

**PHASE 2 ENVIRONMENTAL SITE ASSESSMENT  
420 LAKESHORE ROAD EAST  
MISSISSAUGA, ONTARIO**

**Prepared for:**

Stellarcop Developments 420 Inc.  
329 Brooke Avenue  
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**Prepared by:**

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April 20, 2018  
Project No. 0250-02

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## 1.0 INTRODUCTION

COLESTAR Environmental Inc. (COLESTAR) was retained by Stellarcorp Developments 420 Inc. (Stellarcorp) to conduct a Phase 2 Environmental Site Assessment (P2ESA) of 420 Lakeshore Road East (“the site”) in Mississauga, Ontario. The P2ESA was completed for environmental due diligence purposes, including for financing purposes, and focused on the assessment of the Areas of Potential Environmental Concern (APEC) identified in the “Phase 1 Environmental Site Assessment – 420 Lakeshore Road East, Mississauga, Ontario” report, dated April 5, 2018, prepared by COLESTAR. The APECs identified in the P1ESA and assessed in this P2ESA were:

APEC 1 Northwest side of site in direction of former offsite service station and auto service garages.

APEC 2 Northeast side of site in direction of offsite service station.

The P2ESA was commissioned by Mr. Dung Lam on April 6, 2018. We understand that the P2ESA is required as part of a potential property acquisition transaction (including financing). The contact information for Mr. Lam is provided below:

Mr. Dung Lam  
Stellarcorp Developments 420 Inc.  
329 Brooke Avenue  
Toronto, Ontario  
M5M 2L4  
Tel.: (416) 922-2222  
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This report in its current form is not intended to support the filing of a Record of Site Condition (RSC). If an RSC is required at some future date, the report should be updated and amended to include the reporting sections and components, detailed conceptual site model and recommendations relating to investigation and/or remedial/risk management action set out in Ontario Regulation 153 and its amendments.

## 2.0 BACKGROUND

### 2.1 Site Description and Use

The municipal address of the site is 420 Lakeshore Road East, Mississauga, Ontario (Figure 1). The site is bounded by Lakeshore Road East and Enola Avenue to the northwest and northeast, respectively. The area of the site is approximately 0.37 hectares (0.91 Acres). A building and an asphalt paved parking lot utilized by The Beer Store occupy the site (Figure 2). Grassed areas bounded by the property line, building and parking lot are present on the northeast and northwest sides of the site.

As per the *City of Mississauga Zoning By-Law*, the site is zoned C4 – Mainstreet Commercial.

### 2.2 Topography and Drainage

Regional topography in the vicinity of the study area generally trends towards Lake Ontario located approximately 370 m southeast of the site.

Site drainage flows northwest and northeast into the Lakeshore Road East and Enola Avenue roadways where it discharges into roadway catch-basins. Run-off collecting in the basins is discharged via underground pipelines to the municipal sewer.

### 2.3 Geology and Hydrogeology

According to the *Quaternary Geology of Ontario, Southern Sheet, Map 2556* published by the *Ministry of Northern Development and Mines*, the overburden geology in the area of the site is made up of sand and sand and gravel deposits.

According to the *Bedrock Geology of Ontario, Southern Sheet, Map 2554* published by the *Ministry of Northern Development and Mines*, the bedrock geology in the area of the site is composed of shale, limestone, dolostone and siltstone.

A review of water well records within 500 m of the site indicate that the native soil stratigraphy in the study area generally consists of sand and silt layers. The water well records did not include domestic use wells and static water levels were not recorded in the well records.

The City of Mississauga is supplied with potable water via a municipal system which draws its source water from Lake Ontario. Surface water from Lake Ontario is treated and distributed to Mississauga residents by way of an underground municipal water distribution system.

## 2.4 Offsite Potentially Contaminating Activities

The following offsite potentially contaminating activities (PCAs) that could pose an adverse risk to groundwater and possible soil quality beneath the site were identified on surrounding lands in the P1ESA:

- A service station with three gasoline underground storage tanks (USTs) at 456 Lakeshore Road East located approximately 20 m to the northeast of the site. Street directories, fire insurance plans and aerial photographs indicate/illustrate that the service station has operated at this address since 1953.
- An auto service garage at 425 Lakeshore Road East located approximately 25 m northwest of the site. Street directories indicate that an auto service garage has operated at this address since at least 1958.
- A former service station/auto service garage at 411 Lakeshore Road East located approximately 25 m northwest of the site. The service station/auto service garage is shown with a gasoline UST on the 1952 fire insurance plan. Street directories and aerial photographs indicate/illustrate that the service station operated at this address from the 1940s to 1989 and the auto service garage has operated at this address since the 1940s.

For the purposes of defining contaminants of potential concern (COPCs) the offsite PCAs are grouped as follows:

- Service Stations
- Vehicle Service Garages

Gasoline and diesel stored in USTs and conveyed by underground piping to fuel dispensers are the sources of concern at service stations. COPCs associated with service stations include benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs) and lead.

Sources of concern at vehicle service garages include vehicle fluids – oil, engine coolant, transmission fluid, gasoline, diesel and waste fluids generated from vehicle maintenance and repair operations. COPCs associated with vehicle service garages include volatile organic compounds (VOCs), PHCs, polycyclic aromatic hydrocarbons (PAHs) and metals.

## 2.5 Site Assessment Standards

Although this report is not for the purpose of filing a RSC, and as such Regulation 153/04 is not applicable, for the purpose of assessing the condition of the soil and groundwater, the soil and groundwater site condition assessment standards were identified. In that respect, the assessment standards that would likely apply to the site are the Table 3 generic standards for sites with non-potable groundwater use and coarse textured soil provided in the “Ontario Ministry of the Environment; Soil, Ground Water and Sediment Standards for Use Under Section XV.1 of the Environmental Protection Act” publication dated April 15, 2011. The rationale used to select these standards is outlined below.

- The current use of the site is commercial. Stellarcorps’ plans for the site include continued commercial use or residential re-development. As a result, both the residential and commercial land use based standards were selected for assessment purposes.
- The non-potable standards were selected because the site and Mississauga residents are supplied with potable water via a municipal system that draws its’ source water from Lake Ontario.
- The site is not located within 30 m of a water body. The closest water body is Cooksville Creek located approximately 280 m east of the site.
- The site is not a “Shallow Soil” property as bedrock is more than 2 m below grade (bg). The P2ESA identified soil overlying shale bedrock encountered at 3 to 3.7 m bg.
- The subsurface soil stratigraphy beneath the site includes a sand unit. As a result, the coarse textured soil standards were selected as applicable to the site.
- The site is not considered an Area of Natural Significance (ANS) because it is not located in, or within 30 m of:
  - An area reserved or set apart as a provincial park or conservation reserve under the *Provincial Parks and Conservation Reserves Act, 2006*;

- An area of natural and scientific interest (life science or earth science) identified by the Ministry of Natural Resources as having provincial significance;
- A wetland identified by the Ministry of Natural Resources as having provincial significance;
- An area designated by a municipality in its official plan as environmentally significant, however expressed, including designations of areas as environmentally sensitive, as being of environmental concern and as being ecologically significant. As per the *City of Mississauga, Official Plan*, the site is not located in, or within 30 m of, an ANS.
- An area designated as an escarpment natural area or an escarpment protection area by the Niagara Escarpment Plan under the *Niagara Escarpment Planning and Development Act*;
- An area identified by the Ministry of Natural Resources as significant habitat of a threatened or endangered species;
- An area which is habitat of a species that is classified under Section 7 of the *Endangered Species Act, 2007* as a threatened or endangered species;
- Property within an area designated as a natural core area or natural linkage area within the area to which the Oak Ridges Moraine Conservation Plan under the *Oak Ridges Moraine Conservation Act, 2001* applies; and
- An area set apart as a wilderness area under the *Wilderness Area Act*.



### 3.0 METHODOLOGY

The P2ESA was designed to assess subsurface soil and groundwater quality beneath the site in the general area of the APECs defined in this assessment. Again, although this is not for the purpose of a RSC, the P2ESA was carried out in general accordance with the requirements set-out in applicable Ontario Ministry of the Environment Acts, Regulations and Standards. It included the following work elements:

- health and safety;
- utility locates and clearances;
- borehole drilling and monitoring well installations;
- groundwater monitoring and sampling; and
- quality assurance and quality control.

A site plan illustrating the site features and investigation locations is provided as Figure 2.

#### 3.1 Health and Safety

Before commencing with site activities, a site-specific health and safety plan (HSP) was developed by COLESTAR. The HSP applied to all personnel working for, or under the direction of, COLESTAR during the execution of the P2ESA work. The HSP identified and provided mitigative procedures for anticipated physical and chemical hazards associated with P2ESA work. The HSP included an emergency contact list, hospital route map and protocols to follow in the event of an emergency.

#### 3.2 Utility Locates and Clearances

Prior to intrusive investigation, all borehole locations were scanned and cleared of underground utility conflicts by Complete Line Locating Inc., a private utility locator. In addition, Ontario One-Call was contacted. One Call completed utility locates for hydro, natural gas, Bell, cable and telecommunications.

#### 3.3 Borehole Drilling and Monitoring Well Installations

On April 11, 2018, three boreholes/monitoring wells (BH1, BH2, BH3) were advanced/installed at the locations illustrated on Figure 2. The boreholes were drilled in

accordance with Ontario Regulation 903 by Profile Drilling Ltd. using an auger rig equipped with split spoon samplers. The boreholes which were drilled to depths of 6.1 to 7.6 m bg to assess subsurface conditions at the APECs included:

- BH1 and BH2 positioned within APEC 1.
- BH2 and BH3 positioned within APEC 2.

Soil samples were collected at regular depth intervals from each borehole for textural classification, visual and olfactory inspection for anthropogenic impacts, and vapour concentration measurement. Samples subjected to vapour concentration measurement were placed in polyethylene bags with approximately 50% headspace. Vapour concentrations were measured in the bag headspace using an RKI Eagle 2 gas detector calibrated against hexane and isobutylene and operated in methane elimination mode. Based on the screening results, soil samples were selected for laboratory analysis of various parameter suites corresponding to the potential contaminants of concern associated with the APECs [BTEX, VOCs, PHCs, PAHs, metals]. One field duplicate, denoted DUP-S1, obtained from BH2 at 1.5 to 2 m bg was collected for analysis of PHCs for quality assurance/quality control (QA/QC) purposes.

A monitoring well composed of a 50 mm diameter PVC riser and 3 m screened interval was placed in BH1, BH2 and BH3. The screen consisted of vertical 0.25 um overlapping slots and was placed to intercept the anticipated potentiometric surface of the groundwater unit. A sand pack was installed around the screen from the base of the borehole to about 0.3 m above the top of the well screen. The sand pack material used was No. 10 silica sand. A hydrated bentonite seal was placed atop the sand pack and the annulus above the seal was infilled with sand to approximately 0.3 m bg. A well casing encased in concrete, flush with grade, was placed at surface at each well location.

On April 11, 2018, COLESTAR personnel surveyed the boreholes/wells for their horizontal positions relative to the onsite building and vertical grade and top of well elevations. The horizontal survey data was used to establish the position of the boreholes on the site plan. The vertical survey was referenced to a datum that was assigned an arbitrary elevation of 100.00 m.

### **3.4 Groundwater Monitoring and Sampling**

The monitoring wells were gauged for fluid levels [non-aqueous phase liquids (NAPL) and water] using an ORS interface probe on April 16, 2018. The probe was decontaminated

prior to use and between well locations.

The wells were developed on April 11, 2018. On April 16, 2018, following well purging in accordance with standard practice using a peristaltic pump with designated downhole tubing, groundwater samples were collected and jarred from BH1, BH2 and BH3 for laboratory analysis of VOCs and PHCs. In addition, the groundwater sample from BH2 was analyzed for PAHs and metals. One field duplicate, denoted DUP-W1, obtained from BH1 was collected for analysis of VOCs for quality assurance/quality control (QA/QC) purposes.

