

Z.V. Holdings Corporation

# PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

**1881/1883 Merivale Road, Ottawa, Ontario**

February 17, 2023



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# 1 Executive Summary

Arcadis Canada Inc. (Arcadis) was retained by the Z.V. Holdings Corporation to conduct a Phase Two Environmental Site Assessment (ESA) of the properties at 1881 and 1883 Merivale Road (which include 6 and 12 Jamie Avenue) in Ottawa, ON.

Based on a review of Phase One ESA data, this large property had a mixed land uses, including:

**1881 Merivale**= former Ron Engineering office/warehouse/shop from 1981 to 2005 but then was demolished and became vacant land.

**1883 Merivale**= former residential uses from 1966 onwards. Residential home operating as Divers Warehouse commercial use since 1996 to present.

**6 & 12 Jamie Ave**= residential development in 1960s but became school bus parking in the 1970s onward.

The site is located within a mixed commercial/light industrial area. The closest water body is a man-made stormwater pond to the west. The next closest major water body, the Rideau River, is located approximately 1.9 km to the east of the site.

The general regional groundwater flow, based on monitoring well data, is estimated to be flowing to the northeast, towards the Rideau River.

Soil stratigraphy comprised primarily of native silty sand with gravel surfacing found on the Jamie Ave lot and adjacent to the 1883 Merivale building. No bedrock was encountered anywhere on the property, following from 2019 and 2022 drilling operation and is expected at depths greater than 15 m bgs, based on data review from historical water well records.

Soil was investigated through the drilling/sampling of eight (8) boreholes were advanced on the properties in 2019 (with six locations outfitted as monitoring wells). In 2022, an additional nine (9) boreholes were advanced (with three locations outfitted as monitoring wells). Based on the drilling completed, the following observations were made:

- No staining or odours were reported in any of the advanced boreholes.
- Surface soil samples were selected from four boreholes (BH-1, BH-2, MW-2, MW-3) and submitted for laboratory analysis. Two deeper depth soil samples, collected from borehole locations MW-1 and MW-4, were also submitted to the laboratory.
- Soil samples were submitted for analysis of a combination of metals, VOCs, PAHs, PHCs, pesticides/herbicides, pH, conductivity and SAR. Grain size testing was also performed.
- Groundwater samples were collected from each of the six monitoring wells in 2019 and from one well in 2022, following developing. Groundwater samples were submitted to the laboratory for analysis of a combination of metals, PHCs, VOCs, PAHs, pesticides/herbicides.

The laboratory results of all soil analyses for the chosen parameters met applicable MECP Table 3 Site Condition Standards (SCSs).

The laboratory results of all groundwater analyses for the chosen parameters were found to meet applicable MECP Table 3 SCSs.

No further subsurface investigation or remediation is required at this Phase Two ESA property.

## 2 Introduction

Arcadis Canada Inc. (Arcadis) was retained by Z.V. Holdings Corporation to complete a Phase Two Environmental Site Assessment (ESA) at 1881 and 1883 Merivale Road and 6 and 12 Jamie Avenue, in the City of Ottawa, Ontario (the Phase Two Property or Subject Property). The location of the Phase Two Property is shown on Figure 1. The Phase Two Environmental Site Assessment (ESA) investigations were conducted in accordance with Ontario Regulation 153/04 (O.Reg. 153/04, as amended) to support the submission of a Record of Site Condition (RSC).

The Phase Two ESA investigation was undertaken to investigate areas of potential environmental concern (APECs) that were identified in the Phase One ESA completed by Arcadis (2022), to determine the presence/absence of environmental impacts in on-site soil and ground water, to laterally and vertically delineate impacts in soil and ground water (if identified), and to provide areal and vertical coverage of the investigation of the Phase Two property.

### 2.1 Site Description

Information pertaining to the Phase Two Property is provided below:

#### 2.1.1 Municipal address and property identifier number (PIN)

1881 Merivale Rd and 1883 Merivale Rd,  
Ottawa, Ontario

**Property Identification Number (PIN):**

04628-0085 (LT)

**Legal Description:**

PT LT 28, CON A Rideau Front; PT Clarke RD, PL 382, closed by NP51189; PT Pedley ST, PL 382, closed by NP51189; PT LTS 76, 77 & 82, PL 382; LTS

78, 79, 80 & 81, PL 382; AS IN CR444016 except CR487847 and PT 12, 5R11115; description may not be acceptable in future as in as in CR444016; Nepean

**Approximate Area of Phase Two Property:**

14,113 m<sup>2</sup>

#### 2.1.2 Size and boundaries of the Phase Two Property

The subject site is currently occupied by an undeveloped grass field with a graveled school bus parking lot adjacent to the Jamie Ave. property access. Grass covered areas and mature bushes/trees are found on the periphery of the property. The existing ground surface at the site is relatively flat with a gentle slope towards the west.

The site is located in an area of mixed commercial, industrial, and institutional land use. The site boundaries include Merivale Road on the west side, Jamie Avenue from the north side, industrial/commercial properties on the east, and a commercial property to the south. One the west boundary beyond Merivale Road there is a cemetery. The boundaries of the Phase Two Property were established based on a site survey completed by



Fairhall, Moffat and Woodland Ltd, Ontario Land Surveyors, presented in Phase One ESA report, Appendix A. The Phase Two Property comprises an area of approximately 1.4-hectares.

## **2.2 Property Ownership**

The Phase Two Property is currently owned by ZV Holdings, and the contact information is provided below:

**Property Owner:** Z.V. Holdings Corporation

**Property Owner Contact Details:**

Mr. David Young (President)  
1801 Woodward Drive  
Ottawa, Ontario  
K2C 0R3 Canada

## **2.3 Current and Proposed Future Uses**

The site is surrounded by mixed residential and commercial properties. It is located on the east side of Merivale Road and south side of Jamie Avenue in the City of Ottawa, Ontario.

The subject site is currently occupied by an undeveloped grass field with a graveled school bus parking lot adjacent to the Jamie Ave. property access. Grass covered areas and mature bushes/trees are found on the periphery of the property. The existing ground surface at the site is relatively flat with a gentle downslope towards the west.

The proposed new construction includes two raised, one-storey buildings; Building A of 3540 sq m. area and Building B of 3070 sq m area office/warehouse space, across a total site area of 14,113 m<sup>2</sup> under zoning designation IG- General Industrial zone.

## **2.4 Applicable Site Condition Standards**

Generic soil and ground water site condition standards (SCSs) for use at the Phase Two Property were selected from the Ontario Ministry of the Environment, Conservative and Parks (MECP) "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" dated April 15, 2011 (MECP, 2011a), using the approach prescribed by O.Reg. 153/04 (as amended).

The Phase Two Property is not considered an "environmentally sensitive area" as no areas of natural significance were identified within 250 m of the property boundaries (the Phase One Study Area).

The following rationale was considered for the selection of the generic site condition standards applicable to the Phase Two Property:

- The existing and future land use of the Site is considered to be commercial;
- Groundwater in the area of the Site is not used as a potable water supply. The Site and surrounding areas are serviced by the City of Ottawa municipal water supply;
- The nearest water body to the Phase Two Property is a man-made stormwater pond to the west of Cleopatra Drive, located approximately 400 m west to southwest of the Phase One Property.
- Bedrock was not encountered at any of the borehole locations and is expected to be present at depths greater than 15 m bgs;

- Based on the results of laboratory grain size analysis completed on one soil sample collected from the Site, as presented in Table 2, overburden is comprised of coarse-textured soil.

Based on the abovementioned items, the site condition standard for use on the Phase Two Property corresponds to the Industrial/Commercial/Community Property Use in Table 3: Full Depth Generic Site Condition Standards in a non-potable ground water condition with coarse textured soils (MECP 2011a Table 3 SCS).

## 3 Background Information

Background information on the general physical setting for this Phase Two ESA property is provided below.

Bedrock geology mapping for the Site indicates that local bedrock is described as the Rockcliffe Formation comprising shale with lenses of sandstone (Geological Survey of Canada Map 1058A Generalized Bedrock Geology Ottawa, Ontario and Quebec).

The surficial geology mapping referenced describes surface soils as: Deltaic and Estuarine deposits, medium to fine grained sand, in some place fossiliferous; lying outside abandoned channels; most common deposit is a combined strip delta-sand plain that developed as fluvial water levels fell (Geological Survey of Canada Map 1056A Surficial Geology Ottawa, Ontario and Quebec).

Borehole logs and figures from surrounding properties were also referenced for surficial soil geology from records returned in the ERIS Ecolog search. According to the data contained in logs for wells advanced in close proximity to the property, the soils were generally characterized as sand and/or medium sand from surface to a depth ranging from 10.67 to 15.2 metres below ground surface (mbgs) before encountering bedrock.

Regional shallow groundwater may be directed westwards towards surficial water bodies in the Pinhey Forest but it is expected that deep groundwater flow may be in a northeasterly direction towards the Rideau River, based on a review of local topographical features and drainage patterns. Immediate area groundwater flow may be influenced by local features such as the presence of utilities and site facilities.

### 3.1 Physical Setting

#### *i. water bodies and areas of natural significance within the phase one study area*

The subject property is situated in an urban area zoned for commercial land use. The nearest water body is a man-made stormwater pond to the west of Cleopatra Drive, located approximately 400 m west to southwest of the Phase Two Property.

Therefore, no water bodies are located within the Phase Two Property.

No areas of natural significance were identified within the Phase One Study Area and therefore the Phase One Study Area and the Phase Two Property are not considered to be environmentally sensitive under O.Reg. 153/04 (as amended).

#### *ii. the topography and surface water drainage features on the phase two property.*

The subject area is relatively flat and generally level with surrounding grades having an approximate elevation of 91 m asl. Based on site observations and topographic maps, both 1881 and 1883 Merivale properties slope from east to west towards Merivale Road.

Generally, 1883 Merivale Road is at a higher elevation than 1881 Merivale Road, which is at a slightly higher elevation than 6 and 12 Jamie Avenue. Site drainage was not observed, no ditches were observed on either site.

The site surface stormwater would be expected to flow from east to west towards Merivale Road. The regional topography is relatively flat.

## 3.2 Past Investigations

### *i. A summary of any relevant past investigations of the phase two property*

Arcadis reviewed the following environmental reports pertaining to the Phase One Property:

**Arcadis. (2019). 2019 Phase I & II Environmental Site Assessment, 1881 & 1883 Merivale Road and 6 & 12 Jamie Avenue, Ottawa, ON. December 16, 2019.**

A due diligence Phase I ESA was conducted for the site in 2019. Six (6) APECs were identified at the site related to on-site and off-site PCAs:

- APEC 1: Historic operations at northeast portion of 1881 Merivale Road (related to former Bruno Service Station uses);
- APEC 2: Adjacent Property Commercial Vehicle Parking Lot and Fill Soils, northern boundary of 1881 Merivale Road Property;
- APEC 3: Cemetery Leachate, West Portion of 1881 Merivale Road;
- APEC 4: Uncharacterized Fill Material 1883 Merivale Road Parking Lot, West Portion of Property;
- APEC 5: Presence of Historical Fuel Tanks on adjacent property, to the south of 1883 Merivale Road; and
- APEC 6: Wastes Generated on Adjacent Property, east of 1883 Merivale Road

A Phase II ESA was subsequently carried out based on the findings of the initial Phase I ESA. The work program was carried out onsite between August 23 and 27, 2019 and October 15 and 23, 2019. A total of eight boreholes were advanced on the properties in 2019 (with six locations outfitted as monitoring wells).

- No staining or odours were reported in any of the advanced boreholes.
- Surface soil samples were selected from four boreholes (BH-1, BH-2, MW-2, MW-3) and submitted for laboratory analysis. Two depth soil samples, collected from borehole locations MW-1 and MW-4, were also submitted to the laboratory.
- Soil samples were submitted for analysis of a combination of metals, VOCs, PHCs, pesticides, herbicides, pH, conductivity and SAR.
- Groundwater samples were collected from each of the four monitoring wells, following developing. These samples were submitted to the laboratory for analysis of a combination of metals, PHCs, VOCs, PAHs, pesticides and herbicides.

The site soils had been classified as coarse textured in accordance with Ontario MECP guidelines.

Results were compared to the Ontario MECP "Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act".

- No exceedances of the contaminants analyzed in the soil samples were reported.
- The following exceedances were reported in the groundwater samples:
  - The total silver concentration in the sample collected from monitoring well MW-5 was reported at 1.7 µg/L (MECP Table 3 Standard is 1.5 µg/L); and

- The chloroform concentration in the sample collected from monitoring well MW-5 was reported at 2.4 µg/L, equal to the MECP Table 3 Standard guideline. A laboratory duplicate sample reported the result as 2.5 µg/L, above the Standard.
- Following re-sampling to eliminate a bias from sediment effects in the initial samples collected, all groundwater samples re-analyzed then met all the applicable MECP Table 3 Standards for the parameters analyzed, including silver and chloroform. It was Arcadis' opinion that these newest groundwater results were representative of site conditions. No remediation or additional subsurface investigations were recommended following from the 2019 Phase II ESA report.

ii. **documentation of the steps taken to confirm that information or data which are to be used from previous investigations are of adequate quality such that it can be relied upon**

The 2019 Arcadis Phase I/II ESA was conducted in general accordance with O.Reg 153/04. As such, the data and findings of the Phase I/II ESA report are considered to be reliable.

## 4 Scope of Investigation

### 4.1 Overview of Site Investigation

The current Phase Two ESA investigation included the following:

- Prepared a site-specific Health and Safety Plan (HASP) for field activities completed at the Phase Two Property;
- Identified above ground and subsurface utilities on and in the vicinity of the Phase Two Property via private and public utility requests;
- In 2019, drilled eight (8) boreholes in overburden; installed monitoring wells in six (6) boreholes;
- In 2022, drilled nine (9) boreholes in overburden; installed monitoring wells in three (3) boreholes;
- Collected twenty-six (26) soil samples (including duplicates) from the boreholes advanced in the overburden were submitted for laboratory analysis for one or more of BTEX, PHCs F1 to F4, VOCs, metals/ inorganics, pesticides/ herbicides and Poly Aromatic Hydrocarbons (PAHs).
- Submitted six (6) soil samples for Grain Size Analysis- full curve distribution.
- Developed groundwater in six (6) monitoring wells in 2019; and in three (3) monitoring wells in 2022;
- Conducted a survey to record the elevations of the newly installed monitoring wells (old and new) to the local benchmark (i.e. the corner of the house at 1883 Merivale Rd);
- Monitored the depth to ground water at all monitoring wells on the subject property
- Analyzed six groundwater samples (including one duplicate) in 2019 for one or more parameters; including metals, VOCs, PHCs, PAHs, pesticides/ herbicides
- Collected ground water samples from the newly installed 2022 monitoring wells on the Phase Two Property for laboratory analysis of metals;
- Implemented a quality assurance / quality control (QA/QC) program; and
- Interpreted all data and prepared this report.

The Phase Two ESA investigation was conducted in accordance with O. Reg. 153/04 (as amended), the MECP's "Guide for Completing Phase Two Environmental Site Assessments Under O. Reg. 153/04 (MECP, 2011b), the MECP's "Protocol for Analytical Methods Use in the Assessment of Properties under Part XV.1 of the

Environmental Protection Act" (MECP, 2011c) and the MECP's Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario (MECP, 2004).

## 4.2 Media Investigated

**i. *the rationale for whether to include in the field investigation sampling and analysis of each of ground water and sediment on, in or under the phase two property***

Soil and ground water were investigated during the Phase Two ESA investigation since both could be affected by on-site and/or off-site potentially contaminating activities. No sediments are present on the Phase Two Property and sediments were therefore not sampled during the current investigation.

**ii. *an overview of the field investigation of each medium for which sampling and analysis were done***

The 2019 Phase II ESA included soil and groundwater investigations through the drilling eight (8) boreholes in the overburden (with 6 outfitted as monitoring wells) and, in 2022, advancement of /sampling of nine (9) boreholes in the overburden (with 3 outfitted as monitoring wells). Selected soil samples were analyzed for one (1) or more of PHCs F1 to F4, VOCs, PAHs, metals, pesticides/herbicides, EC, SAR, inorganics, and grain size.

Ground water samples were collected from each of 6 wells in 2019 and analyzed for one (1) or more of PHCs F1 to F4, VOCs, PAHs, metals, and pesticides/herbicides. One well in 2022 was sampled and analysed for metals parameters.

## 4.3 Phase One Conceptual Site Model

The Phase One ESA identified the following APECs resulting from either on-site or off-site PCAs.

APEC 1 is associated with the historic operations at the northeast sector of 1881 Merivale Road (former Bruno Service Station & current Jiffy Lube operations beyond property line to northwest), located in the northeastern area of the Phase One Property. COPCs related to APEC 1 include BTEX, PHCs F1-F4, VOCs, and metals.

APEC 2 is associated with the adjacent property commercial vehicle (school bus) parking pot and uncharacterized imported fill, west of 6-12 Jamie Avenue in the western area of the Phase One Property. COPCs related to APEC 2 include BTEX, PHCs F1-F4, VOCs, and metals.

APEC 3 is associated with the historical use of fill material of unknown quality, located in the western portion of the Phase One Property. COPCs related to APEX 3 include PHCs, metals, and pesticides/herbicides.

APEC 4 is associated with the former ASTs for bulk fuel storage on site in the basement of 1883 Merivale Rd. COPCs related to APEC 4 include PHCs F1-F4, BTEX, VOCs, and metals.

APEC 5 is associated with the historical storage, maintenance, fueling, and repair of equipment, vehicles, and material used to maintain transportation systems at 11 Bentley Ave, along the South portion of the Phase One Property. COPCs related to APEC 5 include PHCs F1-F4, BTEX, VOCs, and lead.

APEC 6 is associated with waste generation related to light industrial firms to the east of 1883 Merivale at the addresses of 15, 17 and 21 Bentley Avenue (Frontier Petroleum, Stone Design, Xylem Water Solutions Company). APEC 6 in located in the Southeastern Portion of the Phase One Property, east of 1883 Merivale Rd. COPCs related to APEC 6 include PHCs F1-F4, BTEX, VOCs, PAHs, and metals.

No underground utilities that could affect contaminant distribution and transport were identified on site. It was reported that utilities were all overhead.

Structures known to have been present at one time on the Phase Two Property include:

**1881 Merivale Road:**

- Eastern portion of the Phase Two Property was formerly occupied by a building (Ron Engineering), demolished in 2005.

**1883 Merivale Road:**

- Two-storey dwelling, with a basement at the west portion of the Phase Two Property (now Diver's Warehouse);
- A metal storage container at the east side of the Phase Two Property (storage of diving supplies); and
- A second metal storage container at the southeast corner of the Phase Two Property.

**6 and 12 Jamie Avenue:**

- A small shed on the northwest corner; and
- A metal fence is present at the west, north and east side of the Phase Two Property Jamie Ave. boundary. The site is currently a gravel parking lot used for school bus parking.

No petroleum handling infrastructure including ASTs were observed on the Phase Two Property although the basement of the 1883 Merivale residence did contain a 900L heating oil AST- as listed under APEC 4 above. The former building at 1881 Merivale Road was demolished in 2005. The former residence building at 1883 Merivale is currently occupied by the commercial operation Divers Warehouse Inc., a scuba supply sales operation.

Shallow ground water flow at the site is anticipated to flow to the north and northeast across the Phase Two Property, based on monitoring well static water table measurements.

At the time of the Phase Two ESA, majority of the property was vacant. On-site human receptors currently include site visitors, maintenance workers at the Diver's Warehouse Inc., bus drivers, and construction workers who could be exposed to contaminants present in soils of the Phase Two Property through direct dermal contact and incidental ingestion and inhalation of outdoor vapours.

The approximate locations of the site buildings, and other site features are presented on **Figure 2**. The six (6) APECs, as described this section, are presented on **Figure 3**.

## 4.4 Deviations From Sampling and Analysis Plan

The sampling locations in respect to APECs identified in Phase One ESA is provided in **Figure 3** and was developed based on the requirements of O. Reg. 153/04 (as amended). No deviations from sampling and analysis plan occurred other than BH22-1 was not advanced due to the conflict with continual school bus traffic at this location near the entry to the Jamie Avenue parking area.

## 4.5 Impediments

No impediments were encountered during the Phase Two ESA investigation.

## 5 Investigation Method

### 5.1 General

The Phase Two ESA investigation included borehole drilling and soil sampling in overburden, monitoring well installation, monitoring well development, ground water monitoring and sampling. The field investigations were conducted in accordance with Arcadis' standard operating procedures.

### 5.2 Drilling and Excavating

On September 15 and 16, 2022, 9 boreholes (ie. BHMW22-2, BH22-3, BHMW22-4, BH22-5, BHMW22-6, BH22-7, BH22-8, BH22-9, and BH22-10) were drilled into the Phase Two Property's overburden, with three of these instrumented as monitoring wells. The boreholes were advanced using a truck-mounted mechanical drill rig (specifically a CME-55) and operated by Downing Estate Drilling personnel under the supervision of Arcadis personnel.

The work in 2022 supplemented the 2019 Phase II ESA investigation in which eight (8) boreholes were drilled in overburden and installation of monitoring wells in six (6) of these boreholes. The 2019 boreholes were advanced using GeoMachine100 rig and Geoprobe operated by Strata Drilling Group under the supervision of Arcadis personnel.

Split spoons were advanced into the soil using an automated hammer. Once advanced through the planned sampling interval, split spoons were removed from the borehole and opened for field logging/screening.

Soil samples obtained from the boreholes were collected at different depths. Prior to re-use, all sampling equipment was thoroughly cleaned with soapy water, followed by distilled water rinses to prevent cross-contamination of soil samples.

Samples were logged/screened for 0.2 m interval. Each sample were screened for PHC odour by using an RKI Eagle II combustible gas meter (CGM).

### 5.3 Soil: Sampling

#### *i. a description of all equipment used to collect soil sample*

Upon collection, soil samples were divided for field logging/screening and for possible laboratory analysis. The portions for field logging/screening were placed in sealable plastic bags and logged in the field for soil type, moisture, colour, structure, texture and visual evidence of impact. Headspace vapour readings in the sample bags were measured using an RKI Eagle II combustible gas meter (CGM) equipped with a photoionization detector (PID), operated in methane elimination mode. The RKI Eagle II was calibrated daily in the field to known concentrations of hexane and isobutylene.

Soil samples for laboratory analysis of BTEX, VOCs and F1 PHC were collected in 40 millilitre (mL) clear glass vials equipped with Teflon™ lined caps and containing methanol preservative. Glass vials were provided by the laboratory and pre-charged with a known mass of methanol. Soil samples for the remaining parameters were collected in 120 mL and 250 mL wide mouthed clear glass jars provided by the laboratory. Soil samples for analysis were prepared to minimize the loss of volatile constituents, placed in coolers with ice and delivered to the laboratory.

**ii. a geological description of soil and sediment cores and samples, based on the finalized field logs for each monitoring well, test hole or intrusive investigation point.**

Borehole logs, advanced in overburden, from the Phase Two ESA are provided in **Appendix C**.

Soil encountered at the Phase Two Property generally consists of native fine to medium sand between 0.6 and 5.2 m bgs. Grass and topsoil were observed between 0.0 and 1.2 m bgs at 1881 and 1883 Merivale Rd, while gravel and sand fill was observed at 6 and 8 Jamie Ave between 0.0 and 1.2 m bgs.

Shallow fill materials are expected to be present in the gravel parking lot surrounding the 1883 Merivale site building. Shallow gravel fill was observed in the Jamie Ave. lot as well to 0.3m depth.

Decommissioning of the former workshop/office on 1881 Merivale would have potentially involved use of fill materials. Use of unknown fill is considered a PCA.

According to the data contained in logs for wells advanced in close proximity to the property, generally the soils were characterized as sand and medium sand from surface to at least a depth of 5.6 m bgs.

Soil encountered at the Phase Two Property generally consists of native silty sand, and poorly graded sand from 0.6 mbgs to depth.

Bedrock was not encountered in any of the boreholes advanced in either 2019 or in 2022 across the subject property and drilling at BH22-10 confirmed bedrock was not observed at a depth of 10.67 m bgs. Based on reference to historic water well logs, bedrock is expected to be present at depths greater than 15 m bgs;

## **5.4 Field Screening Measurements**

**i. Make and model number**

Arcadis conducted field screening measurements using an RKI Eagle II portable hand-held CGM and PID. The RKI Eagle II reports soil vapour concentrations in parts per million by volume (ppmv) or as a percentage of the lower explosive limit of equivalent hexane and isobutylene vapour (%LEL). The readings were taken by placing the end of the intake tube of the monitor into the headspace of the bagged soil samples while the soil was gently broken up and manipulated. Recorded values correspond to the maximum reading attained.

**ii. Chemicals the equipment can detect and associated detection limits**

In CGM mode, the RKI Eagle II detects petroleum hydrocarbon vapours and other explosive vapours at concentrations ranging from 25 parts per million by volume (ppmv) to greater than 100% of the lower explosive limit (>100% LEL). In PID mode, the RKI Eagle 2 detects volatile organic chemicals at concentrations ranging from 2 ppmv to 15,000 ppmv.

When in CGM mode, the RKI Eagle II as operated in methane elimination mode, a mode which reduces false positive readings relating to the presence of methane gas in sample vapours.

**iii. Precision of the measurements**

The precision of the RKI Eagle II is 5% of the span calibration.

**iv. Accuracy of the measurements**

The accuracy of the RKI Eagle II CGM is  $\pm 5\%$  of the reading, or  $\pm 2\%$  LEL, whichever is greater when measuring in the %LEL range. Within the ppmv range, the accuracy is  $\pm 25$  ppmv or  $\pm 5\%$  of the reading, whichever is greater.



The detection limit of the RKI II PID is approximately 2 ppmv. The accuracy of the PID between 10 and 2,000 ppmv is  $\pm 3\%$  LEL at the calibration point when using isobutylene as the calibration gas. The PID has a resolution of 0.1 ppmv for VOCs in the range of 2 to 999.0 ppmv and a resolution of 1 ppmv for VOCs in the range of 1,000 to 15,000 ppmv.

**v. Calibration reference standards such as span gas**

The RKI Eagle II CGM was calibrated to known concentrations of hexane (400 ppmv). The RKI Eagle II PID was calibrated to known concentrations of isobutylene (100 ppmv).

**vi. Procedures for checking calibration of the equipment.**

Calibration of the CGM/PID detector was checked daily in the field using known concentrations of hexane and isobutylene. Hexane and isobutylene were passed through the detector at a constant flow rate. Detector response was adjusted where required and only if response was less than  $\pm 20\%$  of the target concentration. Where response was greater than  $\pm 20\%$  of the target concentration, the meter was taken out of service for detailed maintenance and recalibration.

Generally, soil samples exhibiting the highest CGM/PID readings were selected for laboratory analysis. Other field observations including the presence of staining and odours were also used to guide sample selection for analysis.

Field screening methods followed the proposed procedure. Soil samples collected for field logging/screening were placed in sealable plastic bags and logged in the field for soil type, moisture content, colour, structure, texture and visual evidence of impact by petroleum hydrocarbons. Maximum headspace vapour readings in the sample bags were measured using the RKI Eagle II. Soil samples selected for laboratory analysis generally corresponded to the samples with the highest field screening measurements.

## 5.5 Ground Water: Monitoring Well Installation

**i. the name of the contractor**

Three (3) monitoring wells were installed by Downing Estate Drilling on September 15th and 16th, 2022. Drilling and monitoring well installation conducted in 2019 was completed by the Strata Drilling Group. All wells were installed under direct supervision of Arcadis field personnel.

Well construction details are provided on borehole logs presented in **Appendix C** and on the Table 1 Groundwater Monitoring spreadsheet. Newly installed monitoring wells were registered with the MECP as a cluster in accordance with O.Reg. 903 (as amended). The MECP Well Records are provided in **Appendix D**.

All of the six monitoring wells installed by Arcadis in 2019 (including MW-1 to MW-6) were decommissioned in accordance with O.Reg. 903 in January 2020.

**ii a description of the equipment used**

Monitoring wells were constructed using 5.1 cm inside diameter (I.D.), flush threaded polyvinyl chloride (PVC) well screen and solid riser. A 3.1 m long well screen was installed in each of the boreholes. The base of each well screen was equipped with a tight-fitting slip cap. Monitoring wells were completed with a solid riser. A silica sand filter pack was placed in the borehole annulus around each well screen to approximately 0.1 to 0.3 m above the top of the screen. A bentonite holeplug seal was placed in the borehole annulus above the sand pack to a depth of approximately 0.1 to 0.3 m bgs to prevent infiltration of surface water. Each monitoring well was completed with a flush-mount protective casing.

**iii. a description of the measures taken to minimize the potential for cross-contamination**

Monitoring wells were installed within hollow-stemmed augers to prevent cross contamination within the borehole. Only clean, new materials were used for well construction including PVC well materials, silica sand, and bentonite. The riser pipes and well screens were delivered to the Phase Two Property pre-washed and packed in sealed polyethylene bags where they remained until use. Well materials were only handled using clean, single use vinyl gloves to prevent cross-contamination of materials during installation.

**iv. the frequency of sample collection during drilling, if any**

No ground water samples were collected during drilling.

**v. Provide a description of the methods used to develop monitoring wells**

Monitoring wells were developed to remove foreign materials potentially introduced during drilling and to improve the hydraulic connection of the well to the soil formation.

Monitoring wells were developed using dedicated Waterra tubing and footvalves and were purged of approximately three (3) well volumes (calculated as the volume of standing water in the well casing) or purged dry three (3) times.

## **5.6 Ground Water: Field Measurement of Water Quality Parameters**

Prior to all groundwater sampling, water was purged from each monitoring well and water temperature, conductivity, pH, dissolved oxygen (DO) and oxidation reduction potential (ORP) were measured using a Horiba U-52 multi-parameter meter until successive readings (measured approximately 60 seconds apart) were consistent to within  $\pm 10\%$ .

Purging at the monitoring wells was accomplished using a Geopump portable peristaltic pump. Ground water was purged from the wells through dedicated 6.4 mm LDPE tubing. The pump intake was lowered slowly into the water column to minimize mixing of ground water and the intake was positioned at approximately the centre of the saturated screened interval. The pump outlet was connected to an in-line flow-through cell system to allow continuous monitoring of the geochemical parameters in the ground water during purging.

## **5.7 Ground Water: Sampling**

Once ground water quality parameters had stabilized, ground water samples were collected using dedicated LDPE tubing and the Geopump peristaltic pump.

Ground water samples for laboratory analysis of BTEX, VOCs and F1 PHCs were collected (with zero headspace) in laboratory supplied 40 mL glass vials equipped with Teflon lined caps and containing sodium bisulphate ( $\text{NaHSO}_4$ ) preservatives. Ground water samples for laboratory analysis of F2 to F4 PHCs, and PAHs were collected in laboratory supplied 250 mL amber glass bottles containing  $\text{NaHSO}_4$  preservatives. Ground water samples for analysis of metals were field filtered using 0.45 micrometre ( $\mu\text{m}$ ) in-line disposable filters and collected in laboratory supplied 120 mL plastic bottles containing nitric acid ( $\text{HNO}_3$ ) preservatives. Ground water samples for analysis of inorganics were collected in laboratory supplied 500 mL plastic bottles with no preservative. Samples for analysis were prepared to minimize the loss of volatile constituents, placed in coolers with ice and delivered to the laboratory.

In 2019, groundwater samples from all six monitoring wells were submitted to BVL for analysis of a combination of metals, VOCs, PAHs, PHCs, pesticides and herbicides.

In 2022, the single groundwater sample (MW22-2) was submitted to ALS Environmental Group for analysis for metals concentrations. The other two monitoring wells installed in 2022 were dry at the time of sampling.

## 5.8 Sediment: Sampling

No sediment sampling was completed during the Phase Two ESA investigation completed at the Phase Two Property as no sediment is present on the Phase Two Property.

## 5.9 Air: Sub-Slab Vapour Probe Installation

No Sub-Slab Vapour Probe Installation was performed during the Phase Two ESA investigation completed at the Phase Two Property as sub-slab vapour was not anticipated as a contaminant exposure pathway for this Phase Two Property.

## 5.10 Air: Sub-Slab Vapour Sampling

No Sub-Slab Vapour Sampling was conducted during the Phase Two ESA investigation completed at the Phase Two Property as sub-slab vapour was not anticipated as a contaminant exposure pathway for this Phase Two Property.

## 5.11 Analytical Testing

Soil and ground water samples collected during this Phase Two ESA in 2022 were analysed by:

ALS Environmental Group (ALS)  
60 Northland Road, Unit 1  
Waterloo, ON N2V 2B8

ALS is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) and the Standards Council of Canada (SCC).

Soil and ground water samples collected during the prior 2019 Phase II ESA were analysed by:

Bureau Veritas Group (BV)  
36 Antares Dr Unit 100, Nepean, ON K2E 7W5

BV is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) and the Standards Council of Canada (SCC).

## 5.12 Residue Management Procedures

### *i. soil cuttings from drilling and excavations*

Soil cuttings generated during drilling in 2022 were negligible in quantity. All excess soil cutting were replaced into the boreholes as backfill.

**ii. water from well development and purging**

Ground water from well development and purging was placed in 4 x 20L pails. On November 18, 2022, the pails were consolidated and placed into one 200L drum which was removed from the Phase Two Property by Drain-All, a licensed company for waste management.

The HWIN information and Waste manifest are attached in **Appendix G**.

**iii. fluids from equipment cleaning**

Fluids from equipment cleaning were soaked up in paper towels and the towels were disposed as non-hazardous, solid industrial waste.

## 5.13 Elevation Surveying

An elevation survey was conducted by Arcadis personnel on September 29<sup>th</sup>, 2022 relative to a site benchmark (elev. of the North East corner of the house at 1883 Merivale Road). All of the monitoring wells, which were sampled under the current study, were surveyed relative to this common benchmark. A Topcon RL-H3C laser auto survey level was used to gather survey data. The elevations obtained from the new installed and existing functional wells along with other ground water monitoring information are shown on Table 1. In 2019, the same equipment and benchmark was used to survey in tops of all six monitoring wells advanced.

## 5.14 Quality Assurance and Quality Measures

**i. a description of sample containers, preservation, labelling, handling and custody for samples submitted for laboratory analysis, including any deviations from the sampling and analysis plan**

During the current Phase Two ESA investigation, all soil and ground water samples for laboratory analysis were collected in accordance with the SAP and in appropriate containers provided by the laboratory, and where appropriate, containing preservatives, as described above (**Sections 5.3 and 5.7**).

Disposable nitrile gloves were worn when handling sampling tools and samples and gloves were replaced after handling each sample.

Sample containers were labelled with the unique sample identifiers written on the sample container and on the laboratory Chain-of-Custody (CofC) which was submitted to the laboratory with the samples for documentation and tracking purposes.

Upon filling and labelling each sample container, containers were wrapped in protective bubble wrap and placed immediately in a cooler equipped with ice to lower and maintain sample temperatures at less than 10 degrees Celsius (°C) during sample shipping. Coolers were sealed with signed Custody Seals and were delivered to the laboratory.

Laboratory QA/QC measures included analysis of laboratory control samples, replicate samples, method blank samples, spiked method blank samples, evaluation of surrogate recoveries, and the use of analytical methods consistent with MECP requirements.

Field and laboratory duplicate analyses were evaluated by calculating the relative percent difference (RPD) using the following formula for calculating RPDs:

$$\text{RPD} = \frac{|X1 - X2|}{X_{\text{avg}}} \times 100$$

where, X1 and X2 are the measured concentrations of the duplicate pairs and  $X_{\text{avg}}$  is the mean of these two values. Results for duplicate analyses of field duplicate samples were considered acceptable where RPD values were <100% for soil duplicate analyses and <50% for water duplicate analyses, consistent with common industry practices.

**ii. a description of equipment cleaning procedures followed during all sampling**

To prevent cross-contamination during soil and ground water sampling activities, non-dedicated sampling equipment (i.e. water level tape, etc.) was washed after each use with distilled water and Alconox® detergent and rinsed with distilled water. Disposable nitrile gloves were worn when handling tools and samples and gloves were replaced prior to the next sampling activity.

**iii. a description of how the field quality control measures referred to in subsection 3(3) were carried out. Specifically, subsection 3(3) requires that:**

**a. All non-dedicated sampling and monitoring equipment must be cleaned following each use**

Non-dedicated sampling equipment was rinsed with distilled water and Alconox® detergent between sample locations.

**b. Where ground water samples are to be analysed for volatile organic compounds, one trip blank sample shall be submitted for laboratory analysis with each laboratory submission**

As part of the QA/QC program during the ground water sampling, one (1) field duplicate sample was submitted with laboratory submissions, for laboratory analysis of VOCs. No trip blanks were submitted in the 2019 sampling program.

**c. Specification of the minimum requirements for the number, type and frequency of field quality control measures including trip blanks, field duplicates, and calibration checks on field instruments**

During the 2019 investigation, twenty-six (26) soil samples were submitted for analyses and included one duplicate for each parameter set of analyses. One field blind duplicate soil sample was submitted with the eight samples analyzed for metals/inorganic; for VOC and for PHC sample submittals.

Field duplicate soil and ground water samples were generally collected at a frequency of one (1) duplicate sample for every ten (10) analysed soil and ground water samples.

The calibrations of field instruments were checked daily.

**d. Sufficient field duplicate samples shall be collected in each medium being sampled, so that at least one field duplicate sample can be submitted for laboratory analysis for every ten samples submitted for laboratory analysis**

Twenty six (26) soil samples including one (1) blind field duplicate soil sample was analysed during the boreholes (overburden) program for one (1) or more of PHCs, VOCs, and metals. This soil field duplicate analysis frequency of greater than 10% was considered to be adequate.

Additionally, 6 soil samples for grain size analysis. No duplicate was submitted for grain size analyses.

Six (6) ground water samples including one (1) field duplicate were analyzed for one (1) or more of PHCs, VOCs, PAHs, metals, and pesticides and herbicides. No trip blank was submitted with the VOC testing package. Otherwise, the ground water field blind duplicate analysis frequency is adequate.

**e. At least one field duplicate sample shall be submitted for laboratory analysis for every ten samples submitted for laboratory analysis.**

Twenty six (26) soil samples including one (1) blind field duplicate soil samples were analysed during the boreholes (overburden) program for one (1) or more of PHCs F1 to F4, VOCs, and metals/ inorganics. The soil field duplicate analysis frequency is adequate and meets the 10% submittal requirement.

Seven (7) ground water samples including one (1) field duplicate were analysed for one (1) or more of PHCs, VOCs, and metals/inorganics. The ground water field duplicate analysis frequency is adequate and meets the 10% submittal requirement.

**iv. a description of, and rationale for, any deviations from the procedures set out in the quality assurance and quality control program set out in the sampling and analysis plan.**

The objectives of the QA/QC program set out in the SAP were met during the Phase Two ESA investigation.

## 6 Review and Evaluation

Boreholes and monitoring wells locations are provided on **Figures 2**. Ground water elevations measured are presented in **Table 1** and are also shown on **Figure 6**.

Particle Size Analysis (PSA) results are summarized and presented in **the particle size distribution curves available in Appendix B**. Chemical analytical results of soil samples collected during the Phase Two ESA are summarized in **Tables 1 to 11**.

Chemical analytical results of soil samples collected during the Phase Two ESA are summarized in **Tables 2 to 6**. Chemical analytical results of ground water samples collected during the Phase Two ESA are summarized in **Tables 7 to 11**.

Analytical results of soil and ground water samples collected during this Phase Two ESA are summarized in **Figure 4** for soil and **Figure 5** for ground water. Groundwater contours and inferred flow direction is shown on **Figure 6**. Geological and hydrogeological cross-sections are provided on **Figures 7 and 8**. The Phase Two Conceptual Site Model is provided on **Figure 9**. Contaminant pathways related to Human Health and Ecological Receptors are shown on **Figures 10 and 11**.

No exceedances of Table 3 SCSs were identified in soil or groundwater. **Table 12 and 13** portray maximum concentrations of COCs in analysed soil and groundwater samples; no exceedances were identified in either soil or groundwater. No TCLP testing was conducted as all soils met applicable SCSs.

### 6.1 Geology

**i. estimated thickness of each geologic unit**

The Phase Two Property contains of overburden with bedrock location anticipated at greater than 15 m bgs. Eastern portion of the Phase One Property was formerly occupied by a building (Ron Engineering), demolished in 2005.

Bedrock geology mapping for the Site indicates that local bedrock is described as the Rockcliffe Formation comprising shale with lenses of sandstone (Geological Survey of Canada Map 1058A Generalized Bedrock Geology Ottawa, Ontario and Quebec).

The surficial geology mapping referenced describes surface soils as: Deltaic and Estuarine deposits, medium to fine grained sand, in some place fossiliferous; lying outside abandoned channels; most common deposit is a combined strip delta-sand plain that developed as fluvial water levels fell (Geological Survey of Canada Map 1056A Surficial Geology Ottawa, Ontario and Quebec).

Borehole logs and figures from surrounding properties were also referenced for surficial soil geology from records returned in the ERIS Ecolog search. According to the data contained in logs for wells advanced in close proximity to the property, the soils were generally characterized as sand and/or medium sand from surface to a depth ranging from 10.7 to 15.2 metres below ground surface (mbgs) before encountering bedrock.

Regional shallow groundwater may be directed westwards towards surficial water bodies in the Pinhey Forest but it is expected that deep groundwater flow may be in a northeasterly direction towards the Rideau River, based on a review of local topographical features and drainage patterns. Immediate area groundwater flow may be influenced by local features such as the presence of utilities and site facilities.

The soil encountered at the Phase Two Property generally consists of top soil, grass, and clayey silt from ground surface to 0.0-0.6 m bgs, and silty sand / sandy silt is expected from 0.6 to the bedrock surface which is anticipated at depths greater than 15 m bgs. Fill material (sand and gravel) was generally encountered in the northern portion, and top soil, grass and native soils were present at the southern portion of the Phase Two Property. Bedrock was not encountered at site at any of the boreholes advanced, the deepest of which extended to a depth of 10.67 bgs.

Geologic unit thicknesses are estimated below:

Geologic Unit	Minimum Depth Encountered (m bgs)	Maximum Depth Encountered (m bgs)	Maximum Thickness (m)
Grass/Topsoil	0.0	0.6	0.6
Sand/Gravel (Fill)	0.0	1.2	1.2
Silt with sand	0.6	1.8	1.2
Silty Sand/ Sandy Silt	0.3	10.67	Not known
Bedrock	Not encountered	Not encountered	>10 expected

**ii. elevations, relative to a geodetic benchmark or other permanent and recoverable benchmark, of the top and bottom of each geologic unit**

Elevations of each geologic unit relative to the site benchmark (elevation of the top of the concrete NE corner of the residential building used as the Diver's Warehouse, which was assigned an elevation of 100.00m) are presented in the cross sections provided as **Figures 7 to 8**.

**iii. geological and other material in each geological unit**

Geological units are described above, in the borehole logs (**Appendix C**), and in the geological cross sections provided as **Figures 7 and 8**.

**iv. the properties of each aquifer and aquitard**

As shown on **Figures 7 to 8**, and in the borehole logs (advanced into the overburden) provided in **Appendix C**, ground water was encountered in shallow overburden in a predominant silty sand soil. The anticipated average hydraulic gradient was calculated at 0.0063 m/m. There is only expected to be one aquifer present above the

bedrock surface, from which all shallow groundwater samples were obtained. Depths to the static groundwater table ranged from 4.77 to 5.64 m bgs.

**v. *the rationale for the choice of aquifers and aquitards investigated as it relates to identification of the location, presence, release, concentration, migration or retention of a contaminant***

On-site PCAs (resulting in APEC 1 to APEC 6) which may be impacting the Phase Two Property include the potential for VOC and PHC impacted ground water reported by others, bulk storage and former ASTs. Impacts from these APECs may potentially migrate from/through shallow soils and would be expected to be detected in shallow groundwater. Thus, potential impacts to on-site soil and ground water conditions arising from current or historical on-site PCAs were therefore investigated from grade to the maximum depth of potential impact as indicated by field and analytical observations.

The condition of groundwater on the Subject Property was evaluated in the current Phase Two ESA after installation of nine (9) monitoring wells (i.e. MW1 through MW6 and MW22-1 through MW22-3) with screen lengths of 3m and screen intervals ranging from 2.14 m bgs minimum and extending to a maximum of 7.6 m bgs. Thus, the presence of impacts was evaluated in this Phase Two Property.

## 6.2 Ground Water: Elevations and Flow Direction

**i. *a discussion of, and rationale for, locations and screened intervals of monitoring wells used for interpretations of ground water flow direction***

Borehole drilling and groundwater monitoring well installation was conducted on August 23<sup>rd</sup>, 2019 (four MWs) and on October 15<sup>th</sup>, 2019 (one MW), and October 21<sup>st</sup>, 2019 (one MW). In total, eight (8) boreholes were drilled and six (6) monitoring wells were installed within and around the APECs. Numbers and locations of monitoring wells selected in such way to enable a precise interpretation of ground water flow direction. Locations of the monitoring wells are presented in **Figure 2**.

Ground water monitoring and sampling was conducted on August 27<sup>th</sup>, 2019 (MW-1 to MW-4) and on October 23<sup>rd</sup>, 2019 (MW-5 and MW-6) for all new monitoring wells on the Phase Two Property. These monitoring wells were then decommissioned in January 2020.

Borehole drilling and groundwater monitoring well installation was again conducted on September 15 – 16<sup>th</sup>, 2022. In total, nine (9) boreholes were dug and three (3) monitoring wells were installed within and around the APECs. Locations of the new monitoring wells are also presented in **Figure 2**. Ground water monitoring and sampling was conducted on October 11, 2022 for all new monitoring wells on the Phase Two Property. Only MW22-2 could be sampled, the other newly installed wells (MW22-4 and MW22-6) were dry and did not contain sufficient groundwater for sampling.

Although ground water levels were measured in different events (i.e. August 27, 2019, and October 16<sup>th</sup> and 22<sup>nd</sup>, 2019), ground water elevations measured on October 22<sup>nd</sup>, 2018 were used when interpreting the shallow horizontal ground water flow direction presented on **Figure 5**. Groundwater water was shown to flow in a north-easterly direction, based on a review of static water levels encountered.

Monitoring well MW-1 was installed to a depth of 7.62 m bgs with screened interval of 4.4 to 7.62 m bgs. and MW-2 to MW-5 were installed at depths ranging from 6.1 to 6.4 m bgs with screened interval of 3.0 to 6.4 m bgs. Monitoring wells MW22-2, MW22-4, and MW22-6 were installed to a depth of 5.14 to 5.55 m bgs with typical screened intervals of 2.14 to 5.55 m bgs.



**ii. results of any measurements taken using an interface probe during water level measurements**

Ground water monitoring was completed on August 26 & 27<sup>th</sup>, 2019, September 24, 2019, October 22, 2019, and on October 11, 2022.

Monitoring activities included measuring the depth to any free phase product and measuring the depth to ground water at each monitoring well location. Ground water monitoring results (monitored and measured in different occasions) are summarized in **Table 1**. The depths to ground water were measured using a Heron Instruments interface probe, relative to the top of casing.

On August 26 & 27, 2019, depths to ground water in the monitoring wells ranged from 4.59 m bgs at MW-1 to 5.47 m bgs at MW-2, and ground water elevations ranged from 94.01 meters above local datum (M ald) at MW-2 to 94.43 m ald at MW-4.

On September 24, 2019, depths to ground water in the monitoring wells ranged from 5.18 m bgs at MW-4 to 6.38 m bgs at MW-2, and ground water elevations ranged from 93.96 m ald at MW-2 to 94.25 m ald at MW-4.

On October 23, 2019, depths to ground water in the monitoring wells ranged from 5.29 m bgs at MW-4 to 6.50 m bgs at MW-3, and ground water elevations ranged from 93.85 m ald at MW-2 to 94.43 m ald at MW-5.

On October 11, 2022, depth to ground water in monitoring well MW22-2 was 4.85 m bgs. Ground water was not present in MW22-4 or MW22-6 at this time.

**iii. measurement of the thickness of any free flowing product present in monitoring wells**

No free flowing or free phase product was observed in any of the ground water monitoring wells. No indication of a sheen was noted.

**A description of the method used to calculate ground water elevation in the monitoring well**

The ground water elevations at each newly installed monitoring well were established by subtracting the measured depth to water from the ground surface elevation at each location. Ground surface elevations at these locations were established relative to a local datum (top of the concrete NE corner of the residential building used as the Diver's Wearhouse was assigned an elevation of 100.00m) using standard surveying techniques.

**i. a description of the ground water elevations from all monitoring events in any aquifer investigated**

Measured ground water elevations are reported in **Table 1**.

On August 26 & 27, 2019, depths to ground water in the monitoring wells ranged from 4.59 m bgs at MW-1 to 5.47 m bgs at MW-2, and ground water elevations ranged from 94.01 meters above local datum (M ald) at MW-2 to 94.43 m ald at MW-4.

On September 24, 2019, depths to ground water in the monitoring wells ranged from 5.18 m bgs at MW-4 to 6.38 m bgs at MW-2, and ground water elevations ranged from 93.96 m ald at MW-2 to 94.25 m ald at MW-4.

On October 23, 2019, depths to ground water in the monitoring wells ranged from 5.29 m bgs at MW-4 to 6.50 m bgs at MW-3, and ground water elevations ranged from 93.85 m ald at MW-2 to 94.43 m ald at MW-5.

On October 11, 2022, depth to ground water in monitoring well MW22-2 was 4.85 m bgs. Ground water was not present in MW22-4 or MW22-6 at this time.

**ii a description of the interpreted direction of ground water flow at the phase two property.**

The horizontal ground water flow direction on the Phase Two Property is inferred to be towards the northeast (**Figure 5**). Ground water elevations measured in October 2019 were used to generate the ground water elevation contours and interpret the direction of ground water presented in the Figure.

**iii assessment of the potential for temporal variability in ground water flow direction.**

There is potential for some temporal variability in ground water flow direction as ground water elevations at the Phase Two Property may fluctuate with seasonal conditions. However, the Rideau River, present east of the Phase Two Property, acts as a natural drainage outfall and ground water may be inferred to logically flow towards this natural drainage outfall.

**iv an evaluation and description of the potential interaction between any buried utilities in or under the phase two property and the water table.**

Before drilling the 2019 and 2022 boreholes/monitoring wells, Arcadis subcontracted USL-1 Underground Service Locators Inc. (USL-1) and received a report concerning the presence/absence of public and private buried utilities. Locates documents indicated that there are no communication lines, gas and hydro utilities buried on the Phase Two Property.

## 6.3 Ground Water: Hydraulic Gradients

**i a description of the horizontal hydraulic gradient for each aquifer investigated, including minimum, maximum and average horizontal hydraulic gradients**

Based on the ground water elevations presented on **Figure 6** (measured on October 22, 2019), the hydraulic gradient between monitoring wells MW-1 and MW-4 was calculated to be 0.0047 m/m and between monitoring wells MW-3 and MW-6, 0.0079 m/m with an average horizontal gradient of 0.0063 m/m.

With assumption of  $K=1 \times 10^{-6}$  m/s for a silty sand with a porosity of 0.3, horizontal ground water flow velocity was calculated at approximately:

$$(0.015 \times 10^{-6}) / 0.3 = 4.8^{-8} \text{ m/s} = 1.5 \text{ m/year}$$

**ii a description of vertical hydraulic gradients in aquifers where a contaminant is present at a concentration greater than the applicable site condition standard for the contaminant, including minimum, maximum and average vertical hydraulic gradients.**

Vertical ground water gradient was not calculated as no contaminants were detected following from soil and groundwater analyses for the Phase Two ESA Property.

## 6.4 Fine-Medium Soil Texture

**i a rationale for the use of the fine-medium soil texture category**

During the Phase Two ESA investigation, grain size analyses were performed on two samples as part of the 2019 study. The samples confirmed that a coarse-grained condition was applicable to this site. In 2022, six (6) soil samples collected from different locations across the Phase Two Property in different depths. Based on a review of the six soil samples, the overall site was classified as having a coarse-grained soil texture.

Borehole	Sample Depth (m bgs)	Classification
BH22-3	1.20	67% <0.075 mm (Silty sand, Fine grained)
BH22-4	1.20	69% >0.075 mm (Coarse textured soil.)
BH22-5	0.60	48% <0.075 mm (Sand-Silt, trace clay- Coarse textured.)
BH22-6	0.60	79% >0.075 mm (Coarse textured soil.)
BH22-7	2.40	84% >0.075 mm (Coarse textured soil.)
BH22-10	1.20	62% <0.075 mm (Silty-Clay Soil= medium-fine texture.)

It was assessed that at least 1/3 of the soil at the Phase Two Property, measured by volume, consists of coarse textured soil and, as such, the coarse textured SCSs were applied.

Grain Size Analyses and Particle Size Distribution Curves are presented in **Appendix B**. Locations of the soil samples collected for PSA and grain size distribution table are presented in **Figure 2**.

**ii. a description of the results of the required grain size analysis**

Results of grain size analyses performed during the Phase Two ESA are summarized in **Appendix B**.

Grain size analyses completed during this Phase Two ESA identified on-site soils as coarse textured in accordance with O.Reg. 153/04 (as amended).

**iii. a description and rationale for the number of samples collected and analysed.**

During this 2022 Phase Two ESA investigation, six (6) representative soil samples have been analysed to determine grain size distributions. These soil samples were collected from the native soil at different depths from 0.60 to 2.40 m bgs. Three out of six soil samples were classified as coarse textured. All samples from the 2019 study found site soils to be classified as coarse-grained materials.

These sample intervals were selected to be representative of the main stratigraphic units encountered during drilling.

## 6.5 Soil: Field Screening

Field screening results for borehole and test pit soil samples are summarized in the borehole logs provided in **Appendix C**. Soil headspace vapour concentrations measured on borehole. No staining or odours were reported during the advancement of the boreholes. All soils samples collected reported OVM readings between 0 and 170 ppm, with the highest concentration noted at MW-1.

## 6.6 Soil Quality

### *i. locations and depths of samples*

The locations of soil samples analyzed during this Phase Two ESA investigation, are summarized on **Figure 4**. Sample depths are shown in the borehole logs provided as **Appendix C** and are also presented in **Tables 2 to 6**.

### *ii. comparison of analytical results to applicable site conditions standards*

Certificates of Analyses for soil samples analysed during this Phase Two ESA investigation are provided in **Appendix E**. Results of analyses for analysed soil samples are summarized in **Tables 2 to 6 and on Table 12** and the applicable MECP 2011a Table 3 SCS is provided for comparison.

All soil samples analyzed met the applicable MECP Table 3 Standards for the parameters analyzed.

Concentration of metals, VOCs, PHCs, PAHs, pesticides and herbicides in all analysed soil samples met the applicable MECP 2011a Table 3 SCS

### *iii. contaminants of concern*

Contaminants of concern in soil on the Phase Two Property include metals, VOCs, PHCs, PAHs, pesticides and herbicides.

No contaminants of concern were confirmed from the laboratory testing, all soil analyzed met the applicable MECP Table 3 SCS for the parameters analyzed.

### *iv. contaminants related to chemical and biological transformations that have or may have occurred*

Some VOCs can degrade through biological transformations (e.g. tetrachloroethylene to trichloroethylene). VOC analyses included a review for parent and daughter breakdown products. No parent/daughter contaminants were identified in the analysed soil samples. No elevated concentrations of tetrachloroethylene or trichloroethylene were observed in the sample results.

Soil analytical results suggest that soil impacts may serve as a source of contaminant mass and could contribute to ground water impacts. Ground water was analysed for the contaminants of concern identified for soil.

### *v. whether the results indicate the presence of light or dense non-aqueous phase liquids.*

No evidence of LNAPL was observed at any of MW-1 to MW-6 during the August and October 2019 monitoring events. Concentrations of remaining contaminants of concern were below their respective free phase product formation thresholds.

## 6.7 Ground Water Quality

### *i. locations and sample depth interval of samples*

Monitoring well construction details are provided in Borehole Logs, presented in **Appendix C**. Monitoring well locations are shown on **Figure 2**.

**ii. documentation of any field filtering**

Ground water samples collected for analysis of metals were field filtered using in-line disposable 0.25 µm filters. Ground water samples for the remaining analyses parameters (ie. VOCs or PAHs) were not field or laboratory filtered.

**iii. comparison of analytical results to applicable site conditions standards**

Certificates of Analyses for ground water samples analysed during this Phase Two ESA investigation are provided in **Appendix F**. Results of analyses for analysed ground water samples are summarized in **Tables 7 to 11 and on Table 13** and the applicable MOECC 2011 Table 3 SCS are provided for comparison.

All ground water samples analyzed met the applicable MECP Table 3 Standard for the parameters analyzed. A summary of the ground water soil analytical results is provided in **Tables 7 through 11**, located at the end of this report.

**iv. contaminants of concern**

Contaminants of concern in ground water on the Phase Two Property include PHCs, VOCs, metals, PAHs, and pesticides/herbicides.

No contaminants of concern were observed following from laboratory testing as all groundwater samples met the applicable MECP Table 3 Standards for the parameters analysed.

**v. contaminants related to chemical and biological transformations that have or may have occurred**

Some VOCs can degrade through biological transformations (e.g. tetrachloroethylene to trichloroethylene to cis/trans-1,2-dichloroethylene to 1,1-dichloroethylene to vinyl chloride). No contaminants were identified in the analysed ground water samples, which may have occurred as a chemical or biological transformation. No elevated tetrachloroethylene or trichloroethylene concentrations were identified in sample results.

**vi. whether the results indicate soil serves as a source of contaminant mass contributing to ground water or sediment**

The groundwater results did not show any elevated contaminant concentrations and, as such, it was determined that the soil does not serve as a source of contaminated mass contributions.

**vii. whether the results indicate the presence of light or dense non-aqueous phase liquids.**

No light or dense non-aqueous phase liquid was observed after completion of four (4) ground water monitoring events, occurring between August 2019 and October 2022. Only a slight sheen was observed in MW22-2 during the October 2022 sampling event.

## 6.8 Sediment Quality

No sediment sample was collected as no sediment is present on the Phase Two Property.

## 6.9 Sub-Slab Vapour Quality

No sub-slab vapour was collected, as the site is primarily vacant and no detectible VOC concentrations were detected in site soils or groundwater at the Phase Two Property.

## 6.10 Quality Assurance and Quality Control Results

### *i. a description of the types of quality control samples collected and results of any other quality assurance and quality control measures taken during the field investigation*

During the Phase Two ESA investigation, quality control samples collected by Arcadis during soil sampling included one (1) blind field duplicate soil sample for laboratory analysis of one (1) or more of F1 to F4 PHCs, VOCs, PAHs, and metals. Quality control samples collected by Arcadis during ground water sampling included one (1) blind field duplicate for laboratory analysis of BTEX, F1 to F4 PHC, VOCs, PAHs, and metals.

Blind field duplicate soil and ground water samples were collected generally at a frequency of 1 in 10 analysed samples. Laboratory QA/QC measures included analysis of laboratory control sample (LCS), method blank, laboratory duplicate sample and matrix spike samples.

The results of field duplicate soil and ground water analyses conducted during this Phase Two ESA are summarized in **Tables 2 to 11**. The results of other laboratory QA/QC analyses and the relative percent difference (RPD) calculations for laboratory duplicate analyses are provided in the Laboratory Certificates of Analysis (**Appendices E and F**). The results of RPD calculations for field duplicate soil and ground water samples indicated that all RPD (%) were less than the applicable alert limits discussed in Section 5.14.

The results of QA/QC analyses were acceptable. In general, a calculated RPD of 50% or less is considered acceptable for soils. As shown in the tables, the primary/duplicate pairs for all analytes had a calculated RPD below the 50% alert limit. As such, Arcadis considers that the results of the QA/QC analysis demonstrate that soil samples are representative of the site conditions at the time of sampling.

Hold times were satisfied for analyzed soil samples and the temperature of soil samples upon receipt by the laboratory were less than or equal to 10 degrees Celsius. Laboratory and field QA/QC were within acceptance criteria and alert limits. The laboratory and field QA/QC results confirm that soil sample handling and analytical protocols were acceptable, and the results were reproducible and reliable.

In general, RPD values below 40% are considered acceptable for groundwater results. One duplicate groundwater sample was submitted for analysis of multiple parameters. All calculated RPDs were less than 40% for all duplicate groundwater samples analyzed (see Tables). As such, Arcadis considers that the results of the QA/QC analysis indicate that groundwater samples can be considered representative of site conditions at the time of sampling

### *ii. a description of each instance where a sample was not handled in accordance with the Analytical Protocol*

The laboratory and field QC results were within acceptance criteria and alert limits, respectively. Overall, the laboratory and field QC results confirm that sample handling and analytical protocols were acceptable, and the results were reproducible.

### *iii. a statement, with respect to subsection 47 (3) of the regulation*

All certificates of analysis and analytical reports generated during the current Phase Two ESA investigation comply with subsection 47(3) of the regulation.

A certificate of analysis has been received for each soil and ground water sample that was submitted for analysis.

Certificates of analysis for soil and ground water samples analysed during the current Phase Two ESA investigation are provided in **Appendices E and F**.

**iv. a discussion of the overall quality of the field data from the investigation with respect to the data quality objectives**

The field and laboratory data were generally of acceptable quality. Where deviations were identified, the effects were determined to be negligible and are not believed to have materially affected the conclusions based on these results.

## 6.11 Phase Two Conceptual Site Model

**i. a description and assessment of**

**a. areas where potentially contaminating activity has occurred**

PCAs on the Phase Two property identified by Arcadis (2022) include (based on the numbering system as outlined in O.Reg. 153/04 Table 2; Part VI); as shown on **Figure 3**:

- PCA #28 - Gasoline and associated products storage in fixed tanks;
- PCA #58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners

Off-site PCAs within 250 m of the Phase Two Property which may be contributing to an APEC include:

- PCA #10: Commercial Autobody Shops
- PCA #28: Gasoline and Associated Products Storage in Fixed Tanks
- PCA #31: Ink Manufacturing, Processing and Bulk Storage
- PCA#52: Storage, Maintenance, Fuelling and Repair of Equipment, Vehicles, and Material used to maintain transportation systems.
- PCA #58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners

**b. areas of potential environmental concern**

APECs resulting from on-site or off-site PCAs include:

APEC 1 is associated with the Septic Tanks and storage of different wastes COPCs related to APEC 1 include PHCs F1-F4, VOCs, BTEX and Lead in soil and ground water.

APEC 2 is associated with the Commercial Vehicle Parking lot at Phase Two Property. COPCs related to APEC 2 include PHC F1-F4, VOCs, BTEX and Lead in soil and groundwater

APEC 3 is associated with the Cemetery property. COPCs related to APEC 3 include Uncharacterized Fill of Unknown Quality are PHCs and metals in soil and groundwater.

APEC 4 is associated with the fuel storage tank in basement of 1883 Merivale Road. COPCs related to APEC 4 include Gasoline are PHCs, BTEX, VOCs, lead in soil and groundwater.

APEC 5 is associated with Julian Taxicab Ltd- at 11 Bentley Ave. COPCs related to APEC 4 include Gasoline are BTEX, PHCs, VOCs, Metals in soil and groundwater.

APEC 6 is associated with off-site PCAs at Southeastern Portion of Phase two Property. COPCs related to APEC 4 include Gasoline and material used to maintain transportation systems are BTEX, PHCs, VOCs, Metals in soil and groundwater

The locations of the APECs are presented on **Figure 3**.

***c. any subsurface structures and utilities on, in or under the phase two property that may affect contaminant distribution and transport***

City water and sewer infrastructure is present under the Phase Two property but is found primarily adjacent to the Merivale Road right-of-way.

***ii. a description of and, as appropriate, figures illustrating, the physical setting of the phase two property and any areas under it including***

***a. stratigraphy from ground surface to the deepest aquifer or aquitard investigated***

The Phase Two Property is located in an area of commercial land use. Currently, the site is predominantly vacant and surrounded by commercial properties to the west, north, east, and south.

The nearest surface water body is the man-made stormwater pond to the west of Cleopatra Drive, located approximately 400 m west to southwest of the Phase One Property. Otherwise, the next major water body is the Ottawa River, located approximately 1.9 km east of the subject property.

Site stratigraphy consists primarily of silty sand from essentially ground surface down to the deepest borehole invert advanced on this Phase Two ESA property.

***b. hydrogeological characteristics, including aquifers, aquitards and, in each hydrostratigraphic unit where one or more contaminants is present at concentrations above the applicable site condition standards, lateral and vertical gradients***

Contaminants were sampled for and analysed above and below the ground water table and within the native silty sand overburden.

The horizontal ground water direction on the Phase Two Property is inferred to be towards the northeast. The hydraulic gradient between monitoring wells MW-1 and MW-4 was calculated to be 0.0047 and between monitoring wells MW-3 and MW-6, is 0.0079.

***c. approximate depth to bedrock***

No bedrock was encountered at any borehole location in 2019 or 2022 drilling investigations. Bedrock is expected at depths greater than 15 m bgs.

***d. approximate depth to water table***

Ground water monitoring was completed on August 26<sup>th</sup> and 27<sup>th</sup>, September 24<sup>th</sup> and October 23<sup>rd</sup>, 2019, plus ground water monitoring at MW22-2 on October 11<sup>th</sup> 2022. Monitoring activities included measuring the depth to any free phase product (if any) and measuring the depth to ground water at each monitoring well location. Ground water monitoring depths to water table are summarized in **Table 1**. The depths to ground water were measured using a Heron Instruments interface probe, relative to the top of casing.

On August 26 and 27, 2019, depths to ground water in the wells ranged from 4.59 m bgs at MW1 to 6.33 m bgs at MW2, and ground water elevations ranged from 94 m ald at MW1 to 94.43 m ald at MW4.

On September 24, 2019, depths to ground water in the wells ranged from 4.65 m bgs at MW1 to 6.38 m bgs at MW2 and MW3, and ground water elevations ranged from 93.96 m ald at MW2 to 94.25 m ald at MW4.



On October 23, 2019, depths to ground water in the wells ranged from 4.77 m bgs at MW1 to 6.50 m bgs at MW3 and ground water elevations ranged from 93.85 m ald at MW2 to 94.43 m ald at MW5.

**e. any respect in which section 41 or 43.1 of the regulation applies to the property**

The Phase Two Property:

- (i) does not include an area of natural significance and situated away from the boundaries of any areas of natural significance
- (ii) The Phase Two Property is not considered a “shallow soils property” as defined by Ontario Regulation 153/04 (as amended) since bedrock was encountered at depths greater than 2 m bgs.

The qualified person is of the opinion that, given the characteristics of the Phase Two Property and the certifications the qualified person would be required to make in a Record of Site Condition in relation to the Property, the MECP 2011 Table 3 SCSs are applicable for use at the Phase Two Property.

**f. areas where soil has been brought from another property and placed on, in or under the phase two property**

Topsoil and imported fill are present within the south side of 1883 Merivale Road and at the extreme north end on the 6 and 12 Jamie Ave lot. Gravel was imported for the parking lot of 1883 Merivale Road and the 6 and 12 Jamie lot but the source or years associated with the fill placement could not be confirmed. Surface soil testing for these areas did not encounter any exceedances of MECP Table 3 SCSs.

**g. approximate locations, if known, of any proposed buildings and other structures**

The proposed new office/warehouse building structures for the Phase Two property are shown on **Figure 2**.

**iii. where a contaminant is present on, in or under the phase two property at a concentration greater than the applicable site condition standard, identification of:**

**a. each area where a contaminant is present on, in or under the phase two property at a concentration greater than the applicable site condition standard**

Contaminants of concern in ground water on the Phase Two Property were evaluated through laboratory analysis to include metals, PHCs, VOCs, PAHs, pesticides, and herbicides.

Only one ground water sample collected from MW-5 exceeded the total silver concentration at 1.7 µg/L (MECP Table 3 Standard is 1.5 µg/L) although subsequent sampling and analyses found no silver exceedance. The chloroform concentration in the sample collected from monitoring well MW-5 was reported at 2.4 µg/L, equal to the MECP Table 3 Standard guideline. A laboratory duplicate sample reported the result as 2.5 µg/L, above the Standard. No other chloroform exceedances in groundwater were observed at this subject property. Any chloroform readings were judged to be related to municipal drinking water supply leakage and were not deemed to be considered an exceedance of the Site Condition Standards, based on amendments to O.Reg. 153/04.

Following re-sampling to eliminate bias from sediment effects in the initial samples collected, all subsequent groundwater samples analyzed met the applicable MECP Table 3 Standards for the parameters analyzed, including silver and chloroform. It is Arcadis' opinion that these subsequent groundwater sampling results are more representative of site conditions.

**b. the contaminants associated with each of the areas referred to in subparagraph A**

Contaminants of concern in soil on the Phase Two Property have been confirmed through laboratory analysis to include metals, VOCs, PHCs, pesticides/ herbicides, pH, conductivity, and SAR.

Contaminants of concern in ground water on the Phase Two Property have been confirmed through laboratory analysis to include metals, PHCs, VOCs, PAHs, pesticides/ herbicides.

The lateral and vertical distributions of soil and ground water impacts across the Phase Two property are not shown since there were no exceedances of MECP Table 3 SCSs at this Phase Two property. However, cross sections are provided on **Figures 7** and **8**.

***c. each medium in which a contaminant associated with an area referred to in subparagraph is present***

Contaminants of concern in ground water on the Phase Two Property have been confirmed through laboratory analysis to include metals, PHCs, VOCs, PAHs, and pesticides/ herbicides.

***d. a description and assessment of what is known about each of the areas referred to in subparagraph A***

The total silver concentration in the sample collected from monitoring well MW-5 was reported at 1.7 µg/L (MECP Table 3 Standard is 1.5 µg/L); and the chloroform concentration in the sample collected from monitoring well MW-5 on October 17th, 2019 was reported at 2.4 µg/L, equal to the MECP Table 3 Standard. A lab duplicate reported the result as 2.5 µg/L, which exceeded the guideline. A second sample collected from MW-5 on October 23<sup>rd</sup> 2019 reported a chloroform concentration of 0.21 µg/L, at below the applicable Standard. Based on results, no areas of environmental contamination were identified in soil or in groundwater.

***e. the distribution, in each of the areas referred to in subparagraph A, of each contaminant present in the area at a concentration greater than the applicable site condition standard, for each medium in which the contaminant is present, together with figures showing the distribution***

No areas of environmental contamination were identified in soil or in groundwater.

***f. anything known about the reason for the discharge of the contaminants present on, in or under the phase two property at a concentration greater than the applicable site condition standard into the natural environment***

No areas of environmental contamination were identified in soil or in groundwater.

***g. anything known about migration of the contaminants present on, in or under the phase two property at a concentration greater than the applicable site condition standard away from any area of potential environmental concern, including the identification of any preferential pathways***

No areas of environmental contamination were identified in soil or in groundwater.

***h. climatic or meteorological conditions that may have influenced distribution and migration of the contaminants, such as temporal fluctuations in ground water levels***

Ground water elevations on the Phase Two Property are expected to fluctuate with seasonal precipitation trends and could affect the vertical distribution of contamination in the vicinity of the water table (i.e. vertical smearing). However, no areas of environmental contamination were identified in soil or in groundwater.

***i. if applicable, information concerning soil vapour intrusion of the contaminants into buildings***

The floor for the on-site 1883 Merivale building is comprised of a non-painted concrete basement slab. No Sub-Slab Vapour Probe Installation was performed during the Phase Two ESA investigation completed at the Phase Two Property as sub-slab vapour was not anticipated as a contaminant exposure pathway for this Phase Two Property.

**iv. where contaminants on, in or under the phase two property are present at concentrations greater than the applicable site condition standard, one or more cross-sections showing**

**a. the lateral and vertical distribution of a contaminant in each area where the contaminants is present at concentrations greater than the applicable site condition standard in soil, ground water and sediment**

Cross-sections and site plans at the Phase Two Property in ground water are provided as **Figures 7 to 8**.

There are no diagrams showing the vertical and lateral distribution of contaminants as no areas of environmental contamination were identified in soil or in groundwater.

**b. approximate depth to water table in each area referred to in subparagraph A**

The depths to ground water were measured using a Heron Instruments interface probe, relative to the top of casing.

On August 26 and 27, 2019, depths to ground water in the wells ranged from 4.59 m bgs at MW1 to 6.33 m bgs at MW2, and ground water elevations ranged from 94 m ald at MW1 to 94.43 m ald at MW4.

On September 24, 2019, depths to ground water in the wells ranged from 4.65 m bgs at MW1 to 6.38 m bgs at MW2 and MW3, and ground water elevations ranged from 93.96 m ald at MW2 to 94.25 m ald at MW4.

On October 23, 2019, depths to ground water in the wells ranged from 4.77 m bgs at MW1 to 6.50 m bgs at MW3 and ground water elevations ranged from 93.85 m ald at MW2 to 94.43 m ald at MW5.

On October 24, 2022, depth to ground water in the well ranged from 4.85 m bgs to 5.19 m bgs at MW22-2.

**c. stratigraphy from ground surface to the deepest aquifer or aquitard investigated**

Soil encountered at the Phase Two Property generally consists of coarse-grained brown sand with some rocks. Fill material (gravel) was generally encountered at ground surface in the Jamie Avenue parking lot and surrounding the Divers Warehouse site building, as well as in the east yard. No bedrock was encountered at any borehole locations.

**d. any subsurface structures and utilities that may affect contaminant distribution and transport in each area referred to in subparagraph A**

Not applicable to this Phase Two Property, as there were no areas of environmental contamination identified in soil or in groundwater

**v. for each area where a contaminant is present on, in or under the property at a concentration greater than the applicable site condition standard for the contaminant, a diagram identifying, with narrative explanatory notes**

**a. the release, mechanisms**

No exceedances of the contaminants analyzed in the soil and groundwater samples were reported.

**b. contaminant transport pathway**

Contaminants in soil may leach and dissolve into ground water and migrate as a dissolved phase. Volatile COCs including Ethylbenzene and F1 PHC, may volatilize from ground water and the vapour phase may migrate to the soils via diffusion. Impacts in ground water may also migrate to the soils via sorption. However, no areas of environmental contamination were identified in soil or in groundwater at this Phase Two property.

**c. the human and ecological receptors located on, in or under the phase two property showing receptor exposure points and routes of exposure**

A portion of Phase One Property (1881 Merivale Road) is currently vacant while the 1883 Merivale Road is occupied by a commercial facility (Divers Warehouse) and 6-12 Jamie Avenue is operated as a school bus parking lot.

On-site human receptors currently include site visitors, maintenance workers at the Diver's Warehouse Inc., bus drivers, and construction workers who could be exposed to contaminants present in soils of the Phase One Property through direct dermal contact and incidental ingestion and inhalation of outdoor vapours.

Surrounding properties include commercial and industrial properties. As such, off-site human receptors could include indoor workers, construction workers, outdoor maintenance workers, and visitors. Off-site human receptors could be exposed to contaminants present in groundwater migrating from the site through inhalation of indoor vapours. On-site ecological receptors include soil invertebrates and plants, and mammals and birds.

On-site ecological receptors include soil invertebrates and plants, and mammals and birds. On-site ecological receptors could be exposed to contaminants present in soils on the Phase One Property via incidental ingestion and dermal contact with soils, inhalation of vapour, and ingestion of vegetation and/or prey items.

On-site ecological receptors could be exposed to contaminants present in soils at the Phase Two Property via incidental ingestion and dermal contact with soils, inhalation of vapour, and ingestion of vegetation and/or prey items.

The effect of some uncertainties on the identification of the APECs at this site is considered low since the CSM considers a broad-spectrum potential contaminants and exposure scenarios. Theoretical Human Health and Ecological receptor routes of exposure are portrayed on **Figures 10** and **11**. Nevertheless, no areas of environmental contamination were identified in soil or in groundwater at this Phase Two property.

## 7 Conclusions

The Phase Two ESA identified no impacted soil and ground water on the Phase Two Property. The locations of identified soil and ground water impacts are discussed below.

### Soil

- No exceedances of the contaminants analyzed in the soil samples were reported.

### Groundwater

The following exceedances were reported in 2019 in the groundwater samples:

- The total silver concentration in the sample collected from monitoring well MW-5 was reported at 1.7 µg/L (MECP Table 3 Standard is 1.5 µg/L); and
- The chloroform concentration in the sample collected from monitoring well MW-5 was reported at 2.4 µg/L, equal to the MECP Table 3 Standard guideline. A laboratory duplicate sample reported the result as 2.5 µg/L, above the Standard.
- Following re-sampling to eliminate bias from sediment effects in the initial samples collected, all groundwater samples analyzed met the applicable MECP Table 3 Standards for the parameters analyzed, including silver and chloroform. It is Arcadis' opinion that these more recent groundwater results are best representative of site conditions.

Analytical results for ground water samples collected during the most recent sampling event(s) conducted from MW 22-2 on October 23,2022 as part of this Phase Two ESA are summarized below:

- No exceedances of the Table 3 SCS metal concentrations analyzed in the groundwater samples were reported.

Based on results of the Phase one ESA and the recent lab results, no areas of environmental concern were identified, and no further environmental investigation is warranted at this time.

No Record of Site Condition (RSC) is required for the subject property as there is no anticipated change in land use at this time. However, a record of site condition could be filed for the Phase Two Property without significant additional effort as no soil or groundwater contamination was observed at this Phase Two Property.

## Figure and Tables

<b>Monitoring Well Installation</b>	Please refer to <b>Appendix C</b> (Borehole Logs) showing construction details and elevations for all monitoring wells installed during the field investigations.
<b>Water Levels</b>	Please refer to <b>Table 1</b> for ground water monitoring details.
<b>LNAPLs and DNAPLs</b>	LNAPL and DNAPL were not measured (were not encountered) during any of the 2019 or 2022 monitoring events.
<b>Soil Data</b>	Analytical results for soil samples from the boreholes pertaining to the Phase Two ESA investigation are summarized in <b>Tables 2 to 6 and Table 12</b> . Soil analytical results are also summarized on <b>Figure 4</b> .
<b>Groundwater Data</b>	Analytical results for ground water samples from the Phase Two ESA investigation are summarized in <b>Tables 7 to Table 11</b> . Ground water analytical results are also summarized on <b>Figure 5</b> .
<b>Sediment Data</b>	No sediment sampling was completed as no sediment is present on-site.
<b>Ground Water, Sediment and Soil Maximum Concentration Data</b>	Please refer to <b>Tables 12 to 13</b> .
<b>Areas of Natural Significance and Water Bodies</b>	No ANSI is present within 250 m from the perimeter of the Phase Two Property.
<b>Property Before Actions Taken to Reduce the Concentration of Contaminants</b>	No actions were taken to reduce the concentration of contaminants during this Phase Two ESA. The conceptual site model is presented as <b>Figure 9</b> .
<b>Interpreted Contours of Ground Water Elevations</b>	Please refer to <b>Figure 6</b> .

<b>Contaminants in Soil Before Actions Taken to Reduce the Concentration of Contaminants</b>	No actions were taken to reduce the concentration of contaminants during this Phase Two ESA investigation.
<b>Contaminants in Ground Water Before Actions Taken to Reduce the Concentration of Contaminants</b>	No actions were taken to reduce the concentration of contaminants during this Phase Two ESA investigation.
<b>Contaminants in Sediment Before Actions Taken to Reduce the Concentration of Contaminants</b>	No sediment sampling was completed as no sediment is present on-site.
<b>Delineation</b>	Please refer to <b>Figures 4 and 5</b> as well as cross sections <b>Figures 7 and 8</b>
<b>Contaminants of Concern in Areas of Potential Environmental Concern</b>	No contaminants were observed at the Phase Two property in either soil or groundwater. Please refer to <b>Figures 4 and 5</b> .

## 8 References

Arcadis Canada Inc., 2019. Phase I & II Environmental Site Assessment; 1881/1883 Merivale Road, and 6 and 12 Jamie Avenue, Ottawa, Ontario; dated 16 December 2019- prepared for ZV Holdings Corporation

MECP, 2011a. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. April 15, 2011.

MECP, 2011b. Guide for Completing Phase Two Environmental Assessments Under O.Reg. 153/04. June 2011.

