REMEDIAL INVESTIGATION WORK PLAN
Wills Building

43-01 21st Street
Long Island City, New York 11101
State ID #2-41-143

Prepared for:

Wills Family Group Limited Partnership
43-01 21st Street
Long Island City, New York 11101

Prepared by:

CORE ENVIRONMENTAL CONSULTANTS

46-11 54th Ave
Maspeth, New York 11378

July 23, 2014

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I, Sheila Ransbottom, certify that I am currently a New York State Registered Professional Engineer as defined in Title 6 of the New York Codes, Rules and Regulations Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

076355	7/23/14	Sheila Ransbottom
NYS Professional Engineer Number	Date	Signature

1.0 INTRODUCTION

The Wills Group Family Limited Partnership (Wills Group) retained CORE Environmental Consultants, Inc. (CORE) to prepare this Remedial Investigation Work Plan (RIWP) for the Wills Building located at 43-01 21st Street, Long Island City, New York (Site).

This RIWP identifies the processes for further delineation of the environmental impacts from a release at the Site. It also strives to identify the source of this release and provide additional data needed to assist in the completion of a Remedial Investigation Report (RIR).

1.1 SITE LOCATION AND DESCRIPTION

The Site is located at 43-01 21st Street in Long Island City, Queens, New York. The Wills Building is currently a mixed-use commercial and manufacturing space. The Site is located in an area zoned M1-4 by the New York City Department of City Planning, indicating that it can be used for manufacturing and commercial uses. The Site is presently owned by the Wills Family Group Limited Partnership and is bound by various commercial and industrial properties to the south, 21st Street to the west, 43rd Avenue to the north, and 22nd Street to the east. The East River is located approximately one-half mile northwest of the Site.

The Site is comprised of a large parcel occupying the entire block length between 21st and 22nd Streets. The parcel is approximately 261 feet along 43rd Avenue by 190 feet along the 21st Street frontage, and is identified as Block 441, Lot 16 by the New York City Department of Finance. The Site is currently occupied by one 124,000 square foot, three-story building that was originally constructed in approximately 1926. The property is relatively flat, with an approximate ground elevation 19 feet above mean sea level (msl). General topography in the area of the Site slopes slightly to the West. A Site Location Map is presented as Figure 1 and a Site Map is included as Figure 2.

1.2 SITE HISTORY

Sanborn maps and City Directory listings for the Site indicate the property has been formerly used as a medical equipment manufacturer, cosmetic manufacturer, and clothing manufacturer. A review of the Sanborn maps dated 1936, 1947, and 1950 indicate several properties in the vicinity of the Site had the potential for chlorinated volatile organic compound (CVOC) usage. The property at 13-06 43rd Avenue was occupied by the Careful Carpet Cleaning Company. The City Directory Abstracts also list the building as being operated as some form of carpet cleaning company and/or other textile conditioning lab between the years of 1934 and 1962. The property at 13-06 43rd Avenue is located approximately 200 feet in what is anticipated to be a hydraulically up- to cross-gradient location of the Site.

The property located adjacent to the Site at 21-03 44th Avenue had previous historical uses as a metal etching company and zipper manufacturer. This property, now known as the Queens Medallion Building, is a suspected source of CVOCs in soil and groundwater in the area.

The property located approximately 300 feet south of the Site at 21-16 44th Road operated as a metal plating and finishing facility. The property is currently operating as the Information Technology High School (ITHS) and is undergoing remediation to address elevated CVOC impacts to soil and groundwater. CVOC wastes from the plating and cleaning process, including tetrachloroethylene (PCE), was disposed of through any one of four dry wells, directly to soil and groundwater beneath the property.

1.3 PREVIOUS SITE INVESTIGATIONS

Previous Site investigation activities to date are associated with a RI performed by Arcadis US (Arcadis, 2012) under contract with the NYSDEC and the Limited Subsurface Investigation (LSI) performed by CORE in August 2013.

Remedial Investigation Report, 21-03 44th Avenue Site, Arcadis US (August, 2012)

The Arcadis/NYSDEC investigation was aimed at determining the nature and extent of CVOCs in the soil and groundwater in an area immediately south of the Queens Medallion Building (an adjacent property). Results of this investigation indicated that PCE was found in all bedrock and overburden groundwater samples collected on, and in the immediate vicinity of, the Site. In general, bedrock concentrations were detected at higher levels than those in the overburden. PCE and trichloroethylene (TCE) were not detected in exceedence of applicable guidance criteria in any soil samples collected on, or in the immediate vicinity of, the Site. Sub-slab vapor and indoor air samples were collected from several locations inside the Wills Building during the investigation that indicated exceedences of the New York State Department of Health (NYSDOH) mitigation guidance values for PCE, with the highest values collected beneath the slab in the western portion of the building. Indoor air samples in the western portion of the building also contained concentrations of PCE and TCE exceeding NYSDOH mitigation guidance values.

The combination of analytical data, groundwater directions flow, and isotope analysis of the PCE plume led Arcadis to conclude that a continuing source of “new” PCE was located under both the Queens Medallion and Wills Buildings.

Remedial Investigation Report, Phase I – Limited Subsurface Investigation, Wills Building, CORE Environmental Consultants, Inc. (September, 2013)

Low-level concentrations of PCE and associated degradation products were detected in soil samples collected during the investigation, however, no detections were in exceedence of the applicable Part 375 Unrestricted or Commercial Use SCOs.

All overburden wells sampled during the LSI contained PCE in exceedence of Title 6 of the New York Codes, Rules and Regulations Part 703.5 (6 NYCRR 703.5) guidance criteria for Class GA waters. The highest concentration was detected at monitoring well MW-6BA in the Northern Alleyway (between the Site and the Queens Medallion property). All bedrock wells sampled during the investigation also contained exceedences of Class GA water guidance criteria for PCE.

Groundwater flow in the overburden in vicinity of the Site appeared to form a slight depression in the area of the Site. Groundwater flow in the bedrock is generally west, consistent with the previous Arcadis investigation in the area of the Site. Additional groundwater elevation monitoring should be performed in order to confirm groundwater flow in the vicinity of the site.

To address the issue of indoor air vapor migration of CVOCs, CORE recommended that a sub-slab depressurization system (SSDS) be installed at the Site. Historical sampling locations are presented in Figure 3.

1.4 SITE GEOLOGY AND HYDROGEOLOGY

1.4.1 Site Geology

Based on previous subsurface investigations in the area of the Site (Arcadis, 2012) as well as data collected during the 2013 LSI, overburden materials are composed of brown sands, silty sands, and trace amounts of fine gravel. During this LSI, bedrock beneath the Site was encountered between approximately 18.5 and 22.5 feet below ground surface (bgs).

1.4.2 Site Hydrogeology

During the 2013 LSI, groundwater was encountered during boring advancement in the overburden at depths ranging from 15 to 17 feet bgs. At the time of the LSI, groundwater elevation data for the overburden indicated that the Site may be in a potentiometric depression. Additional groundwater elevation data would assist with verifying flow direction.

Groundwater in bedrock in the area of the site is flowing to the west, which is consistent with previous investigations performed in the area of the Site (Arcadis, 2012).

1.5 REMEDIAL INVESTIGATION APPROACH

1.5.1 Known Site Conditions

Low-level concentrations of PCE and associated degradation products have been detected in soil samples collected during previous Site investigations, however, no detections were in exceedence of the applicable Part 375 Unrestricted or Commercial Use Soil Cleanup Objectives (SCOs).

Overburden groundwater monitoring wells on the Site contain PCE in exceedence of 6 NYCRR 703.5 guidance criteria for Class GA waters The highest concentration detected during the 2013 LSI was at monitoring well MW-6BA in the Northern Alleyway (between the Site and the Queens Medallion property). Exceedences of PCE have also been noted for all bedrock wells located on Site. The 2012 Arcadis remedial investigation (RI) indicated levels of PCE and TCE in exceedence of NYSDOH mitigation criteria in both sub-slab and indoor air quality (IAQ) samples at the Wills Building.

The most recent LSI performed by CORE in 2013 indicated the Site and nearby properties may be in a potentiometric depression, potentially caused by pumping in the area. Previous Site investigations (Arcadis, 2012) have indicated groundwater flow to be to the south. Bedrock groundwater in the area of the Site is flowing to the west.

2.0 REMEDIAL INVESTIGATION SCOPE OF WORK

At this time, CORE intends to complete a thorough Site walk-through to verify the locations of existing groundwater and soil gas vapor monitoring points and identify potential on-Site sources of impacts to the subsurface.

2.1 MOBILIZATION

Prior to conducting remedial investigation work involving intrusive field activities, Dig Safely New York will be contacted and Wills Group staff will be consulted to mark known on-Site underground utilities. A geophysical survey will also be performed in areas anticipated to be disturbed by intrusive activities to assess the presence of underground structures and utilities.

2.2 HEALTH AND SAFETY

A Site-specific Health and Safety Plan (HASP) has been prepared and is included as Appendix A. The HASP addresses worker safety and air monitoring in the worker breathing zone using a photoionization detector (PID). Air monitoring during the investigation is described in Section 7.0 of the attached HASP and in NYSDOH's Generic Community Air Monitoring Plan (CAMP) included as Attachment A of the HASP.

2.3 COMMUNITY AIR MONITORING PLAN

NYSDOH's Generic CAMP has been incorporated as an Attachment to the HASP, included as Appendix A. Additional air monitoring procedures are discussed in Section 7.0 of the HASP, included as Appendix A. The CAMP will be implemented during intrusive field activities which have the potential to generate VOC and/or dust emissions.

2.4 GEOPHYSICAL SURVEY

A ground-penetrating radar (GPR) survey will be conducted to facilitate identification of buried utilities or structures in the areas of anticipated intrusive activities. If deemed necessary, an electromagnetic (EM) survey will be conducted to further refine the locations of metallic subsurface structures (utility pipes, etc.). GPR and EM surveys will be completed prior to the initiation of intrusive subsurface activities.

2.5 SITE WALK-THOUGH

CORE will perform a comprehensive Site-wide walk-through to verify the presence of pertinent Site features and attempt to identify an on-Site source for known subsurface impacts. Pertinent features may include interior floor drains, exterior storm sewers, and previously installed groundwater monitoring wells and soil gas vapor sampling points.

In addition, the comprehensive Site walk-through is intended to assist in identifying an on-Site source to known subsurface impacts. To fully assess the Site, CORE will investigate all

areas of the building/structure for possible sources or PCE. This may include (but is not limited to):

- Interviewing current tenants regarding business practices and potential chemicals currently or formerly used and/or stored on Site;
- Inspections of all rooms within the structure, including closets, storage areas, and the basement; and
- Identifying and locating subsurface utilities that may act as conduits for impacts to travel.

2.5.1 Floor Drains/Sumps

Floor drains were identified in units 101/102 and 123 of the Wills Building during previous Site visits. An abandoned 24-inch manhole containing no pipes or further drainage was identified in suite 121C during a Site inspection. In addition, a sump is located in the partial basement of the building. Please see Figure 2 for the locations of floor drains, manholes, and sumps identified by CORE personnel.

2.5.2 Historical Site Features

CORE personnel reviewed information available at the New York City Department of Buildings (NYCDOB) to determine the presence and/or location of any historical first-floor features that may require further investigation. Review of the documents provided by NYCDOB did not provide any information regarding the presence of former floor drains or other building features of interest.

2.6 SOIL INVESTIGATION

CORE will assess Site conditions and determine the location of soil borings to delineate subsurface impacts. The soil investigation will include soil type characterization and sample collection for laboratory analysis. The primary objective of the soil borings is to identify and delineate CVOC impacts to the subsurface.

CORE will retain a NYS Licensed drilling contractor to advance direct-push soil borings via pneumatic driven macrocore samplers in areas requiring additional soil characterization. Borings will be continuously sampled for characterization and PID screening purposes. Soil sample collection from each boring will be determined in-field based on visual and olfactory indications of impacts to the subsurface as well as potential elevated PID readings. If there are no indications of impacts in the boring, the soil immediately above the saturated zone will be collected for analysis. Direct-push borings will be advanced to refusal. Borings will be abandoned with grout backfill.

Soil borings will be installed in areas of the Site that require additional characterization. Soil samples from select boring locations will be analyzed for the full United States Environmental Protection Agency (USEPA) Target Compound List (TCL) and Target Analyte List (TAL), including TCL VOCs, TCL semi-volatile organic compounds (SVOCs), TCL pesticides/aroclors, and TAL metals and cyanide. Soil samples collected from remaining borings will be analyzed for VOCs only. Refer to Figure 4 for proposed soil boring locations and analyses.

Borings will be backfilled with grout and finished at the surface with concrete. Soil cuttings will be containerized in Department of Transportation (DOT) approved 55-gallon steel drums for later off-Site disposal. Intrusive subsurface activities that may generate excessive noise and/or airborne particulates and VOCs will be performed outside of normal business hours.

2.7 GROUNDWATER INVESTIGATION

The groundwater investigation will include the collection of overburden grab groundwater samples for laboratory analysis, identification of separate phase liquids such as non-aqueous phase liquids (NAPLs), and the characterization of hydrogeologic conditions that affect groundwater flow and chemical migration.

2.7.1 Grab Groundwater Sample Collection

During soil boring advancement, grab groundwater samples will be collected from each boring. Borings will be advanced to the bedrock surface and a 1-inch temporary monitoring well with a 10-foot well screen will be installed at depth. Grab groundwater samples will be collected via peristaltic pump and dedicated tubing at each location. Groundwater samples collected during soil boring advancement will be analyzed per the proposed sampling locations presented on Figure 4.

2.7.2 Groundwater Monitoring Wells

Groundwater monitoring wells are not anticipated to be installed as part of this RI; however, if a sheen or NAPL is identified during soil boring advancement, a monitoring well will be installed to further evaluate subsurface conditions in the area. If necessary, overburden monitoring wells will be constructed with 2-inch diameter schedule-40 polyvinyl chloride (PVC) pipe with up to a 10-foot well screen (0.020-inch slot). No. 2 size sand pack will be placed in the annular space to a minimum of 2 feet above the screen. A 1-foot bentonite seal will be placed on top of the sand pack, and the well will be grouted to the surface. Each well will be completed with flush-mount well boxes at the surface. The monitoring wells will be developed no sooner than 24 hours following installation.

Existing groundwater monitoring wells to be utilized for groundwater sample collection as part of this RI will be redeveloped prior to sample collection. Overburden monitoring wells

MW-1S, MW-2S, MW-6BA, MW-101S, MW-214D, MW-215D, MW-218, and MW-219 and bedrock monitoring wells MW-1D, MW-222B, and MW-227B will be included for groundwater sample collection. A submersible pump will be used to purge each well until temperature, conductivity, pH, and turbidity of the purge water have stabilized as measured on a Horiba U-10. All readings will be recorded on a Well Development Log.

Groundwater samples will be collected within two weeks, but no sooner than one week, following monitoring well development. Depth to groundwater measurements will be collected from all area monitoring wells prior to the commencement of groundwater sampling and will be used to create groundwater elevation contour maps to evaluate groundwater movement at the Site. Monitoring wells will be assessed for the presence of NAPL at this time. During sampling, water quality parameters will be measured using a Horiba U-10 and recorded on a Monitoring Well Sampling Log until stabilized to within ten percent over a period of three consecutive readings. Full TCL/TAL analysis will be performed on groundwater samples collected from overburden monitoring wells MW-1S, MW-2S, Mw-218, and MW-214D. All groundwater samples for metals analysis will be field-filtered at the time of collection. Analysis for TCL VOCs only will be performed for samples from overburden monitoring wells MW-6BA, MW-101S, MW-215D, and MW-219, and bedrock monitoring wells MW-1D, MW-222B, and MW-227B.

2.8 SITE SURVEY

CORE will retain a New York State Licensed Surveyor to re-survey the locations of overburden and bedrock groundwater monitoring wells in the area. CORE anticipates a re-survey of the majority of the monitoring wells on and in the vicinity of the Site. Additional monitoring wells located northwest of the Site beyond 21st Street will also be surveyed for additional data collection. Survey data will be used to calculate groundwater elevation data for potentiometric surface contours.

3.0 DATA EVALUATION AND REMEDIAL INVESTIGATION REPORT

Site characterization data compiled from the RI and previous investigations will be interpreted to establish the nature and extent of subsurface impacts, support analysis of potential remedial alternatives, and complete an exposure pathway assessment for human and other ecological receptors.

A RIR will be prepared following completion of the data analysis and will include the following documentation:

- A description of the Site;
- A summary of field activities used to characterize the Site during the RI, including variances from the scope;
- A Data Usability Summary Report;
- Digital copies of laboratory analytical reports in an Appendix;
- Site maps presenting sample locations, overburden and bedrock potentiometric contour maps, and other maps useful for data summary and comprehension;
- Tabulated data summaries with comparison to regulatory guidance criteria and values;
- Soil boring logs, monitoring well construction diagrams, laboratory analytical reports, sampling information and other supportive Site characterization data;
- Discussion of and conclusions regarding the extent and nature of environmental impact in the various media being investigated;
- A conceptual site model identifying the type and location of all potential sources of impacts and how people, plants, and/or animals may be exposed to those impacts;
- A Qualitative Human Health Exposure Assessment for both off- and on-Site areas; and
- An analysis of remedial alternatives.

4.0 SCHEDULE

Following Agency approval of the RIWP, the activities described in this document will be implemented. NYSDEC will be provided with a minimum notice of two weeks before initiating the first on-Site activities.

5.0 REFERENCES

Arcadis US (Arcadis), 2012. *Remedial Investigation Report, 21-03 44th Avenue Site, Long Island City, New York, Site # 24110.*

CORE Environmental Consultants (CORE), 2013. *Remedial Investigation Report, Phase I, Limited Subsurface Investigation, Wills Building, 43-01 21st Street, Long Island City, New York 11101, State ID #2-41-143.*

New York State Department of Environmental Conservation (NYSDEC), 1999. *Part 703: Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations.*

NYSDEC, 2006. *6 NYCRR Part 375, Environmental Remediation Programs. Subpart 375-6 – Remedial Program Soil Cleanup Objectives for Restricted Use*.

NYSDEC, 2010. *DER-10, Technical Guidance for Site Investigation and Remediation.*

New York State Department of Health (NYSDOH), 2006. *Guidance for Evaluating Soil Vapor Intrusion in the State of New York.*

FIGURES

Source: USGS Topographic map Brooklyn 2013

USGS Topographic map Central Park 2013

JOB TITLE AND LOCATION:

WILLS BUILDING
43-01 21st STREET
LONG ISLAND CITY, NEW YORK

WARNING

IT IS A VIOLATION OF SECTION 7209, SUBDIVISION 2, OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON, OTHER THAN THOSE WHOSE SEAL APPEARS ON THIS DRAWING, TO ALTER IN ANY WAY AN ITEM ON THIS DRAWING. IF AN ITEM IS ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO THE ITEM HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE AND THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

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DRAWING TITLE:

SITE LOCATION MAP

DATE:		JOB NO.:	FIGURE NO.:
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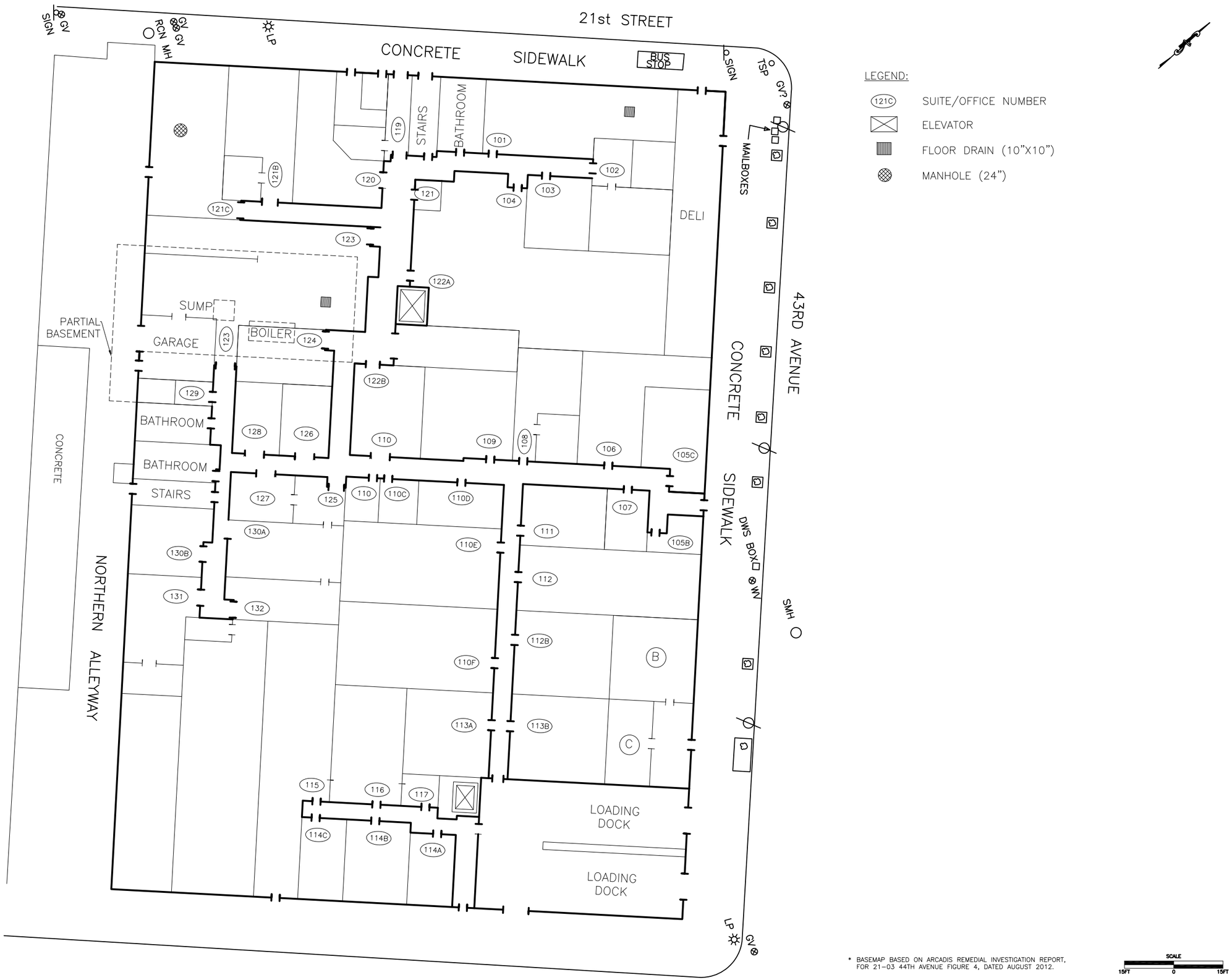

LEGEND:

- (121C) SUITE/OFFICE NUMBER
- ELEVATOR
- FLOOR DRAIN (10"X10")
- MANHOLE (24")

* BASEMAP BASED ON ARCADIS REMEDIAL INVESTIGATION REPORT, FOR 21-03 44TH AVENUE FIGURE 4, DATED AUGUST 2012.

SCALE
15FT 0 15FT

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CLIENT NAME

SEAL & SIGNATURE

NO.	REVISIONS	DATE

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PROJECT TITLE:

WILLS BUILDING
43-01 21ST STREET
LONG ISLAND CITY, NY

DESCRIPTION:

REMEDIAL INVESTIGATION

DRAWING TITLE:

SITE MAP

SEAL & SIGNATURE		
	DATE:	06/23/2014
	PROJECT No.:	--
	DRAWN BY:	BDB
	DESIGNED BY:	AKC
	CHECKED BY:	AKC
	APPROVED BY:	RPT
	FIGURE No.:	2
SCALE: 1"=30'	SHEET No.:	OF:
	REVISED BY:	--

LEGEND:

- SUITE/OFFICE NUMBER
- ELEVATOR
- FLOOR DRAIN (10"X10")
- MANHOLE (24")
- SUB SLAB VAPOR SAMPLING LOCATION (ARCADIS, 2012)
- SUB SLAB VAPOR SAMPLING LOCATION IN BASEMENT (ARCADIS, 2012)
- INDOOR AIR SAMPLING LOCATION (ARCADIS, 2012)
- INDOOR AIR SAMPLING LOCATION IN BASEMENT (ARCADIS, 2012)
- EXISTING OVERBURDEN MONITORING WELL
- EXISTING BEDROCK MONITORING WELL
- CORE SOIL BORING
- CORE OVERBURDEN MONITORING WELL
- CORE BEDROCK MONITORING WELL

* BASEMAP BASED ON ARCADIS REMEDIAL INVESTIGATION REPORT, FOR 21-03 44TH AVENUE FIGURE 4, DATED AUGUST 2012.

