February 4, 2021

Project Delivery Services (East) | Strategic and Investment Directorate
Parks Canada | Government of Canada
630-105 McGill Street
Montreal (Quebec) H2Y 2E7

Subject: Soil Quality and Petroleum-in-air Report
Georges Island National Historic Site, Halifax, NS
Our ref: 2000155.002

1 BACKGROUND

Englobe Corp. (Englobe) was commissioned by Parks Canada Agency (PCA) to complete a Phase II Environmental Site Assessment (ESA), Indoor Air Quality (IAQ) Assessment and Hazmat Survey (report dated May 15, 2020) and a subsequent Human Health and Ecological Risk Assessment (report dated October 2020) at the Georges Island National Historic Site in advance of the 2020 opening season. Following the construction of a wharf and landing area, and a partial opening to the public in 2020, PCA reviewed options to offer an expanded visitor experience in 2021.

In advance of 2021 opening season, PCA sought professional services (Englobe) to screen additional assets (buildings and areas not included in previous assessments) for contamination, and further assess and quantify hazardous materials in select assets which were preliminarily assessed in advance of the 2020 season.

The work was completed to assess surface soil quality, air quality and/or the potential for hazardous building materials (as applicable to the building-specific risks) for the following areas:

- Guardroom and Jail Cells
- Tunnels and Main Magazine
- Loaded Mine Store (previously referred to as Ammunition Loading Depot)
- Connecting Up Shed Foundation
- Case Store Foundation (previously referred to as Coal Store Foundation)
- Workshop
- Cable Store Foundation

2 SCOPE OF WORK

The scope of work for the soil quality and petroleum-in-air program included the following:

- Complete a Field and Analytical Program to assess the buildings/assets listed above.
- Prepare a brief soil quality and petroleum-in-air quality report outlining methodology followed and analytical results obtained (tabulated alongside previous soil sampling results and applicable guidelines).

3 METHODOLOGY

All fieldwork was completed by Mr. Allain Thebeau, CET, and Lauren Bowser, Junior Project Professional, of Englobe. Eagle Beach Contractors Ltd. was retained directly by Englobe to transport all required equipment and personnel to and from Georges Island to complete the sampling program.

3.1 SOIL SAMPLING PROGRAM

The following acronyms were used to describe the soil sample locations: SS = soil sample,

A = 0-0.15 metres, B = 0.15-0.30 metres, and C = 0.30-0.45 metres. Hence, the sample designation SS2-B refers to the second soil sample location collected at a depth of 0.15-0.30 mbgs.

The shallow soil sampling (A, B, C depths) approach was used for sampling soil at the site. Test holes were excavated by hand and the locations are shown on Figure 1, Appendix A. Samples were collected in areas of potential concern based on previously gathered information in early 2020 and our understanding of the planned expansion of visitor access for 2021.

Three soil samples were attempted to be collected in each hole at A, B, and C depths. Based on initial laboratory results, in some cases, B or C depth samples were submitted to assess vertical delineation.

Soil conditions encountered in the test holes were logged by Englobe field personnel at the time of sampling and are described in Section 3.5. The soil samples were placed in laboratory supplied clean glass jars. The jars were placed in a cooler with ice packs for transport to the laboratory for analysis. Samples not submitted for laboratory analysis were archived for potential future analysis.

3.2 FIELD AND LABORATORY ANALYTICAL PROGRAM

The field and laboratory analytical program is summarized below in Table 3.2. Samples were submitted to Bureau Veritas (BV Labs) in Bedford, NS. BV Labs is accredited by the Standards Council of Canada (SCC) for each of the analysis methods utilized and has in-house QA/QC programs to govern sample analysis, including replicates. Laboratory analytical results are presented in Appendix B. Laboratory reports are presented in Appendix C.

Table 3.2 – Field and Laboratory Program

Analytes	Matrix	Sample Locations	Samples Submitted	Sample IDs	QA/QC Samples		
					Original	Field Dup	Lab Dup
BTEX / modified TPH	Soil	8	9 including 1 field dup	SS28-A to SS35-A	SS35-A	Dup1	SS29-A Lab-Dup
Metals	Soil	8	12 including 1 field dup	SS28-A to SS35-A	SS35-A	Dup1	SS30-A Lab-Dup
PAHs	Soil	8	9 including 1 field dup	SS28-A to SS35-A	SS35-A	Dup1	-

3.3 QUALITY ASSURANCE/QUALITY CONTROL SAMPLING PROGRAM

The QA/QC sampling was conducted on approximately 10% of parameters that were analyzed. QA/QC was addressed by collecting field duplicates. The results of this testing were used to evaluate the reliability of the sampling.

3.4 FIELD OBSERVATIONS

Pertinent field observations for soil samples and the co-ordinates of the sampling locations are described in Table D-1 in Appendix D.

The sample locations did not vary significantly from the proposed locations identified in the revised proposal dated December 9, 2020. Where rocks or compact soil conditions were encountered at the surface, locations were moved within a 1 m radius until a suitable location could be hand excavated. Where auger/shovel refusal were encountered at a depth less than 45 cm, a second and third hole were advanced nearby to confirm refusal in the vicinity.

3.5 STRATIGRAPHY

Soil conditions encountered within the Guardroom and Jail Cells were quite different from those encountered elsewhere.

The overburden around the site consisted of reddish-brown to brown sandy silt and silty clay. Refusal at a depth of 0.15 mbgs occurred at sample locations SS31, SS32, SS33, SS34 and SS35.

Refusal at a depth of 0.30 mbgs occurred at sample location SS29 and SS30. Fill was encountered at all sample locations.

In many sample locations (particularly within the uppermost layer encountered in the Guardroom and Jail Cells), black colouring was often correlated with observations of coal.

3.6 PETROLEUM HYDROCARBONS IN AIR SAMPLING

As exceedances of soil guidelines protective of indoor air quality were previously noted in soil in the Guardroom, and given that the guardroom is planned to be accessible by visitors, indoor air quality testing was performed for petroleum hydrocarbons in air in the guardroom. In other words, since there was a predicted air quality concern based on soil data, this procedure would assess whether there is an actual air quality concern.

The air sample was collected on December 19, 2020 using a laboratory-supplied and pre-cleaned summa canister, Teflon tubing, flow controllers and vacuum gauges. The flow controller was pre-calibrated by the laboratory and the sub-slab vapour test was performed as per laboratory methodology, as required to collect a sufficient volume of sample to conduct the BTEX/TPH fractionation analysis at the required detection limits. Pressure gauge readings during the sampling program were within the acceptable range specified by the laboratory. At the end of the sampling period (approximately 8-hours), the summa canister was closed, re-packed in the laboratory supplied box and transported by courier back to the BV Labs in Mississauga, Ontario for BTEX/TPH Fractionation analysis. All site work was conducted in accordance with the December 2016 Atlantic Risk-RBCA Version 3.0 Guidance for Vapour Intrusion Assessments document, updated April 2019. Laboratory analytical results are presented in Appendix B. Laboratory reports are presented in Appendix C.

4 REGULATORY FRAMEWORK

Indoor air analytical results were compared to the Atlantic Risk-Based Corrective Action (RCBA) Vapour Intrusion Screening Levels (VISLs) for a residential building, for ambient indoor air conditions.

The Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health (accessed online in March 2020) are the applicable federal soil guidelines for the following contaminants of potential concern in soil: BTEX, VOCs, PAHs and metals. As Georges Island will be used in the near future as a national historic site with public access, the following guidelines were considered the most applicable given the planned future use of the site.

4.1 PETROLEUM HYDROCARBONS

In addition to the CCME SQGs for BTEX, PHC Fractions F1 (C6-C10), F2 (C10-C16), and F3 (C16-C34) were compared to the CWS for PHC in soil (January, 2008).

4.2 POLYCYCLIC AROMSTIC HYDROCARBONS

CCME presents a single SQG_{HH} for carcinogenic PAHs via ingestion, inhalation and dermal exposure which is expressed as B[a]P TPE. B[a]P TPE is the sum of the estimated cancer potency relative to B[a]P for all potentially carcinogenic PAH. The B[a]P TPE for a soil sample is calculated by multiplying the concentration of each PAH in the sample by its B[a]P PEF and summing these products. PEFs are order of magnitude estimates of carcinogenic potential based on World Health Organization guidance. For the purposes of this environmental investigation and assessment, guidelines have been based on an ILCR of 10^{-5}.

For potable sites, CCME have developed SQG_{PW} for carcinogenic PAHs and an IACR to reflect the cancer risk of the combined carcinogenic PAHs. As the site is considered non-potable, these guidelines were not considered.

Individual guidelines for non-carcinogenic and carcinogenic PAHs were also developed based on the protection of Environmental Health. SQG_E were only developed for parameters having a soil contact guideline.

4.3 METALS

Soil metal concentrations are compared to the CCME SQG guidelines for residential/parkland land use.

5 RESULTS

5.1 LABORATORY ANALYSIS RESULTS FOR SOIL

Soil samples from eight locations were analyzed for petroleum hydrocarbons (i.e. by CCME methodology), PAHs and metals. Sample SS28, SS29, SS30 and SS31 were collected from within the Guardroom and Jail Cells while SS32 S33, SS34 and SS35 were collected from various ruins near the landing area.

Soil sample numbers and exceedances outlined in the following tables include all soil samples submitted for laboratory analysis (i.e. A, B and C horizon soil samples as well as field duplicates). Sample numbers and exceedances do not include previous analytical results or laboratory duplicates.

Petroleum Hydrocarbons in Soil

Laboratory analytical results for PHC in soil are presented in Table 1, Appendix B. BTEX concentrations in the soil samples tested from sample locations SS28 and SS32 exceeded the CCME guidelines for a residential site with non-potable groundwater use and coarse-grained soil.

Fraction F3 (C16-C34 Hydrocarbons) was detected in soil sample SS34 at a concentration that exceeded the CWS for PHC in soil for a residential site.

Table 5-1 - Soil Petroleum Hydrocarbon Samples

Soil Petroleum Hydrocarbon Samples
▸ 9 submitted including 1 field duplicate
▸ 2 exceeded CCME residential guidelines for BTEX (human health)
▸ 1 exceeded for Fraction F3 (ecological health)

Metals in Soil

Laboratory analytical results for metal concentrations in soil are presented in Table 3, Appendix C. Concentrations were above the CCME residential guidelines for all soil samples with the exception of SS34.

Table 5-2 - Soil Metal Samples

Soil Metal Samples
► 13 submitted including 1 field duplicate
► 12 exceeded CCME residential criteria
► 9 exceeded the human health soil ingestion guidelines
► 12 exceeded ecological health guidelines

Due to the presence of lead (and mercury in the case of SS30) in A horizon soil samples collected from within the Guardroom and Jail Cells, additional B and C horizon samples were submitted for analysis for vertical delineation. In the remaining soil sample locations were exceedances were identified, B horizon soil samples were not available for analysis (due to refusal/encountering concrete).

In the Guardroom (SS28), soil concentrations at the C horizon soil (0.3-0.45 m) were below the human health guidelines. In the Jail Cells, B horizon soil samples (0.15-0.3 m) were below the human health guidelines.

PAHs in Soil

Laboratory analytical results for PAHs in soil are included in Table 4, Appendix C. Concentrations were above the CCME residential guidelines for soil samples SS28, SS29, SS32, SS33, SS34 and SS35.

Table 5-3 - Soil PAH Samples

Soil PAH Samples
► 9 submitted including 1 field duplicate
► 6 exceeded CCME residential criteria
► 1 exceeded the human health direct contact guideline
► 6 exceeded ecological health guidelines

The majority of exceedances are for ecological (protection of Freshwater Aquatic Life). Only one sample (SS32) exceeded the human heath direct contact guideline.

5.2 PETROLEUM HYDROCARBONS IN AIR RESULTS

Petroleum Hydrocarbon analytical results are presented in Table 5, Appendix B. Laboratory Certificates of Analysis are attached in Appendix C.

Laboratory analytical results for BTEX/TPH Fractionation reported concentrations in the Guardroom which were all below laboratory detection limits. These results were compliant with Atlantic RBCA Tier II VISLs, indicating that there are no concerns to human health from petroleum hydrocarbons in indoor air within the Guardroom.

6 CONCLUSIONS AND RECOMMENDATIONS

A soil quality and petroleum-in-air program was completed in preparation for an expanded visitor experience in 2021.

Laboratory analytical results for BTEX/TPH Fractionation reported concentrations in air in the Guardroom which were all below laboratory detection limits. This indicates that although the PHC concentrations in soil in the Guardroom (and by extension, the Jail Cells) predicted a potential concern associated with PHC vapours in indoor air, the indoor air test results do not indicate an actual concern.

Soil samples from eight locations were analyzed for petroleum hydrocarbons, PAHs and metals. Sample SS28, SS29, SS30 and SS31 were collected from within the Guardroom and Jail Cells while SS32 (Loaded Mine Store), SS33 (Connecting Up Shed Foundation), SS34 (Case Store Foundation) and SS35 (Workshop) were collected from various ruins near the landing area.

All sample locations identified an exceedance of the guidelines for one or more COPCs. Some of these exceedances are for ecological health. Ecological receptors are not expected to reply upon these areas for habitat. When considering human health guidelines, the PHC exceedances relate to inhalation of indoor air (which would not apply for open-air ruins and have been shown by the air testing to not be a concern in the Guardroom and Jail Cells).

Metals (lead and/or mercury) guideline exceedances were identified in SS32, SS33 and SS35 while PAHs guideline exceedances were identified in SS32. Direct contact and/or soil ingestion of soil in these areas should be prevented. In the newly assessed exterior areas (Loaded Mine Store, Connecting Up Shed, Case Store Foundation, Cable Store Foundation) these concentrations do not pose an immediate risk to human or environmental health since the impacted areas are currently covered by vegetative root mat or gravel which prevents exposure to site occupants. It is recommended that a Risk Management Plan and Safe Work Procedure be developed for on-site workers (i.e. construction workers) in the event excavation is to take place in the areas where the exceedances have been identified. If soil removal work is necessary, specific disposal requirements would be required.

Of particular concern, however, are the metals (lead and/or mercury) concentrations in surface soil within the Guardroom and Jail Cells (SS27, SS28, SS29, SS30, SS31). With no barrier present like in the majority of the sample locations (gravel or grass cover), visitors could contact (and thereby accidentally ingest) soil in this area. Analysis of B and/or C horizon samples from within the Guardroom and Jail Cells suggests a thin impacted layer of surface soil in this structure. Excavation and off-site disposal of 30 cm of soil from within the Guardroom and 15 cm of soil from within the Jail Cells (total estimated volume of 20 m^3) is recommended to address this concern.

7 REPORT USE AND CONDITIONS

The assessment was conducted in accordance with the agreed upon scope using the methodology set out in this report. The opinions in this report are given using generally accepted scientific judgment, principles, and practices; however, because of the inherent uncertainty in this process no guarantee of conclusion is intended or can be given.

The statements and conclusions presented in this report are professional opinions based on previously gathered information in early 2020 and our understanding of the planned expansion of visitor access for 2021.

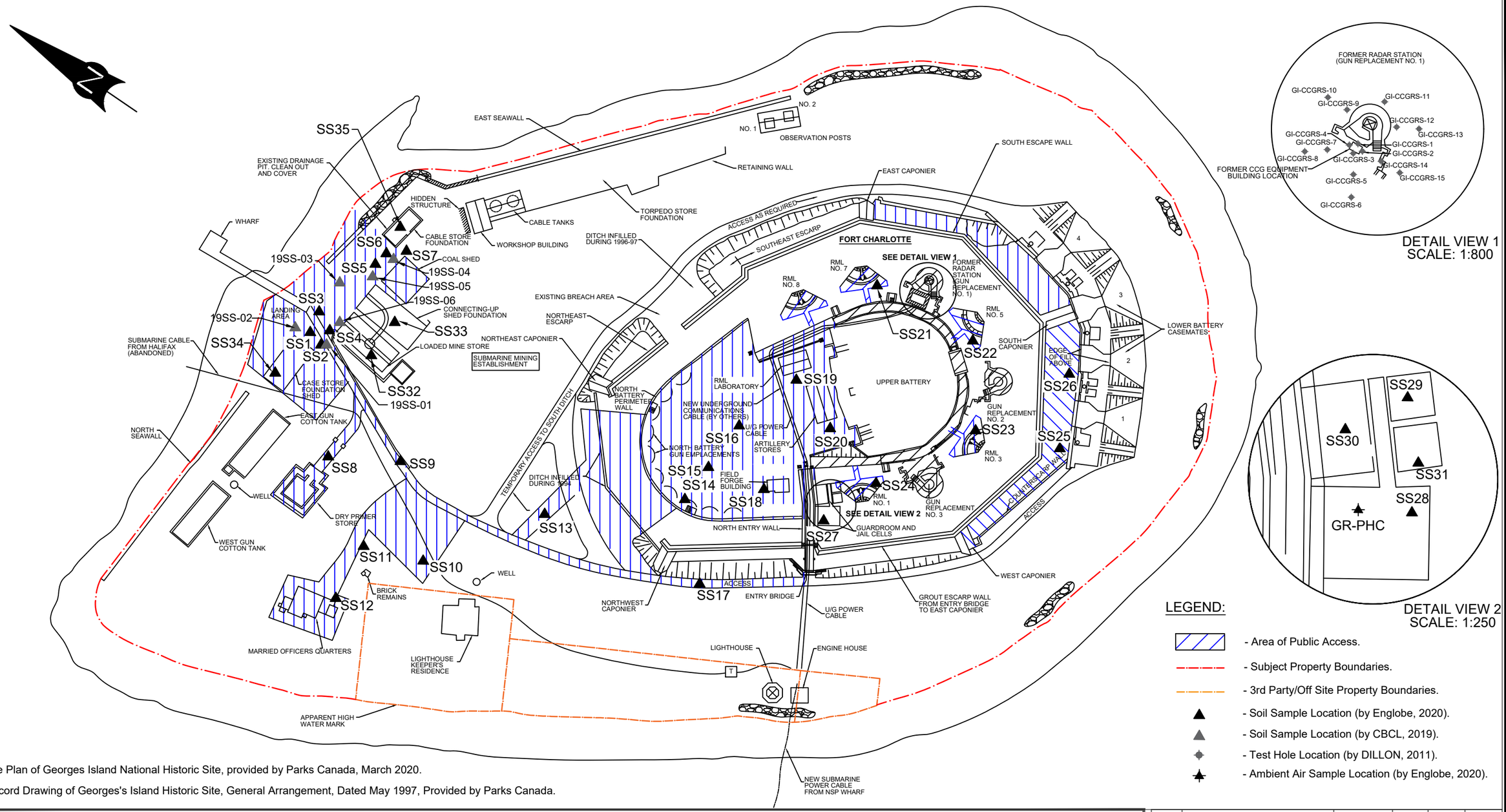
This report was prepared for the exclusive use of Parks Canada. The scope of the services performed may not be appropriate to satisfy the needs of third parties. Any use which a third party makes of this report, or any reliance on or decisions made based on it, is the sole responsibility of the third party. Englobe accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Please contact the undersigned with any questions you may have concerning the enclosed documents.

Yours very truly,
Englobe Corp.

Christina Caldwell, B.Sc. in ENVS
Project Manager, Environmental Engineering

Appendix A Figures



DETAIL VIEW 1
SCALE: 1:800

DETAIL VIEW 2
SCALE: 1:250

LEGEND:

- Area of Public Access.
- Subject Property Boundaries.
- 3rd Party/Off Site Property Boundaries.
- Soil Sample Location (by Englobe, 2020).
- Soil Sample Location (by CBCL, 2019).
- Test Hole Location (by DILLON, 2011).
- Ambient Air Sample Location (by Englobe, 2020).

REF: - Site Plan of Georges Island National Historic Site, provided by Parks Canada, March 2020.
- Record Drawing of Georges's Island Historic Site, General Arrangement, Dated May 1997, Provided by Parks Canada.

Parks Canada Agency

Englobe

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Quantitative Environmental Sampling Program

Georges Island National Historic Site
Halifax, NS

Figure 1: Site Plan Showing Sample Locations

No.	Version	Date	By	Verif	Appr.
		Feb. 2021	JJ	CC	DC

Discipline: Environment		Prepare by: CC	Verify by: CC
Scale: 1:1,200		Draw by: JJ	Approval by: DC
Date: February 2021		Figure no: 1	
Page setup: Fig. 1	Paper size: Previous paper size (17.00 x 11.00 inches)	Register no.:	

Man.	Project	Otp	Project Phase	Electronic ref.	Rev.
148	2000155				

Appendix B Analytical Results

TABLE 1: PETROLEUM COMPOUNDS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME CWS[1]						CCME Residential/Parkland[2]						CBCL Limited Phase II ESA					
			Human Health			Ecological			Human Health				Ecological							
			Direct Contact (Ingestion and Dermal)	Vapour Inhalation (indoor, basement)	Vapour Inhalation (indoor, slab on-grade)	Protection of GW for Aquatic Life	Ecological Direct Soil Contact	Management Limit	Soil Ingestion	Dermal Contact	Inhalation of Indoor Air (Basement)	Inhalation of Indoor Air (Slab on Grade)	Protection of GW for Aquatic Life	Ecological Soil Contact	19SS-01	19SS-02	19SS-03	19SS-04	19SS-05	19SS-06
															0 - 0.3 m	0 - 0.3 m	0 - 0.3 m	0 - 0.3 m	0 - 0.3 m	0 - 0.3 m
															6-Nov-19	6-Nov-19	6-Nov-19	6-Nov-19	6-Nov-19	6-Nov-19
Volatile Organics																				
Benzene	0.006	ug/g	-	-	-	-	-	-	110	250	0.15	0.095	1.0	31	0.013	<0.0060	**0.14**	**0.24**	0.094	0.026
Ethylbenzene	0.01	ug/g	-	-	-	-	-	-	10000	58000	88	55	50	55	<0.01	<0.010	0.044	0.083	0.028	0.014
Toluene	0.02	ug/g	-	-	-	-	-	-	22000	220000	200	120	0.10	75	0.038	<0.020	**0.27**	**0.57**	**0.2**	0.08
p+m-Xylene	0.02	ug/g	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	0.02	ug/g	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Xylenes	0.02	ug/g	-	-	-	-	-	-	150000	NA	22	14	37	95	0.056	<0.020	0.32	0.61	0.24	0.099
F1 (C6-C10)	10	ug/g	12000	40	30	970	210	700	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10
F1 (C6-C10) - BTEX	10	ug/g	-	-	-	-	-	-	-	-	-	-	-	-	<10	<10	27	23	<10	<10
F2-F4 Hydrocarbons																				
F2 (C10-C16 Hydrocarbons)	10	ug/g	6800	190	150	380	150	1000	-	-	-	-	-	-	<10	<10	27	23	<10	<10
F3 (C16-C34 Hydrocarbons)	50	ug/g	15000	-	-	-	300	2500	-	-	-	-	-	-	<50	120	**840**	**450**	120	66
F4 (C34-C50 Hydrocarbons)	50	ug/g	21000	-	-	-	2800	10000	-	-	-	-	-	-	<50	<50	360	260	78	<50
Reached Baseline at C50			-	-	-	-	-	-	-	-	-	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes

Notes:

value	-exceeds CWS/CCME
-	-no guideline or value

[1] 2008 Canadian Council for Ministers of the Environment (CCME) Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil for a Residential Site.
[2] 1999 CCME Canadian Environmental Quality Guidelines for residential land use ((with updates online at the time of reporting (http://st-ts.ccme.ca/)).
[3] Atlantic RBCA Tier II Pathway Specific Screening Levels (PSSLs) for a residential site with non-potable groundwater usage and coarse-grained soil (updated Sept 2015).
[4] Tier 1 Soil Ecological Screening Levels for the Protection of Plants and Soil Invertebrates; Direct Soil Contact, Residential Land Use (updated Sept 2015).
[a] = Where applicable, for protection of potable groundwater.

