124-22 QUEENS BOULEVARD
KEW GARDENS, NEW YORK
NYSDEC BCP ID: C241177
BLOCK: 3359, LOT: 21

INTERIM REMEDIAL MEASURE
WORK PLAN ADDENDUM/EXCAVATION WORK PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

ON BEHALF OF:

Luciano, LLC
25 Aldgate Drive East
Manhasset, New York 11030

PREPARED BY:

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PWGC Project Number: ACT1501

JUNE 2017

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CERTIFICATION

I, Paul Boyce, am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for designing the remedial program for the site located at 124-22 Queens Boulevard, Kew Gardens, New York 11415, NYSDEC BCP Site ID C241177. I certify to the following:

- I have reviewed this document and the Stipulation List, to which my signature and seal are affixed.
- Engineering Controls developed for this remedial action were designed by me or a person under my direct supervision and designed to achieve the goals established in this Soil Excavation Work Plan for this site.
- The Engineering Controls to be constructed during this remedial action are accurately reflected in the text and drawings of the Soil Excavation Work Plan and are of sufficient detail to enable proper construction.
- This Soil Excavation Work Plan (SEWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of soil, fill and other material from off-Site will be in accordance with applicable City, State and Federal laws and requirements. This EWP has provisions to control nuisances during the remediation and intrusive work, including dust and odor suppression.

PAUL K. BOYCE, P.E.

Name

074604

PE License Number

Paul Boyce

Signature

07.10.17

Date

PE Stamp

LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AS/SVE	Air Sparging/Soil Vapor Extraction
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
C&D	Construction and Demolition
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
CVOC	Chlorinated Volatile Organic Compounds
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering Controls and Institutional Controls
ELAP	Environmental Laboratory Accreditation Program
EWP	Excavation Work Plan
FER	Final Engineering Report
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations Emergency Response
IRM	Interim Remedial Measure
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYS DEC	New York State Department of Environmental Conservation
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
NYC VCP	New York City Voluntary Cleanup Program
NYCRR	New York Codes Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
ORC	Oxygen-Release Compound
OSHA	United States Occupational Health and Safety Administration
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photo Ionization Detector
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment

Acronym	Definition
RAOs	Remedial Action Objectives
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate
RD	Remedial Design
RI	Remedial Investigation
RMZ	Residual Management Zone
RRSCO	Restricted Residential Soil Cleanup Objectives
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
USGS	United States Geological Survey
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VOC	Volatile Organic Compound

1.0 INTRODUCTION

P.W. Grosser Consulting Engineer & Hydrogeologist, PC (PWGC) has prepared the following Interim Remedial Measure Addendum/Excavation Work Plan (EWP) for the Brownfield Program Clean-up Site located at 124-22 Queens Boulevard in Kew Gardens, New York. This plan is to be implemented to address Chlorinated Volatile Organic Compound (CVOC) soil contamination. The proposed scope of work is based upon the findings of the Interim Remedial Measure (IRM) Work Plan prepared in February 2016, and a Subsurface Investigation Report prepared by Advanced Cleanup Technologies (ACT) in July 2015.

1.1 Site Background

The subject site is located at 124-22 Queens Boulevard in the Kew Gardens neighborhood of the Borough of Queens, New York. The site is situated on the southwest side of Queens Boulevard, between 82nd Road and 82nd Avenue. The property is identified as Block: 03359 Lot: 0021 by the New York City Department of Assessment. The site measures approximately 7,700 square feet (0.18 acre) and is bounded by a building under construction to the north, an eight-story mixed-use building with apartments above retail stores to the south, Queens Boulevard followed by an eight-story government building to the east, and a commercial hotel to the west. Currently, the Site consists of a vacant lot with the building removed except for the foundation slab. Figure 1 depicts a locational diagram of the site and Figure 2 depicts uses in the immediate vicinity of the site.

The subject site was purchased by Luciano LLC with plans for redevelopment consisting of an 11-story mixed use building with a basement. The building will consist of an open-air parking garage on the basement level (along with machine/utility spaces), commercial space on the first through third floors, and residential space on the fourth through eleventh floors. Construction of the proposed building foundation will require that the majority of the site be excavated to approximately 11 feet below grade, with portions excavated slightly deeper (footings, elevator pit, etc.). As detailed Remedial Investigation Report (RIR) prepared by Advanced Cleanup Technologies, Inc. (March 31, 2017), groundwater on the site was encountered in three onsite monitoring wells at a depth of 67 feet below ground surface. As such, groundwater is not expected to be encountered and dewatering activities are not anticipated.

1.2 Previous Investigations

1.2.1 Phase I ESA

A Phase I ESA for the site prepared by ACT dated March 23, 2015 identified the following Recognized Environmental Conditions (RECs):

- A portion of the site is has been occupied by a drycleaner from at least 1986 through the present.

Based on the findings of the Phase I ESA, ACT recommended that soil vapor sampling be performed at the site to evaluate whether a vapor encroachment condition exists.

A copy of the Phase I ESA was submitted to NYSDEC with the BCP application.

1.2.2 Soil Vapor Intrusion Study

Based on the findings of the Phase I ESA, ACT performed a Soil Vapor Intrusion (SVI) Study at the site in April 2015. The scope of work included the collection and analysis of four sub-slab soil vapor samples from within the building. Soil vapor samples were analyzed for volatile organic compounds (VOCs) by USEPA Method TO-15. Sample results were compared to the screening levels and decision matrices specified in New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006).

Indoor air samples were not collected, however, sub-slab tetrachloroethene (PCE) concentrations exceeded 1,000 µg/m^3 in each of the four soil vapor samples collected. Regardless of indoor air concentrations, PCE concentrations in soil vapor exceeding 1,000 µg/m^3 fall within the mitigation range of NYSDOH Soil Vapor/Indoor Air Matrix 2.

Based on the findings of the SVI Study, ACT recommended that a sub-slab depressurization system be installed at the site, and that the site be entered into the BCP.

A copy of the SVI Study was submitted to NYSDEC with the BCP application.

1.2.3 Subsurface Investigation

Based on the findings of the SVI Study, ACT performed a Subsurface Investigation (SSI) at the site in July 2015 to delineate the extent of subsurface soil impact. The scope of work included the collection and analysis of soil samples from three soil borings installed within the building, in the vicinity of the existing dry cleaning equipment. At each boring location, a shallow soil sample (0 to 2 feet below grade) and deep soil sample (up to 10 to 11 feet below grade) were collected. Soil samples were analyzed for VOCs by USEPA Method 8260. Sample results were compared to the NYSDEC Unrestricted Use Soil Cleanup Objectives (SCOs) specified in 6 NYCRR Part 375-6, Remedial Program Soil Cleanup Objectives (December 2006).

PCE was detected at concentrations exceeding its Unrestricted Use SCO of 1,300 parts per billion (ppb) in each of the shallow (0 to 2 feet below grade) soil samples collected. PCE concentrations in these samples ranged from 7,200 ppb to 82,000 ppb. PCE concentrations in the deep soil samples collected were significantly lower (maximum concentration of 96 ppb), and did not exceed the Unrestricted Use SCO for PCE. Low level concentrations of several other VOCs were detected in soil samples collected from the site, however PCE was the only compound detected above its respective Unrestricted Use SCO.

A copy of the SSI was submitted to NYSDEC with the BCP application.

1.2.3 Interim Remedial Measure Work Plan

An Interim Remedial Measure Work Plan (IRM) for the site prepared by PWGC dated February 2016 identified the remedial objectives for the site, building demolition activities, soil excavation and disposal requirements, engineering specifications and controls, monitoring and maintenance activities, reporting requirements, a site-specific Health and Safety Plan, Community Air Monitoring Plan, Quality Assurance Plan and schedule for the site. The IRM is included as Appendix B.

The following sections provide additional detail related to the planned areas for excavation.

1.2.4 Remedial Investigation

ACT performed a Remedial Investigation (RI) at the site from December 2016 to March 2017. The RI included 19 soil borings, two surface soil samples, eight soil vapor and three groundwater monitoring wells. A Draft Remedial Investigation Report (RIR) documenting the findings of the RI was submitted to NYSDEC in March 2017. The RIR is included as Appendix A.

The RIR documented the presence of elevated concentrations of CVOCs in soils at the site, divided into three Areas of Concern (AOCs). AOCs are summarized as follows:

- AOC-1: Former Dry Cleaning Machine – AOC-1 consists of an approximately 1,650 square foot area on the northern portion of the property surrounding the former dry cleaning machine location. CVOC impact exceeding Unrestricted Use SCOs in this area extends approximately up to 12 feet below grade, with an average depth of approximately 3.5 feet below grade. Based on the areal and vertical extent of CVOC impact, ACT estimated a total volume of approximately 215 cubic yards (300 tons) of CVOC impacted soils exceeding Unrestricted Use SCOs in AOC-1.

- AOC-2: Former Rear Yard – AOC-2 consists of an approximately 900 square foot area on the western portion of the property. CVOC impact in this area extends up to 18 feet below grade. Based on the areal and vertical extent of CVOC impact, ACT estimated a total volume of approximately 275 cubic yards (390 tons) of CVOC impacted soils exceeding Unrestricted Use SCOs in AOC-2.
- AOC-3: Degradation Products Beneath the Eastern Portion of the Site - AOC-3 consists of an approximately 450 square foot area on the eastern portion of the property. CVOC impact in this area is limited to approximately a two-foot interval at 13 to 15 feet below grade. Based on the areal and vertical extent of CVOC impact, ACT estimated a total volume of approximately 35 cubic yards (45 tons) of CVOC impacted soils exceeding Unrestricted Use SCOs in AOC-3.

2.0 DESCRIPTION OF REMEDIAL ACTION

Based on the findings of the ACT RIR, PCE impacted soils are present beneath portions of the site. PWGC recommended that soil impact be addressed by an IRM consisting of remediation of VOC impacted soils in the vicinity of the former dry cleaner.

2.1 Remediation of VOC Impacted Soil

The VOC impacted soils will be excavated and transported off-site for proper disposal as part of the site remediation. In addition, non-remedial construction generated soils will also be removed from the site to allow for construction of the planned development project at the site. The remedial and construction excavation activities should be considered separate under the BCP.

The area and depth to be excavated for off-site disposal as part of this IRM will be determined by delineation sampling detailed in the IRM Work Plan. Figure 3 illustrates the IRM excavation areas and the soil disposal classifications.

Soils will be excavated from the proposed excavation area utilizing an excavating machine. Soils will be screened during excavation and stockpiled on the eastern portion of the site. Soils will be screened utilizing a photoionization detector (PID) capable of detecting the presence of VOCs. Soils exhibiting significantly elevated PID responses or odors may be segregated and stockpiled from other soils being excavated, as necessary. Soil stockpiles will be constructed and maintained in accordance with Section 3.1.3 of the IRM Work Plan.

The exact limit of the IRM excavation will be determined in the field based upon soil screening, verification sampling results, and in consultation with NYSDEC. The final excavation area and depth will be provided in the IRM report. The anticipated waste streams are further detailed below.

2.1.1 Soil Excavation and Disposal

Based upon review of the boring logs from the 19 soil borings conducted as part of the RI, and the analytical results, there are multiple distinct types of materials to be excavated and disposed of as part of the remediation and construction of the site. Based upon the types of materials and waste characterization findings, it is anticipated that the materials will be excavated separately and disposed of at various disposal facilities. The classification of materials to be excavated and potential disposal facilities are detailed below.

Remedial Excavation: Hot-spots: Elevated CVOC impacted soils will be excavated and segregated for disposal in a hazardous waste disposal facility. The soils from hot-spots in the vicinity of soil borings SB-12 and SB-3 will be excavated and segregated from other materials for off-site disposal in an approved hazardous disposal facility (to be determined). Soils in the vicinity, initially a 10-foot radius from the former sample location, of SB-3 will be excavated to a depth of two feet below sidewalk grade while soils in the vicinity of SB-12 will be excavate to a depth of 16 feet below sidewalk grade in stages, to allow for a controlled excavation.

Soil endpoint samples will be collected from the sidewalls and base of each hot-spot excavation at the following depths:

- SB-3 sidewall endpoints will be collected at a depth of one foot below sidewalk grade,
- SB-12 sidewall endpoints will be collected at depths of four, eight and 12 feet below sidewalk grade.

Endpoint samples will be analyzed for TCL VOCs by EPA Method 8260C, TCL SVOCs by EPA Method 8270D, TCL Pesticides by EPA Method 8081B, PCBs by EPA Method 8082, and TAL Metals by EPA Method 6010C/7471/9012B. The results will be compared to NYSDEC Part 375 Restricted Residential SCOs (RRSCOs). If the samples exceed RRSCOs, additional excavation into the sidewalls or deeper will occur followed by collection of additional step-out endpoint samples until soils meet RRSCOs. The approximate location of the endpoint samples are illustrated in Figure 4.

Remedial Excavation: VOC impacted soils (AOC-1): Shallow soils in the northeastern portion of the site, beneath the former dry-cleaning machine will be excavated to an average depth of 3.5 feet below sidewalk grade to meet UUSCOs. In the vicinity of soil boring SB-6, a 10-foot radius excavation will continue to a depth of 16 feet below sidewalk grade. Approximately 300 tons of VOC impacted soils are anticipated to be excavated from this area and disposed of at an approved and permitted off-site facility (to be determined).

Remedial Excavation: Urban Fill: historic urban fill materials consisting of crushed concrete, bricks, ash have been identified through the recent RI throughout the site at depths down to five feet below sidewalk grade. As encountered, urban fill will be segregated and disposed of an approved facility (to be determined) as part of remedial activities.