SCALE
15FT 0 15FT

CLIENT NAME

SEAL & SIGNATURE

NO.	REVISIONS	DATE

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PROJECT TITLE:

WILLS BUILDING
43-01 21ST STREET
LONG ISLAND CITY, NY

DESCRIPTION:

REMEDIAL INVESTIGATION

DRAWING TITLE:

HISTORICAL SAMPLING LOCATIONS

SEAL & SIGNATURE	DATE:	06/23/2014
	PROJECT No.:	-
	DRAWN BY:	BDB
	DESIGNED BY:	AKC
	CHECKED BY:	AKC
	APPROVED BY:	RPT
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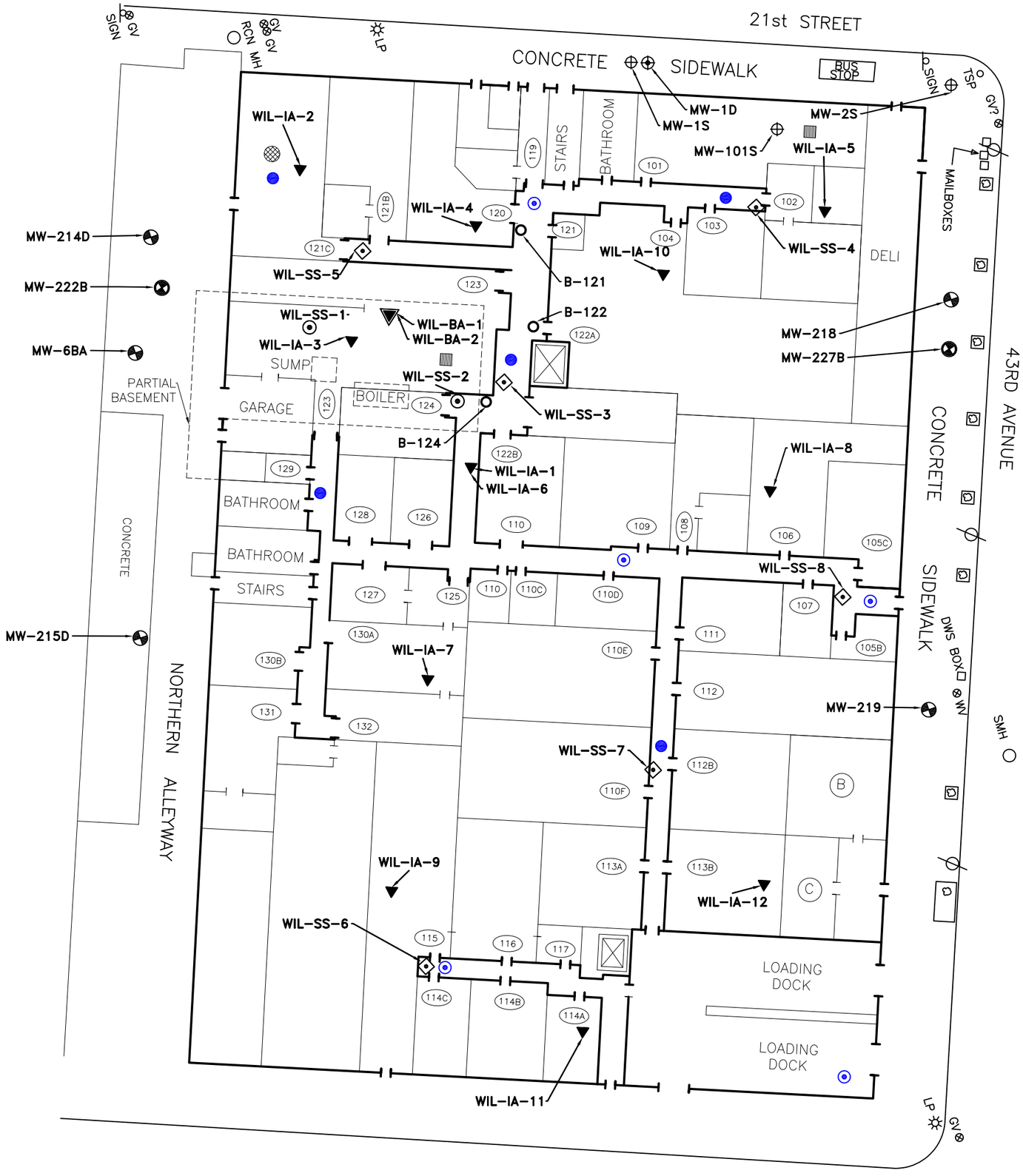
	REVISED BY:	-



LEGEND:

- SUITE/OFFICE NUMBER
- ELEVATOR
- FLOOR DRAIN (10"X10")
- MANHOLE (24")
- SUB SLAB VAPOR SAMPLING LOCATION (ARCADIS, 2012)
- SUB SLAB VAPOR SAMPLING LOCATION IN BASEMENT (ARCADIS, 2012)
- INDOOR AIR SAMPLING LOCATION (ARCADIS, 2012)
- INDOOR AIR SAMPLING LOCATION IN BASEMENT (ARCADIS, 2012)
- EXISTING OVERBURDEN MONITORING WELL
- EXISTING BEDROCK MONITORING WELL
- CORE SOIL BORING
- CORE OVERBURDEN MONITORING WELL
- CORE BEDROCK MONITORING WELL
- PROPOSED SOIL BORING (FULL TCL/TAL ANALYSES)
- PROPOSED SOIL BORING (VOCs ANALYSIS ONLY)

* BASEMAP BASED ON ARCADIS REMEDIAL INVESTIGATION REPORT, FOR 21-03 44TH AVENUE FIGURE 4, DATED AUGUST 2012.

SCALE
15FT 0 15FT

CLIENT NAME

SEAL & SIGNATURE

NO.	REVISIONS	DATE

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PROJECT TITLE:

WILLS BUILDING
43-01 21ST STREET
LONG ISLAND CITY, NY

DESCRIPTION:

REMEDIAL INVESTIGATION

DRAWING TITLE:

PROPOSED SAMPLING LOCATIONS

SEAL & SIGNATURE		
	DATE:	07/18/2014
	PROJECT No.:	-
	DRAWN BY:	BDB
	DESIGNED BY:	AKC
	CHECKED BY:	AKC
	APPROVED BY:	RPT
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	REVISED BY:	-

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APPENDICES

APPENDIX A

Health and Safety Plan

CORE ENVIRONMENTAL CONSULTANTS

HEALTH AND SAFETY PLAN
Wills Building
43-01 21st Street
Long Island City, New York 11101
State ID #2-41-143

Prepared for:

Wills Family Group Limited Partnership
43-01 21st Street
Long Island City, New York 11101

Prepared by:

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July 23, 2014

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FORMS

ATTACHMENTS

1.0 INTRODUCTION

The Wills Group Family Limited Partnership (Wills Group) retained CORE Environmental Consultants, Inc. (CORE) to provide environmental consulting services related to the facility located at 43-01 21st Street, Long Island City, New York (Site). Wills Group tasked CORE to perform a Remedial Investigation at the Wills Building Site (No. 2-41-143).

1.1 PROJECT DESCRIPTION

The purpose of this Health and Safety Plan (HASP) is to set forth appropriate health and safety procedures to be followed by CORE employees during on Site investigative and remedial activities.

This document will serve not only to explain the chemical and physical hazards associated with working on the Site, but will also outline approved measures for dealing with such hazards. The project Health and Safety Officer (HSO) will be responsible for the development and implementation of project Health and Safety protocols. In addition, the subcontractor(s) will be required to designate a Site HSO for their personnel and to follow, at a minimum, the requirements of this HASP. All personnel who will be involved with sampling on Site must have completed the appropriate Hazardous Waste Site Worker Training, i.e. 24 hour or 40 hour, as required by the Occupational Safety and Health Administration (OSHA) in Title 29 of the Code of Federal Regulations (CFR), Part 1910.120(e)(2), 1910.120(e)(3), and 1910.120(e)(8), as applicable, and the required medical surveillance as required by 29 CFR 1910.120(f).

The investigative work efforts will include:

Site Walk-Through

Perform a thorough Site-wide walk-through to evaluate the presence, location, and usability of existing sample points and identify potential on-Site sources of impacts to the subsurface.

Soil Boring Program

The soil boring program will involve evaluation of the nature and extent of impacts to soil through the advancement of borings at interior locations.

Groundwater Monitoring Program

The groundwater monitoring program will involve the installation of groundwater monitoring wells as deemed necessary during field activities/soil boring installation, collection of groundwater samples from monitoring wells located on, and in the immediate vicinity of, the Site, and the evaluation of the nature and extent of impacts in groundwater.

Soil/Sub-Slab Vapor and Indoor Air Quality Survey

The soil vapor and indoor air quality (IAQ) survey will involve the installation of sub-slab sample points, collection of sub-slab vapor and indoor air quality (IAQ) samples for analysis, and the

evaluation of the extent of impacts to sub-slab vapor and IAQ and vapor migration into the overlying structure.

Sample Analysis

Select soil and groundwater samples collected for analysis will be analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), TCL pesticides/aroclors, and Target Analyte List (TAL) metals and cyanide; remaining samples will be analyzed for TCL VOCs.

Analysis of soil vapor samples by United States Environmental Protection Agency (USEPA) Method TO-15. Soil vapor samples will be collected in individually certified clean canisters.

Site Survey

A re-survey of existing sample points as well as an initial survey of newly installed monitoring wells and soil boring locations.

Community Air Monitoring

VOCs and particulates are not anticipated to be a concern to building tenants during intrusive activities based on the non-detection of both in the breathing zone during previous Site investigations performed within the building structure. Exhaust generated by drilling activities will be vented via pipe to the exterior of the building. Community air monitoring will be performed in accordance with New York State Department of Health (NYSDOH) guidance to guarantee the safety of both workers and building tenants. Generic NYSDOH Community Air Monitoring requirements are included in Attachment A.

1.2 SITE DESCRIPTION

The Site is located at 43-01 21st Street in Long Island City, Queens, New York. The Wills Building is currently a mixed-use commercial and manufacturing space. The Site is located in an area zoned M1-4 by the New York City Department of City Planning, indicating that it can be used for manufacturing and commercial uses. The Site is presently owned by the Wills Family Group Limited Partnership and is bound by various commercial and industrial properties to the south, 21st Street to the west, 43rd Avenue to the north, and 22nd Street to the east. The East River is located approximately one-half mile northwest of the Site.

The Site is comprised of a large parcel occupying the entire block length between 21st and 22nd Streets. The parcel is approximately 261 feet along 43rd Avenue by 190 feet along the 21st Street frontage, and is identified as Block 441, Lot 16 by the New York City Department of Finance. The Site is currently occupied by one 124,000 square foot, three-story building that was originally constructed in approximately 1926. The property is relatively flat, with an approximate ground elevation 19 feet above mean sea level (msl). General topography in the area of the Site slopes

slightly to the West. A Site Location Map is presented as Figure 1 and a Site Plan is included as Figure 2.

2.0 KEY PERSONNEL

Personnel responsible for implementation of this Health and Safety Plan are:

Name	Title	Address	Contact Numbers
Ronald Tramposch, PG	Project Manager	46-11 54th Avenue Maspeth, NY 11378	Office: 718-762-0544 Mobile: 917-804-8717
Fred Smith, CIH, CSP	Project HSO	46-11 54th Avenue Maspeth, NY 11378	Office: 718-762-0544

2.1 SITE HEALTH AND SAFETY OFFICER

The responsibilities of the Site HSO are as follows:

- Implement this HASP on Site.
- Enforce day-to-day health and safety protocols in effect on Site.
- Require that all personnel entering the Site understand the provisions of this HASP.
- Conduct periodic training sessions on use/maintenance of personal protective equipment (PPE) and safety practices.
- Conduct daily health and safety meetings each morning.
- Direct and advise CORE's Site personnel, visitors, and subcontractor(s) on the specific hazards associated with the Site and changes, related to health and safety requirements at the Site.
- Conduct necessary health and safety monitoring.
- Administer air monitoring program, to include monitoring logs and accident/incident reports.
- Monitor Site conditions and determine all necessary changes in levels of personal protection and, if warranted, execute work stoppages.
- Report changes in Site conditions and changes in PPE requirements to the Project HSO.

3.0 MEDICAL SURVEILLANCE REQUIREMENTS

All personnel who engage in waste Site activities for 30 days or more per year will participate in a Medical Surveillance Program. All project personnel involved in on Site activities in impacted areas at Site will be required to undergo annual medical examinations. This examination must take place not more than one year prior to and one year after the completion of Site work and must be conducted by a physician who is board-certified in occupational medicine. The physician will have been made familiar with the job-related duties of each worker examined. The physician must certify whether the individual is fit to conduct work on hazardous waste Sites using personal protection, or whether he or she must work within certain restrictions.

Any person exposed to high levels of hazardous substances will be required to undergo a repeat medical exam at or before the conclusion of the project to determine possible health impacts. Any person suffering a lost-time injury or illness must receive medical approval prior to returning to work on Site. When employment is terminated for any reason, the employee must receive an exit medical examination.

All medical records will be held by the employer for the period of employment plus at least 30 years, in accordance with OSHA regulations on confidentiality and any other applicable regulations and will be made available to OSHA upon request. The components of Medical Surveillance include:

- Medical and occupational history
- Physical examination, with particular attention to the cardiopulmonary system, general physical fitness, skin, blood-forming, hepatic, renal, and nervous systems
- Urinalysis, to include:
  - color
  - appearance
  - specific gravity
  - pH
  - ketones
  - protein
  - glucose
  - blood
  - bilirubin
  - leukocyte esterase
  - nitrite
  - WBC
  - RBC
  - casts
  - bacteria
  - epithelial cells
  - crystals
  - yeasts
  - heavy metals - arsenic, lead, mercury
- Blood analysis, to include:
  - complete blood count
  - hemoglobin
  - albumin, globulin, total protein
  - bilirubin - direct and total
  - g-glutamyl transpeptidase
  - serum glutamic oxalacetic transaminase
  - lactic dehydrogenase
  - alkaline phosphatase
  - sodium
  - potassium

  - chloride
  - magnesium
  - calcium
  - phosphorus
  - lead
  - uric acid
  - BUN (blood urea nitrogen)
  - creatinine
  - cholesterol
  - triglycerides
  - glucose
  - iron

- Pulmonary function test

- Additional tests as appropriate, including:

  - chest X-ray
  - electrocardiogram
  - stress test
  - audiogram

4.0 SITE HAZARD/RISK ANALYSIS

Physical hazards include the dangers of tripping and falling on uneven ground, operation of heavy equipment such as drill rigs, vehicular traffic, and utilities either above-ground or buried. The following are physical hazards which may be encountered during investigation activities

4.1 HAZARD ANALYSIS

PPE is the initial level of protection based on the activity hazards and Site conditions which have been identified. Upgrades to respiratory protection may be required based on the action levels discussed in Section 7.0. General on-Site provisions will include: extra nitrile, leather, and/or Kevlar gloves, extra protective coveralls, drinking water and electrolyte fluids, reflective vest, first aid kit, fire extinguisher, hearing protection, and washing facilities.

If Site conditions suggest the existence of a situation more hazardous than anticipated, the Site personnel will evacuate the immediate area. The hazard, the level of precautions, and the PPE will then be reevaluated.

4.2 HANDLING DRUMS AND CONTAINERS

Regulations for handling drums and containers are specified by OSHA 29 CFR 1910.120(j). Potential hazards associated with handling drums include vapor generation, fire, explosions, and possible physical injury. Handling of drums/containers during the Site investigation and remediation activities may be necessary. If drum/container handling is necessary, it will be performed in accordance with applicable regulations.

4.3 ELECTRICAL HAZARDS

4.3.1 Utilities

The Site may have shallow, buried utilities and also overhead utilities in certain areas. It will be necessary for parties disturbing the existing ground surface and conducting operations with heavy equipment having high clearances to exercise caution in performing project-related work with respect to the presence of utilities. Utility companies with active, buried lines in the Site area will be asked by the Contractor performing intrusive activities to mark their facilities. Employees will use these data to choose work locations.

4.3.2 Underground Utilities

No excavating, drilling, boring, or other intrusive activities will be performed until an underground utility survey, conducted by knowledgeable persons or agencies, has been made. This survey will identify underground and in-workplace utilities such as the following:

- Electrical lines and appliances;
- Telephone lines;

- Cable television lines;
- Gas lines;
- Pipelines;
- Steam lines;
- Water lines;
- Sewer lines; and/or
- Pressurized air lines.

The location of utilities will be discussed with CORE employees and subcontractors during a Site Safety Briefing. Identified utilities should be marked or access otherwise restricted to avoid chance of accidental contact.

Even when a utility search has been completed, drilling, boring, and excavation should commence with caution until advanced beyond the depth at which such utilities are usually located. Utilities will be considered "live" or active until reliable sources demonstrate otherwise. Geophysical surveys, including ground penetrating radar (GPR) and electromagnetic (EM) survey, if necessary, will be completed in the area of all indoor boring locations to further refine the presence and locations of potential subsurface utilities.

4.3.3 Overhead Utilities

CORE does not anticipate performing work in the area of overhead utilities; however, if present, clearances will be adequate for the safe movement of vehicles and for the operation of construction equipment.

Overhead or above-ground electric lines should be considered active until a reliable source has documented them to be otherwise. Elevated work platforms, ladders, scaffolding, man-lifts, and drill or vehicle superstructures will be erected a minimum of 20 feet (the actual distance is dependent upon the voltage of the line) from overhead electrical lines until the line is de-energized, grounded, or shielded so arcing cannot occur between the work location or superstructure.

4.4 PHYSICAL HAZARDS

The drilling program poses the greatest potential threat to the safety of Site personnel. The following sections describe specific safety measures to be implemented during specific activities.

4.4.1 Heat Stress

Employees may be exposed to the hazards associated with heat stress when ambient temperatures exceed 70 degrees Fahrenheit (ºF). Employees should increase water intake while working in conditions of high heat. Enough water should be available so that each employee can consume 1 quart of water per hour. In addition, they should increase number of rest breaks and/or rotate employees in shorter work shifts. Employees should rest in cool, dry, shaded areas for at least 5 minutes. Employees should not wait until they feel sick to cool down. Watch for signs and symptoms of heat exhaustion and fatigue. In the event of heat stroke, bring the victim to a cool environment, call for help, and initiate first aid procedures.

The following prevention, recognition, and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress, and to apply the appropriate treatment.

Prevention

- Provide plenty of liquids. A 50 percent solution of fruit punch (or similar) in water, or plain water to be taken with salted foods such as pretzels will be available in the support zone.
- Buddy system. No individual will attempt to undertake any activity alone.
- Provide cooling devices. A spray hose and a source of water will be provided to reduce body temperature, cool protective clothing, and/or act as a quick-drench shower in case of an exposure incident.
- Adjustment of the work schedule. As is practicable, the most labor intensive tasks should be carried out during the coolest part of the day.

Recognition and Treatment

Any person who observes any of the following forms of heat stress, either in himself or in another worker, will report this information to the Site HSO as soon as possible.

1. Heat Rash (or prickly heat)

   Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.

   Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.

   Treatment: Remove source of irritation and cool skin with water or wet cloths.

2. Heat Cramps (or heat prostration)

Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Sudden development of pain and/or muscle spasms in the abdominal region.

Treatment: Remove the worker to the contamination reduction zone. Provide fluids orally. Remove protective clothing. Decrease body temperatures and allow a period of rest in cool location.

3. Heat Exhaustion

Cause: Overexertion in a hot environment and profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.

Treatment: Perform the following while simultaneously making arrangements for transport to a medical facility: Remove the worker to the contamination reduction zone. Remove protective clothing. Lie the worker down on his or her back, in a cool place, and raise the feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of a salt water solution, using one teaspoon of salt in 12 ounces of water. Transport the worker to a medical facility.

4. Heat Stroke

Cause: Same as heat exhaustion.

Symptoms: Dry and hot skin, dry mouth, dizziness, nausea, headache, rapid pulse.

Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital.

4.4.2 Cold Stress

Exposure to cold weather, wet conditions and extreme wind-chill factors may result in excessive loss of body heat (hypothermia) and/or frost bite. To guard against cold exposure and to prevent cold injuries, appropriate warm clothing should be worn, warm shelter must be readily available, rest periods should be adjusted as needed, and the physical conditions of on Site field personnel should be closely monitored. Personnel and supervisors working on Site will be made aware of the signs and symptoms of frost bite and hypothermia such as shivering, reduced blood pressure, reduced coordination, drowsiness, impaired judgment, fatigue, pupils dilated but reactive to light, and numbing

of the toes and fingers. The potential for wetting of protective clothing should be of concern, since wet clothing (from sweat or splashes) will provide poor insulation against the cold.

4.4.3 Noise

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps, and generators. Employees who will perform suspected or established high noise tasks and operations for short durations (less than 1-hour) will wear hearing protection. If deemed necessary by the HSO, additional hearing protection may be added and the need to monitor sound levels for Site activities will be determined. Other employees who do not need to be in proximity of the noise should distance themselves from the equipment generating the noise.

4.4.4 Hand and Power Tools

In order to complete the various tasks for the project, personnel may use hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Work gloves, safety glasses, and hard hats will be worn by the operating personnel when using hand and power tools.

4.4.5 Slips, Trips, and Falls

Working in and around the Site may pose slip, trip, and fall hazards due to slippery and uneven surfaces. Personnel will wear proper foot gear and will employ good work practice and housekeeping procedures to minimize the potential for slips, trips, and falls.

4.4.6 Manual Lifting

Manual lifting of objects and equipment may be required. Failure to follow proper lifting technique can result in back injuries and strains. Employees should use a buddy system and/or power equipment to lift heavy loads whenever possible and should evaluate loads before trying to lift them. Carrying heavy loads with a buddy and proper lifting techniques include: 1) make sure footing is solid; 2) make back straight with no curving or slouching; 3) center body over feet; 4) grasp the object firmly and as close to your body as possible; 5) lift with legs; and 6) turn with your feet, don't twist.

4.4.7 Overhead Dangers

Overhead dangers, including but not limited to falling debris and equipment, can occur while operating drill rigs. CORE personnel will maintain a minimum distance from large overhead operations and to maintain proper communication with heavy equipment operators and their handlers, should work necessitate their presence beyond the minimum safety distance. Proper PPE will be worn during these types of activities including steel-toed/shank boots, safety vests, and hard hats.

4.4.8 Cuts and Lacerations

Field activities that involve drilling and sampling activities usually involve contact with various types of machinery. At least one person on Site must be currently certified in first aid and cardiopulmonary resuscitation (CPR) techniques. Personnel trained and certified in first aid should be prepared to take care of cuts and bruises as well as other minor injuries. CORE will have a first aid kit approved by the American Red Cross available during all field activities.

4.4.9 Traffic Hazards

All traffic, vehicular and pedestrian, shall be maintained and protected at all times consistent with local, state, and federal, and agency regulations regarding such traffic and in accordance with direction of the Owners. Traffic hazards will be limited since the investigation/remediation project is to be completed on private land and not in public right of way areas.

4.5 CHEMICAL HAZARDS

Chemicals that may potentially be encountered at the Site include VOCs, primarily tetrachloroethylene (PCE) and trichloroethylene (TCE). The health/safety characteristics and exposure limits of these compounds are listed in Table 1. The risk of exposure can be by dermal, ingestion, or respiratory routes, depending on the type of compound and intrusive activity being performed.

Particulate matter and VOCs in the breathing zone are not anticipated to pose a threat at the Site as neither was detected during previous Site investigations within the building structure. Exhaust from drilling activities will be vented via pipe to the exterior of the building.

If during soil boring installation, the potential for workers to be exposed to particulates and compounds, such as VOCs, dusts, and metals, in soil and development water through inhalation/ingestion/dermal contact routes, workers may need to apply water or an amended water solution to the area to help control the generation of airborne dusts, particulates, and VOCs. Workers may also use respiratory protection including the use of an air-purifying respirator equipped with approved filter/cartridges. An analysis of the work tasks and potential for chemical exposure should be performed to determine the correct PPE, and/or respirator cartridge(s), if needed. The analysis should include a chemical waste profile to help ensure that PPE specified will be appropriate for the respective chemical hazard(s).

4.6 BIOLOGICAL HAZARDS

There are no anticipated biological hazards associated with the Site.

5.0 SITE CONTROL

In order to keep unauthorized personnel from entering the work areas during drilling activities without proper protective equipment, and for good control of overall Site safety, two work zones will be established. The two work zones are the support zone and the contamination reduction zone/exclusion zone. Actual zone width will be determined by optimal size of work area and by obstructions, if any. A brief description of the Site work zones follows.

5.1 SUPPORT ZONE

The support zone at the Site will be a mobile unit (automobile) including a cellular telephone for communication. The support zone will be located as near as practicable to the active work areas and decontamination areas.

5.2 CONTAMINATION REDUCTION ZONE/EXCLUSION ZONE

Due to the environmental setting for this project, the contamination reduction zone and exclusion zone will be incorporated into one zone at each boring location. This zone will be mobile and the location will be dependent upon where the active test borings are located. The decontamination of personnel, light equipment, and heavy equipment will be performed at each well installation location.

A temporary storage location will be established at the Site for the storage of any drummed drill cuttings, decontamination water, core water, well purge water, recovered oil and disposable clothing. The facility will be situated away from vehicular and pedestrian traffic.