TABLE 1: PETROLEUM COMPOUNDS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME CWS[1]						CCME Residential/Parkland[2]						Englobe Phase II ESA									
			Human Health			Ecological			Human Health				Ecological												
			Direct Contact (Ingestion and Dermal)	Vapour Inhalation (indoor, basement)	Vapour Inhalation (indoor, slab on-grade)	Protection of GW for Aquatic Life	Ecological Direct Soil Contact	Management Limit	Soil Ingestion	Dermal Contact	Inhalation of Indoor Air (Basement)	Inhalation of Indoor Air (Slab on Grade)	Protection of GW for Aquatic Life	Ecological Soil Contact	SS3-A	SS3-B	SS3-C	SS4-A	SS5-A	SS6-A	SS6-C	SS7-A	SS7-A Lab-Dup	SS7-C
															0 - 0.15 m	0.15 - 0.3m	0.3- 0.45 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0.3- 0.45 m	0 - 0.15 m	0 - 0.15 m	0.3- 0.45 m
															19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20
Volatile Organics																								
Benzene	0.006	ug/g	-	-	-	-	-	-	110	250	0.15	0.095	1.0	31	**0.11**	**0.29**	**0.34**	**0.12**	**0.11**	0.036	**0.13**	**0.13**	**0.13**	**0.14**
Ethylbenzene	0.01	ug/g	-	-	-	-	-	-	10000	58000	88	55	50	55	0.041	0.14	0.18	0.038	0.052	0.032	0.059	0.087	0.082	0.061
Toluene	0.02	ug/g	-	-	-	-	-	-	22000	220000	200	120	0.10	75	**0.31**	**1**	**1.4**	**0.25**	**0.28**	0.093	**0.28**	**0.45**	**0.42**	**0.34**
p+m-Xylene	0.02	ug/g	-	-	-	-	-	-	-	-	-	-	-	-	0.25	0.96	1.3	0.2	0.23	0.071	0.2	0.38	0.36	0.26
o-Xylene	0.02	ug/g	-	-	-	-	-	-	-	-	-	-	-	-	0.13	0.43	0.59	0.11	0.13	0.045	0.1	0.24	0.23	0.17
Total Xylenes	0.02	ug/g	-	-	-	-	-	-	150000	NA	22	14	37	95	0.37	1.4	1.9	0.31	0.35	0.12	0.3	0.63	0.59	0.43
F1 (C6-C10)	10	ug/g	12000	40	30	970	210	700	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F1 (C6-C10) - BTEX	10	ug/g	-	-	-	-	-	-	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2-F4 Hydrocarbons																								
F2 (C10-C16 Hydrocarbons)	10	ug/g	6800	190	150	380	150	1000	-	-	-	-	-	-	21	35	42	20	24	15	19	25	-	22
F3 (C16-C34 Hydrocarbons)	50	ug/g	15000	-	-	-	300	2500	-	-	-	-	-	-	**420**	**440**	**490**	**340**	**330**	200	**370**	**710**	-	**570**
F4 (C34-C50 Hydrocarbons)	50	ug/g	21000	-	-	-	2800	10000	-	-	-	-	-	-	280	270	230	210	200	110	220	290	-	210
Reached Baseline at C50			-	-	-	-	-	-	-	-	-	-	-	-	No	No	No	No	No	No	No	No	-	No

Notes:

value	-exceeds CWS/CCME
-	-no guideline or value

[1] 2008 Canadian Council for Ministers of the Environment (CCME) Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil for a Residential Site.
[2] 1999 CCME Canadian Environmental Quality Guidelines for residential land use ((with updates online at the time of reporting (http://st-ts.ccme.ca/)).
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[4] Tier 1 Soil Ecological Screening Levels for the Protection of Plants and Soil Invertebrates; Direct Soil Contact, Residential Land Use (updated Sept 2015).
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			Human Health			Ecological			Human Health				Ecological												
			Direct Contact (Ingestion and Dermal)	Vapour Inhalation (indoor, basement)	Vapour Inhalation (indoor, slab on-grade)	Protection of GW for Aquatic Life	Ecological Direct Soil Contact	Management Limit	Soil Ingestion	Dermal Contact	Inhalation of Indoor Air (Basement)	Inhalation of Indoor Air (Slab on Grade)	Protection of GW for Aquatic Life	Ecological Soil Contact	SS8-A	SS12-A	FIELD DUP1	FIELD DUP1 Lab-Dup	SS18-A	SS19-A	SS20-A	SS21-A	SS23-A	SS27-A
															0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m
															18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20
Volatile Organics																								
Benzene	0.006	ug/g	-	-	-	-	-	-	110	250	0.15	0.095	1.0	31	<0.0060	<0.0060	0.021	-	0.039	0.094	<0.0060	<0.0060	<0.0060	**11**
Ethylbenzene	0.01	ug/g	-	-	-	-	-	-	10000	58000	88	55	50	55	<0.010	<0.010	1	-	0.015	0.02	<0.010	<0.010	<0.010	1.4
Toluene	0.02	ug/g	-	-	-	-	-	-	22000	220000	200	120	0.10	75	<0.020	<0.020	**3.6**	-	0.098	**0.18**	0.027	<0.020	<0.020	**30**
p+m-Xylene	0.02	ug/g	-	-	-	-	-	-	-	-	-	-	-	-	<0.020	<0.020	2.3	-	0.078	0.12	0.021	<0.020	<0.020	18
o-Xylene	0.02	ug/g	-	-	-	-	-	-	-	-	-	-	-	-	<0.020	<0.020	1	-	0.038	0.05	<0.020	<0.020	<0.020	4.3
Total Xylenes	0.02	ug/g	-	-	-	-	-	-	150000	NA	22	14	37	95	<0.020	<0.020	3.3	-	0.12	0.17	0.021	<0.020	<0.020	**23**
F1 (C6-C10)	10	ug/g	12000	40	30	970	210	700	-	-	-	-	-	-	<10	<10	14	-	<10	<10	<10	<10	<10	**180**
F1 (C6-C10) - BTEX	10	ug/g	-	-	-	-	-	-	-	-	-	-	-	-	<10	<10	<10	-	<10	<10	<10	<10	<10	120
F2-F4 Hydrocarbons																								
F2 (C10-C16 Hydrocarbons)	10	ug/g	6800	190	150	380	150	1000	-	-	-	-	-	-	<10	<10	<10	<10	12	18	13	<10	<10	37
F3 (C16-C34 Hydrocarbons)	50	ug/g	15000	-	-	-	300	2500	-	-	-	-	-	-	<50	<50	<50	<50	85	130	97	<50	<50	130
F4 (C34-C50 Hydrocarbons)	50	ug/g	21000	-	-	-	2800	10000	-	-	-	-	-	-	<50	<50	<50	<50	<50	100	59	<50	<50	62
Reached Baseline at C50			-	-	-	-	-	-	-	-	-	-	-	-	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No

Notes:

value	-exceeds CWS/CCME
-	-no guideline or value

[1] 2008 Canadian Council for Ministers of the Environment (CCME) Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil for a Residential Site.
[2] 1999 CCME Canadian Environmental Quality Guidelines for residential land use ((with updates online at the time of reporting (http://st-ts.ccme.ca/)).
[3] Atlantic RBCA Tier II Pathway Specific Screening Levels (PSSLs) for a residential site with non-potable groundwater usage and coarse-grained soil (updated Sept 2015).
[4] Tier 1 Soil Ecological Screening Levels for the Protection of Plants and Soil Invertebrates; Direct Soil Contact, Residential Land Use (updated Sept 2015).
[a] = Where applicable, for protection of potable groundwater.

TABLE 1: PETROLEUM COMPOUNDS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME CWS[1]						CCME Residential/Parkland[2]						Englobe Phase II ESA								
			Human Health			Ecological			Human Health				Ecological											
			Direct Contact (Ingestion and Dermal)	Vapour Inhalation (indoor, basement)	Vapour Inhalation (indoor, slab on-grade)	Protection of GW for Aquatic Life	Ecological Direct Soil Contact	Management Limit	Soil Ingestion	Dermal Contact	Inhalation of Indoor Air (Basement)	Inhalation of Indoor Air (Slab on Grade)	Protection of GW for Aquatic Life	Ecological Soil Contact	SS28-A	SS29-A	SS29-A Lab-Dup	SS30-A	SS31-A	SS32-A	SS33-A	SS34-A	SS35-A	Dup 1
															0 - 0.15 m	0 - 0.15 m		0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m
															19-Dec-20	19-Dec-20		19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20
Volatile Organics																								
Benzene	0.006	ug/g	-	-	-	-	-	-	110	250	0.15	0.095	1.0	31	**0.11**	0.012		0.0082	0.0098	**0.34**	0.011	<0.0060	0.024	0.016
Ethylbenzene	0.01	ug/g	-	-	-	-	-	-	10000	58000	88	55	50	55	0.027	<0.010		<0.010	<0.010	0.076	<0.010	<0.010	<0.010	<0.010
Toluene	0.02	ug/g	-	-	-	-	-	-	22000	220000	200	120	0.10	75	**0.42**	0.025		0.03	0.024	**0.79**	0.034	<0.020	0.066	0.051
p+m-Xylene	0.02	ug/g	-	-	-	-	-	-	-	-	-	-	-	-	0.28	<0.020		0.022	0.021	0.39	0.031	0.042	0.045	0.039
o-Xylene	0.02	ug/g	-	-	-	-	-	-	-	-	-	-	-	-	0.078	<0.020		<0.020	<0.020	0.18	<0.020	<0.020	0.023	0.023
Total Xylenes	0.02	ug/g	-	-	-	-	-	-	150000	NA	22	14	37	95	0.36	<0.020		0.022	0.021	0.57	0.031	0.042	0.068	0.063
F1 (C6-C10)	10	ug/g	12000	40	30	970	210	700	-	-	-	-	-	-	<10	<10		<10	<10	<10	<10	<10	<10	<20
F1 (C6-C10) - BTEX	10	ug/g	-	-	-	-	-	-	-	-	-	-	-	-	<10	<10		<10	<10	<10	<10	<10	<10	<20
F2-F4 Hydrocarbons																								
F2 (C10-C16 Hydrocarbons)	10	ug/g	6800	190	150	380	150	1000	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10	79	<20	<20
F3 (C16-C34 Hydrocarbons)	50	ug/g	15000	-	-	-	300	2500	-	-	-	-	-	-	<50	<50	<50	<50	<50	270	80	**390**	150	280
F4 (C34-C50 Hydrocarbons)	50	ug/g	21000	-	-	-	2800	10000	-	-	-	-	-	-	<50	<50	<50	<50	<50	130	<50	<50	110	220
Reached Baseline at C50			-	-	-	-	-	-	-	-	-	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes:

value	-exceeds CWS/CCME
-	-no guideline or value

[1] 2008 Canadian Council for Ministers of the Environment (CCME) Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil for a Residential Site.
[2] 1999 CCME Canadian Environmental Quality Guidelines for residential land use ((with updates online at the time of reporting (http://st-ts.ccme.ca/)).
[3] Atlantic RBCA Tier II Pathway Specific Screening Levels (PSSLs) for a residential site with non-potable groundwater usage and coarse-grained soil (updated Sept 2015).
[4] Tier 1 Soil Ecological Screening Levels for the Protection of Plants and Soil Invertebrates; Direct Soil Contact, Residential Land Use (updated Sept 2015).
[a] = Where applicable, for protection of potable groundwater.

TABLE 2: VOLATILE ORGANIC COMPOUNDS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Residential/Parkland [1]							Englobe Phase II ESA							
			Human Health				Ecological Health										
			Soil Ingestion	Dermal Contact	Inhalation of Indoor Air (Basement)	Inhalation of Indoor Air (Slab on Grade)	Protection of GW for Aquatic Life	Ecological Soil Contact	CCME SQGs for Residential / Parkland	SS3-A	SS3-A Lab-Dup	SS4-A	SS5-A	SS6-A	SS7-A	SS8-A	SS12-A
										0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m
										19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	18-Mar-20	18-Mar-20
1,2-Dichlorobenzene*	25	ug/kg	-	-	-	-	-	-	1,000	<25	<25	<25	<25	<25	<25	<25	<25
1,3-Dichlorobenzene*	25	ug/kg	-	-	-	-	-	-	1,000	<25	<25	<25	<25	<25	<25	<25	<25
1,4-Dichlorobenzene*	25	ug/kg	-	-	-	-	-	-	1,000	<25	<25	<25	<25	<25	<25	<25	<25
Chlorobenzene*	25	ug/kg	-	-	-	-	-	-	1,000	<25	<25	<25	<25	<25	<25	<25	<25
1,1,1-Trichloroethane*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
1,1,2,2-Tetrachloroethane*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
1,1,2-Trichloroethane*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
1,1-Dichloroethane*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
1,1-Dichloroethylene*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
1,2-Dichloroethane*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
1,2-Dichloropropane*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
Benzene	25	ug/kg	110000	250000	150	95	1000	31000	-	**330**	**330**	**300**	<25	<25	31	<25	<25
Bromodichloromethane (Dichlorobromomethane)	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25	<25
Bromoform (Tribromomethane)	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25	<25
Bromomethane (Methyl bromide)	50	ug/kg	-	-	-	-	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50
Carbon tetrachloride (Tetrachloromethane)*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
Chloroethane (Ethyl chloride)	200	ug/kg	-	-	-	-	-	-	-	<200	<200	<200	<200	<200	<200	<200	<200
Chloroform (Trichloromethane)*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
cis-1,2-Dichloroethylene	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
cis-1,3-Dichloropropene	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25	<25
Dibromochloromethane	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25	<25
Ethylbenzene	25	ug/kg	10000000	58000000	88000	55000	50000	55000	-	99	96	79	<25	<25	<25	<25	<25
Ethylene Dibromide (1,2-Dibromoethane)	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25	<25
Methylene Chloride (Dichloromethane)*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
Methyl T-Butyl Ether (MTBE)	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25	<25
o-Xylene	25	ug/kg	-	-	-	-	-	-	-	300	300	240	83	<25	48	<25	<25
p+m-Xylene	25	ug/kg	-	-	-	-	-	-		600	580	430	140	29	77	<25	<25
Total Xylenes	50	ug/kg	150000000	NA	22000	14000	37000	95000	-	900	870	670	220	<50	120	<50	<50
Styrene*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
Tetrachloroethylene (PCE, 1,1,2,2-Tetrachloroethene)	25	ug/kg	-	-	-	-	-	-	200	<25	<25	<25	<25	<25	<25	<25	<25
Toluene	25	ug/kg	22000000	220000000	200000	120000	100	75000	-	**890**	**870**	**600**	**150**	<50	100	<50	<50
trans-1,2-Dichloroethylene	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25	<25
trans-1,3-Dichloropropene	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25	<25
Trichloroethylene (TCE, 1,1,2-Trichloroethene)	10	ug/kg	-	-	-	-	-	-	10	<10	<10	<10	<10	<10	<10	<10	<10
Trichlorofluoromethane (Freon 11)	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25	<25
Vinyl Chloride	20	ug/kg	-	-	-	-	-	-	-	<20	<20	<20	<20	<20	<20	<20	<20

Notes:

value - Exceeds CCME

[1] 1999 CCME Canadian Environmental Quality Guidelines for residential land use ((with updates online at the time of reporting (http://st-ts.ccme.ca/)).
- = No applicable guideline or parameter not defined.
Lab-Dup = Laboratory duplicate.
(1) Elevated VOC RDL(s) due to matrix interference.

TABLE 2: VOLATILE ORGANIC COMPOUNDS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Residential/Parkland [1]							Englobe Phase II ESA						
			Human Health				Ecological Health		CCME SQGs for Residential / Parkland	FIELD DUP1	SS18-A	SS19-A	SS20-A	SS21-A	SS23-A	SS27-A
			Soil Ingestion	Dermal Contact	Inhalation of Indoor Air (Basement)	Inhalation of Indoor Air (Slab on Grade)	Protection of GW for Aquatic Life	Ecological Soil Contact		0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m
										18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20
1,2-Dichlorobenzene*	25	ug/kg	-	-	-	-	-	-	1,000	<25	<25	<25	<25	<25	<25	<25
1,3-Dichlorobenzene*	25	ug/kg	-	-	-	-	-	-	1,000	<25	<25	<25	<25	<25	<25	<25
1,4-Dichlorobenzene*	25	ug/kg	-	-	-	-	-	-	1,000	<25	<25	<25	<25	<25	<25	<25
Chlorobenzene*	25	ug/kg	-	-	-	-	-	-	1,000	<25	<25	<25	<25	<25	<25	<25
1,1,1-Trichloroethane*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25
1,1,2,2-Tetrachloroethane*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25
1,1,2-Trichloroethane*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25
1,1-Dichloroethane*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25
1,1-Dichloroethylene*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25
1,2-Dichloroethane*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25
1,2-Dichloropropane*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<110 (1)
Benzene	25	ug/kg	110000	250000	150	95	1000	31000	-	<25	<25	**190**	<25	<25	<25	**14000**
Bromodichloromethane (Dichlorobromomethane)	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25
Bromoform (Tribromomethane)	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25
Bromomethane (Methyl bromide)	50	ug/kg	-	-	-	-	-	-	-	<50	<50	<50	<50	<50	<50	<50
Carbon tetrachloride (Tetrachloromethane)*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25
Chloroethane (Ethyl chloride)	200	ug/kg	-	-	-	-	-	-	-	<200	<200	<200	<200	<200	<200	<200
Chloroform (Trichloromethane)*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25
cis-1,2-Dichloroethylene	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25
cis-1,3-Dichloropropene	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25
Dibromochloromethane	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25
Ethylbenzene	25	ug/kg	10000000	58000000	88000	55000	50000	55000	-	<25	<25	<25	<25	<25	<25	2500
Ethylene Dibromide (1,2-Dibromoethane)	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25
Methylene Chloride (Dichloromethane)*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25
Methyl T-Butyl Ether (MTBE)	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25
o-Xylene	25	ug/kg	-	-	-	-	-	-	-	<25	<25	88	<25	<25	<25	7000
p+m-Xylene	25	ug/kg	-	-	-	-	-	-		<25	<25	190	<25	<25	<25	25000
Total Xylenes	50	ug/kg	150000000	NA	22000	14000	37000	95000	-	<50	<50	280	<50	<50	<50	**32000**
Styrene*	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25
Tetrachloroethylene (PCE, 1,1,2,2-Tetrachloroethene)	25	ug/kg	-	-	-	-	-	-	200	<25	<25	<25	<25	<25	<25	<25
Toluene	25	ug/kg	22000000	220000000	200000	120000	100	75000	-	<50	<50	**360**	<50	<50	<50	**41000**
trans-1,2-Dichloroethylene	25	ug/kg	-	-	-	-	-	-	5,000	<25	<25	<25	<25	<25	<25	<25
trans-1,3-Dichloropropene	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25
Trichloroethylene (TCE, 1,1,2-Trichloroethene)	10	ug/kg	-	-	-	-	-	-	10	<10	<10	<10	<10	<10	<10	<10
Trichlorofluoromethane (Freon 11)	25	ug/kg	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	<25	<25
Vinyl Chloride	20	ug/kg	-	-	-	-	-	-	-	<20	<20	<20	<20	<20	<20	<20

Notes:

value - Exceeds CCME

[1] 1999 CCME Canadian Environmental Quality Guidelines for residential land use ((with updates online at the time of reporting (http://st-ts.ccme.ca/)).
- = No applicable guideline or parameter not defined.
Lab-Dup = Laboratory duplicate.
(1) Elevated VOC RDL(s) due to matrix interference.

TABLE 3: Available METALS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines				Dillon Phase II ESA (2011)											
			Residential/ Parkland [1]				GI-CCGRS- 1A	GI-CCGRS- 1A (Lab Dup)	GI-CCGRS- 1B	GI-CCGRS- 2A	GI-CCGRS- 3A	GI-CCGRS- 3B	GI-CCGRS- 4A	GI-CCGRS- 4B	GI-CCGRS- 5A	GI-CCGRS- 6A	GI-CCGRS- 7A	GI-CCGRS- 8A
			Human Health	Ecological Health		Interim Soil Quality Criteria/Provisional SGQ[2]	(0-0.15m)	(0-0.15m)	(0.15-0.3m)	(0-0.15m)	(0-0.15m)	(0.15-0.3m)	(0-0.15m)	(0.15-0.3m)	(0-0.15m)	(0-0.15m)	(0-0.15m)	(0-0.15m)
			Soil Ingestion	Soil Contact	Nutrient and Energy Cycling Check		20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11
Acid Extractable Aluminum (Al)	10	mg/kg	-	-	-	-	9,370	8,730	8,300	9,300	7,510	7,340	8,340	8,480	9,650	8,410	9,770	8,600
Acid Extractable Antimony (Sb)	2.0	mg/kg	-	-	-	20	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)[4]	2.0	mg/kg	31	17	-	30	**72**	**73**	**79**	**36**	11	8	**21**	**19**	16	17	11	**22**
Acid Extractable Barium (Ba)	5.0	mg/kg	6,800	-	-	500	171	153	135	317	40	32	54	85	61	44	48	52
Acid Extractable Beryllium (Be)	2.0	mg/kg	75	-	-	4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	2.0	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	5/50	mg/kg	-	-	-	-	8	7	8	5	<5	<5	<5	<5	<5	<5	<5	<5
Acid Extractable Cadmium (Cd)	0.30	mg/kg	14	10	54	5	**6.9**	**6.5**	4.5	1.6	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	2.0	mg/kg	220	64	52	250	**102**	**111**	**99**	25	13	12	15	15	13	12	13	14
Acid Extractable Cobalt (Co)	1.0	mg/kg	-	-	-	50	6	6	6	8	7	6	6	8	8	7	8	6
Acid Extractable Copper (Cu)	2.0	mg/kg	1100	63	350	100	**306**	**323**	**258**	54	19	16	21	20	16	18	20	18
Acid Extractable Iron (Fe)	50	mg/kg	-	-	-	-	23,500	28,000	21,600	27,400	17,000	16,200	20,600	20,000	22,200	19,800	22,600	22,700
Acid Extractable Lead (Pb)	0.50	mg/kg	140	300	723	500	**605**	**560**	**420**	**1340**	45.3	35.3	120	**150**	20	43.9	41	52.1
Acid Extractable Lithium (Li)	2.0	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Manganese (Mn)	2.0	mg/kg	-	-	-	-	461	484	436	1,010	422	346	515	556	569	480	580	326
Acid Extractable Mercury (Hg)	0.10	mg/kg	6.6	12	20	2	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Molybdenum (Mo)	2.0	mg/kg	-	-	-	10	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	2.0	mg/kg	-	50	146	100	**57**	**74**	33	27	14	13	18	18	16	17	17	18
Acid Extractable Rubidium (Rb)	2.0	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	1.0	mg/kg	80	1	-	3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Silver (Ag)	0.50	mg/kg	20	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	5.0	mg/kg	-	-	-	-	113	104	93	33	11	15	6	8	7	8	10	6
Acid Extractable Thallium (Tl)	0.10	mg/kg	-	1.4	-	1	0.1	0.1	0.1	0.4	0.1	<0.1	0.2	0.1	<0.1	0.1	0.1	0.2
Acid Extractable Tin (Sn)	2.0	mg/kg	-	-	-	50	5	4	4	4	<2.0	<2.0	2	2	<2.0	<2.0	<2.0	<2.0
Acid Extractable Uranium (U)	0.10	mg/kg	23	500	-	-	0.8	0.7	0.7	0.7	0.7	0.9	0.5	0.5	0.7	0.6	0.8	0.6
Acid Extractable Vanadium (V)	2.0	mg/kg	-	130	-	200	123	124	93	83	16	14	65	27	14	31	16	43
Acid Extractable Zinc (Zn)	5.0	mg/kg	10000	250	280	500	**1440**	**1360**	**1040**	**608**	141	74	**453**	**280**	43	57	63	49

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health for residential land use (with updates online at the time of reporting (http://st-ts.ccme.ca/)).

[2] Interim remediation criteria (1991) for soil that have not yet been replaced by the SQGs. These interim remediation criteria are considered generally protective of human and environmental health and were based on experience and professional judgement.

Arsenic guidelines have been adjusted for a 10^{-5} risk factor.

Mercury analyzed as inorganic.

Englobe

TABLE 3: Available METALS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines				Dillon Phase II ESA (2011)									
			Residential/ Parkland [1]				GI-CCGRS- 9A	GI-CCGRS- 9A (Dup A)	GI-CCGRS- 10A	GI-CCGRS- 11A	GI-CCGRS- 12A	GI-CCGRS- 12A (Lab Dup)	GI-CCGRS- 13A	GI-CCGRS- 13A (Dup B)	GI-CCGRS- 14A	GI-CCGRS- 15A
			Human Health	Ecological Health		Interim Soil Quality Criteria/Provisional SGQ[2]	(0-0.15m)	(0-0.15m)	(0-0.15m)	(0-0.15m)	(0-0.15m)	(0-0.15m)	(0-0.15m)	(0-0.15m)	(0-0.15m)	(0-0.15m)
			Soil Ingestion	Soil Contact	Nutrient and Energy Cycling Check		20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11	20-Jan-11
Acid Extractable Aluminum (Al)	10	mg/kg	-	-	-	-	9,020	9,740	10,800	8,750	8,380	8,550	9,520	10,500	9,510	8,580
Acid Extractable Antimony (Sb)	2.0	mg/kg	-	-	-	20	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)[4]	2.0	mg/kg	31	17	-	30	**20**	**18**	16	**19**	**19**	**20**	**19**	**18**	**20**	16
Acid Extractable Barium (Ba)	5.0	mg/kg	6,800	-	-	500	32	40	30	69	98	99	32	36	35	52
Acid Extractable Beryllium (Be)	2.0	mg/kg	75	-	-	4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	2.0	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	5/50	mg/kg	-	-	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Acid Extractable Cadmium (Cd)	0.30	mg/kg	14	10	54	5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	2.0	mg/kg	220	64	52	250	13	13	13	13	13	15	13	13	13	12
Acid Extractable Cobalt (Co)	1.0	mg/kg	-	-	-	50	7	8	7	7	7	7	7	8	7	7
Acid Extractable Copper (Cu)	2.0	mg/kg	1100	63	350	100	15	16	15	19	25	26	18	19	17	15
Acid Extractable Iron (Fe)	50	mg/kg	-	-	-	-	21,500	21,100	21,700	21,500	19,800	19,800	19,800	21,100	20,200	19,400
Acid Extractable Lead (Pb)	0.50	mg/kg	140	300	723	500	52.3	30.9	19.4	**150**	**294**	**356**	103	79.3	91	32.3
Acid Extractable Lithium (Li)	2.0	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Manganese (Mn)	2.0	mg/kg	-	-	-	-	455	609	508	482	485	476	437	554	438	509
Acid Extractable Mercury (Hg)	0.10	mg/kg	6.6	12	20	2	-	-	-	-	-	-	-	-	-	-
Acid Extractable Molybdenum (Mo)	2.0	mg/kg	-	-	-	10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	2.0	mg/kg	-	50	146	100	16	15	15	18	21	21	16	17	15	16
Acid Extractable Rubidium (Rb)	2.0	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	1.0	mg/kg	80	1	-	3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Silver (Ag)	0.50	mg/kg	20	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	5.0	mg/kg	-	-	-	-	<5	<5	<5	9	13	14	6	5	<5	7
Acid Extractable Thallium (Tl)	0.10	mg/kg	-	1.4	-	1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1
Acid Extractable Tin (Sn)	2.0	mg/kg	-	-	-	50	<2.0	<2.0	<2.0	2	8	7	19	11	2	<2.0
Acid Extractable Uranium (U)	0.10	mg/kg	23	500	-	-	0.5	0.6	0.6	0.7	0.6	0.7	0.5	0.6	0.6	0.5
Acid Extractable Vanadium (V)	2.0	mg/kg	-	130	-	200	50	23	19	35	64	62	45	27	31	25
Acid Extractable Zinc (Zn)	5.0	mg/kg	10000	250	280	500	47	50	44	66	73	77	56	54	52	52

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health for residential land use (with updates online at the time of reporting (http://st-ts.ccme.ca/)).

