PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

# 506243 HIGHWAY 89, PRIMROSE, ONTARIO

DELTINI (PRIMROSE) INC.

PROJECT NO.: 191-08696-00
DATE: JULY 2019

WSP
UNITS C AND D
561 BRYNE DRIVE
BARRIE, ON, CANADA L4N 9Y3

T: +1 705 735-9771
F: +1 705 735-6450
WSP.COM

July 26, 2019

Marika Zigon
Deltini (Primrose) Inc.
1350 Shawson Drive
Mississauga, Ontario
L4W 1C5

Dear Ms. Zigon,

WSP is pleased to present our Phase Two Environmental Site Assessment report for the above-noted property. This Phase Two Environmental Site Assessment was generally completed in accordance with Ontario Regulation 153/04, as amended. The report describes the interpreted environmental conditions at the property and provides conclusions for your consideration.

We trust that this information is sufficient for your current needs. If you have any questions or require further information, please contact us.

Kind regards,

Jay Dolan, P.Eng.
Senior Project Engineer, Environment

WSP ref.: 191-08696-00

# SIGNATURES

PREPARED BY

Nicole Corbett
Environmental Technician

REVIEWED BY

Jay Dolan, P.Eng. $QP_{ESA}$
Senior Project Engineer

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# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| µm | micrometre(s) |
| APEC | area(s) of potential environmental concern as defined in O. Reg. 153/04, "the area on, in or under a phase one property where one or more contaminants are potentially present, as determined through the phase one environmental site assessment, including through (a) identification of past or present uses on, in or under the phase one property, and (b) identification of potentially contaminating activity" |
| As | arsenic |
| B-HWS | boron (hot water soluble) |
| BTEX | benzene, toluene, ethylbenzene, and xylenes |
| CALA | Canadian Association for Laboratory Accreditation |
| Cl- | chlorine |
| CN- | cyanide |
| Cr (VI) | hexavalent chromium |
| CSM | conceptual site model |
| DNAPL | dense non-aqueous phase liquid(s) |
| EC | electrical conductivity |
| ESA | environmental site assessment |
| ha | hectare(s) |
| Hg | mercury |
| ICC | Industrial/Commercial/Community |
| km | kilometre(s) |
| L | litre(s) |
| LNAPL | light non-aqueous phase liquid(s) |
| m | metre(s) |
| masl | metres above sea level |
| mbgss | metres below ground surface |
| MDL | method detection limit |
| MNRF | Ministry of Natural Resources and Forestry |
| MECP | Ministry of the Environment and Climate Change |
| N/S | Not Specified |
| Na | sodium |
| O. Reg. 153/04 | Ontario Regulation 153/04, as amended |
| O. Reg. 347 | Ontario Regulation 347, as amended |

| | |
|---|---|
| O. Reg. 903 | Ontario Regulation 903, as amended |
| ORPs | other regulated parameter |
| PAH | polycyclic aromatic hydrocarbon |
| PCA | potentially contaminating activity as defined in O. Reg. 153/04, "a use or activity set out in Column A of Table 2 of Schedule D that is occurring or has occurred in a Phase One study area" |
| PCB | polychlorinated biphenyl |
| PCOC | potential contaminant(s) of concern |
| PHC | petroleum hydrocarbon |
| PID | photoionization detector |
| PIN | property identification number |
| ppm | parts per million |
| QA | quality assurance |
| QC | quality control |
| QPESA | Qualified Person for ESAs according to MECP O. Reg. 153/04 |
| RA | Risk Assessment |
| RDL | reporting detection limit |
| RPI | Residential/Parkland/Institution |
| RPIICC | Residential/Parkland/Institution/Industrial/Commercial/Community |
| RSC | Record of Site Condition |
| SAP | Sampling and Analysis Plan |
| SAR | sodium adsorption ratio |
| Sb | antimony |
| Se | selenium |
| SOP | standard operating procedure(s) |
| SCS | Site Condition Standard |
| THM | trihalomethane |
| TOV | total organic vapours |
| UST | underground storage tank |
| VOC | volatile organic compound |

# 1 EXECUTIVE SUMMARY

WSP was retained by Ms. Marika Zigon on behalf of Deltini (Primose) Inc. to conduct a Phase Two Environmental Site Assessment (ESA) of 506243 Highway 89 in the Town of Primrose, Ontario (hereafter referred to as the "Phase Two Property" or "Site"). It is our understanding that this Phase Two ESA was undertaken to assess soil and groundwater conditions prior to a property transaction, and that a Record of Site Condition (RSC) for the Phase Two Property is not required at this time.

The rectangular-shaped Site is located on the north side of Highway 89 in a primarily commercial and agricultural area in the Town of Primrose, Township of Mulmur, Ontario. The Phase Two Property currently contains a business known as "Shelburne Motel" and occupies a total surface area of approximately 0.95 ha (2.35 acres).

Based on a Phase One ESA completed by WSP in July 2019, the Phase Two Property is considered to have one Areas of Potential Environmental Concern (APEC) due to the potentially contaminating activities (PCAs) shown in Table 1.1 below:

**Table 1.1 Phase One Environmental Assessment - PCA Summary**

| PCAs | DESCRIPTION |
|---|---|
| PCA No. 28 (O. Reg. 153/04) Gasoline and Associated Products Storage in Fixed Tanks | **Phase One Study Area –** One (1) above ground storage tank was observed on the property abutting the north Site boundary. This tank was likely used to store fuel for agricultural equipment such as tractors. Due to this PCA being located to the north of the Site, and due the assumed groundwater direction flowing to the northwest, this PCA in WSP's opinion does not contribute to an APEC.<br>**Phase One Study Area –** A property east of the Site (506255 Highway 89) contained a now-demolished Petro Canada Gas Bar. A gravel patch and groundwater monitoring well currently remain on the property, possibly indicating that the tanks have been removed. Three (3) gasoline tanks with capacities of 50,000L and one (1) diesel tank with a capacity of 25,000L were reported to have been installed in 2007. Four (4) single wall USTs had previously been removed from this location; three (3) of which had capacities of 35,000L with the remaining tank having a capacity of 22,700L. These former single-wall USTs had been installed between 1983 and 1989. **This PCA contributes to APEC-1 due to the environmental risk presented by leaking fuel tanks and piping, and due to the close proximity of this PCA to the Phase One Property.** |
| PCA No. 58 (O. Reg. 153/04) Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners | **Phase One Study Area –** The south adjoining property owned by the County of Dufferin located at 635666 Highway 19 had been registered for a variety of wastes shown in the O. Reg 347 Waste Management Record Database. During the site reconnaissance, it was observed that the south adjoining property was vacant of any structures or activities within 250 m of the Phase One Property and that these activities were occurring approximately 500 m south of the Phase One Property due to the presence of County operations structures. Due to this PCA being located outside of the Phase One Study Area, this PCA does not contribute to an APEC. |

WSP sampled and analyzed subsurface soil and groundwater to determine if APEC-1 has the potential to cause an adverse effect. A total of four (4) boreholes were advanced to maximum depths of 4.6 metres below ground surface (mbgs) on July 9, 2019 under the supervision of WSP personnel. Three (3) of the four (4) boreholes were

completed as groundwater-monitoring wells to facilitate groundwater sampling and to calculate local groundwater flow direction. All three (3) wells were purged and sampled on July 10, 2019. Borehole locations were selected based on the findings of the Phase One ESA (WSP, 2019). Soil and groundwater samples were submitted for analysis of potential contaminants of concern (PCOCs) including metals and other regulated parameters (ORPs), petroleum hydrocarbons (PHCs) and volatile organic compounds (VOCs).

WSP's Phase Two ESA findings are summarized below:

- Three (3) boreholes (BH19-01, BH19-02 and BH19-03) were advanced through a topsoil layer ranging in thickness from 30 to 63 cm. Underlying the topsoil at one (1) of the borehole locations (BH19-03) was a 20 cm layer of clayey silt. BH19-04 was advanced through a 5-cm asphalt layer overlaying a 25-cm granular fill layer. Underneath the granular fill encountered in BH19-04 was an organic/topsoil layer extending to a depth of 0.7 mbgs. Underlying the topsoil in BH19-01 and BH19-02, the clayey silt in BH19-03 and the organics/topsoil layer in BH19-04 was a layer of silty sand/sandy silt beginning at a starting depth of 0.3 to 0.8 mbgs and extending to a depth ranging from 2.4 to 3.8 mbgs. Sand was encountered in all boreholes underlying the silty sand/sandy silt layer and extending to the termination depths of all boreholes. Based on the MECP Water Well Records reviewed as part of the Phase One ESA by WSP, bedrock depth is approximately 6.7 mbgs.
- The depth to groundwater was recorded in three (3) monitoring wells installed during the investigation. The groundwater levels ranged between 0.8 and 3.4 mbgs on July 22, 2019. The July 2019 groundwater elevations ranged from 456.4 to 457.4 m above mean sea level (masl). The inferred shallow groundwater flow direction is to the southwest below the Phase Two study area. Groundwater levels and flow direction can be influenced by seasonal fluctuations, utility services, and other subsurface features and can only be confirmed with long term monitoring.
- The soil and groundwater analytical results were compared with 2011 MECP Table 2 Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for Industrial/Commercial/Community (ICC) land uses.
- On July 9, 2019, a total of four (4) soil samples plus two (2) QA/QC samples (for a total of six (6) soil samples), were submitted to an analytical laboratory and analysed for potential contaminants of concern (PCOCs) including metals and ORPs, PHCs and VOCs. Analytical results indicated that all soil samples submitted to the laboratory met the Table 2 ICC SCS for all parameters analyzed.
- On July 10, 2019, groundwater samples were obtained from each of the three (3) monitoring wells and submitted for analysis of metals and ORPs, PHCs, and VOCs. Analytical results indicated that the groundwater samples submitted to the laboratory all met Table 2 SCS for all parameters analysed except for the parameters shown in Table 1.2 below:

**Table 1.2 Summary of Metals and ORP Table 2 ICC SCS Exceedances in Groundwater**

| WELL LOCATION | PARAMETER | TABLE 2 SCS (UG/L) | RESULT (UG/L) |
|---|---|---|---|
| BH19-03 | Sodium | 490,000 | **588,000** |
| | Chloride | 790,000 | **1,020,000** |

Based on the findings of this Phase Two ESA, WSP presents the following conclusions and recommendations:

- All soil samples collected from the Phase Two Property met Table 2 ICC SCS for all tested parameters.

- Groundwater containing elevated sodium and chloride concentrations was found in one (1) of the three monitoring wells (BH19-03). De-icing road salt (sodium chloride) is often the cause of elevated sodium and chloride concentrations adjacent to roadways and parking lots. The Phase Two Property is located adjacent to Highway 89; a provincial highway that has received decades of road salt applications during the winter months. Elevated sodium and chloride concentrations are of significance where soils must support vegetative root growth and where the water is to be used for potable applications. WSP understands that the Phase Two Property is to be combined with a larger land parcel to the north and that no agricultural uses are expected within this combined land parcel. For this reason, ecological risk exposure due to elevated groundwater sodium and chloride concentrations is considered low. Human health exposure risk via dermal contact due to the presence of elevated sodium and chloride in groundwater is considered negligible. Human health exposure risk due to ingestion of water containing elevated sodium and chloride is considered low, and can be effectively managed by (i) installing potable water well screens in deep aquifers beyond the influence of elevated sodium and chloride and/or (ii) installing end-of-pipe water treatment equipment to reduce sodium and chloride levels.
- All other groundwater parameters tested met their respective Table 2 SCS within samples collected from all three (3) wells.
- As proposed development of the Phase Two Property is not expected to result in a more sensitive land use than the existing commercial use, a Record of Site Condition (RSC) is not required under O. Reg. 153/04 at this time. If an RSC is required for any other purpose (i.e. municipal approvals), a formal risk management strategy for sodium and chloride in the form of a Risk Assessment may be needed under current regulations prior to filing an RSC.

All three (3) monitoring wells installed by WSP for this study should be decommissioned in accordance with O. Reg. 903 when no longer required.

# 2 INTRODUCTION

WSP was retained by Ms. Marika Zigon on behalf of Deltini (Primrose) Inc. to conduct a Phase Two Environmental Site Assessment (ESA) of 506243 Highway 89 in the Town of Primrose, Ontario. It is our understanding that this Phase Two ESA was requested to support a pending property transaction.

The Phase Two ESA was conducted in general compliance with O.Reg. 153/04 to support the proposed property transaction and commercial redevelopment of the Site. The proposed redevelopment of the Phase Two Property is not considered a change to a more sensitive property use, and as such an RSC with the MECP will not be required under O.Reg. 153/04.

## 2.1 SITE DESCRIPTION

The rectangular-shaped Site is located on the north side of Highway 89 in a primarily commercial and agricultural area within the Town of Primrose, Township of Mulmur, Ontario. The Phase Two Property currently contains a business known as "Shelburne Motel" and occupies a total surface area of approximately 0.95 ha (2.35 acres). The location of the Phase Two Property is depicted in ***Figure 1***.

Property information for the Site is provided in Table 2.1 below:

**Table 2.1 Phase Two Property Information**

| CRITERION | DESCRIPTION |
|---|---|
| Municipal Address | 506243 Highway 89, Primrose, Township of Mulmur, Ontario |
| Property Identification Numbers (PINs) | 34128-0051 (LT) |
| Legal Description | Part of the East Half of Lot 1, Concession 2, West of Hurontario Street, Township of Mulmur, County of Dufferin |

A legal survey of the Phase Two Property dated April 6, 1984 prepared by Young & Young Surveying Inc., Ontario Land Surveyor, was provided to WSP and included in ***Appendix A***.

## 2.2 PROPERTY OWNERSHIP

Property ownership information for the Site is provided in the table below:

**Table 2.2 Phase Two Property Ownership Information**

| CRITERION | DESCRIPTION |
|---|---|
| Current Site Owner | Rajinder Samra |
| Phase Two Site Representative | Mr. Ray Duhamel<br>The Jones Consulting Group Ltd.<br>229 Mapleview Drive East<br>Barrie, Ontario<br>L4N 0W5 |

## 2.3 CURRENT AND PROPOSED FUTURE USES

The Phase Two Property currently contains a business known as "Shelburne Motel". Redevelopment of the property for commercial/industrial purposes as part of a larger, consolidated land-parcel has been proposed.

## 2.4 APPLICABLE SITE CONDITION STANDARD

Analytical results were compared to the 2011 MECP Table 2 Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for Industrial/Commercial/Community (ICC) property uses set out in the MECP publication *Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (April 15, 2011). This evaluation standard for the Phase Two Property was selected for comparison purposes based on the following:

- There are no water bodies within 30 m of the Phase Two Property;
- The Phase Two Property has not been confirmed to be an "environmentally sensitive" site, as defined by O.Reg. 153/04;
- Commercial/Industrial land use is proposed for the Phase Two Property;
- It is possible that the future development may use groundwater below the Phase Two Property for potable applications;
- The pH of soil samples analysed during this investigation ranged from 7.69 to 7.95 which falls within the acceptable range pursuant to O. Reg. 153/04; and
- Bedrock was not encountered within 2 m of the ground surface during this investigation.

# 3 BACKGROUND INFORMATION

## 3.1 PHYSICAL SETTING

A summary of the Site's physical setting as determined through the Phase One ESA (WSP, 2019) is provided in Table 3.1 below:

**Table 3.1 Summary of Physical Setting**

| CRITERIA | DESCRIPTION |
|---|---|
| ▪ Water Bodies and Areas of Natural Significance | A branch of the Boyne River is located 470 m northwest of the Phase One Property. The Boyne River flows in a northeasterly direction into the Nottawasaga River which itself flows in a northwesterly direction into Georgian Bay. There are no confirmed areas of natural significance within the Phase One Study Area. According to the MNRF Natural Heritage Map, two threatened species, the bobolink and eastern meadowlark, have been observed on the Phase One Property and/or the Phase One Study Area and therefore the Phase One Property may be considered an environmentally sensitive area in accordance with O.Reg. 153/04, as amended. |
| ▪ Topography, Hydrology, Geology | The Phase One Property slopes in a southeast direction while the general topography of the Phase One Study Area slopes in a north to northwest direction. The Phase One Property is relatively flat and has an elevation of approximately 455 - 465 masl. Based on the local topography, the inferred shallow groundwater flow direction of the Phase One Study Area is to the northwest towards the Boyne River.<br><br>The Phase One Property is situated within a spillways physiographic region. The surficial geology of the Phase One Property is described as "glaciofluvial deposits including river deposits and delta facies". The underlying bedrock within the area generally consists of sandstone, shale, dolostone and siltstone of the Armabel Formation. According to the MECP Water Well Records, the bedrock depth within the Phase One Study Area is approximately 6.7 mbgs. |

## 3.2 PAST ASSESSMENTS AND INVESTIGATIONS

A Phase One ESA (WSP, 2019) was completed concurrently with this investigation and is referenced throughout this report. The Phase One CSM can be found in Section 4.3 below.

The following hydrogeological report was provided to WSP for review as part of this investigation:

*Preliminary Hydrogeological and Servicing Concepts Study – Primrose, Ontario (Township of Mulmur), Prepared for: Township of Mulmur, Prepared by: Azimuth Environmental Consulting, Inc. dated February 2008 (revised March 2009).*

The hydrogeological report provides a preliminary hydrogeological review and servicing conceptual assessment for the Phase Two Property along with properties to the east, north and west. Azimuth excavated a total of eight (8) test pits to maximum depths of 1.0 mbgs, to conduct soil percolation tests. None of the test pits were located on the Phase Two Property. The soils consisted of brown clayey silt with trace gravel, brown

sandy silt with trace gravel and brown clay with some silt, trace sand and gravel. No monitoring wells were installed as part of the Azimuth investigation.

# 4 SCOPE OF INVESTIGATION

## 4.1 OVERVIEW OF SITE INVESTIGATION

The Phase Two ESA involved an intrusive investigation of the APECs identified in the Phase One ESA. The Phase Two ESA was carried out in general accordance with O. Reg. 153/04. The Site investigation activities were limited to visible and accessible locations of the Site. Subsurface investigations, testing, sampling, and laboratory analyses were completed based on the findings of WSP's Phase One ESA, accessibility to each APEC, and site observations.

The site investigation program included the following:

- Clearance of public and private underground utilities and services prior to commencement of intrusive investigation activities;
- Preparation of a Health and Safety Plan and safe execution of all proposed work;
- Advancement of four (4) boreholes on the Phase Two Property to approximate maximum depths of 4.6 mbgs using a pionjar and ram sounder. Soil samples from all boreholes were submitted for analysis. Soil lithology from each borehole was logged in the field and samples were screened for TOV with a photoionization detector. Borehole locations were chosen based on the APEC locations identified during the Phase One ESA (WSP, 2019).
- Based on field screening and visual/olfactory observations, worst-case/representative soil samples from the boreholes were submitted for laboratory testing of PCOCs identified in the Phase I ESA (WSP, 2019);
- Groundwater monitoring wells were installed within three (3) of the four (4) boreholes to assess groundwater quality below the Site;
- The groundwater-monitoring wells were purged to remove stagnant water and sampled for laboratory testing of relevant PCOCs; and
- Soil and groundwater samples were submitted for chemical analysis to a CALA-certified laboratory in accordance with MECP guidelines and requirements of O. Reg. 153/04 (as amended).

### *4.1.1 SAMPLING AND ANALYSIS PLAN*

The WSP sampling and analysis plan (SAP) executed during this study is provided in ***Appendix B***. Per O. Reg. 153/04 Schedule E. Condition 3(5), WSP developed the standard operating procedures (SOPs) used in the field investigation.

Fieldwork for this Phase Two ESA was undertaken following the SOPs. Deviations from the SAP and SOPs, if any, are detailed in Section 4.4. The list of SOPs is presented in the table below.