MECP, 2011c. Protocol for Analytical Methods Use in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

Ministry of Natural Resources and Forestry (MNRF), 2016. Ontario Biodiversity Explorer. Natural Heritage Information Centre. Ministry of Natural Resources. Queen’s Printer for Ontario. Last updated: 2010-07-30. Available at: <https://www.ontario.ca/environment-and-energy/species-risk-region?name=Durham>

## 10 Limitations

This report was prepared by Arcadis Canada Inc. (Arcadis) exclusively for Z.V. Holdings Corporation (ZV). Other than ZV Holdings Corporation, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of Arcadis. Any use, reliance on or decision made by any person other than ZV based on this report is the sole responsibility of such other person. ZV and Arcadis make no representation or warranty to any other person with regard to this report and the work referred to in this report and ZV and Arcadis accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

Achieving the study objectives stated in this report has required Arcadis to arrive at conclusions based on the information presently known to Arcadis. No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce this possibility to an acceptable level. Professional judgment was exercised in gathering and analysing the information obtained. Professional judgment was also exercised in the formulation of recommendations. Like all professional persons rendering advice, we cannot act as absolute insurers of the conclusions we reach. We perform our work, within the limits prescribed by our client, with the usual thoroughness and competence of our profession. No other warranty or representation, expressed or implied, is included or intended in this report.

Third party information reviewed and used to formulate this report is assumed to be complete and correct. Arcadis used this information in good faith and will not accept any responsibility for deficiencies, misinterpretation or incompleteness of the information contained in documents prepared by third parties.

The conclusions presented represent the best judgment of the assessors based on current environmental standards and on the site, conditions observed on the date of Arcadis' sampling events. Due to the nature of the investigation and the limited data available, the assessors cannot warrant against undiscovered environmental liabilities.

Nothing in this report is intended to constitute or provide a legal opinion.

Should additional information become available, Arcadis requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

# Tables



Monitoring Well ID	Screened Interval	Top of Casing Elevation <sup>(1)</sup>	Ground Elevation	Height of Stick-Up	Depth of Well	Water Level (2019-08-26)	Water Level (2019-08-27)	Water Level (2019-09-24)	Water Level (2019-10-23)	Water Level (2019-08-26)	Water Level (2019-08-27)	Water Level (2019-09-24)	Water Level (2019-10-23)
	(m bgs)	(m)	(m)	(m)	(m btoc)	(m btoc)	(m btoc)	(m btoc)	(m btoc)	(m bgs)	(m bgs)	(m bgs)	(m bgs)
MW1	4.6-7.6	99.48	98.63	0.85	8.51	5.48	5.44	5.50	5.62	4.63	4.59	4.65	4.77
MW2	3.0-6.0	100.34	99.48	0.86	6.95	6.30	6.33	6.38	6.49	5.44	5.47	5.52	5.63
MW3	3.0-6.0	100.37	99.51	0.86	7.00	6.29	6.23	6.38	6.50	5.43	5.37	5.52	5.64
MW4	3.0-6.0	99.43	99.43	0.00	6.09	5.02	5.00	5.18	5.29	5.02	5.00	5.18	5.29
MW5	3.0-6.2	99.86	99.86	0.00	6.20	-	-	-	5.43	-	-	-	5.43
MW6	3.0-6.4	99.86	99.86	0.00	6.42	-	-	-	5.55	-	-	-	5.55
MW22-2	2.14-5.14	98.92	98.98	-0.06	5.14	-	-	-	-	-	-	-	-
MW22-4	2.17-5.17	98.90	98.97	-0.07	5.17	-	-	-	-	-	-	-	-
MW22-6	2.55-5.55	98.94	99.04	-0.10	5.55	-	-	-	-	-	-	-	-

**Notes:**

- <sup>(1)</sup> Elevation data collected by Arcadis on September 24 and October 16, 2019
- m btoc: metres below top of PVC casing
- m bgs: metres below ground surface
- ppmv: parts per million by volume
- LNAPL: light non-aqueous phase liquid
- : No value

Monitoring Well ID	Screened Interval	Top of Casing Elevation <sup>(1)</sup>	Ground Elevation	Height of Stick-Up	Water Elevation (2019-08-26)	Water Elevation (2019-08-27)	Water Elevation (2019-09-24)	Water Elevation (2019-10-23)	Combustible Vapours (2019-08-23)	Presence of Sheen or LNAPL (2019-08-26)	Water Elevation (2022-09-29)	Water Elevation (2022-09-29)
	(m bgs)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	ppmv		m btoc	(m)
MW1	4.6-7.6	99.48	98.63	0.85	94	94.04	93.98	93.86	0, 170	No	-	-
MW2	3.0-6.0	100.34	99.48	0.86	94.04	94.01	93.96	93.85	60, 110	No	-	-
MW3	3.0-6.0	100.37	99.51	0.86	94.08	94.14	93.99	93.87	-	No	-	-
MW4	3.0-6.0	99.43	99.43	0.00	94.41	94.43	94.25	94.14	-	No	-	-
MW5	3.0-6.2	99.86	99.86	0.00	-	-	-	94.43	-	No	-	-
MW6	3.0-6.4	99.86	99.86	0.00	-	-	-	94.31	-	No	-	-
MW22-2	2.14-5.14	98.92	98.98	-0.06	-	-	-	-	-	-	4.875	94.04
MW22-4	2.17-5.17	98.90	98.97	-0.07	-	-	-	-	-	-	5.04	93.86 (dry)
MW22-6	2.55-5.55	98.94	99.04	-0.10	-	-	-	-	-	-	dry	DRY

**Notes:**

- <sup>(1)</sup> Elevation data collected by Arcadis on September 24 and October 16, 2019
- m btoc: metres below top of PVC casing
- m bgs: metres below ground surface
- ppmv: parts per million by volume
- LNAPL: light non-aqueous phase liquid
- : No value

Arcadis Sample No.	RDL	Units	MECP Table 1 Standards <sup>1</sup>	MECP Table 3 Standards <sup>2</sup>	BH1-1	BH2-1	MW1-1	MW2-1	DUP-1	RPD	MW3-1	MW4-1	MW5-1	MW6-1
Sample Date					23-Aug-19	27-Aug-19	23-Aug-19	23-Aug-19	23-Aug-19		23-Aug-19	23-Aug-19	15-Oct-19	15-Oct-19
Sample Depth (m below surface)					0.20 - 0.80	0.10 - 0.25	6.0 - 6.3	0.6 - 1.1	0.6 - 1.1		0.2 - 0.8	5.5 - 6.0	5.2 - 5.5	5.2 - 5.5
Soil Type					Sand	Sand	Sand	Sand	Sand		Sand	Sand	Sand	Sand
Laboratory					BVL	BVL	BVL	BVL	BVL		BVL	BVL	BVL	BVL
<b>Grain Size Analysis</b>														
Sieve-#200 (<0.075mm)	na	%	nv	nv	-	-	-	33	-	nv	-	-	-	-
Sieve - #200 (>0.075mm)	na	%	nv	nv	-	-	-	67	-	nv	-	-	-	-
<b>Inorganics</b>														
Chromium (VI)	0.2	µg/g		8	<0.2	<0.2	<0.2	<0.2	<0.2	nc	<0.2	<0.2	-	-
Conductivity	0.002	mS/cm		1.4	-	-	-	-	-	-	-	-	0.072	0.097
Available (CaCl <sub>2</sub> ) pH	na	pH		nv	-	-	-	-	-	-	-	-	6.31	6.55
<b>Calculated Parameters</b>														
Sodium Adsorption Ratio	na	-	na	12	-	-	-	-	-	-	-	-	0.40	0.35
<b>Metals</b>														
Hot Water Ext. Boron (B)	0.050	µg/g	na	2	0.23	0.44	<0.050	0.17	0.15	12.5%	0.058	<0.050	-	-
Acid Extractable Antimony (Sb)	0.20	µg/g	1.3	40	<0.20	0.33	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20
Acid Extractable Arsenic (As)	1.0	µg/g	18	18	<1.0	3.5	<1.0	<1.0	<1.0	nc	<1.0	<1.0	<1.0	<1.0
Acid Extractable Barium (Ba)	0.50	µg/g	220	670	46	77	17	32	28	13.3%	23	13	13	16
Acid Extractable Beryllium (Be)	0.20	µg/g	2.5	8	0.30	0.27	<0.20	0.25	0.22	12.8%	<0.20	<0.20	<0.20	<0.20
Acid Extractable Boron (B)	5.0	µg/g	36	120	<5.0	5.1	<5.0	<5.0	<5.0	nc	<5.0	<5.0	<5.0	<5.0
Acid Extractable Cadmium (Cd)	0.10	µg/g	1.2	1.9	0.11	0.20	<0.10	<0.10	<0.10	nc	<0.10	<0.10	<0.10	<0.10
Acid Extractable Chromium (Cr)	1.0	µg/g	70	160	16	17	18	15	15	0%	9.3	6.4	5.2	8.3
Acid Extractable Cobalt (Co)	0.10	µg/g	21	80	4.6	4.5	3.6	3.9	4.4	12.0%	3.5	4.7	2.7	3.2
Acid Extractable Copper (Cu)	0.50	µg/g	92	230	5.8	13	9.8	5.7	5.9	3.45%	4.2	9.9	7.3	8.3
Acid Extractable Lead (Pb)	1.0	µg/g	120	120	3.2	27	1.8	2.8	2.8	0%	1.8	1.8	1.3	1.5
Acid Extractable Molybdenum (Mo)	0.50	µg/g	2	40	<0.50	0.50	3.1	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50
Acid Extractable Nickel (Ni)	0.50	µg/g	82	270	10	10	5.9	7.7	7.7	0%	5.1	4.7	4.4	4.2
Acid Extractable Selenium (Se)	0.50	µg/g	1.5	5.5	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50
Acid Extractable Silver (Ag)	0.20	µg/g	0.5	40	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20
Acid Extractable Thallium (Tl)	0.050	µg/g	1	3.3	0.057	0.086	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Acid Extractable Uranium (U)	0.050	µg/g	2.5	33	0.47	0.43	0.46	0.51	0.56	9.35%	0.50	0.45	0.43	0.66
Acid Extractable Vanadium (V)	5.0	µg/g	86	86	28	25	20	27	32	16.9%	21	20	15	25
Acid Extractable Zinc (Zn)	5.0	µg/g	290	340	26	63	11	17	15	12.5%	9.7	10	9.2	9.7
Acid Extractable Mercury (Hg)	0.050	µg/g	0.27	3.9	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050

**Notes:**

<sup>1</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 1: Full Depth Background Site Condition Standards for Soils for Residential/Parkland/Institutional/Industrial/ Commercial/Community Property Use; Coarse-Textured Soils

<sup>2</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 3: Generic Site Condition Standards for Soils in a Non-Potable Ground Water Condition for Industrial/Commercial Property Use; Coarse-Textured Soils

µg/g micrograms per gram

RDL Laboratory reportable detection limit

RPD Relative percent difference

na Not Applicable

nc Not Calculated - one (1) or more concentrations less than 5 times RDL

nv No Value

- Not Analysed

< #### Concentration less than laboratory RDL

**VALUE BOLD and UNDERLINED** Value Exceeds MECP SCS

Table 3  
SOIL ANALYTICAL RESULTS - VOCs  
Phase Two ESA  
1881, 1883 Merivale Road, Ottawa, ON

Arcadis Sample No.	RDL	Units	MECP Table 1 Standards <sup>1</sup>	MECP Table 3 Standards <sup>2</sup>	BH1-1	BH2-1	MW1-1	MW2-1	DUP-1	RPD	MW3-1	MW4-1	MW5-1	MW6-1
Sample Date					23-Aug-19	27-Aug-19	23-Aug-19	23-Aug-19	23-Aug-19		23-Aug-19	23-Aug-19	15-Oct-19	15-Oct-19
Sample Depth					0.20 - 0.80	0.10 - 0.25	6.0 - 6.3	0.6 - 1.1	0.6 - 1.1		0.2 - 0.8	5.5 - 6.0	5.2 - 5.5	5.2 - 5.5
Soil Type					Sand	Sand	Sand	Sand	Sand		Sand	Sand	Sand	Sand
Laboratory					BVL	BVL	BVL	BVL	BVL		BVL	BVL	BVL	BVL
<b>Calculated Parameters</b>														
1,3-Dichloropropene (cis+trans)	0.050	µg/g	0.05	nv	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
<b>Volatile Organics</b>														
Acetone (2-Propanone)	0.50	µg/g	0.5	16	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50
Benzene	0.020	µg/g	0.02	0.32	<0.020	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020
Bromodichloromethane	0.050	µg/g	0.05	18	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Bromoform	0.050	µg/g	0.05	0.61	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Bromomethane	0.050	µg/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Carbon Tetrachloride	0.050	µg/g	0.05	0.21	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	0.050	µg/g	0.05	2.4	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Chloroform	0.050	µg/g	0.05	0.47	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	0.050	µg/g	0.05	13	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	0.050	µg/g	0.05	6.8	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	0.050	µg/g	0.05	9.6	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	0.050	µg/g	0.05	0.2	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Dichlorodifluoromethane (FREON 12)	0.050	µg/g	0.05	16	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	0.050	µg/g	0.05	17	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	0.050	µg/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethylene	0.050	µg/g	0.05	0.064	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
cis-1,2-Dichloroethylene	0.050	µg/g	0.05	55	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
trans-1,2-Dichloroethylene	0.050	µg/g	0.05	1.3	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
1,2-Dichloropropane	0.050	µg/g	0.05	0.16	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
cis-1,3-Dichloropropene	0.030	µg/g	nv	nv	<0.030	<0.030	<0.030	<0.030	<0.030	nc	<0.030	<0.030	<0.030	<0.030
trans-1,3-Dichloropropene	0.040	µg/g	nv	nv	<0.040	<0.040	<0.040	<0.040	<0.040	nc	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	0.020	µg/g	0.05	9.5	<0.020	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020
Ethylene Dibromide	0.050	µg/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Hexane	0.050	µg/g	0.05	46	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Methylene Chloride(Dichloromethane)	0.050	µg/g	0.05	1.6	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Methyl Ethyl Ketone (2-Butanone)	0.50	µg/g	0.5	70	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	0.50	µg/g	0.5	31	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50
Methyl t-butyl ether (MTBE)	0.050	µg/g	0.05	11	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Styrene	0.050	µg/g	0.05	34	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	0.050	µg/g	0.05	0.087	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	0.050	µg/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	0.050	µg/g	0.05	4.5	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Toluene	0.020	µg/g	0.2	68	<0.020	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020
1,1,1-Trichloroethane	0.050	µg/g	0.05	6.1	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	0.050	µg/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	0.050	µg/g	0.05	0.91	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Trichlorofluoromethane (FREON 11)	0.050	µg/g	0.25	4	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050
Vinyl Chloride	0.020	µg/g	0.02	0.032	<0.020	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020
p+m-Xylene	0.020	µg/g	nv	nv	<0.020	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020
o-Xylene	0.020	µg/g	nv	nv	<0.020	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020
Total Xylenes	0.020	µg/g	0.05	26	<0.020	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020

**Notes:**  
<sup>1</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 1: Full Depth Background Site Condition Standards for Soils for Residential/Parkland/Institutional/ Industrial/Commercial/Community Property Use; Coarse-Textured Soils  
<sup>2</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 3: Generic Site Condition Standards for Soils in a Non-Potable Ground Water Condition for Industrial/Commercial Property Use; Coarse-Textured Soils

µg/g micrograms per gram

RDL Laboratory reportable detection limit

RPD Relative percent difference

nc Not Calculated - one (1) or more concentrations less than 5 times RDL

nv No Value

<#### Concentration less than laboratory RDL

**VALUE BOLD and UNDERLINED** Value Exceeds MECP SCS

**Table 4**  
**SOIL ANALYTICAL RESULTS - Petroleum Hydrocarbons**  
Phase Two ESA  
1881, 1883 Merivale Road, Ottawa, ON

Arcadis Sample No.	RDL	Units	MECP Table 3 Standards <sup>1</sup>	BH1-1	BH2-1	MW1-1	MW2-1	DUP-1	RPD	MW3-1	MW4-1	MW5-1	MW6-1
Sample Date				23-Aug-19	27-Aug-19	23-Aug-19	23-Aug-19	23-Aug-19		23-Aug-19	23-Aug-19	15-Oct-19	15-Oct-19
Sample Depth				0.20 - 0.80	0.10 - 0.25	6.0 - 6.3	0.6 - 1.1	0.6 - 1.1		0.2 - 0.8	5.5 - 6.0	5.2 - 5.5	5.2 - 5.5
Soil Type				Sand	Sand	Sand	Sand	Sand		Sand	Sand	Sand	Sand
Laboratory				BVL	BVL	BVL	BVL	BVL		BVL	BVL	BVL	BVL
<b>F1 Hydrocarbons</b>													
F1 (C6-C10)	10	µg/g	55	<10	<10	<10	<10	<10	nc	<10	<10	<10	<10
F1 (C6-C10) - BTEX	10	µg/g	55	<10	<10	<10	<10	<10	nc	<10	<10	<10	<10
<b>F2-F4 Hydrocarbons</b>													
F2 (C10-C16 Hydrocarbons)	10	µg/g	230	<10	<10	<10	<10	<10	nc	<10	<10	<10	<10
F3 (C16-C34 Hydrocarbons)	50	µg/g	1700	<50	<50	<50	<50	<50	nc	<50	<50	<50	<50
F4 (C34-C50 Hydrocarbons)	50	µg/g	3300	<50	<50	<50	<50	<50	nc	<50	<50	<50	<50
Reached Baseline at C50				Yes	Yes	Yes	Yes	Yes	nv	Yes	Yes	Yes	Yes

**Notes:**

<sup>1</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 3: Generic Site Condition Standards for Soils in a Non-Potable Ground Water Condition for Industrial/Commercial Property Use; Coarse-Textured Soils

µg/g micrograms per gram

RDL Laboratory reportable detection limit

RPD Relative percent difference

nc Not Calculated - one (1) or more concentrations less than 5 times RDL

nv No Value

< ##### Concentration less than laboratory RDL

**VALUE BOLD and UNDERLINED** Value Exceeds MECP SCS

**Table 5**  
**SOIL ANALYTICAL RESULTS - PAHs**  
**Phase Two ESA**  
**1881, 1883 Merivale Road, Ottawa, ON**

Arcadis Sample No.	RDL	Units	MECP Table 1 Standards <sup>1</sup>	MECP Table 3 Standards <sup>2</sup>	BH2-1	MW1-1	MW5-1	MW6-1
Sample Date					27-Aug-19	23-Aug-19	15-Oct-19	15-Oct-19
Sample Depth					0.6 - 1.1	6.0 - 6.3	5.2 - 5.5	5.2 - 5.5
Soil Type					Sand	Sand	Sand	Sand
Laboratory					BVL	BVL	BVL	BVL
<b>PAHs</b>								
Acenaphthene	0.005	µg/g	0.072	96	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.005	µg/g	0.093	0.15	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.005	µg/g	0.16	0.67	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)anthracene	0.005	µg/g	0.36	0.96	0.013	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene	0.005	µg/g	0.3	0.3	0.014	<0.0050	<0.0050	<0.0050
Benzo(b/j)fluoranthene	0.005	µg/g	0.47	0.96	0.025	<0.0050	<0.0050	<0.0050
Benzo(g,h,i)perylene	0.005	µg/g	0.68	9.6	0.023	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene	0.005	µg/g	0.48	0.96	0.0073	<0.0050	<0.0050	<0.0050
Chrysene	0.005	µg/g	2.8	9.6	0.013	<0.0050	<0.0050	<0.0050
Dibenz(a,h)anthracene	0.005	µg/g	0.1	0.1	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	0.005	µg/g	0.56	9.6	0.027	<0.0050	<0.0050	<0.0050
Fluorene	0.005	µg/g	0.12	62	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	0.005	µg/g	0.23	0.76	0.015	<0.0050	<0.0050	<0.0050
1-Methylnaphthalene	0.005	µg/g	0.59	76	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	0.005	µg/g	0.59	76	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	0.005	µg/g	0.09	9.6	<0.0050	<0.0050	<0.0050	<0.0050
Phenanthrene	0.005	µg/g	0.69	12	0.014	<0.0050	<0.0050	<0.0050
Pyrene	0.005	µg/g	1	96	0.023	<0.0050	<0.0050	<0.0050
<b>Calculated Parameters</b>								
Methylnaphthalene, 2-(1-)	0.0071	µg/g	0.59	76	<0.0071	<0.0071	<0.0071	<0.0071

**Notes:**

<sup>1</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 1: Full Depth Background Site Condition Standards for Soils for Residential/Parkland/Institutional/ Industrial/Commercial/Community Property Use; Coarse-Textured Soils

<sup>2</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 3: Generic Site Condition Standards for Soils in a Non-Potable Ground Water Condition for Industrial/Commercial Property Use; Coarse-Textured Soils

µg/g micrograms per gram

RDL Laboratory reportable detection limit

< #### Concentration less than laboratory RDL

**VALUE BOLD and UNDERLINED** Value Exceeds MECP SCS

**Table 6**  
**SOIL ANALYTICAL RESULTS - Pesticides and Herbicides**  
**Phase Two ESA**  
**1881, 1883 Merivale Road, Ottawa, ON**

Arcadis Sample No.	RDL	Units	MECP Table 3 Standards <sup>1</sup>	MW4-1
Sample Date				23-Aug-19
Sample Depth				5.5 - 6.0
Soil Type				Sand
Laboratory				BVL
<b>Pesticides and Herbicides</b>				
Aldrin	0.0020	µg/g	0.088	<0.0020
a-Chlordane	0.0020	µg/g	nv	<0.0020
g-Chlordane	0.0020	µg/g	nv	<0.0020
o,p-DDD	0.0020	µg/g	nv	<0.0020
p,p-DDD	0.0020	µg/g	nv	<0.0020
o,p-DDE	0.0020	µg/g	nv	<0.0020
p,p-DDE	0.0020	µg/g	nv	<0.0020
o,p-DDT	0.0020	µg/g	nv	<0.0020
p,p-DDT	0.0020	µg/g	nv	<0.0020
Dieldrin	0.0020	µg/g	0.088	<0.0020
Lindane	0.0020	µg/g	0.056	<0.0020
Endosulfan I (alpha)	0.0020	µg/g	nv	<0.0020
Endosulfan II (beta)	0.0020	µg/g	nv	<0.0020
Endrin	0.0020	µg/g	0.04	<0.0020
Heptachlor	0.0020	µg/g	0.19	<0.0020
Heptachlor epoxide	0.0020	µg/g	0.05	<0.0020
Hexachlorobenzene	0.0020	µg/g	0.66	<0.0020
Hexachlorobutadiene	0.0020	µg/g	0.031	<0.0020
Hexachloroethane	0.0020	µg/g	0.21	<0.0020
Methoxychlor	0.0050	µg/g	1.6	<0.0050
Aroclor 1242	0.015	µg/g	nv	<0.015
Aroclor 1248	0.015	µg/g	nv	<0.015
Aroclor 1254	0.015	µg/g	nv	<0.015
Aroclor 1260	0.015	µg/g	nv	<0.015
<b>Calculated Parameters</b>				
Chlordane (Total)	0.0020	µg/g	0.05	<0.0020
o,p-DDD + p,p-DDD	0.0020	µg/g	4.6	<0.0020
o,p-DDE + p,p-DDE	0.0020	µg/g	0.52	<0.0020
o,p-DDT + p,p-DDT	0.0020	µg/g	1.4	<0.0020
Total Endosulfan	0.0020	µg/g	0.3	<0.0020
Total PCB	0.015	µg/g	1.1	<0.015

**Notes:**

<sup>1</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 3: Generic Site Condition Standards for Soils in a Non-Potable Ground Water Condition for Industrial/Commercial Property Use; Coarse-Textured Soils

µg/g micrograms per gram

RDL Laboratory reportable detection limit

nv No Value

< #### Concentration less than laboratory RDL

**VALUE BOLD and UNDERLINED** Value Exceeds MECP SCS

Table 7  
GROUND WATER ANALYTICAL RESULTS - Metals  
Phase Two ESA  
1881, 1883 Merivale Road, Ottawa, ON

Arcadis Sample No.	RDL	Units	MECP Table 3 Standards <sup>1</sup>	MW-1 (total metals)	DUP-1 (total metals)	RPD	MW-2 (total metals)	MW-3 (total metals)	MW-4 (total metals)	MW-5 (total metals)	MW-5 (dissolved metals)	MW-6 (total metals)
Sample Date				27-Aug-19 BVL	27-Aug-19 BVL		27-Aug-19 BVL	27-Aug-19 BVL	27-Aug-19 BVL	23-Oct-19 BVL	29-Oct-19 BVL	23-Oct-19 BVL
Laboratory												
<b>Metals</b>												
Chromium (VI)	0.50	ug/L	140	0.66	0.66	0%	<0.50	<0.50	0.61	-	-	-
Mercury (Hg)	0.0001	mg/L	0.29	<0.0001	<0.0001	nc	<0.0001	<0.0001	<0.0001	-	-	-
Aluminum (Al)	5.0	ug/L	nv	300	270	10.5%	4100	630	7300	14000	-	2000
Antimony (Sb)	0.50	ug/L	20000	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic (As)	1.0	ug/L	1900	<1.0	<1.0	nc	<1.0	<1.0	2.0	3.2	<1.0	<1.0
Barium (Ba)	2.0	ug/L	29000	55	55	0%	86	1600	150	210	58	100
Beryllium (Be)	0.50	ug/L	67	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bismuth (Bi)	1.0	ug/L	nv	<1.0	<1.0	nc	<1.0	<1.0	<1.0	<1.0	-	<1.0
Boron (B)	10	ug/L	45000	31	30	3%	32	38	48	20	28	12
Cadmium (Cd)	0.10	ug/L	2.7	<0.10	<0.10	nc	<0.10	0.31	0.15	0.16	<0.10	<0.10
Calcium (Ca)	200	ug/L	nv	83000	82000	1.21%	17000	290000	160000	120000	-	94000
Total Chromium (Cr)	5.0	ug/L	810	<5.0	<5.0	nc	6.3	<5.0	15	80	<5.0	5.6
Cobalt (Co)	0.50	ug/L	66	1.5	1.5	0%	10	5.9	24	14	1.3	2.9
Copper (Cu)	1.0	ug/L	87	6.3	5.6	11.8%	19	3.2	76	48	1.3	8.9
Iron (Fe)	100	ug/L	nv	1200	1000	18.2%	6500	920	23000	24000	-	3100
Lead (Pb)	0.50	ug/L	25	1.0	0.97	3.05%	3.5	0.62	14	11	<0.50	1.6
Lithium (Li)	5.0	ug/L	nv	<5.0	<5.0	nc	<5.0	<5.0	7.3	7.8	-	<5.0
Magnesium (Mg)	50	ug/L	nv	22000	21000	4.65%	5500	21000	49000	30000	-	24000
Manganese (Mn)	2.0	ug/L	nv	73	66	10.1%	510	530	570	810	-	100
Molybdenum (Mo)	0.50	ug/L	9200	<0.50	<0.50	nc	0.80	0.56	2.1	36	25	2.7
Nickel (Ni)	1.0	ug/L	490	2.5	2.4	4%	11	5.2	23	24	1.8	4.4
Potassium (K)	200	ug/L	nv	2400	1800	28.6%	12000	21000	3600	28000	-	3400
Selenium (Se)	2.0	ug/L	63	<2.0	<2.0	nc	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silicon (Si)	50	ug/L	nv	6700	6700	0%	9900	3300	18000	23000	-	9400
Silver (Ag)	0.10	ug/L	1.5	0.18	<0.10	nc	<0.10	0.14	0.24	<b>1.7</b>	<0.10	0.17
Sodium (Na)	100	ug/L	2300000	57000	58000	1.74%	25000	600000	46000	150000	110,000	34000
Strontium (Sr)	1.0	ug/L	nv	480	480	0%	150	1000	790	1100	-	420
Tellurium (Te)	1.0	ug/L	nv	<1.0	<1.0	nc	<1.0	<1.0	<1.0	<1.0	-	<1.0
Thallium (Tl)	0.050	ug/L	510	<0.050	<0.050	nc	0.11	0.058	0.24	0.23	<0.050	<0.050
Tin (Sn)	1.0	ug/L	nv	<1.0	<1.0	nc	<1.0	<1.0	1.4	1.9	-	<1.0
Titanium (Ti)	5.0	ug/L	nv	17	21	21.1%	280	42	480	810	-	170
Tungsten (W)	1.0	ug/L	nv	<1.0	<1.0	nc	<1.0	<1.0	<1.0	<1.0	-	<1.0
Uranium (U)	0.10	ug/L	420	0.28	0.28	0%	0.47	0.16	1.3	1.3	0.35	0.58
Vanadium (V)	0.50	ug/L	250	1.3	1.2	8.0%	8.3	1.2	21	26	<0.50	4.5
Zinc (Zn)	5.0	ug/L	1100	<5.0	<5.0	nc	19	<5.0	42	53	<5.0	9.3
Zirconium (Zr)	1.0	ug/L	nv	<1.0	<1.0	nc	1.1	<1.0	2.4	1.5	-	<1.0

**Notes:**

<sup>1</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 3: Generic Site Condition Standards for Soils in a Non-Potable Ground Water Condition for Industrial/Commercial Property Use; Coarse-Textured Soils

µg/L - micrograms per litre

RDL - Laboratory reportable detection limit

RPD - Relative percent difference

nc - Not Calculated - one (1) or more concentrations less than 5 times RDL

nv - No Value

< #### - Concentration less than laboratory RDL

**VALUE** Red, **BOLD and UNDERLINED** Value Exceeds MECP Table 3 SCS

**VALUE BOLD** Value Exceedance MECP Table 1 SCS



Arcadis Sample No.	RDL	Units	MECP Table 3 Standards <sup>1</sup>	MW-1 27-Aug-19 BVL	DUP-1 27-Aug-19 BVL	RPD	MW-2 27-Aug-19 BVL	MW-3 27-Aug-19 BVL	MW-4 27-Aug-19 BVL	MW-5 17-Oct-19 BVL	MW-5 (Lab duplicate) 17-Oct-19 BVL	MW-5 23-Oct-19 BVL	MW-5 29-Oct-19 BVL	MW-6 23-Oct-19 BVL
<b>Calculated Parameters</b>														
1,3-Dichloropropene (cis+trans)	0.50	ug/L	5.2	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50
<b>Volatile Organics</b>														
Acetone (2-Propanone)	10	ug/L	130000	<10	<10	nc	<10	<10	<10	<10	<10	<10	<10	<10
Benzene	0.20	ug/L	44	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	0.50	ug/L	85000	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	1.0	ug/L	380	<1.0	<1.0	nc	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	0.50	ug/L	5.6	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon Tetrachloride	0.20	ug/L	0.79	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chlorobenzene	0.20	ug/L	630	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	0.20	ug/L	2.4	<0.20	<0.20	nc	<0.20	<0.20	<0.20	2.4	<b><u>2.5</u></b>	0.21	<0.20	<0.20
Dibromochloromethane	0.50	ug/L	82000	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	0.50	ug/L	4600	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	0.50	ug/L	9600	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	0.50	ug/L	8	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane (FREON 12)	1.0	ug/L	4400	<1.0	<1.0	nc	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	0.20	ug/L	320	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	0.50	ug/L	1.6	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	0.20	ug/L	1.6	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,2-Dichloroethylene	0.50	ug/L	1.6	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	0.50	ug/L	1.6	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	0.20	ug/L	16	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,3-Dichloropropene	0.30	ug/L	nv	<0.30	<0.30	nc	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropene	0.40	ug/L	nv	<0.40	<0.40	nc	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Ethylbenzene	0.20	ug/L	2300	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylene Dibromide	0.20	ug/L	0.25	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexane	1.0	ug/L	51	<1.0	<1.0	nc	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride(Dichloromethane)	2.0	ug/L	610	<2.0	<2.0	nc	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Methyl Ethyl Ketone (2-Butanone)	10	ug/L	470000	<10	<10	nc	<10	<10	<10	<10	<10	<10	<10	<10
Methyl Isobutyl Ketone	5.0	ug/L	140000	<5.0	<5.0	nc	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl t-butyl ether (MTBE)	0.50	ug/L	190	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	0.50	ug/L	1300	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	0.50	ug/L	3.3	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	0.50	ug/L	3.2	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethylene	0.20	ug/L	1.6	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	0.20	ug/L	18000	0.54	0.46	nc	<0.20	<0.20	0.40	<0.20	<0.20	0.62	1.2	0.74
1,1,1-Trichloroethane	0.20	ug/L	640	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane	0.50	ug/L	4.7	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	0.20	ug/L	1.6	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane (FREON 11)	0.50	ug/L	2500	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl Chloride	0.20	ug/L	0.5	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
p+m-Xylene	0.20	ug/L	nv	0.25	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	0.35	0.43	0.47
o-Xylene	0.20	ug/L	nv	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	0.26	<0.20	0.36
Total Xylenes	0.20	ug/L	4200	0.25	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	0.61	0.43	0.83

**Notes:**

<sup>1</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 3: Generic Site Condition Standards for Soils in a Non-Potable Ground Water Condition for Industrial/Commercial Property Use; Coarse-Textured Soils

µg/L micrograms per litre

RDL Laboratory reportable detection limit

RPD Relative percent difference

nc Not Calculated - one (1) or more concentrations less than 5 times RDL

nv No Value

< #### Concentration less than laboratory RDL

**VALUE Red, BOLD and UNDERLINED Value Exceeds Table 3 MECP SCS**

**Table 9**  
**GROUNDWATER ANALYTICAL RESULTS - Petroleum Hydrocarbons**  
**Phase Two ESA**  
**1881, 1883 Merivale Road, Ottawa, ON**

Arcadis Sample No.	RDL	Units	MECP Table 3 Standards <sup>1</sup>	MW-1	DUP-1		MW-2	MW-3	MW-4	MW-5	MW-5	MW-6
Sample Date				27-Aug-19	27-Aug-19	RPD	27-Aug-19	27-Aug-19	27-Aug-19	17-Oct-19	23-Oct-19	23-Oct-19
Laboratory				BVL	BVL		BVL	BVL	BVL	BVL	BVL	BVL
<b>F1 Hydrocarbons</b>												
F1 (C6-C10)	25	µg/L	750	<25	<25	nc	<25	<25	<25	<25	<25	<25
F1 (C6-C10) - BTEX	25	µg/L	750	<25	<25	nc	<25	<25	<25	<25	<25	<25
<b>F2-F4 Hydrocarbons</b>												
F2 (C10-C16 Hydrocarbons)	100	µg/L	150	<100	<100	nc	<100	<100	<100	<100	<100	<100
F3 (C16-C34 Hydrocarbons)	200	µg/L	500	<200	<200	nc	<200	<200	<200	<200	<200	<200
F4 (C34-C50 Hydrocarbons)	200	µg/L	500	<200	<200	nc	<200	<200	<200	<200	<200	<200
Reached Baseline at C50				Yes	Yes	nv	Yes	Yes	Yes	Yes	Yes	Yes

**Notes:**

<sup>1</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 3: Generic Site Condition Standards for Soils in a Non-Potable Ground Water Condition for Industrial/Commercial Property Use; Coarse-Textured Soils

µg/L micrograms per litre

RDL Laboratory reportable detection limit

RPD Relative percent difference

nc Not Calculated - one (1) or more concentrations less than 5 times RDL

nv No Value

< #### Concentration less than laboratory RDL

**VALUE BOLD and UNDERLINED** Value Exceeds MECP SCS

Arcadis Sample No.	RDL	Units	MECP Table 3 Standards <sup>1</sup>	MW-1
Sample Date				27-Aug-19
Laboratory				BVL
<b>PAHs</b>				
Acenaphthene	0.050	µg/L	600	<0.050
Acenaphthylene	0.050	µg/L	1.8	<0.050
Anthracene	0.050	µg/L	2.4	<0.050
Benzo(a)anthracene	0.050	µg/L	4.7	<0.050
Benzo(a)pyrene	0.010	µg/L	0.81	<0.010
Benzo(b/j)fluoranthene	0.050	µg/L	0.75	<0.050
Benzo(g,h,i)perylene	0.050	µg/L	0.2	<0.050
Benzo(k)fluoranthene	0.050	µg/L	0.4	<0.050
Chrysene	0.050	µg/L	1	<0.050
Dibenz(a,h)anthracene	0.050	µg/L	0.52	<0.050
Fluoranthene	0.050	µg/L	130	<0.050
Fluorene	0.050	µg/L	400	<0.050
Indeno(1,2,3-cd)pyrene	0.050	µg/L	0.2	<0.050
1-Methylnaphthalene	0.050	µg/L	1800	<0.050
2-Methylnaphthalene	0.050	µg/L	1800	<0.050
Naphthalene	0.050	µg/L	1400	0.081
Phenanthrene	0.030	µg/L	580	<0.030
Pyrene	0.050	µg/L	68	<0.050
<b>Calculated Parameters</b>				
Methylnaphthalene, 2-(1-)	0.071	µg/L	1800	<0.071

**Notes:**

<sup>1</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 3: Generic Site Condition Standards for Soils in a Non-Potable Ground Water Condition for Industrial/Commercial Property Use; Coarse-Textured Soils

µg/L micrograms per litre

RDL Laboratory reportable detection limit

< ##### Concentration less than laboratory RDL

**VALUE BOLD and UNDERLINED** Value Exceeds MECP SCS

**Table 11**  
**GROUNDWATER ANALYTICAL RESULTS - Pesticides and Herbicides**  
**Phase Two ESA**  
**1881, 1883 Merivale Road, Ottawa, ON**

Arcadis Sample No.	RDL	Units	MECP Table 3 Standards <sup>1</sup>	MW-4
Sample Date				06-Sep-19
Laboratory				BVL
<b>Pesticides and Herbicides (OC Pesticides)</b>				
Aldrin	0.005	µg/L	8.5	<0.005
Dieldrin	0.005	µg/L	0.75	<0.005
a-Chlordane	0.005	µg/L	nv	<0.005
g-Chlordane	0.005	µg/L	nv	<0.005
o,p-DDD	0.005	µg/L	nv	<0.005
p,p-DDD	0.005	µg/L	nv	<0.005
o,p-DDE	0.005	µg/L	nv	<0.005
p,p-DDE	0.005	µg/L	nv	<0.005
o,p-DDT	0.005	µg/L	nv	<0.005
p,p-DDT	0.005	µg/L	nv	<0.005
Lindane	0.003	µg/L	1.2	<0.003
Endosulfan I (alpha)	0.005	µg/L	nv	<0.005
Endosulfan II (beta)	0.005	µg/L	nv	<0.005
Endrin	0.005	µg/L	0.48	<0.005
Heptachlor	0.005	µg/L	2.5	<0.005
Heptachlor epoxide	0.005	µg/L	0.048	<0.005
Hexachlorobenzene	0.005	µg/L	3.1	<0.005
Hexachlorobutadiene	0.009	µg/L	0.44	<0.009
Hexachloroethane	0.01	µg/L	94	<0.01
Methoxychlor	0.01	µg/L	6.5	<0.01
Aroclor 1242	0.05	µg/L	nv	<0.05
Aroclor 1248	0.05	µg/L	nv	<0.05
Aroclor 1254	0.05	µg/L	nv	<0.05
Aroclor 1260	0.05	µg/L	nv	<0.05
<b>Calculated Parameters</b>				
Chlordane (Total)	0.005	µg/L	28	<0.005
o,p-DDD + p,p-DDD	0.005	µg/L	45	<0.005
o,p-DDE + p,p-DDE	0.005	µg/L	20	<0.005
o,p-DDT + p,p-DDT	0.005	µg/L	2.8	<0.005
Total Endosulfan	0.005	µg/L	1.5	<0.005
Total PCB	0.05	µg/L	7.8	<0.05
<b>Pesticides and Herbicides (OP Pesticides)</b>				
Demeton-S	2.0	µg/L	nv	<2.0
Dichlorvos	2.0	µg/L	nv	<2.0
Dimethoate	2.0	µg/L	nv	<2.0
Fenclorophos (Ronnel)	2.0	µg/L	nv	<2.0
Fonofos	2.0	µg/L	nv	<2.0

**Table 11**  
**GROUNDWATER ANALYTICAL RESULTS - Pesticides and Herbicides**  
**Phase Two ESA**  
**1881, 1883 Merivale Road, Ottawa, ON**

Arcadis Sample No.	RDL	Units	MECP Table 3 Standards <sup>1</sup>	MW-4
Sample Date				06-Sep-19
Laboratory				BVL
Metolachlor	5.0	µg/L	nv	<5.0
Mevinphos	2.0	µg/L	nv	<2.0
Phosmet	2.0	µg/L	nv	<2.0
Triallate	5.0	µg/L	nv	<5.0
Trifluralin	5.0	µg/L	nv	<5.0
Atrazine	1.0	µg/L	nv	<1.0
Diazinon	2.0	µg/L	nv	<2.0
Malathion	2.0	µg/L	nv	<2.0
Parathion Ethyl	2.0	µg/L	nv	<2.0
Parathion Methyl	2.0	µg/L	nv	<2.0
Simazine	2.0	µg/L	nv	<2.0
Aldicarb	5.0	µg/L	nv	<5.0
Bendiocarb	2.0	µg/L	nv	<2.0
Carbaryl	5.0	µg/L	nv	<5.0
Carbofuran	5.0	µg/L	nv	<5.0
Cyanazine (Bladex)	5.0	µg/L	nv	<5.0
Prometryne	1.0	µg/L	nv	<1.0
Chlorpyrifos (Dursban)	2.0	µg/L	nv	<2.0
Terbufos	1.0	µg/L	nv	<1.0
Phorate	1.0	µg/L	nv	<1.0
Guthion (Azinphos-methyl)	1.0	µg/L	nv	<1.0
Ethion	1.0	µg/L	nv	<1.0
Fenthion	1.0	µg/L	nv	<1.0

**Notes:**

<sup>1</sup> Ministry of the Environment, Conservation and Parks (MECP, 2011): Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (EPA); April 15, 2011. Table 3: Generic Site Condition Standards for Soils in a Non-Potable Ground Water Condition for Industrial/Commercial Property Use; Coarse-Textured Soils

µg/L micrograms per litre

nv No Value

< #### Concentration less than laboratory RDL

**VALUE BOLD and UNDERLINED** Value Exceeds MECP SCS



**TABLE 12**      **MAXIMUM CONCENTRATIONS OF CONTAMINANTS OF CONCERN IN SOIL**  
**1881/ 1883 Merivale Road, Ottawa, ON**

Parameter	MOECC Table 3 <sup>1</sup>	Units	Maximum Concentration	Location ID	Sample ID	Sample Depth (m bgs)
<b>Petroleum Hydrocarbons</b>						
F1 (C6-C10) - BTEX	55	µg/g	<10	various	various	various
F2 (C10-C16)	230	µg/g	<10	various	various	various
F3 (C16-C34)	1700	µg/g	<50	various	various	various
F4 (C34-C50)	3300	µg/g	<50	various	various	various
<b>Volatile Organic Compounds</b>						
Benzene	0.32	µg/g	<0.02	various	various	various
Toluene	68	µg/g	<0.02	various	various	various
Ethylbenzene	9.5	µg/g	<0.02	various	various	various
m+p-Xylene	NV	µg/g	<0.02	various	various	various
o-Xylene	NV	µg/g	<0.02	various	various	various
Xylenes, Total	26	µg/g	<0.02	various	various	various
Acetone	16	µg/g	<0.5	various	various	various
Bromodichloromethane	18	µg/g	<0.05	various	various	various
Bromoform	0.61	µg/g	<0.05	various	various	various
Bromomethane	0.05	µg/g	<0.05	various	various	various
Carbon Tetrachloride	0.21	µg/g	<0.05	various	various	various
Chlorobenzene	2.4	µg/g	<0.05	various	various	various
Chloroform	0.47	µg/g	<0.05	various	various	various
Dibromochloromethane	13	µg/g	<0.05	various	various	various
1,2-Dichlorobenzene	6.8	µg/g	<0.05	various	various	various
1,3-Dichlorobenzene	9.6	µg/g	<0.05	various	various	various
1,4-Dichlorobenzene	0.2	µg/g	<0.05	various	various	various
Dichlorodifluoromethane	16	µg/g	<0.05	various	various	various
1,1-Dichloroethane	17	µg/g	<0.05	various	various	various
1,2-Dichloroethane	0.05	µg/g	<0.05	various	various	various
1,1-Dichloroethylene	0.064	µg/g	<0.05	various	various	various
cis-1,2-Dichloroethylene	55	µg/g	<0.05	various	various	various
trans-1,2-Dichloroethylene	1.3	µg/g	<0.05	various	various	various
1,2-Dichloropropane	0.16	µg/g	<0.05	various	various	various
cis-1,3-Dichloropropene	0.18	µg/g	<0.05	various	various	various
trans-1,3-Dichloropropene	0.18	µg/g	<0.05	various	various	various
1,3-Dichloropropene (cis+trans)	0.05	µg/g	<0.040	various	various	various
Ethylene Dibromide	0.05	µg/g	<0.05	various	various	various
Hexane (n-Hexane)	46	µg/g	<0.05	various	various	various
Methyl Ethyl Ketone (MEK)	70	µg/g	<0.5	various	various	various
Methyl Isobutyl Ketone (MIBK)	31	µg/g	<0.5	various	various	various
Methyl tert-butyl ether (MTBE)	11	µg/g	<0.05	various	various	various
Methylene Chloride (Dichloromethane)	1.6	µg/g	<0.05	various	various	various
Styrene	34	µg/g	<0.05	various	various	various
1,1,1,2-Tetrachloroethane	0.087	µg/g	<0.05	various	various	various
1,1,2,2-Tetrachloroethane	0.05	µg/g	<0.05	various	various	various
Tetrachloroethylene	4.5	µg/g	<0.05	various	various	various
1,1,1-Trichloroethane	6.1	µg/g	<0.05	various	various	various
1,1,2-Trichloroethane	0.05	µg/g	<0.05	various	various	various
Trichloroethylene	0.91	µg/g	<0.05	various	various	various
Trichlorofluoromethane	4	µg/g	<0.05	various	various	various
Vinyl Chloride	0.032	µg/g	<0.020	various	various	various

µg/g      micrograms per gram

m bgs      metres below ground surface

NV      no value (standard)

<###      less than laboratory detection limit and MOECC Table 3 Standard

<sup>1</sup>      MOECC Table 3 full depth generic site condition standards in a non-potable ground water condition for commercial/industrial/community property use, coarse textured soils (MOECC, 2011).

**#####**      bold and underlined value exceeds the applicable standard



**TABLE 12**      **MAXIMUM CONCENTRATIONS OF CONTAMINANTS OF CONCERN IN SOIL**  
**1881/ 1883 Merivale Road, Ottawa, ON**

Parameter	MOECC Table 3 <sup>1</sup>	Units	Maximum Concentration	Location ID	Sample ID	Sample Depth (m bgs)
<b>Semivolatile Organic Compounds (PAHs)</b>						
Acenaphthene	96	µg/g	<0.005	various	various	various
Acenaphthylene	0.15	µg/g	<0.005	various	various	various
Anthracene	0.67	µg/g	<0.005	various	various	various
Benzo(a)anthracene	0.96	µg/g	0.013	BH2	BH2-1	0.6-1.1 m bgs
Benzo(a)pyrene	0.3	µg/g	0.014	BH2	BH2-1	0.6-1.1 m bgs
Benzo(b/j)fluoranthene	0.96	µg/g	0.025	BH2	BH2-1	0.6-1.1 m bgs
Benzo(g,h,i)perylene	9.6	µg/g	0.023	BH2	BH2-1	0.6-1.1 m bgs
Benzo(k)fluoranthene	0.96	µg/g	0.0073	BH2	BH2-1	0.6-1.1 m bgs
Chrysene	9.6	µg/g	0.013	BH2	BH2-1	0.6-1.1 m bgs
Dibenz(a,h)anthracene	0.1	µg/g	<0.005	various	various	various
Fluoranthene	9.6	µg/g	0.027	various	various	various
Fluorene	62	µg/g	0.14	BH2	BH2-1	0.6-1.1 m bgs
Indeno(1,2,3-cd)pyrene	0.76	µg/g	0.015	BH2	BH2-1	0.6-1.1 m bgs
1-Methylnaphthalene	76	µg/g	<0.005	various	various	various
2-Methylnaphthalene	76	µg/g	<0.005	various	various	various
1+2-Methylnaphthalene	76	µg/g	<0.005	various	various	various
Naphthalene	9.6	µg/g	<0.005	various	various	various
Phenanthrene	12	µg/g	0.014	BH2	BH2-1	0.6-1.1 m bgs
Pyrene	96	µg/g	0.023	BH2	BH2-1	0.6-1.1 m bgs

µg/g      micrograms per gram

m bgs      metres below ground surface

NV      no value (standard)

<###      less than laboratory detection limit and MOECC Table 3 Standard

<sup>1</sup>      MOECC Table 3 full depth generic site condition standards in a non-potable ground water condition for commercial/industrial/community property use, coarse textured soils (MOECC, 2011).

**#####**      bold and underlined value exceeds the applicable standard



**TABLE 12**      **MAXIMUM CONCENTRATIONS OF CONTAMINANTS OF CONCERN IN SOIL**  
**1881/ 1883 Merivale Road, Ottawa, ON**

Parameter	MOECC Table 3 <sup>1</sup>	Units	Maximum Concentration	Location ID	Sample ID	Sample Depth (m bgs)
<b>Metals &amp; Inorganics</b>						
Antimony (Sb)	40	µg/g	0.33	BH2	BH2-1	0.1-0.25
Arsenic (As)	18	µg/g	3.5	BH2	BH2-1	0.1-0.25
Barium (Ba)	670	µg/g	77	BH2	BH2-1	0.1-0.25
Beryllium (Be)	8	µg/g	0.3	BH1	BH1-1	0.2-0.8
Boron (B)	120	µg/g	-	-	-	-
Hot Water Extractable Boron	2	µg/g	0.2	BH2	BH2-1	0.1-0.25
Cadmium (Cd)	1.9	µg/g	0.2	BH2	BH2-1	0.1-0.25
Chromium (Cr)	160	µg/g	17	BH2	BH2-1	0.1-0.25
Hexavalent Chromium (CrVI)	8	µg/g	-	-	-	-
Cobalt (Co)	80	µg/g	4.7	MW-4	MW4-1	5.5-6.0
Copper (Cu)	230	µg/g	13	BH2	BH2-1	0.1-0.25
Lead (Pb)	120	µg/g	27	BH2	BH2-1	0.1-0.25
Mercury (Hg)	3.9	µg/g	<0.05	various	various	various
Molybdenum (Mo)	40	µg/g	3.1	MW-1	MW1-1	6-6.3
Nickel (Ni)	270	µg/g	10	BH2	BH2-1	0.1-0.25
Selenium (Se)	5.5	µg/g	<0.5	various	various	various
Silver (Ag)	40	µg/g	<0.2	various	various	various
Thallium (Tl)	3.3	µg/g	0.086	BH2	BH2-1	0.1-0.25
Uranium (U)	33	µg/g	0.66	MW6	MW6-1	5.2-5.5
Vanadium (V)	86	µg/g	32	DUP-1(MW2)	DUP-1(MW2)	0.6-1.1
Zinc (Zn)	340	µg/g	63	BH2	BH2-1	0.1-0.25
Cyanide	0.051	µg/g	-	-	-	-
Electrical Conductivity	1.4	mS/cm	0.097	MW6	MW6-1	5.2-5.5
Sodium Adsorption Ratio	12	Ratio	0.4	MW5	MW5-1	5.2-5.5

µg/g                      micrograms per gram

m bgs                    metres below ground surface

NV                        no value (standard)

<###                    less than laboratory detection limit and MOECC Table 3 Standard

<sup>1</sup>                            MOECC Table 3 full depth generic site condition standards in a non-potable ground water condition for commercial/industrial/community property use, coarse textured soils (MOECC, 2011).

**#####**                    bold and underlined value exceeds the applicable standard





**TABLE 13**                    **MAXIMUM CONCENTRATIONS OF CONTAMINANTS OF CONCERN IN GROUND WATER**  
**1881/ 1883 Merivale Road, Ottawa, ON**

Parameter	MOECC Table 3 <sup>1</sup>	Units	Maximum Concentration	Monitoring Well ID	Sample ID	Date
<b>Petroleum Hydrocarbons</b>						
F1 (C6-C10) - BTEX	750	ug/L	<25	various	various	various
F2 (C10-C16)	150	ug/L	<100	various	various	various
F3 (C16-C34)	500	ug/L	<200	various	various	various
F4 (C34-C50)	500	ug/L	<200	various	various	various
<b>Volatile Organic Compounds</b>						
Benzene	44	ug/L	<0.2	various	various	various
Toluene	18000	ug/L	1.2	MW-5	MW-5	2019-10-29
Ethylbenzene	2300	ug/L	<0.2	various	various	various
Xylenes, Total	4200	ug/L	0.83	MW-6	MW-6	2019-10-29
Acetone	130,000	ug/L	<10	various	various	various
Bromodichloromethane	85,000	ug/L	<0.5	various	various	various
Bromoform	380	ug/L	<1.0	various	various	various
Bromomethane	5.6	ug/L	<0.5	various	various	various
Carbon Tetrachloride	0.79	ug/L	<0.2	various	various	various
Chlorobenzene	630	ug/L	<0.2	various	various	various
Chloroform	2.4	ug/L	0.21	MW-5	MW-5	2019-10-29
Dibromochloromethane	85,000	ug/L	<0.5	various	various	various
1,2-Dichlorobenzene	4600	ug/L	<0.5	various	various	various
1,3-Dichlorobenzene	9600	ug/L	<0.5	various	various	various
1,4-Dichlorobenzene	8	ug/L	<0.5	various	various	various
Dichlorodifluoromethane	4400	ug/L	<1	various	various	various
1,1-Dichloroethane	320	ug/L	<0.2	various	various	various
1,2-Dichloroethane	1.6	ug/L	<0.5	various	various	various
1,1-Dichloroethylene	1.6	ug/L	<0.2	various	various	various
cis-1,2-Dichloroethylene	1.6	ug/L	<0.3	various	various	various
trans-1,2-Dichloroethylene	1.6	ug/L	<0.5	various	various	various
1,2-Dichloropropane	16	ug/L	<0.2	various	various	various
cis-1,3-Dichloropropene	5.2	ug/L	<0.3	various	various	various
trans-1,3-Dichloropropene	5.2	ug/L	<0.4	various	various	various
1,3-Dichloropropene (cis)	5.2	ug/L	<0.3	various	various	various
1,3-Dichloropropene (trans)	5.2	ug/L	<0.4	various	various	various
Ethylene Dibromide	0.25	ug/L	<0.2	various	various	various
Hexane	51	ug/L	<1	various	various	various
Methyl Ethyl Ketone (MEK)	470,000	ug/L	<10	various	various	various
Methyl Isobutyl Ketone (MIBK)	140,000	ug/L	<5	various	various	various
Methyl tert-butyl ether (MTBE)	190	ug/L	<0.5	various	various	various
Methylene Chloride (Dichloromethane)	610	ug/L	<2	various	various	various
Styrene	1300	ug/L	<0.5	various	various	various
1,1,1,2-Tetrachloroethane	303	ug/L	<0.5	various	various	various
1,1,2,2-Tetrachloroethane	3.2	ug/L	<0.5	various	various	various
Tetrachloroethylene	1.6	ug/L	<0.2	various	various	various
1,1,1-Trichloroethane	640	ug/L	<0.2	various	various	various
1,1,2-Trichloroethane	4.7	ug/L	<0.5	various	various	various
Trichloroethylene	1.6	ug/L	<0.2	various	various	various
Trichlorofluoromethane	2500	ug/L	<0.5	various	various	various
Vinyl Chloride	0.5	ug/L	<0.2	various	various	various

µg/L

micrograms per litre

NV

no value (standard)

&lt;###

less than laboratory detection limit and MOECC Table 3 Standard

1

MOECC Table 3 full depth generic site condition standards in a non-potable ground water condition for commercial/industrial/community property use, coarse textured soils (MOECC, 2011).

**#####**

bold and underlined value exceeds the applicable standard



**TABLE 13**      **MAXIMUM CONCENTRATIONS OF CONTAMINANTS OF CONCERN IN GROUND WATER**  
**1881/ 1883 Merivale Road, Ottawa, ON**

Parameter	MOECC Table 3 <sup>1</sup>	Units	Maximum Concentration	Monitoring Well ID	Sample ID	Date
<b>Semivolatile Organic Compounds (PAHs)</b>						
Acenaphthene	600	ug/L	<0.005	various	various	various
Acenaphthylene	1.8	ug/L	<0.005	various	various	various
Anthracene	2.4	ug/L	<0.005	various	various	various
Benzo(a)anthracene	4.7	ug/L	<0.005	various	various	various
Benzo(a)pyrene	0.81	ug/L	<0.005	various	various	various
Benzo(b/j)fluoranthene	0.75	ug/L	<0.005	various	various	various
Benzo(g,h,i)perylene	0.2	ug/L	<0.005	various	various	various
Benzo(k)fluoranthene	0.4	ug/L	<0.005	various	various	various
Chrysene	1	ug/L	<0.005	various	various	various
Dibenz(a,h)anthracene	0.52	ug/L	<0.005	various	various	various
Fluoranthene	130	ug/L	<0.005	various	various	various
Fluorene	400	ug/L	<0.005	various	various	various
Indeno(1,2,3-cd)pyrene	0.2	ug/L	<0.005	various	various	various
1-Methylnaphthalene	1800	ug/L	<0.005	various	various	various
2-Methylnaphthalene	1800	ug/L	<0.005	various	various	various
1+2-Methylnaphthalene	1800	ug/L	<0.005	various	various	various
Naphthalene	1400	ug/L	<0.005	various	various	various
Phenanthrene	580	ug/L	<0.005	various	various	various
Pyrene	68	ug/L	<0.005	various	various	various

µg/L

micrograms per litre

NV

no value (standard)

&lt;###

less than laboratory detection limit and MOECC Table 3 Standard

1

MOECC Table 3 full depth generic site condition standards in a non-potable ground water condition for commercial/industrial/community property use, coarse textured soils (MOECC, 2011).

**#####**

bold and underlined value exceeds the applicable standard



**TABLE 13**      **MAXIMUM CONCENTRATIONS OF CONTAMINANTS OF CONCERN IN GROUND WATER**  
**1881/ 1883 Merivale Road, Ottawa, ON**

Parameter	MOECC Table 3 <sup>1</sup>	Units	Maximum Concentration	Monitoring Well ID	Sample ID	Date
<b>Metals &amp; Inorganics</b>						
Antimony (Sb)	20000	ug/L	<0.5	various	various	various
Arsenic (As)	1900	ug/L	3.2	MW-5	MW-5	2019-09-23
Barium (Ba)	29000	ug/L	1600	MW-3	MW-3	2019-09-27
Beryllium (Be)	67	ug/L	<0.5	various	various	various
Boron (B)	45000	ug/L	48	MW-4	MW-4	2019-08-27
Cadmium (Cd)	2.7	ug/L	0.31	MW-3	MW-3	2019-08-27
Chloride (Cl)	2,300,000	ug/L	-	-	-	-
Chromium (Cr)	810	ug/L	80	MW-5	MW-5	2019-09-23
Hexavalent Chromium (CrVI)	140	ug/L	0.66	MW22-2	MW22-2	2022-10-23
Cobalt (Co)	66	ug/L	24	MW-4	MW-4	2019-08-27
Copper (Cu)	87	ug/L	76	MW-4	MW-4	2019-08-27
Free Cyanide	66	ug/L	-	-	-	-
Lead (Pb)	25	ug/L	14	MW-4	MW-4	2019-08-27
Mercury (Hg)	0.29	ug/L	<0.0001	various	various	various
Molybdenum (Mo)	9200	ug/L	36	MW-5	MW-5	2019-09-23
Nickel (Ni)	490	ug/L	24	MW-5	MW-5	2019-09-23
Selenium (Se)	63	ug/L	<2	various	various	various
Silver (Ag)	1.5	ug/L	0.18	MW-1	MW-1	2019-08-27
Sodium (Na)	2,300,000	ug/L	600,000	MW-3	MW-3	2019-08-27
Thallium (Tl)	510	ug/L	0.24	MW-4	MW-4	2019-08-27
Uranium (U)	420	ug/L	1.3	MW-4	MW-4	2019-08-27
Vanadium (V)	250	ug/L	26	MW-5	MW-5	2019-09-23
Zinc (Zn)	1100	ug/L	53	MW-5	MW-5	2019-09-23

µg/L

micrograms per litre

NV

no value (standard)

&lt;###

less than laboratory detection limit and MOECC Table 3 Standard

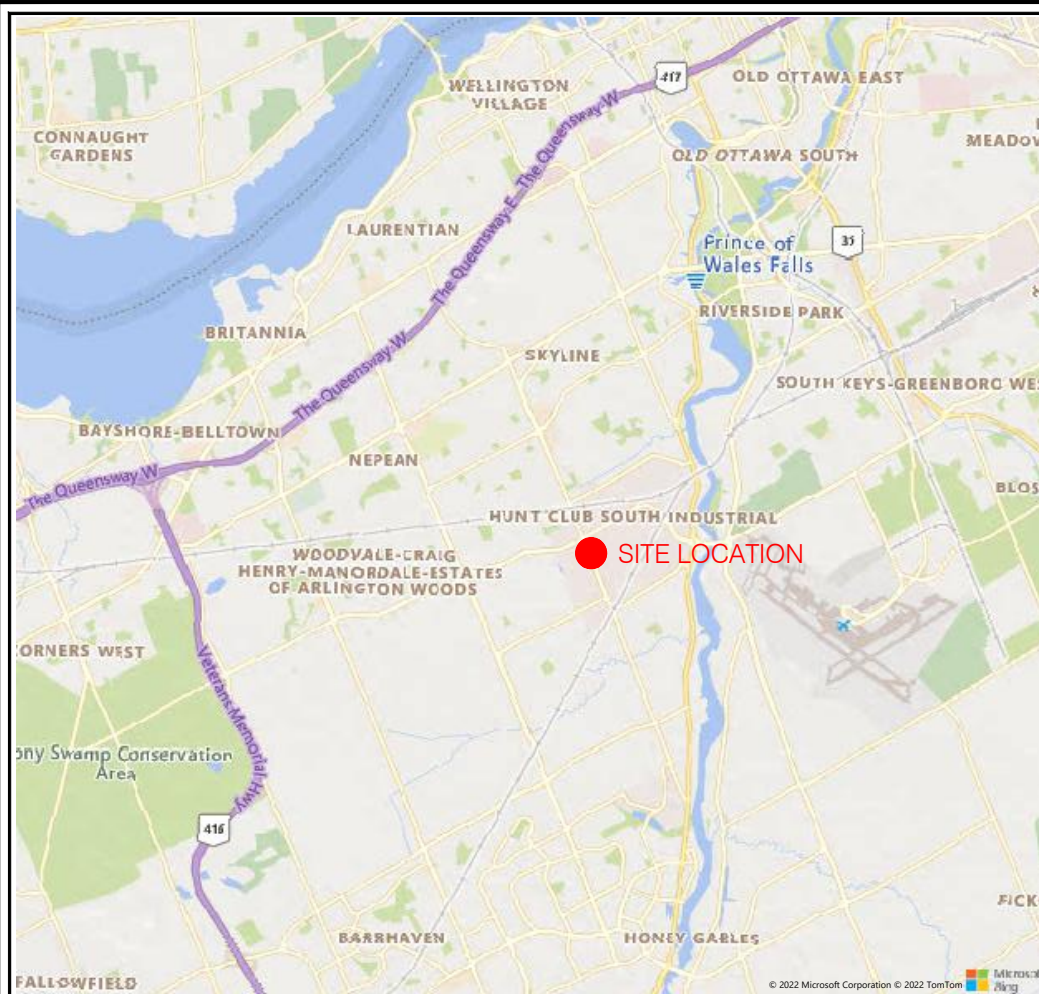
1

MOECC Table 3 full depth generic site condition standards in a non-potable ground water condition for commercial/industrial/community property use, coarse textured soils (MOECC, 2011).

**#####**

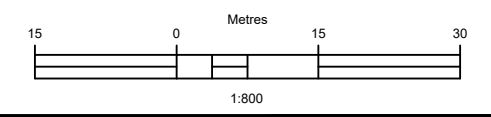
bold and underlined value exceeds the applicable standard

# Figures

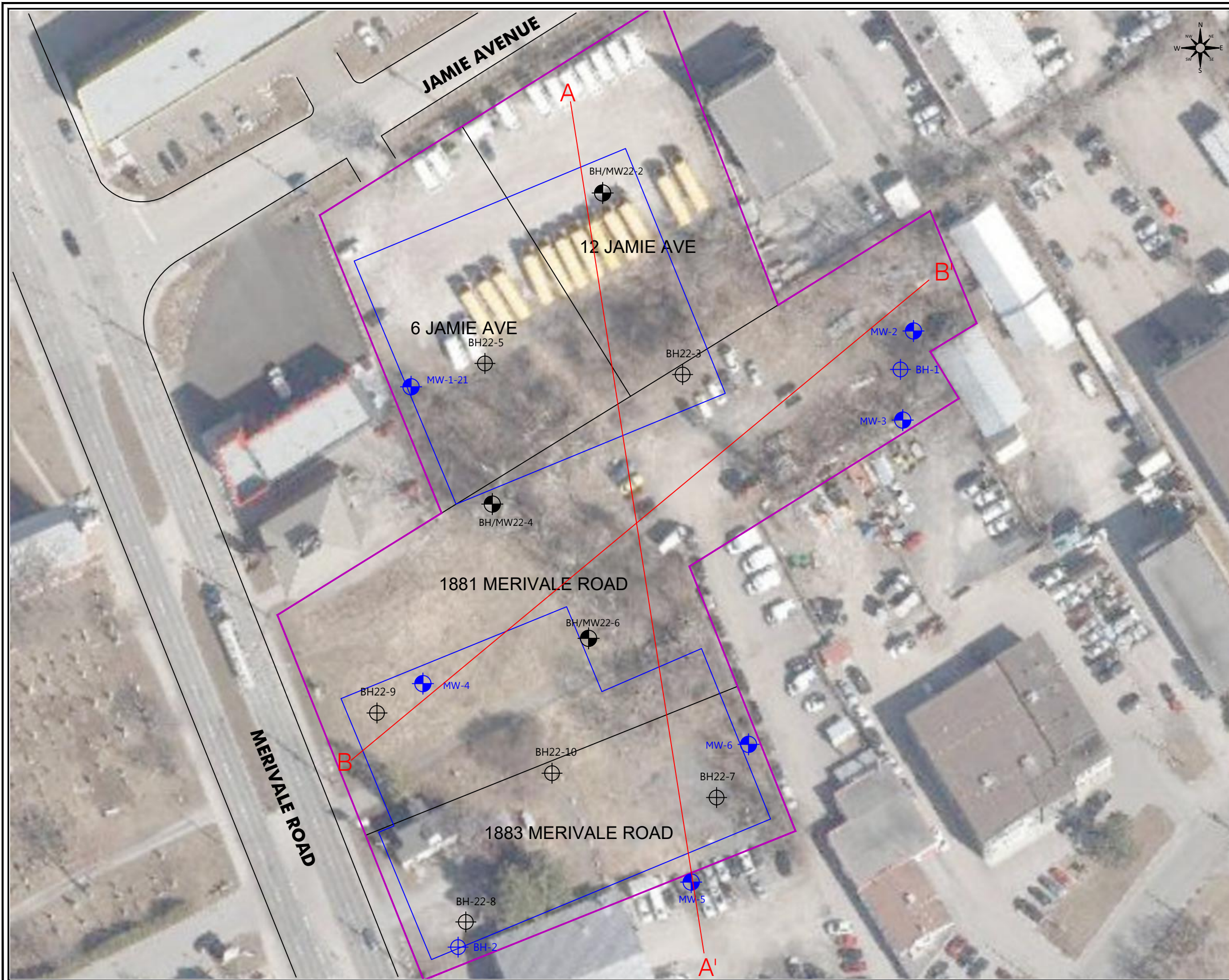


**LEGEND**

- PHASE TWO SITE BOUNDARY
- LOT LINES
- PROPOSED BUILDING FOOTPRINT

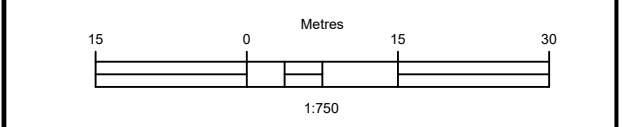


<b>Title:</b>	<b>KEY PLAN</b>
<b>Project:</b>	<b>PHASE TWO ENVIRONMENTAL SITE ASSESSMENT 1881 &amp; 1883 MERIVALE RD and 6 &amp; 12 JAMIE AVENUE OTTAWA, ONTARIO</b>
<b>Client:</b>	<b>Z.V.HOLDINGS CORP.</b>
<b>Date:</b>	<b>NOVEMBER 2022</b>
<b>ARCADIS</b>	
<b>FIGURE 1</b>	



**LEGEND**

- PHASE TWO SITE BOUNDARY
- LOT LINES
- PROPOSED BUILDING FOOTPRINT
- ⊕ MONITORING WELL
- ⊙ BOREHOLE
- ⊕ BOREHOLE/MONITORING WELL LOCATION (ARCADIS, 2022)
- ⊙ BOREHOLE LOCATION (ARCADIS, 2022)
- CROSS SECTION LOCATION



<b>Title:</b>	<b>BOREHOLE/MONITORING WELL LOCATION PLAN</b>
<b>Project:</b>	<b>PHASE TWO ENVIRONMENTAL SITE ASSESSMENT 1881 &amp; 1883 MERIVALE RD and 6 &amp; 12 JAMIE AVENUE OTTAWA, ONTARIO</b>
<b>Client:</b>	<b>Z.V.HOLDINGS CORP.</b>
<b>Date:</b>	NOVEMBER 2022
<b>FIGURE 2</b>	



**LEGEND**

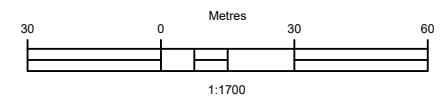
- SITE BOUNDARY
- LOT LINES
- PROPOSED BUILDING FOOTPRINT

**AREAS OF POTENTIAL CONCERN**

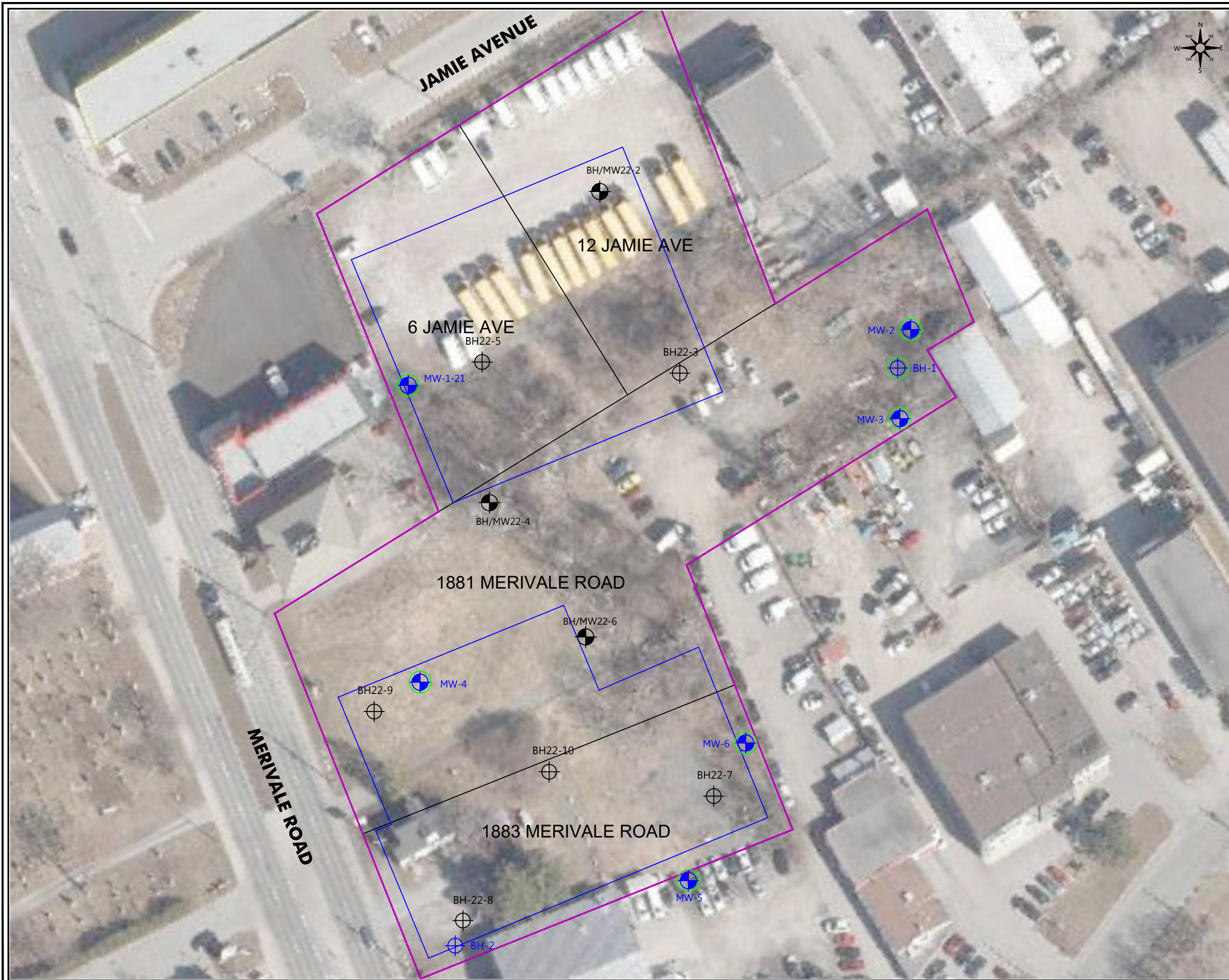
- APEC 1** – Historic Work Shop Operations, Former Building Location, Northeast Portion of 1881 Merivale Road – PHCs, VOCs
- APEC 2** – Commercial Vehicle Parking Lot and Fill Soils, as well as Bruno's Autobody, North boundary of 1881 Merivale and South and West Boundary of 6 Jamie Property – PHCs, VOCs, PAHs, Metals
- APEC 3** – Cemetery Leachate Operations, West and Northwest Portion of 1881 Merivale Road. PHCs, VOCs, Metals, Pesticides, Herbicides
- APEC 4** – Uncharacterized Fill Material 1883 Merivale Road Parking Lot, West Portion of Property - PHCs, VOCs, PAHs, Metals
- APEC 5** - Presence of Historical Fuel Tanks, South of 1883 Merivale Road. South Portion of 1883 Merivale Road. PHCs, VOCs, PAHs and Metals
- APEC 6** - Wastes Generated on Adjacent Property, East of 883 Merivale Road. East Portion of 1883 Merivale Road. PHCs, VOCs, PAHs and METALS

**PROPERTY CONDITION ASSESSMENT**

- PCA a)** 29 CAMELOT DR: DNA GENOTEK INC. (PCA#2: Pharmaceutical Manufacturing and Processing)
- PCA b)** 8 CAMELOT UNIT 200: OSPREY MEDIA GROUP (PCA #31: Ink Manufacturing, Processing and Bulk Storage  
PCA #33: Metal Treatment, Coating, Plating and Finishing  
PCA #34: Metal Fabrication)
- PCA c)** 10 CAMELOT DR UNIT 200: BRAFASCO (PCA#58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosolids as soil conditioners)
- PCA d)** 1903 MERIVALE ROAD: ALUMINUM WAREHOUSE (PCA #31: Ink Manufacturing, Processing and Bulk Storage  
PCA #33: Metal Treatment, Coating, Plating and Finishing  
PCA #43: Plastics (including Fibreglass) Manufacturing and Processing)
- PCA e)** 1900 MERIVALE ROAD: INTERTECHNOLOGY INC., PRO PRINTERS INC., PEERNET INC., CANADA CHINA NEWS (PCA #31: Ink Manufacturing, Processing and Bulk Storage  
PCA #54: Textile Manufacturing and Processing)
- PCA f)** 300-14 BENTLEY AVE.: 2228401 ONTARIO INC. (PCA #58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosolids as soil conditioners)
- PCA g)** 18 BENTLEY AVE.: ADVANCED COPY SYSTEMS (ACS) INC. (PCA#58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosolids as soil conditioners)
- PCA h)** 1895 MERIVALE ROAD: SUNCOR ENERGY INC (PCA#28: Gasoline and Associated Products Storage in Fixed Tanks)
- PCA i)** 15 BENTLEY AVE.: STONE DESIGN CONCEPTS (PCA#58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosolids as soil conditioners)
- PCA j)** 1891 MERIVALE RD UNIT 4: HIGHSPEED SIGNS & BANNERS INC. (PCA #33: Metal Treatment, Coating, Plating and Finishing  
PCA #34: Metal Fabrication)
- PCA k)** 11 BENTLEY AVE.: JULIAN TAXI CAB LTD. (PCA #52: Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems  
PCA #58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosolids as soil conditioners)
- PCA l)** 1881 MERIVALE RD: ARNON DEVELOPMENT CORP. LTD., BRUNOS PERFORMANCE LTD. (PCA #58: Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosolids as soil conditioners)  
(PCA#28: Gasoline and Associated Products Storage in Fixed Tanks)



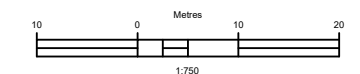
Title:	<b>PCA and APEC LOCATIONS</b>
Project:	<b>PHASE TWO ENVIRONMENTAL SITE ASSESSMENT 1881 &amp; 1883 MERIVALE RD and 6 &amp; 12 JAMIE AVENUE OTTAWA, ONTARIO</b>
Client:	<b>Z.V.HOLDINGS CORP.</b>
	Date: <b>NOVEMBER 2022</b>
<b>ARCADIS</b>	<b>FIGURE 3</b>



**LEGEND**

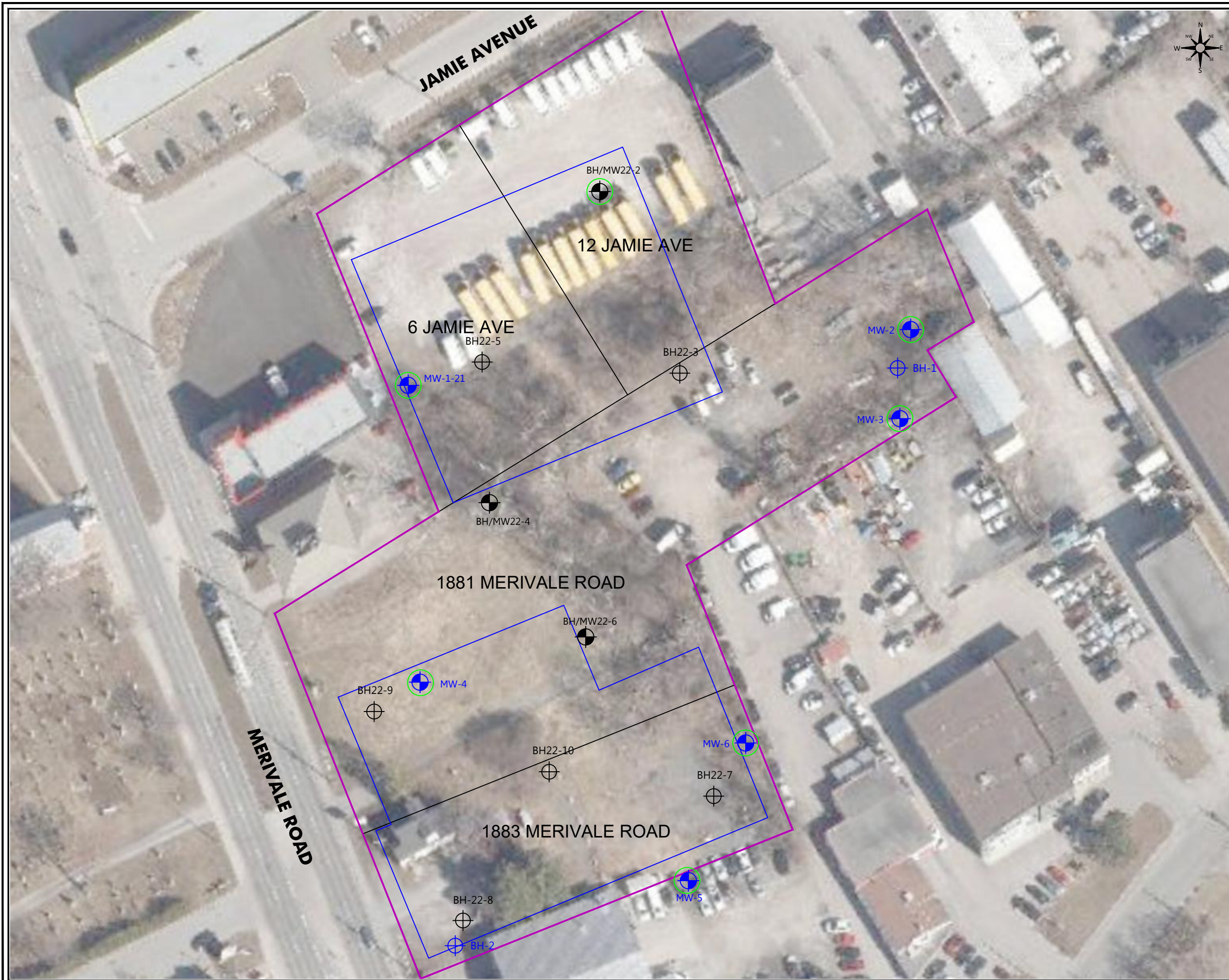
- PHASE TWO SITE BOUNDARY
- LOT LINES
- PROPOSED BUILDING FOOTPRINT
- MONITORING WELL (2019)
- BOREHOLE (2019)
- BOREHOLE/MONITORING WELL LOCATION (ARCADIS, 2022)
- BOREHOLE LOCATION (ARCADIS, 2022)
- ANALYTICAL RESULTS SATISFY APPLICABLE GUIDELINES

**NOTE:**  
 Twenty-six (26) soil samples (including duplicates) from the boreholes advanced in the overburden were submitted for laboratory analysis for one or more parameters of BTEX, PHCs F1 to F4, VOCs, metals/ inorganics, pesticides/ herbicides and Poly Aromatic Hydrocarbons (PAHs). No exceedances of any soil Site Condition Standards were observed in comparison with applicable MECP Table 3 Standards.



