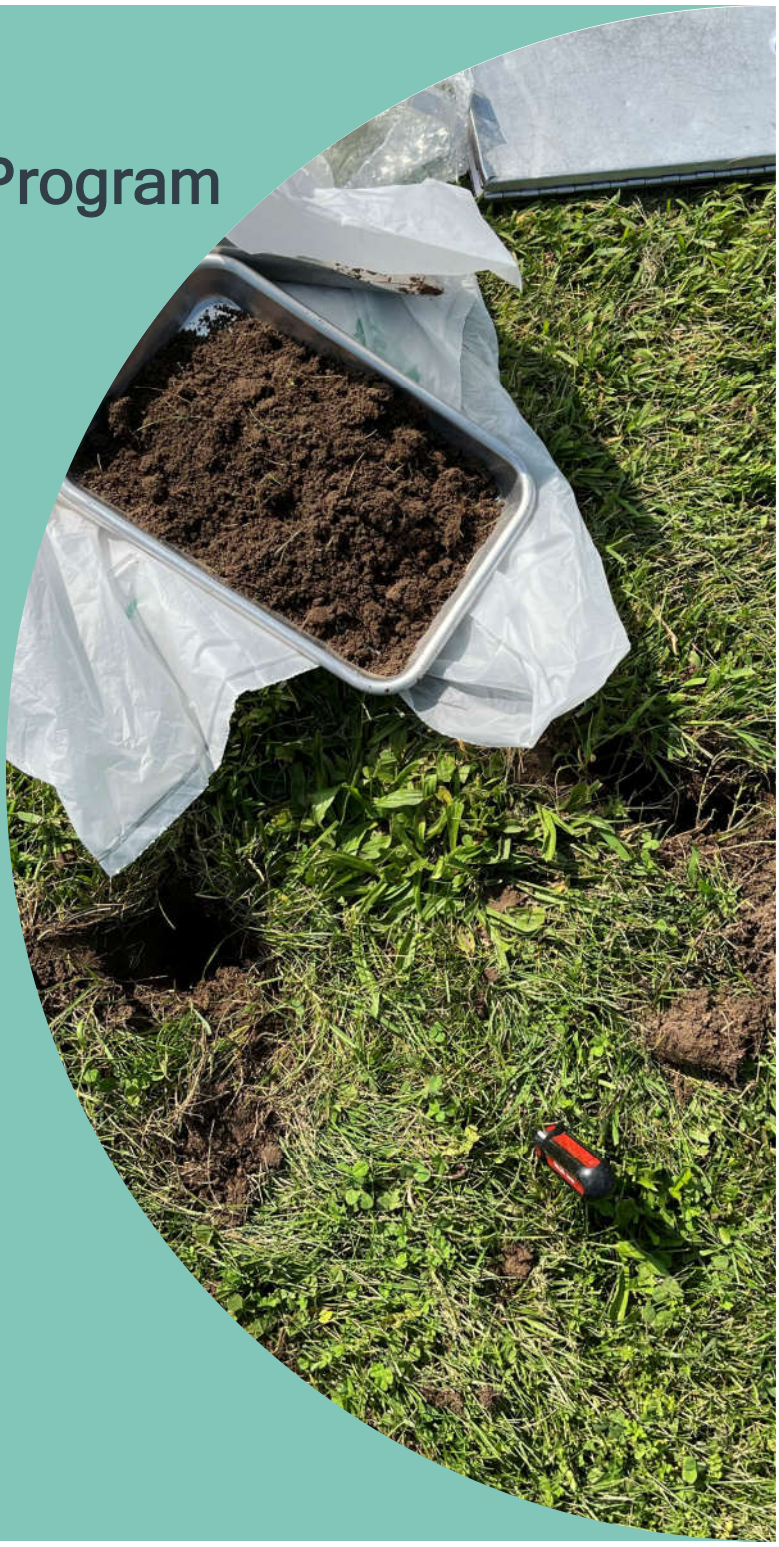
Annual 2024
Surface Soil Sampling Program



Final Report

BWXT Nuclear Energy Canada Inc.
1160 Monaghan Road
Peterborough, ON K9J 3V6

August 30, 2024
02405522.000

Prepared for: BWXT Nuclear Energy Canada Inc.

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Revisions and publications log

Revision No.	Date	D
0A	August 28, 2024	Draft Report for the Client
00	August 30, 2024	Final Report

Distribution

PDF copy	Ms. Rebecca Parker

Executive Summary

Englobe Corp. (Englobe) was retained by BWXT Nuclear Energy Canada Inc. (BWXT) to complete the Annual 2024 Surface Soil Sampling Program for the BWXT Peterborough facility located at 1160 Monaghan Road in Peterborough, Ontario (herein referred to as the “Site”).

The Canadian Nuclear Safety Commission (CNSC), who are the nuclear regulator in Canada, initiated an Independent Environmental Monitoring Program (IEMP) for the Site in 2014. This IEMP conducted by the CNSC has included the sampling of soil, water and air in the vicinity of the Site, at various parks throughout Peterborough, at a public school in close proximity to the Site, and at a background location removed from the Site.

Beginning in 2020, BWXT has retained a third-party consultant to conduct their annual surface soil sampling program. As part of this program, surface soil samples have been collected from locations previously established and sampled by CNSC as part of the IEMP and submitted for analysis of beryllium. In 2021, uranium was added to the annual surface soil sampling program.