**Table 4.1 List of Standard Operating Procedures Used by WSP in Field Investigation**

| CATEGORY | | SOP |
|---|---|---|
| i. | Drilling | Auger/Boring Rigs<br>Monitoring Well<br>Hollow Stem Auger Advancement<br>Soil Sample Material Descriptions |
| ii. | Soil Sampling | Continuous Sampling<br>Field Soil Sampling for VOC and PHC Analysis |
| iii. | Soil Field Testing | Odour Identification<br>Field Screening of Samples for Organic Vapours |
| iv. | Monitoring Well Construction | Monitoring Well Construction<br>Monitoring Well Development |
| v. | Field Measurement of Water Quality Indicators | Temperature Measurement<br>Conductivity Measurement<br>pH Measurement |
| vi. | Groundwater Monitoring/Sampling | Water Level Monitoring<br>Monitoring Well Purging<br>Monitoring Well Sampling<br>Volatile Organic Sampling |
| vii. | QA/QC Program | Quality Assurance<br>Quality Control |

## 4.2 MEDIA INVESTIGATED

A summary of the media investigated during the Phase Two ESA is provided in ***Table 2*** and ***Table 3***, attached.

## 4.3 PHASE ONE CONCEPTUAL SITE MODEL

A Phase One CSM was presented in the Phase One ESA report by WSP (2019) and is presented in this report for reference as ***Figure 2.*** The Phase One CSM identified the PCAs and APECs for the Site, as described in Section 6.4.

## 4.4 DEVIATIONS FROM THE SAMPLING AND ANALYSIS PLAN

This Phase Two ESA was completed in accordance with the SAP without deviation.

## 4.5 IMPEDIMENTS

Impediments limiting WSP's ability to carry out this Phase Two ESA in accordance with O. Reg. 153/04 were not encountered.

# 5 INVESTIGATION METHOD

## 5.1 GENERAL

This section provides a brief description of all methods employed by WSP during this Phase Two ESA. Where the method differs from the associated standard operating procedure, a detailed description of the method used and a rationale for the change in method is provided in the appropriate subsection below.

## 5.2 DRILLING

WSP staff inspected the Site and identified the preferred borehole locations based on the APEC locations identified in the Phase One ESA by WSP (2019), as shown on ***Figure 2.*** Borehole locations are shown on the Borehole Location Plan in ***Figure 3***. Underground services below the Site were cleared prior to commencement of the drilling program. WSP arranged for public service locates to be completed through Ontario One Call and private services were cleared by *Allclear Private Locators*. A summary of the drilling details is presented in Table 5.1 below.

**Table 5.1 Summary of Drilling Details**

| PARAMETER | DETAILS |
|---|---|
| Name of Drilling Contractor | Sonic Soil Sampling Inc. |
| Drilling Equipment Used | Ram Sounder and Pionjar. |
| Measures taken to minimize the potential for cross-contamination | A 50-mm stainless steel split spoon sampler was used to collect soil samples from the boreholes. The split spoon sampler was brushed clean of soil, washed in water containing phosphate free detergent, and rinsed in water for each sampling interval in order to reduce the potential for cross contamination. |
| Frequency of sample collection | All boreholes were sampled continuously every 0.8 m to the termination depths of each borehole. |

On July 9, 2019, four (4) boreholes (BH19-01 to BH19-04 inclusive) were drilled on-site using a Ram Sounder and Pionjar supplied and operated by *Sonic Soil Sampling Inc.* of Vaughan, Ontario. The boreholes were advanced to maximum depths of 4.6 mbgs. Soil samples were collected from the native silty sand/sandy silt to sand with varying amount of clay and gravel using a 50-mm diameter, 0.76-m long stainless-steel split spoon sampler.

## 5.3 SOIL

### 5.3.1 SOIL SAMPLING

Disposable nitrile gloves were used during sample collection and were replaced between each sample to minimize the potential for cross-contamination. Soil samples were described in the field by WSP staff and observations were recorded in a dedicated field book. Soil samples were collected directly into laboratory-supplied 250-ml and 120-mL amber glass jars and 40-mL methanol-preserved vials and were stored in a cooler on ice. Samples selected for laboratory analysis were handled under standard chain of custody procedures until received at the laboratory. The soil samples selected for laboratory analysis were considered representative of "worst-case" conditions in the boreholes based on field screening results and visual and olfactory observations.

All soil samples were submitted to AGAT Laboratories in Mississauga, Ontario. The soil samples submitted for chemical analysis are summarized in ***Table 2***, appended.

### 5.3.2 FIELD SCREENING MEASUREMENTS

Soil samples collected from the boreholes were field screened for TOV using an RKI Eagle 2 PID. In addition to visual and olfactory observations, the results of field screening were used to identify worst-case samples for submission to the laboratory. A summary of field screening measurements is provided in Table 5.2 below:

**Table 5.2 Summary of Field Screening Results (Soil)**

| PARAMETER | | DESCRIPTION |
|---|---|---|
| i. | Make and Model of Field Screening Instrument | RKI Eagle 2 |
| ii. | Chemicals that Field Screening Instrument Detects and Respective Detection Limits | VOCs with dynamic range of 0 parts per million (ppm) to 50,000 ppm |
| iii. | Precision of the Measurements | 3 significant figures |
| iv. | Accuracy of the Measurements | ± 5% display reading ± one digit |
| v. | Calibration Reference Standards | Hexane and Isobutylene |
| vi. | Calibration Procedures | The PID is factory-calibrated on an annual basis and the calibration was checked on a daily basis both prior to and after use in the field using 100 ppm isobutylene according to manufacturer procedures. |

Field screening measurements (PID readings) are discussed in Section 6.2.2 and presented on the borehole logs in ***Appendix C***.

## 5.4 GROUNDWATER

### 5.4.1 GROUNDWATER WELL INSTALLATION AND MONITORING

Groundwater monitoring wells were installed in three (3) of the four (4) borehole locations (BH19-02, BH19-03, and BH19-04) by *Sonic Soil Sampling Inc.* A Ram Sounder and Pionjar were used for the installation of all monitoring wells on July 9, 2019. Nitrile gloves were used to handle the well casings and screens during installation to minimize the potential for cross contamination.

All monitoring wells were screened to intersect the suspected local groundwater table based on observed conditions in the soil horizon (i.e. brown to grey colour change and/or observed change in moisture content) during the drilling and soil sampling activities. The static water table at BH19-03 was slightly above the screened interval as the groundwater level was higher than expected. The wells were constructed using 32-millimetre (mm) Schedule 40 PVC riser and included a 3.1-m well screen (slot 10). A sand pack was placed in the borehole annulus around the well screen from the bottom of the well to approximately 0.3 m above the well screen. Bentonite holeplug seal was placed above the sand pack to surface. The wells were completed with flush-mount casings. The monitoring well construction details are shown on the attached borehole logs included in ***Appendix C***.

### 5.4.2 GROUNDWATER FIELD MEASUREMENT OF WATER QUALITY PARAMETERS

All monitoring wells were purged using HDPE tubing and a low-flow peristaltic pump. The wells were purged by removing three (3) well volumes or by purging the well dry three (3) times. The wells were sampled on July 10, 2019 using the peristaltic pump. Field measurements of water quality parameters were collected using a Hanna multi-meter as part of this assessment including field pH, electrical conductivity (EC), and temperature. Field groundwater quality measurements were obtained after the removal of each well volume and were recorded. This data has been archived and is available upon request.

### 5.4.3 GROUNDWATER SAMPLING

On July 10, 2019, groundwater samples were collected from the newly-installed wells BH19-02, BH19-03 and BH19-04 following purging. The samples were collected in laboratory-supplied and preserved containers and stored in an ice-filled cooler. The groundwater samples were submitted under proper chain of custody procedures to AGAT Laboratories in Mississauga for analysis of metals and ORPs, PHCs, and VOCs.

## 5.5 SEDIMENT SAMPLING

Sediment sampling was not conducted as part of this Phase Two ESA.

## 5.6 ANALYTICAL TESTING

Soil and groundwater samples were submitted to AGAT Laboratories in Mississauga, Ontario for chemical analysis of the above-listed parameters. AGAT Laboratories is certified by CALA.

## 5.7 RESIDUE MANAGEMENT PROCEDURES

The management of residues such as soil cuttings, purge and development groundwater, and fluids from equipment cleaning was conducted as shown in Table 5.3 below:

**Table 5.3 Summary of Residue Management Procedures**

| RESIDUE | | MANAGEMENT PROCEDURE |
|---|---|---|
| i. | Soil cuttings from drilling and excavations | Soil cuttings were left on the Phase Two Property due to the absence of visual and olfactory observations of potential contaminants, and based on the analytical results contained in this report. |
| ii. | Water from well development and purging | Groundwater from the development and purging of the monitoring wells was emptied onto the ground downstream of the wells based on the analytical results contained in this report. |
| iii. | Fluids from equipment cleaning. | Equipment-cleaning water was emptied onto the ground downstream of the wells. No equipment contamination was expected in the field due to WSP's field observations, and as confirmed by the analytical results included in this report. |

## 5.8 ELEVATION SURVEY

A ground surface elevation survey of each borehole location was conducted by WSP. The ground surface elevations are shown on the borehole logs presented in ***Appendix C***.

## 5.9 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC) MEASURES

The project-specific QA/QC measures are described in Table 5.4 below.

**Table 5.4 Quality Assurance and Quality Control Measures**

| QA/QC MEASURE | DESCRIPTION |
|---|---|
| i. Sample containers, preservation, labelling, handling, and custody for samples submitted for laboratory analysis, including any deviations from the SAP. | Soil samples from the boreholes were collected in 40 mL methanol-preserved vials for PHC F1/VOCs/BTEX analysis, 250ml and 120 mL glass jars without preservative for analysis of all other parameters at the sample locations.<br>Groundwater samples from the monitoring wells were collected using the following laboratory-supplied containers (the containers below collectively constitute one sample):<br>a. VOCs – three (3) 40 mL glass vials preserved with a sodium bisulphate tablet<br>b. PHC F1/BTEX – three (3) 40 mL glass vials preserved with a sodium bisulphate tablet<br>c. PHC F2-F4 – one (1) 500 mL amber glass bottle, HCl preservative<br>d. Inorganics – one (1) 500 mL plastic 'general' bottle, no preservation<br>e. Dissolved metals – one (1) 125 mL plastic bottle, HNO3 preservative<br>f. Mercury – one (1) 100 mL clear glass bottle, HCl preservative<br>g. Chromium VI – one (1) 125 mL plastic bottle, preserved with Ammonium Sulfate/Ammonium Hydroxide<br>h. Cyanide – one (1) 125 mL plastic bottle, preserved with Sodium Hydroxide<br>Groundwater samples were collected using dedicated sampling equipment for each well. Groundwater samples collected for dissolved metals, mercury, and chromium (VI) analysis were field-filtered using a new 0.45-micron filter for each well. Groundwater containers used for PHC F1/BTEX and VOC analysis were filled to achieve zero headspace. Sample containers were labelled with a unique sample identification, the project number, and the sampling date. A laboratory-supplied chain of custody was completed. A copy was sent with the samples to the laboratory, and one (1) copy was retained for the project file. |
| ii. Equipment cleaning procedures during sampling | Nitrile gloves were replaced after each sample was collected to reduce the potential for cross-contamination of the samples.<br>Field equipment was cleaned with soap and water, and was rinsed with local well-water between samples. |
| iii. Field QC measures | Blind field duplicate samples of soil and groundwater were collected and submitted for laboratory analysis as part of this investigation. A laboratory-prepared VOC trip blank was brought to the Site during the groundwater sampling and was submitted to the laboratory for analysis. |

| QA/QC MEASURE | | DESCRIPTION |
|---|---|---|
| iv. | Deviations from the procedures set out in the QA/QC program set out in the SAP. | No deviations. |

Field duplicate samples were assessed as part of the QA/QC program through a comparison of the analytical results of the original samples to the field duplicate samples. Field duplicates measure the cumulative effects of both field and laboratory precision and provide an indication of overall precision. Field duplicates may therefore have greater variability than laboratory duplicates which measure only laboratory precision. It is also expected that non-aqueous matrices will have a greater variance than aqueous matrices due to the heterogeneity of most non-aqueous samples (such as soil/sediment samples). Field duplicates were evaluated based on the relative percent difference (RPD) in parameter concentrations.

The RPD was calculated in accordance with the *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act* (July 1, 2011). The calculated RPD was assessed against the recommended performance criteria outlined in the 2011 Protocol where the measured concentration was greater than 5 times the MDL.

AGAT Laboratories also performed QA/QC procedures as outlined in their CALA procedures. These procedures included analysis of lab duplicates and blanks as well as analysis of surrogate recovery as outlined in the Certificates of Analysis provided in ***Appendix D***.

# 6 RESULTS REVIEW AND EVALUATION

## 6.1 GEOLOGY/SOIL STRATIGRAPHY

A brief summary of the subsurface conditions encountered within the Site is presented below. Detailed borehole logs are provided in ***Appendix C***.

Three (3) boreholes (BH19-01, BH19-02 and BH19-03) were advanced through a topsoil layer ranging in thickness from 30 to 63 cm. Underlying the topsoil in one (1) of the boreholes (BH19-03) was a 20-cm layer of clayey silt. BH19-04 was advanced through a 5-cm asphalt layer on top of a 25-cm granular fill layer. Underneath the granular fill encountered in BH19-04 was an organic/topsoil layer that extended to a depth of 0.7 mbgs. Underlying the topsoil in BH19-01 and BH19-02, the clayey silt in BH19-03 and the organics/topsoil layer in BH19-04 was a silty sand/sandy silt layer starting at a depth ranging from 0.3 to 0.8 mbgs and extending to a depth ranging from 2.4 to 3.8 mbgs. Sand was encountered in all boreholes underlying the silty sand/sandy silt layer extending to the termination depth of the boreholes.

Bedrock was not encountered during the Phase Two ESA investigation. Based on the MECP Water Well Records reviewed as part of the Phase One ESA by WSP, bedrock depth is approximately 6.7 mbgs.

## 6.2 HYDROGEOLOGY

### 6.2.1 ELEVATIONS AND FLOW DIRECTION

Groundwater levels in the monitoring wells ranged from 0.8 to 3.4 mbgs on July 22, 2019. The well screens were 3.05 m in length and were installed in the native silty sand/sandy silt and sands at all borehole locations. The starting (pre-purge) water levels were reported to be within the screened intervals at BH19-02 and BH19-04. The water level was above the screen length in BH19-03.

Groundwater elevations were measured on July 22, 2019 and are presented in ***Table 1***. The July 22, 2019 groundwater elevations ranged from 456.4 to 457.4 masl within the monitoring wells. During the drilling investigation, WSP noted that the groundwater in BH19-03 and BH19-04 appeared to be under pressure suggesting that these boreholes and BH19-02 were screened within different aquifers. To determine the groundwater direction across the Site, WSP used the water level within existing well BH19-01 located within the adjacent property to the east (#506249 Highway 89) to determine the flow direction. WSP installed BH19-01 within the adjacent property as part of a separate project. The resulting shallow inferred groundwater flow direction was determined to be to the southwest across the Site. Groundwater levels are presented in ***Figure 4***.

Neither LNAPL nor DNAPL were found to be present within any of the onsite monitoring wells.

### 6.2.2 HYDRAULIC GRADIENTS

The hydraulic gradient was calculated based on the July 22, 2019 groundwater elevations of BH19-03, BH19-04 and BH19-01 located within #506249 Highway 89). The average horizontal hydraulic gradient was calculated to be 0.003 based upon these measurements.

## 6.3 RESULTS OF ANALYSIS

Analytical results are discussed in the following sub-sections.

### 6.3.1 SOIL TEXTURE ANALYSIS

Results of the soil texture analysis are presented below.

**Table 6.1 Soil Texture Analysis**

| CRITERIA | | DESCRIPTION |
|---|---|---|
| i. | rationale for the use of soil texture category, | WSP conservatively assumed that soils within the Phase Two Property were of coarse-grained texture. |
| ii. | a description of the results of the required grain size analysis | Grain size analysis results were not reported to WSP prior to the required delivery date of this report. Coarse-grained soil texture is a conservative assumption that requires application of more-stringent chemical concentration criteria relative to medium to fine-grained soil textures. |
| iii. | a description and rationale for the number of samples collected and analysed | |

### 6.3.2 FIELD SCREENING

Twenty-eight (28) soil samples were screened for TOV using a PID. TOV concentrations ranged from 0 ppm to 410 ppm. The TOV readings are included on the borehole logs included in ***Appendix C***. The samples that were submitted for laboratory analysis of organic parameters (VOCs, PHCs) are shown in ***Table 2***.

### 6.3.3 SOIL CHEMICAL QUALITY

The soil analytical results from the present investigation are presented in ***Tables 4*** through ***6*** and summarized on ***Figure 5***.

The Laboratory Certificates of Analysis for the soil analysis completed during the present investigation are provided in ***Appendix D***.

### 6.3.4 SOIL – METALS AND OTHER REGULATED PARAMETERS (ORP)

Four (4) soil samples and one (1) blind field duplicate QA/QC sample were collected and submitted for analysis of metals and ORPs. The soil analytical results for metals and ORPs are provided in ***Table 4*** and the results of the laboratory analyses indicated that all samples analysed met Table 2 ICC SCS.

### 6.3.5 SOIL – ALIPHATIC PETROLEUM HYDROCARBONS (PHC)

Four (4) soil samples were collected and submitted for analysis of CCME F1-F4 PHCs. The soil analytical results for PHCs are provided in ***Table 5*** and the results of the laboratory analyses indicated that all samples analysed met Table 2 ICC SCS.

### 6.3.6 SOIL – VOLATILE ORGANIC COMPOUNDS

Four (4) soil samples and one (1) blind field duplicate QA/QC sample were collected and submitted for analysis of VOCs. The soil analytical results for VOCs are provided in ***Table 6*** and the results of the laboratory analyses indicated that all samples analysed met Table 2 ICC SCS.

### 6.3.7 GROUNDWATER CHEMICAL QUALITY

The groundwater analytical results from the July 2019 sampling event are presented in ***Tables 7*** through ***9*** and are summarized on ***Figure 6***.

The Laboratory Certificates of Analysis for the groundwater analysis completed during the Phase Two ESA are provided in ***Appendix D***.

### 6.3.8 GROUNDWATER – METALS AND OTHER REGULATED PARAMETERS (ORP)

Three (3) groundwater samples were collected and submitted for analysis of metals and ORPs. The groundwater analytical results for metals and ORPs are provided in ***Table 7.*** Laboratory analytical results indicated that all samples analysed met the Table 2 SCS with the exceptions listed in Table 6.2 below:

**Table 6.2 Summary of Metals and ORP Exceedances in Groundwater**

| WELL LOCATION | PARAMETER | TABLE 2 SCS | RESULT |
|---|---|---|---|
| BH19-03 | Sodium | 490000 | **588000** |
| | Chloride | 790000 | **1020000** |

### 6.3.9 GROUNDWATER - PETROLEUM HYDROCARBONS

Three (3) groundwater samples were collected and submitted for analysis of CCME F1-F4 PHCs. The groundwater analytical results for PHCs are provided in ***Table 8*** and the results of the laboratory analyses indicated that all samples analysed met Table 2 SCS.

### 6.3.10 GROUNDWATER– VOLATILE ORGANIC COMPOUNDS

Three (3) groundwater samples and one (1) blind field QA/QC duplicate were collected and submitted for analysis of VOCs. The groundwater analytical results for VOCs are provided in ***Table 9*** and the laboratory analyses indicated that all samples analysed met Table 2 SCS.

### 6.3.11 SEDIMENT QUALITY

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

## 6.4 QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

Proper field protocols for sample collection and handling were followed by all WSP personnel in accordance with the MECP *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*. All field equipment was decontaminated before and between sample collection and new, clean nitrile gloves were used for each sample to eliminate the potential for cross contamination. All soil and groundwater samples were collected directly into laboratory-supplied containers, preserved as required, and stored and shipped in ice-filled coolers. Proper chain of custody procedures were followed by WSP and the laboratory during sample transfer.

The RPDs for the analyzed parameters in duplicate samples (where the RPD could be calculated) were within the 2011 Protocol performance criteria. As such, it is WSP's opinion that the laboratory analytical data is reliable and reproducible.

A summary of the field duplicate soil and groundwater samples, and the results of the QA/QC comparisons of the duplicate samples indicating that the results can be interpreted with confidence, is provided in Table 6.3.