5.3 SITE VISITATION

It is possible that the Owners or officials from regulating bodies and jurisdiction will visit the Site during operations. It is also possible that an OSHA representative will wish to inspect the Site. All such officials must meet the requirements of occasional Site workers (24 hour OSHA-approved training and Site-specific training) before going into any active contamination reduction zone/exclusion zone. Visitors other than the Owners, NYCDEC, or OSHA representatives will be subject to the additional requirements of having to receive written permission from the Owners to conduct a Site visit. Because of the nature of the work, the work zone will be continually supervised. Signs will be used to prevent the entrance of unauthorized visitors.

All visitors must supply their own PPE and will be directed to appropriate disposal areas for soil or used PPE.

6.0 PERSONAL PROTECTIVE EQUIPMENT

Since personnel working on Site may be exposed to unexpected levels of hazardous airborne chemicals or compounds released during drilling activities, or may come in contact with VOC's, SVOC's and metals in drill cuttings or soil, various levels of protection will be utilized during field activities. Components of all levels of personal protection that will be available are listed in Table 2. Planned levels of protection for various activities are given in Table 3.

In the event that unexpected levels of organic vapors are encountered, any personnel working at Level D protection will don their respirators at once (change to Level C). The Site HSO will consult with the Project HSO to decide if and when Level D protection may be resumed, or if a higher level of personal protection is required. Some modification in safety equipment (e.g., switching from polycoated disposable coveralls to standard disposable coveralls) may be implemented in order to balance concerns for full contaminant protection against concerns for the possibility of heat stress resulting from the need to wear more restrictive PPE. Such modifications may be implemented only if approved in advance by the Site HSO, following consultation with the Project HSO. PPE which fully complies with the requirements of all required levels of protection should be immediately available at all times on the Site.

Level C respiratory protection will normally be provided using The National Institute for Occupational Safety and Health (NIOSH) -approved half-face respirators, with appropriate NIOSH approved cartridge for removal of organic vapors. All team members will be fit-tested for respirators using irritant smoke. Due to difficulties in achieving a proper seal between face and mask, persons with facial hair will not be allowed to work in areas requiring respiratory protection. CORE's complete respiratory protection program requirements are documented in their Health and Safety (HAS) guidelines.

For the fullest protection of Site personnel, the supervising field engineer/geologist will conduct organic vapor monitoring at closely spaced intervals during drilling and sampling activities. Monitoring will be accomplished by real-time monitoring equipment.

The primary purpose of this monitoring will be to assess the adequacy of respiratory protection and to make it possible to stop work quickly if explosive or hazardous gases are encountered, or if an oxygen-deficient atmosphere is detected. The air monitoring to be carried out during all intrusive activities is summarized below.

Site personnel timesheets with employee and Project Manager signatures will serve to document the amount of time spent on Site by each team member.

7.0 AIR MONITORING

Air monitoring will be performed throughout drilling, sampling, and purging activities by trained CORE personnel. While these activities are in progress, monitoring frequencies will be as summarized in Table 4. Air will be monitored for total volatiles with a photoionization detector (PID). All air monitoring results and meteorological data (e.g., temperature range, wind speed, wind direction, etc.) will be recorded on the Instrument Reading Logs.

VOCs and particulates are not anticipated to be a concern to building tenants during intrusive activities based on the non-detection of both in the breathing zone during previous Site investigations performed within the building structure. Community air monitoring will be performed in accordance with NYSDOH guidance to guarantee the safety of both workers and building tenants.

The NYSDOH Generic Community Air Monitoring Plan (CAMP) is included as Attachment A.

7.1 TOTAL VOLATILES

During intrusive activities, air monitoring for VOCs will be performed at the downwind perimeter of the immediate work area using a PID equipped with a 10.2 eV lamp to detect target volatiles typical to the impacts previously identified on Site. When readings up to 5 parts per million (ppm) above background in the breathing zone are observed, work activity will continue. Monitoring will be continuous, and recorded at 15-minute intervals.

Levels less than 5 ppm of total volatiles are permissible. If the concentration of VOCs in ambient air at the downwind perimeter of the work area exceeds 5 ppm for the 15-minute average, work activity must be temporarily halted. Air monitoring is to remain continuous while work is halted. If vapor levels decrease below 5 ppm, work can resume with continued monitoring.

If vapor levels between 5 and 25 ppm are detected, work must be halted, the vapor source identified, abatement actions taken, and air monitoring continued. Work can resume assuming the vapor levels 200 feet downwind of the exclusion zone are less than 5 ppm. Intrusive activities will be shut down if vapor levels at the downwind perimeter of the immediate work area exceed 25 ppm.

7.2 PARTICULATE MONITORING

For intrusive activities performed within the building structure, particulate concentrations will be continuously monitored at one location immediately “downwind” of the work zone. An additional personal dust monitor will be utilized for immediate breathing zone particulate monitoring. For intrusive activities performed outdoors, particulate concentrations will be continuously monitored at the upwind and downwind perimeter boundaries of the work zone. Real-time monitoring equipment capable of detecting particulate matter less than 10 micrometers (PM-10) in size will be utilized. Monitoring will be continuous, and recorded at 15-minute intervals.

If the downwind PM-10 level is 100 micrograms per cubic meter (µg/m^3) greater than upwind/background concentrations over 15-minute average period, dust suppression procedures will occur. If downwind PM-10 concentrations reach levels of 150 µg/m^3 or more greater than upwind concentrations, work must be halted while additional dust suppression measures are implemented.

7.3 AIR MONITORING EQUIPMENT CALIBRATION

The PID will be calibrated to a benzene surrogate (an isobutylene standard with a 100 ppm concentration) daily (prior to field activities) and the results will be recorded. Intrusive activities will not begin until all instruments are calibrated and ambient air conditions are recorded. The PID will be recalibrated throughout the day when necessary.

7.4 WORK STOPPAGE RESPONSES

The following responses will be initiated whenever one or more of the action levels necessitating a work stoppage is exceeded:

(1) The Site HSO will be consulted immediately.

(2) All personnel will be cleared from the work area until appropriate mitigation techniques have been implemented.

(3) Monitoring will be continued until the soil boring is grouted or finished as a monitoring well.

Any chemical release to air, water, or soil must be reported to the Site HSO at once. Any exposure resulting from protective equipment failure must be immediately reported to the Site HSO and to the Project HSO in writing within 24 hours.

8.0 DECONTAMINATION PROCEDURES

8.1 DECONTAMINATION OF PERSONNEL

Decontamination of personnel will be performed at each Contamination Reduction Zone/Exclusion Zone. This can be accomplished by washing and rinsing the outer gloves and outer boots over the decontamination trough. Disposable clothing can then be removed and discarded into a 30-gallon trash can with a vinyl liner. If personnel are in Level C protection, the above procedures will be followed and the respirator will be removed, sanitized, and placed in a plastic bag.

8.2 DECONTAMINATION OF EQUIPMENT

Heavy Equipment

Decontamination of heavy equipment (such as augers, core bits, rods) will be accomplished by steam cleaning on a decontamination pad constructed on Site of wood and covered with water retaining polyethylene sheeting with a minimum thickness of 6 mil. Washing of heavy equipment will be completed with attention to minimize any overspray of water, debris and/or soil. All wash water and debris will be collected and contained on Site in a suitable storage tank and/or 55-gallon drums as appropriate. The polyethylene sheeting will be examined frequently for any tears or punctures that may cause a leak. The sheeting will be examined for staining to ensure it can be discarded in a trash dumpster.

Mid-Weight Equipment

Decontamination of mid-weight equipment (such as split spoons, cutting shoes, pumps, non-disposable bailers, etc.) will be accomplished by scrubbing the equipment with a heavy duty bristle brush in a 5 gallon bucket filled half way with water and Alconox® detergent. After washing and scrubbing the equipment will be rinsed by placing it in a separate bucket of water to remove soap and debris. The wash and rinse water will be collected and contained on Site in a suitable storage tank and/or 55-gallon drums as appropriate.

Light Equipment

Decontamination of light equipment (such as tools, containers, monitoring instruments, radios, clipboards, etc.) will be accomplished by wiping equipment off with clean, damp cloths. The cloths can be discarded in the trash can with disposable clothing.

9.0 EMERGENCY PROCEDURES

The most likely incidents for which emergency measures might be required are:

- A sudden release of hazardous gases/vapors during drilling;
- An explosion or fire occurring during drilling; and/or
- A heavy equipment-related accident, or other accident resulting in personal injury.

Emergency procedures established to respond to these incidents are covered under the sections that follow.

9.1 COMMUNICATIONS

A portable telephone will be maintained by the Site HSO during the entire project. The phone will be frequently checked to ensure an appropriate signal is available for the phone to work properly.

9.2 FIRE/EXPLOSION

It will be the responsibility of the drill operator to have a fire extinguisher available at the drill rig location. The operator will have further responsibility of taking fire prevention measures such as the continuous removal from the rig of accumulated oil, grease, or other combustible materials.

In the event of a drill rig fire or other fire that cannot be controlled with available equipment, or in the event of an explosion, the local fire department will be summoned immediately by the Site HSO, who shall apprise them of the situation upon their arrival. The Owners will also be notified.

9.3 FIRST AID

First aid for personal injuries will be administered by the Site HSO. All accidents, however insignificant, will be reported to the Site HSO. Personnel designated to administer first aid will have received a minimum of eight hours training in first aid and CPR, and be certified by the American Red Cross. If a Site worker should require further treatment, he will be transported to the hospital. The on-Site vehicle will carry a copy of the HASP which includes written directions to the hospital, as well as a map showing the route.

The following sections are intended as a quick guide to basic first aid only. Effective CPR and first aid require hands-on training that is best accomplished by attending a class in person.

One common formula for performing first aid:

> Do a primary scene and patient survey, followed by checking Airway, Breathing, and Circulation (ABCs).

Survey the scene and approach the victim. Determine whether the scene is safe. Look for dangers, such as downed power lines, traffic, unstable vehicles or accidents. Determine what may have happened, how many victims are involved, and if any bystanders can help. If several persons appear to be injured, perform triage.

Survey the patient and perform an initial assessment. Get consent from a conscious victim (parent/guardian if the victim is a minor) before providing care. If the victim is unconscious, consent is implied. Use infection control precautions and check for signs and symptoms of any life-threatening conditions and care for them. To perform an initial assessment:

- Check the victim for consciousness and obtain consent if the victim is conscious;
- Check the ABCs (airway, breathing and circulation); and
- Check for severe bleeding.

Provide brief care for the conditions. If the patient lacks air or circulation, they may begin to suffer brain damage after approximately four minutes. After ten minutes, they most likely will have some permanent brain damage. (Although unusual, some severely hypothermic drowning victims have been successfully revived with no brain damage after an extremely long period without oxygen.) To care for breathing and circulation means first clearing the airway, and briefly attempting to restart their breathing or circulation with rescue breathing or CPR (and use of a portable defibrillator, where available). This step is crucial, because an unconscious person's airway can be blocked by a normal, comfortable-looking head position (e.g., on their back with a pillowed head). Often, simply tilting the head back will open the airway and restart their breathing. Likewise, many people recovering from a blocked airway vomit, and if they are unconscious, they can drown in the vomit. The standard prevention for both these issues is to turn a breathing, unconscious patient on their side, turning their head and spine in the same movement to avoid spinal injury, pillowing their head on one of their arms. Do not move casualties unless it is necessary to remove them from danger, or to make treatment possible (such as onto a hard surface for CPR).

1. Call for emergency services

Calling for emergency medical services must take priority over extended care such as long term rescue breathing or extended CPR, since these techniques are intended to gain time for emergency services to arrive as part of the chain of survival. However, if bystanders are available, both can be pursued at the same time. If you ask others to call an ambulance for you, make sure they report back to you once released by the emergency operator to confirm that the call has been made.

2. Do a secondary patient survey, and provide appropriate emergency first aid

The secondary survey is to gather information about conditions or injuries that may not be life threatening, but may become so if not cared for. Perform a secondary survey only if you are sure that the victim has no life-threatening conditions. A properly trained and certified person performs three stages in the secondary survey:

1. Interview the victim and include bystanders to supplement info from the patient:
    - Signs and Symptoms - Visible indications of injury and patient reported sensations (e.g. pain)
    - Allergies - especially those relevant to injury (i.e. allergy to latex, penicillin, etc.)
    - Medications - what current or recent medications the patient is taking
    - Past Medical History - any related history, or medical conditions that could complicate treatment (e.g. heart condition)
    - Last meal - last food and/or drink
    - Events - confirm how injury most likely occurred
2. Vitals
    - LOC - Level of Consciousness description (e.g. - alert, aware, disoriented, confused, unresponsive) or AVPU (Alert, Voice, Pain, Unresponsive)
    - Breathing Rate - Number of breaths per minute. Calculate by counting breaths for ten seconds and multiplying by six, or 15 seconds and multiplying by four.
    - Pulse Rate - Number of heart beats per minute. Calculate by counting pulse for ten seconds and multiplying by six, or 15 seconds and multiplying by four. Pulse for an unconscious person is taken on the neck (carotid pulse) and on the wrist (radial pulse) for a conscious person.
    - Skin Condition - Pale vs. normal, cool/cold vs. hot, clammy/sweaty vs. dry
3. Head-to-toe examination
    - Perform a head-to-toe examination
    - Look for medical alert bracelets or medallions.
    - Compare one side of the patient against the other
    - Look for pain or deformity

9.4 EMERGENCY ASSISTANCE

The following table list telephone numbers of police, fire, hospital, and other agencies whose services might be required, or from whom information might be needed. The following page includes a map and driving directions to Mount Sinai Hospital Queens, which is the closest hospital with emergency room services.

Name	Contact Numbers
Mount Sinai Hospital Queens 25-10 30th Avenue Long Island City, New York 11102	Main Number: (718) 932-1000
NYCDEP	311
Fire Department:	911
Police Department	911
Poison Information Center	1-(800) 222-1222
NYSDEC Emergency Hotline	1-(800) 457-7362

10.0 SAFETY CONCERNS AND CONTINGENCY MEASURES

Normally, it is the drilling program that poses the greatest potential threat to the safety of Site personnel. Drilling at the Site will be conducted under the OSHA Safety and Health Standards (29 CFR 1926/191) relative to heavy equipment operation. The following sections describe specific safety measures to be implemented during specific activities.

10.1 BUDDY SYSTEM

The buddy system is an arrangement in which persons are paired, as for mutual safety or assistance. All field work will be completed by at least a two person team.

10.2 SOIL BORINGS

An Active Drilling Exclusion Sub-zone is established by the opening of a borehole. A PID calibrated to a benzene surrogate will be used in this zone. Monitoring with real-time instrumentation will be performed at the borehole. Action levels will be considered to have been reached when a continuous, steady reading has been observed.

If at any time during the drilling program, underground storage tanks (USTs), metal, or concrete are penetrated, drilling activities will cease immediately. After obtaining instrument readings, the project geologist/Site HSO will decide whether to continue or discontinue drilling. This decision will be based upon the field conditions such as the resistance to the drill.

10.3 DEVELOPMENT AND DECONTAMINATION WATER

Excess soil and purge and decontamination water generated during field activities will be screened with a PID. Investigation-derived soil waste will be containerized in Department of Transportation (DOT)-approved 55-gallon steel drums. Groundwater will be containerized in an appropriately sized tank. All containers will be labeled with the contents and date, and will be stored at an on-Site staging area for later off-site transport and disposal.

A waste management firm capable of handling both hazardous and nonhazardous wastes, such as National Response Corporation (NRC) of Great River, New York, will be employed to perform waste analysis and profiling, transport, and disposal for all investigation-derived wastes.

TABLES

TABLE 1
HAZARD CHARACTERISTICS OF SUSPECTED CONTAMINANTS

Substance	Incompatibles/Reactive	Exposure Routes/Target Organs	Standards
Tetrachloroethylene (PCE)	Strong oxidizers; chemically-active metals such as lithium, beryllium & barium; caustic soda; sodium hydroxide; potash	Inhalation, skin absorption, ingestion, skin and/or eye contact Central nervous system depression with dizziness and muscular incoordination; Eye and skin irritation upon contact; Liver and kidney damage	NIOSH REL: TWA Ca Minimize exposure OSHA PEL: TWA 100 ppm STEL 100 ppm IDLH: 150 ppm
Trichloroethylene (TCE)	Strong oxidizers, many fluorides	Inhalation, skin absorption, ingestion, skin and/or eye contact Eyes, skin, respiratory system, blood, central nervous system	TWA: 350 STEL: 440 CEIL: from ACGIH CEIL: 2380 (mg/m3) from ACGIH OSHA PEL: 100 ppm TWA IDLH: 1,000 ppm

REL = NIOSH recommended exposure limits, up to 10 hour work day exposure limit, 40 hours/week.
PEL = OSHA permissible exposure limit, 8 hour exposure limit, 40 hours/week, 29 CFR 1910.1000.
REL, PEL in mg/m^3 = (PEL in ppm x molecular weight) / 24.45.
STEL = Short Term Exposure Limit
TWA = time weighted average
OSHA = Occupational Safety and Health Agency
NIOSH = National Institute for Occupational Safety and Health
N.A. = No applicable value available
ND = no detectable exposure levels for proven carcinogenic substances

TABLE 2
COMPONENTS OF PERSONAL PROTECTION LEVELS

Level D Protection	Level C Protection
❒ Safety glasses with side shields (or goggles) ❒ Hard Hat ❒ Face Shield (optional) ❒ Ordinary coveralls ❒ Ordinary work gloves ❒ Steel-toe, steel-shank works shoes or boots (chemical resistant) ❒ Ordinary work gloves	❒ Hard Hat ❒ Ploy-coated disposable (or standard disposable) overalls ❒ Inner gloves of tight-fitting latex or vinyl ❒ Outer gloves of neoprene or nitrile ❒ Steel-toe, steel-shank work shoes or boots (chemical resistant) ❒ Outer boots of neoprene or butyl rubber ❒ Disposable outer "booties" (optional work shoes or boots) ❒ Full-face air-purifying respirator (to be worn)** ❒ Taping of gloves and boots to disposable coveralls

* Respirator to be fitted with NIOSH/MSHA - approved high-efficiency filter (HEPA) combination respirator cartridges approved for organic vapors, particulates, gases, and fumes.
** Half-face respirator, face shield, and safety glasses with side shields (or goggles) may be substituted with approval of the Site HSO.

TABLE 3
ANTICIPATED LEVELS OF PERSONAL PROTECTION FOR PLANNED ACTIVITIES

Task	PPE Level	Site-Specific Requirements	Respirator
Mobilization/Demobilization			
Reconnaissance	D	Safety glasses, steel toe/shank safety boot, reflective vest, leather work gloves, hearing protection as needed	D - None
Mobilization/Demobilization of Equipment and Supplies	D	Hard hat, safety glasses, steel toe/shank safety boot, reflective vest, leather work gloves, hearing protection as needed	D – None
Establishment of Site Security, Work Zones, and Staging Area	D	Hard hat, safety glasses, steel toe/shank safety boot, reflective vest, leather work gloves, hearing protection as needed	D - None
Groundwater/Soil Sampling			
Drilling, Groundwater Well Installation, Excavation, Digging Test Pits, Backfilling, Grading Observation, Sampling	D	Hard hat, safety glasses, steel toe/shank safety boot with overboot as needed, reflective vest, leather work gloves as needed, nitrile gloves, hearing protection as needed, Tyvek as needed	Level D initially, Level C-If action levels exceeded

TABLE 4
ACTION LEVELS DURING INTRUSIVE ACTIVITIES

Organic Vapors (PID)	Responses
0 to <5 ppm above Background	Continue drilling, decontamination, characterization, etc. Level D protection Continued monitoring every 15 minutes
5 ppm above Background	Temporarily halt work activity. Work may resume if vapor levels readily decrease to <5 ppm above Background. Continued monitoring every 15 minutes.
>5 to 25 ppm above Background, Sustained Reading	Discontinue drilling, decontamination, characterization, etc. Identify source of vapors, abatement actions. Work can resume when concentrations 200 feet downwind of the exclusion zone are <5 ppm. Continued monitoring every 15 minutes.
>25 ppm above Background, Sustained Reading	Discontinue intrusive activities

FORM

Hazardous Waste Activities Health and Safety Checklist Briefing

HAZARDOUS WASTE ACTIVITIES
HEALTH and SAFETY CHECKLIST and BRIEFING

Project: _____

Project Manager: _____

On Site Health & Safety Officer: _____

The Project Manager or on Site Health and Safety Officer will signify the completion of the following items by initializing and dating each item.

	Initial	Date
❒ Site health and safety plan prepared and approved by health and safety manager		
All employees who will be on Site		
❒ Have received initial (24 or 40 hr.) training		
❒ Have received annual 8 hr refresher training		
❒ Have reviewed the Site health and safety plan and received pre-job briefing		
❒ Have received respiratory protective equipment training including SCBA if required		
❒ Have received negative pressure respirator fit test		
❒ Have had a medical exam within the past 12 months		
❒ A pre-entry briefing has been conducted by myself on (/ /)		
❒ I deferred the pre-entry briefing responsibility to the HSO		

Each employee conducting field work shall sign this form after the pre-entry briefing is completed and prior to commencing work on Site. A copy of this signed form shall be kept at the Site, and the original sent to the office, for inclusion into the project file.

Site Personnel Sign-off:

❒ I have received a copy of the Site-Specific Health and Safety Plan.

❒ I have read the Plan and will comply with the provisions contained therein.

❒ I have attended a pre-entry briefing outlining the specific health and safety provisions on this Site.

Name: _____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

FORM

Report of Accident Injury

REPORT OF ACCIDENT INJURY

Project: _____ Date of Occurrence: _____

Location: (be specific) _____

_____

Type of Occurrence: (check all that apply)

- ❒ Fire
- ❒ Vehicle Accident
- ❒ Equipment Failure
- ❒ Disabling Injury
- ❒ Property Damage
- ❒ Chemical Exposure
- ❒ Explosion
- ❒ Other Injury
- ❒ Other (explain) _____

Injuries:

Name of Injured: _____ Company: _____

Name of Injured: _____ Company: _____

Name of Injured: _____ Company: _____

Name of Injured: _____ Company: _____

Name of Injured: _____ Company: _____

Witnesses to Accident/Injury:

Name of Injured: _____ Company: _____

Name of Injured: _____ Company: _____

Name of Injured: _____ Company: _____

Name of Injured: _____ Company: _____

Name of Injured: _____ Company: _____

What was being done at the time of the accident/injury?

_____

_____

_____

Nature of the Accident/Injury:

_____

_____

_____

REPORT OF ACCIDENT INJURY
(continued)

What caused the Accident/Injury? _____

_____

_____

_____

_____

What corrective action will be taken to prevent recurrence? _____

_____

_____

_____

_____

Signatures:

Health and Safety Officer _____ Date: _____

Project Manager _____ Date: _____

Reviewer _____ Date: _____

Comments by Reviewer: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

FORM

Medical Data Sheet

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all personnel working on-Site and will be kept on Site during operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to the hospital facilities is required:

Site: _____

Name:_____ Home Telephone: _____

Address:_____

_____

Age: _____ Height: _____ Weight: _____

Person to Contact in Case of Emergency:

_____Phone No. _____

Alternate Person to Contact in Case of Emergency:

_____Phone No. _____

Drug or other Allergies:

_____

_____

Particular Sensitivities: _____

Do You Wear Contacts? YES NO

Provide a List of Previous Illnesses:

_____

_____

_____

_____

_____

Provide a List of Previous Exposures to Hazardous Chemicals: _____

_____

_____

_____

_____

What Medications are you presently using? _____

_____

Do you have any Medical Restriction? _____

_____

_____

Name, Address, and Phone Number of Personal Physician:

Name: _____ Telephone: _____

Address: _____

FORM

On-Site Safety Briefing

ON SITE SAFETY BRIEFING

Each employee conducting field work shall sign this form after the pre-entry briefing is completed and prior to commencing work on Site. A copy of this signed form shall be kept at the Site, and the original sent to the office, for inclusion into the project file.

Site Personnel Sign-off:

❒ I have received a copy of the Site-Specific Health and Safety Plan.

❒ I have read the Plan and will comply with the provisions contained therein.

❒ I have attended a pre-entry briefing outlining the specific health and safety provisions on this Site.

Name: _____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

CORE Environmental, Inc. Project Manager

❒ A pre-entry briefing has been conducted by myself on _____

❒ I deferred the pre-entry briefing responsibility to the Health and Safety Officer.

Name: _____ Date: _____

ATTACHMENTS

ATTACHMENT A

New York State Department of Health Generic Community Air Monitoring Plan

Appendix 1A
New York State Department of Health
Generic 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.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

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. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

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.

VOC Monitoring, Response Levels, and Actions

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. 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/m^3 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.

December 2009

Appendix 1B
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);
(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 PM10 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. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

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.

