SDK Environmental
Consulting & Services

Annual 2021 Soil Siltation Sampling Program

BWXT Nuclear Energy Canada Inc.
Peterborough Facility

Prepared for:
BWXT Nuclear Energy Canada Inc.
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Project P1236

September 21, 2021

Executive Summary

BWXT Nuclear Energy Canada Inc. (BWXT) license to operate a nuclear fuel fabrication facility at the Peterborough location was renewed by the Canadian Nuclear Safety Commission (CNSC) on January 1, 2021. The BWXT Peterborough facility manufactures nuclear fuel bundles from uranium dioxide fuel pellets made at the Toronto facility and zirconium-alloy tubes made at the Arnprior facility.

The CNSC implemented an Independent Environmental Monitoring Program (IEMP) in 2014, 2018, and 2019 around the BWXT Peterborough facility, at various parks located around Peterborough, a public school close to the facility, as well as at a background location 19 kilometers west of the facility at a community centre located north of Omemee, Ontario.

In 2020, Trinity Consultants Ontario Inc. (Trinity) was retained by BWXT, to collect soil samples at the locations previously sampled by CNSC, for determination of beryllium content. Based on the results of the Trinity assessment all results in 2020 were well below the Ministry of the Environment, Conservation and Parks (MECP) most stringent Site Condition Standards, Table 1 (Full Depth Background Site Condition Standards) of Ontario Regulation 153/04 (as amended)(O. Reg. 153/04).

BWXT is required, as condition of their operating license to control emissions, and 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.

Based on the results of the BWXT nuclear license renewal application, and review of the supporting documents, beryllium and uranium analysis was requested to be added to future annual soil sampling programs. BWXT conducted beryllium analysis in 2020 at the request of the CNSC at sampling locations established by the CNSC as part of their Independent Environmental Monitoring Program (IEMP).

The scope of work remains similar to the 2020 program, with the addition of uranium analysis, and included the following activities:

- Collected eight (8) representative soil siltation samples in parks located around Peterborough (samples GP01-S01, GP02-S02, GP03-S03, GP04-S04, GP06-S06, GP07-S07 and GP08-S08) and at public school in close proximity to the facility, Prince of Wales School (sample GP05-S05);

- Collected two (2) blind duplicate quality control samples (samples GP20-S20 and GP21-S21);
- Collected three (3) background samples at a location approximately 19 kilometers west of the BWXT Peterborough facility (samples GP11-S11, GP12-S12 and GP13-S13);
- Stored all samples in a cooler with ice and transported to an accredited laboratory for analysis of beryllium and uranium; and
- Prepared a technical report summarizing the results of the 2021 sampling in comparison to the MECP O. Reg. 153/04 (as amended) Site Condition Standards.

The most stringent standards for Ontario were used for comparison and assessment purposes. The results of the soil siltation sampling program were compared to MECP Table 1 (Full Depth Background Site Condition Standards). This includes residential, parkland, institutional, industrial, commercial, and community property uses.

The results for beryllium and uranium for all samples analyzed are well below the MECP Table 1 Background Site Condition Standards. The 2021 values for beryllium are comparable to the 2020 results. Uranium analysis was not completed in 2020.

Based on the results of the sampling program there is no evidence that beryllium or uranium used at the BWXT facility have had any impact on Peterborough soils. No risk has been identified to the soils or to the public of Peterborough.

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Appendices

1 Introduction

SDK Environmental Consulting & Services (SDK) was retained by BWXT Nuclear Energy Canada Inc. (BWXT) to complete the annual soil siltation sampling program. SDK is pleased to provide this report documenting the results of the recent Annual 2021 Soil Siltation Sampling Program.

1.1 Background

BWXT is located in Peterborough, Ontario at 1160 Monaghan Road. The facility is located in an area of mixed industrial, commercial and residential property uses.

BWXT's license to operate a nuclear fuel fabrication facility at the Peterborough location was renewed by the Canadian Nuclear Safety Commission (CNSC) on January 1, 2021. The BWXT Peterborough facility manufactures nuclear fuel bundles from uranium dioxide fuel pellets made at the Toronto facility and zirconium-alloy tubes made at the Arnprior facility.

The CNSC implemented an Independent Environmental Monitoring Program (IEMP) around the BWXT Peterborough facility, at various parks located around Peterborough, a public school close to the facility, as well as at a background location 19 kilometers west of the facility at a community centre located north of Omemee, Ontario.

In 2020, Trinity Consultants Ontario Inc. (Trinity) was retained by BWXT, to collect soil samples at the locations previously sampled by CNSC, for determination of beryllium content. Based on the results of the Trinity assessment all results in 2020 were well below the Ministry of the Environment, Conservation and Parks (MECP) most stringent Site Condition Standards, Table 1 (Full Depth Background Site Condition Standards) of Ontario Regulation 153/04 (as amended)(O. Reg. 153/04).

2 Objective and Scope of Work

BWXT is required, as condition of their operating license to control emissions, and 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.

Based on the results of the BWXT nuclear license renewal application, and review of the supporting documents, beryllium and uranium analysis was requested to be added to future annual soil sampling programs. BWXT conducted beryllium analysis in 2020 at the request of the CNSC at sampling locations established by the CNSC as part of their Independent Environmental Monitoring Program (IEMP).

The scope of work remains similar to the 2020 program, with the addition of uranium analysis, and included the following activities:

- Collected eight (8) representative soil siltation samples in parks located around Peterborough (samples GP01-S01, GP02-S02, GP03-S03, GP04-S04, GP06-S06, GP07-S07

and GP08-S08) and at public school in close proximity to the facility, Prince of Wales School (sample GP05-S05);
- Collected two (2) blind duplicate quality control samples (samples GP20-S20 and GP21-S21);
- Collected three (3) background samples at a location approximately 19 kilometers west of the BWXT Peterborough facility (samples GP11-S11, GP12-S12 and GP13-S13);
- Stored all samples in a cooler with ice and transported to an accredited laboratory for analysis of beryllium and uranium; and
- Prepared a technical report summarizing the results of the 2021 sampling in comparison to the MECP O. Reg. 153/04 (as amended) Site Condition Standards.

3 Sampling Equipment and Sampling Methodology

The sampling equipment and methodology used in this assessment is detailed below.