Similar to annual surface soil sampling programs from 2020 to 2023, the results of the annual 2024 surface soil sampling program were compared to MECP most stringent Site Condition Standards, Table 1: Full Depth Background Site Condition Standards set out in O. Reg. 153/04 (as amended).

The analytical results for beryllium and uranium for all soil samples collected and analyzed in the annual 2024 surface soil sampling program indicate concentrations well below the most stringent Site Condition Standards in MECP Table 1: Full Depth Background Site Condition Standards for Residential, Parkland, Institutional, Industrial, Commercial, and Community Property Uses.

The 2024 concentrations for beryllium and uranium are comparable to those measured from 2020 to 2023.

Based on the results of the annual 2024 surface soil sampling program, there is no evidence that beryllium or uranium used at the BWXT facility have impacted soils in the specified testing areas.

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Englobe Corp.'s subcontractors who have carried out on-site or laboratory work are duly assessed according to the purchase procedure of our quality system. For further information, please contact your project manager.

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TABLES (IN TEXT)

APPENDICES

1 Introduction

Englobe Corp. (Englobe) was retained by BWXT Nuclear Energy Canada Inc. (BWXT) to complete the Annual 2024 Surface Soil Sampling Program for the BWXT Peterborough facility located at 1160 Monaghan Road in Peterborough, Ontario (herein referred to as the "Site").

1.1 Background

The Canadian Nuclear Safety Commission (CNSC), who are the nuclear regulator in Canada, initiated an Independent Environmental Monitoring Program (IEMP) for the Site in 2014. This IEMP conducted by the CNSC has included the sampling of soil, water and air in the vicinity of the Site, at various parks throughout Peterborough, at a public school in close proximity to the Site, and at a background location removed from the Site.

Beginning in 2020, BWXT retained a third-party consultant to conduct their annual surface soil sampling program. As part of this program, surface soil samples have been collected from locations previously established and sampled by CNSC as part of the IEMP and submitted for analysis of beryllium. In 2021, uranium was added to the annual surface soil sampling program in addition to beryllium.

To date, all results collected in the annual surface soil sampling program have been well below the Ministry of the Environment, Conservation and Parks (MECP) most stringent Site Condition Standards, Table 1: Full Depth Background Site Condition Standards), O. Reg. 153/04 (as amended).

2 Scope of Work

A requirement of BWXT's operating license, they are required to conduct monitoring to ensure the protection of the health and safety of the public and the natural environment. BWXT has developed their own comprehensive environmental protection program to monitor and control nuclear and hazardous substance release from their facility.

During BWXT's license renewal application, and review of the supporting documents, CNSC requested that beryllium and uranium analysis be completed for all future annual surface soil sampling programs.

The scope of work in 2024 remained the same as the 2023 program, and included the following:

— Prepared a site-specific Health & Safety Plan (HASP);

— Collected eight (8) surface soil samples in parks around Peterborough (samples GP01-S01, GP02-S02, GP03-S03, GP04-S04, GP06-S06, GP07-S07, and GP08-S08) and at local Prince of Wales Public School (GP05-S05);

— Collected three (3) background surface soil samples (GP11-S11, GP12-S12, and GP13-S13) at a location (Emily-Omemee Community Centre Park) approximately 19 kilometres west of the BWXT facility;

— Collected two (2) blind duplicate quality control/quality assurance (QA/QC) samples (GP20-S20 and GP21-S21);

— Collected surface soil samples using the previous sampling methodology that was established during the 2020 surface soil sampling program; and,

— Prepared a report summarizing the analytical results of the 2024 sampling in comparison to the MECP Table 1: Full Depth Background Site Condition Standards. A comparison of historical results was also compiled.

3 Assessment Criteria

Similar to annual surface soil sampling programs from 2020 to 2023, the results of the annual 2024 surface soil sampling program were compared to MECP most stringent Site Condition Standards, Table 1: Full Depth Background Site Condition Standards set out in O. Reg. 153/04 (as amended).

4 Sampling Methodology

The sampling methodology is based on the MECP "Guidelines on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", revised December 1996. There is typically a high degree of small-scale variability encountered in most soils. It is strongly recommended that soil sampling for analysis of potential contaminants, other than volatile organics should be conducted by combining a number of samples from the depth of interest into one sample that is representative of both the identifiable sampling site and the depth increment (MECP, 1996). This composite sampling method was established in the 2020 surface soil sampling program. This same composite sampling methodology was used by Englobe during the annual 2024 surface soil sampling program.

The sample locations and coordinates previously established are provided in Table 4-1. The sampling locations are provided in Figures 1, 1A, 1B, 1C, 1D, 1E, 1F, and 2.