Well development and purge water removed from the wells was discharged into the drums containing drill cuttings.

### 3.5 Quality Assurance and Quality Control

The following Quality Assurance/Quality Control protocols were followed:

- samples were placed and packed in an ice filled cooler in a manner which prevented damage to the sample containers during transport to the laboratory;
- the samples were maintained at temperatures below 10 degrees centigrade to minimize degradation of organic contaminants;
- samples were delivered to the laboratory by COLESTAR personnel within 24 hours of sample collection;
- the laboratory used (Caduceon Environmental Laboratories Inc.) is CALA accredited for the analytes included in the soil and groundwater testing programs;
- The parameters analyzed, where applicable, were preserved according to laboratory specifications;
- New dedicated sampling equipment (i.e. bailer, downhole tubing) was used for groundwater sampling and monitoring;
- New nitrile samples gloves, discarded after use, were used at each sample location;
- Fluid level monitoring equipment was decontaminated prior to use and between monitoring locations using distilled water and methanol;
- Field duplicate soil and groundwater samples were collected and analyzed for QA/QC purposes; and
- Drilling and soil sampling equipment was decontaminated prior to use and between drilling/sampling locations to prevent cross contamination.

## 4.0 RESULTS

The results of the investigation activities are presented in the following sections.

Borehole and monitoring well logs are provided in Appendix A. Copies of laboratory reports presenting the results on samples analysed in this assessment are provided in Appendix B.

### 4.1 Stratigraphy

The soil stratigraphy apparent in the boreholes consists of sand and gravel fill overlying sand underlain by clay till encountered at 1.2 to 1.5 m bg. The till is underlain by shale bedrock encountered at 3 to 3.7 m bg.

### 4.2 Groundwater Conditions

The depth to the groundwater unit on the April 16, 2018 monitoring event ranged from 3.6 to 4.1 m bg.

### 4.3 Visual and Olfactory Observations

No visual or olfactory evidence of anthropogenic impact (i.e. odour, staining, discolouration, foreign debris) was apparent in the soil samples recovered from the boreholes.

No visual or olfactory evidence of anthropogenic impact was apparent in the groundwater extracted from the monitoring wells.

### 4.4 Non-Aqueous Phase Liquid

Non-aqueous phase liquid (NAPL) was not apparent at the groundwater surface in the monitoring wells on April 16, 2018. NAPL was also not apparent at the base of the monitoring wells on April 16, 2018.

## 4.5 Vapour Concentrations

Combustible vapour concentrations in the soil samples recovered from the boreholes did not exceed 10 ppm. PID vapour concentrations were not detected (i.e. measured at 0 ppm) in the soil samples.

## 4.6 Soil Laboratory Results

The laboratory results on the analysed soil samples are presented along with comparison with the assessment standards in Table 1. As presented, the following parameters exhibited constituent concentrations above commercial and residential standards:

### **Commercial Standard Exceedances**

- None of the analysed parameters exhibited constituent concentrations above commercial soil quality standards.

### **Residential Standard Exceedances**

- Sodium Adsorption Ratio (SAR) and Electrical Conductivity (EC) in the BH3 soil sample obtained at 0.6 to 1.1 m bg.
- The remaining analysed parameters did not exhibit constituent concentrations above residential soil quality standards.

The laboratory results on the soil QA/QC sample set (BH2/DUP-S1) were generally the same for both the QA/QC sample and its duplicate. Because the duplicate results are the same, the reproducibility of the results as a whole is considered strong suggesting that the field sampling methodology and associated field QA/QC protocols were executed in a manner which yielded a reliable data set.

The laboratory certificate (Appendix B) did not identify any QA/QC issues with the soil analytical data. As a result, it is presumed that the batch analyses were consistent with generally accepted industry practices and that the results represent satisfactory data reproducibility, precision and accuracy.

## 4.7 Groundwater Laboratory Results

The laboratory results on the analysed groundwater samples are presented along with comparison with the assessment standards in Table 2. As presented, although the

standards are not necessarily applicable for these purposes (given this is not for a RSC, which is not required), the analysed parameters in the groundwater samples did not exceed the groundwater standards.

The laboratory results on the groundwater QA/QC sample set (BH1/DUP-W1) were the same for both the QA/QC sample and its duplicate. Because the duplicate results are the same for the QA/QC sample, the reproducibility of the results as a whole is considered strong suggesting that the field sampling methodology and associated field QA/QC protocols were executed in a manner which yielded a reliable data set.

The laboratory certificates (Appendix B) did not identify any QA/QC issues with the groundwater analytical data. As a result, it is presumed that the batch analyses were consistent with generally accepted industry practices and that the results represent satisfactory data reproducibility, precision and accuracy.

## 5.0 SUMMARY OF FINDINGS AND CONCLUSIONS

COLESTAR Environmental Inc. was retained by Stellarcorp Developments 420 Inc. to complete a Phase 1 Environmental Site Assessment (P1ESA) at the site. The P1ESA report, dated April 5, 2018, identified offsite Potentially Contaminating Activities (PCAs) under Ontario Regulation 153 (which does not necessarily apply here, but is a conservative basis for identifying PCAs) that warranted further investigation via a Phase 2 ESA (P2ESA). As detailed in Section 1.0 of this report, the PCAs result in two Areas of Potential Environmental Concern (APECs) at the site, summarized as follows:

APEC 1 Northwest side of site in direction of former offsite service station and auto service garages.

APEC 2 Northeast side of site in direction of offsite service station.

The P1ESA recommended that a P2ESA be completed at the site, the details of which are provided in this report. In summary, the P2ESA sampling was conducted in April 2018 and included three boreholes/monitoring wells advanced at, and in the area of, the APECs. Soil and groundwater samples were collected from the boreholes and wells for field assessment with selected soil and groundwater samples analysed for the Contaminants of Potential Concern (COPCs) associated with the APECs. The COPCs analysed included benzene, toluene, ethylbenzene and xylenes (BTEX), volatile organic compounds (VOCs), petroleum hydrocarbons (PHCs), polycyclic aromatic hydrocarbons (PAHs), metals, pH, electrical conductivity (EC) and sodium adsorption ratio (SAR). The findings of the P2ESA are summarized as follows:

- The soil stratigraphy at the site generally consists of sand and gravel fill resting atop sand underlain by clay till and shale bedrock encountered at 1.2 to 1.5 m bg and 3 to 3.7 m bg, respectively.
- Groundwater was encountered at 3.6 to 4.1 bg on April 16, 2018.
- No anthropogenic impacts (staining, odour, discolouration, foreign debris) were noted in the soil samples recovered from the boreholes. Combustible vapours did not exceed 10 ppm and PID vapours were not detected (i.e. measured at 0 ppm) in the soil samples acquired from the boreholes.

- No visual or olfactory evidence of anthropogenic impact was noted in the groundwater extracted from the monitoring wells.
- Representative soil and groundwater samples analyzed in the assessment comply with the commercial land use standards (Tables 1 and 2).
- With the exception of road salt impacts in soil [i.e. EC and SAR], representative soil and groundwater samples analyzed in this assessment comply with the residential land use standards (Tables 1 and 2). The soil sample acquired beneath the parking lot at 0.6 to 1.1 m below grade at BH3, exhibits EC (1.23 mS/cm) and SAR (7.76) concentrations in excess of the residential land use standards of 0.7 mS/cm and 5.

## Conclusions

In the scenario of continued commercial use and/or commercial redevelopment: The P2ESA did not identify soil or groundwater contamination in excess of the current MOECC commercial land use standards at, or in the area of, the APECs. As a result, no further action is required to permit commercial land use of the site at this time.

In the scenario of residential redevelopment: The P2ESA did not identify soil or groundwater contamination in excess of the current MOECC residential land use standards at, or in the area of, the APECs, save and except for salt impacts. It is anticipated that Ontario Regulation 153 will within the next few years have the requirement for remediation of such salt impacts removed from the requirement provided that it is demonstrated that they were derived from road salt application for de-icing purposes and that they reside below paved or concrete surfaces. In the event that the residential redevelopment does not include paved or concrete surfaces, the salt impacted soil can be removed, as required, as part of the re-development work (example - as part of the excavation work for an underground parking garage).



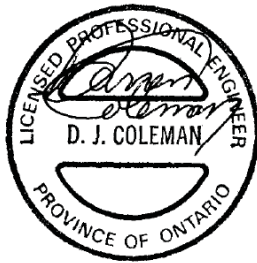
## 6.0 CLOSURE

All elements of the Phase 2 ESA were carried out and/or supervised by Mr. Darren Coleman, P.Eng., QP of COLESTAR Environmental Inc. The qualifications of Mr. Coleman are provided in Appendix C.

We appreciate the opportunity to provide this report and trust that it meets with your requirements. Please be advised that this report is subject to the limitations provided in Attachment A. Should you have any questions, please do not hesitate to contact Mr. Darren Coleman at (905) 554-4156.

Yours truly,

**COLESTAR Environmental Inc.**



Darren J. Coleman, P.Eng., QP.  
President

# FIGURES



SOURCE: INTERACTIVE MISSISSAUGA MAPS

Title:

**SITE LOCATION**



Project: PHASE II ENVIRONMENTAL  
SITE ASSESSMENT  
420 LAKESHORE ROAD EAST  
MISSISSAUGA, ONTARIO

Project Number: 0250-02

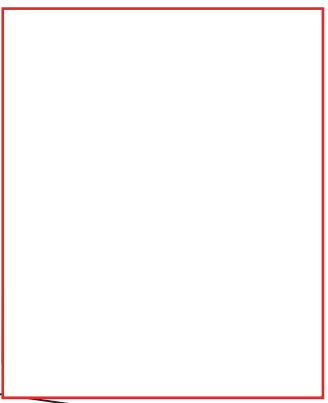
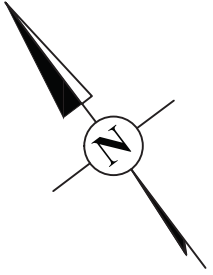
Client: STELLARCOP DEVELOPMENTS 420 INC.

0 1 2k 3 4K

(APPROXIMATE SCALE IN KILOMETRES)

Date: MARCH 2018

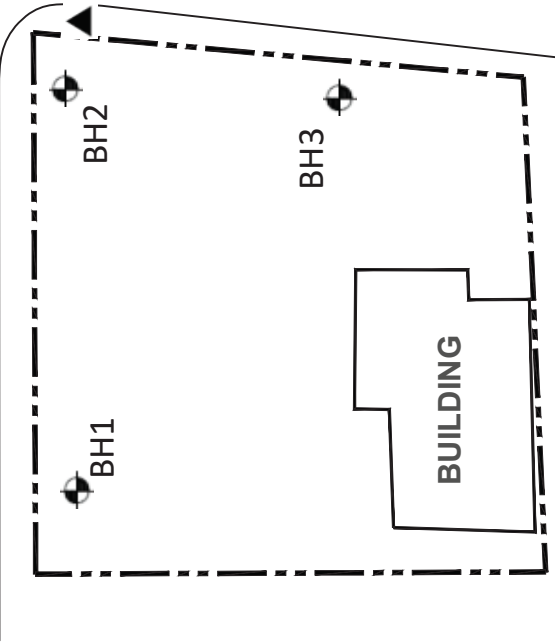
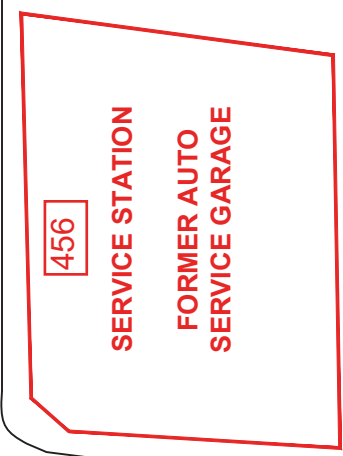
FIGURE 1



ENOLA AVENUE



LAKESHORE ROAD EAST



SOURCE: INTERACTIVE MISSISSAUGA MAPS

**LEGEND**

--- PROPERTY LIMIT

□ OFFSITE PCA

● Borehole/Monitoring Well

▲ VERTICAL SURVEY DATUM, TOP OF HYDRANT (100.00 m, ARBITRARY)

Title:

SITE PLAN



Project: PHASE II ENVIRONMENTAL SITE ASSESSMENT  
420 LAKESHORE ROAD EAST  
MISSISSAUGA, ONTARIO

Project Number: 0250-02

Client: STELLAR CORP DEVELOPMENTS 420 INC.

