

Appendix H - Excess Soil Management Report

PROJECT No.: 22216

October 20, 2022

Niagara Region
1815 Sir Isaac Brock Way
Thorold, Ontario
L2V 4T7

Attention: Ms. Nicole Menard

**EXCESS SOIL MANAGEMENT REPORT
PROPOSED SINGLE STOREY INSTITUTIONAL BUILDING
5 LINCOLN STREET, WELLAND, ONTARIO**

Dear Ms. Menard,

Niagara Testing and Inspection Ltd. [NTIL] was engaged to obtain representative soil samples from the planned areas of excavation at the proposed single storey Institutional building at 5 Lincoln Street in Welland, Ontario.

Ten [10] sampled boreholes were advanced across the property at the locations shown on the attached Drawing No. 1 Borehole Location Plan. The soil was found to consist of a silty clay/clayey silt. Borehole Nos. 8, 9 and 10 were advanced on existing berms, thereby the upper 2.2 to 4.1 metres of material has been described as fill material. Fourteen [14] samples considered to be representative of the varying depths of excess soil material that will be generated at the site were selected for analysis. All samples were submitted to Paracel Laboratories Ltd. for analysis of pH/Sodium Adsorption Ratio [SAR]/Electrical Conductivity [EC], Petroleum Hydrocarbons F1-F4 [PHCs], Benzene, Toluene, Ethylbenzene and Xylene [BTEX] and Metals for comparison to O. Reg. 406/19 On-site and Excess Soil Management Table 1 Agricultural standards. In addition, three [3] samples were submitted for mSPLP Leachate analysis.

RESULTS

The test results for all fourteen [14] soil samples met O. Reg 406/19 Table 1 Agricultural criteria, with the exception of the following:

- 1] The Electrical Conductivity test results for Sample Nos. BH7-B, BH7-C, BH9-B, BH9-C, BH10-B and BH10-C.
- 2] The Sodium Adsorption Ratio test results for Sample Nos. BH9-C and BH10-C.
- 3] The Petroleum Hydrocarbons test results for Sample Nos. BH7-A and BH8-A.
- 4] The Copper test results for Sample Nos. BH6-A and BH10-A.

**EXCESS SOIL MANAGEMENT REPORT
PROPOSED SINGLE STOREY INSTITUTIONAL BUILDING
5 LINCOLN STREET, WELLAND, ONTARIO**

5] The Nickel test results for Sample Nos. BH8-A and BH10-A.

6] The Molybdenum test result for Sample No. BH8-A.

All test results met O. Reg 406/19 Table 2.1 Agricultural Criteria, with the exception of the Electrical Conductivity parameter for Sample Nos. 7-B, 7-C, 9-B and 9-C. The three [3] test results analysed for mSPLP Leachate Metals met Table 1 Leachate, Agricultural criteria, together with Table 2.1 Leachate, Agricultural criteria. A copy of the full laboratory report is appended.

Parameter	Reg 406/19-Table 1 Agricultural	BH7-B	BH7-C	BH9-B	BH9-C
General Organics					
Electrical Conductivity	0.7 mS/cm	0.801	2.640	1.160	1.610

As the soil results meet Table 2.1 R/P/I criteria, the soil may be utilized at Residential or Commercial receiving sites and/or properties for re-use purposes, with the exception of the soil in the area of Borehole Nos. 7 and 9. The soil in the area of Borehole Nos. 7 and 9 may be taken to a Residential or Commercial receiving site so long as the following requirements are satisfied:

1. Final placement of the excess soil must achieve a stratified condition such that soil that meets the stratified standards is placed at a depth of 1.5 metres or greater below the soil surface and the surface soil placed on top meets the applicable full-depth generic excess soil quality standards.
2. The soil may be placed in a future roadway or parking lot area.
3. The reuse site is not an agricultural or other property use, is not a shallow soil property, and the final placement is not within 30 metres of a water body.
4. The location of final placement, the property use, and the type of beneficial purpose are such that a stratified condition will be maintained into the foreseeable future.
5. The reuse site owner, occupier, or person who has charge, management or control of the reuse site must ensure that the stratified condition is established and maintained. This responsibility should be communicated to subsequent property owners.

**EXCESS SOIL MANAGEMENT REPORT
PROPOSED SINGLE STOREY INSTITUTIONAL BUILDING
5 LINCOLN STREET, WELLAND, ONTARIO**

If during excavation any significant changes are noted, i.e., odours, staining, etc., NTIL should be contacted at that time to reassess the environmental characteristics of the soil.