Table 4.1: Summary of Sample Locations and UTM Coordinates

Sample ID	Location	UTM Coordinates (Zone 17T)
GP01-S01	R.A. Morrow Memorial Park	713991 m E, 4907322 m N
GP02-S02	Turner Park	712587 m E, 4907662 m N
GP03-S03	Kinsmen Park	712012 m E, 4908150 m N
GP04-S04	Del Crary Park	713940 m E, 4908177 m N
GP05-S05	Prince of Wales School	712521 m E, 4908271 m N
GP06-S06	Sherbrooke Park	712780 m E, 4908463 m N
GP07-S07	Victoria Park	713953 m E, 4909512 m N
GP08-S08	Bonnerworth Park	712305 m E, 4909533 m N
GP11-S11	Emily-Omemee Community Centre Park	694043 m E, 4909939 m N
GP12-S12	Emily-Omemee Community Centre Park	694082 m E, 4909962 m N
GP13-S13	Emily-Omemee Community Centre Park	694140 m E, 4909967 m N
GP20-S20	Turner Park	Duplicate of GP02-S02
GP21-S21	Emily-Omemee Community Centre Park	Duplicate of GP12-S12

Prior to sampling, access to the properties for sampling purposes was obtained by BWXT by contacting the City of Peterborough, City of Kawartha Lakes, and the Prince of Wales School.

All sample locations were in grass covered areas. The following sampling methodology was developed in 2020 and used for the annual 2024 surface soil sampling program, which was completed on August 14, 2024.

— The sampling location was confirmed using a hand-held GPS receiver using previously established sampling location coordinates;

— The sampling location was cleared of debris, if present (i.e. grass roots, stones, other materials) to allow sample collection;

— Four (4) discrete samples of surface soil (0-5 cm in depth) were collected at the four (4) cardinal directions (i.e. north, south, west, east), within a 50 cm radius of each predetermined sample location using a stainless-steel trowel;

— These discrete samples were placed onto a clean steel sample tray contained within a large Ziploc® bag and was mixed with a stainless-steel spoon. Once thoroughly mixed, the composite sample was placed into a laboratory provided 250 mL clear glass sample container. Any excess soil was placed back into the sample divots and was topped with any of the grass that was removed;

— New nitrile gloves were worn by Englobe staff at each sampling location and used gloves were discarded after sample collection;

— Soil samples were placed into a cooler with ice after sample collection to initiate cooling for transport to the laboratory for analysis;

— The sample trowel, spoon and sample tray were cleaned between sampling locations by spraying with an Alconox® soap and water solution and then distilled water dispensed from spray bottles, then wiped clean with new paper towel. Once confirmed to contain no soil residue, these sampling tools were placed into a new Ziploc® bag for transport to the next sample location; and

— The spent Ziploc® bags were discarded along with any soiled paper towels and nitrile gloves into a garbage bag.

4.1 Analytical Method Reference EPA 6050 (mod)

The analytical method reference and laboratory used in the annual 2024 surface soil sampling program remained the same from the 2020 to 2023 programs.

As included in the ALS Canada Ltd. (ALS) of Waterloo, Ontario work order WT2423565 quality control interpretive report included in Appendix B, the method reference used for metals in soil is EPA 6020B (mod).

The preparation of each sample included drying each sample, then sieved through a 2 mm sieve, digested with HNO_3 and HCL to liberate metals that may be environmentally available.

The analysis was completed by collision reaction cell (CRC) inductively coupled plasma-mass spectrometry (ICP-MS).

The analysis by ALS was completed in accordance with the MECP “Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.1 of the Environmental Protection Act”, July 1, 2011.

4.2 QA/QC

ALS implemented internal laboratory protocols, including method blanks, duplicates, laboratory control sample, and surrogate recoveries, to assess the precision and accuracy of the analytical data.

The analysis by ALS was completed in accordance with the MECP “Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.1 of the Environmental Protection Act”, July 1, 2011.

Two (2) blind duplicate samples (GP20-S20 and GP21-S21) were collected by Englobe to assess the potential variability in the samples and to assess the accuracy of the laboratory.

Three (3) background surface soil samples (GP11-S11, GP12-S12 and GP13-S13) were collected from a location approximately 19 kilometres west of BWXT and are anticipated to represent Ontario background levels for beryllium and uranium.

A copy of the laboratory report is included in Appendix B.

5 Evaluation of Results

5.1 Soil Quality

The analytical results for beryllium and uranium for all soil samples collected and analyzed in the annual 2024 surface soil sampling program are well below the most stringent Site Condition Standards in MECP Table 1: Full Depth Background Site Condition Standards for Residential, Parkland, Institutional, Industrial, Commercial, and community Property Uses.

5.2 QA/QC

All samples were evaluated within their respective holding time and the quality control lot met ALS laboratory Data Quality Objectives.

A review of blind duplicate samples indicates a good correlation between the original sample and the duplicate sample.

A review of the laboratory QA/QC indicates that there were no issues identified that would have a material effect on the conclusions of this report.

6 Conclusion

The analytical results for beryllium and uranium for all soil samples collected and analyzed in the annual 2024 surface soil sampling program indicate concentrations well below the most stringent Site Condition Standards in MECP Table 1: Full Depth Background Site Condition Standards for Residential, Parkland, Institutional, Industrial, Commercial, and community Property Uses.

The 2024 concentrations for beryllium and uranium are comparable to those measured in previous years from 2020 to 2023.

Based on the results of the annual 2024 surface soil sampling program, there is no evidence that beryllium or uranium used at the BWXT facility have impacted soils in the specified testing areas.

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The conclusions presented herein are based on information gathered from a limited historical review of readily available geological, historical, and regulatory information and a field surface soil sampling program at specific pre-established locations. Consequently, the presence and/or extent of any adverse environmental impact is an opinion that has been arrived at within the scope of this assessment.