Date: MARCH 2018  
FIGURE 2



# **TABLES**

**TABLE 1**  
**SOIL LABORATORY RESULTS**  
**420 LAKESHORE ROAD EAST, MISSISSAUGA, ONTARIO**  
(Expressed in mg/kg or ug/g unless noted otherwise)

Parameter	MOE Generic Standards (1)		BH1	BH2	BH2	BH3
			11-Apr-18	11-Apr-18	11-Apr-18	11-Apr-18
	1.5-2 m	1.5-2 m	1.5-2 m	1.5-2 m		
	5-6.5 ft	5-6.5 ft	5-6.5 ft	5-6.5 ft		
				DUP-S1		
Commercial	Residential	B18-09346-1	B18-09346-2	B18-09346-6	B18-09346-5	
<b>Volatile Organic Compounds</b>						
1,1,1,2-Tetrachloroethane	0.087	0.058	< 0.02	< 0.02	---	< 0.02
1,1,1-Trichloroethane	6.1	0.38	< 0.02	< 0.02	---	< 0.02
1,1,2,2-Tetrachloroethane	0.05	0.05	< 0.05	< 0.05	---	< 0.05
1,1,2-Trichloroethane	0.05	0.05	< 0.02	< 0.02	---	< 0.02
1,1-Dichloroethane	17	3.5	< 0.02	< 0.02	---	< 0.02
1,1-Dichloroethylene	0.064	0.05	< 0.02	< 0.02	---	< 0.02
1,2-Dichlorobenzene	6.8	3.4	< 0.05	< 0.05	---	< 0.05
1,2-Dichloroethane	0.05	0.05	< 0.02	< 0.02	---	< 0.02
1,2-Dichloropropane	0.16	0.05	< 0.02	< 0.02	---	< 0.02
1,3-Dichlorobenzene	9.6	4.8	< 0.05	< 0.05	---	< 0.05
1,3-Dichloropropene (Cis + Trans)	0.18	0.05	< 0.02	< 0.02	---	< 0.02
1,4-Dichlorobenzene	0.2	0.083	< 0.05	< 0.05	---	< 0.05
Acetone	16	16	< 0.5	< 0.5	---	< 0.5
Benzene	0.32	0.21	< 0.02	< 0.02	---	< 0.02
Bromodichloromethane	18	13	< 0.02	< 0.02	---	< 0.02
Bromoform	0.61	0.27	< 0.02	< 0.02	---	< 0.02
Bromomethane	0.05	0.05	< 0.05	< 0.05	---	< 0.05
Carbon Tetrachloride	0.21	0.05	< 0.05	< 0.05	---	< 0.05
Chlorobenzene	2.4	2.4	< 0.02	< 0.02	---	< 0.02
Chloroform	0.47	0.05	< 0.02	< 0.02	---	< 0.02
CIS 1,2-Dichloroethylene	55	3.4	< 0.02	< 0.02	---	< 0.02
Dibromochloromethane	13	9.4	< 0.02	< 0.02	---	< 0.02
Dichlorodifluoromethane	16	16	< 0.05	< 0.05	---	< 0.05
Ethylbenzene	9.5	2	< 0.05	< 0.05	---	< 0.05
Ethylene Dibromide	0.05	0.05	< 0.02	< 0.02	---	< 0.02
Methyl Ethyl Ketone	70	16	< 0.5	< 0.5	---	< 0.5
Methyl Isobutyl Ketone	31	1.7	< 0.5	< 0.5	---	< 0.5
Methyl tert-butyl Ether	11	0.75	< 0.05	< 0.05	---	< 0.05
Methylene Chloride	1.6	0.1	< 0.05	< 0.05	---	< 0.05
n-Hexane	46	2.8	< 0.02	< 0.02	---	< 0.02
Styrene	34	0.7	< 0.05	< 0.05	---	< 0.05
Tetrachloroethylene	4.5	0.28	< 0.05	< 0.05	---	< 0.05
Toluene	68	2.3	< 0.2	< 0.2	---	< 0.2
TRANS-1,2-Dichloroethylene	1.3	0.084	< 0.02	< 0.02	---	< 0.02
Trichloroethylene	0.91	0.061	< 0.05	< 0.05	---	< 0.05
Trichlorofluoromethane	4	4	< 0.02	< 0.02	---	< 0.02
Vinyl Chloride	0.032	0.02	< 0.02	< 0.02	---	< 0.02
Xylenes	26	3.1	< 0.03	< 0.03	---	< 0.03
<b>Petroleum Hydrocarbons</b>						
F1 (C6-C10) - BTEX	55	55	< 10	< 10	---	< 10
F2 (C10-C16 Hydrocarbons)	230	98	< 5	< 5	< 5	< 5
F3 (C16-C34 Hydrocarbons)	1700	300	15	< 10	11	13
F4 (C34-C50 Hydrocarbons)	3300	2800	33	< 10	< 10	19
F4 Gravimetrics (2)	3300	2800	410	---	---	500

1 - Soil, Sediment and Ground Water Standards for Use Under Part XV.1 of the Environmental Protection Act (2011), Ontario Ministry of the Environment - Table 3 Soil Standards for commercial sites with coarse grained soil in a non-potable groundwater setting.

2 - analysis performed when PHCs do not descend to baseline

Dates presented are sample dates

Depths provided are in metres (m) and feet (ft) and are relative to grade

'---' - not analyzed or no standard

B18-09346-1: laboratory sample identifier

DUP - field duplicate

**TABLE 1**  
**SOIL LABORATORY RESULTS**  
**420 LAKESHORE ROAD EAST, MISSISSAUGA, ONTARIO**  
(Expressed in mg/kg or ug/g unless noted otherwise)

Parameter	MOE Generic Standards (1)		BH3	BH3
			11-Apr-18	11-Apr-18
			0.6-1.1 m	1.5-1.8 m
			2-3.5 ft	4-5 ft
	Commercial	Residential	B18-09346-3	B18-09346-4
<b>Metals/Inorganics</b>				
pH (pH units)	5 to 9	5 to 9	7.29	---
Electrical Conductivity (mS/cm)	1.4	0.7	<b>1.23</b>	---
Sodium Adsorption Ratio (unitless)	12	5	<b>7.76</b>	---
Antimony	40	7.5	< 0.5	---
Arsenic	18	18	3.2	---
Barium	670	390	82	---
Beryllium	8	4	0.8	---
Boron	120	120	3.1	---
Boron, Hot Water Soluble	2	1.5	0.27	---
Cadmium	1.9	1.2	< 0.5	---
Chromium	160	160	20	---
Chromium (VI)	8	8	< 0.5	---
Cobalt	80	22	10	---
Copper	230	140	18	---
Lead	120	120	12	---
Mercury	3.9	0.27	0.023	---
Molybdenum	40	6.9	< 1	---
Nickel	270	100	17	---
Selenium	5.5	2.4	< 0.5	---
Silver	40	20	< 0.2	---
Thallium	3.3	1	0.1	---
Uranium	33	23	0.9	---
Vanadium	86	86	30	---
Zinc	340	340	49	---
<b>Polycyclic Aromatic Hydrocarbons</b>				
Acenaphthene	96	7.9	---	< 0.05
Acenaphthylene	0.15	0.15	---	< 0.06
Anthracene	0.67	0.67	---	< 0.06
Benzo(a)anthracene	0.96	0.5	---	< 0.06
Benzo(a)pyrene	0.3	0.3	---	< 0.06
Benzo(b)fluoranthene	0.96	0.78	---	< 0.06
Benzo(k)fluoranthene	0.96	0.78	---	< 0.06
Benzo(g,h,i)perylene	9.6	6.6	---	< 0.06
Chrysene	9.6	7	---	< 0.05
Dibenzo(a,h)anthracene	0.1	0.1	---	< 0.06
Fluoranthene	9.6	0.69	---	< 0.06
Fluorene	62	62	---	< 0.05
Indeno(1,2,3-cd)pyrene	0.76	0.38	---	< 0.06
Methylnaphthalene 2-(1-)	76	0.99	---	< 0.08
Naphthalene	9.6	0.6	---	< 0.06
Phenanthrene	12	6.2	---	< 0.06
Pyrene	96	78	---	< 0.05

1 - Soil, Sediment and Ground Water Standards for Use Under Part XV.1 of the Environmental Protection Act (2011), Ontario Ministry of the Environment - Table 3 Soil Standards for commercial sites with coarse grained soil in a non-potable groundwater setting.

Dates presented are sample dates

Depths provided are in metres (m) and feet (ft) and are relative to grade

'---' - not analyzed or no standard

B18-09346-3: laboratory sample identifier

DUP - field duplicate

**BOLD** - value exceeds residential standard

**TABLE 2**  
**GROUNDWATER LABORATORY RESULTS**  
**420 LAKESHORE ROAD EAST, MISSISSAUGA, ONTARIO**  
(Expressed in ug/L unless noted otherwise)

Parameter	MOE Generic Standards (1)	BH1	BH1	BH2	BH3
		16-Apr-18	16-Apr-18	16-Apr-18	16-Apr-18
			DUP-W1		
		B18-09595-1	B18-09595-4	B18-09595-2	B18-09595-3
<b><u>Volatile Organic Compounds</u></b>					
1,1,1,2-Tetrachloroethane	3.3	< 0.5	< 0.5	< 0.5	< 0.5
1,1,1-Trichloroethane	640	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	3.2	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	4.7	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethane	320	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethylene	1.6	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	4600	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethane	1.6	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloropropane	16	< 0.5	< 0.5	< 0.5	< 0.5
1,3-Dichlorobenzene	9600	< 0.5	< 0.5	< 0.5	< 0.5
1,3-Dichloropropene (Cis + Trans)	5.2	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	8	< 0.5	< 0.5	< 0.5	< 0.5
Acetone	130000	< 30	< 30	< 30	< 30
Benzene	44	< 0.5	< 0.5	< 0.5	1.2
Bromodichloromethane	85000	< 2	< 2	< 2	< 2
Bromoform	380	< 5	< 5	< 5	< 5
Bromomethane	5.6	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Tetrachloride	0.79	< 0.2	< 0.2	< 0.2	< 0.2
Chlorobenzene	630	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform	2.4	< 1	< 1	< 1	< 1
CIS 1,2-Dichloroethylene	1.6	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	82000	< 2	< 2	< 2	< 2
Dichlorodifluoromethane	4400	< 2	< 2	< 2	< 2
Ethylbenzene	2300	< 0.5	< 0.5	< 0.5	< 0.5
Ethylene Dibromide	0.25	< 0.2	< 0.2	< 0.2	< 0.2
Methyl Ethyl Ketone	470000	< 20	< 20	< 20	< 20
Methyl Isobutyl Ketone	140000	< 20	< 20	< 20	< 20
Methyl tert-butyl Ether	190	< 2	< 2	< 2	< 2
Methylene Chloride	610	< 5	< 5	< 5	< 5
n-Hexane	51	< 5	< 5	< 5	< 5
Styrene	1300	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	1.6	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	18000	< 0.5	< 0.5	< 0.5	< 0.5
TRANS-1,2-Dichloroethylene	1.6	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	1.6	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	2500	< 5	< 5	< 5	< 5
Vinyl Chloride	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes	4200	< 1.1	< 1.1	< 1.1	< 1.1
<b><u>Petroleum Hydrocarbons</u></b>					
F1 (C6-C10) - BTEX	750	< 50	---	< 50	< 50
F2 (C10-C16 Hydrocarbons)	150	< 50	---	< 50	< 50
F3 (C16-C34 Hydrocarbons)	500	< 400	---	< 400	< 400
F4 (C34-C50 Hydrocarbons)	500	< 400	---	< 400	< 400

1 - Soil, Sediment and Ground Water Standards for Use Under Part XV.1 of the Environmental Protection Act (2011), Ontario Ministry of the Environment - Table 3 Groundwater Standards for sites with coarse grained soil in a non-potable groundwater setting.