**Table 6.3 Summary of QA/QC Results**

| DATE | MEDIA | SAMPLE ID | FIELD DUPLICATE ID | PARAMETERS | QA/QC RESULTS |
|---|---|---|---|---|---|
| 2019-07-09 | Soil | BH19-01 SS3 | DUP-1 | Metals & ORPs | All results were within the 2011 Protocol criteria for RPD |
| 2019-07-09 | | BH19-03 SS5 | DUP-2 | VOCs | All results were within the 2011 Protocol criteria for RPD |
| 2019-07-10 | Groundwater | BH19-03 | GWDUP-1 | VOCs | All results were within the 2011 Protocol criteria for RPD |

A laboratory-prepared trip blank was included with the July 2019 groundwater samples and was analysed by the laboratory for VOCs. All concentrations were below the RDL indicating no contamination from the sample containers, preservatives, transportation, and storage conditions. The results also indicate that the laboratory instrument was not detecting analytical interference.

AGAT Laboratories carried out internal QA/QC measures including process recoveries, blanks, and replicate samples. The laboratory QA/QC results are provided on the Certificates of Analysis in ***Appendix D***. The results were acceptable and therefore suitable for interpretation.

With respect to subsection 47 (3) of O. Reg. 153/04, all certificates of analysis of analytical reports received pursuant to clause 47 (2) (b) of the regulation comply with subsection 47(3), a certificate of analysis of analytical report has been received for each sample submitted for analysis, and all certificates of analysis or analytical reports received have been included in full in ***Appendix D*** to this Phase Two ESA report.

## 6.5 PHASE TWO CONCEPTUAL SITE MODEL

Through analysis and interpretation of the Phase One ESA, Phase One CSM, and field data gathered during this Phase Two ESA, a Phase Two CSM was developed.

Based on information obtained as part of the Phase One ESA (WSP, 2019), it was concluded that APECs associated with past activities/operations existed at the Site. The table of APECs, prepared in accordance with clause 16 (2) (a), Schedule D, O.Reg. 153/04, is presented in Table 6.4 below.

**Table 6.4 Summary of APECs Identified in Phase One ESA**

| AREA OF POTENTIAL ENVIRONMENTAL CONCERN | LOCATION OF POTENTIAL ENVIRONMENTAL CONCERN ON PHASE ONE PROPERTY | POTENTIALLY CONTAMINATING ACTIVITY | LOCATION OF PCA (ON-SITE OR OFF-SITE) | POTENTIAL CONTAMINANTS OF CONCERN | MEDIA POTENTIALLY IMPACTED (GROUND WATER, SOIL AND/OR SEDIMENT) |
|---|---|---|---|---|---|
| APEC-1<br>Historical Gasoline Service Station in southwest adjoining property | Central and Southern portions of the Phase One Property | PCA No. 28<br>Gasoline and Associated Products in Fixed Tanks | Off-site | Metals & ORPs<br>PHCs<br>VOCs | Soil & Groundwater |

Table 6.5 below provides a summary discussion of the interpreted field data that is incorporated into the Phase Two CSM:

**Table 6.5 Summary of Phase Two Conceptual Site Model (CSM)**

| CRITERIA | DISCUSSION |
|---|---|
| i. a description and assessment of,<br>a. areas where a PCA have occurred,<br>b. APECs, and<br>a. any subsurface structures and utilities on, in or under the phase two property that may affect contaminant distribution and transport | The Phase One ESA completed by WSP concurrently with this Phase Two ESA identified PCAs that contributed to the identification of APECs, as identified in ***Figure 2***.<br><br>The Phase One CSM ***(Figure 2)*** for the Site incorporates the information and data collected as part of this Phase Two ESA and Phase One ESA.<br><br>A. In summary, off-site PCAs that were identified as contributing to on-site APECs included:<br>• PCA No. 28. Gasoline and Associated Products Storage in Fixed Tanks off-site (a property to the southeast of the Site)<br><br>B. The on-site APECs that were interpreted from the occurrence of the PCAs were:<br>• APEC #1 – Central and Southern portion of Phase Two Property – Gasoline and Associated Products in Fixed Tanks<br>No exceedances relating to this APEC were identified on-site during this investigation.<br><br>C. Underground utilities can affect contaminant distribution and transport. Trenches excavated to install utility services, and the associated granular backfill may provide preferential pathways for horizontal contaminant migration in the shallow subsurface. |
| ii. a description of and, as appropriate, figures illustrating, the physical setting of the phase two property and any areas under it including,<br>a. stratigraphy from ground surface to the deepest aquifer or aquitard investigated,<br>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,<br>c. approximate depth to bedrock, | A. The Site is located within a spillways physiographic region. Three (3) boreholes (BH19-01, BH19-02 and BH19-03) were advanced through a topsoil layer ranging in thickness from 30 to 63 cm. Underlying the topsoil in one (1) of the boreholes (BH19-03) was a 20-cm layer of clayey silt. BH19-04 was advanced through a 5-cm asphalt layer on top of a 25 cm granular fill layer. Underneath the granular fill encountered in BH19-04 was an organics/topsoil layer that extended to a depth of 0.7 mbgs. Underlying the topsoil in BH19-01 and BH19-02, the clayey silt in BH19-03 and the organics/topsoil layer in BH19-04 was silty sand/sandy silt starting at depth ranging from 0.3 to 0.8 mbgs extending to a depth ranging from 2.4 to 3.8 mbgs. Sand was encountered in all boreholes underlying the silty sand/sandy silt layer extending to the final depth of the boreholes.<br><br>B. During the drilling investigation, WSP noted that the groundwater in BH19-03 and BH19-04 appeared to be under pressure suggesting that these boreholes and BH19-02 were screened within different aquifers. |

| | |
|---|---|
| d. approximate depth to water table,<br>e. any respect in which section 41 or 43.1 of the regulation applies to the property,<br>f. areas where soil has been brought from another property and placed on, in or under the phase two property, and<br>g. approximate locations, if known, of any proposed buildings and other structures | C. Bedrock was not encountered during the Phase Two ESA. Based on the MECP Water Well Records reviewed as part of the Phase One ESA by WSP, the bedrock depth is approximately 6.7 mbgs.<br>D. The depth to shallow groundwater in the overburden was approximately 0.8 to 3.4 mbgs, based on the July 22, 2019 groundwater level monitoring event.<br>E. A branch of the Boyne River is located 470 m northeast of the Phase One Property. The Boyne River flows in a northeasterly direction into the Nottawasaga River which flows in a northwesterly direction into Georgian Bay. According to the MNRF Natural Heritage Map, two threatened species, the bobolink and eastern meadowlark, have been observed on the Phase One Property or within the Phase One Study Area and therefore the Phase One Property may be considered an environmentally sensitive area in accordance with O.Reg. 153/04, as amended. The soil at the property has a pH value between 5 and 9.<br>F. Soil was not brought from another property and placed on, in, or under the Site, as part of this Phase Two ESA.<br>G. The Site is proposed for redevelopment as a commercial/industrial use. Building plans were not provided to WSP as part of this investigation. |
| 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,<br>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,<br>B. the contaminants associated with each of the areas referred to in subparagraph A,<br>C. each medium in which a contaminant associated with an area referred to in subparagraph is present,<br>D. a description and assessment of what is known about each of the areas referred to in subparagraph A,<br>E. the distribution, in each of the areas referred to in | A. / B. / C.<br>Eastern portions of Phase Two Property / Sodium / Groundwater<br>Eastern portions of Phase Two Property / Chloride / Groundwater<br><br>D. What is known about the areas of environmental impact:<br><u>Groundwater</u><br>Elevated Sodium and Chloride were identified during this investigation in the groundwater. It is likely that the application of de-icing road salt to the parking lot and adjacent roadways contributed to the elevated levels observed.<br>E. The horizontal distribution of contaminants in groundwater on-site is presented in ***Figure 6***. The vertical and lateral extent of the sodium and chloride impacts are currently unknown.<br>F. The presence of Sodium and Chloride impacts in groundwater is likely associated with the application of de-icing road salt. |

| | |
|---|---|
| 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,<br>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,<br>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 APEC, including the identification of any preferential pathways,<br>H. climatic or meteorological conditions that may have influenced distribution and migration of the contaminants, such as temporal fluctuations in groundwater levels, and<br>I. if applicable, information concerning soil vapour intrusion of the contaminants into buildings including,<br>1. relevant construction features of a building, such as a basement or crawl space,<br>2. building heating, ventilating and air conditioning design and operation, and<br>3. subsurface utilities, | G. Migration of these contaminants will be affected by water infiltration and groundwater flow.<br>H. Climatic or meteorological conditions are not considered to have greatly influenced the distribution or migration of the contaminants.<br>I. Given the nature of the contaminants identified in this investigation, vapour intrusion is not considered a concern. |

| | |
|---|---|
| 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,<br>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, groundwater and sediment,<br>B. approximate depth to water table in each area referred to in subparagraph A,<br>C. stratigraphy from ground surface to the deepest aquifer or aquitard investigated, and<br>D. any subsurface structures and utilities that may affect contaminant distribution and transport in each area referred to in subparagraph A | A. Plan view figures that indicate the horizontal distribution of contaminants are provided as:<br>Figure 6 Summary of Chemical Analysis and Exceedances in Groundwater<br>B. Groundwater levels are provided in ***Table 1*** and ***Figure 4***.<br>C. Stratigraphy from ground surface to the deepest strata investigated is provided in the borehole logs presented in ***Appendix C***.<br>D. Underground utilities have the potential to affect contaminant distribution and transport. Utilities were primarily located on the west side of the building. Underground utilities on the Phase Two Property and on adjacent properties may affect local migration of contaminants in the subsurface. |
| 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,<br>A. the release mechanisms,<br>B. contaminant transport pathway,<br>C. the human and ecological receptors located on, in or under the phase two property,<br>D. receptor exposure points, and routes of exposure. | Elevated Sodium and Chloride in groundwater is likely due to the application of de-icing road salt on the parking lot of the Phase Two Property and adjacent roadways. A conceptual human health exposure model for sodium and chloride is provided in ***Appendix E***. |

# 7 SUMMARY AND CONCLUSIONS

Based on the Phase Two ESA, WSP presents the following findings:

- Three (3) boreholes (BH19-01, BH19-02 and BH19-03) were advanced through a topsoil layer ranging in thickness from 30 to 63 cm. Underlying the topsoil in one (1) of the boreholes (BH19-03) was a 20-cm layer of clayey silt. BH19-04 was advanced through a 5-cm asphalt layer overlaying a 25-cm granular fill layer. Underneath the granular fill encountered in BH19-04 was an organic/topsoil layer that extended to a depth of 0.7 mbgs. Underlying the topsoil in BH19-01 and BH19-02, the clayey silt in BH19-03 and the organics/topsoil layer in BH19-04 was a silty sand/sandy silt layer starting at depth ranging from 0.3 to 0.8 mbgs extending to a depth ranging from 2.4 to 3.8 mbgs. Sand was encountered in all boreholes underlying the silty sand/sandy silt layer extending to the termination depths of the boreholes. Based on the MECP Water Well Records reviewed as part of the Phase One ESA by WSP, bedrock depth is approximately 6.7 mbgs.
- The depth to groundwater was recorded in three (3) monitoring wells installed during the investigation. The groundwater levels ranged between 0.8 and 3.4 mbgs on July 22, 2019. The July 2019 groundwater elevations ranged from 456.4 to 457.4 m above mean sea level (masl). The inferred shallow groundwater flow direction is to the southwest below the Phase Two study area. Groundwater levels and flow direction can be influenced by seasonal fluctuations, utility services, and other subsurface features and can only be confirmed with long term monitoring.
- The soil and groundwater analytical results were compared to 2011 MECP Table 2 Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for Industrial/Commercial/Community (ICC) land uses.
- On July 9, 2019, a total of four (4) soil samples plus two (2) QA/QC samples (for a total of six (6) soil samples) were submitted to a laboratory and analysed for potential contaminants of concern (PCOCs) including metals and ORPs, PHCs and VOCs. Analytical results indicated that all soil samples submitted to the laboratory met the Table 2 ICC SCS for all parameters analyzed.
- On July 10, 2019, groundwater samples were obtained from each of the three (3) monitoring wells and submitted for analysis of metals and ORPs, PHCs, and VOCs. Analytical results indicated that the groundwater samples submitted to the laboratory all met Table 2 SCS for all parameters analysed except for the parameters shown in Table 7.1 below:

**Table 7.1 Summary of Metals and ORP Table 2 ICC SCS Exceedances in Groundwater**

| WELL LOCATION | PARAMETER | TABLE 2 SCS (UG/L) | RESULT (UG/L) |
|---|---|---|---|
| BH19-03 | Sodium | 490,000 | **588,000** |
| | Chloride | 790,000 | **1,020,000** |

Based on the findings of this Phase Two ESA, WSP presents the following conclusions and recommendations:

- All soil samples collected from the Phase Two Property met Table 2 ICC SCS for all tested parameters.
- Groundwater containing elevated sodium and chloride concentrations was found in one (1) of the three monitoring wells (BH19-03). De-icing road salt (sodium chloride) is often the cause of elevated sodium and chloride concentrations adjacent to roadways and parking lots. The Phase Two Property is located adjacent

to Highway 89; a provincial highway that has received decades of road salt applications during the winter months. Elevated sodium and chloride concentrations are of significance where soils must support vegetative root growth and where the water is to be used for potable applications. WSP understands that the Phase Two Property is to be combined with a larger land parcel to the north and that no agricultural uses are expected within this combined land parcel. For this reason, ecological risk exposure due to elevated groundwater sodium and chloride is considered low. Human health exposure risk via dermal contact due to the presence of elevated sodium and chloride in groundwater is considered negligible. Human health exposure risk due to ingestion of water containing elevated sodium and chloride is considered low, and can be effectively managed by (i) installing potable water well screens in deep aquifers beyond the influence of elevated sodium and chloride and/or (ii) installing end-of-pipe water treatment equipment to reduce sodium and chloride levels.

- All other groundwater parameters tested met their respective Table 2 SCS within samples collected from all three (3) wells.
- As proposed development of the Phase Two Property is not expected to result in a more sensitive land use than the existing agricultural use, a Record of Site Condition (RSC) is not required under O.Reg. 153/04. If an RSC is required for any other purpose (i.e. municipal approvals), a formal risk management strategy for sodium and chloride in the form of a Risk Assessment may be needed prior to filing an RSC.

All three (3) monitoring wells installed by WSP for this study should be decommissioned in accordance with O. Reg. 903 when no longer required.

## 7.1 QUALIFIER

This assignment was limited to the completion of a Phase Two ESA and analysis of potential Contaminants of Concern at the selected borehole locations. This report was prepared for the exclusive use of Deltini (Primrose) Inc. and may not be relied upon by any other party without WSP's written consent.

The Phase Two ESA, sampling, and laboratory analyses were completed as documented in the report. Extrapolation of data beyond the borehole locations assumes that homogenous conditions exist beyond the sampling locations, which may not be the case. Therefore, it is not possible to state conclusively that the subsurface conditions encountered during this investigation exist beyond the sampled locations.

The conclusions provided in this report reflect our best judgment in light of the information available at the time of report preparation. Any use which a third party makes of this report, or any reliance on or any decisions to be made based on it, is the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by any third party because of decisions or actions taken, based on this report. Conclusions documented in this report do not apply to other land uses. It is understood that Site conditions, environmental or otherwise, are not static and that this report documents Site conditions at the time of the investigation.

## 7.2 QUALIFICATIONS OF THE ASSESSORS

Nicole Corbett has an Environmental Technician Diploma and an Ecosystem Management Technology Diploma from Sir Sandford Fleming College. Her experience in environmental monitoring programs, includes long term leachate, ground and surface water monitoring. Observing and recording installation of piezometers, and groundwater sampling programs at landfills, and environmental drilling programs for Phase One & Two ESA's.

This report was reviewed by Jay Dolan, who is a licensed Professional Engineer (Ontario) with over twenty-five (25) years of full and part-time experience in environmental consulting and contracting. Jay has successfully applied in-situ remedial techniques to remediate contaminated soil and groundwater including chemical oxidation, bioremediation, soil vapour extraction and multi-phase extraction, and has successfully applied ex-situ techniques including bio-piling and "dig and dump". He has completed hundreds of Phase I, II and III Environmental Site Assessments and has prepared hundreds of assessment reports and remedial action plans for contaminated properties.

# 8 REFERENCES


— Ontario Ministry of the Environment and Climate Change (MECP). 1996. Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario. December 1996.

— Ontario Ministry of the Environment and Climate Change (MECP). 2011a. Ontario Regulation 153/04, as amended, made under the Environmental Protection Act. July 1, 2011.

— Ontario Ministry of the Environment and Climate Change (MECP). 2011b. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. July 1, 2011.

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— Ontario Ministry of the Environment and Climate Change (MECP). 2013. Ontario Regulation 903: "Wells." R.R.O. 1990, under the Ontario Water Resources Act, as amended by O. Reg. 331/13.

— Preliminary Hydrogeological and Servicing Concepts Study – Primrose, Ontario (Township of Mulmur), Prepared for: Township of Mulmur, Prepared by: Azimuth Environmental Consulting, Inc. dated February 2008 (revised March 2009).

— WSP Canada Inc. (WSP). Phase Two Environmental Site Assessment 506243 Highway 89, Primrose, Ontario. July 2019.

# FIGURES




561 Bryne Drive, Units C&D
Barrie, Ontario
L4N 9Y3

# SITE LOCATION PLAN

| | | |
|---|---|---|
| Scale: 1:54,000 | **PHASE TWO ENVIRONMENTAL SITE ASSESSMENT 506243 HIGHWAY 89, PRIMOSE, TOWNSHIP OF MULMUR, ONTARIO** | Prepared By: NC |
| Date: July 2019 | | Reviewed By: JD |
| Project: 191-08696-00 | Prepared For: Deltini (Mulmur) Inc. | Drawing No. **1** |




wsp

126 DON HILLOCK DRIVE, UNIT 2
AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM


**LEGEND**

- APPROXIMATE PHASE ONE PROPERTY
- PHASE ONE STUDY AREA
- 5 m INTERVAL TOPOGRPAHIC CONTOURS
- WATERCOURSE
- WETLANDS
- INFERRED GROUNDWATER FLOW DIRECTION
- SEPTIC BED
- MECP WATER WELL RECORD
- ON-SITE WELL

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

- APEC 1

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016

| | | | |
|---|---|---|---|
| CLIENT: DELTINI (MULMUR) INC. | PROJECT NO: 191-08696-00 200 | DATE: JULY 2019 | TITLE: CONCEPTUAL SITE MODEL |
| | DESIGNED BY: - | | |
| | DRAWN BY: TP | | DISCIPLINE: ENVIRONMENT |
| PROJECT: PHASE ONE ENVIRONMENTAL SITE ASSESSMENT 506243 HIGHWAY 89 PRIMROSE, TOWNSHIP OF MULMUR, ONTARIO | CHECKED BY: JD | | |
| | FIGURE NO: 2 | SCALE: AS SHOWN | ISSUE: - / REV.: - |

Document Path: T:\191-08696-00\MXD\191-08696-00 100 Figure 2 CSM.mxd


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AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

PROJECT:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
506243 HIGHWAY 89
PRIMROSE, TOWNSHIP OF MULMUR, ONTARIO

TITLE:
BOREHOLE LOCATION PLAN

CLIENT:
DELTINI (MULMUR) INC.

| | |
|---|---|
| SCALE: | 1:1,000 |
| DRAWN BY: | TP |
| CHECKED BY: | JD |
| PROJECT NO: | 191-08696-00 200 |
| DATE: | JULY 2019 |
| FIGURE NO: | 3 |
| REV.: | - |