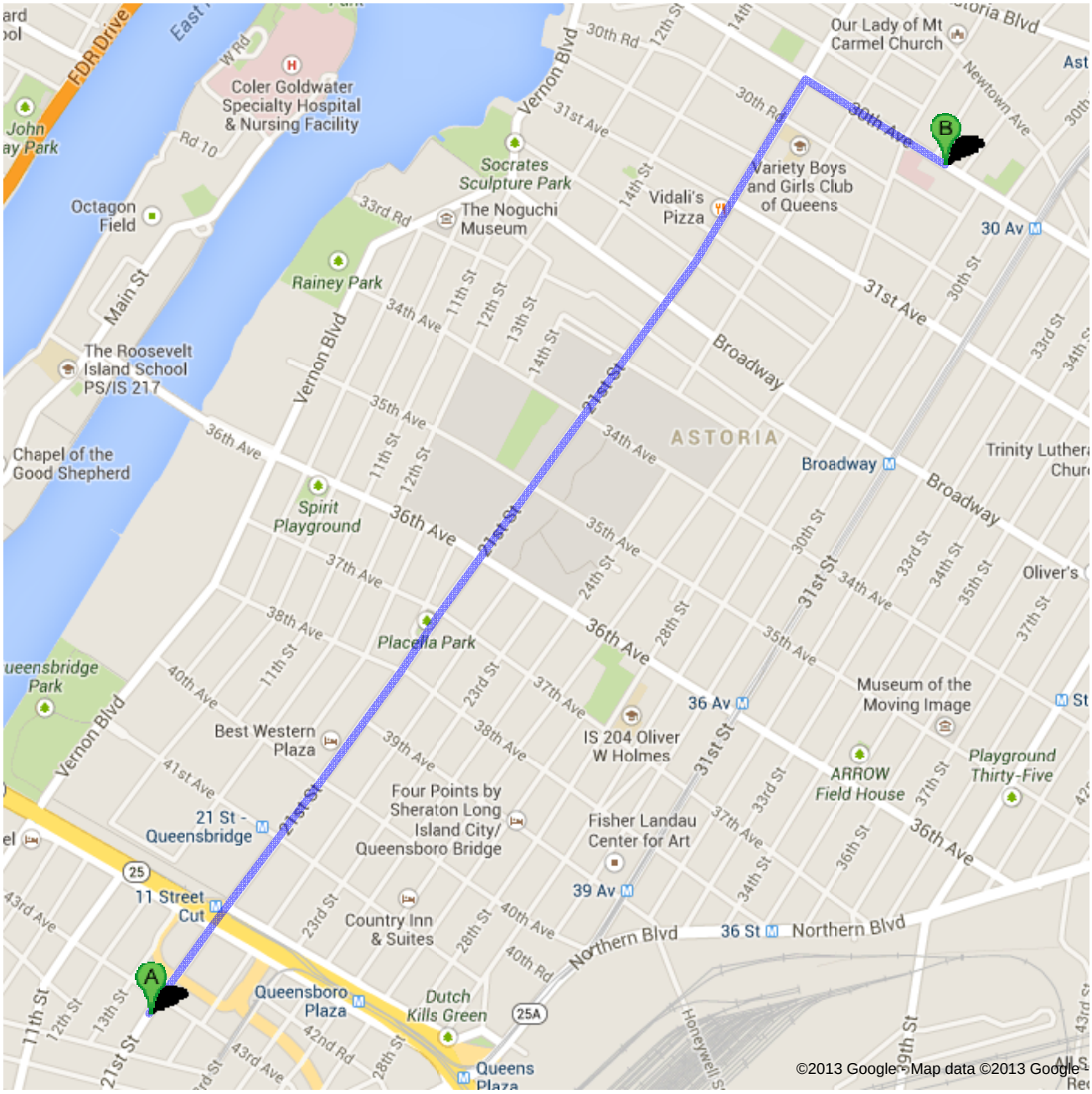
8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements 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.

ATTACHMENT B

Hospital Route Map/Directions

Google

Directions to Mount Sinai Hospital Queens
25-10 30th Ave, Long Island City, NY 11102
1.9 mi – about **6 mins**



A 43-01 21st St, Queens, NY 11101

1.	Head **northeast** on **21st St** toward **43rd Ave** About 5 mins	go 1.7 mi total 1.7 mi
2.	Turn right onto **30th Ave** Destination will be on the right About 59 secs	go 0.2 mi total 1.9 mi

B **Mount Sinai Hospital Queens**
25-10 30th Ave, Long Island City, NY 11102

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

APPENDIX B

Quality Assurance Project Plan

CORE ENVIRONMENTAL CONSULTANTS

QUALITY ASSURANCE PROJECT PLAN
Wills Building
43-01 21st Street
Long Island City, New York 11101
State ID #2-41-143

Prepared for:

Wills Family Group Limited Partnership
43-01 21st Street
Long Island City, New York 11101

Prepared by:

CORE ENVIRONMENTAL CONSULTANTS

46-11 54th Ave
Maspeth, New York 11378

July 10, 2014

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(continued)

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GLOSSARY

The following quality assurance terms and definitions presented in this Quality Assurance Glossary Section have been used in preparing this document related to quality assurance or control.

1. **Alteration -** Altering a sample collected for analysis in any way other than by adding a preservative, e.g. the addition of nitric acid to lower the pH of a sample. Examples of alteration include, but are not limited to, filtering, settling and decanting, centrifuging and decanting, and acid extracting.

2. **Analytical Services Protocol (ASP)** – DEC's compilation of approved EPA laboratory methods for sample preparation, analysis, and data handling procedures.

3. **Correlation Sample** – When an in-field testing and analytical technology is being utilized, a sample that is taken for analysis by an ELAP-certified laboratory to determine the correlation between laboratory and field analytical results.

4. **Effective Solubility** - The theoretical aqueous solubility of an organic constituent in groundwater that is in chemical equilibrium with a separate-phase (NAPL) mixed product (product containing several organic chemicals). The effective solubility of a particular organic chemical can be estimated by multiplying its mole fraction in the product mixture by its pure-phase solubility.

5. **Environmental Laboratory Accreditation Program (ELAP)** - A program conducted by the NYSDOH which certifies environmental laboratories through on-site inspections, evaluation of principles and credentials, and proficiency testing.

6. **Filtration** - The filtering of a groundwater or surface water sample collected for dissolved metals analysis at the time of collection and prior to preservation. Filtering includes, but is not limited to, the use of any membrane, fabric, paper or other filter medium, irrespective of pore size, to remove particulates from suspension.

7. **Final Delineation Sample** - A sample taken to either assist in the decision making process regarding the extent of impacts at a site during the investigation and design of a remedy, or confirmation/documentation sampling during remedial construction. Analysis performed by an ELAP-certified laboratory.

8. **Intermediate Sample** - A sample taken in the course of an investigation or remediation process that is to be followed by a subsequent sample event(s) to confirm whether remediation was successful, or that the extent of impacts has been defined to below a level of concern.

9. **Method Detection Limit (MDL)** - The minimum concentration of a substance that can be measured and reported with a 99 percent confidence that the analyte concentration is greater than zero.

10. **Minimum Reporting Limit** - The lowest concentration at which an analyte can be detected and reported with a reasonable degree of accuracy. It is a lab-specific value, and is generally about 5 times the MDL. The MRL is also referred to as the practical quantitation limit (PQL).

11. **Nephelometric Turbidity Unit (NTU)** - The unit by which turbidity of a water sample is measured.

12. **Preservation** - Preventing the degradation of a sample due to precipitation, biological action, or other physical/chemical processes between the time of sample collection and analysis, e.g. storing samples at 4 degrees Celsius or lowering sample pH by the addition of an acid.

13. **Target Analyte List (TAL)** - The list of inorganic compounds/elements designated for analysis as contained in the EPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration. For the purposes of this chapter, a Target Analyte List scan refers to the analysis of a sample for Target Analyte List compounds/elements.

14. **Targeted Compound** - A compound for which a specific analytical method is designed to detect that compound both qualitatively and quantitatively.

15. **Target Compound List Plus 30 (TCL+30)** - The list of organic compounds designated for analysis (TCL) as contained in the EPA Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration and up to 30 non-targeted organic compounds (plus 30) as detected by gas chromatography/mass spectroscopy (GC/MS) analysis.

16. **Tentatively Identified Compound (TIC)** - A chemical compound that is not on the target compound list but is detected in a sample analyzed by a GC/MS analytical method. TICs are only possible with methods using MS as the detection technique. The compound is tentatively identified using a mass spectral instrumental electronic library search and the concentration of the compound is estimated.

17. **Well Development** - The application of energy to a newly installed monitoring well to establish a hydraulic connection between the well and the surrounding formation. During development, fine-grained formation material that may have infiltrated the sand pack and/or well during installation is removed. This allows water from the formation to enter the well without becoming turbid and therefore a more accurate representation of formation water is obtained.

1.0 INTRODUCTION

CORE has prepared this Quality Assurance Project Plan (QAPP) to accompany the Remedial Investigation Work Plan (RIWP). This QAPP presents the policies, organization, objectives, functional activities, and specific quality assurance and quality control activities to ensure the validity of data generated during the remedial investigation. The purpose of this QAPP is to ensure that all technical data generated are accurate and representative.

Quality assurance (QA) is a management system for ensuring that all information, data, and decisions resulting from investigation and environmental monitoring programs are technically sound and properly documented. Quality control (QC) is the functional mechanism through which quality assurance is achieved. Quality control programs, for example, define the frequency and methods of checks, audits, and reviews necessary to identify problems and dictate corrective actions to resolve these problems, ensuring high quality data. As such, a quality assurance and quality control (QA/QC) program pertains to all data collection, evaluation, and review activities that are part of the investigation.

All QA/QC procedures will be in accordance with applicable professional technical standards, government regulations and guidelines, and specific project goals and requirements. This QAPP has been prepared in accordance with NYSDEC and United States Environmental Protection Agency (USEPA) Region II guidance documents.

The QAPP incorporates the following activities:

- Sample collection, control, chain-of-custody, and analysis;
- Document control;
- Laboratory instrumentation, analysis, and control; and
- Review of project reports.

Laboratory analysis of all project samples will be performed by an independent laboratory with the experience and certifications appropriate for the analyses performed. All analyses will be performed by laboratories accredited pursuant to the New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) for the category of parameters to be analyzed. The specific environmental laboratory or laboratories to be used will be determined at the time investigation and monitoring activities are scheduled.

Duplicates, replicates, and matrix spike/matrix spike duplicate (MS/MSD) samples will be used to identify the quality of the analytical data. Field audits may be conducted to verify that proper sampling techniques and Chain-of Custody procedures are followed. Field data compilation, tabulation, and analysis will be checked for accuracy. Calculations and other post-field tasks will be reviewed by senior project personnel. Equipment used to take field measurements will be maintained and calibrated in accordance with established procedures. Records of calibration and maintenance will

be kept by assigned personnel. Field testing and data acquisition will be performed following strict guidelines as described herein.

Document control procedures will be used to coordinate the distribution, coding, storage, retrieval, and review of all data collected during each sampling task.

A Data Usability Summary Report (DUSR) will be prepared for analytical results from each investigation activity. The DUSR will be prepared by an independent consultant in accordance with NYSDEC's "*Guidance for the Development of Data Usability Summary Reports*," revised 1997 and NYSDEC's DER-10 "Technical Guidance for Site Investigation and Remediation," May 2010 (DER-10).

2.0 PROJECT DESCRIPTION

This QAPP pertains to the completion of field activities and subsequent laboratory and data analysis associated with the Wills Building Site located at 43-01 21st Street, Long Island City, New York (Site). Currently, a sub-slab depressurization system is proposed for the Site, and is described in detail in the Interim Remedial Measure (IRM) Work Plan for the Site.

The objective of the proposed investigation is to determine the on-Site source of subsurface impacts and to determine the most appropriate remedial actions for the Site. The potential implementation of any remedial measures will be done so as to attain conditions at the Site which are protective of commercial or industrial use, public health, the environment, and off-site areas potentially affected by the migration of impacts.

2.1 SITE DESCRIPTION

The Site is located at 43-01 21st Street in Long Island City, Queens, New York. The Wills Building is currently a mixed-use commercial and manufacturing space. The Site is located in an area zoned M1-4 by the New York City Department of City Planning, indicating that it can be used for manufacturing and commercial uses. The Site is presently owned by the Wills Family Group Limited Partnership and is bound by various commercial and industrial properties to the south, 21st Street to the west, 43rd Avenue to the north, and 22nd Street to the east. The East River is located approximately one-half mile northwest of the Site.

The Site is comprised of a large parcel occupying the entire block length between 21st and 22nd Streets. The parcel is approximately 261 feet along 43rd Avenue by 190 feet along the 21st Street frontage, and is identified as Block 441, Lot 16 by the New York City Department of Finance. The Site is currently occupied by one 124,000 square foot, three-story building that was originally constructed in approximately 1926. The property is relatively flat, with an approximate ground elevation 19 feet above mean sea level (msl). General topography in the area of the Site slopes slightly to the West.

2.2 SCOPE

The scope of the project includes a RIWP, QAPP, Health and Safety Plan (HASP), a remedial investigation (RI), a Remedial Investigation Report (RIR), an Alternatives Analysis/Remedial Work Plan, remedy design and construction, an Interim Remedial Measure (IRM), and Final Engineering Report (FER). This QAPP will provide guidance on field collection of samples, analysis procedures, and QA/QC tasks to be performed as part of the project.

2.3 GOALS

The goals of the QA plan are to document the framework needed to ensure that:

- the measurements performed will adequately support the project objectives regarding data collection and hypothesis testing,
- data collected are of the highest quality that can be reasonably expected,
- the quality of the data is known,
- the data and its quality are adequately documented, and
- the data are adequately preserved and rendered in available form.

2.4 PREVIOUS INVESTIGATIONS

Previous investigations of the Wills Building Site are not presented herein, but are discussed in the RIWP to which this QAPP is an Appendix.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This QAPP provides for designated qualified personnel to review products and provide guidance on QA matters. The document also outlines the approach that will be followed in order to ensure that data of sufficient quality are obtained. The Organizational Chart on the following page illustrates the QA program organization. This structure will provide for direct and constant operational responsibility, clear lines of authority, and the integration of QA activities. The various QA functions of the project positions are explained in the following subsections.

Senior Project Manager

The Senior Project Manager will have responsibility for ensuring that the project meets the objectives and quality standards as presented in the RI/FS Work Plan and this QAPP. He/she will be responsible for implementing the project, and will have the authority to commit the resources necessary to meet project objectives and requirements. The project manager's primary function is to ensure that technical, financial, and scheduling objectives are achieved successfully. He/she will act as the major point of contact and control for matters related to the project. In addition, he/she will be responsible for technical quality control and project oversight.

Team Leaders

The Senior Project Manager will be supported by team leaders who will be responsible for leading and coordinating the day-to-day activities of the various resources under their supervision. The team leaders will be highly experienced environmental professionals who will report directly to the Senior Project Manager.

Technical Staff

The technical staff (field support members) for this project will be drawn from CORE's workforce. The technical team staff will be used to gather and analyze data, and to prepare various task reports and support materials. All of the designated technical team members will be experienced professionals who possess the degree of specialization and technical competence required to effectively and efficiently perform the required work.

QA Officer

The Project QA Officer will be responsible for maintaining QA for the project.

4.0 FIELD ACTIVITIES

All measurements will be made to ensure that analytical results are representative of the media and conditions measured. Unless otherwise specified, all data will be calculated and reported in units consistent with other organizations who report similar data to maintain comparability.

The key considerations for the QA assessment of data generated are accuracy, precision, completeness, representativeness, and comparability. These characteristics are defined below:

Accuracy: Accuracy is the degree of agreement of a measurement (or average of measurements) with an accepted reference or "true" value and is a measure of bias in the system.

Precision: Precision is the degree of mutual agreement among individual measurements of a given parameter.

Completeness: Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under correct normal conditions.

Representativeness: Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

Comparability: Comparability expresses the confidence with which one data set can be compared to another.

4.1 GOALS

The QA/QC goal will focus on controlling measurement error within the limits established and will ultimately provide a database for estimating the actual uncertainty in the data collected.

Target values for detection limit, percent spike recovery and percent "true" value of known check standards, and relative percent difference (RPD) of duplicates/replicates are provided in the referenced analytical procedures. It should be noted that target values are not always attainable. Instances may arise where high sample concentrations, non-homogeneity of samples, or matrix interferences preclude achievement of target detection limits or other quality control criteria. In such instances, the laboratory will report reasons for deviations from these detection limits or noncompliance with quality control criteria.

5.0 SAMPLING PROCEDURES

The sampling of various environmental media will be completed as part of the RI activities. Sample type and data use are presented in Table 1.

5.1 SAMPLING PROTOCOL

Contained within this section are various guidelines related to the sample collection activities which may be performed at the site. These guidelines will be used by the field personnel to ensure the samples are collected and field activities are performed in a consistent manner. Each guideline will allow the field teams to customize the Work Plan to meet the specific sampling requirements of each site. Guidelines contained in this section are:

- Soil Sampling
- Boring Using a Geoprobe®
- Boring With a Standard Drilling Rig
- Groundwater Sampling

The sample containers that will be used are identified in Table 2. The sample containers will be labeled in accordance with Section 6.1.1. Sample handling, packaging, and shipping procedures are presented in Section 6.3.

5.1.1 Soil Sampling

This section provides the guidelines and requirements for soil sampling. The objective of the guideline is to ensure a representative soil sample is collected at each designated sampling location to accurately define the concentration and determine whether the site soils have been impacted by site activities.

Soil samples may be collected using a hand auger. Listed below is the process for collecting soil samples:

1. A new pair of clean disposable nitrile gloves will be donned at each sampling location.
2. Prepare the sampling location by removing all concrete, stone sub-base, asphalt, vegetation, roots, etc., from the sampling point.
3. Advance a decontaminated hand auger to the desired sampling depth below ground surface.
4. Remove the hand auger from the boring and use a decontaminated stainless steel spoon to remove the sample from the auger bucket.
5. Carefully place the soil samples for volatile organic analysis directly in to the sample bottles ensuring that no head space exists.
6. Place the remaining sample into a decontaminated bowl (stainless steel or Pyrex). The borehole may need to be further advanced to obtain enough samples to fill all the sample containers.
7. Once enough samples are collected, homogenize the sample using the quartering method (see below). When the sample has been completely mixed, fill the remaining sample containers.

8. After the sample bottle is filled, the cap will be placed on the bottle and the bottle will be packaged for shipment as specified in Section 6.3.
9. QA/QC samples will be collected as specified in Section 5.2.
10. Backfill the boring with the soil removed from the hole and return the Site to its natural state.

The following should be considered when collecting a soil sample using a hand auger:

- When a vertical sampling interval has been established, one auger-bucket is used to advance the auger hole to the first desired sampling depth.
- If discrete grab samples are to be collected to characterize each depth, a new bucket must be placed on the end of the auger extension immediately prior to collecting the next sample.
- The top few inches of soil should be removed from the bucket to minimize the chances of cross-contamination of the sample from fall-in of material from the upper portions of the hole.

The cut and quartering technique is as follows:

- The sample will be thoroughly mixed in a bowl, and divided into quarters.
- A portion of the soil will be gathered from two of the quartered sections. This process will be repeated until the amount of soil needed to completely fill the sample containers has been obtained.
- It is pertinent that soil samples be mixed as thoroughly as possible to ensure the sample is representative of the interval sampled.

Soil sampling records will be kept in the field log book. The information recorded will include the general requirements presented in Section. 6.2. The following records will also be reported:

1. Name and location (including sample interval) of the soil sample and boring.
2. Depth to top of sample and soil description when applicable.
3. Type of equipment used during the soil sampling/boring.
4. Sample location.

Field quality control samples will be collected to verify reproducibility of the sampling and analytical methods. Field duplicates will be obtained at a rate of 1 per 20 original field samples, as outlined in Table 3.

5.1.2 Geoprobe® Borings

This section provides the guidelines and requirements for advancing soil borings using a Geoprobe® for the purpose of collecting soil samples and extracting groundwater samples.

The following procedure will be used to advance borings with a Geobprobe® rig and macrocore sampler to collect subsurface soil samples.

1. Determine and clear (for utilities) the boring locations through site personnel and the local underground facilities locating service. Surface materials such as concrete, asphalt, or vegetation may be removed from boring locations.

2. Geoprobe® rods will be advanced in 4-foot intervals. Each new 4-foot interval will be sampled using a single-use acetate macrocore sleeve liner.
3. Once the desired sampling depth has been reached, rods will be retraced and the macrocore sample liner will be retrieved from the sampling rod sleeve.
4. The acetate liner will be cut open by the drill rig operator or his/her assistant.
5. Small portions of soil will be collected along the length of the acetate liner and placed in VOC sample bottles. Sample bottles will be filled in such a manner as to minimize head space and ensure that a representative sample from the designated sampling depth is collected.
6. After the VOC sample is collected, the remaining sample will be placed in a decontaminated stainless steel bowl, homogenized using the quartering method (see Soil Sampling Section 5.1.1), and used to fill remaining sample containers.
7. Once the samples have been collected they will be packaged as specified in Section 6.3.
8. QA/QC samples will be collected as specified in Section 5.2.
9. Backfill the boring with the soil removed from the hole and return the site to its natural state. If the hole is not completely backfilled to ground surface with the soil removed from the hole, bentonite chips will be used to backfill the remaining space.

The following guidelines are to be used when advancing Geoprobe® borings and extracting groundwater samples in areas immediately surrounding the locations where site activities may have impacted groundwater resources:

1. Sampling locations are determined prior to site activities; however minor adjustments in the field may be needed. Prior to advancing the Geoprobe®, underground utilities in the area will be identified.
2. The Geoprobe® borings will be advanced to just below the water table, a predetermined maximum depth, or to refusal.
3. The outer sleeve will be retracted exposing the inner stainless steel screen.
4. Sample will be obtained using a peristaltic pump, tubing and check ball system or a mini bailer.
5. In areas with low groundwater yield, a temporary piezometer constructed out of pre-cleaned schedule 40 PVC (1" diameter) will be placed in the Geoprobe® borehole after down-hole tools have been removed.
6. If the boring yields sufficient water to allow for sample collection completion within one hour, a peristaltic pump, tubing and check ball system, or a mini bailer will be used for sample collection per section 5.1.6.
7. Groundwater will be removed under very low-flow conditions to minimize turbidity when filling precleaned, pre-preserved, pre-labeled sample bottles, starting with the collection of the samples for volatile organic compound (VOC) analyses.
8. There should be no bubbles in VOC samples.
9. Continue to fill remaining bottles.
10. If samples for metals analysis contain excessive silt, the samples may be allowed to settle. The less turbid sample will be decanted and sent to the laboratory for analysis.
11. After the sample bottle is filled, the cap will be placed on the bottle and the bottle will be packaged for shipment as specified in Section 6.3.
12. QA/QC samples will be collected as specified in Section 5.2.
13. Conductivity, pH, and temperature will be measured after sample collection. The measurements will be recorded in the field log book.
14. Once the sample collection process has been completed, the temporary casing will be removed and the borehole will be backfilled with soil removed from the hole. If the hole is not completely backfilled to ground surface with the soil removed from the hole, bentonite chips will be used to backfill the remaining space.

Geoprobe® records will be recorded in the field log book. The information recorded will include the general requirements presented in Section. 6.2. The following records will also be reported:

1. Name and location of the Geoprobe® sample and boring.
2. Date and time that the Geoprobe® boring/sampling was advanced.
3. Depth range across with sample was collected.
4. Name of the persons overseeing and company conducting the Geoprobe® borings.
5. Type of equipment used during the Geoprobe® boring and during construction of the temporary piezometers. Soil descriptions should be included when applicable.
6. Type of equipment used during sampling, number and type of containers used for sampling purposes, and analyses to be conducted.
7. Sample location (see Section 5.1.8).

Field quality control samples will be collected to verify reproducibility of the sampling and analytical methods. Field duplicates will be obtained at a rate of one per 20 original field samples, as outlined in Table 3.

5.1.3 Hollow Stem Auger Rig Borings

This section provides the guidelines and requirements for advancing soil borings with a standard hollow-stem auger (HSA) drilling rig for the purpose of extracting soil samples and installing groundwater monitoring wells.

The following procedure will be used to advance borings with an HSA rig and split spoon sampler to collect subsurface soil samples. Listed below is the procedure for collecting subsurface soil samples:

1. Determine and clear (for utilities) the boring locations through site personnel and the local underground facilities locating service. Surface materials such as concrete, asphalt, or vegetation may be removed from boring locations.
2. A minimum 2 ½ -inch diameter hollow stem auger will be used to advance the borehole to the desired subsurface depth.
3. Once the desired sampling depth has been reached, a decontaminated split spoon sampler will be used to retrieve the subsurface soil sample.
4. The split spoon sampler will be brought to the surface and opened for sample collection and lithological description.
5. Small portions of soil will be collected along the length of the split spoon and placed in VOC sample bottles. Sample bottles will be filled in such a manner as to minimize head space and ensure that a representative sample from the designated sampling depth is collected.
6. After the VOC sample is collected, the remaining sample will be placed in a decontaminated stainless steel bowl, homogenized using the quartering method (see Soil Sampling Section 5.1.1), and used to fill remaining sample containers.
7. Once the samples have been collected they will be packaged as specified in Section 6.3.
8. QA/QC samples will be collected as specified in Section 5.2.
9. Backfill the boring with the soil removed from the hole and return the site to its natural state. If the hole is not completely backfilled to ground surface with the soil removed from the hole, bentonite chips will be used to backfill the remaining space.

