INTERIM REMEDIAL MEASURES

WORK PLAN

FOR

19 NORTH STREET
CITY OF BUFFALO, ERIE COUNTY, NEW YORK
NYSDEC SITE NO. C915303

Prepared by:

C&S ENGINEERS, INC.
141 ELM STREET, SUITE 100
BUFFALO, NEW YORK 14203

Prepared on Behalf of:

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AMHERST, NEW YORK 14226

JUNE 2017

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APPENDICES

ACRONYM LIST

AAR	Alternative Analysis Report
BGS	Below Ground Surface
BCP	Brownfield Cleanup Program
DUSR	Data Usability and Summary Report
FER	Final Engineering Report
IRM	Interim Remedial Measures
NAPLs	Non-Aqueous Phase Liquids
NYSDEC	New York State Department of Environmental Conservation
PCBs	Polychlorinated Biphenyls
PID	Photo-ionization Detector
PPM	Parts Per Million
RI	Remedial Investigation
SCO	Soil Cleanup Objectives
Site	19 North Street Buffalo, New York
SMP	Site Management Plan
SVOC	Semi-volatile Organic Compounds
TAL	Target Analyte List
TCL	Target Compound List
USEPA	United State Environmental Protection Agency
VOC	Volatile Organic Compounds
QAQC	Quality Assurance Quality Control

INTRODUCTION

C&S Engineers, Inc. (C&S) has prepared this Interim Remedial Measures Work Plan (IRM WP) behalf of the applicant to the Brownfield Cleanup Program (BCP), 23 North Street, LLC (hereafter known as "Applicant"), for the remediation and redevelopment of 19 North Street in the City of Buffalo, New York (the "Site"). **Figure 1** shows the Site's location.

On January 19, 2016, the Applicant submitted a BCP Application to remediate the Site at 19 North Street in the City of Buffalo, New York. Investigative actions covered under the RI included the entire 0.5-acre Site, which formerly occupied two addresses: 23 North Street and 19 North Street, Buffalo, New York.

Initial limited sampling indicated the presence of urban fill with contaminant concentrations in excess of the New York State Department of Environmental Conservation's (NYSDEC's) Soil Cleanup Objectives (SCOs). The NYSDEC used these results to approve the Site's entrance into the BCP.

This IRM WP presents the planned interim remedial steps that will be implemented at the Site to address the soil contamination. Based on information collected during the Remedial Investigation (RI), the IRM WP calls for the removal and re-use or proper disposal of approximately 6,000 cubic yards of contaminated material from the Site. Dewatering is likely unnecessary based on the depth to groundwater and planned excavation depths ranging from one to 13 feet. Following the performance of the IRMs, an IRM Report, Alternatives Analysis Report (AAR), and draft Final Engineering Report (FER) will be submitted to the NYSDEC.

INTERIM REMEDIAL MEASURES WORK PLAN

This plan is based on the review of data collected during preliminary investigations in 2015 and the RI completed in August 2016 through January 2017. **Appendix A** contains soil boring logs from the RI.

1. Approach

Based on data collected during the RI, the following steps will be implemented to address the contaminated soil at the Site:

- Removal of approximately 6,000 cubic yards of surface soil, imported fill, and native soil with residual impacts from the overlying fill for off-site disposal or treatment at a regulated facility, or re-use at a commercial or industrial use brownfield site. If the material is to be re-used, a Beneficial Use Determination (BUD) would be required for formal approval by the NYSDEC.
- If necessary, dewatering of the excavation area and the treatment of captured water.
- Use of confirmatory soil sample results generated during the RI, in conjunction with additional analytical results from post-excavation samples collected along the excavation walls, to show compliance with the Unrestricted Use Soil Cleanup Objective.

The following sections of the IRM Work Plan will identify the actions to be implemented at the Site to achieve the NYSDEC's Unrestricted Use SCOs.

2. Site Control

Site control is an important aspect of this remedial measure. In order to safeguard the health and safety of site workers and the general public, access to all remedial work areas will be restricted. Perimeter fencing will be installed to facilitate site control. Additionally, temporary construction fencing will be erected around accessible excavations and staging areas to prevent unauthorized personnel from entering these areas as appropriate.

3. Site Preparation

Based on planned excavation depths and depth to groundwater at the Site, it is unlikely that groundwater will be encountered in the excavation. However, contingent plans will be created to address stormwater, if any, in the excavation. These plans include the potential for pumping the excavation water using temporary sumps or a vacuum truck into steel holding tanks. Stored water will either be shipped for off-site treatment at a licensed treatment facility or will be characterized and treated, if necessary, on-site and discharged to the sanitary sewer under a Buffalo Sewer Authority permit.

4. Excavation

As discussed in the RI Report, the on-site fill material is present across the Site. The underlying native material generally meets Unrestricted Use SCOs, except for small areas where the urban fill has impacted the upper layers of native material. Based on this information, excavation is planned to occur across the Site and will include the removal and off-site disposal of surface and subsurface fill and certain areas of native material.

The depth of the excavation will be based on the sampling completed during the RI, which demonstrated that, generally, the underlying native material met the Unrestricted Use SCOs. The RI sampling included native soil samples from each 30-foot by 30-foot grid location. Because the grid sampling identified slight variations in fill thickness, the depths of the excavation at the Site will vary and will be based on the RI sampling results. **Figure 2** shows the proposed excavation depths. The existing grade and excavation depths are to be verified via Global Positioning System (GPS) survey.

Due to concerns of structural stability of the adjacent building located at the eastern BCP boundary, a wedge of soil will be left-in-place along the eastern property line to support the foundation. The soil wedge will be necessary beginning at 60 feet north from the southeastern corner of the property and ending at the northeastern corner of the property. The wedge is required to be a minimum of eight feet and a maximum of 15 feet in various locations. Documentation samples of the material left in place will be collected under observation and with location approval from the NYSDEC. Based on the results of this additional documentation data, designation as a Track 4 cleanup and the need for an environmental easement will be determined. **Figure 3** shows the soil wedge necessary along the eastern property line. **Figure 4** shows a schematic of the soil wedge.

Although petroleum or other similar impacts are not anticipated in the material that is planned to be removed, during excavation, a C&S scientist or engineer will screen the removed fill for visual and olfactory observations and for total volatile compounds using a photoionization detector (PID). If grossly contaminated fill is observed, the impacted material will be evaluated and may be handled separately from the other excavated materials at the Site. Excavation is to continue if indications of fill are observed or grossly contaminated soil is discovered at the planned excavation depth. Grossly contaminated soil is defined, for the purpose of this report, as soil with vapors greater than 50 ppm on the PID. Excavation is to continue until the PID reading is less than 50 ppm or until the excavation reaches 15 feet.

Due to limited space, excavated soil will likely be direct-loaded onto trucks for off-site disposal. However, it is possible that excavated material may be stockpiled prior to being loaded onto trucks for off-site re-use or disposal. Any excavated soil to be stockpiled on-site will be placed on and covered by a minimum of double 6-mil polyethylene sheeting which is sufficiently anchored to prevent any wind and water erosion. The cover will be inspected at least once per day, with corrective action taken as needed. The inspections and any corrective actions will be documented in logs and will occur until the materials have been properly removed and disposed off-site.

The excavated material will either be disposed at a landfill permitted by the NYSDEC to receive such material, or, reused if a suitable location can be identified. For landfill disposal, the material will be approved by the NYSDEC prior to transportation off-site. Should a suitable reuse opportunity become evident, a Beneficial Use Determination (BUD) will be submitted to the NYSDEC for consideration. Only after the BUD is approved would the material be removed from the Site.

Good housekeeping practices will be followed during excavation activities to prevent leaving contaminated material on the ground surface (e.g., precautions will be taken to prevent impacts to the ground surface due to material spilled from the excavator bucket). Care will be taken to ensure that contaminated fill material is not tracked off-site. Should the tracking of fill material onto North Street or adjoining roads occur, the road(s) shall be properly cleaned.

Transportation of all wastes will be completed by properly permitted vehicles. To the extent practicable, trucks will travel along routes that avoid residential areas.

5. Backfilling

Grid excavation depth is to be approved by the NYSDEC prior to backfilling. The excavation at the Site will be backfilled with material such as clean soil, crushed stone, and/or concrete to an elevation to facilitate construction of the Site buildings, in accordance with DER-10. The minimum compaction requirements for backfill across the Site and near the adjacent building foundation is 95%.

For each source of backfill that is imported to the Site, one of the following will be completed prior to importing the backfill.

a. Documentation will be provided to NYSDEC as to the source of the material and the consistency of the material in accordance with the exemption for no chemical testing listed in DER-10 Section 5.4(e)(5); **OR**
b. Chemical testing will be completed in accordance with the following table:

Recommended Number of Soil Samples for Soil Imported To or Exported From a Site			
Contaminant	**VOCs**	**SVOCs, Inorganics & PCBs/Pesticides**	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

Taken from DER-10 - Table 5.4(e)10

In the event that laboratory analytical testing is conducted, the results for each new source of fill must meet the values provided in Appendix 5 of DER-10 for Unrestricted Use and must receive approval by the NYSDEC.

6. Air Monitoring

When soil is being excavated or moved at the Site, the Community Air Monitoring Plan (CAMP) included in **Appendix B** will be implemented by C&S. CAMP monitors will be positioned at upwind and downwind locations on the perimeter of the Site.

The action threshold for VOCs established in the CAMP is 5 ppm above background. If this value is exceeded for the 15-minute average work will be halted and work may resume once instantaneous readings fall below 5 ppm work. The action level for dust is 100 micrograms per cubic meter over background during a 15-minute average. If this limit is exceeded, dust suppression techniques will be employed, including using water to wet the area.

7. Erosion and Dust Controls

As part of the interim remedial measures to be performed at the Site, measures will be needed to limit erosion and dust generation. NYSDEC Dust and Erosion Control Guidance is included in the CAMP in **Appendix B**. Erosion control and dust suppression techniques will be employed as necessary to limit erosion and fugitive dust generated in disturbed areas during remediation and redevelopment activities. Such techniques may be employed even if the community air monitoring results indicate that particulate levels are below action levels. Techniques may include but are not limited to:

- Using silt fencing, hay bales, and/or mulching
- Applying water on access/haul roads
- Wetting equipment and excavation surfaces
- Hauling materials in properly tarped or watertight containers
- Limiting vehicle speed on the Site
- Limiting the size of excavations
- Covering excavated areas and materials following excavation

Effectiveness of the dust suppression measures will be evaluated based on the results of the air monitoring that will be conducted under the Community Air Monitoring Plan provided in **Appendix B.**

8. Confirmatory Sampling

As discussed previously, the native soil samples collected during the RI meet the Site's SCOs. Ten additional confirmatory samples will be collected from the excavation walls. The ten samples are comprised of four samples collected from the west excavation wall, three samples collected from the north excavation wall, and three samples collected from the south excavation wall. Along the eastern BCP boundary, documentation samples will be collected from each grid location where soil will remain in place. A total of four documentation samples will be collected from this area.