Title:	<b>SOIL CONTAMINANT DISTRIBUTION</b>
Project:	<b>PHASE TWO ENVIRONMENTAL SITE ASSESSMENT 1881 &amp; 1883 MERIVALE RD and 6 &amp; 12 JAMIE AVENUE OTTAWA, ONTARIO</b>
Client:	<b>Z.V.HOLDINGS CORP.</b>
Date:	NOVEMBER 2022
<b>FIGURE 4</b>	



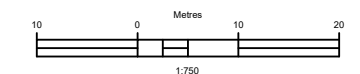


**LEGEND**

- PHASE TWO SITE BOUNDARY
- LOT LINES
- PROPOSED BUILDING FOOTPRINT
- ⊕ MONITORING WELL (2019)
- ⊕ BOREHOLE (2019)
- ⊕ BOREHOLE/MONITORING WELL LOCATION (ARCADIS, 2022)
- ⊕ BOREHOLE LOCATION (ARCADIS, 2022)
- ⊕ ANALYTICAL RESULTS SATISFY APPLICABLE GUIDELINES

MW1 GW tested for Metals, VOCs, PHCs, PAHs  
 MW2 GW tested for Metals, VOCs, PHCs,  
 MW3 GW tested for Metals, VOCs, PHCs  
 MW4 GW tested for Metals, VOCs, PHCs,  
 Pesticides/Herbicides  
 MW5 GW tested for Metals, VOCs, PHCs,  
 MW6 GW tested for Metals, VOCs, PHCs,  
 MW22-2 tested for Metals.

**NOTE:**  
 Arcadis developed groundwater in six (6) monitoring wells in 2019; and in three (3) monitoring wells in 2022; Six groundwater samples (including one duplicate) in 2019 were analyzed for one or more parameters; including metals, VOCs, PHCs, PAHs, pesticides/herbicides.  
 One groundwater sample (MW22-2) was analyzed for metals in 2022.  
 No exceedances within groundwater were observed in comparison with applicable MECP Table 3 SCSs.



Title: **GROUNDWATER CONTAMINANT DISTRIBUTION**

Project: **PHASE TWO ENVIRONMENTAL SITE ASSESSMENT  
 1881 & 1883 MERIVALE RD and 6 & 12 JAMIE AVENUE  
 OTTAWA, ONTARIO**

Client: **Z.V.HOLDINGS CORP.**

Date: **NOVEMBER 2022**

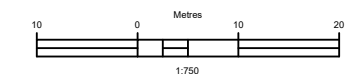


**FIGURE 5**

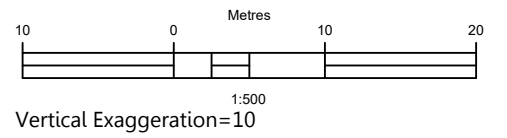
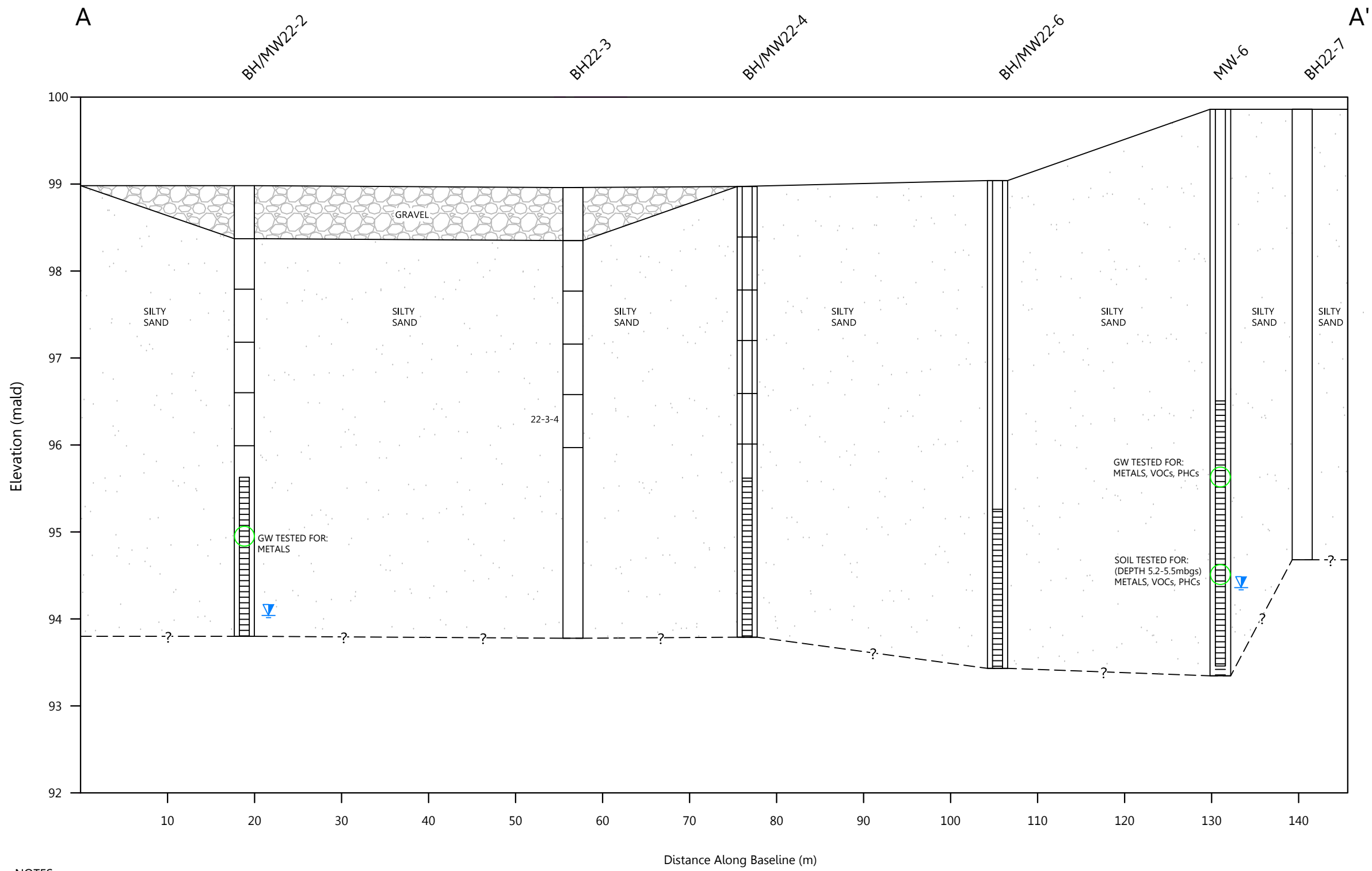


**LEGEND**

- PHASE TWO SITE BOUNDARY
- LOT LINES
- PROPOSED BUILDING FOOTPRINT
- ⊕ MONITORING WELL
- ⊙ BOREHOLE
- ⊕ BOREHOLE/MONITORING WELL LOCATION (ARCADIS, 2022)
- ⊙ BOREHOLE LOCATION (ARCADIS, 2022)
- (93.18) GROUNDWATER ELEVATION RELATIVE TO LOCAL BENCH MARK (ELEV 100m)
- GROUNDWATER FLOW DIRECTION
- ~ GROUNDWATER CONTOUR



<b>Title:</b>	<b>GROUNDWATER CONTOURS AND INFERRED FLOW DIRECTION (OCTOBER 2019)</b>
<b>Project:</b>	<b>PHASE TWO ENVIRONMENTAL SITE ASSESSMENT 1881 &amp; 1883 MERIVALE RD and 6 &amp; 12 JAMIE AVENUE OTTAWA, ONTARIO</b>
<b>Client:</b>	<b>Z.V.HOLDINGS CORP.</b>
<b>Date:</b>	<b>NOVEMBER 2022</b>
<b>FIGURE 6</b>	



Title: **CROSS SECTION A-A'**

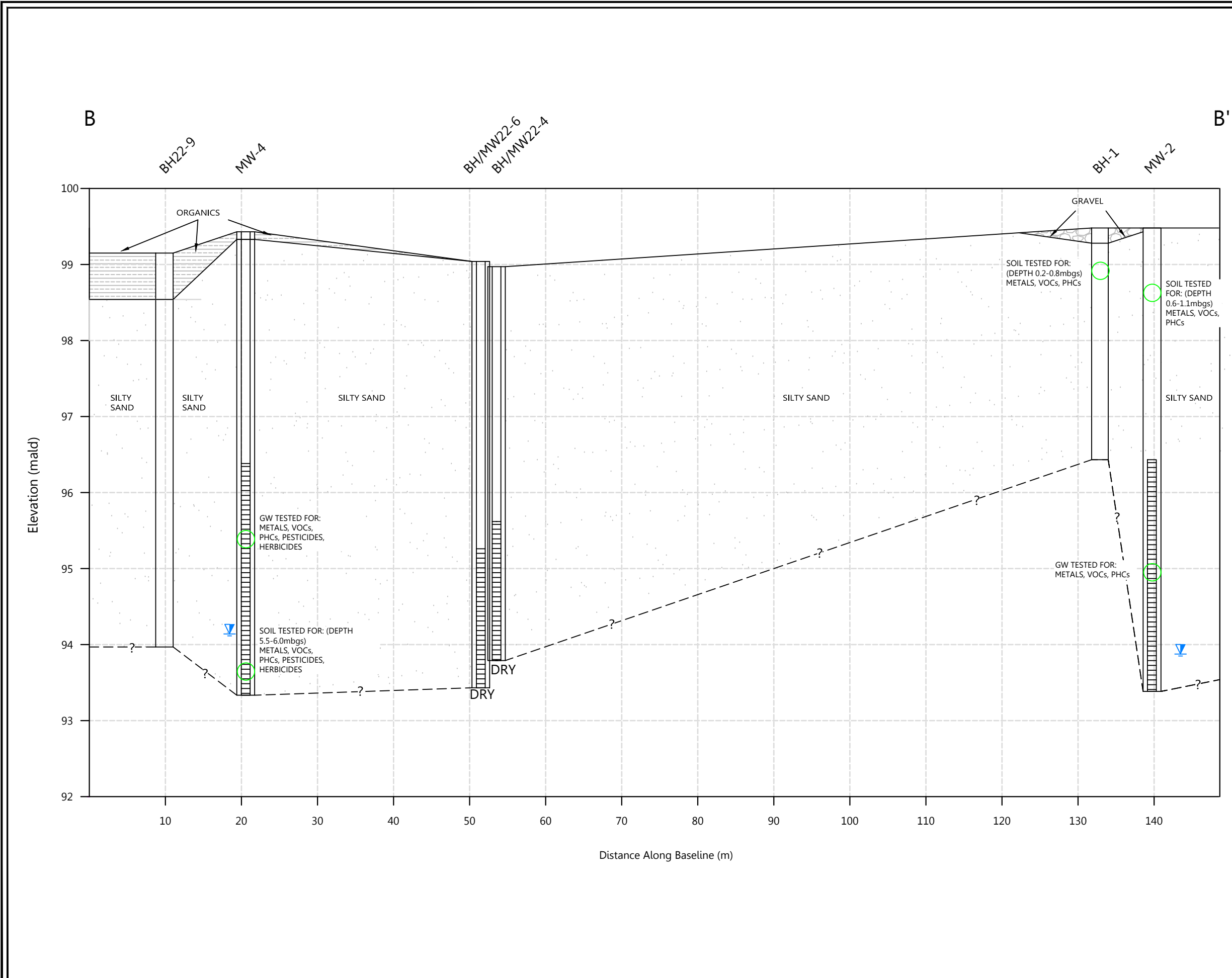
Project: **PHASE TWO ENVIRONMENTAL SITE ASSESSMENT  
1881 & 1883 MERIVALE RD and 6 & 12 JAMIE AVENUE  
OTTAWA, ONTARIO**

Client: **Z.V.HOLDINGS CORP.**

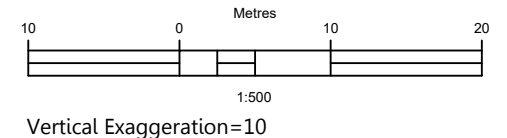
Date: **NOVEMBER 2022**

**ARCADIS**

**FIGURE 7**



- LEGEND**
- MONITORING WELL SCREEN
  - SILTY SAND
  - GRAVEL
  - ORGANICS
  - GROUNDWATER ELEVATION
  - ANALYTICAL RESULTS SATISFY APPLICABLE GUIDELINES



Title: **CROSS SECTION B-B'**

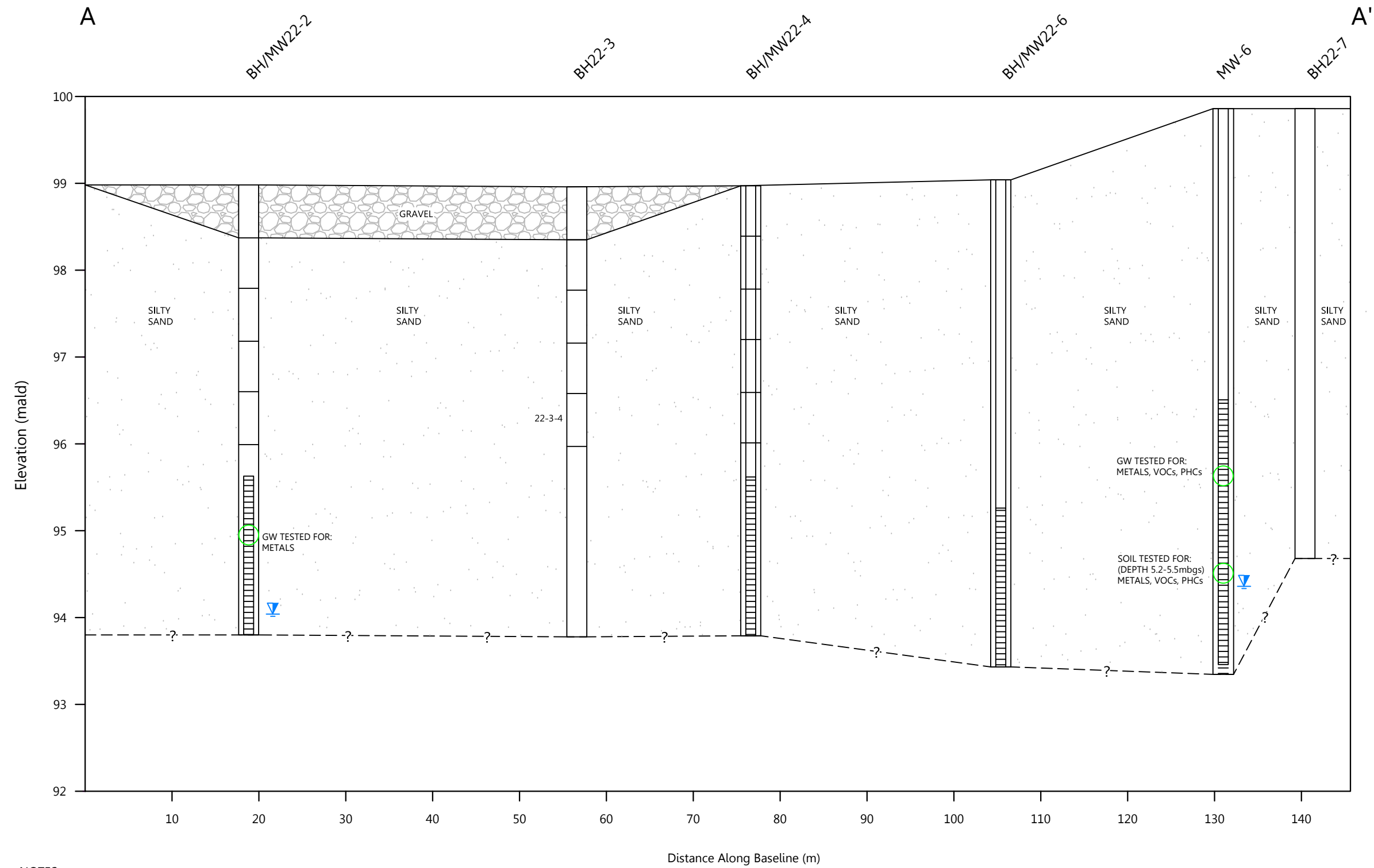
Project: **PHASE TWO ENVIRONMENTAL SITE ASSESSMENT  
1881 & 1883 MERIVALE RD and 6 & 12 JAMIE AVENUE  
OTTAWA, ONTARIO**

Client: **Z.V.HOLDINGS CORP.**

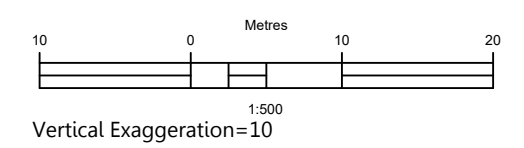
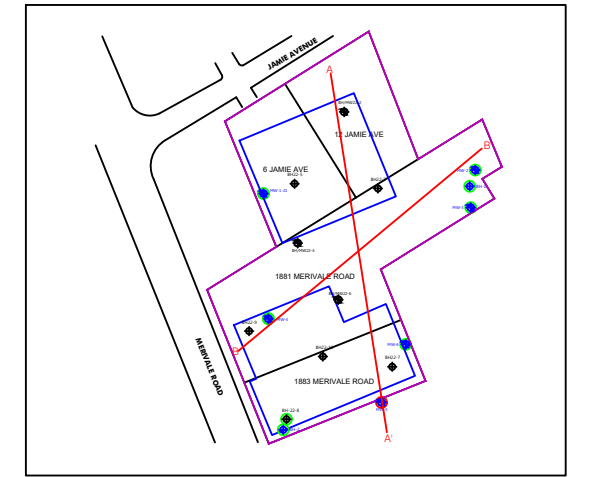
Date: **NOVEMBER 2022**

**ARCADIS**

**FIGURE 8**



- LEGEND**
- MONITORING WELL SCREEN
  - SILTY SAND
  - GRAVEL
  - GROUNDWATER ELEVATION
  - ANALYTICAL RESULTS SATISFY APPLICABLE GUIDELINES



- NOTES:**
- Soil stratigraphy between and beyond boreholes may vary; silty sand present throughout beneath entire Phase Two ESA property
  - No sediments present at Phase Two property
  - Bedrock not encountered at maximum depth of boreholes advanced (bedrock estimated at 15m bgs)
  - Phase Two property not within 30m of any ANSI or subject to shallow soil/pH requirements under O.Reg 153-04 (as amended)
  - No contamination encountered in either soil or groundwater
  - No known presence of preferential pathways.
  - Vertical groundwater gradients range from 0.14 to 0.87. Horizontal groundwater gradients range from 0.01 to 1.97x1
  - Site is to be redeveloped as two raised one storey office/warehouse buildings
  - Average horizontal groundwater gradient at 0.0063 m/m

Title: **PHASE TWO ESA CONCEPTUAL SITE MODEL**

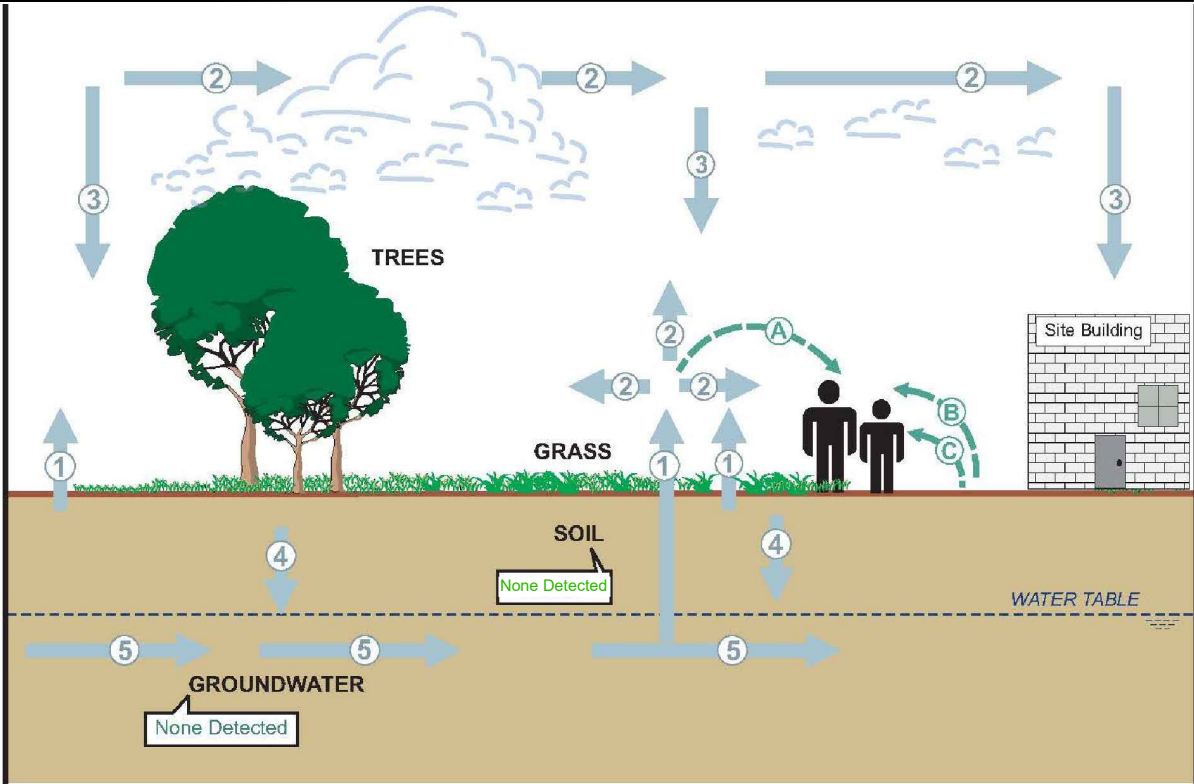
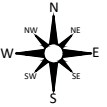
Project: **PHASE TWO ENVIRONMENTAL SITE ASSESSMENT  
1881 & 1883 MERIVALE RD and 6 & 12 JAMIE AVENUE  
OTTAWA, ONTARIO**

Client: **Z.V.HOLDINGS CORP.**

Date: **NOVEMBER 2022**

**ARCADIS**

**FIGURE 9**



**ENVIRONMENTAL FATE PROCESS:**

- ① DUST RESUSPENSION AND VAPOUR MIGRATION
- ② AIR DISPERSION
- ③ WET AND DRY DEPOSITION
- ④ SOIL LEACHING TO GROUNDWATER
- ⑤ MIGRATION OF GROUNDWATER

**PATHWAYS OF EXPOSURE AND RECEPTORS:**

- Ⓐ INHALATION OF DUST AND VAPOUR
- Ⓑ INGESTION OF SOIL
- Ⓒ DERMAL CONTACT WITH SOIL

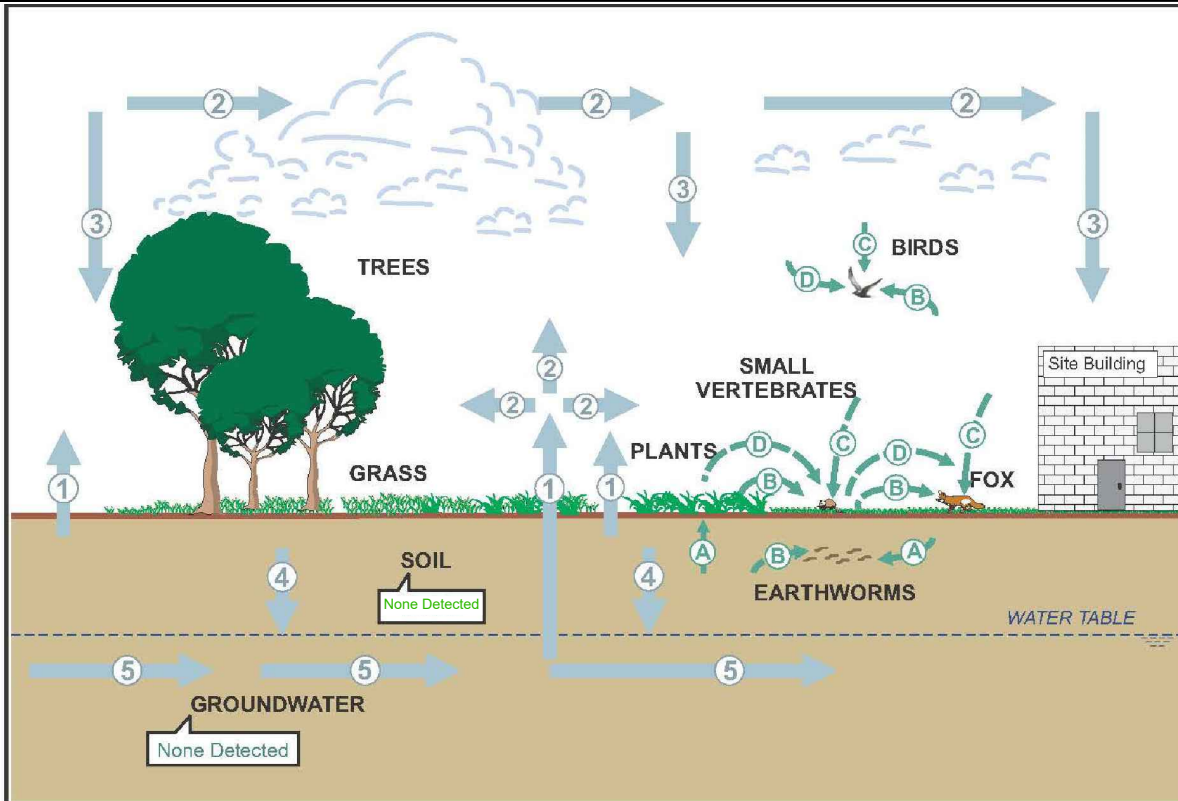
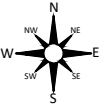
**NOTE:**

- 1. NO POTENTIAL EXPOSURE FOR CONTAMINANTS OR PATHWAYS SHOWN IN GREEN
- 2. POTENTIAL EXPOSURE FOR CONTAMINANTS OR PATHWAYS SHOWN IN RED

LEGEND

Title: <b>CONCEPTUAL SITE MODEL FOR HUMAN HEALTH RECEPTORS</b>	
	Project: <b>PHASE TWO ENVIRONMENTAL SITE ASSESSMENT 1881 &amp; 1883 MERIVALE RD and 6 &amp; 12 JAMIE AVENUE OTTAWA, ONTARIO</b>
	Date: NOVEMBER 2022
Client: <b>Z.V.HOLDINGS CORP.</b>	

**FIGURE 10**



**ENVIRONMENTAL FATE PROCESS:**

- ① DUST RESUSPENSION AND VAPOUR MIGRATION
- ② AIR DISPERSION
- ③ WET AND DRY DEPOSITION
- ④ SOIL LEACHING TO GROUNDWATER
- ⑤ MIGRATION OF GROUNDWATER

**PATHWAYS OF EXPOSURE AND RECEPTORS:**

- Ⓐ UPTAKE FROM SOIL
- Ⓑ DIRECT CONTACT WITH SOIL
- Ⓒ INHALATION OF DUST AND VAPOUR
- Ⓓ INTAKE OF FOOD/SOIL

**NOTE:**

- 1. NO POTENTIAL EXPOSURE FOR CONTAMINANTS OR PATHWAYS SHOWN IN GREEN
- 2. POTENTIAL EXPOSURE FOR CONTAMINANTS OR PATHWAYS SHOWN IN RED

LEGEND

Title: <b>CONCEPTUAL SITE MODEL FOR ECOLOGICAL RECEPTORS</b>	
	Project: <b>PHASE TWO ENVIRONMENTAL SITE ASSESSMENT 1881 &amp; 1883 MERIVALE RD and 6 &amp; 12 JAMIE AVENUE OTTAWA, ONTARIO</b>
	Date: NOVEMBER 2022
Client: <b>Z.V.HOLDINGS CORP.</b>	

**FIGURE 11**

# Appendix A

## Plan of Legal Survey



**METRIC**  
DISTANCES AND ELEVATIONS SHOWN ON THIS PLAN ARE IN METRES  
AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

TOPOGRAPHIC PLAN OF  
LOTS 2 AND 3  
REGISTERED PLAN 564563  
PART OF LOT 28 CONCESSION A (RF)  
PART OF CLARKE ROAD &  
PEDLEY STREET (AS CLOSE BY INST NP51189)  
REGISTERED PLAN 382  
PART OF LOTS 76, 77, 82, 93, 94,  
95, 96 & 97  
LOTS 78, 79, 80 & 81  
REGISTERED PLAN 382  
CITY OF OTTAWA

SCALE 1 : 250  
0 5 10 20 25 metres  
FAIRHALL, MOFFATT & WOODLAND LIMITED  
ONTARIO LAND SURVEYORS



**ELEVATION NOTES**  
1. ELEVATIONS SHOWN HEREON ARE REFERRED TO GEODETIC DATUM (CGVD28).  
2. ELEVATIONS FOR MANHOLE COVERS AND CATCH BASINS HAVE TO BE INDEPENDENTLY CONFIRMED BEFORE THEY CAN BE ACCEPTED FOR FINAL DESIGN OR CONSTRUCTION PURPOSES.  
3. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARKS HAVE NOT BEEN ALTERED OR DISTURBED AND THAT THEIR RELATIVE ELEVATION AND DESCRIPTION AGREE WITH THE INFORMATION SHOWN ON THIS DRAWING.

**UTILITY NOTES**  
1. THIS DRAWING CANNOT BE ACCEPTED AS ACKNOWLEDGING ANY UNDERGROUND UTILITIES AND IT WILL BE THE RESPONSIBILITY OF THE USER TO CONTACT THE RESPECTIVE UTILITY AUTHORITIES FOR CONFIRMATION OR LOCATION.  
2. UNDERGROUND UTILITIES, AS REPORTED ON THIS DRAWING, ARE NOT BASED ON AN ACTUAL 'FIELD LOCATE' BY THE RESPECTIVE UTILITY AGENCIES BUT HAVE BEEN COMPILED FROM DATA OBTAINED FROM THE FOLLOWING SOURCE:  
a) CITY OF OTTAWA  
3. BEFORE ANY WORK INVOLVING PROBING, EXCAVATING, ETC., A FIELD LOCATION OF UNDERGROUND PLUMB BY THE PERTINENT UTILITY AUTHORITY IS MANDATORY.

**NOTES**  
1. BEARINGS ARE GRID, DERIVED FROM THE NORTHERLY LIMIT OF MERVILLE ROAD AS SHOWN ON PLAN SR-11115, HAVING A BEARING OF N 22°28'30" W AND ARE REFERRED TO THE CENTRAL MERIDIAN, 76°30' W LONGITUDE, MTM ZONE 9, NAD 83 (ORIGINAL).  
2. DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR 0.9999937.

**LEGEND**

□	- SURVEY MONUMENT SET	○	MHSA - SANITARY MANHOLE
■	- SURVEY MONUMENT FOUND	○	TMH - TRAFFIC MANHOLE
▣	- STANDARD IRON BAR	○	BMH - BELL MANHOLE
▤	- SHORT STANDARD IRON BAR	○	WMH - WATER MANHOLE
CC	- CUT CROSS	○	FMH - FIRE HYDRANT
CP	- CONCRETE PIN	○	WV - WATER VALVE
(P)	- PLAN 564563	○	GV - GAS VALVE
(P1)	- PLAN SR-11115	○	CT - CURB
(P2)	- REGISTERED PLAN 564563	○	SL - STREET LIGHTING
(M)	- MEASURED	○	ST - STORM SEWER
(S)	- SET	○	LM - LAMP STANDARD
DIA.	- DIAMETER	○	UP - UTILITY POLE
PN	- PROPERTY IDENTIFIER NUMBER	○	WV - WATER VALVE
(857)	- FAIRHALL, MOFFATT & WOODLAND LTD., O.L.S.	○	GV - GAS VALVE
(447)	- H. R. FARLEY, O.L.S.	○	CT - CURB
(RW)	- SURVEY BY RW ARNETT LTD. (REF 94-7-83)	○	SL - STREET LIGHTING
(WT)	- WITNESS	○	ST - STORM SEWER
(SU)	- SOURCE UNKNOWN	○	LM - LAMP STANDARD
CLF	- CHAIN LINK FENCE	○	UP - UTILITY POLE
CB	- CATCH BASIN	○	WV - WATER VALVE
MH	- MANHOLE	○	GV - GAS VALVE
LS	- LAMP STANDARD	○	CT - CURB
UP	- UTILITY POLE	○	SL - STREET LIGHTING
WV	- WATER VALVE	○	ST - STORM SEWER
GV	- GAS VALVE	○	LM - LAMP STANDARD
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UP	- UTILITY POLE	○	SL - STREET LIGHTING
WV	- WATER VALVE	○	ST - STORM SEWER

# Appendix B

## Sampling Plan

**Sampling Plan**

**Conduct Phase One and Two ESA (conversion from CSA to O.Reg. standards) for the property at 1881 Merivale and Adjacent Lot, Ottawa**

<b>Project #:</b>	30127480		
<b>Site Address:</b>	1881-1883 Merivale Road		
<b>Arcadis Ottawa PM:</b>	Troy Austrins	Tel: 613-703-3035 office Cell: 613-816-2405 Home: 613-722-1515	Troy.austrins@arcadis.com
<b>Arcadis PC: (proj cord+ field)</b>	Justin Cameron Ryan Janzen Lennart de Groot	Cell: 613-227-0491 Cell: 613-703-3820 Cell: 613-809-2379	<a href="mailto:Justin.cameron@arcadis.com">Justin.cameron@arcadis.com</a> <a href="mailto:Ryan.Janzen@arcadis.com">Ryan.Janzen@arcadis.com</a> <a href="mailto:Lennart.degroot@arcadis.com">Lennart.degroot@arcadis.com</a>
<b>Laboratory Info</b>	ALS Group Environmental Labs – Quote # Arcadis Standing offer		
<b>MOE Criteria</b>	O.Reg. 153/04- Phase Two ESA-Part XV.1 of the Environmental Protection Act (April 15, 2011)		
<b>Sample TAT</b>	Regular		

**Project Schedule:**

Project Start Date: Within one week of workplan approval  
 Task 1= Soil Sampling  
 Task 2= GW sampling

Field work End Date: 15 September drilling start date (3 days anticipated); Oct 2022 for GW sampling

Project End Date: Dec 2022

Field Personnel: Justin Cameron/ Lennart de Groot/ Hoda MohammadPour

<b>Proposed Field Budget:</b>		<b>Actual Field Time:</b>		
# Days:	3 day drilling	Day 1	Day 2	Day 3
Travel Time:	-			
Field Time:	10 hrs. site/day work for one staff-person			

**Subcontractors:**

**Private Locator:** USL-1 Locates

**Drilling Contractor:** George Downing Estate Drilling Ltd.  
 15-16 September at 8am =pls call to confirm start time;  
 Contact: Get operator name and cell # when you meet them;

**Address:** 410 Rue Principale, Calumet, QC J0V 1B0

**Phone:** (819)242-6469

**Transportation**

1. Vehicle mileage rate: \$ 0.54 / km

**Purpose of Work**

- Submit soil samples for laboratory analyses of geotech parameters from samples obtained from the geotechnical drilling program;
- Soil sampling environmental data to be secured from prior 2019 Phase II ESA completed by Arcadis. The findings as to potentially contaminating activity were outlined in the Arcadis 2019 reporting as well as all contaminants of potential concern. The 2019 report aided in

the pre-assessment of information and matters of environmental condition of the property.

- Perform groundwater monitoring and sampling on site to assess current groundwater contaminant concentrations and depths on site;
- Creation of a Phase Two ESA report and Conceptual Site Model (CSM) as specified by O.Reg. 153/04;
- Media for Investigation/ Sampling= Soil and groundwater
- Sampling system chosen as a 5 BH grid across proposed warehouse building locations and to ensure spread of sampling across subject property

**Scope of Work: 15 September commence Drilling (October 2022 GW Sampling proposed)**

**a) GW and Soil Sampling**

1. Spray paint all proposed 9 drilling locations (and note the proposed 3 monitoring well locations). See Proposed BH Location Plan attached.
2. Make sure all utilities have been located;
3. Make sure Drill Utility clearance form approved and authorized
4. Meet with the drilling operator that morning ;
5. Complete and perform safety meeting;
6. Review all cleared drilling/BH locations.
7. Drill down to 5.2 m depth for enviro/Geotech soil sampling at 9 BH locations and outfit three locations as new monitoring wells. Note that one BH to be advanced to depth using CPT technique;
8. Continuous Enviro and Geotech soil sampling to at least 10 ft depth is required.
9. Decontamination of sampling equipment for soil samples.
10. Wells will be constructed with 2" diameter PVC riser and a 3m length screen using an appropriate sand pack surrounding the screen.
11. Place groundwater sample into the laboratory-supplied bottles appropriate for volatile organic compounds, metals, polychlorinated biphenyls analyses.
12. Get GPS coordinates and ground elevations of all BH locations. Get water levels at all MWs. Take site photos.
13. Samples immediately transferred and stored in coolers with ice packs to hold the sample temperature at approximately 10°C

**Scope of Work: Final Reinstatement**

1. All boreholes completed as part of this project will be restored to their original condition prior to Arcadis' departure from the property.
2. Monitoring wells will be decommissioned at a later date.
3. All soil cuttings and purged groundwater collected during the investigation are to be disposed of by Arcadis in accordance with the applicable provincial or federal regulations
4. Wastes will be disposed of in a timely manner once the field work is complete.
5. Submit 3 GW samples or more to lab for analyses for Metals (+QA/QC).
6. A minimum of 10% collected samples submitted to the laboratory will be blind field duplicates.

**Budget** is attached at rear for reference purposes. Prior Phase I/II ESA report included at back of SOW. The Lab quote was provided also.

Please follow the Arcadis SOP for borehole drilling/ monitoring well installs, GW sampling and Soil sampling. The following will complement the Arcadis procedures. Where there is a discrepancy between any or all of these procedures, please follow the more stringent protocol. If you have any a question as to which is most stringent, please call your PM/PC for clarification.

### **Equipment you will need to bring with you** (not limited to)

1. Personal Protective Equipment (PPE) including hard hat, safety glasses, safety vest, ear plugs, ear muffs, gloves (latex and work), respirator (as required);
2. Coolers with sample jars/bottles (supplied by lab), chains of custody and custody seals.
3. ICE – samples must be maintained on ICE during sample collection. And apply new ICE when packing sample coolers for shipment/transport;
4. Ziploc bags and garbage bags, paper towel
5. Alconox and 20L pails, distilled water and hand brush to clean hand augers;
6. Fire extinguisher; Eye Wash Station and First Aid Kit; Green OSHA booklet and related safety information;
7. HASP and safety alerts
8. Digital Camera;
9. RKI Eagle II unit (use office unit )
10. Horiba Water Parameter Analyzer
11. Water Level tape
12. Measuring tape;
13. Interface probe
14. Hand Shovel
15. Monitoring Well supplies -incl. flush mounted protective casings

### **Health and Safety**

Arcadis is the Prime Contractor for this work; therefore we must implement all necessary H&S requirements. Safety documentation provided:

- Site specific health and safety plan
- OSHA Regs
- Emergency Procedures

You will also need to complete the following documentation:

- Job Safety Assessment (JSA) form daily.
- Last Minute Risk Assessment (LMRA) / Hazard ID/Mitigation Checklist form daily

### **Site Specific Hazards**

- Lifting/ slips or trips
- Drilling rig hazards

### **Project Preparation**

Read this information and review the following:

- Arcadis SOP for soil sampling and GW sampling.
- Sample preparation procedures (attached) for each analysis to be performed (i.e. required bottles/bags, preservatives, hold times, etc.);
- Other relevant site specific information including the site location, site plan, and results of historical Geotech reporting;
- Reserve/rent, sign out and confirm to your PM/PC, the equipment you will take;
- Review scope of work with the PM.
- No physical impediments anticipated other than presence of vegetation and possible interference from school bus parking at the Jaimie Street lot.

### **Soil Sampling**

- Collect samples for laboratory analysis directly in laboratory sample containers;
- Log soil samples for stratigraphy including soil type, colour, moisture content, texture and visual/olfactory evidence of impact;
- Soil samples to be screened for soil vapour with use of Eagle II monitor (calibrated before use)

- Sample IDs:
  - Label samples within each borehole sequentially as you collect them (i.e. auger hole AH1-1, AH1-2, etc.);
- No sampling from rock expected

### **GW Sampling**

- Measure water level before sampling
- Take one GW sample at each three monitoring well locations (total of 3 samples)
- Collect samples for laboratory analysis directly in laboratory sample containers;
- Analyses required for metals in groundwater.
- Trip blanks and field duplicates required if 10 or more GW samples to be acquired and if VOC analyses will be undertaken.

### **Field Documentation**

- Measure in the location of the borehole using GPS. Record on site plan.
- Use BH Log Forms to record soil descriptions,
- Prepare scaled site plan showing location of the new boreholes accurate to  $\pm 0.5$  m.

### **Chain of Custody & Lab Submission**

- **Use C of Cs for onsite and QA/QC samples (field blank and trip blank)**
- **Samples submit for regular TATs**
- Please use C of C checklist to double check your C of C
  - Sign, date and time stamp the CofC in the field;
  - Pack the CofC in the cooler with the samples listed on the CofC;
  - Clearly indicate required TATs using check boxes and notes at right hand side;
  - Use at least one CofC per cooler;
  - Ensure there is adequate ice around samples and samples are protected from breakagePlease use 2 bags of ICE per cooler.

Please drop off the soil samples and GW samples at the ALS Lab:

**Address:** 190 Colonnade Rd S, Nepean, ON K2E 7J6

**Hours:** 9 am to 5 pm

**Phone:** (613) 225-8279

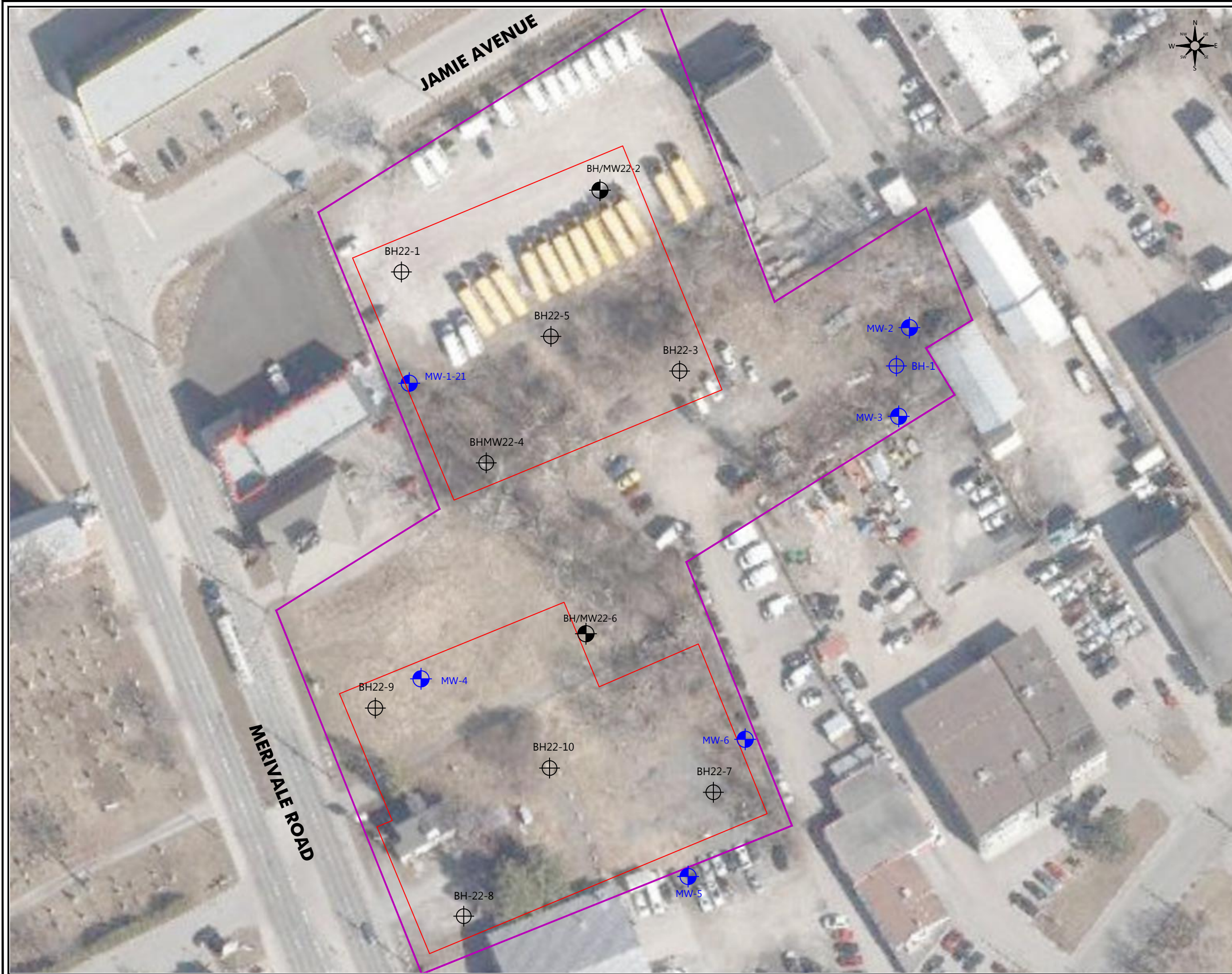
- Mond-Friday: 9:00am – 5:00pm  
After hours: contact manager to arrange
- **Other Items**
- Ensure site is left SECURED and FREE OF ALL DEBRIS/GARBAGE.

### **UPON RETURNING TO THE OFFICE:**







- Ensure your field notes completely document all time spent on-site and mobilizing to and from the site. This allows us to better estimate time required to complete field programs.

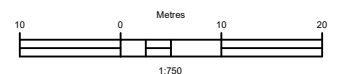
If you have any problems, do not hesitate to call.


**GOOD LUCK and stay safe!**



**LEGEND**

-  SITE BOUNDARY
-  LOT LINES
-  BOREHOLE LOCATION
-  MONITORING WELL LOCATION
-  BOREHOLE/MONITORING WELL LOCATION (ARCADIS, 2022)
-  BOREHOLE LOCATION (ARCADIS, 2022)



Title:	<b>BOREHOLE LOCATION PLAN</b>
Project:	<b>GEOTECHNICAL INVESTIGATION 1881 &amp; 1883 MERIVALE RD and 6 &amp; 12 JAMIE AVENUE OTTAWA, ONTARIO</b>
Client:	<b>Z.V.HOLDINGS CORP.</b>
Date:	October 2022
	
<b>FIGURE 2</b>	

# Appendix C

## Borehole Logs





Arcadis Canada Inc.  
 1050 Morrison Drive, Suite 201  
 Ottawa, ON  
 Telephone: 613-721-0555

# BORING NUMBER BH22-2 (MW22-2)

**CLIENT** ZV Holdings  
**PROJECT NUMBER** 30127480  
**DATE STARTED** 22-9-15 **COMPLETED** 22-9-16  
**DRILLING CONTRACTOR** Downing Estate Drilling  
**DRILLING METHOD** HSA  
**LOGGED BY** LDeGroot **CHECKED BY** RJanzen  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 1881-1883 Merivale Geotech  
**PROJECT LOCATION** 1881 Merivale Road, Ottawa, ON  
**GROUND ELEVATION** 98.98 m **HOLE SIZE** 15cm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**▼ AFTER DRILLING** 4.85 m / Elev 94.13 m

GEOTECH BH COLUMNS 30127480 1881 MERIVAL GEOTECH BH RVJ (1).GPJ GINT STD CANADA LAB.GDT 22-11-22

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m <sup>3</sup> )	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
		WELL GRADED GRAVEL, SANDY, light gray, angular, fine to coarse grained, dry, very dense (GRAVEL FILL)										
1		SILTY SAND, light brown, fine grained, moist, loose to medium dense, trace gravel	SS 1	50	35-55-25-12 (80)							
2		Sand becomes fine to coarse	SS 2	75	8-8-9-10 (17)			8				
3		Colour becomes brown to grey	SS 3	67	4-5-4-50 (9)			3				
4			SS 4	92	5-5-4-11 (9)			3				
5		Becomes wet	SS 5	83	6-8-9-9 (17)			8				
5			SS 6	50	3-7-9-12 (16)			6				

Bottom of borehole at 5.20 meters.



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# BORING NUMBER BH22-3

**CLIENT** ZV Holdings  
**PROJECT NUMBER** 30127480  
**DATE STARTED** 22-9-16 **COMPLETED** 22-9-16  
**DRILLING CONTRACTOR** Downing Estate Drilling  
**DRILLING METHOD** HSA  
**LOGGED BY** LDeGroot **CHECKED BY** RJanzen  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 1881-1883 Merivale Geotech  
**PROJECT LOCATION** 1881 Merivale Road, Ottawa, ON  
**GROUND ELEVATION** 98.96 m **HOLE SIZE** 15cm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GEOTECH BH COLUMNS 30127480 1881 MERIVAL GEOTECH BH RVJ (1) GPJ GINT STD CANADA LAB GDT 22-11-22

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m <sup>3</sup> )	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
1		WELL GRADED GRAVEL, SANDY, light gray, angular, fine to coarse grained, dry, loose to medium dense some dark brown topsoil (GRAVEL FILL)	SS 0	75	18-12-6-2 (18)							
			SS 1	75	2-2-5-3 (7)			6				
2		SILTY SAND, light brown, fine grained, moist, medium dense, trace gravel	SS 2	75	6-8-10-10 (18)			10				33
		Colour becomes light grey	SS 3	75	4-7-8-6 (15)			8				
			SS 4	75	4-8-8-10 (16)			14				
5		Becomes wet	SS 5	75	6-9-6-7 (15)							

Bottom of borehole at 5.20 meters.



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# BORING NUMBER BH22-4 (MW22-4)

**CLIENT** ZV Holdings  
**PROJECT NUMBER** 30127480  
**DATE STARTED** 22-9-15 **COMPLETED** 22-9-15  
**DRILLING CONTRACTOR** Downing Estate Drilling  
**DRILLING METHOD** HSA  
**LOGGED BY** LDeGroot **CHECKED BY** RJanzen  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 1881-1883 Merivale Geotech  
**PROJECT LOCATION** 1881 Merivale Road, Ottawa, ON  
**GROUND ELEVATION** 98.97 m **HOLE SIZE** 15cm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GEOTECH BH COLUMNS 30127480 1881 MERIVALE GEOTECH BH RVJ (1).GPJ GINT STD CANADA LAB.GDT 22-11-22

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m <sup>3</sup> )	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
		ORGANIC SOIL WITH SAND, dark brown, medium to coarse grained, moist, very loose, some organics, and roots (TOPSOIL)	SS 0	50	1-1-1-1 (2)			10				
1		SILTY SAND, light brown, fine grained, moist, medium dense, trace gravel	SS 1	58	5-11-13-16 (24)			5				31
2			SS 2	25	5-11-11-11 (22)			5				
		Becomes wet at 2.5mbs	SS 3	5000	4-7-9-8 (16)			3				
3			SS 4	92	6-8-7-7 (15)			14				
4												
5		Becomes light grey, wet and fine to medium grained	SS 5	83	4-12-13-16 (25)							

Bottom of borehole at 5.20 meters.



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# BORING NUMBER BH22-5

**CLIENT** ZV Holdings  
**PROJECT NUMBER** 30127480  
**DATE STARTED** 22-9-16 **COMPLETED** 22-9-16  
**DRILLING CONTRACTOR** Downing Estate Drilling  
**DRILLING METHOD** HSA  
**LOGGED BY** LDeGroot **CHECKED BY** RJanzen  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 1881-1883 Merivale Geotech  
**PROJECT LOCATION** 1881 Merivale Road, Ottawa, ON  
**GROUND ELEVATION** 98.81 m **HOLE SIZE** 15cm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m <sup>3</sup> )	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
		WELL GRADED GRAVEL, SANDY, light gray, angular, fine to coarse grained, dry, medium dense (GRAVEL FILL)	SS 1	50	18-4-7-7 (11)							
1		SILT WITH SAND, dark brown to black, well graded, fine to coarse grained, moist, loose to medium dense, some organics, trace clay pockets of organic material	SS 2	67	7-7-7-7 (14)			14				52
			SS 3	50	5-5-5-5 (10)			17				
2		SILTY SAND, light gray to brown, fine grained, moist, medium dense, trace gravel	SS 4	83	6-12-14-10 (26)			5				
		Colour becomes only grey	SS 5	92	7-10-13-14 (23)			4				
3												
4												
5		Becomes wet at 4.5mbgs	SS 6	75	7-12-14-14 (26)			5				

Bottom of borehole at 5.20 meters.

GEOTECH BH COLUMNS 30127480 1881 MERIVALE GEOTECH BH RVJ (1) GPJ GINT STD CANADA LAB GDT 22-11-22



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 Telephone: 613-721-0555

# BORING NUMBER BH22-6 (MW22-6)

**CLIENT** ZV Holdings  
**PROJECT NUMBER** 30127480  
**DATE STARTED** 22-9-15 **COMPLETED** 22-9-15  
**DRILLING CONTRACTOR** Downing Estate Drilling  
**DRILLING METHOD** HSA  
**LOGGED BY** LDeGroot **CHECKED BY** RJanzen  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 1881-1883 Merivale Geotech  
**PROJECT LOCATION** 1881 Merivale Road, Ottawa, ON  
**GROUND ELEVATION** 99.04 m **HOLE SIZE** 15cm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m <sup>3</sup> )	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
		ORGANIC SOIL WITH SAND, light brown, well graded, fine to coarse grained, moist, very loose, some organics, trace roots and grass debris (TOPSOIL)	SS 1	50	1-1-2-2 (3)			12				
1		POORLY GRADED SAND, light gray, fine grained, moist, loose to medium dense, some silt	SS 2	75	6-10-12-11 (22)			5				
2		Becoming wet at 2.8mbgs	SS 3	100	4-8-9-8 (17)			6				22
			SS 4	67	3-5-5-5 (10)			11				
3			SS 5	67	3-3-7-6 (10)			19				
4												
5			SS 6	83	6-15-18-21 (33)							

Bottom of borehole at 5.61 meters.

GEOTECH BH COLUMNS 30127480 1881 MERIVAL GEOTECH BH RVJ (1) GPJ GINT STD CANADA LAB GDT 22-11-22



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# BORING NUMBER BH22-7

**CLIENT** ZV Holdings  
**PROJECT NUMBER** 30127480  
**DATE STARTED** 22-9-15 **COMPLETED** 22-9-15  
**DRILLING CONTRACTOR** Downing Estate Drilling  
**DRILLING METHOD** HSA  
**LOGGED BY** LDeGroot **CHECKED BY** RJanzen  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 1881-1883 Merivale Geotech  
**PROJECT LOCATION** 1881 Merivale Road, Ottawa, ON  
**GROUND ELEVATION** 99.86 m **HOLE SIZE** 15cm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GEOTECH BH COLUMNS 30127480 1881 MERIVAL GEOTECH BH RVJ (1) GPJ GINT STD CANADA LAB GDT 22-11-22

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m <sup>3</sup> )	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
		ORGANIC SOIL WITH SAND, light brown to black, well graded, fine to coarse grained, moist, loose, some organics, trace gravel (TOPSOIL)	SS 1	50	1-2-2-1 (4)			11				
1		POORLY GRADED SAND, light brown, fine grained, moist, medium dense, some silt	SS 2	75	4-7-10-8 (17)			6				
			SS 3	92	3-7-8-9 (15)			6				
2			SS 4	83	4-8-10-13 (18)			5				
		WELL GRADED SAND, light brown, fine to coarse grained, moist, medium dense to dense, some silt	SS 5	83	7-12-11-10 (23)			5				16
3												
4												
5		Colour becomes light grey	SS 6	67	4-17-21-16 (38)							

Bottom of borehole at 5.20 meters.



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# BORING NUMBER BH22-8

**CLIENT** ZV Holdings  
**PROJECT NUMBER** 30127480  
**DATE STARTED** 22-9-16 **COMPLETED** 22-9-16  
**DRILLING CONTRACTOR** Downing Estate Drilling  
**DRILLING METHOD** HSA  
**LOGGED BY** LDeGroot **CHECKED BY** RJanzen  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 1881-1883 Merivale Geotech  
**PROJECT LOCATION** 1881 Merivale Road, Ottawa, ON  
**GROUND ELEVATION** 99.48 m **HOLE SIZE** 15cm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m <sup>3</sup> )	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
1		WELL GRADED GRAVEL, SANDY, light gray, angular, fine to coarse grained, dry, loose (GRAVEL FILL)	SS 1	33	11-3-1-2 (4)							
		WELL GRADED SAND, brown, fine to coarse grained, loose (SAND FILL)	SS 2	92	5-3-2-4 (5)			8				
2		SILTY SAND, brown, medium to coarse grained, moist, medium dense	SS 3	83	3-9-11-11 (20)			7				
		Sand becomes fine, colour becomes grey	SS 4	75	4-8-9-11 (17)			4				
			SS 5	83	5-11-11-10 (22)			9				
5		Colour becomes dark grey	SS 6	83	6-12-13-9 (25)							

Bottom of borehole at 5.20 meters.

GEOTECH BH COLUMNS 30127480 1881 MERIVALE GEOTECH BH RVJ (1) GPJ GINT STD CANADA LAB GDT 22-11-22



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 Telephone: 613-721-0555

# BORING NUMBER BH22-9

**CLIENT** ZV Holdings  
**PROJECT NUMBER** 30127480  
**DATE STARTED** 22-9-16 **COMPLETED** 22-9-16  
**DRILLING CONTRACTOR** Downing Estate Drilling  
**DRILLING METHOD** HSA  
**LOGGED BY** LDeGroot **CHECKED BY** RJanzen  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 1881-1883 Merivale Geotech  
**PROJECT LOCATION** 1881 Merivale Road, Ottawa, ON  
**GROUND ELEVATION** 99.15 m **HOLE SIZE** 15cm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m <sup>3</sup> )	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
		ORGANIC SOIL WITH SAND, light brown to black, well graded, fine to coarse grained, moist, very loose, some organics, trace gravel (TOPSOIL)	SS 1	83	1-1-2-1 (3)			16				
1		SILTY SAND, dark brown to light gray, fine grained, moist, medium dense	SS 2	92	4-9-12-11 (21)			8				
		Colour become grey	SS 3	92	6-10-15-13 (25)			9				
2		Coarse sand lenses	SS 4	100	5-9-10-9 (19)			8				
3			SS 5	100	4-10-12-15 (22)			6				
4												
5		Sand becomes fine to coarse	SS 6	75	5-8-11-10 (19)							

Bottom of borehole at 5.20 meters.

GEOTECH BH COLUMNS 30127480 1881 MERIVALE GEOTECH BH RVJ (1) GPJ GINT STD CANADA LAB GDT 22-11-22





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 Ottawa, ON  
 Telephone: 613-721-0555

# BORING NUMBER BH22-10

**CLIENT** ZV Holdings  
**PROJECT NUMBER** 30127480  
**DATE STARTED** 22-9-16 **COMPLETED** 22-9-16  
**DRILLING CONTRACTOR** Downing Estate Drilling  
**DRILLING METHOD** HSA  
**LOGGED BY** LDeGroot **CHECKED BY** RJanzen  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 1881-1883 Merivale Geotech  
**PROJECT LOCATION** 1881 Merivale Road, Ottawa, ON  
**GROUND ELEVATION** 99.86 m **HOLE SIZE** 15cm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GEOTECH BH COLUMNS 30127480 1881 MERIVAL GEOTECH BH RVJ (1).GPJ GINT STD CANADA LAB.GDT 22-11-22

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m <sup>3</sup> )	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		ORGANIC SOIL WITH SAND, dark brown to black, well graded, fine to coarse grained, moist, very loose, some organics, trace roots (TOPSOIL)	SS 0	33	1-1-1-1 (2)							
0.5		SILT WITH SAND, light gray, fine grained, moist, loose to medium dense	SS 1	67	1-1-8-14 (9)			14				
1		Some mottling visible	SS 2	83	5-10-9-10 (19)			12				
1.5			SS 3	50	9-9-9-11 (18)			15				62
2			SS 4	67	5-13-12-12 (25)			2				
5.18			Trace gravel, mottled texture	SS 5	75	4-7-15-15 (22)						
5.18		SPT cone test begins at 5.18mbgs.	SPT		7-8-18-18 (26)							
6			SPT		17-17-17-18 (34)							
7			SPT		18-19-23-23 (42)							
8			SPT		22-23-22-23 (45)							
9			SPT		14-15-10-9 (25)							
10			SPT		14-13-17-18 (30)							
11			SPT		22-23-28-29 (51)							
12			SPT		26-26-27-28 (53)							
13			SPT		27-27-18-18 (45)							
10.67		Cone penetration testing end at 10.67 m bgs.										
Bottom of borehole at 10.67 meters.												

# Appendix D

## MECP Well Records

All measurements recorded in:  Metric  Imperial

Follow instructions on the front and back of this form. Print or Type

Well Tag No. of Deepest Well: (Print Well Tag No.)

A328270

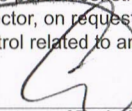
Well No. on Drawing of Deepest Well: 22-2

Dewatering wells

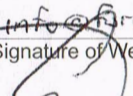
Test holes

No. of wells reported 3

Page 1 of 1

Well Cluster Location Information								Mandatory Attachments/Additional Information							
Address of Well Location (Street Number(s)/Name(s), RR, if available)				Lot(s)		Concession(s)		Geographic Township		County/District/Upper Tier Municipality					
1881 MERIVALE ROAD															
City, Town, Village or Hamlet			Province		GPS Unit Make		Model		Unit Mode of Operation <input type="checkbox"/> Undifferentiated <input checked="" type="checkbox"/> Averaged						
OTTAWA			Ontario		GARMIN		ETREX		<input type="checkbox"/> Differentiated, specify: _____						
Well Details										<input checked="" type="checkbox"/> Land Owner Consent Form must be attached. <input checked="" type="checkbox"/> Detailed Drawing of All Well Locations must be attached. I, the person constructing the well, will promptly submit to the Director, on request, any additional information in my custody or control related to any well in the well cluster that I have constructed.					
										Signature of Technician/Contractor				Date (yyyy/mm/dd)	
												2023/01/20			

Well # on Drawing	UTM Coordinates		Hole Depth (m/ft)	Hole Diameter (cm/in)	Method of Construction	Casing Material; Diameter (cm/in)	Casing (m/ft)		Screen Interval (m/ft)		Annular Space Material (m/ft)			Overburden/Bedrock or Abandonment Filing Material Intervals (m/ft)	Static Water Level (m/ft)	Date of Completion (yyyy/mm/dd)
	Zone	Easting					Northing	From	To	From	To	From	To			
22-2	18	443541	5020580	5.49	20.3	HSA	5.08	0.1	2.44	2.44	5.49	0.25	1.52	BENTONITE SAND	N/A	2022/09/16
22-4	18	443511	5020506	5.18	20.3	HSA	5.08	0.1	2.14	2.14	5.18	0.25	1.22	BENTONITE SAND	N/A	2022/09/15
22-6	18	443525	5020580	5.49	20.3	HSA	5.08	0.1	2.44	2.44	5.49	0.25	1.52	BENTONITE SAND	N/A	2022/09/15

Well Contractor and Well Technician Information					Date First Well in Cluster Constructed or Abandoned (yyyy/mm/dd)		Date Last Well in Cluster Completed (yyyy/mm/dd)		Ministry Use Only		
Business Name of Well Contractor		Business Address (Street Number/Name, RR)		Municipality	Province	2022/09/15		2022/09/16		Date Received (yyyy/mm/dd)	Audit No.
GEORGE DOWNING ESTATE DRILLING LTD		416 RUE PRINCIPALE		GRENVILLE-SUR-LA-ROUGE	QC					C60172	
Postal Code	Bus. Telephone No.	Well Contractor's Licence No.	Business E-mail Address			<b>Well Abandonment</b> Person Abandoning the Wells: Name <u>N/A</u> (Print or Type) - See instruction 11 on the back of this form					
J0V1B0	(819)242-6469	1844	info@fragedowningdrilling.com								
Name of Well Technician (First Name, Last Name)		Well Technician's Licence No.	Signature of Well Technician		Date Submitted (yyyy/mm/dd)		Comments:				
STEPHEN DOWNING		3326			2023/01/23						

# PERMISSION TO FILE A WELL CLUSTER RECORD

**\*leave with onsite technician, for clusters only\***

Our firm was recently contracted to either install or abandon groundwater monitoring wells at your property. When this type of well is installed or abandoned, provincial law requires us to file a well record with the Ministry of Environment.

The well record does not provide any information about your property use, your business, or information about the structural or environmental qualities of your property. The purpose of the record is simply to inform the Ministry that a well exists at this location, and provide details illustrating that the well has been properly constructed or decommissioned.

We can file a single record for each well, but it is more economical to file one record for the entire cluster of wells. In order to file this "cluster record", we are required to obtain written permission from the owner of the land. [Ref: Reg 903 16.4(1)4]

It would be greatly appreciated if you would sign and return the following, so that we can comply with the legislation and file the well record. Scanned, emailed or faxed copies are acceptable.

I hereby authorize George Downing Estate Drilling / Eastern Ontario Diamond Drilling to file a cluster of wells installed at the address below

## Well Location Information

Street Address : 6812 Jamie Ave. and 1881 & 1883 Merivale Rd.

(if no address) Lot & Concession : \_\_\_\_\_

County/District/Municipality : OTTAWA

City/Town/Village : OTTAWA

Postal Code : K2E 6T6 and K2G 4E5

Well Tag Number : mw22-2, mw22-4 Number of Wells : 3  
mw22-6

Audit No. : A328270 Wells : 22-2, 22-4, 22-6

## Property Owners's Information

Company Name (if applicable): Arnon Development Corp.

Name: DAVID YOUNG

Mailing Address: 1801 Woodward Drive

OTTAWA, ON

Email Address : dyoung@arnon.ca

Phone Number : 613 727-4002

Signature :  Date: 17-10-2022









**Note:** This Well Record for Well Cluster Part 3 - Detailed Drawing of all Well Locations, must be attached to Parts 1 and 2. The drawing must include all property boundaries, an arrow indicating the North direction, all named roads and sufficient measurements to locate all wells in the cluster in relation to fixed points. The drawing must show the location of each well and each well must be numbered on the drawing to match number used for that well on the Well Record for Well Cluster Parts 1 and 2. The well with the well tag must be clearly identified on the Drawing. UTM coordinates should appear beside each well, if space permits. Additional comments on wells can be included on the drawing

Well Tag Number: # A328270

“Well Record for Well Cluster” Form Audit Number: # C60172



<p><b>LEGEND</b></p> <ul style="list-style-type: none"> <li> SITE BOUNDARY</li> <li> LOT LINES</li> <li> BOREHOLE LOCATION</li> <li> MONITORING WELL LOCATION</li> <li> PROPOSED BOREHOLE/MONITORING WELL LOCATION</li> <li> PROPOSED BOREHOLE LOCATION</li> </ul>	<p><b>PROPOSED BOREHOLE/MONITORING WELL LOCATION PLAN</b></p> <p>Project: 1881 &amp; 1883 MERVILLE RD and 6 &amp; 8 1/2 JAMIE AVENUE OTTAWA, ONTARIO</p> <p>Phase I and IIA</p> <p>1:50</p> <p>August 2022</p> <p><b>FIGURE 1</b></p>
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# Appendix E

**Laboratory Certificates of Analysis - Soil**



Your Project #: 30029878  
 Your C.O.C. #: 732625-01-01

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
 1050 Morrison Drive  
 Unit 201  
 Ottawa, ON  
 CANADA K2H 8K7

**Report Date: 2019/09/10**  
 Report #: R5873195  
 Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**BV LABS JOB #: B9N6917**

**Received: 2019/08/26, 13:40**

Sample Matrix: Soil  
 # Samples Received: 6

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Methylnaphthalene Sum (1)	1	N/A	2019/09/09	CAM SOP-00301	EPA 8270D m
Hot Water Extractable Boron (1)	6	2019/08/28	2019/08/29	CAM SOP-00408	R153 Ana. Prot. 2011
1,3-Dichloropropene Sum (1)	6	N/A	2019/08/29		EPA 8260C m
Hexavalent Chromium in Soil by IC (1, 2)	6	2019/08/28	2019/08/29	CAM SOP-00436	EPA 3060/7199 m
Petroleum Hydrocarbons F2-F4 in Soil (1, 3)	6	2019/08/29	2019/08/30	CAM SOP-00316	CCME CWS m
Strong Acid Leachable Metals by ICPMS (1)	6	2019/08/28	2019/08/30	CAM SOP-00447	EPA 6020B m
Moisture (1)	6	N/A	2019/08/28	CAM SOP-00445	Carter 2nd ed 51.2 m
OC Pesticides (Selected) & PCB (1, 4)	1	2019/09/06	2019/09/08	CAM SOP-00307	SW846 8081, 8082
OC Pesticides Summed Parameters (1)	1	N/A	2019/09/09	CAM SOP-00307	EPA 8081/8082 m
PAH Compounds in Soil by GC/MS (SIM) (1)	1	2019/09/06	2019/09/06	CAM SOP-00318	EPA 8270D m
Sieve, 75um (1)	1	N/A	2019/08/29	CAM SOP-00467	Carter 2nd ed m
Volatile Organic Compounds and F1 PHCs (1)	6	N/A	2019/08/29	CAM SOP-00230	EPA 8260C m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.