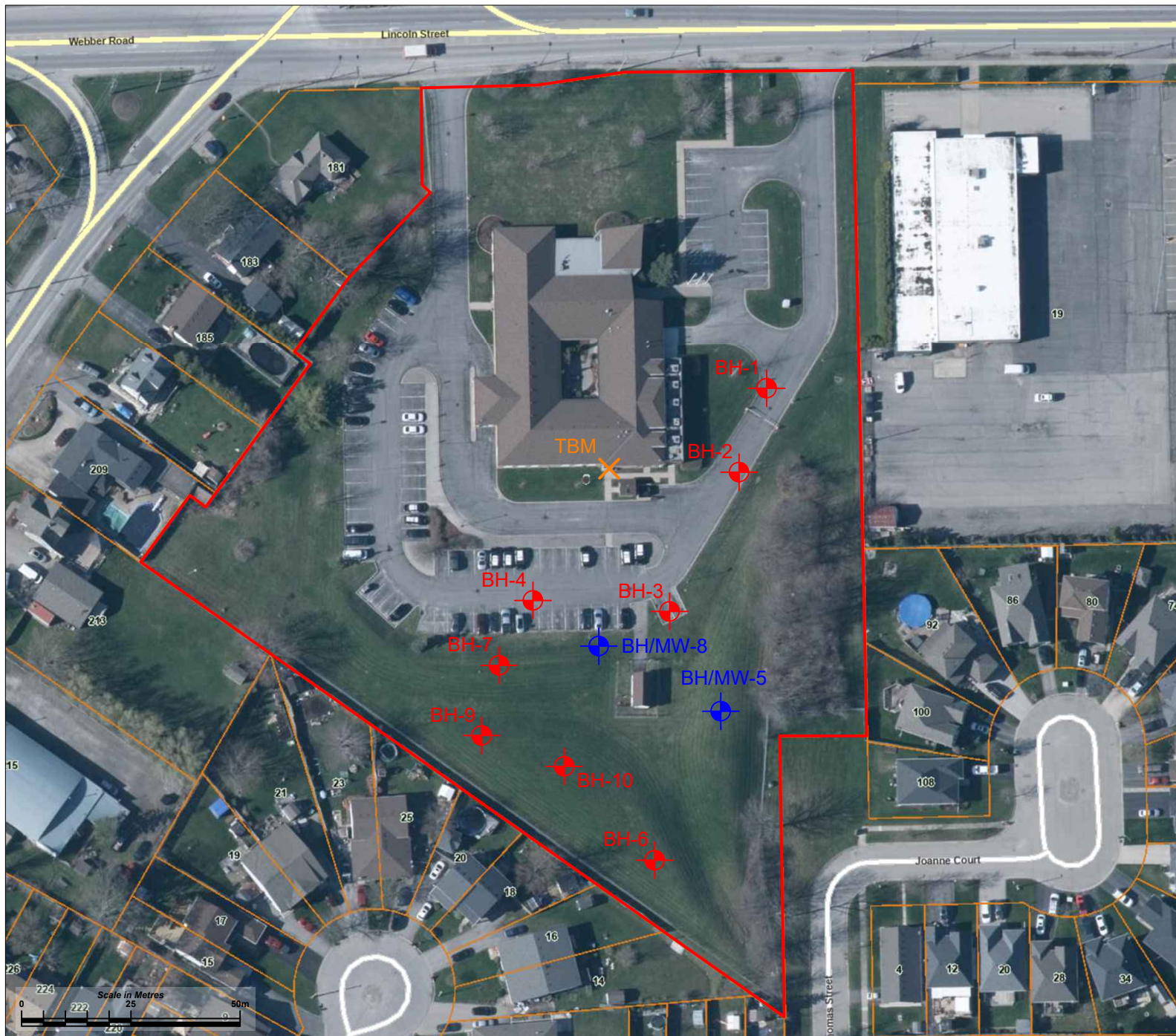
Yours very truly,
Niagara Testing & Inspection Ltd.

A handwritten signature in blue ink, appearing to read 'J. Monkman', with a stylized flourish at the end.




John Monkman, P. Eng.
Vice President

Enclosures: Drawing No. 1, Borehole Location Plan
Paracel Laboratories Ltd. Order # 2241474

Distribution: Region Niagara [1 via pdf]



LEGEND

- BH-1  Borehole Location
- BH/MW-5  Borehole with Monitoring Well Location
- X TBM  Temporary Benchmark
Main floor slab elevation of existing building at rear entrance.
- Site Boundary



CLIENT:

NIAGARA REGION

PROJECT:

**GEOTECHNICAL INVESTIGATION
PROPOSED SINGLE STOREY
INSTITUTIONAL BUILDING
5 LINCOLN STREET
WELLAND, ONTARIO**

TITLE:

**BOREHOLE & MONITORING
WELL LOCATION PLAN**

DRAWN BY:

DN

CHECKED BY:

JM

DATE:

OCTOBER 2022

PROJECT NO:

NT22216

SCALE:

AS SHOWN

NO:

DRAWING 1

REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, <https://maps-beta.niagararegion.ca/Navigator/>

NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

Certificate of Analysis

Niagara Soils Solutions Ltd.