9. Reporting

Following the performance of the IRMs, an IRM Report, Alternatives Analysis Report (AAR), and draft FER will be submitted to the NYSDEC. A Site Management Plan (SMP) will be submitted at that time, if applicable. The IRM Report will document the efforts and results of the removal and backfilling activities and contain the associated logs, manifests, and weigh tickets. The AAR will identify and evaluate potential remedial alternatives for the Site, of which no additional work is anticipated based on achieving a Track 1 cleanup. The FER will affirm that the remedial activities have achieved the Remedial Action Objectives (RAOs).

10. Schedule

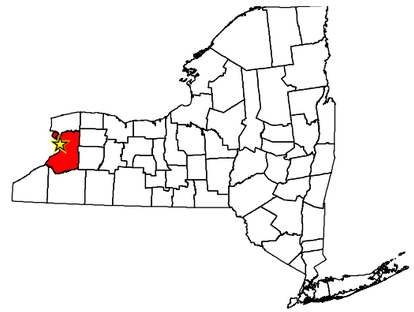
The following presents a revised remedial schedule for the project:

Anticipated Date	**Milestone**
July 10, 2017	Initiation of Interim Remedial Measures
September 1, 2017	Completion of Interim Remedial Measures

September 15, 2017	Submission of IRM Report, AAR and draft FER. Submission of the SMP, if applicable.
December 2017	Receipt of Certificate of Completion

FIGURES

LOCATION MAP



LEGEND

BCP BOUNDARY

NOTES

1) USGS 7.5 MINUTE QUADRANGLE MAP FROM ESRI BASEMAP LAYER.

2) COORDINATE SYSTEM: NAD 1983 STATEPLANE NY
WEST FIPS 3103
PROJECTION: TRANSVERSE MERCATOR
DATUM: NORTH AMERICAN 1983
UNITS: FOOT US

0 375 750 1,500
FEET

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www.cscos.com

N

19 NORTH STREET
BROWNFIELD CLEANUP PROGRAM
INTERIM REMEDIAL MEASURE
BUFFALO, NEW YORK

MARK	DATE	DESCRIPTION

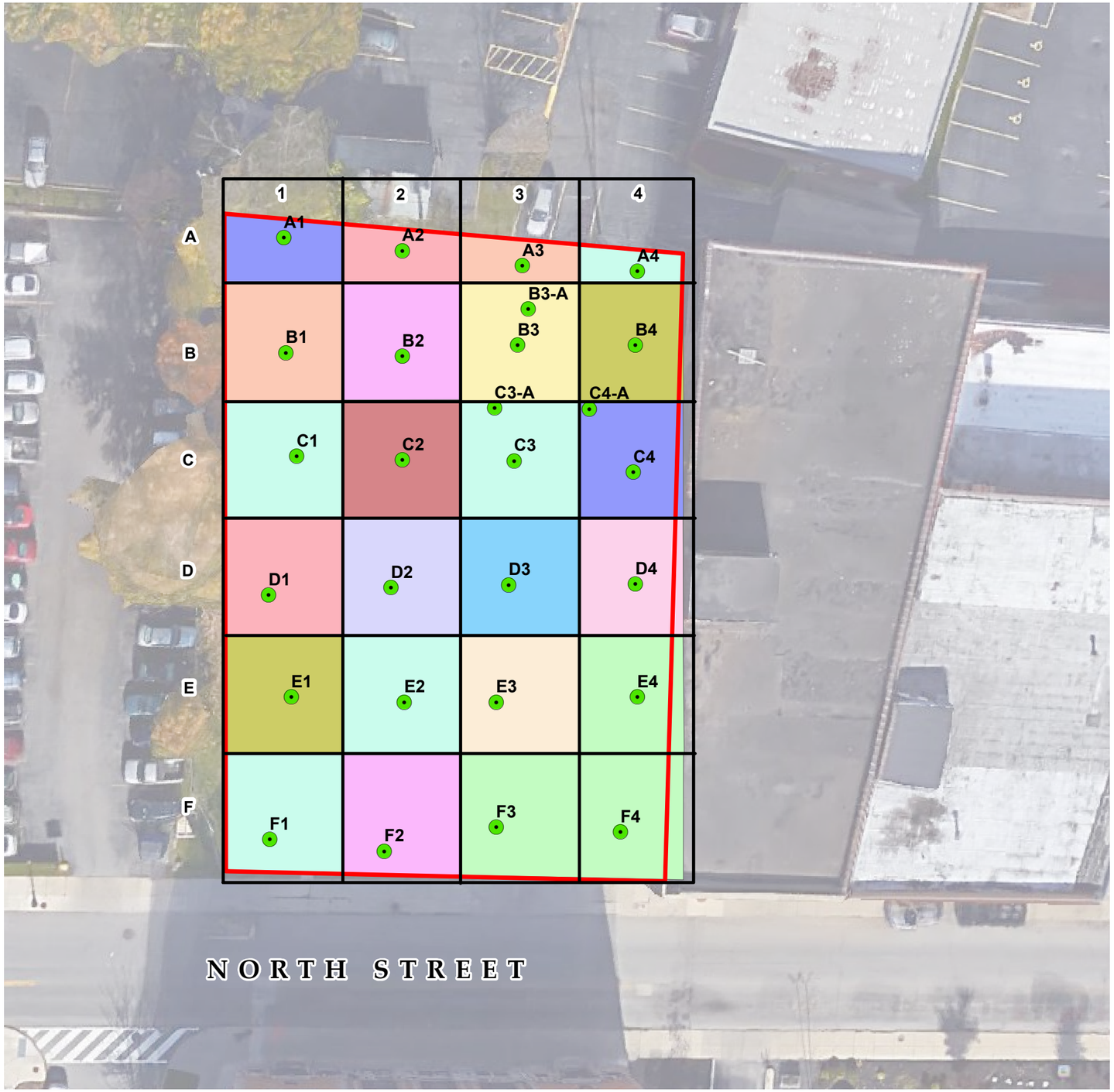
REVISIONS

PROJECT NO:	P67.001.001
DATE:	jUNE3 2016
DRAWN BY:	A DeMARCHI
DESIGNED BY:	A. DeMARCHI
CHECKED BY:	D. RIKER

SITE LOCATION

FIGURE 1

Path: F:\Project\P67 - First Amherst Development Company\Planning-Study\GIS\FIGURE_X_BCP_SITE.mxd



LEGEND

- BCP SITE BOUNDARY
- NATIVE SAMPLE LOCATION
- 1 FOOT DEPTH EXCAVATION
- 4 FOOT DEPTH EXCAVATION
- 5 FOOT DEPTH EXCAVATION
- 5.5 FOOT DEPTH EXCAVATION
- 6 FOOT DEPTH EXCAVATION
- 7 FOOT DEPTH EXCAVATION
- 8 FOOT DEPTH EXCAVATION
- 9 FOOT DEPTH EXCAVATION
- 9.5 FOOT DEPTH EXCAVATION
- 10 FOOT DEPTH EXCAVATION
- 11 FOOT DEPTH EXCAVATION
- 12 FOOT DEPTH EXCAVATION
- 13 FOOT DEPTH EXCAVATION

NOTES

1) ALL NATIVE SAMPLES TO BE USE AS CONFIRMATORY SAMPLES DURING REMEDIAL ACTIVITIES.

2) COORDINATE SYSTEM: NAD 1983 STATEPLANE NY WEST FIPS 3103
PROJECTION: TRANSVERSE MERCATOR
DATUM: NORTH AMERICAN 1983
UNITS: FOOT US

0 15 30 60 Feet

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19 NORTH STREET
BROWNFIELD CLEANUP PROGRAM
INTERIM REMEDIAL MEASURES
BUFFALO, NEW YORK

MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO:	P67.001.001
DATE:	6/20/2017
DRAWN BY:	A. DeMARCHI
DESIGNED BY:	A. DeMARCHI
CHECKED BY:	D. RIKER

DEPTH TO UNRESTRICTED SOILS

FIGURE 2

Path: F:\Project\P67 - First Amherst Development Company\P67.001.001 - BCP APP\Planning-Study\GIS\RI REPORT FIGURE2-1 EXCAVATION DEPTHS.mxd

LEGEND

- BCP SITE BOUNDARY
- TRACK 4 - RESTRICTED RESIDENTIAL USE

NOTES

1) COORDINATE SYSTEM: NAD 1983 STATEPLANE NY WEST FIPS 3103
PROJECTION: TRANSVERSE MERCATOR
DATUM: NORTH AMERICAN 1983
UNITS: FOOT US

0 15 30 60 Feet

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19 NORTH STREET
BROWNFIELD CLEANUP PROGRAM
INTERIM REMEDIAL MEASURES
BUFFALO, NEW YORK