Document Path: T:\191-08696-00\MXD\P2\191-08696-00 200 Figure 3 BH Locations.mxd


126 DON HILLOCK DRIVE, UNIT 2
AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

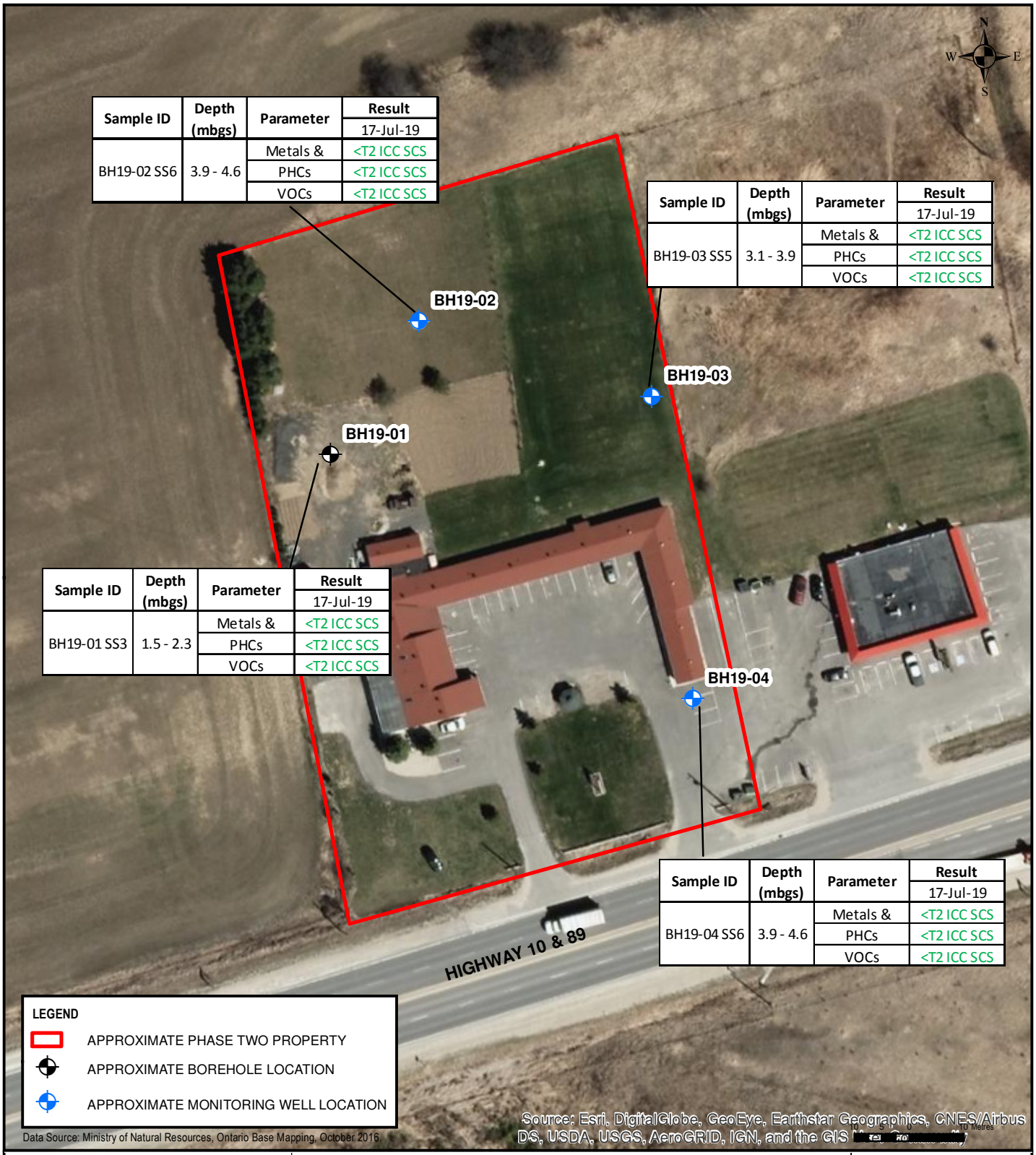
PROJECT:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
506243 HIGHWAY 89
PRIMROSE, TOWNSHIP OF MULMUR, ONTARIO

TITLE:
GROUNDWATER ELEVATIONS

CLIENT:
DELTINI (MULMUR) INC.

| SCALE: | |
|---|---|
| 1:1,000 | |
| DRAWN BY: TP | CHECKED BY: JD |
| PROJECT NO: 191-08696-00 200 | |
| DATE: JULY 2019 | |
| FIGURE NO: 4 | REV.: - |

Document Path: T:\191-08696-00\MXD\P2\191-08696-00 200 Figure 4 Groundwater Contours.mxd




| Sample ID | Depth (mbgs) | Parameter | Result 17-Jul-19 |
|---|---|---|---|
| BH19-02 SS6 | 3.9 - 4.6 | Metals & | <T2 ICC SCS |
| | | PHCs | <T2 ICC SCS |
| | | VOCs | <T2 ICC SCS |

| Sample ID | Depth (mbgs) | Parameter | Result 17-Jul-19 |
|---|---|---|---|
| BH19-03 SS5 | 3.1 - 3.9 | Metals & | <T2 ICC SCS |
| | | PHCs | <T2 ICC SCS |
| | | VOCs | <T2 ICC SCS |

| Sample ID | Depth (mbgs) | Parameter | Result 17-Jul-19 |
|---|---|---|---|
| BH19-01 SS3 | 1.5 - 2.3 | Metals & | <T2 ICC SCS |
| | | PHCs | <T2 ICC SCS |
| | | VOCs | <T2 ICC SCS |

| Sample ID | Depth (mbgs) | Parameter | Result 17-Jul-19 |
|---|---|---|---|
| BH19-04 SS6 | 3.9 - 4.6 | Metals & | <T2 ICC SCS |
| | | PHCs | <T2 ICC SCS |
| | | VOCs | <T2 ICC SCS |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AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM


PROJECT:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
506243 HIGHWAY 89
PRIMROSE, TOWNSHIP OF MULMUR, ONTARIO

TITLE:
SUMMARY OF CHEMICAL ANALYSIS IN SOIL

CLIENT:
DELTINI (MULMUR) INC.

SCALE: 1:1,000

DRAWN BY: TP

CHECKED BY: JD

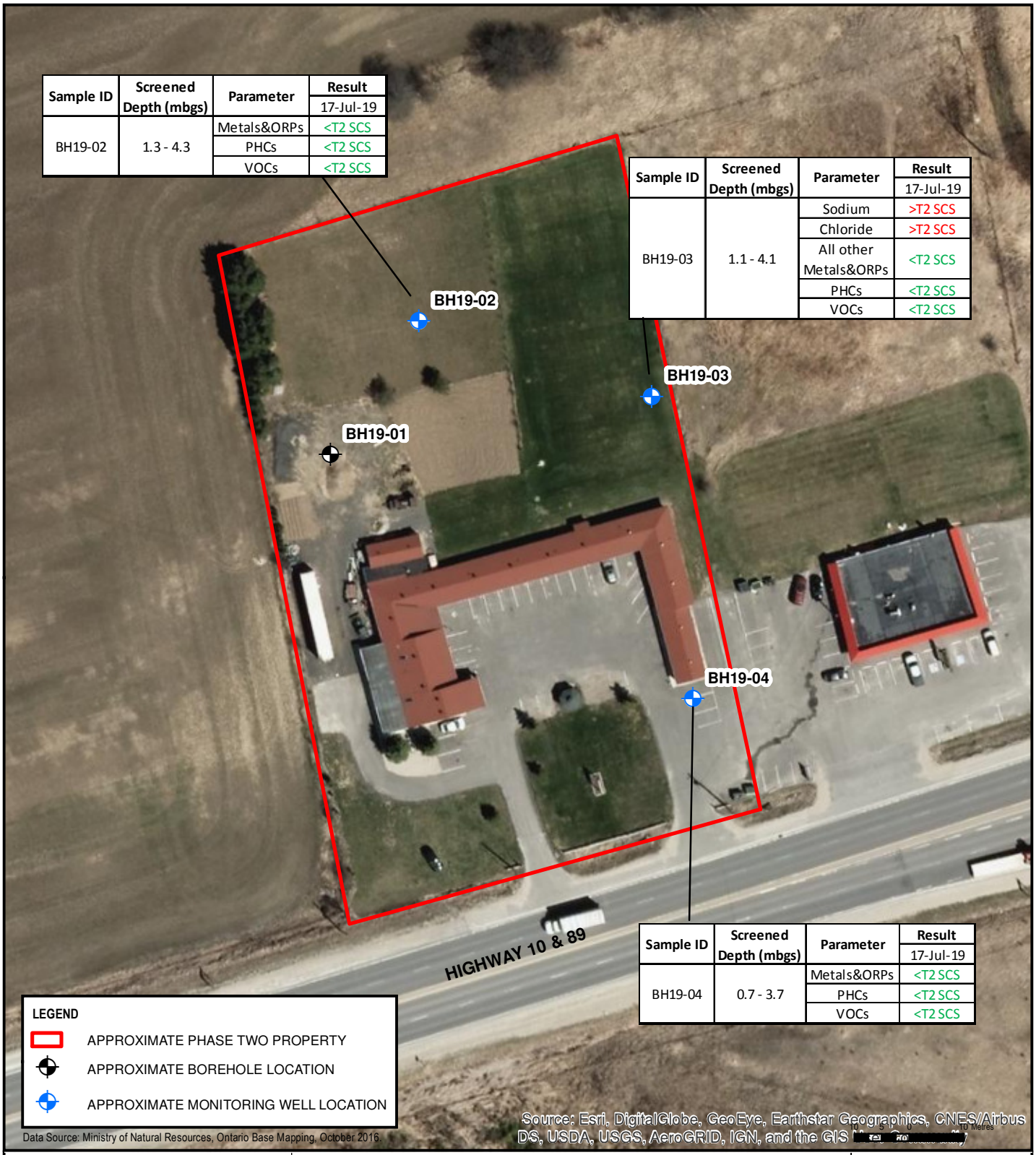
PROJECT NO: 191-08696-00 200

DATE: JULY 2019

FIGURE NO: 5

REV.: -

Document Path: T:\191-08696-00\MXD\P2\191-08696-00 200 Figure 5 Soil Exceedances.mxd




| Sample ID | Screened Depth (mbgs) | Parameter | Result |
|---|---|---|---|
| | | | 17-Jul-19 |
| BH19-02 | 1.3 - 4.3 | Metals&ORPs | <T2 SCS |
| | | PHCs | <T2 SCS |
| | | VOCs | <T2 SCS |

| Sample ID | Screened Depth (mbgs) | Parameter | Result |
|---|---|---|---|
| | | | 17-Jul-19 |
| BH19-03 | 1.1 - 4.1 | Sodium | >T2 SCS |
| | | Chloride | >T2 SCS |
| | | All other Metals&ORPs | <T2 SCS |
| | | PHCs | <T2 SCS |
| | | VOCs | <T2 SCS |

| Sample ID | Screened Depth (mbgs) | Parameter | Result |
|---|---|---|---|
| | | | 17-Jul-19 |
| BH19-04 | 0.7 - 3.7 | Metals&ORPs | <T2 SCS |
| | | PHCs | <T2 SCS |
| | | VOCs | <T2 SCS |

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AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

PROJECT:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
506243 HIGHWAY 89
PRIMROSE, TOWNSHIP OF MULMUR, ONTARIO

TITLE:
SUMMARY OF CHEMICAL ANALYSIS IN GROUNDWATER

CLIENT:
DELTINI (MULMUR) INC.

SCALE: 1:1,000
DRAWN BY: TP
CHECKED BY: JD
PROJECT NO: 191-08696-00 200
DATE: JULY 2019
FIGURE NO: 6
REV.: -

Document Path: T:\191-08696-00\MXD\P2\191-08696-00 200 Figure 6 GW Exceedances.mxd

# APPENDIX

# A LEGAL SURVEY

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE REGISTRY ACT.

DATE April 6, 1984

JOHN F. G. YOUNG, B.Sc., O.L.S.
ONTARIO LAND SURVEYOR

PLAN 7R- 2194

RECEIVED AND DEPOSITED

April 10, 1984

LAND REGISTRAR FOR THE REGISTRY DIVISION OF DUFFERIN (N° 7)

**CAUTION: THIS PLAN IS NOT A PLAN OF SUBDIVISION WITHIN THE MEANING OF THE PLANNING ACT.**

PLAN OF SURVEY OF

# PART OF THE EAST HALF OF LOT 1 CONCESSION 2, WEST OF HURONTARIO STREET

TOWNSHIP OF MULMUR, COUNTY OF DUFFERIN

SCALE 1:500

0m 5 10 15 20 30 40 50m

JOHN F. G. YOUNG B.Sc., O.L.S. 1984

## SCHEDULE

| PART N° | LOT N° | CONCESSION | INST. N° | AREA |
|---|---|---|---|---|
| 1 | 1 | 2 W.H.S. | 13726 (REM) | 0.446 Ha |
| 2 | 1 | 2 W.H.S. | 13726 (REM) | 0.387 Ha |

## NOTES:

BEARINGS SHOWN HEREON ARE ASTRONOMIC AND ARE REFERRED TO THE N 73° 43' 30"E OF THE NORTH LIMIT OF HIGHWAY N° 89 AS WIDENED AND SHOWN ON DEPOSITED PLAN N° 7R-1700 .

| | | |
|---|---|---|
| □ | DENOTES | SURVEY MONUMENT SET |
| ■ | " | SURVEY MONUMENT FOUND |
| IB | " | IRON BAR (0.016 x 0.016 x 0.61m) |
| SIB | " | STANDARD IRON BAR(.025 x .025 x 1.219m) |
| MTC | " | MINISTRY OF TRANSPORTATION AND COMMUNICATIONS |
| CM | " | CONCRETE MONUMENT |
| (P) | " | PLAN 7R-1700 |
| WIT | " | WITNESS |
| meas | " | MEASURED |
| O.U. | " | ORIGIN UNKNOWN |
| INST. | " | INSTRUMENT |

## METRIC:

DISTANCES ONTHIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

## SURVEYOR'S CERTIFICATE

I CERTIFY THAT,

1) THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT AND THE REGISTRY ACT AND THE REGULATIONS MADE THEREUNDER,

2) THE SURVEY WAS COMPLETED ON THE 6th DAY OF APRIL. 1984

April 6, 1984
DATE

JOHN F.G. YOUNG B.Sc., O.L.S.
ONTARIO LAND SURVEYOR


Young & Young Surveying Inc.
TORONTO — 281 HUMBERCREST BLVD. M6S 4L5 769-8081
BOLTON — R R 1 BOLTON L0P 1A0 857-2484


| DRAWN BY | LOT | PROJECT N° |
|---|---|---|
| JFGY | 1 | 84-B428-1 |

INSTRUMENT N° 13726 (REM)

No Fence

N 73° 43' 30"E 139.985

76.160 63.825

1B SIB 1B

PART 1 PART 2

PART 1, 7R-2190 PART 2, 7R-2190

INSTRUMENT N° 13726 (REMAINDER)

E 1/2 LOT 1, CON. 2, W.H.S.

TOWNSHIP OF MULMUR

INSTRUMENT N° 13726 (REM)

N 09° 32' 40" W 58.065 FENCE

N 09° 32' 40" W 59.741 FENCE

N 09° 32' 40" W 60.960 FENCE ON LINE

N 09° 32' 40" W 60.960 SNAKE RAIL FENCE

N 74° 58' 50"E (P & meas) 76.020 (P) 75.982 (Calc B meas)

Post and Wire Fence

1B WIT(P)

Post and Wire Fence

1B(P) WIT

N 73° 43' 30"E 63.825 (INST. MF 122761 & SET)

5.12 meas 5.09 P

1 STOREY BRICK MOTEL

N 09° 32' 40" W 2.895 (P & SET)

61.974 (P & SET) (P & meas)

INSTRUMENT N° 122761

22.93

3.57P 3.59meas

60.755

1 STOREY STUCCO BUILDING RESTAURANT

24.46

63.825 (INST. N° 122761 & meas)

FENCE

N 09° 32' 40" W

66.720 (P & meas) 63.825 (P & meas) Rail Fence

PART 1, 7R-1700 INSTRUMENT N° MF 115431

PART 2, 7R-1700 INSTRUMENT N° MF 115431

N 09° 33' W (P) N 09° 32' 40" W

38.18

36.42

N 09° 33' W (P) N 09° 32' 40" W N 09° 33' W (P)

18.69 18.43

SE ANGLE LOT 1, CON 2 W.H.S. MULMUR

CM MTC

N 09° 33' W (P) N 09° 32' 40" W 7.430 (P & SET)

SIB MTC

SIB (P)

SIB DISTURED O.U.

CM MTC N° 6

N 73° 43' 30"E 63.825 (INST. 122761 & SET)

PART 1, P-1836-32 INST. MF 22023 WIDENING

PLAN P-1836-27 INSTRUMENT MF 11556 WIDENING

N 73° 43' 30"E (P & meas) 76.160 (meas) 76.200 (P) HIGHWAY WIDENED BY INSTRUMENT N° 12342 & 14371

N 73° 43' 30"E 253.124 (P)

N 73° 43' 30"E (7R-1700 & GOVERNS)

THE KING'S HIGHWAY N° 89

# APPENDIX

# B SAMPLING AND ANALYSIS PLAN

## SAMPLING AND ANALYSIS PLAN

WSP was retained by Ms. Marika Zigon on behalf of Deltini (Mulmur) Inc. to conduct a Phase Two Environmental Site Assessment (ESA) of 506243 Highway 89, in the Town of Primrose, Ontario. The purpose of the proposed Phase Two ESA is to assess the current subsurface environmental conditions in support of a property transaction.

The Phase Two ESA will involve intrusive investigation in the areas determined in the Site visit to be APECs, and will be completed in general accordance with O.Reg 153/04. Based on the findings of the field and laboratory analyses, a Phase Two ESA report will be prepared.

The Site Investigation Program will be completed as follows:

- Public and private underground utilities and services will be cleared prior to commencement of intrusive investigation activities
- A Health and Safety Plan will be prepared and all work will be executed safely
- Four (4) boreholes will be advanced on the Phase Two Property, to an approximate maximum depth of 5.0 mbgs using a track-mounted drill rig. The soil profile from each borehole will be logged in the field and samples will be screened for TOV with a PID. The location of the boreholes will be selected to investigate any APECs identified during the Site visit, as well as to delineate the horizontal and vertical extents of relevant parameters of concern.
- Based on field screening and visual/olfactory observations, worst-case/representative soil samples from the boreholes will be submitted for laboratory testing of relevant parameters of concern.
- Three (3) groundwater monitoring wells will be installed within three (3) of the four (4) boreholes to assess groundwater quality below the Site;
- The groundwater levels in the wells will be measured at least 24 hours after well development has been completed.
- The groundwater wells will be purged to remove stagnant water and sampled for laboratory testing of relevant parameters of concern.
- Both soil and groundwater samples will be submitted for chemical analysis by a CALA laboratory in accordance with the Ontario MECP standards and requirements of O.Reg. 153/04 under the Environmental Protection Act.

The proposed analytical program is outlined below (proposed program subject to change as a result of site observations/findings). All soil and groundwater sampling will be carried out in accordance with WSP's Standard Operating Procedures (SOPs).

<u>Soils:</u>

- Four (4) soil samples for Metals and ORPs
- Four (4) soil samples for PHCs
- Four (4) soil samples for VOCs

- Two (2) soil sample for QA/QC purposes (duplicates)

Groundwater:

- Three (3) groundwater samples for Metals and ORPs
- Three (3) groundwater samples for VOCs
- Three (3) groundwater samples for PHCs
- Two (2) groundwater samples for QA/QC purposes (one duplicate and one trip blank)

Following receipt of all of the results, a report in accordance with O.Reg. 153/04 will be prepared.

It is noted that if the Phase Two ESA reveals parameter concentrations greater than the applicable standards set out in *Ontario Regulation 153/04,* then additional work (i.e., supplemental delineation, additional drilling, sampling, analysis, and/or site remediation activities) will be deemed necessary prior to RSC filing, should an RSC be required. The costs for any additional work, if necessary, are beyond the current scope of work.

**Finalized Sampling & Analysis Plan**

The finalized SAP was created based on the request to complete a Phase Two ESA for due diligence purposes. The SAP was compiled to collect data to provide information on soil and/or groundwater quality in each APEC.

Figure 3 outlines the borehole/monitoring well investigation locations. Table 4.1 provides the proposed and implemented SAP, which includes the specific requirements for sampling and analysis for the areas to be investigated.

Additional delineation may be required following the implementation of this SAP to meet the requirements of O.Reg. 153/04 which requires delineation of all areas where concentrations are above the applicable SCS such as in the following conditions:

Unexpected contamination not previously discovered, or not related to identified APECs, will need to be further delineated to identify source(s); and

Requirement for a minimum of three monitoring wells per stratigraphic unit would have to extend to underlying units if there is evidence of contamination extending into it; the SAP assumes contamination is limited to the upper stratigraphic unit (confirmed with clean sample) then the underlying units do not necessarily have to be characterized. The SAP has been developed using the available data, and may require additional delineation if sampling results come out suggesting impacts are deeper than initially expected.