Dates presented are sample dates

DUP - field duplicate

B18-09595-1: laboratory sample identifier



**TABLE 2**  
**GROUNDWATER LABORATORY RESULTS**  
**420 LAKESHORE ROAD EAST, MISSISSAUGA, ONTARIO**  
**(Expressed in ug/L unless noted otherwise)**

Parameter	MOE Generic Standards (1)	BH2
		16-Apr-18
		B18-09595-2
<b>Metals</b>		
Antimony	20000	1.8
Arsenic	1900	9.5
Barium	29000	310
Beryllium	67	<0.1
Boron (total)	45000	994
Cadmium	2.7	0.04
Chromium Total	810	<2
Chromium VI	140	<10
Cobalt	66	3.6
Copper	87	<2
Lead	25	0.02
Mercury	0.29	<0.02
Molybdenum	9200	12.1
Nickel	490	16.2
Selenium	63	6
Silver	1.5	<0.02
Thallium	510	0.06
Uranium	420	2.71
Vanadium	250	<5
Zinc	1100	8
<b>Polycyclic Aromatic Hydrocarbons</b>		
Acenaphthene	600	<0.05
Acenaphthylene	1.8	<0.05
Anthracene	2.4	<0.05
Benz(a)anthracene	4.7	<0.05
Benzo(a)pyrene	0.81	<0.01
Benzo(b)fluoranthene	0.75	<0.05
Benzo(k)fluoranthene	0.4	<0.05
Benzo(g,h,i)perylene	0.2	<0.05
Chrysene	1	<0.05
Dibenz(a,h)anthracene	0.52	<0.05
Fluoranthene	130	<0.05
Fluorene	400	<0.05
Indeno(1,2,3-cd)pyrene	0.2	<0.05
2-and 1-methyl Naphthalene	1800	<0.07
Naphthalene	1400	<0.05
Phenanthrene	580	<0.05
Pyrene	68	<0.05

1 - Soil, Sediment and Ground Water Standards for Use Under Part XV.1 of the Environmental Protection Act (2011), Ontario Ministry of the Environment - Table 3 Groundwater Standards for sites with coarse grained soil in a non-potable groundwater setting.

Dates presented are sample dates

DUP - field duplicate

B18-09595-2: laboratory sample identifier

# **APPENDICES**

**Appendix A**  
**Borehole Logs**

# BOREHOLE LOG

BOREHOLE NO:  
**BH1**

CLIENT: STELLARCORP DEVELOPMENTS 420 INC.  
PROJECT NO: 0250-02  
PROJECT: PHASE 2 ENVIRONMENTAL SITE ASSESSMENT  
SITE LOCATION: 420 LAKESHORE ROAD EAST, MISSISSAUGA

CONTRACTOR: PROFILE DRILLING LTD.  
METHOD: B-60 RIG  
DATE DRILLED: APRIL 11, 2018  
TOC ELEVATION: 99.05m  
GRADE ELEVATION: 99.15m

ELEVATION (m)	DEPTH (m)	WELL DETAIL	SYMBOL	SOIL DESCRIPTION	ELEVATION (m)	DEPTH (m)	METERS	FEET	SAMPLE INTERVAL	VAPOUR CONC. (ppm)		BLOW COUNTS	PENETROMETER (TONS/FT)	ANALYTES
										PID	COMB.			
99.15	0.00			GROUND SURFACE	99.15	0.00	0	0						
		[Concrete Symbol]		ASPHALT	99.05									
98.85	0.30		[Sand and Gravel Symbol]	SAND AND GRAVEL - BROWN, DRY			1	1	[Split Spoon]	0	0	-	-	-
			[Sand Symbol]	SAND - GREY, SILTY, DRY	98.54	0.61	2	2	[Split Spoon]	0	0	-	-	-
			[Sand Symbol]	SAND - GREY, SILTY, DRY			3	3	[Split Spoon]	0	0	-	-	-
			[Sand Symbol]	SAND - GREY, SILTY, DRY			4	4	[Split Spoon]	0	0	-	-	-
97.63	1.52		[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF	97.63	1.52	5	5	[Split Spoon]	0	10	2/3/4	2	VOCs/ PHCs
			[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			6	6	[Split Spoon]	0	10	2/3/4	2	VOCs/ PHCs
			[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			7	7	[Split Spoon]	0	10	2/3/4	2	VOCs/ PHCs
96.41	2.74		[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			8	8	[Split Spoon]	0	10	2/3/4	2	VOCs/ PHCs
			[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			9	9	[Split Spoon]	0	10	2/3/4	2	VOCs/ PHCs
96.10	3.05		[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			10	10	[Split Spoon]	0	5	14/50 FOR 5"	NR	-
			[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			11	11	[Split Spoon]	0	5	14/50 FOR 5"	NR	-
			[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			12	12	[Split Spoon]	0	5	14/50 FOR 5"	NR	-
			[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			13	13	[Split Spoon]	0	5	14/50 FOR 5"	NR	-
			[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			14	14	[Split Spoon]	0	5	14/50 FOR 5"	NR	-
			[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			15	15	[Split Spoon]	0	5	14/50 FOR 5"	NR	-
			[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			16	16	[Split Spoon]	0	0	50 FOR 4"	NR	-
			[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			17	17	[Split Spoon]	0	0	50 FOR 4"	NR	-
			[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			18	18	[Split Spoon]	0	0	50 FOR 4"	NR	-
			[Clay Till Symbol]	CLAY TILL - GREY, SILTY, DRY  - VERY STIFF			19	19	[Split Spoon]	0	0	50 FOR 4"	NR	-
93.05	6.10		[Auger Refusal Symbol]	AUGER REFUSAL (SOUND, UNWEATHERED)	93.05	6.10	6	20	[Split Spoon]	0	0	50 FOR 5"	NR	-
			[Auger Refusal Symbol]	AUGER REFUSAL (SOUND, UNWEATHERED)				21	[Split Spoon]	0	0	50 FOR 5"	NR	-
			[Auger Refusal Symbol]	AUGER REFUSAL (SOUND, UNWEATHERED)				22	[Split Spoon]	0	0	50 FOR 5"	NR	-

END OF BOREHOLE

**LEGEND (WELL)**

- BENTONITE
- SAND
- CONCRETE

WELL CONSTRUCTION: 2 INCH PVC, SCHEDULE 40.



10 SLOT SCREEN



WATER LEVEL  
(95.54 on April 16, 2018)



SPLIT SPOON

NR - NO RECOVERY

LOGGED BY: C. FRANKRUYTER

LOG PREPARED BY: K. DEKKEMA

CHECKED BY: D. COLEMAN



ELEVATIONS ARE REFERENCED TO AN ARBITRARY DATUM.

COLESTAR ENVIRONMENTAL INC. TAKES NO RESPONSIBILITY FOR THE DECISIONS/ACTIONS OF A THIRD PARTY BASED ON THIS LOG.

# BOREHOLE LOG



CLIENT: STELLARCORP DEVELOPMENTS 420 INC.  
 PROJECT NO: 0250-02  
 PROJECT: PHASE 2 ENVIRONMENTAL SITE ASSESSMENT  
 SITE LOCATION: 420 LAKESHORE ROAD EAST, MISSISSAUGA

CONTRACTOR: PROFILE DRILLING LTD.  
 METHOD: B-60 RIG  
 DATE DRILLED: APRIL 11, 2018  
 TOC ELEVATION: 98.76m  
 GRADE ELEVATION: 98.88m


ELEVATION (m)	DEPTH (m)	WELL DETAIL	SYMBOL	SOIL DESCRIPTION	ELEVATION (m)	DEPTH (m)	METERS	FEET	SAMPLE INTERVAL	VAPOUR CONC. (ppm)		BLOW COUNTS	PENETROMETER (TONS/FT)	ANALYTES
										PID	COMB.			
98.88	0.00			GROUND SURFACE	98.88	0.00	0	0						
				ASPHALT	98.78	0.10								
98.58	0.30			SAND AND GRAVEL (FILL) - BROWN, DRY		0.46		1	X	0	0	-	-	-
				SAND - BROWN, SILTY, MOIST				2	X	0	0	-	-	-
								3	X	0	0	-	-	-
								4	X					
97.36	1.52			CLAY TILL - GREENISH BROWN, SILTY, DRY - VERY STIFF		1.37		5	X	0	10	6/11/14	>4.5	VOCs/ PHCs
								6	X					
								7	X					
								8	X					
96.14	2.74							9	X					
95.83	3.05			SHALE BEDROCK - GREY, WEATHERED, DRY		3.05		10	X	0	0	22/19/9	-	pH, S, Cl
								11	X					
								12	X					
								13	X					
								14	X					
								15	X					
								16	X	0	0	50 FOR 6"	-	-
								17	X					
								18	X					
								19	X					
92.78	6.10			AUGER REFUSAL (SOUND, UNWEATHERED)		6.10		20	X					
								21	X	0	0	50 FOR 2"	-	-
								22	X					



END OF BOREHOLE

LEGEND (WELL)

-  BENTONITE
-  SAND
-  CONCRETE

WELL CONSTRUCTION: 2 INCH PVC, SCHEDULE 40.

-  10 SLOT SCREEN

-  WATER LEVEL  
(95.03 m on April 16, 2018)
-  SPLIT SPOON

NR - NO RECOVERY

LOGGED BY: C. FRANKRUYTER

LOG PREPARED BY: K. DEKKEMA

CHECKED BY: D. COLEMAN



ELEVATIONS ARE REFERENCED TO AN ARBITRARY DATUM.

COLESTAR ENVIRONMENTAL INC. TAKES NO RESPONSIBILITY FOR THE DECISIONS/ACTIONS OF A THIRD PARTY BASED ON THIS LOG.