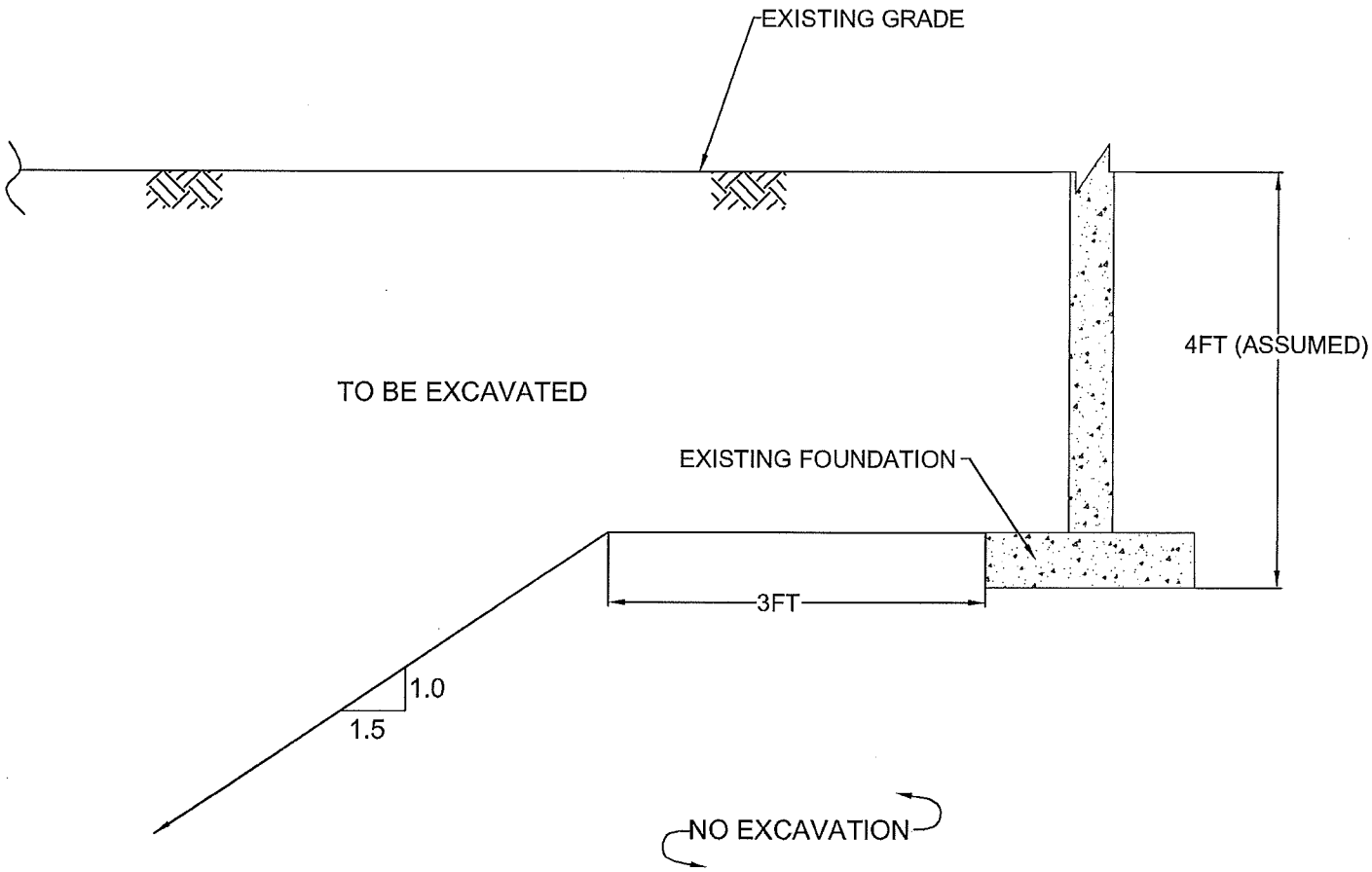
MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO:	P67.001.001
DATE:	6/13/17
DRAWN BY:	A. DeMARCHI
DESIGNED BY:	A. DeMARCHI
CHECKED BY:	D. RIKER

TRACK 4 DESIGNATION

FIGURE 3

Path: F:\Project\P67 - First Amherst Development Company\P67.001.001 - BCP APP\Planning-Study\GIS\RI REPORT FIGURE X TRACK 4 AREA.mxd



Project Mngr: CBG Drawn By: ERG Checked By: CBR Approved By: SCL	Project No. JA175001 Scale: NTS File No. JA175001.dwg Date: MAY 2017	Terracon Consulting Engineers and Scientists 3445 Winton Place Rochester, NY 14623	EXCAVATION LIMITS DIAGRAM MIXED USE BUILDING 19 NORTH STREET BUFFALO, NEW YORK	EXHIBIT SK-1

C&S IRM Figure 4

APPENDICES

APPENDIX A
SOIL BORING LOGS

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	**Boring No.**	**A1**
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation						**Surface Elev.:**		
Location:	19 North Street Buffalo New York						**Datum:**	GROUND SURFACE	
Client:	23 North Street, LLC						**Start Date:**	8/31/16	
Drilling Firm:	NYEG		**Driller:**	**John (NYEG)**			**Finish Date:**	8/31/16	
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	geoprobe 7220			**Inspector:**	SH	
While Drilling:	17	08/31/16	**Casing:**		**Rock Core:**		**Undist:**		
Before Casing Removal:			**Sampler:**		**Other:**				
After Casing Removal:			**Hammer:**						

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-24" ***dark brown, clay and gravel FILL, little churt,***	0.0 ppm	START 1439
1				***concrete pieces***		30" Recovered
				24-30" ***red brown clayey SILT, tree root***	0.0 ppm	
2						Top of native soil - 2 feet below grade
3						
4						
5						
				0-56" ***red brown CLAY, high plasticity***	0.0 ppm	63" Recovered
6				56-63" ***red brown, fine SILT***	0.0 ppm	
7						
8						
9						
10						
				0-6" ***brown, wet SILT with some imbedded gravel***	0.0 ppm	58" recovered
11				6-58" ***tannish brown, wet, fine SAND***	0.0 ppm	
12						
13						
14						
15						
				0-24" ***tan, fine SAND, wet to saturated***	0.0 ppm	58" Recovered
16				24-36" ***tan, fine SILT with some imbedded gravel***	0.0 ppm	
				36-58" ***wet, fine SAND***	0.0 ppm	
17	↓					
18						
19						
20						
				0-17" ***tannish brown SILT and CLAY***	0.0 ppm	58" recovered
21				17-29" ***tan silty CLAY***	0.0 ppm	
				29-42" ***tan SILT***	0.0 ppm	
22				42-58" ***tannish brown CLAY, dense/hard***	0.0 ppm	
23						***Sample:*** Time:
24						***A1-5-6ft*** 1505 ***A1-6-7ft*** 1515
25				***end of boring at 25 feet***		

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	A2
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation						Surface Elev.:		
Location:	19 North Street Buffalo New York						Datum:	GROUND SURFACE	
Client:	23 North Street, LLC						Start Date:	8/31/16	
Drilling Firm:	NYEG			Driller:	John (NYEG)		Finish Date:	8/31/16	
Groundwater	Depth	Date & Time		Drill Rig:	geoprobe 7220		Inspector:	SH	
While Drilling:				Casing:		Rock Core:		Undist:	
Before Casing Removal:				Sampler:		Other:			
After Casing Removal:				Hammer:					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
1				0-6" ***topsoil*** 0.0 ppm	START 912
				6-29" ***FILL - dark sand with brick, concrete, dark spot*** 0.0 ppm	53" Recovered
2				29-53" ***red brown, silty SAND, with trace clay, moist***	Top of native soil - 2 feet 5 inches below grade
3					
4					
5					
6				0-6" ***red brown, silty SAND with clay, moist***	60" Recovered
				6-52" ***red brown, silty CLAY, wet***	
7				52-63" ***red brown, silty SAND, wet***	
8					
9					
10					
11				0-60" ***light brown, silty SAND, wet***	60" recovered
12					
13					
14					
15					
16				***end of boring at 15 feet***	
17					
18					
19					
20					
21					***Sample:*** Time:
22					***A2-1-2ft*** 912 ***A2-9.5-11ft*** 933
23					***DUP*** 1000 ***A2-11-12ft*** 935
24					***A2-12-13ft*** 950 ***A2-13-14ft*** 955
25					

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	A2
			Sheet 1 of:	1
			Project No.:	P67.001.002
Project Name:	19 North Street Remedial Investigation		Surface Elev.:	
Location:	19 North Street Buffalo New York		Datum:	GROUND SURFACE
Client:	23 North Street, LLC		Start Date:	9/2/16
Drilling Firm:	NYEG	Driller: John (NYEG)	Finish Date:	9/2/16
Groundwater	Depth / Date & Time	Drill Rig: geoprobe 7220	Inspector:	SH
While Drilling:		Casing: / Rock Core: / Undist:		
Before Casing Removal:		Sampler: / Other:		
After Casing Removal:		Hammer:		

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)		COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
1						Doing A2 over from 15-25ft
				See A2 log		START 1112
2						
3						
4						
5						
6				***See A2 log***		
7						
8						
9						
10						
11				***See A2 log***		
12						
13						
14						
15						
16			0-12"	***brown, fine SILT, wet trace sand, trace rock***	No PID	59" Recovered
			12-20"	***brown, fine SAND, dry to moist***		
17			20-24"	***brown, coarse SAND***		
			24-43"	***brown, fine SAND, very hard/dense***		
18			43-59"	***brown, hard SAND and GRAVEL, trace silt***		
19						
20						
21			0-19"	***clayey SILT, trace gravel***	0.4 ppm	48" Recovered
			19-27"	***brown, fine SAND, wet***	0.5 ppm	
22			27-40"	***brown, fine SAND, saturated to wet, trace silt***	0.4 ppm	***Sample:*** Time:
			40-48"	***brown, fine SAND, wet, little gravel, trace silt***	0.4 ppm	***No Samples***
23						
24						
25				***end of boring at 25 feet***		

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	A3
			Sheet 1 of:	1
			Project No.:	P67.001.002
Project Name:	19 North Street Remedial Investigation		Surface Elev.:	
Location:	19 North Street Buffalo New York		Datum:	GROUND SURFACE
Client:	23 North Street, LLC		Start Date:	8/31/16
Drilling Firm:	NYEG	Driller: John (NYEG)	Finish Date:	8/31/16
Groundwater	Depth / Date & Time	Drill Rig: geoprobe 7220	Inspector:	SH
While Drilling:	21 feet	Casing: / Rock Core: / Undist:		
Before Casing Removal:		Sampler: / Other: Well to 24 feet, screen 24 to 14 ft		
After Casing Removal:		Hammer:		

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse, m - medium, f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-12" ***topsoil***	START 930
1				12-14" ***black rock***	30" Recovered
				14-17" ***concrete fragments***	
2				17-22" ***silty SAND with trace clay***	
				22-30" ***FILL - brown, sand with black spots, brick pieces***	
3					
4					
5					
				0-18" ***red brown, clayey SILT, native***	60" Recovered
6				18-40" ***red brown CLAY***	Top of native 6 feet below grade
				40-60" ***red brown CLAY, grades to brown silty CLAY***	
7					
8					
9					
10					
				0-60" ***tan, fine SAND, clean***	60" Recovered
11					
12					
13					
14					
15					
16				***NO RECOVERY***	
17					
18					
19					
20					
				0-12" ***slug*** 77 ppm	60" Recovered
21				12-36" ***medium grain SAND, dark staining, petroleum smell*** 35 ppm	
				36-60" ***grey tan, mediun grain SAND*** 10 ppm	***Sample:*** Time:
22					***A3-5-7ft*** 1054
					DUP 1054
23					***A3-7-8ft*** 1100
					A3-8-9ft 1103
24					***A3-9-10ft*** 1107
					A3-14-15ft 1112
25				***end of boring at 25 feet***	***A3-22-23ft*** 1124