3300 Merrittville Highway

Thorold, ON L2V 4Y6

Attn: Jodie Glasier

Client PO:

Project: NS2299-05

Custody:

Report Date: 17-Oct-2022

Order Date: 6-Oct-2022

Order #: 2241474

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID	Paracel ID	Client ID
2241474-01	BH10-B		
2241474-02	BH10-C		
2241474-03	BH5-A		
2241474-04	BH6-A		
2241474-05	BH7-A		
2241474-06	BH7-B		
2241474-07	BH7-C		
2241474-08	BH8-A		
2241474-09	BH8-B		
2241474-10	BH8-C		
2241474-11	BH9-A		
2241474-12	BH9-B		
2241474-13	BH9-C		
2241474-14	BH10-A		

Approved By:



Alex Enfield, MSc

Lab Manager

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	14-Oct-22	17-Oct-22
Conductivity	MOE E3138 - probe @25 °C, water ext	13-Oct-22	13-Oct-22
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	12-Oct-22	12-Oct-22
PHC F1	CWS Tier 1 - P&T GC-FID	14-Oct-22	17-Oct-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	11-Oct-22	12-Oct-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	13-Oct-22	13-Oct-22
REG 406: Leachate - Metals by ICP-MS	mSPLP EPA 6020 - Digestion - ICP-MS	17-Oct-22	17-Oct-22
SAR	Calculated	13-Oct-22	14-Oct-22
Solids, %	CWS Tier 1 - Gravimetric	11-Oct-22	11-Oct-22

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Summary of Criteria Exceedances

(If this page is blank then there are no exceedances)

Only those criteria that a sample exceeds will be highlighted in red

Regulatory Comparison:

Paracel Laboratories has provided regulatory guidelines on this report for informational purposes only and makes no representations or warranties that the data is accurate or reflects the current regulatory values. The user is advised to consult with the appropriate official regulations to evaluate compliance. Sample results that are highlighted have exceeded the selected regulatory limit. Calculated uncertainty estimations have not been applied for determining regulatory exceedances.

Sample	Analyte	MDL / Units	Result	Reg 406/19 -T1 Agr	Reg 406/19 -Leachate T1 Agr
BH10-B	Conductivity	5 uS/cm	508	0.47 mS/cm	-
BH10-C	SAR	0.01 N/A	1.06	1 N/A	-
BH10-C	Conductivity	5 uS/cm	616	0.47 mS/cm	-
BH6-A	Copper	5 ug/g	71.3	62 ug/g	-
BH7-A	F4 PHCs (C34-C50)	6 ug/g	372	120 ug/g	-
BH7-B	Conductivity	5 uS/cm	801	0.47 mS/cm	-
BH7-C	Conductivity	5 uS/cm	2640	0.47 mS/cm	-
BH8-A	Molybdenum	1 ug/g	2.4	2 ug/g	-
BH8-A	Nickel	5 ug/g	45.6	37 ug/g	-
BH8-A	F4 PHCs (C34-C50)	6 ug/g	308	120 ug/g	-
BH9-B	Conductivity	5 uS/cm	1160	0.47 mS/cm	-
BH9-C	SAR	0.01 N/A	1.36	1 N/A	-
BH9-C	Conductivity	5 uS/cm	1610	0.47 mS/cm	-
BH10-A	Copper	5 ug/g	87.5	62 ug/g	-
BH10-A	Nickel	5 ug/g	38.2	37 ug/g	-

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Client ID:	BH10-B	BH10-C	BH5-A	BH6-A	Criteria:	
Sample Date:	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	Reg 406/19 -T1 Agr	Reg 406/19
Sample ID:	2241474-01	2241474-02	2241474-03	2241474-04	-Leachate T1 Agr	
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Physical Characteristics

% Solids	0.1 % by Wt.	76.6	80.4	82.4	76.2	-	-
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mSPLP Leachate Metals

Antimony	0.5 ug/L	-	-	<0.5	-	-	6 ug/L
Arsenic	1 ug/L	-	-	<1.0	-	-	-
Barium	1 ug/L	-	-	8.4	-	-	-
Beryllium	0.5 ug/L	-	-	<0.5	-	-	-
Boron	10 ug/L	-	-	<10.0	-	-	-
Cadmium	0.2 ug/L	-	-	<0.2	-	-	-
Chromium	1 ug/L	-	-	<1.0	-	-	-
Cobalt	0.5 ug/L	-	-	<0.5	-	-	-
Copper	0.5 ug/L	-	-	3.0	-	-	-
Lead	0.2 ug/L	-	-	<0.2	-	-	-
Molybdenum	0.5 ug/L	-	-	8.6	-	-	23 ug/L
Nickel	1 ug/L	-	-	<1.0	-	-	-
Selenium	1 ug/L	-	-	<1.0	-	-	-
Silver	0.2 ug/L	-	-	<0.2	-	-	0.3 ug/L
Thallium	0.5 ug/L	-	-	<0.5	-	-	2 ug/L
Uranium	0.2 ug/L	-	-	2.0	-	-	-
Vanadium	0.5 ug/L	-	-	1.6	-	-	-
Zinc	5 ug/L	-	-	7.7	-	-	-