# BOREHOLE LOG

BOREHOLE NO:  
**BH3**

CLIENT: STELLARCORP DEVELOPEMNTS 420 INC.  
PROJECT NO: 0250-02  
PROJECT: PHASE 2 ENVIRONMENTAL SITE ASSESSMENT  
SITE LOCATION: 420 LAKESHORE ROAD EAST, MISSISSAUGA

CONTRACTOR: PROFILE DRILLING LTD.  
METHOD: B-60 RIG  
DATE DRILLED: APRIL 11, 2018  
TOC ELEVATION: 99.00m  
GRADE ELEVATION: 99.10m

ELEVATION (m)	DEPTH (m)	WELL DETAIL	SYMBOL	SOIL DESCRIPTION	ELEVATION (m)	DEPTH (m)	METERS	FEET	SAMPLE INTERVAL	VAPOUR CONC. (ppm)		BLOW COUNTS	PENETROMETER (TONS/FT)	ANALYTES
										PID	COMB.			
99.10	0.00			GROUND SURFACE	99.10	0.00	0	0						
				ASPHALT	99.00	0.10	0	0						
98.80	0.30			SAND AND GRAVEL (FILL) - BROWN, DRY	98.64	0.46	1	1	X	0	0	-	-	pH,EC, SAR, metals
				SAND - BROWN, SILTY, SOME GRAVEL, MOIST			2	2	X	0	0	-	-	PAHs
				CLAY TILL - GREENISH, BROWN, SILTY, MOIST - VERY STIFF	97.88	1.22	1	3	X	0	0	-	-	PAHs
				CLAY TILL - GREENISH, BROWN, SILTY, MOIST - VERY STIFF			2	4	X	0	10	3/6/10	>4.5	VOCs/ PHCs
				CLAY TILL - GREENISH, BROWN, SILTY, MOIST - VERY STIFF			3	5	X	0	10	3/6/10	>4.5	VOCs/ PHCs
				CLAY TILL - GREENISH, BROWN, SILTY, MOIST - VERY STIFF			4	6	X	0	10	3/6/10	>4.5	VOCs/ PHCs
96.36	2.74			SHALE BEDROCK - GREY, WEATHERED, DRY			3	7	X	0	10	3/6/10	>4.5	VOCs/ PHCs
				SHALE BEDROCK - GREY, WEATHERED, DRY			4	8	X	0	10	3/6/10	>4.5	VOCs/ PHCs
				SHALE BEDROCK - GREY, WEATHERED, DRY			5	9	X	0	10	3/6/10	>4.5	VOCs/ PHCs
94.83	4.27			WATER LEVEL (95.02 m on April 16, 2018)			4	10	X	0	5	6/11/17	>4.5	-
				WATER LEVEL (95.02 m on April 16, 2018)			4	11	X	0	5	6/11/17	>4.5	-
94.53	4.57			SPLIT SPOON			5	12	X	0	0	14/50 FOR 3"	-	-
				SPLIT SPOON			5	13	X	0	0	14/50 FOR 3"	-	-
				SPLIT SPOON			6	14	X	0	0	14/50 FOR 3"	-	-
				SPLIT SPOON			6	15	X	0	0	14/50 FOR 3"	-	-
				SPLIT SPOON			7	16	X	0	0	14/50 FOR 3"	-	-
				SPLIT SPOON			7	17	X	0	0	14/50 FOR 3"	-	-
				SPLIT SPOON			7	18	X	0	0	14/50 FOR 3"	-	-
				SPLIT SPOON			7	19	X	0	0	14/50 FOR 3"	-	-
				SPLIT SPOON			7	20	X	0	0	14/50 FOR 3"	-	-
				SPLIT SPOON			7	21	X	0	0	14/50 FOR 3"	-	-
				SPLIT SPOON			7	22	X	0	0	14/50 FOR 3"	-	-
				SPLIT SPOON			7	23	X	0	0	14/50 FOR 3"	-	-
				SPLIT SPOON			7	24	X	0	0	14/50 FOR 3"	-	-
91.48	7.62			AUGER REFUSAL (SOUND, UNWEATHERED)	91.48	7.62	7	25	X	0	0	50 FOR 2"	-	-
				AUGER REFUSAL (SOUND, UNWEATHERED)			8	26	X	0	0	50 FOR 2"	-	-
				AUGER REFUSAL (SOUND, UNWEATHERED)			8	27	X	0	0	50 FOR 2"	-	-

LEGEND (WELL)

- BENTONITE
- SAND
- CONCRETE

WELL CONSTRUCTION: 2 INCH PVC, SCHEDULE 40.

- 10 SLOT SCREEN

- WATER LEVEL  
(95.02 m on April 16, 2018)
- SPLIT SPOON

NR - NO RECOVERY

LOGGED BY: C. FRANKRUYTER

LOG PREPARED BY: K. DEKKEMA

CHECKED BY: D. COLEMAN



**Appendix B**  
**Laboratory Certificates**

C.O.C.: G73748

REPORT No. B18-09346 (i)

**Report To:**

**Colestar Environmental**

178 Fincham Ave,  
 Markham ON L3P 4B3

**Attention:** Darren Coleman

**Caduceon Environmental Laboratories**

110 West Beaver Creek Rd Unit 14  
 Richmond Hill ON L4B 1J9

Tel: 289-475-5442

Fax: 289-562-1963

DATE RECEIVED: 11-Apr-18

JOB/PROJECT NO.:

DATE REPORTED: 18-Apr-18

P.O. NUMBER: 0250-02

SAMPLE MATRIX: Soil

WATERWORKS NO.

<b>Client I.D.</b>	BH 3, 2'			
<b>Sample I.D.</b>	B18-09346-3			
<b>Date Collected</b>	11-Apr-18			

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
pH @25°C	pH Units		MOEE 3137	13-Apr-18/R	7.29		
Conductivity @25°C	mS/cm	0.07	MOEE3138	12-Apr-18/R	1.23		
Sodium Adsorption Ratio	units		SM 3120	16-Apr-18/O	7.76		
Antimony	µg/g	0.5	EPA 6020	16-Apr-18/O	< 0.5		
Arsenic	µg/g	0.5	EPA 6020	16-Apr-18/O	3.2		
Barium	µg/g	1	EPA 6010	16-Apr-18/O	82		
Beryllium	µg/g	0.2	EPA 6010	16-Apr-18/O	0.8		
Boron	µg/g	0.5	EPA 6010	16-Apr-18/O	3.1		
Boron (HWS)	µg/g	0.02	MOE3470	16-Apr-18/O	0.27		
Cadmium	µg/g	0.5	EPA 6010	16-Apr-18/O	< 0.5		
Chromium	µg/g	1	EPA 6010	16-Apr-18/O	20		
Chromium (VI)	µg/g	0.5	EPA3060A	18-Apr-18/R	< 0.5		
Cobalt	µg/g	1	EPA 6010	16-Apr-18/O	10		
Copper	µg/g	1	EPA 6010	16-Apr-18/O	18		
Lead	µg/g	5	EPA 6010	16-Apr-18/O	12		
Mercury	µg/g	0.005	EPA 7471A	16-Apr-18/O	0.023		

R.L. = Reporting Limit

Site Analyzed: K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill, B-Barrie

Uncertainty values available upon request



Christine Burke  
 Lab Manager

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.



C.O.C.: G73748

REPORT No. B18-09346 (i)

**Report To:**

**Colestar Environmental**  
 178 Fincham Ave,  
 Markham ON L3P 4B3

**Attention:** Darren Coleman

**Caduceon Environmental Laboratories**

110 West Beaver Creek Rd Unit 14  
 Richmond Hill ON L4B 1J9  
 Tel: 289-475-5442  
 Fax: 289-562-1963

DATE RECEIVED: 11-Apr-18  
 DATE REPORTED: 18-Apr-18  
 SAMPLE MATRIX: Soil

JOB/PROJECT NO.:  
 P.O. NUMBER: 0250-02  
 WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Molybdenum	µg/g	1	EPA 6010	16-Apr-18/O	< 1			
Nickel	µg/g	1	EPA 6010	16-Apr-18/O	17			
Selenium	µg/g	0.5	EPA 6020	16-Apr-18/O	< 0.5			
Silver	µg/g	0.2	EPA 6010	16-Apr-18/O	< 0.2			
Thallium	µg/g	0.1	EPA 6020	16-Apr-18/O	0.1			
Uranium	µg/g	0.1	EPA 6020	16-Apr-18/O	0.9			
Vanadium	µg/g	1	EPA 6010	16-Apr-18/O	30			
Zinc	µg/g	3	EPA 6010	16-Apr-18/O	49			

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg

F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)

F2 C10-C16 hydrocarbons in µg/g, (F2-naphth if requested)

F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)

F4 C34-C50 hydrocarbons in µg/g

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

Any deviations from the method are noted and reported for any particular sample.

nC6 and nC10 response factor is within 30% of response factor for toluene:

nC10,nC16 and nC34 response factors within 10% of each other:

C50 response factors within 70% of nC10+nC16+nC34 average:

Linearity is within 15%:

All results expressed on a dry weight basis.

Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

R.L. = Reporting Limit

Site Analyzed: K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill,B-Barrie

Uncertainty values available upon request

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.

If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC

QC will be made available upon request.



Christine Burke  
 Lab Manager

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

C.O.C.: G73748

REPORT No. B18-09346 (iii)

**Report To:**

**Colestar Environmental**

178 Fincham Ave,  
 Markham ON L3P 4B3

**Attention:** Darren Coleman

**Caduceon Environmental Laboratories**

110 West Beaver Creek Rd Unit 14  
 Richmond Hill ON L4B 1J9

Tel: 289-475-5442

Fax: 289-562-1963

DATE RECEIVED: 11-Apr-18

JOB/PROJECT NO.:

DATE REPORTED: 18-Apr-18

P.O. NUMBER: 0250-02

SAMPLE MATRIX: Soil

WATERWORKS NO.

Client I.D.	BH 3, 4'		
Sample I.D.	B18-09346-4		
Date Collected	11-Apr-18		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Acenaphthene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.05		
Acenaphthylene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Anthracene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Benzo(a)anthracene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Benzo(a)pyrene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Benzo(b)fluoranthene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Benzo(b+k)fluoranthene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.1		
Benzo(g,h,i)perylene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Benzo(k)fluoranthene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Chrysene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.05		
Dibenzo(a,h)anthracene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Fluoranthene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Fluorene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.05		
Indeno(1,2,3,-cd)pyrene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Methylnaphthalene,1-	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Methylnaphthalene,2-	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		

R.L. = Reporting Limit

Site Analyzed: K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill, B-Barrie

Uncertainty values available upon request



Christine Burke  
 Lab Manager

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

C.O.C.: G73748

REPORT No. B18-09346 (iii)

**Report To:**

**Colestar Environmental**  
 178 Fincham Ave,  
 Markham ON L3P 4B3

**Attention:** Darren Coleman

**Caduceon Environmental Laboratories**

110 West Beaver Creek Rd Unit 14  
 Richmond Hill ON L4B 1J9  
 Tel: 289-475-5442  
 Fax: 289-562-1963

DATE RECEIVED: 11-Apr-18  
 DATE REPORTED: 18-Apr-18  
 SAMPLE MATRIX: Soil

JOB/PROJECT NO.:  
 P.O. NUMBER: 0250-02  
 WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Methylnaphthalene 2-(1-)	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.08		
Naphthalene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Phenanthrene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.06		
Pyrene	µg/g	0.05	EPA 8270	17-Apr-18/K	< 0.05		

1 Elevated RL due to sample matrix interference

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg

F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)

F2 C10-C16 hydrocarbons in µg/g, (F2-naph if requested)

F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)

F4 C34-C50 hydrocarbons in µg/g

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

Any deviations from the method are noted and reported for any particular sample.

nC6 and nC10 response factor is within 30% of response factor for toluene:

nC10,nC16 and nC34 response factors within 10% of each other:

C50 response factors within 70% of nC10+nC16+nC34 average:

Linearity is within 15%:

All results expressed on a dry weight basis.

Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

R.L. = Reporting Limit

Site Analyzed: K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill,B-Barrie

Uncertainty values available upon request

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.

If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC

QC will be made available upon request.