Non-impacted Construction Generated Soils: Following removal of the hot-spot soils, VOC impacted soils and urban fill material, additional non-impacted construction soils will be excavated to allow for construction activities. These soils will consist of sands, silts and clay that have not previously been identified in the RI as exceeding UUSCOs. The non-impacted construction generated soils will be excavated and trucked off site to a C&D facility or a soil reuse facility (to be determined).

Remedial Excavation: Pile Installation Derived Wastes: During installation of the 25 proposed solider piles along the eastern portion of the site, in support of excavation, drilling fluids and drill cuttings will be produced. Fluids produced by drilling activities will be captured at the well head and pumped into a 10,000 gallon settling tank to be staged along the southern portion of the site. Drill cuttings generated from the pile installation will be temporarily stockpiled on plastic along the eastern portion of the site. Following installation of the piles, the drill cuttings and liquids will be sampled for waste characterization and then properly disposed of. If the drill cuttings and/or liquid waste contain VOCs above allowable limits, they should be considered remedial waste streams, otherwise they shall be handled as construction generated wastes.

Construction and Demolition Materials: Following recent demolition of the building, some of the brick and concrete removed from the upper levels were utilized to temporarily backfill the partial cellar in the southeast corner of the site. This material consists of broken and crushed concrete and brick material (C&D) which is confined to the previous cellar area. As the C&D material is excavated, and the existing concrete slab and foundation, it will be transported off-site to an active NYSDEC registered construction and demolition processing facility as specified in in the following NYSDEC website:
http://www.dec.ny.gov/docs/materials_minerals_pdf/listregcdprocess.pdf

Daily logs of incoming and outgoing trucks and loads will be recorded and copies of manifest and weight tickets will be collected and detailed in the final engineering report.

2.2 Soil/Materials Management Plan

This section presents the approach to managing, disposing, and reusing soil, fill, and debris excavated from the Site. The Remediation Engineer will monitor and document the handling and transporting of material removed from the Site to a proper disposal facility as a regulated waste or as an unregulated waste, as applicable. The Remediation Engineer will assist the remedial contractor in identifying impacted materials during excavation, determining materials suitable for direct load out versus temporary on-Site stockpiling, selection of samples for waste characterization, and determining the proper off-Site disposal facility.

Stockpiling of impacted soil may be completed to allow for additional waste characterization sampling and to allow for easier load outs.

2.2.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a qualified environmental professional during all remedial and development excavations into known or potentially contaminated material (Residual Contamination Zone). Soil screening will be performed regardless of when the intrusive work is done and will include excavation and invasive work performed during the remedy and during development phase, such as excavations for foundations and utility work, prior to issuance of the COC.

All primary contaminant sources (including but not limited to tanks and hot-spots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed under the supervision of a qualified environmental professional or by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the Final Engineering Report.

Screening will be performed by qualified environmental professionals. Resumes will be provided for all personnel responsible for field screening (i.e. those representing the Remedial Engineer) of intrusive work for unknown contaminant sources during remediation and development work.

2.2.2 Stockpile Methods

If necessary, stockpiling of soils will be conducted in accordance with the following procedures.

Stockpiles will be inspected at a minimum once each week and after a storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

Stockpiles will be kept covered with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

2.2.3 Materials Excavation and Load Out

The Remedial Engineer or a qualified environmental professional under his/her supervision will oversee intrusive work and the excavation and load-out of excavated material.

The Volunteer and its contractors are solely responsible for safe execution of intrusive and other work performed under this Plan.

The presence of utilities and easements on the Site has been investigated by the Remedial Engineer. It has been determined that no risk or impediment to the planned work under this Remedial Action Work Plan is posed by utilities or easements on the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-Site, when possible based upon the limited Site size. The Remedial Engineer will be responsible for ensuring that outbound trucks wheels will be washed at the truck wash before leaving the Site until the remedial construction is complete.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site sediment tracking.

The Remedial Engineer will be responsible for ensuring that egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

The Volunteer and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of intrusive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The Remedial Engineer will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this Remedial Action Work Plan.

Each hot-spot and structure to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hot-spot or structure.

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan.

Mechanical processing of historical fill and contaminated soil on-Site is prohibited.

Primary contaminant sources (including but not limited to tanks and hot-spots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed under the supervision of a qualified environmental professional or by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the Final Engineering Report.

2.2.4 Materials Transport Off-Site

Transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Truck transport routes are as follows:

- Exit Site and make a right on Queens Boulevard and proceed southeast to 82nd Road.
- Make a right onto Kew Gardens Road.
- Make a right onto 80th Road.
- Make a left onto Queens Boulevard.
- Turn right onto Union Turnpike.
- Merge onto Van Wyck Expressway (I-678 N)

Trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. Truck operators are responsible for obeying traffic signs and detours.

Proposed in-bound and out-bound truck routes to the Site are shown in Figure 5. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off- Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site.

Egress points for truck and equipment transport from the Site will be kept clean of soil and other materials during Site remediation and development.

Queuing of trucks will be performed on-Site in order to minimize off-Site disturbance. Off-Site queuing will be prohibited.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Trucks will be inspected prior to leaving the Site. If applicable, truck wash waters will be collected and disposed of off-Site in an appropriate manner.

2.2.5 Materials Disposal Off-Site

The disposal location for non-hazardous and hazardous soils will be reported to and approved by the NYSDEC Project Manager upon selection of appropriate facilities. Aadditional disposal locations, if necessary, established at a later date, will similarly be reported to and approved by the NYSDEC Project Manager.

Soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the Remedial Engineer prior to the implementation of the IRM for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with applicable laws: (1) a letter from the Remedial Engineer or BCP Volunteer to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of chemical data for the material being transported (including Site Characterization data); and (2) a letter from

receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2

Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Solid & Hazardous Materials (DSHM) in NYSDEC to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DSHM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of chemical data for the material being transported.

The Final Engineering Report will include an accounting of the destination of material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

Bill of Lading system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the Final Engineering Report.

Hazardous wastes derived from on-Site will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with applicable local, State and Federal regulations.

Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical

results and QA/QC will be reported in the FER. Data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

2.2.6 Materials Reuse On-Site

Materials reuse on-Site is not anticipated.

2.2.7 Fluids Management

Liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site.

Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream or river) is prohibited without a SPDES permit.

3.0 ENGINEERING SPECIFICATIONS AND CONTROLS

Engineering specifications and controls will be implemented in accordance with the Approved IRM Work Plan dated February 2016 (See Appendix B).

4.0 MONITORING AND MAINTENANCE

Monitoring and maintenance will be performed in accordance with the Approved IRM Work Plan dated February 2016 (See Appendix B).

5.0 INTERIM REMEDIAL MEASURE COMPLETION REPORT PREPARATION

An IRM Construction Completion Report will be prepared in accordance with the Approved IRM Work Plan dated February 2016 (See Appendix B).

6.0 HEALTH AND SAFETY PLAN

Field operations will be performed in accordance with the health and safety requirements specified in the Approved IRM Work Plan dated February 2016 (See Appendix B).

7.0 COMMUNITY AIR MONITORING PLAN

Community Air Monitoring will be implemented in accordance with the Approved IRM Work Plan dated February 2016 (See Appendix B).

8.0 QUALITY ASSURANCE PROJECT PLAN

The Quality Assurance Project Plan (QAPP) for the project will be implemented in accordance with the Approved IRM Work Plan dated February 2016 (See Appendix B).

9.0 SCHEDULE

The preliminary schedule for the major project milestones is presented in Table 1. The field work is anticipated to start in June 2017 and be completed by August 2017. A draft IRM Report will be submitted to the NYSDEC by August 2017.

10.0 REFERENCES

6 NYCRR Part 375 – Environmental Remediation Programs, December 2006

6 NYCRR Part 376 - Land Disposal Restrictions, September 2006

29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response

Advanced Cleanup Technologies, Inc., March 23, 2015, Phase I Environmental Site Assessment – 124-22 Queens Boulevard, Kew Gardens, New York

Advanced Cleanup Technologies, Inc., April 14, 2015, Soil Vapor Intrusion Study - 124-22 Queens Boulevard, Kew Gardens, New York

Advanced Cleanup Technologies, Inc., July 28, 2015, Subsurface Investigation Report - 124-22 Queens Boulevard, Kew Gardens, New York

Advanced Cleanup Technologies, Inc., March 31, 2017, Draft Remedial Investigation Report - 124-22 Queens Boulevard, Kew Gardens, New York

NYSDEC, Division of Environmental Restoration, May 2004, Draft Brownfield Program Cleanup Guide.

NYSDEC, Division of Environmental Restoration, December 2002, Draft DER-10, Technical Guidance for Site Investigation and Remediation.

NYSDEC, Division of Technical and Administrative Guidance, June 1, 1992, Memorandum # 4042, Interim Remedial Measures.

NYSDEC, Division of Technical and Administrative Guidance, December 9, 1992, Memorandum # 4048, Interim Remedial Measures - Procedures.

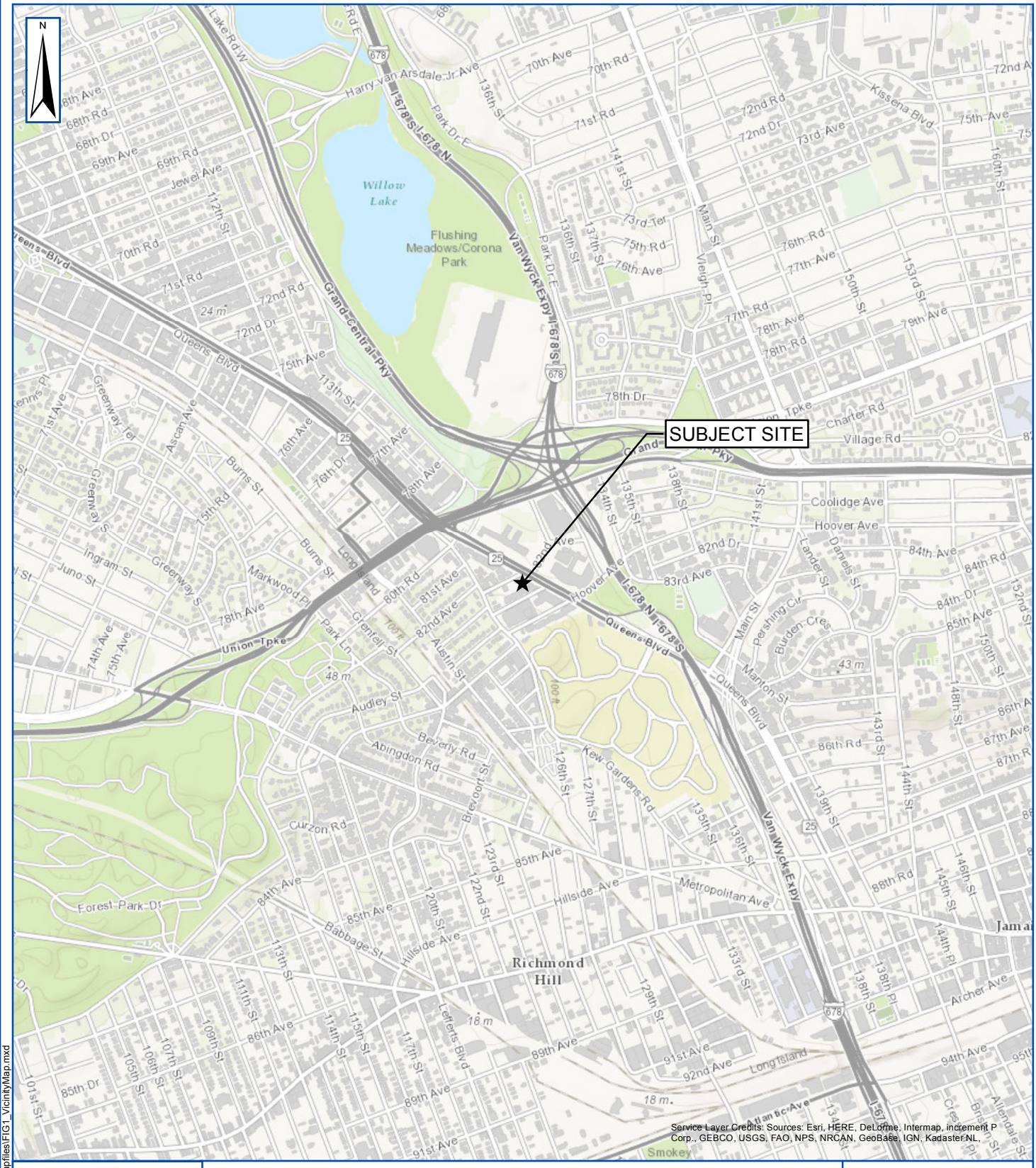
NYSDEC, Division of Technical and Administrative Guidance, October 27, 1989, Memorandum #4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites

NYSDEC, Division of Water, June 1998, Addendum April 2000, Technical and Administrative Guidance Series 1:1:1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.