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	A4
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation							**Surface Elev.:**	
Location:	19 North Street Buffalo New York							**Datum:**	GROUND SURFACE
Client:	23 North Street, LLC							**Start Date:**	8/31/16
Drilling Firm:	NYEG			**Driller:**	John (NYEG)			**Finish Date:**	8/31/16
Groundwater	**Depth**	**Date & Time**		**Drill Rig:**	geoprobe 7220			**Inspector:**	SH
While Drilling:				**Casing:**		**Rock Core:**		**Undist:**	
Before Casing Removal:				**Sampler:**		**Other:**			
After Casing Removal:				**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%		**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-7" ***topsoil***	0.0 ppm	START 1115
1				7-18" ***FILL - dark brown, sand with brick pieces***	0.0 ppm	24" Recovered
				18-24" ***light brown, medium grain SAND, dry***	0.0 ppm	
2						
						Top of native 1 foot 6 inches below
3						grade
4						
5						
				0-16" ***dark brown, SAND with dark spots, dry***	0.0 ppm	30" Recovered
6				16-30" ***red brown, silty CLAY, tough, little moist***	0.0 ppm	
7						
8						
9						
10						
				0-2" ***slug***	0.0 ppm	55" recovered
11				2-15" ***red brown, silty CLAY, trace sand with dark spot***	0.0 ppm	
				15-38" ***red brown CLAY, tough***	0.0 ppm	
12				38-55" ***red brown, silty SAND, moist***	0.0 ppm	
13						
14						
15						
16				***end of boring at 15 feet***		
17						
18						
19						
20						
21						***Sample:*** Time:
						A4-9-10ft 1141
22						***A4-10-11ft*** 1146
						A4-11-12ft 1150
23						***A4-12-13ft*** 1154
24						
25						

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	A4
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation					Surface Elev.:	
Location:	19 North Street Buffalo New York					Datum:	GROUND SURFACE
Client:	23 North Street, LLC					Start Date:	9/2/16
Drilling Firm:	NYEG		Driller:	John (NYEG)		Finish Date:	9/2/16
Groundwater	Depth	Date & Time	Drill Rig:	geoprobe 7220		Inspector:	AD
While Drilling:			Casing:		Rock Core:	Undist:	
Before Casing Removal:			Sampler:		Other:		
After Casing Removal:			Hammer:				

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
1				START 910	
				See A4 log	70 degrees F and Sunny
2					
3					
4					
5					
6				***See A4 log***	
7					
8					
9					
10					
11				***See A4 log***	
12					
13					
14					
15					
16				0-12" ***slug***	62" Recovered
				12-31" ***brown, fine SAND, dry***	
17				31-43" ***grey, coarse SAND, moist*** headspace 2.1 - 8.9 peak	
				43-54" ***light brown, fine SAND, moist*** 2.3 peak	
18				54-62" ***grey, medium to coarse SAND, moist*** 3.2 peak	
19					
20					
21				0-8" ***grey, medium to coarse SAND*** 4.3 ppm	62" Recovered
				8-14" ***black grey, coarse SAND*** 1.4 ppm @ 18"	
22				14-21" ***silty CALY with imbedded rock*** 62 ppm @ 23"	***Sample:*** Time:
				21-32" ***wet to saturated GRAVEL and SAND*** 89 peak	***A4-23-24ft*** 945
23				32-48" ***brown, fine SAND, strong odor*** 882.4 peak	
				48-62" ***brown, fine SAND*** 4.0 ppm	
24					
25				***end of boring at 25 feet***	

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	B1
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation							**Surface Elev.:**	
Location:	19 North Street Buffalo New York							**Datum:**	GROUND SURFACE
Client:	23 North Street, LLC							**Start Date:**	9/1/16
Drilling Firm:	NYEG			**Driller:**	**John (NYEG)**			**Finish Date:**	9/1/16
Groundwater	**Depth**	**Date & Time**		**Drill Rig:**	geoprobe 7220			**Inspector:**	AD
While Drilling:				**Casing:**		**Rock Core:**		**Undist:**	
Before Casing Removal:				**Sampler:**		**Other:**			
After Casing Removal:				**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%		**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-8" ***silty clay topsoil and grass***	0.0 ppm	START 845
1				8-36" ***clay, trace SILT with some trace rock, rock @34"***	0.1 ppm	70 degrees F and Sunny
				36-38" ***red brown CLAY, moist***	0.1 ppm	37" Recovered
2						
						Top of native 8 inches below grad
3						
4						
5						
				0-18" ***red brown CLAY, trace small <0.5" rock***	0.1 ppm	62" Recovered
6				18-34" ***brown, moist SILT***	0.0 ppm	
				34-58" ***red brown, CLAY, dense, moist***	0.0 ppm	
7				58-62" ***moist silt, some CLAY***	0.0 ppm	
8						
9						
10						
				0-9" ***brown, silty CLAY, moist***	0.0 ppm	62" recovered
11				9-62" ***brown, fine SILT, moist***	0.0 ppm	
12						
13						
14						
15						
16				***end of boring at 15 feet***		
17						
18						
19						
20						
21						***Sample:*** headspace
						B1-5-6ft 2.0
22						***B1-6-7ft*** 1.3
						B1-7-8ft 2.3
23						***B1-8-9ft*** 0.2
						B1-15ft 0.5
24						
25						

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BORING LOG

Boring No.	**B2**
Sheet 1 of:	1
Project No.:	P67.001.002
Surface Elev.:	
Datum:	GROUND SURFACE
Start Date:	
Finish Date:	
Inspector:	SH

Project Name:	19 North Street Remedial Investigation
Location:	19 North Street Buffalo New York
Client:	23 North Street, LLC
Drilling Firm:	NYEG
Driller:	John (NYEG)
Drill Rig:	geoprobe 7220
Casing:	
Rock Core:	
Undist:	
Sampler:	
Other:	
Hammer:	

Groundwater	**Depth**	**Date & Time**
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine	**MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-4"	***topsoil***		126 ppm
1				4-11"	***dark brown, CLAY, clean till***		Concrete hit so moved 3 ft
				11-36"	***FILL, dark sand with gravel and brick***		east
2							38" Recovered
3							
4							
5							
				0-7"	***brown, SAND***	0.0 ppm	57" Recovered
6				7-34"	***silty SAND with some brown clay***	0.0 ppm	Top of native 6 feet below grade
				34-57"	***brown CLAY***	0.0 ppm	
7							
8							
9							
10							
				0-8"	***red brown, silty CLAY***	0.0 ppm	60" recovered
11				8-17"	***brown light, silty CLAY with sand***	0.0 ppm	
				17-60"	***brown light, silty SAND***	0.0 ppm	
12							
13							
14							
15							
16					***end of boring at 15 feet***		
17							
18							
19							
20							
21							***Sample:*** time:
							B2 surface 1408
22							***B2-4-5FT*** 1415
							B2-5-6FT 1437
23							***B2-6-7FT*** 1448
							B2-7-8FT 1455
24							***B2-8-9FT*** 1456
25							

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	B3
			Sheet 1 of:	1
			Project No.:	P67.001.002
Project Name:	19 North Street Remedial Investigation		Surface Elev.:	
Location:	19 North Street Buffalo New York		Datum:	GROUND SURFACE
Client:	23 North Street, LLC		Start Date:	8/31/16
Drilling Firm:	NYEG	Driller: John (NYEG)	Finish Date:	8/31/16
Groundwater	Depth / Date & Time	Drill Rig: geoprobe 7220	Inspector:	SH
While Drilling:		Casing:	Rock Core: / Undist:	
Before Casing Removal:		Sampler:	Other:	
After Casing Removal:		Hammer:		

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse, m - medium, f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%		**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-5" ***topsoil***	0.1 ppm	12:40
1				5-13" ***gravel, asphalt***	0.1 ppm	36" Recovered
				13-36" ***dark sandy FILL, brick, concrete and gravel***	0.1 ppm	
2						
3						
4						
5						
				0-4" ***dark sandy FILL, brick, concrete and gravel***	0.1 ppm	51" Recovered
6				4-6" ***brown coarse sand, moist, containing dark spots***	0.1 ppm	
				6-27" ***light brown silty CLAY***	0.1 ppm	
7				27-35" ***hard red-brown CLAY***	0.1 ppm	
				35-43" ***red brown silty CLAY***	0.1 ppm	
8				43-51" ***hard red-brown CLAY***	0.1 ppm	
9						
10						
				0-4" ***slug***	31 ppm	46" recovered
11				4-46" ***moist, red-brown, silty CLAY***	136 ppm	
				red-brown changes to dark brown with depth		
12				***material similar to A3***		
13						
14						
15						
16				***end of boring at 15 feet***		
17						
18						
19						
20						
21						***Sample:*** time:
						B3 UF 2-3ft 1327
22						***B3 3-5 FT*** 1330
						B3 6-7 FT 1336
23						***B3 7-8FT*** 1352
						B3 8-9 FT 1354
24						***B3-13-15 FT*** 1357
25						

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	B3 - A
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation							**Surface Elev.:**	
Location:	19 North Street Buffalo New York							**Datum:**	GROUND SURFACE
Client:	23 North Street, LLC							**Start Date:**	8/31/16
Drilling Firm:	NYEG			**Driller:**	**John (NYEG)**			**Finish Date:**	8/31/16
Groundwater	**Depth**	**Date & Time**		**Drill Rig:**	geoprobe 7220			**Inspector:**	SH
While Drilling:				***Casing:***		***Rock Core:***		***Undist:***	
Before Casing Removal:				***Sampler:***		***Other:***			
After Casing Removal:				***Hammer:***					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-3" ***topsoil***	0.0 ppm	START 1342
1				3-10" ***FILL - dark sand with clay concrete***	0.0 ppm	15" Recovered
				10-14" ***coal pieces***		
2				14-15" ***FILL - crushed concrete subbase***	0.4 ppm	
3						
4						
5						
				0-22" ***red brown, silty SAND with trace clay***	0.0 ppm	60" Recovered
6				22-37" ***red brown, silty CLAY, dense***	0.0 ppm	Top of native 6 feet below grade
				37-60" ***fine, sandy SILT, trace rounded gravel***	0.0 ppm	
7						
8						
9						
10						
				0-3" ***slug***	0.6 ppm	58" recovered
11				3-12" ***red brown, SILT***	0.0 ppm	
				12-58" ***tan, fine SAND, clean***	0.0 ppm	
12						
13						
14						
15						
				0-12" ***slug***		52" Recovered
16				12-18" ***tan, fine SAND***	0.0 ppm	
				18-40" ***clayey SILT with trace gravel, gray @19 ft***	0.0 ppm	
17				40-52" ***gray, fine SAND, slight petroleum smell***	112 ppm	
18						
19						
20						
				0-10" ***slug***		53" Recovered
21				10-42" ***grey SAND, trace gravel, petroleum odor smells***	1179 ppm - 135.1 headspace	
				42-53" ***light brown, fine to medium SAND, trace gravel, water saturated***		***Sample:*** Time:
22				***at 22-23 ft***		***B3-A-22-23ft*** 1426
	S-1					
23						
24						
25				***end of boring at 25 feet***		