The assessment should not be considered a comprehensive audit that covers and eliminates all present, past, and future risks. The information presented in this Report is based on data collected during the completion of the field sampling conducted. The overall subsurface conditions were extrapolated based on information collected at specific sampling locations. Professional judgement was exercised in gathering and analyzing data; however, no monitoring method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level. Consequently, the actual subsurface conditions between the sampling points may vary. In addition, analysis has been carried out only for the chemical and physical parameters identified, and it should not be inferred that other chemical species or physical conditions are not present.

Any description of the site and its physical setting documents in the Report is presented for information purposes only, to provide the reader a better understanding of the site and scope of work.

Any results from laboratory or other subcontractors reported herein have been carried out by others, and the Company cannot warrant their accuracy.

8 References

Canadian Nuclear Safety Commission, 2024: Independent Environmental Monitoring Program, BWXT Nuclear Energy Canada Inc., Peterborough, modified 2024-04-16, https://www.cnsc-ccsn.gc.ca/eng/resources/maps-of-nuclear-facilities/iemp/bwxt-peterborough/

Englobe Corp., 2023: Annual 2023 Surface Soil Sampling Program, 1160 Monaghan Road, Peterborough, ON, October 11, 2023.

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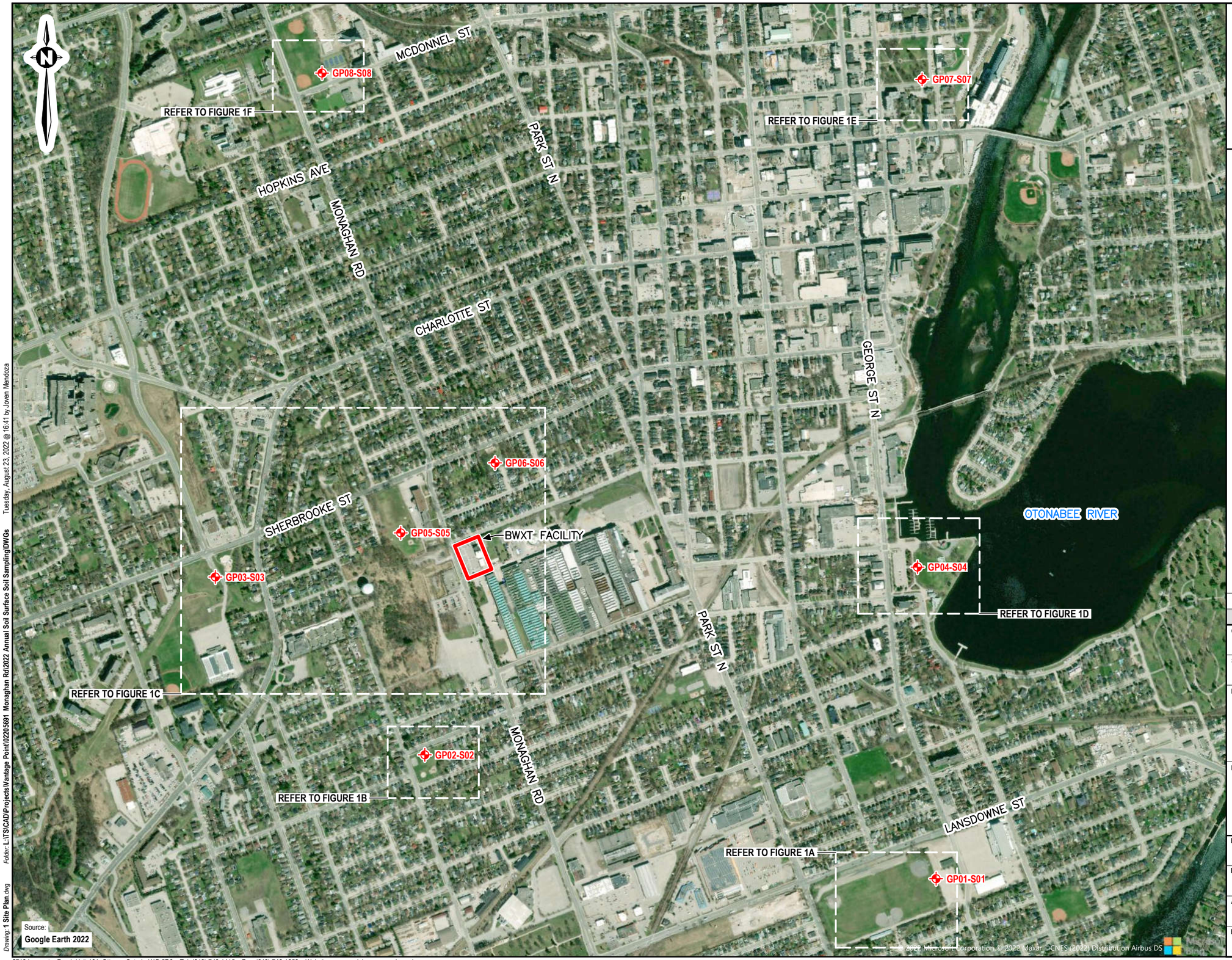
SDK Environmental Consulting & Services, 2021: Annual 2021 Soil Siltation Sampling Program, BWXT Nuclear Energy Canada Inc. Peterborough Facility, Project P1236, September 21, 2021.

