650 Main Street West

Phase Two Environmental Site Assessment

Project Location:
650 Main Street West
Port Colborne, ON
L3K 5V4

Prepared For:
M5V Developments
501 Queen Street West
Toronto, ON
M5V 2B4

NIAGARA SOILS SOLUTIONS LTD.

Prepared By:
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Date: April 21st, 2022
NSSL File No.: NS2208-02

EXCUTIVE SUMMARY

Niagara Soils Solutions Ltd. [NSSL] was retained by M5V Developments, to conduct a Phase Two Environmental Site Assessment [ESA] of the commercial property identified as Seaway Motel, located at 650 Main Street West, Port Colborne, ON [herein referred to as the "Phase One Property" or the "Site"].

NSSL completed a Phase One ESA of the study site in March 2022 with findings indicating that the site was historically utilized for agricultural purposes and later developed between 1954-55 and 1965 into the "Seaway Motel". The Phase One ESA research revealed the site was utilized as a motel for long and short-term rental units. The study site was also documented as containing above ground storage tanks. In total five [5] areas of potential environmental concern were identified:

On-site

- Gasoline and Associated Products Storage in Fixed Tanks

Off-site

- Gasoline and Associated Products Storage in Fixed Tanks
- Soap and Detergent Manufacturing, Processing and Bulk Storage
- Battery Manufacturing, Recycling, and Bulk Storage
- Commercial Trucking and Container Terminals

The Phase Two ESA was completed in general accordance with Ontario Regulation 153/04, as amended, and has been supervised by a Qualified Person [QP_{ESA}] to support a filing of a Record of Site Condition [RSC] with the Ministry of the Environment, Conservation and Parks.

Seven [7] boreholes were drilled across the site. Seven [7] select soil samples were submitted to Paracel Laboratories Ltd. [Paracel] for analyses of Metals by ICP, Petroleum Hydrocarbons [PHCs [F1-F4]], Polycyclic Aromatic Hydrocarbons [PAHs], Volatile Organic Compounds [VOCs], Benzene Toluene Ethylbenzene Xylene [BTEX], and pH/ Sodium Absorption Rate [SAR]/ Electric Conductivity [EC]. The results were evaluated against Ministry of the Environment, Conservation and Parks 2011 Table 6: Generic Site Condition Standards for Shallow Soil in a Potable Ground Water Condition for Residential/Parkland [R/P] property use, fine-textured soils.

Three [3] monitoring wells were utilized to form the basis for the groundwater investigative component of the Phase Two ESA. Groundwater was submitted to Paracel for analyses of PHC [F1-F4], PAH, and VOCs.

The soil results met applicable O. Reg 153/04, Table 6: Generic Site Condition Standards for Shallow Soil in a Potable Ground Water Condition for Residential/Parkland [R/P] property use, fine-textured soils.

The groundwater results met applicable O. Reg 153/04, Table 6 Potable Groundwater to all monitoring wells with fine soil criteria.

CONCLUSIONS

Based upon the above-noted findings NSSL concludes no additional soil and/or groundwater environmental investigation is required and submission of a Record of Site Condition to the Ministry of the Environment, Conservation and Parks for the change in land use is justified.

NOTE: This executive summary provides a brief overview of the study findings. It is not intended to substitute for the complete report, nor does it detail specific issues discussed within the report. This summary is not to be adopted in lieu of reading the complete report.

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1.0 INTRODUCTION

1.1 Site Description

The study site is a commercial motel, Seaway Motel, located at 650 Main Street West, Port Colborne, ON. The site's legal description is PT LT 32 CON 2 Humberstone, PT 1 ON 59R13260; Port Colborne. The Property Identification Number [PIN] is 46195-0089 [LT]. The size of the study site is approximately 0.61 hectares. The property is currently developed with a one [1] storey elongated structure containing multiple long and short-term rental units. The basement of the motel was noted as being built within the bedrock material. The remaining area of the property is an open grassy area, asphaltic concrete covered parking lot [north of the motel] and a swimming pool [within northwestern area of the property]. Historically the structure has experienced periodic renovation throughout various ownerships.

1.2 Property Ownership

The Phase Two Property's ownership and client information is as follows:

Owner	1302645 Ontario Inc.
Client	M5V Developments 501 Queen Street West Toronto, ON M5V 2B4

1.3 Current and Proposed Future Uses

The site is currently in use for commercial purposes as a motel. Proposed land use includes re-development of the property for residential land use. The change in land use will require the submission of a Record of Site Condition to the Ministry of the Environment, Conservation and Parks [MECP].

1.4 Applicable Site Condition Standard

Under O. Reg. 153/04 as amended, the Ministry of the Environment, Conservation and Parks [MECP] has outlined Site Condition Standards [SCS] in the document "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" dated April 15, 2011. The SCS applicable to the Phase Two ESA property has been evaluated based upon the following rationale:

Property Use	The proposed use is residential and therefore the SCS for Residential/Parkland property use would apply.

Grain Size	As per Niagara Testing & Inspection report available in Appendix C, the grain size was determined to be Fine/Medium grained.
Water Wells	Domestic water wells were identified within 250 metres [m] of the Phase Two Property. The proposed development will be serviced by municipal water.
Within 30 m of a Waterbody	In accordance with O. Reg. 153/04, the study site does not include land that is within 30 m of a waterbody.
Depth to Bedrock	Based on the borehole results, there is less than 2 m of soil between ground surface and the top of the bedrock surface at the site.
pH	Soil pH values were reported between 7.09 and 7.36 in the native soil samples.
Environmentally Sensitive Area	The Phase Two Property has not been identified within an environmentally sensitive area.
Area of Natural Significance	The Phase Two Property is not classified as an environmentally sensitive area under O. Reg. 153/04 as amended, as the Phase Two Property does not include land, or is within 30 m of land, that would be classified as an area of natural significance as defined by O. Reg. 153/04 as amended.

Based on the above site characteristics, the Site Condition Standards currently applicable to the Phase Two Property, when the RSC is to be filed for the Phase Two Property, is Table 6: Generic Site Condition Standards for Shallow Soil in a Potable Ground Water Condition for Residential/Parkland [R/P] property use, fine-textured soils.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

Based on NSSL's site visits the ground surface level of the site slopes down towards the northwestern portion of the site.

A review of the Ministry of Natural Resources' "Quaternary Geology, Niagara-Welland Area, Map P2496" indicates that the Site is in an area of the Devonian Unconformity, Onondaga and Bois Blanc Formation, cherty limestone including locally glauconitic sandstone of the Springvale Member. About 50 to 100 mm of topsoil was encountered in boreholes BH1 to BH7. A silty clay/clayey silt native material was found to depths of between about 0 and 1.12 m below grade. The native material was found to be in a soft to firm in consistency and to contain a trace of sand, gravel, and organic inclusions. It appears that some fill material was placed in previous development areas of the commercial building [BH-1 and BH-4]. Limestone bedrock was encountered at depths of 0.2 and 1.12 m below grade and was noted to be buff to brown and described as cherty.

A review of a nearby Water Well [ID 6602323] located north of the subject site completed in 1968 reports 0 to 0.31 m of clay and bedrock encountered at 0.31 m. A review of the Ministry of Natural Resources' "Paleozoic Geology of Welland-Fort Erie Area p.989" indicates that the bedrock consists of limestone, minor shale of the Onondaga Formation, Edgecliff Member.

Regional groundwater flow is expected to be south towards Lake Erie. The Phase One Property is not located within 30 m of a body of water. Ponded surface water was not encountered on the Site during the Phase Two site works.

The property will be serviced by municipal water and sewer in the future.

2.2 Past Investigations

No reports pertaining to the Phase Two property were made available for review by NSSL.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The Phase Two ESA site investigation at the Site consisted of the following components:

- Underground service locates were completed using Ontario One Call and a private locating service.
- A total of five [5] environmental boreholes were advanced at the site to a maximum depth of 4.57 m below ground surface. Seven [7] selected soil samples were submitted for laboratory analysis.
- Three [3] environmental monitoring wells [installed to a maximum depth of 4.57 m below ground surface] and were utilized for obtaining groundwater samples. One [1] groundwater sample from each well was submitted for laboratory analysis.
- The Phase Two ESA was completed in general accordance with the requirements of O. Reg. 153/04 as amended.

3.2 Media Investigated

Soil and groundwater mediums were investigated as part of this Phase Two assessment.

3.3 Deviation from Sampling and Analysis Plan

There were no deviations from NSSL's Sampling and Analysis Plan.

3.4 Impediments

There were no physical impediments or denial of access during the Phase Two ESA.

4.0 INVESTIGATION METHOD

4.1 General

The Phase Two ESA was carried out in accordance with the Sampling and Analysis Plan, and in accordance with NSSL's Standard Operating Procedures. The Phase Two ESA consisted of drilling seven [7] boreholes, installation of three [3] monitoring wells into seven [3] of the boreholes across the study site. Boreholes were drilled to depths of 4.57 m bgs and terminated in bedrock. Monitoring wells were installed to depths of 4.57 m bgs.

Groundwater monitoring wells were installed in accordance with the Ontario Water Resources Act, R.R.O. 1990, Ontario Regulation [O. Reg.] 903 – Amended to O. Reg. 128/03.

The sampling and decontamination procedures were conducted in accordance with the "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", May 1996, revised December 1996, as amended by O. Reg. 511/09.

Laboratory analytical methods, protocols and procedures were carried out in accordance with the 'Protocol for Analytical Methods Use in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", dated March 9, 2004, amended as of July 1, 2011, in accordance with O. Reg. 511/09 and O. Reg. 269/11.

4.2 Utility Clearance

Prior to the commencement of the subsurface investigation, underground service locates were obtained for the Site through Ontario One Call. Additionally, a private underground service locating company, Frontier Locating, located all on-site underground services [hydro, gas, water, sewer, and communications].

4.3 Drilling

Seven [7] boreholes were advanced across the site by Elements Drilling using a D50 track-mounted drill and air rotary compressor on March 31st, 2022. Boreholes were drilled to a maximum depth of approximately 4.57 m bgs. The locations of the boreholes and monitoring wells are shown on Figure 3.

4.4 Soil Sampling

Seven [7] samples were collected from boreholes BH-1 to BH-7. Recovered soil samples were immediately logged for a description of soil type, moisture content, colour, texture and visual evidence of impacts. The samples were then divided into two representative portions: one portion for possible laboratory analysis and one portion for soil headspace combustive gas screening. Samples to be potentially subjected to laboratory analyses were immediately placed into laboratory supplied sample jars and stored in a cooler with ice. Samples to be used for screening were placed in a sealed bag.

Soil samples intended for Volatile Organic Compounds [VOC] and F1 fractions of Petroleum Hydrocarbons analysis were collected using a laboratory-supplied soil core sampler, placed into the vials containing methanol for preservation purposes and sealed using Teflon lined septa lids. All soil samples were placed in clean coolers containing ice prior to and during transportation to the subcontract laboratory, Paracel Laboratories Ltd. in Niagara on the Lake, Ontario. The samples were transported and submitted to Paracel following Chain of Custody [COC] protocols for chemical analyses.

4.5 Field Screening Measurements

All soil samples were screened using RKI Instrument, Eagle Potable Multi-gas detector [with Methane Elimination switch], operated in the methane elimination mode. The instrument measures combustible gases in the atmosphere. The monitor has a range of 0 ppm to 50,000 ppm and an accuracy of ± 5%. The monitor was calibrated with hexane prior to field screening. The instrument was calibrated to hexane standards for both ppm and LEL prior to each use in accordance with the calibration produces outlined in the instruction manual for the instrument. The instrument is calibrated or tuned up by the supplier, Pine Environmental. Samples, based on depth, were bagged from each borehole with the soil vapour measurements recorded. Borehole logs are provided in Appendix A with the readings.

4.6 Ground Water: Monitoring Well Installation

Three [3] monitoring wells MW-1 and MW-3 were installed into boreholes BH-1 and BH-3 on March 31st, 2022. The monitoring wells were constructed to MOECC recognized industry standards and consisted of a 2-inch diameter slotted PVC screen surrounded by a silica sand pack, attached beneath a solid 2-inch diameter PVC riser, surrounded by bentonite grout to ensure a seal between the ground surface and the water table. The wells were fitted with a flush mount metal protective casing. A waterra manual lift pump was installed into the well to allow purging and development, and subsequent groundwater sample collection. The monitoring well locations are shown on Figure 3 and field logs are located in Appendix A, respectively.

4.7 Ground Water: Field Measurement of Water Quality Parameters

The groundwater monitoring wells were considered to have stabilized from the installation date March 31st, 2022. Groundwater observations were recorded for colour, clarity, the presence or absence of any free product/surface sheen and any odours present during the purging of the wells. The water level measuring device was cleaned after each measurement using Alconox™ soap solution wash/scrub, followed by a distilled water rinse and a methanol rinse, to prevent cross-contamination between observation wells. Well purging continued until approximately 3 to 5 well casing volumes were removed, and monitoring indicated the condition in the purged well had stabilized.

4.8 Ground Water: Sampling

The wells were purged on April 6th, 2022, a minimum of 3 to 5 well casing volumes of groundwater, to ensure potential contamination from drilling was flushed out of the system. Purged water was contained and stored on-site for future disposal. Groundwater sampling was conducted on April 6th, and 7th, 2022. The groundwater sampling activities were carried out using dedicated low-density polyethylene tubing and Spectra Field Pro Peristaltic Pump. Groundwater samples were collected into laboratory-supplied containers, prepared with preservatives for the analysis being conducted. Disposable latex gloves were worn at each sample location. The groundwater samples were immediately placed into coolers packed with ice pending delivery to the analytical laboratory.

4.9 Analytical Testing

The soil and groundwater sample analyses were completed by Paracel Laboratories Ltd., located at 360 York Road, #16B, Niagara on the Lake, ON. Paracel is accredited by the Canadian Association for Laboratory Accreditation [CALA] in accordance with ISO/IEC 17025:1999 – "General Requirements for the Competence of Testing and Calibration Laboratories" for all the parameters analyzed during this investigation.

4.10 Residue Management Procedures

Soil material and purge and wash waters from equipment cleaning were contained and stored on-site for future disposal.

4.11 Elevation Surveying

The elevation of the existing ground surface at the borehole, and monitoring well locations was referenced to a temporary site benchmark, described as the top of manhole cover at the northwest corner of 650 Main Street West, assigned Elevation 100.0 meters by Niagara Soils Solutions Ltd.

4.12 Quality Assurance and Quality Control Measures

All activities completed as part of this Phase Two ESA were conducted as per applicable regulatory requirements.

5.0 REVIEW AND EVALUATION

5.1 Geology

The soil stratigraphy for the study site generally consisted of native material – clayey silt/silty clay, brown with trace gravel, between about 0 to 1.12 m bgs. Limestone bedrock was encountered at depths from 0.2 - 1.12 m to termination of the borehole. Fill material was encountered in BH1 and BH4 due to previous site development within this area.

It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of environmental report and therefore should not be construed as the exact depths of geological change.

5.2 Ground Water: Elevations and Flow Direction

Prior to groundwater sampling activities, the depth to groundwater was measured in the monitoring wells on April 6th, and April 7th, 2022. Details of the measured groundwater elevations are summarized in the table below.

Monitoring Well ID	Well Elevation [TBM]	Screen Interval [mbgs]	April 6, 2022		April 7, 2022	
			Groundwater Level [mbgs]	Groundwater Elevation [mbgs]	Groundwater Level [mbgs]	Groundwater Elevation [mbgs]
MW1	100.40	1.52 – 3.05	1.92	98.48	1.88	98.52
MW2	100.43	1.52 – 4.57	3.71	96.72	3.72	96.71
MW3	100.47	1.52 – 4.57	2.46	98.01	2.46	98.01

m bgs = metres below ground surface

Based on the groundwater elevations, the local groundwater below the property appears to be in the northernly direction, however, due to the water being encountered within fractures of the limestone affecting flow patterns the regional groundwater direction is inferred to be south. No boreholes were noted with odour, sheen or free-phase product was observed in any of the monitoring wells.

5.3 Estimated Hydraulic Gradient and Conductivity

Monitoring Well	Water Level Difference (m)	Monitoring Well Distance (m)	Hydraulic Gradient
MW1 – MW2	1.02	50	0.02
MW2 – MW3	1.29	40	0.032

Monitoring Well	Water Level Difference (m)	Monitoring Well Distance (m)	Hydraulic Gradient
MW3 – MW1	0.49	84	0.0058

Based upon the water level data collected and topography of the site, the local shallow groundwater flow direction is north. The average groundwater gradient was interpreted as 0.019.

5.3.1 Hydraulic Conductivity

The K values for the hydraulic conductivity of the soils were estimated based on the results obtained from grain size analyses of selected soil sample and from single well response test [recovery rate].