3.1 Sampling Equipment

The following tools and equipment were utilized to collect representative samples:

- Stainless steel spoon and trowel;
- Plastic spray bottle with Alconox™ soap and water solution and a second plastic spray bottle with distilled water;
- Paper towels;
- Large Zip-loc® bags;
- Metric tape measure;
- Laboratory supplied sample containers;
- Disposable nitrile gloves; and
- Sample cooler with ice to initiate cooling.

3.2 Sampling Methodology

The annual soil siltation sampling program at BWXT 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). Therefore, SDK utilized this composite sampling method, further discussed below to ensure that the sample best represents the material at the point of interest.

Sampling locations were previously established by CNSC and included all grassy areas. The sampling locations, sample identifications and coordinates established by CNSC are provided in **Table 3-1**. The sampling locations are presented in **Figures 1 through 11**.

Table 3.1: INVENTORY OF SAMPLE LOCATIONS AND COORDINATES

Sample Identification	Sample 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	712012m 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	Park on Adeline St. off Patterson St.	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	694043 m E, 4909939 m N
GP12-S12	Emily-Omemee Community Centre	694082 m E, 4909962 m N
GP13-S13	Emily-Omemee Community Centre	694140 m E, 4909967 m N
GP20-S20	Turner Park	Duplicate of GP02-S02
GP21-S21	Emily-Omemee Community Centre	Duplicate of GP12-S12

The standard sampling methodology previously established in the 2020 program, was used to complete this assessment and included the following:

- 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;
- Each sampling location was confirmed using the Global Positioning System coordinates previously supplied to BWXT by CNSC and using a hand-held Garmin GPSMAP 64st;
- Each sample location was cleared of debris, grass roots, stones and other materials to allow for sample collection;
- Four (4) samples were collected at north, south, east and west directions, within a 50 cm radius of the GPS confirmed sample location;
- The discrete samples from the cardinal points (north, south, east and west) were collected using a stainless steel trowel from (0-5 cm depths) as measured using the metric measuring tape, were placed onto a clean sample tray that was inside a Zip-loc® bag. When all four (4) samples had placed onto the tray, they were mixed together using a stainless steel spoon. Once mixed, the composite sample was placed into a laboratory supplied 250 mL sample container. Any excess soil was placed into the sample divots;
- The sample jars were labeled by the laboratory and SDK filled out client name, project number, sample identification, date sample collected, time sample collected, and name of sampler;

- New disposable nitrile gloves were worn for each of the four (4) discrete samples at a sampling location and new nitrile gloves were worn when filling the laboratory supplied containers;
- Filled sample jars were placed on ice immediately after sample collection;
- The sampling trowel and spoon were cleaned between sample locations by wiping with paper towel, spraying with hand-held spray bottles containing an Alconox™ soap and water solution and then one containing distilled water. The sampling tools were then visually inspected to ensure that residual soil particles had been removed. Once confirmed to be free of residual soil particles the tools were wiped dry with fresh paper towels. The samplers were then placed into a designated clean Zip-loc® for transport to the next sample location;
- The Zip-loc® covering the mixing tray was discarded after each use and a new one used on each subsequent sample location. These discarded Zip-loc® bags, paper towels, and nitrile gloves were placed into a garbage bag;
- The mixing tray was cleaned between each composite sample using the same methodology as above (sprayed with soap and water followed by distilled water), visually inspected for residual soil particles and, if present, the tray was sprayed again. Once confirmed to be free of soil particles, the mixing tray was wiped dry using fresh paper towels and the paper towels were discarded into the garbage bag;
- Waste materials, including the used nitrile gloves, paper towels and Zip-loc® bags were retained until the analytical results were obtained and then were disposed at a municipal landfill.

3.3 Analytical Method Reference EPA 200.2/6020 (mod)

As provided in the ALS Environmental (ALS) laboratory certificate of analysis (**Appendix A**), the method reference used for metals in soil by ALS is EPA 200.2/6020B (mod) which includes:

Soil or sediment is dried, disaggregated and sieved (2 mm). For tests intended to support Ontario regulations, the <2 mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2 mm fraction are solubilized by heated digestion with nitric and hydrochloric acids.

Instrument analysis is completed by collision/reaction cell inductively coupled plasma-mass spectrometry (ICP-MS).

The analysis was conducted 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 Quality Assurance/Quality Control (QA/QC)

The soil siltation samples were submitted to ALS Environmental (ALS) in Waterloo, Ontario. ALS is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA).

ALS implemented internal laboratory protocols for QA/QC to assess the precision and accuracy of the analytical data. All analytical protocols followed 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 were collected to assess potential variability in the samples and to assess the accuracy of the laboratory. These samples were designated as GP20-S20 (duplicate of GP02-S02) and GP21-S21 (duplicate of GP12-S12).

In addition, three (3) control samples were collected from a background location, approximately 19 kilometers west of the facility, and were anticipated to represent Ontario background levels of uranium and beryllium in soil. The samples were collected at the Emily-Omemee Community Centre grounds located at 212 Sturgeon Road in Omemee, Ontario.

A copy of the laboratory quality control report is provided in the Laboratory Certificate of Analysis in **Appendix A**.

5 Assessment Criteria

The MECP released updated soil and groundwater standards under O. Reg. 153/04 (as amended) and which are included in "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act," April 15, 2011. These generic standards are presented in Tables (1 through 9) that vary according to background, potable or non-potable groundwater, stratified or full depth standards, property use, shallow soil conditions, and proximity to a water body.

The most stringent standards for Ontario were used for comparison and assessment purposes. The results of the soil siltation sampling program were compared to MECP Table 1 (Full Depth Background Site Condition Standards). This includes residential, parkland, institutional, industrial, commercial, and community property uses.

6 Soil Quality Results

The results for beryllium and uranium for all samples analyzed are well below the MECP Table 1 Background Site Condition Standards. The 2021 values are comparable to the 2020 results. Uranium analysis was not completed in 2020.

A review of the blind duplicate QA/QC samples show a good correlation between the original sample and the duplicate sample.

Based on the QA/QC implemented in the field and by the laboratory, and the duplicate results the data is considered to be reliable.

A copy of the Laboratory Certificate of Analysis is provided in **Appendix A**.