# APPENDIX

# C BOREHOLE LOGS

# LOG OF BOREHOLE BH19-01



PROJECT: Phase Two ESA
REF. NO.: 191-08696-00
CLIENT: Deltini (Mulmur) Inc.
Method: Ram Sounder
ENCL NO.: 1
PROJECT LOCATION: 506243 Highway 89, Primrose, Ontario
Diameter: 50mm
DATUM: Geodetic
Date: Jun/09/2019
BH LOCATION: See Figure 1

| SOIL PROFILE (m) ELEV / DEPTH | DESCRIPTION | STRATA PLOT | SAMPLES NUMBER | TYPE | "N" BLOWS 0.3 m | GROUND WATER CONDITIONS | ELEVATION | DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100 | PLASTIC LIMIT $w_P$ / NATURAL MOISTURE CONTENT $w$ / LIQUID LIMIT $w_L$ WATER CONTENT (%) 10 20 30 | POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m³) | REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 460.4 | Ground Surface | | | | | | | | | | |
| 0.0 / 460.1 | **TOPSOIL:** 30cm | | | | | | | | | | HEX: 0ppm, ISO: 0ppm |
| 0.3 / 459.7 | **SILTY SAND/SANDY SILT:** trace clay, brown, moist, compact | | 1 | SS | 13 | | 460 | | | | |
| 0.8 | some clay, trace gravel | | 2 | SS | 13 | | 459 | | | | HEX: 0ppm, ISO: 0ppm |
| 458.9 | | | | | | | | | | | |
| 1.5 | increased clay, very moist | | 3 | SS | 26 | | | | | | HEX: 140ppm, ISO: 2ppm |
| 458.0 | | | | | | | | | | | HEX: 20ppm, ISO: 2ppm |
| 2.4 | **SAND:** trace silt, brown, moist, dense | | 4 | SS | 27 | | 458 | | | | |
| | | | 5 | SS | 38 | | 457 | | | | HEX: 0ppm, ISO: 2ppm |
| 456.6 | | | | | | | | | | | |
| 3.8 | some silt, very moist | | 6 | SS | 36 | ▽ W. L. 456.3 m Upon Completion | 456 | | | | HEX: 25ppm, ISO: 2ppm |
| 455.9 | | | | | | | | | | | |
| 4.6 | **END OF BOREHOLE:** Notes: 1) Borehole caved to 4.1 mbgs and was wet at bottom. | | | | | | | | | | |

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES + 3, × 3: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

WSP-SOIL-ROCK-MAY-29-2017.GLB
WSP SOIL LOG 191-08696-00 BH LOGS.GPJ 7/29/19

# LOG OF BOREHOLE BH19-02



PROJECT: Phase Two ESA
REF. NO.: 191-08696-00
CLIENT: Deltini (Mulmur) Inc.
Method: Pionjar
ENCL NO.: 2
PROJECT LOCATION: 506243 Highway 89, Primrose, Ontario
Diameter: 50mm
DATUM: Geodetic
Date: Jun/09/2019
BH LOCATION: See Figure 1

| (m) ELEV / DEPTH | DESCRIPTION | NUMBER | TYPE | BLOWS 0.3 m "N" | ELEVATION |
|---|---|---|---|---|---|
| 459.8 | Ground Surface | | | | |
| 0.0 | **TOPSOIL:** 50cm | 1 | SS | | |
| 459.3 | | | | | |
| 0.5 | **SILTY SAND/SANDY SILT:** trace clay, trace cobbles, brown, moist | | | | |
| 459.0 | | | | | |
| 0.8 | some clay to clayey, trace gravel | 2 | SS | | 459 |
| 1 | | | | | |
| | | 3 | SS | | 458 |
| 2 | | | | | |
| 457.5 | | | | | |
| 2.3 | decreased clay | 4 | SS | | 457 |
| 3 | | | | | |
| | | 5 | SS | | |
| 456.1 | | | | | |
| 3.7 | **SAND:** trace silt, brown, wet | 6 | SS | | 456 |
| 4 | | | | | |
| 455.2 | | | | | |
| 4.6 | **END OF BOREHOLE:** | | | | |

Notes:
1) Installed groundwater monitoring well upon completion.
2) Water level was 3.3 mbgs upon completion.

GROUND WATER CONDITIONS: W. L. 456.5 m Upon Completion Jul 22, 2019

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT $w_P$ | NATURAL MOISTURE CONTENT $w$ | LIQUID LIMIT $w_L$
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

HEX: 0ppm, ISO: 1ppm
HEX: 15ppm, ISO: 1ppm
HEX: 30ppm, ISO: 1ppm
HEX: 35ppm, ISO: 0ppm
HEX: 10ppm, ISO: 0ppm
HEX: 410ppm, ISO: 0ppm

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

WSP-SOIL-ROCK-MAY-29-2017.GLB
WSP SOIL LOG 191-08696-00 BH LOGS.GPJ 7/29/19

# LOG OF BOREHOLE BH19-03



PROJECT: Phase Two ESA
REF. NO.: 191-08696-00
CLIENT: Deltini (Mulmur) Inc.
Method: Pionjar
ENCL NO.: 3
PROJECT LOCATION: 506243 Highway 89, Primrose, Ontario
Diameter: 50mm
DATUM: Geodetic
Date: Jun/09/2019
BH LOCATION: See Figure 1

| (m) ELEV / DEPTH | DESCRIPTION | NUMBER | TYPE | BLOWS 0.3 m "N" |
|---|---|---|---|---|
| 458.2 | Ground Surface | | | |
| 0.0 | **TOPSOIL:** 63cm, mixed with clayey silt | 1 | SS | |
| 457.6 | | | | |
| 0.6 / 457.5 | **CLAYEY SILT:** some sand, trace gravel, brown, moist | | | |
| 0.8 | **SANDY SILT/SILTY SAND:** some clay, brown, moist | 2 | SS | |
| | | 3 | SS | |
| | | 4 | SS | |
| 455.5 | | | | |
| 2.7 | trace gravel, grey | 5 | SS | |
| 454.4 | | | | |
| 3.8 | **SAND:** some silt, some clay, grey, very moist | 6 | SS | |
| 453.7 | | | | |
| 4.6 | **END OF BOREHOLE:** | | | |

Notes:
1) Installed groundwater monitoring well upon completion.
2) Water level was 0.9 mbgs upon completion.

W. L. 457.4 m
Upon Completion

ELEVATION: 458, 457, 456, 455, 454

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT $w_P$ | NATURAL MOISTURE CONTENT $w$ | LIQUID LIMIT $w_L$
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

| REMARKS AND GRAIN SIZE DISTRIBUTION (%) | GR | SA | SI | CL |
|---|---|---|---|---|
| HEX: 0ppm, ISO: 0ppm | | | | |
| HEX: 15ppm, ISO: 0ppm | | | | |
| HEX: 0ppm, ISO: 0ppm | | | | |
| HEX: 55ppm, ISO: 0ppm | | | | |
| HEX: 100ppm, ISO: 1ppm | | | | |
| HEX: 25ppm, ISO: 1ppm | | | | |

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

# LOG OF BOREHOLE BH19-04



PROJECT: Phase Two ESA
REF. NO.: 191-08696-00
CLIENT: Deltini (Mulmur) Inc.
Method: Ram Sounder
ENCL NO.: 4
PROJECT LOCATION: 506243 Highway 89, Primrose, Ontario
Diameter: 50mm
DATUM: Geodetic
Date: Jun/09/2019
BH LOCATION: See Figure 1

| (m) ELEV / DEPTH | DESCRIPTION | STRATA PLOT | SAMPLES NUMBER | TYPE | BLOWS 0.3 m "N" | GROUND WATER CONDITIONS | ELEVATION | DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100) | PLASTIC LIMIT $w_P$ / NATURAL MOISTURE CONTENT $w$ / LIQUID LIMIT $w_L$ WATER CONTENT (%) (10 20 30) | POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m³) | REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 458.0 | Ground Surface | | | | | | | | | | | |
| 458.0 / 0.1 | **ASPHALT:** 5cm | | | | | | | | | | | HEX: 5ppm, ISO: 0ppm |
| 457.7 | **GRANULAR FILL:** 25cm, silty sand and gravel, brown, moist, compact | | | | | | | | | | | |
| 0.3 / 457.3 | **ORGANICS/TOPSOIL:** dark brown, moist, loose | | 1 | SS | 11 | | W. L. 457.8 m Upon Completion | | ○ | | | |
| 0.7 | **SANDY SILT/SILTY SAND:** some clay, brown, moist to very moist, loose to compact | | | | | | W. L. 457.2 m Jul 22, 2019 | | | | | HEX: 20ppm, ISO: 0ppm |
| 1 | | | 2 | SS | 11 | | W. L. 457.0 m Jul 10, 2019 | | ○ | | | |
| 456.5 | | | | | | | | | | | | |
| 1.5 | some clay to clayey | | 3 | SS | 9 | | 456 | | ○ | | | HEX: 10ppm, ISO: 0ppm |
| 2 | | | 4 | SS | 11 | | | | ○ | | | HEX: 0ppm, ISO: 0ppm |
| 3 / 455.0 | | | | | | | 455 | | | | | |
| 3.1 | occassional gravel | | 5 | SS | 10 | | | | ○ | | | HEX: 0ppm, ISO: 0ppm |
| 454.2 | | | | | | | | | | | | |
| 3.8 | becoming grey | | | | | | | | | | | HEX: 0ppm, ISO: 0ppm |
| 4 | | | 6 | SS | 8 | | 454 | | ○ | | | |
| 453.5 | | | | | | | | | | | | |
| 4.5 / 453.4 | **SAND:** some silt, some gravel, brown, wet, compact | | | | | | | | | | | |
| 4.6 | **END OF BOREHOLE:** Notes: 1) Installed groundwater monitoring well upon completion. 2) Water level was 0.2 mbgs upon completion. | | | | | | | | | | | |

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES + 3, × 3: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

# APPENDIX

# D CERTIFICATES OF ANALYSIS

# APPENDIX

## *D-1* SOIL

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

**CLIENT NAME: WSP CANADA INC.**
**561 BRYNE DRIVE, UNITS C&D**
**BARRIE , ON L4N9Y3**
**(705) 735-9771**

**ATTENTION TO: Nicole Corbett**

**PROJECT: 191-08696-00**

**AGAT WORK ORDER: 19T490812**

**SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Supervisor**

**TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist**

**DATE REPORTED: Jul 17, 2019**

**PAGES (INCLUDING COVER): 15**

**VERSION*: 1**

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

*NOTES

**All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.**

AGAT Laboratories

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# Certificate of Analysis

**AGAT WORK ORDER: 19T490812**

**PROJECT: 191-08696-00**

**CLIENT NAME: WSP CANADA INC.**

**ATTENTION TO: Nicole Corbett**

**SAMPLING SITE:506243 Highway 89, Primrose**

**SAMPLED BY:Nicole Corbett**

## O. Reg. 153(511) - Metals & Inorganics (Soil)

**DATE RECEIVED: 2019-07-10** **DATE REPORTED: 2019-07-17**

| | | SAMPLE DESCRIPTION: | | BH19-01 SS3 | BH19-02 SS6 | BH19-03 SS5 | BH19-04 SS6 | DUP-1 |
|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Soil | Soil | Soil | Soil | Soil |
| | | DATE SAMPLED: | | 2019-07-09 | 2019-07-09 | 2019-07-09 | 2019-07-09 | 2019-07-09 |
| Parameter | Unit | G / S | RDL | 339062 | 339063 | 339064 | 339065 | 339066 |
| Antimony | µg/g | 40 | 0.8 | <0.8 | <0.8 | <0.8 | <0.8 | <0.8 |
| Arsenic | µg/g | 18 | 1 | 4 | 2 | 3 | 4 | 4 |
| Barium | µg/g | 670 | 2 | 26 | 18 | 34 | 33 | 26 |
| Beryllium | µg/g | 8 | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Boron | µg/g | 120 | 5 | 7 | <5 | 8 | 9 | 7 |
| Boron (Hot Water Soluble) | µg/g | 2 | 0.10 | 0.11 | <0.10 | <0.10 | <0.10 | <0.10 |
| Cadmium | µg/g | 1.9 | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Chromium | µg/g | 160 | 2 | 10 | 6 | 11 | 14 | 10 |
| Cobalt | µg/g | 80 | 0.5 | 5.7 | 2.7 | 5.9 | 7.6 | 5.5 |
| Copper | µg/g | 230 | 1 | 13 | 7 | 12 | 14 | 13 |
| Lead | µg/g | 120 | 1 | 4 | 2 | 5 | 5 | 4 |
| Molybdenum | µg/g | 40 | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Nickel | µg/g | 270 | 1 | 13 | 7 | 13 | 17 | 13 |
| Selenium | µg/g | 5.5 | 0.4 | <0.4 | <0.4 | <0.4 | 0.5 | <0.4 |
| Silver | µg/g | 40 | 0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Thallium | µg/g | 3.3 | 0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Uranium | µg/g | 33 | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Vanadium | µg/g | 86 | 1 | 19 | 13 | 19 | 23 | 19 |
| Zinc | µg/g | 340 | 5 | 23 | 10 | 24 | 30 | 22 |
| Chromium VI | µg/g | 8 | 0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Cyanide | µg/g | 0.051 | 0.040 | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 |
| Mercury | µg/g | 3.9 | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Electrical Conductivity | mS/cm | 1.4 | 0.005 | 0.138 | 0.092 | 0.518 | 0.309 | 0.140 |
| Sodium Adsorption Ratio | NA | 12 | NA | 0.191 | 0.199 | 1.34 | 2.45 | 0.162 |
| pH, 2:1 CaCl2 Extraction | pH Units | | NA | 7.85 | 7.95 | 7.85 | 7.69 | 7.78 |

Certified By:

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# Certificate of Analysis

**AGAT WORK ORDER: 19T490812**

**PROJECT: 191-08696-00**

**CLIENT NAME: WSP CANADA INC.**

**ATTENTION TO: Nicole Corbett**

**SAMPLING SITE:506243 Highway 89, Primrose**

**SAMPLED BY:Nicole Corbett**

## O. Reg. 153(511) - Metals & Inorganics (Soil)

**DATE RECEIVED: 2019-07-10** **DATE REPORTED: 2019-07-17**

**Comments:** RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition - Soil - Industrial/Commercial/Community Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

**339062-339066** EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio. SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Amanjot Bhela

AGAT Laboratories

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CANADA L4Z 1Y2
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# Certificate of Analysis

**AGAT WORK ORDER: 19T490812**

**PROJECT: 191-08696-00**

**CLIENT NAME: WSP CANADA INC.**

**ATTENTION TO: Nicole Corbett**

**SAMPLING SITE:506243 Highway 89, Primrose**

**SAMPLED BY:Nicole Corbett**

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

**DATE RECEIVED: 2019-07-10**

**DATE REPORTED: 2019-07-17**

| | | SAMPLE DESCRIPTION: | | BH19-01 SS3 | BH19-02 SS6 | BH19-03 SS5 | BH19-04 SS6 |
|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Soil | Soil | Soil | Soil |
| | | DATE SAMPLED: | | 2019-07-09 | 2019-07-09 | 2019-07-09 | 2019-07-09 |
| **Parameter** | **Unit** | **G / S** | **RDL** | **339062** | **339063** | **339064** | **339065** |
| F1 (C6 to C10) | µg/g | 55 | 5 | <5 | <5 | <5 | <5 |
| F1 (C6 to C10) minus BTEX | µg/g | 55 | 5 | <5 | <5 | <5 | <5 |
| F2 (C10 to C16) | µg/g | 230 | 10 | <10 | <10 | <10 | <10 |
| F3 (C16 to C34) | µg/g | 1700 | 50 | <50 | <50 | <50 | <50 |
| F4 (C34 to C50) | µg/g | 3300 | 50 | <50 | <50 | <50 | <50 |
| Gravimetric Heavy Hydrocarbons | µg/g | 3300 | 50 | NA | NA | NA | NA |
| Moisture Content | % | | 0.1 | 16.7 | 16.2 | 10.4 | 16.3 |
| **Surrogate** | **Unit** | **Acceptable Limits** | | | | | |
| Terphenyl | % | 60-140 | | 98 | 73 | 62 | 62 |

**Comments:** RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition - Soil - Industrial/Commercial/Community Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

**339062-339065** Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

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5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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# Certificate of Analysis

**AGAT WORK ORDER: 19T490812**

**PROJECT: 191-08696-00**

**CLIENT NAME: WSP CANADA INC.**

**ATTENTION TO: Nicole Corbett**

**SAMPLING SITE:506243 Highway 89, Primrose**

**SAMPLED BY:Nicole Corbett**

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

**DATE RECEIVED: 2019-07-10**

**DATE REPORTED: 2019-07-17**

| | | SAMPLE DESCRIPTION: | | DUP-2 |
|---|---|---|---|---|
| | | SAMPLE TYPE: | | Soil |
| | | DATE SAMPLED: | | 2019-07-09 |
| Parameter | Unit | G / S | RDL | 339067 |
| Dichlorodifluoromethane | µg/g | 16 | 0.05 | <0.05 |
| Vinyl Chloride | ug/g | 0.032 | 0.02 | <0.02 |
| Bromomethane | ug/g | 0.05 | 0.05 | <0.05 |
| Trichlorofluoromethane | ug/g | 4 | 0.05 | <0.05 |
| Acetone | ug/g | 16 | 0.50 | <0.50 |
| 1,1-Dichloroethylene | ug/g | 0.064 | 0.05 | <0.05 |
| Methylene Chloride | ug/g | 1.6 | 0.05 | <0.05 |
| Trans- 1,2-Dichloroethylene | ug/g | 1.3 | 0.05 | <0.05 |
| Methyl tert-butyl Ether | ug/g | 1.6 | 0.05 | <0.05 |
| 1,1-Dichloroethane | ug/g | 0.47 | 0.02 | <0.02 |
| Methyl Ethyl Ketone | ug/g | 70 | 0.50 | <0.50 |
| Cis- 1,2-Dichloroethylene | ug/g | 1.9 | 0.02 | <0.02 |
| Chloroform | ug/g | 0.47 | 0.04 | <0.04 |
| 1,2-Dichloroethane | ug/g | 0.05 | 0.03 | <0.03 |
| 1,1,1-Trichloroethane | ug/g | 6.1 | 0.05 | <0.05 |
| Carbon Tetrachloride | ug/g | 0.21 | 0.05 | <0.05 |
| Benzene | ug/g | 0.32 | 0.02 | <0.02 |
| 1,2-Dichloropropane | ug/g | 0.16 | 0.03 | <0.03 |
| Trichloroethylene | ug/g | 0.55 | 0.03 | <0.03 |
| Bromodichloromethane | ug/g | 1.5 | 0.05 | <0.05 |
| Methyl Isobutyl Ketone | ug/g | 31 | 0.50 | <0.50 |
| 1,1,2-Trichloroethane | ug/g | 0.05 | 0.04 | <0.04 |
| Toluene | ug/g | 6.4 | 0.05 | <0.05 |
| Dibromochloromethane | ug/g | 2.3 | 0.05 | <0.05 |
| Ethylene Dibromide | ug/g | 0.05 | 0.04 | <0.04 |
| Tetrachloroethylene | ug/g | 1.9 | 0.05 | <0.05 |
| 1,1,1,2-Tetrachloroethane | ug/g | 0.087 | 0.04 | <0.04 |
| Chlorobenzene | ug/g | 2.4 | 0.05 | <0.05 |
| Ethylbenzene | ug/g | 1.1 | 0.05 | <0.05 |
| m & p-Xylene | ug/g | | 0.05 | <0.05 |

Certified By: N Popnikolof

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FAX (905)712-5122
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# Certificate of Analysis