5.3.2 Fine-Medium Soil Texture

Grain size analysis was performed as Part of the Phase Two ESA and indicated an average of 77% of the soil matrix passed the No. 200 sieve resulting in a fine soil texture. Therefore, the site condition standards for fine textured soils were used in the assessment. Fine textured soil is classified as soil that contains more than 50 percent by mass of particles that are 75 micrometres or smaller in mean diameter.

Sample ID	Sample Depth [mbgs]	Soil Type	% Passing
BH1 SS2	0.76 – 1.10	Silty Clay / Clayey Silt	70%
BH7 SS2	0.76 – 1.10	Silty Clay / Clayey Silt	84%

5.3.3 Hydraulic Conductivity

Single well response tests [recovery tests] were conducted in two [2] monitoring wells, MW1 and MW2. Prior to the recovery test, initial water levels were measured manually using a water level tape, and the monitoring wells were purged using Waterra pumps [tubing and foot valves] to remove the sediments settled in the wells and in the sand pack around the well screens.

The field recovery test was completed using the rising head method in which a known volume of groundwater was removed from the tested monitoring well, and the water level recovery was measured and recorded. After purging the water, the water level [head] of the monitoring well was periodically recorded versus time through the test. The recorded water level data was analyzed using Hvorslev's method to estimate the hydraulic conductivity values.

A summary of K values estimated from the field test are shown in the following table.

Monitoring Well	Screen Depth [mbgs]	Soil Type	Hydraulic Gradient
MW1	1.52 – 3.05	Fractured Limestone	1.1×10^{-3}
MW2	1.52 – 4.57	Fractured Limestone	5.2×10^{-4}

5.4 Soil: Field Screening

Head space vapour screening was conducted for all retrieved soil samples using a combustible gas detector [RKI Eagle] in methane elimination mode, calibrated with hexane and having a minimum detection level of ± 5%. Soil vapour measurements ranging from non-detect to 20 ppm were recorded for the soil samples, indicating insignificant combustible gases in the soil samples retrieved from the boreholes.

5.5 Soil Results

Soil sampling was conducted on March 31st, 2022. Seven [7] representative soil samples obtained from within the fill and native material were submitted to Paracel Laboratories Ltd. for analysis of Metals by ICP, Petroleum Hydrocarbons [PHCs [F1-F4]], Polycyclic Aromatic Hydrocarbons [PAHs], Volatile Organic Compounds [VOCs], Benzene, Toluene, Ethylbenzene and Xylene [BTEX], and pH/Sodium Adsorption Ratio [SAR]/Electrical Conductivity [EC]. A summary of the soil samples and selected analyses is presented below.

Sample ID	Sample Depth [m bgs]	Parameter Analysed [O. Reg. 153/04 as amended]
BH1-1	0 – 0.61	PHCs/BTEX
BH1-2	0.76 – 1.1	PHCs/BEX
BH2-1	0 – 0.53	Metals by ICP, PHCs/VOCs, PAHs
BH3-1	0 – 0.46	Metals by ICP, PHCs/VOCs, PAHs, pH/SAR/EC
BH4-1	0 – 0.61	Metals by ICP, PHCs/VOCs, PAHs
BH5-1	0 – 0.18	Metals by ICP, PHCs/VOCs, PAHs, pH/SAR/EC
DUP [4-1]	0 – 0.61	Metals by ICP, PHCs/VOCs, PAHs

The soil results met applicable O. Reg 153/04, Table 6: Generic Site Condition Standards for Shallow Soil in a Potable Ground Water Condition for Residential/Parkland [R/P] property use, fine-textured soils. Complete soil laboratory results are provided in Appendix B.

Soil pH

The pH of all sampled borehole soils was found in the range of 5 to 9 [7.09 to 7.36, average of 7.23]. These pH values are within the limits for use of the generic criteria in O. Reg. 153/04, as amended.

5.6 Ground Water Results

Groundwater samples from the three [3] monitoring wells [MW1 to MW3] were submitted to Paracel Laboratories for the following chemical analysis.

Sample ID	Parameter Analysed [O.Reg. 153/04 as amended]
MW1	PHCs/BTEX
MW2	PHCs/VOCs, & PAHs
MW3	
DUP [MW3]	

The groundwater results met applicable O. Reg 153/04, Table 6 Potable Groundwater to all monitoring wells with fine soil criteria. Complete groundwater laboratory results are provided in Appendix B.

5.7 Quality Assurance and Quality Control

All soil and groundwater samples submitted as part of this Phase Two ESA investigation were handled in accordance with Paracel's laboratory analytical protocols in regard to holding time, preservation method, storage requirements, and container type. A Certificate of Analysis has been received for each sample submitted for analysis, and all Certificates of Analysis are appended to this report. The quality of the field data collected during this Phase Two ESA are considered to be sufficient to meet the overall objective of this study.

6.0 CONCLUSIONS

NSSL was retained by M5V Developments, to conduct a Phase Two Environmental Site Assessment [ESA] of the commercial property, "Seaway Motel", located at 650 Main Street West, Port Colborne, Ontario. The primary findings of this Phase Two ESA are:

- Seven [7] boreholes, and three [3] monitoring wells were installed at the study site.
- Seven [7] select soil samples and three [3] monitoring wells were sampled.
- Fill material was encountered in two [2] of the seven [7] boreholes, BH1 and BH4.
- No evidence of staining and odour of impacts were observed by NSSL during the drilling activities of all boreholes.
- The assessment criteria applicable to the Phase Two Property, when the RSC is to be filed for the Phase Two Property is Table 6: Generic Site Condition Standards for Shallow Soil in a Potable Ground Water Condition for Residential/Parkland [R/P] property use, fine-textured soils.
- The soil results revealed no exceedances to Metals by ICP, PHCs, BTEX, VOCs, PAHs, and pH/SAR/EC across all environmental boreholes.
- The groundwater results revealed no exceedances to Table 6 criteria for PHCs, VOCs, BTEX, and PAHs in all monitoring wells.

Based upon the above-noted findings NSSL concludes no additional soil and/or groundwater environmental investigation is required and submission of a Record of Site Condition to the Ministry of the Environment, Conservation and Parks for the change in land use is justified.

6.1 Limitations and Use of the Report

Niagara Soils Solutions Ltd. prepared this Report for the account of M5V Developments and is intended to provide a Phase Two Environmental Site Assessment on the commercial property located at 650 Main Street West, Port Colborne, ON. The material in it reflects Niagara Soils Solutions Ltd.'s best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Should additional parties require reliance on this report, written authorization from NSSL will be required. With respect to third parties, NSSL has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The investigation undertaken by NSSL with respect to this report and any conclusions or recommendations made in this report reflect NSSL's judgment based on the site conditions observed at the time of the Site inspection on the date[s] set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this Site and it is based, in part, upon visual observation of the Phase Two Property, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future Site conditions, portions of the Phase Two Property, which were unavailable for direct investigation, subsurface locations, which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Niagara Soils Solutions Ltd. has expressed professional judgement in gathering and analysing the information obtained and in the formulation of its conclusions.

NSSL makes no other representation whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

Yours very truly,
Niagara Soils Solutions Ltd.

John Monkman, P.Eng., FEC, QP_{ESA}
President

Jodie Glasier, M.MM, PD-EMA, EP
Vice President

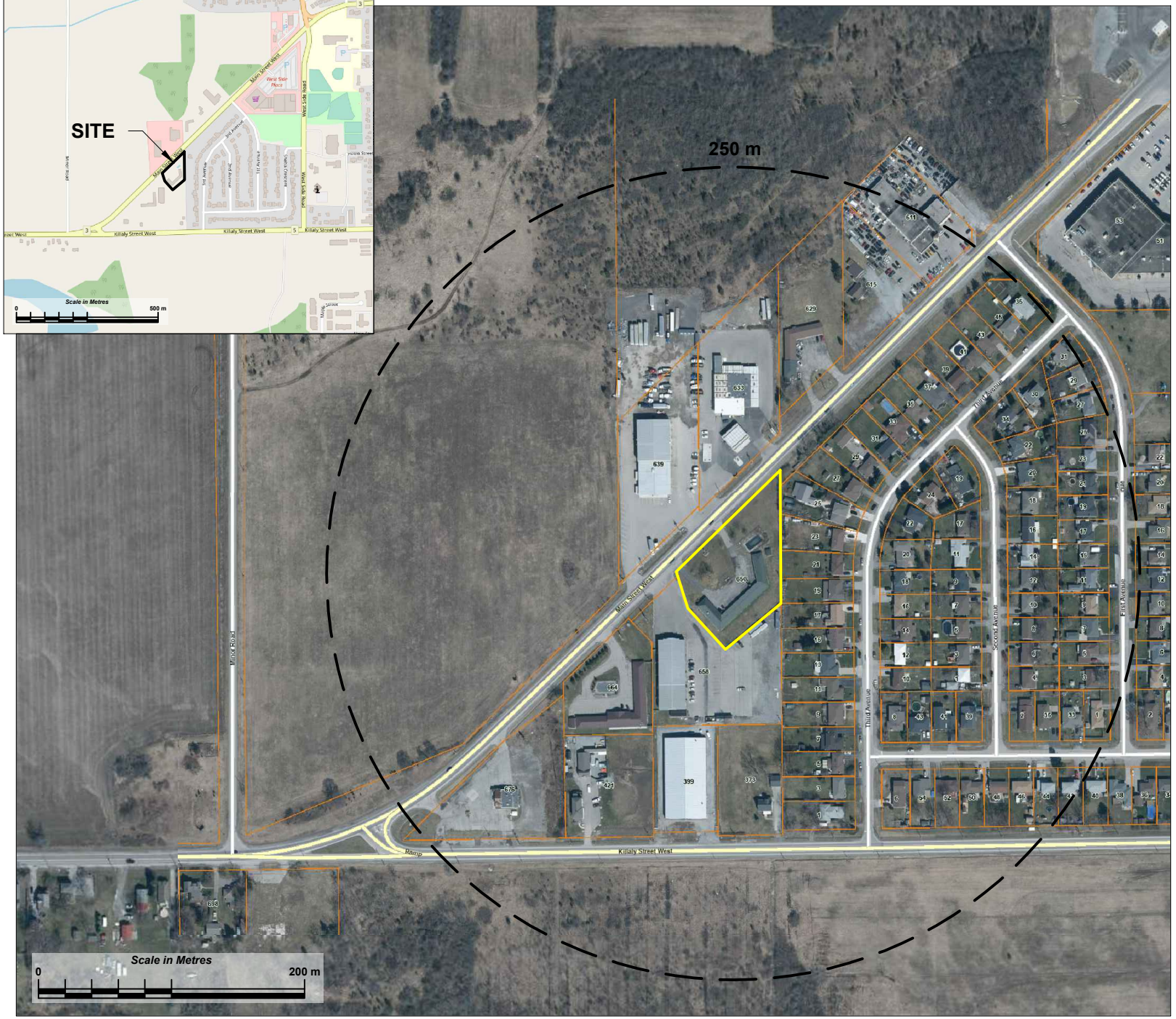
7.0 REFERENCES

The following resources were utilized as references:

- Ontario Division of Mines' "Paleozoic Geology of Southern Ontario, Map 2254".
- Ministry of Natural Resources' "Quaternary Geology, Niagara-Welland, Map P2496.
- Water Wells Ontario site.
- Ontario Oil, Gas, and Salt Resources Library
- Interactive Map – Niagara Navigator, https://navigator.niagararegion.ca/
- Ontario Base Mapping
- Niagara Peninsula Conservation Authority [NPCA] Watershed Explorer

FIGURES

1. Site Location Map
2. Site Layout and Features
3. Potentially Contaminating Activities
4. Area of Potential Environmental Concern
5. Borehole, Monitoring Well & Test Pit Location Plan
6. Topographic Contour Map
7. Groundwater Contour Map
8. Soil Results
9. Groundwater Results
10. Cross Section Plan View
11. Cross Section A – A’



REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

LEGEND

- Phase Two ESA Property Boundary
- 250 m Study Area

NIAGARA SOILS SOLUTIONS LTD.

CLIENT:
M5V Developments

PROJECT:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
650 MAIN STREET WEST
PORT COLBORNE, ONTARIO

TITLE:
SITE LOCATION PLAN

DRAWN BY: DN

CHECKED BY: JM

DATE: APRIL 2022

PROJECT NO: NS2208-02

SCALE: AS SHOWN

NO:

Figure 1

REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

LEGEND

- Phase Two ESA Property Boundary
- Underground Storage Tank

NIAGARA SOILS SOLUTIONS LTD.

CLIENT:
M5V Developments

PROJECT:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
650 MAIN STREET WEST
PORT COLBORNE, ONTARIO

TITLE:
SITE LAYOUT & FEATURES

DRAWN BY: DN

CHECKED BY: JM

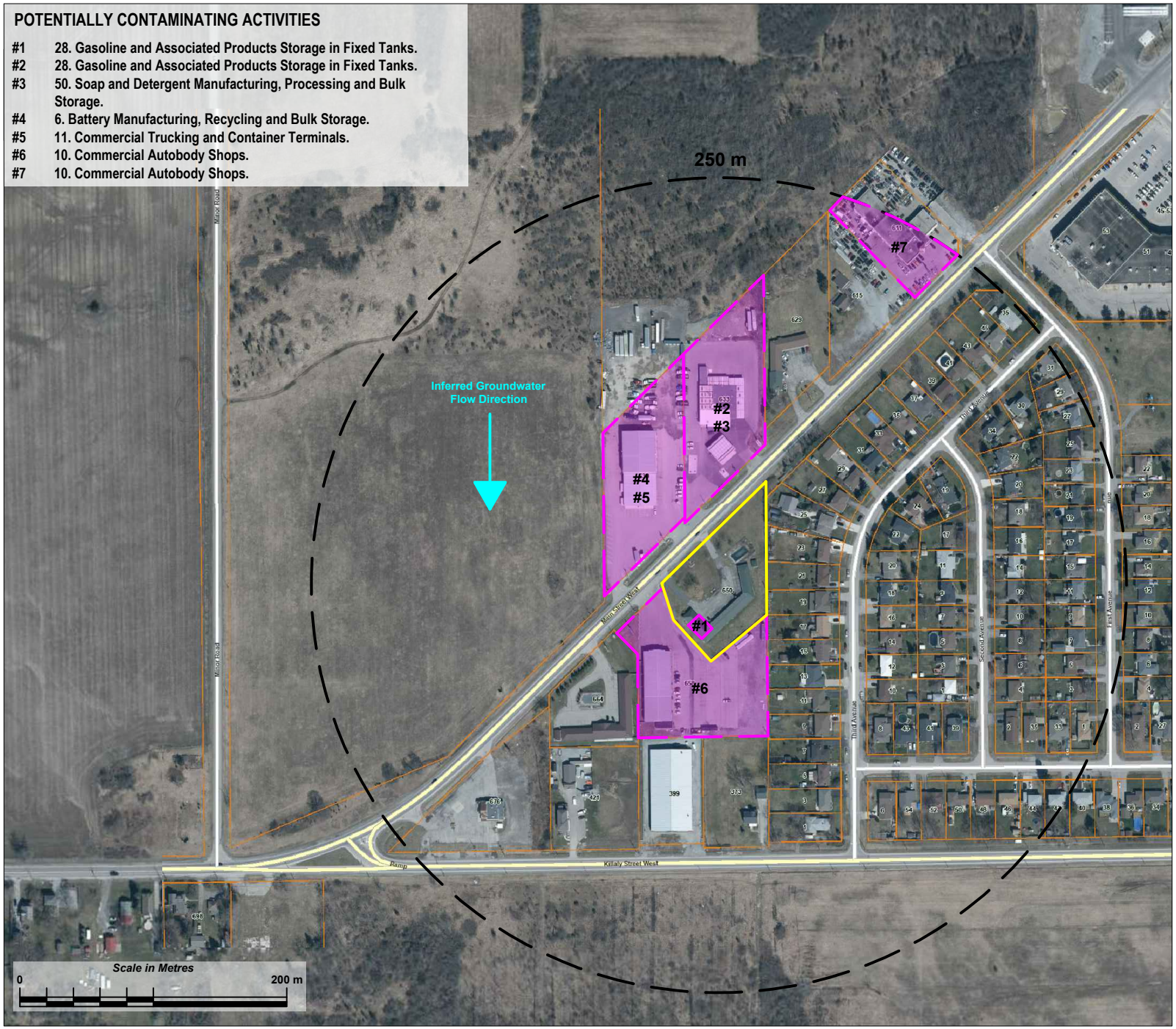
DATE: APRIL 2022

PROJECT NO: NS2208-02

SCALE: AS SHOWN

NO:

Figure 2



LEGEND

- Phase Two ESA Property Boundary
- 250 m Study Area
- PCA Areas
- Inferred Groundwater Flow Direction

NIAGARA SOILS SOLUTIONS LTD.