7 Conclusion

The results for beryllium and uranium for all samples analyzed are well below the MECP Table 1 Background Site Condition Standards. The 2021 values for beryllium are comparable to the 2020 results. Uranium analysis was not completed in 2020.

Based on the results of the sampling program there is no evidence that beryllium or uranium used at the BWXT facility have had any impact on Peterborough soils. No risk has been identified to the soils or to the public of Peterborough.

8 Disclaimer

This report was prepared for the sole use of BWXT Nuclear Energy Canada Inc. This report was completed in accordance with the Scope of Work referred to in Section 2. As such this report may not deal with all issues potentially applicable to the Site. All findings and conclusions presented in this report are based on site conditions as they existed during the investigation. Third party use of the report is not permitted without prior written authorization from SDK. Any use or reliance on the information contained in this report by a third party is the sole responsibility of such third party. SDK accepts no responsibility for liabilities incurred by or damages, if any, suffered by any third party as a result of decisions made or actions taken, based on this report.

It should be recognized that the passage of time may affect the views, conclusions and recommendations, if any, provided in this report because environmental conditions of a property may change.

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Professional Geoscientist

Chris Scullion, B.E.Sc. (Civil Engineering)
Principal Consultant

9 References

Canadian Nuclear Safety Commission, 2021:

Independent Environmental Monitoring Program, BWXT Nuclear Energy Canada Inc., Peterborough, modified 03-05-2021, https://www.cnsc-ccsn.gc.ca/eng/resources/maps-of-nuclear-facilities/iemp/bwxt-peterborough.cfm.

Canadian Nuclear Safety Commission, 2021:

Nuclear Facility – BWXT Nuclear Energy Canada Inc. – Peterborough, modified 03-15-2021, https://www.cnsc-ccsn.gc.ca/eng/uranium/processing/nuclear-facilities/bwxt-nuclear-energy-canada-inc-peterborough/index.cfm.

Google Inc., 2021:

Aerial Imagery

Ministry of the Environment, Conservation and Parks, 2011:

Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, O. Reg. 153/04 (as amended), April 15, 2011.

Ministry of the Environment, Conservation and Parks, 2004:

Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.1 of the Environmental Protection Act, March 4, 2004, amended July 1, 2011.

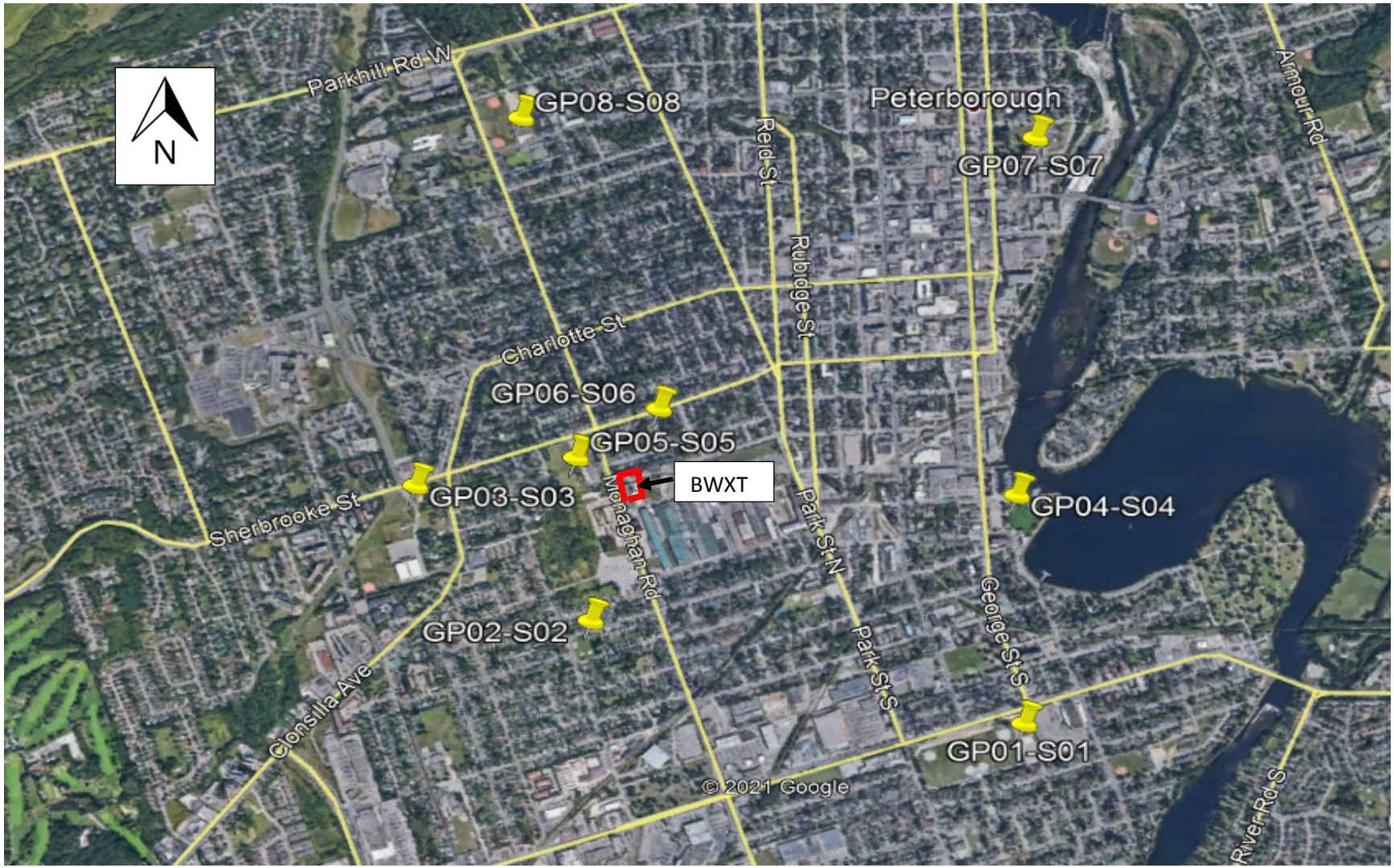
Ministry of the Environment, Conservation and Parks, 1996:

Guidelines on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario, December 1996.