P.W. Grosser Consulting Engineer & Hydrogeologist, PC, February 2016, Interim Remedial Measure Work Plan, 124-22 Queens Boulevard, Kew Gardens, New York

USEPA, SOP # 2001 General Field Sampling Guidelines, SOP# 2012 Soil Sampling, and SOP# 2006 Sampling Equipment Decontamination

FIGURES



SUBJECT SITE VICINITY

124-22 QUEENS BLVD
KEW GARDENS, NY

0 ¼ ½ ¾ 1 Miles

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Date:	9/21/2015
Designed by:	TM
Drawn by:	JCG
Approved by:	TM
Figure No:	1

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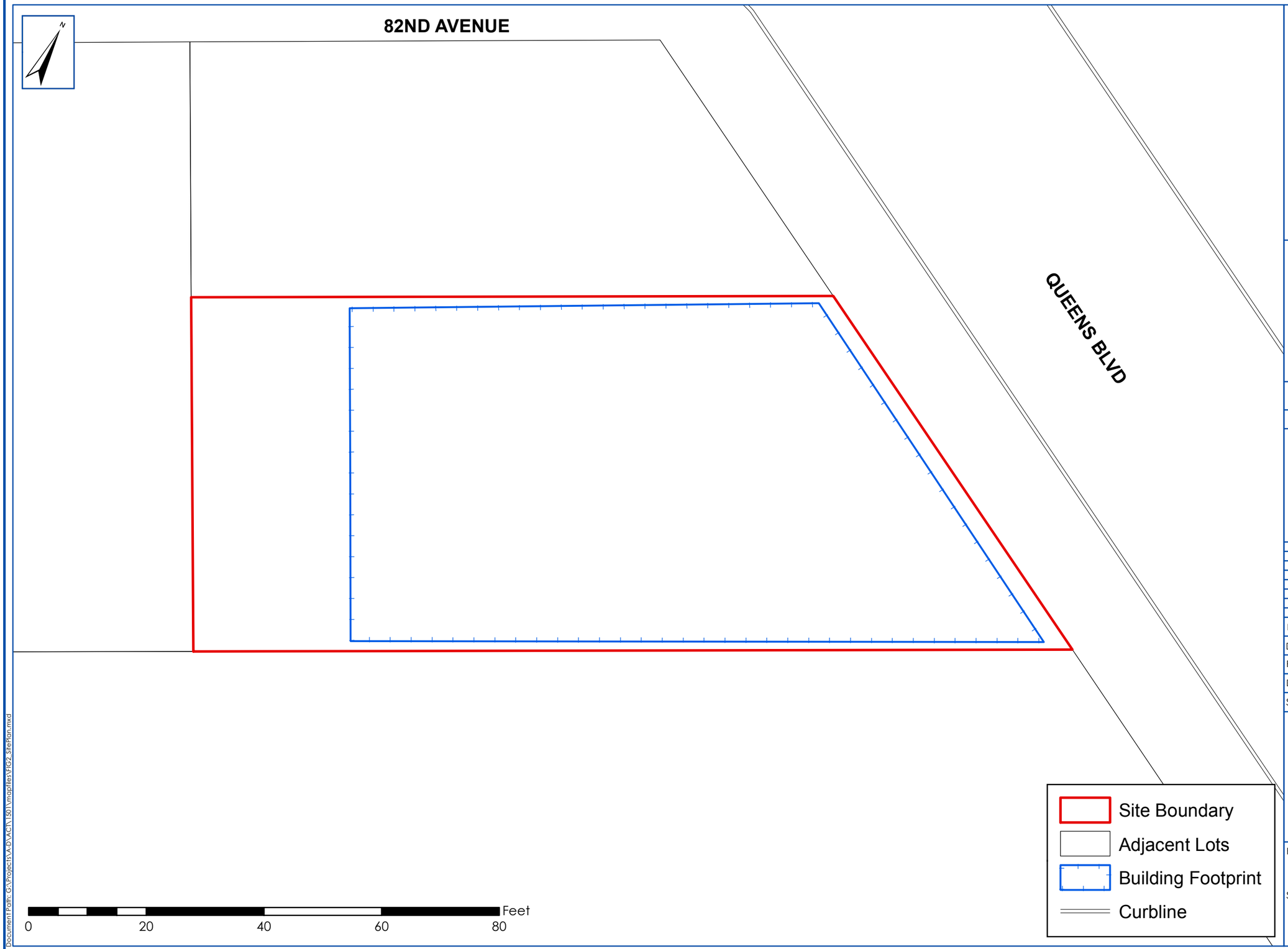

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SITE PLAN

124-22 QUEENS BLVD
KEW GARDENS, NY

FIGURE NO:
2

SHEET:

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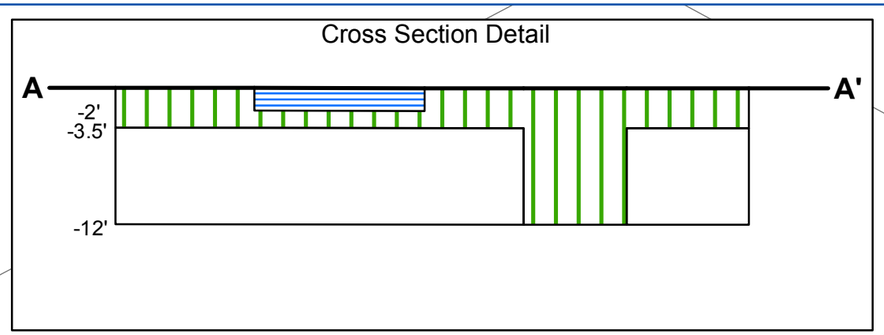
N

Cross Section Detail



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- Soldier Pile
- Soil Boring Location (ACT)
- Cross_Section_line
- Site Boundary
- Holding Tank
- Loading Ramp
- Stockpile
- Previous Building Foundation
- Former Partial Cellar (C&D)
- Adjacent Lot

Excavation Area

- Hot Spot
- VOC Impacted

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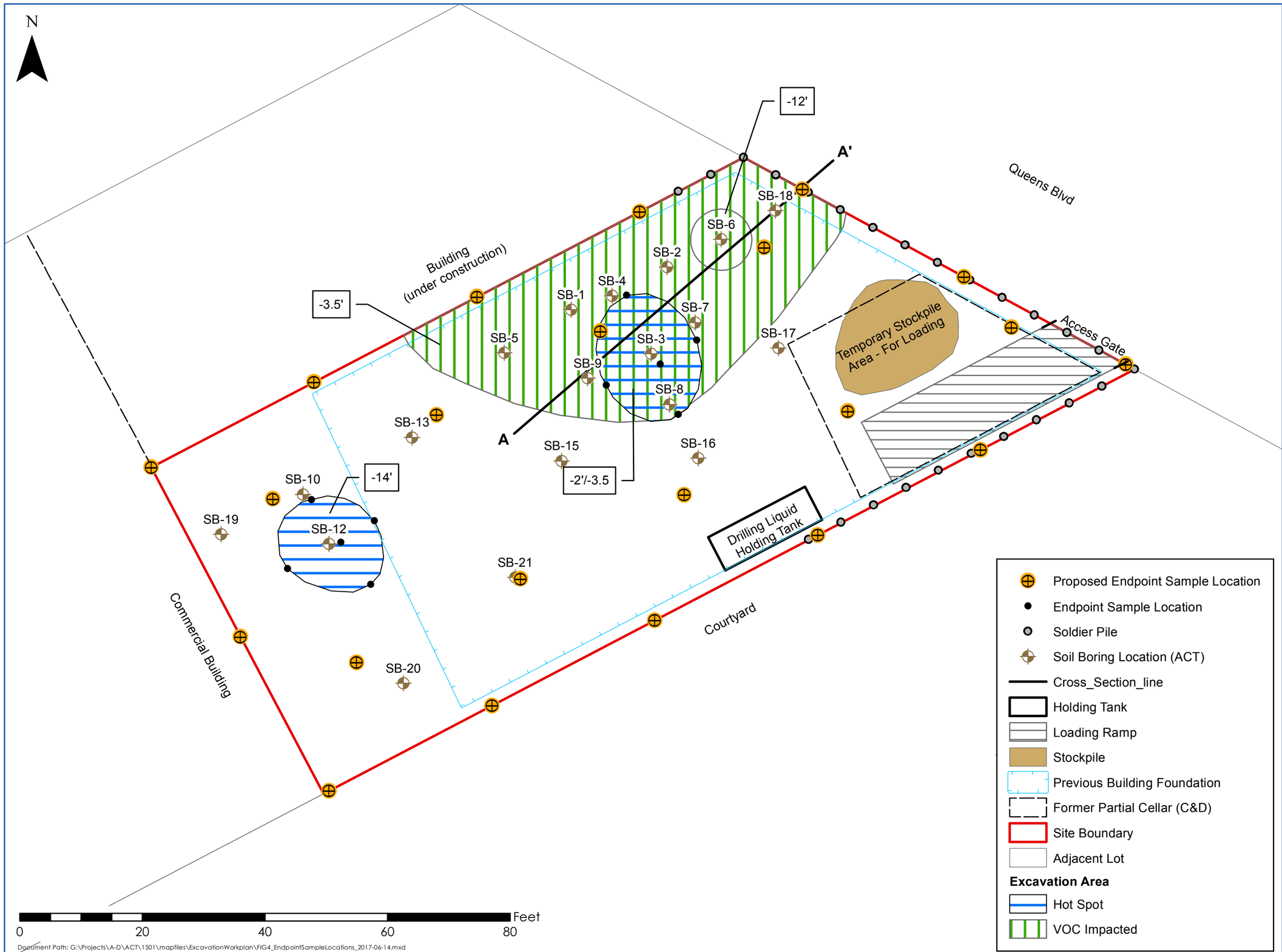
EXCAVATION PLAN

124-22 QUEENS BLVD
KEW GARDENS, NY

FIGURE NO:

3



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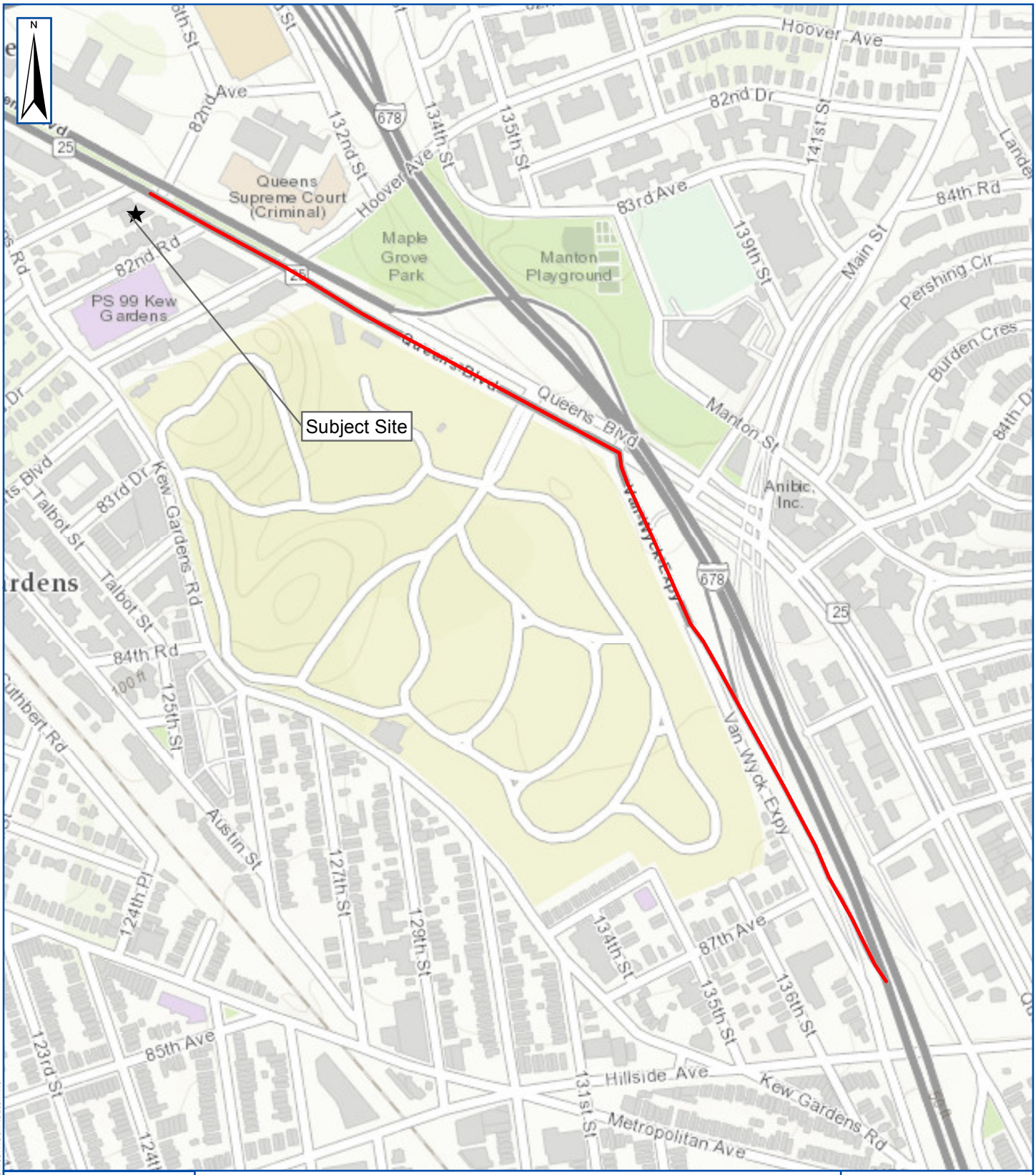
ENDPOINT SAMPLE LOCATIONS

124-22 QUEENS BLVD
KEW GARDENS, NY

FIGURE NO:

4



TRUCK ROUTE MAP

124-22 QUEENS BLVD
KEW GARDENS, NY

0 500 1,000 1,500 2,000 Feet

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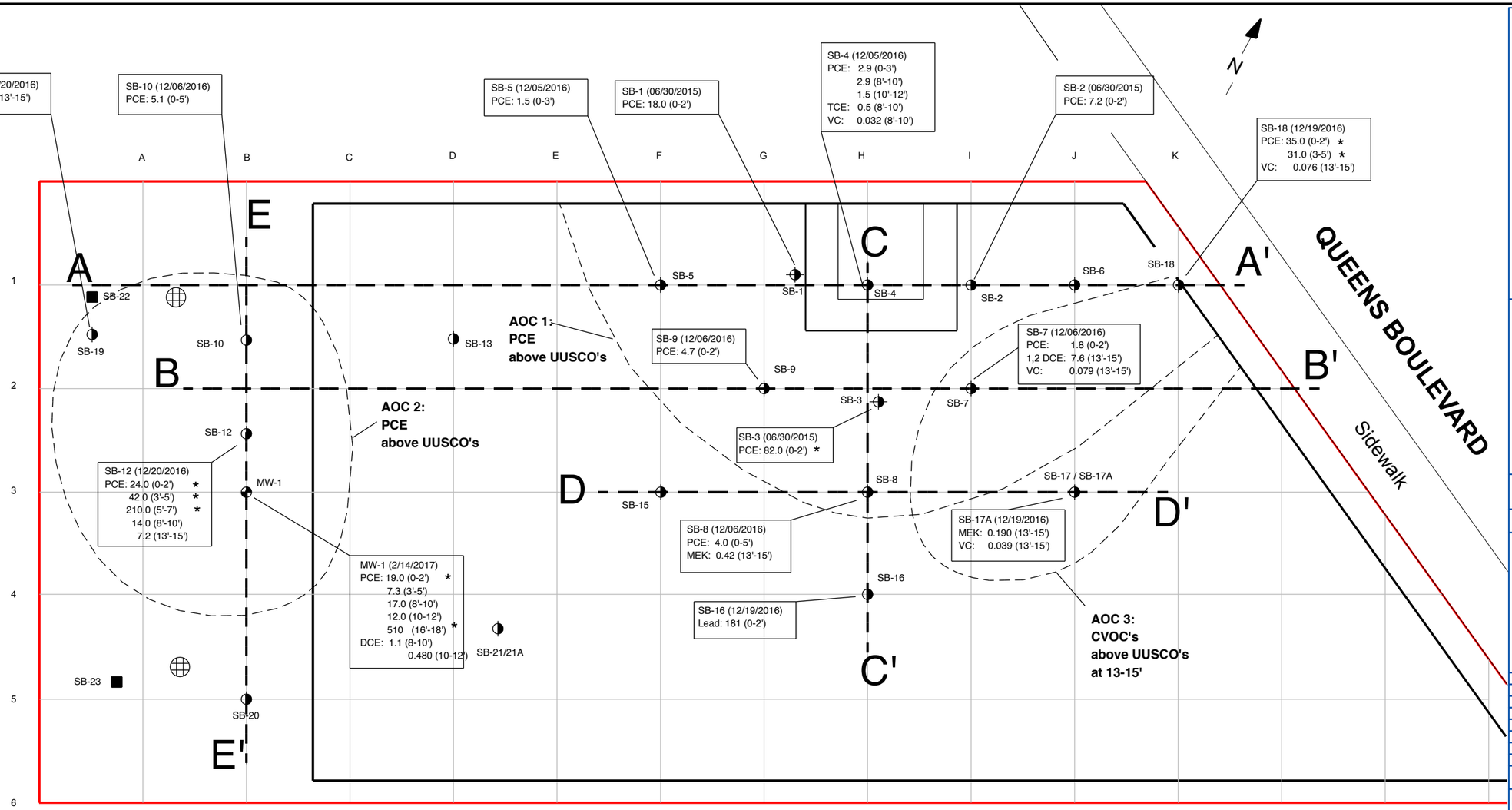
Figure No:	5

Document Path: G:\Projects\A-D\ACT1501\mapfiles\TruckRoute.mxd



Definitions

PCE - Tetrachloroethylene

TCE - Trichloroethylene

DCE - Cis1,2-Dichloroethene

VC - Vinyl Chloride

MEK - Methyl Ethyl Ketone (2-Butanone)

0 5 10 20 30 ft

Legend

SB-1 — Soil Boring Location (6/30/2015)

SB-4 — Soil Boring Location (12/2016 -2/2017)

SB-22 — Surface Soil Sample (2/2017)

A-A' — Geologic Cross Section

Notes

1. Concentration are expressed in mg/kg
2. Concentrations reported exceed UUSCO
3. * Denotes exceedance above RRSCO
4. The soil sampling data presented herein was obtained from the Remedial Investigation Report (RIR) prepared by Advanced Cleanup Technologies, Inc. in March 2017.

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RI Soil Sample Exceedances

124-22 QUEENS BLVD KEW GARDENS, NY

FIGURE NO:

6

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APPENDIX A
REMEDIAL WORK PLAN

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APPENDIX B
INTERIM REMEDIAL MEASURE WORK PLAN

124-22 QUEENS BOUEVARD
KEW GARDENS, NEW YORK
NYSDEC BCP ID: C241177
BLOCK: 3359, LOT: 21

INTERIM REMEDIAL MEASURE
WORK PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

ON BEHALF OF:

Luciano, LLC
25 Aldgate Drive East
Manhasset, New York 11030

PREPARED BY:

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Thomas Melia, Sr. Project Manager thomasm@pwgrosser.com

PWGC Project Number: ACT1501

FEBRUARY 2016

124-22 QUEENS BOULEVARD, KEW GARDENS, NEW YORK
NYSDEC BCP ID C241177
INTERIM REMEDIAL MEASURE WORK PLAN

CONTENTS **PAGE**

124-22 QUEENS BOULEVARD, KEW GARDENS, NEW YORK
NYSDEC BCP ID C241177
INTERIM REMEDIAL MEASURE WORK PLAN

FIGURES

TABLES

APPENDICES

CERTIFICATION

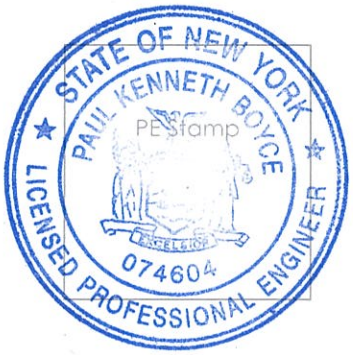
I Paul K. Boyce certify that I am currently a NYS registered professional engineer and that this Interim Remedial Measure Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Paul K. Boyce, P.E.
Name

074604
NYS PE License Number

Signature

03.01.16
Date



1.0 INTRODUCTION

P.W. Grosser Consulting Engineer & Hydrogeologist, PC (PWGC) has prepared the following Interim Remedial Measure (IRM)) for the property located at 124-22 Queens Boulevard in Kew Gardens, New York. The proposed scope of work is based upon a Phase I Environmental Site Assessment (ESA) prepared by Advanced Cleanup Technologies, Inc. (ACT) in March 2015, a Soil Vapor Intrusion Study prepared by ACT in April 2015, and a Subsurface Investigation prepared by ACT in July 2015.

1.1 Site Background

The subject site is located at 124-22 Queens Boulevard in the Kew Gardens neighborhood of the Borough of Queens, New York. The site is situated on the southwest side of Queens Boulevard, between 82nd Road and 82nd Avenue. The property is identified as Block: 03359 Lot: 0021 by the New York City Department of Assessment. The site measures approximately 7,700 square feet (0.18 acre).

The property is currently occupied by a two-story commercial building with a partial basement. The building is currently vacant with the exception of a drycleaner in the northernmost first-floor unit; the drycleaner is expected to vacate the building in the near future (prior to implementation of this IRM).

The subject site was recently purchased by Luciano LLC with plans for redevelopment consisting of an 11-story mixed use building with a basement. The building will consist of an open-air parking garage on the basement level (along with machine/utility spaces), commercial space on the first through third floors, and residential space on the fourth through eleventh floors. Construction of the proposed building foundation will require that the majority of the site be excavated to approximately 11 feet below grade, with portions excavated slightly deeper (footings, elevator pit, etc.).

An application for the New York State Brownfield Clean-up Program (BCP) for the project was submitted in August 2015. NYSDEC issued a letter of incompleteness on September 14, 2015; a revised BCP application for the site is currently pending. BCP number C241177 has been assigned to the site.

A Vicinity Map is included as **Figure 1**; a Site Plan is included as **Figure 2**.

1.2 Previous Investigations

1.2.1 Phase I ESA

A Phase I ESA for the site prepared by Advanced Cleanup Technologies, Inc. (ACT) dated March 23, 2015 identified the following Recognized Environmental Conditions (RECs):

- A portion of the site is has been occupied by a drycleaner from at least 1986 through the present.

Based on the findings of the Phase I ESA, ACT recommended that a Vapor Intrusion Study be implemented at the site to evaluate whether a vapor encroachment condition exists.

A copy of the Phase I ESA was submitted to NYSDEC with the BCP application.

1.2.2 Soil Vapor Intrusion Study

Based on the findings of the Phase I ESA, ACT performed a Soil Vapor Intrusion (SVI) Study at the site in April 2015. The scope of work included the collection and analysis of four sub-slab soil vapor samples from within the building. Soil vapor samples were analyzed for volatile organic compounds (VOCs) by USEPA Method TO-15. Sample results were compared to the screening levels and decision matrices specified in New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006).

Although indoor air samples were not collected, sub-slab tetrachloroethene (PCE) concentrations exceeded 1,000 µg/m^3 in each of the four soil vapor samples collected. Regardless of indoor air concentrations, PCE concentrations in soil vapor exceeding 1,000 µg/m^3 fall within the mitigation range in NYSDOH Soil Vapor/Indoor Air Matrix 2.

Based on the findings of the SVI Study, ACT recommended that a sub-slab depressurization system be installed at the site, and that the site be entered into the BCP.

A copy of the SVI Study was submitted to NYSDEC with the BCP application.

1.2.3 Subsurface Investigation

Based on the findings of the SVI Study, ACT performed a Subsurface Investigation (SSI) at the site in July 2015 to delineate the extent of subsurface soil impact. The scope of work included the collection and analysis of soil samples from three soil borings installed within the building, in the vicinity of the existing dry cleaning

equipment. At each boring location, a shallow soil sample (0 to 2 feet below grade) and deep soil sample (up to 10 to 11 feet below grade) were collected. Soil samples were analyzed for VOCs by USEPA Method 8260. Sample results were compared to the NYSDEC Unrestricted Use Soil Cleanup Objectives (SCOs) specified in 6 NYCRR Part 375-6, Remedial Program Soil Cleanup Objectives (December 2006).

PCE was detected at concentrations exceeding its Unrestricted Use SCO of 1,300 parts per billion (ppb) in each of the shallow (0 to 2 feet below grade) soil samples collected. PCE concentrations in these samples ranged from 7,200 ppb to 82,000 ppb. PCE concentrations in the deep soil samples collected were significantly lower (maximum concentration of 96 ppb), and did not exceed the Unrestricted Use SCO for PCE. Low level concentrations of several other VOCs were detected in soil samples collected from the site, however PCE was the only compound detected above its respective Unrestricted Use SCO.

A copy of the SSI was submitted to NYSDEC with the BCP application.

2.0 DESCRIPTION OF REMEDIAL ACTION

Based on the findings of the ACT Subsurface Investigation and Soil Vapor Intrusion Study, PCE impacted soils are present beneath the eastern portion of the site. PWGC recommends that soil impact be addressed by an IRM consisting of:

- Remediation of VOC impacted soils in the vicinity of the former dry cleaner.

2.1 Remediation of VOC Impacted Soil

Prior investigations identified VOCs, primarily PCE impacting subsurface soil and soil vapor beneath the existing building slab. Impacted soils from this portion of the site will be excavated, removed from the site, and properly disposed of.

2.1.1 Building Demolition

Prior to the start of this IRM, the existing building will be demolished, with the exception of the floor slab. The floor slab will be kept in place until excavation work begins to prevent potential vapor concerns related to off-gassing of VOCs from PCE impacted soils beneath the slab. Building demolition will be performed in accordance with the requirements of the New York City (NYC) Department of Building (DOB).

2.1.2 IRM Area Delineation Sampling

To determine the horizontal and vertical extent of impacted soil to be remediated as part of this IRM, delineation sampling will be performed in the vicinity of the suspected source area. Delineation sampling will consist of a minimum of six soil borings in the vicinity of the former dry cleaner location. Based on field screening and/or analytical results, additional step-out borings will be installed as necessary. Proposed boring locations are illustrated in **Figure 4**.

At each soil boring location, soils will be collected continuously from grade to a depth of 15 feet below grade. Soil borings will be installed utilizing a Geoprobe® direct-push drill rig (or equivalent) outfitted with a macro-core sampler and dedicated acetate liners. Soils will be field screened for the presence of VOCs using a PID. At each boring location, a minimum of four soil samples will be collected from the following depth intervals:

- 0 to 2 feet below grade
- 3 to 5 feet below grade
- 8 to 10 feet below grade
- 13 to 15 feet below grade

Delineation soil samples will collected in properly preserved, pre-cleaned, laboratory supplied glassware, stored in a cooler on ice, and shipped to the analytical laboratory under proper chain of custody procedures. Samples will be submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certified laboratory. Laboratory analysis of samples will be as follows:

- All samples:
    - TCL VOCs by USEPA Method 8260
- Analysis for additional parameters will be dependent on analytical results for VOC analysis for specific depth intervals. For each sample interval, sufficient soils will be collected to allow analysis for the full list of TCL/TAL parameters below. Initially, these samples will be placed on hold at the analytical laboratory. Upon receipt of VOC analytical data, for each boring location, the shallowest sample collected that meets Restricted Residential SCOs for VOC impact will be analyzed for the full list of TCL/TAL parameters. To prevent hold times for additional analyses from being exceeded while samples are on hold at the laboratory, VOC analysis will be performed with an accelerated turnaround time. If necessary, the laboratory may also perform sample extraction for analyses (e.g., SVOCs) that are approaching the limit of their respective hold times, with the extraction archived pending a determination as to whether analysis is required. In addition to VOCs, full TCL/TAL analysis will include:
    - TCL Semi-volatile organic compounds by USEPA Method 8270
    - TAL metals by USEPA Method 6010/7471
    - TCL Pesticides and PCBs by USEPA Method 8081/8082

During collection of delineation samples, waste characterization samples will be collected from the site as well. The specific sample depths, sample frequency, and laboratory analyses will be determined based upon the requirements of the selected disposal facilities. Waste characterization sample results will be used to obtain a waste approval from a properly permitted disposal facility prior to the start of excavation activities. A copy of the selected disposal facility(ies) permit and waste approval will be provided to NYSDEC prior to wastes being transported off site.