Figures

ENGLOBE



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- BWXT Facility Location

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Revision	Date	Issue	Approval
A	2024/08/30	Final	

Client: **BWXT Nuclear Energy Canada Inc.**

Site: **1160 Monaghan Road, Peterborough, ON**

Report Title: **Annual Surface Soil Sampling Program**

Drawing Title: **Peterborough Sampling Locations**

Designed By: BS	Scale: As shown
Drawn By: JM	Date: August 2024
Approved By: BG	Project No.: 02405522.000

Figure No.: **1**

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Client
BWXT Nuclear Energy Canada Inc.

Site
1160 Monaghan Road, Peterborough, ON

Report Title
Annual Surface Soil Sampling Program

Drawing Title
R. A. Morrow Memorial Park Sampling Location

Designed By: BS	Scale: As shown
Drawn By: JM	Date: August 2024
Approved By: BG	Project No.: 02405522.000
Figure No.: 1A	

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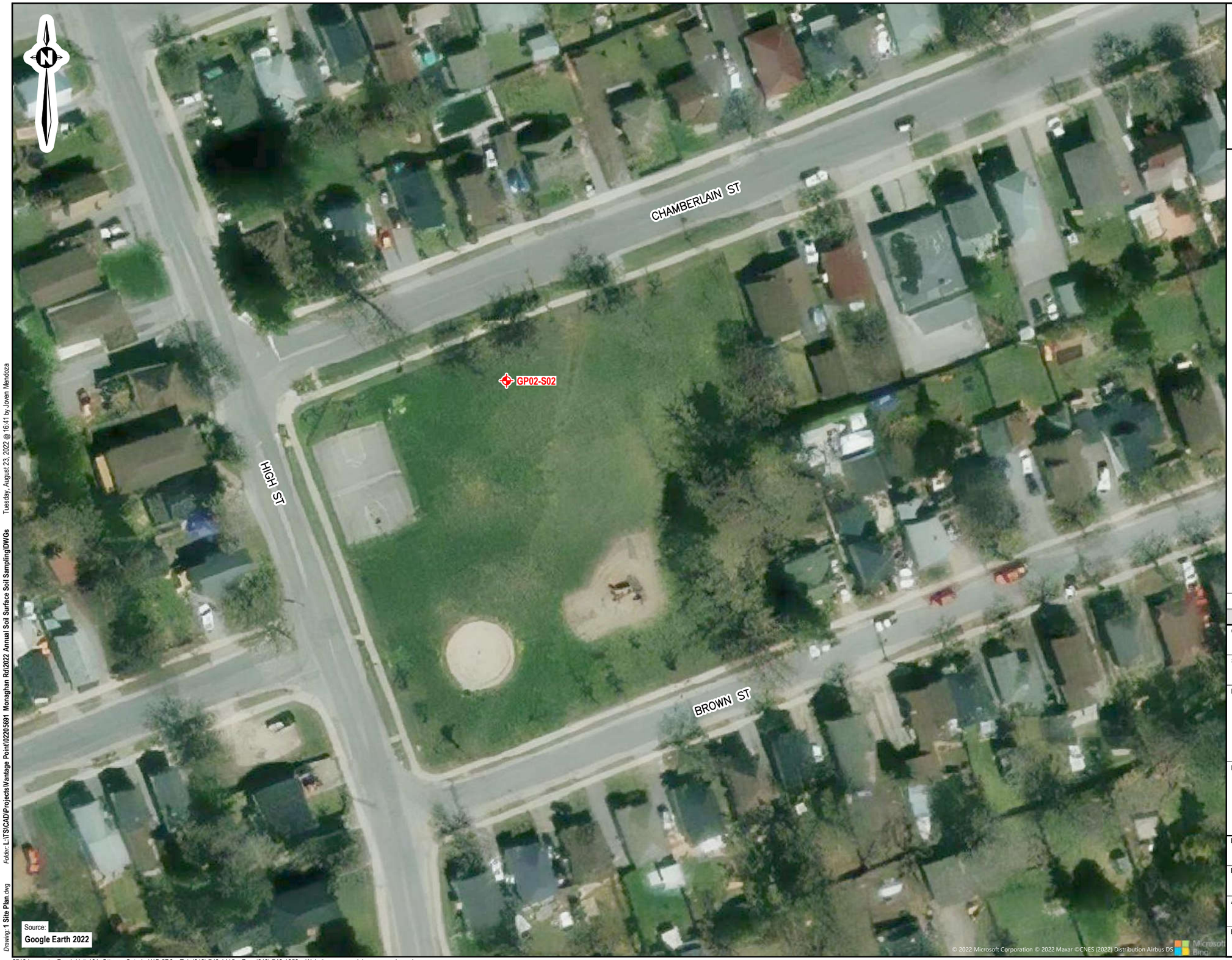

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Report Title
Annual Surface Soil Sampling Program

Drawing Title
Turner Park Sampling Location

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Drawn By	**Date**
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Figure No.
1B

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- BWXT Facility Location

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Client: **BWXT Nuclear Energy Canada Inc.**

Site: **1160 Monaghan Road, Peterborough, ON**

Report Title: **Annual Surface Soil Sampling Program**

Drawing Title: **Kinsmen Park / Prince of Wales School Sherbrooke Park Sampling Location**

Designed By	Scale
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Drawn By	**Date**
JM	August 2024
Approved By	**Project No.**
BG	02405522.000