Trinity Consultants Ontario Inc., 2020:

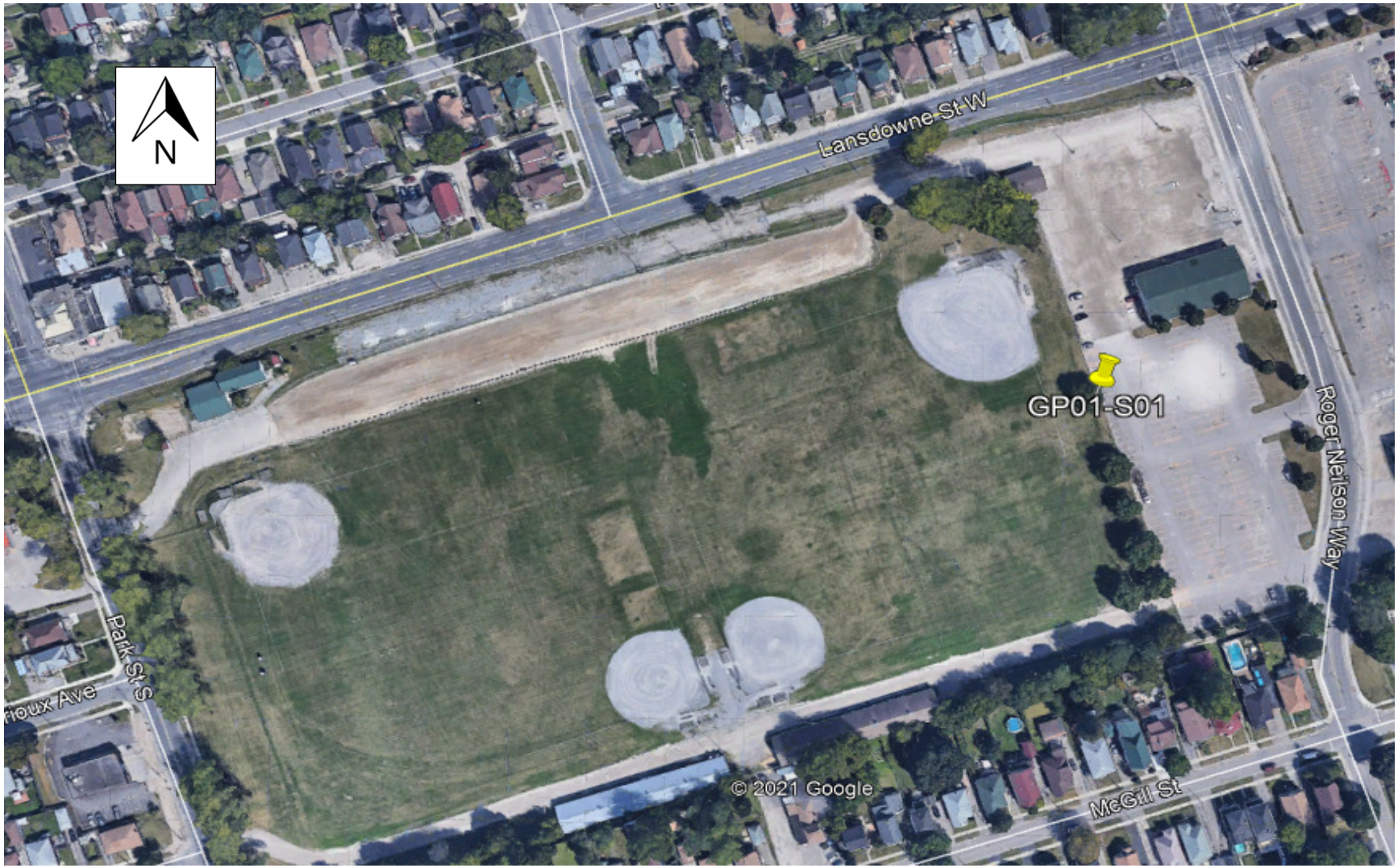
Beryllium Soil Sampling Program, BWXT Nuclear Energy Canada Inc., 1160 Monaghan Road, Peterborough, Ontario, Project 207205.0018, September 8, 2020.