CLIENT: M5V Developments

PROJECT:

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
650 MAIN STREET WEST
PORT COLBORNE, ONTARIO

TITLE: POTENTIALLY CONTAMINATING ACTIVITIES

DRAWN BY: DN

CHECKED BY: JM

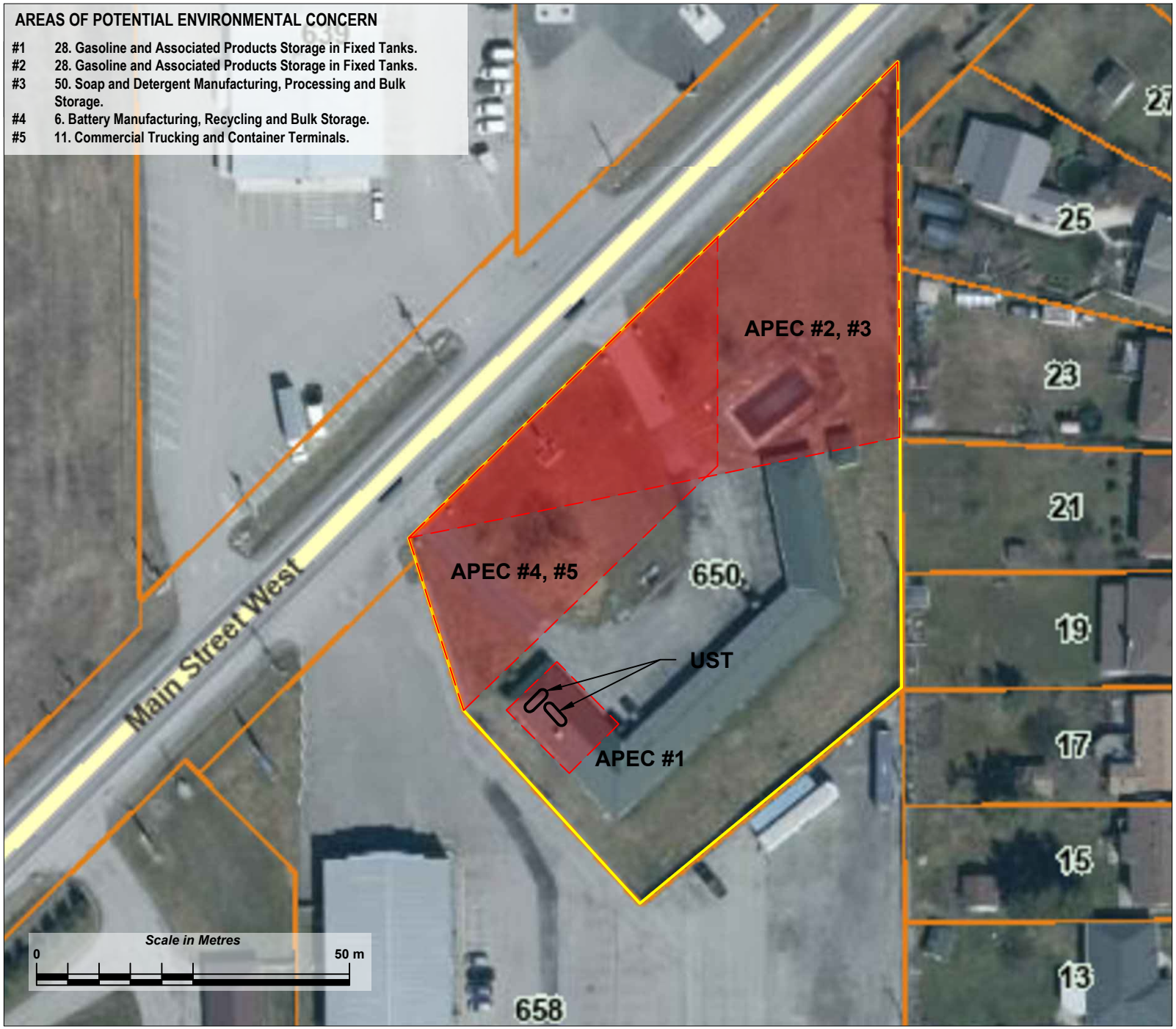
DATE: APRIL 2022

PROJECT NO: NS2208-02

SCALE: AS SHOWN

NO: Figure 3

REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.



LEGEND

- Phase Two ESA Property Boundary
- APEC Areas
- Underground Storage Tank

NIAGARA SOILS SOLUTIONS LTD.

CLIENT: M5V Developments

PROJECT:

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
650 MAIN STREET WEST
PORT COLBORNE, ONTARIO

TITLE: AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

DRAWN BY: DN

CHECKED BY: JM

DATE: APRIL 2022

PROJECT NO: NS2208-02

SCALE: AS SHOWN

NO:

Figure 4

REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

LEGEND

- Property Boundary
- BH 1 — Borehole Location
- BH/MW-1 — Borehole with Monitoring Well Location
- TBM — Temporary Benchmark; Drain Basin at Western Property Boundary

CLIENT: **M5V Developments**

PROJECT: **PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RESIDENTIAL DEVELOPMENT; 650 Main Street West, Port Colborne, ON**

TITLE: **Borehole Location Plan**

DRAWN BY: DN

CHECKED BY: JM

DATE: APRIL 2022

PROJECT NO: NS2208-02

SCALE: AS SHOWN

NO:

Figure 5

REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

LEGEND

- Property Boundary
- BH 1 — Borehole Location
- BH/MW-1 — Borehole with Monitoring Well Location
- TBM — Temporary Benchmark; Drain Basin at Western Property Boundary

CLIENT: M5V Developments

PROJECT: PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RESIDENTIAL DEVELOPMENT; 650 Main Street West, Port Colborne, ON

TITLE: Topographic Contour Map

DRAWN BY: DN

CHECKED BY: JM

DATE: APRIL 2022

PROJECT NO: NS2208-02

SCALE: AS SHOWN

NO: Figure 6

REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

LEGEND

- Property Boundary
- BH 1 — Borehole Location
- BH/MW-1 — Borehole with Monitoring Well Location
- TBM — Temporary Benchmark; Drain Basin at Western Property Boundary

CLIENT: M5V Developments

PROJECT: PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RESIDENTIAL DEVELOPMENT; 650 Main Street West, Port Colborne, ON

TITLE: Groundwater Contour Map

DRAWN BY: DN

CHECKED BY: JM

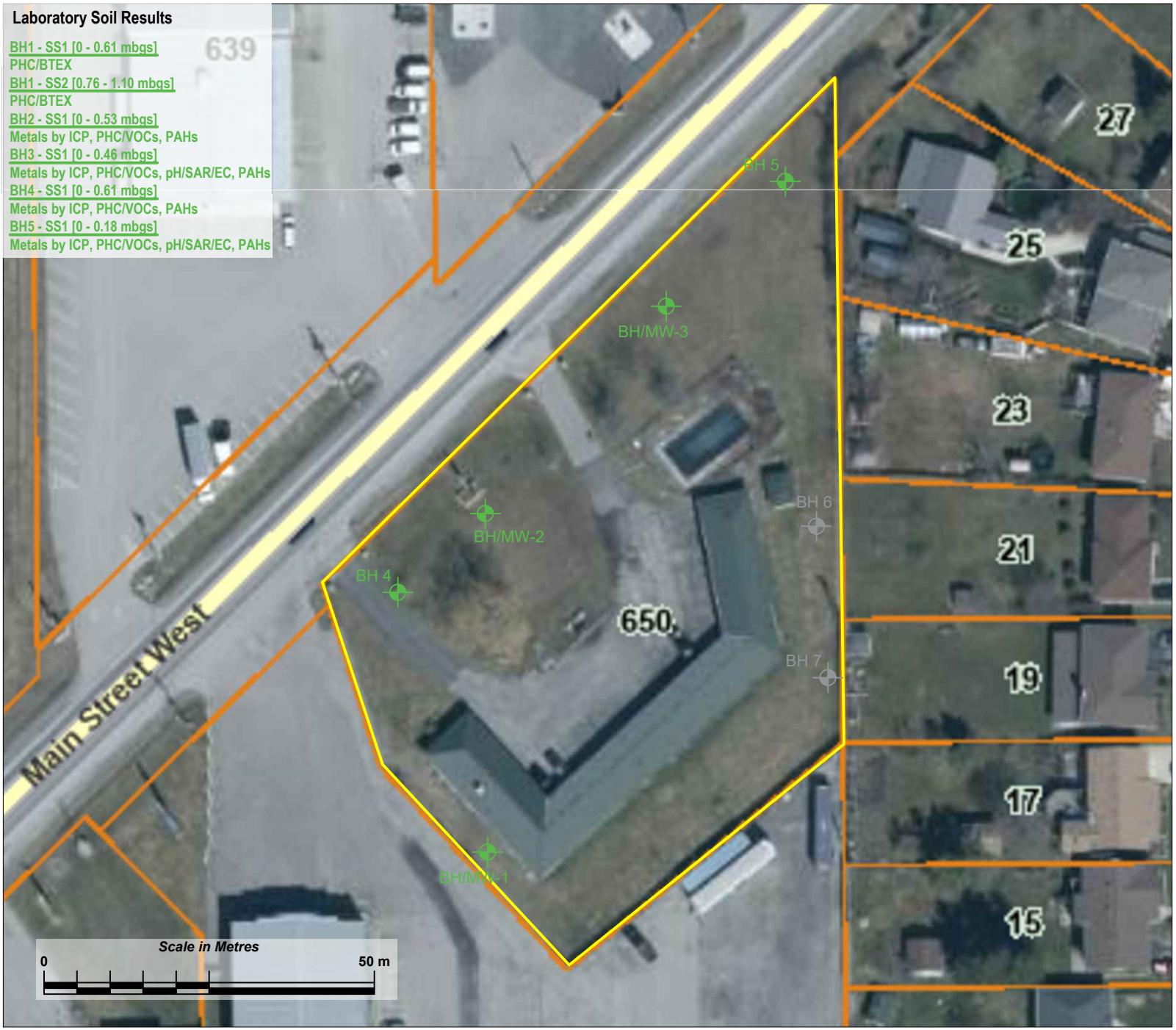
DATE: APRIL 2022

PROJECT NO: NS2208-02

SCALE: AS SHOWN

NO: Figure 7

REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.



REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

LEGEND

- Property Boundary
- BH 1 — Borehole Location
- BH/MW-1 — Borehole with Monitoring Well Location
- Passed Table 6, Residential, Shallow Bedrock, Potable Groundwater with Fine Soil
- Exceeded Table 6, Residential, Shallow Bedrock, Potable Groundwater with Fine Soil
- Geotechnical Borehole, Soil was not Analyzed

CLIENT: **M5V Developments**

PROJECT: **PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RESIDENTIAL DEVELOPMENT; 650 Main Street West, Port Colborne, ON**

TITLE: **Soil Results**

DRAWN BY: DN

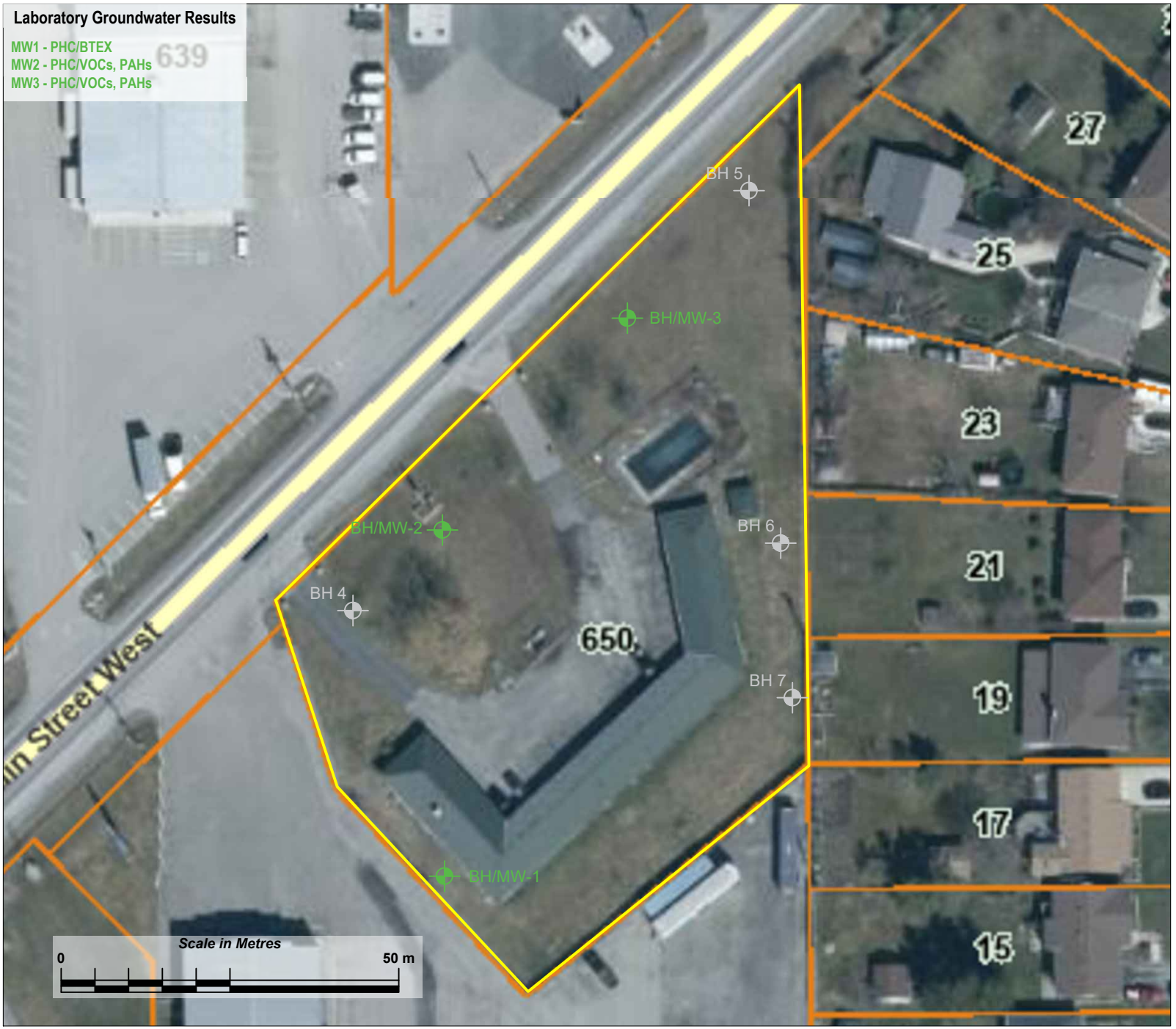
CHECKED BY: JM

DATE: APRIL 2022

PROJECT NO: NS2208-02

SCALE: AS SHOWN

NO: Figure 8



REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

LEGEND

- Property Boundary
- BH 1 — Borehole Location
- BH/MW-1 — Borehole with Monitoring Well Location
- Passed Table 6, Residential, Shallow Bedrock, Potable Groundwater with Fine Soil
- Exceeded Table 6, Residential, Shallow Bedrock, Potable Groundwater with Fine Soil

CLIENT: **M5V Developments**

PROJECT: **PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RESIDENTIAL DEVELOPMENT; 650 Main Street West, Port Colborne, ON**