[2] Interim remediation criteria (1991) for soil that have not yet been replaced by the SQGs. These interim remediation criteria are considered generally protective of human and environmental health and were based on experience and professional judgement.

Arsenic guidelines have been adjusted for a 10^{-5} risk factor.

Mercury analyzed as inorganic.

TABLE 3: Available METALS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines				CBCL Limited Phase II ESA					
			Residential/ Parkland [1]				19SS-01	19SS-02	19SS-03	19SS-04	19SS-05	19SS-06
			Human Health	Ecological Health		Interim Soil Quality Criteria/Provisional SGQ[2]	0 - 0.3 m	0 - 0.3 m	0 - 0.3 m	0 - 0.3 m	0 - 0.3 m	0 - 0.3 m
			Soil Ingestion	Soil Contact	Nutrient and Energy Cycling Check		6-Nov-19	6-Nov-19	6-Nov-19	6-Nov-19	6-Nov-19	6-Nov-19
Acid Extractable Aluminum (Al)	10	mg/kg	-	-	-	-	7100	5700	8300	7900	8900	11000
Acid Extractable Antimony (Sb)	2.0	mg/kg	-	-	-	20	<2.0	<2.0	4.1	3.6	<2.0	<2.0
Acid Extractable Arsenic (As)[4]	2.0	mg/kg	31	17	-	30	11	7.3	**44**	**24**	**18**	**30**
Acid Extractable Barium (Ba)	5.0	mg/kg	6,800	-	-	500	39	40	290	120	78	130
Acid Extractable Beryllium (Be)	2.0	mg/kg	75	-	-	4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	2.0	mg/kg	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	5/50	mg/kg	-	-	-	-	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	0.30	mg/kg	14	10	54	5	<0.30	<0.30	0.67	0.38	0.49	0.37
Acid Extractable Chromium (Cr)	2.0	mg/kg	220	64	52	250	13	9.3	29	17	16	26
Acid Extractable Cobalt (Co)	1.0	mg/kg	-	-	-	50	6.4	4.4	11	7.1	7.6	14
Acid Extractable Copper (Cu)	2.0	mg/kg	1100	63	350	100	21	17	**89**	55	50	60
Acid Extractable Iron (Fe)	50	mg/kg	-	-	-	-	20000	13000	43000	26000	25000	28000
Acid Extractable Lead (Pb)	0.50	mg/kg	140	300	723	500	51	140	**3300**	**460**	**400**	**250**
Acid Extractable Lithium (Li)	2.0	mg/kg	-	-	-	-	14	16	17	16	17	22
Acid Extractable Manganese (Mn)	2.0	mg/kg	-	-	-	-	390	300	570	410	450	660
Acid Extractable Mercury (Hg)	0.10	mg/kg	6.6	12	20	2	0.28	**4.8**	**18**	**2.9**	1.3	1.7
Acid Extractable Molybdenum (Mo)	2.0	mg/kg	-	-	-	10	<2.0	<2.0	2.7	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	2.0	mg/kg	-	50	146	100	17	13	32	25	20	32
Acid Extractable Rubidium (Rb)	2.0	mg/kg	-	-	-	-	6.8	7.4	9	7.5	8.6	15
Acid Extractable Selenium (Se)	1.0	mg/kg	80	1	-	3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Silver (Ag)	0.50	mg/kg	20	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	5.0	mg/kg	-	-	-	-	23	26	41	19	47	65
Acid Extractable Thallium (Tl)	0.10	mg/kg	-	1.4	-	1	<0.10	<0.10	0.28	0.16	0.11	0.18
Acid Extractable Tin (Sn)	2.0	mg/kg	-	-	-	50	2.9	2.1	29	9.8	13	4.6
Acid Extractable Uranium (U)	0.10	mg/kg	23	500	-	-	0.44	0.62	0.55	0.54	0.51	0.78
Acid Extractable Vanadium (V)	2.0	mg/kg	-	130	-	200	20	20	95	72	39	43
Acid Extractable Zinc (Zn)	5.0	mg/kg	10000	250	280	500	100	82	**530**	**280**	**270**	240

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health for residential land use (with updates online at the time of reporting (http://st-ts.ccme.ca/)).

[2] Interim remediation criteria (1991) for soil that have not yet been replaced by the SQGs. These interim remediation criteria are considered generally protective of human and environmental health and were based on experience and professional judgement.

Arsenic guidelines have been adjusted for a 10^{-5} risk factor.

Mercury analyzed as inorganic.

Englobe

TABLE 3: Available METALS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines				Englobe Phase II ESA													
			Residential/ Parkland [1]				SS1-A	SS1-B	SS1-C	SS2-A	SS2-B	SS2-C	SS3-A	SS3-B	SS3-C	SS3-C Lab-Dup	SS4-A	SS5-A	SS6-A	SS6-C	SS7-A
			Human Health	Ecological Health		Interim Soil Quality Criteria/Provisional SGQ[2]	0 - 0.15 m	0.15 - 0.3m	0.3- 0.45 m	0 - 0.15 m	0.15 - 0.3m	0.3- 0.45 m	0 - 0.15 m	0.15 - 0.3m	0.3- 0.45 m	0.3- 0.45 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0.3- 0.45 m	0 - 0.15 m
			Soil Ingestion	Soil Contact	Nutrient and Energy Cycling Check		19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20
Acid Extractable Aluminum (Al)	10	mg/kg	-	-	-	-	7500	6900	7200	7000	6700	6500	6200	5100	6100	5600	7600	7800	6900	6900	8200
Acid Extractable Antimony (Sb)	2.0	mg/kg	-	-	-	20	<2.0	<2.0	2.5	<2.0	<2.0	<2.0	2.7	2.9	3.2	2.2	2.4	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)[4]	2.0	mg/kg	31	17	-	30	14	13	**29**	11	12	17	**49**	**39**	**35**	**28**	**32**	**23**	**19**	**21**	**28**
Acid Extractable Barium (Ba)	5.0	mg/kg	6,800	-	-	500	37	60	130	33	50	63	600	580	370	350	230	110	62	100	120
Acid Extractable Beryllium (Be)	2.0	mg/kg	75	-	-	4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	2.0	mg/kg	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	5/50	mg/kg	-	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	0.30	mg/kg	14	10	54	5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.97	0.9	0.76	0.65	0.42	0.36	<0.30	0.31	0.4
Acid Extractable Chromium (Cr)	2.0	mg/kg	220	64	52	250	17	13	17	12	11	13	29	16	17	14	27	15	14	13	16
Acid Extractable Cobalt (Co)	1.0	mg/kg	-	-	-	50	6.6	6.5	6.6	6.3	5.9	6.3	6.1	5.4	6.2	4.8	7.6	6.9	6.4	5.5	7.2
Acid Extractable Copper (Cu)	2.0	mg/kg	1100	63	350	100	26	29	230	21	37	36	**100**	**85**	**90**	**75**	**490**	48	43	**80**	**75**
Acid Extractable Iron (Fe)	50	mg/kg	-	-	-	-	18000	19000	30000	18000	20000	22000	26000	27000	25000	-	30000	25000	24000	21000	30000
Acid Extractable Lead (Pb)	0.50	mg/kg	140	300	723	500	60	130	**400**	43	58	**180**	**1200**	**1200**	**1800**	**1900**	**1600**	**400**	**270**	**540**	**560**
Acid Extractable Lithium (Li)	2.0	mg/kg	-	-	-	-	14	14	16	13	14	14	13	12	14	13	14	15	15	16	16
Acid Extractable Manganese (Mn)	2.0	mg/kg	-	-	-	-	350	350	390	320	400	360	580	310	400	320	400	370	380	350	430
Acid Extractable Mercury (Hg)	0.10	mg/kg	6.6	12	20	2	0.5	1.4	**3.9**	0.18	0.29	1.3	**8.9**	**11**	**71**	**76**	**18**	**2.2**	**3.1**	**6.6**	**3.5**
Acid Extractable Molybdenum (Mo)	2.0	mg/kg	-	-	-	10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	2.0	mg/kg	-	50	146	100	17	18	18	16	14	16	21	17	19	15	22	21	18	16	21
Acid Extractable Rubidium (Rb)	2.0	mg/kg	-	-	-	-	7.9	7.1	7.8	6.5	6.2	7	6.8	5.5	5.7	5.7	9	9.2	8.5	5.9	7.9
Acid Extractable Selenium (Se)	1.0	mg/kg	80	1	-	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.55	<0.50	<0.50	<0.50	0.5
Acid Extractable Silver (Ag)	0.50	mg/kg	20	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	5.0	mg/kg	-	-	-	-	29	27	27	27	30	28	46	90	60	51	25	23	15	21	19
Acid Extractable Thallium (Tl)	0.10	mg/kg	-	1.4	-	1	<0.10	0.11	0.16	<0.10	<0.10	<0.10	0.19	0.16	0.15	0.13	0.21	0.15	0.11	0.13	0.2
Acid Extractable Tin (Sn)	2.0	mg/kg	-	-	-	50	3	15	13	1.8	2.3	7.7	20	19	17	20	10	11	8.9	11	66
Acid Extractable Uranium (U)	0.10	mg/kg	23	500	-	-	0.51	0.45	0.55	0.42	0.46	0.46	0.45	0.43	0.45	0.48	0.59	0.49	0.49	0.45	0.55
Acid Extractable Vanadium (V)	2.0	mg/kg	-	130	-	200	21	30	41	19	22	34	62	47	38	36	59	48	49	30	49
Acid Extractable Zinc (Zn)	5.0	mg/kg	10000	250	280	500	73	97	160	63	57	110	**940**	**450**	**470**	**420**	**330**	**260**	160	220	**300**

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health for residential land use (with updates online at the time of reporting (http://st-ts.ccme.ca/)).

[2] Interim remediation criteria (1991) for soil that have not yet been replaced by the SQGs. These interim remediation criteria are considered generally protective of human and environmental health and were based on experience and professional judgement.

Arsenic guidelines have been adjusted for a 10^{-5} risk factor.

Mercury analyzed as inorganic.

TABLE 3: Available METALS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines				SS7-C
			Residential/ Parkland [1]				SS7-C
			Human Health	Ecological Health		Interim Soil Quality Criteria/Provisional SGQ[2]	0.3- 0.45 m
			Soil Ingestion	Soil Contact	Nutrient and Energy Cycling Check		19-Mar-20
Acid Extractable Aluminum (Al)	10	mg/kg	-	-	-	-	7000
Acid Extractable Antimony (Sb)	2.0	mg/kg	-	-	-	20	<2.0
Acid Extractable Arsenic (As)[4]	2.0	mg/kg	31	17	-	30	**120**
Acid Extractable Barium (Ba)	5.0	mg/kg	6,800	-	-	500	90
Acid Extractable Beryllium (Be)	2.0	mg/kg	75	-	-	4	<2.0
Acid Extractable Bismuth (Bi)	2.0	mg/kg	-	-	-	-	<2.0
Acid Extractable Boron (B)	5/50	mg/kg	-	-	-	-	<50
Acid Extractable Cadmium (Cd)	0.30	mg/kg	14	10	54	5	<0.30
Acid Extractable Chromium (Cr)	2.0	mg/kg	220	64	52	250	14
Acid Extractable Cobalt (Co)	1.0	mg/kg	-	-	-	50	6.2
Acid Extractable Copper (Cu)	2.0	mg/kg	1100	63	350	100	51
Acid Extractable Iron (Fe)	50	mg/kg	-	-	-	-	32000
Acid Extractable Lead (Pb)	0.50	mg/kg	140	300	723	500	**450**
Acid Extractable Lithium (Li)	2.0	mg/kg	-	-	-	-	16
Acid Extractable Manganese (Mn)	2.0	mg/kg	-	-	-	-	550
Acid Extractable Mercury (Hg)	0.10	mg/kg	6.6	12	20	2	**2.1**
Acid Extractable Molybdenum (Mo)	2.0	mg/kg	-	-	-	10	<2.0
Acid Extractable Nickel (Ni)	2.0	mg/kg	-	50	146	100	18
Acid Extractable Rubidium (Rb)	2.0	mg/kg	-	-	-	-	7.2
Acid Extractable Selenium (Se)	1.0	mg/kg	80	1	-	3	<0.50
Acid Extractable Silver (Ag)	0.50	mg/kg	20	-	-	-	<0.50
Acid Extractable Strontium (Sr)	5.0	mg/kg	-	-	-	-	12
Acid Extractable Thallium (Tl)	0.10	mg/kg	-	1.4	-	1	0.15
Acid Extractable Tin (Sn)	2.0	mg/kg	-	-	-	50	8.1
Acid Extractable Uranium (U)	0.10	mg/kg	23	500	-	-	0.51
Acid Extractable Vanadium (V)	2.0	mg/kg	-	130	-	200	19
Acid Extractable Zinc (Zn)	5.0	mg/kg	10000	250	280	500	240

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health for residential land use (with updates online at the time of reporting (http://st-ts.ccme.ca/)).

[2] Interim remediation criteria (1991) for soil that have not yet been replaced by the SQGs. These interim remediation criteria are considered generally protective of human and environmental health and were based on experience and professional judgement.

Arsenic guidelines have been adjusted for a 10^{-5} risk factor.

Mercury analyzed as inorganic.

Englobe

TABLE 3: Available METALS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines				Englobe Phase II ESA													
			Residential/ Parkland [1]				SS8-A	SS9-A	SS10-A	SS11-A	SS12-A	FIELD DUP1	SS13-A	SS14-A	SS14-A Lab-Dup	SS14-B	SS15-A	FIELD DUP2	SS16-A	SS17-A	SS18-A
			Human Health	Ecological Health		Interim Soil Quality Criteria/Provisional SGQ[2]	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0.15 - 0.3 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m
			Soil Ingestion	Soil Contact	Nutrient and Energy Cycling Check		18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20
Acid Extractable Aluminum (Al)	10	mg/kg	-	-	-	-	7400	10000	8500	10000	11000	10000	11000	9700	10000	8600	11000	11000	11000	10000	11000
Acid Extractable Antimony (Sb)	2.0	mg/kg	-	-	-	20	<2.0	<2.0	<2.0	<2.0	<2.0	3.5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)[4]	2.0	mg/kg	31	17	-	30	11	**20**	13	**23**	**22**	**24**	**21**	**21**	**22**	**19**	**21**	**22**	**21**	**18**	**27**
Acid Extractable Barium (Ba)	5.0	mg/kg	6,800	-	-	500	27	54	60	74	79	78	66	69	69	62	62	64	61	59	87
Acid Extractable Beryllium (Be)	2.0	mg/kg	75	-	-	4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	2.0	mg/kg	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	5/50	mg/kg	-	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	0.30	mg/kg	14	10	54	5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	2.0	mg/kg	220	64	52	250	12	16	17	16	18	17	16	14	15	13	16	16	16	16	18
Acid Extractable Cobalt (Co)	1.0	mg/kg	-	-	-	50	6.6	9.2	7.1	8.9	10	9.8	12	9.8	9.5	8.3	8.9	9.3	8.9	8.8	9.5
Acid Extractable Copper (Cu)	2.0	mg/kg	1100	63	350	100	16	33	31	21	21	22	18	33	33	28	20	20	21	23	25
Acid Extractable Iron (Fe)	50	mg/kg	-	-	-	-	16000	27000	22000	24000	23000	24000	23000	33000	31000	28000	22000	25000	22000	23000	27000
Acid Extractable Lead (Pb)	0.50	mg/kg	140	300	723	500	8.5	58	110	73	37	59	19	**270**	**270**	**250**	59	67	69	52	**150**
Acid Extractable Lithium (Li)	2.0	mg/kg	-	-	-	-	23	20	16	17	18	18	18	17	18	16	18	18	19	19	20
Acid Extractable Manganese (Mn)	2.0	mg/kg	-	-	-	-	350	600	440	500	690	630	600	610	600	520	530	560	530	530	590
Acid Extractable Mercury (Hg)	0.10	mg/kg	6.6	12	20	2	<0.10	0.17	0.34	0.19	<0.10	<0.10	<0.10	0.23	0.2	0.3	0.16	0.16	0.15	0.13	0.2
Acid Extractable Molybdenum (Mo)	2.0	mg/kg	-	-	-	10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	2.0	mg/kg	-	50	146	100	13	22	21	22	22	22	18	22	22	19	20	19	20	20	22
Acid Extractable Rubidium (Rb)	2.0	mg/kg	-	-	-	-	10	10	9.9	11	11	11	10	11	12	9.5	10	9.8	12	11	12
Acid Extractable Selenium (Se)	1.0	mg/kg	80	1	-	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Silver (Ag)	0.50	mg/kg	20	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	5.0	mg/kg	-	-	-	-	12	14	20	18	15	13	8.6	31	32	28	24	29	25	16	23
Acid Extractable Thallium (Tl)	0.10	mg/kg	-	1.4	-	1	<0.10	0.12	0.1	0.16	<0.10	0.11	0.13	0.17	0.16	0.15	0.1	0.11	0.11	0.12	0.16
Acid Extractable Tin (Sn)	2.0	mg/kg	-	-	-	50	<1.0	2.3	6.2	1.8	<1.0	<1.0	<1.0	3.5	3.7	4	1.8	1.3	1.6	9.1	2.1
Acid Extractable Uranium (U)	0.10	mg/kg	23	500	-	-	1.2	0.67	0.45	0.53	0.53	0.48	0.58	0.52	0.57	0.47	0.55	0.57	0.58	0.56	0.69
Acid Extractable Vanadium (V)	2.0	mg/kg	-	130	-	200	17	32	45	50	21	23	23	48	47	39	25	34	27	24	37
Acid Extractable Zinc (Zn)	5.0	mg/kg	10000	250	280	500	48	79	110	73	120	150	53	99	98	87	66	69	75	72	97

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health for residential land use (with updates online at the time of reporting (http://st-ts.ccme.ca/)).

[2] Interim remediation criteria (1991) for soil that have not yet been replaced by the SQGs. These interim remediation criteria are considered generally protective of human and environmental health and were based on experience and professional judgement.

Arsenic guidelines have been adjusted for a 10^{-5} risk factor.

Mercury analyzed as inorganic.

TABLE 3: Available METALS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines				SS18-B
			Residential/ Parkland [1]				
			Human Health	Ecological Health		Interim Soil Quality Criteria/Provisional SGQ[2]	0.15 - 0.3m
			Soil Ingestion	Soil Contact	Nutrient and Energy Cycling Check		18-Mar-20
Acid Extractable Aluminum (Al)	10	mg/kg	-	-	-	-	10000
Acid Extractable Antimony (Sb)	2.0	mg/kg	-	-	-	20	<2.0
Acid Extractable Arsenic (As)[4]	2.0	mg/kg	31	17	-	30	27
Acid Extractable Barium (Ba)	5.0	mg/kg	6,800	-	-	500	87
Acid Extractable Beryllium (Be)	2.0	mg/kg	75	-	-	4	<2.0
Acid Extractable Bismuth (Bi)	2.0	mg/kg	-	-	-	-	<2.0
Acid Extractable Boron (B)	5/50	mg/kg	-	-	-	-	<50
Acid Extractable Cadmium (Cd)	0.30	mg/kg	14	10	54	5	<0.30
Acid Extractable Chromium (Cr)	2.0	mg/kg	220	64	52	250	17
Acid Extractable Cobalt (Co)	1.0	mg/kg	-	-	-	50	8.8
Acid Extractable Copper (Cu)	2.0	mg/kg	1100	63	350	100	22
Acid Extractable Iron (Fe)	50	mg/kg	-	-	-	-	25000
Acid Extractable Lead (Pb)	0.50	mg/kg	140	300	723	500	140
Acid Extractable Lithium (Li)	2.0	mg/kg	-	-	-	-	18
Acid Extractable Manganese (Mn)	2.0	mg/kg	-	-	-	-	520
Acid Extractable Mercury (Hg)	0.10	mg/kg	6.6	12	20	2	0.24
Acid Extractable Molybdenum (Mo)	2.0	mg/kg	-	-	-	10	<2.0
Acid Extractable Nickel (Ni)	2.0	mg/kg	-	50	146	100	20
Acid Extractable Rubidium (Rb)	2.0	mg/kg	-	-	-	-	9.5
Acid Extractable Selenium (Se)	1.0	mg/kg	80	1	-	3	<0.50
Acid Extractable Silver (Ag)	0.50	mg/kg	20	-	-	-	<0.50
Acid Extractable Strontium (Sr)	5.0	mg/kg	-	-	-	-	20
Acid Extractable Thallium (Tl)	0.10	mg/kg	-	1.4	-	1	0.19
Acid Extractable Tin (Sn)	2.0	mg/kg	-	-	-	50	1.6
Acid Extractable Uranium (U)	0.10	mg/kg	23	500	-	-	0.63
Acid Extractable Vanadium (V)	2.0	mg/kg	-	130	-	200	33
Acid Extractable Zinc (Zn)	5.0	mg/kg	10000	250	280	500	77

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health for residential land use (with updates online at the time of reporting (http://st-ts.ccme.ca/)).

[2] Interim remediation criteria (1991) for soil that have not yet been replaced by the SQGs. These interim remediation criteria are considered generally protective of human and environmental health and were based on experience and professional judgement.

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Mercury analyzed as inorganic.

Englobe

TABLE 3: Available METALS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines				Englobe Phase II ESA												
			Residential/ Parkland [1]				SS18-C	SS19-A	SS19-B	SS19-C	SS20-A	SS21-A	SS22-A	SS23-A	SS24-A	SS25-A	SS26-A	SS26-B	SS26-C	SS27-A
			Human Health	Ecological Health		Interim Soil Quality Criteria/Provisional SGQ[2]	0.3- 0.45 m	0 - 0.15 m	0.15 - 0.3 m	0.3- 0.45 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0.15 - 0.3 m	0.3- 0.45 m	0 - 0.15 m
			Soil Ingestion	Soil Contact	Nutrient and Energy Cycling Check		18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20
Acid Extractable Aluminum (Al)	10	mg/kg	-	-	-	-	9800	10000	10000	9400	11000	8300	9700	8400	7900	9900	10000	10000	12000	6600
Acid Extractable Antimony (Sb)	2.0	mg/kg	-	-	-	20	<2.0	4	29	21	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.3
Acid Extractable Arsenic (As)[4]	2.0	mg/kg	31	17	-	30	**23**	**30**	**90**	**56**	**20**	10	15	13	12	**20**	**22**	**20**	5.3	**48**
Acid Extractable Barium (Ba)	5.0	mg/kg	6,800	-	-	500	83	230	680	410	96	48	46	36	27	65	100	160	110	340
Acid Extractable Beryllium (Be)	2.0	mg/kg	75	-	-	4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	2.0	mg/kg	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	5/50	mg/kg	-	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	0.30	mg/kg	14	10	54	5	<0.30	0.34	1	0.8	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.76
Acid Extractable Chromium (Cr)	2.0	mg/kg	220	64	52	250	14	18	23	19	16	11	15	13	12	15	15	16	26	16
Acid Extractable Cobalt (Co)	1.0	mg/kg	-	-	-	50	9.5	9.3	13	10	8.9	5.9	7.6	6.9	6.2	9.2	11	9.6	9.1	8.8
Acid Extractable Copper (Cu)	2.0	mg/kg	1100	63	350	100	21	33	**170**	**120**	22	12	19	14	12	23	31	51	20	**120**
Acid Extractable Iron (Fe)	50	mg/kg	-	-	-	-	22000	30000	65000	51000	25000	15000	20000	17000	15000	21000	24000	23000	23000	26000
Acid Extractable Lead (Pb)	0.50	mg/kg	140	300	723	500	140	**610**	**2100**	**1200**	140	16	54	17	9.8	84	**160**	**380**	46	**1600**
Acid Extractable Lithium (Li)	2.0	mg/kg	-	-	-	-	17	16	15	17	18	27	26	21	23	19	18	21	23	13
Acid Extractable Manganese (Mn)	2.0	mg/kg	-	-	-	-	560	550	740	640	580	290	450	380	310	510	560	520	380	660
Acid Extractable Mercury (Hg)	0.10	mg/kg	6.6	12	20	2	0.25	0.25	0.31	0.4	0.25	<0.10	<0.10	<0.10	<0.10	<0.10	0.32	0.85	0.18	1.8
Acid Extractable Molybdenum (Mo)	2.0	mg/kg	-	-	-	10	<2.0	2.3	13	6.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.5
Acid Extractable Nickel (Ni)	2.0	mg/kg	-	50	146	100	22	24	32	27	21	11	16	14	12	20	39	22	23	18
Acid Extractable Rubidium (Rb)	2.0	mg/kg	-	-	-	-	9.4	10	8.7	8.8	11	14	11	11	8.9	8.3	9.2	14	55	7.1
Acid Extractable Selenium (Se)	1.0	mg/kg	80	1	-	3	<0.50	<0.50	0.94	0.53	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2
Acid Extractable Silver (Ag)	0.50	mg/kg	20	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	5.0	mg/kg	-	-	-	-	17	28	52	33	21	25	16	8.6	7.5	11	11	14	14	64
Acid Extractable Thallium (Tl)	0.10	mg/kg	-	1.4	-	1	0.15	0.18	0.43	0.32	0.12	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	0.14	0.39	0.32
Acid Extractable Tin (Sn)	2.0	mg/kg	-	-	-	50	1.5	7.3	16	22	5.5	<1.0	1.1	<1.0	<1.0	1.1	2	7	<1.0	37
Acid Extractable Uranium (U)	0.10	mg/kg	23	500	-	-	0.58	0.72	0.81	0.57	0.59	1	0.96	0.84	0.97	0.53	0.58	0.65	0.62	0.48
Acid Extractable Vanadium (V)	2.0	mg/kg	-	130	-	200	30	47	51	36	33	15	20	17	15	20	23	23	28	31
Acid Extractable Zinc (Zn)	5.0	mg/kg	10000	250	280	500	130	250	**470**	**430**	88	34	70	42	34	91	130	180	130	**440**

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health for residential land use (with updates online at the time of reporting (http://st-ts.ccme.ca/)).