Figure No. **1C**

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Client
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Site
1160 Monaghan Road, Peterborough, ON

Report Title
Annual Surface Soil Sampling Program

Drawing Title
Del Crary Park Sampling Location

Designed By	Scale
BS	As shown
Drawn By	**Date**
JM	August 2024
Approved By	**Project No.**
BG	02405522.000

Figure No.
1D

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Surface Soil Sample Location

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A	2024/08/30	Final	

Client
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Site
1160 Monaghan Road, Peterborough, ON

Report Title
Annual Surface Soil Sampling Program

Drawing Title
Victoria Park Sampling Location

Designed By	Scale
BS	As shown
Drawn By	**Date**
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BG	02405522.000

Figure No.
1E

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Legend

Surface Soil Sample Location

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Revision	Date	Issue	Approval
A	2024/08/30	Final	

Client: **BWXT Nuclear Energy Canada Inc.**

Site: **1160 Monaghan Road, Peterborough, ON**

Report Title: **Annual Surface Soil Sampling Program**

Drawing Title: **Bonnerworth Park Sampling Location**

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Drawn By: JM	Date: August 2024
Approved By: BG	Project No.: 02405522.000
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Surface Soil Sample Location

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Revision	Date	Issue	Approval
A	2024/08/30	Final	

Client
BWXT Nuclear Energy Canada Inc.

Site
1160 Monaghan Road, Peterborough, ON

Report Title
Annual Surface Soil Sampling Program

Drawing Title
Emily-Omemee Community Centre Park Background Sampling Locations

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Figure No.
2

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Appendix A
Surface Soil Analytical Results

Table 1: 2024 Surface Soil Sampling Results – Beryllium
Table 2: 2024 Surface Soil Sampling Results - Uranium

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Table 1
2024 Surface Soil Sampling Results - Beryllium
BWXT - Peterborough, Ontario

Sample ID	Sample Location	Property Use	MECP Table 1 SCS (µg/g)	2020	2021	2022	2023	2024
GP01-S01	R.A. Morrow Memorial Park	Parkland	2.5	<0.50	<0.50	<0.50	<0.50	<0.50
GP02-S02	Turner Park	Parkland	2.5	<0.50	<0.50	<0.50	<0.50	<0.50
GP03-S03	Kinsmen Park	Parkland	2.5	<0.50	<0.50	<0.50	<0.50	<0.50
GP04-S04	Del Crary Park	Parkland	2.5	<0.50	<0.50	<0.50	<0.50	<0.50
GP05-S05	Prince of Wales School	Institutional	2.5	0.50	<0.50	<0.50	<0.50	<0.50
GP06-S06	Park on Adeline St. off Patterson St.	Parkland	2.5	0.52	0.55	0.53	0.56	0.50
GP07-S07	Victoria Park	Parkland	2.5	<0.50	<0.50	<0.50	<0.50	<0.50
GP08-S08	Bonnerworth Park	Parkland	2.5	<0.50	<0.50	<0.50	0.52	<0.50
GP11-S11	Emily-Omemee Park	Parkland	2.5	<0.50	<0.50	<0.50	<0.50	<0.50
GP12-S12	Emily-Omemee Park	Parkland	2.5	<0.50	<0.50	<0.50	<0.50	<0.50
GP13-S13	Emily-Omemee Park	Parkland	2.5	<0.50	<0.50	<0.50	<0.50	<0.50
GP20-S20	Duplicate of GP02-S02	Parkland	2.5	<0.50	<0.50	<0.50	<0.50	<0.50
GP21-S21	Duplicate of GP12-S12	Parkland	2.5	<0.50	<0.50	<0.50	<0.50	<0.50

Notes

All results expressed as µg/g.

NV	No Criteria/RDL Value
NA	Not Applicable
'<'	Value is less than the Reported Detection Limit (RDL)
MECP	Soil, Ground Water and Sediment Standards for use Under Part XV.1 of the Environmental Protection Act (MECP 2011), Table 1: Full Depth Background Site Condition Standards for Residential, Parkland, Institutional, Industrial, Commercial, Community Property Use.
Yellow Highlight	Exceeds Table 1 Site Condition Standards

August 2024

Table 2
2024 Surface Soil Sampling Results - Uranium
BWXT - Peterborough, Ontario

Sample ID	Sample Location	Property Use	MECP Table 1 SCS (µg/g)	2021	2022	2023	2024
GP01-S01	R.A. Morrow Memorial Park	Parkland	2.5	<1.0	<1.0	<1.0	<1.0
GP02-S02	Turner Park	Parkland	2.5	<1.0	<1.0	<1.0	<1.0
GP03-S03	Kinsmen Park	Parkland	2.5	<1.0	<1.0	<1.0	<1.0
GP04-S04	Del Crary Park	Parkland	2.5	<1.0	<1.0	<1.0	<1.0
GP05-S05	Prince of Wales School	Institutional	2.5	<1.0	<1.0	<1.0	<1.0
GP06-S06	Park on Adeline St. off Patterson St.	Parkland	2.5	<1.0	<1.0	<1.0	<1.0
GP07-S07	Victoria Park	Parkland	2.5	<1.0	<1.0	<1.0	<1.0
GP08-S08	Bonnerworth Park	Parkland	2.5	1.0	<1.0	<1.0	<1.0
GP11-S11	Emily-Omemee Park	Parkland	2.5	<1.0	<1.0	<1.0	<1.0
GP12-S12	Emily-Omemee Park	Parkland	2.5	<1.0	<1.0	<1.0	<1.0
GP13-S13	Emily-Omemee Park	Parkland	2.5	<1.0	<1.0	<1.0	<1.0
GP20-S20	Duplicate of GP02-S02	Parkland	2.5	<1.0	<1.0	<1.0	<1.0
GP21-S21	Duplicate of GP12-S12	Parkland	2.5	<1.0	<1.0	<1.0	<1.0

Notes

All results expressed as µg/g.