Christine Burke  
 Lab Manager

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

C.O.C.: G73748

REPORT No. B18-09346 (ii)

**Report To:**

**Colestar Environmental**  
 178 Fincham Ave,  
 Markham ON L3P 4B3

**Attention:** Darren Coleman

**Caduceon Environmental Laboratories**

110 West Beaver Creek Rd Unit 14  
 Richmond Hill ON L4B 1J9  
 Tel: 289-475-5442  
 Fax: 289-562-1963

DATE RECEIVED: 11-Apr-18  
 DATE REPORTED: 18-Apr-18  
 SAMPLE MATRIX: Soil

JOB/PROJECT NO.:  
 P.O. NUMBER: 0250-02  
 WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	BH 1, 5'-6.5'	BH 2, 5'-6.5'	BH 3, 5'-6.5'	DUP - S1
					Sample I.D.	B18-09346-1	B18-09346-2	B18-09346-5	B18-09346-6
Date Collected					11-Apr-18	11-Apr-18	11-Apr-18	11-Apr-18	11-Apr-18
Acetone	µg/g	0.5	EPA 8260	12-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5	
Benzene	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	< 0.02	
Bromodichloromethane	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	< 0.02	
Bromoform	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	< 0.02	
Bromomethane	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	< 0.05	
Carbon Tetrachloride	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	< 0.05	
Monochlorobenzene (Chlorobenzene)	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	< 0.02	
Chloroform	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	< 0.02	
Dibromochloromethane	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	< 0.02	
Dichlorobenzene, 1,2-	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	< 0.05	
Dichlorobenzene, 1,3-	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	< 0.05	
Dichlorobenzene, 1,4-	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	< 0.05	
Dichlorodifluoromethane	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	< 0.05	
Dichloroethane, 1,1-	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	< 0.02	
Dichloroethane, 1,2-	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	< 0.02	

R.L. = Reporting Limit

Site Analyzed: K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill, B-Barrie

Uncertainty values available upon request



Christine Burke  
 Lab Manager

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C.O.C.: G73748

REPORT No. B18-09346 (ii)

**Report To:**

**Colestar Environmental**

178 Fincham Ave,  
 Markham ON L3P 4B3

**Attention:** Darren Coleman

**Caduceon Environmental Laboratories**

110 West Beaver Creek Rd Unit 14  
 Richmond Hill ON L4B 1J9

Tel: 289-475-5442

Fax: 289-562-1963

DATE RECEIVED: 11-Apr-18

JOB/PROJECT NO.:

DATE REPORTED: 18-Apr-18

P.O. NUMBER: 0250-02

SAMPLE MATRIX: Soil

WATERWORKS NO.

<b>Client I.D.</b>	BH 1, 5'-6.5'	BH 2, 5'-6.5'	BH 3, 5'-6.5'	DUP - S1
<b>Sample I.D.</b>	B18-09346-1	B18-09346-2	B18-09346-5	B18-09346-6
<b>Date Collected</b>	11-Apr-18	11-Apr-18	11-Apr-18	11-Apr-18

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Dichloroethylene, 1,1-	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Dichloroethene, cis-1,2-	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Dichloroethene, trans-1,2-	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Dichloropropane, 1,2-	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Dichloropropene, cis-1,3-	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Dichloropropene, trans-1,3-	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Dichloropropene 1,3-cis+trans	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Ethylbenzene	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	
Dibromoethane, 1,2- (Ethylene Dibromide)	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Hexane	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Methyl Ethyl Ketone	µg/g	0.5	EPA 8260	12-Apr-18/R	< 0.5	< 0.5	< 0.5	
Methyl Isobutyl Ketone	µg/g	0.5	EPA 8260	12-Apr-18/R	< 0.5	< 0.5	< 0.5	
Methyl-t-butyl Ether	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	

R.L. = Reporting Limit

Site Analyzed: K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill, B-Barrie

Uncertainty values available upon request



Christine Burke  
 Lab Manager

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

C.O.C.: G73748

REPORT No. B18-09346 (ii)

**Report To:**

**Colestar Environmental**  
 178 Fincham Ave,  
 Markham ON L3P 4B3

**Attention:** Darren Coleman

**Caduceon Environmental Laboratories**

110 West Beaver Creek Rd Unit 14  
 Richmond Hill ON L4B 1J9  
 Tel: 289-475-5442  
 Fax: 289-562-1963

DATE RECEIVED: 11-Apr-18  
 DATE REPORTED: 18-Apr-18  
 SAMPLE MATRIX: Soil

JOB/PROJECT NO.:  
 P.O. NUMBER: 0250-02  
 WATERWORKS NO.

<b>Client I.D.</b>	BH 1, 5'-6.5'	BH 2, 5'-6.5'	BH 3, 5'-6.5'	DUP - S1
<b>Sample I.D.</b>	B18-09346-1	B18-09346-2	B18-09346-5	B18-09346-6
<b>Date Collected</b>	11-Apr-18	11-Apr-18	11-Apr-18	11-Apr-18

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Dichloromethane (Methylene Chloride)	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	
Styrene	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	
Tetrachloroethane, 1,1,1,2-	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Tetrachloroethane, 1,1,2,2-	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	
Tetrachloroethylene	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	
Toluene	µg/g	0.2	EPA 8260	12-Apr-18/R	< 0.2	< 0.2	< 0.2	
Trichloroethane, 1,1,1-	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Trichloroethane, 1,1,2-	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Trichloroethylene	µg/g	0.05	EPA 8260	12-Apr-18/R	< 0.05	< 0.05	< 0.05	
Trichlorofluoromethane	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Vinyl Chloride	µg/g	0.02	EPA 8260	12-Apr-18/R	< 0.02	< 0.02	< 0.02	
Xylene, m,p-	µg/g	0.03	EPA 8260	12-Apr-18/R	< 0.03	< 0.03	< 0.03	
Xylene, o-	µg/g	0.03	EPA 8260	12-Apr-18/R	< 0.03	< 0.03	< 0.03	
Xylene, m,p,o-	µg/g	0.03	EPA 8260	12-Apr-18/R	< 0.03	< 0.03	< 0.03	
PHC F1 (C6-C10)	µg/g	10	CWS Tier 1	12-Apr-18/R	< 10	< 10	< 10	

R.L. = Reporting Limit

Site Analyzed: K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill, B-Barrie

Uncertainty values available upon request



Christine Burke  
 Lab Manager

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

C.O.C.: G73748

REPORT No. B18-09346 (ii)

**Report To:**

**Colestar Environmental**

178 Fincham Ave,  
 Markham ON L3P 4B3

**Attention:** Darren Coleman

**Caduceon Environmental Laboratories**

110 West Beaver Creek Rd Unit 14  
 Richmond Hill ON L4B 1J9

Tel: 289-475-5442

Fax: 289-562-1963

DATE RECEIVED: 11-Apr-18

JOB/PROJECT NO.:

DATE REPORTED: 18-Apr-18

P.O. NUMBER: 0250-02

SAMPLE MATRIX: Soil

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	BH 1, 5'-6.5'	BH 2, 5'-6.5'	BH 3, 5'-6.5'	DUP - S1
					Sample I.D.	B18-09346-1	B18-09346-2	B18-09346-5	B18-09346-6
Date Collected					11-Apr-18	11-Apr-18	11-Apr-18	11-Apr-18	11-Apr-18
PHC F2 (>C10-C16)	µg/g	5	CWS Tier 1	16-Apr-18/K	< 5	< 5	< 5	< 5	< 5
PHC F3 (>C16-C34)	µg/g	10	CWS Tier 1	16-Apr-18/K	15	< 10	13	11	
PHC F4 (>C34-C50)	µg/g	10	CWS Tier 1	16-Apr-18/K	33 <sup>1</sup>	< 10	19 <sup>1</sup>	< 10	
PHC F4 (Gravimetric)	µg/g	50	CWS Tier 1	17-Apr-18/K	410		500		
% moisture	%			12-Apr-18/R	20.2	10.5	17.3	11.5	

1. F4 Gravimetric analysis required as chromatids did not return to baseline.

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg

F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)

F2 C10-C16 hydrocarbons in µg/g, (F2-naph if requested)

F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)

F4 C34-C50 hydrocarbons in µg/g

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

Any deviations from the method are noted and reported for any particular sample.

nC6 and nC10 response factor is within 30% of response factor for toluene:

nC10,nC16 and nC34 response factors within 10% of each other:

C50 response factors within 70% of nC10+nC16+nC34 average:

Linearity is within 15%:

All results expressed on a dry weight basis.

Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

R.L. = Reporting Limit

Site Analyzed: K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill,B-Barrie

Uncertainty values available upon request

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.

If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC

QC will be made available upon request.



Christine Burke  
 Lab Manager

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

C.O.C.: G74663

REPORT No. B18-09595 (i)

**Report To:**

**Colestar Environmental**

178 Fincham Ave,  
 Markham ON L3P 4B3

**Attention:** Darren Coleman

**Caduceon Environmental Laboratories**

110 West Beaver Creek Rd Unit 14  
 Richmond Hill ON L4B 1J9

Tel: 289-475-5442

Fax: 289-562-1963

DATE RECEIVED: 16-Apr-18

JOB/PROJECT NO.:

DATE REPORTED: 19-Apr-18

P.O. NUMBER: 0250-02

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

<b>Client I.D.</b>	BH 2			
<b>Sample I.D.</b>	B18-09595-2			
<b>Date Collected</b>	16-Apr-18			

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Antimony	µg/L	0.1	EPA 200.8	17-Apr-18/O	1.8			
Arsenic	µg/L	0.1	EPA 200.8	17-Apr-18/O	9.5			
Barium	µg/L	1	SM 3120	17-Apr-18/O	310			
Beryllium	µg/L	0.1	EPA 200.8	17-Apr-18/O	< 0.1			
Boron	µg/L	5	SM 3120	17-Apr-18/O	994			
Cadmium	µg/L	0.01	EPA 200.8	17-Apr-18/O	0.040			
Chromium	µg/L	2	SM 3120	17-Apr-18/O	< 2			
Chromium (VI)	µg/L	10	SM3500CrB	19-Apr-18/R	< 10 <sup>1</sup>			
Cobalt	µg/L	0.1	EPA 200.8	17-Apr-18/O	3.6			
Copper	µg/L	2	SM 3120	17-Apr-18/O	< 2			
Lead	µg/L	0.02	EPA 200.8	17-Apr-18/O	0.02			
Mercury	µg/L	0.02	SM 3112 B	19-Apr-18/O	< 0.02			
Molybdenum	µg/L	0.1	EPA 200.8	17-Apr-18/O	12.1			
Nickel	µg/L	0.2	EPA 200.8	17-Apr-18/O	16.2			
Selenium	µg/L	1	EPA 200.8	17-Apr-18/O	6			
Silver	µg/L	0.02	EPA 200.8	17-Apr-18/O	< 0.02			
Thallium	µg/L	0.05	EPA 200.8	17-Apr-18/O	0.06			
Uranium	µg/L	0.05	EPA 200.8	17-Apr-18/O	2.71			
Vanadium	µg/L	5	SM 3120	17-Apr-18/O	< 5			
Zinc	µg/L	5	SM 3120	17-Apr-18/O	8			

<sup>1</sup> Chromium VI is based on Total Chromium



Christine Burke  
 Lab Manager

R.L. = Reporting Limit

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**C.O.C.: G74663**

**REPORT No. B18-09595 (ii)**

**Report To:**

**Colestar Environmental**

178 Fincham Ave,  
Markham ON L3P 4B3

**Attention:** Darren Coleman

**Caduceon Environmental Laboratories**

110 West Beaver Creek Rd Unit 14  
Richmond Hill ON L4B 1J9

Tel: 289-475-5442

Fax: 289-562-1963

DATE RECEIVED: 16-Apr-18

JOB/PROJECT NO.:

DATE REPORTED: 19-Apr-18

P.O. NUMBER: 0250-02

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Client I.D.		BH 1	BH 2	BH 3	DUP-W1
			Sample I.D.	Date Collected	B18-09595-1	B18-09595-2	B18-09595-3	B18-09595-4
			Reference Method	Date/Site Analyzed				
Acetone	µg/L	30	EPA 8260	16-Apr-18/R	< 30	< 30	< 30	< 30
Benzene	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	1.2	< 0.5
Bromodichloromethane	µg/L	2	EPA 8260	16-Apr-18/R	< 2	< 2	< 2	< 2
Bromoform	µg/L	5	EPA 8260	16-Apr-18/R	< 5	< 5	< 5	< 5
Bromomethane	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Tetrachloride	µg/L	0.2	EPA 8260	16-Apr-18/R	< 0.2	< 0.2	< 0.2	< 0.2
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform	µg/L	1	EPA 8260	16-Apr-18/R	< 1	< 1	< 1	< 1
Dibromochloromethane	µg/L	2	EPA 8260	16-Apr-18/R	< 2	< 2	< 2	< 2
Dichlorobenzene, 1,2-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene, 1,3-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene, 1,4-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	2	EPA 8260	16-Apr-18/R	< 2	< 2	< 2	< 2
Dichloroethane, 1,1-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethylene, 1,1-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropane, 1,2-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene 1,3-cis+trans	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5