2.1.3 Soil Excavation and Disposal

The area and depth to be excavated for off-site disposal as part of this IRM will be determined by delineation sampling described in Section 2.1.2, above. Prior to the start of work, a figure illustrating the proposed IRM excavation area will be submitted to NYSDEC for review.

In the event that the size and depth of the IRM excavation area near the property boundary precludes utilizing sloping to stabilize the excavation sidewalls, a sheeting/shoring plan will be prepared by the redevelopment team, and approved by NYC DOB prior to the start of work (see Section 3.1.3)

Soils will be excavated from the proposed excavation area utilizing an excavating machine. Soils will be screened during excavation and stockpiled on the eastern portion of the site. Soils will be screened utilizing a photoionization detector (PID) capable of detecting the presence of VOCs. Soils exhibiting significantly elevated PID responses or odors may be segregated and stockpiled from other soils being excavated, as necessary. Soil stockpiles will be constructed and maintained in accordance with Section 3.1.3. Soils will be characterized in-situ prior to excavation to allow for a "load and go" excavation and eliminating the need for onsite stockpiling of soils to be disposed of.

The final limit of the IRM excavation will be determined in the field based upon soil screening, analytical results from delineation sampling (see Section 2.1.2), verification sampling results (see Section 4.2), and in consultation with NYSDEC. The final excavation area and depth will be provided in the IRM report.

3.0 ENGINEERING SPECIFICATIONS AND CONTROLS

3.1 Engineering Specifications

3.1.1 Mobilization, Site Security

Mobilization will include the delivery of construction equipment and materials to the site. Site workers will receive site orientation and training in accordance with the site specific Health and Safety Plan (HASP), Community Air Monitoring Plan (CAMP) and established policies and procedures to be followed during the implementation of the IRM. The remediation contractor and all associated subcontractors will each receive a copy of the IRM Work Plan, HASP and CAMP and will be briefed on their contents.

Site security will be maintained by utilizing and maintaining the existing eight foot high plywood construction fence surrounding the property. The fence will be maintained throughout the project and the vehicle access gate on the east side leading to Coney Island Avenue will be kept closed during daily operations and closed and locked at all other times.

3.1.2 Building Demolition

Prior to implementation of this IRM, the existing building will be demolished, with the exception of the existing floor slab. A demolition permit will be acquired from NYC DOB prior to building demolition; demolition work will be performed in accordance with the DOB permit requirements.

3.1.3 Sheeting/Shoring Plan

If necessary, sheeting/shoring will be installed and maintained in accordance with the site specific sheeting plan which will be submitted to and approved by NYC DOB prior to the start of excavation activities. Modifications or additions to the sheeting/shoring plan will be made by a professional engineer and approved by NYC DOB in advance.

3.1.4 Soil Stockpile Area Construction and Maintenance

Excavated soils stockpiled on-site prior to disposal will be confined to the eastern portion of the site within the fence line. If necessary to segregate soils for multiple disposal facilities, stockpile areas will be lined with 20-mil polyethylene sheeting to prevent cross contamination. Stockpiled material will be covered with 20-mil polyethylene sheeting, secured and maintained until removed from the site.

3.1.5 Soil Disposal

Excavated soils stockpiles will be sampled in accordance with the procedures described under Section 4.3 of this document to meet the waste acceptance criteria of the disposal facility. Impacted soil to be removed from the

site will be loaded into roll-off containers and/or dump trucks provided by a licensed waste transport company. Loading will be performed with a back-hoe, excavator, or equivalent. Loaded containers will be covered with a tarp.

As necessary, waste disposal will be coordinated with NYSDEC Division of Solid and Hazardous Materials, to allow for wastes to be disposed of as hazardous or non-hazardous waste based upon their characteristic qualities. Non-hazardous waste streams will be approved by NYSDEC in advance.

3.1.6 Backfill and Site Restoration

Following removal of impacted soils, excavated areas will be partially backfilled for future construction needs, with clean fill. Clean fill, as defined by 6NYCRR Part 360, may be brought in from off-site to backfill the excavations and will be in compliance with 6NYCRR Part 375-6.7(d). The NYSDEC will be consulted, and must approve in advance, the return of excavated soil and the use of off-site fill.

3.1.7 Demobilization

Following the completion of interim remedial activities at the site, equipment and remedial structures will be dismantled and removed from the site. Solid wastes generated during IRM activities (i.e., polyethylene sheeting) will be properly disposed of.

3.2 Engineering Controls

3.2.1 Dust Suppression

Dust generation from excavation activities and stockpiled soils will be monitored as described under Section 7.0. If dust generation approaches action levels, suppression will be accomplished by:

- Covering/capping exposed soil area with mulch, rubber mats, etc.
- Wetting equipment and excavation faces;
- Water spray dust suppression;
- Hauling materials in properly covered containers; and,
- Restricting vehicle speeds to 10 mph.

When possible, impacted soils will be loaded directly into trucks for immediate off-site disposal.

3.2.2 Odor Control

In the event that odor suppression becomes necessary, techniques to be implemented for control of odors from stockpiled soil or from the open excavation will include one or more of the following:

- Cover with plastic
- Cover with “clean soil”
- Application of hydro-mulch or encapsulating foam
- Limit working hours to favorable wind and temperature conditions

Hydro-mulch or encapsulating foam can be sprayed over open excavation areas, temporary stockpile areas and loaded trucks, as necessary. This is a highly effective method for controlling odors as the release of odors is sealed immediately at the source.

3.2.3 Sediment and Erosion Control

Erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff will be placed to protect the excavation work and adjacent areas during excavation activities. Storm water control measures, such as straw hay bales or silt fence, may be utilized during excavation activities to prevent storm water runoff from impacting excavation areas and neighboring sites.

4.0 MONITORING AND MAINTENANCE

4.1 Construction Phase Monitoring

Monitoring during soil excavation will be performed to protect the health of site workers and the surrounding community. A Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) have been developed for this project. These plans specify the monitoring procedures, action levels, and contingency measures that are required to protect public health and site workers. Air monitoring will include real-time measurement of volatile emissions and dust levels.

4.2 Post-Excavation Monitoring and Verification

As specified in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, verification sampling will consist of collecting endpoint soil samples from within each excavation area. The sampling frequency will be one sample from the base of the excavation for every 900 square feet of bottom. Depending on the size of the excavation and analytical results, samples collected during delineation of the IRM area may be used as in-situ verification samples (see Section 2.1.2).

Verification soil samples will be submitted to a NYSDOH ELAP certified laboratory (specific laboratory to be determined). Samples will be analyzed for the presence of VOCs by USEPA Method 8260. Sample analytical results will be compared to NYSDEC soil cleanup objectives.

Soil sampling and equipment decontamination will be performed in accordance with USEPA SOP # 2001 General Field Sampling Guidelines, SOP# 2012 Soil Sampling, and SOP# 2006 Sampling Equipment Decontamination.

4.3 Waste Characterization

Prior to the start of excavation, in situ soil samples will be collected from throughout the site (see Section 2.1.2) to determine whether wastes generated during this IRM will be disposed as hazardous or non-hazardous material prior to mobilization. The specific sample depths, sample frequency, and laboratory analyses for waste characterization samples will be determined based upon the requirements of the selected disposal facilities (to be determined).

Soil sampling and equipment decontamination will be performed in accordance with USEPA SOP # 2001 General Field Sampling Guidelines, SOP# 2012 Soil Sampling, and SOP# 2006 Sampling Equipment Decontamination.

5.0 INTERIM REMEDIAL MEASURE COMPLETION REPORT PREPARATION

An IRM Construction Completion Report will incorporate the details and findings of the IRM activities performed as outlined in this work plan consistent with NYSDEC DER-10, Section 5.8. The report will detail analytical data, soil disposal volumes, and manifests, site restoration details, results of CAMP monitoring,

Electronic copies of the IRM Completion Report will be submitted to the NYSDEC. Analytical results of the investigation will be submitted in the electronic data delivery (EDD) format through the Departments environmental information management system (EIMS).

6.0 HEALTH AND SAFETY PLAN

Field operations will be performed in accordance with the health and safety requirements to be provided in the site specific HASP (to be provided at a later date, prior to the start of work). The HASP outlines the requirements for training, medical surveillance, daily tailgate meetings, emergency response, and accident and injury reporting.

The Field Team Leader will be responsible for implementing the HASP, completing the daily tailgate safety meetings and performing necessary Industrial Hygiene (IH) monitoring as specified in the HASP.

Sub-contractors will have the option of adopting this HASP or developing their own site-specific document. If a subcontractor chooses to prepare their own HASP, it must meet the minimum requirements as detailed in the site HASP and must be made available to PWGC and NYSDEC.

Activities performed under the HASP will comply with applicable parts of OSHA Regulations, primarily 29 CFR Parts 1910 and 1926, and the PWGC Corporate Environmental Health and Safety policy. Modifications to the HASP may be made with the approval of the PWGC Health and Safety Manager (HSM) and/or Project Manager (PM).

7.0 COMMUNITY AIR MONITORING PLAN

A site specific Community Air Monitoring Plan has been prepared to provide measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminants as a direct result of the remedial activities (to be provided at a later date, prior to the start of work). The primary concerns for this site are VOCs and dust particulates.

The CAMP will be implemented and executed in accordance with 29 CFR 1910.120(h), the New York State Department of Health's (NYSDOH) Generic CAMP, and the NYSDEC TAGM #4031.

8.0 QUALITY ASSURANCE PROJECT PLAN

A Quality Assurance Project Plan (QAPP) has been prepared to detail the objectives, functional activities, methods, and quality assurance / quality control (QA/QC) requirements associated with sample collection and laboratory analysis for remedial activities. The QAPP follows requirements detailed in DER-10, Section 2.

The components of the QAPP include:

- Project Organization,
- Sampling requirements, including methodology, identification, quantity, volumes, locations, frequency, chain of custody procedures, and sample packaging,
- Field/Laboratory data control requirements,
- Equipment decontamination, and
- Field documentation.

A copy of the QAPP is included as **Appendix C**.

9.0 SCHEDULE

The preliminary schedule for the major project milestones is presented in Table 1. The field work is anticipated to start in March 2016 and be completed by June 2016. A draft IRM Report will be submitted to the NYSDEC by August 2016.

10.0 REFERENCES

6 NYCRR Part 375 – Environmental Remediation Programs, December 2006

6 NYCRR Part 376 - Land Disposal Restrictions, September 2006

29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response

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Advanced Cleanup Technologies, Inc., April 14, 2015, Soil Vapor Intrusion Study - 124-22 Queens Boulevard, Kew Gardens, New York

Advanced Cleanup Technologies, Inc., July 28, 2015, Subsurface Investigation Report - 124-22 Queens Boulevard, Kew Gardens, New York

NYSDEC, Division of Environmental Restoration, May 2004, Draft Brownfield Program Cleanup Guide.

NYSDEC, Division of Environmental Restoration, December 2002, Draft DER-10, Technical Guidance for Site Investigation and Remediation.

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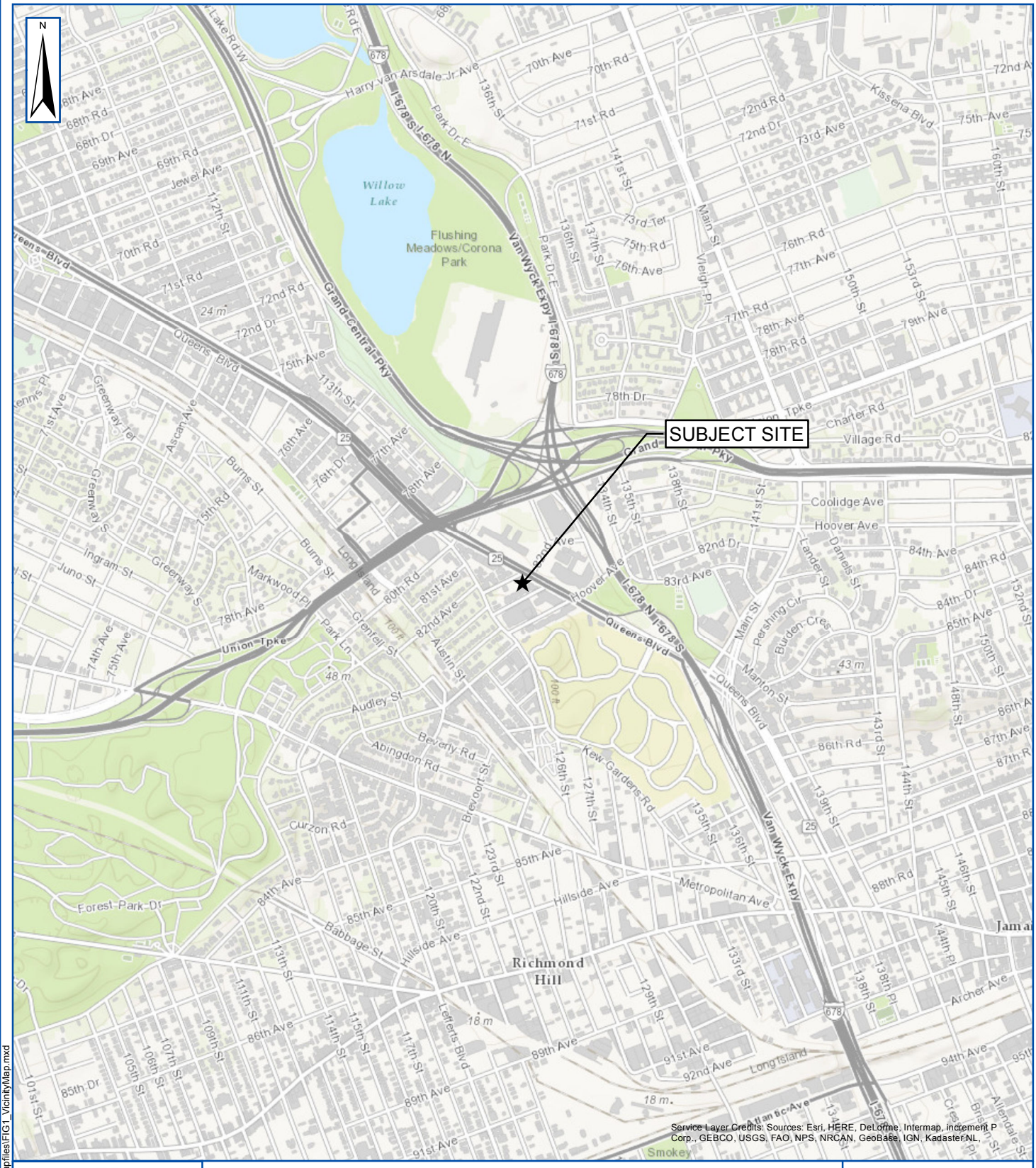
NYSDEC, Division of Technical and Administrative Guidance, December 9, 1992, Memorandum # 4048, Interim Remedial Measures - Procedures.