TITLE: **Groundwater Results**

DRAWN BY: DN

CHECKED BY: JM

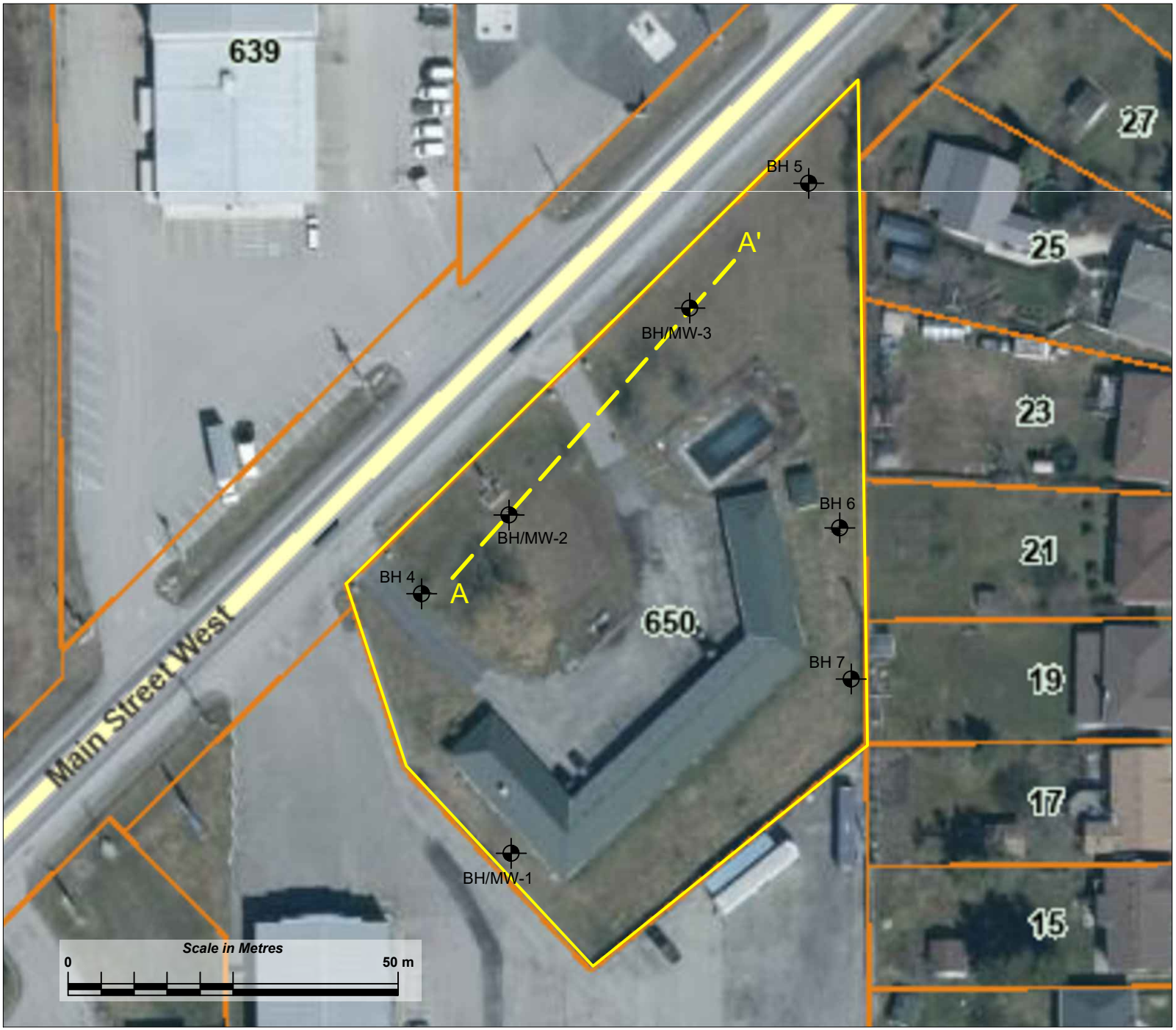
DATE: APRIL 2022

PROJECT NO: NS2208-02

SCALE: AS SHOWN

NO:

Figure 9



LEGEND

- Property Boundary
- BH 1 — Borehole Location
- BH/MW-1 — Borehole with Monitoring Well Location
- Cross Section Plan View

CLIENT: **M5V Developments**

PROJECT: **PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RESIDENTIAL DEVELOPMENT; 650 Main Street West, Port Colborne, ON**

TITLE: **Cross Section Plan View**

DRAWN BY: DN

CHECKED BY: JM

DATE: APRIL 2022

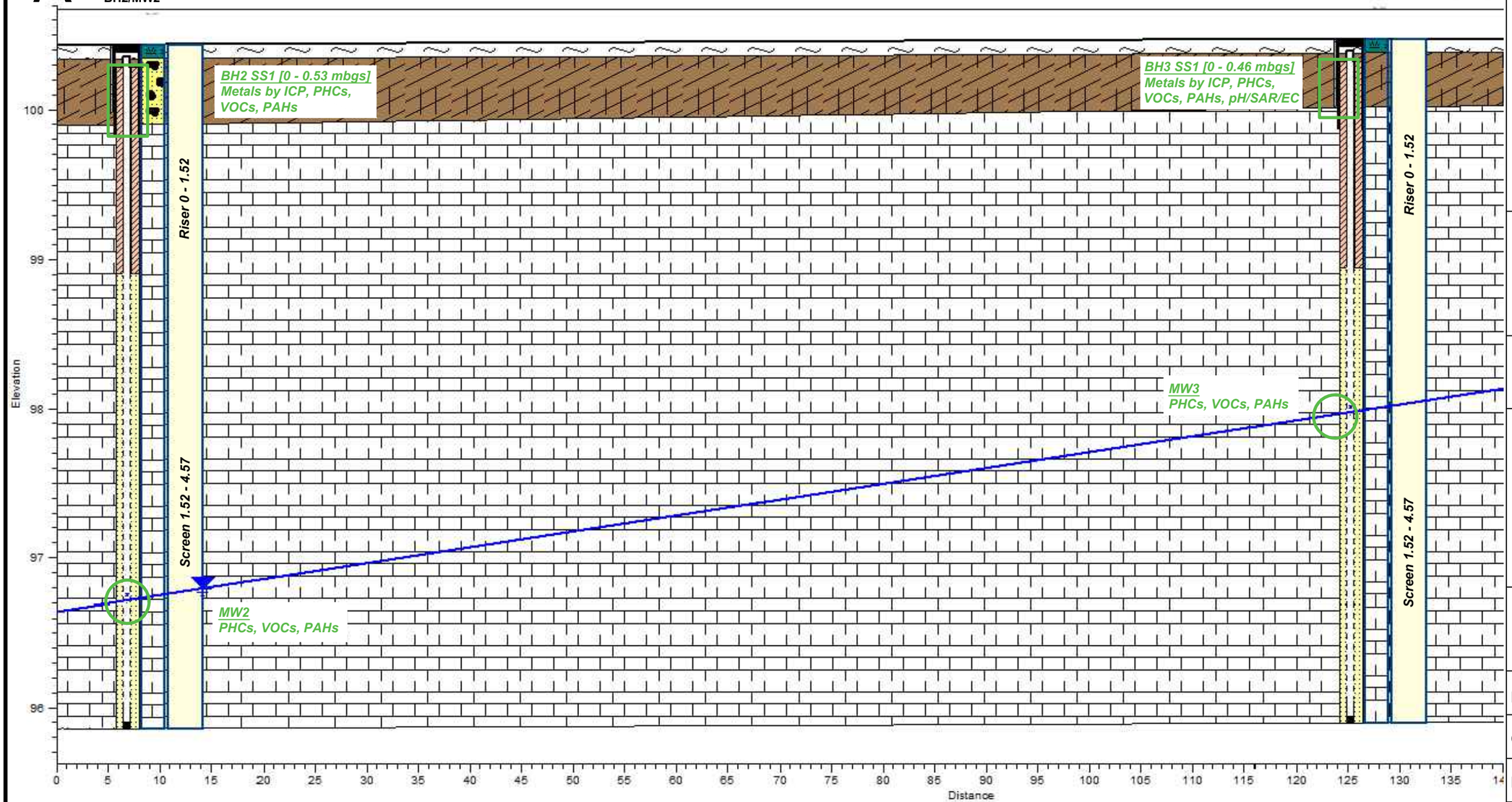
PROJECT NO: NS2208-02

SCALE: AS SHOWN

NO:

Figure 10

REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.



NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

LEGEND

- Topsoil
- Silty Clay/Clayey Silt
- Limestone

NIAGARA SOILS SOLUTIONS LTD.

CLIENT:

M5V Developments

PROJECT:

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RESIDENTIAL DEVELOPMENT; 650 Main Street West, Port Colborne, ON

TITLE:

Cross Section A - A'

DRAWN BY: DN

CHECKED BY: JM

DATE: April 2022

PROJECT NO: NS2208-02

SCALE: AS SHOWN

NO: Figure 11

APPENDIX A

FIELD LOGS

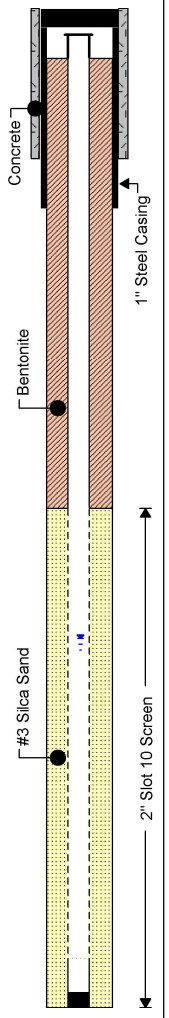
RECORD OF BOREHOLE: BH-1 / MW-1

PROJECT NO.: NS2208-02
PROJECT: Proposed Residential Development
LOCATION: 650 Main Street West, Port Colborne
CLIENT: M5V Developments

DRILLING COMPANY: Elements Drilling
DRILLING METHOD: 150 mm Solid Stem Augers / Air Rotary
DRILL RIG: Track Mount Drill Rig - CME 55
BOREHOLE COORDINATE (UTM): 641179 E, 4750388 N

SHEET 1 of 1
DATE STARTED: March 31, 2022
DATE COMPLETED: March 31, 2022
DATUM: TBM

SOIL PROFILE		SAMPLES				DEPTH SCALE ft / m	ELEVATION (m)	FIELD TESTING	COV (ppm / %LEL)	LAB TESTING	WELL INSTALLATION	COMMENTS
LITHOLOGY PLOT	DESCRIPTION	TYPE	NUMBER	SPT 'N' VALUE	RECOVERY (%)			SPT (N) 25 50 75 100		LAB ANALYSIS		
	Ground Surface					ft m 0.0 0.0	100.40					
	50 mm Topsoil											
	Brown Gravelly Sand **FILL** trace silt, loose	SS	1	4, 3, 2, 4		1.0	100.00	5	0	PHC/BTEX		
	Brown Silty Clay / Clayey Silt **REWORKED** trace gravel, stiff	SS	2	4, 8, 50 for 1"		3.0 1.0		> 58	0	PHC/BTEX		
	Limestone Bedrock Buff - Brown Cherty					4.0	99.00					
						5.0						
						6.0 2.0						
						7.0						
						8.0	98.00					
						9.0						
						10.0 3.0						
	End of Borehole					11.0	97.00					
						12.0						



Groundwater Level Upon Completion:
Secondary Groundwater Level:

INITIAL WATER LEVEL: 1.92 m bgs
SECONDARY WATER LEVEL: 1.88 m bgs
BOREHOLE CAVE UPON COMPLETION: OPEN

INITIAL WATER LEVEL DATE: April 6, 2022
SECONDARY WATER LEVEL DATE: April 7, 2022

LOGGED: DN
COMPILED: JM
CHECKED: JM

Niagara Soils Solutions Ltd.
3300 Merrittville Highway, Unit 5
Thorold, Ontario, L2V 4Y6

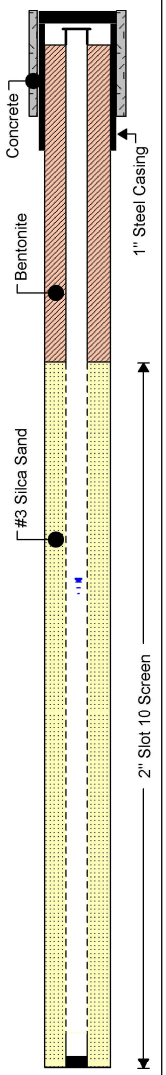
RECORD OF BOREHOLE: BH-3 / MW-3

PROJECT NO.: NS2208-02
PROJECT: Proposed Residential Development
LOCATION: 650 Main Street West, Port Colborne
CLIENT: M5V Developments

DRILLING COMPANY: Elements Drilling
DRILLING METHOD: 150 mm Solid Stem Augers / Air Rotary
DRILL RIG: Track Mount Drill Rig - CME 55
BOREHOLE COORDINATE (UTM): 641202 E, 4750469 N

SHEET 1 of 1
DATE STARTED: March 31, 2022
DATE COMPLETED: March 31, 2022
DATUM: TBM

SOIL PROFILE		SAMPLES				DEPTH SCALE ft / m	ELEVATION (m)	FIELD TESTING		LAB TESTING	WELL INSTALLATION	COMMENTS
LITHOLOGY PLOT	DESCRIPTION	TYPE	NUMBER	SPT 'N' VALUE	RECOVERY (%)			SPT (N) 25 50 75 100	COV (ppm / %LEL)	LAB ANALYSIS		
	Ground Surface					ft m	100.47					
	75 mm Topsoil					0.0 0.0						
	Grey - Brown Silty Clay / Clayey Silt **NATIVE** trace gravel, soft	SS	1	0, 0, 0, 50 for 0'		1.0		> 50	0	Metals by ICP, PHC/VOCs, ph/SAR/EC, PAHs		
	Limestone Bedrock Buff to Brown Cherty					2.0	100.00					
						3.0 1.0						
						4.0						
						5.0	99.00					
						6.0 2.0						
						7.0						
						8.0	98.00					
						9.0						
						10.0 3.0						
						11.0						
						12.0	97.00					
						13.0 4.0						
						14.0						
						15.0	96.00					
	End of Borehole					16.0 5.0						
						17.0						



Groundwater Level Upon Completion:
Secondary Groundwater Level:

INITIAL WATER LEVEL: 2.46 m bgs
SECONDARY WATER LEVEL: 2.46 m bgs
BOREHOLE CAVE UPON COMPLETION: OPEN

INITIAL WATER LEVEL DATE: April 6, 2022
SECONDARY WATER LEVEL DATE: April 7, 2022

LOGGED: DN
COMPILED: JM
CHECKED: JM

Niagara Soils Solutions Ltd.
3300 Merrittville Highway, Unit 5
Thorold, Ontario, L2V 4Y6

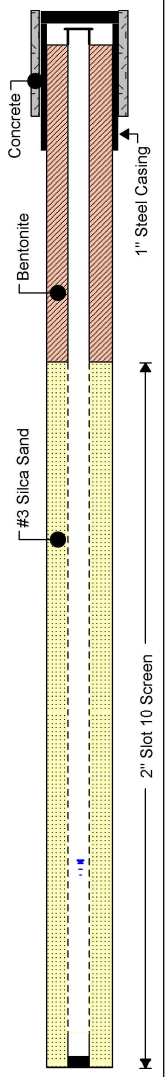
RECORD OF BOREHOLE: BH-2 / MW-2

PROJECT NO.: NS2208-02
PROJECT: Proposed Residential Development
LOCATION: 650 Main Street West, Port Colborne
CLIENT: M5V Developments

DRILLING COMPANY: Elements Drilling
DRILLING METHOD: 150 mm Solid Stem Augers / Air Rotary
DRILL RIG: Track Mount Drill Rig - CME 55
BOREHOLE COORDINATE (UTM): 641179 E, 470440 N

SHEET 1 of 1
DATE STARTED: March 31, 2022
DATE COMPLETED: March 31, 2022
DATUM: TBM

SOIL PROFILE		SAMPLES				DEPTH SCALE ft / m	ELEVATION (m)	FIELD TESTING		LAB TESTING	WELL INSTALLATION	COMMENTS
LITHOLOGY PLOT	DESCRIPTION	TYPE	NUMBER	SPT 'N' VALUE	RECOVERY (%)			SPT (N) 25 50 75 100	COV (ppm / %LEL)	LAB ANALYSIS		
	Ground Surface					ft m	100.43					
	75 mm Topsoil					0.0 0.0						
	Brown Gravelly Sand **NATIVE** trace gravel and rootlets loose	SS	1	0, 0, 3, 50 for 3"		1.0		>53	0	Metals by ICP, PHC/VOCs, PAHs		
	Limestone Bedrock Buff to Brown Cherty					2.0	100.00					
						3.0 1.0						
						4.0	99.00					
						5.0						
						6.0 2.0						
						7.0						
						8.0	98.00					
						9.0						
						10.0 3.0						
						11.0	97.00					
						12.0						
						13.0 4.0						
						14.0						
						15.0	96.00					
	End of Borehole					16.0 5.0						
						17.0						



Groundwater Level Upon Completion:
Secondary Groundwater Level:

INITIAL WATER LEVEL: 3.71 m bgs
SECONDARY WATER LEVEL: 3.72 m bgs
BOREHOLE CAVE UPON COMPLETION: OPEN

INITIAL WATER LEVEL DATE: April 6, 2022
SECONDARY WATER LEVEL DATE: April 7, 2022

LOGGED: DN
COMPILED: JM
CHECKED: JM

Niagara Soils Solutions Ltd.
3300 Merrittville Highway, Unit 5
Thorold, Ontario, L2V 4Y6

Note: This borehole log has been prepared for environmental purposes and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole details as presented, do not constitute a through understanding of all potential conditions present and require interpretative assistance from a qualified Geotechnical Engineer/Geoscientist.