General Inorganics

SAR	0.01 N/A	0.68	1.06	0.40	0.11	1 N/A	-
Conductivity	5 uS/cm	508	616	369	355	0.47 mS/cm	-
pH	0.05 pH Units	7.87	7.78	7.62	7.47	5.00 - 9.00 pH Units	-

Metals

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Client ID:	BH10-B	BH10-C	BH5-A	BH6-A	Criteria:	
Sample Date:	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	Reg 406/19 -T1 Agr	Reg 406/19
Sample ID:	2241474-01	2241474-02	2241474-03	2241474-04	-Leachate T1 Agr	
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Metals

Antimony	1 ug/g	<1.0	<1.0	<1.0	<1.0	1 ug/g	-
Arsenic	1 ug/g	5.6	7.0	9.9	7.5	11 ug/g	-
Barium	1 ug/g	131	137	136	128	210 ug/g	-
Beryllium	0.5 ug/g	0.9	0.7	0.9	0.9	2.5 ug/g	-
Boron	5 ug/g	5.4	7.5	<5.0	<5.0	36 ug/g	-
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	1 ug/g	-
Chromium	5 ug/g	34.2	26.2	29.8	30.6	67 ug/g	-
Cobalt	1 ug/g	9.2	12.5	13.2	10.6	19 ug/g	-
Copper	5 ug/g	34.5	21.8	38.0	71.3	62 ug/g	-
Lead	1 ug/g	19.2	10.5	16.8	31.7	45 ug/g	-
Molybdenum	1 ug/g	1.6	<1.0	1.3	1.4	2 ug/g	-
Nickel	5 ug/g	28.6	28.3	33.1	36.7	37 ug/g	-
Selenium	1 ug/g	<1.0	<1.0	<1.0	<1.0	1.2 ug/g	-
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	0.5 ug/g	-
Thallium	1 ug/g	<1.0	<1.0	<1.0	<1.0	1 ug/g	-
Uranium	1 ug/g	<1.0	<1.0	<1.0	<1.0	1.9 ug/g	-
Vanadium	10 ug/g	39.8	35.0	42.2	39.3	86 ug/g	-
Zinc	20 ug/g	62.1	60.7	71.1	94.8	290 ug/g	-

Volatiles

Benzene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.02 ug/g	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	0.05 ug/g	-
Toluene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	0.2 ug/g	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	0.05 ug/g	-

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Client ID:	BH10-B	BH10-C	BH5-A	BH6-A	Criteria:	
Sample Date:	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	Reg 406/19 -T1 Agr	Reg 406/19
Sample ID:	2241474-01	2241474-02	2241474-03	2241474-04	-Leachate T1 Agr	
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Volatiles

Toluene-d8	Surrogate	105%	105%	106%	106%	-	-
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Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g	<7	<7	<7	<7	17 ug/g	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	<4	<4	10 ug/g	-
F3 PHCs (C16-C34)	8 ug/g	<8	<8	54	49	240 ug/g	-
F4 PHCs (C34-C50)	6 ug/g	<6	<6	69	57	120 ug/g	-

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Client ID:	BH7-A	BH7-B	BH7-C	BH8-A	Criteria:	
Sample Date:	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	Reg 406/19 -T1 Agr	Reg 406/19
Sample ID:	2241474-05	2241474-06	2241474-07	2241474-08	-Leachate T1 Agr	
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Physical Characteristics

% Solids	0.1 % by Wt.	86.8	85.5	85.8	85.8	-	-
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General Inorganics

SAR	0.01 N/A	0.24	0.59	0.65	0.26	1 N/A	-
Conductivity	5 uS/cm	266	801	2640	293	0.47 mS/cm	-
pH	0.05 pH Units	7.51	7.64	7.70	7.62	5.00 - 9.00 pH Units	-

Metals

Antimony	1 ug/g	<1.0	<1.0	<1.0	<1.0	1 ug/g	-
Arsenic	1 ug/g	5.0	5.0	5.4	6.9	11 ug/g	-
Barium	1 ug/g	99.6	132	138	92.3	210 ug/g	-
Beryllium	0.5 ug/g	0.7	1.0	0.8	0.6	2.5 ug/g	-
Boron	5 ug/g	5.8	10.7	10.1	5.1	36 ug/g	-
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	1 ug/g	-
Chromium	5 ug/g	28.7	31.0	25.6	26.1	67 ug/g	-
Cobalt	1 ug/g	10.9	16.4	13.4	8.0	19 ug/g	-
Copper	5 ug/g	23.3	24.9	24.6	19.6	62 ug/g	-
Lead	1 ug/g	33.5	12.7	10.0	32.4	45 ug/g	-
Molybdenum	1 ug/g	1.1	<1.0	<1.0	2.4	2 ug/g	-
Nickel	5 ug/g	28.5	35.2	28.0	45.6	37 ug/g	-
Selenium	1 ug/g	<1.0	<1.0	<1.0	<1.0	1.2 ug/g	-
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	0.5 ug/g	-
Thallium	1 ug/g	<1.0	<1.0	<1.0	<1.0	1 ug/g	-
Uranium	1 ug/g	<1.0	1.2	<1.0	<1.0	1.9 ug/g	-
Vanadium	10 ug/g	40.4	40.3	35.7	33.8	86 ug/g	-
Zinc	20 ug/g	62.7	66.3	61.2	60.7	290 ug/g	-