Figures

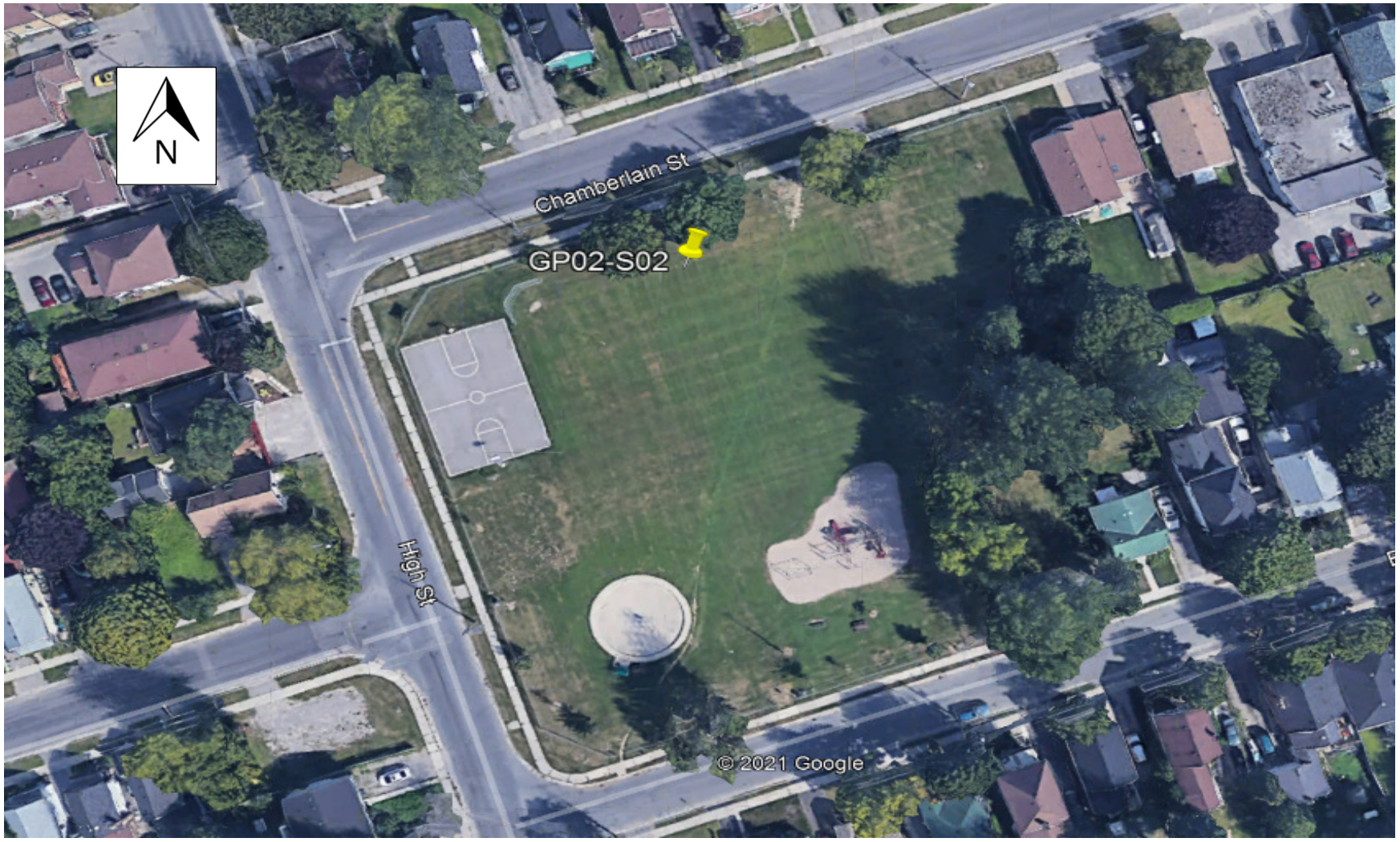


SDK Environmental	Peterborough Sampling Locations (Figure 1)	BWXT 1160 Monaghan Road Peterborough, ON	Annual Soil Siltation Sampling Program SDK Project No. P1236 September 2021

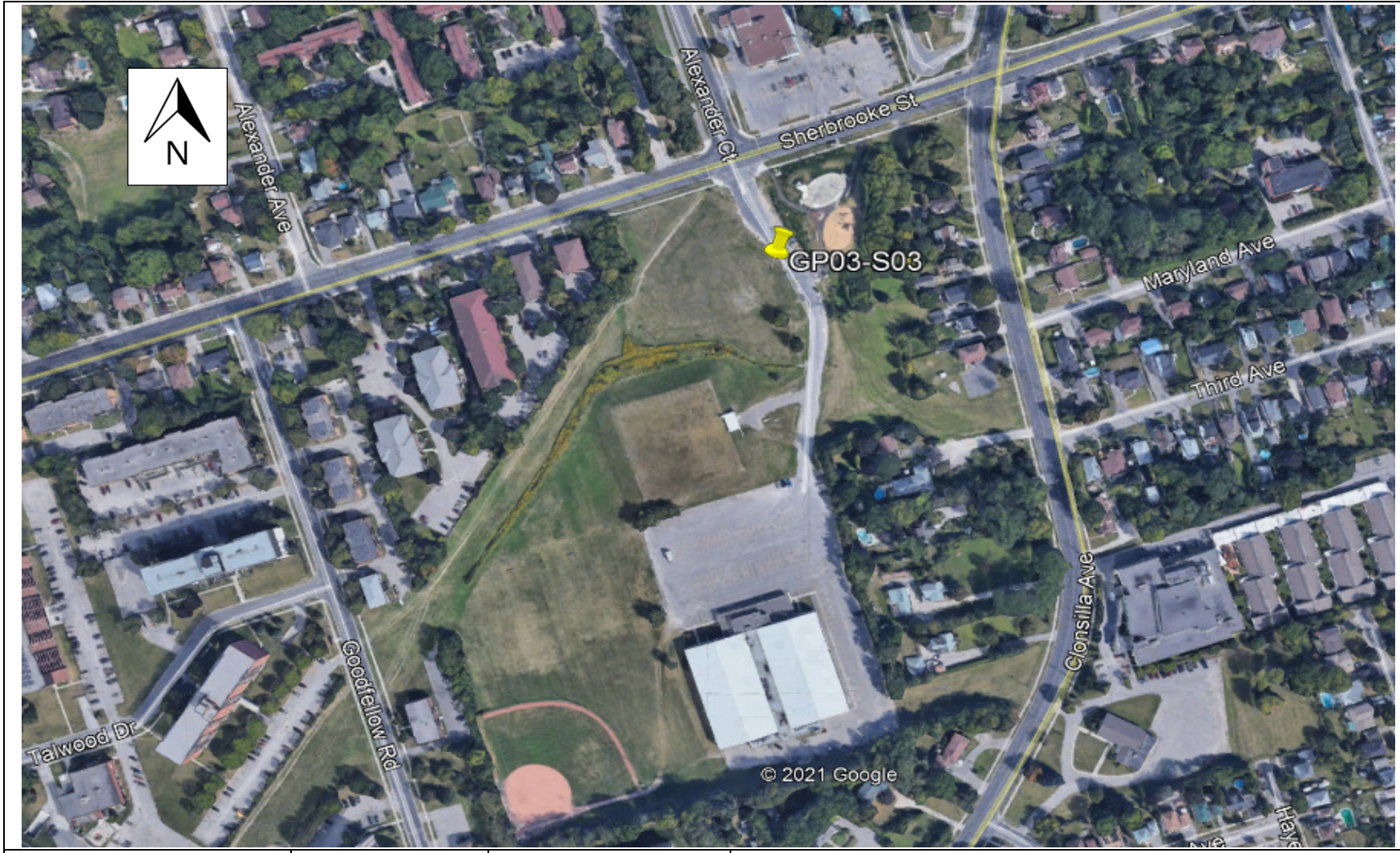
SDK Environmental	Background (Omemee) Sampling Locations (Figure 2)	BWXT 1160 Monaghan Road Peterborough, ON	Annual Soil Siltation Sampling Program SDK Project No. P1236 September 2021



SDK Environmental	R. A. Morrow Memorial Park Sampling Location (Figure 3)	BWXT 1160 Monaghan Road Peterborough, ON	Annual Soil Siltation Sampling Program SDK Project No. P1236 September 2021