NV	No Criteria/RDL Value
NA	Not Applicable
'<'	Value is less than the RDL
MECP	Soil, Ground Water and Sediment Standards for use Under Part XV.1 of the Environmental Protection Act (MECP 2011), Table 1: Full Depth Background Site Condition Standards for Residential, Parkland, Institutional, Industrial, Commercial, Community Property Use.
Yellow Highlight	Exceeds Table 1 Site Condition Standards

Appendix B
Laboratory Certificate of Analysis

ENGLOBE

CERTIFICATE OF ANALYSIS

Work Order	: **WT2423565**	Page	: 1 of 4
Amendment	: **1**		
Client	: **Englobe Corp.**	Laboratory	: ALS Environmental - Waterloo
Contact	: Brian Schuyler	Account Manager	: Emily Smith
Address	: 605 Hewitson St Thunder Bay ON Canada P7B5V5	Address	: 60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8
Telephone	: 1 877 300 4800	Telephone	: +1 519 886 6910
Project	: 02405522	Date Samples Received	: 15-Aug-2024 09:00
PO	: ----	Date Analysis Commenced	: 20-Aug-2024
C-O-C number	: ----	Issue Date	: 23-Aug-2024 14:36
Sampler	: Client		
Site	: ----		
Quote number	: TB - Uranium and Beryllium in Soil		
No. of samples received	: 13		
No. of samples analysed	: 13		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Greg Pokocky	Manager - Inorganics	Metals, Waterloo, Ontario

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/kg	milligrams per kilogram

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Report revised to review and update Be and U reporting limits where possible - E. Smith (22/08/2024).

Analytical Results

Sub-Matrix: **Soil/Solid**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	GP06-SO6	GP05-SO5	GP02-SO2	GP03-SO3	GP01-SO1
					Client sampling date / time	14-Aug-2024 10:15	14-Aug-2024 09:30	14-Aug-2024 10:55	14-Aug-2024 11:30	14-Aug-2024 12:50
						WT2423565-001	WT2423565-002	WT2423565-003	WT2423565-004	WT2423565-005
						Result	Result	Result	Result	Result
Metals										
Beryllium	7440-41-7	E440C/WT	0.10	mg/kg		0.50	<0.50	<0.50	<0.50	<0.50
Uranium	7440-61-1	E440C/WT	0.050	mg/kg		<1.00	<1.00	<1.00	<1.00	<1.00

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Soil/Solid**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	GP04-SO4	GP07-SO7	GP08-SO8	GP20-S20	GP13-S13
					Client sampling date / time	14-Aug-2024 13:30	14-Aug-2024 14:00	14-Aug-2024 14:40	14-Aug-2024 11:00	14-Aug-2024 15:50
						WT2423565-006	WT2423565-007	WT2423565-008	WT2423565-009	WT2423565-010
						Result	Result	Result	Result	Result
Metals										
Beryllium	7440-41-7	E440C/WT	0.10	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Uranium	7440-61-1	E440C/WT	0.050	mg/kg		<1.00	<1.00	<1.00	<1.00	<1.00