[2] Interim remediation criteria (1991) for soil that have not yet been replaced by the SQGs. These interim remediation criteria are considered generally protective of human and environmental health and were based on experience and professional judgement.

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Mercury analyzed as inorganic.

Englobe

TABLE 3: Available METALS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines				Englobe Phase II ESA												
			Residential/ Parkland [1]				SS28-A	SS28-B	SS28-C	SS29-A	SS29-B	SS30-A	SS30-B	SS30-A Lab-Dup	SS31-A	SS32-A	SS33-A	SS34-A	SS35-A	Dup 1
			Human Health	Ecological Health		Interim Soil Quality Criteria/Provisional SGQ[2]	0-0.15 m	0.15-0.30	0.3-0.45	0-0.15 m	0.15 -0.3 m	0-0.15 m	0.15-0.3 m		0-0.15 m	0-0.15 m	0-0.15 m	0-0.15 m	0-0.15 m	0-0.15 m
			Soil Ingestion	Soil Contact	Nutrient and Energy Cycling Check		19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20		19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20
Acid Extractable Aluminum (Al)	10	mg/kg	-	-	-	-	9500	11000	12000	9700	9800	10000	11000	10000	11000	13000	15000	13000	11000	9500
Acid Extractable Antimony (Sb)	2.0	mg/kg	-	-	-	20	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	4.4	<2.0	7.3	<2.0	<2.0	2.0
Acid Extractable Arsenic (As)[4]	2.0	mg/kg	31	17	-	30	**28**	**23**	**25**	**24**	**24**	**28**	**24**	**34**	**23**	**18**	**23**	14	**19**	**20**
Acid Extractable Barium (Ba)	5.0	mg/kg	6,800	-	-	500	220	110	99	160	86	260	99	260	110	130	230	90	250	220
Acid Extractable Beryllium (Be)	2.0	mg/kg	75	-	-	4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	2.0	mg/kg	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	5/50	mg/kg	-	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	0.30	mg/kg	14	10	54	5	0.62	<0.30	<0.30	0.91	1.1	<0.30	<0.30	<0.30	<0.30	0.94	0.54	<0.30	0.60	0.60
Acid Extractable Chromium (Cr)	2.0	mg/kg	220	64	52	250	19	17	20	17	18	19	18	21	21	23	32	19	23	22
Acid Extractable Cobalt (Co)	1.0	mg/kg	-	-	-	50	10	11	11	11	11	11	11	13	10	8.5	8.6	8.6	7.1	6.8
Acid Extractable Copper (Cu)	2.0	mg/kg	1100	63	350	100	31	22	27	27	23	24	21	23	24	56	**570**	32	**340**	**940**
Acid Extractable Iron (Fe)	50	mg/kg	-	-	-	-	37000	25000	32000	34000	25000	36000	25000	41000	27000	42000	36000	23000	32000	27000
Acid Extractable Lead (Pb)	0.50	mg/kg	140	300	723	500	**680**	**200**	110	**480**	110	**540**	75	**550**	**220**	**510**	**4600**	130	**890**	**430**
Acid Extractable Lithium (Li)	2.0	mg/kg	-	-	-	-	17	20	21	18	21	20	22	20	19	18	15	17	13	14
Acid Extractable Manganese (Mn)	2.0	mg/kg	-	-	-	-	720	720	730	720	640	740	770	820	610	700	960	410	440	410
Acid Extractable Mercury (Hg)	0.10	mg/kg	6.6	12	20	2	1.1	0.24	0.22	0.28	0.11	**8.1**	1.4	**7.9**	0.23	3.7	0.71	5	0.68	1.1
Acid Extractable Molybdenum (Mo)	2.0	mg/kg	-	-	-	10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	2.0	mg/kg	-	50	146	100	26	23	25	25	24	26	24	29	24	31	**51**	23	38	36
Acid Extractable Rubidium (Rb)	2.0	mg/kg	-	-	-	-	11	11	11	9.7	10	12	11	13	13	7.3	9.1	8.5	6.3	7
Acid Extractable Selenium (Se)	1.0	mg/kg	80	1	-	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.62	0.69
Acid Extractable Silver (Ag)	0.50	mg/kg	20	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	5.0	mg/kg	-	-	-	-	30	17	16	22	15	30	17	32	20	120	120	240	100	68
Acid Extractable Thallium (Tl)	0.10	mg/kg	-	1.4	-	1	0.15	0.12	0.12	<0.10	<0.10	0.46	0.13	0.46	0.13	0.1	0.11	<0.10	0.15	0.17
Acid Extractable Tin (Sn)	2.0	mg/kg	-	-	-	50	31	4.3	3.7	12	2.9	9.6	3.1	13	130	18	38	4.3	6.8	6.9
Acid Extractable Uranium (U)	0.10	mg/kg	23	500	-	-	0.5	0.53	0.52	0.53	0.50	0.52	0.48	0.51	0.54	0.73	0.79	0.87	0.55	0.6
Acid Extractable Vanadium (V)	2.0	mg/kg	-	130	-	200	28	22	23	22	21	25	20	25	23	49	130	36	65	63
Acid Extractable Zinc (Zn)	5.0	mg/kg	10000	250	280	500	250	93	94	**340**	76	110	61	110	100	**570**	**540**	140	**1000**	**700**

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health for residential land use (with updates online at the time of reporting (http://st-ts.ccme.ca/)).

[2] Interim remediation criteria (1991) for soil that have not yet been replaced by the SQGs. These interim remediation criteria are considered generally protective of human and environmental health and were based on experience and professional judgement.

Arsenic guidelines have been adjusted for a 10^{-5} risk factor.

Mercury analyzed as inorganic.

TABLE 4: POLYCYCLIC AROMATIC HYDROCARBONS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines (SQGs)[1]						CBCL Limited Phase II ESA						Englobe Phase II ESA					
									19SS-01	19SS-02	19SS-03	19SS-04	19SS-05	19SS-06	SS1-A	SS1-B	SS1-B Lab-Dup	SS1-C	SS2-A	SS2-B
			Human Health	Environmental Health				Interim Soil Quality Criteria	0 - 0.3 m	0 - 0.3 m	0 - 0.3 m	0 - 0.3 m	0 - 0.3 m	0 - 0.3 m	0 - 0.15 m	0.15 - 0.3 m	0.15 - 0.3 m	0.3 - 0.45 m	0 - 0.15 m	0.15 - 0.3 m
			Direct Contact	Soil Contact	Soil and Food Ingestion	Protection of Freshwater Aquatic Life	SQG_E	Remediation Criteria	6-Nov-19	6-Nov-19	6-Nov-19	6-Nov-19	6-Nov-19	6-Nov-19	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20
1-Methylnapthalene	0.0100	mg/kg	-	-	-	-	-	-	0.022	0.013	0.45	0.38	0.048	0.08	0.024	0.041	0.048	0.13	0.02	0.026
2-Methylnapthalene	0.0100	mg/kg	-	-	-	-	-	-	0.025	0.016	0.53	0.42	0.053	0.089	0.029	0.045	0.052	0.15	0.025	0.029
Acenaphthene	0.0100	mg/kg	-	-	21.5	0.28	-	-	0.012	<0.010	**0.330**	**0.440**	0.059	0.049	0.017	0.043	0.038	0.061	0.018	0.042
Acenaphthylene	0.0100	mg/kg	-	-	-	320	-	-	<0.010	0.016	0.53	0.18	0.044	0.038	<0.010	0.012	0.012	0.033	<0.010	<0.010
Anthracene	0.0100	mg/kg	-	2.5	61.5	NA	2.5	-	0.024	0.048	**2.80**	1.40	0.210	0.190	0.076	0.13	0.12	0.26	0.042	0.075
Benz(a)anthracene	0.0100	mg/kg	-	-	6.2	-	-	1	0.094	0.240	**11**	**5.2**	**1.1**	0.780	0.25	0.47	0.47	**1.3**	0.12	0.22
Benzo(a)pyrene	0.0100	mg/kg	-	20	0.6	8800	20	-	0.099	0.260	**12**	**5.3**	**1.3**	0.900	0.24	0.49	0.5	1.4	0.12	0.21
Benzo(b)fluoranthene	0.0100	mg/kg	-	-	6.2	-	-	1	0.086	0.22	**11**	**4.6**	**1.1**	0.82	0.2	0.4	0.4	**1.1**	0.098	0.17
Benzo(b+j)fluoranthene	0.0100	mg/kg	-	-	-	-	-	-	0.13	0.35	17	7.1	1.7	1.3	0.32	0.63		1.7	0.16	0.27
Benzo(g,h,i)perylene	0.0100	mg/kg	-	-	-	-	-	-	0.071	0.2	7	3.2	0.9	0.61	0.15	0.32	0.33	0.9	0.087	0.13
Benzo(j)fluoranthene	0.0100	mg/kg	-	-	-	-	-	-	0.048	0.13	5.9	2.5	0.61	0.46	0.12	0.23	0.22	0.62	0.064	0.1
Benzo(k)fluoranthene	0.0100	mg/kg	-	-	6.2	-	-	1	0.046	0.13	**6**	**2.5**	0.64	0.45	0.13	0.23	0.24	0.64	0.074	0.1
Chrysene	0.0100	mg/kg	-	-	6.2	-	-	-	0.11	0.29	13	5.4	1.2	0.95	0.28	0.5	0.49	1.3	0.14	0.24
Dibenz(a,h)anthracene	0.0100	mg/kg	-	-	-	-	-	1	0.013	0.032	**1.9**	0.81	0.19	0.12	0.028	0.068	0.069	0.2	0.014	0.028
Fluoranthene	0.0100	mg/kg	-	50	15.4	-	50	-	0.19	0.53	21	10	1.9	1.5	0.51	0.99	0.9	2.4	0.28	0.55
Fluorene	0.0100	mg/kg	-	-	15.4	0.25	-	-	<0.010	0.014	**0.56**	**0.45**	0.063	0.047	0.023	0.044	0.041	0.072	0.017	0.039
Indeno(1,2,3-c,d)pyrene	0.0100	mg/kg	-	-	-	-	-	1	0.056	0.15	**6.6**	**2.9**	0.75	0.49	0.12	0.26	0.27	0.76	0.067	0.1
Naphthalene	0.0100	mg/kg	-	-	8.8	0.013	-	0.6	**0.02**	**0.017**	**0.5**	**0.43**	**0.059**	**0.087**	**0.022**	**0.037**	**0.041**	**0.11**	**0.021**	**0.037**
Perylene	0.0100	mg/kg	-	-	-	-	-	-	0.026	0.066	2.9	1.3	0.32	0.21	0.052	0.12	0.12	0.33	0.025	0.049
Phenanthrene	0.0100	mg/kg	-	-	43	0.046	-	5	**0.13**	**0.23**	**10**	**6.1**	**0.94**	**0.78**	**0.32**	**0.56**	**0.49**	**1.1**	**0.21**	**0.38**
Pyrene	0.0100	mg/kg	-	-	7.7	-	-	10	0.17	0.46	**17**	**8.8**	1.7	1.3	0.47	0.87	0.81	2.2	0.25	0.45
Calculated B(a)P TPE (10^{-5}) [2,3]	-	mg/kg	5.3	-	-	-	-	-	0.44	1.15	**54.45**	**23.9**	**5.79**	4.01	0.354	0.725	0.737	2.064	0.179	0.311

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME SQGs for the Protection of Human and Environmental Health with updates online at the time of reporting (http://st-ts.ccme.ca/)) and the 1991 CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites.

[2] B(a)P TPE (Benzo(a)pyrene Total Potency Equivalent) is the sum of estimated cancer potency relative to B(a)P for all potentially carcinogenic unsubstituted PAH. The B(a)P TPE for a soil sample is calculated by multiplying the concentration of each PAH in the sample by its B(a)P Potency Equivalence Factor (PEF) and summing these products.

[3] Where a calculation requires the use of a value which was not detected, half of the laboratory reportable detection limit (RDL) is used in the equation.

Lab-Dup = Laboratory Duplicate.

TABLE 4: POLYCYCLIC AROMATIC HYDROCARBONS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines (SQGs)[1]						Englobe Phase II ESA												
			Human Health	Environmental Health				Interim Soil Quality Criteria	SS2-C	SS3-A	SS3-B	SS3-C	SS4-A	SS5-A	SS6-A	SS6-C	SS7-A	SS7-C	SS8-A	SS9-A	SS10-A
									0.3 - 0.45 m	0 - 0.15 m	0.15 - 0.3 m	0.3 - 0.45 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0.3 - 0.45 m	0 - 0.15 m	0.3 - 0.45 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m
			Direct Contact	Soil Contact	Soil and Food Ingestion	Protection of Freshwater Aquatic Life	SQG_E	Remediation Criteria	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20
1-Methylnapthalene	0.0100	mg/kg	-	-	-	-	-	-	0.056	0.35	0.25	0.18	0.34	0.22	0.15	0.15	0.39	0.38	<0.010	0.02	<0.010
2-Methylnapthalene	0.0100	mg/kg	-	-	-	-	-	-	0.063	0.41	0.29	0.22	0.41	0.26	0.16	0.15	0.45	0.4	<0.010	0.024	0.021
Acenaphthene	0.0100	mg/kg	-	-	21.5	0.28	-	-	0.038	**0.83**	**0.29**	0.23	**0.43**	**0.38**	0.28	0.22	**0.78**	**0.77**	<0.010	0.014	<0.010
Acenaphthylene	0.0100	mg/kg	-	-	-	320	-	-	0.014	0.17	0.2	0.085	0.12	0.078	0.1	0.13	0.24	0.18	<0.010	<0.010	<0.010
Anthracene	0.0100	mg/kg	-	2.5	61.5	NA	2.5	-	0.12	**3**	1.7	0.94	1.3	1	0.78	0.81	1.6	1.9	<0.010	0.041	0.058
Benz(a)anthracene	0.0100	mg/kg	-	-	6.2	-	-	1	0.49	**7.6**	5.7	4.7	**5.3**	**3.5**	**2.5**	**3.1**	**7.5**	**8.4**	<0.010	0.19	0.19
Benzo(a)pyrene	0.0100	mg/kg	-	20	0.6	8800	20	-	0.53	**7.8**	**5.4**	**5.2**	**5.6**	**3.8**	**2.5**	**3.1**	**9.3**	**9.5**	<0.010	0.19	0.19
Benzo(b)fluoranthene	0.0100	mg/kg	-	-	6.2	-	-	1	0.44	**6.5**	4.1	4.1	**4.8**	**3.3**	**2.2**	**2.4**	**7**	**6.9**	<0.010	0.15	0.14
Benzo(b+j)fluoranthene	0.0100	mg/kg	-	-	-	-	-	-	0.69	9.7	6.5	6.3	7.2	4.8	3.3	3.7	10	11	<0.020	0.24	0.23
Benzo(g,h,i)perylene	0.0100	mg/kg	-	-	-	-	-	-	0.36	4.6	3.9	4	3.7	2.6	1.6	1.9	6.1	5.6	<0.010	0.11	0.12
Benzo(j)fluoranthene	0.0100	mg/kg	-	-	-	-	-	-	0.25	3.3	2.4	2.2	2.3	1.6	1.1	1.4	3.4	3.6	<0.010	0.086	0.082
Benzo(k)fluoranthene	0.0100	mg/kg	-	-	6.2	-	-	1	0.25	**3.5**	**2.5**	**2.2**	**2.5**	**1.7**	**1.2**	**1.4**	**3.6**	**3.7**	<0.010	0.085	0.094
Chrysene	0.0100	mg/kg	-	-	6.2	-	-	-	0.53	**7.4**	5.4	4.7	5.3	3.5	2.5	3.1	**7.3**	**8**	<0.010	0.2	0.21
Dibenz(a,h)anthracene	0.0100	mg/kg	-	-	-	-	-	1	0.077	**1.4**	0.9	0.84	1	0.73	0.44	0.48	**1.7**	**1.4**	<0.010	0.024	0.024
Fluoranthene	0.0100	mg/kg	-	50	15.4	-	50	-	0.94	15	10	8.7	9.8	6.7	4.7	5.8	13	14	<0.010	0.39	0.38
Fluorene	0.0100	mg/kg	-	-	15.4	0.25	-	-	0.039	**0.91**	**0.48**	**0.26**	**0.46**	**0.4**	**0.34**	**0.29**	**0.77**	**0.79**	<0.010	0.014	<0.010
Indeno(1,2,3-c,d)pyrene	0.0100	mg/kg	-	-	-	-	-	1	0.3	**4.3**	**3.2**	**3.3**	**3.3**	**2.3**	**1.4**	**1.6**	**5.2**	**4.7**	<0.010	0.095	0.1
Naphthalene	0.0100	mg/kg	-	-	8.8	0.013	-	0.6	**0.048**	**0.48**	**0.26**	**0.22**	**0.34**	**0.27**	**0.16**	**0.16**	**0.66**	**0.68**	<0.010	**0.019**	<0.010
Perylene	0.0100	mg/kg	-	-	-	-	-	-	0.12	1.8	1.3	1.3	1.3	0.88	0.55	0.67	2.1	2.1	<0.010	0.041	0.036
Phenanthrene	0.0100	mg/kg	-	-	43	0.046	-	5	**0.5**	**11**	**5.9**	**4**	**5.9**	**5**	**3.8**	**3.5**	**10**	**8.6**	<0.010	**0.21**	**0.21**
Pyrene	0.0100	mg/kg	-	-	7.7	-	-	10	0.83	**12**	**7.9**	**7.2**	**8.2**	5.8	4.2	5.1	**11**	**12**	<0.010	0.34	0.33
Calculated B(a)P TPE (10^{-5}) [2,3]	-	mg/kg	5.3	-	-	-	-	-	0.789	**11.84**	**8.183**	**7.777**	**8.51**	**5.831**	3.821	4.620	**13.804**	**13.766**	0.01	0.28	0.278

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME SQGs for the Protection of Human and Environmental Health with updates online at the time of reporting (http://st-ts.ccme.ca/)) and the 1991 CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites.

[2] B(a)P TPE (Benzo(a)pyrene Total Potency Equivalent) is the sum of estimated cancer potency relative to B(a)P for all potentially carcinogenic unsubstituted PAH. The B(a)P TPE for a soil sample is calculated by multiplying the concentration of each PAH in the sample by its B(a)P Potency Equivalence Factor (PEF) and summing these products.

[3] Where a calculation requires the use of a value which was not detected, half of the laboratory reportable detection limit (RDL) is used in the equation.

Lab-Dup = Laboratory Duplicate.

TABLE 4: POLYCYCLIC AROMATIC HYDROCARBONS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines (SQGs)[1]						Englobe Phase II ESA												
			Human Health	Environmental Health				Interim Soil Quality Criteria	SS11-A	SS11-B	SS11-C	SS12-A	FIELD DUP1	SS13-A	SS14-A	SS15-A	FIELD DUP2	FIELD DUP2 Lab-Dup	SS16-A	SS17-A	SS18-A
									0 - 0.15 m	0.15 - 0.3 m	0.3 - 0.45 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m
			Direct Contact	Soil Contact	Soil and Food Ingestion	Protection of Freshwater Aquatic Life	SQG_E	Remediation Criteria	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20
1-Methylnapthalene	0.0100	mg/kg	-	-	-	-	-	-	0.091	0.12	0.069	<0.010	<0.010	<0.010	0.029	0.032	<0.010	<0.010	0.047	0.017	0.069
2-Methylnapthalene	0.0100	mg/kg	-	-	-	-	-	-	0.083	0.11	0.066	<0.010	<0.010	<0.010	0.033	0.028	<0.010	<0.010	0.053	0.019	0.08
Acenaphthene	0.0100	mg/kg	-	-	21.5	0.28	-	-	**0.37**	**0.55**	**0.32**	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	0.069	0.014	0.055
Acenaphthylene	0.0100	mg/kg	-	-	-	320	-	-	0.039	0.032	0.031	<0.010	<0.010	<0.010	0.019	0.11	<0.010	<0.010	0.042	0.015	0.059
Anthracene	0.0100	mg/kg	-	2.5	61.5	NA	2.5	-	0.83	0.99	0.89	<0.010	<0.010	<0.010	0.042	0.1	0.022	0.029	0.19	0.04	0.15
Benz(a)anthracene	0.0100	mg/kg	-	-	6.2	-	-	1	**3**	**2.8**	**2.1**	0.024	0.022	0.055	0.12	0.24	0.056	0.069	0.37	0.11	0.43
Benzo(a)pyrene	0.0100	mg/kg	-	20	0.6	8800	20	-	**2.9**	**2.7**	**1.8**	0.021	0.022	0.049	0.11	0.28	0.052	0.06	0.33	0.1	0.38
Benzo(b)fluoranthene	0.0100	mg/kg	-	-	6.2	-	-	1	**2.3**	**2**	**1.3**	0.016	0.017	0.037	0.1	0.25	0.04	0.048	0.24	0.082	0.31
Benzo(b+j)fluoranthene	0.0100	mg/kg	-	-	-	-	-	-	3.4	3.1	2	<0.020	<0.020	0.059	0.15	0.4	0.061		0.39	0.12	0.5
Benzo(g,h,i)perylene	0.0100	mg/kg	-	-	-	-	-	-	1.8	1.5	1	0.014	0.014	0.032	0.079	0.19	0.034	0.038	0.19	0.067	0.22
Benzo(j)fluoranthene	0.0100	mg/kg	-	-	-	-	-	-	1.1	1.1	0.7	<0.010	<0.010	0.022	0.05	0.15	0.021	0.024	0.15	0.042	0.19
Benzo(k)fluoranthene	0.0100	mg/kg	-	-	6.2	-	-	1	**1.2**	**1.1**	0.72	<0.010	0.014	0.023	0.051	0.17	0.03	0.037	0.15	0.053	0.19
Chrysene	0.0100	mg/kg	-	-	6.2	-	-	-	2.9	2.7	1.9	0.026	0.027	0.058	0.14	0.37	0.059	0.074	0.36	0.12	0.48
Dibenz(a,h)anthracene	0.0100	mg/kg	-	-	-	-	-	1	0.41	0.36	0.23	<0.010	<0.010	<0.010	0.019	0.042	<0.010	<0.010	0.043	0.014	0.057
Fluoranthene	0.0100	mg/kg	-	50	15.4	-	50	-	5.4	5.8	4.5	0.053	0.053	0.093	0.27	0.86	0.12	0.15	0.83	0.24	0.96
Fluorene	0.0100	mg/kg	-	-	15.4	0.25	-	-	**0.3**	**0.3**	**0.3**	<0.010	<0.010	<0.010	0.013	0.026	<0.010	<0.010	0.084	0.013	0.055
Indeno(1,2,3-c,d)pyrene	0.0100	mg/kg	-	-	-	-	-	1	**1.3**	**1.3**	0.8	<0.010	<0.010	0.027	0.064	0.16	0.027	0.031	0.16	0.053	0.19
Naphthalene	0.0100	mg/kg	-	-	8.8	0.013	-	0.6	**0.11**	**0.11**	**0.11**	<0.010	<0.010	<0.010	**0.028**	**0.046**	<0.010	<0.010	**0.078**	**0.016**	**0.071**
Perylene	0.0100	mg/kg	-	-	-	-	-	-	0.6	0.57	0.38	<0.010	<0.010	<0.010	0.023	0.051	<0.010	0.013	0.071	0.022	0.075
Phenanthrene	0.0100	mg/kg	-	-	43	0.046	-	5	**4**	**4**	**4**	0.041	0.035	**0.048**	**0.19**	**0.81**	**0.081**	**0.12**	**0.87**	**0.18**	**0.77**
Pyrene	0.0100	mg/kg	-	-	7.7	-	-	10	4.9	4.9	3.8	0.042	0.043	0.083	0.23	0.67	0.1	0.13	0.73	0.21	0.81
Calculated B(a)P TPE (10^{-5}) [2,3]	-	mg/kg	5.3	-	-	-	-	-	4.25	3.932	2.621	0.032	0.034	0.0713	0.170	0.425	0.075	0.087	0.486	0.150	0.575

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME SQGs for the Protection of Human and Environmental Health with updates online at the time of reporting (http://st-ts.ccme.ca/)) and the 1991 CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites.

[2] B(a)P TPE (Benzo(a)pyrene Total Potency Equivalent) is the sum of estimated cancer potency relative to B(a)P for all potentially carcinogenic unsubstituted PAH. The B(a)P TPE for a soil sample is calculated by multiplying the concentration of each PAH in the sample by its B(a)P Potency Equivalence Factor (PEF) and summing these products.