SDK Environmental	Turner Park Sampling Location (Figure 4)	BWXT 1160 Monaghan Road Peterborough, ON	Annual Soil Siltation Sampling Program SDK Project No. P1236 September 2021

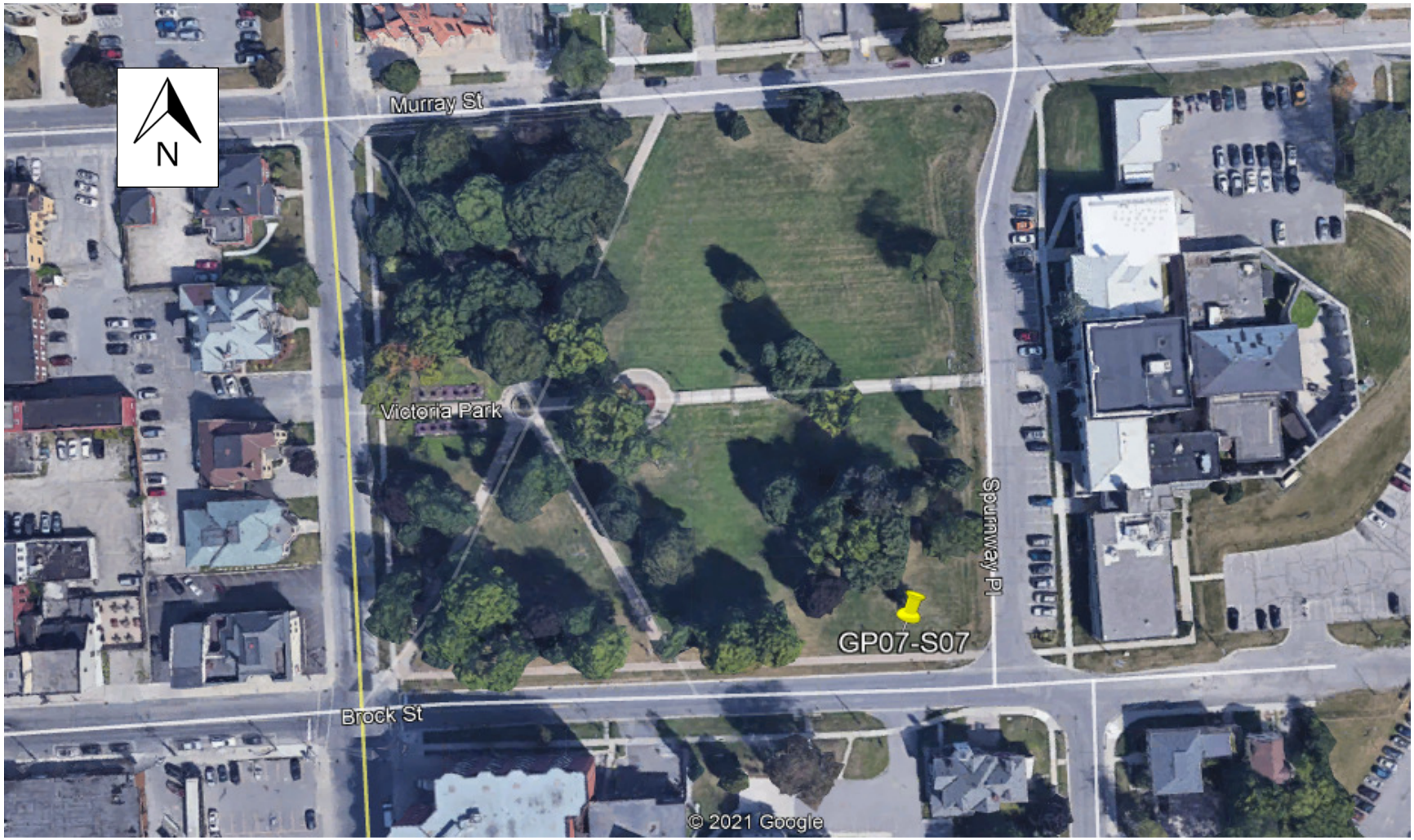


SDK Environmental	Kinsmen Park Sampling Location (Figure 5)	BWXT 1160 Monaghan Road Peterborough, ON	Annual Soil Siltation Sampling Program SDK Project No. P1236 September 2021