**AGAT WORK ORDER: 19T490812**

**PROJECT: 191-08696-00**

**CLIENT NAME: WSP CANADA INC.**

**ATTENTION TO: Nicole Corbett**

**SAMPLING SITE:506243 Highway 89, Primrose**

**SAMPLED BY:Nicole Corbett**

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

**DATE RECEIVED: 2019-07-10** **DATE REPORTED: 2019-07-17**

| | | SAMPLE DESCRIPTION: | | DUP-2 |
|---|---|---|---|---|
| | | SAMPLE TYPE: | | Soil |
| | | DATE SAMPLED: | | 2019-07-09 |
| **Parameter** | **Unit** | **G / S** | **RDL** | **339067** |
| Bromoform | ug/g | 0.61 | 0.05 | <0.05 |
| Styrene | ug/g | 34 | 0.05 | <0.05 |
| 1,1,2,2-Tetrachloroethane | ug/g | 0.05 | 0.05 | <0.05 |
| o-Xylene | ug/g | | 0.05 | <0.05 |
| 1,3-Dichlorobenzene | ug/g | 9.6 | 0.05 | <0.05 |
| 1,4-Dichlorobenzene | ug/g | 0.2 | 0.05 | <0.05 |
| 1,2-Dichlorobenzene | ug/g | 1.2 | 0.05 | <0.05 |
| Xylene Mixture | ug/g | 26 | 0.05 | <0.05 |
| 1,3-Dichloropropene | µg/g | 0.059 | 0.04 | <0.04 |
| n-Hexane | µg/g | 46 | 0.05 | <0.05 |
| Moisture Content | % | | 0.1 | 10.2 |
| **Surrogate** | **Unit** | **Acceptable Limits** | | |
| Toluene-d8 | % Recovery | 50-140 | | 99 |
| 4-Bromofluorobenzene | % Recovery | 50-140 | | 101 |

**Comments:** RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition - Soil - Industrial/Commercial/Community Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

**339067** The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

AGAT Laboratories

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

**DATE RECEIVED: 2019-07-10**

**DATE REPORTED: 2019-07-17**

| | | SAMPLE DESCRIPTION: | | BH19-01 SS3 | BH19-02 SS6 | BH19-03 SS5 | BH19-04 SS6 |
|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Soil | Soil | Soil | Soil |
| | | DATE SAMPLED: | | 2019-07-09 | 2019-07-09 | 2019-07-09 | 2019-07-09 |
| Parameter | Unit | G / S | RDL | 339062 | 339063 | 339064 | 339065 |
| Dichlorodifluoromethane | µg/g | 16 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Vinyl Chloride | ug/g | 0.032 | 0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Bromomethane | ug/g | 0.05 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Trichlorofluoromethane | ug/g | 4 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Acetone | ug/g | 16 | 0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 1,1-Dichloroethylene | ug/g | 0.064 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Methylene Chloride | ug/g | 1.6 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Trans- 1,2-Dichloroethylene | ug/g | 1.3 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Methyl tert-butyl Ether | ug/g | 1.6 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,1-Dichloroethane | ug/g | 0.47 | 0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Methyl Ethyl Ketone | ug/g | 70 | 0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Cis- 1,2-Dichloroethylene | ug/g | 1.9 | 0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Chloroform | ug/g | 0.47 | 0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| 1,2-Dichloroethane | ug/g | 0.05 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| 1,1,1-Trichloroethane | ug/g | 6.1 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Carbon Tetrachloride | ug/g | 0.21 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Benzene | ug/g | 0.32 | 0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 1,2-Dichloropropane | ug/g | 0.16 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Trichloroethylene | ug/g | 0.55 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Bromodichloromethane | ug/g | 1.5 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Methyl Isobutyl Ketone | ug/g | 31 | 0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| 1,1,2-Trichloroethane | ug/g | 0.05 | 0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| Toluene | ug/g | 6.4 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Dibromochloromethane | ug/g | 2.3 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ethylene Dibromide | ug/g | 0.05 | 0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| Tetrachloroethylene | ug/g | 1.9 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,1,1,2-Tetrachloroethane | ug/g | 0.087 | 0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| Chlorobenzene | ug/g | 2.4 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ethylbenzene | ug/g | 1.1 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| m & p-Xylene | ug/g | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |

Certified By: N Popnikolof

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# Certificate of Analysis

**AGAT WORK ORDER: 19T490812**

**PROJECT: 191-08696-00**

**CLIENT NAME: WSP CANADA INC.**

**ATTENTION TO: Nicole Corbett**

**SAMPLING SITE:506243 Highway 89, Primrose**

**SAMPLED BY:Nicole Corbett**

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

**DATE RECEIVED: 2019-07-10** **DATE REPORTED: 2019-07-17**

| | | SAMPLE DESCRIPTION: | | BH19-01 SS3 | BH19-02 SS6 | BH19-03 SS5 | BH19-04 SS6 |
|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Soil | Soil | Soil | Soil |
| | | DATE SAMPLED: | | 2019-07-09 | 2019-07-09 | 2019-07-09 | 2019-07-09 |
| **Parameter** | **Unit** | **G / S** | **RDL** | **339062** | **339063** | **339064** | **339065** |
| Bromoform | ug/g | 0.61 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Styrene | ug/g | 34 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,1,2,2-Tetrachloroethane | ug/g | 0.05 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| o-Xylene | ug/g | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,3-Dichlorobenzene | ug/g | 9.6 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,4-Dichlorobenzene | ug/g | 0.2 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,2-Dichlorobenzene | ug/g | 1.2 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Xylene Mixture | ug/g | 26 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,3-Dichloropropene | µg/g | 0.059 | 0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| n-Hexane | µg/g | 46 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| **Surrogate** | **Unit** | **Acceptable Limits** | | | | | |
| Toluene-d8 | % Recovery | 50-140 | | 102 | 97 | 102 | 96 |
| 4-Bromofluorobenzene | % Recovery | 50-140 | | 130 | 117 | 110 | 107 |

**Comments:** RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition - Soil - Industrial/Commercial/Community Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

**339062-339065** The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popowich

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Quality Assurance

**CLIENT NAME: WSP CANADA INC.**

**AGAT WORK ORDER: 19T490812**

**PROJECT: 191-08696-00**

**ATTENTION TO: Nicole Corbett**

**SAMPLING SITE:506243 Highway 89, Primrose**

**SAMPLED BY:Nicole Corbett**

## Soil Analysis

| RPT Date: Jul 17, 2019 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| **O. Reg. 153(511) - Metals & Inorganics (Soil)** | | | | | | | | | | | | | | | |
| Antimony | 349876 | | <0.8 | <0.8 | NA | < 0.8 | 125% | 70% | 130% | 96% | 80% | 120% | 95% | 70% | 130% |
| Arsenic | 349876 | | 6 | 6 | 0.0% | < 1 | 104% | 70% | 130% | 102% | 80% | 120% | 101% | 70% | 130% |
| Barium | 349876 | | 133 | 130 | 2.3% | < 2 | 101% | 70% | 130% | 98% | 80% | 120% | 97% | 70% | 130% |
| Beryllium | 349876 | | 0.8 | 0.7 | NA | < 0.5 | 98% | 70% | 130% | 104% | 80% | 120% | 106% | 70% | 130% |
| Boron | 349876 | | 13 | 13 | NA | < 5 | 75% | 70% | 130% | 114% | 80% | 120% | 98% | 70% | 130% |
| Boron (Hot Water Soluble) | 349876 | | 0.31 | 0.31 | NA | < 0.10 | 115% | 60% | 140% | 102% | 70% | 130% | 101% | 60% | 140% |
| Cadmium | 349876 | | <0.5 | <0.5 | NA | < 0.5 | 99% | 70% | 130% | 100% | 80% | 120% | 101% | 70% | 130% |
| Chromium | 349876 | | 28 | 28 | 0.0% | < 2 | 89% | 70% | 130% | 107% | 80% | 120% | 103% | 70% | 130% |
| Cobalt | 349876 | | 15.3 | 14.7 | 4.0% | < 0.5 | 101% | 70% | 130% | 118% | 80% | 120% | 111% | 70% | 130% |
| Copper | 349876 | | 25 | 25 | 0.0% | < 1 | 83% | 70% | 130% | 106% | 80% | 120% | 94% | 70% | 130% |
| Lead | 349876 | | 19 | 19 | 0.0% | < 1 | 95% | 70% | 130% | 106% | 80% | 120% | 108% | 70% | 130% |
| Molybdenum | 349876 | | 0.6 | 0.6 | NA | < 0.5 | 104% | 70% | 130% | 108% | 80% | 120% | 104% | 70% | 130% |
| Nickel | 349876 | | 32 | 32 | 0.0% | < 1 | 93% | 70% | 130% | 109% | 80% | 120% | 101% | 70% | 130% |
| Selenium | 349876 | | 0.5 | 0.4 | NA | < 0.4 | 127% | 70% | 130% | 102% | 80% | 120% | 99% | 70% | 130% |
| Silver | 349876 | | <0.2 | <0.2 | NA | < 0.2 | 93% | 70% | 130% | 101% | 80% | 120% | 93% | 70% | 130% |
| Thallium | 349876 | | <0.4 | <0.4 | NA | < 0.4 | 104% | 70% | 130% | 95% | 80% | 120% | 94% | 70% | 130% |
| Uranium | 349876 | | 1.0 | 1.0 | NA | < 0.5 | 117% | 70% | 130% | 108% | 80% | 120% | 109% | 70% | 130% |
| Vanadium | 349876 | | 43 | 42 | 2.4% | < 1 | 103% | 70% | 130% | 119% | 80% | 120% | 113% | 70% | 130% |
| Zinc | 349876 | | 71 | 69 | 2.9% | < 5 | 80% | 70% | 130% | 106% | 80% | 120% | 103% | 70% | 130% |
| Chromium VI | 341423 | | <0.2 | <0.2 | NA | < 0.2 | 111% | 70% | 130% | 104% | 80% | 120% | 98% | 70% | 130% |
| Cyanide | 339065 | 339065 | <0.040 | <0.040 | NA | < 0.040 | 110% | 70% | 130% | 107% | 80% | 120% | 92% | 70% | 130% |
| Mercury | 349876 | | <0.10 | <0.10 | NA | < 0.10 | 103% | 70% | 130% | 96% | 80% | 120% | 97% | 70% | 130% |
| Electrical Conductivity | 337336 | | 0.854 | 0.852 | 0.2% | < 0.005 | 101% | 90% | 110% | NA | | | NA | | |
| Sodium Adsorption Ratio | 337336 | | 12.7 | 12.0 | 5.7% | NA | NA | | | NA | | | NA | | |
| pH, 2:1 CaCl2 Extraction | 339063 | 339063 | 7.95 | 7.95 | 0.0% | NA | 101% | 80% | 120% | NA | | | NA | | |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Certified By:

Amanjot Bhela

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
AMANJOT BHELA
CHEMIST

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Quality Assurance

**CLIENT NAME: WSP CANADA INC.**

**AGAT WORK ORDER: 19T490812**

**PROJECT: 191-08696-00**

**ATTENTION TO: Nicole Corbett**

**SAMPLING SITE:506243 Highway 89, Primrose**

**SAMPLED BY:Nicole Corbett**

## Trace Organics Analysis

| RPT Date: Jul 17, 2019 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| **O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Soil)** | | | | | | | | | | | | | | | |
| F1 (C6 to C10) | 335857 | | < 5 | < 5 | NA | < 5 | 96% | 60% | 130% | 92% | 85% | 115% | 89% | 70% | 130% |
| F2 (C10 to C16) | 317733 | | < 10 | < 10 | NA | < 10 | 100% | 60% | 130% | 95% | 80% | 120% | 78% | 70% | 130% |
| F3 (C16 to C34) | 317733 | | < 50 | < 50 | NA | < 50 | 102% | 60% | 130% | 106% | 80% | 120% | 80% | 70% | 130% |
| F4 (C34 to C50) | 317733 | | < 50 | < 50 | NA | < 50 | 97% | 60% | 130% | 114% | 80% | 120% | 85% | 70% | 130% |
| **O. Reg. 153(511) - VOCs (Soil)** | | | | | | | | | | | | | | | |
| Dichlorodifluoromethane | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 73% | 50% | 140% | 80% | 50% | 140% | 78% | 50% | 140% |
| Vinyl Chloride | 337393 | | < 0.02 | < 0.02 | NA | < 0.02 | 73% | 50% | 140% | 78% | 50% | 140% | 88% | 50% | 140% |
| Bromomethane | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 117% | 50% | 140% | 121% | 50% | 140% | 75% | 50% | 140% |
| Trichlorofluoromethane | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 84% | 50% | 140% | 70% | 50% | 140% | 84% | 50% | 140% |
| Acetone | 337393 | | < 0.50 | < 0.50 | NA | < 0.50 | 87% | 50% | 140% | 77% | 50% | 140% | 94% | 50% | 140% |
| 1,1-Dichloroethylene | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 70% | 50% | 140% | 90% | 60% | 130% | 95% | 50% | 140% |
| Methylene Chloride | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 90% | 50% | 140% | 119% | 60% | 130% | 79% | 50% | 140% |
| Trans- 1,2-Dichloroethylene | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 98% | 50% | 140% | 82% | 60% | 130% | 94% | 50% | 140% |
| Methyl tert-butyl Ether | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 83% | 50% | 140% | 89% | 60% | 130% | 84% | 50% | 140% |
| 1,1-Dichloroethane | 337393 | | < 0.02 | < 0.02 | NA | < 0.02 | 106% | 50% | 140% | 74% | 60% | 130% | 103% | 50% | 140% |
| Methyl Ethyl Ketone | 337393 | | < 0.50 | < 0.50 | NA | < 0.50 | 72% | 50% | 140% | 85% | 50% | 140% | 82% | 50% | 140% |
| Cis- 1,2-Dichloroethylene | 337393 | | < 0.02 | < 0.02 | NA | < 0.02 | 71% | 50% | 140% | 81% | 60% | 130% | 80% | 50% | 140% |
| Chloroform | 337393 | | < 0.04 | < 0.04 | NA | < 0.04 | 100% | 50% | 140% | 88% | 60% | 130% | 115% | 50% | 140% |
| 1,2-Dichloroethane | 337393 | | < 0.03 | < 0.03 | NA | < 0.03 | 87% | 50% | 140% | 72% | 60% | 130% | 97% | 50% | 140% |
| 1,1,1-Trichloroethane | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 91% | 50% | 140% | 79% | 60% | 130% | 86% | 50% | 140% |
| Carbon Tetrachloride | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 86% | 50% | 140% | 72% | 60% | 130% | 85% | 50% | 140% |
| Benzene | 337393 | | < 0.02 | < 0.02 | NA | < 0.02 | 70% | 50% | 140% | 89% | 60% | 130% | 96% | 50% | 140% |
| 1,2-Dichloropropane | 337393 | | < 0.03 | < 0.03 | NA | < 0.03 | 89% | 50% | 140% | 89% | 60% | 130% | 85% | 50% | 140% |
| Trichloroethylene | 337393 | | < 0.03 | < 0.03 | NA | < 0.03 | 101% | 50% | 140% | 82% | 60% | 130% | 108% | 50% | 140% |
| Bromodichloromethane | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 102% | 50% | 140% | 88% | 60% | 130% | 116% | 50% | 140% |
| Methyl Isobutyl Ketone | 337393 | | < 0.50 | < 0.50 | NA | < 0.50 | 74% | 50% | 140% | 90% | 50% | 140% | 94% | 50% | 140% |
| 1,1,2-Trichloroethane | 337393 | | < 0.04 | < 0.04 | NA | < 0.04 | 109% | 50% | 140% | 86% | 60% | 130% | 90% | 50% | 140% |
| Toluene | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 99% | 50% | 140% | 73% | 60% | 130% | 87% | 50% | 140% |
| Dibromochloromethane | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 106% | 50% | 140% | 115% | 60% | 130% | 96% | 50% | 140% |
| Ethylene Dibromide | 337393 | | < 0.04 | < 0.04 | NA | < 0.04 | 105% | 50% | 140% | 90% | 60% | 130% | 113% | 50% | 140% |
| Tetrachloroethylene | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 104% | 50% | 140% | 84% | 60% | 130% | 89% | 50% | 140% |
| 1,1,1,2-Tetrachloroethane | 337393 | | < 0.04 | < 0.04 | NA | < 0.04 | 117% | 50% | 140% | 117% | 60% | 130% | 91% | 50% | 140% |
| Chlorobenzene | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 119% | 50% | 140% | 97% | 60% | 130% | 82% | 50% | 140% |
| Ethylbenzene | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 93% | 50% | 140% | 71% | 60% | 130% | 83% | 50% | 140% |
| m & p-Xylene | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 114% | 50% | 140% | 85% | 60% | 130% | 75% | 50% | 140% |
| Bromoform | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 114% | 50% | 140% | 128% | 60% | 130% | 70% | 50% | 140% |
| Styrene | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 75% | 50% | 140% | 78% | 60% | 130% | 106% | 50% | 140% |
| 1,1,2,2-Tetrachloroethane | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 111% | 50% | 140% | 93% | 60% | 130% | 121% | 50% | 140% |
| o-Xylene | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 108% | 50% | 140% | 98% | 60% | 130% | 93% | 50% | 140% |

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Quality Assurance

**CLIENT NAME: WSP CANADA INC.**

**AGAT WORK ORDER: 19T490812**

**PROJECT: 191-08696-00**

**ATTENTION TO: Nicole Corbett**

**SAMPLING SITE:506243 Highway 89, Primrose**

**SAMPLED BY:Nicole Corbett**

## Trace Organics Analysis (Continued)

| RPT Date: Jul 17, 2019 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| 1,3-Dichlorobenzene | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 113% | 50% | 140% | 123% | 60% | 130% | 118% | 50% | 140% |
| 1,4-Dichlorobenzene | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 83% | 50% | 140% | 129% | 60% | 130% | 96% | 50% | 140% |
| 1,2-Dichlorobenzene | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 117% | 50% | 140% | 124% | 60% | 130% | 94% | 50% | 140% |
| 1,3-Dichloropropene | 337393 | | < 0.04 | < 0.04 | NA | < 0.04 | 86% | 50% | 140% | 89% | 60% | 130% | 105% | 50% | 140% |
| n-Hexane | 337393 | | < 0.05 | < 0.05 | NA | < 0.05 | 102% | 50% | 140% | 108% | 60% | 130% | 98% | 50% | 140% |

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

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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# Method Summary

**CLIENT NAME: WSP CANADA INC.**

**AGAT WORK ORDER: 19T490812**

**PROJECT: 191-08696-00**

**ATTENTION TO: Nicole Corbett**

**SAMPLING SITE:506243 Highway 89, Primrose**

**SAMPLED BY:Nicole Corbett**

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| **Soil Analysis** | | | |
| Antimony | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Boron (Hot Water Soluble) | MET-93-6104 | EPA SW 846 6010C; MSA, Part 3, Ch.21 | ICP/OES |
| Cadmium | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Molybdenum | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Chromium VI | INOR-93-6029 | SM 3500 B; MSA Part 3, Ch. 25 | SPECTROPHOTOMETER |
| Cyanide | INOR-93-6052 | MOE CN-3015 & E 3009 A;SM 4500 CN | TECHNICON AUTO ANALYZER |
| Mercury | MET-93-6103 | EPA SW-846 3050B & 6020A | ICP-MS |
| Electrical Conductivity | INOR-93-6036 | McKeague 4.12, SM 2510 B | EC METER |
| Sodium Adsorption Ratio | INOR-93-6007 | McKeague 4.12 & 3.26 & EPA SW-846 6010C | ICP/OES |
| pH, 2:1 CaCl2 Extraction | INOR-93-6031 | MSA part 3 & SM 4500-H+ B | PH METER |

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5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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# Method Summary