Standard drilling rig records and soil sampling records will be kept in the field log book. The information recorded will include the general requirements presented in Section. 6.2. The following records will also be reported:

1. Name and location of the boring.
2. Date and time that the boring was advanced and sampling occurred.
3. Depth range across which sample was collected.
4. Names of on-site personnel and company conducting the borings.
5. Lithological description of subsurface soils for each boring location.
6. Length of split spoon sampler and amount of recovered sample.
7. Sample location (see Section 5.1.8).

Field quality control samples will be collected to verify reproducibility of the sampling and analytical methods. Field duplicates will be obtained at a rate of 1 per 20 original field samples, as outlined in Table 3.

5.1.4 Groundwater Sampling

This section provides the guidelines and requirements for collecting groundwater samples from monitoring wells. The purpose of the guideline is to ensure that the groundwater samples are collected in such a manner to ensure that a representative sample is collected at each designated sampling location.

Prior to collection of groundwater samples, monitoring wells and water supply wells will be purged to remove stagnant water that is not considered indicative of aquifer conditions. Purge water disposal will be addressed on a site-specific basis. A new pair of clean disposable gloves will be donned at each sample location.

Procedures for monitoring well purging:

1. Place plastic around well head.
2. Unlock protective casing and remove well cap.
3. Immediately (after well cap removal) take an organic vapor reading down the well casing using a photoionization detector (PID) and record reading in the field logbook.
4. Measure water level distance from top of casing and sound the total depth as detailed below. Record in logbook. Check tip of water level indicator for silt or product residue. If either is observed, note in logbook.

    a) Lower decontaminated water level indicator into monitoring well until indicator sounds and light is illuminated.
    b) Confirm that the water surface has been contacted by repeatedly raising and lowering the indicator at least three times to ensure a consistent sounding level has been reached.
    c) Measure and record depth (nearest 0.01 feet) to the water surface from the top of casing in field logbook.
    d) Lower the indicator to the well bottom and record the total depth.
    e) Retrieve and decontaminate water level indicator.

5. Calculate volume to remove for purging.
6. Lower decontaminated purging device into well.
7. Begin to purge water from the well near the bottom.
8. Observe and record: odor, color, clarity, siltiness, and general water condition in logbook. Also record changes in the physical condition of the monitoring wells that could affect well integrity.
9. Temperature, pH, and specific conductivity of groundwater will be measured and recorded periodically during well purging. The sample may be collected after the water has cleared sufficiently and temperature, pH, and conductivity have stabilized. Stabilization is defined as follows:

   Temperature ±1°C, pH ±0.1 S.U., and conductivity ±10 µmhos/cm^2.

10. A total of at least 3-5 volumes of well water should be removed for purging to be considered complete. Wells with little or no recharge will be purged to near dryness. If a pump is used for well purging, it will be brought to the water surface prior to completion of purging activities to ensure complete removal of stagnant water.

Water supply wells which need to be sampled for constituents of concern and are equipped with an operable pump will also be purged of stagnant water. To do so, the total depth and diameter of the well should be known or accurately estimated, and it must be determined whether or not a storage tank exits. If a storage tank is present and is located before the sample port location, it must also be purged of stagnant water.

Listed below are the guidelines used for water supply well purging:

1. Locate a sample port or discharge location.
2. Determine volume to be removed based on total depth and diameter of the well and the storage capacity of the storage tank if it exists.
3. Activate the submersible pump in the well.
4. Begin to remove water from the well, and continue until it has been determined that the stagnant water has been removed based on discharge rate and well construction.
5. Observe and record: odor, color, clarity, siltiness and general water condition in logbook. Also record observed construction of the water supply well.
6. Temperature, pH, and, specific conductivity of the groundwater will be measured and recorded periodically during water supply well purging. The sample may be collected after the water has cleared sufficiently and the temperature, pH, and conductivity have stabilized. Stabilization is defined as follows:

   Temperature ±1°C, pH ±0.1 S.U., and conductivity ±10 µmhos/cm^2.

7. If well construction information is not available, then the recommended purge time is 15 minutes for a high volume pump.

Monitoring wells which contain excess silt and have a low yield will be purged using low flow methodology. This method of purging and well sampling will be used to minimize the volume of purge water removed from the well and to reduce turbidity in the groundwater samples collected. The pumping device selected should operate at variable speeds to reduce aquifer stress and agitation.

Listed below are the guidelines used for purging a well using the low flow method:

1. Place plastic around well head.
2. Unlock protective casing and remove well cap.
3. Immediately (after well cap removal) take an organic vapor reading down the well casing using a photoionization detector and record reading in the field logbook.
4. Measure water level distance from top of casing and sound the total depth as detailed below. Record in logbook. Check tip of water level indicator for silt or product residue (if either are observed note in logbook).

    a) Lower decontaminated water level indicator into monitoring well until indicator sounds and light is illuminated.
    b) Confirm that the water surface has been contacted by repeatedly raising and lowering the indicator at least three times to ensure a consistent sounding level has been reached.
    c) Measure and record depth (nearest 0.01 feet) to the water surface from the top of casing in field logbook.
    d) Lower the indicator to the well bottom and record the total depth.
    e) Retrieve and decontaminate water level indicator.

5. Calculate volume to remove for purging.
6. Lower decontaminated low flow purging device into well within the screened area of the well producing the highest flow rate.
7. Begin pumping and measure the groundwater elevation to ensure that the aquifer is not being stressed. If significant drawdown occurs, reduce the pumping rate. Flow rates should range between 100 mL/ min and 1,000 mL/min.
8. Observe and record: odor, color, clarity, siltiness, and general water condition in logbook. Also record changes in the physical condition of the monitoring wells that could affect well integrity.
9. Temperature, pH, turbidity, dissolved oxygen, redox potential, and specific conductivity of the groundwater will be measured and recorded periodically during well purging. The sample may be collected after the water has cleared sufficiently, water quality indicators have stabilized after 3 successive measurements, and at least one well volume has been removed. Stabilization is defined as follows:

    Temperature ±1°C, pH ±0.1 S.U., redox potential ±3% for 10 mv and turbidity/dissolved oxygen ±10 %.

10. After the monitoring well is purged, do not turn off the pump or remove it from the well.

Groundwater sample collection from a monitoring well:

1. Purge the monitoring well as described earlier in section.
2. Establish that the well has properly recharged (80% of static water level has recovered). No more than 16 hours should lapse between purge completion and sample collection.
3. Carefully lower a decontaminated bailer (with a fresh nylon line attached for each well) down the monitoring well. Disposable bailers may also be used.
4. Continue to lower the sample collection device to the desired sampling depth.
5. Raise the bailer and carefully fill precleaned, pre-preserved, pre-labeled sample bottles, VOC analysis first.
6. Make sure there are no bubbles in VOC samples.
7. Continue to fill remaining bottles.

8. After the sample bottle is filled, the cap will be placed on the bottle and the bottle will be packaged for shipment as specified in Section 6.3.
9. QA/QC samples will be collected as specified in Section 5.2.
10. Conductivity, pH, and temperature, will be measured after sample collection. The measurements will be recorded in the field log book.

Groundwater sample collection using the low flow method:

1. Purge the monitoring well as described earlier in section.
2. Use the pumping device already in place to collect the samples where turbidity can influence the analytical results (such as metals).
3. If a peristaltic pump/ vacuum jug assembly or stainless steel and Teflon bladder pump were used for purging, continue to collect the remaining samples using these devices.
4. If neither of the devices listed above were used, carefully remove the pump from the well and use a Teflon bailer to collect the remaining groundwater samples.
5. After the sample bottle is filled, the cap will be placed on the bottle and the bottle will be packaged for shipment as specified in Section 6.3.
6. QA/QC samples will be collected as specified in Section 6.2.
7. Conductivity, pH, and temperature will be measured after sample collection. The measurements will be recorded in the field log book.

Records

Sample collection records will be kept on the appropriate forms, including the purge logs and sampling log forms. The information recorded is described on the forms. In addition, the following information will also be reported in the log book:

1. Observations of groundwater condition;
2. Field measurements;
3. Sample identification, date, and time; and
4. Sample analytical parameters

5.2 FIELD QUALITY CONTROL SAMPLES

Field quality control samples will consist of trip blanks, field blanks, field duplicates, matrix spikes, and matrix spike duplicates, as shown in Table 3.

5.2.1 Field Duplicates

Field quality control samples will be collected to verify reproducibility of the sampling and analytical methods. Field duplicates will be obtained at a rate of 1 per 20 original field samples, as outlined in Table 3.

5.2.2 Trip Blanks

Trip blanks will be used to assess whether groundwater has been exposed to volatile constituents during sample storage and transport. Trip blanks will consist of a volatile organics analysis (VOA) vial pre-filled by the laboratory with analyte-free water. The trip blanks will remain unopened

throughout the sampling event and will only be analyzed for VOCs. Trip blanks will be collected as outlined in Table 3.

5.2.3 Matrix Spike/Matrix Spike Duplicates

MS/MSD samples will be obtained to determine if the matrix is interfering with the sample analysis. MS/MSDs will be collected at a rate of 1 per 20 original field samples, as outlined in Table 3.

5.2.4 Rinseate Blanks

Rinseate blanks will be used to assess decontamination procedures for non-dedicated equipment. Rinse blanks will be collected as outlined in Table 3.

5.2.5 Laboratory Quality Control Checks

Internal laboratory quality control checks will be used to monitor data integrity. These checks include method (equipment) blanks, spike blanks, internal standards, surrogate samples, calibration standards, and reference standards.

5.3 SAMPLE CONTAINERS

The volumes and containers required for the sampling activities are included in Table 2. Pre-washed sample containers will be provided by the laboratory. All bottles are to be prepared in accordance with EPA bottle washing procedures.

5.4 DECONTAMINATION

Dedicated and/or disposable sampling equipment will be used to the extent possible to minimize decontamination requirements and the possibility of cross-contamination.

When the use of new/dedicated equipment at each sampling location is not feasible, such as the use of augers and a split spoon sampler, equipment will be decontaminated between sampling locations. The water level indicator will be decontaminated between locations by using the following decontamination procedures:

- Initial cleaning of any foreign matter with paper towels, if needed;
- Low phosphate detergent wash;
- De-ionized water rinse; and
- Air dry.

If a Geoprobe® is used to install monitoring wells, the Geoprobe®, Geoprobe® rods, and Macrocore® samplers utilized to install borings will be decontaminated with a bucket wash consisting of a low phosphate detergent wash followed by water rinse. The backhoe bucket, drill rig, augers, rods, split spoon samplers, and/or other related downhole equipment will be decontaminated using high pressure steam prior to initiating the excavation and well installation programs prior to the

initiation of subsurface intrusive activities and between each boring location. Steam cleaning will be performed in a pre-designated on-site decontamination area. Throughout and after the cleaning processes, direct contact between the equipment and the ground surface will not be permitted. Decontamination waste water will be collected in 55-gallon drums. The drill rig and associated equipment will also be cleaned upon completion of the investigation and prior to departure from the Site using the following methods:

- Initial cleaning of all foreign matter; and
- Wash down with high pressure, high temperature sprays to remove and/or volatilize organic contamination.

5.5 LEVELS OF PROTECTION/SITE SAFETY

All sampling will be conducted under a documented Health and Safety Plan. On the basis of air monitoring, the level of protection may be downgraded or upgraded at the discretion of the Site Safety Officer. Crew members will stand upwind of open boreholes or wellheads during the collection of samples, when possible. All work will initially be conducted in Level D (refer to Site Specific Health and Safety Plan). Air purifying respirators (APRs) will be available if monitoring indicates an upgrade to Level C is appropriate.

6.0 SAMPLE CUSTODY

This section describes standard operating procedures for sample identification and chain-of custody to be used for all field activities. These procedures are in place to ensure that the quality of the samples is maintained during collection, transportation, storage, and analysis. All Chain-of-Custody requirements comply with standard operating procedures indicated in USEPA and NYSDEC sample-handling protocol.

Sample identification documents must be carefully prepared so that sample identification and Chain-of-Custody can be maintained and sample disposition controlled. Sample identification documents include:

- Field records;
- Sample labels;
- Custody seals; and
- Chain-of-Custody records.

6.1 CHAIN-OF-CUSTODY

The primary objective of the Chain-of-Custody procedures is to provide an accurate written or computerized record that can be used to trace the possession and handling of a sample from collection to completion of all required analyses.

6.1.1 Sample Labels

Sample labels attached to, or affixed around, the sample container must be used to properly identify all samples collected in the field. To the extent possible, the sample labels are to be placed on the bottles so as not to obscure QA/QC lot numbers on bottles. Sample information must be printed in a legible manner using waterproof ink. Field identification must be sufficient to enable cross reference with the field sampling records or sample logbook. For Chain-of-Custody purposes, all QC samples are subject to the same custodial procedures and documentation as original samples.

6.1.2 Custody Seals

Custody seals are pre-printed adhesive-backed seals, often with security slots, designed to break if the seals are disturbed. Sample shipping containers (coolers, cardboard boxes, etc.) are sealed to ensure security. Seals must be signed and dated before use. Upon receipt at the laboratory, the custodian must check (and certify by completing logbook entries) that seals on shipping containers are intact. Strapping tape should be placed over the seals to ensure the Chain-of-Custody remains intact and seals are not inadvertently destroyed during sample shipment.

6.1.3 Chain-Of-Custody Record

The Chain-of-Custody record must be fully completed, on duplicate, at a minimum, by the field technician who has been designated responsible for sample shipment. In addition, if samples are

known to require rapid analysis turnaround time because of project time constraints or analytical concerns (e.g., extraction time or sample retention period limitations), the person completing the Chain-of-Custody record should note these constraints in the "Remarks" section of the Custody record.

6.1.4 Field Custody Procedures

- As few persons as possible should handle samples.
- Sample bottles will be obtained pre-cleaned by the laboratory and shipped to sampling personnel in charge of the field activities.
- Coolers or boxes containing cleaned bottles will be sealed with a custody tape seal during transport to the field or while in storage prior to use.
- The sample collector is personally responsible for the care and custody of samples collected until they are transferred to another person or dispatched properly under Chain-of-Custody procedures.
- The sample collector will record sample data in a controlled field notebook and/or on appropriate field sampling records.
- The Site team leader will determine whether proper custody procedures were followed during fieldwork, and decide if additional samples are required.

6.2 DOCUMENTATION

6.2.1 Sample Identification

All containers of samples collected from the project will be identified using the following format on a label or tag fixed to the sample container:

Sample Type Abbreviations which may be used include:

- SS Soil Sample
- GW Groundwater Sample
- A Air
- SB Source Blank
- TB Trip Blank
- ER Equipment Rinse
- FB Field Blank

For example, a sample number: SS-3 (0-2') would indicate a surface soil sample collected at the Site, at location 3 and at depths of 0 to 2 feet below ground surface. Each sample will be labeled, chemically preserved (where required), and sealed immediately following collection. To minimize handling of sample containers, labels will be filled out prior to sample collection to the extent possible. The sample label will be filled out using waterproof ink and will be firmly affixed to the appropriate sample container. The following information will be contained on the sample label:

- Name or initials of sampler;
- Date and time of collection;
- Sample identification;

- Intended analysis; and
- Preservation method (if any).

6.2.2 Daily Logs

Daily logs and data forms are necessary to provide sufficient data and observations to enable participants to reconstruct events that occurred during the project. All daily logs will be kept in a notebook and consecutively numbered. All entries will be made in waterproof ink, dated, and signed. Sampling data will be recorded in sampling records. Errors in daily reporting logs will be corrected with a single strike-through line through incorrect information, and the initials of the personnel responsible for the correction.

6.3 SAMPLE HANDLING, PACKAGING, AND SHIPPING

The transportation and handling of samples must be accomplished in a manner that not only protects the integrity of the sample, but also prevents any detrimental effects due to the potential hazardous nature of the samples. Regulations for packaging, marking, labeling, and shipping hazardous materials are promulgated by the United States Department of Transportation (DOT) in the Code of Federal Regulations, 49 CFR 171 through 177.

All Chain-of-Custody requirements must comply with standard operating procedures in the NYSDEC and USEPA sample handling protocols. Field personnel will make arrangements for samples to be transported to the laboratory. When custody is relinquished to a shipper, field personnel will ensure that the laboratory custodian or Project Manager is aware of the expected arrival time of the sample shipment and of any time constraints on sample analysis. All samples will be delivered to the laboratory in a timely manner to help ensure sample analysis holding times are met.

7.0 CALIBRATION PROCEDURES AND FREQUENCY

All instruments and equipment used during sampling and analysis will be operated, calibrated, and maintained according to the manufacturer's guidelines and recommendations as well as criteria set forth in the applicable analytical methodology references.

7.1 FIELD INSTRUMENTS

A calibration program will be implemented to ensure that routine calibration is performed on all field instruments. Field team members familiar with field calibration and operation of the equipment will maintain proficiency and perform the prescribed calibration procedures outlined in the Operation and Field Manuals accompanying the respective instruments. Calibration records for each field instrument used on the project will be maintained on-site during field activities and a copy will be kept in the project files.

7.1.1 Portable Total Organic Vapor Monitor

Any vapor monitor used will undergo routine maintenance and calibration prior to shipment to the project site. Daily calibration and instrument checks will be performed by a trained team member at the start of each day. Daily calibrations will be performed according to the manufacturer's specifications and are to include the following:

- Battery check: If the equipment fails the battery check, recharge the battery.
- Gas standard: The gauge should display an accurate reading when a standard gas is used.
- Cleaning: If proper calibration cannot be achieved, the instrument ports must be cleaned.

7.1.2 pH and Specific Conductance

The following steps should be observed by personnel engaged in groundwater sampling for pH and specific conductance:

- The operation of instrumentation should be checked prior to each day’s sampling and calibrated if necessary. Fresh standard buffer solution (pH 4, pH 7 and pH 10) will be used if it is determined that calibration is required.
- The specific conductance meter should be calibrated prior to each sampling event using a standard solution of known specific conductance.

More frequent calibrations may be performed as necessary to maintain analytical integrity. Calibration records for each field instrument used on the project should be maintained and a copy kept in project files.

8.0 ANALYTICAL PROCEDURES

8.1 FIELD

On-site procedures for analysis of total organic vapor and other field parameters are addressed in the Remedial Investigation Work Plan.

8.2 LABORATORY

Specific analytical methods for constituents of interest in soil and groundwater are listed in Table 2. The laboratory will maintain, and have available for the appropriate operators, standard operating procedures relating to sample preparation and analysis according to the methods stipulated in Table 2.

9.0 DATA REDUCTION AND REPORTING

QA/QC requirements will be strictly adhered to during sampling and analytical work. All data generated will be reviewed by comparing and interpreting results from chromatograms (responses, stability of retention times), accuracy (mean percent recovery of spiked samples), and precision (reproducibility of results). Refer to Section 10 for a discussion of QA/QC protocol.

Data storage and documentation will be maintained using logbooks and data sheets that will be kept on file. Analytical QC will be documented and included in the analytical testing report. A central file will be maintained for the sampling and analytical effort after the final laboratory report is issued.

All calculations and data manipulations are included in the appropriate methodology references. Control charts and calibration curves will be used to review the data and identify outlying results. Prior to the submission of the report to the client, all data will be evaluated for precision, accuracy, and completeness. Sections 8.0 and 13.0 of this document include some of the QC criteria that will be used in the data evaluation process.

Laboratory reports will be reviewed by the laboratory supervisor, the QA Officer, Laboratory Manager and/or Director, and the project manager. Analytical reports will contain a data tabulation including results and supporting QC information will be provided. Raw data will be available for later inspection, if required, and maintained in the control project file.

All data will be reported to NYSDEC in electronic format in accordance with DER-10 and the NYSDEC's Environmental Data Submission requirements.

10.0 INTERNAL QUALITY CONTROL CHECKS

QC data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of glassware and reagents. The procedures for internal quality control checks will be consistent with NYSDEC ASP protocols.

11.0 PERFORMANCE AND SYSTEM AUDITS

11.1 FIELD AUDITS

The Project QA Director may conduct episodic audits of the operations at the Site to ensure that work is being performed in accordance with the Work Plan and associated Standard Operating Practice (SOP). The audit will cover, but not necessarily be limited to, such areas as:

- Conformance to standard operating procedures;
- Completeness and accuracy of documentation;
- Chain-of-Custody procedures; and
- Construction specifications.

11.2 LABORATORY AUDITS

In addition to any audits required by the NYSDEC, the Project QA Director may choose to audit the laboratory. These additional audits may take the form of performance evaluation samples or on-site laboratory inspections. Performance evaluation samples may be either blind samples or samples of known origin to the laboratory. Reasonable notice will be provided if the audit is to include an on-site inspection.

12.0 PREVENTIVE MAINTENANCE

12.1 FIELD

Field personnel assigned to complete the work will be responsible for preventative maintenance of all field instruments. The field sampling personnel will protect the portable total organic vapor monitors, water quality meter, etc. by placing them in portable boxes and/or protective cases.

All field equipment will be subject to a routine maintenance program, prior to and after each use. The routine maintenance program for each piece of equipment will be in accordance with the manufacturer's operations and maintenance manual. All equipment will be cleaned and checked for integrity after each use. Necessary repairs will be performed immediately after any defects are observed, and before the equipment is used again. Equipment parts with a limited life (such as batteries, membranes, and some electronic components) will be periodically checked and replaced/recharged as necessary according to the manufacturer's specifications.

12.2 LABORATORY

The laboratory's preventative maintenance procedures can be provided as outlined in their Laboratory Quality Assurance Manual.

13.0 DATA ASSESSMENT PROCEDURES

Performance of the following calculations will be completed to evaluate the accuracy, precision and completeness of collected measurement data.

13.1 PRECISION

Precision of a particular analysis is measured by assessing its performance with duplicate or replicate samples. Duplicate samples are pairs of samples taken in the field and transported to the laboratory as distinct samples. Often, the identity of a sample as a duplicate is unknown to the laboratory, so their usefulness for monitoring analytical precision at bench level is limited. For most purposes, precision is determined by the analysis of replicate pairs (i.e., two samples prepared at the laboratory from one original sample). In replicate analysis the sample often chosen for replication does not contain target analytes so that quantification of precision is impossible. Replicate pairs of spiked samples, known as matrix spike/matrix spike duplicate samples, are used for precision studies. This has the advantage that two real positive values for a target analyte can be compared.

Precision is calculated in terms of Relative Percent Difference (RPD), which is expressed as follows:

$$RPD = \frac{(X_1 - X_2)}{(X_1 + X_2)/2} \times 100$$

Where X_1 and X_2 represent the individual values found for the target analyte in the two replicate analyses or in the matrix spike/matrix spike duplicate analyses. RPDs must be compared to the method RPD for the analysis. The analyst or his/her supervisor must investigate the cause of RPDs outside stated acceptance limits. This may include a visual inspection of the sample for non-homogeneity, analysis of check samples, etc. Follow-up action may include sample re-analysis or flagging of the data as suspect if problems cannot be resolved.

13.2 ACCURACY

Accuracy of a particular analysis is measured by assessing its performance with "known" samples. These "knowns" can take the form of EPA or NBS traceable standards (usually spiked into a pure water matrix), or laboratory prepared solutions of target analytes into a pure water or sample matrix; or (in the case of GC or GC/MS analyses) solutions of surrogate compounds which can be spiked into every sample and are designed to mimic the behavior of target analytes without interfering with their determination. In each case the recovery of the analyte is measured as a percentage, corrected for analytes known to be present in the original sample if necessary, as in the case of a matrix spike analysis. For EPA or NBS supplied known solutions, this recovery is compared to the published data that accompany the solution. For prepared solutions, the recovery is compared to EPA-developed data or historical data as available. In the case of surrogate compounds, recoveries are compared to USEPA Contract Laboratory Program (CLP) acceptable recovery tables. If recoveries do not meet required criteria, then the analytical data for the batch (or, in the case of surrogate compounds, for the individual sample) are considered potentially inaccurate.

For highly contaminated samples, recovery of matrix spike may depend on sample homogeneity. As a rule, analyses are not corrected for recovery of matrix spike or surrogate compounds.

13.3 COMPLETENESS

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the total amount expected to be obtained under normal conditions. Completeness for each parameter is calculated as:

$$\text{Completeness} = \frac{\text{Number of successful analyses}}{\text{Number of requested analyses}} \times 100$$

Target value for completeness for all parameters is 100%. A completeness value of 95% will be considered acceptable. Incomplete results will be reported to the client project officer.

13.4 REPRESENTATIVENESS

The characteristic of representativeness is not quantifiable. Subjective factors taken into account are as follows:

- The degree of homogeneity of a site;
- The degree of homogeneity of a sample taken from one point in a site; and
- The available information on which a sampling plan is based.

To maximize representativeness of results, sampling techniques and sample locations will be carefully chosen so that they provide laboratory samples representative of the Site and the specific area.

14.0 CORRECTIVE ACTIONS

Corrective actions can be initiated as a result of performance and system audits, laboratory and interfiled comparison studies, data validation, and/or a QA program audit. They may also be required as a result of a request from project representatives. All corrective action necessary to resolve analytical problems will be taken. Success or failure of corrective actions will be reported with an estimate of effect on data quality, if any.