RECORD OF BOREHOLE: BH-4

PROJECT NO.: NS2208-02
PROJECT: Proposed Residential Development
LOCATION: 650 Main Street West, Port Colborne
CLIENT: M5V Developments

DRILLING COMPANY: Elements Drilling
DRILLING METHOD: 150 mm Solid Stem Augers / Air Rotary
DRILL RIG: Track Mount Drill Rig - CME 55
BOREHOLE COORDINATE (UTM): 641164 E, 4750433 N

SHEET 1 of 1
DATE STARTED: March 31, 2022
DATE COMPLETED: March 31, 2022
DATUM: TBM

SOIL PROFILE		SAMPLES				DEPTH SCALE ft / m	ELEVATION (m)	FIELD TESTING		LAB TESTING	WELL INSTALLATION	COMMENTS
LITHOLOGY PLOT	DESCRIPTION	TYPE	NUMBER	SPT 'N' VALUE	RECOVERY (%)			SPT (N) 25 50 75 100	COV (ppm / %LEL)	LAB ANALYSIS		
	Ground Surface					ft m 0.0 0.0	100.36		0			
	100 mm Topsoil											
	Brown Gravelly Sand **FILL** trace asphalt concrete fragments and organic rootlets, loose	SS	1	4, 2, 1, 2		1.0	100.00	3		Metals by ICP, PHC/VOCs, PAHs		
	Brown Silty Clay / Clayey Silt **Native** trace gravel and rootlets firm	SS	2	2, 5, 50 for 2"		2.0 3.0 1.0		> 55	0			
	Limestone Bedrock Buff to Brown Cherty					4.0	99.00					
	End of Borehole					5.0 6.0 2.0 7.0						

Groundwater Level Upon Completion:
Secondary Groundwater Level:

INITIAL WATER LEVEL: N/A
SECONDARY WATER LEVEL: N/A
BOREHOLE CAVE UPON COMPLETION: OPEN

INITIAL WATER LEVEL DATE: N/A
SECONDARY WATER LEVEL DATE: N/A

LOGGED: DN
COMPILED: JM
CHECKED: JM

Niagara Soils Solutions Ltd.
3300 Merrittville Highway, Unit 5
Thorold, Ontario, L2V 4Y6

RECORD OF BOREHOLE: BH-5

PROJECT NO.: NS2208-02
PROJECT: Proposed Residential Development
LOCATION: 650 Main Street West, Port Colborne
CLIENT: M5V Developments

DRILLING COMPANY: Elements Drilling
DRILLING METHOD: 150 mm Solid Stem Augers
DRILL RIG: Track Mount Drill Rig - CME 55
BOREHOLE COORDINATE (UTM): 641224 E, 4750495 N

SHEET 1 of 1
DATE STARTED: March 31, 2022
DATE COMPLETED: March 31, 2022
DATUM: TBM

SOIL PROFILE		SAMPLES				DEPTH SCALE ft / m	ELEVATION (m)	FIELD TESTING		LAB TESTING	WELL INSTALLATION	COMMENTS
LITHOLOGY PLOT	DESCRIPTION	TYPE	NUMBER	SPT 'N' VALUE	RECOVERY (%)			SPT (N) 25 50 75 100	COV (ppm / %LEL)	LAB ANALYSIS		
	Ground Surface					ft 0.0 / m 0.0	100.54					
	Brown Clayey Silt/ Silty Clay **Native** trace gravel, organic rootlets soft	SS	1	4, 50 for 1"								
	Limestone Bedrock Brown to Buff Cherty					1.0 / 0.3		>54	0	Metals by ICP, PHC/VOCs, pH/SAR/EC, PAHs		
	End of Borehole					2.0 / 0.6	100.00					
						3.0 / 0.9						
						4.0 / 1.2						
						5.0 / 1.5	99.00					
						6.0 / 1.8						
						7.0 / 2.0						

Groundwater Level Upon Completion:
Secondary Groundwater Level:

INITIAL WATER LEVEL: N/A
SECONDARY WATER LEVEL: N/A
BOREHOLE CAVE UPON COMPLETION: OPEN

INITIAL WATER LEVEL DATE: N/A
SECONDARY WATER LEVEL DATE: N/A

NIAGARA SOILS SOLUTIONS LTD.

LOGGED: DN
COMPILED: JM
CHECKED: JM

Niagara Soils Solutions Ltd.
3300 Merrittville Highway, Unit 5
Thorold, Ontario, L2V 4Y6

Note: This borehole log has been prepared for environmental purposes and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole details as presented, do not constitute a through understanding of all potential conditions present and require interpretative assistance from a qualified Geotechnical Engineer/Geoscientist.

RECORD OF BOREHOLE: BH-6

PROJECT NO.: NS2208-02
PROJECT: Proposed Residential Development
LOCATION: 650 Main Street West, Port Colborne
CLIENT: M5V Developments

DRILLING COMPANY: Elements Drilling
DRILLING METHOD: 150 mm Solid Stem Augers
DRILL RIG: Track Mount Drill Rig - CME 55
BOREHOLE COORDINATE (UTM): 641228 E, 4750447 N

SHEET 1 of 1
DATE STARTED: March 31, 2022
DATE COMPLETED: March 31, 2022
DATUM: TBM

SOIL PROFILE		SAMPLES				DEPTH SCALE ft / m	ELEVATION (m)	FIELD TESTING		LAB TESTING		
LITHOLOGY PLOT	DESCRIPTION	TYPE	NUMBER	SPT 'N' VALUE	RECOVERY (%)			SPT (N) 25 50 75 100	COV (ppm / %LEL)	LAB ANALYSIS	WELL INSTALLATION	COMMENTS
	Ground Surface					ft m 0.0 0.0	100.51					
	Brown - Grey Silty Clay / Clayey Silt **Native** trace gravel, sand and rootlets soft to firm	SS	1	4, 4, 5, 50 for 0"		1.0		>55	0			
	Limestone Bedrock Buff to Brown Cherty					2.0	100.00					
	End of Borehole					3.0 1.0						
						4.0						
						5.0	99.00					
						6.0 2.0						
						7.0						

Groundwater Level Upon Completion:
Secondary Groundwater Level:

INITIAL WATER LEVEL: N/A
SECONDARY WATER LEVEL: N/A
BOREHOLE CAVE UPON COMPLETION: OPEN

INITIAL WATER LEVEL DATE: N/A
SECONDARY WATER LEVEL DATE: N/A

NIAGARA SOILS SOLUTIONS LTD.

LOGGED: DN
COMPILED: JM
CHECKED: JM

Niagara Soils Solutions Ltd.
3300 Merrittville Highway, Unit 5
Thorold, Ontario, L2V 4Y6

RECORD OF BOREHOLE: BH-7

PROJECT NO.: NS2208-02
PROJECT: Proposed Residential Development
LOCATION: 650 Main Street West, Port Colborne
CLIENT: M5V Developments

DRILLING COMPANY: Elements Drilling
DRILLING METHOD: 150 mm Solid Stem Augers
DRILL RIG: Track Mount Drill Rig - CME 55
BOREHOLE COORDINATE (UTM): 641229 E, 4750417 N

SHEET 1 of 1
DATE STARTED: March 31, 2022
DATE COMPLETED: March 31, 2022
DATUM: TBM

SOIL PROFILE		SAMPLES				DEPTH SCALE ft / m	ELEVATION (m)	FIELD TESTING		LAB TESTING		
LITHOLOGY PLOT	DESCRIPTION	TYPE	NUMBER	SPT 'N' VALUE	RECOVERY (%)			SPT (N) 25 50 75 100	COV (ppm / %LEL)	LAB ANALYSIS	WELL INSTALLATION	COMMENTS
	Ground Surface					ft m 0.0 0.0	100.30					
	75 mm Topsoil											
	Brown - Grey Silty Clay / Clayey Silt **Native** trace gravel, sand and rootlets soft to firm	SS	1	4, 1, 2, 3		1.0	100.00	3	0			
						2.0						
		SS	2	4, 8, 50 for 1"		3.0 1.0		>58	0			
	Limestone Bedrock Buff to Brown Cherty					4.0	99.00					
	End of Borehole					5.0 6.0 2.0 7.0						

Groundwater Level Upon Completion:
Secondary Groundwater Level:

INITIAL WATER LEVEL: N/A
SECONDARY WATER LEVEL: N/A
BOREHOLE CAVE UPON COMPLETION: OPEN

INITIAL WATER LEVEL DATE: N/A
SECONDARY WATER LEVEL DATE: N/A

NIAGARA SOILS SOLUTIONS LTD.

LOGGED: DN
COMPILED: JM
CHECKED: JM

Niagara Soils Solutions Ltd.
3300 Merrittville Highway, Unit 5
Thorold, Ontario, L2V 4Y6

Project Number: NS2208-02
Location: 650 Main Street West, P.C.
Date: April 6th
Surveyed By: AL / DN

NTiL
NIAGARA TESTING & INSPECTION LTD.

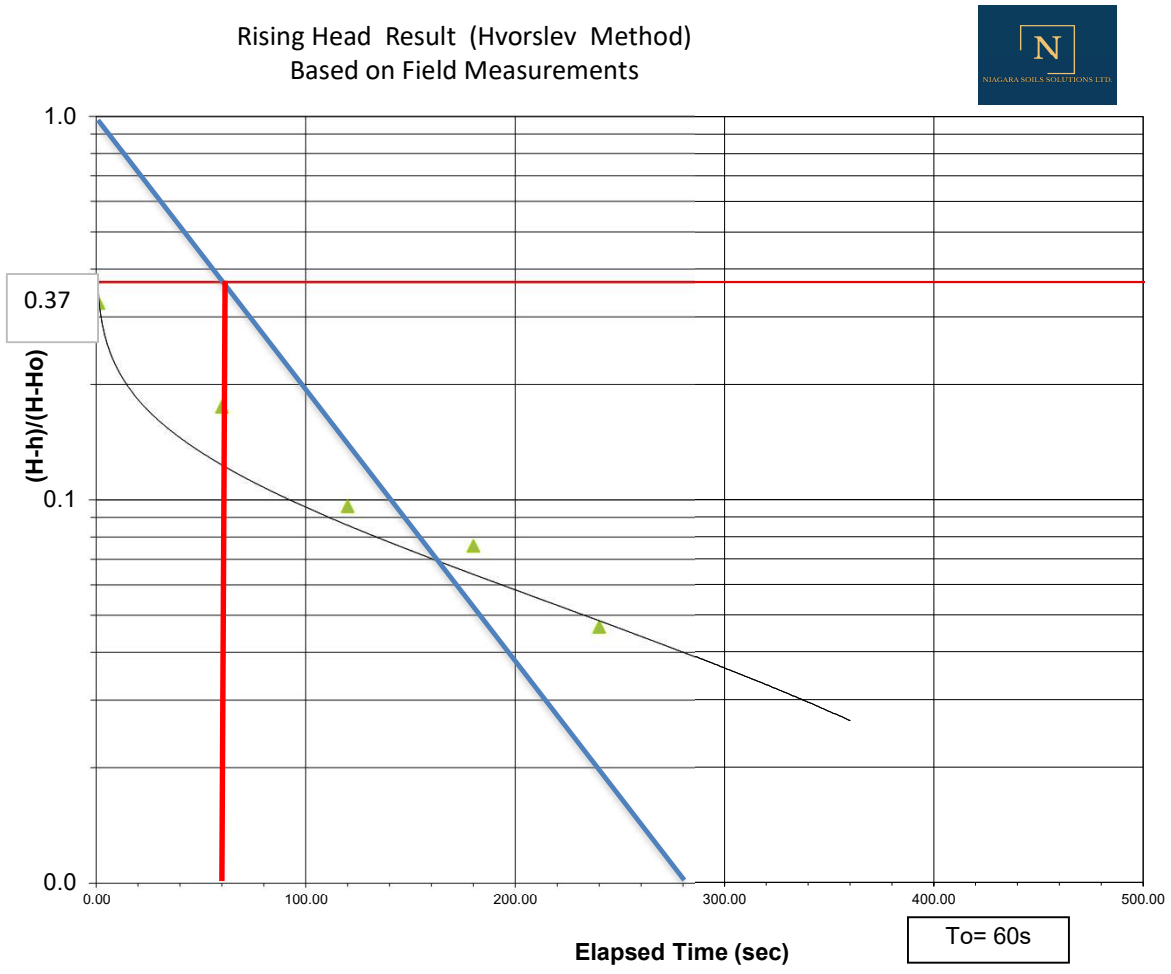
Datumn	BS (m)	HI (m)	FS (m)	ELEV (m)	Notes
TBM	1.57				- cold basin West of Property Line
MW1	1.34				
MW2	1.74				
turn		1.52			.22
MW3		1.49			.29
~~BH5~~ BH5		1.55			22%
BH7		1.21			
BH6		1.47			
BH4		1.42			
TBM		1.29			
TBM	Man hole		1.28	1.284	24, 10 100.28
	BH4		1.36		100.36
	MW2		1.43		100.43
	MW3		1.47		100.47
	BH5		1.54		100.54
	BH6		1.51		100.31
	BH7.		1.30		100.30
	Turn,			1.52	
	Double check MW2			1.53	
	MW1			1.29	100.40

BS	backward sight
HI	height of instrument (HI = ELEV + BS)
FS	forward sight
ELEV	elevation (100.00m assumed for TBM) (ELEV = HI - FS)
TBM1	temporary benchmark
TURN1	turning point to move tripod/scope (first record FS, then move tripod, then record BS, the rod does not move locations) (calculate new HI)

Well ID: MW1
(Based on Rising Head Method - April 6, 2022)

650 Main Street West, Port Colborne, ON

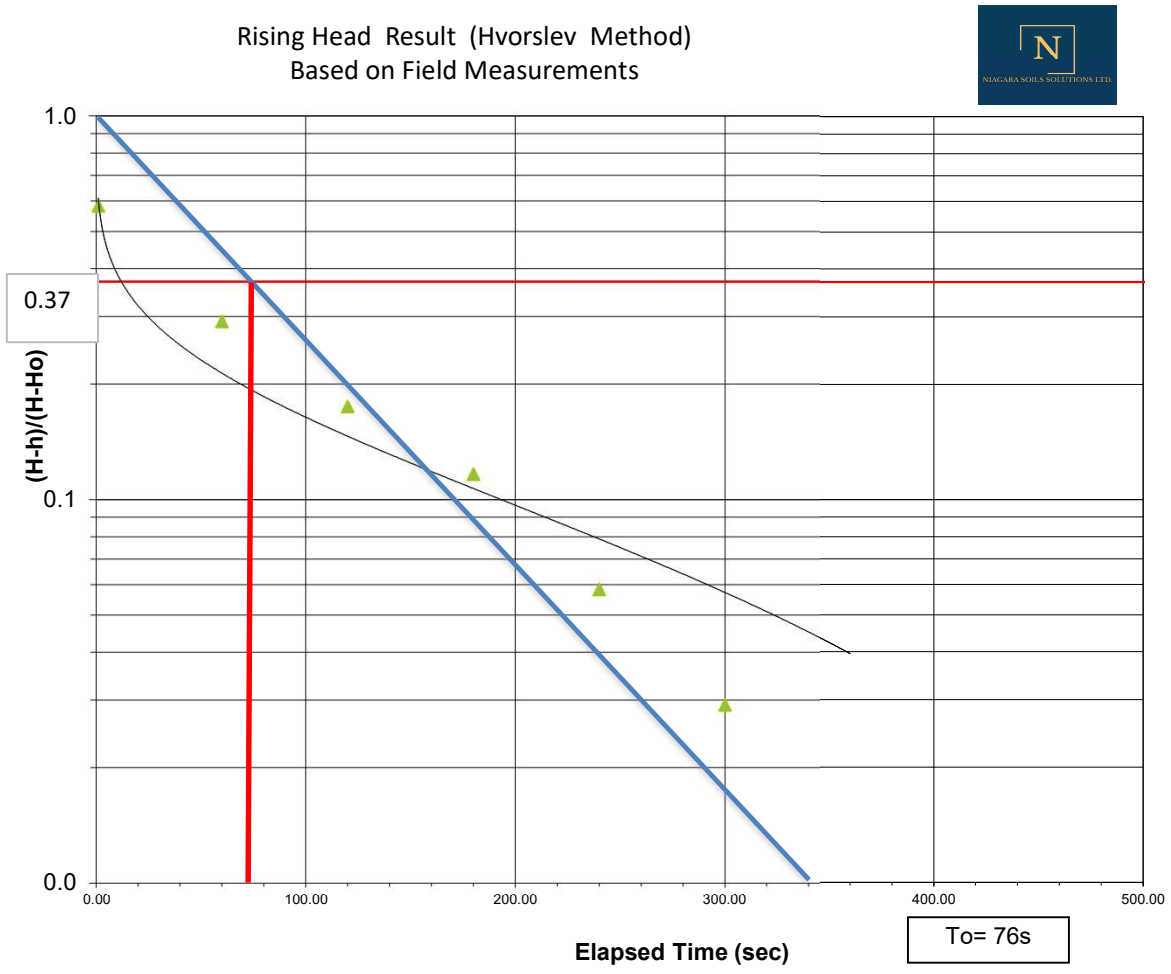
Project No. : NS2208-02			H =	Assumed Initial Water Head	
Conducted by:	DN		Ho =	Water Head at time = 0	
Interpretted by:	DN		h =	Water Head/Level at time t	
Well Number:	MW1				
Screen Depth (mBGS):	1.52~3.05				
Well Elevation (mASL):	-		L =	150	cm
Well Diameter:	2.0" ID		R =	7.65	cm
Static Water Level (mBGS):	1.90		r =	2.55	cm
Finish Reading (H)	1.93	m	To =	60	sec
Start Reading (h_0)	3.05	m	$K = r^2\ln(L/R)/(2LTo)$ =	**1.1E-03**	cm/s



Well ID: MW2
(Based on Rising Head Method - April 6, 2022)

650 Main Street West, Port Colborne, ON

Project No. : NS2208-02			H =	Assumed Initial Water Head	
Conducted by:	DN		Ho =	Water Head at time = 0	
Interpretted by:	DN		h =	Water Head/Level at time t	
Well Number:	MW2				
Screen Depth (mBGS):	1.52~4.57				
Well Elevation (mASL):	-		L =	300	cm
Well Diameter:	2.0" ID		R =	7.65	cm
Static Water Level (mBGS):	2.46		r =	2.55	cm
Finish Reading (H)	2.5	m	To =	76	sec
Start Reading (h_0)	4.57	m	$K = r^2\ln(L/R)/(2LTo)$ =	**5.2E-04**	cm/s



APPENDIX B

CERTIFICATES OF ANALYSIS – SOIL & GROUNDWATER

PARACEL LABORATORIES LTD.