**CLIENT NAME: WSP CANADA INC.**

**AGAT WORK ORDER: 19T490812**

**PROJECT: 191-08696-00**

**ATTENTION TO: Nicole Corbett**

**SAMPLING SITE:506243 Highway 89, Primrose**

**SAMPLED BY:Nicole Corbett**

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| **Trace Organics Analysis** | | | |
| F1 (C6 to C10) | VOL-91-5009 | CCME Tier 1 Method, SW846 5035 | P&T GC/FID |
| F1 (C6 to C10) minus BTEX | VOL-91-5009 | CCME Tier 1 Method, SW846 5035 | P&T GC/FID |
| F2 (C10 to C16) | VOL-91-5009 | CCME Tier 1 Method | GC/FID |
| F3 (C16 to C34) | VOL-91-5009 | CCME Tier 1 Method | GC/FID |
| F4 (C34 to C50) | VOL-91-5009 | CCME Tier 1 Method | GC/FID |
| Gravimetric Heavy Hydrocarbons | VOL-91-5009 | CCME Tier 1 Method | BALANCE |
| Moisture Content | VOL-91-5009 | CCME Tier 1 Method | BALANCE |
| Terphenyl | VOL-91-5009 | CCME Tier 1 Method | GC/FID |
| Dichlorodifluoromethane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Vinyl Chloride | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Bromomethane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Trichlorofluoromethane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Acetone | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| 1,1-Dichloroethylene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Methylene Chloride | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Trans- 1,2-Dichloroethylene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Methyl tert-butyl Ether | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| 1,1-Dichloroethane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Methyl Ethyl Ketone | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Cis- 1,2-Dichloroethylene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Chloroform | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| 1,2-Dichloroethane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| 1,1,1-Trichloroethane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Carbon Tetrachloride | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Benzene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| 1,2-Dichloropropane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Trichloroethylene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Bromodichloromethane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Methyl Isobutyl Ketone | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| 1,1,2-Trichloroethane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Toluene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Dibromochloromethane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Ethylene Dibromide | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Tetrachloroethylene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| 1,1,1,2-Tetrachloroethane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Chlorobenzene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Ethylbenzene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| m & p-Xylene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Bromoform | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Styrene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| 1,1,2,2-Tetrachloroethane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| o-Xylene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| 1,3-Dichlorobenzene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| 1,4-Dichlorobenzene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| 1,2-Dichlorobenzene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Xylene Mixture | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| 1,3-Dichloropropene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| n-Hexane | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Toluene-d8 | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |

AGAT Laboratories

5835 COOPERS AVENUE
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CANADA L4Z 1Y2
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FAX (905)712-5122
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# Method Summary

**CLIENT NAME: WSP CANADA INC.**

**AGAT WORK ORDER: 19T490812**

**PROJECT: 191-08696-00**

**ATTENTION TO: Nicole Corbett**

**SAMPLING SITE:506243 Highway 89, Primrose**

**SAMPLED BY:Nicole Corbett**

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| 4-Bromofluorobenzene | VOL-91-5002 | EPA SW-846 5035 & 8260D | (P&T)GC/MS |
| Moisture Content | | MOE E3139 | BALANCE |

# AGAT Laboratories

1 med

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

## Chain of Custody Record

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

### Laboratory Use Only

Work Order #: 19T490812

Cooler Quantity:

Arrival Temperatures: ~~15.9~~ | ~~15.6~~ | ~~16.1~~
11.9 | 8.9 | 9.1

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: on ice

### Report Information:

Company: WSP Canada Inc.
Contact: Nicole Corbett
Address: 561 Bryne Dr. Units C+D
Barrie, ON L4N 9X3
Phone: (705)888-5629 Fax:
*Reports to be sent to:*
1. Email: nicole.corbett@wsp.com
2. Email: jay.dolan@wsp.com

### Regulatory Requirements:

☐ No Regulatory Requirement

*(Please check all applicable boxes)*

☒ Regulation 153/04
Table 2 (Indicate One)
☒ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture (Check One)
☒ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

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

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

### Turnaround Time (TAT) Required:

**Regular TAT** ☒ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

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

**OR** Date Required (Rush Surcharges May Apply):

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

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

### Project Information:

Project: 191-08696-00
Site Location: 506243 Highway 89, Primrose
Sampled By: NC
AGAT Quote #: 50 PO:
*Please note: If quotation number is not provided, client will be billed full price for analysis.*

### Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email: Payables.Ontario@wsp.com

### Sample Matrix Legend

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

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Field Filtered - Metals, Hg, CrVI (Y/N) | O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides)) | O. Reg 153: ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR | Full Metals Scan | Regulation/Custom Metals | Nutrients: ☐ TP ☐ $NH_3$ ☐ TKN ☐ $NO_3$ ☐ $NO_2$ ☐ $NO_3$+$NO_2$ | Volatiles: ☒ VOC ☐ BTEX ☐ THM | PHCs F1 - F4 | ABNs | PAHs | PCBs: ☐ Total ☐ Aroclors | Organochlorine Pesticides | TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs | Sewer Use | PHCs + VOCs | | | | | Potentially Hazardous or High Concentration (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BH19-01 SS3 | 07/09/19 | AM | 3 | S | | N | X | | | | | | | | | | | | | | X | | | | |
| BH19-02 SS6 | " | AM | " | " | | | X | | | | | | | | | | | | | | X | | | | |
| BH19-03 SS5 | | PM | | | | | X | | | | | | | | | | | | | | X | | | | |
| BH19-04 SS6 | | PM | ↓ | | | | X | | | | | | | | | | | | | | X | | | | |
| DUP-1 | | | 1 | | | | X | | | | | | | | | | | | | | | | | | |
| DUP-2 | ↓ | | 2 | ↓ | | ↓ | | | | | | X | | | | | | | | | | | | | |

| Samples Relinquished By (Print Name and Sign) | Date | Time | Samples Received By (Print Name and Sign) | Date | Time |
|---|---|---|---|---|---|
| Nicole Corbett | 07/10/19 | 2:50 pm | Abdul | July/10/2019 | 2:54 |
| | | | | | |
| | | | | | |

Page 1 of 1

Nº: T 091889

Document ID: DW-78-1511-010

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

# APPENDIX

## D-2 GROUNDWATER

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: WSP CANADA INC.
561 BRYNE DRIVE, UNITS C&D
BARRIE , ON L4N9Y3
(705) 735-9771

ATTENTION TO: Nicole Corbett

PROJECT: 191-08696-00

AGAT WORK ORDER: 19T490817

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

WATER ANALYSIS REVIEWED BY: Jacky Zhu, Spectroscopy Technician

DATE REPORTED: Jul 17, 2019

PAGES (INCLUDING COVER): 12

VERSION*: 1

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

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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# Certificate of Analysis

AGAT WORK ORDER: 19T490817

PROJECT: 191-08696-00

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Nicole Corbett

SAMPLING SITE:506243 Highway 89, Primrose

SAMPLED BY:Nicole Corbett

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

DATE RECEIVED: 2019-07-10

DATE REPORTED: 2019-07-17

| | | SAMPLE DESCRIPTION: | | BH19-02 | BH19-03 | BH19-04 |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-07-10 | 2019-07-10 | 2019-07-10 |
| Parameter | Unit | G / S | RDL | 339141 | 339216 | 339217 |
| F1 (C6 - C10) | µg/L | 750 | 25 | <25 | <25 | <25 |
| F1 (C6 to C10) minus BTEX | µg/L | 750 | 25 | <25 | <25 | <25 |
| F2 (C10 to C16) | µg/L | 150 | 100 | <100 | <100 | <100 |
| F3 (C16 to C34) | µg/L | 500 | 100 | <100 | <100 | <100 |
| F4 (C34 to C50) | µg/L | 500 | 100 | <100 | <100 | <100 |
| Gravimetric Heavy Hydrocarbons | µg/L | 500 | 500 | NA | NA | NA |
| Surrogate | Unit | Acceptable Limits | | | | |
| Terphenyl | % | 60-140 | | 96 | 92 | 119 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition - Potable Ground Water - All Types of Property Uses - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

339141-339217 The C6-C10 fraction is calculated using Toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popowkolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Certificate of Analysis

AGAT WORK ORDER: 19T490817

PROJECT: 191-08696-00

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Nicole Corbett

SAMPLING SITE:506243 Highway 89, Primrose

SAMPLED BY:Nicole Corbett

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

DATE RECEIVED: 2019-07-10

DATE REPORTED: 2019-07-17

| SAMPLE DESCRIPTION: | | | | BH19-02 | BH19-03 | BH19-04 | GWDUP-1 | Trip Blank |
|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2019-07-10 | 2019-07-10 | 2019-07-10 | 2019-07-10 | 2019-07-10 |
| Parameter | Unit | G / S | RDL | 339141 | 339216 | 339217 | 339218 | 339220 |
| Dichlorodifluoromethane | µg/L | 590 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Vinyl Chloride | µg/L | 0.5 | 0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 |
| Bromomethane | µg/L | 0.89 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Trichlorofluoromethane | µg/L | 150 | 0.40 | <0.40 | <0.40 | <0.40 | <0.40 | <0.40 |
| Acetone | µg/L | 2700 | 1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| 1,1-Dichloroethylene | µg/L | 1.6 | 0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 |
| Methylene Chloride | µg/L | 50 | 0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 |
| trans- 1,2-Dichloroethylene | µg/L | 1.6 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Methyl tert-butyl ether | µg/L | 15 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| 1,1-Dichloroethane | µg/L | 5 | 0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 |
| Methyl Ethyl Ketone | µg/L | 1800 | 1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| cis- 1,2-Dichloroethylene | µg/L | 1.6 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Chloroform | µg/L | 2.4 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| 1,2-Dichloroethane | µg/L | 1.6 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| 1,1,1-Trichloroethane | µg/L | 200 | 0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 |
| Carbon Tetrachloride | µg/L | 0.79 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Benzene | µg/L | 5.0 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| 1,2-Dichloropropane | µg/L | 5 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Trichloroethylene | µg/L | 1.6 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Bromodichloromethane | µg/L | 16 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Methyl Isobutyl Ketone | µg/L | 640 | 1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| 1,1,2-Trichloroethane | µg/L | 4.7 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Toluene | µg/L | 24 | 0.20 | 0.32 | <0.20 | <0.20 | <0.20 | <0.20 |
| Dibromochloromethane | µg/L | 25 | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Ethylene Dibromide | µg/L | 0.2 | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Tetrachloroethylene | µg/L | 1.6 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| 1,1,1,2-Tetrachloroethane | µg/L | 1.1 | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Chlorobenzene | µg/L | 30 | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Ethylbenzene | µg/L | 2.4 | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| m & p-Xylene | µg/L | | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |

Certified By: NPopowkolof

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Certificate of Analysis

AGAT WORK ORDER: 19T490817

PROJECT: 191-08696-00

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Nicole Corbett

SAMPLING SITE:506243 Highway 89, Primrose

SAMPLED BY:Nicole Corbett

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

DATE RECEIVED: 2019-07-10

DATE REPORTED: 2019-07-17

| | | SAMPLE DESCRIPTION: | | BH19-02 | BH19-03 | BH19-04 | GWDUP-1 | Trip Blank |
|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-07-10 | 2019-07-10 | 2019-07-10 | 2019-07-10 | 2019-07-10 |
| Parameter | Unit | G / S | RDL | 339141 | 339216 | 339217 | 339218 | 339220 |
| Bromoform | µg/L | 25 | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Styrene | µg/L | 5.4 | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| 1,1,2,2-Tetrachloroethane | µg/L | 1 | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| o-Xylene | µg/L | | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| 1,3-Dichlorobenzene | µg/L | 59 | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| 1,4-Dichlorobenzene | µg/L | 1 | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| 1,2-Dichlorobenzene | µg/L | 3 | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| 1,3-Dichloropropene | µg/L | 0.5 | 0.30 | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 |
| Xylene Mixture | µg/L | 300 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| n-Hexane | µg/L | 51 | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Surrogate | Unit | Acceptable Limits | | | | | | |
| Toluene-d8 | % Recovery | 50-140 | | 104 | 97 | 101 | 101 | 102 |
| 4-Bromofluorobenzene | % Recovery | 50-140 | | 94 | 86 | 96 | 91 | 90 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition - Potable Ground Water - All Types of Property Uses - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

339141-339220 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: NPopowich

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Certificate of Analysis

AGAT WORK ORDER: 19T490817

PROJECT: 191-08696-00

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Nicole Corbett

SAMPLING SITE:506243 Highway 89, Primrose

SAMPLED BY:Nicole Corbett

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

DATE RECEIVED: 2019-07-10

DATE REPORTED: 2019-07-17

| | | SAMPLE DESCRIPTION: | | BH19-02 | | BH19-03 | | BH19-04 |
|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water | | Water |
| | | DATE SAMPLED: | | 2019-07-10 | | 2019-07-10 | | 2019-07-10 |
| Parameter | Unit | G / S | RDL | 339141 | RDL | 339216 | RDL | 339217 |
| Antimony | µg/L | 6 | 1.0 | <1.0 | 1.0 | <1.0 | 1.0 | <1.0 |
| Arsenic | µg/L | 25 | 1.0 | <1.0 | 1.0 | <1.0 | 1.0 | <1.0 |
| Barium | µg/L | 1000 | 2.0 | 41.2 | 2.0 | 111 | 2.0 | 71.8 |
| Beryllium | µg/L | 4.0 | 0.5 | <0.5 | 0.5 | <0.5 | 0.5 | <0.5 |
| Boron | µg/L | 5000 | 10.0 | <10.0 | 10.0 | 48.6 | 10.0 | 29.4 |
| Cadmium | µg/L | 2.7 | 0.2 | <0.2 | 0.2 | <0.2 | 0.2 | <0.2 |
| Chromium | µg/L | 50 | 2.0 | <2.0 | 2.0 | <2.0 | 2.0 | <2.0 |
| Cobalt | µg/L | 3.8 | 0.5 | 0.8 | 0.5 | 1.6 | 0.5 | 0.6 |
| Copper | µg/L | 87 | 1.0 | 6.0 | 1.0 | <1.0 | 1.0 | 1.2 |
| Lead | µg/L | 10 | 0.5 | <0.5 | 0.5 | <0.5 | 0.5 | <0.5 |
| Molybdenum | µg/L | 70 | 0.5 | 4.6 | 0.5 | <0.5 | 0.5 | 2.6 |
| Nickel | µg/L | 100 | 1.0 | <1.0 | 1.0 | 2.1 | 1.0 | 7.9 |
| Selenium | µg/L | 10 | 1.0 | <1.0 | 1.0 | <1.0 | 1.0 | 1.0 |
| Silver | µg/L | 1.5 | 0.2 | <0.2 | 0.2 | <0.2 | 0.2 | <0.2 |
| Thallium | µg/L | 2 | 0.3 | <0.3 | 0.3 | <0.3 | 0.3 | <0.3 |
| Uranium | µg/L | 20 | 0.5 | <0.5 | 0.5 | 0.8 | 0.5 | 0.9 |
| Vanadium | µg/L | 6.2 | 0.4 | <0.4 | 0.4 | 2.6 | 0.4 | <0.4 |
| Zinc | µg/L | 1100 | 5.0 | <5.0 | 5.0 | <5.0 | 5.0 | <5.0 |
| Mercury | µg/L | | 0.02 | <0.02 | 0.02 | <0.02 | 0.02 | <0.02 |
| Chromium VI | µg/L | 25 | 5 | <5 | 5 | <5 | 5 | <5 |
| Cyanide | µg/L | 66 | 2 | <2 | 2 | <2 | 2 | <2 |
| Sodium | µg/L | 490000 | 500 | 4540 | 2500 | 588000 | 2500 | 203000 |
| Chloride | µg/L | 790000 | 100 | 8430 | 2000 | 1020000 | 1000 | 506000 |
| Electrical Conductivity | uS/cm | | 2 | 557 | 2 | 3580 | 2 | 2010 |
| pH | pH Units | | NA | 7.73 | NA | 7.41 | NA | 7.61 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition - Potable Ground Water - All Types of Property Uses - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

339216-339217 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

# Guideline Violation

AGAT WORK ORDER: 19T490817

PROJECT: 191-08696-00

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Nicole Corbett

| SAMPLEID | SAMPLE TITLE | GUIDELINE | ANALYSIS PACKAGE | PARAMETER | UNIT | GUIDEVALUE | RESULT |
|---|---|---|---|---|---|---|---|
| 339216 | BH19-03 | ON T2 PGW CT | O. Reg. 153(511) - Metals & Inorganics (Water) | Chloride | µg/L | 790000 | 1020000 |
| 339216 | BH19-03 | ON T2 PGW CT | O. Reg. 153(511) - Metals & Inorganics (Water) | Sodium | µg/L | 490000 | 588000 |

AGAT Laboratories

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# Quality Assurance

CLIENT NAME: WSP CANADA INC.
AGAT WORK ORDER: 19T490817

PROJECT: 191-08696-00
ATTENTION TO: Nicole Corbett

SAMPLING SITE:506243 Highway 89, Primrose
SAMPLED BY:Nicole Corbett

## Trace Organics Analysis

| RPT Date: Jul 17, 2019 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water) | | | | | | | | | | | | | | | |
| F1 (C6 - C10) | 335913 | | < 25 | < 25 | NA | < 25 | 87% | 60% | 140% | 86% | 60% | 140% | 91% | 60% | 140% |
| F2 (C10 to C16) | | TW | < 100 | < 100 | NA | < 100 | 105% | 60% | 140% | 111% | 60% | 140% | 104% | 60% | 140% |
| F3 (C16 to C34) | | TW | < 100 | < 100 | NA | < 100 | 105% | 60% | 140% | 109% | 60% | 140% | 118% | 60% | 140% |
| F4 (C34 to C50) | | TW | < 100 | < 100 | NA | < 100 | 87% | 60% | 140% | 114% | 60% | 140% | 96% | 60% | 140% |
| O. Reg. 153(511) - VOCs (Water) | | | | | | | | | | | | | | | |
| Dichlorodifluoromethane | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 80% | 50% | 140% | 88% | 50% | 140% | 79% | 50% | 140% |
| Vinyl Chloride | 335913 | | < 0.17 | < 0.17 | NA | < 0.17 | 88% | 50% | 140% | 98% | 50% | 140% | 90% | 50% | 140% |
| Bromomethane | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 98% | 50% | 140% | 114% | 50% | 140% | 103% | 50% | 140% |
| Trichlorofluoromethane | 335913 | | < 0.40 | < 0.40 | NA | < 0.40 | 80% | 50% | 140% | 87% | 50% | 140% | 85% | 50% | 140% |
| Acetone | 335913 | | < 1.0 | < 1.0 | NA | < 1.0 | 109% | 50% | 140% | 110% | 50% | 140% | 99% | 50% | 140% |
| 1,1-Dichloroethylene | 335913 | | < 0.30 | < 0.30 | NA | < 0.30 | 79% | 50% | 140% | 96% | 60% | 130% | 80% | 50% | 140% |
| Methylene Chloride | 335913 | | < 0.30 | < 0.30 | NA | < 0.30 | 98% | 50% | 140% | 93% | 60% | 130% | 100% | 50% | 140% |
| trans- 1,2-Dichloroethylene | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 72% | 50% | 140% | 89% | 60% | 130% | 103% | 50% | 140% |
| Methyl tert-butyl ether | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 81% | 50% | 140% | 118% | 60% | 130% | 110% | 50% | 140% |
| 1,1-Dichloroethane | 335913 | | < 0.30 | < 0.30 | NA | < 0.30 | 94% | 50% | 140% | 109% | 60% | 130% | 102% | 50% | 140% |
| Methyl Ethyl Ketone | 335913 | | < 1.0 | < 1.0 | NA | < 1.0 | 76% | 50% | 140% | 107% | 50% | 140% | 86% | 50% | 140% |
| cis- 1,2-Dichloroethylene | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 89% | 50% | 140% | 109% | 60% | 130% | 108% | 50% | 140% |
| Chloroform | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 81% | 50% | 140% | 111% | 60% | 130% | 105% | 50% | 140% |
| 1,2-Dichloroethane | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 94% | 50% | 140% | 118% | 60% | 130% | 108% | 50% | 140% |
| 1,1,1-Trichloroethane | 335913 | | < 0.30 | < 0.30 | NA | < 0.30 | 88% | 50% | 140% | 79% | 60% | 130% | 80% | 50% | 140% |
| Carbon Tetrachloride | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 102% | 50% | 140% | 73% | 60% | 130% | 78% | 50% | 140% |
| Benzene | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 84% | 50% | 140% | 97% | 60% | 130% | 98% | 50% | 140% |
| 1,2-Dichloropropane | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 90% | 50% | 140% | 95% | 60% | 130% | 100% | 50% | 140% |
| Trichloroethylene | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 81% | 50% | 140% | 91% | 60% | 130% | 98% | 50% | 140% |
| Bromodichloromethane | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 84% | 50% | 140% | 111% | 60% | 130% | 84% | 50% | 140% |
| Methyl Isobutyl Ketone | 335913 | | < 1.0 | < 1.0 | NA | < 1.0 | 85% | 50% | 140% | 100% | 50% | 140% | 97% | 50% | 140% |
| 1,1,2-Trichloroethane | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 107% | 50% | 140% | 107% | 60% | 130% | 103% | 50% | 140% |
| Toluene | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 82% | 50% | 140% | 88% | 60% | 130% | 103% | 50% | 140% |
| Dibromochloromethane | 335913 | | < 0.10 | < 0.10 | NA | < 0.10 | 78% | 50% | 140% | 111% | 60% | 130% | 87% | 50% | 140% |
| Ethylene Dibromide | 335913 | | < 0.10 | < 0.10 | NA | < 0.10 | 88% | 50% | 140% | 118% | 60% | 130% | 101% | 50% | 140% |
| Tetrachloroethylene | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 82% | 50% | 140% | 79% | 60% | 130% | 91% | 50% | 140% |
| 1,1,1,2-Tetrachloroethane | 335913 | | < 0.10 | < 0.10 | NA | < 0.10 | 91% | 50% | 140% | 103% | 60% | 130% | 81% | 50% | 140% |
| Chlorobenzene | 335913 | | < 0.10 | < 0.10 | NA | < 0.10 | 88% | 50% | 140% | 105% | 60% | 130% | 109% | 50% | 140% |
| Ethylbenzene | 335913 | | < 0.10 | < 0.10 | NA | < 0.10 | 88% | 50% | 140% | 81% | 60% | 130% | 98% | 50% | 140% |
| m & p-Xylene | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 89% | 50% | 140% | 83% | 60% | 130% | 107% | 50% | 140% |
| Bromoform | 335913 | | < 0.10 | < 0.10 | NA | < 0.10 | 102% | 50% | 140% | 92% | 60% | 130% | 91% | 50% | 140% |
| Styrene | 335913 | | < 0.10 | < 0.10 | NA | < 0.10 | 83% | 50% | 140% | 98% | 60% | 130% | 98% | 50% | 140% |
| 1,1,2,2-Tetrachloroethane | 335913 | | < 0.10 | < 0.10 | NA | < 0.10 | 111% | 50% | 140% | 79% | 60% | 130% | 100% | 50% | 140% |
| o-Xylene | 335913 | | < 0.10 | < 0.10 | NA | < 0.10 | 86% | 50% | 140% | 93% | 60% | 130% | 108% | 50% | 140% |