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	B4
			Sheet 1 of:	1
			Project No.:	P67.001.002
Project Name:	19 North Street Remedial Investigation		Surface Elev.:	
Location:	19 North Street Buffalo New York		Datum:	GROUND SURFACE
Client:	23 North Street, LLC		Start Date:	8/30/16
Drilling Firm:	NYEG	Driller: John (NYEG)	Finish Date:	8/30/16
Groundwater	Depth / Date & Time	Drill Rig: geoprobe 7220	Inspector:	SH
While Drilling:	26 ft	Casing: / Rock Core: / Undist:		
Before Casing Removal:		Sampler: / Other:		
After Casing Removal:		Hammer:		

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"		MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%)		COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				1-8"	***topsoil***	0.0 ppm	START 1048
1				8-12"	***FILL - dark sand with pieces of wood, trace glass, brick,***	0.0 ppm	36" Recovered
					and concrete		
2				12-36"	***FILL - dark brown, medium grain silty sand, dry***	0.0 ppm	
3							
4							
5							
				0-12"	***FILL - dark brown, sand with rock chunk, brick and gravel,***	0.0 ppm	23" Recovered
6					***moist***		
				12-23"	***brown, silty CLAY***	0.0 ppm	Top of native 7 feet below grade
7							
8							
9							
10							
				0-12"	***dark brown, silty CLAY, moist***	0.0 ppm	45" Recovered
11				12-18"	***dark brown, silty CLAY***	0.0 ppm	
				18-45"	***red brown, CLAY, hard, moist***	0.0 ppm	
12							
13							
14							
15							
				0-8"	***red brown, CLAY***	0.0 ppm	58" Recovered
16				8-58"	***light brown, silty SAND***	0.0 ppm	
17							
18							
19							
20							
21					***end of boring at 20 feet***		***Sample:***
22							***B4-9-10FT***
							B4-10-11
23							***MSMSD***
							B4-12-14.5
24							***B4-14.5-15.5***
							B4-15.5-16.5
25							

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			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation						**Surface Elev.:**		
Location:	19 North Street Buffalo New York						**Datum:**	GROUND SURFACE	
Client:	23 North Street, LLC						**Start Date:**	8/31/16	
Drilling Firm:	NYEG			**Driller:**	John (NYEG)		**Finish Date:**	8/31/16	
Groundwater	**Depth**	**Date & Time**		**Drill Rig:**	geoprobe 7220		**Inspector:**	SH	
While Drilling:				**Casing:**		**Rock Core:**		**Undist:**	
Before Casing Removal:				**Sampler:**		**Other:**			
After Casing Removal:				**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-12" ***topsoil*** 0.0 ppm	START 817
1				12-24" ***FILL - dark sand with brick and concrete*** 0.0 ppm	Refusal at 6 ft, moved
				24-41" ***FILL - red brown sand with dark spots, brick***	east 3.7 ft
2					After concrete, tube went
					down easily, potential void
3					in surface
					Refusal at 6 ft, moved 3 ft
4					south
					41" Recovered
5					
				0-29" ***FILL with brick concrete, dark sand***	60" Recovered
6				29-38" ***light brown, fine SAND, dry***	Top of native 8 feet 5 inches
				38-60" ***red brown, silty SAND***	below grade
7					
8					
9					
10					
				0-18" ***fine SAND, coarse to fine grain***	50" Recovered
11				18-50" ***light brown, fine SAND, wet***	
12					
13					
14					
15					
16				***end of boring at 15 feet***	
17					
18					
19					
20					
21					***Sample:*** Time:
					C1 Surface 823
22					***C1-3-4ft*** 900
					C1-3-4ft Hex 911
23					***C1-8-9ft*** 900
					C1-9-10ft 901
24					***C1-10-11ft*** 905
					C1-11-12ft 908
25					

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	C2
			Sheet 1 of:	1
			Project No.:	P67.001.002
Project Name:	19 North Street Remedial Investigation		Surface Elev.:	
Location:	19 North Street Buffalo New York		Datum:	GROUND SURFACE
Client:	23 North Street, LLC		Start Date:	9/1/16
Drilling Firm:	NYEG	Driller: John (NYEG)	Finish Date:	9/1/16
Groundwater	Depth / Date & Time	Drill Rig: geoprobe 7220	Inspector:	AD
While Drilling:		Casing:	Rock Core:	Undist:
Before Casing Removal:		Sampler:	Other:	
After Casing Removal:		Hammer:		

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse, m - medium, f - fine	MATERIAL DESCRIPTION (S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-10"	***topsoil and grass***	0.1 ppm	START 915
1				10-51"	***FILL - clay and trace silt, rock, coarse sand***	0.0 ppm	52" Recovered
				51-52"	***FILL - stained material, silt, brick, and coal***	0.0 ppm	
2							
3							
4							
5							
				0-5"	***beds of light brown fine SAND and dark brown silty CLAY***	0.1 ppm	62" Recovered
6				5-22"	***grey, rock, coarse SAND***	0.0 ppm	
				22-45"	***brown CLAY, dense***	0.0 ppm	
7				45-62"	***light brown and red brown, SILT***	0.0 ppm	
8							
9							
10							
				0-5"	***brown, CLAY, dense***	0.1 ppm	57" Recovered
11				5-38"	***grey, crushed stone and concrete with SILT, moist***		Possible building foundation
				38-57"	***brown, fine SAND***	0.1 ppm	
12							
13							
14							
15							
				0-5"	***slug***	0.0 ppm	62" Recovered
16				5-13"	***light brown, SILT, moist***	0.1 ppm	
				13-38"	***light brown, SAND, saturated***	0.1 ppm	
17				38-62"	***light brown, SAND with rounded stones, moist***	0.1 ppm	
18							
19							
20							
				0-18"	***brown, SILT, saturated***	0.1 ppm	62" Recovered
21				18-39"	***SILT, brown, saturated***	0.0 ppm	
				39-62"	***brown, CLAY, dense***	0.0 ppm	***Sample:*** headspace
22							***C2-WC*** 2.0
							(comp from 3-12)
23							***C2-13-14.5ft*** 1.7
							(+MS/MSD)
24							***C2-14.5-15.5ft*** 1.4
							C2-15.5-16.5ft 1.7
25					***end of boring at 25 feet***		***C2-16.5-17.5ft*** 1.5

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	C3
			Sheet 1 of:	1
			Project No.:	P67.001.002
Project Name:	19 North Street Remedial Investigation		Surface Elev.:	
Location:	19 North Street Buffalo New York		Datum:	GROUND SURFACE
Client:	23 North Street, LLC		Start Date:	
Drilling Firm:	NYEG	Driller: John (NYEG)	Finish Date:	
Groundwater	Depth / Date & Time	Drill Rig: geoprobe 7220	Inspector:	
While Drilling:		Casing: / Rock Core: / Undist:		
Before Casing Removal:		Sampler: / Other:		
After Casing Removal:		Hammer:		

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse, m - medium, f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%		**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-6"	***topsoil*** 0.0 ppm	START 1220
1				6-14"	***FILL - gravel subbase, brick concrete*** 0.1 ppm	29" Recovered
				14-29"	***FILL - dark coarse sand with black spots, moist*** 0.0 ppm	
2						
3						
4						
5						
				0-6"	***FILL - brown coarse sand with concrete pieces*** 0.0 ppm	45" Recovered
6				6-7"	***gravel*** 0.0 ppm	
				7-12"	***FILL - dark coarse sand with some clay, glass, concrete, and*** 0.0 ppm	Top of native 7 feet below grade
7					***dark spots***	
				12-15"	***red brown, sandy CLAY*** 0.0 ppm	
8				15-26"	***red brown, CLAY, dense*** 0.0 ppm	
				26-28"	***red brown, silty SAND*** 0.0 ppm	
9				28-33"	***red brown, CLAY, tough*** 0.0 ppm	
				33-40"	***red brown, silty SAND, wet*** 0.0 ppm	
10				40-45"	***red brown, CLAY*** 0.0 ppm	
				0-6"	***slug*** 0.0 ppm	50" Recovered
11				6-15"	***red brown, CLAY*** 0.0 ppm	
				15-21"	***silty CLAY with sand, moist*** 0.0 ppm	
12				21-50"	***light brown, medium grain SAND, moist*** 0.0 ppm	
13						
14						
15						
16					***end of boring at 15 feet***	
17						
18						
19						
20						
21						
						Sample:
22						***C3-9-10FT***
						C3-10.5-11.5
23						***C3-12.5-13.5***
						C3-14-15
24						
25						

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	C3-A
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation						Surface Elev.:	
Location:	19 North Street Buffalo New York						Datum:	GROUND SURFACE
Client:	23 North Street, LLC						Start Date:	
Drilling Firm:	NYEG		Driller:	John (NYEG)			Finish Date:	
Groundwater	Depth	Date & Time	Drill Rig:	geoprobe 7220			Inspector:	
While Drilling:			Casing:		Rock Core:		Undist:	
Before Casing Removal:			Sampler:		Other:			
After Casing Removal:			Hammer:					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
1				***See C3 log***	
2					
3					
4					
5					
6				***See C3 log***	
7					
8					
9					
10					
11				***See C3 log***	
12					
13					
14					
15					
16				0-60" ***brown, fine SAND, trace silt, wet*** peak 0.4 ppm	62" Recovered
				60-62" ***brown, fine SAND, some silt*** peak 0.4 ppm	
17				***(Water Saturated 32-59")***	
18					
19					
20					
21				0-12" ***light brown, clayey SAND, wet*** peak 0.4 ppm	62" Recovered
				12-24" ***clayey SAND***	
22				24-30" ***clayey SAND with rock*** peak 0.4 ppm	***Sample:*** Time:
				30-40" ***red brown, medium SAND***	***No Samples***
23				40-55" ***coarse SAND, some to little clay*** peak 0.4 ppm	
				55-62" ***brown, CLAY, hard*** peak 0.4 ppm	***No odors***
24					
25				***end of boring at 25 feet***	