[3] Where a calculation requires the use of a value which was not detected, half of the laboratory reportable detection limit (RDL) is used in the equation.

Lab-Dup = Laboratory Duplicate.

TABLE 4: POLYCYCLIC AROMATIC HYDROCARBONS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines (SQGs)[1]						Englobe Phase II ESA										
			Human Health	Environmental Health				Interim Soil Quality Criteria	SS19-A	SS19-B	SS19-C	SS20-A	SS21-A	SS22-A	SS23-A	SS24-A	SS25-A	SS26-A	SS27-A
									0 - 0.15 m	0.15 - 0.3 m	0.3 - 0.45 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m
			Direct Contact	Soil Contact	Soil and Food Ingestion	Protection of Freshwater Aquatic Life	SQG_E	Remediation Criteria	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20	19-Mar-20
1-Methylnapthalene	0.0100	mg/kg	-	-	-	-	-	-	0.37	0.33	0.33	0.047	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	1
2-Methylnapthalene	0.0100	mg/kg	-	-	-	-	-	-	0.5	0.37	0.38	0.044	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	1.6
Acenaphthene	0.0100	mg/kg	-	-	21.5	0.28	-	-	**0.43**	0.22	**0.47**	0.15	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	0.17
Acenaphthylene	0.0100	mg/kg	-	-	-	320	-	-	0.29	0.14	0.11	0.051	<0.010	<0.010	<0.010	<0.010	0.018	0.056	0.094
Anthracene	0.0100	mg/kg	-	2.5	61.5	NA	2.5	-	0.75	0.54	0.98	0.35	0.039	0.02	<0.010	<0.010	0.028	0.11	0.62
Benz(a)anthracene	0.0100	mg/kg	-	-	6.2	-	-	1	**1.9**	**1.7**	**2.6**	0.72	0.06	0.046	<0.010	<0.010	0.093	0.33	**1.1**
Benzo(a)pyrene	0.0100	mg/kg	-	20	0.6	8800	20	-	**1.9**	**1.8**	**2.4**	**0.62**	0.059	0.04	<0.010	<0.010	0.079	0.3	**0.85**
Benzo(b)fluoranthene	0.0100	mg/kg	-	-	6.2	-	-	1	**1.6**	**1.5**	**1.8**	0.46	0.043	0.034	<0.010	<0.010	0.067	0.22	0.78
Benzo(b+j)fluoranthene	0.0100	mg/kg	-	-	-	-	-	-	2.5	2.3	2.8	0.73	0.064	0.055	<0.020	<0.020	0.11	0.36	1.2
Benzo(g,h,i)perylene	0.0100	mg/kg	-	-	-	-	-	-	1.1	1	1.2	0.32	0.037	0.028	<0.010	<0.010	0.05	0.18	0.48
Benzo(j)fluoranthene	0.0100	mg/kg	-	-	-	-	-	-	0.86	0.85	1	0.27	0.022	0.021	<0.010	<0.010	0.044	0.14	0.4
Benzo(k)fluoranthene	0.0100	mg/kg	-	-	6.2	-	-	1	0.91	0.86	1.1	0.28	0.029	0.021	<0.010	<0.010	0.044	0.15	0.43
Chrysene	0.0100	mg/kg	-	-	6.2	-	-	-	2.1	2	2.5	0.72	0.063	0.048	0.013	<0.010	0.09	0.33	1.2
Dibenz(a,h)anthracene	0.0100	mg/kg	-	-	-	-	-	1	0.3	0.26	0.33	0.087	<0.010	<0.010	<0.010	<0.010	0.014	0.043	0.13
Fluoranthene	0.0100	mg/kg	-	50	15.4	-	50	-	4.9	4.7	6.1	1.7	0.16	0.1	0.024	<0.010	0.19	0.61	2.7
Fluorene	0.0100	mg/kg	-	-	15.4	0.25	-	-	**0.38**	**0.3**	**0.48**	0.13	0.018	<0.010	<0.010	<0.010	<0.010	0.024	0.25
Indeno(1,2,3-c,d)pyrene	0.0100	mg/kg	-	-	-	-	-	1	1	0.95	1.1	0.3	0.031	0.023	<0.010	<0.010	0.045	0.15	0.44
Naphthalene	0.0100	mg/kg	-	-	8.8	0.013	-	0.6	**0.84**	**0.44**	**0.43**	**0.068**	**0.018**	<0.010	<0.010	<0.010	<0.010	0.013	**1.1**
Perylene	0.0100	mg/kg	-	-	-	-	-	-	0.41	0.37	0.5	0.13	0.012	<0.010	<0.010	<0.010	0.016	0.062	0.18
Phenanthrene	0.0100	mg/kg	-	-	43	0.046	-	5	**4.7**	**4**	**4.6**	**1.6**	**0.18**	**0.081**	0.017	<0.010	**0.089**	**0.33**	**3.1**
Pyrene	0.0100	mg/kg	-	-	7.7	-	-	10	4	3.7	4.8	1.3	0.14	0.09	0.022	<0.010	0.16	0.57	2.2
Calculated B(a)P TPE (10^{-5}) [2,3]	-	mg/kg	5.3	-	-	-	-	-	2.859	2.676	3.527	0.92	0.08	0.060	0.01	0.013	0.1237	0.447	1.312

Notes:

value -exceeds CCME guideline
\- -no guideline or value

[1] 1999 CCME SQGs for the Protection of Human and Environmental Health with updates online at the time of reporting (http://st-ts.ccme.ca/)) and the 1991 CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites.

[2] B(a)P TPE (Benzo(a)pyrene Total Potency Equivalent) is the sum of estimated cancer potency relative to B(a)P for all potentially carcinogenic unsubstituted PAH. The B(a)P TPE for a soil sample is calculated by multiplying the concentration of each PAH in the sample by its B(a)P Potency Equivalence Factor (PEF) and summing these products.
[3] Where a calculation requires the use of a value which was not detected, half of the laboratory reportable detection limit (RDL) is used in the equation.
Lab-Dup = Laboratory Duplicate.

TABLE 4: POLYCYCLIC AROMATIC HYDROCARBONS in Soil (Residential)
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER	RDL	UNITS	CCME Soil Quality Guidelines (SQGs)[1]						Englobe Phase II ESA								
									SS28-A	SS29-A	SS30-A	SS31-A	SS32-A	SS33-A	SS34-A	SS35-A	Dup 1
			Human Health	Environmental Health				Interim Soil Quality Criteria	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	0 - 0.15 m	
			Direct Contact	Soil Contact	Soil and Food Ingestion	Protection of Freshwater Aquatic Life	SQG_E	Remediation Criteria	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	19-Dec-20	
1-Methylnapthalene	0.0100	mg/kg	-	-	-	-	-	-	0.040	<0.010	<0.010	<0.010	0.067	0.037	0.034	0.076	0.11
2-Methylnapthalene	0.0100	mg/kg	-	-	-	-	-	-	0.050	<0.010	<0.010	0.013	0.075	0.043	0.053	0.076	0.10
Acenaphthene	0.0100	mg/kg	-	-	21.5	0.28	-	-	0.019	<0.010	<0.010	<0.010	0.1	0.057	<0.010	0.16	0.28
Acenaphthylene	0.0100	mg/kg	-	-	-	320	-	-	0.021	<0.010	<0.010	<0.010	0.094	<0.010	<0.010	0.058	0.079
Anthracene	0.0100	mg/kg	-	2.5	61.5	NA	2.5	-	0.11	0.044	<0.010	<0.010	0.63	0.14	<0.010	0.51	0.75
Benz(a)anthracene	0.0100	mg/kg	-	-	6.2	-	-	1	0.37	0.064	0.016	0.018	4.5	0.69	0.061	1.7	2.3
Benzo(a)pyrene	0.0100	mg/kg	-	20	0.6	8800	20	-	0.34	0.056	0.015	0.016	**4.4**	**0.61**	0.063	**1.8**	**2.3**
Benzo(b)fluoranthene	0.0100	mg/kg	-	-	6.2	-	-	1	0.31	0.046	0.017	0.020	3.9	0.54	0.062	1.7	2.2
Benzo(b+j)fluoranthene	0.0100	mg/kg	-	-	-	-	-	-	0.49	0.073	<0.020	0.020	6.1	0.86	0.097	2.6	3.4
Benzo(g,h,i)perylene	0.0100	mg/kg	-	-	-	-	-	-	0.25	0.033	0.016	0.016	2.8	0.40	0.083	1.3	1.6
Benzo(j)fluoranthene	0.0100	mg/kg	-	-	-	-	-	-	0.18	0.027	<0.010	<0.010	2.2	0.32	0.035	0.94	1.2
Benzo(k)fluoranthene	0.0100	mg/kg	-	-	6.2	-	-	1	0.17	0.023	<0.010	<0.010	2.1	0.30	0.033	0.86	1.1
Chrysene	0.0100	mg/kg	-	-	6.2	-	-	-	0.42	0.07	0.022	0.027	5.1	0.81	0.087	2.2	2.8
Dibenz(a,h)anthracene	0.0100	mg/kg	-	-	-	-	-	1	0.063	<0.010	<0.010	<0.010	0.77	0.12	<0.010	0.31	0.40
Fluoranthene	0.0100	mg/kg	-	50	15.4	-	50	-	0.89	0.16	0.039	0.041	7.9	1.3	0.13	3.8	5.1
Fluorene	0.0100	mg/kg	-	-	15.4	0.25	-	-	0.035	0.020	<0.010	<0.010	0.14	0.051	<0.010	0.16	**0.27**
Indeno(1,2,3-c,d)pyrene	0.0100	mg/kg	-	-	-	-	-	1	0.22	0.028	<0.010	<0.010	2.3	0.33	0.051	1.0	1.3
Naphthalene	0.0100	mg/kg	-	-	8.8	0.013	-	0.6	**0.038**	0.013	<0.010	<0.010	**0.076**	**0.046**	**0.030**	**0.093**	**0.15**
Perylene	0.0100	mg/kg	-	-	-	-	-	-	0.099	0.017	<0.010	<0.010	1.1	0.15	0.019	0.46	0.58
Phenanthrene	0.0100	mg/kg	-	-	43	0.046	-	5	**0.55**	**0.18**	0.035	0.035	**3.0**	**0.89**	0.10	**2.5**	**3.7**
Pyrene	0.0100	mg/kg	-	-	7.7	-	-	10	0.70	0.13	0.031	0.035	6.8	1.1	0.13	3.3	4.3
Calculated B(a)P TPE (10^{-5}) [2,3]	-	mg/kg	5.3	-	-	-	-	-	0.535	0.081	0.025	0.027	**6.749**	0.960	0.094	2.765	3.554

Notes:

value	-exceeds CCME guideline
-	-no guideline or value

[1] 1999 CCME SQGs for the Protection of Human and Environmental Health with updates online at the time of reporting (http://st-ts.ccme.ca/)) and the 1991 CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites.

[2] B(a)P TPE (Benzo(a)pyrene Total Potency Equivalent) is the sum of estimated cancer potency relative to B(a)P for all potentially carcinogenic unsubstituted PAH. The B(a)P TPE for a soil sample is calculated by multiplying the concentration of each PAH in the sample by its B(a)P Potency Equivalence Factor (PEF) and summing these products.

[3] Where a calculation requires the use of a value which was not detected, half of the laboratory reportable detection limit (RDL) is used in the equation.

Lab-Dup = Laboratory Duplicate.

TABLE 5: Total Petroleum Hydrocarbon (TPH) Compounds in Soil Vapour
Client: Parks Canada
Site Location: Georges Island National Historic Site, Halifax, NS
Englobe Project No.: 2000155

PARAMETER		Units	ATLANTIC RBCA VISLs [1] (Indoor Air)	GR-PHC
				19-Dec-20
BTEX	Benzene	mg/m^3	0.025	0.000025
	Toluene	mg/m^3	13	0.0008
	Ethylbenzene	mg/m^3	3.6	0.0008
	Xylenes	mg/m^3	0.65	0.0011
Aliphatic >C5-C6		mg/m^3	-	0.0025
Aliphatic >C6-C8		mg/m^3	67	0.003
Aliphatic >C8-C10		mg/m^3	3.6	0.003
Aliphatic >C10-C12		mg/m^3	3.6	0.00
Aliphatic >C12-C16		mg/m^3	3.6	0.003
Aromatic >C7-C8 (TEX excluded)		mg/m^3	-	0.0025
Aromatic >C8-C10 (EX excluded)		mg/m^3	0.73	0.0025
Aromatic >C10-C12		mg/m^3	0.73	0.003
Aromatic >C12-C16		mg/m^3	0.73	0.0025
Index of Additive Risk (IAR) Soil Vapour [2]		mg/m^3	1	0.012395

Notes:

value	- values exceed the established Vapour Intrusion Screening Level (VISL) including Index of Additive Risk (IAR)
-	- no standards for these fractions

[1] 2019 Atlantic RBCA Version 3.0 Guidance for Vapour Intrusion Assessments Tier II VISLs for Petroleum Hydrocarbons (VISLs); soil vapour sampling, indoor air for a commercial setting.

[2] The IAR is calculated by multiplying the concentration of each TPH fraction in the sample (or 1/2 its detection limit when concentration is non-detect) by its corresponding VISL, and summing these products. For total modified TPH analysis, the most conservative VISL in the carbon range was used.

Appendix C Laboratory Certificates

Your P.O. #: 13523
Your Project #: 2000155.000.0003

Attention: Christina Caldwell

Englobe Corp
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Your C.O.C. #: 805714-01-01, 805714-02-01, 805714-03-01

Report Date: 2020/12/31
Report #: R6467742
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0Y0624
Received: 2020/12/21, 10:55

Sample Matrix: Soil
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Benzo(b/j)fluoranthene Sum (soil)	9	N/A	2020/12/29	N/A	Auto Calc.
Petroleum Hydrocarbons F2-F4 in Soil (1, 2)	9	2020/12/29	2020/12/29	CAM SOP-00316	CCME CWS m
Metals Solids Acid Extr. ICPMS	9	2020/12/28	2020/12/30	ATL SOP 00058	EPA 6020B R2 m
Moisture	9	N/A	2020/12/24	ATL SOP 00001	OMOE Handbook 1983 m
PAH Compounds by GCMS (SIM) (3)	9	2020/12/23	2020/12/25	ATL SOP 00102	EPA 8270E R6 m
Volatile Organic Compounds and F1 PHCs (1)	5	N/A	2020/12/29	CAM SOP-00230	EPA 8260 m
Volatile Organic Compounds and F1 PHCs (1)	3	N/A	2020/12/30	CAM SOP-00230	EPA 8260 m

Sample Matrix: Solid
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Volatile Organic Compounds and F1 PHCs (1)	1	N/A	2020/12/29	CAM SOP-00230	EPA 8260 m

Remarks:

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

Your P.O. #: 13523
Your Project #: 2000155.000.0003

Attention: Christina Caldwell

Englobe Corp
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Your C.O.C. #: 805714-01-01, 805714-02-01, 805714-03-01

Report Date: 2020/12/31
Report #: R6467742
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0Y0624
Received: 2020/12/21, 10:55

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

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

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

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Keri Mackay, Customer Experience Team Lead
Email: Keri.MACKAY@bvlabs.com
Phone# (902)420-0203 Ext:294

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BV Labs Job #: C0Y0624
Report Date: 2020/12/31

Englobe Corp
Client Project #: 2000155.000.0003
Your P.O. #: 13523
Sampler Initials: LB

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

BV Labs ID		OLY198	OLY199			OLY199			OLY200		
Sampling Date		2020/12/19	2020/12/19			2020/12/19			2020/12/19		
COC Number		805714-01-01	805714-01-01			805714-01-01			805714-01-01		
Sample #		SS28-A	SS29-A			SS29-A			SS30-A		
	UNITS	**SS28-A**	**SS29-A**	**RDL**	**QC Batch**	**SS29-A Lab-Dup**	**RDL**	**QC Batch**	**SS30-A**	**RDL**	**QC Batch**
Volatile Organics											
Benzene	ug/g	0.11	0.012	0.0060	7129112				0.0082	0.0060	7129112
Ethylbenzene	ug/g	0.027	<0.010	0.010	7129112				<0.010	0.010	7129112
Toluene	ug/g	0.42	0.025	0.020	7129112				0.030	0.020	7129112
p+m-Xylene	ug/g	0.28	<0.020	0.020	7129112				0.022	0.020	7129112
o-Xylene	ug/g	0.078	<0.020	0.020	7129112				<0.020	0.020	7129112
Total Xylenes	ug/g	0.36	<0.020	0.020	7129112				0.022	0.020	7129112
F1 (C6-C10)	ug/g	<10	<10	10	7129112				<10	10	7129112
F1 (C6-C10) - BTEX	ug/g	<10	<10	10	7129112				<10	10	7129112
F2-F4 Hydrocarbons											
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	10	7128821	<10	10	7128821	<10	10	7128821
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	50	7128821	<50	50	7128821	<50	50	7128821
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	50	7128821	<50	50	7128821	<50	50	7128821
Reached Baseline at C50	ug/g	Yes	Yes		7128821	Yes		7128821	Yes		7128821
Surrogate Recovery (%)											
o-Terphenyl	%	83	82		7128821	84		7128821	86		7128821
4-Bromofluorobenzene	%	97	95		7129112				97		7129112
D10-o-Xylene	%	104	111		7129112				117		7129112
D4-1,2-Dichloroethane	%	97	95		7129112				98		7129112
D8-Toluene	%	99	97		7129112				99		7129112

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: C0Y0624
Report Date: 2020/12/31

Englobe Corp
Client Project #: 2000155.000.0003
Your P.O. #: 13523
Sampler Initials: LB

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

BV Labs ID		OLY201	OLY205	OLY206			OLY207		
Sampling Date		2020/12/19	2020/12/19	2020/12/19			2020/12/19		
COC Number		805714-01-01	805714-02-01	805714-02-01			805714-02-01		
Sample #		SS31-A	SS32-A	SS33-A			SS34-A		
	UNITS	**SS31-A**	**SS32-A**	**SS33-A**	**RDL**	**QC Batch**	**SS34-A**	**RDL**	**QC Batch**
Volatile Organics									
Benzene	ug/g	0.0098	0.34	0.011	0.0060	7129112			
Ethylbenzene	ug/g	<0.010	0.076	<0.010	0.010	7129112			
Toluene	ug/g	0.024	0.79	0.034	0.020	7129112			
p+m-Xylene	ug/g	0.021	0.39	0.031	0.020	7129112			
o-Xylene	ug/g	<0.020	0.18	<0.020	0.020	7129112			
Total Xylenes	ug/g	0.021	0.57	0.031	0.020	7129112			
F1 (C6-C10)	ug/g	<10	<10	<10	10	7129112			
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	10	7129112			
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	10	7128821	79	10	7129313
F3 (C16-C34 Hydrocarbons)	ug/g	<50	270	80	50	7128821	390	50	7129313
F4 (C34-C50 Hydrocarbons)	ug/g	<50	130	<50	50	7128821	<50	50	7129313
Reached Baseline at C50	ug/g	Yes	Yes	Yes		7128821	Yes		7129313
Surrogate Recovery (%)									
o-Terphenyl	%	84	84	83		7128821	86		7129313
4-Bromofluorobenzene	%	94	96	96		7129112			
D10-o-Xylene	%	118	118	116		7129112			
D4-1,2-Dichloroethane	%	96	100	96		7129112			
D8-Toluene	%	99	98	98		7129112			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Englobe Corp
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Your P.O. #: 13523
Sampler Initials: LB

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

BV Labs ID		OLY216		OLY217		
Sampling Date		2020/12/19		2020/12/19		
COC Number		805714-03-01		805714-03-01		
Sample #		SS35-A		DUP 1		
	UNITS	SS35-A	RDL	Dup 1	RDL	QC Batch
Volatile Organics						
Benzene	ug/g	0.024	0.0060	0.016	0.0060	7129112
Ethylbenzene	ug/g	<0.010	0.010	<0.010	0.010	7129112
Toluene	ug/g	0.066	0.020	0.051	0.020	7129112
p+m-Xylene	ug/g	0.045	0.020	0.039	0.020	7129112
o-Xylene	ug/g	0.023	0.020	0.023	0.020	7129112
Total Xylenes	ug/g	0.068	0.020	0.063	0.020	7129112
F1 (C6-C10)	ug/g	<10	10	<20 (1)	20	7129112
F1 (C6-C10) - BTEX	ug/g	<10	10	<20	20	7129112
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	<20	20	<20	20	7128821
F3 (C16-C34 Hydrocarbons)	ug/g	150	100	280	100	7128821
F4 (C34-C50 Hydrocarbons)	ug/g	110	100	220	100	7128821
Reached Baseline at C50	ug/g	Yes		Yes		7128821
Surrogate Recovery (%)						
o-Terphenyl	%	83		81		7128821
4-Bromofluorobenzene	%	95		97		7129112
D10-o-Xylene	%	117		128		7129112
D4-1,2-Dichloroethane	%	99		98		7129112
D8-Toluene	%	99		98		7129112

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Detection limits were raised due to high moisture content of soil provided.

BV Labs Job #: C0Y0624
Report Date: 2020/12/31

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Client Project #: 2000155.000.0003
Your P.O. #: 13523
Sampler Initials: LB

RESULTS OF ANALYSES OF SOIL

BV Labs ID		OLY198	OLY199	OLY200	OLY201	OLY205	OLY206		
Sampling Date		2020/12/19	2020/12/19	2020/12/19	2020/12/19	2020/12/19	2020/12/19		
COC Number		805714-01-01	805714-01-01	805714-01-01	805714-01-01	805714-02-01	805714-02-01		
Sample #		SS28-A	SS29-A	SS30-A	SS31-A	SS32-A	SS33-A		
	UNITS	**SS28-A**	**SS29-A**	**SS30-A**	**SS31-A**	**SS32-A**	**SS33-A**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	12	13	13	15	31	35	1.0	7124541

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		OLY207	OLY216	OLY217		
Sampling Date		2020/12/19	2020/12/19	2020/12/19		
COC Number		805714-02-01	805714-03-01	805714-03-01		
Sample #		SS34-A	SS35-A	DUP 1		
	UNITS	**SS34-A**	**SS35-A**	**Dup 1**	**RDL**	**QC Batch**
Inorganics						
Moisture	%	30	44	50	1.0	7124541

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2020/12/31

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Client Project #: 2000155.000.0003
Your P.O. #: 13523
Sampler Initials: LB

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		OLY198	OLY199		OLY200	OLY200		
Sampling Date		2020/12/19	2020/12/19		2020/12/19	2020/12/19		
COC Number		805714-01-01	805714-01-01		805714-01-01	805714-01-01		
Sample #		SS28-A	SS29-A		SS30-A	SS30-A		
	UNITS	SS28-A	SS29-A	QC Batch	SS30-A	SS30-A Lab-Dup	RDL	QC Batch
Metals								
Acid Extractable Aluminum (Al)	mg/kg	9500	9700	7128351	10000	10000	10	7128414
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	7128351	<2.0	<2.0	2.0	7128414
Acid Extractable Arsenic (As)	mg/kg	28	24	7128351	28	34	2.0	7128414
Acid Extractable Barium (Ba)	mg/kg	220	160	7128351	260	260	5.0	7128414
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	7128351	<2.0	<2.0	2.0	7128414
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	7128351	<2.0	<2.0	2.0	7128414
Acid Extractable Boron (B)	mg/kg	<50	<50	7128351	<50	<50	50	7128414
Acid Extractable Cadmium (Cd)	mg/kg	0.62	0.91	7128351	<0.30	<0.30	0.30	7128414
Acid Extractable Chromium (Cr)	mg/kg	19	17	7128351	19	21	2.0	7128414
Acid Extractable Cobalt (Co)	mg/kg	10	11	7128351	11	13	1.0	7128414
Acid Extractable Copper (Cu)	mg/kg	31	27	7128351	24	23	2.0	7128414
Acid Extractable Iron (Fe)	mg/kg	37000	34000	7128351	36000	41000	50	7128414
Acid Extractable Lead (Pb)	mg/kg	680	480	7128351	540	550	0.50	7128414
Acid Extractable Lithium (Li)	mg/kg	17	18	7128351	20	20	2.0	7128414
Acid Extractable Manganese (Mn)	mg/kg	720	720	7128351	740	820	2.0	7128414
Acid Extractable Mercury (Hg)	mg/kg	1.1	0.28	7128351	8.1	7.9	0.10	7128414
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	7128351	<2.0	<2.0	2.0	7128414
Acid Extractable Nickel (Ni)	mg/kg	26	25	7128351	26	29	2.0	7128414
Acid Extractable Rubidium (Rb)	mg/kg	11	9.7	7128351	12	13	2.0	7128414
Acid Extractable Selenium (Se)	mg/kg	<0.50	<0.50	7128351	<0.50	<0.50	0.50	7128414
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	7128351	<0.50	<0.50	0.50	7128414
Acid Extractable Strontium (Sr)	mg/kg	30	22	7128351	30	32	5.0	7128414
Acid Extractable Thallium (Tl)	mg/kg	0.15	<0.10	7128351	0.46	0.46	0.10	7128414
Acid Extractable Tin (Sn)	mg/kg	31	12	7128351	9.6	13	1.0	7128414
Acid Extractable Uranium (U)	mg/kg	0.50	0.53	7128351	0.52	0.51	0.10	7128414
Acid Extractable Vanadium (V)	mg/kg	28	22	7128351	25	25	2.0	7128414
Acid Extractable Zinc (Zn)	mg/kg	250	340	7128351	110	110	5.0	7128414

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: C0Y0624
Report Date: 2020/12/31