Your Project #: 30029878  
Your C.O.C. #: 732625-01-01

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
1050 Morrison Drive  
Unit 201  
Ottawa, ON  
CANADA K2H 8K7

**Report Date: 2019/09/10**  
Report #: R5873195  
Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**BV LABS JOB #: B9N6917**

**Received: 2019/08/26, 13:40**

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by Bureau Veritas Laboratories Mississauga
- (2) Soils are reported on a dry weight basis unless otherwise specified.
- (3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.
- (4) Chlordane ( Total) = Alpha Chlordane + Gamma Chlordane

Encryption Key

Alisha Williamson  
Project Manager  
10 Sep 2019 09:20:17

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Alisha Williamson, Project Manager  
Email: Alisha.Williamson@bvlabs.com  
Phone# (613)274-0573

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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BV Labs Job #: B9N6917  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 METALS PACKAGE (SOIL)**

BV Labs ID		KPP084			KPP084			KPP085		
Sampling Date		2019/08/23 10:00			2019/08/23 10:00			2019/08/23 12:30		
COC Number		732625-01-01			732625-01-01			732625-01-01		
	<b>UNITS</b>	<b>MW-1-1</b>	<b>RDL</b>	<b>QC Batch</b>	<b>MW-1-1 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>	<b>MW-2-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Inorganics</b>										
Chromium (VI)	ug/g	<0.2	0.2	6303766				<0.2	0.2	6303766
<b>Metals</b>										
Hot Water Ext. Boron (B)	ug/g	<0.050	0.050	6304580				0.17	0.050	6304580
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.20	6304237	<0.20	0.20	6304237	<0.20	0.20	6304237
Acid Extractable Arsenic (As)	ug/g	<1.0	1.0	6304237	<1.0	1.0	6304237	<1.0	1.0	6304237
Acid Extractable Barium (Ba)	ug/g	17	0.50	6304237	18	0.50	6304237	32	0.50	6304237
Acid Extractable Beryllium (Be)	ug/g	<0.20	0.20	6304237	<0.20	0.20	6304237	0.25	0.20	6304237
Acid Extractable Boron (B)	ug/g	<5.0	5.0	6304237	<5.0	5.0	6304237	<5.0	5.0	6304237
Acid Extractable Cadmium (Cd)	ug/g	<0.10	0.10	6304237	<0.10	0.10	6304237	<0.10	0.10	6304237
Acid Extractable Chromium (Cr)	ug/g	18	1.0	6304237	19	1.0	6304237	15	1.0	6304237
Acid Extractable Cobalt (Co)	ug/g	3.6	0.10	6304237	3.6	0.10	6304237	3.9	0.10	6304237
Acid Extractable Copper (Cu)	ug/g	9.8	0.50	6304237	9.8	0.50	6304237	5.7	0.50	6304237
Acid Extractable Lead (Pb)	ug/g	1.8	1.0	6304237	1.8	1.0	6304237	2.8	1.0	6304237
Acid Extractable Molybdenum (Mo)	ug/g	3.1	0.50	6304237	3.4	0.50	6304237	<0.50	0.50	6304237
Acid Extractable Nickel (Ni)	ug/g	5.9	0.50	6304237	6.0	0.50	6304237	7.7	0.50	6304237
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	6304237	<0.50	0.50	6304237	<0.50	0.50	6304237
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	6304237	<0.20	0.20	6304237	<0.20	0.20	6304237
Acid Extractable Thallium (Tl)	ug/g	<0.050	0.050	6304237	<0.050	0.050	6304237	<0.050	0.050	6304237
Acid Extractable Uranium (U)	ug/g	0.46	0.050	6304237	0.45	0.050	6304237	0.51	0.050	6304237
Acid Extractable Vanadium (V)	ug/g	20	5.0	6304237	20	5.0	6304237	27	5.0	6304237
Acid Extractable Zinc (Zn)	ug/g	11	5.0	6304237	11	5.0	6304237	17	5.0	6304237
Acid Extractable Mercury (Hg)	ug/g	<0.050	0.050	6304237	<0.050	0.050	6304237	<0.050	0.050	6304237
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										



O.REG 153 METALS PACKAGE (SOIL)

BV Labs ID		KPP086		KPP087			KPP087		
Sampling Date		2019/08/23 14:30		2019/08/23 16:30			2019/08/23 16:30		
COC Number		732625-01-01		732625-01-01			732625-01-01		
	UNITS	MW-3-1	QC Batch	MW-4-1	RDL	QC Batch	MW-4-1 Lab-Dup	RDL	QC Batch
<b>Inorganics</b>									
Chromium (VI)	ug/g	<0.2	6303766	<0.2	0.2	6303766			
<b>Metals</b>									
Hot Water Ext. Boron (B)	ug/g	0.058	6304103	<0.050	0.050	6304580	<0.050	0.050	6304580
Acid Extractable Antimony (Sb)	ug/g	<0.20	6304237	<0.20	0.20	6304237			
Acid Extractable Arsenic (As)	ug/g	<1.0	6304237	<1.0	1.0	6304237			
Acid Extractable Barium (Ba)	ug/g	23	6304237	13	0.50	6304237			
Acid Extractable Beryllium (Be)	ug/g	<0.20	6304237	<0.20	0.20	6304237			
Acid Extractable Boron (B)	ug/g	<5.0	6304237	<5.0	5.0	6304237			
Acid Extractable Cadmium (Cd)	ug/g	<0.10	6304237	<0.10	0.10	6304237			
Acid Extractable Chromium (Cr)	ug/g	9.3	6304237	6.4	1.0	6304237			
Acid Extractable Cobalt (Co)	ug/g	3.5	6304237	4.7	0.10	6304237			
Acid Extractable Copper (Cu)	ug/g	4.2	6304237	9.9	0.50	6304237			
Acid Extractable Lead (Pb)	ug/g	1.8	6304237	1.8	1.0	6304237			
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	6304237	<0.50	0.50	6304237			
Acid Extractable Nickel (Ni)	ug/g	5.1	6304237	4.7	0.50	6304237			
Acid Extractable Selenium (Se)	ug/g	<0.50	6304237	<0.50	0.50	6304237			
Acid Extractable Silver (Ag)	ug/g	<0.20	6304237	<0.20	0.20	6304237			
Acid Extractable Thallium (Tl)	ug/g	<0.050	6304237	<0.050	0.050	6304237			
Acid Extractable Uranium (U)	ug/g	0.50	6304237	0.45	0.050	6304237			
Acid Extractable Vanadium (V)	ug/g	21	6304237	20	5.0	6304237			
Acid Extractable Zinc (Zn)	ug/g	9.7	6304237	10	5.0	6304237			
Acid Extractable Mercury (Hg)	ug/g	<0.050	6304237	<0.050	0.050	6304237			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate									



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BV Labs Job #: B9N6917  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 METALS PACKAGE (SOIL)**

BV Labs ID		KPP088			KPP088			KPP089		
Sampling Date		2019/08/23 13:30			2019/08/23 13:30			2019/08/23		
COC Number		732625-01-01			732625-01-01			732625-01-01		
	UNITS	BH-1-1	RDL	QC Batch	BH-1-1 Lab-Dup	RDL	QC Batch	DUP-1	RDL	QC Batch
<b>Inorganics</b>										
Chromium (VI)	ug/g	<0.2	0.2	6303766	<0.2	0.2	6303766	<0.2	0.2	6303766
<b>Metals</b>										
Hot Water Ext. Boron (B)	ug/g	0.23	0.050	6304103				0.15	0.050	6304580
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.20	6304237				<0.20	0.20	6304237
Acid Extractable Arsenic (As)	ug/g	<1.0	1.0	6304237				<1.0	1.0	6304237
Acid Extractable Barium (Ba)	ug/g	46	0.50	6304237				28	0.50	6304237
Acid Extractable Beryllium (Be)	ug/g	0.30	0.20	6304237				0.22	0.20	6304237
Acid Extractable Boron (B)	ug/g	<5.0	5.0	6304237				<5.0	5.0	6304237
Acid Extractable Cadmium (Cd)	ug/g	0.11	0.10	6304237				<0.10	0.10	6304237
Acid Extractable Chromium (Cr)	ug/g	16	1.0	6304237				15	1.0	6304237
Acid Extractable Cobalt (Co)	ug/g	4.6	0.10	6304237				4.4	0.10	6304237
Acid Extractable Copper (Cu)	ug/g	5.8	0.50	6304237				5.9	0.50	6304237
Acid Extractable Lead (Pb)	ug/g	3.2	1.0	6304237				2.8	1.0	6304237
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	0.50	6304237				<0.50	0.50	6304237
Acid Extractable Nickel (Ni)	ug/g	10	0.50	6304237				7.7	0.50	6304237
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	6304237				<0.50	0.50	6304237
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	6304237				<0.20	0.20	6304237
Acid Extractable Thallium (Tl)	ug/g	0.057	0.050	6304237				<0.050	0.050	6304237
Acid Extractable Uranium (U)	ug/g	0.47	0.050	6304237				0.56	0.050	6304237
Acid Extractable Vanadium (V)	ug/g	28	5.0	6304237				32	5.0	6304237
Acid Extractable Zinc (Zn)	ug/g	26	5.0	6304237				15	5.0	6304237
Acid Extractable Mercury (Hg)	ug/g	<0.050	0.050	6304237				<0.050	0.050	6304237
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										



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BV Labs Job #: B9N6917  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### O.REG 153 OC PESTICIDES (SOIL)

BV Labs ID		KPP087			KPP087		
Sampling Date		2019/08/23 16:30			2019/08/23 16:30		
COC Number		732625-01-01			732625-01-01		
	<b>UNITS</b>	<b>MW-4-1</b>	<b>RDL</b>	<b>QC Batch</b>	<b>MW-4-1 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>							
Chlordane (Total)	ug/g	<0.0020	0.0020	6315997			
o,p-DDD + p,p-DDD	ug/g	<0.0020	0.0020	6315997			
o,p-DDE + p,p-DDE	ug/g	<0.0020	0.0020	6315997			
o,p-DDT + p,p-DDT	ug/g	<0.0020	0.0020	6315997			
Total Endosulfan	ug/g	<0.0020	0.0020	6315997			
Total PCB	ug/g	<0.015	0.015	6315997			
<b>Pesticides &amp; Herbicides</b>							
Aldrin	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
a-Chlordane	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
g-Chlordane	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
o,p-DDD	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
p,p-DDD	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
o,p-DDE	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
p,p-DDE	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
o,p-DDT	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
p,p-DDT	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
Dieldrin	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
Lindane	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
Endosulfan I (alpha)	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
Endosulfan II (beta)	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
Endrin	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
Heptachlor	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
Heptachlor epoxide	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
Hexachlorobenzene	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
Hexachlorobutadiene	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
Hexachloroethane	ug/g	<0.0020	0.0020	6319822	<0.0020	0.0020	6319822
Methoxychlor	ug/g	<0.0050	0.0050	6319822	<0.0050	0.0050	6319822
Aroclor 1242	ug/g	<0.015	0.015	6319822	<0.015	0.015	6319822
Aroclor 1248	ug/g	<0.015	0.015	6319822	<0.015	0.015	6319822
Aroclor 1254	ug/g	<0.015	0.015	6319822	<0.015	0.015	6319822
Aroclor 1260	ug/g	<0.015	0.015	6319822	<0.015	0.015	6319822
<b>Surrogate Recovery (%)</b>							
2,4,5,6-Tetrachloro-m-xylene	%	72		6319822	76		6319822
Decachlorobiphenyl	%	112		6319822	125		6319822
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							



BUREAU  
VERITAS

BV Labs Job #: B9N6917

Report Date: 2019/09/10

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

### O.REG 153 PAHS (SOIL)

BV Labs ID		KPP084		
Sampling Date		2019/08/23 10:00		
COC Number		732625-01-01		
	<b>UNITS</b>	<b>MW-1-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	0.0071	6315990
<b>Polyaromatic Hydrocarbons</b>				
Acenaphthene	ug/g	<0.0050	0.0050	6318139
Acenaphthylene	ug/g	<0.0050	0.0050	6318139
Anthracene	ug/g	<0.0050	0.0050	6318139
Benzo(a)anthracene	ug/g	<0.0050	0.0050	6318139
Benzo(a)pyrene	ug/g	<0.0050	0.0050	6318139
Benzo(b/j)fluoranthene	ug/g	<0.0050	0.0050	6318139
Benzo(g,h,i)perylene	ug/g	<0.0050	0.0050	6318139
Benzo(k)fluoranthene	ug/g	<0.0050	0.0050	6318139
Chrysene	ug/g	<0.0050	0.0050	6318139
Dibenz(a,h)anthracene	ug/g	<0.0050	0.0050	6318139
Fluoranthene	ug/g	<0.0050	0.0050	6318139
Fluorene	ug/g	<0.0050	0.0050	6318139
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.0050	6318139
1-Methylnaphthalene	ug/g	<0.0050	0.0050	6318139
2-Methylnaphthalene	ug/g	<0.0050	0.0050	6318139
Naphthalene	ug/g	<0.0050	0.0050	6318139
Phenanthrene	ug/g	<0.0050	0.0050	6318139
Pyrene	ug/g	<0.0050	0.0050	6318139
<b>Surrogate Recovery (%)</b>				
D10-Anthracene	%	100		6318139
D14-Terphenyl (FS)	%	109		6318139
D8-Acenaphthylene	%	95		6318139
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU  
VERITAS

BV Labs Job #: B9N6917  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### O.REG 153 VOCS BY HS & F1-F4 (SOIL)

BV Labs ID		KPP084		KPP085		KPP086	KPP087		
Sampling Date		2019/08/23 10:00		2019/08/23 12:30		2019/08/23 14:30	2019/08/23 16:30		
COC Number		732625-01-01		732625-01-01		732625-01-01	732625-01-01		
	UNITS	MW-1-1	QC Batch	MW-2-1	QC Batch	MW-3-1	MW-4-1	RDL	QC Batch
<b>Inorganics</b>									
Moisture	%	12	6304283	5.2	6304194	5.9	16	1.0	6304283
<b>Calculated Parameters</b>									
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	6299508	<0.050	6299508	<0.050	<0.050	0.050	6299508
<b>Volatile Organics</b>									
Acetone (2-Propanone)	ug/g	<0.50	6303503	<0.50	6303503	<0.50	<0.50	0.50	6303503
Benzene	ug/g	<0.020	6303503	<0.020	6303503	<0.020	<0.020	0.020	6303503
Bromodichloromethane	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Bromoform	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Bromomethane	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Carbon Tetrachloride	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Chlorobenzene	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Chloroform	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Dibromochloromethane	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
1,2-Dichlorobenzene	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
1,3-Dichlorobenzene	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
1,4-Dichlorobenzene	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
1,1-Dichloroethane	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
1,2-Dichloroethane	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
1,1-Dichloroethylene	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
cis-1,2-Dichloroethylene	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
trans-1,2-Dichloroethylene	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
1,2-Dichloropropane	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
cis-1,3-Dichloropropene	ug/g	<0.030	6303503	<0.030	6303503	<0.030	<0.030	0.030	6303503
trans-1,3-Dichloropropene	ug/g	<0.040	6303503	<0.040	6303503	<0.040	<0.040	0.040	6303503
Ethylbenzene	ug/g	<0.020	6303503	<0.020	6303503	<0.020	<0.020	0.020	6303503
Ethylene Dibromide	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Hexane	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Methylene Chloride(Dichloromethane)	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	6303503	<0.50	6303503	<0.50	<0.50	0.50	6303503
Methyl Isobutyl Ketone	ug/g	<0.50	6303503	<0.50	6303503	<0.50	<0.50	0.50	6303503
Methyl t-butyl ether (MTBE)	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Styrene	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
1,1,1,2-Tetrachloroethane	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
1,1,2,2-Tetrachloroethane	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									



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VERITAS

BV Labs Job #: B9N6917  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 VOCS BY HS & F1-F4 (SOIL)**

BV Labs ID		KPP084		KPP085		KPP086	KPP087		
Sampling Date		2019/08/23 10:00		2019/08/23 12:30		2019/08/23 14:30	2019/08/23 16:30		
COC Number		732625-01-01		732625-01-01		732625-01-01	732625-01-01		
	UNITS	MW-1-1	QC Batch	MW-2-1	QC Batch	MW-3-1	MW-4-1	RDL	QC Batch
Tetrachloroethylene	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Toluene	ug/g	<0.020	6303503	<0.020	6303503	<0.020	<0.020	0.020	6303503
1,1,1-Trichloroethane	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
1,1,2-Trichloroethane	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Trichloroethylene	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	6303503	<0.050	6303503	<0.050	<0.050	0.050	6303503
Vinyl Chloride	ug/g	<0.020	6303503	<0.020	6303503	<0.020	<0.020	0.020	6303503
p+m-Xylene	ug/g	<0.020	6303503	<0.020	6303503	<0.020	<0.020	0.020	6303503
o-Xylene	ug/g	<0.020	6303503	<0.020	6303503	<0.020	<0.020	0.020	6303503
Total Xylenes	ug/g	<0.020	6303503	<0.020	6303503	<0.020	<0.020	0.020	6303503
F1 (C6-C10)	ug/g	<10	6303503	<10	6303503	<10	<10	10	6303503
F1 (C6-C10) - BTEX	ug/g	<10	6303503	<10	6303503	<10	<10	10	6303503
<b>F2-F4 Hydrocarbons</b>									
F2 (C10-C16 Hydrocarbons)	ug/g	<10	6306927	<10	6306927	<10	<10	10	6306927
F3 (C16-C34 Hydrocarbons)	ug/g	<50	6306927	<50	6306927	<50	<50	50	6306927
F4 (C34-C50 Hydrocarbons)	ug/g	<50	6306927	<50	6306927	<50	<50	50	6306927
Reached Baseline at C50	ug/g	Yes	6306927	Yes	6306927	Yes	Yes		6306927
<b>Surrogate Recovery (%)</b>									
o-Terphenyl	%	93	6306927	106	6306927	93	100		6306927
4-Bromofluorobenzene	%	95	6303503	96	6303503	95	94		6303503
D10-o-Xylene	%	104	6303503	110	6303503	103	107		6303503
D4-1,2-Dichloroethane	%	99	6303503	99	6303503	99	98		6303503
D8-Toluene	%	99	6303503	99	6303503	98	98		6303503
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									





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VERITAS

BV Labs Job #: B9N6917  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 VOCS BY HS & F1-F4 (SOIL)**

BV Labs ID		KPP088	KPP089		
Sampling Date		2019/08/23 13:30	2019/08/23		
COC Number		732625-01-01	732625-01-01		
	<b>UNITS</b>	<b>BH-1-1</b>	<b>DUP-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Inorganics</b>					
Moisture	%	4.9	4.2	1.0	6304283
<b>Calculated Parameters</b>					
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	<0.050	0.050	6299508
<b>Volatile Organics</b>					
Acetone (2-Propanone)	ug/g	<0.50	<0.50	0.50	6303503
Benzene	ug/g	<0.020	<0.020	0.020	6303503
Bromodichloromethane	ug/g	<0.050	<0.050	0.050	6303503
Bromoform	ug/g	<0.050	<0.050	0.050	6303503
Bromomethane	ug/g	<0.050	<0.050	0.050	6303503
Carbon Tetrachloride	ug/g	<0.050	<0.050	0.050	6303503
Chlorobenzene	ug/g	<0.050	<0.050	0.050	6303503
Chloroform	ug/g	<0.050	<0.050	0.050	6303503
Dibromochloromethane	ug/g	<0.050	<0.050	0.050	6303503
1,2-Dichlorobenzene	ug/g	<0.050	<0.050	0.050	6303503
1,3-Dichlorobenzene	ug/g	<0.050	<0.050	0.050	6303503
1,4-Dichlorobenzene	ug/g	<0.050	<0.050	0.050	6303503
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	<0.050	0.050	6303503
1,1-Dichloroethane	ug/g	<0.050	<0.050	0.050	6303503
1,2-Dichloroethane	ug/g	<0.050	<0.050	0.050	6303503
1,1-Dichloroethylene	ug/g	<0.050	<0.050	0.050	6303503
cis-1,2-Dichloroethylene	ug/g	<0.050	<0.050	0.050	6303503
trans-1,2-Dichloroethylene	ug/g	<0.050	<0.050	0.050	6303503
1,2-Dichloropropane	ug/g	<0.050	<0.050	0.050	6303503
cis-1,3-Dichloropropene	ug/g	<0.030	<0.030	0.030	6303503
trans-1,3-Dichloropropene	ug/g	<0.040	<0.040	0.040	6303503
Ethylbenzene	ug/g	<0.020	<0.020	0.020	6303503
Ethylene Dibromide	ug/g	<0.050	<0.050	0.050	6303503
Hexane	ug/g	<0.050	<0.050	0.050	6303503
Methylene Chloride(Dichloromethane)	ug/g	<0.050	<0.050	0.050	6303503
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	<0.50	0.50	6303503
Methyl Isobutyl Ketone	ug/g	<0.50	<0.50	0.50	6303503
Methyl t-butyl ether (MTBE)	ug/g	<0.050	<0.050	0.050	6303503
Styrene	ug/g	<0.050	<0.050	0.050	6303503
1,1,1,2-Tetrachloroethane	ug/g	<0.050	<0.050	0.050	6303503
1,1,2,2-Tetrachloroethane	ug/g	<0.050	<0.050	0.050	6303503
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



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BV Labs Job #: B9N6917  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 VOCS BY HS & F1-F4 (SOIL)**

BV Labs ID		KPP088	KPP089		
Sampling Date		2019/08/23 13:30	2019/08/23		
COC Number		732625-01-01	732625-01-01		
	<b>UNITS</b>	<b>BH-1-1</b>	<b>DUP-1</b>	<b>RDL</b>	<b>QC Batch</b>
Tetrachloroethylene	ug/g	<0.050	<0.050	0.050	6303503
Toluene	ug/g	<0.020	<0.020	0.020	6303503
1,1,1-Trichloroethane	ug/g	<0.050	<0.050	0.050	6303503
1,1,2-Trichloroethane	ug/g	<0.050	<0.050	0.050	6303503
Trichloroethylene	ug/g	<0.050	<0.050	0.050	6303503
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	<0.050	0.050	6303503
Vinyl Chloride	ug/g	<0.020	<0.020	0.020	6303503
p+m-Xylene	ug/g	<0.020	<0.020	0.020	6303503
o-Xylene	ug/g	<0.020	<0.020	0.020	6303503
Total Xylenes	ug/g	<0.020	<0.020	0.020	6303503
F1 (C6-C10)	ug/g	<10	<10	10	6303503
F1 (C6-C10) - BTEX	ug/g	<10	<10	10	6303503
<b>F2-F4 Hydrocarbons</b>					
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	10	6306927
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	50	6306927
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	50	6306927
Reached Baseline at C50	ug/g	Yes	Yes		6306927
<b>Surrogate Recovery (%)</b>					
o-Terphenyl	%	98	92		6306927
4-Bromofluorobenzene	%	95	95		6303503
D10-o-Xylene	%	100	106		6303503
D4-1,2-Dichloroethane	%	98	99		6303503
D8-Toluene	%	98	98		6303503
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



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BV Labs Job #: B9N6917  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### RESULTS OF ANALYSES OF SOIL

BV Labs ID		KPP085		
Sampling Date		2019/08/23 12:30		
COC Number		732625-01-01		
	<b>UNITS</b>	<b>MW-2-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Miscellaneous Parameters</b>				
Grain Size	%	COARSE	N/A	6304182
Sieve - #200 (<0.075mm)	%	33	1	6304182
Sieve - #200 (>0.075mm)	%	67	1	6304182
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable				



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BV Labs Job #: B9N6917  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### TEST SUMMARY

**BV Labs ID:** KPP084  
**Sample ID:** MW-1-1  
**Matrix:** Soil

**Collected:** 2019/08/23  
**Shipped:**  
**Received:** 2019/08/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6315990	N/A	2019/09/09	Automated Statchk
Hot Water Extractable Boron	ICP	6304580	2019/08/28	2019/08/29	Azita Fazaeli
1,3-Dichloropropene Sum	CALC	6299508	N/A	2019/08/29	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	6303766	2019/08/28	2019/08/29	Rupinder Sihota
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6306927	2019/08/29	2019/08/30	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6304237	2019/08/28	2019/08/30	Viviana Canzonieri
Moisture	BAL	6304283	N/A	2019/08/28	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6318139	2019/09/06	2019/09/06	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6303503	N/A	2019/08/29	Xueming Jiang

**BV Labs ID:** KPP084 Dup  
**Sample ID:** MW-1-1  
**Matrix:** Soil

**Collected:** 2019/08/23  
**Shipped:**  
**Received:** 2019/08/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	6304237	2019/08/28	2019/08/30	Viviana Canzonieri

**BV Labs ID:** KPP085  
**Sample ID:** MW-2-1  
**Matrix:** Soil

**Collected:** 2019/08/23  
**Shipped:**  
**Received:** 2019/08/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	6304580	2019/08/28	2019/08/29	Azita Fazaeli
1,3-Dichloropropene Sum	CALC	6299508	N/A	2019/08/29	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	6303766	2019/08/28	2019/08/29	Rupinder Sihota
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6306927	2019/08/29	2019/08/30	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6304237	2019/08/28	2019/08/30	Viviana Canzonieri
Moisture	BAL	6304194	N/A	2019/08/28	Manpreet Kaur
Sieve, 75um	SIEV	6304182	N/A	2019/08/29	Gurpreet Kaur
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6303503	N/A	2019/08/29	Xueming Jiang

**BV Labs ID:** KPP086  
**Sample ID:** MW-3-1  
**Matrix:** Soil

**Collected:** 2019/08/23  
**Shipped:**  
**Received:** 2019/08/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	6304103	2019/08/28	2019/08/29	Jolly John
1,3-Dichloropropene Sum	CALC	6299508	N/A	2019/08/29	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	6303766	2019/08/28	2019/08/29	Rupinder Sihota
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6306927	2019/08/29	2019/08/30	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6304237	2019/08/28	2019/08/30	Viviana Canzonieri
Moisture	BAL	6304283	N/A	2019/08/28	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6303503	N/A	2019/08/29	Xueming Jiang



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BV Labs Job #: B9N6917  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### TEST SUMMARY

**BV Labs ID:** KPP087  
**Sample ID:** MW-4-1  
**Matrix:** Soil

**Collected:** 2019/08/23  
**Shipped:**  
**Received:** 2019/08/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	6304580	2019/08/28	2019/08/29	Azita Fazaeli
1,3-Dichloropropene Sum	CALC	6299508	N/A	2019/08/29	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	6303766	2019/08/28	2019/08/29	Rupinder Sihota
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6306927	2019/08/29	2019/08/30	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6304237	2019/08/28	2019/08/30	Viviana Canzonieri
Moisture	BAL	6304283	N/A	2019/08/28	Chun Yan
OC Pesticides (Selected) & PCB	GC/ECD	6319822	2019/09/06	2019/09/08	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	6315997	N/A	2019/09/09	Automated Statchk
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6303503	N/A	2019/08/29	Xueming Jiang

**BV Labs ID:** KPP087 Dup  
**Sample ID:** MW-4-1  
**Matrix:** Soil

**Collected:** 2019/08/23  
**Shipped:**  
**Received:** 2019/08/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	6304580	2019/08/28	2019/08/29	Azita Fazaeli
OC Pesticides (Selected) & PCB	GC/ECD	6319822	2019/09/06	2019/09/08	Mahmudul Khan

**BV Labs ID:** KPP088  
**Sample ID:** BH-1-1  
**Matrix:** Soil

**Collected:** 2019/08/23  
**Shipped:**  
**Received:** 2019/08/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	6304103	2019/08/28	2019/08/29	Jolly John
1,3-Dichloropropene Sum	CALC	6299508	N/A	2019/08/29	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	6303766	2019/08/28	2019/08/29	Rupinder Sihota
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6306927	2019/08/29	2019/08/30	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6304237	2019/08/28	2019/08/30	Viviana Canzonieri
Moisture	BAL	6304283	N/A	2019/08/28	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6303503	N/A	2019/08/29	Xueming Jiang

**BV Labs ID:** KPP088 Dup  
**Sample ID:** BH-1-1  
**Matrix:** Soil

**Collected:** 2019/08/23  
**Shipped:**  
**Received:** 2019/08/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hexavalent Chromium in Soil by IC	IC/SPEC	6303766	2019/08/28	2019/08/29	Rupinder Sihota

**BV Labs ID:** KPP089  
**Sample ID:** DUP-1  
**Matrix:** Soil

**Collected:** 2019/08/23  
**Shipped:**  
**Received:** 2019/08/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	6304580	2019/08/28	2019/08/29	Azita Fazaeli
1,3-Dichloropropene Sum	CALC	6299508	N/A	2019/08/29	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	6303766	2019/08/28	2019/08/29	Rupinder Sihota
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6306927	2019/08/29	2019/08/30	Prabhjot Gulati



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VERITAS

BV Labs Job #: B9N6917  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### TEST SUMMARY

**BV Labs ID:** KPP089  
**Sample ID:** DUP-1  
**Matrix:** Soil

**Collected:** 2019/08/23  
**Shipped:**  
**Received:** 2019/08/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	6304237	2019/08/28	2019/08/30	Viviana Canzonieri
Moisture	BAL	6304283	N/A	2019/08/28	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6303503	N/A	2019/08/29	Xueming Jiang



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ARCADIS Canada Inc  
Client Project #: 30029878  
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### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.3°C
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Revised Report (2019/09/09): OC Pesticides and PAH analysis added per client request.

**Results relate only to the items tested.**



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BV Labs Job #: B9N6917  
Report Date: 2019/09/10

### QUALITY ASSURANCE REPORT

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6303503	4-Bromofluorobenzene	2019/08/28	101	60 - 140	101	60 - 140	94	%				
6303503	D10-o-Xylene	2019/08/28	107	60 - 130	104	60 - 130	95	%				
6303503	D4-1,2-Dichloroethane	2019/08/28	101	60 - 140	100	60 - 140	101	%				
6303503	D8-Toluene	2019/08/28	99	60 - 140	98	60 - 140	97	%				
6306927	o-Terphenyl	2019/08/29	96	60 - 130	95	60 - 130	89	%				
6318139	D10-Anthracene	2019/09/06	97	50 - 130	95	50 - 130	98	%				
6318139	D14-Terphenyl (FS)	2019/09/06	108	50 - 130	104	50 - 130	106	%				
6318139	D8-Acenaphthylene	2019/09/06	100	50 - 130	95	50 - 130	95	%				
6319822	2,4,5,6-Tetrachloro-m-xylene	2019/09/08	79	50 - 130	84	50 - 130	74	%				
6319822	Decachlorobiphenyl	2019/09/08	121	50 - 130	119	50 - 130	112	%				
6303503	1,1,1,2-Tetrachloroethane	2019/08/28	107	60 - 140	106	60 - 130	<0.050	ug/g	NC	50		
6303503	1,1,1-Trichloroethane	2019/08/28	98	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
6303503	1,1,2,2-Tetrachloroethane	2019/08/28	101	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
6303503	1,1,2-Trichloroethane	2019/08/28	100	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
6303503	1,1-Dichloroethane	2019/08/28	93	60 - 140	95	60 - 130	<0.050	ug/g	NC	50		
6303503	1,1-Dichloroethylene	2019/08/28	99	60 - 140	102	60 - 130	<0.050	ug/g	NC	50		
6303503	1,2-Dichlorobenzene	2019/08/28	99	60 - 140	95	60 - 130	<0.050	ug/g	NC	50		
6303503	1,2-Dichloroethane	2019/08/28	100	60 - 140	101	60 - 130	<0.050	ug/g	NC	50		
6303503	1,2-Dichloropropane	2019/08/28	87	60 - 140	87	60 - 130	<0.050	ug/g	NC	50		
6303503	1,3-Dichlorobenzene	2019/08/28	100	60 - 140	95	60 - 130	<0.050	ug/g	NC	50		
6303503	1,4-Dichlorobenzene	2019/08/28	108	60 - 140	101	60 - 130	<0.050	ug/g	NC	50		
6303503	Acetone (2-Propanone)	2019/08/28	96	60 - 140	98	60 - 140	<0.50	ug/g	NC	50		
6303503	Benzene	2019/08/28	91	60 - 140	92	60 - 130	<0.020	ug/g	NC	50		
6303503	Bromodichloromethane	2019/08/28	94	60 - 140	94	60 - 130	<0.050	ug/g	NC	50		
6303503	Bromoform	2019/08/28	100	60 - 140	98	60 - 130	<0.050	ug/g	NC	50		
6303503	Bromomethane	2019/08/28	111	60 - 140	117	60 - 140	<0.050	ug/g	NC	50		
6303503	Carbon Tetrachloride	2019/08/28	98	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
6303503	Chlorobenzene	2019/08/28	98	60 - 140	96	60 - 130	<0.050	ug/g	NC	50		
6303503	Chloroform	2019/08/28	94	60 - 140	96	60 - 130	<0.050	ug/g	NC	50		
6303503	cis-1,2-Dichloroethylene	2019/08/28	97	60 - 140	97	60 - 130	<0.050	ug/g	NC	50		
6303503	cis-1,3-Dichloropropene	2019/08/28	78	60 - 140	78	60 - 130	<0.030	ug/g	NC	50		
6303503	Dibromochloromethane	2019/08/28	102	60 - 140	101	60 - 130	<0.050	ug/g	NC	50		





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### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6303503	Dichlorodifluoromethane (FREON 12)	2019/08/28	98	60 - 140	127	60 - 140	<0.050	ug/g	NC	50		
6303503	Ethylbenzene	2019/08/28	89	60 - 140	86	60 - 130	<0.020	ug/g	NC	50		
6303503	Ethylene Dibromide	2019/08/28	101	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
6303503	F1 (C6-C10) - BTEX	2019/08/28					<10	ug/g	NC	30		
6303503	F1 (C6-C10)	2019/08/28	99	60 - 140	96	80 - 120	<10	ug/g	NC	30		
6303503	Hexane	2019/08/28	91	60 - 140	94	60 - 130	<0.050	ug/g	NC	50		
6303503	Methyl Ethyl Ketone (2-Butanone)	2019/08/28	89	60 - 140	90	60 - 140	<0.50	ug/g	NC	50		
6303503	Methyl Isobutyl Ketone	2019/08/28	82	60 - 140	82	60 - 130	<0.50	ug/g	NC	50		
6303503	Methyl t-butyl ether (MTBE)	2019/08/28	87	60 - 140	87	60 - 130	<0.050	ug/g	NC	50		
6303503	Methylene Chloride(Dichloromethane)	2019/08/28	93	60 - 140	95	60 - 130	<0.050	ug/g	NC	50		
6303503	o-Xylene	2019/08/28	91	60 - 140	88	60 - 130	<0.020	ug/g	NC	50		
6303503	p+m-Xylene	2019/08/28	92	60 - 140	89	60 - 130	<0.020	ug/g	NC	50		
6303503	Styrene	2019/08/28	90	60 - 140	87	60 - 130	<0.050	ug/g	NC	50		
6303503	Tetrachloroethylene	2019/08/28	101	60 - 140	99	60 - 130	<0.050	ug/g	NC	50		
6303503	Toluene	2019/08/28	89	60 - 140	88	60 - 130	<0.020	ug/g	NC	50		
6303503	Total Xylenes	2019/08/28					<0.020	ug/g	NC	50		
6303503	trans-1,2-Dichloroethylene	2019/08/28	101	60 - 140	102	60 - 130	<0.050	ug/g	NC	50		
6303503	trans-1,3-Dichloropropene	2019/08/28	78	60 - 140	76	60 - 130	<0.040	ug/g	NC	50		
6303503	Trichloroethylene	2019/08/28	108	60 - 140	108	60 - 130	<0.050	ug/g	NC	50		
6303503	Trichlorofluoromethane (FREON 11)	2019/08/28	117	60 - 140	123	60 - 130	<0.050	ug/g	NC	50		
6303503	Vinyl Chloride	2019/08/28	103	60 - 140	111	60 - 130	<0.020	ug/g	NC	50		
6303766	Chromium (VI)	2019/08/29	37 (1)	70 - 130	101	80 - 120	<0.2	ug/g	NC	35		
6304103	Hot Water Ext. Boron (B)	2019/08/29	102	75 - 125	105	75 - 125	<0.050	ug/g	3.6	40		
6304182	Sieve - #200 (<0.075mm)	2019/08/29							5.0	20	56	53 - 58
6304182	Sieve - #200 (>0.075mm)	2019/08/29							2.6	20	44	42 - 47
6304194	Moisture	2019/08/28							1.3	20		
6304237	Acid Extractable Antimony (Sb)	2019/08/30	98	75 - 125	101	80 - 120	<0.20	ug/g	NC	30		
6304237	Acid Extractable Arsenic (As)	2019/08/30	101	75 - 125	103	80 - 120	<1.0	ug/g	NC	30		
6304237	Acid Extractable Barium (Ba)	2019/08/30	98	75 - 125	101	80 - 120	<0.50	ug/g	6.7	30		
6304237	Acid Extractable Beryllium (Be)	2019/08/30	100	75 - 125	99	80 - 120	<0.20	ug/g	NC	30		
6304237	Acid Extractable Boron (B)	2019/08/30	100	75 - 125	99	80 - 120	<5.0	ug/g	NC	30		
6304237	Acid Extractable Cadmium (Cd)	2019/08/30	102	75 - 125	103	80 - 120	<0.10	ug/g	NC	30		



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BV Labs Job #: B9N6917  
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### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6304237	Acid Extractable Chromium (Cr)	2019/08/30	99	75 - 125	100	80 - 120	<1.0	ug/g	7.4	30		
6304237	Acid Extractable Cobalt (Co)	2019/08/30	98	75 - 125	100	80 - 120	<0.10	ug/g	0.67	30		
6304237	Acid Extractable Copper (Cu)	2019/08/30	100	75 - 125	101	80 - 120	<0.50	ug/g	0.46	30		
6304237	Acid Extractable Lead (Pb)	2019/08/30	102	75 - 125	102	80 - 120	<1.0	ug/g	3.1	30		
6304237	Acid Extractable Mercury (Hg)	2019/08/30	98	75 - 125	100	80 - 120	<0.050	ug/g	NC	30		
6304237	Acid Extractable Molybdenum (Mo)	2019/08/30	104	75 - 125	100	80 - 120	<0.50	ug/g	9.7	30		
6304237	Acid Extractable Nickel (Ni)	2019/08/30	99	75 - 125	100	80 - 120	<0.50	ug/g	2.0	30		
6304237	Acid Extractable Selenium (Se)	2019/08/30	103	75 - 125	104	80 - 120	<0.50	ug/g	NC	30		
6304237	Acid Extractable Silver (Ag)	2019/08/30	101	75 - 125	102	80 - 120	<0.20	ug/g	NC	30		
6304237	Acid Extractable Thallium (Tl)	2019/08/30	101	75 - 125	100	80 - 120	<0.050	ug/g	NC	30		
6304237	Acid Extractable Uranium (U)	2019/08/30	99	75 - 125	98	80 - 120	<0.050	ug/g	2.4	30		
6304237	Acid Extractable Vanadium (V)	2019/08/30	100	75 - 125	100	80 - 120	<5.0	ug/g	0.036	30		
6304237	Acid Extractable Zinc (Zn)	2019/08/30	93	75 - 125	103	80 - 120	<5.0	ug/g	2.4	30		
6304283	Moisture	2019/08/28							5.0	20		
6304580	Hot Water Ext. Boron (B)	2019/08/29	103	75 - 125	108	75 - 125	<0.050	ug/g	NC	40		
6306927	F2 (C10-C16 Hydrocarbons)	2019/08/29	100	50 - 130	99	80 - 120	<10	ug/g	NC	30		
6306927	F3 (C16-C34 Hydrocarbons)	2019/08/29	93	50 - 130	91	80 - 120	<50	ug/g	5.2	30		
6306927	F4 (C34-C50 Hydrocarbons)	2019/08/29	NC	50 - 130	88	80 - 120	<50	ug/g	19	30		
6318139	1-Methylnaphthalene	2019/09/06	110	50 - 130	107	50 - 130	<0.0050	ug/g	NC	40		
6318139	2-Methylnaphthalene	2019/09/06	95	50 - 130	94	50 - 130	<0.0050	ug/g	NC	40		
6318139	Acenaphthene	2019/09/06	100	50 - 130	96	50 - 130	<0.0050	ug/g	7.2	40		
6318139	Acenaphthylene	2019/09/06	99	50 - 130	96	50 - 130	<0.0050	ug/g	84 (2)	40		
6318139	Anthracene	2019/09/06	97	50 - 130	98	50 - 130	<0.0050	ug/g	15	40		
6318139	Benzo(a)anthracene	2019/09/06	98	50 - 130	102	50 - 130	<0.0050	ug/g	19	40		
6318139	Benzo(a)pyrene	2019/09/06	92	50 - 130	96	50 - 130	<0.0050	ug/g	33	40		
6318139	Benzo(b/j)fluoranthene	2019/09/06	92	50 - 130	102	50 - 130	<0.0050	ug/g	31	40		
6318139	Benzo(g,h,i)perylene	2019/09/06	106	50 - 130	86	50 - 130	<0.0050	ug/g	34	40		
6318139	Benzo(k)fluoranthene	2019/09/06	92	50 - 130	96	50 - 130	<0.0050	ug/g	36	40		
6318139	Chrysene	2019/09/06	86	50 - 130	90	50 - 130	<0.0050	ug/g	23	40		
6318139	Dibenz(a,h)anthracene	2019/09/06	113	50 - 130	76	50 - 130	<0.0050	ug/g	39	40		
6318139	Fluoranthene	2019/09/06	89	50 - 130	102	50 - 130	<0.0050	ug/g	2.6	40		
6318139	Fluorene	2019/09/06	102	50 - 130	98	50 - 130	<0.0050	ug/g	8.3	40		



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### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6318139	Indeno(1,2,3-cd)pyrene	2019/09/06	115	50 - 130	91	50 - 130	<0.0050	ug/g	37	40		
6318139	Naphthalene	2019/09/06	101	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40		
6318139	Phenanthrene	2019/09/06	90	50 - 130	98	50 - 130	<0.0050	ug/g	20	40		
6318139	Pyrene	2019/09/06	91	50 - 130	103	50 - 130	<0.0050	ug/g	2.5	40		
6319822	a-Chlordane	2019/09/08	99	50 - 130	96	50 - 130	<0.0020	ug/g	NC	40		
6319822	Aldrin	2019/09/08	82	50 - 130	83	50 - 130	<0.0020	ug/g	NC	40		
6319822	Aroclor 1242	2019/09/08					<0.015	ug/g	NC	40		
6319822	Aroclor 1248	2019/09/08					<0.015	ug/g	NC	40		
6319822	Aroclor 1254	2019/09/08					<0.015	ug/g	NC	40		
6319822	Aroclor 1260	2019/09/08					<0.015	ug/g	NC	40		
6319822	Dieldrin	2019/09/08	121	50 - 130	105	50 - 130	<0.0020	ug/g	NC	40		
6319822	Endosulfan I (alpha)	2019/09/08	77	50 - 130	70	50 - 130	<0.0020	ug/g	NC	40		
6319822	Endosulfan II (beta)	2019/09/08	107	50 - 130	90	50 - 130	<0.0020	ug/g	NC	40		
6319822	Endrin	2019/09/08	109	50 - 130	91	50 - 130	<0.0020	ug/g	NC	40		
6319822	g-Chlordane	2019/09/08	96	50 - 130	91	50 - 130	<0.0020	ug/g	NC	40		
6319822	Heptachlor epoxide	2019/09/08	95	50 - 130	87	50 - 130	<0.0020	ug/g	NC	40		
6319822	Heptachlor	2019/09/08	87	50 - 130	86	50 - 130	<0.0020	ug/g	NC	40		
6319822	Hexachlorobenzene	2019/09/08	98	50 - 130	90	50 - 130	<0.0020	ug/g	NC	40		
6319822	Hexachlorobutadiene	2019/09/08	91	50 - 130	98	50 - 130	<0.0020	ug/g	NC	40		
6319822	Hexachloroethane	2019/09/08	96	50 - 130	104	50 - 130	<0.0020	ug/g	NC	40		
6319822	Lindane	2019/09/08	99	50 - 130	93	50 - 130	<0.0020	ug/g	NC	40		
6319822	Methoxychlor	2019/09/08	127	50 - 130	115	50 - 130	<0.0050	ug/g	NC	40		
6319822	o,p-DDD	2019/09/08	108	50 - 130	100	50 - 130	<0.0020	ug/g	NC	40		
6319822	o,p-DDE	2019/09/08	107	50 - 130	102	50 - 130	<0.0020	ug/g	NC	40		
6319822	o,p-DDT	2019/09/08	96	50 - 130	94	50 - 130	<0.0020	ug/g	NC	40		
6319822	p,p-DDD	2019/09/08	100	50 - 130	89	50 - 130	<0.0020	ug/g	NC	40		
6319822	p,p-DDE	2019/09/08	87	50 - 130	83	50 - 130	<0.0020	ug/g	NC	40		



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### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6319822	p,p-DDT	2019/09/08	98	50 - 130	93	50 - 130	<0.0020	ug/g	NC	40		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) The matrix spike recovery was below the lower control limit. This may be due in part to the reducing environment of the sample. The sample was reanalyzed with the same results.

(2) Duplicate results exceeded RPD acceptance criteria. This is likely due to sample heterogeneity . The variability in the results for flagged analyte may be more pronounced.

(3) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



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BV Labs Job #: B9N6917  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

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Anastassia Hamanov, Scientific Specialist

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Brad Newman, Scientific Service Specialist

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



<b>INVOICE TO:</b>		<b>REPORT TO:</b>		<b>PROJECT INFORMATION:</b>		<b>Laboratory Use Only:</b>	
Company Name: #10988 ARCADIS Canada Inc	Company Name: Stephanie Joyce	Quotation #: B81974	BV Labs Job #:		Bottle Order #:		
Attention: Accounts Payable Canada	Attention: Stephanie Joyce	P.O. #:	30029878		COC #:		Project Manager:
Address: 1050 Morrison Drive Unit 201 Ottawa ON K2H 8K7	Address:	Project Name:	Site #:		732625		Alisha Williamson
Tel: (613) 721-0555 Fax: (613) 721-0029	Tel: Fax:	Sampled By: <i>Lennart de Groot</i>	C#732625-01-01				
Email: AccountsPayable.Canada@arcadis.com	Email: Stephanie.Joyce@arcadis.com						

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects		
Regulation 153 (2011)		Other Regulations		Special Instructions		Field Filtered (please circle): Metals / Hg / Cr / V	O.Reg 153 VOCs by HS & F1-F4 (Soil)	O.Reg 153 Metals Package (Soil)	Sieve, 75um	Nonen Landfill Waste Soil	O.Reg 153 VOCs by HS & F1-F4	O.Reg 153 Metals Package (Water)	Regular (Standard) TAT: <i>(will be applied if Rush TAT is not specified)</i>		Job Specific Rush TAT (if applies to entire submission)		# of Bottles	Comments
Table 1	Table 2	Table 3	Table	CCME	Reg 558								MISA	PWQO	Other	Sanitary Sewer Bylaw		
<input type="checkbox"/> Table 1	<input checked="" type="checkbox"/> Res/Park	<input type="checkbox"/> Medium/Fine	<input type="checkbox"/> Table	<input type="checkbox"/> CCME	<input type="checkbox"/> Reg 558	<input type="checkbox"/> MISA	<input type="checkbox"/> PWQO	<input type="checkbox"/> Other	<input type="checkbox"/> Sanitary Sewer Bylaw	<input type="checkbox"/> Storm Sewer Bylaw	<input type="checkbox"/> Municipality			<input checked="" type="checkbox"/>			5	
<input type="checkbox"/> Table 2	<input checked="" type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> Table	<input type="checkbox"/> CCME	<input type="checkbox"/> Reg 558	<input type="checkbox"/> MISA	<input type="checkbox"/> PWQO	<input type="checkbox"/> Other	<input type="checkbox"/> Sanitary Sewer Bylaw	<input type="checkbox"/> Storm Sewer Bylaw	<input type="checkbox"/> Municipality						5	on ice
<input type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other	<input type="checkbox"/> For RSC	<input type="checkbox"/> Table	<input type="checkbox"/> CCME	<input type="checkbox"/> Reg 558	<input type="checkbox"/> MISA	<input type="checkbox"/> PWQO	<input type="checkbox"/> Other	<input type="checkbox"/> Sanitary Sewer Bylaw	<input type="checkbox"/> Storm Sewer Bylaw	<input type="checkbox"/> Municipality						5	
<input type="checkbox"/> Table				<input type="checkbox"/> CCME	<input type="checkbox"/> Reg 558	<input type="checkbox"/> MISA	<input type="checkbox"/> PWQO	<input type="checkbox"/> Other	<input type="checkbox"/> Sanitary Sewer Bylaw	<input type="checkbox"/> Storm Sewer Bylaw	<input type="checkbox"/> Municipality						5	
Include Criteria on Certificate of Analysis (Y/N)?																	5	
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix														
1	MW-1-1	23-08-19	10:00	soil		X	X										5	
2	MW-2-1	23-08-19	12:30	soil		X	X	X									5	on ice
3	MW-3-1	23-08-19	14:30	soil		X	X										5	
4	MW-4-1	23-08-19	16:30	soil		X	X										5	RECEIVED IN OTTAWA
5	BH-1-1	23-08-19	13:30	soil		X	X										5	
6	Dup-1	23-08-19		soil		X	X										5	
7																		
8																		
9																		
10																		

26-Aug-19 13:40  
Alisha Williamson  
B9N6917  
KIV OTT 001

* RELINQUISHED BY: (Signature/Print) <i>Lennart de Groot</i>	Date: (YY/MM/DD) 2019-08-26	Time 13:40	RECEIVED BY: (Signature/Print) <i>Paul Ian Campbell</i>	Date: (YY/MM/DD) 20190826	Time 13:40	# jars used and not submitted	Laboratory Use Only				
							Time Sensitive	Temperature (°C) on Recept 8, 10, 2	Custody Seal Present	Yes	No
									Intact		

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.  
 \*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.  
 White: BV Labs Yellow: Client  
 SAMPLES MUST BE KEPT COOL (<10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS



<b>INVOICE TO:</b>		<b>REPORT TO:</b>		<b>PROJECT INFORMATION:</b>		<b>Laboratory Use Only:</b>	
Company Name: #10988 ARCADIS Canada Inc		Company Name: _____		Quotation #: B81974		BV Labs Job #:	
Attention: Accounts Payable Canada		Attention: Stephanie Joyce		P.O. #: _____		Bottle Order #:	
Address: 1050 Morrison Drive Unit 201		Address: _____		Project: 30029878		COC #:	
Ottawa ON K2H 8K7		Tel: _____		Project Name: _____		Project Manager:	
Tel: (613) 721-0555 Fax: (613) 721-0029		Tel: _____		Site #: _____		Alisha Williamson	
Email: AccountsPayable.Canada@arcadis.com		Email: Stephanie.Joyce@arcadis.com		Sampled By: <i>Lennox de Groot</i>		C#732625-01-01	

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY					ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects							
Regulation 153 (2011)		Other Regulations		Special Instructions	Field Filtered (please circle): Metals / Hg / Cr / V	O.Reg 153 VOCs by HS & F-H-F4 (Soil)	O.Reg 153 Metals Package (Soil)	Sieve, 75um	Non-landfill Waste Soil	O.Reg 153 VOCs by HS & F-H-F4	O.Reg 153 Metals Package (Water)											
<input type="checkbox"/> Table 1	<input checked="" type="checkbox"/> Res/Park	<input type="checkbox"/> Medium/Fine	<input type="checkbox"/> CCME	<input type="checkbox"/> Sanitary Sewer Bylaw																		
<input type="checkbox"/> Table 2	<input checked="" type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> Reg 558	<input type="checkbox"/> Storm Sewer Bylaw																		
<input type="checkbox"/> Table 3	<input type="checkbox"/> Agrl/Other	<input type="checkbox"/> For RSC	<input type="checkbox"/> MISA	Municipality _____																		
<input type="checkbox"/> Table			<input type="checkbox"/> PWQO																			
<input type="checkbox"/> Table			<input type="checkbox"/> Other																			
Include Criteria on Certificate of Analysis (Y/N)?																						
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix																		
1	MW-1-1	23-08-19	10:00	soil		X	X															
2	MW-2-1	23-08-19	12:30	soil		X	X	X													on ice	
3	MW-3-1	23-08-19	14:30	soil		X	X															
4	MW-4-1	23-08-19	16:30	soil		X	X														RECEIVED IN OTTAWA	
5	BH-1-1	23-08-19	13:30	soil		X	X															
6	Dup-1	23-08-19		soil		X	X															
7																						
8																						
9																						
10																						

**Regular (Standard) TAT:**  
(will be applied if Rush TAT is not specified):   
Standard TAT = 5-7 Working days for most tests.  
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

**Job Specific Rush TAT (if applies to entire submission)**  
Date Required: \_\_\_\_\_ Time Required:   
Rush Confirmation Number: \_\_\_\_\_ (call lab for #)

# of Bottles	Comments
5	
5	on ice
5	
5	
5	
5	
5	
5	
5	

26-Aug-19 13:40  
Alisha Williamson  
B9N6917  
KIV OTT 001

* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only				
<i>Lennox de Groot</i>		2019-08-26	13:40	<i>Jan Campbell</i>		2019-08-26	13:40		Time Sensitive	Temperature (°C) on Reel	Custody Seal Present	Yes	No
										8, 10, 2	Intact		

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

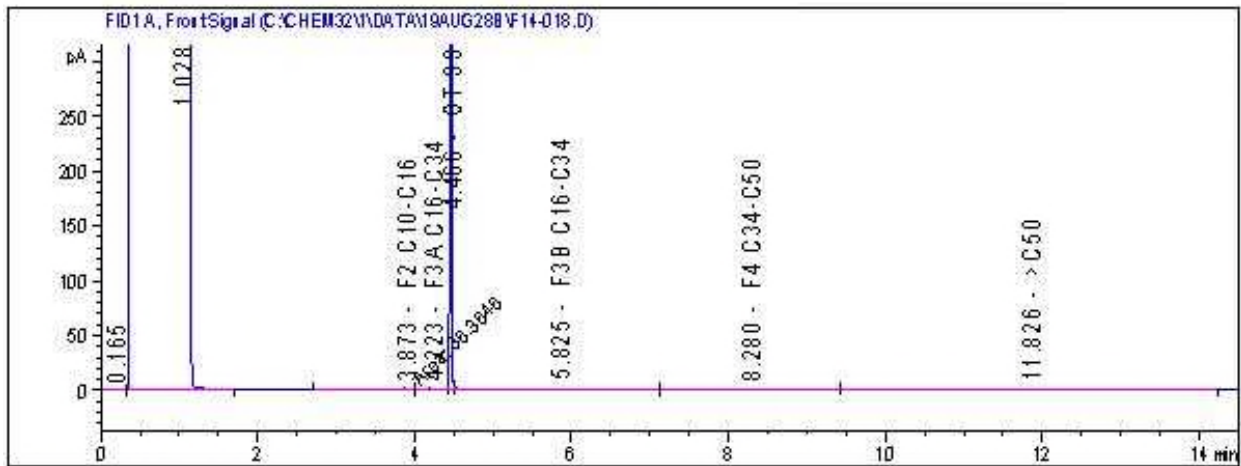
\*\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS. *5198*

\*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

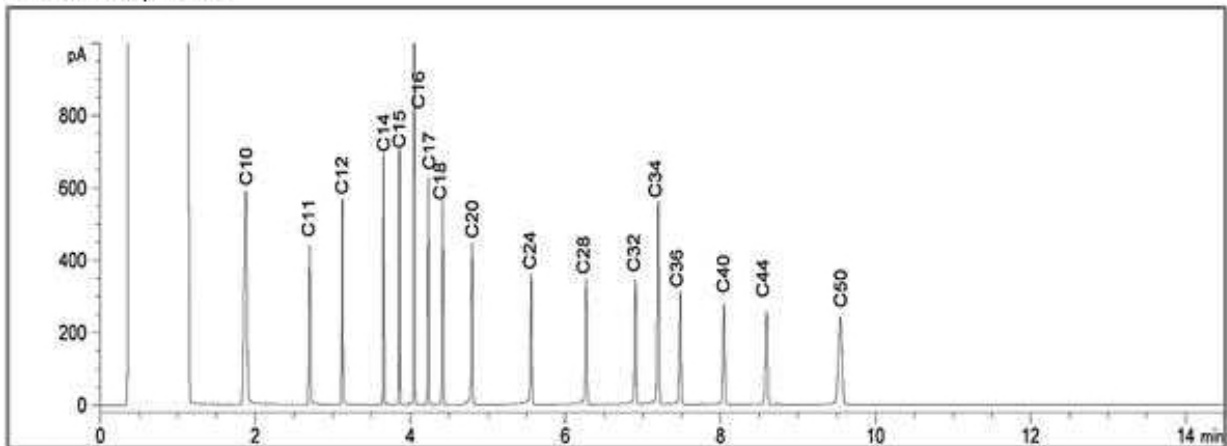
SAMPLES MUST BE KEPT COOL (<10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

White: BV Labs Yellow: Client

**Petroleum Hydrocarbons F2-F4 in Soil Chromatogram**



**Reference Spectrum**



**TYPICAL PRODUCT CARBON NUMBER RANGES**

Gasoline: **C6 - C12**

Diesel: **C10 - C24**

Jet Fuels: **C6 - C16**

Varsol: **C8 - C12**

Fuel Oils: **C6 - C32**

Creosote: **C10 - C26**

Kerosene: **C8 - C16**

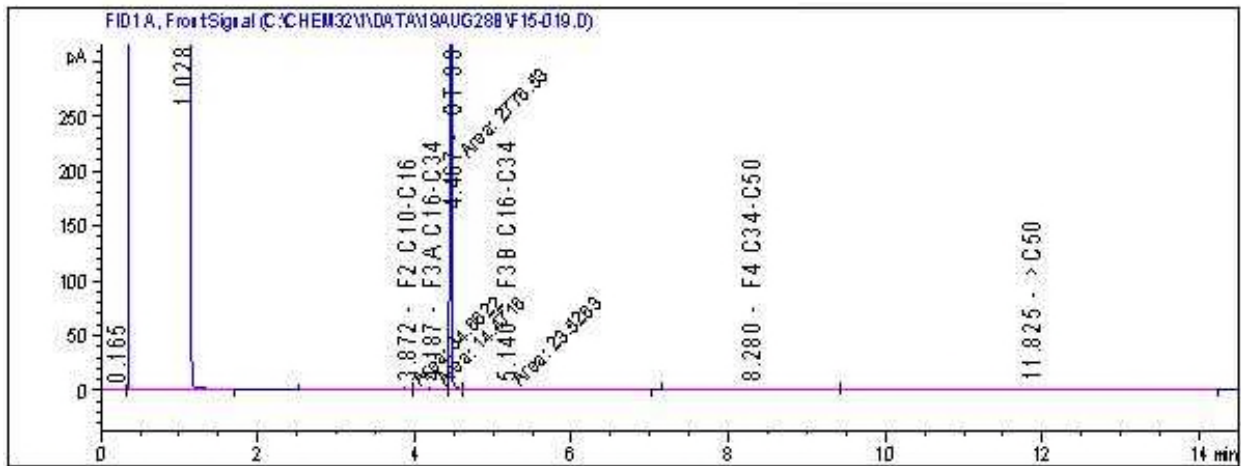
Motor Oils: **C16 - C50**

Asphalt: **C18 - C50+**

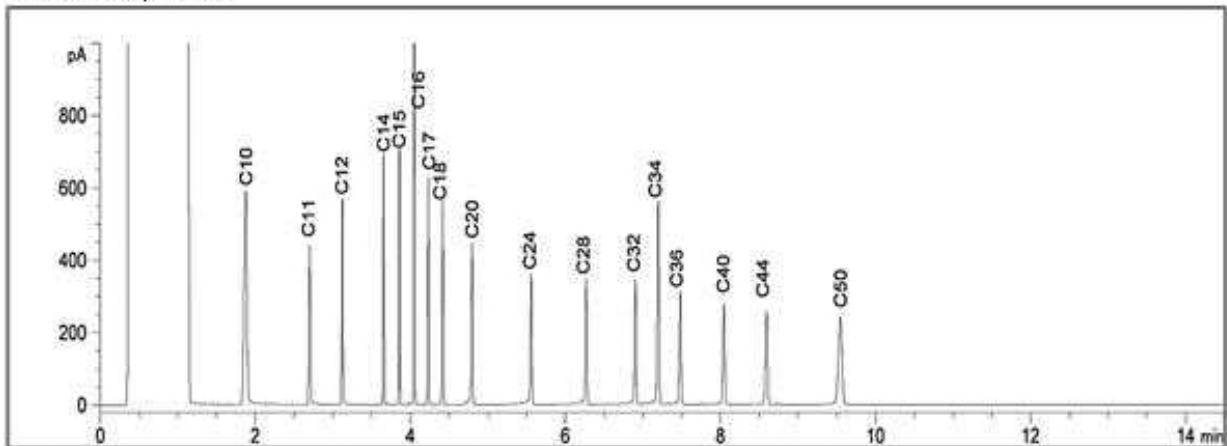
**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**



**Petroleum Hydrocarbons F2-F4 in Soil Chromatogram**



**Reference Spectrum**



**TYPICAL PRODUCT CARBON NUMBER RANGES**

Gasoline: **C6 - C12**

Diesel: **C10 - C24**

Jet Fuels: **C6 - C16**

Varsol: **C8 - C12**

Fuel Oils: **C6 - C32**

Creosote: **C10 - C26**

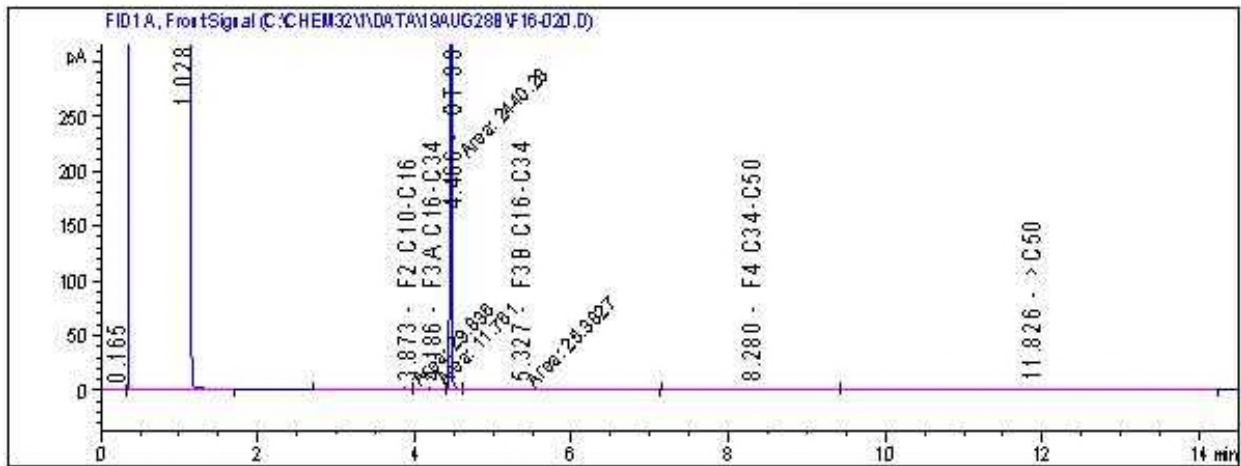
Kerosene: **C8 - C16**

Motor Oils: **C16 - C50**

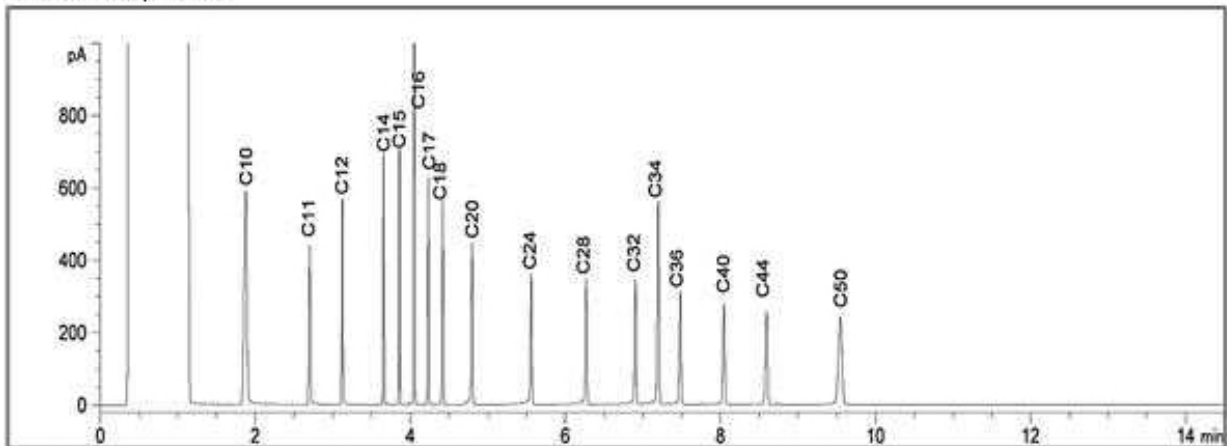
Asphalt: **C18 - C50+**

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**

**Petroleum Hydrocarbons F2-F4 in Soil Chromatogram**



**Reference Spectrum**



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Fuel Oils: **C6 - C32**

Creosote: **C10 - C26**

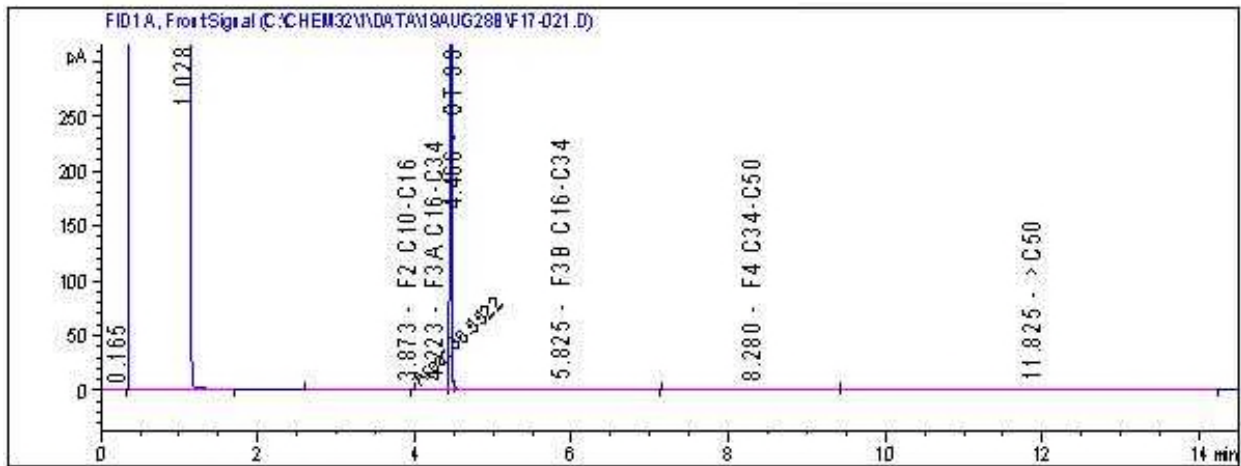
Kerosene: **C8 - C16**

Motor Oils: **C16 - C50**

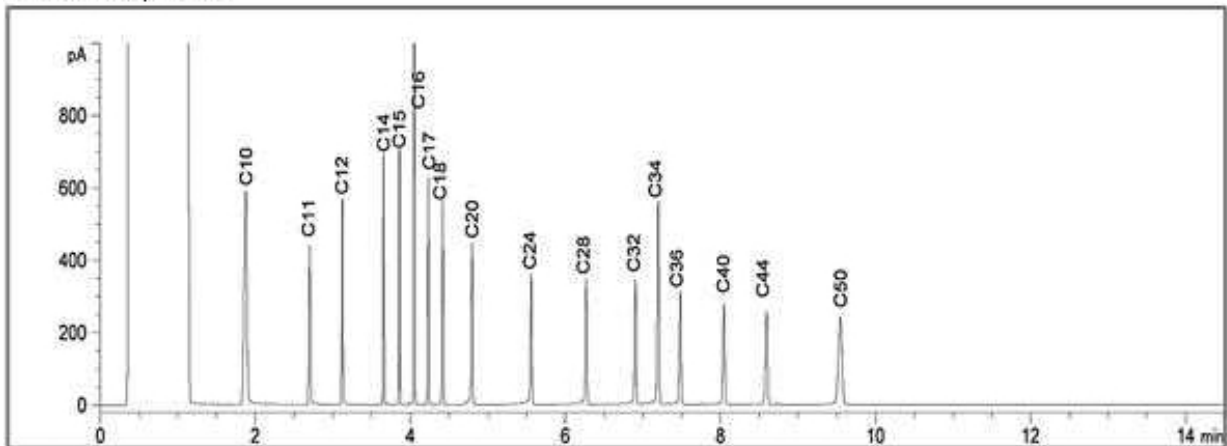
Asphalt: **C18 - C50+**

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**

**Petroleum Hydrocarbons F2-F4 in Soil Chromatogram**



**Reference Spectrum**



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Varsol: **C8 - C12**

Fuel Oils: **C6 - C32**

Creosote: **C10 - C26**

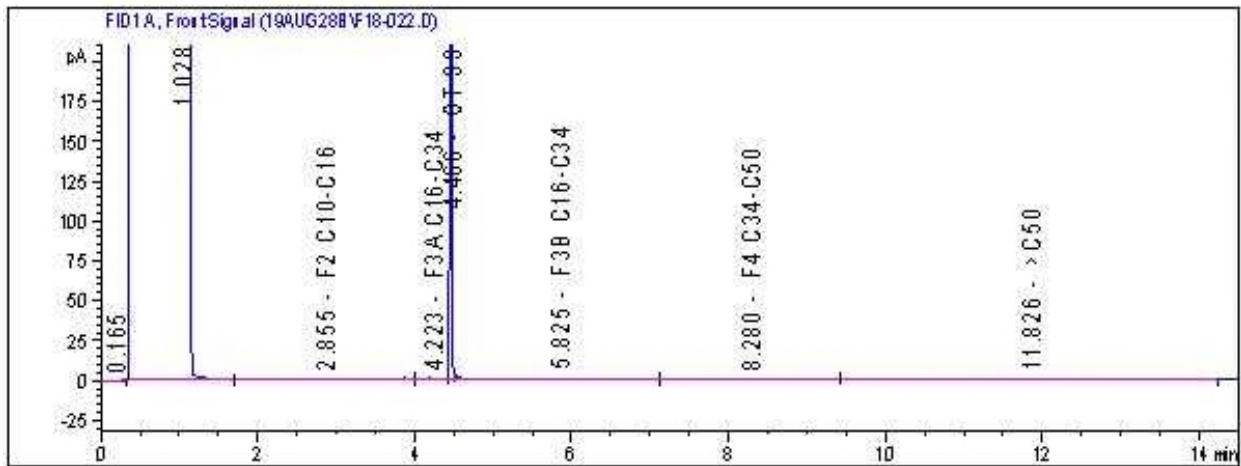
Kerosene: **C8 - C16**

Motor Oils: **C16 - C50**

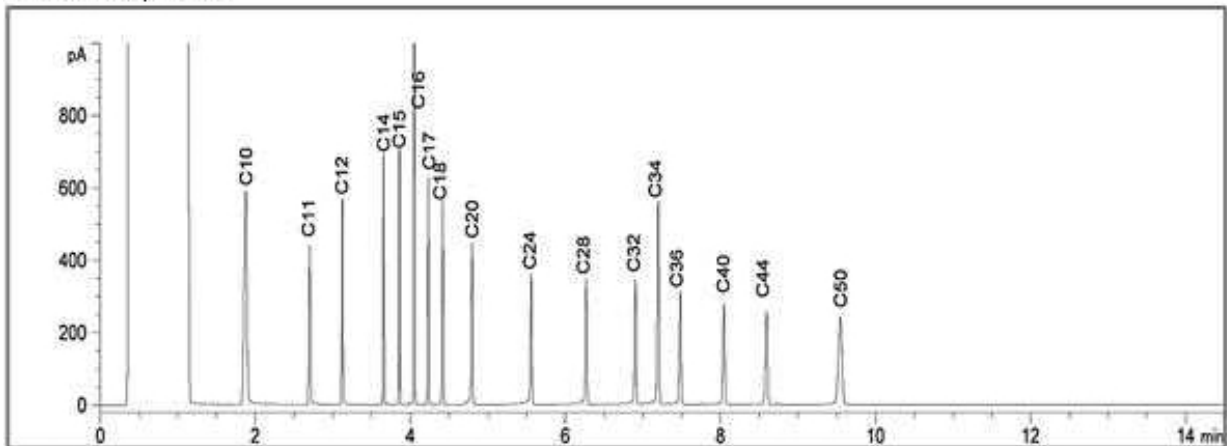
Asphalt: **C18 - C50+**

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**

**Petroleum Hydrocarbons F2-F4 in Soil Chromatogram**



**Reference Spectrum**



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Diesel: **C10 - C24**

Jet Fuels: **C6 - C16**

Varsol: **C8 - C12**

Fuel Oils: **C6 - C32**

Creosote: **C10 - C26**

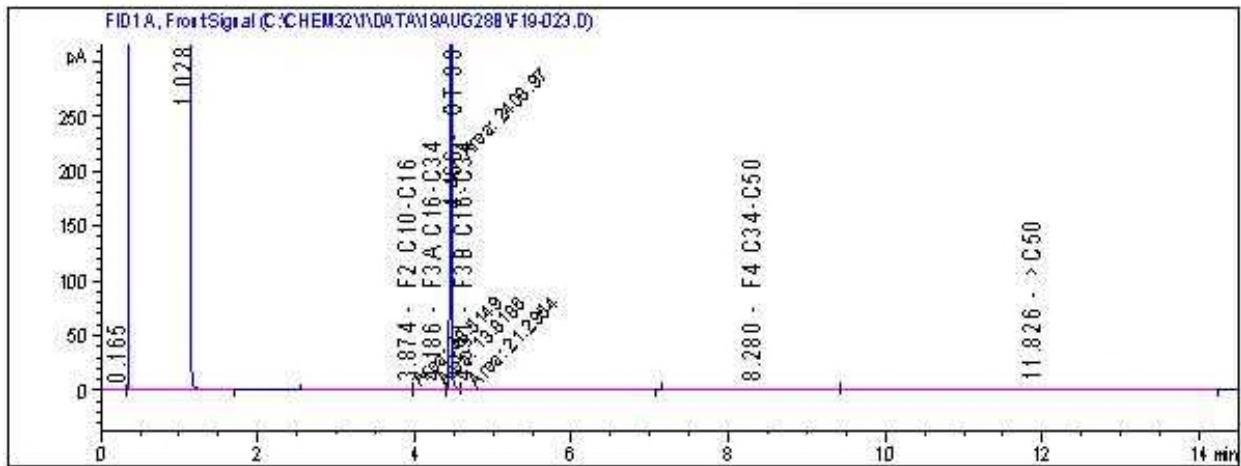
Kerosene: **C8 - C16**

Motor Oils: **C16 - C50**

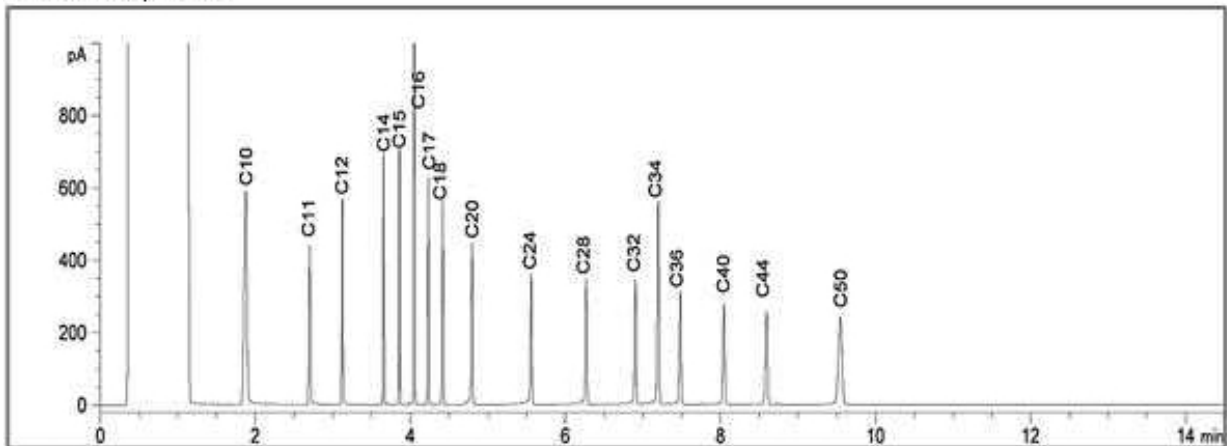
Asphalt: **C18 - C50+**

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**

**Petroleum Hydrocarbons F2-F4 in Soil Chromatogram**



**Reference Spectrum**



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Gasoline: **C6 - C12**  
 Varsol: **C8 - C12**  
 Kerosene: **C8 - C16**

Diesel: **C10 - C24**  
 Fuel Oils: **C6 - C32**  
 Motor Oils: **C16 - C50**

Jet Fuels: **C6 - C16**  
 Creosote: **C10 - C26**  
 Asphalt: **C18 - C50+**

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**



Your Project #: 30029878  
 Your C.O.C. #: 732625-02-01

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
 1050 Morrison Drive  
 Unit 201  
 Ottawa, ON  
 CANADA K2H 8K7

**Report Date: 2019/09/09**  
 Report #: R5872692  
 Version: 2 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9N9515**

**Received: 2019/08/27, 16:00**

Sample Matrix: Soil  
 # Samples Received: 1

<b>Analyses</b>	<b>Quantity</b>	<b>Date Extracted</b>	<b>Date Analyzed</b>	<b>Laboratory Method</b>	<b>Reference</b>
Methylnaphthalene Sum (1)	1	N/A	2019/09/09	CAM SOP-00301	EPA 8270D m
Hot Water Extractable Boron (1)	1	2019/08/31	2019/09/03	CAM SOP-00408	R153 Ana. Prot. 2011
1,3-Dichloropropene Sum (1)	1	N/A	2019/09/04		EPA 8260C m
Hexavalent Chromium in Soil by IC (1, 2)	1	2019/08/30	2019/09/03	CAM SOP-00436	EPA 3060/7199 m
Petroleum Hydrocarbons F2-F4 in Soil (1, 3)	1	2019/08/30	2019/09/01	CAM SOP-00316	CCME CWS m
Strong Acid Leachable Metals by ICPMS (1)	1	2019/08/31	2019/09/04	CAM SOP-00447	EPA 6020B m
Moisture (1)	1	N/A	2019/08/30	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM) (1)	1	2019/09/06	2019/09/06	CAM SOP-00318	EPA 8270D m
Volatile Organic Compounds and F1 PHCs (1)	1	N/A	2019/09/03	CAM SOP-00230	EPA 8260C m

Sample Matrix: Water  
 # Samples Received: 5

<b>Analyses</b>	<b>Quantity</b>	<b>Date Extracted</b>	<b>Date Analyzed</b>	<b>Laboratory Method</b>	<b>Reference</b>
Methylnaphthalene Sum (1)	1	N/A	2019/09/06	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum (1)	5	N/A	2019/09/02		EPA 8260C m
Chromium (VI) in Water (1)	5	N/A	2019/09/03	CAM SOP-00436	EPA 7199 m
Petroleum Hydrocarbons F2-F4 in Water (1, 3)	5	2019/08/30	2019/09/03	CAM SOP-00316	CCME PHC-CWS m
Mercury in Water by CVAA (1)	5	2019/09/03	2019/09/03	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS (1)	4	N/A	2019/09/01	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS (1)	1	N/A	2019/09/03	CAM SOP-00447	EPA 6020B m
PAH Compounds in Water by GC/MS (SIM) (1)	1	2019/09/05	2019/09/06	CAM SOP-00318	EPA 8270D m
Volatile Organic Compounds and F1 PHCs (1)	5	N/A	2019/08/31	CAM SOP-00230	EPA 8260C m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.