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	C4
			Sheet 1 of:	1
			Project No.:	P67.001.002
Project Name:	19 North Street Remedial Investigation		Surface Elev.:	
Location:	19 North Street Buffalo New York		Datum:	GROUND SURFACE
Client:	23 North Street, LLC		Start Date:	8/30/16
Drilling Firm:	NYEG	Driller: John (NYEG)	Finish Date:	8/30/16
Groundwater	Depth / Date & Time	Drill Rig: geoprobe 7220	Inspector:	
While Drilling:	22 feet / 8/30 @ 845am	Casing:	Rock Core:	Undist:
Before Casing Removal:		Sampler:	Other: well bottom -24 ft, sand to 12 ft. benonite -	
After Casing Removal:		Hammer:	10 ft to surface	

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse, m - medium, f - fine	MATERIAL DESCRIPTION (S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%)		COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-10"	***asphalt, gravel subbase***	0.0 ppm	START 746
1				10-25"	***FILL - dark sand with black spots, medium grain, some brick***	0.0 ppm	25" Recovered
					and concrete pieces		
2							
3							
4							
5							
				0-17"	***FILL - brick, concrete gravel***	0.0 ppm	46" Recovered
6				17-20"	***FILL - concrete rubble***	0.0 ppm	
				20-28"	***red brown, silty SAND, moist***	0.0 ppm	
7				28-36"	***red brown, silty SAND with trace clay***	0.0 ppm	
				36-46"	***red brown, silty CLAY moist***	0.0 ppm	
8							
9							
10							
				0-8"	***slug***	0.0 ppm	52" Recovered
11				8-18"	***red brown, silty SAND with some concrete, brick***	0.0 ppm	
				18-52"	***red brown, silty SAND, little moist***	0.0 ppm	
12							
13							
14							
15							
				0-8"	***dark brown, medium grain SAND with trace concrete***	0.0 ppm	60" Recovered
16					***and brick***		
				8-13"	***red brown silty SAND***	0.0 ppm	
17				13-20"	***sandy CLAY***	0.0 ppm	
				20-41"	***medium grain SAND with some concrete, brick, and gravel***	0.0 ppm	
18				41-60"	***light brown, medium grain SAND, some brick***	0.0 ppm	
19							
20							
				0-10"	***medium grain, dark SAND with brick and concrete, dry***	0.0 ppm	58" Recovered
21				10-58"	***light brown, medium grain SAND, wet***	0.0 ppm	
					water at 22 ft		***Sample:*** Time:
22	↓						***C4-5-7ft***
							C4-5-7ft Hex
23							***C4-7-8ft***
							C4-8-9ft
24							***C4-9-10ft***
25					***end of boring at 25 feet***		

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	C4-A
			Sheet 1 of:	1
			Project No.:	P67.001.002
Project Name:	19 North Street Remedial Investigation		Surface Elev.:	
Location:	19 North Street Buffalo New York		Datum:	GROUND SURFACE
Client:	23 North Street, LLC		Start Date:	9/2/16
Drilling Firm:	NYEG	Driller: John (NYEG)	Finish Date:	9/2/16
Groundwater	Depth / Date & Time	Drill Rig: geoprobe 7220	Inspector:	
While Drilling:	22 feet / 8/30 @ 845am	Casing:	Rock Core:	Undist:
Before Casing Removal:		Sampler:	Other: well bottom -24 ft, sand to 12 ft. benonite -	
After Casing Removal:		Hammer:	10 ft to surface	

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%		**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
						START 945
1						
				See C4 log		
2						
3						
4						
5						
6						
				See C4 log		
7						
8						
9						
10						
11						
12				***See C4 log***		
13						
14						
15						
			0-22"	***brown, fine SILT, moist, trace rock***	1.1 ppm	
16			22-28"	***brown grey, GRAVEL and SAND, wet***	2.0 ppm	
			28-32"	***brown CLAY***		
17			32-62"	***brown and red brown SAND, coarse to medium grain***	0.4 ppm	
18						
19						
20						
			0-12"	***brown, GRAVEL and fine SAND, wet, very slight odor***	0.4 ppm	
21			12-16"	***brown, fine SAND, saturated***	0.1 ppm	
			16-36"	***brown, medium to fine SAND, wet***	0.1 ppm	***Sample:*** Time:
22			36-40"	***brown, coarse SAND, wet***	0.3 ppm	***No Samples***
			40-60"	***brown, fine SAND and SILT, moist***	0.3 ppm	
23			60-62"	***brown, varve CLAY***	0.4 ppm	
24						
25				***end of boring at 25 feet***		

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	D1
			Sheet 1 of:	1
			Project No.:	P67.001.002
Project Name:	19 North Street Remedial Investigation		Surface Elev.:	
Location:	19 North Street Buffalo New York		Datum:	GROUND SURFACE
Client:	23 North Street, LLC		Start Date:	
Drilling Firm:	NYEG	Driller: John (NYEG)	Finish Date:	
Groundwater	Depth / Date & Time	Drill Rig: geoprobe 7220	Inspector:	
While Drilling:		Casing: / Rock Core: / Undist:		
Before Casing Removal:		Sampler: / Other:		
After Casing Removal:		Hammer:		

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-5" ***topsoil and grass***	START 1030
1				5-19" ***FILL- CLAY, brown, moist, imbedded rock piece***	20" Recovered
				19-20" ***FILL - SILT, brown, moist***	
2					
3					
4					
5					
				0-19" ***FILL - clay with rock, brick, woody debris, root***	56" Recovered
6				19-26" ***red silt and brown grey CLAY***	Top of native soil 7 feet 7 inches
				26-39" ***red yellow brown, SILT, saturated and wet***	below grade
7				39-52" ***red brown, CLAY, dense***	
				52-56" ***brown SILT***	
8					
9					
10					
				0-7" ***brown SILT with rock, wet***	62" Recovered
11				7-60" ***light brown, fine SAND, trace rock, moist***	
				60-62" ***brown grey, SAND and rock, dry***	
12					
13					
14					
15					
				0-1" ***slug***	62" Recovered
16				1-9" ***brown, medium grain SAND and GRAVEL***	
				9-14" ***red brown CLAY***	
17				14-15" ***multicolor, coarse SAND***	
				15-21" ***brown, fine SAND***	
18				21-45" ***brown, fine to medium SAND and rock, moist***	
				45-62" ***brown, fine SAND, moist to wet***	
19					
20					
				0-11" ***brown and red, coarse to medium grain SAND, wet***	62" Recovered
21				11-62" ***varve CLAY***	headspace / ***Sample:*** / Time:
					2.2 / ***D1-9.5-11.5ft*** / 1117
22					***Hex + MS/MSD***
					2.0 / ***D1-11.5-12.5ft*** / 1121
23					1.9 / ***D1-12.5-13.5ft*** / 1123
					2.2 / ***D1-13.5-14.5ft*** / 1125
24					0.8 / ***D1-15-16ft*** / 1126
					MW
25				***end of boring at 25 feet***	

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	D2
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation						Surface Elev.:		
Location:	19 North Street Buffalo New York						Datum:	GROUND SURFACE	
Client:	23 North Street, LLC						Start Date:		
Drilling Firm:	NYEG		Driller:	John (NYEG)			Finish Date:		
Groundwater	Depth	Date & Time	Drill Rig:	geoprobe 7220			Inspector:		
While Drilling:			Casing:		Rock Core:		Undist:		
Before Casing Removal:			Sampler:		Other:				
After Casing Removal:			Hammer:						

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-24" ***FILL - dark brown, soil, some rocks***	0.1 ppm	START 1410
1				24-34" ***FILL - dark brown clay***	0.1 ppm	36" Recovered
				34-36" ***FILL - gravel and concrete***	0.1 ppm	
2						
3						
4						
5						
				0-10" ***FILL - concrete and gravel***	0.0 ppm	45" Recovered
6				10-23" ***brown, medium grain SAND with clay***	0.1 ppm	Top of native soil 5 feet 10 inches
				23-45" ***light brown, medium grain SAND***	0.1 ppm	below grade
7						
8						
9						
10						
				0-9" ***slug, brown, silty sand, dry***	0.0 ppm	57" Recovered
11				9-12" ***slug, gravel and concrete***	0.0 ppm	
				red brown, medium grain, silty SAND	0.0 ppm	
12				12-57" ***light brown, medium grain SAND with some silt***	0.0 ppm	
13						
14						
15						
16				***end of boring at 15 feet***		
17						
18						
19						
20						
21						
22						***Sample:*** Time:
						D2 SURFACE
						D2-0-2 FT
23						***D2-10-11FT***
						D2-11-12FT
24						***D2-12-13FT***
						D2-13-14FT
25						

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	D3
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation						Surface Elev.:	
Location:	19 North Street Buffalo New York						Datum:	GROUND SURFACE
Client:	23 North Street, LLC						Start Date:	
Drilling Firm:	NYEG		Driller:	John (NYEG)			Finish Date:	
Groundwater	Depth	Date & Time	Drill Rig:	geoprobe 7220			Inspector:	
While Drilling:			Casing:		Rock Core:		Undist:	
Before Casing Removal:			Sampler:		Other:			
After Casing Removal:			Hammer:					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%		**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-4" ***topsoil***	0.0 ppm	START 1200
1				4-9" ***FILL - gravel subbase***	0.0 ppm	17" Recovered
				9-17" ***FILL - gravel, brick, concrete chunks***	0.0 ppm	
2						
3						
4						
5						
				0-6" ***FILL - brick, concrete, and gravel***	0.0 ppm	39" Recovered
6				6-22" ***lighter brown, medium grain silty SAND, wet***	0.0 ppm	Top of native 5 feet 6 inches
				22-27" ***red brown, silty CLAY, dense***	0.0 ppm	below grade
7				27-39" ***lighter brown, medium grain SAND, wet***	0.0 ppm	
8						
9						
10						
				0-58" ***light brown, medium grained SAND, wet***	0.0 ppm	58" Recovered
11				***(wettest 0-1 ft)***	0.0 ppm	
12						
13						
14						
15						
16				***end of boring at 15 feet***		
17						
18						
19						
20						
21						
						Sample: Time:
22						***D3-5.5-7.5***
						DUP
23						***D3-7.5-9.5***
						D3-10.5-11.5
24						
25						