Englobe Corp
Client Project #: 2000155.000.0003
Your P.O. #: 13523
Sampler Initials: LB

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		OLY201	OLY205	OLY206	OLY207	OLY216		
Sampling Date		2020/12/19	2020/12/19	2020/12/19	2020/12/19	2020/12/19		
COC Number		805714-01-01	805714-02-01	805714-02-01	805714-02-01	805714-03-01		
Sample #		SS31-A	SS32-A	SS33-A	SS34-A	SS35-A		
	UNITS	**SS31-A**	**SS32-A**	**SS33-A**	**SS34-A**	**SS35-A**	**RDL**	**QC Batch**
Metals								
Acid Extractable Aluminum (Al)	mg/kg	11000	13000	15000	13000	11000	10	7128351
Acid Extractable Antimony (Sb)	mg/kg	4.4	<2.0	7.3	<2.0	<2.0	2.0	7128351
Acid Extractable Arsenic (As)	mg/kg	23	18	23	14	19	2.0	7128351
Acid Extractable Barium (Ba)	mg/kg	110	130	230	90	250	5.0	7128351
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7128351
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7128351
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	7128351
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.94	0.54	<0.30	0.60	0.30	7128351
Acid Extractable Chromium (Cr)	mg/kg	21	23	32	19	23	2.0	7128351
Acid Extractable Cobalt (Co)	mg/kg	10	8.5	8.6	8.6	7.1	1.0	7128351
Acid Extractable Copper (Cu)	mg/kg	24	56	570	32	340	2.0	7128351
Acid Extractable Iron (Fe)	mg/kg	27000	42000	36000	23000	32000	50	7128351
Acid Extractable Lead (Pb)	mg/kg	220	510	4600	130	890	0.50	7128351
Acid Extractable Lithium (Li)	mg/kg	19	18	15	17	13	2.0	7128351
Acid Extractable Manganese (Mn)	mg/kg	610	700	960	410	440	2.0	7128351
Acid Extractable Mercury (Hg)	mg/kg	0.23	3.7	0.71	5.0	0.68	0.10	7128351
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	2.1	<2.0	<2.0	2.0	7128351
Acid Extractable Nickel (Ni)	mg/kg	24	31	51	23	38	2.0	7128351
Acid Extractable Rubidium (Rb)	mg/kg	13	7.3	9.1	8.5	6.3	2.0	7128351
Acid Extractable Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	<0.50	0.62	0.50	7128351
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7128351
Acid Extractable Strontium (Sr)	mg/kg	20	120	120	240	100	5.0	7128351
Acid Extractable Thallium (Tl)	mg/kg	0.13	0.10	0.11	<0.10	0.15	0.10	7128351
Acid Extractable Tin (Sn)	mg/kg	130	18	38	4.3	6.8	1.0	7128351
Acid Extractable Uranium (U)	mg/kg	0.54	0.73	0.79	0.87	0.55	0.10	7128351
Acid Extractable Vanadium (V)	mg/kg	23	49	130	36	65	2.0	7128351
Acid Extractable Zinc (Zn)	mg/kg	100	570	540	140	1000	5.0	7128351

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Client Project #: 2000155.000.0003
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Sampler Initials: LB

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		OLY217		
Sampling Date		2020/12/19		
COC Number		805714-03-01		
Sample #		DUP 1		
	UNITS	Dup 1	RDL	QC Batch
Metals				
Acid Extractable Aluminum (Al)	mg/kg	9500	10	7128351
Acid Extractable Antimony (Sb)	mg/kg	2.0	2.0	7128351
Acid Extractable Arsenic (As)	mg/kg	20	2.0	7128351
Acid Extractable Barium (Ba)	mg/kg	220	5.0	7128351
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	7128351
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	7128351
Acid Extractable Boron (B)	mg/kg	<50	50	7128351
Acid Extractable Cadmium (Cd)	mg/kg	0.60	0.30	7128351
Acid Extractable Chromium (Cr)	mg/kg	22	2.0	7128351
Acid Extractable Cobalt (Co)	mg/kg	6.8	1.0	7128351
Acid Extractable Copper (Cu)	mg/kg	940	2.0	7128351
Acid Extractable Iron (Fe)	mg/kg	27000	50	7128351
Acid Extractable Lead (Pb)	mg/kg	430	0.50	7128351
Acid Extractable Lithium (Li)	mg/kg	14	2.0	7128351
Acid Extractable Manganese (Mn)	mg/kg	410	2.0	7128351
Acid Extractable Mercury (Hg)	mg/kg	1.1	0.10	7128351
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	7128351
Acid Extractable Nickel (Ni)	mg/kg	36	2.0	7128351
Acid Extractable Rubidium (Rb)	mg/kg	7.0	2.0	7128351
Acid Extractable Selenium (Se)	mg/kg	0.69	0.50	7128351
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	7128351
Acid Extractable Strontium (Sr)	mg/kg	68	5.0	7128351
Acid Extractable Thallium (Tl)	mg/kg	0.17	0.10	7128351
Acid Extractable Tin (Sn)	mg/kg	6.9	1.0	7128351
Acid Extractable Uranium (U)	mg/kg	0.60	0.10	7128351
Acid Extractable Vanadium (V)	mg/kg	63	2.0	7128351
Acid Extractable Zinc (Zn)	mg/kg	700	5.0	7128351

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

BV Labs ID		OLY198	OLY199	OLY200	OLY201	OLY205	OLY206		
Sampling Date		2020/12/19	2020/12/19	2020/12/19	2020/12/19	2020/12/19	2020/12/19		
COC Number		805714-01-01	805714-01-01	805714-01-01	805714-01-01	805714-02-01	805714-02-01		
Sample #		SS28-A	SS29-A	SS30-A	SS31-A	SS32-A	SS33-A		
	UNITS	**SS28-A**	**SS29-A**	**SS30-A**	**SS31-A**	**SS32-A**	**SS33-A**	**RDL**	**QC Batch**
Polyaromatic Hydrocarbons									
1-Methylnaphthalene	mg/kg	0.040	<0.010	<0.010	<0.010	0.067	0.037	0.010	7125056
2-Methylnaphthalene	mg/kg	0.050	<0.010	<0.010	0.013	0.075	0.043	0.010	7125056
Acenaphthene	mg/kg	0.019	<0.010	<0.010	<0.010	0.10	0.057	0.010	7125056
Acenaphthylene	mg/kg	0.021	<0.010	<0.010	<0.010	0.094	<0.010	0.010	7125056
Anthracene	mg/kg	0.11	0.044	<0.010	<0.010	0.63	0.14	0.010	7125056
Benzo(a)anthracene	mg/kg	0.37	0.064	0.016	0.018	4.5	0.69	0.010	7125056
Benzo(a)pyrene	mg/kg	0.34	0.056	0.015	0.016	4.4	0.61	0.010	7125056
Benzo(b)fluoranthene	mg/kg	0.31	0.046	0.017	0.020	3.9	0.54	0.010	7125056
Benzo(b/j)fluoranthene	mg/kg	0.49	0.073	<0.020	0.020	6.1	0.86	0.020	7122664
Benzo(g,h,i)perylene	mg/kg	0.25	0.033	0.016	0.016	2.8	0.40	0.010	7125056
Benzo(j)fluoranthene	mg/kg	0.18	0.027	<0.010	<0.010	2.2	0.32	0.010	7125056
Benzo(k)fluoranthene	mg/kg	0.17	0.023	<0.010	<0.010	2.1	0.30	0.010	7125056
Chrysene	mg/kg	0.42	0.070	0.022	0.027	5.1	0.81	0.010	7125056
Dibenzo(a,h)anthracene	mg/kg	0.063	<0.010	<0.010	<0.010	0.77	0.12	0.010	7125056
Fluoranthene	mg/kg	0.89	0.16	0.039	0.041	7.9	1.3	0.010	7125056
Fluorene	mg/kg	0.035	0.020	<0.010	<0.010	0.14	0.051	0.010	7125056
Indeno(1,2,3-cd)pyrene	mg/kg	0.22	0.028	<0.010	<0.010	2.3	0.33	0.010	7125056
Naphthalene	mg/kg	0.038	0.013	<0.010	<0.010	0.076	0.046	0.010	7125056
Perylene	mg/kg	0.099	0.017	<0.010	<0.010	1.1	0.15	0.010	7125056
Phenanthrene	mg/kg	0.55	0.18	0.035	0.035	3.0	0.89	0.010	7125056
Pyrene	mg/kg	0.70	0.13	0.031	0.035	6.8	1.1	0.010	7125056
Surrogate Recovery (%)									
D10-Anthracene	%	106	106	107	105	107	104		7125056
D14-Terphenyl (FS)	%	104	103	102	103	103	101		7125056
D8-Acenaphthylene	%	101	97	97	97	99	96		7125056

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Englobe Corp
Client Project #: 2000155.000.0003
Your P.O. #: 13523
Sampler Initials: LB

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

BV Labs ID		OLY207	OLY216	OLY217		
Sampling Date		2020/12/19	2020/12/19	2020/12/19		
COC Number		805714-02-01	805714-03-01	805714-03-01		
Sample #		SS34-A	SS35-A	DUP 1		
	UNITS	**SS34-A**	**SS35-A**	**Dup 1**	**RDL**	**QC Batch**
Polyaromatic Hydrocarbons						
1-Methylnaphthalene	mg/kg	0.034	0.076	0.11	0.010	7125056
2-Methylnaphthalene	mg/kg	0.053	0.076	0.10	0.010	7125056
Acenaphthene	mg/kg	<0.010	0.16	0.28	0.010	7125056
Acenaphthylene	mg/kg	<0.010	0.058	0.079	0.010	7125056
Anthracene	mg/kg	<0.010	0.51	0.75	0.010	7125056
Benzo(a)anthracene	mg/kg	0.061	1.7	2.3	0.010	7125056
Benzo(a)pyrene	mg/kg	0.063	1.8	2.3	0.010	7125056
Benzo(b)fluoranthene	mg/kg	0.062	1.7	2.2	0.010	7125056
Benzo(b/j)fluoranthene	mg/kg	0.097	2.6	3.4	0.020	7122664
Benzo(g,h,i)perylene	mg/kg	0.083	1.3	1.6	0.010	7125056
Benzo(j)fluoranthene	mg/kg	0.035	0.94	1.2	0.010	7125056
Benzo(k)fluoranthene	mg/kg	0.033	0.86	1.1	0.010	7125056
Chrysene	mg/kg	0.087	2.2	2.8	0.010	7125056
Dibenzo(a,h)anthracene	mg/kg	<0.010	0.31	0.40	0.010	7125056
Fluoranthene	mg/kg	0.13	3.8	5.1	0.010	7125056
Fluorene	mg/kg	<0.010	0.16	0.27	0.010	7125056
Indeno(1,2,3-cd)pyrene	mg/kg	0.051	1.0	1.3	0.010	7125056
Naphthalene	mg/kg	0.030	0.093	0.15	0.010	7125056
Perylene	mg/kg	0.019	0.46	0.58	0.010	7125056
Phenanthrene	mg/kg	0.10	2.5	3.7	0.010	7125056
Pyrene	mg/kg	0.13	3.3	4.3	0.010	7125056
Surrogate Recovery (%)						
D10-Anthracene	%	104	103	102		7125056
D14-Terphenyl (FS)	%	101	99	99		7125056
D8-Acenaphthylene	%	95	98	96		7125056

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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VOLATILE ORGANICS BY GC/MS (SOLID)

BV Labs ID		OLY207		
Sampling Date				
COC Number		805714-01-01		
Sample #		SS34-A		
	UNITS	SS34-A	RDL	QC Batch
Volatile Organics				
Acetone (2-Propanone)	ug/g	<0.50	0.50	7129112
Benzene	ug/g	<0.0060	0.0060	7129112
Bromodichloromethane	ug/g	<0.050	0.050	7129112
Bromoform	ug/g	<0.050	0.050	7129112
Bromomethane	ug/g	<0.050	0.050	7129112
Carbon Tetrachloride	ug/g	<0.050	0.050	7129112
Chlorobenzene	ug/g	<0.050	0.050	7129112
Chloroform	ug/g	<0.050	0.050	7129112
Dibromochloromethane	ug/g	<0.050	0.050	7129112
1,2-Dichlorobenzene	ug/g	<0.050	0.050	7129112
1,3-Dichlorobenzene	ug/g	<0.050	0.050	7129112
1,4-Dichlorobenzene	ug/g	<0.050	0.050	7129112
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	0.050	7129112
1,1-Dichloroethane	ug/g	<0.050	0.050	7129112
1,2-Dichloroethane	ug/g	<0.050	0.050	7129112
1,1-Dichloroethylene	ug/g	<0.050	0.050	7129112
cis-1,2-Dichloroethylene	ug/g	<0.050	0.050	7129112
trans-1,2-Dichloroethylene	ug/g	<0.050	0.050	7129112
1,2-Dichloropropane	ug/g	<0.050	0.050	7129112
cis-1,3-Dichloropropene	ug/g	<0.030	0.030	7129112
trans-1,3-Dichloropropene	ug/g	<0.040	0.040	7129112
Ethylbenzene	ug/g	<0.010	0.010	7129112
Ethylene Dibromide	ug/g	<0.050	0.050	7129112
Hexane	ug/g	<0.050	0.050	7129112
Methylene Chloride(Dichloromethane)	ug/g	<0.050	0.050	7129112
Methyl Isobutyl Ketone	ug/g	<0.50	0.50	7129112
Methyl Ethyl Ketone (2-Butanone)	ug/g	2.0	0.50	7129112
Methyl t-butyl ether (MTBE)	ug/g	<0.050	0.050	7129112
Styrene	ug/g	<0.050	0.050	7129112
1,1,1,2-Tetrachloroethane	ug/g	<0.050	0.050	7129112
1,1,2,2-Tetrachloroethane	ug/g	<0.050	0.050	7129112
Tetrachloroethylene	ug/g	<0.050	0.050	7129112
Toluene	ug/g	<0.020	0.020	7129112
1,1,1-Trichloroethane	ug/g	<0.050	0.050	7129112

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Englobe Corp
Client Project #: 2000155.000.0003
Your P.O. #: 13523
Sampler Initials: LB

VOLATILE ORGANICS BY GC/MS (SOLID)

BV Labs ID		OLY207		
Sampling Date				
COC Number		805714-01-01		
Sample #		SS34-A		
	UNITS	SS34-A	RDL	QC Batch
1,1,2-Trichloroethane	ug/g	<0.050	0.050	7129112
Trichloroethylene	ug/g	<0.010	0.010	7129112
Vinyl Chloride	ug/g	<0.020	0.020	7129112
p+m-Xylene	ug/g	0.042	0.020	7129112
o-Xylene	ug/g	<0.020	0.020	7129112
Total Xylenes	ug/g	0.042	0.020	7129112
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	0.050	7129112
F1 (C6-C10)	ug/g	<10	10	7129112
F1 (C6-C10) - BTEX	ug/g	<10	10	7129112
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	97		7129112
D10-o-Xylene	%	102		7129112
D4-1,2-Dichloroethane	%	98		7129112
D8-Toluene	%	96		7129112

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

GENERAL COMMENTS

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

Package 1	3.3°C
Package 2	4.0°C

Sample SS34-A was lab preserved for BTEX/F1 due to insufficient methanol in vials when received at the lab. 2020/12/23 MMC

Sample OLY198 [SS28-A] : VOCF1 Analysis: Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency

Sample OLY199 [SS29-A] : VOCF1 Analysis: Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency

Sample OLY201 [SS31-A] : VOCF1 Analysis: Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency

Sample OLY207 [SS34-A] : Sample preserved in lab for F1BTEX testing.

Sample OLY216 [SS35-A] : F2-F4 Analysis: Detection limits were adjusted for high moisture content.

Sample OLY217 [Dup 1] : F2-F4 Analysis: Detection limits were adjusted for high moisture content.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7124541	KKE	RPD	Moisture	2020/12/24	3.8		%	25
7125056	RST	Matrix Spike	D10-Anthracene	2020/12/25		103	%	50 - 130
			D14-Terphenyl (FS)	2020/12/25		102	%	50 - 130
			D8-Acenaphthylene	2020/12/25		96	%	50 - 130
			1-Methylnaphthalene	2020/12/25		92	%	50 - 130
			2-Methylnaphthalene	2020/12/25		93	%	50 - 130
			Acenaphthene	2020/12/25		96	%	50 - 130
			Acenaphthylene	2020/12/25		91	%	50 - 130
			Anthracene	2020/12/25		95	%	50 - 130
			Benzo(a)anthracene	2020/12/25		95	%	50 - 130
			Benzo(a)pyrene	2020/12/25		93	%	50 - 130
			Benzo(b)fluoranthene	2020/12/25		95	%	50 - 130
			Benzo(g,h,i)perylene	2020/12/25		91	%	50 - 130
			Benzo(j)fluoranthene	2020/12/25		94	%	50 - 130
			Benzo(k)fluoranthene	2020/12/25		91	%	50 - 130
			Chrysene	2020/12/25		101	%	50 - 130
			Dibenzo(a,h)anthracene	2020/12/25		95	%	50 - 130
			Fluoranthene	2020/12/25		98	%	50 - 130
			Fluorene	2020/12/25		98	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/12/25		91	%	50 - 130
			Naphthalene	2020/12/25		97	%	50 - 130
			Perylene	2020/12/25		93	%	50 - 130
			Phenanthrene	2020/12/25		102	%	50 - 130
			Pyrene	2020/12/25		100	%	50 - 130
7125056	RST	Spiked Blank	D10-Anthracene	2020/12/25		108	%	50 - 130
			D14-Terphenyl (FS)	2020/12/25		103	%	50 - 130
			D8-Acenaphthylene	2020/12/25		98	%	50 - 130
			1-Methylnaphthalene	2020/12/25		92	%	50 - 130
			2-Methylnaphthalene	2020/12/25		94	%	50 - 130
			Acenaphthene	2020/12/25		97	%	50 - 130
			Acenaphthylene	2020/12/25		92	%	50 - 130
			Anthracene	2020/12/25		101	%	50 - 130
			Benzo(a)anthracene	2020/12/25		97	%	50 - 130
			Benzo(a)pyrene	2020/12/25		97	%	50 - 130
			Benzo(b)fluoranthene	2020/12/25		100	%	50 - 130
			Benzo(g,h,i)perylene	2020/12/25		98	%	50 - 130
			Benzo(j)fluoranthene	2020/12/25		96	%	50 - 130
			Benzo(k)fluoranthene	2020/12/25		92	%	50 - 130
			Chrysene	2020/12/25		103	%	50 - 130
			Dibenzo(a,h)anthracene	2020/12/25		100	%	50 - 130
			Fluoranthene	2020/12/25		101	%	50 - 130
			Fluorene	2020/12/25		100	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2020/12/25		96	%	50 - 130
			Naphthalene	2020/12/25		99	%	50 - 130
			Perylene	2020/12/25		99	%	50 - 130
			Phenanthrene	2020/12/25		106	%	50 - 130
			Pyrene	2020/12/25		103	%	50 - 130
7125056	RST	Method Blank	D10-Anthracene	2020/12/25		106	%	50 - 130
			D14-Terphenyl (FS)	2020/12/25		102	%	50 - 130
			D8-Acenaphthylene	2020/12/25		97	%	50 - 130
			1-Methylnaphthalene	2020/12/25	<0.010		mg/kg	
			2-Methylnaphthalene	2020/12/25	<0.010		mg/kg	
			Acenaphthene	2020/12/25	<0.010		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acenaphthylene	2020/12/25	<0.010		mg/kg	
			Anthracene	2020/12/25	<0.010		mg/kg	
			Benzo(a)anthracene	2020/12/25	<0.010		mg/kg	
			Benzo(a)pyrene	2020/12/25	<0.010		mg/kg	
			Benzo(b)fluoranthene	2020/12/25	<0.010		mg/kg	
			Benzo(g,h,i)perylene	2020/12/25	<0.010		mg/kg	
			Benzo(j)fluoranthene	2020/12/25	<0.010		mg/kg	
			Benzo(k)fluoranthene	2020/12/25	<0.010		mg/kg	
			Chrysene	2020/12/25	<0.010		mg/kg	
			Dibenzo(a,h)anthracene	2020/12/25	<0.010		mg/kg	
			Fluoranthene	2020/12/25	<0.010		mg/kg	
			Fluorene	2020/12/25	<0.010		mg/kg	
			Indeno(1,2,3-cd)pyrene	2020/12/25	<0.010		mg/kg	
			Naphthalene	2020/12/25	<0.010		mg/kg	
			Perylene	2020/12/25	<0.010		mg/kg	
			Phenanthrene	2020/12/25	<0.010		mg/kg	
			Pyrene	2020/12/25	<0.010		mg/kg	
7125056	RST	RPD	1-Methylnaphthalene	2020/12/25	NC		%	50
			2-Methylnaphthalene	2020/12/25	NC		%	50
			Acenaphthene	2020/12/25	NC		%	50
			Acenaphthylene	2020/12/25	NC		%	50
			Anthracene	2020/12/25	NC		%	50
			Benzo(a)anthracene	2020/12/25	NC		%	50
			Benzo(a)pyrene	2020/12/25	NC		%	50
			Benzo(b)fluoranthene	2020/12/25	48		%	50
			Benzo(g,h,i)perylene	2020/12/25	14		%	50
			Benzo(j)fluoranthene	2020/12/25	NC		%	50
			Benzo(k)fluoranthene	2020/12/25	NC		%	50
			Chrysene	2020/12/25	12		%	50
			Dibenzo(a,h)anthracene	2020/12/25	NC		%	50
			Fluoranthene	2020/12/25	38		%	50
			Fluorene	2020/12/25	NC		%	50
			Indeno(1,2,3-cd)pyrene	2020/12/25	NC		%	50
			Naphthalene	2020/12/25	NC		%	50
			Perylene	2020/12/25	NC		%	50
			Phenanthrene	2020/12/25	35		%	50
			Pyrene	2020/12/25	38		%	50
7128351	MLB	Matrix Spike	Acid Extractable Antimony (Sb)	2020/12/30		93	%	75 - 125
			Acid Extractable Arsenic (As)	2020/12/30		100	%	75 - 125
			Acid Extractable Barium (Ba)	2020/12/30		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/12/30		103	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/12/30		107	%	75 - 125
			Acid Extractable Boron (B)	2020/12/30		82	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/12/30		99	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/12/30		93	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/12/30		95	%	75 - 125
			Acid Extractable Copper (Cu)	2020/12/30		100	%	75 - 125
			Acid Extractable Lead (Pb)	2020/12/30		224 (1)	%	75 - 125
			Acid Extractable Lithium (Li)	2020/12/30		114	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/12/30		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2020/12/30		100	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/12/30		94	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/12/30		89	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Rubidium (Rb)	2020/12/30		100	%	75 - 125
			Acid Extractable Selenium (Se)	2020/12/30		94	%	75 - 125
			Acid Extractable Silver (Ag)	2020/12/30		102	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/12/30		116	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/12/30		99	%	75 - 125
			Acid Extractable Tin (Sn)	2020/12/30		110	%	75 - 125
			Acid Extractable Uranium (U)	2020/12/30		103	%	75 - 125
			Acid Extractable Vanadium (V)	2020/12/30		102	%	75 - 125
			Acid Extractable Zinc (Zn)	2020/12/30		NC	%	75 - 125
7128351	MLB	Spiked Blank	Acid Extractable Antimony (Sb)	2020/12/28		106	%	75 - 125
			Acid Extractable Arsenic (As)	2020/12/28		97	%	75 - 125
			Acid Extractable Barium (Ba)	2020/12/28		95	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/12/28		97	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/12/28		98	%	75 - 125
			Acid Extractable Boron (B)	2020/12/28		94	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/12/28		96	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/12/28		95	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/12/28		95	%	75 - 125
			Acid Extractable Copper (Cu)	2020/12/28		100	%	75 - 125
			Acid Extractable Lead (Pb)	2020/12/28		96	%	75 - 125
			Acid Extractable Lithium (Li)	2020/12/28		95	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/12/28		95	%	75 - 125
			Acid Extractable Mercury (Hg)	2020/12/28		107	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/12/28		103	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/12/28		100	%	75 - 125
			Acid Extractable Rubidium (Rb)	2020/12/28		96	%	75 - 125
			Acid Extractable Selenium (Se)	2020/12/28		95	%	75 - 125
			Acid Extractable Silver (Ag)	2020/12/28		97	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/12/28		99	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/12/28		98	%	75 - 125
			Acid Extractable Tin (Sn)	2020/12/28		98	%	75 - 125
			Acid Extractable Uranium (U)	2020/12/28		97	%	75 - 125
			Acid Extractable Vanadium (V)	2020/12/28		100	%	75 - 125
			Acid Extractable Zinc (Zn)	2020/12/28		99	%	75 - 125
7128351	MLB	Method Blank	Acid Extractable Aluminum (Al)	2020/12/30	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2020/12/30	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Boron (B)	2020/12/30	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2020/12/30	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2020/12/30	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2020/12/30	<50		mg/kg	
			Acid Extractable Lead (Pb)	2020/12/30	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2020/12/30	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2020/12/30	<2.0		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Selenium (Se)	2020/12/30	<0.50		mg/kg	
			Acid Extractable Silver (Ag)	2020/12/30	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2020/12/30	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2020/12/30	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2020/12/30	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2020/12/30	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2020/12/30	<5.0		mg/kg	
7128351	MLB	RPD	Acid Extractable Aluminum (Al)	2020/12/30	1.9		%	35
			Acid Extractable Antimony (Sb)	2020/12/30	NC		%	35
			Acid Extractable Arsenic (As)	2020/12/30	18		%	35
			Acid Extractable Barium (Ba)	2020/12/30	3.7		%	35
			Acid Extractable Beryllium (Be)	2020/12/30	NC		%	35
			Acid Extractable Bismuth (Bi)	2020/12/30	NC		%	35
			Acid Extractable Boron (B)	2020/12/30	NC		%	35
			Acid Extractable Cadmium (Cd)	2020/12/30	NC		%	35
			Acid Extractable Chromium (Cr)	2020/12/30	8.8		%	35
			Acid Extractable Cobalt (Co)	2020/12/30	4.9		%	35
			Acid Extractable Copper (Cu)	2020/12/30	7.7		%	35
			Acid Extractable Iron (Fe)	2020/12/30	3.3		%	35
			Acid Extractable Lead (Pb)	2020/12/30	1.1		%	35
			Acid Extractable Lithium (Li)	2020/12/30	3.5		%	35
			Acid Extractable Manganese (Mn)	2020/12/30	2.9		%	35
			Acid Extractable Mercury (Hg)	2020/12/30	NC		%	35
			Acid Extractable Molybdenum (Mo)	2020/12/30	9.9		%	35
			Acid Extractable Nickel (Ni)	2020/12/30	11		%	35
			Acid Extractable Rubidium (Rb)	2020/12/30	4.5		%	35
			Acid Extractable Selenium (Se)	2020/12/30	NC		%	35
			Acid Extractable Silver (Ag)	2020/12/30	NC		%	35
			Acid Extractable Strontium (Sr)	2020/12/30	27		%	35
			Acid Extractable Thallium (Tl)	2020/12/30	5.0		%	35
			Acid Extractable Tin (Sn)	2020/12/30	NC		%	35
			Acid Extractable Uranium (U)	2020/12/30	1.9		%	35
			Acid Extractable Vanadium (V)	2020/12/30	3.8		%	35
			Acid Extractable Zinc (Zn)	2020/12/30	0.00071		%	35
7128414	MLB	Matrix Spike [OLY200-04]	Acid Extractable Antimony (Sb)	2020/12/30		105	%	75 - 125
			Acid Extractable Arsenic (As)	2020/12/30		94	%	75 - 125
			Acid Extractable Barium (Ba)	2020/12/30		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/12/30		104	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/12/30		100	%	75 - 125
			Acid Extractable Boron (B)	2020/12/30		90	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/12/30		99	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/12/30		94	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/12/30		92	%	75 - 125
			Acid Extractable Copper (Cu)	2020/12/30		88	%	75 - 125
			Acid Extractable Lead (Pb)	2020/12/30		NC	%	75 - 125
			Acid Extractable Lithium (Li)	2020/12/30		110	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/12/30		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2020/12/30		105	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/12/30		103	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/12/30		91	%	75 - 125
			Acid Extractable Rubidium (Rb)	2020/12/30		102	%	75 - 125
			Acid Extractable Selenium (Se)	2020/12/30		94	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Silver (Ag)	2020/12/30		100	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/12/30		109	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/12/30		101	%	75 - 125
			Acid Extractable Tin (Sn)	2020/12/30		NC	%	75 - 125
			Acid Extractable Uranium (U)	2020/12/30		100	%	75 - 125
			Acid Extractable Vanadium (V)	2020/12/30		99	%	75 - 125
			Acid Extractable Zinc (Zn)	2020/12/30		NC	%	75 - 125
7128414	MLB	Spiked Blank	Acid Extractable Antimony (Sb)	2020/12/28		106	%	75 - 125
			Acid Extractable Arsenic (As)	2020/12/28		98	%	75 - 125
			Acid Extractable Barium (Ba)	2020/12/28		98	%	75 - 125
			Acid Extractable Beryllium (Be)	2020/12/28		98	%	75 - 125
			Acid Extractable Bismuth (Bi)	2020/12/28		100	%	75 - 125
			Acid Extractable Boron (B)	2020/12/28		98	%	75 - 125
			Acid Extractable Cadmium (Cd)	2020/12/28		96	%	75 - 125
			Acid Extractable Chromium (Cr)	2020/12/28		96	%	75 - 125
			Acid Extractable Cobalt (Co)	2020/12/28		95	%	75 - 125
			Acid Extractable Copper (Cu)	2020/12/28		101	%	75 - 125
			Acid Extractable Lead (Pb)	2020/12/28		98	%	75 - 125
			Acid Extractable Lithium (Li)	2020/12/28		95	%	75 - 125
			Acid Extractable Manganese (Mn)	2020/12/28		99	%	75 - 125
			Acid Extractable Mercury (Hg)	2020/12/28		110	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2020/12/28		97	%	75 - 125
			Acid Extractable Nickel (Ni)	2020/12/28		100	%	75 - 125
			Acid Extractable Rubidium (Rb)	2020/12/28		96	%	75 - 125
			Acid Extractable Selenium (Se)	2020/12/28		95	%	75 - 125
			Acid Extractable Silver (Ag)	2020/12/28		99	%	75 - 125
			Acid Extractable Strontium (Sr)	2020/12/28		99	%	75 - 125
			Acid Extractable Thallium (Tl)	2020/12/28		100	%	75 - 125
			Acid Extractable Tin (Sn)	2020/12/28		102	%	75 - 125
			Acid Extractable Uranium (U)	2020/12/28		98	%	75 - 125
			Acid Extractable Vanadium (V)	2020/12/28		99	%	75 - 125
			Acid Extractable Zinc (Zn)	2020/12/28		102	%	75 - 125
7128414	MLB	Method Blank	Acid Extractable Aluminum (Al)	2020/12/30	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2020/12/30	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Boron (B)	2020/12/30	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2020/12/30	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2020/12/30	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2020/12/30	<50		mg/kg	
			Acid Extractable Lead (Pb)	2020/12/30	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2020/12/30	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2020/12/30	<0.50		mg/kg	
			Acid Extractable Silver (Ag)	2020/12/30	<0.50		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Strontium (Sr)	2020/12/30	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2020/12/30	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2020/12/30	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2020/12/30	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2020/12/30	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2020/12/30	<5.0		mg/kg	
7128414	MLB	RPD [OLY200-04]	Acid Extractable Aluminum (Al)	2020/12/30	0.68		%	35
			Acid Extractable Antimony (Sb)	2020/12/30	NC		%	35
			Acid Extractable Arsenic (As)	2020/12/30	20		%	35
			Acid Extractable Barium (Ba)	2020/12/30	0.50		%	35
			Acid Extractable Beryllium (Be)	2020/12/30	NC		%	35
			Acid Extractable Bismuth (Bi)	2020/12/30	NC		%	35
			Acid Extractable Boron (B)	2020/12/30	NC		%	35
			Acid Extractable Cadmium (Cd)	2020/12/30	NC		%	35
			Acid Extractable Chromium (Cr)	2020/12/30	13		%	35
			Acid Extractable Cobalt (Co)	2020/12/30	12		%	35
			Acid Extractable Copper (Cu)	2020/12/30	3.8		%	35
			Acid Extractable Iron (Fe)	2020/12/30	12		%	35
			Acid Extractable Lead (Pb)	2020/12/30	1.5		%	35
			Acid Extractable Lithium (Li)	2020/12/30	2.2		%	35
			Acid Extractable Manganese (Mn)	2020/12/30	10		%	35
			Acid Extractable Mercury (Hg)	2020/12/30	3.3		%	35
			Acid Extractable Molybdenum (Mo)	2020/12/30	NC		%	35
			Acid Extractable Nickel (Ni)	2020/12/30	11		%	35
			Acid Extractable Rubidium (Rb)	2020/12/30	5.1		%	35
			Acid Extractable Selenium (Se)	2020/12/30	NC		%	35
			Acid Extractable Silver (Ag)	2020/12/30	NC		%	35
			Acid Extractable Strontium (Sr)	2020/12/30	4.8		%	35
			Acid Extractable Thallium (Tl)	2020/12/30	0.0041		%	35
			Acid Extractable Tin (Sn)	2020/12/30	27		%	35
			Acid Extractable Uranium (U)	2020/12/30	1.5		%	35
			Acid Extractable Vanadium (V)	2020/12/30	0.62		%	35
			Acid Extractable Zinc (Zn)	2020/12/30	2.0		%	35
7128821	JJE	Matrix Spike [OLY199-01]	o-Terphenyl	2020/12/29		83	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/12/29		98	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2020/12/29		98	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2020/12/29		98	%	50 - 130
7128821	JJE	Spiked Blank	o-Terphenyl	2020/12/29		83	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/12/29		99	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2020/12/29		97	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2020/12/29		98	%	80 - 120
7128821	JJE	Method Blank	o-Terphenyl	2020/12/29		85	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/12/29	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2020/12/29	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2020/12/29	<50		ug/g	
7128821	JJE	RPD [OLY199-01]	F2 (C10-C16 Hydrocarbons)	2020/12/29	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2020/12/29	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2020/12/29	NC		%	30
7129112	AYA	Matrix Spike	4-Bromofluorobenzene	2020/12/29		101	%	60 - 140
			D10-o-Xylene	2020/12/29		100	%	60 - 130
			D4-1,2-Dichloroethane	2020/12/29		98	%	60 - 140
			D8-Toluene	2020/12/29		98	%	60 - 140
			Acetone (2-Propanone)	2020/12/29		89	%	60 - 140