Corrective actions may include altering procedures in the field, conducting subsequent audits, or modifying project protocol. Time and type of corrective action, if needed, will depend on the severity of the problem and relative overall project importance. The project manager is responsible for initiating corrective action and the team leader is responsible for its implementation in the correction of field non-conformance corrective actions.

15.0 QUALITY ASSURANCE REPORTS

Upon completion of a project sampling effort, analytical and QC data will be included in a Data Usability Summary Report (DUSR) that summarizes the work and provides a data evaluation. A discussion of the usability of the results in the context of QA/QC procedures will be made, as well as a summation of the QA/QC activity. The DUSR will be performed in accordance with the DEC's "Guidance for the Development of Data Usability Summary Reports," revised 1997 and DER-10.

Serious analytical problems will be reported. Time and type of corrective action, if needed, will depend on the severity of the problem and relative overall project importance. Corrective actions may include altering procedures in the field, conducting an audit, or modifying laboratory protocol. All corrective action will be implemented after notification of the project representatives.

16.0 REFERENCES

New York State Department of Environmental Conservation (NYSDEC), 2010. *DEC Program Policy. DER-10/Technical Guidance for Site Investigation and Remediation.*

NYSDEC, 2013. *Analytical Services Protocol.*

United States Environmental Protection Agency (USEPA), 2005. *Standard Methods for the Examination of Water and Wastewater.*

USEPA, 2008. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods/SW-846.*

TABLES

TABLE 1
SAMPLE SUMMARY

Media	Type	Matrix	Data Use
Soil	Pneumatic Soil Boring	Soil	Comparison to Part 375[2]
	HSA[1] Split Spoon		
	Pneumatic Soil Vapor Boring		
Vapor	VOCs[3]	Vapor	NYSDOH[4] Vapor Intrusion Guidelines
Groundwater	Monitoring Wells	Water	Comparison to Part 703.5[5]
	Pneumatic Boring Grab Sample		

Notes:

(1) Hollow-stem auger
(2) Title 6 of the New York Codes, Rules, and Regulations Part 375 (6 NYCRR 375) Soil Cleanup Objectives
(3) Volatile organic compounds
(4) New York State Department of Health
(5) 6 NYCRR 703.5 - *Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations, Water quality standards for taste-, color- and odor-producing, toxic and other deleterious substances*

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TABLE 2
SAMPLE CONTAINERS AND PRESERVATION

Parameter	Method	Matrix	Container	Preservation[1]
TCL[3] VOCs[4]	SW-846[2] 8260B	Groundwater	Glass, 2 x 40 mL	HCl to pH<2
		Soil	Glass, 4 x 40 mL (Terracore)	USEPA 5030/5035
	USEPA[5] TO-15	Vapor	SUMMA Canister (6 L)	None
TCL SVOCs[6]	SW-846 8270C	Groundwater	Amber Glass, 1 x 1000 mL	None
		Soil	Glass Soil Jar, 1 x 8 oz	None
TCL Pesticides	SW-846 8081B	Groundwater	Amber Glass, 1 x 1000 mL	None
		Soil[7]	Glass Soil Jar, 1 x 8 oz	None
TCL Aroclors	SW-846 8082A	Groundwater	Amber Glass, 1 x 1000 mL	None
		Soil[7]	Glass Soil Jar, 1 x 8 oz	None
TAL[8] Metals	SW-846 6010C	Groundwater	Plastic, 1 x 250 mL	HNO_3
		Soil[7]	Glass Soil Jar, 1 x 8 oz	None
Cyanide	SW-846 9012B	Groundwater	Plastic, 1 x 250 mL	NaOH
		Soil[7]	Glass Soil Jar, 1 x 8 oz	None

Notes:

(1) All soil and groundwater samples will be maintained at 4ºC following collection
(2) USEPA *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*
(3) Target Compound List
(4) Volatile organic compounds
(5) United States Environmental Protection Agency
(6) Semi-volatile organic compounds
(7) Sample can be analyzed from same jar containing soil for SVOC analysis
(8) Target Analyte List

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TABLE 3
SUMMARY OF QUALITY CONTROL CHECKS

Sample Type	Frequency	Justification
Field Duplicate	1 per 20 samples collected	Data shows precision of analytical scheme from sampling through analysis when compared with results of sample. This represents a blind QC sample to the laboratory. Collect an additional amount of sample.
Laboratory Duplicate	1 per 20 samples collected	Data shows precision of the analytical scheme within the laboratory. The difference between this precision and that of the field duplicate represents the precision of the analytical method.
LS/LSD[(1)]	1 per 20 samples collected	Data shows how well the analysis of interest can be performed, and recovered from the sample matrix. Such information is useful when reported value is near an action level, but the sample exhibits poor recovery.
MS/MSD[(2)]	1 per 20 samples collected	Data shows precision of analysis when compared with matrix spike duplicate and matrix effects from recovery of spiked analysis. Collect an additional amount for each analysis. Analyzed as a spike.
MS/MSD (inorganic)	1 per 20 samples collected	Data shows precision of laboratory analysis when compared with results of sample. Collect an additional amount of sample for each analysis. Analyzed as unspiked sample.
Field Blank/ Equipment Blank	As required by DQOs[(3)]	Data demonstrates that sampling equipment was clean prior to use. Pass a sample of reagent water through collection device. Submit for analysis of analytes of concern.
Trip Blank	One per cooler containing samples for VOC[(4)] analysis	Data demonstrates that sample was not contaminated with volatile organics by other samples in shipping container, laboratory or outside influences.
Background or Reference Sample	As required by DQOs	Data provides baseline information to evaluate environmental impact.
Split Samples	When required to meet DQOs	Compare the quality of laboratory procedures of the permittee with State contracted laboratory procedures. Collect an additional amount of sample for each analysis.

Notes:

(1) Laboratory Spike/Laboratory Spike Duplicate
(2) Matrix Spike/Matrix Spike Duplicate
(3) Data Quality Objectives
(4) Volatile Organic Compounds

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Daily Observation Log

Daily Observation Log

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Project Name:	**Date:**
Project Address:	**Weather:**
Field Activity:	

PERSONNEL: Name	COMPANY	TIME IN	TIME OUT

TIME	DESCRIPTION OF WORK PERFORMED

Daily Observation Log (continuted)

CORE ENVIRONMENTAL

Project Name:	**Date:**

TIME	DESCRIPTION OF WORK PERFORMED

FORMS

Soil Boring Log

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2312 Wehrle Drive
Williamsville, NY
14221
(716) 204-8054

TEST BORING LOG

BORING NO.

Project:
Client:
Contractor:

Project No.
GS Elev
WS Ref Elev
N-S Coord
E-W Coord
Start Date
Finish Date
Driller
Geologist

Groundwater Data (feet)				Equipment Data			
Date	Time	Depth	Elev		Casing	Sampler	Core
				Type	HSA	SS	HQ
				Diameter	4.25"	2.0"	3.5"
				Weight		140 #	
				Fall		30"	

Well Construction	Depth (feet)	Sample No.	Blows per 6"	N' Value	Recovery (%)	Graphic Log	Field Description	Remarks PID Reading (ppm) Direct Screen	Remarks PID Reading (ppm) Head Space
	5								
	10								
	15								
	20								
	25								
	30								

FORMS

Well Development/Sampling Log

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WELL SAMPLING/DEVELOPMENT RECORD

Well ID: _____ **Initial Depth to Water:** _____

Sample ID: _____ **Duplicate ID:** _____ **Depth to Water After Sampling:** _____

Sample Depth: _____ **Total Depth to Well:** _____

Project Name: _____ **Well Diameter (in.)** _____

Project Address: _____ **1 Casing Volume (Gallons)** _____

Date: _____

Sampled By: _____ **Sample Time:** _____ **4 Casing Volumes (Gallons)** _____

Purge Method: _____

Sample Method: _____ **Total Casing Volumes Removed:** _____

Time	Rate (gal/min)	Cum. Vol. (gal)	Temp (°C)	pH (units)	Specific Electrical Conductivity (mS/cm)	Redox Potential mV	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Depth to Water (ft btoc)	Remarks (color and sediment)

pH CALIBRATION (choose two)			
Buffer Solution	pH 4.0	oH 7.0	pH 10.0
Field Temperature (°C)			
Instrument Reading			

SPECIFIC ELECTRICAL CONDUCTANCE - CALIBRATION			
KCL Solution (mS/cm)	4.49 at 25°C		
Field Temperature (°C)			
Instrument Reading			

REDOX CALIBRATION	DISSOLVED OXYGEN CALIBRATION
Standard Solution	Salinity %
Field Temperature (°C)	Altitude
Instrument Reading	Instrument Readin
Model or Unit No.	Model or Unit No.

Model or Unit No:

Well Diameter	Volume (gal/ft)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

Model or Unit No:

Notes:

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WELL SAMPLING/DEVELOPMENT RECORD
(continued)

Well ID: ______________________ **Date:** ____________ **Project Name:** ______________________________ Page _____ of _____

Time	Rate (gal/min)	Cum. Vol. (gal)	Temp (°C)	pH (units)	Specific Electrical Conductivity (mS/cm)	Redox Potential mV	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Depth to Water (ft btoc)	Remarks (color and sediment)

SAMPLE CONTROL LOG

CORE ENVIRONMENTAL

Project Name: _____ **Laboratory:** _____

Project Address: _____ **Page** _____ **of** _____

Sampling Date	Sampling Time	Sample ID	C.O.C. Number	Analyses Requested	Remarks (Duplicate, Blank info, etc.)	Date Sent to Lab
				See C.O.C.		

ATTACHMENT

Resumes

CORE ENVIRONMENTAL CONSULTANTS

RESUME

RONALD TRAMPOSCH

Senior Project Manager

CURRENT RESPONSIBILITIES:

Mr. Tramposch is a Senior Project Manager with over 25 years of experience in remedial investigations, feasibility studies, underground storage tank management programs, and remedial system design. He specializes in management of large work-order based environmental investigation and remediation projects. He has managed hazardous materials projects involving lead, metals, PCBs, hazardous waste, and asbestos, with many of these assignments occurring simultaneously. He also has experience in environmental assessment, planning, supervision, and interpretation of hydrogeologic and geotechnical investigations, and report preparation for various suites including active and inactive hazardous waste sites. Mr. Tramposch is currently directing an indefinite delivery order contract for asbestos, lead, and comprehensive environmental services for New York City Transit.

YEARS EXPERIENCE WITH FIRM: 10

YEARS EXPERIENCE WITH OTHER FIRMS: 30

EDUCATION:
B.S., Geology, State University of New York at Buffalo, 1982
M.S., Environmental Science, University of New Haven, 1988

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS:

USEPA Environmental Impact Assessment Training
OSHA Confined Space Safety Training
40 Hour OSHA Waste Site Worker Protection Training
8 Hour OSHA Supervisory Training
New York State DOL Asbestos Supervisor
NYCDEP Certified Asbestos Investigator

SUMMARY OF EXPERIENCE:

Remedial Investigation/Feasibility Study Work Plan for the Former National Rubber Adhesives Site, Long Island City, NY – Hamil Stratten Properties, LLC: Project Manager responsible for oversight of a Remedial Investigation/ Feasibility Study (RIFS) Work Plan for the former National Rubber Adhesives Site in Long Island City, New York. Remedial Investigation activities are being performed to delineate the nature and extent of subsurface impacts potentially associated with historic site activities. In addition to determining the proper field and office activities necessary for the successful completion of the investigation, the Work Plan also included the preparation of Site-specific Quality Assurance Project Plan (QAPP), Health and Safety Plan (HASP), and Community Air Monitoring Plan (CAMP).

Phase I Remedial Investigation Report, Remedial Investigation Work Plan, and Interim Remedial Measure Work Plan for the Wills Building, Long Island City, NY – Wills Family Group Limited Partnership: Project Manager responsible for oversight of a Scope of Work for Phase I Remedial Investigation including the installation of soil boring and groundwater monitoring wells to delineate the nature and extent of known subsurface impacts. Oversaw the preparation of a Remedial Investigation Report (RIR) that detailed a description of Site investigation activities, investigation results, and an analysis and interpretation of results. In addition, oversaw the development of a Remedial Investigation Work Plan for additional Site investigation activities and an Interim Remedial Measure Work Plan to address sub-slab vapor and indoor air quality issues in the on-Site building.

Phase I Environmental Site Assessment, Eberl Iron Works, Buffalo, NY: Oversaw the completion of a Phase I ESA for Eberl Iron Works for a building located on Sycamore Street in Buffalo, NY. The Phase I ESA included historical records reviews including but not limited to environmental records, proprietary records, topographical maps, Sanborn maps, aerial photography, and City Directories to assess the current and past environmental conditions at the site.

SEQR Determination and Documentation Services, NOCO Energy Corp, Tonawanda, NY: Senior Project Manager responsible for the completion of the State Environmental Quality Review (SEQR) component for NOCO for a proposed Emergency Power System at their Terminal located in Tonawanda, New York. The property was classified as a major oil storage facility (MOSF) with a capacity of over 400,000 gallons. Mr. Tramposch was responsible for preparing the SEQR evaluation, determination, documentation and municipal permitting, as well as the materials included as part of grant evaluations for NY State Dormitory Authority and Federal Emergency Management Agency (FEMA) funds.

SUNY Buffalo, Asbestos Survey & Design Services, O'Brian Hall: Senior Project Manager responsible for the completion of an inspection for suspect asbestos-containing materials at O'Brian Hall, located on SUNY Buffalo's North Campus. The inspection included all accessible interior spaces, building envelopes, and roof areas. Collected bulk samples for laboratory analysis at suspect locations. Completed an asbestos survey report along with asbestos abatement design specifications for the removal.

SUNY Buffalo, Asbestos Project & Air Monitoring Services, Cary Hall: Project Manager responsible for oversight during the project monitoring services at Cary Hall, located on SUNY Buffalo's North Campus. Supervised CORE's project monitors completing oversight during asbestos abatement that included floor tile and mastic, cove base, sinks, and a fume hood containing transite panels. Oversaw the completion of an Asbestos Final Project report that detailed the asbestos abatement.

Asbestos Abatement Monitoring and Testing, Emery Park, Erie County Department of Public Works: As Program Manager for our Hazardous Materials Term Agreement with Erie County for Asbestos Abatement Monitoring and Testing, Mr. Tramposch directed the collection of samples of suspect materials at Emery Park in the Richardson Lodge and Shelter, and the

Stohres Lodge. Suspect materials were analyzed for asbestos using a New York State Department of Health ELAP certified laboratory and report of Asbestos Abatement monitoring and testing prepared.

Asbestos Abatement Project Monitoring, Beebe Road Waterline, Wilson, NY: Project Manager responsible for the removal and disposal of ACM waterline pipe in association with the reconstruction of Beebe Road in Wilson, NY. Mr. Tramposch was responsible for overseeing project monitors during project monitoring and air sampling in accordance with New York State Department of Transportation Standard Specification Section 210 – Removal and Disposal of Asbestos Containing Material. Mr. Tramposch oversaw the completion of a Closure Report, which included copies of daily project records, sample analytical results and waste manifests.

Phase II Environmental Site Investigation (ESI) for 91 Sawyer Avenue, Niagara Blower Company, Tonawanda, NY: Project Manager responsible for completion of Phase II Environmental Site Investigation (ESI) to investigate Recognized Environmental Conditions (REC's) identified in Draft Phase I Environmental Assessment (ESA). A Phase II Environmental Site Investigation was conducted and consisted of the advancement of fourteen soil borings, collection of soil samples from each boring for laboratory analysis, and the sampling and laboratory analysis of groundwater samples collected from monitoring wells at four locations (both permanent and temporary wells).

Lead Based Paint Inspection Services Contract, New York City, NY - NYC Housing Authority: Project Manager responsible for project oversight of all lead based paint inspections. Inspections were completed on housing units, common areas, and storage units in accordance with U.S. Housing and Urban Development protocols. Inspections included the use of X-Ray Fluorescence (XRF) analysis in each unit and often paint chip samples were collected and laboratory analyzed. The XRF analysis is conducted on site, using a portable LPA-1 Lead Paint Inspection System manufactured by Radiation Monitoring Devices, Inc. (RMD).

Asbestos Services, Five Boroughs, NY - NYC School Construction Authority: Project Manager responsible for oversight of the air sampling and project monitoring. He managed the surveys that included collection of bulk samples throughout the campus that included operating office buildings, mechanical rooms, and various other structures.

Asbestos, Lead, and Comprehensive Environmental Consultant Services Contract, NY – NYCT MTA: Program Manager responsible for three consecutive indefinite quantity contracts. Responsible for the overall management of the project ensuring all required resources were provided to meet project schedules and budgets. Additional responsibilities include the development and implementation of project quality control and assurance measures. Services included asbestos investigations and reports, development of abatement work plans, cost estimating, project coordination and interfacing with site representatives, and project management with oversight of the abatement contractors. Project sites included operating substations, subway stations, office buildings, mechanical rooms, rail yards, bus depots, tunnels, bridges, and various other structures throughout many of NYCT's over 3,000 facilities throughout New York City.

Mother Clara Hale Bus Depot Replacement, New York City, NY Franklin Company Contractors / NYCT MTA: Project Manager responsible for overseeing an experienced scientist to initially direct the contractor in segregating excavated soils according to total organic vapor (TOV) content with a photo-ionization detector. The work was completed in 20' x 20' cells. The soil was stabilized by open pit mixing with a fly ash and grout mix that was previously pilot tested. The stabilization was verified by wet sampling from specific intervals. Responsible for the review of all project deliverables.

Petroleum Monitoring Reporting Services Contract, New York City, NY NYC Housing Authority: Project Manager responsible for project oversight of the Quarterly Petroleum Remediation Monitoring Reports at 27 Housing Development Sites that have groundwater contamination resulting from petroleum releases from fuel oil tanks. The purpose of the report is to summarize petroleum remediation activities performed on site, describe the current status, and provide an analysis of current remediation system effectiveness with further recommendation.

Site Investigation and Remediation, Lewiston, NY - NYPA: Completed the project management for a site remediation and investigation project at a vacant site impacted with No. 2 fuel oil. The site had formerly contained a building and operated as a construction staging area for the Niagara Power Project. Included In house completion of manual product recovery

from monitoring wells, a geophysical survey with anomalies located utilizing a Global Positioning System (GPS), a drilling investigation that included rock coring and monitoring well installation and soil and groundwater screening and sampling. All waste streams were characterized for treatment and/or disposal and a comprehensive report was completed.

UST Management Program, NY – NYCT MTA: Project Manager responsible for this program involving site assessments, remedial investigation, feasibility studies, remedial design, and remedial action oversight services for the New York City Transit Underground Storage Tank Management Program. Activities include tank tightness testing, remedial investigations and remediation recommendations, design overview and technical inspection for tank replacement and installation. The underground storage tanks (USTs) are located in all five boroughs of New York City, encompassing 350 tanks at 27 facilities. The USTs range in size from 200 gallons to 35,000 gallons, are generally single walled, and are up to 52 years in age. The tanks contain petroleum products such as gasoline, diesel fuel, lube oil, fuel oil, and waste oil. A comprehensive database and GIS system was developed for UST management.

Remediation System Services, New York City, NY - Franklin Co.: Project Manager for providing remediation system operation and maintenance, monitoring and reporting services at 14 sites in the five boroughs of New York City. Developed and implemented site specific investigations to evaluate the extent and migration of contamination in soil and groundwater. In-depth evaluations of soil and groundwater contamination along with pilot study data and recommendations for remediation were completed. Core personnel prepared the design drawings and specifications for the selected remedial approach. Manager for providing construction monitoring and inspection services during system installation, startup and initial troubleshooting.

Facility Reports, Plans and Drawings, New York City, NY - Franklin Company Contractors, NYC Department of Environmental Protection: Project Manager responsible for overseeing the preparation of Petroleum Bulk Storage (PBS) Facility Reports, As-Built Drawings of tanks and Spill Prevention, Control, and Countermeasures Plans (SPCC) at 24 New York City Department of Environmental Protection (DEP) Water Pollution Control Plants and Pumping Stations under Contract 1198-PBS. The purpose of the PBS Facility Report is to identify PBS deficiencies at the site, if any, and provide recommendations for corrective actions. The program is part of DEP's on-going effort to inspect, test, maintain and determine the regulatory health of their PBS tanks, and ancillary equipment through testing, inspection, review, and modifications. As-built drawings were produced from record drawings and field inspections in order to satisfy the requirements of New York State PBS regulations. The drawings and plans were reviewed and approved by the Project Manager prior to submission to the client the NYC DEP.

Waste Auditor: Performed the compliance auditing of eight (8) hazardous waste management facilities and Waste Accumulation Areas (WAAs) for compliance with EPA and NYSDEC policies. Waste included: hazardous, radioactive (high and low level), and mixed.

JFK IA Terminal 5 Redevelopment, Queens, NY - Turner Construction Corp.: Project Manager for completing the field monitoring and oversight of the JFK International Airport Terminal 5

Redevelopment Project. The project area, approximately 67 acres, required work area air monitoring throughout the excavation program. As the project air monitoring consultant, Core was responsible for conducting NYSDOL and OSHA compliance monitoring. Core performed continuous air monitoring during excavation of the hydrant fueling lines. A photo-ionization detector (PID) and an explosimeter were used to document site conditions for worker Health and Safety monitoring. Air monitoring equipment was calibrated daily and all data including meteorological data (e.g., temperature range, wind speed, wind direction, etc.) was recorded. He supervised the Asbestos Project Air monitoring consultant during abatement and completed the QA/QC of daily reports.

Warehouse Demolition/ Remediation, JFK IA, Queens, NY - JetBlue Airways: Principal in Charge for the site investigation and design for the demolition of four large warehouse and maintenance facilities at JFK International Airport. He provided field support and prepared site investigation reports for the remediation of hazardous materials and asbestos. He supervised the preparation of drawings and specifications for the removal of asbestos, USTs, drummed wastes (PCBs and CFCs).

JetBlue Airways, JFK IA, Queens, NY: Project Manager for completing a Spill Prevention Controls and Countermeasures Plan at John J. Kennedy International Airport Building 74 Ground Service Equipment (GSE) Maintenance Building. For JetBlue, he managed the preparation of a SPCC Plan, in writing, and in accordance with 40 CFR Part 112.7, and any other applicable section of Part 112 – Oil Pollution Prevention (40 CFR Part 112.8). Petroleum Bulk Storage at Building 74 GSE the facility is in one (1) aboveground storage tank (AST) and numerous 55-gallon capacity drums.

Logan International Airport, Boston, MA - JetBlue Airways: Project Manager for completing the SWPPP at the Logan Station after Massachusetts switched to a multi sector general permit. Completed the project Quality Assurance and Quality Control (QA/QC) review for site specific SWPPPs for an expanding airline at international airports. Tasks included confirmation of site drainage, outfalls, permits and airport BMPs as well as the overall review of all report submittals, which included reports, inspection forms, drawings, figures, BMPs, flow charts, and spill report procedures.

Habitat Restoration Project at Calvert Vaux Park (formerly Dreier-Offerman Park), Brooklyn, NY: This project included the construction of aquatic and coastal upland habitats, wetland restoration, and trail construction. The project also involved the removal of 3.2 acres of contaminated soil. Mr. Tramposch was the Program Manager responsible for air monitoring services in relation to the removal of contaminated soil. Core monitored upwind and downwind areas of excavation work to ensure that dust concentrations did not exceed New York State Department of Environmental Conservation (NYSDEC) regulations [TAGM 4031]. Mr. Tramposch also completed the Site Specific Health and Safety Plan for environmental monitoring and weekly SPDES inspections. All Qualified Inspectors have received four (4) hours of training endorsed by the NYSDEC from a Soil and Water Conservation District and on-the-job training to follow the appropriate New York State standards, specifications, permits and manuals as part of the job.

Phase II ESAs, Queens, NY, Countrywide Commercial Real Estate: Project Manager responsible for Phase II (ESAs) for the properties to investigate the concerns determined during the Phase I activities. Core completed soil borings and temporary monitoring well installations to evaluate site soils and groundwater samples from the sites. ESA reports were prepared presenting the approach, methods, results, and interpretations of the data as well as recommendations, conclusions and an opinion on further action.

Incinerator/Garage Demolition, NY - NYCDOS: Project Director which included a detailed site investigation for asbestos / hazardous materials. and a structural evaluation in preparation of demolition design documents and specifications. Responsible for coordinating field work and for preparing drawing and specifications for asbestos, lead paint, mercury containing equipment, PCB-bearing equipment, residual ash, USTs, contaminated soil/groundwater and metals contaminated building components.

Varick Avenue Redevelopment, NY - NYCDOS: Principal in Charge for the subsurface environmental investigation for large property being redeveloped for use by NYCDOS. Investigation included over 80 soil borings for delineation of contamination. His investigation work saved the owner from extensive costs and his RI/Site Remediation Plan was cited for excellence by the Chief of NYSDEC's Regional Hazardous Waste Program.

UST Program, NY - DASNY: Project Manager for the Authority's Program to upgrade, replace, add/or close 28 underground storage tanks at various City of New York Campuses in order to comply with Federal, State, and Local regulations regarding storage of petroleum products. The project included heating oil and emergency generator underground storage tanks ranging in size from 280 - 48,000 gallons.