Volatiles

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Client ID:	BH7-A	BH7-B	BH7-C	BH8-A	Criteria:	
Sample Date:	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	Reg 406/19 -T1 Agr	Reg 406/19
Sample ID:	2241474-05	2241474-06	2241474-07	2241474-08	-Leachate T1 Agr	
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Volatiles

Benzene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.02 ug/g	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	0.05 ug/g	-
Toluene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	0.2 ug/g	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	0.05 ug/g	-
Toluene-d8	Surrogate	105%	105%	106%	105%	-	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g	<7	<7	<7	<7	17 ug/g	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	<4	<4	10 ug/g	-
F3 PHCs (C16-C34)	8 ug/g	227	<8	<8	220	240 ug/g	-
F4 PHCs (C34-C50)	6 ug/g	372	<6	<6	308	120 ug/g	-

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Client ID:	BH8-B	BH8-C	BH9-A	BH9-B	Criteria:	
Sample Date:	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	Reg 406/19 -T1 Agr	Reg 406/19
Sample ID:	2241474-09	2241474-10	2241474-11	2241474-12	-Leachate T1 Agr	
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Physical Characteristics

% Solids	0.1 % by Wt.	75.7	81.5	77.2	82.1	-	-
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mSPLP Leachate Metals

Antimony	0.5 ug/L	-	<0.5	-	<0.5	-	6 ug/L
Arsenic	1 ug/L	-	<1.0	-	<1.0	-	-
Barium	1 ug/L	-	9.7	-	21.4	-	-
Beryllium	0.5 ug/L	-	<0.5	-	<0.5	-	-
Boron	10 ug/L	-	<10.0	-	<10.0	-	-
Cadmium	0.2 ug/L	-	<0.2	-	<0.2	-	-
Chromium	1 ug/L	-	<1.0	-	<1.0	-	-
Cobalt	0.5 ug/L	-	<0.5	-	<0.5	-	-
Copper	0.5 ug/L	-	1.2	-	<0.5	-	-
Lead	0.2 ug/L	-	<0.2	-	<0.2	-	-
Molybdenum	0.5 ug/L	-	<0.5	-	2.3	-	23 ug/L
Nickel	1 ug/L	-	<1.0	-	<1.0	-	-
Selenium	1 ug/L	-	<1.0	-	<1.0	-	-
Silver	0.2 ug/L	-	<0.2	-	<0.2	-	0.3 ug/L
Thallium	0.5 ug/L	-	<0.5	-	<0.5	-	2 ug/L
Uranium	0.2 ug/L	-	0.8	-	0.4	-	-
Vanadium	0.5 ug/L	-	0.9	-	<0.5	-	-
Zinc	5 ug/L	-	<5.0	-	<5.0	-	-

General Inorganics

SAR	0.01 N/A	0.45	0.46	0.50	0.58	1 N/A	-
Conductivity	5 uS/cm	325	254	397	1160	0.47 mS/cm	-
pH	0.05 pH Units	7.59	7.64	7.45	7.43	5.00 - 9.00 pH Units	-

Metals

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Client ID:	BH8-B	BH8-C	BH9-A	BH9-B	Criteria:	
Sample Date:	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	Reg 406/19 -T1 Agr	Reg 406/19
Sample ID:	2241474-09	2241474-10	2241474-11	2241474-12	-Leachate T1 Agr	
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Metals

Antimony	1 ug/g	<1.0	<1.0	<1.0	<1.0	1 ug/g	-
Arsenic	1 ug/g	5.6	4.2	5.8	5.0	11 ug/g	-
Barium	1 ug/g	131	106	142	132	210 ug/g	-
Beryllium	0.5 ug/g	1.2	0.9	1.0	0.8	2.5 ug/g	-
Boron	5 ug/g	5.9	7.3	5.6	9.3	36 ug/g	-
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	1 ug/g	-
Chromium	5 ug/g	31.5	28.9	33.4	28.2	67 ug/g	-
Cobalt	1 ug/g	14.9	13.8	12.1	14.8	19 ug/g	-
Copper	5 ug/g	27.9	25.2	21.1	22.6	62 ug/g	-
Lead	1 ug/g	12.5	11.7	21.5	11.6	45 ug/g	-
Molybdenum	1 ug/g	<1.0	<1.0	<1.0	<1.0	2 ug/g	-
Nickel	5 ug/g	35.4	32.5	36.9	30.6	37 ug/g	-
Selenium	1 ug/g	<1.0	<1.0	<1.0	<1.0	1.2 ug/g	-
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	0.5 ug/g	-
Thallium	1 ug/g	<1.0	<1.0	<1.0	<1.0	1 ug/g	-
Uranium	1 ug/g	<1.0	<1.0	1.1	1.0	1.9 ug/g	-
Vanadium	10 ug/g	42.8	38.8	44.1	37.9	86 ug/g	-
Zinc	20 ug/g	72.4	65.5	84.6	62.0	290 ug/g	-