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzene	2020/12/29		88	%	60 - 140
			Bromodichloromethane	2020/12/29		94	%	60 - 140
			Bromoform	2020/12/29		84	%	60 - 140
			Bromomethane	2020/12/29		102	%	60 - 140
			Carbon Tetrachloride	2020/12/29		101	%	60 - 140
			Chlorobenzene	2020/12/29		91	%	60 - 140
			Chloroform	2020/12/29		94	%	60 - 140
			Dibromochloromethane	2020/12/29		87	%	60 - 140
			1,2-Dichlorobenzene	2020/12/29		92	%	60 - 140
			1,3-Dichlorobenzene	2020/12/29		95	%	60 - 140
			1,4-Dichlorobenzene	2020/12/29		110	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2020/12/29		97	%	60 - 140
			1,1-Dichloroethane	2020/12/29		92	%	60 - 140
			1,2-Dichloroethane	2020/12/29		89	%	60 - 140
			1,1-Dichloroethylene	2020/12/29		99	%	60 - 140
			cis-1,2-Dichloroethylene	2020/12/29		98	%	60 - 140
			trans-1,2-Dichloroethylene	2020/12/29		102	%	60 - 140
			1,2-Dichloropropane	2020/12/29		90	%	60 - 140
			cis-1,3-Dichloropropene	2020/12/29		91	%	60 - 140
			trans-1,3-Dichloropropene	2020/12/29		90	%	60 - 140
			Ethylbenzene	2020/12/29		89	%	60 - 140
			Ethylene Dibromide	2020/12/29		86	%	60 - 140
			Hexane	2020/12/29		95	%	60 - 140
			Methylene Chloride(Dichloromethane)	2020/12/29		98	%	60 - 140
			Methyl Isobutyl Ketone	2020/12/29		83	%	60 - 140
			Methyl Ethyl Ketone (2-Butanone)	2020/12/29		84	%	60 - 140
			Methyl t-butyl ether (MTBE)	2020/12/29		87	%	60 - 140
			Styrene	2020/12/29		93	%	60 - 140
			1,1,1,2-Tetrachloroethane	2020/12/29		92	%	60 - 140
			1,1,2,2-Tetrachloroethane	2020/12/29		82	%	60 - 140
			Tetrachloroethylene	2020/12/29		92	%	60 - 140
			Toluene	2020/12/29		92	%	60 - 140
			1,1,1-Trichloroethane	2020/12/29		100	%	60 - 140
			1,1,2-Trichloroethane	2020/12/29		91	%	60 - 140
			Trichloroethylene	2020/12/29		106	%	60 - 140
			Vinyl Chloride	2020/12/29		99	%	60 - 140
			p+m-Xylene	2020/12/29		90	%	60 - 140
			o-Xylene	2020/12/29		86	%	60 - 140
			Trichlorofluoromethane (FREON 11)	2020/12/29		106	%	60 - 140
			F1 (C6-C10)	2020/12/29		103	%	60 - 140
7129112	AYA	Spiked Blank	4-Bromofluorobenzene	2020/12/29		99	%	60 - 140
			D10-o-Xylene	2020/12/29		105	%	60 - 130
			D4-1,2-Dichloroethane	2020/12/29		96	%	60 - 140
			D8-Toluene	2020/12/29		99	%	60 - 140
			Acetone (2-Propanone)	2020/12/29		89	%	60 - 140
			Benzene	2020/12/29		86	%	60 - 130
			Bromodichloromethane	2020/12/29		91	%	60 - 130
			Bromoform	2020/12/29		83	%	60 - 130
			Bromomethane	2020/12/29		101	%	60 - 140
			Carbon Tetrachloride	2020/12/29		98	%	60 - 130
			Chlorobenzene	2020/12/29		90	%	60 - 130
			Chloroform	2020/12/29		92	%	60 - 130
			Dibromochloromethane	2020/12/29		86	%	60 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichlorobenzene	2020/12/29		92	%	60 - 130
			1,3-Dichlorobenzene	2020/12/29		95	%	60 - 130
			1,4-Dichlorobenzene	2020/12/29		110	%	60 - 130
			Dichlorodifluoromethane (FREON 12)	2020/12/29		98	%	60 - 140
			1,1-Dichloroethane	2020/12/29		89	%	60 - 130
			1,2-Dichloroethane	2020/12/29		87	%	60 - 130
			1,1-Dichloroethylene	2020/12/29		97	%	60 - 130
			cis-1,2-Dichloroethylene	2020/12/29		95	%	60 - 130
			trans-1,2-Dichloroethylene	2020/12/29		100	%	60 - 130
			1,2-Dichloropropane	2020/12/29		87	%	60 - 130
			cis-1,3-Dichloropropene	2020/12/29		89	%	60 - 130
			trans-1,3-Dichloropropene	2020/12/29		89	%	60 - 130
			Ethylbenzene	2020/12/29		89	%	60 - 130
			Ethylene Dibromide	2020/12/29		85	%	60 - 130
			Hexane	2020/12/29		93	%	60 - 130
			Methylene Chloride(Dichloromethane)	2020/12/29		96	%	60 - 130
			Methyl Isobutyl Ketone	2020/12/29		80	%	60 - 130
			Methyl Ethyl Ketone (2-Butanone)	2020/12/29		81	%	60 - 140
			Methyl t-butyl ether (MTBE)	2020/12/29		85	%	60 - 130
			Styrene	2020/12/29		93	%	60 - 130
			1,1,1,2-Tetrachloroethane	2020/12/29		92	%	60 - 130
			1,1,2,2-Tetrachloroethane	2020/12/29		81	%	60 - 130
			Tetrachloroethylene	2020/12/29		91	%	60 - 130
			Toluene	2020/12/29		92	%	60 - 130
			1,1,1-Trichloroethane	2020/12/29		98	%	60 - 130
			1,1,2-Trichloroethane	2020/12/29		89	%	60 - 130
			Trichloroethylene	2020/12/29		104	%	60 - 130
			Vinyl Chloride	2020/12/29		98	%	60 - 130
			p+m-Xylene	2020/12/29		90	%	60 - 130
			o-Xylene	2020/12/29		85	%	60 - 130
			Trichlorofluoromethane (FREON 11)	2020/12/29		104	%	60 - 130
			F1 (C6-C10)	2020/12/29		90	%	80 - 120
7129112	AYA	Method Blank	4-Bromofluorobenzene	2020/12/29		96	%	60 - 140
			D10-o-Xylene	2020/12/29		110	%	60 - 130
			D4-1,2-Dichloroethane	2020/12/29		96	%	60 - 140
			D8-Toluene	2020/12/29		99	%	60 - 140
			Acetone (2-Propanone)	2020/12/29	<0.50		ug/g	
			Benzene	2020/12/29	<0.0060		ug/g	
			Bromodichloromethane	2020/12/29	<0.050		ug/g	
			Bromoform	2020/12/29	<0.050		ug/g	
			Bromomethane	2020/12/29	<0.050		ug/g	
			Carbon Tetrachloride	2020/12/29	<0.050		ug/g	
			Chlorobenzene	2020/12/29	<0.050		ug/g	
			Chloroform	2020/12/29	<0.050		ug/g	
			Dibromochloromethane	2020/12/29	<0.050		ug/g	
			1,2-Dichlorobenzene	2020/12/29	<0.050		ug/g	
			1,3-Dichlorobenzene	2020/12/29	<0.050		ug/g	
			1,4-Dichlorobenzene	2020/12/29	<0.050		ug/g	
			Dichlorodifluoromethane (FREON 12)	2020/12/29	<0.050		ug/g	
			1,1-Dichloroethane	2020/12/29	<0.050		ug/g	
			1,2-Dichloroethane	2020/12/29	<0.050		ug/g	
			1,1-Dichloroethylene	2020/12/29	<0.050		ug/g	
			cis-1,2-Dichloroethylene	2020/12/29	<0.050		ug/g	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			trans-1,2-Dichloroethylene	2020/12/29	<0.050		ug/g	
			1,2-Dichloropropane	2020/12/29	<0.050		ug/g	
			cis-1,3-Dichloropropene	2020/12/29	<0.030		ug/g	
			trans-1,3-Dichloropropene	2020/12/29	<0.040		ug/g	
			Ethylbenzene	2020/12/29	<0.010		ug/g	
			Ethylene Dibromide	2020/12/29	<0.050		ug/g	
			Hexane	2020/12/29	<0.050		ug/g	
			Methylene Chloride(Dichloromethane)	2020/12/29	<0.050		ug/g	
			Methyl Isobutyl Ketone	2020/12/29	<0.50		ug/g	
			Methyl Ethyl Ketone (2-Butanone)	2020/12/29	<0.50		ug/g	
			Methyl t-butyl ether (MTBE)	2020/12/29	<0.050		ug/g	
			Styrene	2020/12/29	<0.050		ug/g	
			1,1,1,2-Tetrachloroethane	2020/12/29	<0.050		ug/g	
			1,1,2,2-Tetrachloroethane	2020/12/29	<0.050		ug/g	
			Tetrachloroethylene	2020/12/29	<0.050		ug/g	
			Toluene	2020/12/29	<0.020		ug/g	
			1,1,1-Trichloroethane	2020/12/29	<0.050		ug/g	
			1,1,2-Trichloroethane	2020/12/29	<0.050		ug/g	
			Trichloroethylene	2020/12/29	<0.010		ug/g	
			Vinyl Chloride	2020/12/29	<0.020		ug/g	
			p+m-Xylene	2020/12/29	<0.020		ug/g	
			o-Xylene	2020/12/29	<0.020		ug/g	
			Total Xylenes	2020/12/29	<0.020		ug/g	
			Trichlorofluoromethane (FREON 11)	2020/12/29	<0.050		ug/g	
			F1 (C6-C10)	2020/12/29	<10		ug/g	
			F1 (C6-C10) - BTEX	2020/12/29	<10		ug/g	
7129112	AYA	RPD	Benzene	2020/12/29	NC		%	50
			Ethylbenzene	2020/12/29	NC		%	50
			Toluene	2020/12/29	NC		%	50
			p+m-Xylene	2020/12/29	NC		%	50
			o-Xylene	2020/12/29	NC		%	50
			Total Xylenes	2020/12/29	NC		%	50
			F1 (C6-C10)	2020/12/29	NC		%	30
			F1 (C6-C10) - BTEX	2020/12/29	NC		%	30
7129313	KLI	Matrix Spike	o-Terphenyl	2020/12/29		82	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/12/29		100	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2020/12/29		103	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2020/12/29		106	%	50 - 130
7129313	KLI	Spiked Blank	o-Terphenyl	2020/12/29		79	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/12/29		96	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2020/12/29		93	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2020/12/29		96	%	80 - 120
7129313	KLI	Method Blank	o-Terphenyl	2020/12/29		84	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/12/29	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2020/12/29	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2020/12/29	<50		ug/g	
7129313	KLI	RPD	F2 (C10-C16 Hydrocarbons)	2020/12/29	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2020/12/29	NC		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			F4 (C34-C50 Hydrocarbons)	2020/12/29	NC		%	30

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

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

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

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

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

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

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

(1) Matrix Spike exceeds acceptance limits, probable matrix interference.

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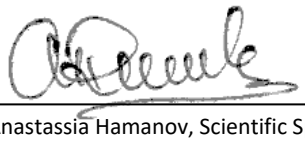
BV Labs Job #: C0Y0624
Report Date: 2020/12/31

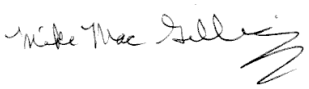
Englobe Corp
Client Project #: 2000155.000.0003
Your P.O. #: 13523
Sampler Initials: LB

VALIDATION SIGNATURE PAGE

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



Anastassia Hamanov, Scientific Specialist



Mike MacGillivray, Scientific Specialist (Inorganics)

Rosemarie MacDonald, Scientific Specialist (Organics)

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

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200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.bvlabs.com

Chain Of Custody Record

C0Y0667

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#41009 Englobe Corp	Company Name		Quotation #	B90220	BV Labs Job #	Bottle Order #:
Contact Name	ACCOUNTS PAYABLE	Contact Name	Christina Caldwell	P.O. #	13523	C0Y0624	805714
Address	97 Troop Ave Dartmouth NS B3B 2A7	Address		Project #	2000155.000.0003	Chain Of Custody Record	Project Manager
Phone	(902) 468-6486 Fax: (902) 468-4919	Phone	Fax:	Project Name		C#805714-02-01	Keri Mackay
Email	Heather.Mason@englobecorp.com	Email	christina.caldwell@englobecorp.com	Site #			
				Sampled By	LB/AT		

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

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

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

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

Job Specific Rush TAT (if applies to entire submission)
Date Required: Time Required:

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	CCME Petroleum Hydrocarbons Soil	Metals Solids Acid Extr. ICPMS	PAH Compounds by GCMS (SIM)	Hold pending "A" results	# of Bottles	Comments / Hazards / Other Required Analysis
1		~~SS31-B~~	Dec 19		Soil								
2		~~SS31-C~~											
3		✓ SS32-A			Soil	✓		✓	✓	✓		6	
4		~~SS32-B~~											
5		~~SS32-C~~											
6		✓ SS33-A				✓		✓	✓	✓		6	
7		~~SS33-B~~											
8		~~SS33-C~~											
9		✓ SS34-A				✓		✓	✓	✓		6	
10		~~SS34-B~~											

2020 DEC 21 10:55

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
Christina Caldwell Christina Caldwell	20/12/21	9:20					☐	3,6,1/6,4,2	☐ Yes ☐ No

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

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

White: BV Labs Yellow: Client

Bureau Veritas Canada (2019) Inc.

Bureau Veritas Laboratories
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.bvlabs.com

Chain Of Custody Record

COY0667

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#41009 Englobe Corp	Company Name		Quotation #	B90220	BV Labs Job #	Bottle Order #:
Contact Name	ACCOUNTS PAYABLE	Contact Name	Christina Caldwell	P.O #	13523	COY0624	805714
Address	97 Troop Ave Dartmouth NS B3B 2A7	Address		Project #	2000155.000.0003	Chain Of Custody Record	Project Manager
Phone	(902) 468-6486 Fax: (902) 468-4919	Phone	Fax:	Project Name		C#805714-03-01	Keri Mackay
Email	Heather.Mason@englobecorp.com	Email	christina.caldwell@englobecorp.com	Site #			
				Sampled By	CB/AT		

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

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

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field ~~Filtered~~ & Preserved	Lab Filtration Required	CCME Petroleum Hydrocarbons Soil	Metals Solids Acid Extr. ICPMS	PAH Compounds by GCMS (SIM)	Hold pending 'A' results	# of Bottles	Comments / Hazards / Other Required Analysis
1		~~SS34-C~~	Dec 19		Soil								
2		✓ SS35-A				✓		✓	✓	✓		6	
3		~~SS35-B~~											
4		~~SS35-C~~											
5		✓ Dup 1				✓		✓	✓	✓		6	
6													
7													
8													
9													
10													

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT: ✓

(will be applied if Rush TAT is not specified):

Standard TAT = 5-7 Working days for most tests..

Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)

Date Required: Time Required:

2020 DEC 21 10:55

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
Christina Caldwell Christina Caldwell	20/12/21	9:20	[illegible]				☐	3.6 / 6.4.2	☐ Yes ☐ No

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White: BV Labs Yellow: Client

Bureau Veritas Canada (2019) Inc.

Bureau Veritas Laboratories
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.bvlabs.com

Chain Of Custody Record

COY0667

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#41009 Englobe Corp	Company Name		Quotation #	B90220	BV Labs Job #	Bottle Order #:
Contact Name	ACCOUNTS PAYABLE	Contact Name	Christina Caldwell	P.O. #	13523	COY0624	805714
Address	97 Troop Ave Dartmouth NS B3B 2A7	Address		Project #	2000155.000.0003	Chain Of Custody Record	Project Manager
Phone	(902) 468-6486 Fax: (902) 468-4919	Phone	Fax:	Project Name		C#805714-01-01	Keri Mackay
Email	Heather.Mason@englobecorp.com	Email	christina.caldwell@englobecorp.com	Site #			
				Sampled By	LB/AT		

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

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

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

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

Job Specific Rush TAT (if applies to entire submission)
Date Required: Time Required: ☐

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field-Filtered & Preserved	Lab Filtration Required	CCME Petroleum Hydrocarbons Soil	Metals Solids Acid Extr. ICPMS	PAH Compounds by GCMS (SIM)	Hold pending "A" results	# of Bottles	Comments / Hazards / Other Required Analysis
1		✓SS28-A	Dec 19		Soil	✓		✓	✓	✓		6	
2		✓SS28-B				✓					✓	6	
3		✓SS28-C				✓					✓	6	
4		✓SS29-A				✓		✓	✓	✓		6	
5		✓SS29-B				✓					✓	6	
6		~~SS29-C~~											
7		✓SS30-A				✓		✓	✓	✓		6	
8		✓SS30-B				✓					✓	6	2020 DEC 21 10:55
9		~~SS30-C~~											
10		✓SS31-A	↓		↓	✓		✓	✓	✓		6	

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
Christina Caldwell	20/12/21	9:20					☐	3,6,1/6,4,2	☐ Yes ☐ No

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

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White: BV Labs Yellow: Client

Bureau Veritas Canada (2019) Inc.