New York Bus Service, NY: Project Manager responsible for the design of a 1,000 cfm multi phase extraction system for the removal and treatment of free product, soil vapor and groundwater contamination. Negotiated a Stipulation Agreement with NYSDEC to allow discharge of treated groundwater to the Hutchinson River.

UST Program, NJ - NJ Department of Treasury: Project Manager responsible for the statewide underground storage tank program consisting of 281 facilities with approximately 1,369 tanks. Project included pre-design investigations, site assessments, tank tightness testing, and soil borings. Responsible for preparation of conceptual design documents and construction staging plans for the upgrade, replacement, and closure at each facility. Project included a motor fuel consolidation study consisting of 229 sites and 458 fuel tanks.

UST Program, NY - NYCDDC: Project Manager for this program, which included the design, construction inspection, and environmental investigation of 225 facilities for the Department of Design and Construction. He was responsible for preparing construction plans and specifications for the installation of 250 tanks.

Stormwater Pollution Prevention Plans, Multiple Cites, U.S. and U.S. Territories - JetBlue Airways: Project Manager for completing SWPPPs at 48 Locations in the U.S. and U.S. Territories: Completed the project Quality Assurance and Quality Control (QA/QC) review for

site specific SWPPPs for an expanding airline at international airports. Tasks included confirmation of site drainage, outfalls, permits and airport BMPs as well as the overall review of all report submittals, which included reports, inspection forms, drawings, figures, BMPs, flow charts, and spill report procedures.

Asbestos and Lead Paint Consulting Services - PA of NY&NJ: Principal for asbestos air and project monitoring services at various PA facilities. Project included surveying, bulk sampling, reporting, tracking of materials/ quantities, compliance monitoring, daily record-keeping of all contractor activities, and reporting.

Mendon Truck Leasing, NY: Project Manager responsible for the investigation of a petroleum spill and the pilot testing of a 600 cfm multi phase extraction system for the removal and treatment of free product, soil vapor and groundwater contamination. The system designed utilizes a medium vacuum liquid ring pump manifolded to 14 recovery wells to recover the free product, groundwater, and soil vapor. Additional duties included system operation, maintenance, and compliance monitoring/reporting.

Stuyvesant Cove Park, NY: Principal-in-Charge for the investigation, remediation, and redevelopment of a 20-acre brownfields site in Manhattan. This former industrial site was contaminated with petroleum products, PCBs, and metals. He provided an accelerated site investigation and remedial design within six months of the work assignment. His leadership provided design-build services and remedial system construction, operation, and maintenance.

Asbestos and Lead Monitoring and Design Services Contract, New York City, NY – NYCT MTA: Senior Project Manager responsible for the indefinite quantity contract (CM-1320). Responsible for the general day to day management of the project ensuring resources are available to meet project demands, schedules and budgets. Responsibilities include the implementation of project quality control and assurance measures including corrective actions. Services provided include lead inspections, lead based paint removal project oversight, waste determination and manifest tracking. Asbestos services include surveys, abatement designs and work plans, cost estimating, project coordination, project and air monitoring, project reporting and oversight of the abatement contractors

U.S. Air Force - Loring Air Force Base, ME: Design Task Manager for $1.4 million study for free product recovery at the base fire training area. Design elements include 300 gal/min groundwater treatment facility, blast fractured trench for product recovery, PLC remote monitoring and groundwater and plume modeling.

Asbestos Consulting Services, Bronx, Brooklyn, Queens and Staten Island, NY - Restored Homes HDFC: Project Manager responsible for assigning personnel, quality assurance and project deliverables. Core reviewed third-party lead-based paint (LBP) inspection reports, dust wipe analysis and determined the existence and presence of ACMs through surveys specific to areas scheduled for renovation. Also identified ACM, LBP and lead dust to determine what actions are necessary to treat, remediate, abate, enclose, encapsulate, remove or otherwise control such contaminants. Core also provided all design services necessary for the treatment, removal or abatement of ACMs and LBP.

Lead and Asbestos Services, Five Boroughs, NY - Mendon Truck Leasing: Project Manager responsible for the completion of the project to ensure scope of work is executed and the contract documents are adhered to and all appropriate standards are followed. Project included inspection services for lead and asbestos at buildings throughout New York City in support of facility design and future abatement, encapsulation and construction activities. Complete lead and asbestos investigative surveys, inspections, sampling and abatement design. Project reporting with chain of custodies, laboratory analysis and photographs was completed. Core also completed data management with a project information database. Project involves inspection services for lead and asbestos at buildings throughout New York City in support of facility design and future abatement, encapsulation and construction activities of 26 buildings and properties.

Kirkman Boulevard Site, NJ: Task Manager for the investigation of the ACIA hazardous waste site in Atlantic City, New Jersey. The property had a long history of manufactured gas plant (MGP) use and the investigations were conducted in support of redevelopment of the property into a rail terminal and convention center. Responsible for monitoring well construction, soil drilling, data interpretation, and report preparation. The report included plans for managing contaminated soil and groundwater as well plans for long-term monitoring at the site.

Karlsberger Architecture, P.C. - Various Sites: Principal-in-Charge for site investigations and property evaluations for building design and construction specifications at various development sites in New York City. The investigations included reviews of site historical information from Sanborn maps and state/federal database searches as well as subsurface investigations to characterize soil and groundwater quality. Mr. Tramposch identified one of the properties as the former Brooklyn Union Gas Flatbush Works manufactured gas plant (MGP) and MGP contaminants were identified.

GM Plant Decommissioning, Clark, NJ: Task Manager for a site previously used as an automobile assembly plant in Clark, New Jersey. Responsible for delineation of contamination and interpretation of hydrogeologic, geologic, and geotechnical data; and supervision of shallow and deep monitoring well construction. Evaluated 25 underground storage tanks for compliance with NJDEP/USEPA requirements. The project also included determination of soil remediation or reuse options and the development of remedial plans in accordance with NJDEP requirements.

GM Plant Decommissioning Study, Trenton, NJ: Project Manager for a NJDEP ISRA plant closure investigation which included a complete facility assessment with environmental sampling to identify potential environmental concerns. Project scope involved the investigation of PCB transformers, wastewater treatment equipment, RCRA storage areas, waste treatment tanks, USTs, ASTs, process equipment and potential asbestos-containing materials throughout the plant. Soil and groundwater contaminant levels were compared to NJDEP standards to determine cleanup requirements for site soil and groundwater.

Federal Deposit Insurance Corporation (FDIC), MA: Project Engineer responsible for performing environmental assessments of several properties to identify environmental concerns

relating to property transfer. Assessments involved site walkover inspections and file reviews for the identification of asbestos containing materials as well as lead based paint.

USAF Plattsburgh AFB, NY: Task Leader responsible for oversight of field work including groundwater, soil, and sediments sampling; developing geologic interpretations; and assisting in report preparation for several assignments of this Indefinite Delivery Type Contract for the U.S. Air Force.

CORE ENVIRONMENTAL CONSULTANTS

RESUME

TERESA TRAMPOSCH

Vice President

YEARS EXPERIENCE WITH FIRM: 10

YEARS EXPERIENCE WITH OTHER FIRMS: 20

EDUCATION:
B.S., Biochemistry and Nutrition, Cornell University, 1982
M.S., Biochemistry and Nutrition, Texas Woman's University, 1983

CURRENT RESPONSIBILITIES:

Ms. Tramposch has over 20 years of professional management experience. In late 2003, Ms. Tramposch formed a consulting company specializing in environmental services to include site assessment, site inspections and site remediation. Ms. Tramposch's distinguished career includes teaching at college level and numerous managerial positions prior to her current involvement in the environmental industry. Past and present responsibilities have prepared her for her role as President and Chief Executive Officer (CEO) of the growing corporation.

As Principal, Ms. Tramposch responsibilities include the operation of the corporation, maintaining the corporation books, and marketing the services of the corporation. Ms. Tramposch is responsible for the successful contracting with Restored Homes Housing Development Fund Corporation, the New York Power Authority, JetBlue Airways Corporation, Ryder Trucking, Mendon Leasing and Franklin Company Contractors.

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS:

Certified Environmental Inspector (CEI)
NYSDOL Asbestos Project Designer
EPA, IAQ Mold Remediation in Schools and Commercial Buildings

SUMMARY OF EXPERIENCE:

Habitat Restoration Work at Calvert Vaux Park (formerly Dreier-Offerman Park), Brooklyn, NY: Principal responsible for providing air monitoring services to monitor upwind and downwind areas of excavation work to ensure that dust concentrations in air did not exceed New York State Department of Environmental Conservation (NYSDEC) regulations [TAGM 4031]. CORE provided professional/civil engineering services to perform site inspections required to conform to the requirements in the NYSDEC Pollution Discharge for Construction Activities, General Permit GP-0-08-001.

Phase I Environmental Site Assessments (ESA) - Queens, NY: Completed the project Quality Assurance and Quality Control (QA/QC) review for ESAs completed for two (2) self storage facilities. The ESAs were prepared in accordance with ASTM E 1527-05 and EPA All

Appropriate Inquiry standards. The confirmation of the recognized environmental conditions (RECs) and overall review of all reports submittals was completed. A scope of work for Phase II ESI activities was provided as part of the ESAs.

Garrison Avenue Soil Remediation System, Brooklyn, NY: Project Principal for the remediation system installation and operation of a 350 scfm soil vapor extraction system for the Mendon Truck Leasing Garrison Avenue facility. Coordinated numerous sub-contractors for the installation of 350 feet of buried piping and as well as nine (9) vapor extraction wells. Close monitoring of project costs and contractors invoice were required.

Franklin Company Contractors, NYCT MTA Mother Clara Hale Bus Depot Replacement, New York City, NY: Principal in Charge of the project oversight of Core's scientist to initially direct the contractor in segregating excavated soils according to total organic vapor (TOV) content with a photo-ionization detector. The work was completed in 20' x 20' cells. The soil was stabilized by open pit mixing with a fly ash and grout mix that was previously pilot tested. The stabilization was verified by wet sampling from specific intervals. Responsible for the review of all project deliverables.

Health and Safety Plan, Lewiston, NY: Completed the program Quality Assurance and Quality Control (QA/QC) review for a site specific Health and Safety Plan (HASP) for a site remediation and investigation project at a vacant site impacted with No. 2 fuel oil. The site had formerly contained a building and operated as a construction staging area for the Niagara Power Project. The site is adjoined by a contaminated landfill site that has the potential to impact the target site. Project required confirmation of site specific contaminants of concern, exposure levels, personnel protection equipment (PPE), air monitoring, site controls, decontamination and emergency procedures.

Franklin Company Contractors, NYC Department of Environmental Protection, Facility Reports, Plans and Drawings, New York City, NY: Principal in Charge of the project oversight for the preparation of Petroleum Bulk Storage (PBS) Facility Reports, As-Built Drawings of tanks and Spill Prevention, Control, and Countermeasures Plans (SPCC) at 24 New York City Department of Environmental Protection (DEP) Water Pollution Control Plants and Pumping Stations under Contract 1198-PBS. The purpose of the PBS Facility Report is to identify PBS deficiencies at the site, if any, and provide recommendations for corrective actions.

NYCT Asbestos and Lead Monitoring and Design Services Contract, New York City, NY: Project Principal responsible for the indefinite quantity contract (CM-1320) and for the assurance that the contract documents adhered to all appropriate standards. Project involves inspection services for lead and asbestos throughout New York City in support of facility design and future abatement, encapsulation and construction activities. Services include lead and asbestos investigations and reports, development of abatement work plans, cost estimating, project coordination and interfacing with site representatives, and project management with oversight of the abatement contractors. Project sites included operating substations, subway stations, office buildings, mechanical rooms, rail yards, bus depots, tunnels, bridges, and various other structures throughout many of NYC Transits 3,000 facilities located throughout

the five boroughs of New York City.

NYC School Construction Authority, Asbestos Services, Five Boroughs, NY: Principal in Charge of the project oversight of the air sampling and project monitoring at New York City Schools. The project included surveys, to include the collection of bulk samples as well as project monitoring during asbestos abatement.

Remediation System Operation and Reporting, Five Boroughs of NY: Project Principal responsible for office support to Franklin Company Contractors providing remediation system monitoring and reporting related to fourteen soil and groundwater remediation systems in the City of New York. Responsibilities include daily remote monitoring of remediation systems utilizing SCADA software, weekly report preparation, and preparation of monthly system status reports.

NYC Housing Authority, Lead Based Paint Inspection Services Contract, New York City, NY: Principal in Charge of the project oversight of all lead based paint inspections. Inspections are completed on housing units, common areas, and storage units in accordance with U.S. Housing and Urban Development protocols. Inspections included the use of X-Ray Fluorescence (XRF) analysis in each unit and often paint chip samples were collected and laboratory analyzed. The XRF analysis is conducted on site, using a portable LPA-1 Lead Paint Inspection System manufactured by Radiation Monitoring Devices, Inc. (RMD).

Mendon Truck Leasing Lead and Asbestos Services, Five Boroughs, NY: Project Principal responsible for the preparation of the contract documents and assurance that the contract documents adhered to all appropriate standards. Project involves inspection services for lead and asbestos at buildings throughout New York City in support of facility design and future abatement, encapsulation and construction activities.

Restored Homes HDFC Asbestos Consulting Services, Bronx, Brooklyn, Queens and Staten Island, NY: Project Principal for the contract to complete comprehensive asbestos containing material (ACM) surveys and assessments at 280 1-3 family vacant homes being rehabilitated. Responsibilities include the development and supervision of project quality control and assurance measures for efforts to provide comprehensive asbestos inspections and assessments, abatement or removal design.

CORE ENVIRONMENTAL CONSULTANTS

RESUME

SHEILA RANSBOTTOM, PE

Vice President of Engineering Services

CURRENT RESPONSIBILITIES:

Ms. Ransbottom has 20 years professional experience in civil/site/transportation engineering in the western New York area. Ms. Ransbottom has extensive experience working with various state agencies (NYSDOT, NYS Thruway, NYSDEC, NYPA) and several local counties and municipalities. She is experienced in the planning, design and construction aspects of a wide variety of projects. Ms. Ransbottom is experienced in managing and coordinating the planning, design, and construction phases of a variety of project types including transportation and roadway projects, civil/site projects and various studies (corridor, traffic, feasibility, environmental).

YEARS EXPERIENCE WITH FIRM: 1

YEARS EXPERIENCE WITH OTHER FIRMS: 19

EDUCATION:
B.S. Civil Engineering, University of Pittsburgh, 1993

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS:

New York State Licensed Professional Engineer 076355
NYSDOL Asbestos Project Designer

SUMMARY OF EXPERIENCE:

New York Power Authority, City of Buffalo Energy Master Plan (Wendel Energy Services) Buffalo, NY: CORE acted as subconsultant to Wendel Energy Services to provide information regarding an Energy Master Plan for the City of Buffalo. The Master Plan will plan and coordinate strategies to improve energy efficiency that will support economic growth, create jobs, and serve the residents of New York State. Ms. Ransbottom was Project Manager responsible for the oversight of data collection, analysis, and development of recommendations for improved coordination and planning efforts between governmental departments, non-governmental agencies, and utility companies. She reviewed energy purchasing processes and strategies, analysis of future energy requirements, and recommendations for energy procurement strategies.

Various Asbestos Design Certifications, Various Firms, Buffalo, NY: Professional Engineer responsible for oversight and approval of asbestos investigations and reports, and development of abatement work plans for various Dormitory Authority of the State of NY (DASNY), State University Construction Fund (SUCF) and NY State Office of General Services (OGS) building projects. CORE is typically a subconsultant to an architect or engineering firm for this work. Ms.

Ransbottom has completed certifications for various local firms including Sienna Environmental Technologies, Trautman Associates, Mach Architecture, and Architectural Resources. Examples of projects include design certifications for various SUNY school buildings (including Albany, Buffalo, Fredonia, Oswego, Plattsburgh, and Purchase) and for various local primary and secondary schools. Ms. Ransbottom has also completed design certification for the NYS Office for People with Developmental Disabilities (OPWDD) Fire Safety Improvements & Associated Asbestos & Hazardous Materials Abatement Program.

Stormwater Pollution Prevention Programs, Zaepfel Development Corp., Williamsville, NY: Professional Engineer responsible for the oversight and QA/QC for SWPPP inspections of the Remmington Woods Apartments and the PHH Office Building construction projects in Williamsville, NY, Erie County. Monthly inspections, inspection reports, and monthly, quarterly, and yearly summaries of inspections for both properties were required.

Fuel System Installation, Port Authority of NY-NJ, Red Hook Container Terminal, Bronx ,NY: Project Manager responsible for the development of site plans and details for the installation of a Petroleum Bulk Storage dispensing system for Franklin Company Contractors at the Red Hook Container Terminal in Bronx, NY. Designs include the placement of tanks, fuel dispensers, and related monitoring equipment as per the relevant New York City Codes & regulations (NEPA 30). Development of a Fire Suppression system is also included in the design.

Health & Safety Plan, The LIRO Group, Syosset, NY: Project Manager responsible for the development of a General Health & Safety Plan for The LIRO Group located in Syosset, NY. The plan provides guidelines for safety of LIRO employees and contractors and covers topics such as safety training, emergency action plans, job hazard analysis, means of egress, hazard communication, materials handling, and protective equipment. The plan includes examples of safety inspection checklists, noise & dust mitigation plans, maintenance and protection of traffic plan, lockout/tagout program, and confined space program.

Construction Inspection, Westmont Ridge Development project, Ellicottville, NY (2013): Ms. Ransbottom performed construction inspection for the $22 million, multi-phase Westmont Ridge Development project at Holimont Ski Resort. The project included construction of several roadways and utilities to ultimately serve a total build out of 94 ski in/ski out residential properties and 72 condominiums. Ms. Ransbottom coordinated directly with the contractors (Northrup Construction and Coldsprings Construction) on a daily basis to ensure the project was built to the design plans and specifications. In addition to new roadway construction, the project included new water and sewer lines, storm drainage and large culverts, and retention ponds.

NYS Department of Transportation (DOT), Reconstruction of Main Street, Village of East Aurora, NY: Project Manager for this project to reconstruct approximately 2 km of US 20A/NY16/NY78, Main Street, between the Traffic circle and the East Village Line. The project included Right of Way mapping, grading and drainage design, utility coordination, traffic signage/markings, street lighting, landscaping, pavement design, and maintenance of traffic. Also included design of a roundabout to replace the existing traffic circle and evaluate design

options for additional roundabouts in the project area. A coordinated traffic signal system was designed in order to improve traffic flow through the corridor. Context Sensitive Design principles were used to develop a design to meet transportation needs as well as the needs of the community. Project also included a video survey of the existing drainage system and obtaining of oblique aerial photographs from a helicopter. This project included considerable public involvement and Public Meetings. Ms. Ransbottom developed and maintained both a project newsletter and project website to provide information regarding this high profile project. She was the lynchpin between the numerous stakeholders, including the Village Reconstruction Task Force, the driving force behind the project. She met with the Village Task Force every two weeks for the four-year duration of the design. Ms. Ransbottom's commitment to communication and organization between the task force and all other stakeholders, such as SHPO, NYSDOT, and NYSDEC, kept the project on schedule and moving smoothly.

City of Buffalo Department of Public Works, Reconstruction of Main Street, Buffalo, NY: Project Manager/Senior Transportation Engineer for this locally administered, federally aided project to reconstruct Main Street from Bailey Avenue (US62) to the Scajaquada Expressway (NY198). Ms. Ransbottom was involved in the project from preliminary design to beginning of construction. Preliminary design included preparation of Design Report, highway capacity analyses, accident investigations, subsurface testing, bridge inspections, development projections, utility research, historical investigations, and bike route analyses. Final design included pavement replacement, widening and intersection re-alignment, drainage improvements, utility relocations, new traffic signals, bridge rehabilitation, maintenance of traffic plan, street signage/markings, and street lighting. The project required coordination with numerous federal, state, local, and private agencies, groups, and utilities. This project required numerous public meetings to keep the public informed of project progress. As project manager, Ms. Ransbottom went door to door to meet and coordinate with business owners. Since their businesses would be affected the most by the reconstruction of Main Street, she made sure the design included accommodations for temporary parking and maintaining pedestrian traffic during construction.

City of Buffalo Department of Public Works, Reconstruction of Elmwood Avenue in Buffalo NY: Project Manager for this project to reconstruct nearly 1 mile of roadway along Elmwood and Forest Avenues. Project included preparation of Design Report, many design alternatives (including roundabouts), separating storm sewer from combined storm/sanitary system, accident analyses, capacity analyses, soil and pavement evaluation, utility coordination, traffic signage, street lighting, landscaping, and maintenance and protection of traffic. The design utilized Context sensitive design solutions and included a coordinated traffic signal system and City gateway features. The project area included Buffalo State College, Buffalo Psychiatric Center, Albright Knox Art Gallery, Buffalo Olmsted Parks and the Elmwood commercial strip. Ms. Ransbottom was responsible for coordinating with and obtaining agreement between several groups including the State Historic Preservation Office (SHPO), the City of Buffalo, NYSDOT, and a very active community task force. Her innovative design options were the key to getting consensus on the design of the project. She provided design alternatives that included safe and efficient operation for vehicles, bicycles, and pedestrians in this unique City neighborhood.

Greater Buffalo Niagara Regional Transportation Council (GBNTRC), Traffic Signal Optimization Project: Project Manager for this $400k project to develop and implement cost effective traffic signal timing and coordination plans for 6 major corridors in the Buffalo area (142 signals) to reduce travel times and emissions. The project provided significant traffic flow improvements to the corridors with yearly benefits of over $1M in reduced travel time, stops, and gas consumption. City of Buffalo corridors included Clinton St. and Elmwood Ave. Traffic volume counts and geometric data were inventoried to develop coordination timings for each of the systems using the latest Synchro software. The resulting Synchro traffic models were used to manage and maintain the Owner's traffic network and provide a database for volumes, lane geometry, signal timing and phasing, and system coordination and offsets. Ms. Ransbottom also coordinated with the City of Buffalo Signal Dept. to assist with implementing new timings and phasings' manually in the signal controllers.

City of Buffalo Department of Public Works, Curb and Sidewalk Project: Project Manager responsible for this $400,000 Locally Administered Federally Funded stimulus project for the City of Buffalo. Because it was a stimulus (ARA) project, it had a fast-paced design schedule (only 9 weeks). Project included curb and sidewalk replacement and curb ramp reconstruction to ADA standards on eight City streets. The project was closely coordinated with a separate project to mill/overlay the same eight City streets. Ms. Ransbottom's ability to provide a meticulous paperwork trail from design through construction assisted the City through two successful FHWA stimulus audits.

City of Buffalo Department of Public Works, Seneca Street Streetscape: Project Manager responsible for this $1 million Locally Administered Federal Funded project in the City of Buffalo. This was a streetscape project on Seneca Street from Hayden Street to Indian Church Road (approx. 1 mile), and included mill and overlay of the pavement, curb and sidewalk replacement, ADA compliant curb ramps, and traffic signal improvements at two intersections. This project also incorporated performing a traffic signal coordination / optimization study for the entire length of Seneca St. from Michigan Avenue to the City Line.

Greater Buffalo Niagara Regional Transportation Council (GBNTRC), Feasibility Study for Accommodating Motor Vehicles within the Pedestrian Mall on Main Street: Project Engineer responsible for compiling this study in conjunction with the City of Buffalo, NFTA, GBNRTC and Buffalo Place. Ms. Ransbottom attended numerous meetings with the project team in an effort to develop the feasibility study, which ultimately moved this important project in the City forward. The study included a matrix of numerous feasible options, photo simulations, and costs associated with all options.

Erie County Department of Environment and Planning, Black Rock Canal Park Feasibility Study, Buffalo NY: Project Manager for this project as subconsultant to a Landscape Architect. Responsibilities included topographic and boundary surveys of a series of connected Erie County-owned waterfront parks. The study was to determine possible future development in the parks. Project included inspection of the Black Rock Canal park interlocked steel sheet-pile cantilevered retaining wall approximately 2200' in length. The inspection was conducted above

water using a boat and walking along the top. Also prepared sketches and preliminary costs for a cantilevered walkway for a new pedestrian bridge over Cornelius Creek.

Erie County Department of Public Works, Maple Road Reconstruction Project (Flint Road to Niagara Falls Blvd), Amherst, NY: Project Manager for this project as subconsultant to Prime consultant. Project included widening of shoulders along Maple Road, adding turning lanes to assist capacity issues, improved drainage systems, and replacement of guide rails. Project also included reconstruction of North Bailey Avenue between Maple and Romney Road including left turning lanes to alleviate traffic conditions and replacement of existing drainage system. Responsibilities included traffic analyses and capacity analyses in coordination with replacement of all traffic signals along Maple and North Bailey, a new signal at the intersection of Bowmart and North Bailey, and new sidewalks with handicap ramps and pedestrian signals.