Your Project #: 30029878  
Your C.O.C. #: 732625-02-01

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
1050 Morrison Drive  
Unit 201  
Ottawa, ON  
CANADA K2H 8K7

**Report Date: 2019/09/09**  
Report #: R5872692  
Version: 2 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9N9515**  
**Received: 2019/08/27, 16:00**

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by Bureau Veritas Laboratories Mississauga
- (2) Soils are reported on a dry weight basis unless otherwise specified.
- (3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Alisha Williamson  
Project Manager  
09 Sep 2019 17:19:38

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Alisha Williamson, Project Manager  
Email: Alisha.Williamson@bvlabs.com  
Phone# (613)274-0573

=====  
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



BUREAU  
VERITAS

BV Labs Job #: B9N9515

Report Date: 2019/09/09

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

### O.REG 153 METALS PACKAGE (SOIL)

BV Labs ID		KQD244		
Sampling Date		2019/08/27 15:30		
COC Number		732625-02-01		
	<b>UNITS</b>	<b>BH-2-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Inorganics</b>				
Chromium (VI)	ug/g	<0.2	0.2	6309781
<b>Metals</b>				
Hot Water Ext. Boron (B)	ug/g	0.44	0.050	6311023
Acid Extractable Antimony (Sb)	ug/g	0.33	0.20	6310722
Acid Extractable Arsenic (As)	ug/g	3.5	1.0	6310722
Acid Extractable Barium (Ba)	ug/g	77	0.50	6310722
Acid Extractable Beryllium (Be)	ug/g	0.27	0.20	6310722
Acid Extractable Boron (B)	ug/g	5.1	5.0	6310722
Acid Extractable Cadmium (Cd)	ug/g	0.20	0.10	6310722
Acid Extractable Chromium (Cr)	ug/g	17	1.0	6310722
Acid Extractable Cobalt (Co)	ug/g	4.5	0.10	6310722
Acid Extractable Copper (Cu)	ug/g	13	0.50	6310722
Acid Extractable Lead (Pb)	ug/g	27	1.0	6310722
Acid Extractable Molybdenum (Mo)	ug/g	0.50	0.50	6310722
Acid Extractable Nickel (Ni)	ug/g	10	0.50	6310722
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	6310722
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	6310722
Acid Extractable Thallium (Tl)	ug/g	0.086	0.050	6310722
Acid Extractable Uranium (U)	ug/g	0.43	0.050	6310722
Acid Extractable Vanadium (V)	ug/g	25	5.0	6310722
Acid Extractable Zinc (Zn)	ug/g	63	5.0	6310722
Acid Extractable Mercury (Hg)	ug/g	<0.050	0.050	6310722
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				





BUREAU  
VERITAS

BV Labs Job #: B9N9515

Report Date: 2019/09/09

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

### O.REG 153 PAHS (SOIL)

BV Labs ID		KQD244		
Sampling Date		2019/08/27 15:30		
COC Number		732625-02-01		
	<b>UNITS</b>	<b>BH-2-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	0.0071	6315990
<b>Polyaromatic Hydrocarbons</b>				
Acenaphthene	ug/g	<0.0050	0.0050	6318139
Acenaphthylene	ug/g	<0.0050	0.0050	6318139
Anthracene	ug/g	<0.0050	0.0050	6318139
Benzo(a)anthracene	ug/g	0.013	0.0050	6318139
Benzo(a)pyrene	ug/g	0.014	0.0050	6318139
Benzo(b/j)fluoranthene	ug/g	0.025	0.0050	6318139
Benzo(g,h,i)perylene	ug/g	0.023	0.0050	6318139
Benzo(k)fluoranthene	ug/g	0.0073	0.0050	6318139
Chrysene	ug/g	0.013	0.0050	6318139
Dibenz(a,h)anthracene	ug/g	<0.0050	0.0050	6318139
Fluoranthene	ug/g	0.027	0.0050	6318139
Fluorene	ug/g	<0.0050	0.0050	6318139
Indeno(1,2,3-cd)pyrene	ug/g	0.015	0.0050	6318139
1-Methylnaphthalene	ug/g	<0.0050	0.0050	6318139
2-Methylnaphthalene	ug/g	<0.0050	0.0050	6318139
Naphthalene	ug/g	<0.0050	0.0050	6318139
Phenanthrene	ug/g	0.014	0.0050	6318139
Pyrene	ug/g	0.023	0.0050	6318139
<b>Surrogate Recovery (%)</b>				
D10-Anthracene	%	95		6318139
D14-Terphenyl (FS)	%	106		6318139
D8-Acenaphthylene	%	99		6318139
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU  
VERITAS

BV Labs Job #: B9N9515  
Report Date: 2019/09/09

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 VOCS BY HS & F1-F4 (SOIL)**

BV Labs ID		KQD244			KQD244		
Sampling Date		2019/08/27 15:30			2019/08/27 15:30		
COC Number		732625-02-01			732625-02-01		
	<b>UNITS</b>	<b>BH-2-1</b>	<b>RDL</b>	<b>QC Batch</b>	<b>BH-2-1 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Inorganics</b>							
Moisture	%	9.5	1.0	6309671			
<b>Calculated Parameters</b>							
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	0.050	6308565			
<b>Volatile Organics</b>							
Acetone (2-Propanone)	ug/g	<0.50	0.50	6311962	<0.50	0.50	6311962
Benzene	ug/g	<0.020	0.020	6311962	<0.020	0.020	6311962
Bromodichloromethane	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Bromoform	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Bromomethane	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Carbon Tetrachloride	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Chlorobenzene	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Chloroform	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Dibromochloromethane	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
1,2-Dichlorobenzene	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
1,3-Dichlorobenzene	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
1,4-Dichlorobenzene	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
1,1-Dichloroethane	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
1,2-Dichloroethane	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
1,1-Dichloroethylene	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
cis-1,2-Dichloroethylene	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
trans-1,2-Dichloroethylene	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
1,2-Dichloropropane	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
cis-1,3-Dichloropropene	ug/g	<0.030	0.030	6311962	<0.030	0.030	6311962
trans-1,3-Dichloropropene	ug/g	<0.040	0.040	6311962	<0.040	0.040	6311962
Ethylbenzene	ug/g	<0.020	0.020	6311962	<0.020	0.020	6311962
Ethylene Dibromide	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Hexane	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Methylene Chloride(Dichloromethane)	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	0.50	6311962	<0.50	0.50	6311962
Methyl Isobutyl Ketone	ug/g	<0.50	0.50	6311962	<0.50	0.50	6311962
Methyl t-butyl ether (MTBE)	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Styrene	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
1,1,1,2-Tetrachloroethane	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							



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VERITAS

BV Labs Job #: B9N9515  
Report Date: 2019/09/09

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 VOCS BY HS & F1-F4 (SOIL)**

BV Labs ID		KQD244			KQD244		
Sampling Date		2019/08/27 15:30			2019/08/27 15:30		
COC Number		732625-02-01			732625-02-01		
	<b>UNITS</b>	<b>BH-2-1</b>	<b>RDL</b>	<b>QC Batch</b>	<b>BH-2-1 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>
1,1,2,2-Tetrachloroethane	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Tetrachloroethylene	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Toluene	ug/g	<0.020	0.020	6311962	<0.020	0.020	6311962
1,1,1-Trichloroethane	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
1,1,2-Trichloroethane	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Trichloroethylene	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	0.050	6311962	<0.050	0.050	6311962
Vinyl Chloride	ug/g	<0.020	0.020	6311962	<0.020	0.020	6311962
p+m-Xylene	ug/g	<0.020	0.020	6311962	<0.020	0.020	6311962
o-Xylene	ug/g	<0.020	0.020	6311962	<0.020	0.020	6311962
Total Xylenes	ug/g	<0.020	0.020	6311962	<0.020	0.020	6311962
F1 (C6-C10)	ug/g	<10	10	6311962	<10	10	6311962
F1 (C6-C10) - BTEX	ug/g	<10	10	6311962	<10	10	6311962
<b>F2-F4 Hydrocarbons</b>							
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	6310087	<10	10	6310087
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	6310087	<50	50	6310087
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	6310087	<50	50	6310087
Reached Baseline at C50	ug/g	Yes		6310087	Yes		6310087
<b>Surrogate Recovery (%)</b>							
o-Terphenyl	%	96		6310087	95		6310087
4-Bromofluorobenzene	%	97		6311962	97		6311962
D10-o-Xylene	%	95		6311962	95		6311962
D4-1,2-Dichloroethane	%	102		6311962	101		6311962
D8-Toluene	%	99		6311962	100		6311962
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							



BUREAU  
VERITAS

BV Labs Job #: B9N9515  
Report Date: 2019/09/09

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		KQD239	KQD240			KQD240		
Sampling Date		2019/08/27 13:00	2019/08/27 14:00			2019/08/27 14:00		
COC Number		732625-02-01	732625-02-01			732625-02-01		
	UNITS	MW-1	MW-2	RDL	QC Batch	MW-2 Lab-Dup	RDL	QC Batch
<b>Metals</b>								
Chromium (VI)	ug/L	0.66	<0.50	0.50	6312012			
Mercury (Hg)	mg/L	<0.0001	<0.0001	0.0001	6311617	<0.0001	0.0001	6311617
Total Aluminum (Al)	ug/L	300	4100	5.0	6309523			
Total Antimony (Sb)	ug/L	<0.50	<0.50	0.50	6309523			
Total Arsenic (As)	ug/L	<1.0	<1.0	1.0	6309523			
Total Barium (Ba)	ug/L	55	86	2.0	6309523			
Total Beryllium (Be)	ug/L	<0.50	<0.50	0.50	6309523			
Total Bismuth (Bi)	ug/L	<1.0	<1.0	1.0	6309523			
Total Boron (B)	ug/L	31	32	10	6309523			
Total Cadmium (Cd)	ug/L	<0.10	<0.10	0.10	6309523			
Total Calcium (Ca)	ug/L	83000	17000	200	6309523			
Total Chromium (Cr)	ug/L	<5.0	6.3	5.0	6309523			
Total Cobalt (Co)	ug/L	1.5	10	0.50	6309523			
Total Copper (Cu)	ug/L	6.3	19	1.0	6309523			
Total Iron (Fe)	ug/L	1200	6500	100	6309523			
Total Lead (Pb)	ug/L	1.0	3.5	0.50	6309523			
Total Lithium (Li)	ug/L	<5.0	<5.0	5.0	6309523			
Total Magnesium (Mg)	ug/L	22000	5500	50	6309523			
Total Manganese (Mn)	ug/L	73	510	2.0	6309523			
Total Molybdenum (Mo)	ug/L	<0.50	0.80	0.50	6309523			
Total Nickel (Ni)	ug/L	2.5	11	1.0	6309523			
Total Potassium (K)	ug/L	2400	12000	200	6309523			
Total Selenium (Se)	ug/L	<2.0	<2.0	2.0	6309523			
Total Silicon (Si)	ug/L	6700	9900	50	6309523			
Total Silver (Ag)	ug/L	0.18	<0.10	0.10	6309523			
Total Sodium (Na)	ug/L	57000	25000	100	6309523			
Total Strontium (Sr)	ug/L	480	150	1.0	6309523			
Total Tellurium (Te)	ug/L	<1.0	<1.0	1.0	6309523			
Total Thallium (Tl)	ug/L	<0.050	0.11	0.050	6309523			
Total Tin (Sn)	ug/L	<1.0	<1.0	1.0	6309523			
Total Titanium (Ti)	ug/L	17	280	5.0	6309523			
Total Tungsten (W)	ug/L	<1.0	<1.0	1.0	6309523			
Total Uranium (U)	ug/L	0.28	0.47	0.10	6309523			
Total Vanadium (V)	ug/L	1.3	8.3	0.50	6309523			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate								



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VERITAS

BV Labs Job #: B9N9515

Report Date: 2019/09/09

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

### ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		KQD239	KQD240			KQD240		
Sampling Date		2019/08/27 13:00	2019/08/27 14:00			2019/08/27 14:00		
COC Number		732625-02-01	732625-02-01			732625-02-01		
	<b>UNITS</b>	<b>MW-1</b>	<b>MW-2</b>	<b>RDL</b>	<b>QC Batch</b>	<b>MW-2 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>
Total Zinc (Zn)	ug/L	<5.0	19	5.0	6309523			
Total Zirconium (Zr)	ug/L	<1.0	1.1	1.0	6309523			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate								



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VERITAS

BV Labs Job #: B9N9515  
Report Date: 2019/09/09

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		KQD241		KQD242			KQD242		
Sampling Date		2019/08/27 14:30		2019/08/27 15:00			2019/08/27 15:00		
COC Number		732625-02-01		732625-02-01			732625-02-01		
	UNITS	MW-3	RDL	MW-4	RDL	QC Batch	MW-4 Lab-Dup	RDL	QC Batch
<b>Metals</b>									
Chromium (VI)	ug/L	<0.50	0.50	0.61	0.50	6312012	0.62	0.50	6312012
Mercury (Hg)	mg/L	<0.0001	0.0001	<0.0001	0.0001	6311617			
Total Aluminum (Al)	ug/L	630	5.0	7300	5.0	6309523			
Total Antimony (Sb)	ug/L	<0.50	0.50	<0.50	0.50	6309523			
Total Arsenic (As)	ug/L	<1.0	1.0	2.0	1.0	6309523			
Total Barium (Ba)	ug/L	1600	2.0	150	2.0	6309523			
Total Beryllium (Be)	ug/L	<0.50	0.50	<0.50	0.50	6309523			
Total Bismuth (Bi)	ug/L	<1.0	1.0	<1.0	1.0	6309523			
Total Boron (B)	ug/L	38	10	48	10	6309523			
Total Cadmium (Cd)	ug/L	0.31	0.10	0.15	0.10	6309523			
Total Calcium (Ca)	ug/L	290000	200	160000	200	6309523			
Total Chromium (Cr)	ug/L	<5.0	5.0	15	5.0	6309523			
Total Cobalt (Co)	ug/L	5.9	0.50	24	0.50	6309523			
Total Copper (Cu)	ug/L	3.2	1.0	76	1.0	6309523			
Total Iron (Fe)	ug/L	920	100	23000	100	6309523			
Total Lead (Pb)	ug/L	0.62	0.50	14	0.50	6309523			
Total Lithium (Li)	ug/L	<5.0	5.0	7.3	5.0	6309523			
Total Magnesium (Mg)	ug/L	21000	50	49000	50	6309523			
Total Manganese (Mn)	ug/L	530	2.0	570	2.0	6309523			
Total Molybdenum (Mo)	ug/L	0.56	0.50	2.1	0.50	6309523			
Total Nickel (Ni)	ug/L	5.2	1.0	23	1.0	6309523			
Total Potassium (K)	ug/L	21000	200	3600	200	6309523			
Total Selenium (Se)	ug/L	<2.0	2.0	<2.0	2.0	6309523			
Total Silicon (Si)	ug/L	3300	50	18000	50	6309523			
Total Silver (Ag)	ug/L	0.14	0.10	0.24	0.10	6309523			
Total Sodium (Na)	ug/L	600000	500	46000	100	6309523			
Total Strontium (Sr)	ug/L	1000	1.0	790	1.0	6309523			
Total Tellurium (Te)	ug/L	<1.0	1.0	<1.0	1.0	6309523			
Total Thallium (Tl)	ug/L	0.058	0.050	0.24	0.050	6309523			
Total Tin (Sn)	ug/L	<1.0	1.0	1.4	1.0	6309523			
Total Titanium (Ti)	ug/L	42	5.0	480	5.0	6309523			
Total Tungsten (W)	ug/L	<1.0	1.0	<1.0	1.0	6309523			
Total Uranium (U)	ug/L	0.16	0.10	1.3	0.10	6309523			
Total Vanadium (V)	ug/L	1.2	0.50	21	0.50	6309523			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate									



BUREAU  
VERITAS

BV Labs Job #: B9N9515

Report Date: 2019/09/09

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

### ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		KQD241		KQD242			KQD242		
Sampling Date		2019/08/27 14:30		2019/08/27 15:00			2019/08/27 15:00		
COC Number		732625-02-01		732625-02-01			732625-02-01		
	<b>UNITS</b>	<b>MW-3</b>	<b>RDL</b>	<b>MW-4</b>	<b>RDL</b>	<b>QC Batch</b>	<b>MW-4 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>
Total Zinc (Zn)	ug/L	<5.0	5.0	42	5.0	6309523			
Total Zirconium (Zr)	ug/L	<1.0	1.0	2.4	1.0	6309523			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate									



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VERITAS

BV Labs Job #: B9N9515  
Report Date: 2019/09/09

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		KQD243		
Sampling Date		2019/08/27		
COC Number		732625-02-01		
	<b>UNITS</b>	<b>DUP-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Metals</b>				
Chromium (VI)	ug/L	0.66	0.50	6312012
Mercury (Hg)	mg/L	<0.0001	0.0001	6311617
Total Aluminum (Al)	ug/L	270	5.0	6309523
Total Antimony (Sb)	ug/L	<0.50	0.50	6309523
Total Arsenic (As)	ug/L	<1.0	1.0	6309523
Total Barium (Ba)	ug/L	55	2.0	6309523
Total Beryllium (Be)	ug/L	<0.50	0.50	6309523
Total Bismuth (Bi)	ug/L	<1.0	1.0	6309523
Total Boron (B)	ug/L	30	10	6309523
Total Cadmium (Cd)	ug/L	<0.10	0.10	6309523
Total Calcium (Ca)	ug/L	82000	200	6309523
Total Chromium (Cr)	ug/L	<5.0	5.0	6309523
Total Cobalt (Co)	ug/L	1.5	0.50	6309523
Total Copper (Cu)	ug/L	5.6	1.0	6309523
Total Iron (Fe)	ug/L	1000	100	6309523
Total Lead (Pb)	ug/L	0.97	0.50	6309523
Total Lithium (Li)	ug/L	<5.0	5.0	6309523
Total Magnesium (Mg)	ug/L	21000	50	6309523
Total Manganese (Mn)	ug/L	66	2.0	6309523
Total Molybdenum (Mo)	ug/L	<0.50	0.50	6309523
Total Nickel (Ni)	ug/L	2.4	1.0	6309523
Total Potassium (K)	ug/L	1800	200	6309523
Total Selenium (Se)	ug/L	<2.0	2.0	6309523
Total Silicon (Si)	ug/L	6700	50	6309523
Total Silver (Ag)	ug/L	<0.10	0.10	6309523
Total Sodium (Na)	ug/L	58000	100	6309523
Total Strontium (Sr)	ug/L	480	1.0	6309523
Total Tellurium (Te)	ug/L	<1.0	1.0	6309523
Total Thallium (Tl)	ug/L	<0.050	0.050	6309523
Total Tin (Sn)	ug/L	<1.0	1.0	6309523
Total Titanium (Ti)	ug/L	21	5.0	6309523
Total Tungsten (W)	ug/L	<1.0	1.0	6309523
Total Uranium (U)	ug/L	0.28	0.10	6309523
Total Vanadium (V)	ug/L	1.2	0.50	6309523
Total Zinc (Zn)	ug/L	<5.0	5.0	6309523
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				





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VERITAS**

BV Labs Job #: B9N9515  
Report Date: 2019/09/09

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		KQD243		
Sampling Date		2019/08/27		
COC Number		732625-02-01		
	<b>UNITS</b>	<b>DUP-1</b>	<b>RDL</b>	<b>QC Batch</b>
Total Zirconium (Zr)	ug/L	<1.0	1.0	6309523
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU  
VERITAS

BV Labs Job #: B9N9515  
Report Date: 2019/09/09

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 PAHS (WATER)**

BV Labs ID		KQD239		
Sampling Date		2019/08/27 13:00		
COC Number		732625-02-01		
	<b>UNITS</b>	<b>MW-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
Methylnaphthalene, 2-(1-)	ug/L	<0.071	0.071	6316012
<b>Polyaromatic Hydrocarbons</b>				
Acenaphthene	ug/L	<0.050	0.050	6317502
Acenaphthylene	ug/L	<0.050	0.050	6317502
Anthracene	ug/L	<0.050	0.050	6317502
Benzo(a)anthracene	ug/L	<0.050	0.050	6317502
Benzo(a)pyrene	ug/L	<0.010	0.010	6317502
Benzo(b,j)fluoranthene	ug/L	<0.050	0.050	6317502
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	6317502
Benzo(k)fluoranthene	ug/L	<0.050	0.050	6317502
Chrysene	ug/L	<0.050	0.050	6317502
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	6317502
Fluoranthene	ug/L	<0.050	0.050	6317502
Fluorene	ug/L	<0.050	0.050	6317502
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	6317502
1-Methylnaphthalene	ug/L	<0.050	0.050	6317502
2-Methylnaphthalene	ug/L	<0.050	0.050	6317502
Naphthalene	ug/L	0.081	0.050	6317502
Phenanthrene	ug/L	<0.030	0.030	6317502
Pyrene	ug/L	<0.050	0.050	6317502
<b>Surrogate Recovery (%)</b>				
D10-Anthracene	%	109		6317502
D14-Terphenyl (FS)	%	110		6317502
D8-Acenaphthylene	%	103		6317502
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU  
VERITAS

BV Labs Job #: B9N9515  
Report Date: 2019/09/09

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### O.REG 153 VOCs BY HS & F1-F4 (WATER)

BV Labs ID		KQD239	KQD240			KQD240		
Sampling Date		2019/08/27 13:00	2019/08/27 14:00			2019/08/27 14:00		
COC Number		732625-02-01	732625-02-01			732625-02-01		
	UNITS	MW-1	MW-2	RDL	QC Batch	MW-2 Lab-Dup	RDL	QC Batch
<b>Calculated Parameters</b>								
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	<0.50	0.50	6309133			
<b>Volatile Organics</b>								
Acetone (2-Propanone)	ug/L	<10	<10	10	6309418	<10	10	6309418
Benzene	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
Bromodichloromethane	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
Bromoform	ug/L	<1.0	<1.0	1.0	6309418	<1.0	1.0	6309418
Bromomethane	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
Carbon Tetrachloride	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
Chlorobenzene	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
Chloroform	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
Dibromochloromethane	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
1,3-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
1,4-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	1.0	6309418	<1.0	1.0	6309418
1,1-Dichloroethane	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
1,2-Dichloroethane	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
1,1-Dichloroethylene	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
1,2-Dichloropropane	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	0.30	6309418	<0.30	0.30	6309418
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	0.40	6309418	<0.40	0.40	6309418
Ethylbenzene	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
Ethylene Dibromide	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
Hexane	ug/L	<1.0	<1.0	1.0	6309418	<1.0	1.0	6309418
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	2.0	6309418	<2.0	2.0	6309418
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	10	6309418	<10	10	6309418
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	5.0	6309418	<5.0	5.0	6309418
Methyl t-butyl ether (MTBE)	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
Styrene	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
1,1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
Tetrachloroethylene	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate								



BUREAU  
VERITAS

BV Labs Job #: B9N9515  
Report Date: 2019/09/09

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 VOCs BY HS & F1-F4 (WATER)**

BV Labs ID		KQD239	KQD240			KQD240		
Sampling Date		2019/08/27 13:00	2019/08/27 14:00			2019/08/27 14:00		
COC Number		732625-02-01	732625-02-01			732625-02-01		
	UNITS	MW-1	MW-2	RDL	QC Batch	MW-2 Lab-Dup	RDL	QC Batch
Toluene	ug/L	0.54	<0.20	0.20	6309418	<0.20	0.20	6309418
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
1,1,2-Trichloroethane	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
Trichloroethylene	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	0.50	6309418	<0.50	0.50	6309418
Vinyl Chloride	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
p+m-Xylene	ug/L	0.25	<0.20	0.20	6309418	<0.20	0.20	6309418
o-Xylene	ug/L	<0.20	<0.20	0.20	6309418	<0.20	0.20	6309418
Total Xylenes	ug/L	0.25	<0.20	0.20	6309418	<0.20	0.20	6309418
F1 (C6-C10)	ug/L	<25	<25	25	6309418	<25	25	6309418
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	6309418	<25	25	6309418
<b>F2-F4 Hydrocarbons</b>								
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	6309420			
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	6309420			
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	6309420			
Reached Baseline at C50	ug/L	Yes	Yes		6309420			
<b>Surrogate Recovery (%)</b>								
o-Terphenyl	%	93	93		6309420			
4-Bromofluorobenzene	%	96	95		6309418	96		6309418
D4-1,2-Dichloroethane	%	102	101		6309418	102		6309418
D8-Toluene	%	99	100		6309418	99		6309418
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate								



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VERITAS

BV Labs Job #: B9N9515  
Report Date: 2019/09/09

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 VOCs BY HS & F1-F4 (WATER)**

BV Labs ID		KQD241	KQD242	KQD243		
Sampling Date		2019/08/27 14:30	2019/08/27 15:00	2019/08/27		
COC Number		732625-02-01	732625-02-01	732625-02-01		
	<b>UNITS</b>	<b>MW-3</b>	<b>MW-4</b>	<b>DUP-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>						
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	<0.50	<0.50	0.50	6309133
<b>Volatile Organics</b>						
Acetone (2-Propanone)	ug/L	<10	<10	<10	10	6309418
Benzene	ug/L	<0.20	<0.20	<0.20	0.20	6309418
Bromodichloromethane	ug/L	<0.50	<0.50	<0.50	0.50	6309418
Bromoform	ug/L	<1.0	<1.0	<1.0	1.0	6309418
Bromomethane	ug/L	<0.50	<0.50	<0.50	0.50	6309418
Carbon Tetrachloride	ug/L	<0.20	<0.20	<0.20	0.20	6309418
Chlorobenzene	ug/L	<0.20	<0.20	<0.20	0.20	6309418
Chloroform	ug/L	<0.20	<0.20	<0.20	0.20	6309418
Dibromochloromethane	ug/L	<0.50	<0.50	<0.50	0.50	6309418
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	6309418
1,3-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	6309418
1,4-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	6309418
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	<1.0	1.0	6309418
1,1-Dichloroethane	ug/L	<0.20	<0.20	<0.20	0.20	6309418
1,2-Dichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	6309418
1,1-Dichloroethylene	ug/L	<0.20	<0.20	<0.20	0.20	6309418
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	0.50	6309418
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	0.50	6309418
1,2-Dichloropropane	ug/L	<0.20	<0.20	<0.20	0.20	6309418
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	<0.30	0.30	6309418
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	<0.40	0.40	6309418
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	0.20	6309418
Ethylene Dibromide	ug/L	<0.20	<0.20	<0.20	0.20	6309418
Hexane	ug/L	<1.0	<1.0	<1.0	1.0	6309418
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	<2.0	2.0	6309418
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	<10	10	6309418
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	<5.0	5.0	6309418
Methyl t-butyl ether (MTBE)	ug/L	<0.50	<0.50	<0.50	0.50	6309418
Styrene	ug/L	<0.50	<0.50	<0.50	0.50	6309418
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	0.50	6309418
1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	0.50	6309418
Tetrachloroethylene	ug/L	<0.20	<0.20	<0.20	0.20	6309418
Toluene	ug/L	<0.20	0.40	0.46	0.20	6309418
RDL = Reportable Detection Limit QC Batch = Quality Control Batch						



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BV Labs Job #: B9N9515

Report Date: 2019/09/09

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

**O.REG 153 VOCs BY HS & F1-F4 (WATER)**

BV Labs ID		KQD241	KQD242	KQD243		
Sampling Date		2019/08/27 14:30	2019/08/27 15:00	2019/08/27		
COC Number		732625-02-01	732625-02-01	732625-02-01		
	<b>UNITS</b>	<b>MW-3</b>	<b>MW-4</b>	<b>DUP-1</b>	<b>RDL</b>	<b>QC Batch</b>
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	<0.20	0.20	6309418
1,1,2-Trichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	6309418
Trichloroethylene	ug/L	<0.20	<0.20	<0.20	0.20	6309418
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	<0.50	0.50	6309418
Vinyl Chloride	ug/L	<0.20	<0.20	<0.20	0.20	6309418
p+m-Xylene	ug/L	<0.20	<0.20	<0.20	0.20	6309418
o-Xylene	ug/L	<0.20	<0.20	<0.20	0.20	6309418
Total Xylenes	ug/L	<0.20	<0.20	<0.20	0.20	6309418
F1 (C6-C10)	ug/L	<25	<25	<25	25	6309418
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	25	6309418
<b>F2-F4 Hydrocarbons</b>						
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	100	6309420
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	200	6309420
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	200	6309420
Reached Baseline at C50	ug/L	Yes	Yes	Yes		6309420
<b>Surrogate Recovery (%)</b>						
o-Terphenyl	%	93	93	96		6309420
4-Bromofluorobenzene	%	95	95	95		6309418
D4-1,2-Dichloroethane	%	103	104	105		6309418
D8-Toluene	%	99	100	99		6309418
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						



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VERITAS

BV Labs Job #: B9N9515  
Report Date: 2019/09/09

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### TEST SUMMARY

**BV Labs ID:** KQD239  
**Sample ID:** MW-1  
**Matrix:** Water

**Collected:** 2019/08/27  
**Shipped:**  
**Received:** 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6316012	N/A	2019/09/06	Automated Statchk
1,3-Dichloropropene Sum	CALC	6309133	N/A	2019/09/02	Automated Statchk
Chromium (VI) in Water	IC	6312012	N/A	2019/09/03	Lang Le
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6309420	2019/08/30	2019/09/03	Prabhjot Gulati
Mercury in Water by CVAA	CV/AA	6311617	2019/09/03	2019/09/03	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	6309523	N/A	2019/09/01	Matthew Ritenburg
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6317502	2019/09/05	2019/09/06	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6309418	N/A	2019/08/31	Anna Gabrielyan

**BV Labs ID:** KQD240  
**Sample ID:** MW-2  
**Matrix:** Water

**Collected:** 2019/08/27  
**Shipped:**  
**Received:** 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6309133	N/A	2019/09/02	Automated Statchk
Chromium (VI) in Water	IC	6312012	N/A	2019/09/03	Lang Le
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6309420	2019/08/30	2019/09/03	Prabhjot Gulati
Mercury in Water by CVAA	CV/AA	6311617	2019/09/03	2019/09/03	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	6309523	N/A	2019/09/01	Matthew Ritenburg
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6309418	N/A	2019/08/31	Anna Gabrielyan

**BV Labs ID:** KQD240 Dup  
**Sample ID:** MW-2  
**Matrix:** Water

**Collected:** 2019/08/27  
**Shipped:**  
**Received:** 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury in Water by CVAA	CV/AA	6311617	2019/09/03	2019/09/03	Ron Morrison
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6309418	N/A	2019/08/31	Anna Gabrielyan

**BV Labs ID:** KQD241  
**Sample ID:** MW-3  
**Matrix:** Water

**Collected:** 2019/08/27  
**Shipped:**  
**Received:** 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6309133	N/A	2019/09/02	Automated Statchk
Chromium (VI) in Water	IC	6312012	N/A	2019/09/03	Lang Le
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6309420	2019/08/30	2019/09/03	Prabhjot Gulati
Mercury in Water by CVAA	CV/AA	6311617	2019/09/03	2019/09/03	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	6309523	N/A	2019/09/03	Matthew Ritenburg
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6309418	N/A	2019/08/31	Anna Gabrielyan

**BV Labs ID:** KQD242  
**Sample ID:** MW-4  
**Matrix:** Water

**Collected:** 2019/08/27  
**Shipped:**  
**Received:** 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6309133	N/A	2019/09/02	Automated Statchk



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BV Labs Job #: B9N9515  
Report Date: 2019/09/09

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### TEST SUMMARY

**BV Labs ID:** KQD242  
**Sample ID:** MW-4  
**Matrix:** Water

**Collected:** 2019/08/27  
**Shipped:**  
**Received:** 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chromium (VI) in Water	IC	6312012	N/A	2019/09/03	Lang Le
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6309420	2019/08/30	2019/09/03	Prabhjot Gulati
Mercury in Water by CVAA	CV/AA	6311617	2019/09/03	2019/09/03	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	6309523	N/A	2019/09/01	Matthew Ritenburg
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6309418	N/A	2019/08/31	Anna Gabrielyan

**BV Labs ID:** KQD242 Dup  
**Sample ID:** MW-4  
**Matrix:** Water

**Collected:** 2019/08/27  
**Shipped:**  
**Received:** 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chromium (VI) in Water	IC	6312012	N/A	2019/09/03	Lang Le

**BV Labs ID:** KQD243  
**Sample ID:** DUP-1  
**Matrix:** Water

**Collected:** 2019/08/27  
**Shipped:**  
**Received:** 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6309133	N/A	2019/09/02	Automated Statchk
Chromium (VI) in Water	IC	6312012	N/A	2019/09/03	Lang Le
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6309420	2019/08/30	2019/09/03	Prabhjot Gulati
Mercury in Water by CVAA	CV/AA	6311617	2019/09/03	2019/09/03	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	6309523	N/A	2019/09/01	Matthew Ritenburg
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6309418	N/A	2019/08/31	Anna Gabrielyan

**BV Labs ID:** KQD244  
**Sample ID:** BH-2-1  
**Matrix:** Soil

**Collected:** 2019/08/27  
**Shipped:**  
**Received:** 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6315990	N/A	2019/09/09	Automated Statchk
Hot Water Extractable Boron	ICP	6311023	2019/08/31	2019/09/03	Suban Kanapathipplai
1,3-Dichloropropene Sum	CALC	6308565	N/A	2019/09/04	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	6309781	2019/08/30	2019/09/03	Sally Norouz Coughlin
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6310087	2019/08/30	2019/09/01	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6310722	2019/08/31	2019/09/04	Viviana Canzonieri
Moisture	BAL	6309671	N/A	2019/08/30	Mithunaa Sasitheepan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6318139	2019/09/06	2019/09/06	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6311962	N/A	2019/09/03	Yang (Philip) Yu

**BV Labs ID:** KQD244 Dup  
**Sample ID:** BH-2-1  
**Matrix:** Soil

**Collected:** 2019/08/27  
**Shipped:**  
**Received:** 2019/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6310087	2019/08/30	2019/09/01	Prabhjot Gulati
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6311962	N/A	2019/09/03	Yang (Philip) Yu





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BV Labs Job #: B9N9515

Report Date: 2019/09/09

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	19.0°C
Package 2	20.7°C

**Results relate only to the items tested.**



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BV Labs Job #: B9N9515  
Report Date: 2019/09/09

### QUALITY ASSURANCE REPORT

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6309418	4-Bromofluorobenzene	2019/08/31	100	70 - 130	99	70 - 130	96	%		
6309418	D4-1,2-Dichloroethane	2019/08/31	103	70 - 130	99	70 - 130	99	%		
6309418	D8-Toluene	2019/08/31	102	70 - 130	103	70 - 130	101	%		
6309420	o-Terphenyl	2019/09/03	97	60 - 130	111	60 - 130	94	%		
6310087	o-Terphenyl	2019/09/01	95	60 - 130	89	60 - 130	94	%		
6311962	4-Bromofluorobenzene	2019/09/03	100	60 - 140	100	60 - 140	97	%		
6311962	D10-o-Xylene	2019/09/03	101	60 - 130	91	60 - 130	96	%		
6311962	D4-1,2-Dichloroethane	2019/09/03	94	60 - 140	106	60 - 140	102	%		
6311962	D8-Toluene	2019/09/03	105	60 - 140	102	60 - 140	99	%		
6317502	D10-Anthracene	2019/09/06	119	50 - 130	109	50 - 130	109	%		
6317502	D14-Terphenyl (FS)	2019/09/06	121	50 - 130	113	50 - 130	112	%		
6317502	D8-Acenaphthylene	2019/09/06	112	50 - 130	98	50 - 130	97	%		
6318139	D10-Anthracene	2019/09/06	97	50 - 130	95	50 - 130	98	%		
6318139	D14-Terphenyl (FS)	2019/09/06	108	50 - 130	104	50 - 130	106	%		
6318139	D8-Acenaphthylene	2019/09/06	100	50 - 130	95	50 - 130	95	%		
6309418	1,1,1,2-Tetrachloroethane	2019/08/31	100	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
6309418	1,1,1-Trichloroethane	2019/08/31	101	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
6309418	1,1,2,2-Tetrachloroethane	2019/08/31	91	70 - 130	88	70 - 130	<0.50	ug/L	NC	30
6309418	1,1,2-Trichloroethane	2019/08/31	102	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
6309418	1,1-Dichloroethane	2019/08/31	102	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
6309418	1,1-Dichloroethylene	2019/08/31	108	70 - 130	108	70 - 130	<0.20	ug/L	NC	30
6309418	1,2-Dichlorobenzene	2019/08/31	89	70 - 130	89	70 - 130	<0.50	ug/L	NC	30
6309418	1,2-Dichloroethane	2019/08/31	106	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
6309418	1,2-Dichloropropane	2019/08/31	97	70 - 130	95	70 - 130	<0.20	ug/L	NC	30
6309418	1,3-Dichlorobenzene	2019/08/31	93	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
6309418	1,4-Dichlorobenzene	2019/08/31	95	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
6309418	Acetone (2-Propanone)	2019/08/31	98	60 - 140	93	60 - 140	<10	ug/L	NC	30
6309418	Benzene	2019/08/31	102	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
6309418	Bromodichloromethane	2019/08/31	96	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
6309418	Bromoform	2019/08/31	91	70 - 130	89	70 - 130	<1.0	ug/L	NC	30
6309418	Bromomethane	2019/08/31	115	60 - 140	112	60 - 140	<0.50	ug/L	NC	30
6309418	Carbon Tetrachloride	2019/08/31	99	70 - 130	98	70 - 130	<0.20	ug/L	NC	30



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QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6309418	Chlorobenzene	2019/08/31	94	70 - 130	94	70 - 130	<0.20	ug/L	NC	30
6309418	Chloroform	2019/08/31	96	70 - 130	94	70 - 130	<0.20	ug/L	NC	30
6309418	cis-1,2-Dichloroethylene	2019/08/31	96	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
6309418	cis-1,3-Dichloropropene	2019/08/31	97	70 - 130	93	70 - 130	<0.30	ug/L	NC	30
6309418	Dibromochloromethane	2019/08/31	97	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
6309418	Dichlorodifluoromethane (FREON 12)	2019/08/31	113	60 - 140	120	60 - 140	<1.0	ug/L	NC	30
6309418	Ethylbenzene	2019/08/31	93	70 - 130	93	70 - 130	<0.20	ug/L	NC	30
6309418	Ethylene Dibromide	2019/08/31	99	70 - 130	95	70 - 130	<0.20	ug/L	NC	30
6309418	F1 (C6-C10) - BTEX	2019/08/31					<25	ug/L	NC	30
6309418	F1 (C6-C10)	2019/08/31	91	60 - 140	98	60 - 140	<25	ug/L	NC	30
6309418	Hexane	2019/08/31	108	70 - 130	108	70 - 130	<1.0	ug/L	NC	30
6309418	Methyl Ethyl Ketone (2-Butanone)	2019/08/31	101	60 - 140	96	60 - 140	<10	ug/L	NC	30
6309418	Methyl Isobutyl Ketone	2019/08/31	100	70 - 130	97	70 - 130	<5.0	ug/L	NC	30
6309418	Methyl t-butyl ether (MTBE)	2019/08/31	93	70 - 130	92	70 - 130	<0.50	ug/L	NC	30
6309418	Methylene Chloride(Dichloromethane)	2019/08/31	97	70 - 130	94	70 - 130	<2.0	ug/L	NC	30
6309418	o-Xylene	2019/08/31	94	70 - 130	94	70 - 130	<0.20	ug/L	NC	30
6309418	p+m-Xylene	2019/08/31	98	70 - 130	99	70 - 130	<0.20	ug/L	NC	30
6309418	Styrene	2019/08/31	92	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
6309418	Tetrachloroethylene	2019/08/31	94	70 - 130	94	70 - 130	<0.20	ug/L	NC	30
6309418	Toluene	2019/08/31	95	70 - 130	95	70 - 130	<0.20	ug/L	NC	30
6309418	Total Xylenes	2019/08/31					<0.20	ug/L	NC	30
6309418	trans-1,2-Dichloroethylene	2019/08/31	101	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
6309418	trans-1,3-Dichloropropene	2019/08/31	87	70 - 130	82	70 - 130	<0.40	ug/L	NC	30
6309418	Trichloroethylene	2019/08/31	102	70 - 130	101	70 - 130	<0.20	ug/L	NC	30
6309418	Trichlorofluoromethane (FREON 11)	2019/08/31	113	70 - 130	113	70 - 130	<0.50	ug/L	NC	30
6309418	Vinyl Chloride	2019/08/31	114	70 - 130	115	70 - 130	<0.20	ug/L	NC	30
6309420	F2 (C10-C16 Hydrocarbons)	2019/09/03	95	50 - 130	107	60 - 130	<100	ug/L	NC	30
6309420	F3 (C16-C34 Hydrocarbons)	2019/09/03	NC	50 - 130	122	60 - 130	<200	ug/L	NC	30
6309420	F4 (C34-C50 Hydrocarbons)	2019/09/03	106	50 - 130	124	60 - 130	<200	ug/L	NC	30
6309523	Total Aluminum (Al)	2019/09/01	100	80 - 120	102	80 - 120	<5.0	ug/L		
6309523	Total Antimony (Sb)	2019/09/01	102	80 - 120	99	80 - 120	<0.50	ug/L		
6309523	Total Arsenic (As)	2019/09/01	98	80 - 120	100	80 - 120	<1.0	ug/L		



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QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6309523	Total Barium (Ba)	2019/09/01	93	80 - 120	95	80 - 120	<2.0	ug/L		
6309523	Total Beryllium (Be)	2019/09/01	98	80 - 120	97	80 - 120	<0.50	ug/L		
6309523	Total Bismuth (Bi)	2019/09/01	91	80 - 120	91	80 - 120	<1.0	ug/L		
6309523	Total Boron (B)	2019/09/01	97	80 - 120	97	80 - 120	<10	ug/L		
6309523	Total Cadmium (Cd)	2019/09/01	98	80 - 120	97	80 - 120	<0.10	ug/L	NC	20
6309523	Total Calcium (Ca)	2019/09/01	NC	80 - 120	100	80 - 120	<200	ug/L		
6309523	Total Chromium (Cr)	2019/09/01	97	80 - 120	98	80 - 120	<5.0	ug/L	NC	20
6309523	Total Cobalt (Co)	2019/09/01	95	80 - 120	97	80 - 120	<0.50	ug/L		
6309523	Total Copper (Cu)	2019/09/01	97	80 - 120	98	80 - 120	<1.0	ug/L	NC	20
6309523	Total Iron (Fe)	2019/09/01	97	80 - 120	98	80 - 120	<100	ug/L		
6309523	Total Lead (Pb)	2019/09/01	93	80 - 120	93	80 - 120	<0.50	ug/L		
6309523	Total Lithium (Li)	2019/09/01	97	80 - 120	96	80 - 120	<5.0	ug/L		
6309523	Total Magnesium (Mg)	2019/09/01	96	80 - 120	97	80 - 120	<50	ug/L		
6309523	Total Manganese (Mn)	2019/09/01	96	80 - 120	97	80 - 120	<2.0	ug/L		
6309523	Total Molybdenum (Mo)	2019/09/01	100	80 - 120	100	80 - 120	<0.50	ug/L		
6309523	Total Nickel (Ni)	2019/09/01	95	80 - 120	96	80 - 120	<1.0	ug/L	NC	20
6309523	Total Potassium (K)	2019/09/01	97	80 - 120	98	80 - 120	<200	ug/L		
6309523	Total Selenium (Se)	2019/09/01	104	80 - 120	105	80 - 120	<2.0	ug/L		
6309523	Total Silicon (Si)	2019/09/01	96	80 - 120	97	80 - 120	<50	ug/L		
6309523	Total Silver (Ag)	2019/09/01	96	80 - 120	97	80 - 120	<0.10	ug/L		
6309523	Total Sodium (Na)	2019/09/01	97	80 - 120	97	80 - 120	<100	ug/L		
6309523	Total Strontium (Sr)	2019/09/01	96	80 - 120	96	80 - 120	<1.0	ug/L		
6309523	Total Tellurium (Te)	2019/09/01	102	80 - 120	101	80 - 120	<1.0	ug/L		
6309523	Total Thallium (Tl)	2019/09/01	95	80 - 120	95	80 - 120	<0.050	ug/L		
6309523	Total Tin (Sn)	2019/09/01	97	80 - 120	96	80 - 120	<1.0	ug/L		
6309523	Total Titanium (Ti)	2019/09/01	98	80 - 120	97	80 - 120	<5.0	ug/L		
6309523	Total Tungsten (W)	2019/09/01	97	80 - 120	97	80 - 120	<1.0	ug/L		
6309523	Total Uranium (U)	2019/09/01	97	80 - 120	96	80 - 120	<0.10	ug/L		
6309523	Total Vanadium (V)	2019/09/01	99	80 - 120	99	80 - 120	<0.50	ug/L		
6309523	Total Zinc (Zn)	2019/09/01	98	80 - 120	99	80 - 120	<5.0	ug/L	12	20
6309523	Total Zirconium (Zr)	2019/09/01	100	80 - 120	99	80 - 120	<1.0	ug/L		
6309671	Moisture	2019/08/30							1.1	20



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			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6309781	Chromium (VI)	2019/09/03	54 (1)	70 - 130	100	80 - 120	<0.2	ug/g	NC	35
6310087	F2 (C10-C16 Hydrocarbons)	2019/09/01	103	50 - 130	93	80 - 120	<10	ug/g	NC	30
6310087	F3 (C16-C34 Hydrocarbons)	2019/09/01	102	50 - 130	90	80 - 120	<50	ug/g	NC	30
6310087	F4 (C34-C50 Hydrocarbons)	2019/09/01	104	50 - 130	89	80 - 120	<50	ug/g	NC	30
6310722	Acid Extractable Antimony (Sb)	2019/09/04	88	75 - 125	100	80 - 120	<0.20	ug/g	NC	30
6310722	Acid Extractable Arsenic (As)	2019/09/04	99	75 - 125	103	80 - 120	<1.0	ug/g	0.96	30
6310722	Acid Extractable Barium (Ba)	2019/09/04	NC	75 - 125	105	80 - 120	<0.50	ug/g	5.0	30
6310722	Acid Extractable Beryllium (Be)	2019/09/04	99	75 - 125	99	80 - 120	<0.20	ug/g	4.8	30
6310722	Acid Extractable Boron (B)	2019/09/04	97	75 - 125	100	80 - 120	<5.0	ug/g	6.1	30
6310722	Acid Extractable Cadmium (Cd)	2019/09/04	98	75 - 125	100	80 - 120	<0.10	ug/g	NC	30
6310722	Acid Extractable Chromium (Cr)	2019/09/04	101	75 - 125	101	80 - 120	<1.0	ug/g	0.38	30
6310722	Acid Extractable Cobalt (Co)	2019/09/04	97	75 - 125	101	80 - 120	<0.10	ug/g	0.80	30
6310722	Acid Extractable Copper (Cu)	2019/09/04	NC	75 - 125	100	80 - 120	<0.50	ug/g	0.91	30
6310722	Acid Extractable Lead (Pb)	2019/09/04	97	75 - 125	102	80 - 120	<1.0	ug/g	0.68	30
6310722	Acid Extractable Mercury (Hg)	2019/09/04	92	75 - 125	98	80 - 120	<0.050	ug/g		
6310722	Acid Extractable Molybdenum (Mo)	2019/09/04	100	75 - 125	100	80 - 120	<0.50	ug/g	NC	30
6310722	Acid Extractable Nickel (Ni)	2019/09/04	NC	75 - 125	100	80 - 120	<0.50	ug/g	0.24	30
6310722	Acid Extractable Selenium (Se)	2019/09/04	98	75 - 125	100	80 - 120	<0.50	ug/g	NC	30
6310722	Acid Extractable Silver (Ag)	2019/09/04	100	75 - 125	101	80 - 120	<0.20	ug/g	NC	30
6310722	Acid Extractable Thallium (Tl)	2019/09/04	94	75 - 125	101	80 - 120	<0.050	ug/g	8.3	30
6310722	Acid Extractable Uranium (U)	2019/09/04	98	75 - 125	99	80 - 120	<0.050	ug/g	0.95	30
6310722	Acid Extractable Vanadium (V)	2019/09/04	NC	75 - 125	98	80 - 120	<5.0	ug/g	4.2	30
6310722	Acid Extractable Zinc (Zn)	2019/09/04	NC	75 - 125	101	80 - 120	<5.0	ug/g	1.0	30
6311023	Hot Water Ext. Boron (B)	2019/09/03	101	75 - 125	109	75 - 125	<0.050	ug/g	4.8	40
6311617	Mercury (Hg)	2019/09/03	104	75 - 125	107	80 - 120	<0.0001	mg/L	NC	20
6311962	1,1,1,2-Tetrachloroethane	2019/09/03	100	60 - 140	102	60 - 130	<0.050	ug/g	NC	50
6311962	1,1,1-Trichloroethane	2019/09/03	102	60 - 140	100	60 - 130	<0.050	ug/g	NC	50
6311962	1,1,2,2-Tetrachloroethane	2019/09/03	86	60 - 140	105	60 - 130	<0.050	ug/g	NC	50
6311962	1,1,2-Trichloroethane	2019/09/03	95	60 - 140	104	60 - 130	<0.050	ug/g	NC	50
6311962	1,1-Dichloroethane	2019/09/03	100	60 - 140	100	60 - 130	<0.050	ug/g	NC	50
6311962	1,1-Dichloroethylene	2019/09/03	113	60 - 140	106	60 - 130	<0.050	ug/g	NC	50
6311962	1,2-Dichlorobenzene	2019/09/03	90	60 - 140	88	60 - 130	<0.050	ug/g	NC	50



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			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6311962	1,2-Dichloroethane	2019/09/03	96	60 - 140	109	60 - 130	<0.050	ug/g	NC	50
6311962	1,2-Dichloropropane	2019/09/03	92	60 - 140	98	60 - 130	<0.050	ug/g	NC	50
6311962	1,3-Dichlorobenzene	2019/09/03	97	60 - 140	90	60 - 130	<0.050	ug/g	NC	50
6311962	1,4-Dichlorobenzene	2019/09/03	99	60 - 140	93	60 - 130	<0.050	ug/g	NC	50
6311962	Acetone (2-Propanone)	2019/09/03	85	60 - 140	104	60 - 140	<0.50	ug/g	NC	50
6311962	Benzene	2019/09/03	100	60 - 140	100	60 - 130	<0.020	ug/g	NC	50
6311962	Bromodichloromethane	2019/09/03	92	60 - 140	100	60 - 130	<0.050	ug/g	NC	50
6311962	Bromoform	2019/09/03	86	60 - 140	105	60 - 130	<0.050	ug/g	NC	50
6311962	Bromomethane	2019/09/03	119	60 - 140	121	60 - 140	<0.050	ug/g	NC	50
6311962	Carbon Tetrachloride	2019/09/03	102	60 - 140	99	60 - 130	<0.050	ug/g	NC	50
6311962	Chlorobenzene	2019/09/03	95	60 - 140	93	60 - 130	<0.050	ug/g	NC	50
6311962	Chloroform	2019/09/03	94	60 - 140	96	60 - 130	<0.050	ug/g	NC	50
6311962	cis-1,2-Dichloroethylene	2019/09/03	93	60 - 140	95	60 - 130	<0.050	ug/g	NC	50
6311962	cis-1,3-Dichloropropene	2019/09/03	96	60 - 140	103	60 - 130	<0.030	ug/g	NC	50
6311962	Dibromochloromethane	2019/09/03	93	60 - 140	105	60 - 130	<0.050	ug/g	NC	50
6311962	Dichlorodifluoromethane (FREON 12)	2019/09/03	142 (2)	60 - 140	134	60 - 140	<0.050	ug/g	NC	50
6311962	Ethylbenzene	2019/09/03	96	60 - 140	89	60 - 130	<0.020	ug/g	NC	50
6311962	Ethylene Dibromide	2019/09/03	90	60 - 140	104	60 - 130	<0.050	ug/g	NC	50
6311962	F1 (C6-C10) - BTEX	2019/09/03					<10	ug/g	NC	30
6311962	F1 (C6-C10)	2019/09/03	93	60 - 140	96	80 - 120	<10	ug/g	NC	30
6311962	Hexane	2019/09/03	115	60 - 140	104	60 - 130	<0.050	ug/g	NC	50
6311962	Methyl Ethyl Ketone (2-Butanone)	2019/09/03	85	60 - 140	111	60 - 140	<0.50	ug/g	NC	50
6311962	Methyl Isobutyl Ketone	2019/09/03	85	60 - 140	114	60 - 130	<0.50	ug/g	NC	50
6311962	Methyl t-butyl ether (MTBE)	2019/09/03	87	60 - 140	93	60 - 130	<0.050	ug/g	NC	50
6311962	Methylene Chloride(Dichloromethane)	2019/09/03	92	60 - 140	97	60 - 130	<0.050	ug/g	NC	50
6311962	o-Xylene	2019/09/03	96	60 - 140	92	60 - 130	<0.020	ug/g	NC	50
6311962	p+m-Xylene	2019/09/03	102	60 - 140	95	60 - 130	<0.020	ug/g	NC	50
6311962	Styrene	2019/09/03	93	60 - 140	93	60 - 130	<0.050	ug/g	NC	50
6311962	Tetrachloroethylene	2019/09/03	98	60 - 140	89	60 - 130	<0.050	ug/g	NC	50
6311962	Toluene	2019/09/03	97	60 - 140	91	60 - 130	<0.020	ug/g	NC	50
6311962	Total Xylenes	2019/09/03					<0.020	ug/g	NC	50
6311962	trans-1,2-Dichloroethylene	2019/09/03	103	60 - 140	99	60 - 130	<0.050	ug/g	NC	50



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			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6311962	trans-1,3-Dichloropropene	2019/09/03	89	60 - 140	93	60 - 130	<0.040	ug/g	NC	50
6311962	Trichloroethylene	2019/09/03	103	60 - 140	100	60 - 130	<0.050	ug/g	NC	50
6311962	Trichlorofluoromethane (FREON 11)	2019/09/03	119	60 - 140	114	60 - 130	<0.050	ug/g	NC	50
6311962	Vinyl Chloride	2019/09/03	123	60 - 140	117	60 - 130	<0.020	ug/g	NC	50
6312012	Chromium (VI)	2019/09/03	105	80 - 120	105	80 - 120	<0.50	ug/L	0.33	20
6317502	1-Methylnaphthalene	2019/09/06	109	50 - 130	96	50 - 130	<0.050	ug/L	NC	30
6317502	2-Methylnaphthalene	2019/09/06	100	50 - 130	88	50 - 130	<0.050	ug/L	NC	30
6317502	Acenaphthene	2019/09/06	105	50 - 130	98	50 - 130	<0.050	ug/L	NC	30
6317502	Acenaphthylene	2019/09/06	107	50 - 130	100	50 - 130	<0.050	ug/L	NC	30
6317502	Anthracene	2019/09/06	107	50 - 130	101	50 - 130	<0.050	ug/L	NC	30
6317502	Benzo(a)anthracene	2019/09/06	118	50 - 130	113	50 - 130	<0.050	ug/L	NC	30
6317502	Benzo(a)pyrene	2019/09/06	105	50 - 130	101	50 - 130	<0.010	ug/L	NC	30
6317502	Benzo(b,j)fluoranthene	2019/09/06	101	50 - 130	95	50 - 130	<0.050	ug/L	NC	30
6317502	Benzo(g,h,i)perylene	2019/09/06	109	50 - 130	106	50 - 130	<0.050	ug/L	NC	30
6317502	Benzo(k)fluoranthene	2019/09/06	108	50 - 130	103	50 - 130	<0.050	ug/L	NC	30
6317502	Chrysene	2019/09/06	96	50 - 130	92	50 - 130	<0.050	ug/L	NC	30
6317502	Dibenz(a,h)anthracene	2019/09/06	109	50 - 130	108	50 - 130	<0.050	ug/L	NC	30
6317502	Fluoranthene	2019/09/06	120	50 - 130	114	50 - 130	<0.050	ug/L	NC	30
6317502	Fluorene	2019/09/06	112	50 - 130	104	50 - 130	<0.050	ug/L	NC	30
6317502	Indeno(1,2,3-cd)pyrene	2019/09/06	111	50 - 130	109	50 - 130	<0.050	ug/L	NC	30
6317502	Naphthalene	2019/09/06	85	50 - 130	76	50 - 130	<0.050	ug/L	NC	30
6317502	Phenanthrene	2019/09/06	103	50 - 130	98	50 - 130	<0.030	ug/L	NC	30
6317502	Pyrene	2019/09/06	113	50 - 130	108	50 - 130	<0.050	ug/L	NC	30
6318139	1-Methylnaphthalene	2019/09/06	110	50 - 130	107	50 - 130	<0.0050	ug/g	NC	40
6318139	2-Methylnaphthalene	2019/09/06	95	50 - 130	94	50 - 130	<0.0050	ug/g	NC	40
6318139	Acenaphthene	2019/09/06	100	50 - 130	96	50 - 130	<0.0050	ug/g	7.2	40
6318139	Acenaphthylene	2019/09/06	99	50 - 130	96	50 - 130	<0.0050	ug/g	84 (3)	40
6318139	Anthracene	2019/09/06	97	50 - 130	98	50 - 130	<0.0050	ug/g	15	40
6318139	Benzo(a)anthracene	2019/09/06	98	50 - 130	102	50 - 130	<0.0050	ug/g	19	40
6318139	Benzo(a)pyrene	2019/09/06	92	50 - 130	96	50 - 130	<0.0050	ug/g	33	40
6318139	Benzo(b,j)fluoranthene	2019/09/06	92	50 - 130	102	50 - 130	<0.0050	ug/g	31	40
6318139	Benzo(g,h,i)perylene	2019/09/06	106	50 - 130	86	50 - 130	<0.0050	ug/g	34	40



BUREAU  
VERITAS

BV Labs Job #: B9N9515  
Report Date: 2019/09/09

### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6318139	Benzo(k)fluoranthene	2019/09/06	92	50 - 130	96	50 - 130	<0.0050	ug/g	36	40
6318139	Chrysene	2019/09/06	86	50 - 130	90	50 - 130	<0.0050	ug/g	23	40
6318139	Dibenz(a,h)anthracene	2019/09/06	113	50 - 130	76	50 - 130	<0.0050	ug/g	39	40
6318139	Fluoranthene	2019/09/06	89	50 - 130	102	50 - 130	<0.0050	ug/g	2.6	40
6318139	Fluorene	2019/09/06	102	50 - 130	98	50 - 130	<0.0050	ug/g	8.3	40
6318139	Indeno(1,2,3-cd)pyrene	2019/09/06	115	50 - 130	91	50 - 130	<0.0050	ug/g	37	40
6318139	Naphthalene	2019/09/06	101	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40
6318139	Phenanthrene	2019/09/06	90	50 - 130	98	50 - 130	<0.0050	ug/g	20	40
6318139	Pyrene	2019/09/06	91	50 - 130	103	50 - 130	<0.0050	ug/g	2.5	40

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) The matrix spike recovery was below the lower control limit. This may be due in part to the reducing environment of the sample. The sample was reanalyzed with the same results.

(2) The recovery was above the upper control limit. This may represent a high bias in some results for this specific analyte. For results that were not detected (ND), this potential bias has no impact.

(3) Duplicate results exceeded RPD acceptance criteria. This is likely due to sample heterogeneity. The variability in the results for flagged analyte may be more pronounced.





BUREAU  
VERITAS

BV Labs Job #: B9N9515

Report Date: 2019/09/09

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

---

Anastassia Hamanov, Scientific Specialist

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Brad Newman, Scientific Service Specialist

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





Bureau Veritas Laboratories  
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(305) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvlabs.com

CHAIN OF CUSTODY RECORD

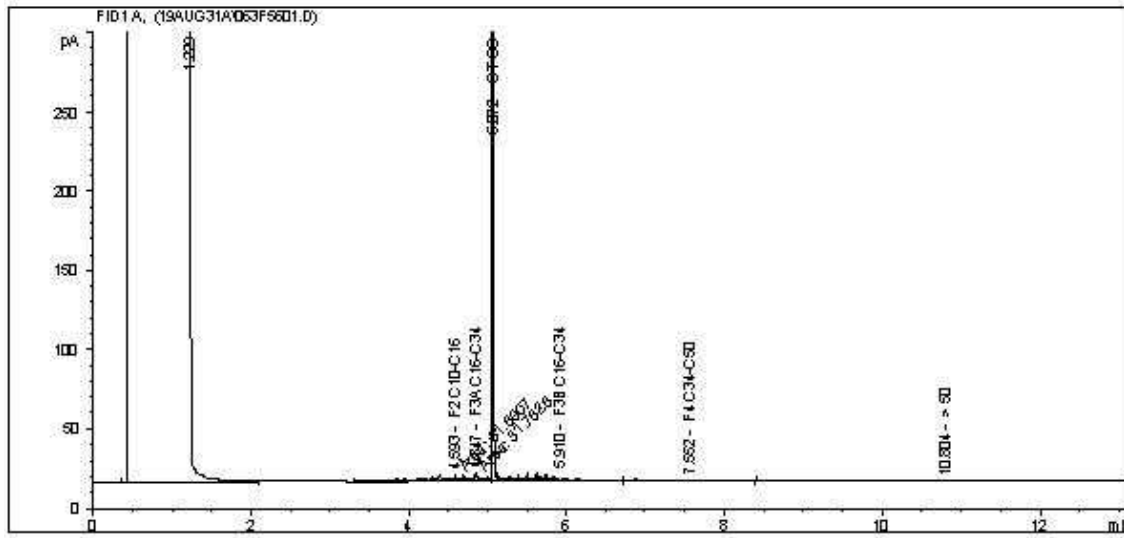
<b>INVOICE TO:</b>		<b>REPORT TO:</b>		<b>PROJECT INFORMATION:</b>		<b>Laboratory Use Only:</b>	
Company Name: #10988 ARCADIS Canada Inc	Company Name: Account Payable Canada	Company Name: Stephanie Joyce	Quotation #: B81974	Project Name: 30029878	Project Name: 30029878	BV Labs Job #:	Bottle Order #:
Attention: Accounts Payable Canada	Attention: Stephanie Joyce	Address: 1050 Morrison Drive Unit 201	P.O. #:	Site #:	Site #:	Barcode: 732625	Project Manager:
Address: Ottawa ON K2H 8K7	Address: Stephanie.Joyce@arcadis.com	Tel: (613) 721-0555 Fax: (613) 721-0029	Project: 30029878	Sampled By: <i>Ronald de Groot</i>	Sampled By: <i>Ronald de Groot</i>	COC #:	Barcode: 732625-02-01
Tel: (613) 721-0555 Fax: (613) 721-0029	Tel: Stephanie.Joyce@arcadis.com	Email: AccountsPayable.Canada@arcadis.com	Project Name: 30029878	Site #:	Site #:	Barcode: 732625-02-01	Alisha Williamson
Email: AccountsPayable.Canada@arcadis.com	Email: Stephanie.Joyce@arcadis.com						

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY					ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects				
Regulation 153 (2011)		Other Regulations		Special Instructions	Field Filtered (please circle): Metals / Hg / Cr / V	O.Reg 153 VOCs by HS & F1-F4 (Soil)	O.Reg 153 Metals Package (Soil)	Sieve, 75um	Navam Landfill Waste Soil	O.Reg 153 VOCs by HS & F1-F4 <i>Water</i>	O.Reg 153 Metals Package (Water)							Regular (Standard) TAT: <small>(will be applied if Rush TAT is not specified):</small>	
Table 1	Res/Park	Medium/Fine	CCME	Sanitary Sewer Bylaw														Regular (Standard) TAT: <small>(will be applied if Rush TAT is not specified):</small>	<input checked="" type="checkbox"/>
Table 2	Ind/Comm	Coarse	Reg 558	Storm Sewer Bylaw	Standard TAT = 5-7 Working days for most tests.	Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.													
Table 3	Agri/Other	For RSC	MISA	Municipality	Job Specific Rush TAT (if applies to entire submission)	Date Required: _____ Time Required: _____													
Table			PWQO		Rush Confirmation Number: _____	<small>(call lab for #)</small>													
Include Criteria on Certificate of Analysis (Y/N)?					# of Bottles	Comments													
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix															
1	MW-1	27-08-19	13:00	water						X	X							8	
2	MW-2	"	14:00	"						X	X							8	
3	MW-3	"	14:30	"						X	X							8	
4	MW-4	"	15:00	"						X	X							8	
5	Dup-1	"		"						X	X							8	
6																			
7	BH-2-1	27-08-19	15:30	soil		X	X											6	
8																			
9																			
10																			

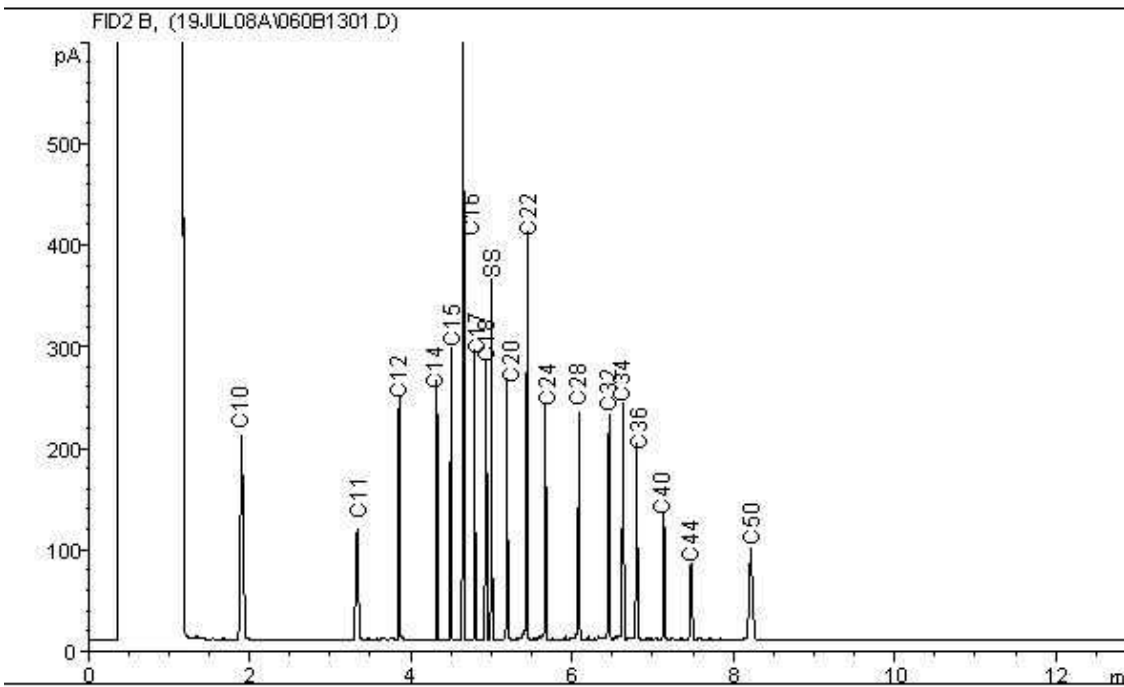
27-Aug-19 16:00  
Alisha Williamson  
B9N9515  
THP ENV-1144  
on ice packs  
RECEIVED IN OTTAWA

* RELINQUISHED BY: (Signature/Print) <i>Ronald de Groot</i>	Date: (YY/MM/DD) 19-08-27	Time 16:00	RECEIVED BY: (Signature/Print) <i>Serge Leger</i>	Date: (YY/MM/DD) 19/08/27	Time 16:00	# jars used and not submitted	Laboratory Use Only				
							Time Sensitive	Temperature (°C) on Reel 18,22,17 / 20,22,20	Custody Seal Present Intact	Yes X	No
* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.						White: BV Labs			Yellow: Client		
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS. 31414						SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS					
** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.											

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

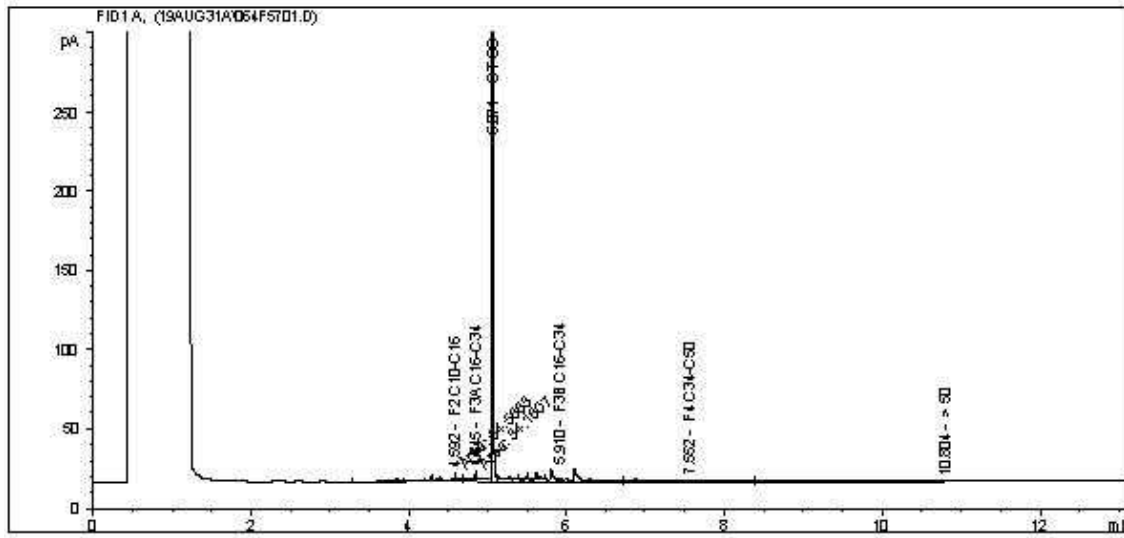
Gasoline: C6 - C12  
 Varsol: C8 - C12  
 Kerosene: C8 - C16

Diesel: C10 - C24  
 Fuel Oils: C6 - C32  
 Motor Oils: C16 - C50

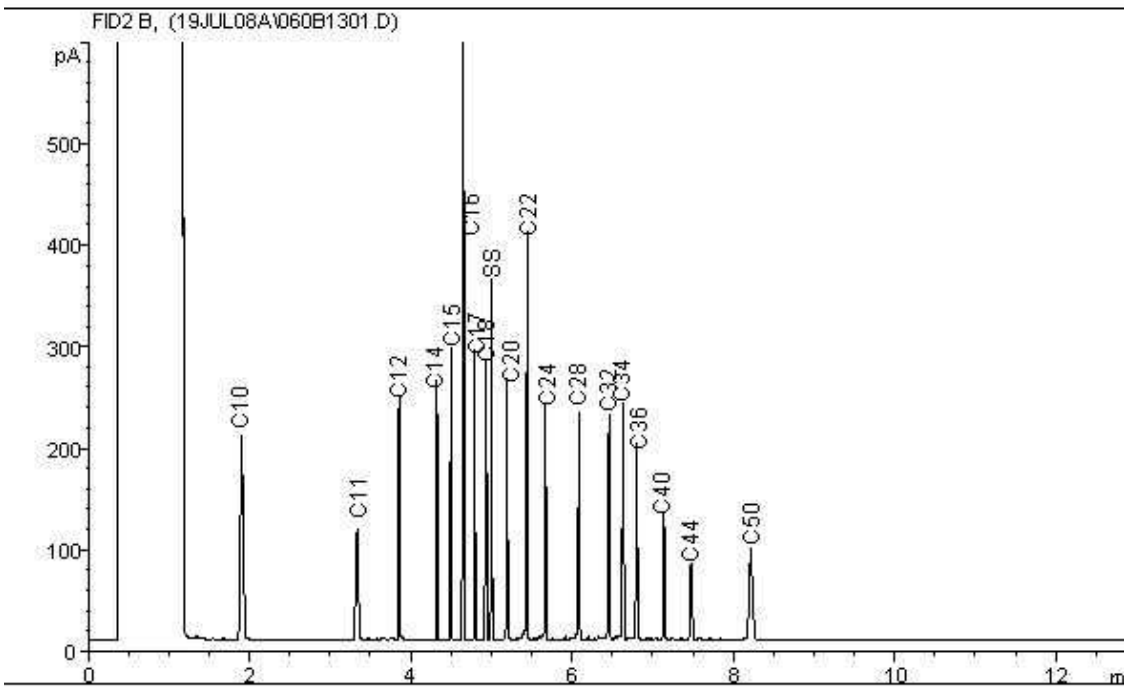
Jet Fuels: C6 - C16  
 Creosote: C10 - C26  
 Asphalt: C18 - C50+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum

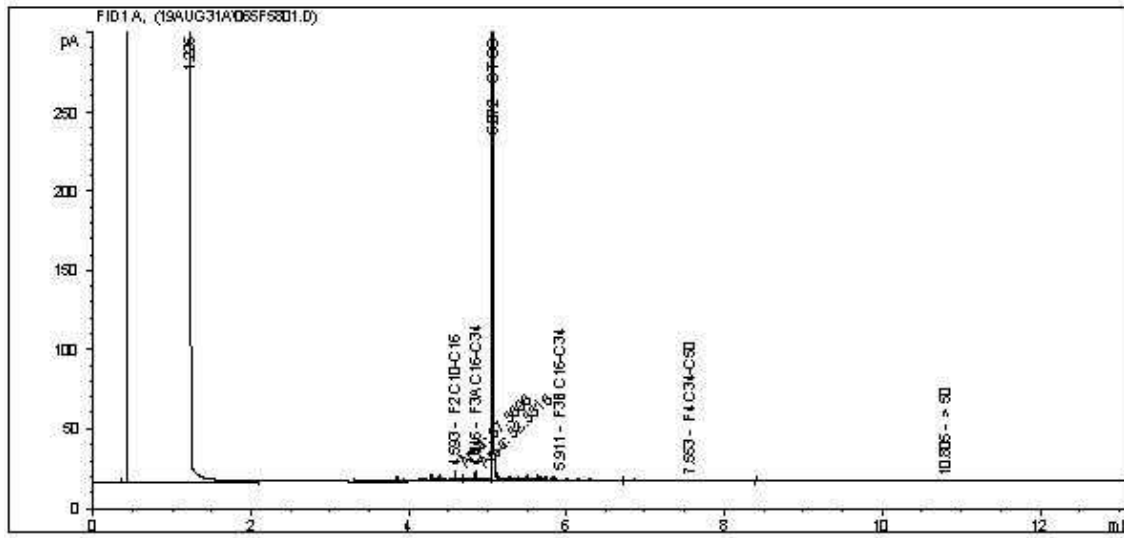


**TYPICAL PRODUCT CARBON NUMBER RANGES**

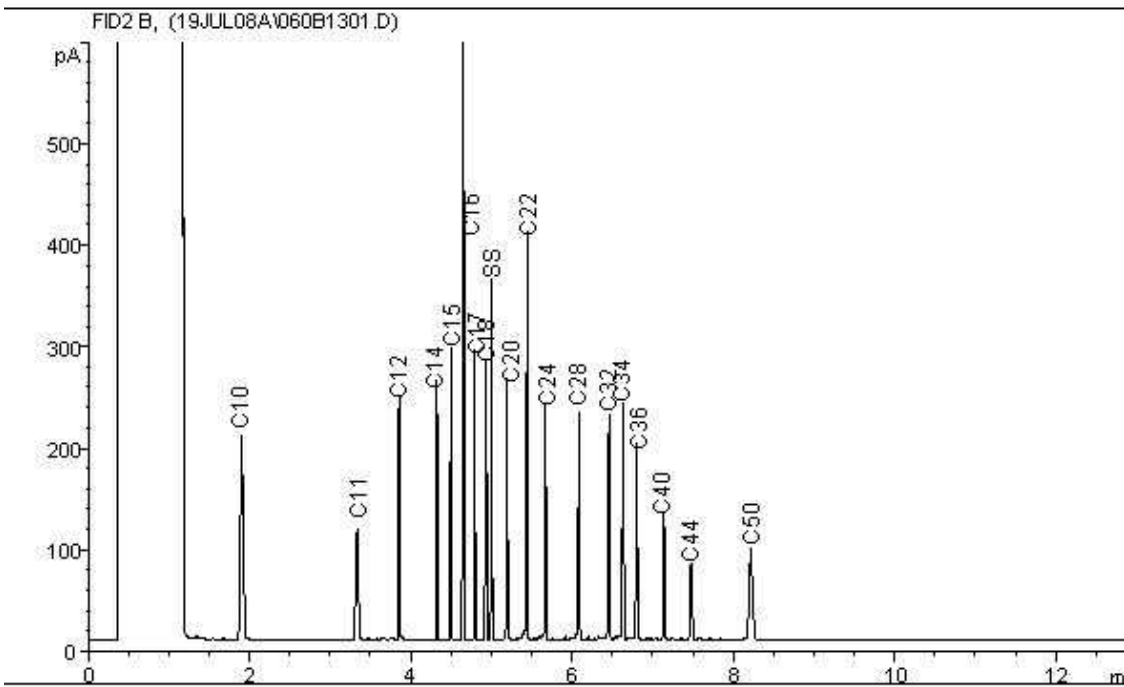
Gasoline: <b>C6 - C12</b>	Diesel: <b>C10 - C24</b>	Jet Fuels: <b>C6 - C16</b>
Varsol: <b>C8 - C12</b>	Fuel Oils: <b>C6 - C32</b>	Creosote: <b>C10 - C26</b>
Kerosene: <b>C8 - C16</b>	Motor Oils: <b>C16 - C50</b>	Asphalt: <b>C18 - C50+</b>

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum

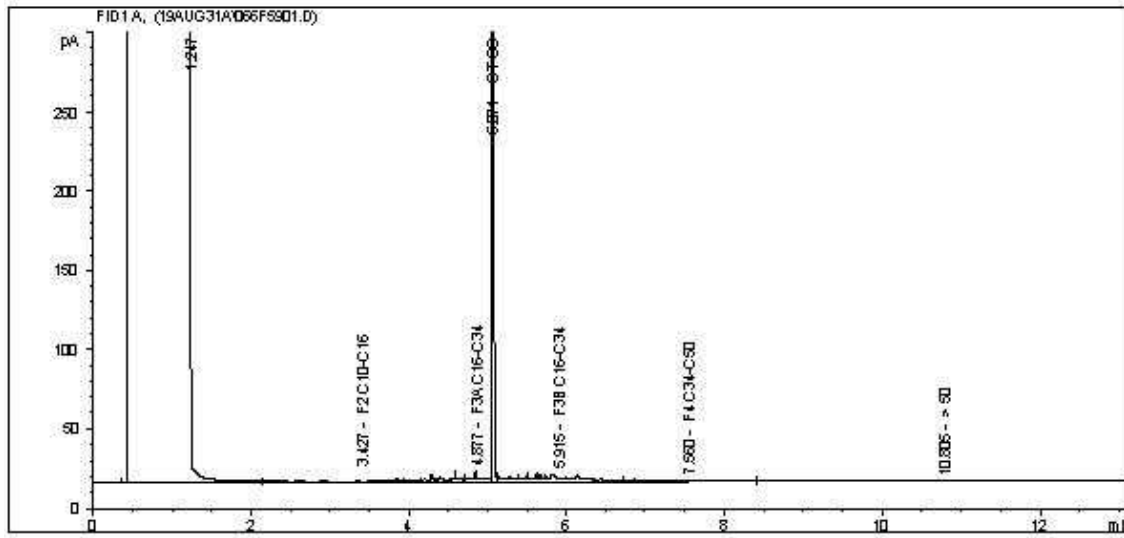


**TYPICAL PRODUCT CARBON NUMBER RANGES**

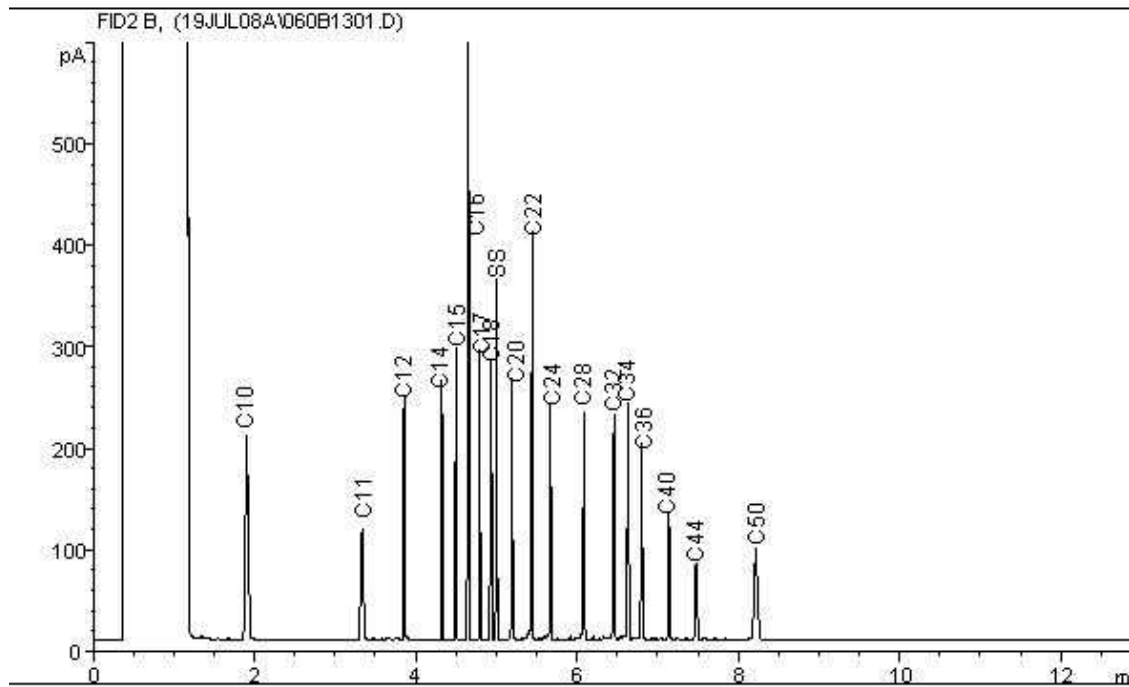
Gasoline: <b>C6 - C12</b>	Diesel: <b>C10 - C24</b>	Jet Fuels: <b>C6 - C16</b>
Varsol: <b>C8 - C12</b>	Fuel Oils: <b>C6 - C32</b>	Creosote: <b>C10 - C26</b>
Kerosene: <b>C8 - C16</b>	Motor Oils: <b>C16 - C50</b>	Asphalt: <b>C18 - C50+</b>

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum

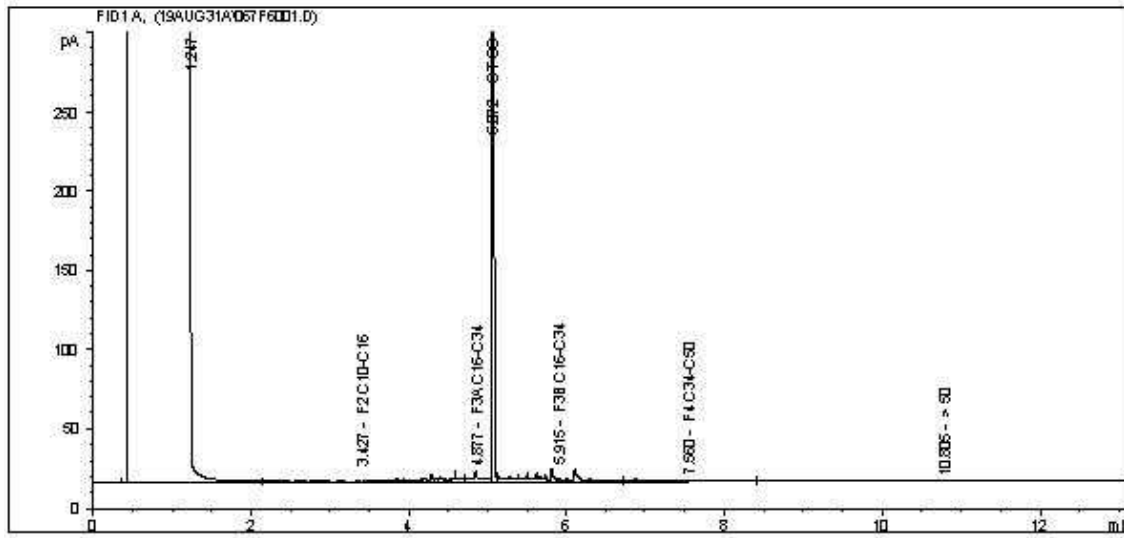


**TYPICAL PRODUCT CARBON NUMBER RANGES**

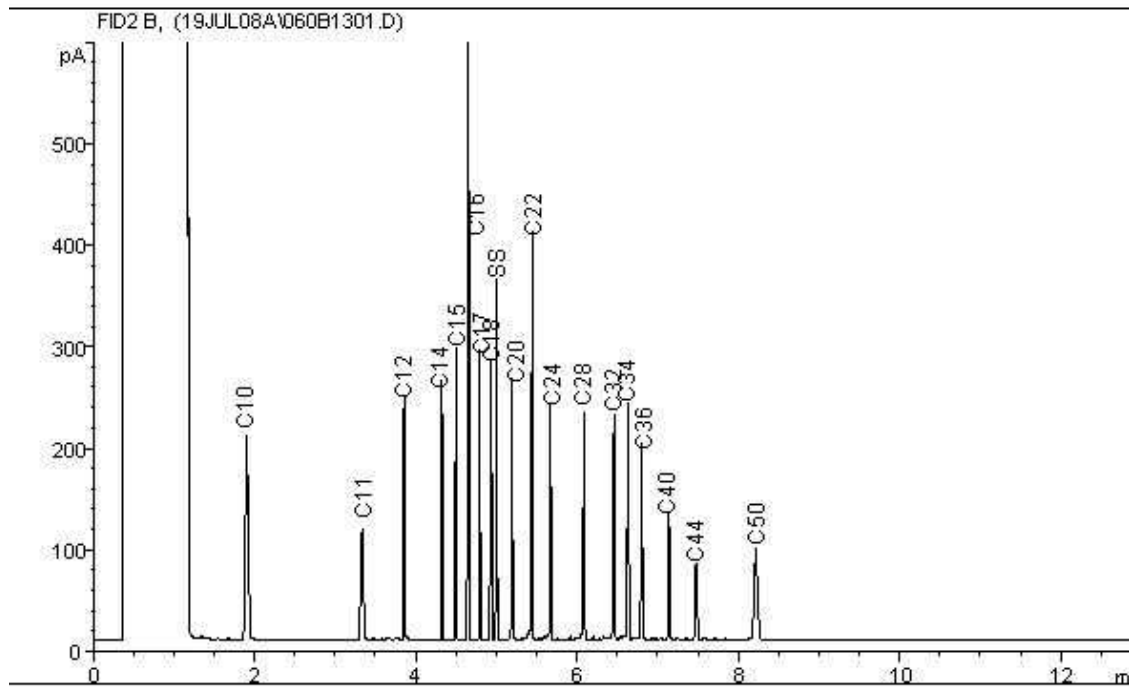
Gasoline: <b>C6 - C12</b>	Diesel: <b>C10 - C24</b>	Jet Fuels: <b>C6 - C16</b>
Varsol: <b>C8 - C12</b>	Fuel Oils: <b>C6 - C32</b>	Creosote: <b>C10 - C26</b>
Kerosene: <b>C8 - C16</b>	Motor Oils: <b>C16 - C50</b>	Asphalt: <b>C18 - C50+</b>

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



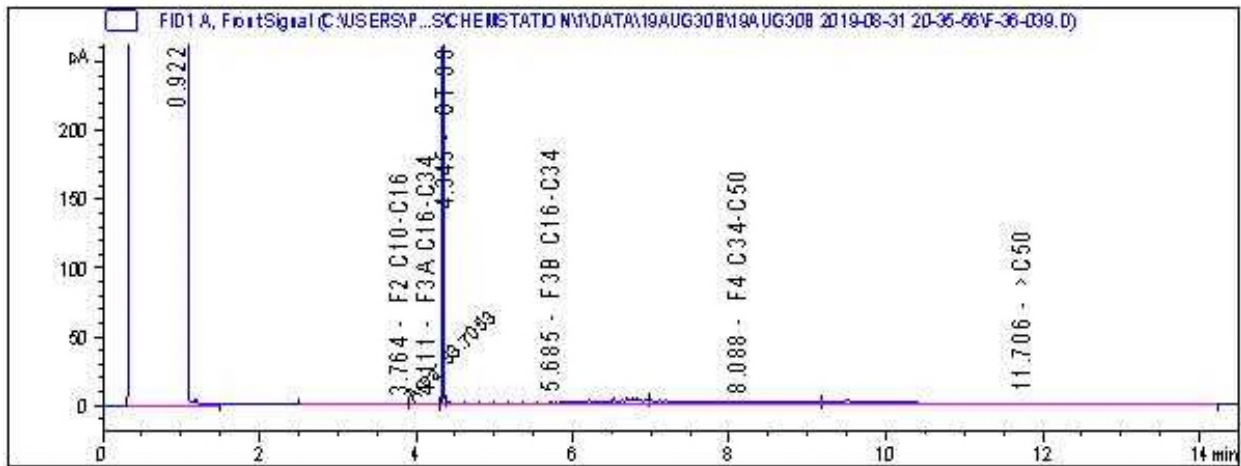
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: <b>C6 - C12</b>	Diesel: <b>C10 - C24</b>	Jet Fuels: <b>C6 - C16</b>
Varsol: <b>C8 - C12</b>	Fuel Oils: <b>C6 - C32</b>	Creosote: <b>C10 - C26</b>
Kerosene: <b>C8 - C16</b>	Motor Oils: <b>C16 - C50</b>	Asphalt: <b>C18 - C50+</b>

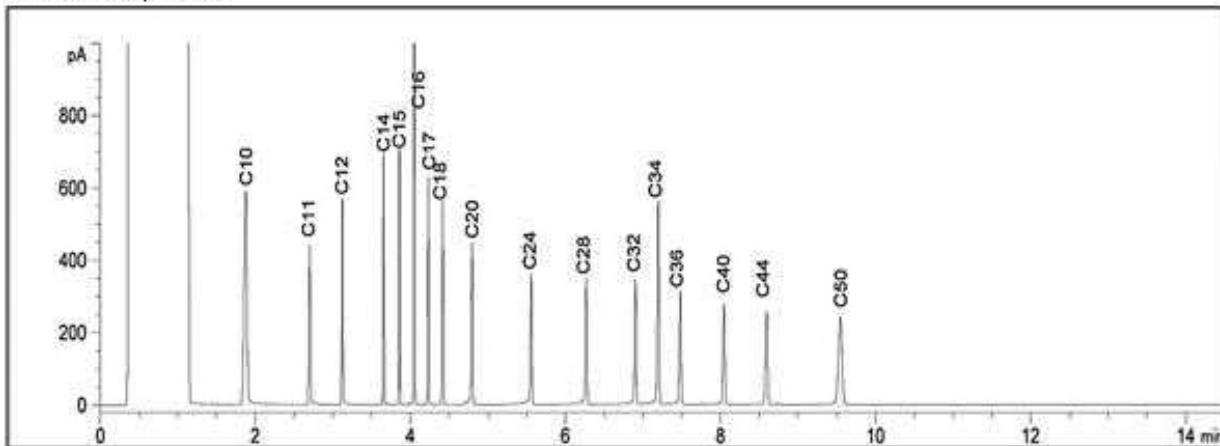
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.