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	**Boring No.**	**D4**
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation					**Surface Elev.:**	
Location:	19 North Street Buffalo New York					**Datum:**	GROUND SURFACE
Client:	23 North Street, LLC					**Start Date:**	8/29/16
Drilling Firm:	NYEG		**Driller:**	**John (NYEG)**		**Finish Date:**	8/29/16
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	geoprobe 7220		**Inspector:**	
While Drilling:			**Casing:**		**Rock Core:**	**Undist:**	
Before Casing Removal:			**Sampler:**		**Other:**		
After Casing Removal:			**Hammer:**				

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%		**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-12" ***asphalt, gravel subbase***	0.3 ppm	START 1451
1				12-29" ***FILL - dark, medium grained sand with spots of dark trace silt***	0.1 ppm	29" Recovered
2						
3						
4						
5						
				0-9" ***FILL - medium grain sand, dry***		34" Recovered
6				9-11" ***gravel FILL***		Top of native 5 feet 9 inches
				11-24" ***brown, silty SAND, dry***		below grade
7				24-29" ***brown, SAND with some clay, moist***		
				29-34" ***red brown, CLAY, moist***		
8						
9						
10						
				1-12" ***brown, silty SAND, medium grained, moist***	0.0 ppm	49" Recovered
11				12-49" ***red brown, sandy SILT, moist***	0.0 ppm	
12						
13						
14						
15						
16				***end of boring at 15 feet***		
17						
18						
19						
20						
21						
22						***Sample:*** Time: ***D4-8-9ft***
23						***D4-Hex-8-9ft*** ***D4-9-10ft***
24						***D4-10-11ft*** ***D4-15ft***
25						

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	E1
			Sheet 1 of:	1
			Project No.:	P67.001.002
Project Name:	19 North Street Remedial Investigation		Surface Elev.:	
Location:	19 North Street Buffalo New York		Datum:	GROUND SURFACE
Client:	23 North Street, LLC		Start Date:	8/30/16
Drilling Firm:	NYEG	Driller: John (NYEG)	Finish Date:	8/30/16
Groundwater	Depth / Date & Time	Drill Rig: geoprobe 7220	Inspector:	
While Drilling:		Casing: / Rock Core: / Undist:		
Before Casing Removal:		Sampler: / Other:		
After Casing Removal:		Hammer:		

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-18" ***Topsoil - light brown soil, sandy***	START 1435
1				18-19" ***FILL - rock pieces and gravel***	29" Recovered
				19-29" ***FILL - mix of sand silt and clay, brown, moist, some imbedded rock pieces***	
2					
3					
4					
5					
				0-10" ***slug, gravel and rock***	48" Recovered
6				10-26" ***dark brown, medium grained SAND***	Top of native soil 5 feet below gra
				26-48" ***light brown, medium grained SAND with silt***	
7					
8					
9					
10					
				0-7" ***slug, gravel, rocks, and concrete***	46" Recovered
11				7-46" ***light brown, silty SAND***	
12					
13					
14					
15					
				0-8" ***light brown, silty SAND with trace clay***	48" Recovered
16				8-18" ***light colored, coarse SAND with rock***	
				15-48" ***silty SAND, coarse, wet***	
17					
18					
19					
20					
21				***end of boring at 20 feet***	
22					***Sample:*** Time:
					E1 SURFACE
23					***E1-1-2.5FT***
					E1-11-12 FT
24					***E1-12-13 FT***
					E1-13-14FT
25					***E1-14-15FT***

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	E2
			Sheet 1 of:	1
			Project No.:	P67.001.002
Project Name:	19 North Street Remedial Investigation		Surface Elev.:	
Location:	19 North Street Buffalo New York		Datum:	GROUND SURFACE
Client:	23 North Street, LLC		Start Date:	9/1/16
Drilling Firm:	NYEG	Driller: John (NYEG)	Finish Date:	9/1/16
Groundwater	Depth / Date & Time	Drill Rig: geoprobe 7220	Inspector:	AD
While Drilling:		Casing: / Rock Core: / Undist:		
Before Casing Removal:		Sampler: / Other:		
After Casing Removal:		Hammer:		

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%		**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-62" ***FILL - dark brown clay with rock and trace tree pieces***	0.1 ppm	START 1345
1				***with dark clay near them***		80 degrees F and Sunny
						62" Recovered
2						
3						
4						
5						
				0-8" ***FILL - light brown, clay with rock***	0.1 ppm	50" Recovered
6				8-16" ***FILL - gravel, crushed stone, trace brick, some coarse sand***	0.1 ppm	
				16-29" ***brown, fine silty SAND***	0.1 ppm	
7				29-34" ***dark brown, silty SAND***	0.1 ppm	
				34-50" ***light brown, fine SAND, moist***	0.1 ppm	
8						
9						
10						
				0-12" ***light brown, silty SAND***	0 ppm	
11				12-50" ***light brown, medium grain SAND with some silt***	0 ppm	50" recovered
12						
13						
14						
15						
16				***end of boring at 15 feet***		
17						
18						
19						
20						
21					headspace	***Sample:*** Time:
					0.5	***E2-5-6.5ft*** 1412
22					1.1	***E2-9-10ft*** 1416
					1.4	***E2-10-11ft*** 1418
23					0.8	***E2-11-12ft*** 1419
					1.0	***E2-12-13ft*** 1423
24					0.8	***E2-14-15ft (+Hex)*** 1425
25						

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	E3
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation					Surface Elev.:	
Location:	19 North Street Buffalo New York					Datum:	GROUND SURFACE
Client:	23 North Street, LLC					Start Date:	8/29/16
Drilling Firm:	NYEG		Driller:	John (NYEG)		Finish Date:	8/29/16
Groundwater	Depth	Date & Time	Drill Rig:	geoprobe 7220		Inspector:	SH
While Drilling:			Casing:	5 ft liner	Rock Core:	Undist:	
Before Casing Removal:			Sampler:		Other:		
After Casing Removal:			Hammer:				

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%		**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-10" ***asphalt and gravel subbase***	0.1 ppm	START 1320
1				10-28" ***URBAN FILL, brick and concrete***	0.1 ppm	30" Recovered
				28-30" ***yellow, SAND, dry material***	0.1 ppm	
2						
3						
4						
5						
				1-13" ***brick, concrete***	0.1 ppm	28" Recovered
6				13-28" ***brown, fine silty sand, little moist***	0.0 ppm	
7						
8						
9						
10						
				0-12" ***brick and concrete***		56" Recovered
11				12-18" ***brown, silty CLAY***		
				18-22" ***brick pieces***		possible building foundation
12				22-42" ***red brown, silty SAND, trace clay***		
				42-56" ***brown, fine SAND, dry***		
13						
14						
15						
				0-16" ***slug***		57" Recovered
16				16-57" ***brown, medium grained SAND, wet***		
17						
18						
19						
20						
21				***end of boring at 20 feet***		
22						***Sample:*** Time: ***E3-12-13ft***
23						***E3-13-14ft*** ***E3-14-15ft*** ***E3-15-16ft***
24						
25						

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	E4
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation						**Surface Elev.:**	
Location:	19 North Street Buffalo New York						**Datum:**	GROUND SURFACE
Client:	23 North Street, LLC						**Start Date:**	8/29/16
Drilling Firm:	NYEG		**Driller:**	John (NYEG)			**Finish Date:**	8/29/16
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	geoprobe 7220			**Inspector:**	
While Drilling:			**Casing:**	5 ft liner	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**		**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%		**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-11" ***asphalt and gravel***	0.2 ppm	START 1412
1				11-16" ***red brown, silty SAND, dry***	0.1 ppm	30" Recovered
				16-30" ***brown, sandy SILT***	0.1 ppm	
2						Top of native soil 11 inches below grade
3						
4						
5						
				0-4" ***slug***	0.1 ppm	42" Recovered
6				4-11" ***brown, medium grained, SAND, dry***	0.1 ppm	
				11-21" ***dark brown, silty SAND, moist***	0.1 ppm	
7				21-36" ***lighter brown, silty SAND***	0.1 ppm	
				36-42" ***red brown, CLAY, moist***	0.1 ppm	
8						
9						
10						
				0-10" ***slug***	0.3 ppm	32" Recovered
11				10-28" ***red brown, sandy SILT, moist***	0.1 ppm	
				28-32" ***red brown, CLAY, moist***	0.0 ppm	
12						
13						
14						
15						
16				***end of boring at 15 feet***		
17						
18						
19						
20						
21						
						Sample: Time:
22						***E4-1-2ft***
						E4-2-3ft
23						***E4-5.5-6.5ft***
						E4-6.5-7.5ft
24						
25						

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	F1
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation						Surface Elev.:	
Location:	19 North Street Buffalo New York						Datum:	GROUND SURFACE
Client:	23 North Street, LLC						Start Date:	
Drilling Firm:	NYEG		Driller:	John (NYEG)			Finish Date:	
Groundwater	Depth	Date & Time	Drill Rig:	geoprobe 7220			Inspector:	
While Drilling:			Casing:	5 ft liner	Rock Core:		Undist:	
Before Casing Removal:			Sampler:		Other:			
After Casing Removal:			Hammer:					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%		**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-10" ***topsoil and grass***	0.1 ppm	START 1430
1				10-54" ***FILL - medium grain sand, brown, with rock and trace brick, moist***	0.0 ppm	80 degrees F
						54" Recovered
2						
3						
4						
5						
				0-16" ***FILL - medium sand, brown with rock pieces and trace brick pieces***	0.1 ppm	62" Recovered
6				16-45" ***dark brown, fine SAND and SILT, dry***	0.0 ppm	Top of native soil 6 feet 4 inches
				45-52" ***red brown, CLAY, dense***	0.0 ppm	below grade
7				52-62" ***brown, SILT, dry to moist***	0.1 ppm	
8						
9						
10						
				0-1" ***slug***	0.0 ppm	62" Recovered
11				1-62" ***red brown, fine SILT***	0.0 ppm	
12						
13						
14						
15						
16				***end of boring at 15 feet***		
17						
18						
19						
20						
21						
						Sample: headspace
22						***F1-3-5ft (+Hex)*** 0.3
						F1-9-10ft (+Hex) 1.5
23						***F1-10-11ft*** 1.5
						F1-11-12ft 1.4
24						***F1-12-13ft*** 0.4
						F1-15ft 0.4
25						