Cattaraugus County Department of Public Works, St. Bonaventure University Access Improvements Project, Allegany, NY: Project Manager for this $2M project that included several improvements at St. Bonaventure University (a private campus). Improvements included the design of a new multi-use trail, reconstruction, and realignment of several campus roadways; construction of a new campus access road; redesign of an existing 5-way intersection; stormwater treatment (bioretention), amenities and signage; and a new public safety/restroom building. Project included topographic survey/mapping, ROW mapping, Environmental Assessment, civil/site and structural design of the new building, and construction support/inspection. Ms. Ransbottom effectively coordinated and resolved environmental issues associated with wetland impacts, contaminated soils, floodplain encroachment, utility relocations, and impacts to historically sensitive areas.

Cattaraugus Country Department of Public Works, Replacement of Little Valley Bridge #15 - North Ninth Street over Little Valley Creek: This project replaced a deficient 30 ft. span highway bridge and an adjacent trail bridge over the Little Valley Creek. Both structures were replaced with a two-cell reinforced precast concrete box structure. The channel is on a curved and skewed alignment that required a structure design, which was curved through the site. Wingwalls were also precast, and the trail was extended over the upstream side of the bridge. As Project Engineer, Ms. Ransbottom was responsible for highway design, MPT, and design report preparation.

Village of East Aurora, NY, Landscaping and Scenic Beautification Project, East Aurora NY: Project Manager for this $1M Transportation Enhancement Program (TEP) project in the Village. The project was locally administrated and federally funded. Project included new directional signage within the Central Business District, new Village boundary signs, and improvements to alleyways in downtown area with new signage, landscaping, and lighting. Project also included extensive restoration of pedestrian pathways and parking areas on the National Historic Landmark Roycroft campus. This project was designed in close coordination with another of Ms. Ransbottom's projects to install drainage on the Roycroft campus, which previously had no storm drainage system. The National Historic Landmark status necessitated extensive coordination with the State Historic Preservation Office (SHPO). Ms. Ransbottom coordinated

the Environmental Assessment for both projects on the campus, which included a month-long Phase III Archaeological Data Recovery phase.

Roycroft Campus Corporation (RCC), Roycroft Campus Drainage Project: Project Manager for drainage improvements on the Roycroft Campus, a recognized National Historic Landmark, which lacked storm water collection and flooded frequently. Mrs. Ransbottom also guided the Campus through extensive reviews by the State Historic Preservation Office.

City of Tonawanda NY, Delaware Street Rehabilitation: Transportation Engineer responsible for writing Draft Expanded Project Proposal (EPP) for the select reconstruction and general rehabilitation of Route 384, Delaware Street, a locally administered, federally aided project. Provided pavement evaluation, horizontal and vertical alignment analysis, drainage analysis, replacement of sidewalks, driveway aprons and curbs, intersection improvements, right-of-way analysis, traffic volumes, non-standard features, safety considerations and alternative lane configurations. Analyzed traffic counts, signal phasing and existing conditions at all signalized intersections and used Highway Capacity Manual methodology and Highway Capacity Software to determine a LOS at these intersections and examine the need for improvements. Coordinated presentations to and feedback from the client.

New York State Department of Transportation (NYSDOT), Hamburg, NY: Project Engineer responsible for the Route 75 reconstruction and widening included pavement widening design, pavement full-depth reconstruction design, intersection design, closed drainage system design, curb design, sidewalk design, waterline design and tabulation, performed vertical geometric design calculations, and horizontal geometry calculations to determine proposed curb locations.

NYSDOT, Towns of Clarence and Newstead, NY: Project Engineer responsible for the reconstruction of Route 5 (Main Street). The project included writing pre-draft and Draft Design Report/Environmental Assessment for project involving rehabilitation, widening, intersection design, closed-drainage system design, traffic operations analysis, reconstruction through an historic business district, installation of new traffic control devices (signs and signals), left and center turn lane analyses, curb and sidewalk design, and replacement of two box culverts. Performed horizontal and vertical geometric design, driveway analysis, preliminary Right-of-way analysis, and coordination with utility owners.

NYSDOT, Town of Newfane, NY: Project Engineer responsible for minor widening, intersection improvements, open and closed drainage system analyses, and traffic analysis of signalized intersections for the Route 78 rehabilitation and reconstruction, Lockport-Olcott Road. Wrote Design Reports that included descriptions of existing speeds and delay, traffic volumes, Level of Service (LOS), non-standard features and safety considerations. Performed horizontal and vertical geometric design, super elevation design, intersection design, left turn lane analysis, driveway design, curb and sidewalk design, preliminary Right-of-way analysis, tree analysis, pavement reconstruction and widening design and design of drainage systems. Prepared public hearing materials, including script, slides, and brochure; coordinated preparation of take-line meeting materials such as colored plans and cross sections; prepared and reviewed individual take maps. Assisted in development of Right-of-Way plan. Wrote Final

Design Report that included responses to comments generated at public hearing. Prepared 40% and ADP submittals, including estimates.

NYSDOT, Route 240 Reconstruction, Harlem Road, Amherst, NY: Project Engineer responsible for writing Draft and Final Design Report. The report included descriptions of existing speeds, traffic volumes, and level of service and safety considerations, preparing responses to general and individual comments generated at the public hearing. Also included was a left turn lane analysis, assistance with pavement full-depth reconstruction design, center turn lane evaluation, intersection design, curb and sidewalk design, horizontal and vertical geometric design, assistance with design of right-of-way plan, and preparation of individual ROW acquisition maps.

NY State Thruway Authority, New E-ZPass Only Toll Lanes at Five Buffalo area Locations: Project Manager for this project involving new E-ZPass Only toll lanes at five Buffalo area interchanges - Pembroke (#48A), Depew (#49), Silver Creek (#58), Dunkirk (#59) and North Grand Island Bridge (#89). The project included data collection and research, topographic survey and mapping, Environmental Assessment, preliminary and detailed design, geotechnical work, electrical design, structural design, and construction administration. This project was part of a Thruway term agreement that included four other projects in the Buffalo area coordinated and managed by Ms. Ransbottom.

Town of Wheatfield, NY, Drainage Study: Civil Engineer responsible for analyzing existing drainage systems when problems arose and proposing alternative solutions, using HEC-2 computer software to analyze impact of existing and proposed cross culverts and bridges on Sawyer Creek, and reviewing subdivision site plans including drainage design, contour design, detention ponds and roadway horizontal and vertical geometry.

Chautauqua County Industrial Development Agency (CCIDA), Dunkirk and Fredonia NY: Project Engineer responsible for researching and evaluating financial and operational information regarding sewer operations, assisted in preparation of a report regarding development of a master sewer district for Northern Chautauqua County, and met with City and Village officials and County agencies.

Town of Hamburg, NY, Master Plan Update: Civil Engineer responsible for updating information regarding transportation, infrastructure, land characteristics and environmental restrictions within the Town, using information to write Town Master Plan, and meeting with various Town committees and officials and state and county transportation agencies.

New York Air National Guard, Niagara Falls NY*:* Project Engineer responsibilities for this term contract/Kirsch Drive reconstruction included the redesign of roadway on Air National Guard base that included horizontal and vertical geometric design, pavement full-depth reconstruction design, and coordinating design with existing utilities. Performed NYANG Type "A" services including design evaluation of several alternative roadway designs and preparation of report, and performed NYANG Type "B" services including design and evaluation of proposed project, technical specifications, horizontal alignment data, maintenance, and protection of traffic, cross-section design, and cost estimates.

Little Ausable River Trail, Peru, NY*:* Project Manager for this $800,000 Rails-to-Trails conversion project in Town of Peru. The project included design of a picturesque trail along the Little Ausable River between two of the Town's most popular historic parks. Ms. Ransbottom worked closely with the Town to ensure proper procedures for the Transportation Enhancement Program (TEP) were followed and assisted in dealing with the NYSDOT regarding the trail crossing a state highway. The project included design of a 180 ft. long steel and timber pedestrian bridge and extensive coordination with the NY State Historic Preservation Office including completion of a Phase IA and IB Cultural Resource investigation.

CORE ENVIRONMENTAL CONSULTANTS

RESUME

ALYSSA CRUIKSHANK

Environmental Scientist/Geologist

YEARS EXPERIENCE WITH FIRM: 1

YEARS EXPERIENCE WITH OTHER FIRMS: 8

EDUCATION:
B.S., Environmental Science, Rensselaer Polytechnic Institute, 2004;
M.S., Geological Studies, Polytechnic Institute, 2005
M.A., Biological Sciences, State University of New York at Buffalo, 2012

CURRENT RESPONSIBILITIES:

Ms. Cruikshank has over ten years of experience in environmental consulting, including technical reporting, analytical data QA/QC and validation procedures, and extensive field experience in both soil and groundwater characterization. She is currently managing CORE's environmental fieldwork division that involves Phase I ESAs, Phase II ESIs, Remedial Investigations, and Record Review Reports.

SUMMARY OF EXPERIENCE:

Remedial Investigation/Feasibility Study Work Plan for the Former National Rubber Adhesives Site, Long Island City, NY – Hamil Stratten Properties, LLC: Prepared a Remedial Investigation/ Feasibility Study (RIFS) Work Plan for the former National Rubber Adhesives Site in Long Island City, New York. Remedial Investigation activities are being performed to delineate the nature and extent of subsurface impacts potentially associated with historic site activities. In addition to determining the proper field and office activities necessary for the successful completion of the investigation, the Work Plan also included the preparation of Site-specific Quality Assurance Project Plan (QAPP), Health and Safety Plan (HASP), and Community Air Monitoring Plan (CAMP).

Phase I Remedial Investigation Report, Remedial Investigation Work Plan, and Interim Remedial Measure Work Plan for the Wills Building, Long Island City, NY – Wills Family Group Limited Partnership: Prepared a Scope of Work for Phase I Remedial Investigation including the installation of soil boring and groundwater monitoring wells to delineate the nature and extent of known subsurface impacts. Prepared a Remedial Investigation Report (RIR) including a detailed description of Site investigation activities, investigation results, and an analysis and interpretation of results. In addition, developed and prepared a Remedial Investigation Work Plan for additional Site investigation activities and an Interim Remedial Measure Work Plan to address sub-slab vapor and indoor air quality issues in the on-Site building. Assisted the client in completing application paperwork for admission to the New York State Brownfield Cleanup Program.

Remedial Action Report and Quarterly Groundwater Monitoring Reports for Everest Scaffolding, Bronx, NY – Mendon Truck Leasing and Rental Corporation: Prepared a Remedial Action Report (RAR) detailing field activities relating to the installation of injection wells and the injection of an oxidizing agent into the subsurface to address known petroleum-related impacts at the Site. Report detailed methods and results of the injection event. Prepare quarterly groundwater monitoring reports summarizing analytical data results and conclusions and recommendations.

Facility Reports and Plans, New York City, NY – Franklin Company Contractors, New York City Fire Department: Responsible for updating and finalizing Facility Spill Prevention, Control, and Countermeasures Plan (SPCC) for Petroleum Bulk Storage (PBS) and Spill Prevention Report (SPR) for Chemical Bulk Storage (CBS). The purpose of the SPR is to identify CBS deficiencies at the Site, if any, and to provide recommendations for corrective actions. The SPR and SPCC for this Facility were being issued as new documents for use by the New York City Fire Department (FDNY), the current Site owner/operator.

Facility Reports and Plans, New York City, NY - Franklin Company Contractors, New York City Department of Environmental Protection: Responsible for updating Petroleum Bulk Storage (PBS) Facility Reports and Spill Prevention, Control, and Countermeasures Plans (SPCC) at six New York City Department of Environmental Protection (NYCDEP) Water Pollution Control Plants under Contract 1198-PBS. The purpose of the PBS Facility Report is to identify PBS deficiencies at the Site, if any, and to provide recommendations for corrective actions. The program is part of DEP's on-going effort to inspect, test, maintain and determine the regulatory health of their PBS tanks, and ancillary equipment through testing, inspection, review, and modifications.

Lead Based Paint Inspection Services Contract, New York City, NY - NYC Housing Authority: Report Manager responsible for the deliverables of the lead based paint inspections. Inspections are completed on housing units, common areas, and storage units in accordance with U.S. Housing and Urban Development protocols. Inspections included the use of X-Ray Fluorescence (XRF) analysis in each unit and often paint chip samples were collected and laboratory analyzed. The XRF analysis is conducted on site, using a portable LPA-1 Lead Paint Inspection System manufactured by Radiation Monitoring Devices, Inc. (RMD).

SENY Reporting for Poletti, 500MW, and Flynn Plants, Astoria, NY– New York Power Authority (NYPA): CORE is providing State Pollution Discharge Elimination System (SPDES), Major Oil Storage Facility (MOSF), and Resource Conservation and Recovery Act (RCRA) Metals sampling services at the facilities as part of on-going environmental compliance programs. Technicians are completing sampling and laboratory analysis of groundwater, surface water and waste sampling services on a scheduled basis. Environmental Scientist responsible for preparing weekly reports of the NYPA Plant water inlet and outlet sample results.

Stormwater Pollution Prevention Plan (SWPPP) and Discharge Monitoring Reporting (DMR), Brooklyn, NY – Mendon Truck Leasing and Rental Corporation: Updated Site-specific

SWPPP following a change to the State-dictated sampling frequency and schedule. Track and submit DMRs to the New York State Department of Environmental Conservation's (NYSDEC) Bureau of Water Compliance to maintain compliance with Client's discharge permit.

Phase I Environmental Site Assessment, Willamsville, New York - SYMS Corporation: Provided investigations and reporting for McKinley, Inc. for the SYMS building located in Williamsville, New York in Erie County. Executed historical records reviews including but not limited to environmental records, proprietary records, topographical maps, Sanborn maps, aerial photography, and City Directories to assess the current and past environmental conditions at the site. Completed FOIL/FOIA requests to all applicable government agencies.

Phase I Environmental Site Assessment, Buffalo, New York - Buffalo Metal Forming: Provided investigations and reporting for Eberl Iron Works, Inc. for two properties owned by Buffalo Metal Forming located in Buffalo, New York in Erie County. Executed historical records reviews including but not limited to environmental records, proprietary records, topographical maps, Sanborn maps, aerial photography, and City Directories to assess the current and past environmental conditions at the site. Completed FOIL/FOIA requests to all applicable government agencies.

Phase I Environmental Site Assessment, Ellicottville, New York - Edelweiss Ski Lodge: Provided investigations and reporting for the Edelweiss Ski Lodge properties located in Ellicottville, New York in Cattaraugus County. Executed historical records reviews including but not limited to environmental records, proprietary records, topographical maps, Sanborn maps, aerial photography, and City Directories to assess the current and past environmental conditions at the site. Completed FOIL/FOIA requests to all applicable government agencies.

Phase I Environmental Site Assessment, Queens, New York - Trattoria Neo: Provided investigations and reporting for the Trattoria Neo restaurant located in Queens, New York in Queens County. Executed historical records reviews including but not limited to environmental records, proprietary records, topographical maps, Sanborn maps, aerial photography, and City Directories to assess the current and past environmental conditions at the site. Completed FOIL/FOIA requests to all applicable government agencies.

Phase I Environmental Site Assessment, Bronx, New York – Group Corporation: Provided investigations and reporting for two adjacent properties on 179th Street and Bronx Park Avenue in Bronx, New York in Bronx County. Executed historical records reviews including but not limited to environmental records, proprietary records, topographical maps, Sanborn maps, aerial photography, and City Directories to assess the current and past environmental conditions at the site. Completed FOIL/FOIA requests to all applicable government agencies.

Environmental Restoration Specialist – Edwards Air Force Base, CA – CH2MHill: Performed quarterly groundwater sampling and prepared quarterly and annual groundwater monitoring reports for various long-term-monitoring Sites, including a CERCLA listed Site. Prepared reports in accordance with regulatory guidelines, including CERCLA, California EPA and applicable Regional Water Quality Control Boards.

Groundwater & Environmental Services, Inc. – Westford, MA: Project Manager and field team leader responsible for field investigations, basic management of Site-related activities including arranging field schedules, preparing characterization reports, closure reports, and remedial action plans, as well as interfacing with clients and regulatory agencies. Performed additional project management duties such as technical report writing and budget/project management.

Site Investigations and Management at Multiple Locations, Massachusetts - ExxonMobil Corporation: Field duties included Site characterization for petroleum impacts to soil, groundwater, and surface water by performing investigative drilling using hollow stem auger, direct push, cone penetrometer (CPT), and air-rotary hammer methods, lithologic logging of borings, soil and groundwater sample collection, and monitoring well installation.

Construction Oversight and Tank-Top Upgrade, Concord, MA - ExxonMobil Corporation: Field Investigator responsible for construction oversight of contractors during operations to perform gasoline service station tank-top upgrades and underground storage tank (UST) removals.

ASTM Phase I Reporting at Multiple Locations, Rhode Island – Shell Oil Company: Case manager responsible for performing several ASTM Phase I Site investigations for property divestment purposes, including historical records review.

AMEC E&I – Amherst, NY and Newport Beach, CA: Project Manager responsible for scheduling, budgeting, invoicing, and direct client interaction. Involved in technical report writing for Feasibility Studies, Quarterly Groundwater Monitoring Reports, Remedial Investigation Reports, and Work Plans.

Site Characterization at the Former Papermate Facility, Santa Monica, CA – The Gillette Company: On-Site geologist responsible for oversight of drilling activities to determine vertical and horizontal extent of VOC and other impacts to the subsurface. Responsible for soil and groundwater sample collection. Performed construction oversight of installation and sampling of continuous multichannel tubing (CMT) and traditional groundwater wells. Interpreted and reported lithologic and hydrogeologic data collected during Site assessments, developed cross-sections, and compiled and performed QA/QC and data validation of laboratory analytical data.

MGP Remedial Investigation for the West Station Plant, Rochester, NY – Rochester Gas and Electric Corporation: Field Investigator for the Manufactured Gas Plant Site, including soil and rock core collection and monitoring well installation. Assisted with preparation of associated Work Plans, Remedial Investigation Report, Supplemental Remedial Investigation Reports, and Feasibility Study.

Site Investigation for Property Redevelopment, New Philadelphia, OH – GE Water & Process Technology: On-Site geologist responsible for overseeing and monitoring drilling activities to determine potential vertical and horizontal extent of impacts to the subsurface prior to property redevelopment. Responsible for lithologic logging of all soils and soil sample collection. Performed oversight of construction, installation, and sampling groundwater wells.

RCRA Corrective Action Activities for the FMC Middleport Facility, Middleport, NY – FMC Corporation: Community Relations Liaison for an industrial client and associated environmental project, handling community complaints, preparing newsletters, updating

various client-sponsored websites, coordinating stakeholder meetings, and relaying information between the client and the community.

CORE ENVIRONMENTAL CONSULTANTS

RESUME

BENJAMIN BARREY

Environmental Engineer

CURRENT RESPONSIBILITIES:

Mr. Barrey is an up-and-coming environmental/civil engineer with a solid foundation of both recent coursework and project experience. He is experienced with CADD and has produced drawings for various projects including asbestos/lead abatement design, above and underground storage tank design, and various civil engineering designs. Mr. Barrey has experience with hazardous waste remediation, environmental assessments, groundwater modeling, and wastewater treatment. He also has several years of experience in managing people of varying cultural and socioeconomic backgrounds along with project costs to ensure that projects run efficiently.

YEARS EXPERIENCE WITH FIRM: 1

YEARS EXPERIENCE WITH OTHER FIRMS: 4

EDUCATION:
B.S., Environmental Engineering, State University of New York at Buffalo, 2013

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS:

NYSDEC Erosion and Sediment Control Certificate

SUMMARY OF EXPERIENCE:

Phase I Environmental Site Assessment, SYMS Corp., Williamsville, NY: Project Engineer responsible for investigating and reporting for McKinley, Inc. for the SYMS building located in Williamsville, NY in Erie County. Mr. Barrey performed historical records reviews including but not limited to environmental records, proprietary records, topographical maps, Sanborn maps, aerial photography, and local directories to assess the current and past environmental conditions at the site.

New York Power Authority City of Buffalo Energy Master Plan, Wendel Energy Services, Buffalo, NY: Project Engineer responsible for the Energy Planning & Coordination Section of the Master Plan. Tasks included collecting Citywide and third party stakeholder data regarding energy procurement practices in Buffalo, NY in Erie County. Mr. Barrey also performed an analysis of current market rates along with forecasted rates out to 2030 which when compared to City of Buffalo data pinpointed areas of improvement. This information was used to provide recommendations to the City of Buffalo on how the procurement of energy could be made more cost effective.

Habitat Restoration Project at Calvert Vaux Park (formerly Dreier-Offerman Park), Brooklyn, NY: This project included the construction of aquatic and coastal upland habitats, wetland restoration, and trail construction. The project also involved the removal of 3.2 acres of contaminated soil. NYSDEC Erosion and Sediment Control Inspector responsible for coordination of and reporting on weekly Stormwater Pollution Prevention Plan (SWPPP) inspections for monitoring, recording and reporting on the condition of soil erosion and sedimentation practices that were employed to comply with the NYSDEC SPDES General Permit for Storm Water Discharges from Construction Activities (GP-0-10-001).

Fuel System Installation, Port Authority of NY-NJ: Project Engineer responsible for developing site plans & details for the installation of two (2) Petroleum Bulk Storage dispensing systems for Franklin Company Contractors at the Red Hook Container Terminal in the Bronx, NY in Nassau County. Designs included the placement of tanks, fuel dispensers, and related monitoring equipment as per the relevant New York City Codes & regulations (NEPA 30). Development of a Fire Suppression system was also included in the design.

Health & Safety Plan, The LIRO Group: Project Engineer responsible for developing a General Health & Safety Plan for The LIRO Group located in Syosset, NY. The plan provided guidelines for safety of LIRO employees and contractors and covered topics such as safety training, emergency action plans, job hazard analysis, means of egress, hazard communication, materials handling, and protective equipment. Also developed in the plan were examples of safety inspection checklists, noise & dust mitigation plans, a protection of traffic plan, a lockout/tagout program, and a confined space program.

Diesel Exhaust Fluid Dispensing System, Ryder Truck Rental Inc.: Project Engineer responsible for developing site plans & details for the installation of a 1000 gallon enclosed aboveground diesel exhaust fluid (DEF) dispensing system for Ryder Truck Rental Inc. at the Farmingdale, NY facility in Suffolk County. Mr. Barrey provided engineering and administrative support to Ryder to expedite the tank registration process with the Town of Babylon and Suffolk County.

Backflow Prevention Device Design, Zaepfel Development Corp., Williamsville, NY: Provided engineering services for the design of a Backflow Prevention Device for Zaepfel Development Corporation's Remmington Woods Apartments in Williamsville, NY in Erie County. The project included analyzing historical hydrologic data, municipal water distribution data, current hydrant flow data collection, and drafting designs in AutoCAD.

Stormwater Pollution Prevention Programs, Zaepfel Development Corp., Williamsville, NY: NYSDEC Erosion and Sediment Control Inspector responsible for the routine inspection of the Remmington Woods Apartments and the PHH Office Building in Williamsville, NY in Erie County. Preformed weekly inspections, developed inspection reports, and provided monthly, quarterly, and yearly summaries of inspections for both properties.

Remedial Investigation, Buffalo Color Corporation, Buffalo, NY: Remedial Project Manager (University of Buffalo) for the Remedial Investigation/Feasibility Study (RI/FS) at the Buffalo

Color Corporation in the City of Buffalo, along the Buffalo River. Mr. Barrey managed a team effort to create a remedial design to re-develop the land for commercial and light industrial zoning uses. Responsibilities included reviewing the Phase I and Phase II assessments that had been performed for the site.

Wastewater Plant Design, Buffalo: Project Engineer responsible for developing all stages in the design of a wastewater treatment plant. Utilized the knowledge of chemical and treatment processes to meet remedial goals of the wastewater.

Drinking Water Distribution System Design, Buffalo: Project Engineer responsible for developing a drinking water distribution network to supply clean water to a community in northern California. Mr. Barrey incorporated the use of network design software (EPANET) to aid in the sizing and placement of the new distribution system in order to project future supply needs of the growing community.

Environmental Impact Statement Review, Buffalo: Project Engineer responsible for the review of a final impact statement for a proposed redevelopment of a federal military ammunitions testing facility. Responsible for reviewing the state and federal guidelines for air, noise, soil and water pollution along with key factors such as public acceptance, ecological footprint, economic impacts and effects on endangered species.

Life Cycle Analysis, Buffalo: Engineer responsible for an in depth look at energy, materials and costs required to create and install a rooftop solar array located in Buffalo and to compare it to the energy generated by the current system. Mr. Barrey was responsible for developing detailed cost analyses, and transportation and energy matrices to determine a benefit to cost ratio for different rooftop photovoltaic systems.

Volunteer at Buffalo Niagara Riverkeeper: Mr. Barrey was involved in an Outreach program in which the community is engaged at tabling events and speaking engagements to develop awareness of the Riverkeeper mission. He was also involved in a River Stewardship program in which water quality testing, research and cleanups are performed.

Town of Amherst, NY Parks Department: Mr. Barrey was a manager in the Town Park's Department where he supervised several seasonal employees and maintained public grounds by pesticide application, watering, excavation, berm installation, tree/shrub planting, debris removal, and several drainage installations.