Your P.O. #: 13523
Your Project #: 2000155.000.0003
Your C.O.C. #: 805714-01-01

Attention: Christina Caldwell

Englobe Corp
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2021/01/27
Report #: R6496162
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C118774
Received: 2021/01/21, 10:55

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Metals Solids Acid Extr. ICPMS	4	2021/01/26	2021/01/26	ATL SOP 00058	EPA 6020B R2 m

Remarks:

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Keri Mackay, Customer Experience Team Lead
Email: Keri.MACKAY@bureauveritas.com
Phone# (902)420-0203 Ext:294

==========

BV Labs Job #: C118774
Report Date: 2021/01/27

Englobe Corp
Client Project #: 2000155.000.0003
Your P.O. #: 13523
Sampler Initials: LB

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		ORC777	ORC778	ORC778	ORC779	ORC780		
Sampling Date		2020/12/19	2020/12/19	2020/12/19	2020/12/19	2020/12/19		
COC Number		805714-01-01	805714-01-01	805714-01-01	805714-01-01	805714-01-01		
	UNITS	SS28-B	SS28-C	SS28-C Lab-Dup	SS29-B	SS30-B	RDL	QC Batch
Metals								
Acid Extractable Aluminum (Al)	mg/kg	11000	12000	12000	9800	11000	10	7168286
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7168286
Acid Extractable Arsenic (As)	mg/kg	23	25	30	24	24	2.0	7168286
Acid Extractable Barium (Ba)	mg/kg	110	99	110	86	99	5.0	7168286
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7168286
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7168286
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	7168286
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	1.1	<0.30	0.30	7168286
Acid Extractable Chromium (Cr)	mg/kg	17	20	20	18	18	2.0	7168286
Acid Extractable Cobalt (Co)	mg/kg	11	11	12	11	11	1.0	7168286
Acid Extractable Copper (Cu)	mg/kg	22	27	27	23	21	2.0	7168286
Acid Extractable Iron (Fe)	mg/kg	25000	32000	34000	25000	25000	50	7168286
Acid Extractable Lead (Pb)	mg/kg	200	110	95	110	75	0.50	7168286
Acid Extractable Lithium (Li)	mg/kg	20	21	22	21	22	2.0	7168286
Acid Extractable Manganese (Mn)	mg/kg	720	730	800	640	770	2.0	7168286
Acid Extractable Mercury (Hg)	mg/kg	0.24	0.22	0.15	0.11	1.4	0.10	7168286
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7168286
Acid Extractable Nickel (Ni)	mg/kg	23	25	27	24	24	2.0	7168286
Acid Extractable Rubidium (Rb)	mg/kg	11	11	11	10	11	2.0	7168286
Acid Extractable Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7168286
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7168286
Acid Extractable Strontium (Sr)	mg/kg	17	16	18	15	17	5.0	7168286
Acid Extractable Thallium (Tl)	mg/kg	0.12	0.12	0.11	<0.10	0.13	0.10	7168286
Acid Extractable Tin (Sn)	mg/kg	4.3	3.7	6.6 (1)	2.9	3.1	1.0	7168286
Acid Extractable Uranium (U)	mg/kg	0.53	0.52	0.59	0.50	0.48	0.10	7168286
Acid Extractable Vanadium (V)	mg/kg	22	23	26	21	20	2.0	7168286
Acid Extractable Zinc (Zn)	mg/kg	93	94	99	76	61	5.0	7168286

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Poor RPD due to sample inhomogeneity. Verified by repeat digestion and analysis.

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BV Labs Job #: C118774
Report Date: 2021/01/27

Englobe Corp
Client Project #: 2000155.000.0003
Your P.O. #: 13523
Sampler Initials: LB

GENERAL COMMENTS

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

Package 1	3.3°C
Package 2	4.0°C

Mercury analysis proceeding past recommended hold time.

Results relate only to the items tested.

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BV Labs Job #: C118774
Report Date: 2021/01/27

Englobe Corp
Client Project #: 2000155.000.0003
Your P.O. #: 13523
Sampler Initials: LB

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7168286	MLB	Matrix Spike [ORC778-01]	Acid Extractable Antimony (Sb)	2021/01/26		94	%	75 - 125
			Acid Extractable Arsenic (As)	2021/01/26		102	%	75 - 125
			Acid Extractable Barium (Ba)	2021/01/26		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2021/01/26		96	%	75 - 125
			Acid Extractable Bismuth (Bi)	2021/01/26		102	%	75 - 125
			Acid Extractable Boron (B)	2021/01/26		94	%	75 - 125
			Acid Extractable Cadmium (Cd)	2021/01/26		99	%	75 - 125
			Acid Extractable Chromium (Cr)	2021/01/26		95	%	75 - 125
			Acid Extractable Cobalt (Co)	2021/01/26		99	%	75 - 125
			Acid Extractable Copper (Cu)	2021/01/26		91	%	75 - 125
			Acid Extractable Lead (Pb)	2021/01/26		NC	%	75 - 125
			Acid Extractable Lithium (Li)	2021/01/26		103	%	75 - 125
			Acid Extractable Manganese (Mn)	2021/01/26		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2021/01/26		98	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2021/01/26		104	%	75 - 125
			Acid Extractable Nickel (Ni)	2021/01/26		99	%	75 - 125
			Acid Extractable Rubidium (Rb)	2021/01/26		99	%	75 - 125
			Acid Extractable Selenium (Se)	2021/01/26		101	%	75 - 125
			Acid Extractable Silver (Ag)	2021/01/26		101	%	75 - 125
			Acid Extractable Strontium (Sr)	2021/01/26		110	%	75 - 125
			Acid Extractable Thallium (Tl)	2021/01/26		102	%	75 - 125
			Acid Extractable Tin (Sn)	2021/01/26		106	%	75 - 125
			Acid Extractable Uranium (U)	2021/01/26		100	%	75 - 125
			Acid Extractable Vanadium (V)	2021/01/26		100	%	75 - 125
			Acid Extractable Zinc (Zn)	2021/01/26		NC	%	75 - 125
7168286	MLB	Spiked Blank	Acid Extractable Antimony (Sb)	2021/01/26		99	%	75 - 125
			Acid Extractable Arsenic (As)	2021/01/26		97	%	75 - 125
			Acid Extractable Barium (Ba)	2021/01/26		95	%	75 - 125
			Acid Extractable Beryllium (Be)	2021/01/26		92	%	75 - 125
			Acid Extractable Bismuth (Bi)	2021/01/26		98	%	75 - 125
			Acid Extractable Boron (B)	2021/01/26		96	%	75 - 125
			Acid Extractable Cadmium (Cd)	2021/01/26		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2021/01/26		95	%	75 - 125
			Acid Extractable Cobalt (Co)	2021/01/26		96	%	75 - 125
			Acid Extractable Copper (Cu)	2021/01/26		95	%	75 - 125
			Acid Extractable Lead (Pb)	2021/01/26		96	%	75 - 125
			Acid Extractable Lithium (Li)	2021/01/26		97	%	75 - 125
			Acid Extractable Manganese (Mn)	2021/01/26		97	%	75 - 125
			Acid Extractable Mercury (Hg)	2021/01/26		103	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2021/01/26		103	%	75 - 125
			Acid Extractable Nickel (Ni)	2021/01/26		100	%	75 - 125
			Acid Extractable Rubidium (Rb)	2021/01/26		95	%	75 - 125
			Acid Extractable Selenium (Se)	2021/01/26		100	%	75 - 125
			Acid Extractable Silver (Ag)	2021/01/26		101	%	75 - 125
			Acid Extractable Strontium (Sr)	2021/01/26		94	%	75 - 125
			Acid Extractable Thallium (Tl)	2021/01/26		100	%	75 - 125
			Acid Extractable Tin (Sn)	2021/01/26		99	%	75 - 125
			Acid Extractable Uranium (U)	2021/01/26		95	%	75 - 125
			Acid Extractable Vanadium (V)	2021/01/26		99	%	75 - 125
			Acid Extractable Zinc (Zn)	2021/01/26		99	%	75 - 125
7168286	MLB	Method Blank	Acid Extractable Aluminum (Al)	2021/01/26	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2021/01/26	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2021/01/26	<2.0		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Barium (Ba)	2021/01/26	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2021/01/26	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2021/01/26	<2.0		mg/kg	
			Acid Extractable Boron (B)	2021/01/26	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2021/01/26	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2021/01/26	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2021/01/26	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2021/01/26	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2021/01/26	<50		mg/kg	
			Acid Extractable Lead (Pb)	2021/01/26	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2021/01/26	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2021/01/26	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2021/01/26	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2021/01/26	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2021/01/26	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2021/01/26	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2021/01/26	<0.50		mg/kg	
			Acid Extractable Silver (Ag)	2021/01/26	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2021/01/26	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2021/01/26	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2021/01/26	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2021/01/26	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2021/01/26	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2021/01/26	<5.0		mg/kg	
7168286	MLB	RPD [ORC778-01]	Acid Extractable Aluminum (Al)	2021/01/26	4.9		%	35
			Acid Extractable Antimony (Sb)	2021/01/26	NC		%	35
			Acid Extractable Arsenic (As)	2021/01/26	17		%	35
			Acid Extractable Barium (Ba)	2021/01/26	12		%	35
			Acid Extractable Beryllium (Be)	2021/01/26	NC		%	35
			Acid Extractable Bismuth (Bi)	2021/01/26	NC		%	35
			Acid Extractable Boron (B)	2021/01/26	NC		%	35
			Acid Extractable Cadmium (Cd)	2021/01/26	NC		%	35
			Acid Extractable Chromium (Cr)	2021/01/26	0.038		%	35
			Acid Extractable Cobalt (Co)	2021/01/26	8.0		%	35
			Acid Extractable Copper (Cu)	2021/01/26	1.5		%	35
			Acid Extractable Iron (Fe)	2021/01/26	5.4		%	35
			Acid Extractable Lead (Pb)	2021/01/26	15		%	35
			Acid Extractable Lithium (Li)	2021/01/26	5.0		%	35
			Acid Extractable Manganese (Mn)	2021/01/26	9.3		%	35
			Acid Extractable Mercury (Hg)	2021/01/26	NC		%	35
			Acid Extractable Molybdenum (Mo)	2021/01/26	NC		%	35
			Acid Extractable Nickel (Ni)	2021/01/26	7.9		%	35
			Acid Extractable Rubidium (Rb)	2021/01/26	2.2		%	35
			Acid Extractable Selenium (Se)	2021/01/26	NC		%	35
			Acid Extractable Silver (Ag)	2021/01/26	NC		%	35
			Acid Extractable Strontium (Sr)	2021/01/26	7.6		%	35
			Acid Extractable Thallium (Tl)	2021/01/26	6.2		%	35
			Acid Extractable Tin (Sn)	2021/01/26	56 (1)		%	35
			Acid Extractable Uranium (U)	2021/01/26	13		%	35
			Acid Extractable Vanadium (V)	2021/01/26	12		%	35

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Zinc (Zn)	2021/01/26	4.7		%	35

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

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

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

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

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

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

(1) Poor RPD due to sample inhomogeneity. Verified by repeat digestion and analysis.

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BV Labs Job #: C118774
Report Date: 2021/01/27

Englobe Corp
Client Project #: 2000155.000.0003
Your P.O. #: 13523
Sampler Initials: LB

VALIDATION SIGNATURE PAGE

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

Eric Dearman, Scientific Specialist

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

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C118774

Chain Of Custody Record

COY0667

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#41009 Englobe Corp	Company Name		Quotation #	B90220	BV Labs Job #	Bottle Order #:
Contact Name	ACCOUNTS PAYABLE	Contact Name	Christina Caldwell	P.O. #	13523	COY0624	805714
Address	97 Troop Ave	Address		Project #	2000155.000.0003	Chain Of Custody Record	Project Manager
	Dartmouth NS B3B 2A7			Project Name		C#805714-01-01	Ken Mackay
Phone	(902) 468-6486 Fax: (902) 468-4919	Phone	Fax:	Site #			
Email	Heather.Mason@englobecorp.com	Email	christina.caldwell@englobecorp.com	Sampled By	LB/AT		

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

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

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

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

Job Specific Rush TAT (if applies to entire submission)
Date Required: Time Required: ☐

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	CCME Petroleum Hydrocarbons Soil	Metals Solids Acid Extr. ICPMS	PAH Compounds by GCMS (SIM)	Hold pending "A" results	# of Bottles	Comments / Hazards / Other Required Analysis
1		✓SS28-A	Dec 19		Soil	✓		✓	✓	✓		6	
2		✓SS28-B				✓					✓	6	
3		✓SS28-C				✓					✓	6	
4		✓SS29-A				✓		✓	✓	✓		6	
5		✓SS29-B				✓					✓	6	
6		~~SS29-C~~											
7		✓SS30-A				✓		✓	✓	✓		6	
8		✓SS30-B				✓					✓	6	
9		~~SS30-C~~											
10		✓SS31-A	↓		↓	✓		✓	✓	✓		6	

RECEIVED DEC 21 10:55

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
Christina Caldwell	20/12/21	9:20	[illegible]				☐	3.6, 1/6.4.2	☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: BV Labs Yellow: Client

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C118774

Chain Of Custody Record

C0Y0667

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#41009 Englobe Corp	Company Name		Quotation #	B90220	BV Labs Job #	Bottle Order #:
Contact Name	ACCOUNTS PAYABLE	Contact Name	Christina Caldwell	P.O. #	13523	C0Y0624	805714
Address	97 Troop Ave Dartmouth NS B3B 2A7	Address		Project #	2000155.000.0003	Chain Of Custody Record	Project Manager
Phone	(902) 468-6486 Fax (902) 468-4919	Phone	Fax:	Project Name		C#805714-02-01	Keri Mackay
Email	Heather.Mason@englobecorp.com	Email	christina.caldwell@englobecorp.com	Site #			
				Sampled By	LB/AT		

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

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

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:

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Job Specific Rush TAT (If applies to entire submission)
Date Required: Time Required:

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	CCME Petroleum Hydrocarbons Soil	Metals Solids Acid Extr. ICPMS	PAH Compounds by GCMS (SIM)	Hold pending "A" results	# of Bottles	Comments / Hazards / Other Required Analysis
1		~~SS31-B~~	Dec 19		Soil								
2		~~SS31-C~~											
3		✓ SS32-A			Soil	✓		✓	✓	✓		6	
4		~~SS32-B~~											
5		~~SS32-C~~											
6		✓ SS33-A				✓		✓	✓	✓		6	
7		~~SS33-B~~											
8		~~SS33-C~~											
9		✓ SS34-A				✓		✓	✓	✓		6	
10		~~SS34-B~~											

2019 DEC 21 10:55

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Christina Caldwell Christina Caldwell	2019/12/21	9:20				

Lab Use Only
Time Sensitive ☐
Temperature (°C) on Receipt: 3.6 | 1.6 | 4.2
Custody Seal Intact on Cooler? ☐ Yes ☐ No

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

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C118774

Chain Of Custody Record

COY0667

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#41009 Englobe Corp	Company Name		Quotation #	B90220	BV Labs Job #	Bottle Order #:
Contact Name	ACCOUNTS PAYABLE	Contact Name	Christina Caldwell	P.O #	13523	COY0624	805714
Address	97 Troop Ave	Address		Project #	2000155.000.0003	Chain Of Custody Record	Project Manager
	Dartmouth NS B3B 2A7			Project Name		C#805714-03-01	Ken Mackay
Phone	(902) 468-6486 Fax (902) 468-4919	Phone	Fax	Site #			
Email	Heather.Mason@englobecorp.com	Email	christina.caldwell@englobecorp.com	Sampled By	CB/AT		

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

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

Job Specific Rush TAT (if applies to entire submission)
Date Required: Time Required:

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	CCME Petroleum Hydrocarbons Soil	Metals Solids Acid Extr. ICPMS	PAH Compounds by GCMS (SIM)	Hold pending 'A' results	# of Bottles	Comments / Hazards / Other Required Analysis
1		~~SS34-C~~	Dec 19		Soil								
2		✓ SS35-A				✓		✓	✓	✓		6	
3		~~SS35-B~~											
4		~~SS35-C~~											
5		✓ Dup 1			↓	✓		✓	✓	✓		6	
6													
7													
8													
9													
10													

2020 DEC 21 10:56

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
Christina Caldwell Christina Caldwell	20/12/21	9:30					☐	3.6, 1/6.4.2	☐ Yes ☐ No

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

White: BV Labs Yellow: Client

Your P.O. #: 12820
Your Project #: 2000156.000
Site Location: GEORGE'S ISLAND
Your C.O.C. #: 48058

Attention: Christina Caldwell

Englobe Corp
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2021/01/07
Report #: R6472885
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0Y0755
Received: 2020/12/22, 09:30

Sample Matrix: Air
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX Fractionation in Air (TO-15mod)	1	N/A	2020/12/31	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	1	N/A	2020/12/31	BRL SOP-00304	EPA TO-15 m

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

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Marinela Sim, Project Manager
Email: Marinela.Sim@bvlabs.com
Phone# (905)817-5828

==========

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BV Labs Job #: C0Y0755
Report Date: 2021/01/07

Englobe Corp
Client Project #: 2000156.000
Site Location: GEORGE'S ISLAND
Your P.O. #: 12820
Sampler Initials: AT

RESULTS OF ANALYSES OF AIR

BV Labs ID		OLY994	
Sampling Date		2020/12/19	
COC Number		48058	
	UNITS	**GR-PHC**	**QC Batch**
Pressure on Receipt	psig	(-2.6)	7132601
QC Batch = Quality Control Batch			

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BV Labs Job #: C0Y0755
Report Date: 2021/01/07

Englobe Corp
Client Project #: 2000156.000
Site Location: GEORGE'S ISLAND
Your P.O. #: 12820
Sampler Initials: AT

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		OLY994		
Sampling Date		2020/12/19		
COC Number		48058		
	UNITS	GR-PHC	RDL	QC Batch
Benzene	ug/m3	<0.50	0.50	7135480
Toluene	ug/m3	<1.6	1.6	7135480
Ethylbenzene	ug/m3	<1.6	1.6	7135480
Total Xylenes	ug/m3	<2.2	2.2	7135480
Aliphatic >C5-C6	ug/m3	<5.0	5.0	7135480
Aliphatic >C6-C8	ug/m3	<5.0	5.0	7135480
Aliphatic >C8-C10	ug/m3	<5.0	5.0	7135480
Aliphatic >C10-C12	ug/m3	<5.0	5.0	7135480
Aliphatic >C12-C16	ug/m3	<5.0	5.0	7135480
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	5.0	7135480
Aromatic >C8-C10	ug/m3	<5.0	5.0	7135480
Aromatic >C10-C12	ug/m3	<5.0	5.0	7135480
Aromatic >C12-C16	ug/m3	<5.0	5.0	7135480
Surrogate Recovery (%)				
1,4-Difluorobenzene	%	100		7135480
Bromochloromethane	%	101		7135480
D5-Chlorobenzene	%	98		7135480

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0Y0755
Report Date: 2021/01/07

Englobe Corp
Client Project #: 2000156.000
Site Location: GEORGE'S ISLAND
Your P.O. #: 12820
Sampler Initials: AT

GENERAL COMMENTS

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7135480	LSY	Spiked Blank	1,4-Difluorobenzene	2020/12/31		109	%	60 - 140
			Bromochloromethane	2020/12/31		108	%	60 - 140
			D5-Chlorobenzene	2020/12/31		109	%	60 - 140
			Benzene	2020/12/31		107	%	70 - 130
			Toluene	2020/12/31		106	%	70 - 130
			Ethylbenzene	2020/12/31		97	%	70 - 130
			Total Xylenes	2020/12/31		98	%	70 - 130
7135480	LSY	Method Blank	1,4-Difluorobenzene	2020/12/31		111	%	60 - 140
			Bromochloromethane	2020/12/31		109	%	60 - 140
			D5-Chlorobenzene	2020/12/31		105	%	60 - 140
			Benzene	2020/12/31	<0.50		ug/m3	
			Toluene	2020/12/31	<1.6		ug/m3	
			Ethylbenzene	2020/12/31	<1.6		ug/m3	
			Total Xylenes	2020/12/31	<2.2		ug/m3	
			Aliphatic >C5-C6	2020/12/31	<5.0		ug/m3	
			Aliphatic >C6-C8	2020/12/31	<5.0		ug/m3	
			Aliphatic >C8-C10	2020/12/31	<5.0		ug/m3	
			Aliphatic >C10-C12	2020/12/31	<5.0		ug/m3	
			Aliphatic >C12-C16	2020/12/31	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2020/12/31	<5.0		ug/m3	
			Aromatic >C8-C10	2020/12/31	<5.0		ug/m3	
			Aromatic >C10-C12	2020/12/31	<5.0		ug/m3	
			Aromatic >C12-C16	2020/12/31	<5.0		ug/m3	

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

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

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

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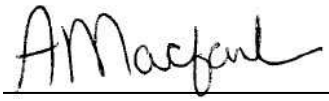
VALIDATION SIGNATURE PAGE

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



Anke Macfarlane, Laboratory Manager, VOC

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

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Appendix D Soil Descriptions

Table D1 - Soil Descriptions - Georges Island National Historic Site **Project No. 2000155**

Sample Location			Depth (mbgs)	Latitude NAD83 (CSRS)	Longitude NAD83 (CSRS)	Colour	Description	Fill/Till	Stains Y/N	Odours Y/N	Debris Type Present / Comment
SS	28	A	0-0.15			Dark brown/black/red	Coal dust on surface, turns to moist sandy silt, then to moist silty clay	Fill	N	N	Some small rocks
SS	28	B	0.15-0.30			Reddish-brown with black flakes	Moist silty clay	Fill	N	N	Coal dust throughout
SS	28	C	0.30-0.45			Reddish-brown with black flakes	Moist silty clay	Fill	N	N	Larger pieces of coal dust throughout
SS	29	A	0-0.15			Dark brown/black/red	Coal dust on surface, turns to moist sandy silt, then to moist silty clay	Fill	N	N	Coal dust throughout
SS	29	B	0.15-0.30			Reddish-brown with black flakes	Moist silty clay	Fill	N	N	Coal dust and small rocks throughout; very wet at 30cm
SS	29	C	0.30-0.45			Sample not collected					Auger/shovel refused at 30cm on concrete and/or rock
SS	30	A	0-0.15			Brown/reddish-brown	Moist sandy silt near surface then turns to moist silty clay	Fill	N	N	Some small rocks
SS	30	B	0.15-0.30			Reddish-brown	Moist silty clay	Fill	N	N	More small rocks then A; very wet at 30cm
SS	30	C	0.30-0.45			Sample not collected					Auger/shovel refused at 30cm on concrete and/or rock
SS	31	A	0-0.15			Brown/reddish-brown	Very moist silty clay	Fill	N	N	Red brick pieces on surface; some small rocks throughout
SS	31	B	0.15-0.30			Sample not collected					Auger/shovel refused at 15cm on concrete and/or rock
SS	31	C	0.30-0.45			Sample not collected					Auger/shovel refused at 15cm on concrete and/or rock
SS	32	A	0-0.10	455588.94	4943355.92	Brown	High organics on surface, gradually moist loose sand with some silt and trace clay.	Fill	N	N	Red brick pieces throughout; broke up some concrete floor when we hit it
SS	32	B	0.10-0.30			Sample not collected					Auger/shovel refused at 10cm on concrete floor
SS	32	C	0.30-0.45			Sample not collected					Auger/shovel refused at 10cm on concrete floor
SS	33	A	0-0.10	455600.38	4943342.27	Brown	High organics on surface, gradually moist loose sand with some silt and trace clay.	Fill	N	N	
SS	33	B	0.10-0.30			Sample not collected					Auger/shovel refused at 10cm on concrete floor
SS	33	C	0.30-0.45			Sample not collected					Auger/shovel refused at 10cm on concrete floor

Table D1 - Soil Descriptions - Georges Island National Historic Site **Project No. 2000155**

Sample Location			Depth (mbgs)	Latitude NAD83 (CSRS)	Longitude NAD83 (CSRS)	Colour	Description	Fill/Till	Stains Y/N	Odours Y/N	Debris Type Present / Comment
SS	34	A	0-0.15	455571.89	4943366.49	Brown	Moist silty sand with some gravel	Fill	N	N	3in layer of gravel on surface; lots of gravel throughout; pieces of concrete and glass throughout
SS	34	B	0.15-0.30			Sample not collected					Auger/shovel refused at 15cm on large beach rocks
SS	34	C	0.30-0.45			Sample not collected					Auger/shovel refused at 15cm on large beach rocks
SS	35	A	0-0.15	455628.02	4943356.5	Brown	High organics on surface, gradually moist loose sand with some silt and trace clay.	Fill	N	N	Pieces of red brick and green specks (likely paint) throughout
SS	35	B	0.15-0.30			Sample not collected					Auger/shovel refused at 10cm on concrete floor
SS	35	C	0.30-0.45			Sample not collected					Auger/shovel refused at 10cm on concrete floor