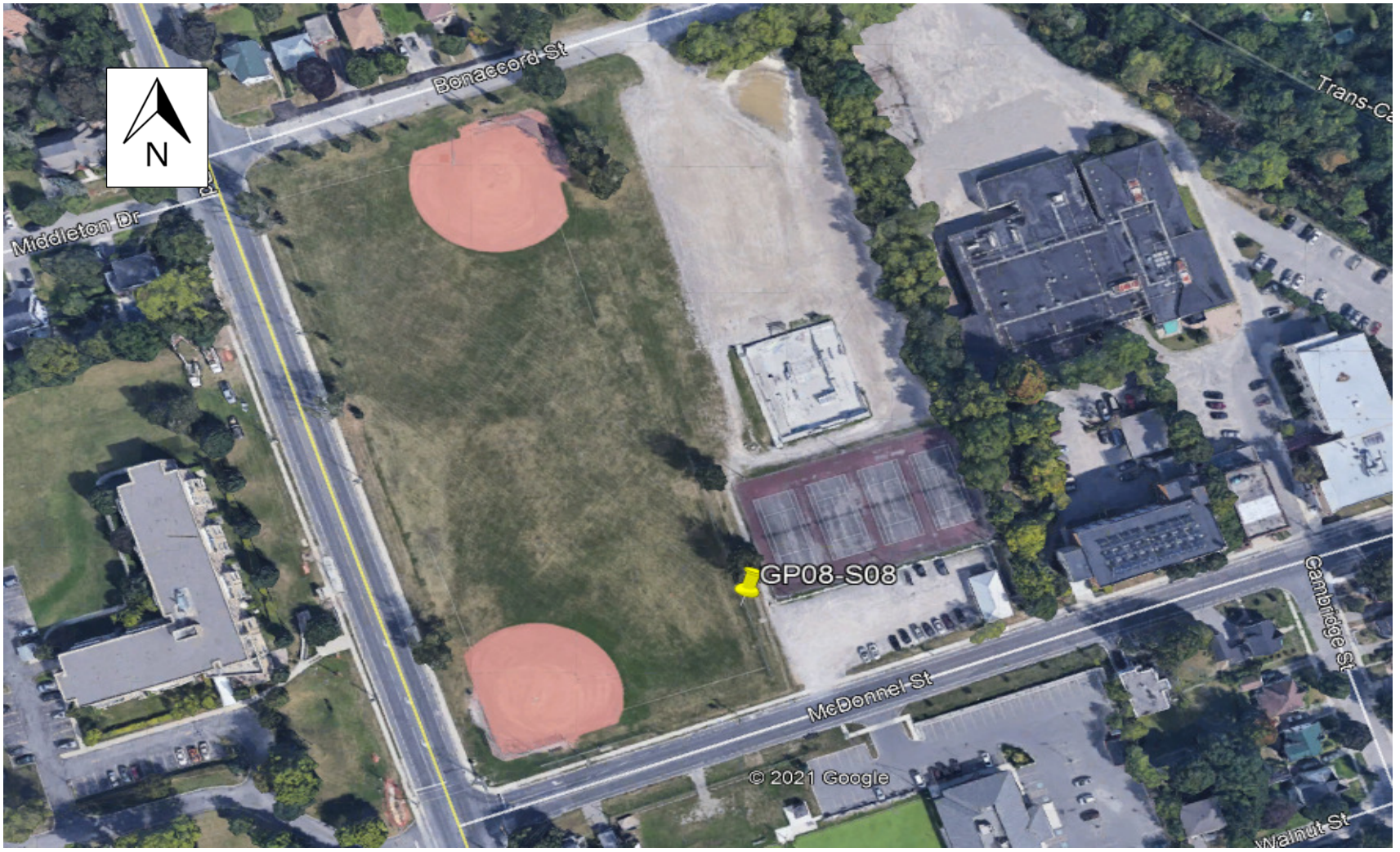
SDK Environmental	Del Crary Park Sampling Location (Figure 6)	BWXT 1160 Monaghan Road Peterborough, ON	Annual Soil Siltation Sampling Program SDK Project No. P1236 September 2021

SDK Environmental	Prince of Wales School Sampling Location (Figure 7)	BWXT 1160 Monaghan Road Peterborough, ON	Annual Soil Siltation Sampling Program SDK Project No. P1236 September 2021

SDK Environmental	Park off Adeline Street at Patterson Street Sampling Location (Figure 8)	BWXT 1160 Monaghan Road Peterborough, ON	Annual Soil Siltation Sampling Program SDK Project No. P1236 September 2021



SDK Environmental	Victoria Park Sampling Location (Figure 9)	BWXT 1160 Monaghan Road Peterborough, ON	Annual Soil Siltation Sampling Program SDK Project No. P1236 September 2021



SDK Environmental	Bonnerworth Park Sampling Location (Figure 10)	BWXT 1160 Monaghan Road Peterborough, ON	Annual Soil Siltation Sampling Program SDK Project No. P1236 September 2021

SDK Environmental	Emily-Omemee Community Centre and Arena Sampling Locations (Figure 11)	BWXT 1160 Monaghan Road Peterborough, ON	Annual Soil Siltation Sampling Program SDK Project No. P1236 September 2021

Tables

Table 1
Annual Soil Siltation Sampling Program
Soil Analytical Results - Beryllium (August 25, 2021)
BWXT - Peterborough, Ontario

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

All results expressed in µg/g

Analytical Comparison Documents

O.Reg. 153 - MECP Standards - "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", Table 3 Standards (April 15, 2011)

334 Highlight shows exceedance of O.Reg. 153 MECP Table 1 Standards, Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

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Table 2
Annual Soil Siltation Sampling Program
Soil Analytical Results - Uranium (August 25, 2021)
BWXT - Peterborough, Ontario

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

All results expressed in µg/g

Analytical Comparison Documents

O.Reg. 153 - MECP Standards - "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", Table 3 Standards (April 15, 2011)

334 Highlight shows exceedance of O.Reg. 153 MECP Table 1 Standards, Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

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Appendix A
Laboratory Certificate of Analysis

CASH CLIENTS - RICHMOND HILL
ATTN: BRIAN SCHUYLER
YOUNG MULOCK
P.O Box 93307
NEWMARKET ON L3X 1A3

Date Received: 26-AUG-21
Report Date: 08-SEP-21 12:46 (MT)
Version: FINAL

Client Phone: --

Certificate of Analysis

Lab Work Order #: L2632254
Project P.O. #: NOT SUBMITTED
Job Reference: P1236
C of C Numbers:
Legal Site Desc:

Tyler Prentice
Account Manager

Summary of Guideline Exceedances

ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit	Guideline
Ontario Regulation 153/04 - April 15, 2011 Standards - T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use							
(No parameter exceedances)							

Metals - SOIL

		Guide Limits									
Lab ID				L2632254-1	L2632254-2	L2632254-3	L2632254-4	L2632254-5	L2632254-6	L2632254-7	L2632254-8	L2632254-9
Sample Date				25-AUG-21	25-AUG-21	25-AUG-21	25-AUG-21	25-AUG-21	25-AUG-21	25-AUG-21	25-AUG-21	25-AUG-21
Sample ID				GP01-S01	GP02-S02	GP03-S03	GP04-S04	GP05-S05	GP06-S06	GP07-S07	GP08-S08	GP11-S11
Analyte	**Unit**	**#1**	**#2**									
Beryllium (Be)	ug/g	2.5	-	<0.50	<0.50	<0.50	<0.50	<0.50	0.55	<0.50	<0.50	<0.50
Uranium (U)	ug/g	2.5	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Metals - SOIL

		Guide Limits					
				Lab ID	L2632254-10	L2632254-11	L2632254-12	L2632254-13
				Sample Date	25-AUG-21	25-AUG-21	25-AUG-21	25-AUG-21
				Sample ID	GP12-S12	GP13-S13	GP20-S20	GP21-S21
Analyte	Unit	#1	#2				
Beryllium (Be)	ug/g	2.5	-	<0.50	<0.50	<0.50	<0.50
Uranium (U)	ug/g	2.5	-	<1.0	<1.0	<1.0	<1.0