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Soil/Solid (Matrix: Soil/Solid)									
				Client sample ID	GP12-S12	GP21-S21	GP11-S11	----	----
				Client sampling date / time	14-Aug-2024 16:05	14-Aug-2024 16:10	14-Aug-2024 16:20	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	WT2423565-011	WT2423565-012	WT2423565-013	--------	--------
					Result	Result	Result	----	----
Metals									
Beryllium	7440-41-7	E440C/WT	0.10	mg/kg	<0.50	<0.50	<0.50	----	----
Uranium	7440-61-1	E440C/WT	0.050	mg/kg	<1.00	<1.00	<1.00	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2423565**	Page	: 1 of 6
Amendment	: **1**		
Client	: **Englobe Corp.**	Laboratory	: ALS Environmental - Waterloo
Contact	: Brian Schuyler	Account Manager	: Emily Smith
Address	: 605 Hewitson St Thunder Bay ON Canada P7B5V5	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 1 877 300 4800	Telephone	: +1 519 886 6910
Project	: 02405522	Date Samples Received	: 15-Aug-2024 09:00
PO	: ----	Issue Date	: 23-Aug-2024 14:36
C-O-C number	: ----		
Sampler	: Client		
Site	: ----		
Quote number	: TB - Uranium and Beryllium in Soil		
No. of samples received	: 13		
No. of samples analysed	: 13		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / **Container / Client Sample ID(s)**	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP01-SO1	E440C	14-Aug-2024	20-Aug-2024	180 days	6 days	✓	21-Aug-2024	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP02-SO2	E440C	14-Aug-2024	20-Aug-2024	180 days	6 days	✓	21-Aug-2024	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP03-SO3	E440C	14-Aug-2024	20-Aug-2024	180 days	6 days	✓	21-Aug-2024	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP04-SO4	E440C	14-Aug-2024	20-Aug-2024	180 days	6 days	✓	21-Aug-2024	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP07-SO7	E440C	14-Aug-2024	20-Aug-2024	180 days	6 days	✓	21-Aug-2024	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP08-SO8	E440C	14-Aug-2024	20-Aug-2024	180 days	6 days	✓	21-Aug-2024	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP20-S20	E440C	14-Aug-2024	20-Aug-2024	180 days	6 days	✓	21-Aug-2024	180 days	7 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP05-SO5	E440C	14-Aug-2024	20-Aug-2024	180 days	7 days	✓	21-Aug-2024	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP06-SO6	E440C	14-Aug-2024	20-Aug-2024	180 days	7 days	✓	21-Aug-2024	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP11-S11	E440C	14-Aug-2024	21-Aug-2024	180 days	7 days	✓	21-Aug-2024	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP12-S12	E440C	14-Aug-2024	21-Aug-2024	180 days	7 days	✓	21-Aug-2024	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP13-S13	E440C	14-Aug-2024	21-Aug-2024	180 days	7 days	✓	21-Aug-2024	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS (<355 µm)										
Glass soil jar/Teflon lined cap [ON MECP] GP21-S21	E440C	14-Aug-2024	21-Aug-2024	180 days	7 days	✓	21-Aug-2024	180 days	7 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Metals in Soil/Solid by CRC ICPMS (<355 µm)	E440C	1603030	2	31	6.4	5.0	✓
Laboratory Control Samples (LCS)							
Metals in Soil/Solid by CRC ICPMS (<355 µm)	E440C	1603030	4	31	12.9	10.0	✓
Method Blanks (MB)							
Metals in Soil/Solid by CRC ICPMS (<355 µm)	E440C	1603030	2	31	6.4	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals in Soil/Solid by CRC ICPMS (<355 µm)	E440C ALS Environmental - Waterloo	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 355 µm sieve, and digested with HNO_3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Metals and Mercury (355 µm Sieve)	EP440C ALS Environmental - Waterloo	Soil/Solid	EPA 200.2 (mod)	Samples are sieved through a 355 µm sieve, and digested with HNO_3 and HCl. This method is intended to liberate metals that may be environmentally available.

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QUALITY CONTROL REPORT

Work Order	: **WT2423565**	Page	: 1 of 4
Amendment	: **1**		
Client	: Englobe Corp.	Laboratory	: ALS Environmental - Waterloo
Contact	: Brian Schuyler	Account Manager	: Emily Smith
Address	: 605 Hewitson St Thunder Bay ON Canada P7B5V5	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 1 877 300 4800	Telephone	: +1 519 886 6910
Project	: 02405522	Date Samples Received	: 15-Aug-2024 09:00
PO	: ----	Date Analysis Commenced	: 20-Aug-2024
C-O-C number	: ----	Issue Date	: 23-Aug-2024 14:36
Sampler	: Client		
Site	: ----		
Quote number	: TB - Uranium and Beryllium in Soil		
No. of samples received	: 13		
No. of samples analysed	: 13		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Greg Pokocky	Manager - Inorganics	Waterloo Metals, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1603030)											
WT2423545-003	Anonymous	Beryllium	7440-41-7	E440C	0.10	mg/kg	0.22	0.20	0.01	Diff <2x LOR	----
		Uranium	7440-61-1	E440C	0.050	mg/kg	0.328	0.403	20.4%	30%	----
Metals (QC Lot: 1604843)											
WT2423574-002	Anonymous	Beryllium	7440-41-7	E440C	0.10	mg/kg	0.29	0.30	0.007	Diff <2x LOR	----
		Uranium	7440-61-1	E440C	0.050	mg/kg	0.434	0.421	3.07%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1603030)						
Beryllium	7440-41-7	E440C	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440C	0.05	mg/kg	<0.050	----
Metals (QCLot: 1604843)						
Beryllium	7440-41-7	E440C	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440C	0.05	mg/kg	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1603030)									
Beryllium	7440-41-7	E440C	0.1	mg/kg	10 mg/kg	93.2	80.0	120	----
Uranium	7440-61-1	E440C	0.05	mg/kg	0.5 mg/kg	97.6	80.0	120	----
Metals (QCLot: 1604843)									
Beryllium	7440-41-7	E440C	0.1	mg/kg	10 mg/kg	95.9	80.0	120	----
Uranium	7440-61-1	E440C	0.05	mg/kg	0.5 mg/kg	94.6	80.0	120	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

Reference Material (RM) Report									
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1603030)									
QC-1603030-003	RM	Beryllium	7440-41-7	E440C	1.82 mg/kg	95.4	70.0	130	----
QC-1603030-003	RM	Uranium	7440-61-1	E440C	3.97 mg/kg	95.3	70.0	130	----
Metals (QCLot: 1604843)									
QC-1604843-003	RM	Beryllium	7440-41-7	E440C	1.82 mg/kg	96.2	70.0	130	----
QC-1604843-003	RM	Uranium	7440-61-1	E440C	3.97 mg/kg	87.2	70.0	130	----