Christine Burke  
Lab Manager

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**C.O.C.: G74663**

**REPORT No. B18-09595 (ii)**

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178 Fincham Ave,  
 Markham ON L3P 4B3

**Attention:** Darren Coleman

**Caduceon Environmental Laboratories**

110 West Beaver Creek Rd Unit 14  
 Richmond Hill ON L4B 1J9

Tel: 289-475-5442

Fax: 289-562-1963

DATE RECEIVED: 16-Apr-18

JOB/PROJECT NO.:

DATE REPORTED: 19-Apr-18

P.O. NUMBER: 0250-02

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Client I.D.		BH 1	BH 2	BH 3	DUP-W1
			Sample I.D.	Date Collected	B18-09595-1	B18-09595-2	B18-09595-3	B18-09595-4
Reference Method	Date/Site Analyzed							
Dibromoethane,1,2-(Ethylene Dibromide)	µg/L	0.2	EPA 8260	16-Apr-18/R	< 0.2	< 0.2	< 0.2	< 0.2
Hexane	µg/L	5	EPA 8260	16-Apr-18/R	< 5	< 5	< 5	< 5
Methyl Ethyl Ketone	µg/L	20	EPA 8260	16-Apr-18/R	< 20	< 20	< 20	< 20
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	16-Apr-18/R	< 20	< 20	< 20	< 20
Methyl-t-butyl Ether	µg/L	2	EPA 8260	16-Apr-18/R	< 2	< 2	< 2	< 2
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	16-Apr-18/R	< 5	< 5	< 5	< 5
Styrene	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,2,2-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane,1,1,1-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane,1,1,2-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	5	EPA 8260	16-Apr-18/R	< 5	< 5	< 5	< 5
Vinyl Chloride	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Xylene, m,p-	µg/L	1.0	EPA 8260	16-Apr-18/R	< 1.0	< 1.0	< 1.0	< 1.0
Xylene, o-	µg/L	0.5	EPA 8260	16-Apr-18/R	< 0.5	< 0.5	< 0.5	< 0.5
Xylene, m,p,o-	µg/L	1.1	EPA 8260	16-Apr-18/R	< 1.1	< 1.1	< 1.1	< 1.1
PHC F1 (C6-C10)	µg/L	50	MOE E3421	16-Apr-18/R	< 50	< 50	< 50	
PHC F2 (>C10-C16)	µg/L	50	MOE E3421	17-Apr-18/K	< 50	< 50	< 50	
PHC F3 (>C16-C34)	µg/L	400	MOE E3421	17-Apr-18/K	< 400	< 400	< 400	
PHC F4 (>C34-C50)	µg/L	400	MOE E3421	17-Apr-18/K	< 400	< 400	< 400	



Christine Burke  
 Lab Manager

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**REPORT No. B18-09595 (iii)**

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**Attention:** Darren Coleman

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Tel: 289-475-5442

Fax: 289-562-1963

DATE RECEIVED: 16-Apr-18

JOB/PROJECT NO.:

DATE REPORTED: 19-Apr-18

P.O. NUMBER: 0250-02

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

<b>Client I.D.</b>	BH 2			
<b>Sample I.D.</b>	B18-09595-2			
<b>Date Collected</b>	16-Apr-18			

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Acenaphthene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Acenaphthylene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Anthracene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Benzo(a)anthracene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Benzo(a)pyrene	µg/L	0.01	EPA 8270	18-Apr-18/K	< 0.01			
Benzo(b)fluoranthene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Benzo(b+k)fluoranthene	µg/L	0.1	EPA 8270	18-Apr-18/K	< 0.1			
Benzo(g,h,i)perylene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Benzo(k)fluoranthene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Chrysene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Dibenzo(a,h)anthracene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Fluoranthene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Fluorene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Indeno(1,2,3,-cd)pyrene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Methylnaphthalene,1-	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Methylnaphthalene,2-	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Methylnaphthalene 2-(1-)	µg/L	0.07	EPA 8270	18-Apr-18/K	< 0.07			
Naphthalene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Phenanthrene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			
Pyrene	µg/L	0.05	EPA 8270	18-Apr-18/K	< 0.05			



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 Lab Manager

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## **Appendix C**

### **Qualifications**

# Darren J. Coleman, P.Eng., QP

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**Position:** Project Director, Project Manager and Senior Environmental Engineer

## **BIOGRAPHY**

*Mr. Coleman has 22 years of experience in environmental site assessments, hydrogeology, risk assessment, risk management, remediation and site closures. He is the president of COLESTAR Environmental Inc. and has led teams of environmental professionals, both at COLESTAR as well as with previous employers. He is geographically diverse with experience in nine Canadian provinces/territories. Mr. Coleman has experience with a wide array of contaminants (PHCs, PAHs, cVOCs, pesticides, fertilizers, PCBs and metals) in various media (soil, groundwater, soil gas, sediment and surface water). His projects involve detailed phase 1, 2 & 3 investigations, risk assessment and management, evaluation of remedial/risk management (RRMs) options, development of RRM plans, design and implementation of RRM systems, permitting, Certificates of Approvals, Records of Site Conditions, regulatory compliance, site closures, among other services. Over the years, Mr. Coleman and his team have designed and implemented a number of RRMs and remedial programs that have resulted in successful site closures. These RRMs/remedial programs have included air sparging, soil vapour extraction, bioventing, pump-and-treat, passive and active subsurface vapour collection, venting and treatment systems, barriers, MPE, DPE, biopiles, landfarms, vapour management systems, and engineered caps and containment cells.*

## **REGISTRATIONS/ASSOCIATIONS**

Professional Engineer (P.Eng.) – PEO Ontario

Professional Engineer (P.Eng.) – APEGBC British Columbia

Professional Engineer (P.Eng.) – APEGA Alberta

Professional Engineer (P.Eng.) – APEGS Saskatchewan

Professional Engineer (P.Eng.) – APEGM Manitoba

Qualified Person Under O. Reg 153 – ESAs, RAs and TRNs

## **ACADEMIC BACKGROUND**

B.A.Sc. (1994), Civil Engineering, University of Waterloo, Waterloo, Ontario

Diploma (1989), Civil Engineering Technology, Conestoga College, Kitchener, Ontario

## **EXPERIENCE HISTORY**

COLESTAR Environmental Inc., Markham, Ontario (2008+) – President, Senior Environmental Engineer

Franz Environmental Inc. Mississauga, Ontario (2006 – 2008) – Manager, Mississauga Office

Franz Environmental Inc. Mississauga, Ontario (2000 – 2006) – Project Manager

O'Connor Associates Environmental Inc., Edmonton, AB (1997 – 2000) – Manager, Edmonton Office

O'Connor Associates Environmental Inc., Oakville, ON (1994 – 1997) – Project Manager

Conestoga Rovers and Associates (1991 - 1994)

## **SELECTED PROJECT EXPERIENCE**

- Prime Consultant responsible for the provision of environmental services under a sole source arrangement to large bus company at sites across Canada. Services have been provided since 2010 at over 60 school bus/coach bus maintenance and fuelling facilities. Services provided include Phase 1, 2 and 3 ESAs, review of programs proposed by others, remediation options analysis, development and implementation of risk

management/remedial action plans, risk assessment, waste characterization and management plans, environmental liability assessments, acquisition of RSCs, and remediation/risk management site closures.

- Prime Consultant responsible for the provision of environmental services under a sole source arrangement to a property developer in Toronto. Services have been provided since 2006 at over 20 sites (Brownfields, waste disposal facilities, tanneries, manufacturing plants and facilities) for a wide range of contaminants (PHCs, PAHs, metals, PCBs, inorganics). Services provided include Phase 1, 2 and 3 ESAs, review of programs proposed by others, remediation options analysis, development and implementation of risk management/remedial action plans, risk assessment, waste characterization and management plans, environmental liability assessments, assistance in acquisition of Brownfield remediation funding, acquisition of RSCs, and remediation/risk management site closures. Remedial and risk management measures implemented at the sites have included containment of contaminated soil within engineered cells, passive and active soil gas venting/treatment systems beneath future buildings, groundwater and vapour barriers, groundwater remedial systems, in-situ treatment using MPE, SVE and AS.
- Project Director, Manager and Prime Consultant responsible for the management of environmental issues at a power plant in Ontario since 2003. Mr. Coleman has completed a wide array of projects at this facility, including detailed environmental assessments, landfill monitoring and CofA compliance, risk assessments (human and ecological based) and remedial system and risk management/abatement system design. He has been responsible for the development of remedial options and detailed remedial and risk management plans. Mr. Coleman has designed a number of remedial/risk management systems which are currently in operation at the power plant. He has also conducted detailed treatability studies on existing plant treatment facilities and has carried out risk assessments on wastewater and effluent discharges to a local water body. He was the lead in the design and execution of a number of large scale hydrogeological studies to assess hydraulic trap conditions in the vicinity of contaminant plumes and assess the integrity of large treatment ponds in operation at the plant.
- Prime Consultant providing environmental services [since 2006] to several property developers in Toronto. Services have been provided at various sites (brownfields, industrial and commercial properties) and have included a range of contaminants (PHCs, PAHs, metals, PCBs, inorganics). Services provided include(d) Phase 1-3 ESAs, peer reviews, remedial/risk management (RRM) options development and analysis, development and implementation of RRM action plans, risk assessment, acquisition of RSCs and CofAs, permitting, RRM site closures, among other services. RRM implemented have included engineered caps, engineered containment cells, passive and active soil gas venting systems, groundwater and vapour barriers, in-situ treatment using MPE, SVE and AS.
- Senior Engineer responsible for the completion of screening level risk assessments for a large consulting firm in Ontario. The RAs were completed for a petroleum company and included exposure pathway analysis and tabulation of site specific remedial targets/objectives for constituents found at concentrations above generic standards in soil and groundwater. Several of the projects also included soil gas probe installations, soil gas monitoring, tabulation of risk based soil gas objectives and the development and evaluation of RRM. The RAs followed provincial guidelines and also used the framework set out in federal guidelines for ecological and human health RAs (i.e. Health Canada's HHPQRA and ERE guidelines). Mr. Coleman was responsible for all aspects of the RAs and RRM, including reporting.

- Senior Remediation Engineer responsible for the development and analysis of remedial/risk management options for several property parcels located at the Oshawa Harbour. The work was done for a large consulting firm working on behalf of PWGSC and included the development of the preferred options into a detailed remedial action plan. Mr. Coleman was responsible for the RRM component of this study (including reporting).
- Senior Remediation Engineer responsible for the development and analysis of lagoon closure options for a wastewater treatment plant located in Niagara-On-The-Lake, Ontario. The work was done for a large consulting firm working on behalf of PWGSC and included the development of numerous options with one selected as preferred and incorporated into a detailed remedial action/lagoon closure plan. Mr. Coleman was responsible for all aspects of this study, including reporting.
- Prime Consultant acting to resolve environmental claims for an insurance company. Mr. Coleman has serviced this client since 2006 and has to date successfully restored or remediated a number of sites to the extent necessary to achieve closure of the claims. Services provided have included expert environmental advice, environmental site assessment and investigation, risk assessment/management and remediation, peer review of programs proposed by others (for third parties), environmental liability assessments, air quality studies and site closures. Technologies implemented to restore the sites have included pump and treat, multi-phase extraction, soil vapour extraction, air sparging with SVE as well as ex-situ methods (i.e. excavation with offsite disposal of contaminated media)
- Project Director and Manager for the Goose Bay Remediation Project (GBRP) on which Mr. Coleman's former firm (FRANZ) was acting as a sub-consultant. Mr. Coleman served as the project director on the GBRP from 2005 to 2008 and was responsible for all elements of this project. This included the management of a team of environmental professionals including project managers, risk assessment professionals, geologists, hydrogeologists, technicians and technologists. Mr. Coleman oversaw and executed an array of large scale hydrogeological, natural attenuation, remedial and risk management design, and detailed contaminant plume and soil gas assessment projects. He was responsible for the development of remedial/risk management options and the design of detailed remedial/risk management plans. He has also been involved in the modelling of soil gas transport and associated risk assessment of exposure (human) to contaminants in the vapour phase at several area buildings. On past studies at this Base, Mr. Coleman was the lead on groundwater modelling and contaminant transport studies and several risk assessments.
- Project Manager and Remediation Design Engineer for the investigation and remediation of offsite and onsite gasoline contamination for a large development company at a Brownfields site in Toronto, Ontario. Offsite remediation was achieved in-situ using a soil vapour extraction/air sparging system that was designed by Mr. Coleman. Mr. Coleman also supervised the construction and operation of the system as well as the pre- and post- remediation investigation programs. Offsite remediation was successful and to the satisfaction of both the regulator and the City of Toronto. Mr. Coleman also managed the investigation and remediation of onsite contamination and obtained site closures through the acquisition of four acknowledged Records of Site Conditions corresponding to the development phases (areas/sites) of property. Two of the RSCs were audited by the MOE and both were deemed compliant with the requirements set out under O. Reg 153/04.