TRUSTED.
RESPONSIVE.
RELIABLE.

351 Nash Road North, unit 9B
Hamilton, ON L8H 7P4
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

NIAGARA SOILS SOLUTIONS LTD.

3300 MERRITTVILLE HIGHWAY
THOROLD, ON L2V 4Y6
Attn: JODIE GLASIER

Client PO: 22-143
Project: NS2208-02
Custody:

Report Date: 11-Apr-2022
Order Date: 1-Apr-2022

Order #: 2214543

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

Paracel ID	Client ID
2214543-01	BH1-1
2214543-02	BH2-1
2214543-03	BH3-1
2214543-04	BH3-2
2214543-05	BH4-1
2214543-06	BH5-1
2214543-07	DUP

Approved By:

Dale Robertson, BSc
Laboratory Director

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	6-Apr-22	7-Apr-22
Conductivity	MOE E3138 - probe @25 °C, water ext	5-Apr-22	6-Apr-22
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	7-Apr-22	7-Apr-22
PHC F1	CWS Tier 1 - P&T GC-FID	6-Apr-22	7-Apr-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	1-Apr-22	7-Apr-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	6-Apr-22	6-Apr-22
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	6-Apr-22	10-Apr-22
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	6-Apr-22	7-Apr-22
SAR	Calculated	5-Apr-22	6-Apr-22
Solids, %	Gravimetric, calculation	5-Apr-22	6-Apr-22

Certificate of Analysis

Report Date: 11-Apr-2022

Client: NIAGARA SOILS SOLUTIONS LTD.

Order Date: 1-Apr-2022

Client PO: 22-143

Project Description: NS2208-02

	Client ID:	BH1-1	BH2-1	BH3-1	BH3-2
	Sample Date:	31-Mar-22 12:00	31-Mar-22 12:00	31-Mar-22 12:00	31-Mar-22 12:00
	Sample ID:	2214543-01	2214543-02	2214543-03	2214543-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	82.4	69.5	79.7	80.2
General Inorganics					
SAR	0.01 N/A	0.11	-	-	-
Conductivity	5 uS/cm	575	-	-	-
pH	0.05 pH Units	7.09	-	-	-
Metals					
Antimony	1.0 ug/g dry	2.0	<1.0	-	-
Arsenic	1.0 ug/g dry	8.6	4.7	-	-
Barium	1.0 ug/g dry	115	121	-	-
Beryllium	0.5 ug/g dry	0.7	0.9	-	-
Boron	5.0 ug/g dry	43.5	5.5	-	-
Cadmium	0.5 ug/g dry	0.6	<0.5	-	-
Chromium	5.0 ug/g dry	33.9	22.3	-	-
Cobalt	1.0 ug/g dry	9.1	7.2	-	-
Copper	5.0 ug/g dry	96.2	20.4	-	-
Lead	1.0 ug/g dry	53.5	28.4	-	-
Molybdenum	1.0 ug/g dry	2.5	<1.0	-	-
Nickel	5.0 ug/g dry	50.4	62.3	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	1.0	<1.0	-	-
Vanadium	10.0 ug/g dry	32.0	35.1	-	-
Zinc	20.0 ug/g dry	177	64.1	-	-
Volatiles					
Acetone	0.50 ug/g dry	<0.50	<0.50	-	-
Benzene	0.02 ug/g dry	<0.02	<0.02	-	-
Bromodichloromethane	0.05 ug/g dry	<0.05	<0.05	-	-
Bromoform	0.05 ug/g dry	<0.05	<0.05	-	-
Bromomethane	0.05 ug/g dry	<0.05	<0.05	-	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05	<0.05	-	-
Chlorobenzene	0.05 ug/g dry	<0.05	<0.05	-	-
Chloroform	0.05 ug/g dry	<0.05	<0.05	-	-
Dibromochloromethane	0.05 ug/g dry	<0.05	<0.05	-	-
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	<0.05	-	-

Certificate of Analysis

Client: NIAGARA SOILS SOLUTIONS LTD.

Client PO: 22-143

Report Date: 11-Apr-2022

Order Date: 1-Apr-2022

Project Description: NS2208-02

	Client ID:	BH1-1	BH2-1	BH3-1	BH3-2
	Sample Date:	31-Mar-22 12:00	31-Mar-22 12:00	31-Mar-22 12:00	31-Mar-22 12:00
	Sample ID:	2214543-01	2214543-02	2214543-03	2214543-04
	MDL/Units	Soil	Soil	Soil	Soil
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	-	-
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	-	-
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	-	-
1,1-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	-	-
1,2-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	-	-
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	-	-
1,2-Dichloropropane	0.05 ug/g dry	<0.05	<0.05	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	-	-
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	<0.05	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	<0.05	<0.05	-	-
Hexane	0.05 ug/g dry	<0.05	<0.05	-	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	<0.50	-	-
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	<0.50	-	-
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	<0.05	-	-
Methylene Chloride	0.05 ug/g dry	<0.05	<0.05	-	-
Styrene	0.05 ug/g dry	<0.05	<0.05	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	-	-
Tetrachloroethylene	0.05 ug/g dry	<0.05	<0.05	-	-
Toluene	0.05 ug/g dry	<0.05	<0.05	-	-
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	-	-
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	-	-
Trichloroethylene	0.05 ug/g dry	<0.05	<0.05	-	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05	<0.05	-	-
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g dry	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	-	-
4-Bromofluorobenzene	Surrogate	104%	100%	-	-
Dibromofluoromethane	Surrogate	113%	111%	-	-
Toluene-d8	Surrogate	138%	136%	-	-
Benzene	0.02 ug/g dry	-	-	<0.02	<0.02

Certificate of Analysis

Report Date: 11-Apr-2022

Client: NIAGARA SOILS SOLUTIONS LTD.

Order Date: 1-Apr-2022

Client PO: 22-143

Project Description: NS2208-02

	Client ID:	BH1-1	BH2-1	BH3-1	BH3-2
	Sample Date:	31-Mar-22 12:00	31-Mar-22 12:00	31-Mar-22 12:00	31-Mar-22 12:00
	Sample ID:	2214543-01	2214543-02	2214543-03	2214543-04
	MDL/Units	Soil	Soil	Soil	Soil
Ethylbenzene	0.05 ug/g dry	-	-	<0.05	<0.05
Toluene	0.05 ug/g dry	-	-	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	-	-	<0.05	<0.05
o-Xylene	0.05 ug/g dry	-	-	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	-	-	<0.05	<0.05
Toluene-d8	Surrogate	-	-	138%	133%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	10	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	9	<6	<6	<6
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	-	-
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	-	-
Anthracene	0.02 ug/g dry	<0.02	<0.02	-	-
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	-	-
Benzo [a] pyrene	0.02 ug/g dry	0.03	0.04	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	0.03	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	0.03	0.03	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	-	-
Chrysene	0.02 ug/g dry	0.02	0.04	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	-	-
Fluoranthene	0.02 ug/g dry	0.03	0.07	-	-
Fluorene	0.02 ug/g dry	<0.02	<0.02	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	0.02	-	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	-	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	-	-
Naphthalene	0.01 ug/g dry	<0.01	<0.01	-	-
Phenanthrene	0.02 ug/g dry	<0.02	0.03	-	-
Pyrene	0.02 ug/g dry	0.02	0.05	-	-
2-Fluorobiphenyl	Surrogate	88.2%	99.7%	-	-
Terphenyl-d14	Surrogate	112%	109%	-	-

Certificate of Analysis

Report Date: 11-Apr-2022

Client: NIAGARA SOILS SOLUTIONS LTD.

Order Date: 1-Apr-2022

Client PO: 22-143

Project Description: NS2208-02

	Client ID:	BH4-1	BH5-1	DUP	-
	Sample Date:	31-Mar-22 12:00	31-Mar-22 12:00	31-Mar-22 12:00	-
	Sample ID:	2214543-05	2214543-06	2214543-07	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	83.5	72.8	84.0	-
General Inorganics					
SAR	0.01 N/A	-	0.34	-	-
Conductivity	5 uS/cm	-	452	-	-
pH	0.05 pH Units	-	7.36	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Arsenic	1.0 ug/g dry	4.5	5.6	5.2	-
Barium	1.0 ug/g dry	112	106	71.8	-
Beryllium	0.5 ug/g dry	0.8	0.8	0.6	-
Boron	5.0 ug/g dry	10.9	<5.0	6.9	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	-
Chromium	5.0 ug/g dry	28.8	21.1	18.6	-
Cobalt	1.0 ug/g dry	8.5	7.1	7.0	-
Copper	5.0 ug/g dry	16.3	17.7	17.7	-
Lead	1.0 ug/g dry	10.2	25.9	24.2	-
Molybdenum	1.0 ug/g dry	1.4	<1.0	1.1	-
Nickel	5.0 ug/g dry	27.8	48.4	66.5	-
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	-
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Vanadium	10.0 ug/g dry	32.8	32.6	30.0	-
Zinc	20.0 ug/g dry	52.1	58.7	70.8	-
Volatiles					
Acetone	0.50 ug/g dry	<0.50	<0.50	<0.50	-
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Bromodichloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Bromoform	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Bromomethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Chlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Chloroform	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Dibromochloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-

Certificate of Analysis

Client: NIAGARA SOILS SOLUTIONS LTD.

Client PO: 22-143

Report Date: 11-Apr-2022

Order Date: 1-Apr-2022

Project Description: NS2208-02

	Client ID:	BH4-1	BH5-1	DUP	-
	Sample Date:	31-Mar-22 12:00	31-Mar-22 12:00	31-Mar-22 12:00	-
	Sample ID:	2214543-05	2214543-06	2214543-07	-
	MDL/Units	Soil	Soil	Soil	-
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,1-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,2-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,2-Dichloropropane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Ethylene dibromide (dibromoethane, 1	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Hexane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	<0.50	<0.50	-
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	<0.50	<0.50	-
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Methylene Chloride	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Styrene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Tetrachloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Trichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	<0.02	-
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	-
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	-
4-Bromofluorobenzene	Surrogate	94.7%	104%	97.9%	-
Dibromofluoromethane	Surrogate	108%	114%	109%	-
Toluene-d8	Surrogate	129%	137%	131%	-

Certificate of Analysis

Report Date: 11-Apr-2022

Client: NIAGARA SOILS SOLUTIONS LTD.