**Petroleum Hydrocarbons F2-F4 in Soil Chromatogram**



**Reference Spectrum**



**TYPICAL PRODUCT CARBON NUMBER RANGES**

Gasoline: **C6 - C12**

Diesel: **C10 - C24**

Jet Fuels: **C6 - C16**

Varsol: **C8 - C12**

Fuel Oils: **C6 - C32**

Creosote: **C10 - C26**

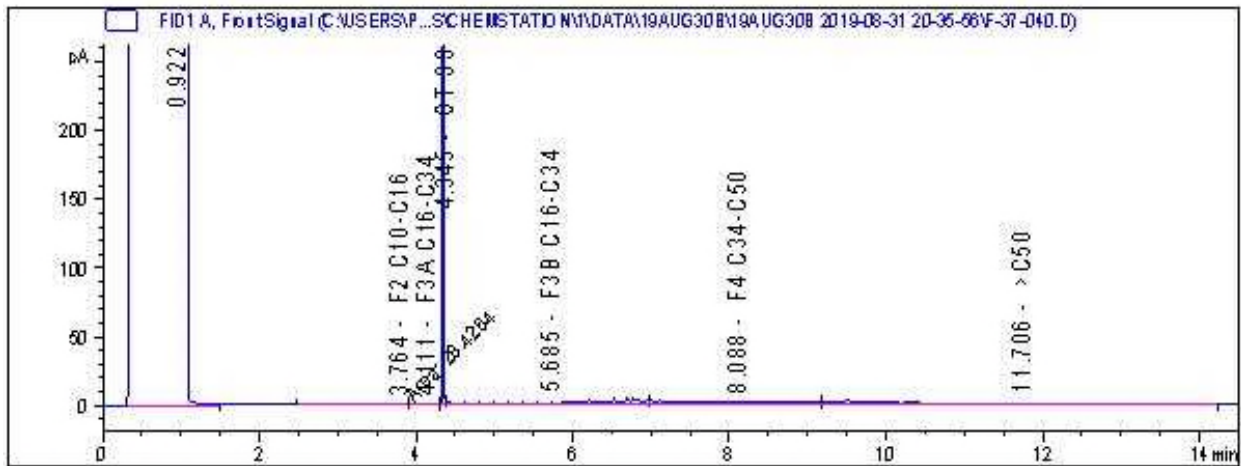
Kerosene: **C8 - C16**

Motor Oils: **C16 - C50**

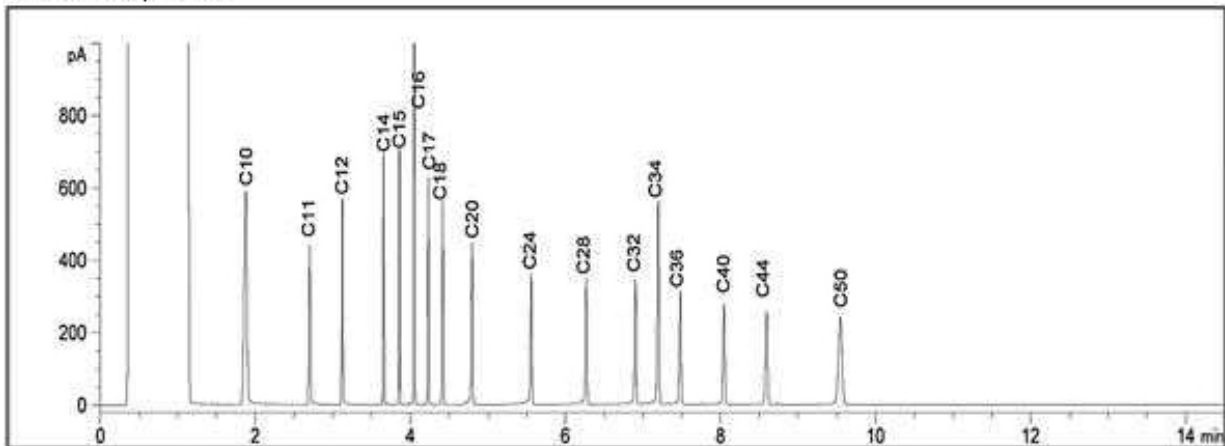
Asphalt: **C18 - C50+**

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**

**Petroleum Hydrocarbons F2-F4 in Soil Chromatogram**



**Reference Spectrum**



**TYPICAL PRODUCT CARBON NUMBER RANGES**

Gasoline: <b>C6 - C12</b>	Diesel: <b>C10 - C24</b>	Jet Fuels: <b>C6 - C16</b>
Varsol: <b>C8 - C12</b>	Fuel Oils: <b>C6 - C32</b>	Creosote: <b>C10 - C26</b>
Kerosene: <b>C8 - C16</b>	Motor Oils: <b>C16 - C50</b>	Asphalt: <b>C18 - C50+</b>

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**



Your Project #: 30029878  
Your C.O.C. #: 736518-01-01

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
1050 Morrison Drive  
Unit 201  
Ottawa, ON  
CANADA K2H 8K7

**Report Date: 2019/09/10**  
Report #: R5874073  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B908426**  
**Received: 2019/09/06, 13:45**

Sample Matrix: Water  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
OC Pesticides (Selected) & PCB (1, 2)	1	2019/09/07	2019/09/09	CAM SOP-00307	EPA 8081A/8082B m
OC Pesticides Summed Parameters (1)	1	N/A	2019/09/09	CAM SOP-00307	EPA 8081A/8082B m
GC/MS Analysis of OP Pesticides. (1)	1	2019/09/06	2019/09/09	CAM SOP-00301	EPA 8270 m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Laboratories Mississauga

(2) Chlordane ( Total) = Alpha Chlordane + Gamma Chlordane



Your Project #: 30029878  
Your C.O.C. #: 736518-01-01

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
1050 Morrison Drive  
Unit 201  
Ottawa, ON  
CANADA K2H 8K7

**Report Date: 2019/09/10**  
Report #: R5874073  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B908426**  
**Received: 2019/09/06, 13:45**

Encryption Key

Alisha Williamson  
Project Manager  
10 Sep 2019 16:21:14

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Alisha Williamson, Project Manager  
Email: Alisha.Williamson@bvlab.com  
Phone# (613)274-0573

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



BUREAU  
VERITAS

BV Labs Job #: B908426  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: EH

### ORGANOPHOSPHORUS PESTICIDES BY GC-MS (WATER)

BV Labs ID		KSA741		
Sampling Date		2019/09/06 12:25		
COC Number		736518-01-01		
	<b>UNITS</b>	<b>MW-4</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Pesticides &amp; Herbicides</b>				
Demeton-S	ug/L	<2.0	2.0	6319055
Dichlorvos	ug/L	<2.0	2.0	6319055
Dimethoate	ug/L	<2.0	2.0	6319055
Fenchlorphos (Ronnell)	ug/L	<2.0	2.0	6319055
Fonofos	ug/L	<2.0	2.0	6319055
Metolachlor	ug/L	<5.0	5.0	6319055
Mevinphos	ug/L	<2.0	2.0	6319055
Phosmet	ug/L	<2.0	2.0	6319055
Triallate	ug/L	<5.0	5.0	6319055
Trifluralin	ug/L	<5.0	5.0	6319055
Atrazine	ug/L	<1.0	1.0	6319055
Diazinon	ug/L	<2.0	2.0	6319055
Malathion	ug/L	<2.0	2.0	6319055
Parathion Ethyl	ug/L	<2.0	2.0	6319055
Parathion Methyl	ug/L	<2.0	2.0	6319055
Simazine	ug/L	<2.0	2.0	6319055
Aldicarb	ug/L	<5.0	5.0	6319055
Bendiocarb	ug/L	<2.0	2.0	6319055
Carbaryl	ug/L	<5.0	5.0	6319055
Carbofuran	ug/L	<5.0	5.0	6319055
Cyanazine (Bladex)	ug/L	<5.0	5.0	6319055
Prometryne	ug/L	<1.0	1.0	6319055
Chlorpyrifos (Dursban)	ug/L	<2.0	2.0	6319055
Terbufos	ug/L	<1.0	1.0	6319055
Phorate	ug/L	<1.0	1.0	6319055
Guthion (Azinphos-methyl)	ug/L	<1.0	1.0	6319055
Ethion	ug/L	<1.0	1.0	6319055
Fenthion	ug/L	<1.0	1.0	6319055
<b>Surrogate Recovery (%)</b>				
2-Fluorobiphenyl	%	46		6319055
D14-Terphenyl (FS)	%	98		6319055
D5-Nitrobenzene	%	51		6319055
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU  
VERITAS

BV Labs Job #: B908426  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: EH

### O.REG 153 OC PESTICIDES (WATER)

BV Labs ID		KSA741		
Sampling Date		2019/09/06 12:25		
COC Number		736518-01-01		
	<b>UNITS</b>	<b>MW-4</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
Chlordane (Total)	ug/L	<0.005	0.005	6318576
o,p-DDD + p,p-DDD	ug/L	<0.005	0.005	6318576
o,p-DDE + p,p-DDE	ug/L	<0.005	0.005	6318576
o,p-DDT + p,p-DDT	ug/L	<0.005	0.005	6318576
Total Endosulfan	ug/L	<0.005	0.005	6318576
Total PCB	ug/L	<0.05	0.05	6318576
<b>Pesticides &amp; Herbicides</b>				
Aldrin	ug/L	<0.005	0.005	6320464
Dieldrin	ug/L	<0.005	0.005	6320464
a-Chlordane	ug/L	<0.005	0.005	6320464
g-Chlordane	ug/L	<0.005	0.005	6320464
o,p-DDD	ug/L	<0.005	0.005	6320464
p,p-DDD	ug/L	<0.005	0.005	6320464
o,p-DDE	ug/L	<0.005	0.005	6320464
p,p-DDE	ug/L	<0.005	0.005	6320464
o,p-DDT	ug/L	<0.005	0.005	6320464
p,p-DDT	ug/L	<0.005	0.005	6320464
Lindane	ug/L	<0.003	0.003	6320464
Endosulfan I (alpha)	ug/L	<0.005	0.005	6320464
Endosulfan II (beta)	ug/L	<0.005	0.005	6320464
Endrin	ug/L	<0.005	0.005	6320464
Heptachlor	ug/L	<0.005	0.005	6320464
Heptachlor epoxide	ug/L	<0.005	0.005	6320464
Hexachlorobenzene	ug/L	<0.005	0.005	6320464
Hexachlorobutadiene	ug/L	<0.009	0.009	6320464
Hexachloroethane	ug/L	<0.01	0.01	6320464
Methoxychlor	ug/L	<0.01	0.01	6320464
Aroclor 1242	ug/L	<0.05	0.05	6320464
Aroclor 1248	ug/L	<0.05	0.05	6320464
Aroclor 1254	ug/L	<0.05	0.05	6320464
Aroclor 1260	ug/L	<0.05	0.05	6320464
<b>Surrogate Recovery (%)</b>				
2,4,5,6-Tetrachloro-m-xylene	%	81		6320464
Decachlorobiphenyl	%	99		6320464
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU  
VERITAS

BV Labs Job #: B908426  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: EH

### TEST SUMMARY

**BV Labs ID:** KSA741  
**Sample ID:** MW-4  
**Matrix:** Water

**Collected:** 2019/09/06  
**Shipped:**  
**Received:** 2019/09/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
OC Pesticides (Selected) & PCB	GC/ECD	6320464	2019/09/07	2019/09/09	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	6318576	N/A	2019/09/09	Automated Statchk
GC/MS Analysis of OP Pesticides.	GC/MS	6319055	2019/09/06	2019/09/09	Thoai Truyen Huynh



BUREAU  
VERITAS

BV Labs Job #: B908426  
Report Date: 2019/09/10

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: EH

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.3°C
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**Results relate only to the items tested.**





BUREAU  
VERITAS

BV Labs Job #: B908426  
Report Date: 2019/09/10

### QUALITY ASSURANCE REPORT

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: EH

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6319055	2-Fluorobiphenyl	2019/09/09	36	30 - 130	59	30 - 130	71	%		
6319055	D14-Terphenyl (FS)	2019/09/09	94	30 - 130	92	30 - 130	96	%		
6319055	D5-Nitrobenzene	2019/09/09	45	30 - 130	74	30 - 130	85	%		
6320464	2,4,5,6-Tetrachloro-m-xylene	2019/09/09	90	50 - 130	76	50 - 130	70	%		
6320464	Decachlorobiphenyl	2019/09/09	125	50 - 130	106	50 - 130	94	%		
6319055	Aldicarb	2019/09/09	97	30 - 130	97	30 - 130	<5.0	ug/L	NC	40
6319055	Atrazine	2019/09/09	101	30 - 130	92	30 - 130	<1.0	ug/L	NC	40
6319055	Bendiocarb	2019/09/09	99	30 - 130	95	30 - 130	<2.0	ug/L	NC	40
6319055	Carbaryl	2019/09/09	100	30 - 130	91	30 - 130	<5.0	ug/L	NC	40
6319055	Carbofuran	2019/09/09	111	30 - 130	98	30 - 130	<5.0	ug/L	NC	40
6319055	Chlorpyrifos (Dursban)	2019/09/09	102	30 - 130	100	30 - 130	<2.0	ug/L	NC	40
6319055	Cyanazine (Bladex)	2019/09/09	107	30 - 130	101	30 - 130	<5.0	ug/L	NC	40
6319055	Demeton-S	2019/09/09	85	30 - 130	81	30 - 130	<2.0	ug/L	NC	40
6319055	Diazinon	2019/09/09	99	30 - 130	98	30 - 130	<2.0	ug/L	NC	40
6319055	Dichlorvos	2019/09/09	56	30 - 130	101	30 - 130	<2.0	ug/L	NC	40
6319055	Dimethoate	2019/09/09	95	30 - 130	90	30 - 130	<2.0	ug/L	NC	40
6319055	Ethion	2019/09/09	106	30 - 130	101	30 - 130	<1.0	ug/L	NC	40
6319055	Fenchlorphos (Ronnell)	2019/09/09	91	30 - 130	90	30 - 130	<2.0	ug/L	NC	40
6319055	Fenthion	2019/09/09	94	30 - 130	91	30 - 130	<1.0	ug/L	NC	40
6319055	Fonofos	2019/09/09	93	30 - 130	96	30 - 130	<2.0	ug/L	NC	40
6319055	Guthion (Azinphos-methyl)	2019/09/09	123	30 - 130	101	30 - 130	<1.0	ug/L	NC	40
6319055	Malathion	2019/09/09	102	30 - 130	98	30 - 130	<2.0	ug/L	NC	40
6319055	Metolachlor	2019/09/09	102	30 - 130	99	30 - 130	<5.0	ug/L	NC	40
6319055	Mevinphos	2019/09/09	82	30 - 130	90	30 - 130	<2.0	ug/L	NC	40
6319055	Parathion Ethyl	2019/09/09	105	30 - 130	102	30 - 130	<2.0	ug/L	NC	40
6319055	Parathion Methyl	2019/09/09	97	30 - 130	95	30 - 130	<2.0	ug/L	NC	40
6319055	Phorate	2019/09/09	85	30 - 130	96	30 - 130	<1.0	ug/L	NC	40
6319055	Phosmet	2019/09/09	108	30 - 130	97	30 - 130	<2.0	ug/L	NC	40
6319055	Prometryne	2019/09/09	99	30 - 130	93	30 - 130	<1.0	ug/L	NC	40
6319055	Simazine	2019/09/09	95	30 - 130	86	30 - 130	<2.0	ug/L	NC	40
6319055	Terbufos	2019/09/09	82	30 - 130	91	30 - 130	<1.0	ug/L	NC	40
6319055	Triallate	2019/09/09	93	30 - 130	98	30 - 130	<5.0	ug/L	NC	40



BUREAU  
VERITAS

BV Labs Job #: B908426  
Report Date: 2019/09/10

### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: EH

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6319055	Trifluralin	2019/09/09	77	30 - 130	82	30 - 130	<5.0	ug/L	NC	40
6320464	a-Chlordane	2019/09/09	101	50 - 130	88	50 - 130	<0.005	ug/L		
6320464	Aldrin	2019/09/09	85	50 - 130	71	50 - 130	<0.005	ug/L		
6320464	Aroclor 1242	2019/09/09					<0.05	ug/L	200 (1)	30
6320464	Aroclor 1248	2019/09/09					<0.05	ug/L		
6320464	Aroclor 1254	2019/09/09					<0.05	ug/L		
6320464	Aroclor 1260	2019/09/09					<0.05	ug/L		
6320464	Dieldrin	2019/09/09	109	50 - 130	99	50 - 130	<0.005	ug/L		
6320464	Endosulfan I (alpha)	2019/09/09	75	50 - 130	72	50 - 130	<0.005	ug/L		
6320464	Endosulfan II (beta)	2019/09/09	92	50 - 130	80	50 - 130	<0.005	ug/L		
6320464	Endrin	2019/09/09	103	50 - 130	84	50 - 130	<0.005	ug/L		
6320464	g-Chlordane	2019/09/09	94	50 - 130	86	50 - 130	<0.005	ug/L		
6320464	Heptachlor epoxide	2019/09/09	95	50 - 130	82	50 - 130	<0.005	ug/L		
6320464	Heptachlor	2019/09/09	87	50 - 130	77	50 - 130	<0.005	ug/L		
6320464	Hexachlorobenzene	2019/09/09	101	50 - 130	93	50 - 130	<0.005	ug/L	NC	30
6320464	Hexachlorobutadiene	2019/09/09	103	50 - 130	86	50 - 130	<0.009	ug/L	NC	30
6320464	Hexachloroethane	2019/09/09	93	50 - 130	81	50 - 130	<0.01	ug/L	NC	30
6320464	Lindane	2019/09/09	100	50 - 130	95	50 - 130	<0.003	ug/L		
6320464	Methoxychlor	2019/09/09	115	50 - 130	98	50 - 130	<0.01	ug/L		
6320464	o,p-DDD	2019/09/09	108	50 - 130	90	50 - 130	<0.005	ug/L		
6320464	o,p-DDE	2019/09/09	106	50 - 130	91	50 - 130	<0.005	ug/L		
6320464	o,p-DDT	2019/09/09	96	50 - 130	85	50 - 130	<0.005	ug/L		
6320464	p,p-DDD	2019/09/09	100	50 - 130	86	50 - 130	<0.005	ug/L		
6320464	p,p-DDE	2019/09/09	90	50 - 130	80	50 - 130	<0.005	ug/L		



BUREAU  
VERITAS

BV Labs Job #: B908426  
Report Date: 2019/09/10

### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: EH

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6320464	p,p-DDT	2019/09/09	101	50 - 130	85	50 - 130	<0.005	ug/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference  $\leq 2x$  RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU  
VERITAS

BV Labs Job #: B908426

Report Date: 2019/09/10

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: EH

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

A handwritten signature in black ink, appearing to read 'A. Hamanov', written over a horizontal line.

Anastassia Hamanov, Scientific Specialist

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Bureau Veritas Laboratories  
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

CHAIN OF CUSTODY RECORD

Page of

<b>INVOICE TO:</b> Company Name: #10988 ARCADIS Canada Inc Attention: Accounts Payable Canada Address: 1050 Morrison Drive Unit 201 Ottawa ON K2H 8K7 Tel: (613) 721-0555 Fax: (613) 721-0029 Email: AccountsPayable.Canada@arcadis.com		<b>REPORT TO:</b> Company Name: <u>Arcadis Canada Inc.</u> Attention: <u>Stephanie Joyce</u> Address: <u>1050 Morrison Drive Unit 201</u> Tel: _____ Fax: _____ Email: <u>Stephanie.Joyce@arcadis.com</u>		<b>PROJECT INFORMATION:</b> Quotation #: <u>B81974</u> P.O. #: _____ Project: _____ Project Name: _____ Site #: _____ Sampled By: _____		<b>Laboratory Use Only:</b> BV Labs Job #: _____ Bottle Order #:  736518 COC #: _____  C#736518-01-01 Project Manager: <u>Alisha Williamson</u>	
---	--	--	--	---	--	--	--

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY					Field Filtered (please circle): Metals / Hg / Cr-VI	O.Reg 153 OC Pesticides (Water) <u>OP Pesticides</u>	ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects	
Regulation 153 (2011)		Other Regulations		Special Instructions													Regular (Standard) TAT: <small>(will be applied if Rush TAT is not specified):</small> Standard TAT = 5-7 Working days for most tests. <small>Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are &gt; 5 days - contact your Project Manager for details.</small>	
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Medium/Fine	<input type="checkbox"/> CCME				<input type="checkbox"/> Sanitary Sewer Bylaw											Job Specific Rush TAT (if applies to entire submission) Date Required: <u>1 DAY</u> Time Required: _____
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> Reg 558.	<input type="checkbox"/> Storm Sewer Bylaw											Rush Confirmation Number: _____ (call lab for #)			
<input checked="" type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other	<input type="checkbox"/> For RSC	<input type="checkbox"/> MISA	Municipality _____											# of Bottles			
<input type="checkbox"/> Table			<input type="checkbox"/> PWQO	<input type="checkbox"/> Other _____											Comments			
Include Criteria on Certificate of Analysis (Y/N)?																		
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix														
1	<u>MW-4</u>	<u>2019-09-06</u>	<u>12:25</u>	<u>GW</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>											<u>4</u>	<u>2x 500mL 2x AL</u>
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

06-Sep-19 13:45  
Alisha Williamson  
  
B908426  
KJY OTT-001

* RELINQUISHED BY: (Signature/Print) <u>[Signature]</u>	Date: (YY/MM/DD) <u>19/09/06</u>	Time <u>1:28pm</u>	RECEIVED BY: (Signature/Print) <u>[Signature]</u>	Date: (YY/MM/DD) <u>24/09/06</u>	Time <u>12:45</u>	# jars used and not submitted	Laboratory Use Only				
							Time Sensitive	Temperature (°C) on Recept <u>8.7, 7</u>	Custody Seal Present	Yes	No



\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.  
 \*\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.  
 \*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.  
 White: BV Labs Yellow: Client  
 SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS



Bureau Veritas Laboratories  
6740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvlabs.com

CHAIN OF CUSTODY RECORD

Page of

<b>INVOICE TO:</b> Company Name: #10988 ARCADIS Canada Inc Attention: Accounts Payable Canada Address: 1050 Morrison Drive Unit 201 Ottawa ON K2H 8K7 Tel: (613) 721-0555 Fax: (613) 721-0029 Email: AccountsPayable.Canada@arcadis.com		<b>REPORT TO:</b> Company Name: <u>Arcadis Canada Inc.</u> Attention: <u>Stephanie Joyce</u> Address: <u>1050 Morrison Drive Unit 201</u> Tel: _____ Fax: _____ Email: <u>Stephanie.Joyce@arcadis.com</u>		<b>PROJECT INFORMATION:</b> Quotation #: B81974 P.O. #: _____ Project: _____ Project Name: _____ Site #: _____ Sampled By: _____		<b>Laboratory Use Only:</b> BV Labs Job #: _____ Bottle Order #:  736518 COC #: _____ Project Manager:  Alisha Williamson	
---	--	--	--	--	--	---	--

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY					ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects					
Regulation 153 (2011)			Other Regulations		Special Instructions											Regular (Standard) TAT: <small>(will be applied if Rush TAT is not specified)</small> Standard TAT = 5-7 Working days for most tests. <small>Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are &gt; 5 days - contact your Project Manager for details.</small>				
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Medium/Fine	<input type="checkbox"/> CCME	<input type="checkbox"/> Sanitary Sewer Bylaw												Job Specific Rush TAT (if applies to entire submission) Date Required: <u>1 DAY</u> Time Required: _____ Rush Confirmation Number: _____ <small>(call lab for #)</small>				
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> Reg 558	<input type="checkbox"/> Storm Sewer Bylaw												# of Bottles				
<input checked="" type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other	<input type="checkbox"/> For RSC	<input type="checkbox"/> MISA	Municipality _____												Comments				
<input type="checkbox"/> Table _____			<input type="checkbox"/> PWQO																	
Include Criteria on Certificate of Analysis (Y/N)?																				
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals /Hg /Cr/Vi	O.Reg 153 OC Pesticides (Water)	OP Pesticides													
1	<u>MW-4</u>	<u>2019-09-06</u>	<u>12:25</u>	<u>GW</u>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>												<u>4</u> <u>2x 500mL 2x 1L</u>	
2																				
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7																				
8																				
9																				
10																				

06-Sep-19 13:45  
Alisha Williamson  
B908426  
KJY OTT-001

RECEIVED IN CHARGE

* RELINQUISHED BY: (Signature/Print) <u>[Signature]</u>		Date: (YY/MM/DD) <u>19/09/06</u>	Time <u>1:28pm</u>	RECEIVED BY: (Signature/Print) <u>[Signature]</u>		Date: (YY/MM/DD) <u>26/09/06</u>	Time <u>13:45</u>	# Jars used and not submitted	Laboratory Use Only			
				Date: (YY/MM/DD) <u>2019/09/07</u>		Time <u>08:11</u>		Time Sensitive	Temperature (°C) on Reel <u>8.3°C</u>	Custody Seal Present <input checked="" type="checkbox"/>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

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SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

6/614



Your Project #: 30029878  
 Your C.O.C. #: 741644-01-01

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
 1050 Morrison Drive  
 Unit 201  
 Ottawa, ON  
 CANADA K2H 8K7

**Report Date: 2019/10/22**  
 Report #: R5931670  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9S8563**

**Received: 2019/10/15, 12:10**

Sample Matrix: Soil  
 # Samples Received: 2

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Methylnaphthalene Sum (1)	2	N/A	2019/10/22	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum (1)	2	N/A	2019/10/21		EPA 8260C m
Petroleum Hydrocarbons F2-F4 in Soil (1, 2)	2	2019/10/19	2019/10/20	CAM SOP-00316	CCME CWS m
Strong Acid Leachable Metals by ICPMS (1)	2	2019/10/18	2019/10/21	CAM SOP-00447	EPA 6020B m
Moisture (1)	2	N/A	2019/10/17	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM) (1)	2	2019/10/19	2019/10/19	CAM SOP-00318	EPA 8270D m
Volatile Organic Compounds and F1 PHCs (1)	2	N/A	2019/10/18	CAM SOP-00230	EPA 8260C m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Laboratories Mississauga

(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.



Your Project #: 30029878  
Your C.O.C. #: 741644-01-01

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
1050 Morrison Drive  
Unit 201  
Ottawa, ON  
CANADA K2H 8K7

**Report Date: 2019/10/22**  
Report #: R5931670  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9S8563**  
**Received: 2019/10/15, 12:10**

Encryption Key

Alisha Williamson  
Project Manager  
22 Oct 2019 17:20:13

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Alisha Williamson, Project Manager  
Email: Alisha.Williamson@bvlab.com  
Phone# (613)274-0573

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





BUREAU  
VERITAS

BV Labs Job #: B9S8563  
Report Date: 2019/10/22

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### O.REG 153 ICPMS METALS (SOIL)

BV Labs ID		LAQ284	LAQ285		
Sampling Date		2019/10/15 09:30	2019/10/15 11:30		
COC Number		741644-01-01	741644-01-01		
	<b>UNITS</b>	<b>MW-5-1</b>	<b>MW-6-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Metals</b>					
Acid Extractable Antimony (Sb)	ug/g	<0.20	<0.20	0.20	6393427
Acid Extractable Arsenic (As)	ug/g	<1.0	<1.0	1.0	6393427
Acid Extractable Barium (Ba)	ug/g	13	16	0.50	6393427
Acid Extractable Beryllium (Be)	ug/g	<0.20	<0.20	0.20	6393427
Acid Extractable Boron (B)	ug/g	<5.0	<5.0	5.0	6393427
Acid Extractable Cadmium (Cd)	ug/g	<0.10	<0.10	0.10	6393427
Acid Extractable Chromium (Cr)	ug/g	5.2	8.3	1.0	6393427
Acid Extractable Cobalt (Co)	ug/g	2.7	3.2	0.10	6393427
Acid Extractable Copper (Cu)	ug/g	7.3	8.3	0.50	6393427
Acid Extractable Lead (Pb)	ug/g	1.3	1.5	1.0	6393427
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	<0.50	0.50	6393427
Acid Extractable Nickel (Ni)	ug/g	4.4	4.2	0.50	6393427
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	0.50	6393427
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	0.20	6393427
Acid Extractable Thallium (Tl)	ug/g	<0.050	<0.050	0.050	6393427
Acid Extractable Uranium (U)	ug/g	0.43	0.66	0.050	6393427
Acid Extractable Vanadium (V)	ug/g	15	25	5.0	6393427
Acid Extractable Zinc (Zn)	ug/g	9.2	9.7	5.0	6393427
Acid Extractable Mercury (Hg)	ug/g	<0.050	<0.050	0.050	6393427
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					



BUREAU  
VERITAS

BV Labs Job #: B9S8563  
Report Date: 2019/10/22

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 PAHS (SOIL)**

BV Labs ID		LAQ284	LAQ285		
Sampling Date		2019/10/15 09:30	2019/10/15 11:30		
COC Number		741644-01-01	741644-01-01		
	<b>UNITS</b>	<b>MW-5-1</b>	<b>MW-6-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>					
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	<0.0071	0.0071	6388655
<b>Polyaromatic Hydrocarbons</b>					
Acenaphthene	ug/g	<0.0050	<0.0050	0.0050	6395798
Acenaphthylene	ug/g	<0.0050	<0.0050	0.0050	6395798
Anthracene	ug/g	<0.0050	<0.0050	0.0050	6395798
Benzo(a)anthracene	ug/g	<0.0050	<0.0050	0.0050	6395798
Benzo(a)pyrene	ug/g	<0.0050	<0.0050	0.0050	6395798
Benzo(b/j)fluoranthene	ug/g	<0.0050	<0.0050	0.0050	6395798
Benzo(g,h,i)perylene	ug/g	<0.0050	<0.0050	0.0050	6395798
Benzo(k)fluoranthene	ug/g	<0.0050	<0.0050	0.0050	6395798
Chrysene	ug/g	<0.0050	<0.0050	0.0050	6395798
Dibenz(a,h)anthracene	ug/g	<0.0050	<0.0050	0.0050	6395798
Fluoranthene	ug/g	<0.0050	<0.0050	0.0050	6395798
Fluorene	ug/g	<0.0050	<0.0050	0.0050	6395798
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	<0.0050	0.0050	6395798
1-Methylnaphthalene	ug/g	<0.0050	<0.0050	0.0050	6395798
2-Methylnaphthalene	ug/g	<0.0050	<0.0050	0.0050	6395798
Naphthalene	ug/g	<0.0050	<0.0050	0.0050	6395798
Phenanthrene	ug/g	<0.0050	<0.0050	0.0050	6395798
Pyrene	ug/g	<0.0050	<0.0050	0.0050	6395798
<b>Surrogate Recovery (%)</b>					
D10-Anthracene	%	93	98		6395798
D14-Terphenyl (FS)	%	96	99		6395798
D8-Acenaphthylene	%	92	94		6395798
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



BUREAU  
VERITAS

BV Labs Job #: B9S8563  
Report Date: 2019/10/22

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### O.REG 153 VOCS BY HS & F1-F4 (SOIL)

BV Labs ID		LAQ284			LAQ284			LAQ285		
Sampling Date		2019/10/15 09:30			2019/10/15 09:30			2019/10/15 11:30		
COC Number		741644-01-01			741644-01-01			741644-01-01		
	UNITS	MW-5-1	RDL	QC Batch	MW-5-1 Lab-Dup	RDL	QC Batch	MW-6-1	RDL	QC Batch
<b>Inorganics</b>										
Moisture	%	17	1.0	6391015	17	1.0	6391015	17	1.0	6391015
<b>Calculated Parameters</b>										
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	0.050	6386451				<0.050	0.050	6386451
<b>Volatile Organics</b>										
Acetone (2-Propanone)	ug/g	<0.50	0.50	6389310				<0.50	0.50	6389310
Benzene	ug/g	<0.020	0.020	6389310				<0.020	0.020	6389310
Bromodichloromethane	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Bromoform	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Bromomethane	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Carbon Tetrachloride	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Chlorobenzene	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Chloroform	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Dibromochloromethane	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
1,2-Dichlorobenzene	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
1,3-Dichlorobenzene	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
1,4-Dichlorobenzene	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
1,1-Dichloroethane	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
1,2-Dichloroethane	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
1,1-Dichloroethylene	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
cis-1,2-Dichloroethylene	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
trans-1,2-Dichloroethylene	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
1,2-Dichloropropane	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
cis-1,3-Dichloropropene	ug/g	<0.030	0.030	6389310				<0.030	0.030	6389310
trans-1,3-Dichloropropene	ug/g	<0.040	0.040	6389310				<0.040	0.040	6389310
Ethylbenzene	ug/g	<0.020	0.020	6389310				<0.020	0.020	6389310
Ethylene Dibromide	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Hexane	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Methylene Chloride(Dichloromethane)	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	0.50	6389310				<0.50	0.50	6389310
Methyl Isobutyl Ketone	ug/g	<0.50	0.50	6389310				<0.50	0.50	6389310
Methyl t-butyl ether (MTBE)	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Styrene	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
1,1,1,2-Tetrachloroethane	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										



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VERITAS

BV Labs Job #: B9S8563  
Report Date: 2019/10/22

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### O.REG 153 VOCS BY HS & F1-F4 (SOIL)

BV Labs ID		LAQ284			LAQ284			LAQ285		
Sampling Date		2019/10/15 09:30			2019/10/15 09:30			2019/10/15 11:30		
COC Number		741644-01-01			741644-01-01			741644-01-01		
	UNITS	MW-5-1	RDL	QC Batch	MW-5-1 Lab-Dup	RDL	QC Batch	MW-6-1	RDL	QC Batch
1,1,2,2-Tetrachloroethane	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Tetrachloroethylene	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Toluene	ug/g	<0.020	0.020	6389310				<0.020	0.020	6389310
1,1,1-Trichloroethane	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
1,1,2-Trichloroethane	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Trichloroethylene	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	0.050	6389310				<0.050	0.050	6389310
Vinyl Chloride	ug/g	<0.020	0.020	6389310				<0.020	0.020	6389310
p+m-Xylene	ug/g	<0.020	0.020	6389310				<0.020	0.020	6389310
o-Xylene	ug/g	<0.020	0.020	6389310				<0.020	0.020	6389310
Total Xylenes	ug/g	<0.020	0.020	6389310				<0.020	0.020	6389310
F1 (C6-C10)	ug/g	<10	10	6389310				<10	10	6389310
F1 (C6-C10) - BTEX	ug/g	<10	10	6389310				<10	10	6389310
<b>F2-F4 Hydrocarbons</b>										
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	6395799				<10	10	6395799
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	6395799				<50	50	6395799
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	6395799				<50	50	6395799
Reached Baseline at C50	ug/g	Yes		6395799				Yes		6395799
<b>Surrogate Recovery (%)</b>										
o-Terphenyl	%	89		6395799				89		6395799
4-Bromofluorobenzene	%	97		6389310				97		6389310
D10-o-Xylene	%	104		6389310				99		6389310
D4-1,2-Dichloroethane	%	94		6389310				94		6389310
D8-Toluene	%	99		6389310				99		6389310
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										



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VERITAS

BV Labs Job #: B9S8563  
Report Date: 2019/10/22

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### TEST SUMMARY

**BV Labs ID:** LAQ284  
**Sample ID:** MW-5-1  
**Matrix:** Soil

**Collected:** 2019/10/15  
**Shipped:**  
**Received:** 2019/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6388655	N/A	2019/10/22	Automated Statchk
1,3-Dichloropropene Sum	CALC	6386451	N/A	2019/10/21	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6395799	2019/10/19	2019/10/20	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6393427	2019/10/18	2019/10/21	Daniel Teclu
Moisture	BAL	6391015	N/A	2019/10/17	Gurpreet Kaur
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6395798	2019/10/19	2019/10/19	Bibin Alias Paul
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6389310	N/A	2019/10/18	Xueming Jiang

**BV Labs ID:** LAQ284 Dup  
**Sample ID:** MW-5-1  
**Matrix:** Soil

**Collected:** 2019/10/15  
**Shipped:**  
**Received:** 2019/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	6391015	N/A	2019/10/17	Gurpreet Kaur

**BV Labs ID:** LAQ285  
**Sample ID:** MW-6-1  
**Matrix:** Soil

**Collected:** 2019/10/15  
**Shipped:**  
**Received:** 2019/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6388655	N/A	2019/10/22	Automated Statchk
1,3-Dichloropropene Sum	CALC	6386451	N/A	2019/10/21	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6395799	2019/10/19	2019/10/20	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6393427	2019/10/18	2019/10/21	Daniel Teclu
Moisture	BAL	6391015	N/A	2019/10/17	Gurpreet Kaur
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6395798	2019/10/19	2019/10/19	Bibin Alias Paul
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6389310	N/A	2019/10/18	Xueming Jiang



BUREAU  
VERITAS

BV Labs Job #: B9S8563  
Report Date: 2019/10/22

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	13.3°C
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**Results relate only to the items tested.**



BUREAU  
VERITAS

BV Labs Job #: B9S8563  
Report Date: 2019/10/22

### QUALITY ASSURANCE REPORT

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6389310	4-Bromofluorobenzene	2019/10/18	105	60 - 140	103	60 - 140	98	%		
6389310	D10-o-Xylene	2019/10/18	104	60 - 130	102	60 - 130	95	%		
6389310	D4-1,2-Dichloroethane	2019/10/18	94	60 - 140	96	60 - 140	92	%		
6389310	D8-Toluene	2019/10/18	101	60 - 140	101	60 - 140	99	%		
6395798	D10-Anthracene	2019/10/19	96	50 - 130	103	50 - 130	99	%		
6395798	D14-Terphenyl (FS)	2019/10/19	88	50 - 130	98	50 - 130	94	%		
6395798	D8-Acenaphthylene	2019/10/19	88	50 - 130	97	50 - 130	92	%		
6395799	o-Terphenyl	2019/10/19	84	60 - 130	84	60 - 130	86	%		
6389310	1,1,1,2-Tetrachloroethane	2019/10/18	95	60 - 140	101	60 - 130	<0.050	ug/g	NC	50
6389310	1,1,1-Trichloroethane	2019/10/18	98	60 - 140	100	60 - 130	<0.050	ug/g	NC	50
6389310	1,1,2,2-Tetrachloroethane	2019/10/18	95	60 - 140	103	60 - 130	<0.050	ug/g	NC	50
6389310	1,1,2-Trichloroethane	2019/10/18	90	60 - 140	97	60 - 130	<0.050	ug/g	NC	50
6389310	1,1-Dichloroethane	2019/10/18	99	60 - 140	102	60 - 130	<0.050	ug/g	NC	50
6389310	1,1-Dichloroethylene	2019/10/18	99	60 - 140	101	60 - 130	<0.050	ug/g	NC	50
6389310	1,2-Dichlorobenzene	2019/10/18	94	60 - 140	102	60 - 130	<0.050	ug/g	NC	50
6389310	1,2-Dichloroethane	2019/10/18	93	60 - 140	98	60 - 130	<0.050	ug/g	NC	50
6389310	1,2-Dichloropropane	2019/10/18	100	60 - 140	104	60 - 130	<0.050	ug/g	NC	50
6389310	1,3-Dichlorobenzene	2019/10/18	98	60 - 140	105	60 - 130	<0.050	ug/g	NC	50
6389310	1,4-Dichlorobenzene	2019/10/18	100	60 - 140	110	60 - 130	<0.050	ug/g	NC	50
6389310	Acetone (2-Propanone)	2019/10/18	96	60 - 140	102	60 - 140	<0.50	ug/g	NC	50
6389310	Benzene	2019/10/18	98	60 - 140	101	60 - 130	<0.020	ug/g	NC	50
6389310	Bromodichloromethane	2019/10/18	96	60 - 140	101	60 - 130	<0.050	ug/g	NC	50
6389310	Bromoform	2019/10/18	94	60 - 140	101	60 - 130	<0.050	ug/g	NC	50
6389310	Bromomethane	2019/10/18	99	60 - 140	102	60 - 140	<0.050	ug/g	NC	50
6389310	Carbon Tetrachloride	2019/10/18	97	60 - 140	99	60 - 130	<0.050	ug/g	NC	50
6389310	Chlorobenzene	2019/10/18	92	60 - 140	97	60 - 130	<0.050	ug/g	NC	50
6389310	Chloroform	2019/10/18	95	60 - 140	97	60 - 130	<0.050	ug/g	NC	50
6389310	cis-1,2-Dichloroethylene	2019/10/18	99	60 - 140	103	60 - 130	<0.050	ug/g	NC	50
6389310	cis-1,3-Dichloropropene	2019/10/18	95	60 - 140	101	60 - 130	<0.030	ug/g	NC	50
6389310	Dibromochloromethane	2019/10/18	93	60 - 140	100	60 - 130	<0.050	ug/g	NC	50
6389310	Dichlorodifluoromethane (FREON 12)	2019/10/18	105	60 - 140	105	60 - 140	<0.050	ug/g	NC	50
6389310	Ethylbenzene	2019/10/18	96	60 - 140	102	60 - 130	<0.020	ug/g	NC	50



BUREAU  
VERITAS

BV Labs Job #: B9S8563  
Report Date: 2019/10/22

### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6389310	Ethylene Dibromide	2019/10/18	92	60 - 140	101	60 - 130	<0.050	ug/g	NC	50
6389310	F1 (C6-C10) - BTEX	2019/10/18					<10	ug/g	NC	30
6389310	F1 (C6-C10)	2019/10/18	100	60 - 140	88	80 - 120	<10	ug/g	NC	30
6389310	Hexane	2019/10/18	103	60 - 140	104	60 - 130	<0.050	ug/g	NC	50
6389310	Methyl Ethyl Ketone (2-Butanone)	2019/10/18	102	60 - 140	109	60 - 140	<0.50	ug/g	NC	50
6389310	Methyl Isobutyl Ketone	2019/10/18	99	60 - 140	105	60 - 130	<0.50	ug/g	NC	50
6389310	Methyl t-butyl ether (MTBE)	2019/10/18	97	60 - 140	100	60 - 130	<0.050	ug/g	NC	50
6389310	Methylene Chloride(Dichloromethane)	2019/10/18	96	60 - 140	100	60 - 130	<0.050	ug/g	NC	50
6389310	o-Xylene	2019/10/18	96	60 - 140	101	60 - 130	<0.020	ug/g	NC	50
6389310	p+m-Xylene	2019/10/18	98	60 - 140	103	60 - 130	<0.020	ug/g	NC	50
6389310	Styrene	2019/10/18	101	60 - 140	107	60 - 130	<0.050	ug/g	NC	50
6389310	Tetrachloroethylene	2019/10/18	96	60 - 140	101	60 - 130	<0.050	ug/g	NC	50
6389310	Toluene	2019/10/18	94	60 - 140	99	60 - 130	<0.020	ug/g	NC	50
6389310	Total Xylenes	2019/10/18					<0.020	ug/g	NC	50
6389310	trans-1,2-Dichloroethylene	2019/10/18	100	60 - 140	103	60 - 130	<0.050	ug/g	NC	50
6389310	trans-1,3-Dichloropropene	2019/10/18	92	60 - 140	100	60 - 130	<0.040	ug/g	NC	50
6389310	Trichloroethylene	2019/10/18	99	60 - 140	101	60 - 130	<0.050	ug/g	NC	50
6389310	Trichlorofluoromethane (FREON 11)	2019/10/18	108	60 - 140	109	60 - 130	<0.050	ug/g	NC	50
6389310	Vinyl Chloride	2019/10/18	107	60 - 140	107	60 - 130	<0.020	ug/g	NC	50
6391015	Moisture	2019/10/17							3.0	20
6393427	Acid Extractable Antimony (Sb)	2019/10/21	101	75 - 125	105	80 - 120	<0.20	ug/g	NC	30
6393427	Acid Extractable Arsenic (As)	2019/10/21	104	75 - 125	102	80 - 120	<1.0	ug/g	13	30
6393427	Acid Extractable Barium (Ba)	2019/10/21	99	75 - 125	105	80 - 120	<0.50	ug/g	2.8	30
6393427	Acid Extractable Beryllium (Be)	2019/10/21	96	75 - 125	97	80 - 120	<0.20	ug/g	NC	30
6393427	Acid Extractable Boron (B)	2019/10/21	94	75 - 125	97	80 - 120	<5.0	ug/g	NC	30
6393427	Acid Extractable Cadmium (Cd)	2019/10/21	100	75 - 125	101	80 - 120	<0.10	ug/g	NC	30
6393427	Acid Extractable Chromium (Cr)	2019/10/21	NC	75 - 125	103	80 - 120	<1.0	ug/g	5.1	30
6393427	Acid Extractable Cobalt (Co)	2019/10/21	100	75 - 125	101	80 - 120	<0.10	ug/g	5.6	30
6393427	Acid Extractable Copper (Cu)	2019/10/21	NC	75 - 125	102	80 - 120	<0.50	ug/g	5.7	30
6393427	Acid Extractable Lead (Pb)	2019/10/21	101	75 - 125	103	80 - 120	<1.0	ug/g	3.9	30
6393427	Acid Extractable Mercury (Hg)	2019/10/21	90	75 - 125	91	80 - 120	<0.050	ug/g	NC	30
6393427	Acid Extractable Molybdenum (Mo)	2019/10/21	101	75 - 125	102	80 - 120	<0.50	ug/g	NC	30





BUREAU  
VERITAS

BV Labs Job #: B9S8563  
Report Date: 2019/10/22

### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6393427	Acid Extractable Nickel (Ni)	2019/10/21	95	75 - 125	97	80 - 120	<0.50	ug/g	7.2	30
6393427	Acid Extractable Selenium (Se)	2019/10/21	103	75 - 125	106	80 - 120	<0.50	ug/g	NC	30
6393427	Acid Extractable Silver (Ag)	2019/10/21	99	75 - 125	102	80 - 120	<0.20	ug/g	NC	30
6393427	Acid Extractable Thallium (Tl)	2019/10/21	99	75 - 125	102	80 - 120	<0.050	ug/g	13	30
6393427	Acid Extractable Uranium (U)	2019/10/21	95	75 - 125	97	80 - 120	<0.050	ug/g	18	30
6393427	Acid Extractable Vanadium (V)	2019/10/21	NC	75 - 125	102	80 - 120	<5.0	ug/g	0.025	30
6393427	Acid Extractable Zinc (Zn)	2019/10/21	NC	75 - 125	100	80 - 120	<5.0	ug/g	4.0	30
6395798	1-Methylnaphthalene	2019/10/19	105	50 - 130	110	50 - 130	<0.0050	ug/g	NC	40
6395798	2-Methylnaphthalene	2019/10/19	98	50 - 130	103	50 - 130	<0.0050	ug/g	NC	40
6395798	Acenaphthene	2019/10/19	95	50 - 130	100	50 - 130	<0.0050	ug/g	NC	40
6395798	Acenaphthylene	2019/10/19	95	50 - 130	100	50 - 130	<0.0050	ug/g	NC	40
6395798	Anthracene	2019/10/19	94	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40
6395798	Benzo(a)anthracene	2019/10/19	100	50 - 130	106	50 - 130	<0.0050	ug/g	NC	40
6395798	Benzo(a)pyrene	2019/10/19	96	50 - 130	101	50 - 130	<0.0050	ug/g	NC	40
6395798	Benzo(b/j)fluoranthene	2019/10/19	95	50 - 130	101	50 - 130	<0.0050	ug/g	NC	40
6395798	Benzo(g,h,i)perylene	2019/10/19	85	50 - 130	87	50 - 130	<0.0050	ug/g	NC	40
6395798	Benzo(k)fluoranthene	2019/10/19	96	50 - 130	105	50 - 130	<0.0050	ug/g	NC	40
6395798	Chrysene	2019/10/19	94	50 - 130	99	50 - 130	<0.0050	ug/g	NC	40
6395798	Dibenz(a,h)anthracene	2019/10/19	93	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40
6395798	Fluoranthene	2019/10/19	107	50 - 130	114	50 - 130	<0.0050	ug/g	11	40
6395798	Fluorene	2019/10/19	92	50 - 130	102	50 - 130	<0.0050	ug/g	NC	40
6395798	Indeno(1,2,3-cd)pyrene	2019/10/19	90	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40
6395798	Naphthalene	2019/10/19	91	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40
6395798	Phenanthrene	2019/10/19	93	50 - 130	99	50 - 130	<0.0050	ug/g	NC	40
6395798	Pyrene	2019/10/19	104	50 - 130	110	50 - 130	<0.0050	ug/g	4.3	40
6395799	F2 (C10-C16 Hydrocarbons)	2019/10/20	88	50 - 130	90	80 - 120	<10	ug/g	NC	30
6395799	F3 (C16-C34 Hydrocarbons)	2019/10/20	85	50 - 130	87	80 - 120	<50	ug/g	NC	30



BUREAU  
VERITAS

BV Labs Job #: B9S8563

Report Date: 2019/10/22

### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6395799	F4 (C34-C50 Hydrocarbons)	2019/10/20	86	50 - 130	88	80 - 120	<50	ug/g	NC	30

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).




BUREAU  
VERITAS

BV Labs Job #: B9S8563  
Report Date: 2019/10/22

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

*Eva Pranjić*  


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Ewa Pranjić, M.Sc., C.Chem, Scientific Specialist

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Bureau Veritas Laboratories  
6740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

<b>INVOICE TO:</b>		<b>REPORT TO:</b>		<b>PROJECT INFORMATION:</b>		<b>Laboratory Use Only:</b>	
Company Name: #10988 ARCADIS Canada Inc	Company Name: Stephanie Joyce	Quotation #: B94764	Company Name: Stephanie Joyce	P.O. #: 30029878	Project: 30029878	Project Name: <i>Remise de Gros</i>	Site #: <i>Remise de Gros</i>
Attention: Accounts Payable Canada	Attention: Stephanie Joyce	Project: 30029878	Address: 1050 Morrison Drive Unit 201	Project Name: <i>Remise de Gros</i>	Site #: <i>Remise de Gros</i>	Sampled By: <i>Remise de Gros</i>	Sampled By: <i>Remise de Gros</i>
Address: Ottawa ON K2H 8K7	Address: Stephanie.Joyce@arcadis.com	Project: 30029878	Tel: (613) 721-0555	Project Name: <i>Remise de Gros</i>	Site #: <i>Remise de Gros</i>	Sampled By: <i>Remise de Gros</i>	Sampled By: <i>Remise de Gros</i>
Tel: (613) 721-0555	Tel: Stephanie.Joyce@arcadis.com	Project: 30029878	Fax: (613) 721-0029	Project Name: <i>Remise de Gros</i>	Site #: <i>Remise de Gros</i>	Sampled By: <i>Remise de Gros</i>	Sampled By: <i>Remise de Gros</i>
Email: AccountsPayable.Canada@arcadis.com	Email: Stephanie.Joyce@arcadis.com	Project: 30029878	Fax: (613) 721-0029	Project Name: <i>Remise de Gros</i>	Site #: <i>Remise de Gros</i>	Sampled By: <i>Remise de Gros</i>	Sampled By: <i>Remise de Gros</i>

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required:						
Regulation 153 (2011)			Other Regulations			Special Instructions	Field Filtered (please circle):	Metals / Hg / Cr-VI	O Reg 153 VOCs by HS & F1-F4 (Soil)	O Reg 153 ICPMS Metals (Soil)	O Reg 153 VOCs by HS & F1-F4	Total Metals Analysis by ICPMS										
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Medium/Fine	<input type="checkbox"/> CCME	<input type="checkbox"/> Sanitary Sewer Bylaw																		
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> Reg 558	<input type="checkbox"/> Storm Sewer Bylaw																		
<input type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other	<input type="checkbox"/> For RSC	<input type="checkbox"/> MISA	Municipality _____																		
<input type="checkbox"/> Table _____			<input type="checkbox"/> PWQO																			
<input type="checkbox"/> Other _____			<input type="checkbox"/> Other _____																			
Include Criteria on Certificate of Analysis (Y/N)?																						
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix																		
1	MW-5-1	15-10-19	9:30	soil			X	X													4	
2	MW-6-1	"	11:30	soil			X	X													4	
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

15-Oct-19 12:10  
Alisha Williamson  
B9S8563  
KJY OTT-001

*on ice*  
RECEIVED IN OTTAWA

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only				
<i>Remise de Gros</i>	19-10-15		<i>Stephanie Joyce</i>	19/10/15	12:10		Time Sensitive	Temperature (°C) on Recept	Custody Seal Present	Yes	No
								14, 10, 16	Intact	X	

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

\*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

White: BV Labs Yellow: Client



Bureau Veritas Laboratories  
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

CHAIN OF CUSTODY RECORD

<b>INVOICE TO:</b> Company Name: #10988 ARCADIS Canada Inc Attention: Accounts Payable Canada Address: 1050 Morrison Drive Unit 201 Ottawa ON K2H 8K7 Tel: (613) 721-0555 Fax: (613) 721-0029 Email: AccountsPayable.Canada@arcadis.com		<b>REPORT TO:</b> Company Name: Attention: Stephanie Joyce Address: Tel: Fax: Email: Stephanie.Joyce@arcadis.com		<b>PROJECT INFORMATION:</b> Quotation #: B94764 P.O. #: Project: 30029878 Project Name: Site #: Sampled By: <i>Terence de Goois</i>		<b>Laboratory Use Only:</b> BV Labs Job #: Bottle Order #: 741644 COC #: Project Manager: Alisha Williamson CH741644-01-01	
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MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY					ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects							
Regulation 153 (2011)			Other Regulations		Special Instructions	Field Filtered (please circle): Metals / Hg / Cr VI	O Reg 153 VOCs by HS & F1-F4 (Soil)	O Reg 153 ICPMS Metals (Soil)	O Reg 153 VOCs by HS & F1-F4	Total Metals Analysis by ICPMS											Regular (Standard) TAT: <small>(will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are &gt; 5 days - contact your Project Manager for details.</small>	<input checked="" type="checkbox"/>
Include Criteria on Certificate of Analysis (Y/N)?																						
Table 1	Res/Park	Medium/Fine	CCME	Sanitary Sewer Bylaw																		
Table 2	Ind/Comm	Coarse	Reg 558	Storm Sewer Bylaw																		
Table 3	Agri/Other	For RSC	MISA	Municipality																		
Table			PWQO																			
Table			Other																			
1																						4
2																						4
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

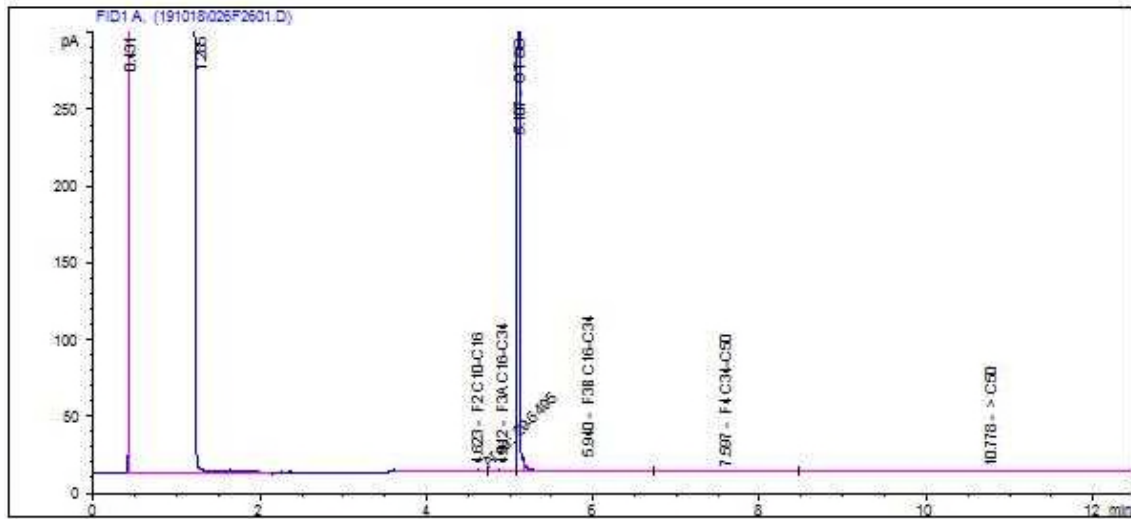
15-Oct-19 12:10  
Alisha Williamson  
B9S8563  
KJY OTT-001

*on ice*

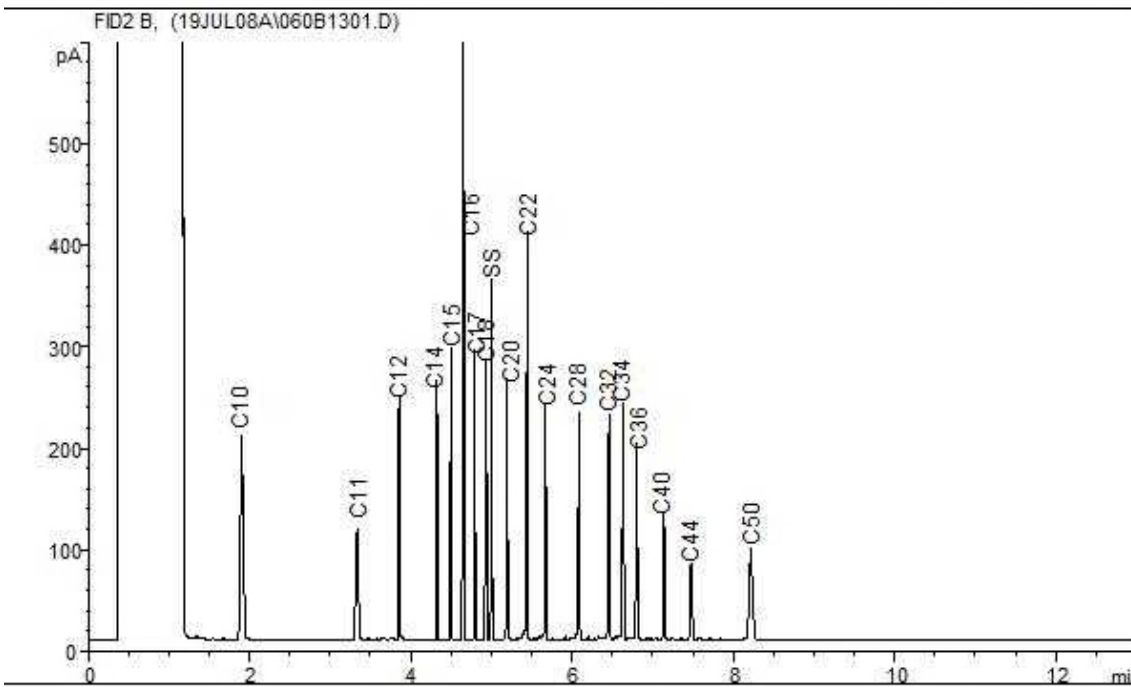
* RELINQUISHED BY: (Signature/Print) <i>Terence de Goois</i>		Date: (YY/MM/DD) 19-10-15	Time	RECEIVED BY: (Signature/Print) <i>Stephane Leger</i>	Date: (YY/MM/DD) 19/10/15	Time 12:10	# Jars used and not submitted	Laboratory Use Only		Custody Seal	
								Time Sensitive	Temperature (°C) on Recv: 14.10.16	Present	Yes
										Intact	No

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.  
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 \*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.  
 SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS  
 White: BV Labs Yellow: Client

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

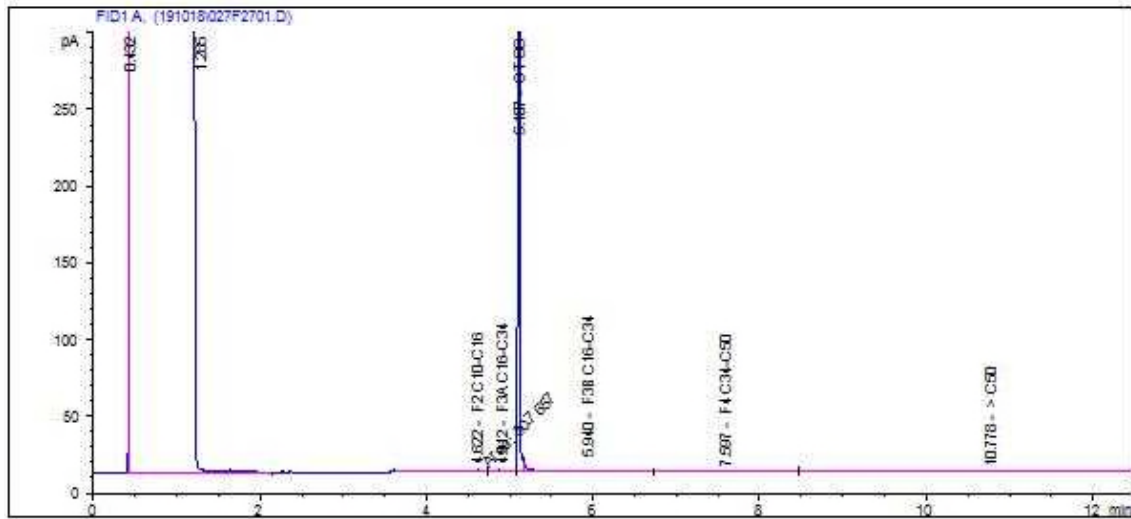
Gasoline: C6 - C12  
 Varsol: C8 - C12  
 Kerosene: C8 - C16

Diesel: C10 - C24  
 Fuel Oils: C6 - C32  
 Motor Oils: C16 - C50

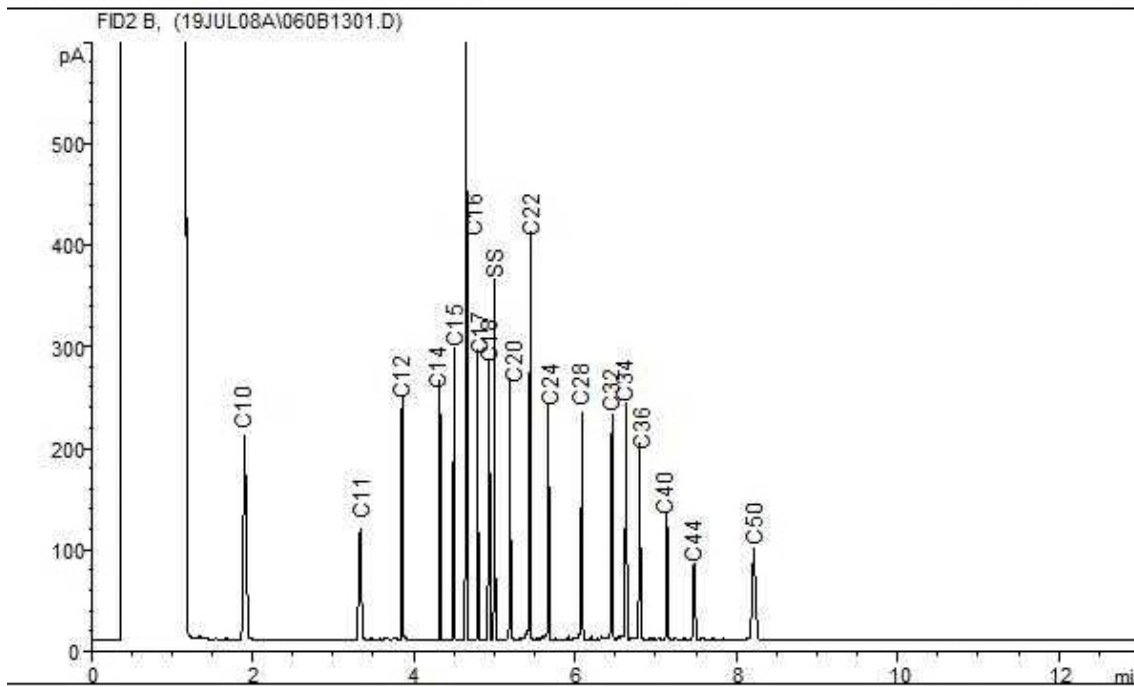
Jet Fuels: C6 - C16  
 Creosote: C10 - C26  
 Asphalt: C18 - C50+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C6 - C12  
 Varsol: C8 - C12  
 Kerosene: C8 - C16

Diesel: C10 - C24  
 Fuel Oils: C6 - C32  
 Motor Oils: C16 - C50

Jet Fuels: C6 - C16  
 Creosote: C10 - C26  
 Asphalt: C18 - C50+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.



Your Project #: 30029878  
 Site Location: 1881/1883 MERIVALE  
 Your C.O.C. #: 137919

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
 1050 Morrison Drive  
 Unit 201  
 Ottawa, ON  
 CANADA K2H 8K7

**Report Date: 2019/10/24**  
 Report #: R5935189  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9T2908**  
**Received: 2019/10/17, 15:07**

Sample Matrix: Water  
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
1,3-Dichloropropene Sum (1)	1	N/A	2019/10/24		EPA 8260C m
Petroleum Hydrocarbons F2-F4 in Water (1, 2)	1	2019/10/22	2019/10/23	CAM SOP-00316	CCME PHC-CWS m
Volatile Organic Compounds and F1 PHCs (1)	1	N/A	2019/10/23	CAM SOP-00230	EPA 8260C m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Laboratories Mississauga

(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.





Your Project #: 30029878  
Site Location: 1881/1883 MERIVALE  
Your C.O.C. #: 137919

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
1050 Morrison Drive  
Unit 201  
Ottawa, ON  
CANADA K2H 8K7

**Report Date: 2019/10/24**  
Report #: R5935189  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9T2908**  
**Received: 2019/10/17, 15:07**

Encryption Key

Alisha Williamson  
Project Manager  
24 Oct 2019 18:50:54

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Alisha Williamson, Project Manager  
Email: Alisha.Williamson@bvlab.com  
Phone# (613)274-0573

=====

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BUREAU  
VERITAS

BV Labs Job #: B9T2908  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Site Location: 1881/1883 MERIVALE  
Sampler Initials: EH

**O.REG 153 VOCs BY HS & F1-F4 (WATER)**

BV Labs ID		LBN755			LBN755		
Sampling Date		2019/10/17 14:00			2019/10/17 14:00		
COC Number		137919			137919		
	<b>UNITS</b>	<b>MW-5</b>	<b>RDL</b>	<b>QC Batch</b>	<b>MW-5 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>							
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	0.50	6398936			
<b>Volatile Organics</b>							
Acetone (2-Propanone)	ug/L	<10	10	6398809	<10	10	6398809
Benzene	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
Bromodichloromethane	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
Bromoform	ug/L	<1.0	1.0	6398809	<1.0	1.0	6398809
Bromomethane	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
Carbon Tetrachloride	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
Chlorobenzene	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
Chloroform	ug/L	2.4	0.20	6398809	2.5	0.20	6398809
Dibromochloromethane	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
1,2-Dichlorobenzene	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
1,3-Dichlorobenzene	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
1,4-Dichlorobenzene	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	1.0	6398809	<1.0	1.0	6398809
1,1-Dichloroethane	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
1,2-Dichloroethane	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
1,1-Dichloroethylene	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
1,2-Dichloropropane	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	6398809	<0.30	0.30	6398809
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	6398809	<0.40	0.40	6398809
Ethylbenzene	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
Ethylene Dibromide	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
Hexane	ug/L	<1.0	1.0	6398809	<1.0	1.0	6398809
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	6398809	<2.0	2.0	6398809
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	10	6398809	<10	10	6398809
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	6398809	<5.0	5.0	6398809
Methyl t-butyl ether (MTBE)	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
Styrene	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							



BUREAU  
VERITAS

BV Labs Job #: B9T2908  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Site Location: 1881/1883 MERIVALE  
Sampler Initials: EH

### O.REG 153 VOCs BY HS & F1-F4 (WATER)

BV Labs ID		LBN755			LBN755		
Sampling Date		2019/10/17 14:00			2019/10/17 14:00		
COC Number		137919			137919		
	<b>UNITS</b>	<b>MW-5</b>	<b>RDL</b>	<b>QC Batch</b>	<b>MW-5 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>
Tetrachloroethylene	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
Toluene	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
1,1,1-Trichloroethane	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
1,1,2-Trichloroethane	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
Trichloroethylene	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	6398809	<0.50	0.50	6398809
Vinyl Chloride	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
p+m-Xylene	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
o-Xylene	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
Total Xylenes	ug/L	<0.20	0.20	6398809	<0.20	0.20	6398809
F1 (C6-C10)	ug/L	<25	25	6398809	<25	25	6398809
F1 (C6-C10) - BTEX	ug/L	<25	25	6398809	<25	25	6398809
<b>F2-F4 Hydrocarbons</b>							
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	6399765			
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	6399765			
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	6399765			
Reached Baseline at C50	ug/L	Yes		6399765			
<b>Surrogate Recovery (%)</b>							
o-Terphenyl	%	96		6399765			
4-Bromofluorobenzene	%	87		6398809	87		6398809
D4-1,2-Dichloroethane	%	109		6398809	109		6398809
D8-Toluene	%	95		6398809	95		6398809
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							



BUREAU  
VERITAS

BV Labs Job #: B9T2908  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Site Location: 1881/1883 MERIVALE  
Sampler Initials: EH

### TEST SUMMARY

**BV Labs ID:** LBN755  
**Sample ID:** MW-5  
**Matrix:** Water

**Collected:** 2019/10/17  
**Shipped:**  
**Received:** 2019/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6398936	N/A	2019/10/24	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6399765	2019/10/22	2019/10/23	Prabhjot Gulati
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6398809	N/A	2019/10/23	Yang (Philip) Yu

**BV Labs ID:** LBN755 Dup  
**Sample ID:** MW-5  
**Matrix:** Water

**Collected:** 2019/10/17  
**Shipped:**  
**Received:** 2019/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6398809	N/A	2019/10/23	Yang (Philip) Yu



BUREAU  
VERITAS

BV Labs Job #: B9T2908  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Site Location: 1881/1883 MERIVALE  
Sampler Initials: EH

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.0°C
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**Results relate only to the items tested.**



BUREAU  
VERITAS

BV Labs Job #: B9T2908  
Report Date: 2019/10/24

### QUALITY ASSURANCE REPORT

ARCADIS Canada Inc  
Client Project #: 30029878  
Site Location: 1881/1883 MERIVALE  
Sampler Initials: EH

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6398809	4-Bromofluorobenzene	2019/10/23	97	70 - 130	97	70 - 130	90	%		
6398809	D4-1,2-Dichloroethane	2019/10/23	104	70 - 130	105	70 - 130	107	%		
6398809	D8-Toluene	2019/10/23	108	70 - 130	110	70 - 130	94	%		
6399765	o-Terphenyl	2019/10/23	100	60 - 130	97	60 - 130	107	%		
6398809	1,1,1,2-Tetrachloroethane	2019/10/23	96	70 - 130	107	70 - 130	<0.50	ug/L	NC	30
6398809	1,1,1-Trichloroethane	2019/10/23	94	70 - 130	104	70 - 130	<0.20	ug/L	NC	30
6398809	1,1,2,2-Tetrachloroethane	2019/10/23	95	70 - 130	106	70 - 130	<0.50	ug/L	NC	30
6398809	1,1,2-Trichloroethane	2019/10/23	104	70 - 130	113	70 - 130	<0.50	ug/L	NC	30
6398809	1,1-Dichloroethane	2019/10/23	97	70 - 130	107	70 - 130	<0.20	ug/L	NC	30
6398809	1,1-Dichloroethylene	2019/10/23	94	70 - 130	102	70 - 130	<0.20	ug/L	NC	30
6398809	1,2-Dichlorobenzene	2019/10/23	90	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
6398809	1,2-Dichloroethane	2019/10/23	95	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
6398809	1,2-Dichloropropane	2019/10/23	95	70 - 130	103	70 - 130	<0.20	ug/L	NC	30
6398809	1,3-Dichlorobenzene	2019/10/23	90	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
6398809	1,4-Dichlorobenzene	2019/10/23	89	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
6398809	Acetone (2-Propanone)	2019/10/23	98	60 - 140	100	60 - 140	<10	ug/L	NC	30
6398809	Benzene	2019/10/23	91	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
6398809	Bromodichloromethane	2019/10/23	93	70 - 130	102	70 - 130	<0.50	ug/L	NC	30
6398809	Bromoform	2019/10/23	92	70 - 130	102	70 - 130	<1.0	ug/L	NC	30
6398809	Bromomethane	2019/10/23	96	60 - 140	99	60 - 140	<0.50	ug/L	NC	30
6398809	Carbon Tetrachloride	2019/10/23	94	70 - 130	105	70 - 130	<0.20	ug/L	NC	30
6398809	Chlorobenzene	2019/10/23	89	70 - 130	99	70 - 130	<0.20	ug/L	NC	30
6398809	Chloroform	2019/10/23	95	70 - 130	104	70 - 130	<0.20	ug/L	0.98	30
6398809	cis-1,2-Dichloroethylene	2019/10/23	93	70 - 130	102	70 - 130	<0.50	ug/L	NC	30
6398809	cis-1,3-Dichloropropene	2019/10/23	92	70 - 130	93	70 - 130	<0.30	ug/L	NC	30
6398809	Dibromochloromethane	2019/10/23	95	70 - 130	105	70 - 130	<0.50	ug/L	NC	30
6398809	Dichlorodifluoromethane (FREON 12)	2019/10/23	91	60 - 140	102	60 - 140	<1.0	ug/L	NC	30
6398809	Ethylbenzene	2019/10/23	84	70 - 130	93	70 - 130	<0.20	ug/L	NC	30
6398809	Ethylene Dibromide	2019/10/23	97	70 - 130	105	70 - 130	<0.20	ug/L	NC	30
6398809	F1 (C6-C10) - BTEX	2019/10/23					<25	ug/L	NC	30
6398809	F1 (C6-C10)	2019/10/23	93	60 - 140	95	60 - 140	<25	ug/L	NC	30
6398809	Hexane	2019/10/23	98	70 - 130	105	70 - 130	<1.0	ug/L	NC	30



BUREAU  
VERITAS

BV Labs Job #: B9T2908  
Report Date: 2019/10/24

### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Site Location: 1881/1883 MERIVALE  
Sampler Initials: EH

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6398809	Methyl Ethyl Ketone (2-Butanone)	2019/10/23	99	60 - 140	105	60 - 140	<10	ug/L	NC	30
6398809	Methyl Isobutyl Ketone	2019/10/23	88	70 - 130	96	70 - 130	<5.0	ug/L	NC	30
6398809	Methyl t-butyl ether (MTBE)	2019/10/23	89	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
6398809	Methylene Chloride(Dichloromethane)	2019/10/23	107	70 - 130	114	70 - 130	<2.0	ug/L	NC	30
6398809	o-Xylene	2019/10/23	84	70 - 130	93	70 - 130	<0.20	ug/L	NC	30
6398809	p+m-Xylene	2019/10/23	81	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
6398809	Styrene	2019/10/23	67 (1)	70 - 130	76	70 - 130	<0.50	ug/L	NC	30
6398809	Tetrachloroethylene	2019/10/23	95	70 - 130	106	70 - 130	<0.20	ug/L	NC	30
6398809	Toluene	2019/10/23	89	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
6398809	Total Xylenes	2019/10/23					<0.20	ug/L	NC	30
6398809	trans-1,2-Dichloroethylene	2019/10/23	92	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
6398809	trans-1,3-Dichloropropene	2019/10/23	101	70 - 130	100	70 - 130	<0.40	ug/L	NC	30
6398809	Trichloroethylene	2019/10/23	91	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
6398809	Trichlorofluoromethane (FREON 11)	2019/10/23	100	70 - 130	110	70 - 130	<0.50	ug/L	NC	30
6398809	Vinyl Chloride	2019/10/23	96	70 - 130	110	70 - 130	<0.20	ug/L	NC	30
6399765	F2 (C10-C16 Hydrocarbons)	2019/10/23	82	50 - 130	100	60 - 130	<100	ug/L	NC	30
6399765	F3 (C16-C34 Hydrocarbons)	2019/10/23	70	50 - 130	93	60 - 130	<200	ug/L	NC	30
6399765	F4 (C34-C50 Hydrocarbons)	2019/10/23	77	50 - 130	97	60 - 130	<200	ug/L	NC	30

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) The recovery was below the lower control limit. This may represent a low bias in some results for this specific analyte.



BUREAU  
VERITAS

BV Labs Job #: B9T2908  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Site Location: 1881/1883 MERIVALE  
Sampler Initials: EH

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

A handwritten signature in black ink, appearing to read "Anastassia Hamanov", written over a horizontal line.

Anastassia Hamanov, Scientific Specialist

---

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



17-Oct-19 15:07

Alisha Williamson



B9T2908

**Presence of Visible Particulate/Sediment**

Maxxam Analytics

CAM FCD-01013/5

Page 1 of 1

When there is >1cm of visible particulate/sediment, the amount will be recorded in the field below

JCC ENV-1221

**Bottle Types**

Sample ID	All	Inorganics					Organics										Hydrocarbons						Volatiles				Other											
		CrVI	CN	General	Hg	Metals (Diss.)	Organic 1 of 2	Organic 2 of 2	PCB 1 of 2	PCB 2 of 2	Pest/Herb 1 of 2	Pest/Herb 2 of 2	SVOC/ABN 1 of 2	SVOC/ABN 2 of 2	PAH 1 of 2	PAH 2 of 2	Dioxin/Furan	F1 Vial 1	F1 Vial 2	F1 Vial 3	F1 Vial 4	F2-F4 1 of 2	F2-F4 2 of 2	F4G	VOC Vial 1	VOC Vial 2		VOC Vial 3	VOC Vial 4									
1	TS																																					
2																																						
3																																						
4																																						
5																																						
6																																						
7																																						
8																																						
9																																						
10																																						

Comments:

Legend:	
P	Suspended Particulate
TS	Trace Settled Sediment (just covers bottom of container or less)
S	Sediment greater than (>) Trace, but less than (<) 1 cm

Recorded By: (signature/print) *Juni - COLENE CURTADO*



6740 Campobello Road, Mississauga, Ontario L5N 2L8  
 Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266  
 CAM FCD-01191/5

CHAIN OF CUSTODY RECORD **137919** Page \_\_\_\_ of \_\_\_\_

Invoice Information		Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required				
Company Name: <u>ARCADIS CANADA</u>		Company Name: _____				Quotation #: _____				<input checked="" type="checkbox"/> Regular TAT (5-7 days) Most analyses				
Contact Name: <u>Stephanie Joyce</u>		Contact Name: _____				P.O. #/ AFE#: _____				PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS				
Address: <u>1050 Monivon Drive Ottawa, ON.</u>		Address: _____				Project #: <u>30029878</u>				Rush TAT (Surcharges will be applied)				
Phone: _____ Fax: _____		Phone: _____ Fax: _____				Site Location: <u>1881/1883 Merivale</u>				<input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Days <input type="checkbox"/> 3-4 Days				
Email: <u>Stephanie.Joyce@arcadis.com</u>		Email: _____				Site #: _____				Date Required: _____				
Site Location Province: _____		Site Location Province: _____				Site Location Province: _____				Rush Confirmation #: _____				
SAMPLED BY: _____		SAMPLED BY: _____				SAMPLED BY: _____				LABORATORY USE ONLY				
REGULATION 153		OTHER REGULATIONS				ANALYSIS REQUESTED				CUSTODY SEAL				
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/ Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/ Other <input type="checkbox"/> Table _____ FOR RSC (PLEASE CIRCLE) Y / N		<input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> MISA <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> PWQO Region _____ <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> REG 558 (MIN. 3 DAY TAT REQUIRED)				REG 153 METALS & INORGANICS REG 153 ICPMS METALS REG 153 METALS (Pb, Cr VI, ICPMS Metals, HNS - B)				<input checked="" type="checkbox"/> Y <input type="checkbox"/> N Present Intact COOLER TEMPERATURES <u>8.8, 8</u> <u>7.8, 8</u> COOLING MEDIA PRESENT: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N				
INCLUDE CRITERIA ON CERTIFICATE OF ANALYSIS: Y / N		SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS				HOLD - DO NOT ANALYZE				COMMENTS				
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CrVI	BTEX/ PHC F1	PHCS F2 - F4	VOCS	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Pb, Cr VI, ICPMS Metals, HNS - B)		
1 <u>MW-5</u>		<u>2019/10/17</u>	<u>2:00 AM</u>	<u>GW</u>		<input checked="" type="checkbox"/>								
2														
3														
4														
5														
6														
7														
8														
9														
10														
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)							
<u>Erin Thornton</u>		<u>2019/10/17</u>	<u>15:06</u>	<u>Erin Thornton</u>		<u>2019/10/17</u>	<u>15:07</u>							
				<u>Erin Thornton</u>		<u>2019/10/18</u>	<u>08:00</u>							

17-Oct-19 15:07  
 Alisha Williamson  
 B9T2908

JCC ENV-1221

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of conditions.