Volatiles

Benzene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.02 ug/g	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	0.05 ug/g	-
Toluene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	0.2 ug/g	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	0.05 ug/g	-

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Client ID:	BH8-B	BH8-C	BH9-A	BH9-B	Criteria:	
Sample Date:	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	03-Oct-22 09:00	Reg 406/19 -T1 Agr	Reg 406/19
Sample ID:	2241474-09	2241474-10	2241474-11	2241474-12	-Leachate T1 Agr	
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Volatiles

Toluene-d8	Surrogate	105%	105%	106%	106%	-	-
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Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g	<7	<7	<7	<7	17 ug/g	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	<4	<4	10 ug/g	-
F3 PHCs (C16-C34)	8 ug/g	<8	<8	<8	<8	240 ug/g	-
F4 PHCs (C34-C50)	6 ug/g	48	<6	<6	<6	120 ug/g	-

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Client ID:	BH9-C	BH10-A			Criteria:
Sample Date:	03-Oct-22 09:00	03-Oct-22 09:00			Reg 406/19 -T1 Agr
Sample ID:	2241474-13	2241474-14			Reg 406/19
Matrix:	Soil	Soil			-Leachate T1 Agr
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	83.1	79.6	-	-	-	-
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General Inorganics

SAR	0.01 N/A	1.36	0.38	-	-	1 N/A	-
Conductivity	5 uS/cm	1610	287	-	-	0.47 mS/cm	-
pH	0.05 pH Units	7.62	7.60	-	-	5.00 - 9.00 pH Units	-

Metals

Antimony	1 ug/g	<1.0	<1.0	-	-	1 ug/g	-
Arsenic	1 ug/g	4.5	5.9	-	-	11 ug/g	-
Barium	1 ug/g	110	158	-	-	210 ug/g	-
Beryllium	0.5 ug/g	0.7	1.0	-	-	2.5 ug/g	-
Boron	5 ug/g	7.3	8.2	-	-	36 ug/g	-
Cadmium	0.5 ug/g	<0.5	<0.5	-	-	1 ug/g	-
Chromium	5 ug/g	23.6	33.6	-	-	67 ug/g	-
Cobalt	1 ug/g	10.5	14.7	-	-	19 ug/g	-
Copper	5 ug/g	22.0	87.5	-	-	62 ug/g	-
Lead	1 ug/g	9.3	18.0	-	-	45 ug/g	-
Molybdenum	1 ug/g	<1.0	<1.0	-	-	2 ug/g	-
Nickel	5 ug/g	23.9	38.2	-	-	37 ug/g	-
Selenium	1 ug/g	<1.0	<1.0	-	-	1.2 ug/g	-
Silver	0.3 ug/g	<0.3	<0.3	-	-	0.5 ug/g	-
Thallium	1 ug/g	<1.0	<1.0	-	-	1 ug/g	-
Uranium	1 ug/g	<1.0	1.1	-	-	1.9 ug/g	-
Vanadium	10 ug/g	33.0	44.5	-	-	86 ug/g	-
Zinc	20 ug/g	53.6	78.4	-	-	290 ug/g	-

Volatiles

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Client ID:	BH9-C	BH10-A			Criteria:
Sample Date:	03-Oct-22 09:00	03-Oct-22 09:00			Reg 406/19 -T1 Agr
Sample ID:	2241474-13	2241474-14			Reg 406/19
Matrix:	Soil	Soil			-Leachate T1 Agr
MDL/Units					

Volatiles

Benzene	0.02 ug/g	<0.02	<0.02	-	-	0.02 ug/g	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	-	-	0.05 ug/g	-
Toluene	0.05 ug/g	<0.05	0.06	-	-	0.2 ug/g	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	-	-	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	-	-	0.05 ug/g	-
Toluene-d8	Surrogate	105%	105%	-	-	-	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g	<7	<7	-	-	17 ug/g	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	-	-	10 ug/g	-
F3 PHCs (C16-C34)	8 ug/g	<8	<8	-	-	240 ug/g	-
F4 PHCs (C34-C50)	6 ug/g	<6	<6	-	-	120 ug/g	-

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics								
SAR	ND	0.01	N/A					
Conductivity	ND	5	uS/cm					
Hydrocarbons								
F1 PHCs (C6-C10)	ND	7	ug/g					
F2 PHCs (C10-C16)	ND	4	ug/g					
F3 PHCs (C16-C34)	ND	8	ug/g					
F4 PHCs (C34-C50)	ND	6	ug/g					
Metals								
Antimony	ND	1.0	ug/g					
Arsenic	ND	1.0	ug/g					
Barium	ND	1.0	ug/g					
Beryllium	ND	0.5	ug/g					
Boron	ND	5.0	ug/g					
Cadmium	ND	0.5	ug/g					
Chromium	ND	5.0	ug/g					
Cobalt	ND	1.0	ug/g					
Copper	ND	5.0	ug/g					
Lead	ND	1.0	ug/g					
Molybdenum	ND	1.0	ug/g					
Nickel	ND	5.0	ug/g					
Selenium	ND	1.0	ug/g					
Silver	ND	0.3	ug/g					
Thallium	ND	1.0	ug/g					
Uranium	ND	1.0	ug/g					
Vanadium	ND	10.0	ug/g					
Zinc	ND	20.0	ug/g					
mSPLP Leachate Metals								
Antimony	ND	0.5	ug/L					
Arsenic	ND	1.0	ug/L					
Barium	ND	1.0	ug/L					
Beryllium	ND	0.5	ug/L					
Boron	ND	10.0	ug/L					