NYSDEC, Division of Technical and Administrative Guidance, October 27, 1989, Memorandum #4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites

NYSDEC, Division of Water, June 1998, Addendum April 2000, Technical and Administrative Guidance Series 1:1:1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.

USEPA, SOP # 2001 General Field Sampling Guidelines, SOP# 2012 Soil Sampling, and SOP# 2006 Sampling Equipment Decontamination

FIGURES



SUBJECT SITE VICINITY

124-22 QUEENS BLVD
KEW GARDENS, NY

0 ¼ ½ ¾ 1 Miles

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Designed by:	TM
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Approved by:	TM
Figure No:	1

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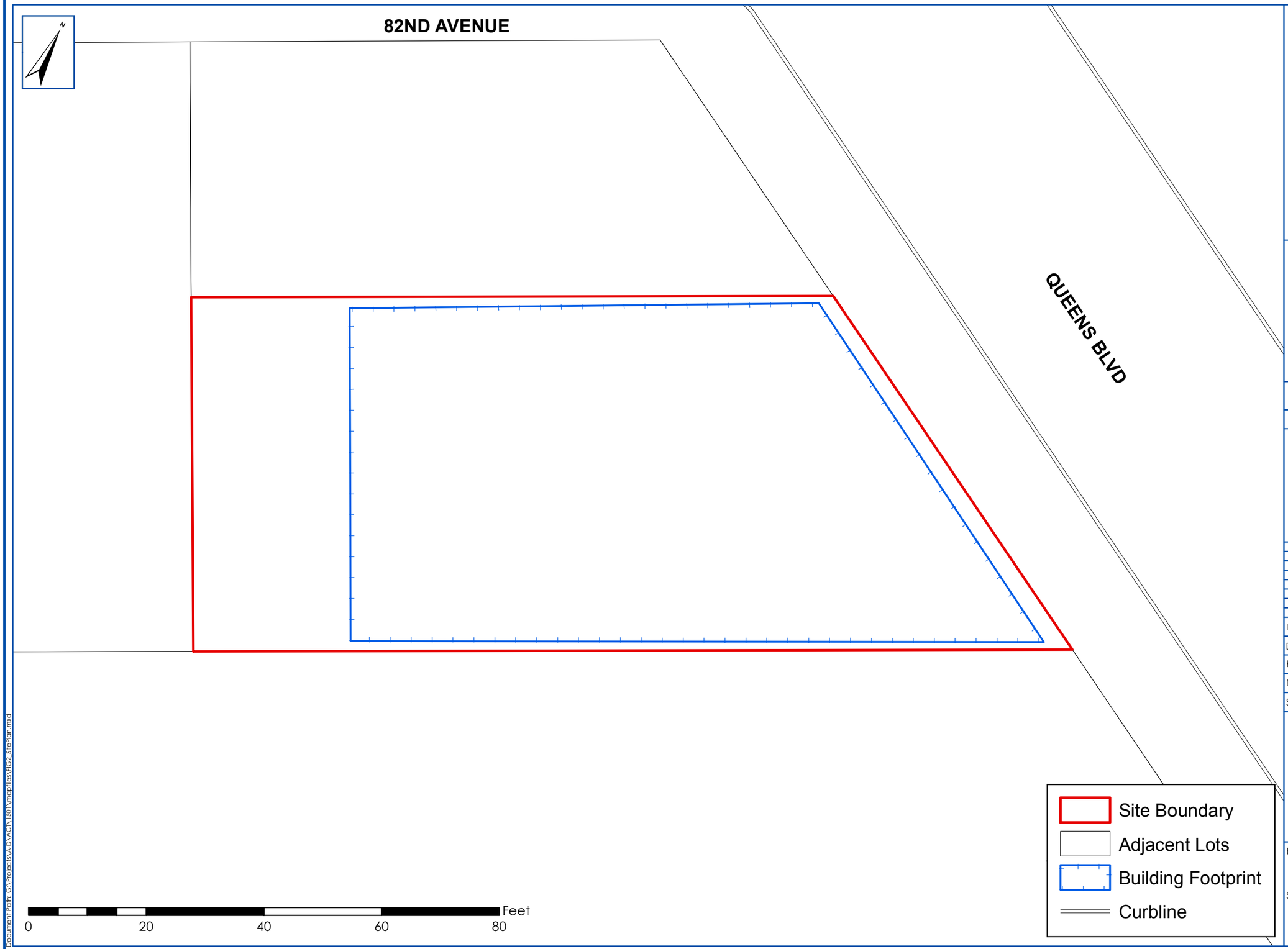

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Scale:	AS SHOWN	Approved by:	TM

SITE PLAN

124-22 QUEENS BLVD
KEW GARDENS, NY

FIGURE NO:
2

SHEET:

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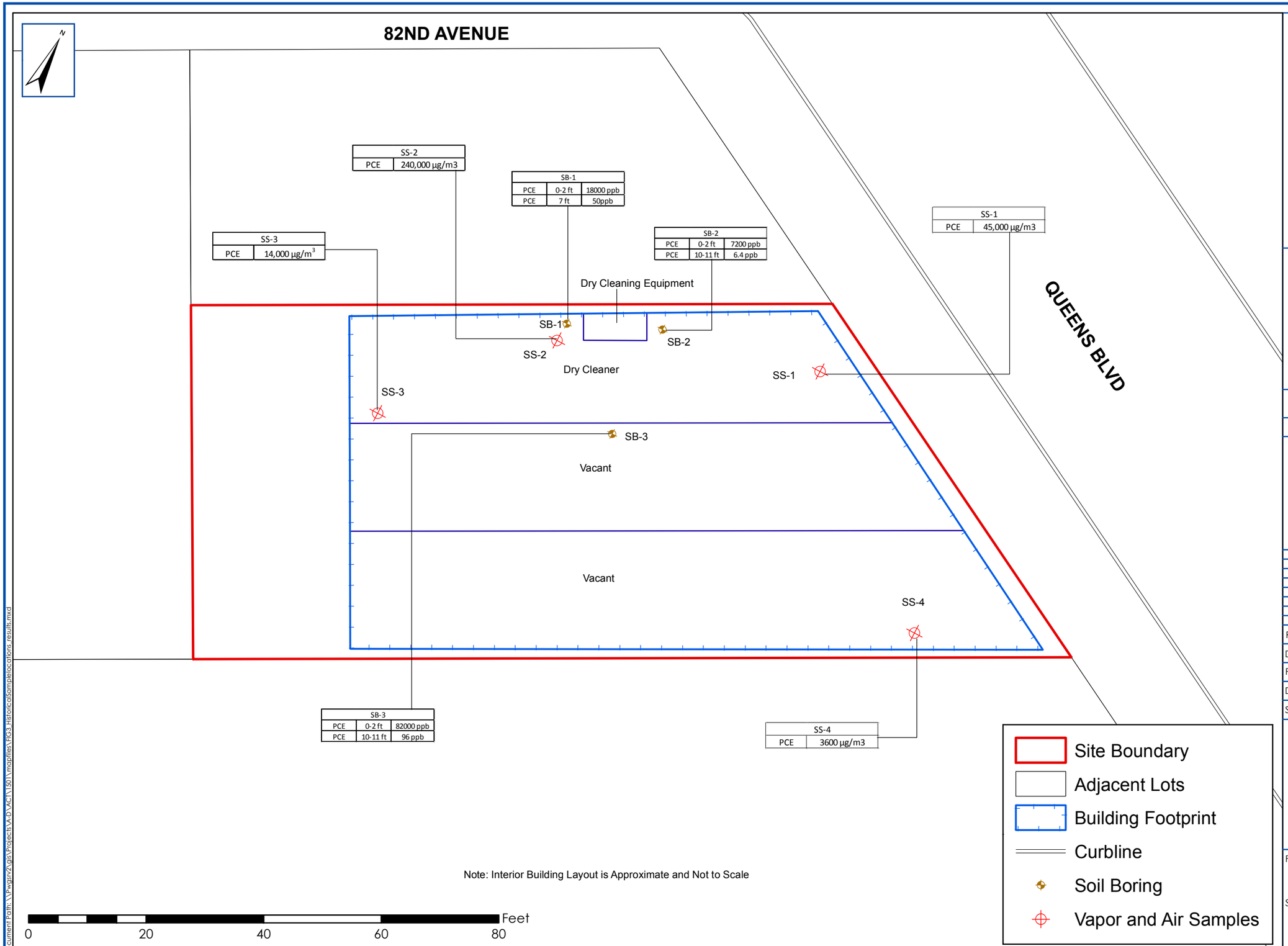

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Scale:	AS SHOWN	Approved by:	TM

HISTORICAL SAMPLE LOCATIONS AND RESULTS

124-22 QUEENS BLVD
KEW GARDENS, NY

FIGURE NO:
3

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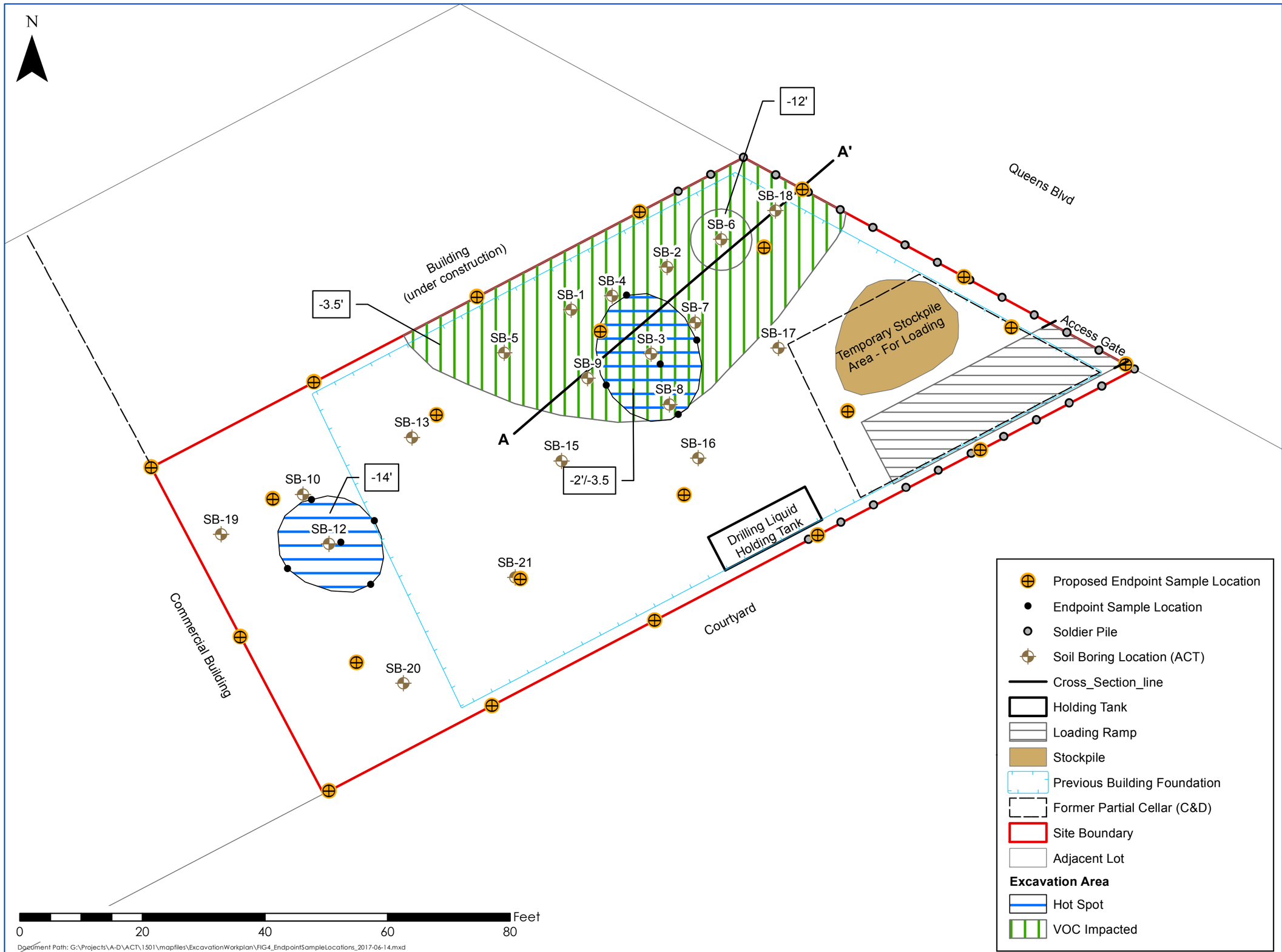