Order Date: 1-Apr-2022

Client PO: 22-143

Project Description: NS2208-02

	Client ID:	BH4-1	BH5-1	DUP	-
	Sample Date:	31-Mar-22 12:00	31-Mar-22 12:00	31-Mar-22 12:00	-
	Sample ID:	2214543-05	2214543-06	2214543-07	-
	MDL/Units	Soil	Soil	Soil	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	23	24	31	-
F4 PHCs (C34-C50)	6 ug/g dry	63	30	35	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Benzo [a] pyrene	0.02 ug/g dry	0.03	<0.02	<0.02	-
Benzo [b] fluoranthene	0.02 ug/g dry	0.03	<0.02	<0.02	-
Benzo [g,h,i] perylene	0.02 ug/g dry	0.04	<0.02	<0.02	-
Benzo [k] fluoranthene	0.02 ug/g dry	0.02	<0.02	<0.02	-
Chrysene	0.02 ug/g dry	0.03	<0.02	<0.02	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Fluoranthene	0.02 ug/g dry	0.04	0.04	0.03	-
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	0.03	<0.02	<0.02	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	0.03	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	0.05	-
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	-
Phenanthrene	0.02 ug/g dry	0.02	0.02	0.03	-
Pyrene	0.02 ug/g dry	0.03	0.03	0.02	-
2-Fluorobiphenyl	Surrogate	79.0%	82.0%	77.5%	-
Terphenyl-d14	Surrogate	98.8%	101%	99.6%	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
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						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.21*		*ug/g*		*90.7*	*50-140*			
Surrogate: Terphenyl-d14	*1.38*		*ug/g*		*104*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane, 1,2-	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	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: 4-Bromofluorobenzene	*10.2*		*ug/g*		*128*	*50-140*			
Surrogate: Dibromofluoromethane	*8.08*		*ug/g*		*101*	*50-140*			
Surrogate: Toluene-d8	*10.1*		*ug/g*		*127*	*50-140*			
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	*10.1*		*ug/g*		*127*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	0.39	0.01	N/A	0.40			2.5	30	
Conductivity	879	5	uS/cm	884			0.6	5	
pH	8.03	0.05	pH Units	8.02			0.1	2.3	
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	3.2	1.0	ug/g	3.1			2.9	30	
Arsenic	6.5	1.0	ug/g	7.9			19.0	30	
Barium	66.7	1.0	ug/g	85.7			24.9	30	
Beryllium	0.8	0.5	ug/g	1.0			17.1	30	
Boron	15.1	5.0	ug/g	18.9			22.4	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	21.7	5.0	ug/g	28.0			25.4	30	
Cobalt	11.2	1.0	ug/g	14.5			25.8	30	
Copper	30.2	5.0	ug/g	40.8			29.9	30	
Lead	10.3	1.0	ug/g	13.1			24.0	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	24.4	5.0	ug/g	30.5			22.2	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	30.1	10.0	ug/g	38.8			25.3	30	
Zinc	62.9	20.0	ug/g	80.2			24.1	30	
Physical Characteristics									
% Solids	79.5	0.1	% by Wt.	81.3			2.4	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g	ND			NC	40	
Anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Chrysene	ND	0.02	ug/g	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g	ND			NC	40	
Fluoranthene	ND	0.02	ug/g	ND			NC	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	ND	0.01	ug/g	ND			NC	40	
Phenanthrene	ND	0.02	ug/g	ND			NC	40	
Pyrene	ND	0.02	ug/g	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	*1.44*		*ug/g*		*87.9*	*50-140*			
Surrogate: Terphenyl-d14	*1.80*		*ug/g*		*110*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g	ND			NC	50	
Benzene	ND	0.02	ug/g	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g	ND			NC	50	
Bromoform	ND	0.05	ug/g	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromomethane	ND	0.05	ug/g	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g	ND			NC	50	
Chloroform	ND	0.05	ug/g	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g	ND			NC	50	
Hexane	ND	0.05	ug/g	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g	ND			NC	50	
Styrene	ND	0.05	ug/g	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g	ND			NC	50	
Vinyl chloride	ND	0.02	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: 4-Bromofluorobenzene	*9.34*		*ug/g*		*98.6*	*50-140*			
Surrogate: Dibromofluoromethane	*9.94*		*ug/g*		*105*	*50-140*			
Surrogate: Toluene-d8	*12.4*		*ug/g*		*131*	*50-140*			
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	*12.4*		*ug/g*		*131*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	183	7	ug/g	ND	91.7	80-120			
F2 PHCs (C10-C16)	101	4	ug/g	ND	101	60-140			
F3 PHCs (C16-C34)	260	8	ug/g	ND	105	60-140			
F4 PHCs (C34-C50)	166	6	ug/g	ND	106	60-140			
Metals									
Antimony	33.8	1.0	ug/g	1.2	65.2	70-130			QM-07
Arsenic	51.2	1.0	ug/g	3.1	96.0	70-130			
Barium	70.4	1.0	ug/g	34.3	72.2	70-130			
Beryllium	49.7	0.5	ug/g	ND	98.6	70-130			
Boron	53.4	5.0	ug/g	7.6	91.7	70-130			
Cadmium	45.1	0.5	ug/g	ND	90.1	70-130			
Chromium	57.1	5.0	ug/g	11.2	91.9	70-130			
Cobalt	51.6	1.0	ug/g	5.8	91.6	70-130			
Copper	56.6	5.0	ug/g	16.3	80.6	70-130			
Lead	48.8	1.0	ug/g	5.3	87.1	70-130			
Molybdenum	49.1	1.0	ug/g	ND	97.5	70-130			
Nickel	56.1	5.0	ug/g	12.2	87.8	70-130			
Selenium	44.2	1.0	ug/g	ND	88.0	70-130			
Silver	42.4	0.3	ug/g	ND	84.8	70-130			
Thallium	46.7	1.0	ug/g	ND	93.2	70-130			
Uranium	46.1	1.0	ug/g	ND	91.5	70-130			
Vanadium	61.8	10.0	ug/g	15.5	92.6	70-130			
Zinc	67.8	20.0	ug/g	32.1	71.4	70-130			
Semi-Volatiles									
Acenaphthene	0.203	0.02	ug/g	ND	99.0	50-140			
Acenaphthylene	0.158	0.02	ug/g	ND	77.0	50-140			
Anthracene	0.150	0.02	ug/g	ND	73.3	50-140			
Benzo [a] anthracene	0.160	0.02	ug/g	ND	78.0	50-140			
Benzo [a] pyrene	0.177	0.02	ug/g	ND	86.5	50-140			
Benzo [b] fluoranthene	0.160	0.02	ug/g	ND	78.4	50-140			
Benzo [g,h,i] perylene	0.157	0.02	ug/g	ND	76.7	50-140			
Benzo [k] fluoranthene	0.145	0.02	ug/g	ND	70.9	50-140			
Chrysene	0.191	0.02	ug/g	ND	93.5	50-140			
Dibenzo [a,h] anthracene	0.149	0.02	ug/g	ND	72.8	50-140			
Fluoranthene	0.143	0.02	ug/g	ND	70.1	50-140			
Fluorene	0.184	0.02	ug/g	ND	89.9	50-140			
Indeno [1,2,3-cd] pyrene	0.146	0.02	ug/g	ND	71.3	50-140			
1-Methylnaphthalene	0.217	0.02	ug/g	ND	106	50-140			
2-Methylnaphthalene	0.231	0.02	ug/g	ND	113	50-140			
Naphthalene	0.224	0.01	ug/g	ND	109	50-140			
Phenanthrene	0.162	0.02	ug/g	ND	79.0	50-140			
Pyrene	0.156	0.02	ug/g	ND	76.3	50-140			
Surrogate: 2-Fluorobiphenyl	*1.45*		*ug/g*		*88.4*	*50-140*			
Surrogate: Terphenyl-d14	*1.76*		*ug/g*		*108*	*50-140*			
Volatiles									
Acetone	6.51	0.50	ug/g	ND	65.1	50-140			
Benzene	3.17	0.02	ug/g	ND	79.3	60-130			
Bromodichloromethane	3.10	0.05	ug/g	ND	77.4	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromoform	4.09	0.05	ug/g	ND	102	60-130			
Bromomethane	3.73	0.05	ug/g	ND	93.3	50-140			
Carbon Tetrachloride	3.30	0.05	ug/g	ND	82.6	60-130			
Chlorobenzene	4.18	0.05	ug/g	ND	105	60-130			
Chloroform	3.37	0.05	ug/g	ND	84.2	60-130			
Dibromochloromethane	3.95	0.05	ug/g	ND	98.7	60-130			
Dichlorodifluoromethane	2.60	0.05	ug/g	ND	65.0	50-140			
1,2-Dichlorobenzene	2.75	0.05	ug/g	ND	68.8	60-130			
1,3-Dichlorobenzene	2.94	0.05	ug/g	ND	73.4	60-130			
1,4-Dichlorobenzene	3.09	0.05	ug/g	ND	77.3	60-130			
1,1-Dichloroethane	3.33	0.05	ug/g	ND	83.2	60-130			
1,2-Dichloroethane	3.09	0.05	ug/g	ND	77.3	60-130			
1,1-Dichloroethylene	3.22	0.05	ug/g	ND	80.5	60-130			
cis-1,2-Dichloroethylene	3.07	0.05	ug/g	ND	76.7	60-130			
trans-1,2-Dichloroethylene	3.21	0.05	ug/g	ND	80.2	60-130			
1,2-Dichloropropane	3.17	0.05	ug/g	ND	79.3	60-130			
cis-1,3-Dichloropropylene	2.88	0.05	ug/g	ND	72.0	60-130			
trans-1,3-Dichloropropylene	2.90	0.05	ug/g	ND	72.4	60-130			
Ethylbenzene	3.99	0.05	ug/g	ND	99.9	60-130			
Ethylene dibromide (dibromoethane, 1,2-	3.97	0.05	ug/g	ND	99.3	60-130			
Hexane	3.64	0.05	ug/g	ND	90.9	60-130			
Methyl Ethyl Ketone (2-Butanone)	6.50	0.50	ug/g	ND	65.0	50-140			
Methyl Isobutyl Ketone	7.90	0.50	ug/g	ND	79.0	50-140			
Methyl tert-butyl ether	10.0	0.05	ug/g	ND	100	50-140			
Methylene Chloride	3.39	0.05	ug/g	ND	84.8	60-130			
Styrene	3.67	0.05	ug/g	ND	91.8	60-130			
1,1,1,2-Tetrachloroethane	4.16	0.05	ug/g	ND	104	60-130			
1,1,2,2-Tetrachloroethane	3.30	0.05	ug/g	ND	82.6	60-130			
Tetrachloroethylene	4.21	0.05	ug/g	ND	105	60-130			
Toluene	4.35	0.05	ug/g	ND	109	60-130			
1,1,1-Trichloroethane	3.42	0.05	ug/g	ND	85.5	60-130			
1,1,2-Trichloroethane	3.17	0.05	ug/g	ND	79.3	60-130			
Trichloroethylene	3.70	0.05	ug/g	ND	92.6	60-130			
Trichlorofluoromethane	3.56	0.05	ug/g	ND	88.9	50-140			
Vinyl chloride	3.22	0.02	ug/g	ND	80.4	50-140			
m,p-Xylenes	8.07	0.05	ug/g	ND	101	60-130			
o-Xylene	4.12	0.05	ug/g	ND	103	60-130			
Surrogate: 4-Bromofluorobenzene	*7.70*		*ug/g*		*96.3*	*50-140*			
Surrogate: Dibromofluoromethane	*7.53*		*ug/g*		*94.2*	*50-140*			
Surrogate: Toluene-d8	*8.21*		*ug/g*		*103*	*50-140*			
Benzene	3.17	0.02	ug/g	ND	79.3	60-130			
Ethylbenzene	3.99	0.05	ug/g	ND	99.9	60-130			
Toluene	4.35	0.05	ug/g	ND	109	60-130			
m,p-Xylenes	8.07	0.05	ug/g	ND	101	60-130			
o-Xylene	4.12	0.05	ug/g	ND	103	60-130			
Surrogate: Toluene-d8	*8.21*		*ug/g*		*103*	*50-140*			

Qualifier Notes:

QC Qualifiers :

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

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 when the units are denoted with 'dry'.
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.

PARACEL LABORATORIES LTD.

Paracel ID: 2214543

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2214543	

Client Name:	NSSL	Project Ref:	NS2208-02
Contact Name:	JODIE GLASIER	Quote #:	
Address:	3300 MERRITTVILLE HIGHWAY UNIT #5 THOROLD, ON, L2V 4Y6	PO #:	22-143
Telephone:	289-407-6341	E-mail:	JGLASIER@NSSL.CA DNYLAND@NSSL.CA

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Turnaround Time

☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular

Date Required: ______

☒ REG 153/04 ☐ REG 406/19

☐ Table 1 ☐ Res/Park ☐ Med/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☒ Table 6

For RSC: ☒ Yes ☐ No

Other Regulation

☐ REG 558 ☐ PWQO ☐ CCME ☐ MISA ☐ SU - Sani ☐ SU - Storm

Mun: ______

☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Metals (ICP)	PHC/BTEX	PHC/VOCs	pH/SAR/EC	PAHs
1	BH1-1	S		2	3-31	PM	X		X	X	X
2	BH2-1	↓		↓	↓	↓	X		X		X
3	BH3-1	↓		↓	↓	↓		X			
4	BH3-2	↓		↓	↓	↓		X			
5	BH4-1	↓		↓	↓	↓	X		X		X
6	BH5-1	↓		↓	↓	↓	X		X	X	X
7	DUP	↓		↓	↓	↓	X		X		X
8											
9											
10											

Comments:

Relinquished By (Sign): [signature]	Received By Driver/Depot: Niagara B. Homenuk	Received at Lab: [signature]	Method of Delivery: Walkin
Relinquished By (Print): Damen Nyland			Verified By: [signature]
Date/Time: March 31, 2022	Date/Time: 1Apr22 1400	Date/Time: April 2,22 15:24	Date/Time: April 2,22 17:47
	Temperature: 9.1 °C	Temperature: 5.2°C	pH Verified: ☐ By: NA

Chain of Custody (Blank).xlsx

Revsion 4.0

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Certificate of Analysis

NIAGARA SOILS SOLUTIONS LTD.
3300 MERRITTVILLE HIGHWAY
THOROLD, ON L2V 4Y6
Attn: JODIE GLASIER

Client PO:
Project: NS2208-02
Custody:

Report Date: 13-Apr-2022
Order Date: 7-Apr-2022

Order #: 2215552

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

Paracel ID	Client ID
2215552-01	MW1
2215552-02	MW2
2215552-03	MW3
2215552-04	DUP

Approved By:

Alex Enfield, MSc
Lab Manager

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	12-Apr-22	12-Apr-22
PHC F1	CWS Tier 1 - P&T GC-FID	11-Apr-22	12-Apr-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	12-Apr-22	13-Apr-22
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	11-Apr-22	12-Apr-22
REG 153: VOCs by P&T GC-MS	EPA 624 - P&T GC-MS	12-Apr-22	12-Apr-22

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 153/04 -T6 Potable Groundwater	-

Certificate of Analysis

Report Date: 13-Apr-2022

Client: NIAGARA SOILS SOLUTIONS LTD.

Order Date: 7-Apr-2022

Client PO:

Project Description: NS2208-02

	Client ID:	MW1	MW2	MW3	DUP	Criteria:	
	Sample Date:	06-Apr-22 12:00	06-Apr-22 12:00	06-Apr-22 12:00	07-Apr-22 00:00	Reg 153/04 -T6 Potable Groundwater	-
	Sample ID:	2215552-01	2215552-02	2215552-03	2215552-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
Volatiles							
Acetone	5.0 ug/L	-	<5.0	<5.0	<5.0	2700 ug/L	-
Benzene	0.5 ug/L	-	<0.5	<0.5	<0.5	0.5 ug/L	-
Bromodichloromethane	0.5 ug/L	-	<0.5	<0.5	<0.5	16 ug/L	-
Bromoform	0.5 ug/L	-	<0.5	<0.5	<0.5	5 ug/L	-
Bromomethane	0.5 ug/L	-	<0.5	<0.5	<0.5	0.89 ug/L	-
Carbon Tetrachloride	0.2 ug/L	-	<0.2	<0.2	<0.2	0.2 ug/L	-
Chlorobenzene	0.5 ug/L	-	<0.5	<0.5	<0.5	30 ug/L	-
Chloroform	0.5 ug/L	-	<0.5	<0.5	<0.5	2 ug/L	-
Dibromochloromethane	0.5 ug/L	-	<0.5	<0.5	<0.5	25 ug/L	-
Dichlorodifluoromethane	1.0 ug/L	-	<1.0	<1.0	<1.0	590 ug/L	-
1,2-Dichlorobenzene	0.5 ug/L	-	<0.5	<0.5	<0.5	3 ug/L	-
1,3-Dichlorobenzene	0.5 ug/L	-	<0.5	<0.5	<0.5	59 ug/L	-
1,4-Dichlorobenzene	0.5 ug/L	-	<0.5	<0.5	<0.5	0.5 ug/L	-
1,1-Dichloroethane	0.5 ug/L	-	<0.5	<0.5	<0.5	5 ug/L	-
1,2-Dichloroethane	0.5 ug/L	-	<0.5	<0.5	<0.5	0.5 ug/L	-
1,1-Dichloroethylene	0.5 ug/L	-	<0.5	<0.5	<0.5	0.5 ug/L	-
cis-1,2-Dichloroethylene	0.5 ug/L	-	<0.5	<0.5	<0.5	1.6 ug/L	-
trans-1,2-Dichloroethylene	0.5 ug/L	-	<0.5	<0.5	<0.5	1.6 ug/L	-
1,2-Dichloropropane	0.5 ug/L	-	<0.5	<0.5	<0.5	0.58 ug/L	-
cis-1,3-Dichloropropylene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	-	<0.5	<0.5	<0.5	0.5 ug/L	-
Ethylbenzene	0.5 ug/L	-	<0.5	<0.5	<0.5	2.4 ug/L	-
Ethylene dibromide (dibromoethane,	0.2 ug/L	-	<0.2	<0.2	<0.2	0.2 ug/L	-
Hexane	1.0 ug/L	-	<1.0	<1.0	<1.0	5 ug/L	-

	Client ID:	MW1	MW2	MW3	DUP	Criteria:	
	Sample Date:	06-Apr-22 12:00	06-Apr-22 12:00	06-Apr-22 12:00	07-Apr-22 00:00	Reg 153/04 -T6 Potable Groundwater	-
	Sample ID:	2215552-01	2215552-02	2215552-03	2215552-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
Volatiles							
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	-	<5.0	<5.0	<5.0	1800 ug/L	-
Methyl Isobutyl Ketone	5.0 ug/L	-	<5.0	<5.0	<5.0	640 ug/L	-
Methyl tert-butyl ether	2.0 ug/L	-	<2.0	<2.0	<2.0	15 ug/L	-
Methylene Chloride	5.0 ug/L	-	<5.0	<5.0	<5.0	26 ug/L	-
Styrene	0.5 ug/L	-	<0.5	<0.5	<0.5	5.4 ug/L	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	-	<0.5	<0.5	<0.5	1.1 ug/L	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	-	<0.5	<0.5	<0.5	0.5 ug/L	-
Tetrachloroethylene	0.5 ug/L	-	<0.5	<0.5	<0.5	0.5 ug/L	-
Toluene	0.5 ug/L	-	0.6	<0.5	<0.5	24 ug/L	-
1,1,1-Trichloroethane	0.5 ug/L	-	<0.5	<0.5	<0.5	23 ug/L	-
1,1,2-Trichloroethane	0.5 ug/L	-	<0.5	<0.5	<0.5	0.5 ug/L	-
Trichloroethylene	0.5 ug/L	-	<0.5	<0.5	<0.5	0.5 ug/L	-
Trichlorofluoromethane	1.0 ug/L	-	<1.0	<1.0	<1.0	150 ug/L	-
Vinyl chloride	0.5 ug/L	-	<0.5	<0.5	<0.5	0.5 ug/L	-
m,p-Xylenes	0.5 ug/L	-	0.6	<0.5	<0.5	-	-
o-Xylene	0.5 ug/L	-	0.7	<0.5	<0.5	-	-
Xylenes, total	0.5 ug/L	-	1.3	<0.5	<0.5	72 ug/L	-
Toluene-d8	Surrogate	-	108%	109%	109%	-	-
4-Bromofluorobenzene	Surrogate	-	105%	101%	99.2%	-	-
Dibromofluoromethane	Surrogate	-	68.0%	61.5%	61.2%	-	-
Benzene	0.5 ug/L	<0.5	-	-	-	0.5 ug/L	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-	2.4 ug/L	-
Toluene	0.5 ug/L	<0.5	-	-	-	24 ug/L	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-	-	-

	Client ID:	MW1	MW2	MW3	DUP	Criteria:	
	Sample Date:	06-Apr-22 12:00	06-Apr-22 12:00	06-Apr-22 12:00	07-Apr-22 00:00	Reg 153/04 -T6 Potable Groundwater	-
	Sample ID:	2215552-01	2215552-02	2215552-03	2215552-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
Volatiles							
Xylenes, total	0.5 ug/L	<0.5	-	-	-	72 ug/L	-
Toluene-d8	Surrogate	108%	-	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25	420 ug/L	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100	150 ug/L	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100	500 ug/L	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100	500 ug/L	-
Semi-Volatiles							
Acenaphthene	0.05 ug/L	-	<0.05	<0.05	<0.05	4.1 ug/L	-
Acenaphthylene	0.05 ug/L	-	<0.05	<0.05	<0.05	1 ug/L	-
Anthracene	0.01 ug/L	-	<0.01	<0.01	<0.01	1 ug/L	-
Benzo [a] anthracene	0.01 ug/L	-	<0.01	<0.01	<0.01	1 ug/L	-
Benzo [a] pyrene	0.01 ug/L	-	<0.01	<0.01	<0.01	0.01 ug/L	-
Benzo [b] fluoranthene	0.05 ug/L	-	<0.05	<0.05	<0.05	0.1 ug/L	-
Benzo [g,h,i] perylene	0.05 ug/L	-	<0.05	<0.05	<0.05	0.2 ug/L	-
Benzo [k] fluoranthene	0.05 ug/L	-	<0.05	<0.05	<0.05	0.1 ug/L	-
Chrysene	0.05 ug/L	-	<0.05	<0.05	<0.05	0.1 ug/L	-
Dibenzo [a,h] anthracene	0.05 ug/L	-	<0.05	<0.05	<0.05	0.2 ug/L	-
Fluoranthene	0.01 ug/L	-	<0.01	<0.01	<0.01	0.41 ug/L	-
Fluorene	0.05 ug/L	-	<0.05	<0.05	<0.05	120 ug/L	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	-	<0.05	<0.05	<0.05	0.2 ug/L	-
1-Methylnaphthalene	0.05 ug/L	-	0.69	<0.05	<0.05	3.2 ug/L	-
2-Methylnaphthalene	0.05 ug/L	-	0.75	0.20	<0.05	3.2 ug/L	-
Methylnaphthalene (1&2)	0.10 ug/L	-	1.45	0.20	<0.10	3.2 ug/L	-
Naphthalene	0.05 ug/L	-	0.43	0.38	<0.05	7 ug/L	-