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2632254 Report Date: 08-SEP-21

Client: CASH CLIENTS - RICHMOND HILL
YOUNG MULOCK P.O Box 93307
NEWMARKET ON L3X 1A3
Contact: BRIAN SCHUYLER

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
Batch R5576119								
WG3609862-2 CRM		**WT-SS-2**						
Beryllium (Be)			110.9		%		70-130	02-SEP-21
Uranium (U)			100.3		%		70-130	02-SEP-21
WG3609862-4 DUP		**L2632805-4**						
Beryllium (Be)		<0.50	<0.50	RPD-NA	ug/g	N/A	30	02-SEP-21
Uranium (U)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	02-SEP-21
WG3609862-3 LCS								
Beryllium (Be)			104.6		%		80-120	02-SEP-21
Uranium (U)			97.9		%		80-120	02-SEP-21
WG3609862-1 MB								
Beryllium (Be)			<0.10		mg/kg		0.1	02-SEP-21
Uranium (U)			<0.050		mg/kg		0.05	02-SEP-21
Batch R5578062								
WG3609970-2 CRM		**WT-SS-2**						
Beryllium (Be)			104.1		%		70-130	02-SEP-21
Uranium (U)			104.3		%		70-130	02-SEP-21
WG3609970-6 DUP		**WG3609970-5**						
Beryllium (Be)		0.19	0.21		ug/g	8.2	30	02-SEP-21
Uranium (U)		0.563	0.446		ug/g	23	30	02-SEP-21
WG3609970-4 LCS								
Beryllium (Be)			93.1		%		80-120	02-SEP-21
Uranium (U)			93.4		%		80-120	02-SEP-21
WG3609970-1 MB								
Beryllium (Be)			<0.10		mg/kg		0.1	02-SEP-21
Uranium (U)			<0.050		mg/kg		0.05	02-SEP-21

Quality Control Report

Workorder: L2632254 Report Date: 08-SEP-21

Client: CASH CLIENTS - RICHMOND HILL
YOUNG MULOCK P.O Box 93307
NEWMARKET ON L3X 1A3
Contact: BRIAN SCHUYLER

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes 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 pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain c

L2632254-COFC

COC Number: 20 - 892280

Page 1 of 2

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Report To	Contact and company name below will appear on the final report
Company:	SDR Environmental
Contact:	Brian Schuyler
Phone:	(905) 717-6720
	Company address below will appear on the final report
Street:	Yonge-Mulock P.O. P.O. Box 93509
City/Province:	Newmarket, ON
Postal Code:	L3X 1A3
Invoice To	Same as Report To ☒ YES ☐ NO
	Copy of Invoice with Report ☒ YES ☐ NO
Company:	
Contact:	

Select Report Format:	☒ PDF ☒ EXCEL ☐ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☒ YES ☐ NO ☐ N/A
☒ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☒ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	brian.schuyler@gmail.com
Email 2	chris@sdkenvironmental.com
Email 3	

Invoice Recipients

Select Invoice Distribution:	☒ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	brian.schuyler@gmail.com
Email 2	chris@sdkenvironmental.com Ca

Turnaround Time (TAT) Requested

- ☒ Routine [R] if received by 3pm M-F - no surcharges apply
- ☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
- ☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
- ☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
- ☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
- ☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm (24hr)

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	Q 86599
Job #:	P1236
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only): LQ63Q254

ALS Contact: Melissa Tran Sampler: B. Schuyler

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Beryllium	Uranium	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	GP01-S01	Aug 25/21	11:55	SOIL	1	X	X			
	GP02-S02		10:39		1	X	X			
	GP03-S03		11:15		1	X	X			
	GP04-S04		1:00		1	X	X			
	GP05-S05		9:35		1	X	X			
	GP06-S06		10:07		1	X	X			
	GP07-S07		1:35		1	X	X			
	GP08-S08		2:10		1	X	X			
	GP11-S11		3:10		1	X	X			
	GP12-S12		3:25		1	X	X			
	GP13-S13		3:50		1	X	X			
	GP20-S20		10:45		1	X	X			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

MECP Table 1 Res/Park/Inst/Ind/Com/Comm Property Use

* Contact Brian Schuyler before disposing samples

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☒ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
3.3				3.4			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
BSchuyler	Aug 26/21	17:56

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time
[illegible]	Aug 26/21	13:00

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time
[illegible]	AUG 26	1630

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain

L2632254-COFC

COC Number: 20 - 892279

Page 2 of 2

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Report To	Contact and company name below will appear on the final report	Report / Recipients	Turnaround Time (TAT) Requested
Company:	SDK Environmental	Select Report Format: ☒ PDF ☒ EXCEL ☐ EDD (DIGITAL)	☒ Routine [R] if received by 3pm M-F - no surcharges apply
Contact:	Brian Schuyler	Merge QC/QCI Reports with COA ☒ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
Phone:	(905) 717-6720	☒ Compare Results to Criteria on Report - provide details below if box checked	☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
	Company address below will appear on the final report	Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
Street:	Yacht Club P.O. P.O. Box 93307	Email 1 or Fax brian.schuyler@gmail.com	☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
City/Province:	Newmarket, ON	Email 2 chris@sdkenvironmental.ca	☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests
Postal Code:	L3X 1A3	Email 3	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm
Invoice To	Same as Report To ☒ YES ☐ NO	**Invoice Recipients**	For all tests with rush TATs requested, please contact your AM to confirm availability.
	Copy of Invoice with Report ☒ YES ☐ NO	Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	**Analysis Request**
Company:		Email 1 or Fax brian.schuyler@gmail.com	
Contact:		Email 2 chris@sdkenvironmental.ca	

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q 86599	AFE/Cost Center:	PO#
Job #:	P1236	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):	L2632054	ALS Contact: Melissa Tran	Sampler: B. Schuyler

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Benzene	Xylenes	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	GP21-S21	Aug 25/21	4:30	SOIL	1	X	X			

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	MECP Table 1 Res/Park/Inst/Ind/Com/Commu Property Use
Are samples for human consumption/ use? ☐ YES ☐ NO	*Contact Brian Schuyler before disposing samples

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
3.3				3.5			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	Aug 26/21	12:56		Aug 26/21	13:16		AUG 27	1630

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.