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Scale:	AS SHOWN	Approved by:	KA

ENDPOINT SAMPLE LOCATIONS

124-22 QUEENS BLVD
KEW GARDENS, NY

FIGURE NO:

4

TABLES

Table 1
Estimated Project Schedule
Interim Remedial Measure
124-22 Queens Boulevard
Kew Gardens, New York
NYSDEC BCP ID: C241177

	Weeks																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Task	Mobilization																							
			Delineation Sampling																					
							Soil Excavation and Removal																	
													Endpoint Soil Sampling										
															IRM Completion Report Preparation									

APPENDIX A
HEALTH AND SAFETY PLAN

124-22 QUEENS BOUEVARD
KEW GARDENS, NEW YORK
NYSDEC BCP ID: C241177
BLOCK: 3359, LOT: 21

HEALTH AND SAFETY PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

ON BEHALF OF:

Luciano, LLC
25 Aldgate Drive East
Manhasset, New York 11030

PREPARED BY:

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PWGC Project Number: ACT1501

FEBRUARY 2016

P.W. GROSSER CONSULTING INC.
PROJECT No. ACT1501

HEALTH AND SAFETY PLAN

122-24 QUEENS BOULEVARD
KEW GARDENS, NEW YORK
BCP Site # C241177

Submitted:
February 2016

Prepared for:
The New York State Department of Environmental Conservation
Division of Environmental Remediation

On behalf of:
Luciano LLC
25 Aldgate Drive East
Manhasset, New York 11030

Prepared By:
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124-22 QUEENS BOULEVARD, KEW GARDENS, NEW YORK
NYSDEC BCP ID C241177
HEALTH AND SAFETY PLAN

CONTENTS **PAGE**

124-22 QUEENS BOULEVARD, KEW GARDENS, NEW YORK
NYSDEC BCP ID C241177
HEALTH AND SAFETY PLAN

CONTENTS **PAGE**

124-22 QUEENS BOULEVARD, KEW GARDENS, NEW YORK
NYSDEC BCP ID C241177
HEALTH AND SAFETY PLAN

CONTENTS

TABLES

APPENDICES

1.0 STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to chemical, biological and physical hazards during the planned Interim Remedial Measure (IRM) to be performed at 124-22 Queens Boulevard, Kew Gardens, New York. P.W. Grosser Consulting Inc.'s (PWGC's) policy is to minimize the possibility of work-related exposure through awareness and qualified supervision, health and safety training, medical monitoring, use of appropriate personal protective equipment, and the following activity specific safety protocols contained in this HASP. PWGC has established a guidance program to implement this policy in a manner that protects personnel to the maximum reasonable extent.

This HASP, which applies to persons present at the site actually or potentially exposed to safety or health hazards, describes emergency response procedures for actual and potential physical, biological and chemical hazards. This HASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy.

2.0 INTRODUCTION

2.1 Purpose

This HASP addresses the minimum health and safety practices that will be employed by site workers participating in IRM activities at the project site located at 124-22 Queens Boulevard, Kew Gardens, New York.

The HASP takes into account the specific hazards inherent to the site and presents the minimum requirements which are to be met by P.W. Grosser Consulting, Inc. (PWGC), its' subcontractors, and other on-site personnel in order to avoid and, if necessary, protect against health and/or safety hazards. PWGC sub-contractors will have the option of adopting this HASP or developing their own site-specific document. If a subcontractor chooses to prepare their own HASP, it must meet the minimum requirements as detailed in this HASP and must be made available to PWGC for review and acceptance.

Activities performed under this HASP will comply with applicable parts of Occupational Safety and Health Administration (OSHA) Regulations, primarily 29 CFR Parts 1910 and 1926 and all other applicable federal, state, and local regulations. Modifications to the HASP may be made with the approval of the PWGC Health and Safety Manager (HSM) and/or Project Manager (PM). A copy of this HASP will be maintained on-site during all work activities.

Refusal to comply with the HASP or violation of any safety procedures by field personnel may result in their immediate removal from the site following consultation with the HSM and the Field Team Leader (FTL).

2.2 Scope

This HASP addresses the potential hazards related to IRM activities. The primary IRM activities include the following:

- Mobilization/Demobilization.
- Drilling.
- Soil and groundwater sampling.
- Excavation.
- Soil transport and disposal.

The potential hazards associated with this scope are listed below and are discussed in more detail in this HASP after the project organization and responsibilities section.

- Chemical Hazards.
- Biological Hazards.
- Physical Hazards.

2.3 Application

The HASP applies to all personnel involved in the above tasks who wish to gain access to active work areas, including but not limited to:

- PWGC employees and subcontractors.
- Client representatives.
- Federal, state or local representatives.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section specifies the project organization and responsibilities.

3.1 Project Manager

- Participates in major incident investigations;
- Ensures that the HASP has all of the required approvals before site work is conducted; and
- Has the overall project responsibility for project health and safety.

3.2 Field Team Leader (FTL)/ Site Health and Safety Officer (SHSO)

- Ensures that the HASP is implemented in conjunction with the Health and Safety Manager (HSM);
- Ensures that field work is scheduled with adequate equipment to complete the job safely;
- Enforces site health and safety rules;
- Ensures that proper personal protective equipment is utilized;
- Ensures that the HSM is informed of project changes that require modifications to the HASP;
- Ensures that the procedure modifications are implemented;
- Investigates incidents;
- Conducts the site safety briefing;
- Reports to HSM to provide summaries of field operations and progress; and
- Acts as Emergency Coordinator.

3.3 Health and Safety Manager

- Provides for the development of the HASP;
- Serves as the primary contact to review health and safety matters that may arise;
- Approves individuals who are assigned SHSO responsibilities;
- Coordinates revisions of this HASP with field personnel; and
- Assists in the investigation of major accidents.

3.4 Site Personnel

- Report any unsafe or potentially hazardous conditions to the FTL/SHSO;
- Maintain knowledge of the information, instructions and emergency response actions contained in this HASP; and
- Comply with rules, regulations and procedures as set forth in this HASP and any revisions.

4.0 SITE HISTORY AND PROJECT DESCRIPTION

4.1 Project Background

This Health and Safety Plan (HASP) has been prepared by PWGC, on behalf of Luciano, LLC. Tetrachloroethene (PCE) has been identified in soil and soil vapor at the site. Additionally, based on the urban nature of the site, historic fill material, which typically contains elevated concentrations of semi-volatile organic compounds (SVOCs) and metals, is likely to be present at the property.

4.2 Site Location and Description

The subject site is located at 124-22 Queens Boulevard in the Kew Gardens neighborhood of the Borough of Queens, New York. The site is situated on the southwest side of Queens Boulevard, between 82nd Road and 82nd Avenue. The property is identified as Block: 03359 Lot: 0021 by the New York City Department of Assessment. The site measures approximately 7,700 square feet (0.18 acre).

The property is currently occupied by a two-story commercial building with a partial basement. The building is currently vacant with the exception of a drycleaner in the northernmost first-floor unit; the drycleaner is expected to vacate the building in the near future (prior to implementation of this IRM).

The subject site was recently purchased by Luciano LLC with plans for redevelopment consisting of an 11-story mixed use building with a basement. The building will consist of an open-air parking garage on the basement level (along with machine/utility spaces), commercial space on the first through third floors, and residential space on the fourth through eleventh floors. Construction of the proposed building foundation will require that the majority of the site be excavated to approximately 11 feet below grade, with portions excavated slightly deeper (footings, elevator pit, etc.).

5.0 POTENTIAL HAZARDS OF THE SITE

This section presents an assessment of the chemical, biological, and physical hazards that may be encountered during the tasks specified under Section 1.0. Additional information can be found in **Appendix A** - Material Safety Data Sheets or in **Appendix B** - Activity Hazard Analyses.

5.1 Chemical Hazards

Review of historical information from the site indicates that the soil and soil vapor at the site is contaminated with PCE above NYSDEC and NYSDOH standards and guidance levels. Additionally, based on the presumed presence of historic fill material at the site, SVOC and metals impact exceeding NYSDEC standards is likely present in soils at the site as well. These compounds may present an occupational exposure hazard during site operations.

The chemicals identified above may have an effect on the central nervous system, respiratory system and may cause chronic liver and kidney damage. Acute exposure symptoms may include headache, dizziness, nausea, diarrhea and skin and eye irritation. Specific information on the chemicals identified at the Site can be found in Table 5-1 as well as on the Chemical Data Sheets found in **Appendix A**.

Table 5-1

Chemical Hazards

COMPOUND	CAS#	OSHA PEL	ROUTES OF EXPOSURE	SYMPTOMS OF EXPOSURE	TARGET ORGANS	PHYSICAL DATA
Tetrachloroethene (PCE)	127-48-4	TWA 100 mg/m^3	Inhalation Ingestion Skin/Eye	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; potential occupational carcinogen	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system	Colorless liquid with a mild, chloroform-like odor.

Abbreviations

C = Ceiling limit, not to be exceeded

CNS = Central Nervous System

PEL=Permissible Exposure Limit

OSHA = Occupational Safety and Health Administration

ppm = parts per million

VP = vapor pressure at approximately 68□ F in mm Hg (mercury)

TWA = Time-weighted average (8 hours)

5.2 Biological Hazards

Work will be performed in a highly urban area within the City of New York. Potential exists for workers to come into contact with biological hazards such as animals, insects and plants. The Activity Hazard Analyses found in **Appendix B** includes specific hazards and control measures for each task, if applicable.

5.2.1 Animals

Sites are located in predominantly commercial/urban areas. It is unlikely that significant amounts of wildlife will be encountered. However, workers shall use discretion and avoid contact with animals, if necessary.

5.2.2 Insects

Insects, such as mosquitoes, ticks, bees and wasps may be present during certain times of the year. Workers will be encouraged to wear repellents and PPE, if deemed necessary, when working in areas where insects are expected to be present.

During the months of April through October, particular caution must be exercised to minimize exposure to deer ticks and the potential for contracting Lyme disease. Specific precautionary work practices that are recommended include the following:

- Cover your body as much as possible. Wear long pants and long sleeved shirts. Light color clothing makes spotting of ticks easier.
- Try to eliminate possible paths by which the Deer Tick may reach unprotected skin. For example, tuck bottoms of pants into socks or boots and sleeves into gloves. (Duct tape may be utilized to help seal cuffs and ankles). If heavy concentrations of ticks or insects are anticipated or encountered, Tyvek coveralls may be utilized for added protection when the potential for heat stress is not a concern.
- Conduct periodic and frequent, (e.g., hourly), surveys of your clothing for the presence of ticks. Remove any tick, save it and report to the clinic with the tick.
- Use insect /tick repellents that contain the chemical DEET (n,n-Diethyltoluamide). Apply repellents in accordance with manufacturers' recommendations. These repellents are readily available and include such brands as Deep Woods OFF and Maximum Strength OFF.

5.2.3 Plants

Hazardous plants such as poison ivy and poison oak may be present at the site. In the event that these plants are present, the FTL/SHSO should identify susceptible individuals and workers shall avoid contact with these plants.

5.3 Physical Hazards

Most safety hazards are discussed in the Activity Hazard Analyses (AHA) in **Appendix B** for the different phases of the project. In addition to the AHAs, general work rules and other safety procedures are described in Section 10 of this HASP.

5.3.1 Temperature Extremes

Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke.

Cold Stress

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, and poor judgment.

PWGC's Heat/Cold Stress Protocols are specified in **Appendix C**.

5.3.2 Steam, Heat and Splashing

Exposure to steam/heat/splashing hazards can occur during steam cleaning activities. Splashing can also occur during well development and sampling activities. Exposure to steam/heat/splashing can result in scalding/burns, eye injury, and puncture wounds.

5.3.3 Noise

Noise is a potential hazard associated with the operation of heavy equipment, drill rigs, pumps and engines. Workers will wear hearing protection while in the work zone when these types of machinery are operating.

5.3.4 Fire and Explosion

When conducting excavation or drilling activities, the opportunity of encountering fire and explosion hazards may exist from encountering underground utilities, from the use of diesel engine equipment, and other potential ignition sources. During dry periods there is an increased chance of forest and brush fires starting at the job site. If these conditions occur no smoking will be permitted at the site and all operations involving potential ignition sources will be monitored continuously (fire watch).

5.3.5 Manual Lifting/Material Handling

Manual lifting of heavy objects may be required. Failure to follow proper lifting technique can result in back injuries and strains. Back injuries are a serious concern as they are the most common work place injury, often resulting in lost or restricted work time, and long treatment and recovery periods.

5.3.6 Slips, Trips and Falls

Working in and around the site will pose slip, trip and fall hazards due to slippery surfaces that may be oil covered, or from rough terrain, surfaces that are steep inclines, surfaced debris, or surfaces which are wet from rain or ice. Falls may result in twisted ankles, broken bones, head trauma or back injuries.

5.3.7 Heavy Equipment Operation

An excavator/backhoe will be used to excavate where required. Working with or near heavy equipment poses many potential hazards, including electrocution, fire/explosion, being struck by or against, or pinched/caught/crushed by, and can result in serious physical harm.

5.3.8 Electrocution

Encountering underground utilities may pose electrical hazards to workers. Additionally, overhead electrical lines can be a concern during drilling operations. Potential adverse effects of electrical hazards include burns and electrocution, which could result in death.