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Quality Assurance

CLIENT NAME: WSP CANADA INC.
AGAT WORK ORDER: 19T490817
PROJECT: 191-08696-00
ATTENTION TO: Nicole Corbett
SAMPLING SITE:506243 Highway 89, Primrose
SAMPLED BY:Nicole Corbett

## Trace Organics Analysis (Continued)

| RPT Date: Jul 17, 2019 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| 1,3-Dichlorobenzene | 335913 | | < 0.10 | < 0.10 | NA | < 0.10 | 93% | 50% | 140% | 84% | 60% | 130% | 115% | 50% | 140% |
| 1,4-Dichlorobenzene | 335913 | | < 0.10 | < 0.10 | NA | < 0.10 | 93% | 50% | 140% | 110% | 60% | 130% | 116% | 50% | 140% |
| 1,2-Dichlorobenzene | 335913 | | < 0.10 | < 0.10 | NA | < 0.10 | 88% | 50% | 140% | 116% | 60% | 130% | 104% | 50% | 140% |
| 1,3-Dichloropropene | 335913 | | < 0.30 | < 0.30 | NA | < 0.30 | 87% | 50% | 140% | 85% | 60% | 130% | 94% | 50% | 140% |
| n-Hexane | 335913 | | < 0.20 | < 0.20 | NA | < 0.20 | 100% | 50% | 140% | 88% | 60% | 130% | 94% | 50% | 140% |

Comments: Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.
When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Quality Assurance

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 19T490817

PROJECT: 191-08696-00

ATTENTION TO: Nicole Corbett

SAMPLING SITE:506243 Highway 89, Primrose

SAMPLED BY:Nicole Corbett

## Water Analysis

| RPT Date: Jul 17, 2019 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| O. Reg. 153(511) - Metals & Inorganics (Water) | | | | | | | | | | | | | | | |
| Antimony | 338712 | | <1.0 | <1.0 | NA | < 1.0 | 102% | 70% | 130% | 98% | 80% | 120% | 97% | 70% | 130% |
| Arsenic | 338712 | | 3.2 | 4.3 | NA | < 1.0 | 99% | 70% | 130% | 101% | 80% | 120% | 102% | 70% | 130% |
| Barium | 338712 | | 101 | 98.1 | 2.9% | < 2.0 | 102% | 70% | 130% | 100% | 80% | 120% | 99% | 70% | 130% |
| Beryllium | 338712 | | <0.5 | <0.5 | NA | < 0.5 | 97% | 70% | 130% | 104% | 80% | 120% | 107% | 70% | 130% |
| Boron | 338712 | | 48.1 | 48.7 | NA | < 10.0 | 97% | 70% | 130% | 99% | 80% | 120% | 100% | 70% | 130% |
| Cadmium | 338712 | | <0.2 | <0.2 | NA | < 0.2 | 100% | 70% | 130% | 103% | 80% | 120% | 114% | 70% | 130% |
| Chromium | 338712 | | <2.0 | <2.0 | NA | < 2.0 | 100% | 70% | 130% | 103% | 80% | 120% | 104% | 70% | 130% |
| Cobalt | 338712 | | 2.7 | 2.6 | 3.8% | < 0.5 | 98% | 70% | 130% | 100% | 80% | 120% | 100% | 70% | 130% |
| Copper | 338712 | | 3.3 | 3.3 | NA | < 1.0 | 100% | 70% | 130% | 105% | 80% | 120% | 102% | 70% | 130% |
| Lead | 338712 | | 1.2 | 1.3 | NA | < 0.5 | 102% | 70% | 130% | 104% | 80% | 120% | 103% | 70% | 130% |
| Molybdenum | 338712 | | 4.1 | 4.3 | 4.8% | < 0.5 | 98% | 70% | 130% | 100% | 80% | 120% | 103% | 70% | 130% |
| Nickel | 338712 | | <1.0 | <1.0 | NA | < 1.0 | 100% | 70% | 130% | 103% | 80% | 120% | 102% | 70% | 130% |
| Selenium | 338712 | | <1.0 | <1.0 | NA | < 1.0 | 99% | 70% | 130% | 101% | 80% | 120% | 102% | 70% | 130% |
| Silver | 338712 | | <0.2 | <0.2 | NA | < 0.2 | 102% | 70% | 130% | 109% | 80% | 120% | 101% | 70% | 130% |
| Thallium | 338712 | | <0.3 | <0.3 | NA | < 0.3 | 103% | 70% | 130% | 105% | 80% | 120% | 102% | 70% | 130% |
| Uranium | 338712 | | 3.2 | 3.1 | 3.2% | < 0.5 | 98% | 70% | 130% | 104% | 80% | 120% | 103% | 70% | 130% |
| Vanadium | 338712 | | 1.2 | 1.4 | NA | < 0.4 | 95% | 70% | 130% | 97% | 80% | 120% | 97% | 70% | 130% |
| Zinc | 338712 | | 7.6 | 7.6 | NA | < 5.0 | 101% | 70% | 130% | 101% | 80% | 120% | 106% | 70% | 130% |
| Mercury | 339141 | 339141 | <0.02 | <0.02 | NA | < 0.02 | 101% | 70% | 130% | 104% | 80% | 120% | 99% | 70% | 130% |
| Chromium VI | 335913 | | <5 | <5 | NA | < 5 | 101% | 70% | 130% | 101% | 80% | 120% | 99% | 70% | 130% |
| Cyanide | 339141 | 339141 | <2 | <2 | NA | < 2 | 110% | 70% | 130% | 93% | 80% | 120% | 97% | 70% | 130% |
| Sodium | 340408 | | 5670 | 5610 | 1.1% | < 500 | 92% | 70% | 130% | 93% | 80% | 120% | 96% | 70% | 130% |
| Chloride | 337757 | | 52500 | 50100 | 4.7% | < 100 | 107% | 70% | 130% | 101% | 70% | 130% | 98% | 70% | 130% |
| Electrical Conductivity | 337764 | | 631 | 634 | 0.5% | < 2 | 100% | 90% | 110% | | | | | | |
| pH | 337764 | | 8.03 | 8.06 | 0.4% | NA | 100% | 90% | 110% | | | | | | |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 19T490817

PROJECT: 191-08696-00

ATTENTION TO: Nicole Corbett

SAMPLING SITE:506243 Highway 89, Primrose

SAMPLED BY:Nicole Corbett

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Trace Organics Analysis | | | |
| F1 (C6 - C10) | VOL-91- 5010 | MOE PHC E3421 | (P&T)GC/FID |
| F1 (C6 to C10) minus BTEX | VOL-91-5010 | MOE PHC E3421 | (P&T)GC/FID |
| F2 (C10 to C16) | VOL-91-5010 | MOE PHC E3421 | GC / FID |
| F3 (C16 to C34) | VOL-91-5010 | MOE PHC E3421 | GC / FID |
| F4 (C34 to C50) | VOL-91-5010 | MOE PHC E3421 | GC / FID |
| Gravimetric Heavy Hydrocarbons | VOL-91-5010 | MOE PHC E3421 | BALANCE |
| Terphenyl | VOL-91-5010 | | GC/FID |
| Dichlorodifluoromethane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Vinyl Chloride | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Bromomethane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Trichlorofluoromethane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Acetone | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 1,1-Dichloroethylene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Methylene Chloride | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| trans- 1,2-Dichloroethylene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Methyl tert-butyl ether | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 1,1-Dichloroethane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Methyl Ethyl Ketone | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| cis- 1,2-Dichloroethylene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Chloroform | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 1,2-Dichloroethane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 1,1,1-Trichloroethane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Carbon Tetrachloride | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Benzene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 1,2-Dichloropropane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Trichloroethylene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Bromodichloromethane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Methyl Isobutyl Ketone | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 1,1,2-Trichloroethane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Toluene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Dibromochloromethane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Ethylene Dibromide | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Tetrachloroethylene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 1,1,1,2-Tetrachloroethane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Chlorobenzene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Ethylbenzene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| m & p-Xylene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Bromoform | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Styrene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 1,1,2,2-Tetrachloroethane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| o-Xylene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 1,3-Dichlorobenzene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 1,4-Dichlorobenzene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 1,2-Dichlorobenzene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 1,3-Dichloropropene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Xylene Mixture | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| n-Hexane | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| Toluene-d8 | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |
| 4-Bromofluorobenzene | VOL-91-5001 | EPA SW-846 5030C & 8260D | (P&T)GC/MS |

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 19T490817

PROJECT: 191-08696-00

ATTENTION TO: Nicole Corbett

SAMPLING SITE:506243 Highway 89, Primrose

SAMPLED BY:Nicole Corbett

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Antimony | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cadmium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Molybdenum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Mercury | MET-93-6100 | EPA SW 846 7470 & 245.1 | CVAAS |
| Chromium VI | INOR-93-6034 | SM 3500-Cr B | SPECTROPHOTOMETER |
| Cyanide | INOR-93-6052 | MOE METHOD CN- 3015 & SM 4500 CN- I | TECHNICON AUTO ANALYZER |
| Sodium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Chloride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Electrical Conductivity | INOR-93-6000 | SM 2510 B | PC TITRATE |
| pH | INOR-93-6000 | SM 4500-H+ B | PC TITRATE |

# AGAT Laboratories

1 Large

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

## Chain of Custody Record

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

### Laboratory Use Only

Work Order #: 19T490817

Cooler Quantity:

Arrival Temperatures: 8.5 | 8.4 | 9.1

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: on ice

### Report Information:

Company: WSP Canada Inc.
Contact: Nicole Corbett
Address: 561 Bryne Dr. Units C+D
Barrie, ON L4N 9A3
Phone: (705)888-5629 Fax:
Reports to be sent to:
1. Email: nicole.corbett@wsp.com
2. Email: jay.dolan@wsp.com

### Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☒ Regulation 153/04
Table 2 (Indicate One)
☒ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture (Check One)
☒ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

### Turnaround Time (TAT) Required:

**Regular TAT** ☒ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

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

**OR** Date Required (Rush Surcharges May Apply):

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

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

### Project Information:

Project: 191-08696-00
Site Location: 506243 Highway 89, Primrose
Sampled By: NC
AGAT Quote #: 50 PO:
*Please note: If quotation number is not provided, client will be billed full price for analysis.*

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

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

### Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email: Payables.Ontario@wsp.com

### Sample Matrix Legend

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

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Field Filtered - Metals, Hg, CrVI (Y/N) | O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides)) | O. Reg 153: ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ $Cr^{6+}$ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR | O. Reg 153: Full Metals Scan | O. Reg 153: Regulation/Custom Metals | O. Reg 153: Nutrients: ☐ TP ☐ $NH_3$ ☐ TKN ☐ $NO_3$ ☐ $NO_2$ ☐ $NO_3$+$NO_2$ | O. Reg 153: Volatiles: ☒ VOC ☐ BTEX ☐ THM | O. Reg 153: PHCs F1 - F4 | O. Reg 153: ABNs | O. Reg 153: PAHs | O. Reg 153: PCBs: ☐ Total ☐ Aroclors | O. Reg 153: Organochlorine Pesticides | O. Reg 153: TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs | O. Reg 153: Sewer Use | PHCs + VOCs | Potentially Hazardous or High Concentration (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BH19-02 | 07/10/19 | AM | 12 | GW | | Y | X | | | | | X | | | | | | | | X | |
| BH19-03 | ↓ | AM | ↓ | ↓ | | | X | | | | | | | | | | | | | X | |
| BH19-04 | | PM | | | limited sample for PHCs F2-F4 + Inorganics | | X | | | | | | | | | | | | | X | |
| GWDUP-1 | ↓ | | | ↓ | | | | | | | | X | | | | | | | | | |
| Trip Blank | | | | | | | | | | | | X | | | | | | | | | |

| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time |
|---|---|---|---|---|---|
| Nicole Corbett | 07/10/19 | 2:50 pm | | July 10/19 | 3:55 |
| | | | | | |
| | | | | | |

Page 1 of 1

N°: T 091888

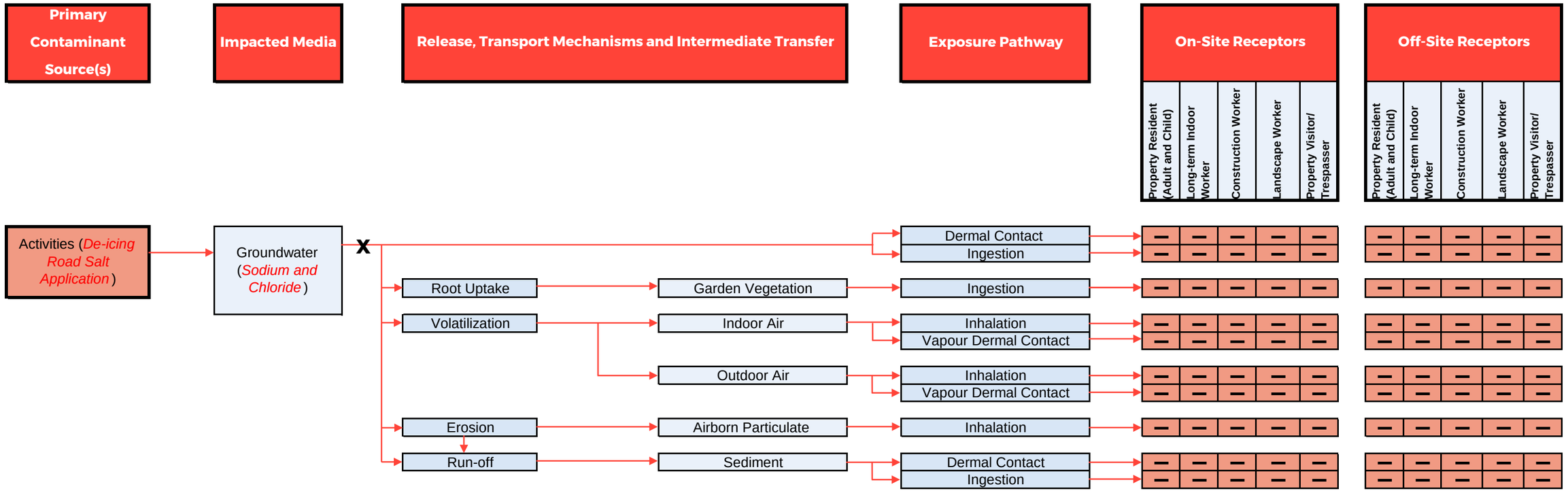
Document ID: DM-75-1511-016

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

# APPENDIX

# E CSM TRANSPORT DIAGRAMS

# PHASE TWO ESA CONCEPTUAL SITE MODEL - HUMAN HEALTH EXPOSURE

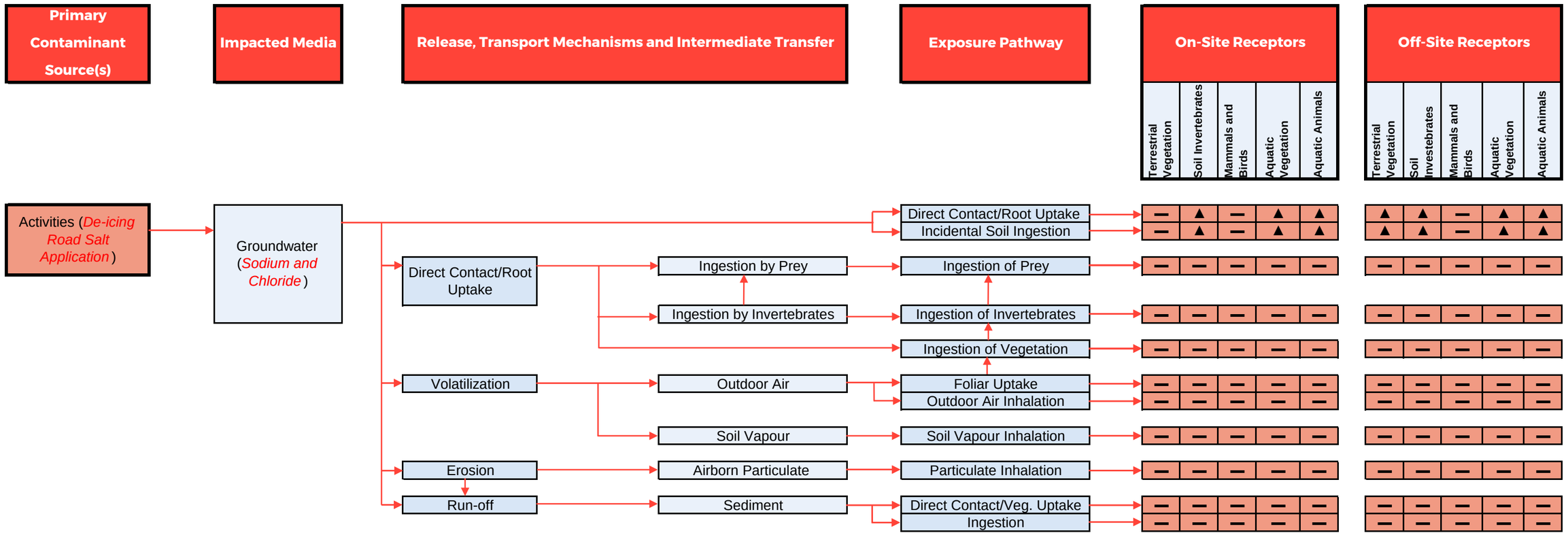



**LEGEND:**

[—] - NO Receptor considered to be present and/or Pathway Incomplete
[▲] - Receptor is considered to be present and Pathway Complete
X - Exposure Pathway considered blocked (*indicate* Risk Management *and/or* Remediation) *(To be Shown after completion of Remediation/Risk Assessment)*

| | | |
|---|---|---|
| **Project No.:** *191-08696-00* | | **Appendix: E** |
| **Project:** *506243 Highway 89, Primrose, Ontario* | | |
| **Date: July, 2019** | **Drawn: NC** | **Approved: JD** |

# PHASE TWO ESA CONCEPTUAL SITE MODEL - ECOLOGICAL EXPOSURE




**LEGEND:**

[—] - NO Receptor considered to be present and/or Pathway Incomplete
[▲] - Receptor is considered to be present and Pathway Complete

| | | |
|---|---|---|
| **Project No.:** *191-08696-00* | | **Appendix: E** |
| **Project:** *506243 Highway 89, Primrose, Ontario* | | |
| **Date: July, 2019** | **Drawn: NC** | **Approved: JD** |