	Client ID:	MW1	MW2	MW3	DUP	Criteria:	
	Sample Date:	06-Apr-22 12:00	06-Apr-22 12:00	06-Apr-22 12:00	07-Apr-22 00:00	Reg 153/04 -T6 Potable Groundwater	-
	Sample ID:	2215552-01	2215552-02	2215552-03	2215552-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
Semi-Volatiles							
Phenanthrene	0.05 ug/L	-	0.16	0.09	<0.05	1 ug/L	-
Pyrene	0.01 ug/L	-	<0.01	<0.01	<0.01	4.1 ug/L	-
2-Fluorobiphenyl	Surrogate	-	93.7%	88.0%	77.2%	-	-
Terphenyl-d14	Surrogate	-	93.2%	97.3%	97.6%	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons								
F1 PHCs (C6-C10)	ND	25	ug/L					
F2 PHCs (C10-C16)	ND	100	ug/L					
F3 PHCs (C16-C34)	ND	100	ug/L					
F4 PHCs (C34-C50)	ND	100	ug/L					
Semi-Volatiles								
Acenaphthene	ND	0.05	ug/L					
Acenaphthylene	ND	0.05	ug/L					
Anthracene	ND	0.01	ug/L					
Benzo [a] anthracene	ND	0.01	ug/L					
Benzo [a] pyrene	ND	0.01	ug/L					
Benzo [b] fluoranthene	ND	0.05	ug/L					
Benzo [g,h,i] perylene	ND	0.05	ug/L					
Benzo [k] fluoranthene	ND	0.05	ug/L					
Chrysene	ND	0.05	ug/L					
Dibenzo [a,h] anthracene	ND	0.05	ug/L					
Fluoranthene	ND	0.01	ug/L					
Fluorene	ND	0.05	ug/L					
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L					
1-Methylnaphthalene	ND	0.05	ug/L					
2-Methylnaphthalene	ND	0.05	ug/L					
Methylnaphthalene (1&2)	ND	0.10	ug/L					
Naphthalene	ND	0.05	ug/L					
Phenanthrene	ND	0.05	ug/L					
Pyrene	ND	0.01	ug/L					
Surrogate: 2-Fluorobiphenyl	*6.72*		*ug/L*	*67.2*	*50-140*			
Surrogate: Terphenyl-d14	*9.47*		*ug/L*	*94.7*	*50-140*			
Volatiles								
Acetone	ND	5.0	ug/L					
Benzene	ND	0.5	ug/L					
Bromodichloromethane	ND	0.5	ug/L					
Bromoform	ND	0.5	ug/L					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromomethane	ND	0.5	ug/L					
Carbon Tetrachloride	ND	0.2	ug/L					
Chlorobenzene	ND	0.5	ug/L					
Chloroform	ND	0.5	ug/L					
Dibromochloromethane	ND	0.5	ug/L					
Dichlorodifluoromethane	ND	1.0	ug/L					
1,2-Dichlorobenzene	ND	0.5	ug/L					
1,3-Dichlorobenzene	ND	0.5	ug/L					
1,4-Dichlorobenzene	ND	0.5	ug/L					
1,1-Dichloroethane	ND	0.5	ug/L					
1,2-Dichloroethane	ND	0.5	ug/L					
1,1-Dichloroethylene	ND	0.5	ug/L					
cis-1,2-Dichloroethylene	ND	0.5	ug/L					
trans-1,2-Dichloroethylene	ND	0.5	ug/L					
1,2-Dichloropropane	ND	0.5	ug/L					
cis-1,3-Dichloropropylene	ND	0.5	ug/L					
trans-1,3-Dichloropropylene	ND	0.5	ug/L					
1,3-Dichloropropene, total	ND	0.5	ug/L					
Ethylbenzene	ND	0.5	ug/L					
Ethylene dibromide (dibromoethane, 1,2-)	ND	0.2	ug/L					
Hexane	ND	1.0	ug/L					
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L					
Methyl Isobutyl Ketone	ND	5.0	ug/L					
Methyl tert-butyl ether	ND	2.0	ug/L					
Methylene Chloride	ND	5.0	ug/L					
Styrene	ND	0.5	ug/L					
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L					
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L					
Tetrachloroethylene	ND	0.5	ug/L					
Toluene	ND	0.5	ug/L					
1,1,1-Trichloroethane	ND	0.5	ug/L					
1,1,2-Trichloroethane	ND	0.5	ug/L					
Trichloroethylene	ND	0.5	ug/L					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Trichlorofluoromethane	ND	1.0	ug/L					
Vinyl chloride	ND	0.5	ug/L					
m,p-Xylenes	ND	0.5	ug/L					
o-Xylene	ND	0.5	ug/L					
Xylenes, total	ND	0.5	ug/L					
Surrogate: 4-Bromofluorobenzene	*82.8*		*ug/L*	*104*	*50-140*			
Surrogate: Dibromofluoromethane	*58.9*		*ug/L*	*73.6*	*50-140*			
Surrogate: Toluene-d8	*85.6*		*ug/L*	*107*	*50-140*			
Benzene	ND	0.5	ug/L					
Ethylbenzene	ND	0.5	ug/L					
Toluene	ND	0.5	ug/L					
m,p-Xylenes	ND	0.5	ug/L					
o-Xylene	ND	0.5	ug/L					
Xylenes, total	ND	0.5	ug/L					
Surrogate: Toluene-d8	*85.6*		*ug/L*	*107*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	32.5	5.0	ug/L	15.6			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	ND	0.5	ug/L	ND			NC	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-)	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*79.7*		*ug/L*		*99.6*	*50-140*			
Surrogate: Dibromofluoromethane	*49.8*		*ug/L*		*62.2*	*50-140*			
Surrogate: Toluene-d8	*86.9*		*ug/L*		*109*	*50-140*			
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*86.9*		*ug/L*		*109*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	627	25	ug/L	ND	88.7	68-117			
F2 PHCs (C10-C16)	1380	100	ug/L	ND	83.3	60-140			
F3 PHCs (C16-C34)	3710	100	ug/L	ND	100	60-140			
F4 PHCs (C34-C50)	2390	100	ug/L	ND	89.4	60-140			
Semi-Volatiles									
Acenaphthene	8.97	0.05	ug/L	ND	89.7	50-140			
Acenaphthylene	9.45	0.05	ug/L	ND	94.5	50-140			
Anthracene	9.32	0.01	ug/L	ND	93.2	50-140			
Benzo [a] anthracene	9.12	0.01	ug/L	ND	91.2	50-140			
Benzo [a] pyrene	7.97	0.01	ug/L	ND	79.7	50-140			
Benzo [b] fluoranthene	7.81	0.05	ug/L	ND	78.1	50-140			
Benzo [g,h,i] perylene	7.94	0.05	ug/L	ND	79.4	50-140			
Benzo [k] fluoranthene	7.74	0.05	ug/L	ND	77.4	50-140			
Chrysene	8.24	0.05	ug/L	ND	82.4	50-140			
Dibenzo [a,h] anthracene	7.91	0.05	ug/L	ND	79.1	50-140			
Fluoranthene	8.73	0.01	ug/L	ND	87.3	50-140			
Fluorene	13.0	0.05	ug/L	ND	130	50-140			
Indeno [1,2,3-cd] pyrene	7.54	0.05	ug/L	ND	75.4	50-140			
1-Methylnaphthalene	9.13	0.05	ug/L	ND	91.3	50-140			
2-Methylnaphthalene	8.91	0.05	ug/L	ND	89.1	50-140			
Naphthalene	8.90	0.05	ug/L	ND	89.0	50-140			
Phenanthrene	8.94	0.05	ug/L	ND	89.4	50-140			
Pyrene	8.77	0.01	ug/L	ND	87.7	50-140			
Surrogate: 2-Fluorobiphenyl	*11.5*		*ug/L*		*115*	*50-140*			
Surrogate: Terphenyl-d14	*9.50*		*ug/L*		*95.0*	*50-140*			
Volatiles									
Acetone	83.2	5.0	ug/L	ND	83.2	50-140			
Benzene	39.7	0.5	ug/L	ND	98.8	50-140			
Bromodichloromethane	39.3	0.5	ug/L	ND	97.7	50-140			
Bromoform	37.5	0.5	ug/L	ND	93.3	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromomethane	38.1	0.5	ug/L	ND	95.2	50-140			
Carbon Tetrachloride	39.0	0.2	ug/L	ND	97.4	50-140			
Chlorobenzene	34.8	0.5	ug/L	ND	86.5	50-140			
Chloroform	38.7	0.5	ug/L	ND	96.2	50-140			
Dibromochloromethane	39.2	0.5	ug/L	ND	98.1	50-140			
Dichlorodifluoromethane	30.0	1.0	ug/L	ND	75.1	50-140			
1,2-Dichlorobenzene	33.7	0.5	ug/L	ND	84.2	50-140			
1,3-Dichlorobenzene	31.1	0.5	ug/L	ND	77.8	50-140			
1,4-Dichlorobenzene	30.7	0.5	ug/L	ND	76.4	50-140			
1,1-Dichloroethane	39.2	0.5	ug/L	ND	98.1	50-140			
1,2-Dichloroethane	39.6	0.5	ug/L	ND	98.6	50-140			
1,1-Dichloroethylene	36.3	0.5	ug/L	ND	90.7	50-140			
cis-1,2-Dichloroethylene	38.8	0.5	ug/L	ND	96.6	50-140			
trans-1,2-Dichloroethylene	36.8	0.5	ug/L	ND	91.5	50-140			
1,2-Dichloropropane	40.8	0.5	ug/L	ND	102	50-140			
cis-1,3-Dichloropropylene	38.9	0.5	ug/L	ND	97.2	50-140			
trans-1,3-Dichloropropylene	38.3	0.5	ug/L	ND	95.3	50-140			
Ethylbenzene	32.1	0.5	ug/L	ND	80.0	50-140			
Ethylene dibromide (dibromoethane, 1,2-)	37.6	0.2	ug/L	ND	93.6	50-140			
Hexane	17.3	1.0	ug/L	ND	43.3	50-140			QS-02
Methyl Ethyl Ketone (2-Butanone)	93.9	5.0	ug/L	ND	93.9	50-140			
Methyl Isobutyl Ketone	106	5.0	ug/L	ND	106	50-140			
Methyl tert-butyl ether	103	2.0	ug/L	ND	103	50-140			
Methylene Chloride	38.0	5.0	ug/L	ND	94.6	50-140			
Styrene	34.7	0.5	ug/L	ND	86.0	50-140			
1,1,1,2-Tetrachloroethane	39.5	0.5	ug/L	ND	98.8	50-140			
1,1,2,2-Tetrachloroethane	38.2	0.5	ug/L	ND	95.1	50-140			
Tetrachloroethylene	29.1	0.5	ug/L	ND	72.3	50-140			
Toluene	36.5	0.5	ug/L	ND	91.2	50-140			
1,1,1-Trichloroethane	39.6	0.5	ug/L	ND	99.0	50-140			
1,1,2-Trichloroethane	39.8	0.5	ug/L	ND	99.1	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Trichloroethylene	36.6	0.5	ug/L	ND	91.0	50-140			
Trichlorofluoromethane	33.6	1.0	ug/L	ND	84.0	50-140			
Vinyl chloride	35.8	0.5	ug/L	ND	89.5	50-140			
m,p-Xylenes	66.0	0.5	ug/L	ND	82.3	50-140			
o-Xylene	35.6	0.5	ug/L	ND	88.4	50-140			
Surrogate: 4-Bromofluorobenzene	*86.6*		*ug/L*		*108*	*50-140*			
Surrogate: Dibromofluoromethane	*104*		*ug/L*		*130*	*50-140*			
Surrogate: Toluene-d8	*80.7*		*ug/L*		*101*	*50-140*			
Benzene	39.7	0.5	ug/L	ND	98.8	50-140			
Ethylbenzene	32.1	0.5	ug/L	ND	80.0	50-140			
Toluene	36.5	0.5	ug/L	ND	91.2	50-140			
m,p-Xylenes	66.0	0.5	ug/L	ND	82.3	50-140			
o-Xylene	35.6	0.5	ug/L	ND	88.4	50-140			
Surrogate: Toluene-d8	*80.7*		*ug/L*		*101*	*50-140*			

Qualifier Notes:

QC Qualifiers :

QS-02: Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.

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

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.

PARACEL LABORATORIES LTD.

Paracel ID: 2215552

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2215552	

Client Name: Jodie Glesir	Project Ref: NS2208-02	Page 1 of 1
Contact Name: NSSL	Quote #:	Turnaround Time
Address: 3320 Merritville Highway Unit #5 Thorold.	PO #: 22-143	☐ 1 day ☐ 3 day ☐ 2 day ☑ Regular
Telephone: 289-407-6341	E-mail: jglesir@nssl.ca dryland@nssl.ca	Date Required:

☑ REG 153/04 ☐ REG 406/19

☐ Table 1 ☑ Res/Park ☑ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other
☑ Table 6
For RSC: ☑ Yes ☐ No

Other Regulation: ☐ REG 558 ☐ PWQO ☐ CCME ☐ MISA ☐ SU - Sani ☐ SU - Storm Mun: ☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	Required Analysis: PAH	PHC/BTEX	PHC/VOC
1	MW1	GW		3	4-6	PM		X	
2	MW2	"		4	4-6	"	X		X
3	MW3	"		4	4-6	"	X		X
4	DUP	"		4	4-7	AM	X		X
5									
6									
7									
8									
9									
10									

Comments:

Method of Delivery: walk in

Relinquished By (Sign):	Received By Driver/Depot: Niagara	Received at Lab:	Verified By: BB
Relinquished By (Print): Dylan Nyland	Date/Time: 7Apr22 1315	Date/Time: Apr 8/22 8:35	Date/Time: 8/4/22 9:20
Date/Time: 2022-4-7	Temperature: 10 °C	Temperature: 8.2	pH Verified: ☐ By: NA

APPENDIX C

GRAIN SIZE ANALYSIS

Project No.: NT22072 April 21, 2022

Niagara Soils Solutions Ltd.
3300 Merrittville Highway, Unit 5
Thorold, Ontario
L2V 4Y6

Attention: Ms. Jodie Glasier, Vice President

RE: Laboratory Analysis for Soil Texture Classification
Niagara Soils Solutions Ltd. Project No. NS2208-02
650 Main Street West, Port Colborne, Ontario

Dear Ms. Glasier:

As requested, Niagara Testing & Inspection Ltd. (NTIL) was retained to perform laboratory analysis on soil samples for soil texture classification (i.e., fine/medium or coarse grain soil determination) as defined in Ontario Regulation 153/04 (as amended).

On Tuesday April 19th, 2022, two (2) soil samples were delivered by Niagara Soils Solutions Ltd. to NTIL soils laboratory for 75-micron (µm) (#200) single-sieve grain size analysis. Results for the analysis are summarized in the table below.

Sample I.D.	*Percent Passing 75 µm (#200) Sieve*	*Percent Retained on 75 µm (#200) Sieve*	*Soil Texture*
BH-1 SS-2	52.3 %	47.7 %	Fine/Medium Grained
BH-7 SS-2	70.8 %	29.2 %	Fine/Medium Grained

We trust that this information is satisfactory for your purposes. Should you have any queries please do not hesitate to contact the undersigned.

Regards:

Niagara Testing & Inspection Ltd.

Prepared by:

Dwayne Neill, B.Eng.
Geotechnical Engineering

Reviewed by:

John Monkman, P.Eng.
Project Engineer

LICENSED PROFESSIONAL ENGINEER
J. D. MONKMAN
PROVINCE OF ONTARIO
Apr 21, 2022

Distribution:
Jodie Glasier – jglasier@nssl.ca