- Project Manager and Senior Remediation Design Engineer responsible for the design and construction oversight of a 750 m Passive Phase Separator along SW No. 4 in Goose Bay, Newfoundland and Labrador. The separator was designed to cut-off petroleum hydrocarbon sheens and reduce/eliminate contaminant load to SW4, a surface water body. The separator was designed as a shoreline extension of the water body atop an abandoned dump site, located along the toe of a 35 m high escarpment. The design was cost effective as it eliminated the need for costly geotechnical shoring of the escarpment slope and contaminated waste excavation, handling and disposal. Further, the trench system was designed to act as an in-situ phase separator complete with cofferdam, barrier wall, head load stabilizers, horizontal collection pipe and recovery and monitoring well infrastructure. This passive phase separator design reduced future operation and maintenance costs. The existing three dimensional groundwater flow model for Goose Bay was used by Mr. Coleman in the phase separator design. Simulations were run using this model to establish ideal head load stabilizer positions, i.e., positions which would through natural drawdown optimize sheen capture and containment. The design also included the capture of overland fuel seeps with the resulting flow directed into the trench system via a surface drainage collection system. As part of this work, Mr. Coleman designed high flow treatment systems complete with infrastructure to handle dewatering fluids and sediment. This included pumping systems and fluid/sediment transfer piping, the design of a large phase separator/settling treatment tank using existing infrastructure, and a large sediment containment facility (SCF) complete with liner and leachate collection system. Mr. Coleman oversaw and produced the construction tender documents. Mr. Coleman and the project team also oversaw and supervised the construction of the Works (trench, dewatering system and sediment containment facility). The design was commissioned in March 2006 and the Works constructed by the end of November 2006. The SCF has since been converted into a potential containment/treatment facility for contaminated soil generated at 5 Wing, the design/construction amendments of which were provided by Mr. Coleman's engineering team.
- Project Manager and Senior Remediation Design Engineer for a detailed Phase 2 investigation, remediation and risk assessment of petroleum hydrocarbon and hot water soluble boron impacts for a private developer at a Brownfields site in Brantford, Ontario. The remediation and risk assessment/management measures implored at this site included the placement of the HWS boron impacted soil in an engineered containment cell designed by Mr. Coleman. The risk assessment and risk management measures were approved by the Ontario Ministry of the Environment with a Record of Site Condition and Certificate of Property Use issued for the site.
- Project Manager and Senior Remediation Engineer responsible for the restoration of a former bulk fuel marine terminal, deemed a Brownfield site, on behalf of a large petroleum company. Contaminants of concern included petroleum hydrocarbons, PAHs (coal tar) and lead. The project consisted of: review of previous investigations, soil waste characterization remedial plan development; acquisition of Certificates of Approval to operate a Waste Management and Waste Disposal Site, remedial excavation, contaminated soil management & treatment, design of soil & groundwater treatment systems (biopiles, soil screening & aeration, oil-water separation, soil washing), and site closure complete with 2 acknowledged Record of Site Conditions and subsequent Transition Notices into Ontario Regulation 153/04. Both RSCs were audited by the MOE and were deemed compliant with the requirements set out under O. Reg 153/04.
- Senior Environmental Engineer and Project Manager responsible for the soil remediation program at the Fort Nelson Airport in British Columbia from 2001 to 2005. This project involved the site assessment and contaminant delineation of numerous sites situated within the airport, remedial excavation of numerous



contaminated sub-sites, excavation dewatering and treatment, soil staging and management, soil bio-treatability assessments, bio-treatment of petroleum hydrocarbon contaminated soil at the Soil Treatment Facility and landfill assessment, monitoring and permit compliance. Process soil volumes ranged from 15,000 to 30,000 m<sup>3</sup> per annum. Groundwater treatment volumes ranged from 25,000 Litres to 5 Million Litres per annum. Mr. Coleman led the team on this project, designed the groundwater treatment system that was used to treat excavation dewatering fluid (LNAPL and groundwater), and oversaw and managed the site investigations, remedial excavations, soil staging operations and soil bio-treatment processes.

- Project Manager & Senior Remediation Engineer for environmental site assessment and remediation of lead and benzo(a)pyrene contamination in soils at a former skeet shooting range at Toronto's Pearson Airport. Conducted gap analysis, designed work plan to collect data required for remediation screening, remedial option evaluation, developed remedial action plan using on-site soil stabilization, and conducted stabilization/solidification treatability studies.
- Project Manager & Senior Remediation Engineer for the free product recovery optimization study performed on subsurface LNAPL plumes (4.5 million Litres) at the Upper Tank Farm, 5 Wing Goose Bay. The study was comprehensive and looked at pressure differential and capillary fringe effects on product recovery and included the monitoring of LNAPL plume distributions and the development of methods to optimize LNAPL recovery using existing and alternate infrastructure/technology.
- Project Manager responsible for environmental studies carried out at 12 federal prisons across Canada (NB, NS, QC, ON, MB, AB, BC). The study, carried out for Correctional Services Canada, focussed on hydrocarbon and metals contamination and involved Phase II&III ESAs to delineate subsurface contamination, SSRA to assess risks to humans and the environment and the development of remedial options.
- Project Manager responsible for the delineation and groundwater/contaminant transport modelling of contamination arising from two light non-aqueous phase plumes present in the subsurface on Moose Factory Island, Ontario.
- Project Manager responsible for the environmental study of the former ammunition, ordnance and hazardous material storage depots at a military base in Labrador, Newfoundland. The study involved: a Phase I study; historical hydro-chemical data evaluation; phase II investigation; groundwater and contaminant transport/fate modelling; particle tracking; risk assessment and remedial option development and screening. The contaminants considered in the study included VOCs, cVOCs, PAHs and metals.
- Project Manager and Remediation Engineer for the environmental assessment, investigation and remediation of numerous industrial sites located in Saskatchewan and Alberta for a large liquid/solid commodity transport company. The work involved several different media (soil, sediment, soil gas, groundwater and surface water) and an array of contaminants; including, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, chlorinated organic compounds, chlorides, metals and nitrates.
- Project Manager responsible for the management of Phase I assessments, Phase II investigations, environmental liability assessments, third party impact assessments, and remediation of numerous commercial and industrial sites in Alberta and Saskatchewan for several large real estate corporations. The

sites included paint storage and packaging facilities; truck maintenance and fuelling yards; vehicle maintenance, repair and service complexes; and, commercial malls with dry-cleaners and service stations. Assessments involved soil and groundwater media and one, several or all of the following contaminants; petroleum hydrocarbons, chlorinated volatile organic compounds, polycyclic aromatic hydrocarbons and heavy metals. Remediation activities included remedial excavations with onsite treatment (biopiles/landfarms) or offsite disposal and in-situ treatment (air sparging, vapour extraction, multi-phase extraction, barrier walls, pump and treat, LNAPL recovery, etc. ).

- Project Manager responsible for an environmental evaluation of a Printing Facility in Ontario. The project included a detailed Phase I assessment/compliance audit; a vapour and light non-aqueous phase liquid migration pathway(s) assessment; and, development of a remedial work plan.
- Project Manager responsible for the investigation and remediation of over 100 petroleum hydrocarbon contaminated sites (bulk plants, marine terminals and service stations) in Ontario, British Columbia, Alberta, Saskatchewan and the Northwest Territories for several large petroleum companies. A number of the sites were in the Canadian north with permafrost conditions. Responsibilities, included: detailed intrusive investigations to delineate free product plumes and soil and groundwater contamination; development and evaluation of remedial options; remedial action plans; remediation system design, tendering, construction and operation; permitting, certificates of approvals and site closures. Remedial systems designed and put in-place at these sites included liners, passive vapour management systems, active vapour management systems, an in-situ phase separator, and pump and treat, LNAPL recovery, multi-phase extraction, vapour extraction, air sparging and soil vapour extraction systems, enhanced bioremediation, natural attenuation, biopiles and landfarming).
- Project Manager responsible for a detailed Phase I Environmental Assessment and follow-up Phase II investigation for a large steel pressure vessel manufacturing facility in Alberta. Assessment involved soil and groundwater media and petroleum hydrocarbon and heavy metal contaminants.
- Project Manager responsible for the assessment of subsurface salinity impacts associated with four large Brine Ponds for a Petroleum Fractionation facility in Alberta. The assessment involved a review of investigation activities carried out by others as well as the development of Phase II investigation activities designed to ascertain whether saline groundwater may be impacting a nearby freshwater river. The work also included the development of several preliminary remedial/risk management options complete with order of magnitude cost estimates to mitigate the worst case scenario; plume migration towards and into the River.

**ATTACHMENT A**

**LIMITATIONS**

## **COLESTAR ENVIRONMENTAL INC.**

### **GENERAL CONDITIONS AND LIMITATIONS**

1. This report has been prepared in accordance with generally accepted engineering and environmental practices for the exclusive use of the client named in the report preceding these limitations. This report is based on the information obtained while conducting authorized environmental assessment, investigation and/or remediation activities at the property or subject site.
2. The findings and conclusions presented in this report are based exclusively on the field parameters measured and the chemical parameters tested at specific locations. It should be recognized that subsurface conditions between and beyond the sample locations may vary. COLESTAR cannot expressly guarantee that subsurface conditions between and beyond the sample locations do not vary from the results determined at the sample locations. Notwithstanding these limitations, this report is believed to provide a reasonable representation of the environmental conditions apparent at the site on the dates of measurement and laboratory testing.
3. The contents of this report are based on the information collected during assessment, investigation and/or remediation activities, our understanding of the actual site conditions, and our professional opinion according to the information available at the time of preparation of this report. This report gives a professional opinion and, by consequence, no guarantee is attached to the conclusions or expert advice depicted in this report. This report does not provide a legal opinion in regards to Regulations and applicable Laws.
4. Any use of this report by a third party and any decision made based on the information contained in this report by the third party is the sole responsibility of that third party. COLESTAR will not accept any responsibility for damages resulting from a decision or an action made by a third party based on the information contained in this report.
5. Third party information reviewed and used to develop the opinions and conclusions contained in this report is assumed to be complete and correct. COLESTAR used this information in good faith and will not accept any responsibility for deficiencies, mis-interpretation or incompleteness of the information contained in documents prepared by third parties.
6. The services performed and outlined in this report were based, in part, upon visual observations of the site and attendant structures. Our opinion cannot be extended to portions of the site which were unavailable for direct observation, reasonably beyond our control.
7. The objective of this report was to assess environmental conditions at the site, within the context of the agreed scope of work and existing environmental regulations within the applicable jurisdiction. Evaluating compliance of past or future owners with applicable local, provincial and federal government laws and regulations was not included in our contract for services.