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Cadmium	ND	0.2	ug/L					
Chromium	ND	1.0	ug/L					
Cobalt	ND	0.5	ug/L					
Copper	ND	0.5	ug/L					
Lead	ND	0.2	ug/L					
Molybdenum	ND	0.5	ug/L					
Nickel	ND	1.0	ug/L					
Selenium	ND	1.0	ug/L					
Silver	ND	0.2	ug/L					
Thallium	ND	0.5	ug/L					
Uranium	ND	0.2	ug/L					
Vanadium	ND	0.5	ug/L					
Zinc	ND	5.0	ug/L					
Volatiles								
Benzene	ND	0.02	ug/g					
Ethylbenzene	ND	0.05	ug/g					
Toluene	ND	0.05	ug/g					
m,p-Xylenes	ND	0.05	ug/g					
o-Xylene	ND	0.05	ug/g					
Xylenes, total	ND	0.05	ug/g					
Surrogate: Toluene-d8	8.46		ug/g	106	50-140			

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	0.18	0.01	N/A	0.16			11.8	30	
Conductivity	193	5	uS/cm	190			1.7	5	
pH	7.56	0.05	pH Units	7.41			2.0	10	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	6.4	1.0	ug/g	6.2			4.3	30	
Barium	71.6	1.0	ug/g	70.3			1.9	30	
Beryllium	0.7	0.5	ug/g	0.6			16.0	30	
Boron	9.7	5.0	ug/g	ND			NC	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	17.0	5.0	ug/g	16.6			2.8	30	
Cobalt	7.8	1.0	ug/g	7.4			4.8	30	
Copper	39.2	5.0	ug/g	38.6			1.5	30	
Lead	61.9	1.0	ug/g	52.7			16.0	30	
Molybdenum	2.2	1.0	ug/g	1.2			NC	30	
Nickel	18.5	5.0	ug/g	18.2			1.6	30	
Selenium	1.5	1.0	ug/g	ND			NC	30	
Silver	0.3	0.3	ug/g	ND			NC	30	
Thallium	1.2	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	25.4	10.0	ug/g	25.6			1.0	30	
Zinc	156	20.0	ug/g	156			0.1	30	
mSPLP Leachate Metals									
Antimony	ND	0.5	ug/L	ND			NC	50	
Arsenic	ND	1.0	ug/L	ND			NC	50	

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Barium	1.87	1.0	ug/L	1.77			5.7	50	
Beryllium	ND	0.5	ug/L	ND			NC	50	
Boron	ND	10.0	ug/L	10.1			NC	50	
Cadmium	ND	0.2	ug/L	ND			NC	50	
Chromium	ND	1.0	ug/L	ND			NC	50	
Cobalt	ND	0.5	ug/L	ND			NC	50	
Copper	0.71	0.5	ug/L	0.71			0.2	50	
Lead	ND	0.2	ug/L	0.43			NC	50	
Molybdenum	ND	0.5	ug/L	1.21			NC	50	
Nickel	ND	1.0	ug/L	ND			NC	50	
Selenium	ND	1.0	ug/L	ND			NC	50	
Silver	ND	0.2	ug/L	ND			NC	50	
Thallium	ND	0.5	ug/L	ND			NC	50	
Uranium	0.23	0.2	ug/L	ND			NC	50	
Vanadium	0.79	0.5	ug/L	0.77			2.7	50	
Zinc	ND	5.0	ug/L	ND			NC	50	
Physical Characteristics									
% Solids	76.4	0.1	% by Wt.	76.6			0.3	25	
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	7.62		ug/g		106	50-140			