Your Project #: 30029878  
Your C.O.C. #: 743886-01-01

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
1050 Morrison Drive  
Unit 201  
Ottawa, ON  
CANADA K2H 8K7

**Report Date: 2019/10/24**  
Report #: R5934655  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9T7629**

**Received: 2019/10/23, 12:15**

Sample Matrix: Water  
# Samples Received: 2

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
1,3-Dichloropropene Sum (1)	2	N/A	2019/10/24		EPA 8260C m
Petroleum Hydrocarbons F2-F4 in Water (1, 2)	2	2019/10/24	2019/10/24	CAM SOP-00316	CCME PHC-CWS m
Total Metals Analysis by ICPMS (1)	2	N/A	2019/10/24	CAM SOP-00447	EPA 6020B m
Volatile Organic Compounds and F1 PHCs (1)	2	N/A	2019/10/24	CAM SOP-00230	EPA 8260C m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Laboratories Mississauga

(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.



Your Project #: 30029878  
Your C.O.C. #: 743886-01-01

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
1050 Morrison Drive  
Unit 201  
Ottawa, ON  
CANADA K2H 8K7

**Report Date: 2019/10/24**  
Report #: R5934655  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9T7629**  
**Received: 2019/10/23, 12:15**

Encryption Key

Alisha Williamson  
Project Manager  
24 Oct 2019 16:01:56

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Alisha Williamson, Project Manager  
Email: Alisha.Williamson@bvlab.com  
Phone# (613)274-0573

=====

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BUREAU  
VERITAS

BV Labs Job #: B9T7629  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		LCN441		LCN442		
Sampling Date		2019/10/23 10:00		2019/10/23 11:00		
COC Number		743886-01-01		743886-01-01		
	<b>UNITS</b>	<b>MW-5-1</b>	<b>RDL</b>	<b>MW-6-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Metals</b>						
Total Aluminum (Al)	ug/L	14000	5.0	2000	5.0	6403980
Total Antimony (Sb)	ug/L	<0.50	0.50	<0.50	0.50	6403980
Total Arsenic (As)	ug/L	3.2	1.0	<1.0	1.0	6403980
Total Barium (Ba)	ug/L	210	2.0	100	2.0	6403980
Total Beryllium (Be)	ug/L	<0.50	0.50	<0.50	0.50	6403980
Total Bismuth (Bi)	ug/L	<1.0	1.0	<1.0	1.0	6403980
Total Boron (B)	ug/L	20	10	12	10	6403980
Total Cadmium (Cd)	ug/L	0.16	0.10	<0.10	0.10	6403980
Total Calcium (Ca)	ug/L	120000	200	94000	200	6403980
Total Chromium (Cr)	ug/L	80	5.0	5.6	5.0	6403980
Total Cobalt (Co)	ug/L	14	0.50	2.9	0.50	6403980
Total Copper (Cu)	ug/L	48	1.0	8.9	1.0	6403980
Total Iron (Fe)	ug/L	24000	100	3100	100	6403980
Total Lead (Pb)	ug/L	11	0.50	1.6	0.50	6403980
Total Lithium (Li)	ug/L	7.8	5.0	<5.0	5.0	6403980
Total Magnesium (Mg)	ug/L	30000	50	24000	50	6403980
Total Manganese (Mn)	ug/L	810	2.0	100	2.0	6403980
Total Molybdenum (Mo)	ug/L	36	0.50	2.7	0.50	6403980
Total Nickel (Ni)	ug/L	24	1.0	4.4	1.0	6403980
Total Potassium (K)	ug/L	28000	200	3400	200	6403980
Total Selenium (Se)	ug/L	<2.0	2.0	<2.0	2.0	6403980
Total Silicon (Si)	ug/L	23000	50	9400	50	6403980
Total Silver (Ag)	ug/L	1.7	0.10	0.17	0.10	6403980
Total Sodium (Na)	ug/L	150000	100	34000	100	6403980
Total Strontium (Sr)	ug/L	1100	1.0	420	1.0	6403980
Total Tellurium (Te)	ug/L	<1.0	1.0	<1.0	1.0	6403980
Total Thallium (Tl)	ug/L	0.23	0.050	<0.050	0.050	6403980
Total Tin (Sn)	ug/L	1.9	1.0	<1.0	1.0	6403980
Total Titanium (Ti)	ug/L	810	25	170	5.0	6403980
Total Tungsten (W)	ug/L	<1.0	1.0	<1.0	1.0	6403980
Total Uranium (U)	ug/L	1.3	0.10	0.58	0.10	6403980
Total Vanadium (V)	ug/L	26	0.50	4.5	0.50	6403980
Total Zinc (Zn)	ug/L	53	5.0	9.3	5.0	6403980
Total Zirconium (Zr)	ug/L	1.5	1.0	<1.0	1.0	6403980
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						



BUREAU  
VERITAS

BV Labs Job #: B9T7629  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 VOCs BY HS & F1-F4 (WATER)**

BV Labs ID		LCN441			LCN441			LCN442		
Sampling Date		2019/10/23 10:00			2019/10/23 10:00			2019/10/23 11:00		
COC Number		743886-01-01			743886-01-01			743886-01-01		
	UNITS	MW-5-1	RDL	QC Batch	MW-5-1 Lab-Dup	RDL	QC Batch	MW-6-1	RDL	QC Batch
<b>Calculated Parameters</b>										
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	0.50	6401347				<0.50	0.50	6401347
<b>Volatile Organics</b>										
Acetone (2-Propanone)	ug/L	<10	10	6399780	<10	10	6399780	<10	10	6399780
Benzene	ug/L	<0.20	0.20	6399780	<0.20	0.20	6399780	<0.20	0.20	6399780
Bromodichloromethane	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
Bromoform	ug/L	<1.0	1.0	6399780	<1.0	1.0	6399780	<1.0	1.0	6399780
Bromomethane	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
Carbon Tetrachloride	ug/L	<0.20	0.20	6399780	<0.20	0.20	6399780	<0.20	0.20	6399780
Chlorobenzene	ug/L	<0.20	0.20	6399780	<0.20	0.20	6399780	<0.20	0.20	6399780
Chloroform	ug/L	0.21	0.20	6399780	0.20	0.20	6399780	<0.20	0.20	6399780
Dibromochloromethane	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
1,2-Dichlorobenzene	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
1,3-Dichlorobenzene	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
1,4-Dichlorobenzene	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	1.0	6399780	<1.0	1.0	6399780	<1.0	1.0	6399780
1,1-Dichloroethane	ug/L	<0.20	0.20	6399780	<0.20	0.20	6399780	<0.20	0.20	6399780
1,2-Dichloroethane	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
1,1-Dichloroethylene	ug/L	<0.20	0.20	6399780	<0.20	0.20	6399780	<0.20	0.20	6399780
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
1,2-Dichloropropane	ug/L	<0.20	0.20	6399780	<0.20	0.20	6399780	<0.20	0.20	6399780
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	6399780	<0.30	0.30	6399780	<0.30	0.30	6399780
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	6399780	<0.40	0.40	6399780	<0.40	0.40	6399780
Ethylbenzene	ug/L	<0.20	0.20	6399780	<0.20	0.20	6399780	<0.20	0.20	6399780
Ethylene Dibromide	ug/L	<0.20	0.20	6399780	<0.20	0.20	6399780	<0.20	0.20	6399780
Hexane	ug/L	<1.0	1.0	6399780	<1.0	1.0	6399780	<1.0	1.0	6399780
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	6399780	<2.0	2.0	6399780	<2.0	2.0	6399780
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	10	6399780	<10	10	6399780	<10	10	6399780
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	6399780	<5.0	5.0	6399780	<5.0	5.0	6399780
Methyl t-butyl ether (MTBE)	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
Styrene	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
Tetrachloroethylene	ug/L	<0.20	0.20	6399780	<0.20	0.20	6399780	<0.20	0.20	6399780
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										



BUREAU  
VERITAS

BV Labs Job #: B9T7629  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 VOCs BY HS & F1-F4 (WATER)**

BV Labs ID		LCN441			LCN441			LCN442		
Sampling Date		2019/10/23 10:00			2019/10/23 10:00			2019/10/23 11:00		
COC Number		743886-01-01			743886-01-01			743886-01-01		
	UNITS	MW-5-1	RDL	QC Batch	MW-5-1 Lab-Dup	RDL	QC Batch	MW-6-1	RDL	QC Batch
Toluene	ug/L	0.62	0.20	6399780	0.60	0.20	6399780	0.74	0.20	6399780
1,1,1-Trichloroethane	ug/L	<0.20	0.20	6399780	<0.20	0.20	6399780	<0.20	0.20	6399780
1,1,2-Trichloroethane	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
Trichloroethylene	ug/L	<0.20	0.20	6399780	<0.20	0.20	6399780	<0.20	0.20	6399780
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	6399780	<0.50	0.50	6399780	<0.50	0.50	6399780
Vinyl Chloride	ug/L	<0.20	0.20	6399780	<0.20	0.20	6399780	<0.20	0.20	6399780
p+m-Xylene	ug/L	0.35	0.20	6399780	0.34	0.20	6399780	0.47	0.20	6399780
o-Xylene	ug/L	0.26	0.20	6399780	0.25	0.20	6399780	0.36	0.20	6399780
Total Xylenes	ug/L	0.61	0.20	6399780	0.59	0.20	6399780	0.83	0.20	6399780
F1 (C6-C10)	ug/L	<25	25	6399780	<25	25	6399780	<25	25	6399780
F1 (C6-C10) - BTEX	ug/L	<25	25	6399780	<25	25	6399780	<25	25	6399780
<b>F2-F4 Hydrocarbons</b>										
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	6403991				<100	100	6403991
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	6403991				<200	200	6403991
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	6403991				<200	200	6403991
Reached Baseline at C50	ug/L	Yes		6403991				Yes		6403991
<b>Surrogate Recovery (%)</b>										
o-Terphenyl	%	103		6403991				102		6403991
4-Bromofluorobenzene	%	97		6399780	96		6399780	97		6399780
D4-1,2-Dichloroethane	%	105		6399780	107		6399780	105		6399780
D8-Toluene	%	92		6399780	91		6399780	92		6399780
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										



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VERITAS

BV Labs Job #: B9T7629  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 VOCS BY HS & F1-F4 (WATER)**

BV Labs ID		LCN442		
Sampling Date		2019/10/23 11:00		
COC Number		743886-01-01		
	<b>UNITS</b>	<b>MW-6-1 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>
<b>F2-F4 Hydrocarbons</b>				
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	6403991
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	6403991
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	6403991
Reached Baseline at C50	ug/L	Yes		6403991
<b>Surrogate Recovery (%)</b>				
o-Terphenyl	%	99		6403991
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate				





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BV Labs Job #: B9T7629  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### TEST SUMMARY

**BV Labs ID:** LCN441  
**Sample ID:** MW-5-1  
**Matrix:** Water

**Collected:** 2019/10/23  
**Shipped:**  
**Received:** 2019/10/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6401347	N/A	2019/10/24	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6403991	2019/10/24	2019/10/24	Atoosa Keshavarz
Total Metals Analysis by ICPMS	ICP/MS	6403980	N/A	2019/10/24	Arefa Dabhad
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6399780	N/A	2019/10/24	Blair Gannon

**BV Labs ID:** LCN441 Dup  
**Sample ID:** MW-5-1  
**Matrix:** Water

**Collected:** 2019/10/23  
**Shipped:**  
**Received:** 2019/10/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6399780	N/A	2019/10/24	Blair Gannon

**BV Labs ID:** LCN442  
**Sample ID:** MW-6-1  
**Matrix:** Water

**Collected:** 2019/10/23  
**Shipped:**  
**Received:** 2019/10/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6401347	N/A	2019/10/24	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6403991	2019/10/24	2019/10/24	Atoosa Keshavarz
Total Metals Analysis by ICPMS	ICP/MS	6403980	N/A	2019/10/24	Arefa Dabhad
Volatile Organic Compounds and F1 PHCs	GC/MSFD	6399780	N/A	2019/10/24	Blair Gannon

**BV Labs ID:** LCN442 Dup  
**Sample ID:** MW-6-1  
**Matrix:** Water

**Collected:** 2019/10/23  
**Shipped:**  
**Received:** 2019/10/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6403991	2019/10/24	2019/10/24	Atoosa Keshavarz



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BV Labs Job #: B9T7629  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	9.7°C
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**Results relate only to the items tested.**



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BV Labs Job #: B9T7629  
Report Date: 2019/10/24

### QUALITY ASSURANCE REPORT

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6399780	4-Bromofluorobenzene	2019/10/24	105	70 - 130	106	70 - 130	98	%		
6399780	D4-1,2-Dichloroethane	2019/10/24	103	70 - 130	97	70 - 130	101	%		
6399780	D8-Toluene	2019/10/24	102	70 - 130	103	70 - 130	93	%		
6403991	o-Terphenyl	2019/10/24	106	60 - 130	105	60 - 130	103	%		
6399780	1,1,1,2-Tetrachloroethane	2019/10/24	96	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
6399780	1,1,1-Trichloroethane	2019/10/24	97	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
6399780	1,1,2,2-Tetrachloroethane	2019/10/24	97	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
6399780	1,1,2-Trichloroethane	2019/10/24	100	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
6399780	1,1-Dichloroethane	2019/10/24	99	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
6399780	1,1-Dichloroethylene	2019/10/24	100	70 - 130	101	70 - 130	<0.20	ug/L	NC	30
6399780	1,2-Dichlorobenzene	2019/10/24	96	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
6399780	1,2-Dichloroethane	2019/10/24	107	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
6399780	1,2-Dichloropropane	2019/10/24	103	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
6399780	1,3-Dichlorobenzene	2019/10/24	99	70 - 130	103	70 - 130	<0.50	ug/L	NC	30
6399780	1,4-Dichlorobenzene	2019/10/24	101	70 - 130	105	70 - 130	<0.50	ug/L	NC	30
6399780	Acetone (2-Propanone)	2019/10/24	114	60 - 140	103	60 - 140	<10	ug/L	NC	30
6399780	Benzene	2019/10/24	98	70 - 130	97	70 - 130	<0.20	ug/L	NC	30
6399780	Bromodichloromethane	2019/10/24	97	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
6399780	Bromoform	2019/10/24	99	70 - 130	96	70 - 130	<1.0	ug/L	NC	30
6399780	Bromomethane	2019/10/24	92	60 - 140	87	60 - 140	<0.50	ug/L	NC	30
6399780	Carbon Tetrachloride	2019/10/24	96	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
6399780	Chlorobenzene	2019/10/24	96	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
6399780	Chloroform	2019/10/24	96	70 - 130	95	70 - 130	<0.20	ug/L	2.0	30
6399780	cis-1,2-Dichloroethylene	2019/10/24	101	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
6399780	cis-1,3-Dichloropropene	2019/10/24	108	70 - 130	101	70 - 130	<0.30	ug/L	NC	30
6399780	Dibromochloromethane	2019/10/24	100	70 - 130	97	70 - 130	<0.50	ug/L	NC	30
6399780	Dichlorodifluoromethane (FREON 12)	2019/10/24	112	60 - 140	97	60 - 140	<1.0	ug/L	NC	30
6399780	Ethylbenzene	2019/10/24	99	70 - 130	102	70 - 130	<0.20	ug/L	NC	30
6399780	Ethylene Dibromide	2019/10/24	105	70 - 130	99	70 - 130	<0.20	ug/L	NC	30
6399780	F1 (C6-C10) - BTEX	2019/10/24					<25	ug/L	NC	30
6399780	F1 (C6-C10)	2019/10/24	97	60 - 140	96	60 - 140	<25	ug/L	NC	30
6399780	Hexane	2019/10/24	106	70 - 130	108	70 - 130	<1.0	ug/L	NC	30



BUREAU  
VERITAS

BV Labs Job #: B9T7629  
Report Date: 2019/10/24

### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6399780	Methyl Ethyl Ketone (2-Butanone)	2019/10/24	122	60 - 140	112	60 - 140	<10	ug/L	NC	30
6399780	Methyl Isobutyl Ketone	2019/10/24	95	70 - 130	90	70 - 130	<5.0	ug/L	NC	30
6399780	Methyl t-butyl ether (MTBE)	2019/10/24	109	70 - 130	107	70 - 130	<0.50	ug/L	NC	30
6399780	Methylene Chloride(Dichloromethane)	2019/10/24	90	70 - 130	88	70 - 130	<2.0	ug/L	NC	30
6399780	o-Xylene	2019/10/24	100	70 - 130	104	70 - 130	<0.20	ug/L	2.8	30
6399780	p+m-Xylene	2019/10/24	78	70 - 130	82	70 - 130	<0.20	ug/L	4.3	30
6399780	Styrene	2019/10/24	72	70 - 130	75	70 - 130	<0.50	ug/L	NC	30
6399780	Tetrachloroethylene	2019/10/24	94	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
6399780	Toluene	2019/10/24	94	70 - 130	96	70 - 130	<0.20	ug/L	3.1	30
6399780	Total Xylenes	2019/10/24					<0.20	ug/L	3.7	30
6399780	trans-1,2-Dichloroethylene	2019/10/24	96	70 - 130	97	70 - 130	<0.50	ug/L	NC	30
6399780	trans-1,3-Dichloropropene	2019/10/24	107	70 - 130	98	70 - 130	<0.40	ug/L	NC	30
6399780	Trichloroethylene	2019/10/24	98	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
6399780	Trichlorofluoromethane (FREON 11)	2019/10/24	98	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
6399780	Vinyl Chloride	2019/10/24	97	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
6403980	Total Aluminum (Al)	2019/10/24	100	80 - 120	107	80 - 120	<5.0	ug/L	NC	20
6403980	Total Antimony (Sb)	2019/10/24	105	80 - 120	103	80 - 120	<0.50	ug/L	14	20
6403980	Total Arsenic (As)	2019/10/24	101	80 - 120	103	80 - 120	<1.0	ug/L	0.99	20
6403980	Total Barium (Ba)	2019/10/24	103	80 - 120	107	80 - 120	<2.0	ug/L	1.9	20
6403980	Total Beryllium (Be)	2019/10/24	96	80 - 120	102	80 - 120	<0.50	ug/L	NC	20
6403980	Total Bismuth (Bi)	2019/10/24	98	80 - 120	98	80 - 120	<1.0	ug/L		
6403980	Total Boron (B)	2019/10/24	89	80 - 120	94	80 - 120	<10	ug/L	3.5	20
6403980	Total Cadmium (Cd)	2019/10/24	100	80 - 120	102	80 - 120	<0.10	ug/L	0	20
6403980	Total Calcium (Ca)	2019/10/24	NC	80 - 120	104	80 - 120	<200	ug/L	3.0	20
6403980	Total Chromium (Cr)	2019/10/24	95	80 - 120	95	80 - 120	<5.0	ug/L	NC	20
6403980	Total Cobalt (Co)	2019/10/24	95	80 - 120	104	80 - 120	<0.50	ug/L	2.0	20
6403980	Total Copper (Cu)	2019/10/24	104	80 - 120	106	80 - 120	<1.0	ug/L	0.39	20
6403980	Total Iron (Fe)	2019/10/24	96	80 - 120	102	80 - 120	<100	ug/L	NC	20
6403980	Total Lead (Pb)	2019/10/24	98	80 - 120	98	80 - 120	<0.50	ug/L	4.1	20
6403980	Total Lithium (Li)	2019/10/24	97	80 - 120	99	80 - 120	<5.0	ug/L		
6403980	Total Magnesium (Mg)	2019/10/24	96	80 - 120	100	80 - 120	<50	ug/L	2.1	20
6403980	Total Manganese (Mn)	2019/10/24	94	80 - 120	99	80 - 120	<2.0	ug/L	2.2	20



BUREAU  
VERITAS

BV Labs Job #: B9T7629  
Report Date: 2019/10/24

### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6403980	Total Molybdenum (Mo)	2019/10/24	106	80 - 120	103	80 - 120	<0.50	ug/L	0	20
6403980	Total Nickel (Ni)	2019/10/24	91	80 - 120	96	80 - 120	<1.0	ug/L	4.4	20
6403980	Total Potassium (K)	2019/10/24	98	80 - 120	103	80 - 120	<200	ug/L	1.5	20
6403980	Total Selenium (Se)	2019/10/24	98	80 - 120	104	80 - 120	<2.0	ug/L	NC	20
6403980	Total Silicon (Si)	2019/10/24	99	80 - 120	104	80 - 120	<50	ug/L	2.4	20
6403980	Total Silver (Ag)	2019/10/24	98	80 - 120	102	80 - 120	<0.10	ug/L	NC	20
6403980	Total Sodium (Na)	2019/10/24	NC	80 - 120	100	80 - 120	<100	ug/L	1.6	20
6403980	Total Strontium (Sr)	2019/10/24	NC	80 - 120	99	80 - 120	<1.0	ug/L	2.4	20
6403980	Total Tellurium (Te)	2019/10/24	105	80 - 120	103	80 - 120	<1.0	ug/L		
6403980	Total Thallium (Tl)	2019/10/24	100	80 - 120	100	80 - 120	<0.050	ug/L	3.0	20
6403980	Total Tin (Sn)	2019/10/24	104	80 - 120	104	80 - 120	<1.0	ug/L		
6403980	Total Titanium (Ti)	2019/10/24	98	80 - 120	101	80 - 120	<5.0	ug/L	NC	20
6403980	Total Tungsten (W)	2019/10/24	101	80 - 120	103	80 - 120	<1.0	ug/L		
6403980	Total Uranium (U)	2019/10/24	100	80 - 120	102	80 - 120	<0.10	ug/L		
6403980	Total Vanadium (V)	2019/10/24	99	80 - 120	98	80 - 120	<0.50	ug/L	13	20
6403980	Total Zinc (Zn)	2019/10/24	96	80 - 120	102	80 - 120	<5.0	ug/L	2.3	20
6403980	Total Zirconium (Zr)	2019/10/24	106	80 - 120	104	80 - 120	<1.0	ug/L		
6403991	F2 (C10-C16 Hydrocarbons)	2019/10/24	102	50 - 130	103	60 - 130	<100	ug/L	NC	30
6403991	F3 (C16-C34 Hydrocarbons)	2019/10/24	NC	50 - 130	106	60 - 130	<200	ug/L	NC	30
6403991	F4 (C34-C50 Hydrocarbons)	2019/10/24	103	50 - 130	103	60 - 130	<200	ug/L	NC	30

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU  
VERITAS

BV Labs Job #: B9T7629

Report Date: 2019/10/24

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

A handwritten signature in black ink, appearing to read 'A. Hamanov', written over a horizontal line.

Anastassia Hamanov, Scientific Specialist

---

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Bureau Veritas Laboratories  
6740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvlabs.com

CHAIN OF CUSTODY RECORD

<b>INVOICE TO:</b> Company Name: #10988 ARCADIS Canada Inc Attention: Accounts Payable Canada Address: 1050 Morrison Drive Unit 201 Ottawa ON K2H 8K7 Tel: (613) 721-0555 Fax: (613) 721-0029 Email: AccountsPayable.Canada@arcadis.com		<b>REPORT TO:</b> Company Name: Attention: Stephanie Joyce Address: Tel: Fax: Email: Stephanie.Joyce@arcadis.com		<b>PROJECT INFORMATION:</b> Quotation #: B81974 P.O. #: Project: 30029878 Project Name: Site #: Sampled By: <i>Jennat de Goo</i>		<b>Laboratory Use Only:</b> BV Labs Job #: Bottle Order #: 743886 COC #: Project Manager: Alisha Williamson Barcode: C#743886-01-01	
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MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)												Turnaround Time (TAT) Required: Please provide advance notice for rush projects					
Regulation 153 (2011)			Other Regulations			Special Instructions	Field Filtered (please circle): Metals / Hg / Cr / V	O Reg 153 VOCs by HS & F1-F4	Total Metals Analysis by CPMS													Regular (Standard) TAT: <i>(will be applied if Rush TAT is not specified):</i>	
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Medium/Fine	<input type="checkbox"/> CCME	<input type="checkbox"/> Sanitary Sewer Bylaw														Standard TAT = 5-7 Working days for most tests.					
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> Reg 558	<input type="checkbox"/> Storm Sewer Bylaw														Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.					
<input type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other	<input type="checkbox"/> For RSC	<input type="checkbox"/> MISA	Municipality _____														Job Specific Rush TAT (if applies to entire submission)					
<input type="checkbox"/> Table			<input type="checkbox"/> PWOO															Date Required: <i>24-10-2019</i> Time Required: <i>16:00</i> <input checked="" type="checkbox"/>					
Include Criteria on Certificate of Analysis (Y/N)?																		Rush Confirmation Number: _____ (call lab for #)					
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix													# of Bottles	Comments					
1	<i>mw-5-1</i>	<i>23-10-19</i>	<i>10:00</i>	<i>W</i>													<i>6</i>						
2	<i>mw-6-1</i>	<i>"</i>	<i>11:00</i>	<i>W</i>													<i>6</i>						
3																							
4																							
5																							
6																							
7																							
8																							
9																		<i>on ice</i>					
10																							

* RELINQUISHED BY: (Signature/Print) <i>Jennat de Goo</i>		Date: (YY/MM/DD) <i>19-10-23</i>	Time <i>12:15</i>	RECEIVED BY: (Signature/Print) <i>Suzanne Lévesque</i>	Date: (YY/MM/DD) <i>19/10/23</i>	Time <i>12:15</i>	# jars used and not submitted	Laboratory Use Only		Time Sensitive		Temperature (°C) on Recl <i>4.11/11</i>	Custody Seal Present <input checked="" type="checkbox"/>	Intact <input checked="" type="checkbox"/>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
--	--	-------------------------------------	----------------------	---	-------------------------------------	----------------------	-------------------------------	---------------------	--	----------------	--	--	---	---	--	--------------------------------

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

\*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

White: BV Labs Yellow: Client



**RUSH!** Bureau Veritas Laboratories  
 2740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

CHAIN OF CUSTODY RECORD

<b>INVOICE TO:</b>		<b>REPORT TO:</b>		<b>PROJECT INFORMATION:</b>		<b>Laboratory Use Only:</b>	
Company Name: #10988 ARCADIS Canada Inc		Company Name:		Quotation #: B81974		BV Labs Job #:	
Attention: Accounts Payable Canada		Attention: Stephanie Joyce		P.O. #:		Bottle Order #:	
Address: 1050 Morrison Drive Unit 201		Address:		Project: 30029878		743886	
Ottawa ON K2H 8K7				Project Name:		COC #:	
Tel: (613) 721-0555 Fax: (613) 721-0029		Tel: Fax:		Site #:		Project Manager:	
Email: AccountsPayable.Canada@arcadis.com		Email: Stephanie.Joyce@arcadis.com		Sampled By: <i>tenant de Gout</i>		Alisha Williamson	

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects					
Regulation 153 (2011)		Other Regulations		Special Instructions		Field Filtered (please circle): Metals / Hg / Cr / V /	O Reg 153 VOCs by HS & FI-F4	Total Metals Analysis by ICPMS											Regular (Standard) TAT: <i>(will be applied if Rush TAT is not specified):</i>		
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Medium/Fine	<input type="checkbox"/> CCME	<input type="checkbox"/> Sanitary Sewer Bylaw															Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.		
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> Reg 558	<input type="checkbox"/> Storm Sewer Bylaw												Job Specific Rush TAT (if applies to entire submission)					
<input type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other	<input type="checkbox"/> For RSC	<input type="checkbox"/> MISA	Municipality _____												Date Required: <i>24-10-2019</i> Time Required: <i>16:00</i> <input checked="" type="checkbox"/>					
<input type="checkbox"/> Table _____			<input type="checkbox"/> PWQO	<input type="checkbox"/> Other _____												Rush Confirmation Number: _____ (call lab for #)					
Include Criteria on Certificate of Analysis (Y/N)?																		# of Bottles		Comments	
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix																	
1	<i>mw-5-1'</i>	<i>23-10-19</i>	<i>10:00</i>	<i>W</i>													<i>6</i>				
2	<i>mw-6-1</i>	<i>"</i>	<i>11:00</i>	<i>W</i>													<i>6</i>				
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# Jars used and not submitted	Laboratory Use Only				
<i>tenant de Gout</i>		<i>19-10-23</i>	<i>12:15</i>	<i>Suzanne Lévesque</i>		<i>19/10/23</i>	<i>12:15</i>		Time Sensitive	Temperature (°C) on Recept	Custody Seal Present	Yes	No
				<i>TRUSHADA PATEL</i>		<i>2019/10/24</i>	<i>08:00</i>			<i>4.1/1.1</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

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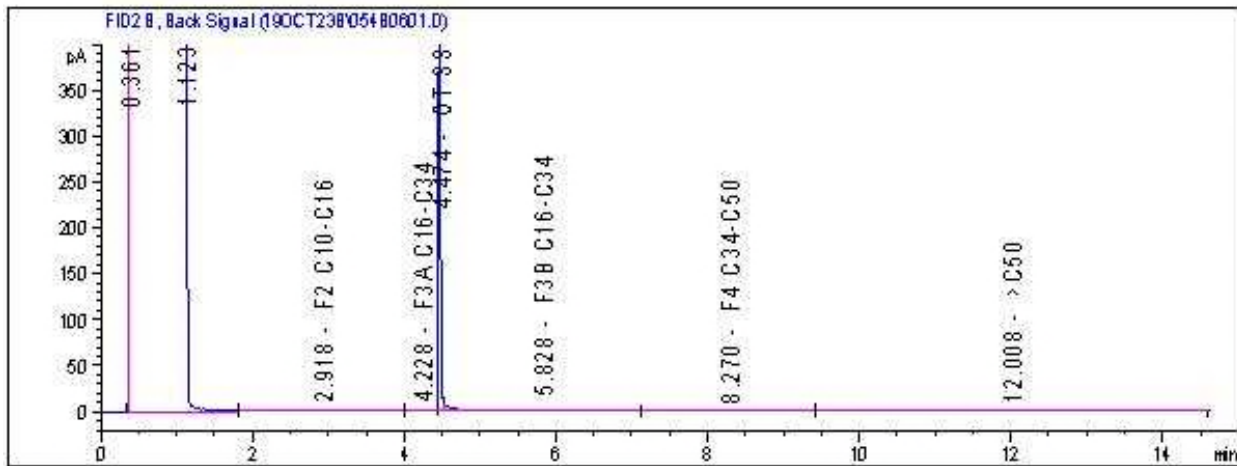
\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

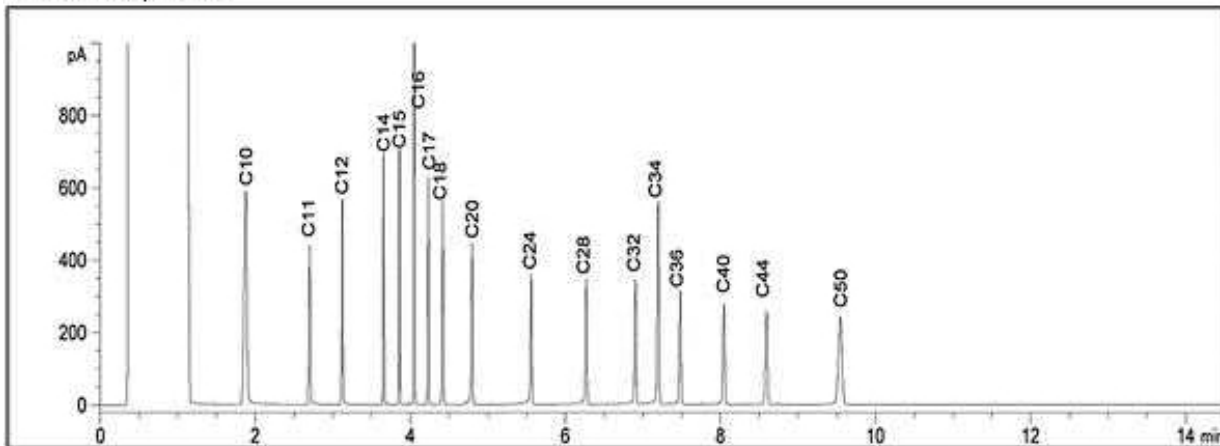
*5/6/15*



**Petroleum Hydrocarbons F2-F4 in Water Chromatogram**



**Reference Spectrum**



**TYPICAL PRODUCT CARBON NUMBER RANGES**

Gasoline: **C6 - C12**

Diesel: **C10 - C24**

Jet Fuels: **C6 - C16**

Varsol: **C8 - C12**

Fuel Oils: **C6 - C32**

Creosote: **C10 - C26**

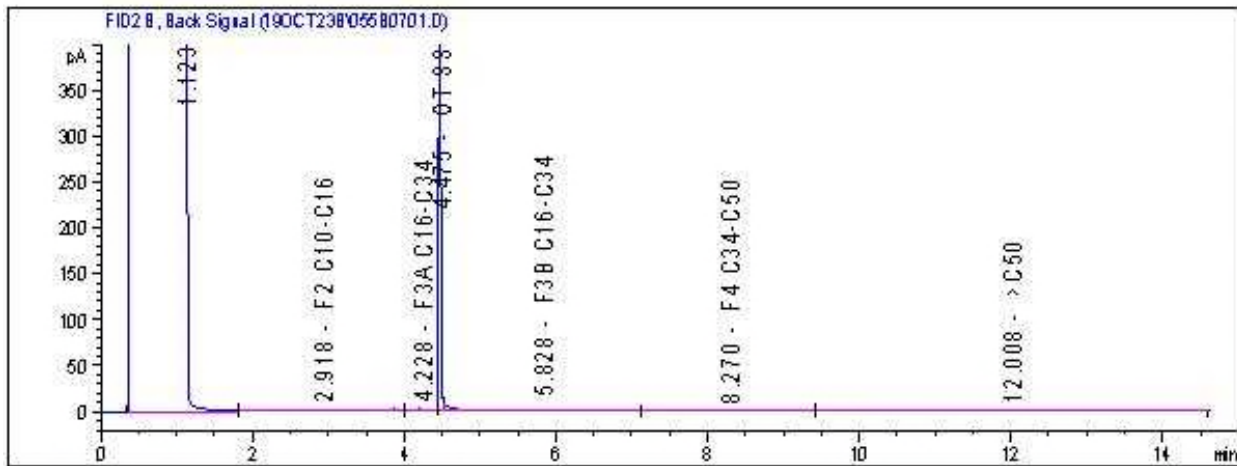
Kerosene: **C8 - C16**

Motor Oils: **C16 - C50**

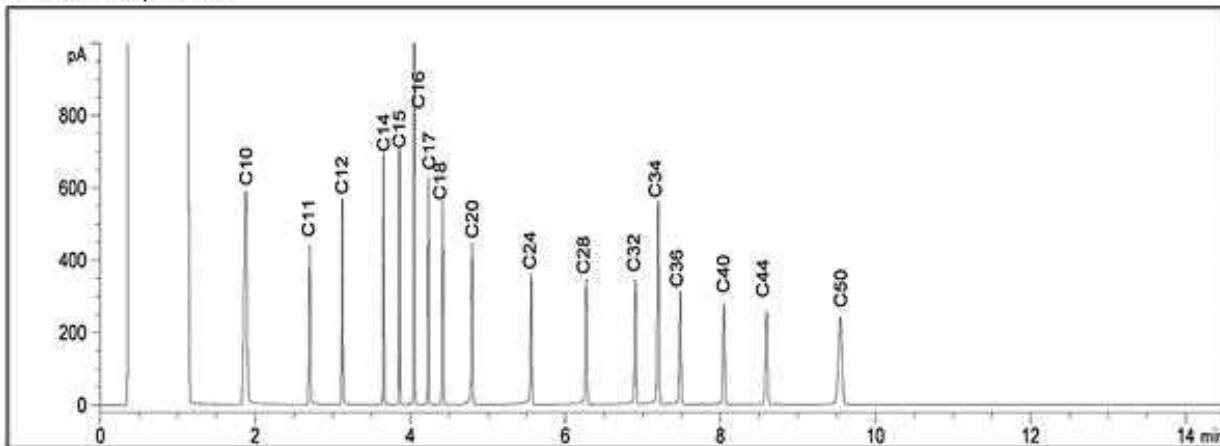
Asphalt: **C18 - C50+**

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**

**Petroleum Hydrocarbons F2-F4 in Water Chromatogram**



**Reference Spectrum**

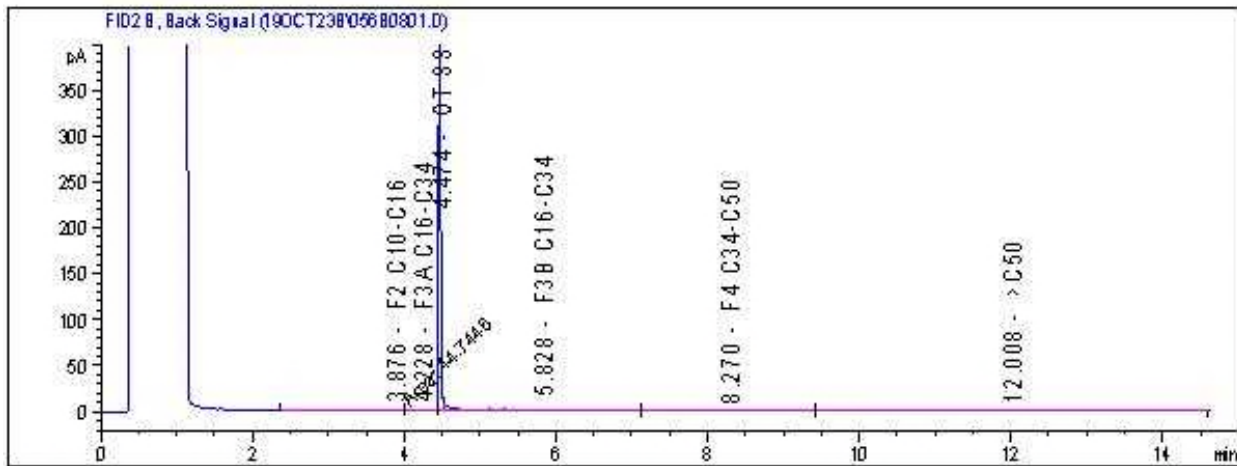


**TYPICAL PRODUCT CARBON NUMBER RANGES**

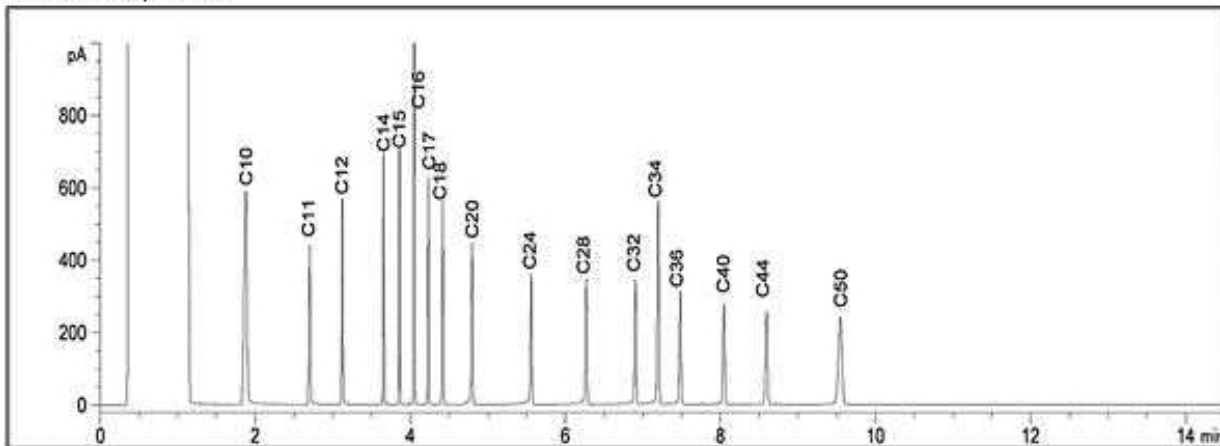
Gasoline: <b>C6 - C12</b>	Diesel: <b>C10 - C24</b>	Jet Fuels: <b>C6 - C16</b>
Varsol: <b>C8 - C12</b>	Fuel Oils: <b>C6 - C32</b>	Creosote: <b>C10 - C26</b>
Kerosene: <b>C8 - C16</b>	Motor Oils: <b>C16 - C50</b>	Asphalt: <b>C18 - C50+</b>

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**

**Petroleum Hydrocarbons F2-F4 in Water Chromatogram**



**Reference Spectrum**



**TYPICAL PRODUCT CARBON NUMBER RANGES**

Gasoline: <b>C6 - C12</b>	Diesel: <b>C10 - C24</b>	Jet Fuels: <b>C6 - C16</b>
Varsol: <b>C8 - C12</b>	Fuel Oils: <b>C6 - C32</b>	Creosote: <b>C10 - C26</b>
Kerosene: <b>C8 - C16</b>	Motor Oils: <b>C16 - C50</b>	Asphalt: <b>C18 - C50+</b>

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**



Your Project #: 30029878  
Your C.O.C. #: 137927

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
1050 Morrison Drive  
Unit 201  
Ottawa, ON  
CANADA K2H 8K7

**Report Date: 2019/10/24**  
Report #: R5934858  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9T8028**

**Received: 2019/10/23, 15:55**

Sample Matrix: Soil  
# Samples Received: 2

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Conductivity (1)	2	2019/10/24	2019/10/24	CAM SOP-00414	OMOE E3530 v1 m
pH CaCl2 EXTRACT (1)	2	2019/10/24	2019/10/24	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR) (1)	2	N/A	2019/10/24	CAM SOP-00102	EPA 6010C

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Laboratories Mississauga



Your Project #: 30029878  
Your C.O.C. #: 137927

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
1050 Morrison Drive  
Unit 201  
Ottawa, ON  
CANADA K2H 8K7

**Report Date: 2019/10/24**  
Report #: R5934858  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9T8028**

**Received: 2019/10/23, 15:55**

Encryption Key

Alisha Williamson  
Project Manager  
24 Oct 2019 18:44:16

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Alisha Williamson, Project Manager  
Email: Alisha.Williamson@bvlab.com  
Phone# (613)274-0573

=====

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BUREAU  
VERITAS

BV Labs Job #: B9T8028  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### RESULTS OF ANALYSES OF SOIL

BV Labs ID		LCP639	LCP640		
Sampling Date		2019/10/15 10:00	2019/10/15 11:00		
COC Number		137927	137927		
	<b>UNITS</b>	<b>BH-5-1</b>	<b>BH-6-1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>					
Sodium Adsorption Ratio	N/A	0.40	0.35		6402316
<b>Inorganics</b>					
Conductivity	mS/cm	0.072	0.097	0.002	6404028
Available (CaCl <sub>2</sub> ) pH	pH	6.31	6.55		6403645
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



BUREAU  
VERITAS

BV Labs Job #: B9T8028  
Report Date: 2019/10/24

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### TEST SUMMARY

**BV Labs ID:** LCP639  
**Sample ID:** BH-5-1  
**Matrix:** Soil

**Collected:** 2019/10/15  
**Shipped:**  
**Received:** 2019/10/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	6404028	2019/10/24	2019/10/24	Tanvee Kapur
pH CaCl2 EXTRACT	AT	6403645	2019/10/24	2019/10/24	Kazzandra Adeva
Sodium Adsorption Ratio (SAR)	CALC/MET	6402316	N/A	2019/10/24	Automated Statchk

**BV Labs ID:** LCP640  
**Sample ID:** BH-6-1  
**Matrix:** Soil

**Collected:** 2019/10/15  
**Shipped:**  
**Received:** 2019/10/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	6404028	2019/10/24	2019/10/24	Tanvee Kapur
pH CaCl2 EXTRACT	AT	6403645	2019/10/24	2019/10/24	Kazzandra Adeva
Sodium Adsorption Ratio (SAR)	CALC/MET	6402316	N/A	2019/10/24	Automated Statchk



### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.0°C
-----------	-------

Sample LCP639 [BH-5-1] : SAR Analysis: Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Sample LCP640 [BH-6-1] : SAR Analysis: Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

**Results relate only to the items tested.**





BUREAU  
VERITAS

BV Labs Job #: B9T8028  
Report Date: 2019/10/24

### QUALITY ASSURANCE REPORT

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6403645	Available (CaCl2) pH	2019/10/24	100	97 - 103			1.1	N/A
6404028	Conductivity	2019/10/24	102	90 - 110	<0.002	mS/cm	0.36	10

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.



BUREAU  
VERITAS

BV Labs Job #: B9T8028

Report Date: 2019/10/24

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

A handwritten signature in black ink, appearing to read 'A. Hamanov', written over a horizontal line.

Anastassia Hamanov, Scientific Specialist

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6740  
 Phone: 1-800-387-2739  
 CAM FCD-01191/5

**RUSH**

CHAIN OF CUSTODY RECORD

137927

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name: <u>Arcadis</u>		Company Name:		Quotation #:		<input type="checkbox"/> Regular TAT (5-7 days) Most analyses	
Contact Name: <u>Stephanie Joyce</u>		Contact Name:		P.O. #/ AFE:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address: <u>1050 Morrison Dr. OTTAWA</u>		Address:		Project #: <u>30029878</u>		Rush TAT (Surcharges will be applied)	
Phone: Fax:		Phone: Fax:		Site Location:		<input checked="" type="checkbox"/> 1 Day <input type="checkbox"/> 2 Days <input type="checkbox"/> 3-4 Days	
Email: <u>Stephanie.joyce@arcadis.com</u>		Email:		Site #:		Date Required: <u>24-10-2019</u>	
NOTE: REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS LABORATORIES' DRINKING WATER CHAIN OF CUSTODY				Sampled By: <u>Lennox de Groot</u>		Rush Confirmation #:	
Regulation 153		Other Regulations		Analysis Requested		LABORATORY USE ONLY	
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/ Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/ Other <input type="checkbox"/> Table _____ FOR RSC (PLEASE CIRCLE) Y / N		<input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> MISA <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> PWQO <input type="checkbox"/> Region <input type="checkbox"/> Other (Specify) <input type="checkbox"/> REG 558 (MIN. 3 DAY TAT REQUIRED)		# OF CONTAINERS SUBMITTED REG FILTERED (CIRCLE) Metals / Hg / CrVI BTEX / PHC F1 PHC F2 - 14 NOES REG 153 METALS & INORGANICS REG 153 ICPM5 METALS REG 153 METALS (Hg, CrVI, ICPM5 Metals, HWS - B) <u>XX PH, EC, SAR</u>		CUSTODY SEAL <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Present Intact <u>1, 0, 2</u> COOLING MEDIA PRESENT: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N COMMENTS <u>1 bag</u> <u>1 bag</u>  <u>on ice</u>	
INCLUDE CRITERIA ON CERTIFICATE OF ANALYSIS: Y / N							
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS							
SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	REG FILTERED (CIRCLE) Metals / Hg / CrVI	BTEX / PHC F1	PHC F2 - 14
1 BH-5-1	2019-10-15	10:00	Soil				
2 BH-6-1	"	11:00	"				
3							
4							
5							
6							
7							
8							
9							
10							
23-Oct-19 15:55 Alisha Williamson  B9T8028 KJY OTT-001							
RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV JOB #	
<u>Lennox de Groot</u>	<u>2019-10-23</u>	<u>15:55</u>	<u>Kim Jung</u>	<u>2019/10/23</u>	<u>15:55</u>		
			<u>[Signature]</u>	<u>2019/10/24</u>	<u>07:00</u>		

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at <http://www.bvlabs.com/terms-and-conditions>  
 COC-1004 (06/19) 4/4/4 White: Maxxam - Yellow: Client



Your Project #: 30029878  
Your C.O.C. #: 137755

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
1050 Morrison Drive  
Unit 201  
Ottawa, ON  
CANADA K2H 8K7

**Report Date: 2019/10/31**  
Report #: R5945856  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9U3463**

**Received: 2019/10/29, 13:30**

Sample Matrix: Water  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
1,3-Dichloropropene Sum (1)	1	N/A	2019/10/31		EPA 8260C m
Dissolved Metals by ICPMS (1)	1	N/A	2019/10/31	CAM SOP-00447	EPA 6020B m
Volatile Organic Compounds in Water (1)	1	N/A	2019/10/30	CAM SOP-00228	EPA 8260C m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Laboratories Mississauga



Your Project #: 30029878  
Your C.O.C. #: 137755

**Attention: Stephanie Joyce**

ARCADIS Canada Inc  
1050 Morrison Drive  
Unit 201  
Ottawa, ON  
CANADA K2H 8K7

**Report Date: 2019/10/31**  
Report #: R5945856  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9U3463**  
**Received: 2019/10/29, 13:30**

Encryption Key

Alisha Williamson  
Project Manager  
31 Oct 2019 14:29:26

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Alisha Williamson, Project Manager  
Email: Alisha.Williamson@bvlab.com  
Phone# (613)274-0573

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



BUREAU  
VERITAS

BV Labs Job #: B9U3463

Report Date: 2019/10/31

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

**O.REG 153 DISSOLVED ICPMS METALS (WATER)**

BV Labs ID		LDU332		
Sampling Date		2019/10/29 13:00		
COC Number		137755		
	<b>UNITS</b>	<b>MW-5-2</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Metals</b>				
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	6415201
Dissolved Arsenic (As)	ug/L	<1.0	1.0	6415201
Dissolved Barium (Ba)	ug/L	58	2.0	6415201
Dissolved Beryllium (Be)	ug/L	<0.50	0.50	6415201
Dissolved Boron (B)	ug/L	28	10	6415201
Dissolved Cadmium (Cd)	ug/L	<0.10	0.10	6415201
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	6415201
Dissolved Cobalt (Co)	ug/L	1.3	0.50	6415201
Dissolved Copper (Cu)	ug/L	1.3	1.0	6415201
Dissolved Lead (Pb)	ug/L	<0.50	0.50	6415201
Dissolved Molybdenum (Mo)	ug/L	25	0.50	6415201
Dissolved Nickel (Ni)	ug/L	1.8	1.0	6415201
Dissolved Selenium (Se)	ug/L	<2.0	2.0	6415201
Dissolved Silver (Ag)	ug/L	<0.10	0.10	6415201
Dissolved Sodium (Na)	ug/L	110000	100	6415201
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	6415201
Dissolved Uranium (U)	ug/L	0.35	0.10	6415201
Dissolved Vanadium (V)	ug/L	<0.50	0.50	6415201
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	6415201
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU  
VERITAS

BV Labs Job #: B9U3463  
Report Date: 2019/10/31

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### O.REG 153 VOCS BY HS (WATER)

BV Labs ID		LDU332		
Sampling Date		2019/10/29 13:00		
COC Number		137755		
	<b>UNITS</b>	<b>MW-5-2</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	0.50	6412140
<b>Volatile Organics</b>				
Acetone (2-Propanone)	ug/L	<10	10	6412955
Benzene	ug/L	<0.20	0.20	6412955
Bromodichloromethane	ug/L	<0.50	0.50	6412955
Bromoform	ug/L	<1.0	1.0	6412955
Bromomethane	ug/L	<0.50	0.50	6412955
Carbon Tetrachloride	ug/L	<0.20	0.20	6412955
Chlorobenzene	ug/L	<0.20	0.20	6412955
Chloroform	ug/L	<0.20	0.20	6412955
Dibromochloromethane	ug/L	<0.50	0.50	6412955
1,2-Dichlorobenzene	ug/L	<0.50	0.50	6412955
1,3-Dichlorobenzene	ug/L	<0.50	0.50	6412955
1,4-Dichlorobenzene	ug/L	<0.50	0.50	6412955
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	1.0	6412955
1,1-Dichloroethane	ug/L	<0.20	0.20	6412955
1,2-Dichloroethane	ug/L	<0.50	0.50	6412955
1,1-Dichloroethylene	ug/L	<0.20	0.20	6412955
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	6412955
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	6412955
1,2-Dichloropropane	ug/L	<0.20	0.20	6412955
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	6412955
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	6412955
Ethylbenzene	ug/L	<0.20	0.20	6412955
Ethylene Dibromide	ug/L	<0.20	0.20	6412955
Hexane	ug/L	<1.0	1.0	6412955
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	6412955
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	10	6412955
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	6412955
Methyl t-butyl ether (MTBE)	ug/L	<0.50	0.50	6412955
Styrene	ug/L	<0.50	0.50	6412955
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	6412955
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	6412955
Tetrachloroethylene	ug/L	<0.20	0.20	6412955
Toluene	ug/L	1.2	0.20	6412955
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



BUREAU  
VERITAS

BV Labs Job #: B9U3463  
Report Date: 2019/10/31

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

**O.REG 153 VOCS BY HS (WATER)**

BV Labs ID		LDU332		
Sampling Date		2019/10/29 13:00		
COC Number		137755		
	<b>UNITS</b>	<b>MW-5-2</b>	<b>RDL</b>	<b>QC Batch</b>
1,1,1-Trichloroethane	ug/L	<0.20	0.20	6412955
1,1,2-Trichloroethane	ug/L	<0.50	0.50	6412955
Trichloroethylene	ug/L	<0.20	0.20	6412955
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	6412955
Vinyl Chloride	ug/L	<0.20	0.20	6412955
p+m-Xylene	ug/L	0.43	0.20	6412955
o-Xylene	ug/L	<0.20	0.20	6412955
Total Xylenes	ug/L	0.43	0.20	6412955
<b>Surrogate Recovery (%)</b>				
4-Bromofluorobenzene	%	99		6412955
D4-1,2-Dichloroethane	%	99		6412955
D8-Toluene	%	98		6412955
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				





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VERITAS

BV Labs Job #: B9U3463  
Report Date: 2019/10/31

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

### TEST SUMMARY

**BV Labs ID:** LDU332  
**Sample ID:** MW-5-2  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/10/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6412140	N/A	2019/10/31	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6415201	N/A	2019/10/31	Arefa Dabhad
Volatile Organic Compounds in Water	GC/MS	6412955	N/A	2019/10/30	Chandni Khawas



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BV Labs Job #: B9U3463

Report Date: 2019/10/31

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	11.0°C
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**Results relate only to the items tested.**



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VERITAS

BV Labs Job #: B9U3463

Report Date: 2019/10/31

### QUALITY ASSURANCE REPORT

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6412955	4-Bromofluorobenzene	2019/10/30	103	70 - 130	101	70 - 130	101	%		
6412955	D4-1,2-Dichloroethane	2019/10/30	100	70 - 130	103	70 - 130	101	%		
6412955	D8-Toluene	2019/10/30	96	70 - 130	99	70 - 130	98	%		
6412955	1,1,1,2-Tetrachloroethane	2019/10/30	85	70 - 130	85	70 - 130	<0.50	ug/L	NC	30
6412955	1,1,1-Trichloroethane	2019/10/30	89	70 - 130	89	70 - 130	<0.20	ug/L	NC	30
6412955	1,1,2,2-Tetrachloroethane	2019/10/30	95	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
6412955	1,1,2-Trichloroethane	2019/10/30	90	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
6412955	1,1-Dichloroethane	2019/10/30	91	70 - 130	92	70 - 130	<0.20	ug/L	NC	30
6412955	1,1-Dichloroethylene	2019/10/30	89	70 - 130	90	70 - 130	<0.20	ug/L	NC	30
6412955	1,2-Dichlorobenzene	2019/10/30	93	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
6412955	1,2-Dichloroethane	2019/10/30	93	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
6412955	1,2-Dichloropropane	2019/10/30	91	70 - 130	92	70 - 130	<0.20	ug/L	NC	30
6412955	1,3-Dichlorobenzene	2019/10/30	92	70 - 130	92	70 - 130	<0.50	ug/L	NC	30
6412955	1,4-Dichlorobenzene	2019/10/30	93	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
6412955	Acetone (2-Propanone)	2019/10/30	96	60 - 140	100	60 - 140	<10	ug/L	NC	30
6412955	Benzene	2019/10/30	90	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
6412955	Bromodichloromethane	2019/10/30	88	70 - 130	87	70 - 130	<0.50	ug/L	NC	30
6412955	Bromoform	2019/10/30	75	70 - 130	74	70 - 130	<1.0	ug/L	NC	30
6412955	Bromomethane	2019/10/30	95	60 - 140	94	60 - 140	<0.50	ug/L	NC	30
6412955	Carbon Tetrachloride	2019/10/30	82	70 - 130	81	70 - 130	<0.20	ug/L	NC	30
6412955	Chlorobenzene	2019/10/30	92	70 - 130	93	70 - 130	<0.20	ug/L	NC	30
6412955	Chloroform	2019/10/30	92	70 - 130	93	70 - 130	<0.20	ug/L	4.5	30
6412955	cis-1,2-Dichloroethylene	2019/10/30	94	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
6412955	cis-1,3-Dichloropropene	2019/10/30	92	70 - 130	88	70 - 130	<0.30	ug/L	NC	30
6412955	Dibromochloromethane	2019/10/30	80	70 - 130	81	70 - 130	<0.50	ug/L	NC	30
6412955	Dichlorodifluoromethane (FREON 12)	2019/10/30	86	60 - 140	88	60 - 140	<1.0	ug/L	NC	30
6412955	Ethylbenzene	2019/10/30	89	70 - 130	89	70 - 130	<0.20	ug/L	NC	30
6412955	Ethylene Dibromide	2019/10/30	94	70 - 130	97	70 - 130	<0.20	ug/L	NC	30
6412955	Hexane	2019/10/30	87	70 - 130	88	70 - 130	<1.0	ug/L	NC	30
6412955	Methyl Ethyl Ketone (2-Butanone)	2019/10/30	100	60 - 140	104	60 - 140	<10	ug/L	NC	30
6412955	Methyl Isobutyl Ketone	2019/10/30	98	70 - 130	98	70 - 130	<5.0	ug/L	NC	30
6412955	Methyl t-butyl ether (MTBE)	2019/10/30	92	70 - 130	93	70 - 130	<0.50	ug/L	NC	30



BUREAU  
VERITAS

BV Labs Job #: B9U3463  
Report Date: 2019/10/31

### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc  
Client Project #: 30029878  
Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6412955	Methylene Chloride(Dichloromethane)	2019/10/30	89	70 - 130	91	70 - 130	<2.0	ug/L	NC	30
6412955	o-Xylene	2019/10/30	89	70 - 130	89	70 - 130	<0.20	ug/L	NC	30
6412955	p+m-Xylene	2019/10/30	88	70 - 130	87	70 - 130	<0.20	ug/L	21	30
6412955	Styrene	2019/10/30	92	70 - 130	92	70 - 130	<0.50	ug/L	NC	30
6412955	Tetrachloroethylene	2019/10/30	91	70 - 130	92	70 - 130	<0.20	ug/L	NC	30
6412955	Toluene	2019/10/30	86	70 - 130	89	70 - 130	<0.20	ug/L	13	30
6412955	Total Xylenes	2019/10/30					<0.20	ug/L	21	30
6412955	trans-1,2-Dichloroethylene	2019/10/30	90	70 - 130	90	70 - 130	<0.50	ug/L	NC	30
6412955	trans-1,3-Dichloropropene	2019/10/30	91	70 - 130	86	70 - 130	<0.40	ug/L	NC	30
6412955	Trichloroethylene	2019/10/30	94	70 - 130	93	70 - 130	<0.20	ug/L	7.0	30
6412955	Trichlorofluoromethane (FREON 11)	2019/10/30	93	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
6412955	Vinyl Chloride	2019/10/30	89	70 - 130	90	70 - 130	<0.20	ug/L	NC	30
6415201	Dissolved Antimony (Sb)	2019/10/31	102	80 - 120	101	80 - 120	<0.50	ug/L		
6415201	Dissolved Arsenic (As)	2019/10/31	99	80 - 120	99	80 - 120	<1.0	ug/L		
6415201	Dissolved Barium (Ba)	2019/10/31	97	80 - 120	99	80 - 120	<2.0	ug/L		
6415201	Dissolved Beryllium (Be)	2019/10/31	99	80 - 120	100	80 - 120	<0.50	ug/L		
6415201	Dissolved Boron (B)	2019/10/31	98	80 - 120	98	80 - 120	<10	ug/L		
6415201	Dissolved Cadmium (Cd)	2019/10/31	100	80 - 120	100	80 - 120	<0.10	ug/L		
6415201	Dissolved Chromium (Cr)	2019/10/31	93	80 - 120	94	80 - 120	<5.0	ug/L		
6415201	Dissolved Cobalt (Co)	2019/10/31	96	80 - 120	100	80 - 120	<0.50	ug/L		
6415201	Dissolved Copper (Cu)	2019/10/31	97	80 - 120	100	80 - 120	<1.0	ug/L		
6415201	Dissolved Lead (Pb)	2019/10/31	95	80 - 120	97	80 - 120	<0.50	ug/L	NC	20
6415201	Dissolved Molybdenum (Mo)	2019/10/31	102	80 - 120	100	80 - 120	<0.50	ug/L		
6415201	Dissolved Nickel (Ni)	2019/10/31	93	80 - 120	98	80 - 120	<1.0	ug/L		
6415201	Dissolved Selenium (Se)	2019/10/31	97	80 - 120	99	80 - 120	<2.0	ug/L		
6415201	Dissolved Silver (Ag)	2019/10/31	97	80 - 120	98	80 - 120	<0.10	ug/L		
6415201	Dissolved Sodium (Na)	2019/10/31	NC	80 - 120	96	80 - 120	<100	ug/L		
6415201	Dissolved Thallium (Tl)	2019/10/31	96	80 - 120	98	80 - 120	<0.050	ug/L		
6415201	Dissolved Uranium (U)	2019/10/31	96	80 - 120	96	80 - 120	<0.10	ug/L		
6415201	Dissolved Vanadium (V)	2019/10/31	96	80 - 120	96	80 - 120	<0.50	ug/L		



BUREAU  
VERITAS

BV Labs Job #: B9U3463

Report Date: 2019/10/31

### QUALITY ASSURANCE REPORT(CONT'D)

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6415201	Dissolved Zinc (Zn)	2019/10/31	97	80 - 120	99	80 - 120	<5.0	ug/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU  
VERITAS

BV Labs Job #: B9U3463

Report Date: 2019/10/31

ARCADIS Canada Inc

Client Project #: 30029878

Sampler Initials: LG

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

A handwritten signature in black ink, appearing to read "A. Hamanov", written over a horizontal line.

Anastassia Hamanov, Scientific Specialist

---

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



6740 Campobello Road, Mississauga, Ontario L5N 2L8  
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 CAM FCD-01191/5

**CHAIN OF CUSTODY RECORD**

137755

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)				Project Information (where applicable)				Turnaround Time (TAT) Required								
Company Name: <u>Arcadis</u>		Company Name: _____				Quotation #: _____				<input type="checkbox"/> Regular TAT (5-7 days) Most analyses								
Contact Name: <u>Stephanie Joyce</u>		Contact Name: _____				P.O. #/ AFE#: _____				PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS								
Address: <u>1050 Morrison Dr. OTTAWA</u>		Address: _____				Project #: <u>30029878</u>				Rush TAT (Surcharges will be applied)								
Phone: _____ Fax: _____		Phone: _____ Fax: _____				Site Location: _____				<input type="checkbox"/> 1 Day <input checked="" type="checkbox"/> 2 Days <input type="checkbox"/> 3-4 Days								
Email: <u>Stephanie.Joyce@Arcadis.com</u>		Email: _____				Site #: _____				Date Required: _____								
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS LABORATORIES' DRINKING WATER CHAIN OF CUSTODY						Site Location Province: <u>ON</u>				Rush Confirmation #: _____								
Sampled By: <u>Lennart de Groot</u>																		
Regulation 153		Other Regulations		Analysis Requested				LABORATORY USE ONLY										
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Med/ Fine	<input type="checkbox"/> CCME	<input type="checkbox"/> Sanitary Sewer Bylaw	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CrVI	BTEX / PHC F1	PHCs F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Hg, Cr, V), ICPMS Metals, HWS - B)	REG 153 DISINTEGRATED METALS	HOLD - DO NOT ANALYZE	CUSTODY SEAL Y / N		COOLER TEMPERATURES	
<input type="checkbox"/> Table 2	<input checked="" type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> MISA	<input type="checkbox"/> Storm Sewer Bylaw											Present	Intact		
<input type="checkbox"/> Table 3	<input type="checkbox"/> Agri/ Other		<input type="checkbox"/> PWQO	Region _____														
<input type="checkbox"/> Table _____			<input type="checkbox"/> Other (Specify) _____															
FOR RSC (PLEASE CIRCLE) Y / N		REG 558 (MIN. 3 DAY TAT REQUIRED)						COOLING MEDIA PRESENT: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N										
Include Criteria on Certificate of Analysis: Y / N		SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS						COMMENTS										
SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX															
1 <u>mw-5-2</u>	<u>2019-10-29</u>	<u>13:00</u>	<u>WATER</u>	<u>4</u>	<u>X</u>													
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV JOB #										
<u>Lennart de Groot</u>		<u>2019-10-29</u>	<u>13:30</u>	<u>Stephanie Joyce</u>		<u>2019/10/29</u>	<u>13:30</u>											

29-Oct-19 13:30  
 Alisha Williamson  
 B9U3463  
 KJY OTT-001

RECEIVED IN OTTAWA

ON See Page 1

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at <http://www.bvlabs.com/terms-and-conditions>



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 CAM FCD-01191/5

CHAIN OF CUSTODY RECORD **137755**

Page 1 of 1

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required								
Company Name: <u>Arceadis</u>		Company Name:		Quotation #:		<input type="checkbox"/> Regular TAT (5-7 days) Most analyses								
Contact Name: <u>Stephanie Joyce</u>		Contact Name:		P.O. # / AFE:		<b>PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS</b>								
Address: <u>1050 Morrison Dr.</u>		Address:		Project #: <u>30029878</u>		Rush TAT (Surcharges will be applied)								
<u>OTTAWA</u>				Site Location:		<input type="checkbox"/> 1 Day <input checked="" type="checkbox"/> 2 Days <input type="checkbox"/> 3-4 Days								
Phone: Fax:		Phone: Fax:		Site #:		Date Required:								
Email: <u>Stephanie.Joyce@Arceadis.com</u>		Email:		Site Location Province: <u>ON</u>		Rush Confirmation #:								
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS LABORATORIES' DRINKING WATER CHAIN OF CUSTODY														
Regulation 153		Other Regulations		Analysis Requested		LABORATORY USE ONLY								
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> Table 2 <input checked="" type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/ Other <input type="checkbox"/> Table _____ FOR RSC (PLEASE CIRCLE) Y / N		<input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> MISA <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> PIWQO Region: _____ <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> REG 558 (MIN. 3 DAY TAT REQUIRED)		# OF CONTAINERS SUBMITTED FIELD FILTERED (CIRCLE) Metals / Hg / Cu BTEX/PHC F1 PHC F2 / F4 VOCs REG 153 METALS & INORGANICS REG 153 ICPMS METALS REG 153 METALS (Hg, Cu, V), ICPMS METALS (Mn, B) REG 153 <u>disturbed</u> METALS		CUSTODY SEAL Y / N Present: Intact COOLER TEMPERATURES 12, 10, 11 334 COOLING MEDIA PRESENT: Y N COMMENTS								
Include Criteria on Certificate of Analysis: Y / N														
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS														
SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH-MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / Cu	BTEX/PHC F1	PHC F2 / F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Hg, Cu, V), ICPMS METALS (Mn, B)	REG 153 <u>disturbed</u> METALS	HOLD-DO NOT ANALYZE	LABORATORY USE ONLY
1 <u>MW-S-2</u>	<u>2019-10-29</u>	<u>13:00</u>	<u>water</u>	<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>ON See Page 1</u>
2														
3														
4														
5														
6														
7														
8														
9														
10														
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH-MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH-MM)	BV JOB #						
<u>Lennart de Groot</u>		<u>2019-10-29</u>	<u>13:30</u>	<u>Kim Joyce</u>		<u>2019/10/29</u>	<u>13:30</u>							
				<u>Colin Gwynne</u>		<u>2019/10/30</u>	<u>08:00</u>							

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 COC-1004 (06/19) White: Maxxam - Yellow: Client





## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>WT2214822</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Arcadis Canada Inc.</b></p> <p><b>Contact</b> : Lennart DeGroot</p> <p><b>Address</b> : 1050 Morrison Drive Suite 201 Ottawa ON Canada K2H 1L1</p> <p><b>Telephone</b> : 613 721 0555</p> <p><b>Project</b> : 30127480</p> <p><b>PO</b> : ----</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : ----</p> <p><b>Site</b> : ----</p> <p><b>Quote number</b> : Waterloo 2022 Price List</p> <p><b>No. of samples received</b> : 42</p> <p><b>No. of samples analysed</b> : 42</p>	<p><b>Page</b> : 1 of 10</p> <p><b>Laboratory</b> : Waterloo - Environmental</p> <p><b>Account Manager</b> : Emily Smith</p> <p><b>Address</b> : 60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8</p> <p><b>Telephone</b> : +1 519 886 6910</p> <p><b>Date Samples Received</b> : 19-Sep-2022 14:55</p> <p><b>Date Analysis Commenced</b> : 21-Sep-2022</p> <p><b>Issue Date</b> : 31-Oct-2022 10:15</p>
--	--

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Amanda Ganouri-Lumsden	Department Manager - Microbiology and Prep	Centralized Prep, Waterloo, Ontario
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Sask Soils, Saskatoon, Saskatchewan
Jon Fisher	Department Manager - Inorganics	Inorganics, Waterloo, Ontario
Joseph Scharbach		Centralized Prep, Waterloo, Ontario
Niral Patel		Centralized Prep, Waterloo, Ontario



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
 LOR: Limit of Reporting (detection limit).

Unit	Description
-	No Unit
%	percent
µS/cm	Microsiemens per centimetre
mg/kg	milligrams per kilogram
mV	millivolts
ohm cm	ohm centimetre (resistivity)
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Sample Comments

Sample	Client Id	Comment
WT2214822-007	BH22-3-2	Sample(s) XXX: Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
WT2214822-020	MW22-4-2	Sample(s) XXX: Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
WT2214822-025	BH22-5-2	Sample(s) XXX: Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
WT2214822-030	MW22-6-2	Sample(s) XXX: Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.
WT2214822-038	BH22-7-5	Sample(s) XXX: Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.



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WT2214822-040

BH22-10-2

Sample(s) XXX: Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.

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### Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					MW22-2-1	MW22-2-2	MW22-2-3	MW22-2-4	MW22-2-5
Client sampling date / time					16-Sep-2022 09:00	16-Sep-2022 09:00	16-Sep-2022 09:00	16-Sep-2022 09:00	16-Sep-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	WT2214822-001	WT2214822-002	WT2214822-003	WT2214822-004	WT2214822-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	8.08	3.28	3.22	8.18	6.09

Please refer to the General Comments section for an explanation of any qualifiers detected.

### Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					BH22-3-1	BH22-3-2	BH22-3-3	BH22-3-4	BH22-8-1
Client sampling date / time					16-Sep-2022 12:00	16-Sep-2022 12:00	16-Sep-2022 12:00	16-Sep-2022 12:00	16-Sep-2022 14:00
Analyte	CAS Number	Method	LOR	Unit	WT2214822-006	WT2214822-007	WT2214822-008	WT2214822-009	WT2214822-010
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
conductivity (1:2 leachate)	----	E100-L	5.00	µS/cm	----	202	----	----	----
moisture	----	E144	0.25	%	5.84	9.93	7.95	13.5	8.06
oxidation-reduction potential [ORP]	----	E125	0.10	mV	----	486	----	----	----
pH (1:2 soil:CaCl2-aq)	----	E108A	0.10	pH units	----	7.54	----	----	----
resistivity	----	EC100R	100	ohm cm	----	4950	----	----	----
<b>Particle Size</b>									
passing (9.5 mm)	----	E181	1.0	%	----	100	----	----	----
passing (4.75 mm)	----	E181	1.0	%	----	100	----	----	----
passing (19 mm)	----	E181	1.0	%	----	100	----	----	----
passing (25.4 mm)	----	E181	1.0	%	----	100	----	----	----
passing (38.1 mm)	----	E181	1.0	%	----	100	----	----	----
passing (50.8 mm)	----	E181	1.0	%	----	100	----	----	----
passing (76.2 mm)	----	E181	1.0	%	----	100	----	----	----
passing (1.0 mm)	----	E182	1.0	%	----	100	----	----	----
passing (0.841 mm)	----	E182	1.0	%	----	100	----	----	----
passing (0.50 mm)	----	E182	1.0	%	----	99.8	----	----	----
passing (0.420 mm)	----	E182	1.0	%	----	99.7	----	----	----



## Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BH22-3-1	BH22-3-2	BH22-3-3	BH22-3-4	BH22-8-1
Client sampling date / time					16-Sep-2022 12:00	16-Sep-2022 12:00	16-Sep-2022 12:00	16-Sep-2022 12:00	16-Sep-2022 14:00
Analyte	CAS Number	Method	LOR	Unit	WT2214822-006	WT2214822-007	WT2214822-008	WT2214822-009	WT2214822-010
					Result	Result	Result	Result	Result
<b>Particle Size</b>									
passing (0.250 mm)	----	E182	1.0	%	----	95.9	----	----	----
passing (0.149 mm)	----	E182	1.0	%	----	75.6	----	----	----
passing (0.125 mm)	----	E182	1.0	%	----	61.8	----	----	----
passing (0.075 mm)	----	E182	1.0	%	----	33.1	----	----	----
passing (0.063 mm)	----	E182	1.0	%	----	22.7	----	----	----
passing (0.05 mm)	----	E182	1.0	%	----	13.4	----	----	----
passing (0.0312 mm)	----	E183	1.0	%	----	7.8	----	----	----
passing (0.020 mm)	----	E183	1.0	%	----	4.5	----	----	----
passing (0.005 mm)	----	E183	1.0	%	----	3.4	----	----	----
passing (0.004 mm)	----	E183	1.0	%	----	3.0	----	----	----
passing (0.002 mm)	----	E183	1.0	%	----	2.2	----	----	----
grain size curve	----	E185	-	-	----	See	----	----	----
passing (2.0 mm)	----	E181	1.0	%	----	Attached 100	----	----	----
<b>Inorganic Parameters</b>									
sulfides, acid volatile	----	E396-L	0.20	mg/kg	----	<0.20	----	----	----
<b>Leachable Anions &amp; Nutrients</b>									
chloride, soluble ion content	16887-00-6	E236.Cl	5.0	mg/kg	----	29.8	----	----	----
sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	----	<20	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					BH22-8-2	BH22-8-3	BH22-8-4	BH22-9-1	BH22-9-2
Client sampling date / time					16-Sep-2022 14:00	16-Sep-2022 14:00	16-Sep-2022 14:00	16-Sep-2022 13:00	16-Sep-2022 13:00
Analyte	CAS Number	Method	LOR	Unit	WT2214822-011	WT2214822-012	WT2214822-013	WT2214822-014	WT2214822-015
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	7.19	4.09	8.75	15.9	7.82

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					BH22-9-3	BH22-9-4	BH22-9-5	MW22-4-1	MW22-4-2
Client sampling date / time					16-Sep-2022 13:00	16-Sep-2022 13:00	16-Sep-2022 13:00	15-Sep-2022 15:45	15-Sep-2022 15:45
Analyte	CAS Number	Method	LOR	Unit	WT2214822-016	WT2214822-017	WT2214822-018	WT2214822-019	WT2214822-020
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	9.34	7.60	6.48	10.1	4.59
<b>Particle Size</b>									
sand (>0.075mm)	----	E178	1.0	%	----	----	----	----	69.3
finer (<0.075mm)	----	E178	1.0	%	----	----	----	----	30.6
texture class	----	E178	-	-	----	----	----	----	Coarse

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					MW22-4-3	MW22-4-4	MW22-4-5	BH22-5-1	BH22-5-2
Client sampling date / time					15-Sep-2022 15:45	15-Sep-2022 15:45	15-Sep-2022 15:45	16-Sep-2022 08:50	16-Sep-2022 08:50
Analyte	CAS Number	Method	LOR	Unit	WT2214822-021	WT2214822-022	WT2214822-023	WT2214822-024	WT2214822-025
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
moisture	---	E144	0.25	%	5.44	2.88	13.8	14.3	16.9
<b>Particle Size</b>									
passing (9.5 mm)	---	E181	1.0	%	---	---	---	---	100
passing (4.75 mm)	---	E181	1.0	%	---	---	---	---	100
passing (19 mm)	---	E181	1.0	%	---	---	---	---	100
passing (25.4 mm)	---	E181	1.0	%	---	---	---	---	100
passing (38.1 mm)	---	E181	1.0	%	---	---	---	---	100
passing (50.8 mm)	---	E181	1.0	%	---	---	---	---	100
passing (76.2 mm)	---	E181	1.0	%	---	---	---	---	100
passing (1.0 mm)	---	E182	1.0	%	---	---	---	---	94.3
passing (0.841 mm)	---	E182	1.0	%	---	---	---	---	93.2
passing (0.50 mm)	---	E182	1.0	%	---	---	---	---	80.7
passing (0.420 mm)	---	E182	1.0	%	---	---	---	---	77.9
passing (0.250 mm)	---	E182	1.0	%	---	---	---	---	74.3
passing (0.149 mm)	---	E182	1.0	%	---	---	---	---	66.6
passing (0.125 mm)	---	E182	1.0	%	---	---	---	---	61.9
passing (0.075 mm)	---	E182	1.0	%	---	---	---	---	52.2
passing (0.063 mm)	---	E182	1.0	%	---	---	---	---	43.4
passing (0.05 mm)	---	E182	1.0	%	---	---	---	---	33.8
passing (0.0312 mm)	---	E183	1.0	%	---	---	---	---	21.5
passing (0.020 mm)	---	E183	1.0	%	---	---	---	---	14.9
passing (0.005 mm)	---	E183	1.0	%	---	---	---	---	6.4
passing (0.004 mm)	---	E183	1.0	%	---	---	---	---	5.7
passing (0.002 mm)	---	E183	1.0	%	---	---	---	---	4.8
grain size curve	---	E185	-	-	---	---	---	---	See Attached
passing (2.0 mm)	---	E181	1.0	%	---	---	---	---	99.4

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Soil/Solid (Matrix: Soil/Solid)					Client sample ID	BH22-5-3	BH22-5-4	BH22-5-5	MW22-6-1	MW22-6-2
Client sampling date / time					16-Sep-2022 08:50	16-Sep-2022 08:50	16-Sep-2022 08:50	15-Sep-2022 11:15	15-Sep-2022 11:15	
Analyte	CAS Number	Method	LOR	Unit	WT2214822-026	WT2214822-027	WT2214822-028	WT2214822-029	WT2214822-030	
					Result	Result	Result	Result	Result	
<b>Physical Tests</b>										
conductivity (1:2 leachate)	---	E100-L	5.00	µS/cm	194	---	---	---	---	---
moisture	---	E144	0.25	%	4.82	4.42	5.22	11.9	5.34	
oxidation-reduction potential [ORP]	---	E125	0.10	mV	457	---	---	---	---	
pH (1:2 soil:CaCl2-aq)	---	E108A	0.10	pH units	7.52	---	---	---	---	
resistivity	---	EC100R	100	ohm cm	5150	---	---	---	---	
<b>Particle Size</b>										
sand (>0.075mm)	---	E178	1.0	%	---	---	---	---	78.5	
finer (<0.075mm)	---	E178	1.0	%	---	---	---	---	21.5	
texture class	---	E178	-	-	---	---	---	---	Coarse	
<b>Inorganic Parameters</b>										
sulfides, acid volatile	---	E396-L	0.20	mg/kg	<0.20	---	---	---	---	
<b>Leachable Anions &amp; Nutrients</b>										
chloride, soluble ion content	16887-00-6	E236.Cl	5.0	mg/kg	40.5	---	---	---	---	
sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	<20	---	---	---	---	

Please refer to the General Comments section for an explanation of any qualifiers detected.





## Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					MW22-6-3	MW22-6-4	MW22-6-5	BH22-7-1	BH22-7-2
Client sampling date / time					15-Sep-2022 11:15	15-Sep-2022 11:15	15-Sep-2022 11:15	15-Sep-2022 13:00	15-Sep-2022 13:00
Analyte	CAS Number	Method	LOR	Unit	WT2214822-031	WT2214822-032	WT2214822-033	WT2214822-034	WT2214822-035
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
conductivity (1:2 leachate)	----	E100-L	5.00	µS/cm	40.2	----	----	----	----
moisture	----	E144	0.25	%	5.90	10.6	19.4	10.6	5.59
oxidation-reduction potential [ORP]	----	E125	0.10	mV	409	----	----	----	----
pH (1:2 soil:CaCl2-aq)	----	E108A	0.10	pH units	6.63	----	----	----	----
resistivity	----	EC100R	100	ohm cm	24900	----	----	----	----
<b>Inorganic Parameters</b>									
sulfides, acid volatile	----	E396-L	0.20	mg/kg	<0.20	----	----	----	----
<b>Leachable Anions &amp; Nutrients</b>									
chloride, soluble ion content	16887-00-6	E236.Cl	5.0	mg/kg	<5.0	----	----	----	----
sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	<20	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					BH22-7-3	BH22-7-4	BH22-7-5	BH22-10-1	BH22-10-2
Client sampling date / time					15-Sep-2022 13:00	15-Sep-2022 13:00	15-Sep-2022 13:00	15-Sep-2022 14:10	15-Sep-2022 14:10
Analyte	CAS Number	Method	LOR	Unit	WT2214822-036	WT2214822-037	WT2214822-038	WT2214822-039	WT2214822-040
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	6.03	4.98	4.63	14.4	12.0
<b>Particle Size</b>									
sand (>0.075mm)	----	E178	1.0	%	----	----	83.9	----	38.1
finer (<0.075mm)	----	E178	1.0	%	----	----	16.1	----	61.9
texture class	----	E178	-	-	----	----	Coarse	----	Fine

Please refer to the General Comments section for an explanation of any qualifiers detected.



**Analytical Results**

Sub-Matrix: **Soil/Solid**

(Matrix: **Soil/Solid**)

					Client sample ID	BH22-10-3	BH22-10-4	----	----	----
					Client sampling date / time	15-Sep-2022 14:10	15-Sep-2022 14:10	----	----	----
Analyte	CAS Number	Method	LOR	Unit	WT2214822-041	WT2214822-042	-----	-----	-----	
					Result	Result	----	----	----	
<b>Physical Tests</b>										
moisture	----	E144	0.25	%	14.6	1.99	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.




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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>WT2214822</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Arcadis Canada Inc.</b></p> <p><b>Contact</b> : Lennart DeGroot</p> <p><b>Address</b> : 1050 Morrison Drive Suite 201 Ottawa ON Canada K2H 1L1</p> <p><b>Telephone</b> : 613 721 0555</p> <p><b>Project</b> : 30127480</p> <p><b>PO</b> : ----</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : ----</p> <p><b>Site</b> : ----</p> <p><b>Quote number</b> : Waterloo 2022 Price List</p> <p><b>No. of samples received</b> : 42</p> <p><b>No. of samples analysed</b> : 42</p>	<p><b>Page</b> : 1 of 15</p> <p><b>Laboratory</b> : Waterloo - Environmental</p> <p><b>Account Manager</b> : Emily Smith</p> <p><b>Address</b> : 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8</p> <p><b>Telephone</b> : +1 519 886 6910</p> <p><b>Date Samples Received</b> : 19-Sep-2022 14:55</p> <p><b>Issue Date</b> : 31-Oct-2022 10:15</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

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### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Inorganic Parameters : Acid Volatile Sulfide in Soil by Colourimetry (0.2 mg/kg)</b>										
Glass soil jar/Teflon lined cap BH22-3-2	E396-L	16-Sep-2022	21-Sep-2022	14 days	5 days	✓	21-Sep-2022	7 days	0 days	✓
<b>Inorganic Parameters : Acid Volatile Sulfide in Soil by Colourimetry (0.2 mg/kg)</b>										
Glass soil jar/Teflon lined cap BH22-5-3	E396-L	16-Sep-2022	21-Sep-2022	14 days	5 days	✓	21-Sep-2022	7 days	0 days	✓
<b>Inorganic Parameters : Acid Volatile Sulfide in Soil by Colourimetry (0.2 mg/kg)</b>										
Glass soil jar/Teflon lined cap MW22-6-3	E396-L	15-Sep-2022	21-Sep-2022	14 days	6 days	✓	21-Sep-2022	7 days	0 days	✓
<b>Leachable Anions &amp; Nutrients : Water Extractable Chloride by IC</b>										
Glass soil jar/Teflon lined cap BH22-3-2	E236.Cl	16-Sep-2022	26-Sep-2022	30 days	10 days	✓	28-Sep-2022	28 days	2 days	✓
<b>Leachable Anions &amp; Nutrients : Water Extractable Chloride by IC</b>										
Glass soil jar/Teflon lined cap BH22-5-3	E236.Cl	16-Sep-2022	26-Sep-2022	30 days	10 days	✓	28-Sep-2022	28 days	2 days	✓
<b>Leachable Anions &amp; Nutrients : Water Extractable Chloride by IC</b>										
Glass soil jar/Teflon lined cap MW22-6-3	E236.Cl	15-Sep-2022	26-Sep-2022	30 days	11 days	✓	28-Sep-2022	28 days	2 days	✓
<b>Leachable Anions &amp; Nutrients : Water Extractable Sulfate by IC</b>										
Glass soil jar/Teflon lined cap BH22-3-2	E236.SO4	16-Sep-2022	26-Sep-2022	30 days	10 days	✓	28-Sep-2022	28 days	2 days	✓



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Leachable Anions &amp; Nutrients : Water Extractable Sulfate by IC</b>											
Glass soil jar/Teflon lined cap BH22-5-3	E236.S04	16-Sep-2022	26-Sep-2022	30 days	10 days	✓	28-Sep-2022	28 days	2 days	✓	
<b>Leachable Anions &amp; Nutrients : Water Extractable Sulfate by IC</b>											
Glass soil jar/Teflon lined cap MW22-6-3	E236.S04	15-Sep-2022	26-Sep-2022	30 days	11 days	✓	28-Sep-2022	28 days	2 days	✓	
<b>Particle Size : CCME fine/coarse Particle Size Analysis by wet sieve</b>											
Glass soil jar/Teflon lined cap BH22-10-2	E178	15-Sep-2022	----	----	----		30-Sep-2022	180 days	15 days	✓	
<b>Particle Size : CCME fine/coarse Particle Size Analysis by wet sieve</b>											
Glass soil jar/Teflon lined cap BH22-7-5	E178	15-Sep-2022	----	----	----		30-Sep-2022	180 days	15 days	✓	
<b>Particle Size : CCME fine/coarse Particle Size Analysis by wet sieve</b>											
Glass soil jar/Teflon lined cap MW22-4-2	E178	15-Sep-2022	----	----	----		30-Sep-2022	180 days	15 days	✓	
<b>Particle Size : CCME fine/coarse Particle Size Analysis by wet sieve</b>											
Glass soil jar/Teflon lined cap MW22-6-2	E178	15-Sep-2022	----	----	----		30-Sep-2022	180 days	15 days	✓	
<b>Particle Size : Grain Size Report (Attachment) Hydrometer/Sieve Method</b>											
Glass soil jar/Teflon lined cap BH22-3-2	E185	16-Sep-2022	----	----	----		29-Sep-2022	----	----		
<b>Particle Size : Grain Size Report (Attachment) Hydrometer/Sieve Method</b>											
Glass soil jar/Teflon lined cap BH22-5-2	E185	16-Sep-2022	----	----	----		29-Sep-2022	----	----		
<b>Particle Size : Particle Size Analysis - Hydrometer</b>											
Glass soil jar/Teflon lined cap BH22-3-2	E183	16-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	365 days	7 days	✓	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Particle Size : Particle Size Analysis - Hydrometer</b>											
Glass soil jar/Teflon lined cap BH22-5-2	E183	16-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	365 days	7 days	✔	
<b>Particle Size : Particle Size Analysis - Sieve &lt;2mm</b>											
Glass soil jar/Teflon lined cap BH22-3-2	E182	16-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	365 days	7 days	✔	
<b>Particle Size : Particle Size Analysis - Sieve &lt;2mm</b>											
Glass soil jar/Teflon lined cap BH22-5-2	E182	16-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	365 days	7 days	✔	
<b>Particle Size : Particle Size Analysis - Sieve &gt;2mm</b>											
Glass soil jar/Teflon lined cap BH22-3-2	E181	16-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	365 days	7 days	✔	
<b>Particle Size : Particle Size Analysis - Sieve &gt;2mm</b>											
Glass soil jar/Teflon lined cap BH22-5-2	E181	16-Sep-2022	23-Sep-2022	----	----		23-Sep-2022	365 days	7 days	✔	
<b>Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)</b>											
Glass soil jar/Teflon lined cap BH22-3-2	E100-L	16-Sep-2022	28-Sep-2022	----	----		28-Sep-2022	30 days	12 days	✔	
<b>Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)</b>											
Glass soil jar/Teflon lined cap BH22-5-3	E100-L	16-Sep-2022	28-Sep-2022	----	----		28-Sep-2022	30 days	12 days	✔	
<b>Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)</b>											
Glass soil jar/Teflon lined cap MW22-6-3	E100-L	15-Sep-2022	28-Sep-2022	----	----		28-Sep-2022	30 days	13 days	✔	
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap BH22-10-1	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----		



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-10-2	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-10-3	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-10-4	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-3-1	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-3-2	E144	16-Sep-2022	----	----	----		21-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-3-3	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-3-4	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-5-1	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-5-2	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	





Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-5-3	E144	16-Sep-2022	----	----	----		21-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-5-4	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-5-5	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-7-1	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-7-2	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-7-3	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-7-4	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-7-5	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-8-1	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-8-2	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-8-3	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-8-4	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-9-1	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-9-2	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-9-3	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-9-4	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap BH22-9-5	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap MW22-2-1	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap MW22-2-2	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap MW22-2-3	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap MW22-2-4	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap MW22-2-5	E144	16-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap MW22-4-1	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap MW22-4-2	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap MW22-4-3	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap MW22-4-4	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap MW22-4-5	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap MW22-6-1	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap MW22-6-2	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap MW22-6-3	E144	15-Sep-2022	----	----	----		21-Sep-2022	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap MW22-6-4	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap MW22-6-5	E144	15-Sep-2022	----	----	----		22-Sep-2022	----	----		
<b>Physical Tests : ORP by Electrode</b>											
Glass soil jar/Teflon lined cap BH22-3-2	E125	16-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	180 days	6 days	✔	
<b>Physical Tests : ORP by Electrode</b>											
Glass soil jar/Teflon lined cap BH22-5-3	E125	16-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	180 days	6 days	✔	
<b>Physical Tests : ORP by Electrode</b>											
Glass soil jar/Teflon lined cap MW22-6-3	E125	15-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	180 days	7 days	✔	
<b>Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received</b>											
Glass soil jar/Teflon lined cap BH22-3-2	E108A	16-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	30 days	6 days	✔	



Matrix: **Soil/Solid**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received</b>										
Glass soil jar/Teflon lined cap BH22-5-3	E108A	16-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	30 days	6 days	✔
<b>Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received</b>										
Glass soil jar/Teflon lined cap MW22-6-3	E108A	15-Sep-2022	22-Sep-2022	----	----		22-Sep-2022	30 days	7 days	✔

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acid Volatile Sulfide in Soil by Colourimetry (0.2 mg/kg)	E396-L	657907	1	4	25.0	4.7	✔
CCME fine/coarse Particle Size Analysis by wet sieve	E178	674236	1	8	12.5	5.0	✔
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	659587	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	659122	4	70	5.7	5.0	✔
ORP by Electrode	E125	659317	1	3	33.3	5.0	✔
Particle Size Analysis - Hydrometer	E183	663154	1	5	20.0	5.0	✔
Particle Size Analysis - Sieve <2mm	E182	663153	1	5	20.0	5.0	✔
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A	659219	1	20	5.0	5.0	✔
Water Extractable Chloride by IC	E236.Cl	659594	1	3	33.3	5.0	✔
Water Extractable Sulfate by IC	E236.SO4	659593	1	3	33.3	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Acid Volatile Sulfide in Soil by Colourimetry (0.2 mg/kg)	E396-L	657907	1	4	25.0	4.7	✔
CCME fine/coarse Particle Size Analysis by wet sieve	E178	674236	1	8	12.5	5.0	✔
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	659587	2	19	10.5	10.0	✔
Moisture Content by Gravimetry	E144	659122	4	70	5.7	5.0	✔
ORP by Electrode	E125	659317	1	3	33.3	5.0	✔
Particle Size Analysis - Hydrometer	E183	663154	1	5	20.0	5.0	✔
Particle Size Analysis - Sieve <2mm	E182	663153	1	5	20.0	5.0	✔
Particle Size Analysis - Sieve >2mm	E181	663152	1	5	20.0	5.0	✔
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A	659219	1	20	5.0	5.0	✔
Water Extractable Chloride by IC	E236.Cl	659594	2	3	66.6	10.0	✔
Water Extractable Sulfate by IC	E236.SO4	659593	2	3	66.6	10.0	✔
<b>Method Blanks (MB)</b>							
Acid Volatile Sulfide in Soil by Colourimetry (0.2 mg/kg)	E396-L	657907	1	4	25.0	4.7	✔
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	659587	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	659122	4	70	5.7	5.0	✔
Water Extractable Chloride by IC	E236.Cl	659594	1	3	33.3	5.0	✔
Water Extractable Sulfate by IC	E236.SO4	659593	1	3	33.3	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L Waterloo - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Conductance is measured in the fluid that is observed in the upper layer.
pH by Meter (1:2 Soil:0.01M CaCl <sub>2</sub> Extraction) - As Received	E108A Waterloo - Environmental	Soil/Solid	MOEE E3137A	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C) and is carried out in accordance with procedures described in the Analytical Protocol (prescriptive method). A minimum 10g portion of the sample, as received, is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil by centrifuging, settling, or decanting and then analyzed using a pH meter and electrode.
ORP by Electrode	E125 Waterloo - Environmental	Soil/Solid	APHA 2580 (mod)	Oxidation Reduction Potential (ORP) is reported as the oxidation-reduction potential of the platinum metal-reference electrode employed in the analysis, measured in mV.
Moisture Content by Gravimetry	E144 Waterloo - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
CCME fine/coarse Particle Size Analysis by wet sieve	E178 Saskatoon - Environmental	Soil/Solid	CCME Vol 4 Analytical Methods	An air-dried sample is reduced to < 2 mm size and mixed with a dispersing agent (sodium hexametaphosphate). The sample is washed through a 200 mesh (0.075 mm) sieve. The retained mass of sample is used to determine % sand fraction. If the percentage of sand is >50%, the soil is considered to be coarse textured soil. If the percentage of sand is <50%, the soil is considered to be fine textured.
Particle Size Analysis - Sieve >2mm	E181 Saskatoon - Environmental	Soil/Solid	ASTM D6913-17 (mod)	Soil samples are disaggregated and sieved through a 2mm sieve. Material retained on the sieve is then further sieved through a series of sieves. The amount passing through the sieves is measured gravimetrically.
Particle Size Analysis - Sieve <2mm	E182 Saskatoon - Environmental	Soil/Solid	ASTM D6913-17 (mod)	Soil samples are disaggregated and sieved through a 2mm sieve. Material passed through the sieve is then further disaggregated using calgon solution and passed through a series of sieves. The amount passing through the sieves is measured gravimetrically.
Particle Size Analysis - Hydrometer	E183 Saskatoon - Environmental	Soil/Solid	ASTM D7928-21 (mod)	Soil material is separated from coarse material (>2mm). A specimen is then disaggregated through mixing with Calgon solution. The material is then suspended in solution wherein regular hydrometer readings are taken at specific time intervals. The principles of Stokes' Law are applied to determine the amount of material remaining in solution as well as the maximum particle size remaining in solution at the specified time.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Grain Size Report (Attachment) Hydrometer/Sieve Method	E185  Saskatoon - Environmental	Soil/Solid	ASTM D6913/D7928	A grain size curve is a graphical representation of the particle sizing of a sample representing the percent passing against the effective particle size.
Water Extractable Chloride by IC	E236.Cl  Waterloo - Environmental	Soil/Solid	EPA 300.1	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Water Extractable Sulfate by IC	E236.SO4  Waterloo - Environmental	Soil/Solid	EPA 300.1	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Acid Volatile Sulfide in Soil by Colourimetry (0.2 mg/kg)	E396-L  Waterloo - Environmental	Soil/Solid	APHA 4500S2J	This analysis is carried out in accordance with the method described in APHA 4500 S2-J. After extraction the Acid Volatile Sulphide is determined colourimetrically.
Resistivity Calculation for Soil Using E100-L	EC100R  Waterloo - Environmental	Soil/Solid	APHA 2510 B	Soil Resistivity (calculated) is determined as the inverse of the conductivity of a 2:1 water:soil leachate (dry weight). This method is intended as a rapid approximation for Soil Resistivity. Where high accuracy results are required, direct measurement of Soil Resistivity by the Wenner Four-Electrode Method (ASTM G57) is recommended.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108  Waterloo - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Leach 1:2 Soil : 0.01CaCl2 - As Received for pH	EP108A  Waterloo - Environmental	Soil/Solid	MOEE E3137A	A minimum 10g portion of the sample, as received, is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil by centrifuging, settling or decanting and then analyzed using a pH meter and electrode.
Preparation of ORP by Electrode	EP125  Waterloo - Environmental	Soil/Solid	APHA 2580 (mod)	Field-moist sample is extracted in a 1:2 ratio with DI water and then analyzed by ORP meter.
Anions Leach 1:10 Soil:Water (Dry)	EP236  Waterloo - Environmental	Soil/Solid	EPA 300.1	5 grams of dried soil is mixed with 50 grams of distilled water for a minimum of 30 minutes. The extract is filtered and analyzed by ion chromatography.
Distillation for Acid Volatile Sulfide in Soil	EP396-L  Waterloo - Environmental	Soil/Solid	APHA 4500S2J	Acid Volatile Sulfide is determined by colourimetric measurement on a sediment sample that has been treated with hydrochloric acid within a purge and trap system, where the evolved hydrogen sulfide gas is carried into a basic solution by argon gas for analysis.



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Project : 30127480



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dry and Grind in Soil/Solid <60°C	EPP442  Waterloo - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.



## QUALITY CONTROL REPORT

<b>Work Order</b>	: <b>WT2214822</b>	<b>Page</b>	: 1 of 7
<b>Amendment</b>	: <b>1</b>		
<b>Client</b>	: Arcadis Canada Inc.	<b>Laboratory</b>	: Waterloo - Environmental
<b>Contact</b>	: Lennart DeGroot	<b>Account Manager</b>	: Emily Smith
<b>Address</b>	: 1050 Morrison Drive Suite 201 Ottawa ON Canada K2H 1L1	<b>Address</b>	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
<b>Telephone</b>	:	<b>Telephone</b>	: +1 519 886 6910
<b>Project</b>	: 30127480	<b>Date Samples Received</b>	: 19-Sep-2022 14:55
<b>PO</b>	: ----	<b>Date Analysis Commenced</b>	: 21-Sep-2022
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 31-Oct-2022 10:15
<b>Sampler</b>	: ----                    613 721 0555		
<b>Site</b>	: ----		
<b>Quote number</b>	: Waterloo 2022 Price List		
<b>No. of samples received</b>	: 42		
<b>No. of samples analysed</b>	: 42		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Amanda Ganouri-Lumsden	Department Manager - Microbiology and Prep	Waterloo Centralized Prep, Waterloo, Ontario
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Work Order : WT2214822 Amendment 1  
Client : Arcadis Canada Inc.  
Project : 30127480



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Soil/Solid

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 659122)</b>											
WT2214822-001	MW22-2-1	moisture	----	E144	0.25	%	8.08	7.88	2.55%	20%	----
<b>Physical Tests (QC Lot: 659123)</b>											
WT2214822-010	BH22-8-1	moisture	----	E144	0.25	%	8.06	8.07	0.109%	20%	----
<b>Physical Tests (QC Lot: 659219)</b>											
TY2201744-003	Anonymous	pH (1:2 soil:CaCl2-aq)	----	E108A	0.10	pH units	7.56	7.69	1.70%	5%	----
<b>Physical Tests (QC Lot: 659220)</b>											
WT2214822-032	MW22-6-4	moisture	----	E144	0.25	%	10.6	10.2	3.74%	20%	----
<b>Physical Tests (QC Lot: 659317)</b>											
WT2214822-007	BH22-3-2	oxidation-reduction potential [ORP]	----	E125	0.10	mV	486	472	2.92%	25%	----
<b>Physical Tests (QC Lot: 659587)</b>											
WT2214860-003	Anonymous	conductivity (1:2 leachate)	----	E100-L	5.00	µS/cm	0.492 mS/cm	510	3.59%	20%	----
<b>Physical Tests (QC Lot: 660485)</b>											
WT2214804-001	Anonymous	moisture	----	E144	0.25	%	78.4	78.1	0.386%	20%	----
<b>Particle Size (QC Lot: 663153)</b>											
WT2214849-001	Anonymous	passing (0.05 mm)	----	E182	1.0	%	84.1	83.3	0.977%	15%	----
		passing (0.063 mm)	----	E182	1.0	%	90.4	90.1	0.353%	15%	----
		passing (0.075 mm)	----	E182	1.0	%	96.3	96.4	0.146%	15%	----
		passing (0.125 mm)	----	E182	1.0	%	96.9	97.0	0.137%	15%	----
		passing (0.149 mm)	----	E182	1.0	%	97.2	97.3	0.133%	15%	----
		passing (0.250 mm)	----	E182	1.0	%	97.6	97.7	0.0742%	15%	----
		passing (0.420 mm)	----	E182	1.0	%	98.0	98.0	0.0182%	15%	----
		passing (0.50 mm)	----	E182	1.0	%	98.1	98.1	0.00625%	15%	----
		passing (0.841 mm)	----	E182	1.0	%	98.5	98.4	0.0404%	15%	----
passing (1.0 mm)	----	E182	1.0	%	98.5	98.5	0.0361%	15%	----		
<b>Particle Size (QC Lot: 663154)</b>											
WT2214849-001	Anonymous	passing (0.002 mm)	----	E183	1.0	%	27.4	28.4	3.70%	20%	----
		passing (0.004 mm)	----	E183	1.0	%	45.0	47.2	4.84%	20%	----
		passing (0.005 mm)	----	E183	1.0	%	51.9	53.8	3.66%	20%	----
		passing (0.020 mm)	----	E183	1.0	%	75.0	74.1	1.19%	20%	----
		passing (0.0312 mm)	----	E183	1.0	%	77.6	76.6	1.35%	20%	----



Sub-Matrix: Soil/Solid					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Particle Size (QC Lot: 674236)</b>											
SK2205375-027	Anonymous	sand (>0.075mm)	----	E178	1.0	%	<1.0	<1.0	0	Diff <2x LOR	----
<b>Inorganic Parameters (QC Lot: 657907)</b>											
WT2214267-003	Anonymous	sulfides, acid volatile	----	E396-L	0.20	mg/kg	0.24	0.33	0.09	Diff <2x LOR	----
<b>Leachable Anions &amp; Nutrients (QC Lot: 659593)</b>											
WT2214822-007	BH22-3-2	sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	<20	<20	0	Diff <2x LOR	----
<b>Leachable Anions &amp; Nutrients (QC Lot: 659594)</b>											
WT2214822-007	BH22-3-2	chloride, soluble ion content	16887-00-6	E236.Cl	5.0	mg/kg	29.8	28.8	1.0	Diff <2x LOR	----

### Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 659122)</b>						
moisture	----	E144	0.25	%	<0.25	----
<b>Physical Tests (QCLot: 659123)</b>						
moisture	----	E144	0.25	%	<0.25	----
<b>Physical Tests (QCLot: 659220)</b>						
moisture	----	E144	0.25	%	<0.25	----
<b>Physical Tests (QCLot: 659587)</b>						
conductivity (1:2 leachate)	----	E100-L	5	µS/cm	<5.00	----
<b>Physical Tests (QCLot: 660485)</b>						
moisture	----	E144	0.25	%	<0.25	----
<b>Inorganic Parameters (QCLot: 657907)</b>						
sulfides, acid volatile	----	E396-L	0.2	mg/kg	<0.20	----
<b>Leachable Anions &amp; Nutrients (QCLot: 659593)</b>						
sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	<20	----
<b>Leachable Anions &amp; Nutrients (QCLot: 659594)</b>						
chloride, soluble ion content	16887-00-6	E236.Cl	5	mg/kg	<5.0	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 659122)</b>									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
<b>Physical Tests (QCLot: 659123)</b>									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
<b>Physical Tests (QCLot: 659219)</b>									
pH (1:2 soil:CaCl2-aq)	----	E108A	----	pH units	7 pH units	101	98.0	102	----
<b>Physical Tests (QCLot: 659220)</b>									
moisture	----	E144	0.25	%	50 %	101	90.0	110	----
<b>Physical Tests (QCLot: 659587)</b>									
conductivity (1:2 leachate)	----	E100-L	5	µS/cm	1409 µS/cm	105	90.0	110	----
<b>Physical Tests (QCLot: 660485)</b>									
moisture	----	E144	0.25	%	50 %	101	90.0	110	----
<b>Inorganic Parameters (QCLot: 657907)</b>									
sulfides, acid volatile	----	E396-L	0.2	mg/kg	2.536 mg/kg	99.4	70.0	130	----
<b>Leachable Anions &amp; Nutrients (QCLot: 659593)</b>									
sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	5000 mg/kg	102	70.0	130	----
<b>Leachable Anions &amp; Nutrients (QCLot: 659594)</b>									
chloride, soluble ion content	16887-00-6	E236.Cl	5	mg/kg	5000 mg/kg	101	80.0	120	----



## Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
<b>Physical Tests (QCLot: 659317)</b>									
	RM	oxidation-reduction potential [ORP]	----	E125	475 mV	102	80.0	120	----
<b>Physical Tests (QCLot: 659587)</b>									
	RM	conductivity (1:2 leachate)	----	E100-L	1031.5 µS/cm	111	70.0	130	----
<b>Particle Size (QCLot: 663152)</b>									
	RM	passing (19 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (2.0 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (25.4 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (38.1 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (4.75 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (50.8 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (76.2 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (9.5 mm)	----	E181	100 %	100	90.0	110	----
<b>Particle Size (QCLot: 663153)</b>									
	RM	passing (0.05 mm)	----	E182	49.81 %	99.2	90.0	110	----
	RM	passing (0.063 mm)	----	E182	54.27 %	98.6	90.8	109	----
	RM	passing (0.075 mm)	----	E182	58.38 %	98.2	91.4	109	----
	RM	passing (0.125 mm)	----	E182	68.06 %	99.3	92.7	107	----
	RM	passing (0.149 mm)	----	E182	72.71 %	99.7	93.1	107	----
	RM	passing (0.250 mm)	----	E182	85.38 %	99.2	94.1	106	----
	RM	passing (0.420 mm)	----	E182	92.78 %	99.7	94.6	105	----
	RM	passing (0.50 mm)	----	E182	93.78 %	99.7	94.7	105	----
	RM	passing (0.841 mm)	----	E182	97.34 %	99.8	94.9	105	----
	RM	passing (1.0 mm)	----	E182	97.77 %	99.8	94.9	105	----
<b>Particle Size (QCLot: 663154)</b>									
	RM	passing (0.002 mm)	----	E183	21.14 %	89.0	76.0	124	----
	RM	passing (0.004 mm)	----	E183	24.64 %	93.7	80.0	120	----
	RM	passing (0.005 mm)	----	E183	25.91 %	96.3	82.0	118	----
	RM	passing (0.020 mm)	----	E183	37.12 %	96.9	87.0	113	----



Sub-Matrix:

					Reference Material (RM) Report				
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
<b>Particle Size (QCLot: 663154) - continued</b>									
	RM	passing (0.0312 mm)	----	E183	42.58 %	98.7	88.0	112	----
<b>Particle Size (QCLot: 674236)</b>									
	RM	sand (>0.075mm)	----	E178	42.85 %	93.6	88.0	112	----
<b>Leachable Anions &amp; Nutrients (QCLot: 659593)</b>									
	RM	sulfate, soluble ion content	14808-79-8	E236.SO4	217 mg/kg	107	60.0	140	----
<b>Leachable Anions &amp; Nutrients (QCLot: 659594)</b>									
	RM	chloride, soluble ion content	16887-00-6	E236.Cl	673 mg/kg	99.4	70.0	130	----



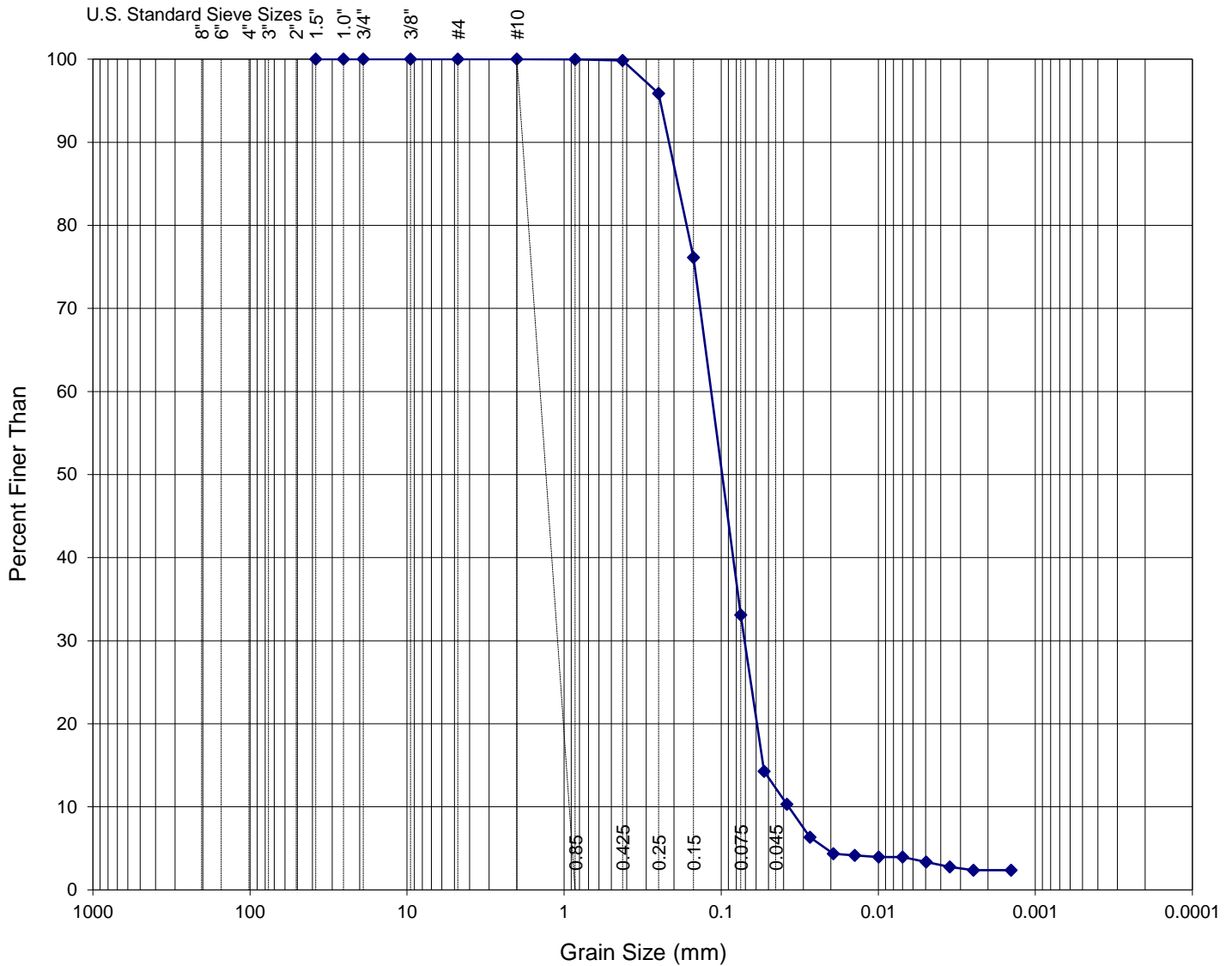
# ALS Laboratory Group

819-58th Street, Saskatoon, SK

## PARTICLE SIZE DISTRIBUTION CURVE

Client Name: WT2214822007  
 Project Number:  
 Client Sample ID BH22-3-2  
 Lab Sample ID WT2214822007  
 Date Sample Received 00-Jan-00  
 Test Completion Date: 28-Sep-22  
 Analyst: SIH

BOULDERS	COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		



### METHOD DESCRIPTION

Method Reference: ASTM D6913 & D7928

Dispersion method: Mechanical

Dispersion period: 1 minute cm/s

### DESCRIPTION OF SAND AND GRAVEL PARTICLES

Shape: Angular

Hardness: Hard

### SUMMARY OF RESULTS

GRAIN SIZE	WT %	DIA. RANGE (mm)
% GRAVEL :	<1	> 4.75
% COARSE SAND :	<1	2.0 - 4.75
% MEDIUM SAND :	<1	0.425 - 2.0
% FINE SAND :	66.73	0.075 - 0.425
% SILT :	29.71	0.075 - 0.005
% CLAY :	3.39	< 0.005

# ALS Laboratory Group

819-58th Street, Saskatoon, SK

## PARTICLE SIZE DISTRIBUTION CURVE

Client Name: WT2214822020

Project Number:

Client Sample ID MW22-4-2

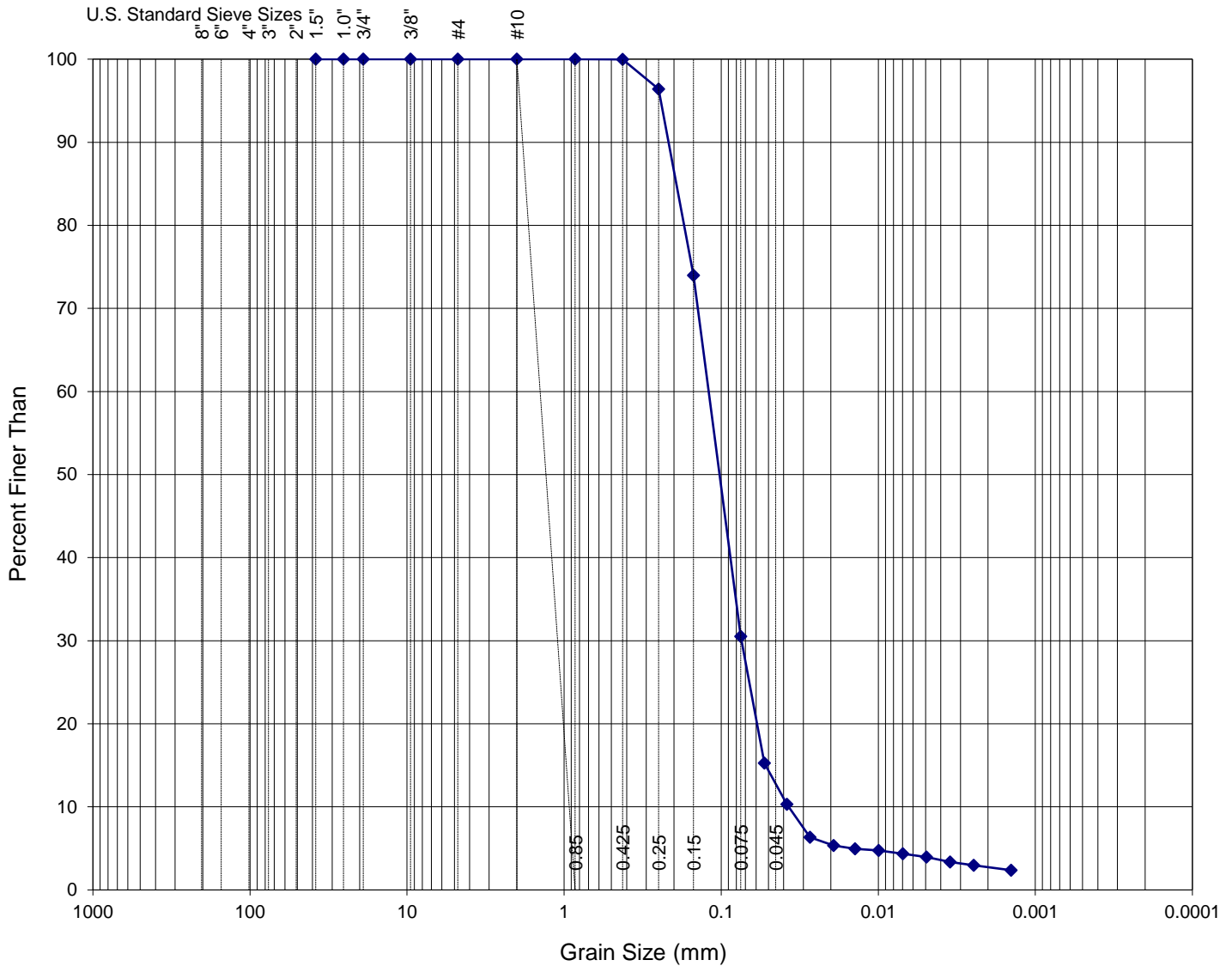
Lab Sample ID WT2214822020

Date Sample Received 00-Jan-00

Test Completion Date: 28-Sep-22

Analyst: SIH

BOULDERS	COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		



### METHOD DESCRIPTION

Method Reference: ASTM D6913 & D7928

Dispersion method: Mechanical

Dispersion period: 1 minute cm/s

### DESCRIPTION OF SAND AND GRAVEL PARTICLES

Shape: Angular

Hardness: Hard

### SUMMARY OF RESULTS

GRAIN SIZE	WT %	DIA. RANGE (mm)
% GRAVEL :	<1	> 4.75
% COARSE SAND :	<1	2.0 - 4.75
% MEDIUM SAND :	<1	0.425 - 2.0
% FINE SAND :	69.44	0.075 - 0.425
% SILT :	26.55	0.075 - 0.005
% CLAY :	3.98	< 0.005

# ALS Laboratory Group

819-58th Street, Saskatoon, SK

## PARTICLE SIZE DISTRIBUTION CURVE

Client Name: WT2214822025

Project Number:

Client Sample ID BH22-5-2

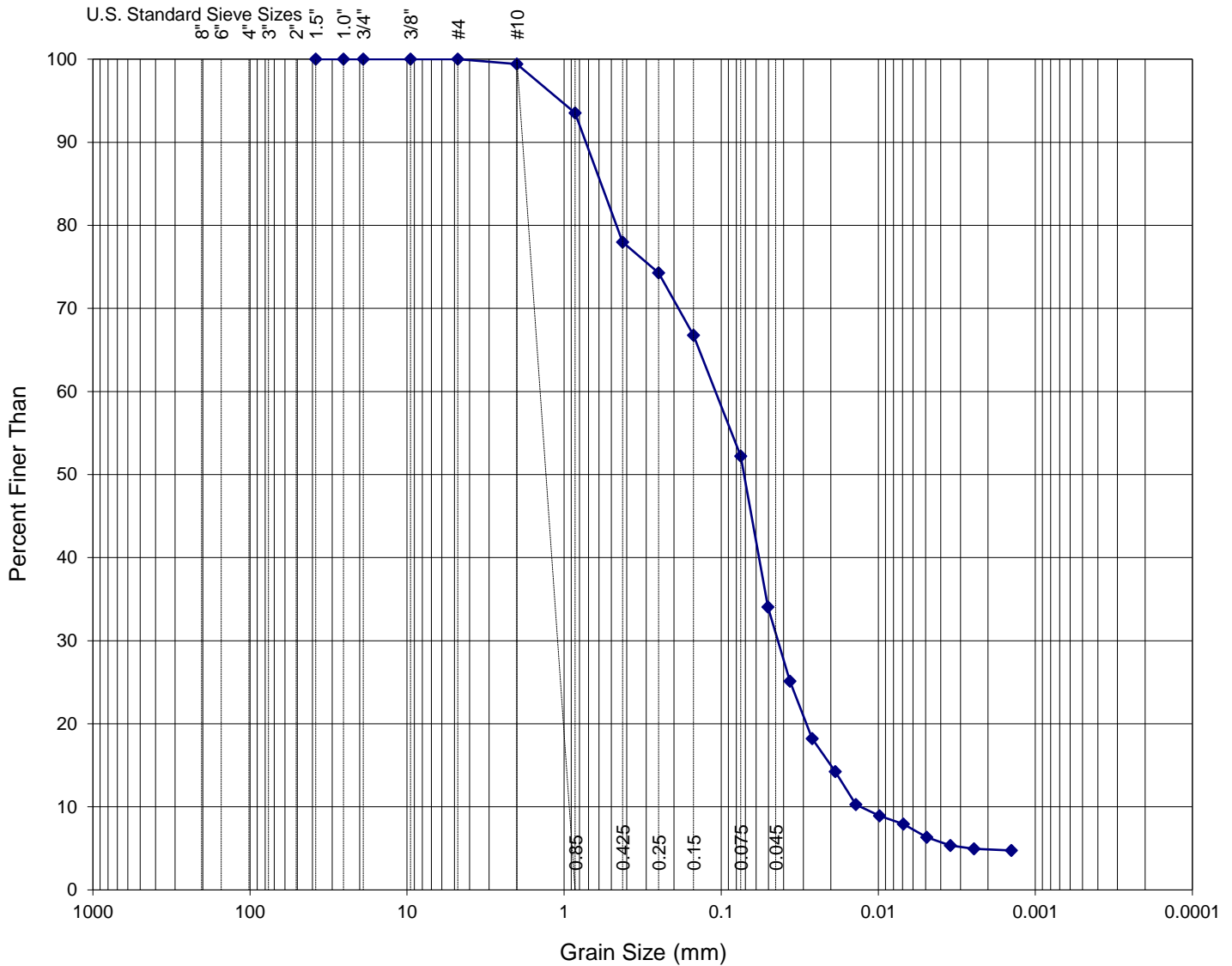
Lab Sample ID WT2214822025

Date Sample Received 00-Jan-00

Test Completion Date: 28-Sep-22

Analyst: SIH

BOULDERS	COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		



### METHOD DESCRIPTION

Method Reference: ASTM D6913 & D7928

Dispersion method: Mechanical

Dispersion period: 1 minute cm/s

### DESCRIPTION OF SAND AND GRAVEL PARTICLES

Shape: Angular

Hardness: Hard

### SUMMARY OF RESULTS

GRAIN SIZE	WT %	DIA. RANGE (mm)
% GRAVEL :	<1	> 4.75
% COARSE SAND :	<1	2.0 - 4.75
% MEDIUM SAND :	21.40	0.425 - 2.0
% FINE SAND :	25.78	0.075 - 0.425
% SILT :	45.80	0.075 - 0.005
% CLAY :	6.42	< 0.005

# ALS Laboratory Group

819-58th Street, Saskatoon, SK

## PARTICLE SIZE DISTRIBUTION CURVE

Client Name: WT2214822030

Project Number:

Client Sample ID MW22-6-2

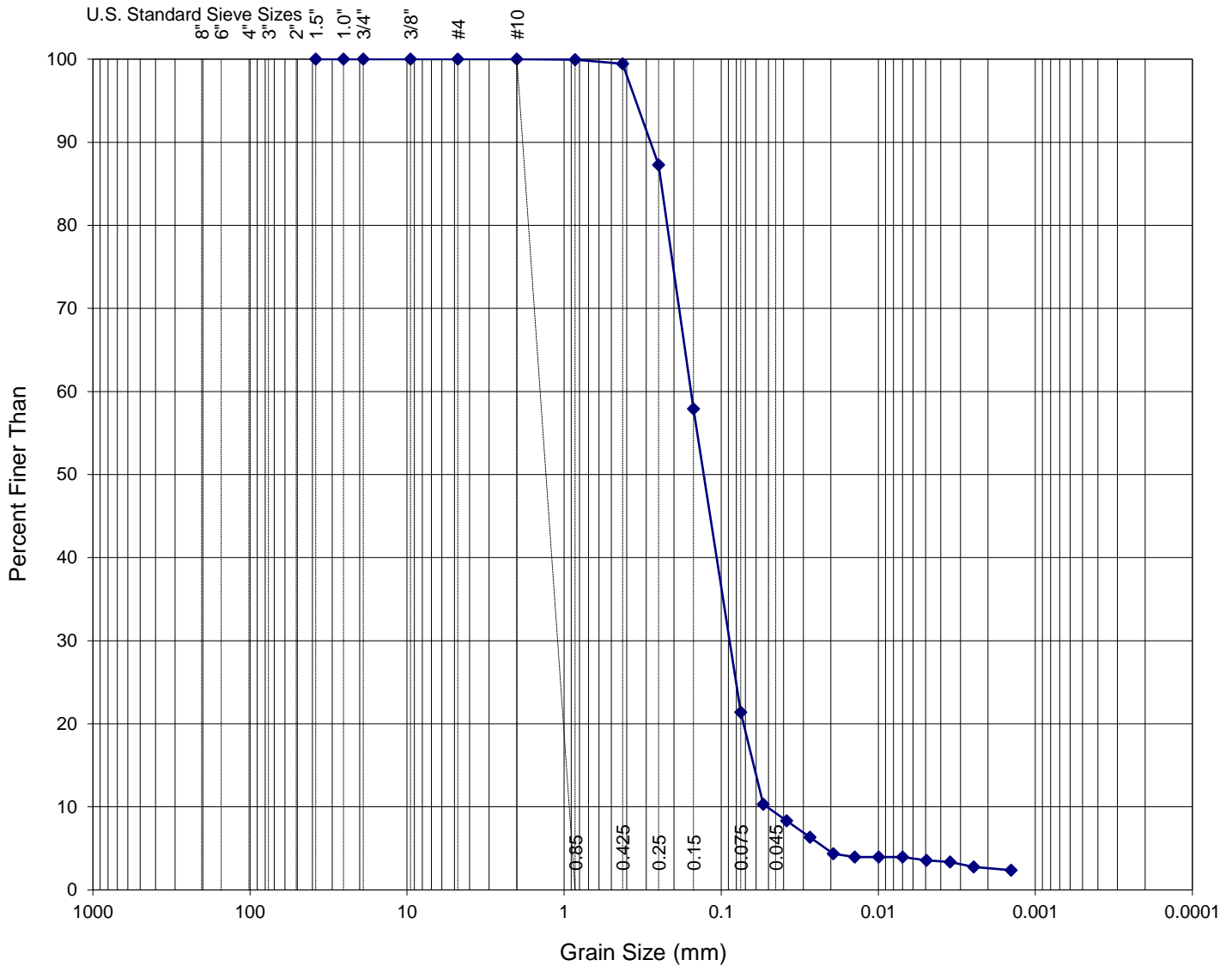
Lab Sample ID WT2214822030

Date Sample Received 00-Jan-00

Test Completion Date: 28-Sep-22

Analyst: SIH

BOULDERS	COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		



### METHOD DESCRIPTION

Method Reference: ASTM D6913 & D7928

Dispersion method: Mechanical

Dispersion period: 1 minute cm/s

### DESCRIPTION OF SAND AND GRAVEL PARTICLES

Shape: Angular

Hardness: Hard

### SUMMARY OF RESULTS

GRAIN SIZE	WT %	DIA. RANGE (mm)
% GRAVEL :	<1	> 4.75
% COARSE SAND :	<1	2.0 - 4.75
% MEDIUM SAND :	<1	0.425 - 2.0
% FINE SAND :	78.05	0.075 - 0.425
% SILT :	17.81	0.075 - 0.005
% CLAY :	3.58	< 0.005

# ALS Laboratory Group

819-58th Street, Saskatoon, SK

## PARTICLE SIZE DISTRIBUTION CURVE

Client Name: WT2214822038

Project Number:

Client Sample ID BH22-7-5

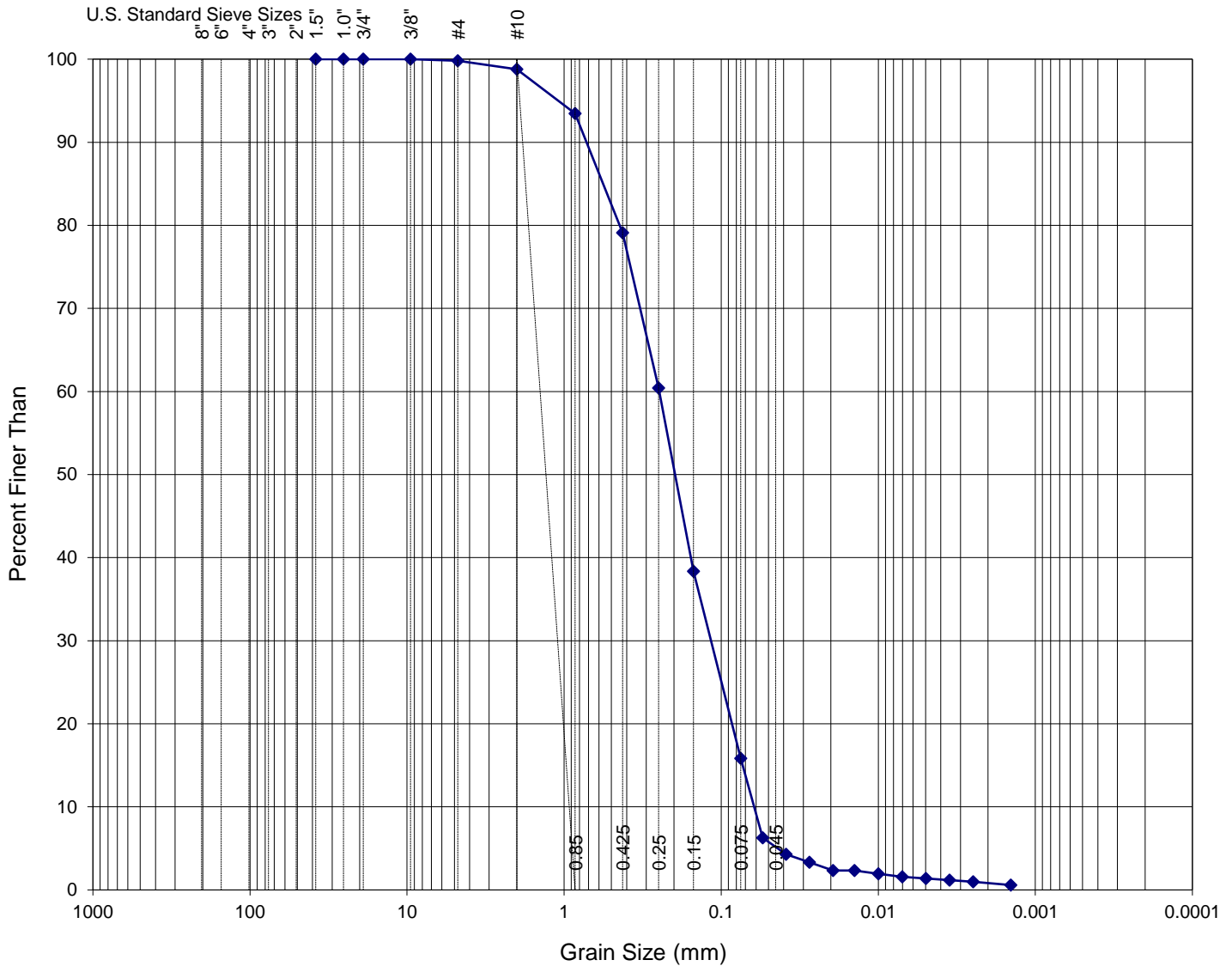
Lab Sample ID WT2214822038

Date Sample Received 00-Jan-00

Test Completion Date: 28-Sep-22

Analyst: SIH

BOULDERS	COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		



### METHOD DESCRIPTION

Method Reference: ASTM D6913 & D7928

Dispersion method: Mechanical

Dispersion period: 1 minute cm/s

### DESCRIPTION OF SAND AND GRAVEL PARTICLES

Shape: Angular

Hardness: Hard

### SUMMARY OF RESULTS

GRAIN SIZE	WT %	DIA. RANGE (mm)
% GRAVEL :	<1	> 4.75
% COARSE SAND :	1.02	2.0 - 4.75
% MEDIUM SAND :	19.69	0.425 - 2.0
% FINE SAND :	63.24	0.075 - 0.425
% SILT :	14.47	0.075 - 0.005
% CLAY :	1.37	< 0.005





**Chain of Custody (COC) / Analytical Request Form**

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COC Number: 17 -

Page 1 of 5

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>					
Company: ARCADIS Canada Inc.		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply					
Contact: Lennart de Groot		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days)	4 day [P4-20%] <input type="checkbox"/>		EMERGENCY	1 Business day [E - 100%] <input type="checkbox"/>	
Phone: 613-809-2379		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>	
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-50%] <input type="checkbox"/>				
Street: 1050 Morrison Drive		Email 1 or Fax: Lennart.deGroot@arcadis.com			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm					
City/Province: Ottawa, ON		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.					
Postal Code: K2H 8K7		Email 3			<b>Analysis Request</b>					
<b>Invoice To</b>		<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below					
Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			<b>NUMBER OF CONTAINERS</b>	<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">moisture content</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Hydrometer Analysis</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Full Grain Size Plot</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Conductivity</div> </div> <div style="text-align: center; margin-top: 20px;"> <p>Am 13</p> <p>Environmental Division Waterloo Work Order Reference <b>WT2214822</b></p> <p>Telephone : + 1 519 886 8910</p> </div>				
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax: Lennart.deGroot@arcadis.com								
Company:		Email 2: AccountsPayable.canada@arcadis.com								
Contact: AccountsPayable.canada@arcadis.com										
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>								
ALS Account # / Quote #: Q88485 (2022 SOA)		AFE/Cost Center:		PO#						
Job #: 30127480		Major/Minor Code:		Routing Code:						
PO / AFE:		Requisitioner:								
LSD:		Location:								
ALS Lab Work Order # (lab use only):		ALS Contact: Emily Smith	Sampler:							
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>	<b>Date (dd-mmm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>						
	MW22-2-1	16-09-2022	9:00	Soil	1	R				
	MW22-2-2	16-09-2022	9:00	Soil	1	R				
	MW22-2-3	16-09-2022	9:00	Soil	1	R				
	MW22-2-4	16-09-2022	9:00	Soil	1	R				
	MW22-2-5	16-09-2022	9:00	Soil	1	R				
	BH22-3-1	16-09-2022	12:00	Soil	1	R				
	BH22-3-2	16-09-2022	12:00	Soil	3	R	R		R	
	BH22-3-3	16-09-2022	12:00	Soil	1	R				
	BH22-3-4	16-09-2022	12:00	Soil	1	R				
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>					
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>					
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>					
					Cooling Initiated <input type="checkbox"/>					
					INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
					14.9			10.2		
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>					
Released by: Lennart de Groot		Date: 19-09-2022	Time:	Received by: <i>COLTAP</i>	Date: 9/19/22	Time: 14:55	Received by: <i>AP</i>	Date: 20 Sep 22	Time: <i>1:00</i>	

**SAMPLES ON HOLD**  
SUSPECTED HAZARD (see Special Instructions)

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

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COC Number: 17 -

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Report To		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)																				
Company:	ARCADIS Canada Inc.	Select Report Format:	<input checked="" type="checkbox"/> PDF	<input checked="" type="checkbox"/> EXCEL	<input checked="" type="checkbox"/> EDD (DIGITAL)	Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																			
Contact:	Lennart de Groot	Quality Control (QC) Report with Report	<input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days)	4 day [P4-20%]	<input type="checkbox"/>	EMERGENCY	1 Business day [E - 100%]					<input type="checkbox"/>										
Phone:	613-809-2379	<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%]		<input type="checkbox"/>	Same Day, Weekend or Statutory holiday [E2 -200%]					<input type="checkbox"/>												
Company address below will appear on the final report		Select Distribution:	<input checked="" type="checkbox"/> EMAIL	<input type="checkbox"/> MAIL	<input type="checkbox"/> FAX	2 day [P2-50%]		<input type="checkbox"/>	(Laboratory opening fees may apply) ]					<input type="checkbox"/>											
Street:	1050 Morrison Drive	Email 1 or Fax:	Lennart.deGroot@arcadis.com			Date and Time Required for all E&P TATs:					dd-mmm-yy hh:mm														
City/Province:	Ottawa, ON	Email 2:				For tests that can not be performed according to the service level selected, you will be contacted.																			
Postal Code:	K2H 8K7	Email 3:				Analysis Request																			
Invoice To	Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO	Invoice Distribution			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																				
Copy of Invoice with Report	<input type="checkbox"/> YES <input type="checkbox"/> NO	Select Invoice Distribution:	<input checked="" type="checkbox"/> EMAIL	<input type="checkbox"/> MAIL	<input type="checkbox"/> FAX	NUMBER OF CONTAINERS																			
Company:		Email 1 or Fax:	Lennart.deGroot@arcadis.com				moisture content																		
Contact:	AccountsPayable.canada@arcadis.com	Email 2:	AccountsPayable.canada@arcadis.com					Hydrometer Analysis																	
Project Information		Oil and Gas Required Fields (client use)			Full Grain Size Plot																				
ALS Account # / Quote #:	Q88485 (2022 SOA)	AFE/Cost Center:	PO#						Corrosivity																
Job #:	30127480	Major/Minor Code:	Routing Code:																						
PO / AFE:		Requisitioner:																							
LSD:		Location:																							
ALS Lab Work Order # (lab use only):		ALS Contact:	Emily Smith	Sampler:																					
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type																					
MW22-6-1		15-09-2022	11:15	Soil		1				R															
MW22-6-2		15-09-2022	11:15	Soil		1	R				R														
MW22-6-3		15-09-2022	11:15	Soil		1	R				R														
MW22-6-4		15-09-2022	11:15	Soil	1	R																			
MW22-6-5		15-09-2022	11:15	Soil	1	R																			
BH22-7-1		15-09-2022	13:00	Soil	1	R																			
BH22-7-2		15-09-2022	13:00	Soil	1	R																			
BH22-7-3		15-09-2022	13:00	Soil	1	R																			
BH22-7-4		15-09-2022	13:00	Soil	1	R																			
BH22-7-5		15-09-2022	13:00	Soil	2	R		R																	
Drinking Water (DW) Samples (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)																				
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/>					SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>															
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/>					Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>															
					Cooling Initiated <input type="checkbox"/>																				
					INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C															
					14.9					10.2															
SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)																			
Released by:	Lennart de Groot	Date:	19-09-2022	Time:		Received by:	<i>Carla F</i>	Date:	9/19/22	Time:	14:55	Received by:	<i>AP</i>	Date:	20 Sep 22	Time:	9:00								

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

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Company: ARCADIS Canada Inc.		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																						
Contact: Lennart de Groot		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days) 4 day [P4-20%] <input type="checkbox"/>		EMERGENCY 1 Business day [E - 100%] <input type="checkbox"/>																																																				
Phone: 613-809-2379		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2 -200%] <input type="checkbox"/>																																																				
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2-50%] <input type="checkbox"/>		(Laboratory opening fees may apply)																																																				
Street: 1050 Morrison Drive		Email 1 or Fax: Lennart.deGroot@arcadis.com			Date and Time Required for all E&P TATs:					dd-mmm-yy hh:mm																																																	
City/Province: Ottawa, ON		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.																																																						
Postal Code: K2H 8K7		Email 3			<b>Analysis Request</b>																																																						
Invoice To: Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																						
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																																																									
Company:		Email 1 or Fax: Lennart.deGroot@arcadis.com			<table border="1"> <tr> <td rowspan="4">NUMBER OF CONTAINERS</td> <td rowspan="4">moisture content</td> <td rowspan="4">Hydrometer Analysis</td> <td rowspan="4">Full Grain Size Plot</td> <td rowspan="4">Compositivity</td> <td colspan="10"></td> </tr> <tr><td colspan="10"></td></tr> <tr><td colspan="10"></td></tr> <tr><td colspan="10"></td></tr> </table>										NUMBER OF CONTAINERS	moisture content	Hydrometer Analysis	Full Grain Size Plot	Compositivity																																								
NUMBER OF CONTAINERS	moisture content	Hydrometer Analysis	Full Grain Size Plot	Compositivity																																																							
Contact: AccountsPayable.canada@arcadis.com		Email 2: AccountsPayable.canada@arcadis.com																																																									
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>			<table border="1"> <tr> <td rowspan="4">SAMPLES ON HOLD</td> <td colspan="10"></td> </tr> <tr><td colspan="10"></td></tr> <tr><td colspan="10"></td></tr> <tr><td colspan="10"></td></tr> </table>										SAMPLES ON HOLD																																												
SAMPLES ON HOLD																																																											
ALS Account # / Quote #: Q88485 (2022 SOA)		APE/Cost Center:	PO#																																																								
Job #: 30127480		Major/Minor Code:	Routing Code:																																																								
PO / AFE:		Requisitioner:																																																									
LSD:		Location:																																																									
ALS Lab Work Order # (lab use only):		ALS Contact: Emily Smith	Sampler:																																																								
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mmm-yy)	Time (hh:mm)	Sample Type																																																					
BH22-10-1				15-09-2022	14:10	Soil																																																					
BH22-10-2				15-09-2022	14:10	Soil																																																					
BH22-10-3				15-09-2022	14:10	Soil																																																					
BH22-10-4				15-09-2022	14:10	Soil																																																					
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																																																						
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>																																																						
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																																																						
					Cooling Initiated <input type="checkbox"/>																																																						
					INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C																																																	
					14.9					10.2																																																	
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>																																																						
Released by: Lennart de Groot	Date: 19-09-2022	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:																																																
			[Signature]	9/19/22	14:55	[Signature]	20 Sep 22	9:00																																																			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

NOV 2016 F-0017

# Appendix F

**Laboratory Certificates of Analysis – Ground Water**



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>WT2217514</b></p> <p>Client : <b>Arcadis Canada Inc.</b></p> <p>Contact : Troy Austrins</p> <p>Address : 1050 Morrison Drive Suite 201 Ottawa ON Canada K2H 1L1</p> <p>Telephone : 613 721 0555</p> <p>Project : 30127480</p> <p>PO : ----</p> <p>C-O-C number : 20-1009742</p> <p>Sampler : CLIENT</p> <p>Site : ----</p> <p>Quote number : Waterloo 2022 Price List</p> <p>No. of samples received : 1</p> <p>No. of samples analysed : 1</p>	<p>Page : 1 of 4</p> <p>Laboratory : Waterloo - Environmental</p> <p>Account Manager : Emily Smith</p> <p>Address : 60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8</p> <p>Telephone : +1 519 886 6910</p> <p>Date Samples Received : 11-Oct-2022 13:40</p> <p>Date Analysis Commenced : 14-Oct-2022</p> <p>Issue Date : 18-Oct-2022 18:23</p>
---	---

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Greg Pokocky	Supervisor - Inorganic	Metals, Waterloo, Ontario



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



## Analytical Results

Sub-Matrix: Water					Client sample ID	MW 22-2	---	---	---	---
(Matrix: Water)					Client sampling date / time	11-Oct-2022 12:55	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	WT2217514-001	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0043	---	---	---	---	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	---	---	---	---	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00021	---	---	---	---	
barium, total	7440-39-3	E420	0.00010	mg/L	0.147	---	---	---	---	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	---	---	---	---	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	---	---	---	---	
boron, total	7440-42-8	E420	0.010	mg/L	0.037	---	---	---	---	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000412	---	---	---	---	
calcium, total	7440-70-2	E420	0.050	mg/L	133	---	---	---	---	
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	---	---	---	---	
chromium, total	7440-47-3	E420	0.00050	mg/L	0.00066	---	---	---	---	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00031	---	---	---	---	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00228	---	---	---	---	
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	---	---	---	---	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	---	---	---	---	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0019	---	---	---	---	
magnesium, total	7439-95-4	E420	0.0050	mg/L	14.4	---	---	---	---	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.0869	---	---	---	---	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000267	---	---	---	---	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00273	---	---	---	---	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	---	---	---	---	
potassium, total	7440-09-7	E420	0.050	mg/L	5.43	---	---	---	---	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00117	---	---	---	---	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000050	---	---	---	---	
silicon, total	7440-21-3	E420	0.10	mg/L	7.69	---	---	---	---	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000038	---	---	---	---	
sodium, total	7440-23-5	E420	0.050	mg/L	178	---	---	---	---	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.952	---	---	---	---	
sulfur, total	7704-34-9	E420	0.50	mg/L	23.3	---	---	---	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	MW 22-2	----	----	----	----
(Matrix: Water)					Client sampling date / time	11-Oct-2022 12:55	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	WT2217514-001	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Total Metals</b>										
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	---	---	---	---	
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000013	---	---	---	---	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	---	---	---	---	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	---	---	---	---	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	---	---	---	---	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	---	---	---	---	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000646	---	---	---	---	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00051	---	---	---	---	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	---	---	---	---	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	---	---	---	---	

Please refer to the General Comments section for an explanation of any qualifiers detected.






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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>WT2217514</b></p> <p><b>Client</b> : <b>Arcadis Canada Inc.</b></p> <p><b>Contact</b> : Troy Austrins</p> <p><b>Address</b> : 1050 Morrison Drive Suite 201 Ottawa ON Canada K2H 1L1</p> <p><b>Telephone</b> : 613 721 0555</p> <p><b>Project</b> : 30127480</p> <p><b>PO</b> : ----</p> <p><b>C-O-C number</b> : 20-1009742</p> <p><b>Sampler</b> : CLIENT</p> <p><b>Site</b> : ----</p> <p><b>Quote number</b> : Waterloo 2022 Price List</p> <p><b>No. of samples received</b> : 1</p> <p><b>No. of samples analysed</b> : 1</p>	<p><b>Page</b> : 1 of 5</p> <p><b>Laboratory</b> : Waterloo - Environmental</p> <p><b>Account Manager</b> : Emily Smith</p> <p><b>Address</b> : 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8</p> <p><b>Telephone</b> : +1 519 886 6910</p> <p><b>Date Samples Received</b> : 11-Oct-2022 13:40</p> <p><b>Issue Date</b> : 18-Oct-2022 18:23</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

---

### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE [ON MECP]</b> MW 22-2	E420	11-Oct-2022	14-Oct-2022	180 days	3 days	✓	14-Oct-2022	177 days	0 days	✓

### Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Total metals in Water by CRC ICPMS	E420	695718	1	20	5.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Total metals in Water by CRC ICPMS	E420	695718	1	20	5.0	5.0	✔
<b>Method Blanks (MB)</b>							
Total metals in Water by CRC ICPMS	E420	695718	1	20	5.0	5.0	✔
<b>Matrix Spikes (MS)</b>							
Total metals in Water by CRC ICPMS	E420	695718	1	20	5.0	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total metals in Water by CRC ICPMS	E420  Waterloo - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.



## QUALITY CONTROL REPORT

<p><b>Work Order</b> : <b>WT2217514</b></p> <p>Client : Arcadis Canada Inc.</p> <p>Contact : Troy Austrins</p> <p>Address : 1050 Morrison Drive Suite 201 Ottawa ON Canada K2H 1L1</p> <p>Telephone :</p> <p>Project : 30127480</p> <p>PO : ----</p> <p>C-O-C number : 20-1009742</p> <p>Sampler : CLIENT 613 721 0555</p> <p>Site : ----</p> <p>Quote number : Waterloo 2022 Price List</p> <p>No. of samples received : 1</p> <p>No. of samples analysed : 1</p>	<p>Page : 1 of 10</p> <p>Laboratory : Waterloo - Environmental</p> <p>Account Manager : Emily Smith</p> <p>Address : 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8</p> <p>Telephone : +1 519 886 6910</p> <p>Date Samples Received : 11-Oct-2022 13:40</p> <p>Date Analysis Commenced : 14-Oct-2022</p> <p>Issue Date : 18-Oct-2022 18:23</p>
--	--

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Greg Pokocky	Supervisor - Inorganic	Waterloo Metals, Waterloo, Ontario

Page : 2 of 10  
Work Order : WT2217514  
Client : Arcadis Canada Inc.  
Project : 30127480



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 695718)</b>											
WT2217292-012	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0110	0.0100	0.0010	Diff <2x LOR	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00814	0.00832	2.20%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.242	0.244	1.06%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.030	0.031	0.0005	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	32.9	33.0	0.352%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.114	0.114	0.0209%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0104	0.0101	2.88%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	22.6	23.2	2.26%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.0229	0.0243	5.63%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000591	0.000588	0.594%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	3.46	3.47	0.224%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00335	0.00328	2.34%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	15.7	15.7	0.0240%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	3.68	3.75	1.80%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.143	0.141	1.25%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----





Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 695718) - continued</b>											
WT2217292-012	Anonymous	thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00051	<0.00030	0.00021	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 695718)</b>						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	---
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	---
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	---
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	---
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	---
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	---
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	---
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	---
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	---
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	---
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	---
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	---
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	---
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	---
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	---
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	---
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	---
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	---
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	---
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	---
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	---
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	---
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	---
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	---

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Client : Arcadis Canada Inc.  
Project : 30127480



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
<b>Total Metals (QCLot: 695718) - continued</b>						
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Total Metals (QCLot: 695718)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	102	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	103	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	102	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.0125 mg/L	103	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.005 mg/L	96.8	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	0.05 mg/L	99.5	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	0.05 mg/L	94.8	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	102	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	2.5 mg/L	97.0	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.0025 mg/L	102	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.0125 mg/L	97.5	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.0125 mg/L	98.4	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.0125 mg/L	95.2	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	0.05 mg/L	100	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	101	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.0125 mg/L	97.8	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	2.5 mg/L	97.2	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.0125 mg/L	99.9	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.0125 mg/L	101	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	96.8	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	0.5 mg/L	103	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	2.5 mg/L	101	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.005 mg/L	104	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	99.1	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	0.5 mg/L	102	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	102	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	2.5 mg/L	99.6	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.0125 mg/L	101	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	2.5 mg/L	99.6	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.005 mg/L	96.6	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	0.05 mg/L	99.8	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.005 mg/L	98.4	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	101	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Total Metals (QCLot: 695718) - continued</b>									
titanium, total	7440-32-6	E420	0.0003	mg/L	0.0125 mg/L	100	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.005 mg/L	100	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.00025 mg/L	102	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.025 mg/L	99.8	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	99.9	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.005 mg/L	98.5	80.0	120	----



## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Total Metals (QCLot: 695718)</b>										
WT2217444-001	Anonymous	aluminum, total	7429-90-5	E420	0.0991 mg/L	0.1 mg/L	99.1	70.0	130	----
		antimony, total	7440-36-0	E420	0.0514 mg/L	0.05 mg/L	103	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0510 mg/L	0.05 mg/L	102	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.00494 mg/L	0.005 mg/L	98.8	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0478 mg/L	0.05 mg/L	95.7	70.0	130	----
		boron, total	7440-42-8	E420	0.046 mg/L	0.05 mg/L	92.3	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00506 mg/L	0.005 mg/L	101	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.00249 mg/L	0.0025 mg/L	99.6	70.0	130	----
		chromium, total	7440-47-3	E420	0.0128 mg/L	0.0125 mg/L	102	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0123 mg/L	0.0125 mg/L	98.3	70.0	130	----
		copper, total	7440-50-8	E420	0.0117 mg/L	0.0125 mg/L	93.8	70.0	130	----
		iron, total	7439-89-6	E420	0.049 mg/L	0.05 mg/L	98.1	70.0	130	----
		lead, total	7439-92-1	E420	0.0241 mg/L	0.025 mg/L	96.3	70.0	130	----
		lithium, total	7439-93-2	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0128 mg/L	0.0125 mg/L	102	70.0	130	----
		nickel, total	7440-02-0	E420	0.0237 mg/L	0.025 mg/L	95.0	70.0	130	----
		phosphorus, total	7723-14-0	E420	0.555 mg/L	0.5 mg/L	111	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	ND mg/L	0.005 mg/L	ND	70.0	130	----
		selenium, total	7782-49-2	E420	0.0501 mg/L	0.05 mg/L	100	70.0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	0.5 mg/L	ND	70.0	130	----
		silver, total	7440-22-4	E420	0.00503 mg/L	0.005 mg/L	101	70.0	130	----
		sodium, total	7440-23-5	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E420	0.00458 mg/L	0.005 mg/L	91.6	70.0	130	----
		thallium, total	7440-28-0	E420	0.0478 mg/L	0.05 mg/L	95.6	70.0	130	----

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 Client : Arcadis Canada Inc.  
 Project : 30127480



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Total Metals (QCLot: 695718) - continued</b>										
WT2217444-001	Anonymous	thorium, total	7440-29-1	E420	0.00428 mg/L	0.005 mg/L	85.6	70.0	130	----
		tin, total	7440-31-5	E420	0.0253 mg/L	0.025 mg/L	101	70.0	130	----
		titanium, total	7440-32-6	E420	0.0136 mg/L	0.0125 mg/L	108	70.0	130	----
		tungsten, total	7440-33-7	E420	0.00499 mg/L	0.005 mg/L	99.9	70.0	130	----
		uranium, total	7440-61-1	E420	0.000255 mg/L	0.00025 mg/L	102	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0258 mg/L	0.025 mg/L	103	70.0	130	----
		zinc, total	7440-66-6	E420	0.0218 mg/L	0.025 mg/L	87.4	70.0	130	----
		zirconium, total	7440-67-7	E420	0.00465 mg/L	0.005 mg/L	93.1	70.0	130	----



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: /

Environmental Division
Waterloo
Work Order Reference
WT2217514

Pac

Telephone : +1 519 886 6910



Report To: Arcadis, Contact: Troy Austins, Phone: 613-703-3035, Street: 1050 Morrison Dr, City/Province: Ottawa, Invoice To: Same as Report To, Company: Arcadis, Project Information: ALS Account # / Quote #: 30127480, Job #: 30127480, PO / AFE: , LSD: , ALS Lab Work Order #: , ALS Sample #: MW 22-2, Date: 11/10/2022, Time: 12:55, Sample Type: Water, Analysis Request table with 1 sample, SHIPMENT RELEASE and INITIAL SHIPMENT RECEPTION sections.



# Appendix G

## Residue Management

**MOVEMENT DOCUMENT / MANIFEST**  
**DOCUMENT DE MOUVEMENT / MANIFESTE**

2004 Agency Certif. No. 8954 (Rev. 1)  
 910 #403287

**MX669737-3**

Case of DANGEROUS GOODS EMERGENCY call Number: 24 HOUR EMERGENCY No. 1-877-963-5931, Movement Document / Manifest Reference No. 23  
 Case of DANGEROUS GOODS EMERGENCY call Number: 24 HOUR No. 1-877-963-5931, N° de référence du document de mouvement/manifeste

<b>A Generator / consigneur</b> <b>Producteur / expéditeur</b> Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial 000-37946-118 ONA383477 Company name / Nom de l'entreprise 000-37946-118 Mailing address / Adresse postale City / Ville Province Postal code / Code postal 000-37946-118 000-37946-118 ON K1G 3K7 E-mail / Courriel électronique Tel. No. / N° de tél. ( ) 000-37946-118 Shipping site address / Adresse du lieu de l'expédition 453 Parkdale Ave City / Ville Province Postal code / Code postal Ottawa ON K1V 1H1	<b>B Carrier</b> <b>Transporteur</b> Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial 4880517 Company name / Nom de l'entreprise 000-37946-118 Mailing address / Adresse postale City / Ville Province Postal code / Code postal 000-37946-118 000-37946-118 ON K1G 3K7 E-mail / Courriel électronique Tel. No. / N° de tél. ( ) 000-37946-118 Vehicle / Véhicule Registration No. / N° d'immatriculation Prov. 24 Trailer - Rail car No. 1 / 1 <sup>re</sup> remorque - wagon 117718 ON Trailer - Rail car No. 2 / 2 <sup>e</sup> remorque - wagon Port of entry / Point d'entrée International use only Port of exit / Point de sortie International use only 25 <b>Carrier Certification:</b> I certify that I have received waste or recyclable material from the generator / consigneur for delivery to the receiver / consignee as set out in Part A and that the information contained in Part B is complete and correct. / <b>Attestation du transporteur:</b> J'atteste avoir reçu les déchets ou matières recyclables du producteur / expéditeur en vue de leur livraison au réceptionnaire / destinataire, tels qu'ils figurent à la partie A et que les renseignements inscrits à la partie B sont exacts et complets. 26 Name of authorized person (print) / Nom de l'agent autorisé (caractères d'imprimerie): Tel. No. / N° de tél. Mike Shuber ( ) 613-739-1070 Year / Année Month / Mois Day / Jour Signature: 2/2/11 Mike Shuber	Reference Nos. of other movement document(s) / manifest(s) used / N° de référence des autres documents de mouvement/manifestes utilisés 27 <b>C Receiver / consignee</b> <b>Réceptionnaire / destinataire</b> Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial A460722 Receiver / consignee information same as in Part A / Les renseignements du réceptionnaire / destinataire sont les mêmes qu'à la Partie A <input checked="" type="checkbox"/> Yes / Oui <input type="checkbox"/> No, complete the box below / Non, remplir la case ci-dessous Company name / Nom de l'entreprise Mailing address / Adresse postale City / Ville Province Postal code / Code postal E-mail / Courriel électronique Tel. No. / N° de tél. Receiving site address / Adresse du lieu de destination Date received / Date de réception 28 Year / Année Month / Mois Day / Jour Time / Heure 2/2/11 2:11 P.M. If waste or recyclable material to be transferred, specify intended company name / Si les déchets ou matières recyclables doivent être transférés, préciser le nom du destinataire 29 Registration No. / Provincial ID No. / N° d'immatriculation / d'id provincial 30
Prov. code / Code prov. 3 Shipping name / Appellation réglementaire 4 Class / Classe 5 Sub. class(es) / Classe(s) sub. 5 UN No. / N° NU 6 Packing / risk gr. / Gr. d'emballage / de risque 7 Quantity shipped / Quantité expédiée 8 Units / L or / ou Kg / Unités 8 Packaging / Contenant / Codes Int-ext 9 Phys. state / État phys. 10 Quantity received / Quantité reçue 31 Units / L or / ou kg / Unités 31 Comments / Commentaires 32 Handling Code / Code de manutention 33 Shipment / Envoi 34 Accepted / Accepté 34 Refused / Refusé 34 Decont. / Veh. 35 Pack. / Veh. 35	Notice No. / N° de notification 11 Notice Line No / N° de ligne de la notification 12 Shipment / Envoi 13 Of / De 14 D or R code / Code D ou R 15 C code / Code C 16 Basel Annex VIII or OECD Code / Annexe VIII de Bâle ou Code OCDE 17 H code / Code H 18 Y code / Code Y 19 National code in country of / Code du pays 18 Export / Importation 19 Customs code(s) / Code(s) de douanes 19 <b>Receiver / consignee certification:</b> I certify that the information contained in Part C is correct and complete. / <b>Attestation du réceptionnaire / destinataire:</b> J'atteste que tous les renseignements à la partie C sont exacts et complets. 37 Name of authorized person (print) / Nom de l'agent autorisé (caractères d'imprimerie) Mike Shuber Tel. No. / N° de tél. 613-739-1070 Signature: Mike Shuber Special handling / Manutention spéciale 22 <input type="checkbox"/> Attached / Joint <input type="checkbox"/> As follows / Ci-contre:	
<b>Generator / consigneur certification:</b> I certify that the information contained in Part A is correct and complete. I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. <b>Attestation du producteur / expéditeur:</b> J'atteste que tous les renseignements à la partie A sont exacts et complets. Je déclare que le contenu de ce chargement est décrit ci-dessus de façon complète et exacte par la désignation officielle de transport et qu'il est convenablement classé, emballé, marqué, étiqueté, muni de plaques-étiquettes et à tous égards bien conditionné pour être transporté conformément aux réglementations internationales et nationales applicables.	Name of authorized person (print) / Nom de l'agent autorisé (caractères d'imprimerie) 20 Mike Shuber Tel. No. / N° de tél. 20 ( ) Signature 20 Date shipped / Date d'expédition 21 Year / Année Month / Mois Day / Jour Time / Heure 2/2/11 1:15 P.M. Scheduled arrival date / Date d'arrivée prévue 21 Year / Année Month / Mois Day / Jour 2/2/11 1:15	

**Consignee to Consignor**  
**Destinataire à l'expéditeur**

**Copy / Copie 6 (brown / brun)**

Arcadis Canada Inc.  
1050 Morrison Drive, Suite 201  
Ottawa  
Ontario K2H 8K7  
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