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BORING LOG

Boring No.	**F2**
Sheet 1 of:	1
Project No.:	P67.001.002
Surface Elev.:	
Datum:	GROUND SURFACE
Start Date:	9/1/16
Finish Date:	9/1/16
Inspector:	

Project Name:	19 North Street Remedial Investigation							
Location:	19 North Street Buffalo New York							
Client:	23 North Street, LLC							
Drilling Firm:	NYEG		**Driller:**	**John (NYEG)**				
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	geoprobe 7220				
While Drilling:			**Casing:**	5 ft liner	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**		**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"		MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%)		COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-5"	***topsoil***	0.0 ppm	START 1500
1				5-28"	***FILL - brown, medium sand with rock pieces***	0.1 ppm	28" Recovered
2							
3							
4							
5							
				0-5"	***red brown, fine SAND and SILT***	0.1 ppm	62" Recovered
6				5-62"	***brown, fine to medium grained SAND, wet to saturated***	0.1 ppm	
7					***coarse, wet sand @ 62"***		
8							
9							
10							
				0-16"	***brown, medium sand with rock pieces***	0.1 ppm	45" Recovered
11				16-29"	***dense, hard CLAY***	0.1 ppm	
12				29-45"	***red brown, fine SAND and SILT***	0.1 ppm	
13							
14							
15							
				0-5"	***red brown, silty SAND, trace clay***	0.1 ppm	40" Recovered
16				5-40"	***red brown, silty SAND, moist***	0.0 ppm	
17							
18							
19							
20							
				0-24"	***brown, coarse SAND, wet***	0.0 ppm	62" Recovered
21				24-62"	***hard, dense CLAY***	0.1 ppm	
22							***Sample:*** headspace
23							***F2-4-6ft*** 0.7 ***F2-9-10ft(+ Hex)*** 0.8 ***F2-10-11ft*** 0.8 ***F2-11-12ft*** 1.6
24							***F2-12-13ft*** 0.8
25					***end of boring at 25 feet***		

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	F3
			Sheet 1 of:	1
			Project No.:	P67.001.002

Project Name:	19 North Street Remedial Investigation						**Surface Elev.:**	
Location:	19 North Street Buffalo New York						**Datum:**	GROUND SURFACE
Client:	23 North Street, LLC						**Start Date:**	8/29/16
Drilling Firm:	NYEG		**Driller:**	John (NYEG)			**Finish Date:**	8/29/16
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	geoprobe 7220			**Inspector:**	NW
While Drilling:			**Casing:**	5 ft liner	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**		**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%		**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-4" ***blacktop***	0.1 ppm	START 1240
1				4"-8" ***crushed stone***		33" Recovered
				8"-60" ***red brown, very fine SAND, silt, and a little clay, damp***		Top of native soil 8 inches below
2						grade
3						
4						
5						
				5'-7' ***red brown, CLAY, some silt, very fine sand, damp***	0.1 ppm	37" Recovered
6				7'-10' ***red brown, very fine SAND and SILT, little clay, damp***	0.5 ppm	
7						
8						
9						
10						
				10'-16' ***red brown, very fine SAND and SILT, little clay, damp***	0.1 ppm	34" Recovered
11						
12						
13						
14						
15						
				15'-16' ***medium brown, fine SAND, some silt, moist***	0.1 ppm	
16						
17				***end of boring at 16 feet***		
18						
19						
20						
21						
22						***Sample:*** Time: ***F3-0.5-1FT*** ***F3-1-2.5 FT***
23						***F3-3.5-4.5FT*** ***F3-5.5-6.5 FT***
24						***F3-15FT***
25						

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**BORING LOG**	Boring No.	F4
			Sheet 1 of:	1
			Project No.:	P67.001.002
Project Name:	19 North Street Remedial Investigation		Surface Elev.:	
Location:	19 North Street Buffalo New York		Datum:	GROUND SURFACE
Client:	23 North Street, LLC		Start Date:	8/29/16
Drilling Firm:	NYEG	Driller: John (NYEG)	Finish Date:	8/29/16
Groundwater	Depth / Date & Time	Drill Rig: geoprobe 7220	Inspector:	NW
While Drilling:		Casing: 5 ft liner / Rock Core:	Undist:	
Before Casing Removal:		Sampler: / Other:		
After Casing Removal:		Hammer:		

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse, m - medium, f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				4" ***blacktop***	START 1210
1				4.5" - 8.5' ***crushed stone*** 0.3 ppm	28" Recovered
				8.5"-28" ***red brown, very fine SAND and SILT, little clay, damp*** 1.1 ppm	
2					Top of native soil 8.5 inches below grade
3					
4					
5					
				18" ***red brown, very fine SAND and SILT, moist to wet***	34" Recovered
6				18"-24" ***red brown, CLAY, moist***	
				24-34" ***red brown, very fine SAND and SILT, trace clay***	
7					
8					
9					
10					
				0"-47" ***red brown, very fine SAND and SILT, trace clay, moist to***	47" Recovered
11				***saturated***	
12					
13					
14					
15					
16				***end of boring at 15 feet***	
17					
18					
19					
20					
21					
22					***Sample:*** Time: ***F4-0.5-1FT***
23					***F4-1-2.5*** ***F4-3.5-4.5***
24					***F4-5.5-7.0***
25					

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BORING LOG
GENERAL INFORMATION & KEY

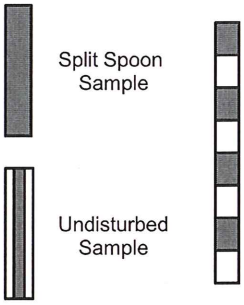
Casing, Sampling and Other Equipment

H.S.A: Hollow Stem Auger (record I.D.)
S.S.A: Solid Stem Auger (record O.D.)
Steel: Hollow Steel Flush Joint Casing (recorded I.D.)
Open: Open Hole / No Casing (record I.D.)
S.S.: Split Spoon (record I.D.)
Hammer: Auto - Automatic, Manual - Manual (rope & cat-head)
Undist: Tube - Shelby, Oste - Osteberg (record I.D. & length)

Rock Cores

	Standard I.D.	Wire Line I.D.
EW / EX	1-13/32"	-- --
AW / AX	1-25/32"	AQ 1-1/8"
BW / BX	2-7/32"	BQ 1-1/2"
NW / NX	2-27/32"	NQ 1-31/32"
HW / HX	2-25/32"	HQ 2-5/8"

Symbol Legend & Abbreviations



Abbreviations

W.O.R. - Weight of Rods
W.O.H. - Weight of Rods & Hammer
N - Standard Penetration Test N-value
N.W.E. - No Water Encountered
do - ditto (same as above)
Rec - Recovery
RQD - Rock Quality Designation
PP - Pocket Penetrometer
Tor - Torvane

Color

br - brown
rd - red
gr - gray
grn - green
blk - black
wht - white

Description of Soil Density

Relative Soil Density determined while advancing the soil boring by using ASTM Method D-1586, *Standard Penetration Test N-Value*. The N-Value is calculated by adding the hammer blow counts of the 2nd and 3rd sampling intervals together for driving a 2" O.D. sampler with a 140 lb. hammer falling 30" --OR-- by obtaining Pocket Penetrometer or Torvane Readings.

Course Grained Soils Greater than half the material larger than No. 200 Sieve (sand and gravel)		**Fine Grained Soils**					
		N-Value	**Undrained Shear Strength (q_u)**				**Relative Density**
			psi	psf	tsf or kg/cm^2	kN/m^2	
N-Value	**Relative Density**	< 2	< 2.5	< 375	< 0.2	< 20	Very Soft
< 4	Very Loose	2 to 4	2.5 - 5	375 - 750	0.20 - 0.40	20 - 40	Soft
4 to 10	Loose	5 to 8	5 -10	750 - 1,500	0.40 - 0.75	40 - 75	Firm -or- Medium Stiff
11 to 30	Medium Dense	9 to 15	10 - 20	1,500 - 3,000	0.75 - 1.50	75 - 150	Stiff
31 to 50	Dense	16 to 30	20 - 40	3,000 - 6,000	1.50 - 3.00	150 - 300	Very Stiff
> 50	Very Dense	> 30	> 40	> 6,000	> 3	> 3,000	Hard

Description of Soil Type

Material	**Grain Size**	**Material**	**Grain Size**	**Material**	**Grain Size**	**Material**	**Grain Size**
Boulder	> 8"	**Gravel**		**Sand**		**Silt & Clay**	< #200
Cobble	8" - 3"	Course	3" - 1-1/2"	Course	#4 - #10	Note: # indicates U.S. Standard Sieve with size shown.	
		Medium	1-1/2" - 3/4"	Medium	#10 - #40		
		Fine	3/4" - #4	Fine	#40 - #200		

Bed Rock Classification Terms & Field Test / Field Observation

Term	**Field Test / Field Observation**
Hardness	
Soft	Can be Scratched by Fingernail
Medium Hard	Easily Scratched by Pen Knife or Nail
Hard	Difficultly Scratched by Pen Knife or Nail
Very Hard	Cannot be Scratched by Pen Knife or Nail
Weathering	
Very Weathered	Based on observations (e.g., amount of disintegration, iron staining, core recovery, clay seams, amount of material within joints, etc.)
Weathered	
Sound	
Bedding (Natural Breaks in Rock Layers)	
Laminated	< 1 inch
Thinly Bedded	1 inch to 4 inches
Bedded	4 inches to 12 inches
Thickly Bedded	12 inches to 36 inches
Massive	> 36 inches

Rock Mass Classification based on RQD

RQD	**Rock Mass Quality**
< 25%	very poor
25% - 50%	poor
50% - 75%	fair
75% - 90%	good
90% - 100%	excellent

$$RQD = \frac{\Sigma \text{ of pieces} \geq 4"}{\text{total length of run}}$$

ASTM Method D-6032, *Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Cores*

APPENDIX B

COMMUNITY AIR MONITORING PROGRAM (INCLUDES NYSDEC DUST AND EROSION CONTROL GUIDANCE)

Community Air Monitoring Plan

for

19 North Street
Buffalo, Erie County, New York

Site No. C915303

June 2016

Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

<u>VOC Monitoring, Response Levels and Actions</u>

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate

surrogate, such as isobutylene. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust

suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number;
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;

(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50$_o$ C (14 to 122$_o$ F); and
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record-keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM-10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.