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	71	7	ug/g	ND	99.7	80-120			
F2 PHCs (C10-C16)	98	4	ug/g	ND	89.8	60-140			
F3 PHCs (C16-C34)	229	8	ug/g	ND	93.6	60-140			
F4 PHCs (C34-C50)	151	6	ug/g	ND	85.8	60-140			
Metals									
Antimony	116	1.0	ug/g	ND	92.8	70-130			
Arsenic	126	1.0	ug/g	6.2	96.1	70-130			
Barium	187	1.0	ug/g	70.3	93.6	70-130			
Beryllium	104	0.5	ug/g	0.6	82.9	70-130			
Boron	99.4	5.0	ug/g	ND	79.5	70-130			
Cadmium	122	0.5	ug/g	ND	97.3	70-130			
Chromium	132	5.0	ug/g	16.6	92.0	70-130			
Cobalt	120	1.0	ug/g	7.4	90.4	70-130			
Copper	157	5.0	ug/g	38.6	94.7	70-130			
Lead	158	1.0	ug/g	52.7	84.3	70-130			
Molybdenum	124	1.0	ug/g	1.2	98.4	70-130			
Nickel	136	5.0	ug/g	18.2	94.7	70-130			
Selenium	122	1.0	ug/g	ND	97.5	70-130			
Silver	105	0.3	ug/g	ND	84.1	70-130			
Thallium	110	1.0	ug/g	ND	88.3	70-130			
Uranium	120	1.0	ug/g	ND	96.2	70-130			
Vanadium	139	10.0	ug/g	25.6	91.0	70-130			
Zinc	276	20.0	ug/g	156	96.0	70-130			
mSPLP Leachate Metals									
Antimony	49.4	0.5	ug/L	ND	98.7	70-130			
Arsenic	55.4	1.0	ug/L	ND	111	70-130			
Barium	54.2	1.0	ug/L	1.77	105	70-130			
Beryllium	50.1	0.5	ug/L	ND	100	70-130			
Boron	53.2	10.0	ug/L	10.1	86.1	70-130			
Cadmium	54.3	0.2	ug/L	ND	109	70-130			

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Chromium	52.4	1.0	ug/L	ND	105	70-130			
Cobalt	50.7	0.5	ug/L	ND	101	70-130			
Copper	51.3	0.5	ug/L	0.71	101	70-130			
Lead	46.4	0.2	ug/L	0.43	92.0	70-130			
Molybdenum	49.1	0.5	ug/L	1.21	95.8	70-130			
Nickel	51.0	1.0	ug/L	ND	102	70-130			
Selenium	52.7	1.0	ug/L	ND	105	70-130			
Silver	45.5	0.2	ug/L	ND	91.1	70-130			
Thallium	48.7	0.5	ug/L	ND	97.3	70-130			
Uranium	53.0	0.2	ug/L	ND	106	70-130			
Vanadium	53.6	0.5	ug/L	0.77	106	70-130			
Zinc	54.1	5.0	ug/L	ND	108	70-130			
Volatiles									
Benzene	3.77	0.02	ug/g	ND	94.2	60-130			
Ethylbenzene	4.17	0.05	ug/g	ND	104	60-130			
Toluene	3.78	0.05	ug/g	ND	94.5	60-130			
m,p-Xylenes	7.42	0.05	ug/g	ND	92.6	60-130			
o-Xylene	3.81	0.05	ug/g	ND	95.3	60-130			
Surrogate: Toluene-d8	8.06		ug/g		101	50-140			

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Niagara Soils Solutions Ltd.

Order Date: 6-Oct-2022

Client PO:

Project Description: NS2299-05

Qualifier Notes:**QC Qualifiers:****Sample Data Revisions:**

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unless otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Client Name: NIAGARA SOILS SOLUTIONS LTD.	Project Ref: NS2299-05	Page 1 of 2
Contact Name: JODIE GLASIER	Quote #: 22-143	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular Date Required:
Address: 3300 MERRITTVILLE HIGHWAY, UNIT 5, THOROLD, ON L2V 4Y6	PO #:	
Telephone: 289-407-6341	E-mail: JGLASIER@NSSL.CA, DNEILL@NTIL.CA	

[illegible]

Comments:				Method of Delivery:	
				WALK IN	
Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:		
Nicole Burke	BHOMENIER	C-114	C-114		
Relinquished By (Print):	Date/Time:	Date/Time:	Date/Time:		
Nicole Burke	OCT 22 1300	OCT 22 8:30	OCT 22 9:00		
Date/Time:	Temperature:	Temperature:	pH Verified: <input type="checkbox"/> By:		
OCT 16/22	11.6 °C	9.5	NA		
Chain of Custody (Blank) v1.0					

Client Name:	NIAGARA SOILS SOLUTIONS LTD.	Project Ref:	NS2299-05	Page <u>2</u> of <u>2</u>
Contact Name:	JODIE GLASIER	Quote #:	22-143	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address:	3300 MERRITTVILLE HIGHWAY, UNIT 5, THOROLD, ON L2V 4Y6	PO #:		
Telephone:	289-407-6341	E-mail:	JGLASIER@NSSL.CA, DNEILL@NTIL.CA	
				Date Required:

[illegible]

Comments:				Method of Delivery:			
Relinquished By (Sign): Nicole Burke				Received By Driver/Depot: NIAGARA SHOMENIEK		Received at Lab: C-PLY	
Relinquished By (Print): Nicole Burke				Date/Time: OCT 30 1300		Date/Time: Oct 31/22 8:30	
Date/Time: Oct 6/22				Temperature: 1116 °C		Date/Time: Oct 7/22 9:00	
Chain of Custody (Blank).xlsx				Temperature: 9.5		pH Verified: <input type="checkbox"/> By: WA	