6.0 ACTIVITY HAZARD ANALYSES

The Activity Hazard Analysis (AHA) is a systematic way of identifying the potential health and safety hazards associated with major phases of work on the project and the methods to avoid, control and mitigate those hazards. The AHAs will be used to train work crews in proper safety procedures during phase preparatory meetings.

AHAs have been developed by PWGC for the following phases of work:

1. Site Mobilization/Demobilization.
2. Excavation.
3. Soil and Groundwater sampling.
4. Decontamination.

Copies of these AHAs are included in **Appendix B** of this HASP.

7.0 PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment (PPE) specified in **Table 7-1** represents the hazard analysis and PPE selection required by 29 CFR 1910.132. Specific information on known potential hazards can be found under Section 4.0 and **Appendix B** - Activity Hazard Analyses. For the purposes of PPE selection, the HSM and FTL/SHSO are considered competent persons. The signatures on the approval page of the HASP constitute certification of the hazard assessment. For activities not covered by **Table 7-1**, the FTL/SHSO will conduct the hazard assessment, select the PPE, and document changes in the appropriate field logs. PPE selection will be made in consultation with the HSM.

Modifications for initial PPE selection may also be made by the FTL/SHSO in consultation with the HSM and changes documented accordingly. If major modifications occur, the HSM will notify the PM.

7.1 PPE Abbreviations

HEAD PROTECTION

HH = Hard Hat

HEARING PROTECTION

EP = ear plugs

EM = ear muffs

HAND PROTECTION

Cot = cotton

But = Butyl

LWG = Leather Work Gloves

Neo = Neoprene

Nit = Nitrile

Sur = Surgical

EYE/FACE PROTECTION

APR = Full Face Air Purifying Respirator

MFS = Mesh Face shield

PFS =Plastic Face shield

SG = ANSI approved safety glasses with side shields

BODY PROTECTION

WC = work clothes

Cot Cov = Cotton Coveralls

Poly = Polyethylene coated Tyvek® coveralls

Saran = Saranex coated coveralls

Tyvek® = Uncoated Tyvek® coveralls

FOOT PROTECTION

Neo = Neoprene

OB = Overboot

Poly = polyethylene coated boot

Rub = rubber slush boots

STB = Leather work boots with steel toe

RESPIRATORY PROTECTION

APR = Full-face air purifying respirator with organic vapor cartridges

ASR = Full face air supplied respirator with escape bottle

SCBA = Self-contained breathing apparatus

7.2 Hazard Assessment for Selection of Personal Protective Equipment

The initial selection of personal protective equipment for each task was done by performing a hazard assessment taking into consideration the following:

- Potential chemical and physical present.
- Work operations to be performed.
- Potential routes of exposure.
- Concentrations of contaminants present.
- Characteristics, capabilities and limitations of PPE and any hazard that the PPE presents or magnifies.

A review of the analytical data from previous sampling events indicates that PCE (see **Table 5-**1) is the primary contaminant of concern. The maximum concentration detected for PCE in soil at the site is 82,000 ppb. Additionally, based on the presumed presence of historic fill material at the site, SVOC and metals impact exceeding NYSDEC standards is likely present in soils at the site as well.

Exposure routes for these chemicals include are inhalation, skin absorption, skin/eye contact and ingestion. Chemical protective gloves will be required for all activities that involve sample handling and the likelihood for skin contact. The proper use of PPE and strict adherence to decontamination and personal hygiene procedures will effectively minimize skin contact and ingestion as potential routes of exposure.

Table 7-1

Personal Protective Equipment Selection

TASK	HEAD	EYE/FACE	FEET	HANDS	BODY	HEARING	RESPIRATOR
Mobilization/ Demobilization	HH	SG	STB	WG	WC	None	None
Excavation, loading and backfilling	HH	SG	STB	WG	WC	EM or EP	None initially APR if action levels exceeded
Drilling Activities	HH	SG	STB	WG	WC	EM or EP	None initially APR if action levels exceeded
Soil/GW sampling	HH	SG	STB	WG, Nit & Sur as needed	WC, Tyvek® as needed	None	None initially APR if action levels exceeded
Decontamination	HH	SG	STB	Nit + Sur	WC, Tyvek® as needed	None	None initially APR if action levels exceeded

7.3 Respirator Cartridge Change-Out Schedule

A respirator cartridge change-out schedule has been developed in order to comply with 29 CFR 1910.134. If the use of respirators is necessary, the respirator cartridge change-out schedule for this project will be as follows:

1. Cartridges shall be removed and disposed of at the end of each shift, when cartridges become wet or wearer experiences breakthrough, whichever occurs first; and
2. If the humidity exceeds 85%, then cartridges shall be removed and disposed of after 4 hours of use.

Respirators shall not be stored at the end of the shift with contaminated cartridges left on. Cartridges shall not be worn on the second day, no matter how short of time period they were used the day before.

The schedule was developed based on the following scientific information and assumptions:

- Analytical data that is available regarding site contaminants.
- Using the Rule of Thumb provided by the AIHA.
- All of the chemicals have boiling points greater than 70°C.
- Total airborne concentration of contaminants is anticipated to be less than 200 ppm.
- The humidity is expected to be less than 85%.
- Desorption of the contaminants (including those with poor warning properties) after partial use of the chemical cartridge can occur after a short period (hours) without use (e.g., overnight) and result in a non-use exposure.

The following is a partial list of factors that may affect the usable cartridge service life and/or the degree of respiratory protection attainable under actual workplace conditions. These factors have been considered when developing the cartridge change-out schedule.

Type of contaminant(s);

- Contaminant concentration.
- Relative humidity.
- Breathing rate; Temperature; Changes in contaminant concentration, humidity, breathing rate and temperature.
- Mixtures of contaminants.
- Accuracy in the determination of the conditions.

- The contaminant concentration in the workplace can vary greatly. Consideration must be given to the quality of the estimate of the workplace concentration;
- Storage conditions between multiple uses of the same respirator cartridges. It is recommended that the chemical cartridges be replaced after each work shift. Contaminants adsorbed on a cartridge can migrate through the carbon bed without airflow;
- Age of the cartridge;
- Condition of the cartridge and respirator;
- Respirator and cartridge selection respirator fit;
- Respirator assembly, operation, and maintenance;
- User training, experience and medical fitness;
- Warning properties of the contaminant; and
- The quality of the warning properties should be considered when establishing the chemical cartridge change schedule. Good warning properties may provide a secondary or back-up indication for cartridge change-out.

8.0 AIR MONITORING

Air monitoring will be performed for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities at the site. Air monitoring will be used to help to confirm that the remedial work will not spread contamination off-site through the air. The primary concerns for this site are dust particulates and VOCs. Site monitoring with a photo-ionization detector (PID) will be performed during any invasive activities.

Real-time monitoring for dust and VOCs will be conducted both within the work area, and along the site perimeter, during intrusive activities such as excavation and drilling activities.

Detailed information on the types, frequency and location of real-time monitoring and community air monitoring requirements are provided in the Community Air Monitoring Plan (CAMP) prepared for this project.

9.0 ZONES, PROTECTION AND COMMUNICATION

9.1 Site Control

Site zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas. A three-zone approach will be utilized. It shall include an Exclusion Zone (EZ), Contamination Reduction Zone (CRZ) and a Support Zone (SZ). Specific zones shall be established on the work site when operations begin.

This project is a hazardous waste remediation project, and any person working in an area where the potential for exposure to site contaminants exists, will only be allowed access after providing the FTL/SHSO with proper training and medical documentation.

The zones are based upon current knowledge of proposed site activities. It is possible that the zone configurations may be altered due to work plan revisions. Should this occur, the work zone will be adjusted accordingly, and documented through use of a field-change request form.

The following shall be used for guidance in revising these preliminary zone designations, if necessary.

Support Zone - The SZ is an uncontaminated area that will be the field support area for most operations. The SZ provides for field team communications and staging for emergency response. Appropriate safety equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples.

Contamination Reduction Zone - The CRZ is established between the EZ and the SZ. The CRZ contains the contamination reduction corridor and provides for an area for decontamination of personnel and portable hand-held equipment, tools and heavy equipment. A personnel decontamination area will be prepared at each exclusion zone. The CRZ will be used for EZ entry and egress in addition to access for heavy equipment and emergency support services.

Exclusion Zone - All activities, which may involve exposure to site contaminants, hazardous materials and/or conditions, should be considered an EZ. The FTL/SHSO may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ shall be determined by the site HSO allowing adequate space for the activity to be completed, field members and emergency equipment.

9.2 Contamination Control

Decontamination areas will be established for the following activities.

- Drilling/Sampling Activities
- Excavation

9.2.1 Personnel Decontamination Station

All personnel and portable equipment used in the EZ shall be subject to a thorough decontamination process, as deemed necessary by the FTL/SHSO. Sampling equipment shall be decontaminated. As necessary, all boots and gloves will be decontaminated using soap and water solution and scrub brushes or simple removal and disposal. All used respiratory protective equipment will be decontaminated daily and sanitized with appropriate sanitizer solution.

All drums generated as a result of sampling and decontamination activities will be marked and stored at a designated area at the site until the materials can be property disposed of off-site.
All non-expendable sampling equipment will be decontaminated. This usually entails the use of Alconox, solvent and distilled/deionized water rinses to eliminate contaminants.

9.3 Communication

- Each team member will have a Nextel cell phone/radio for communication with the PM, HSO and other team members during field activities.
- Hand Signals - Hand signals shall be used by field teams, along with the buddy system. The entire field team shall know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

SIGNAL	MEANING
Hand gripping throat	Out of air, can't breathe
Grip on a partner's wrist or placement of both hands around a partner's waist.	Leave the area immediately, no debate.
Hands on top of head	Need assistance
Thumbs up	Okay, I'm all right, I understand.
Thumbs down	No, negative.

10.0 MEDICAL SURVEILLANCE PROCEDURES

All contractor and subcontractor personnel performing field work where potential exposure to contaminants exists at the site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120(f).

10.1 Medical Surveillance Requirements

A physician's medical release for work will be confirmed by the HSM before an employee can work in the exclusion zone. The examination will be taken annually at a minimum and upon termination of hazardous waste site work if the last examination was not taken within the previous six months. Additional medical testing may be required by the HSM in consultation with the Corporate Medical Consultant and the FTL/SHSO if an over-exposure or accident occurs, if an employee exhibits symptoms of exposure, or if other site conditions warrant further medical surveillance.

10.2 Medical Data Sheet

A medical data sheet is provided in **Appendix D**. This medical data sheet is voluntary and should be completed by all on-site personnel and will be maintained at the site. Where possible, this medical data sheet will accompany the personnel needing medical assistance. The medical data sheet will be maintained in a secure location, treated as confidential, and used only on a need-to-know basis.

11.0 SAFETY CONSIDERATIONS

11.1 General Health and Safety Work Practices

A list of general health and safety work practices is included as an included in **Appendix E**. The work rules will be posted in a conspicuous location at the site.

11.2 The Buddy System

At a minimum, employees shall work in groups of two in such a manner that they can observe each other and maintain line-of-sight for each employee within the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

11.3 Sample Handling

Personnel responsible for the handling of samples should wear the prescribed level of protection. Samples should be identified as to their hazard and packaged as to prevent spillage or breakage. Sample containers shall be decontaminated in the CRZ or EZ before entering a clean Support Zone area. Any unusual sample conditions, odors, or real-time readings should be noted. Laboratory personnel should be advised of sample hazard level and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or including a written statement with the samples reviewing lab safety procedures in handling, in order to assure that the practices are appropriate for the suspected contaminants in the sample.

11.4 Drill Rigs

When conducting drilling activities, the opportunity of encountering fire and explosion hazards exists from underground utilities and gases. The locations of underground utilities will be verified prior to performing any intrusive activities. Additionally, because of the inherently hazardous nature of drilling operations, safety and accident prevention are crucial when drilling operations are performed. Most drilling accidents occur as a direct result of lack of training and supervision, improper handling of equipment, and unsafe work practices. Hazards include: assembling and disassembling rigs, rotary and auger drilling, and grouting. The drilling contractor shall perform drilling in accordance with its own Health & Safety Program for Drill Rig Safety.

11.4.1 Safety During Drilling Operations

- Safety requires the attention and cooperation of every worker and site visitor.
- Do not drive the drill rig from hole to hole with the mast (derrick) in the raised position.
- Before raising the mast (derrick), look up to check for overhead obstructions.
- Maintain a minimum of 15 feet clearance from all overhead electric lines.

- Before raising the mast (derrick), all drill rig personnel (with the exception of the operator) and visitors shall be cleared from the areas immediately to the rear and the sides of the mast. All drill rig personnel and visitors shall be informed that the mast is being raised prior to raising it.
- Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig must first be leveled and stabilized with leveling jacks and/or solid cribbing. Lower the mast (derrick) only when the leveling jacks are down and do not raise the leveling jack pads until the mast (derrick) is lowered completely.
- The operator of a drill rig shall only operate a drill rig from the position of the controls.
- Throwing or dropping tools shall not be permitted. All tools shall be carefully passed by hand between personnel or a hoist line shall be used.
- Do not consume alcoholic beverages or other depressants or chemical stimulants prior to starting work on a drill rig or while on the job.
- All unattended boreholes must be adequately covered or otherwise protected to prevent drill rig personnel, site visitors, or animals form stepping or falling into the hole.
- Terminate drilling operations during an electrical storm and move the entire crew away from the drill rig.

11.5 Excavation

Although extensive excavation is not anticipated for the scope of this project, excavations will be conducted in accordance with the requirements contained in 29 CFR 1926, Subpart P-Excavations. It provides for the designation of a "Competent Person" and general requirements for safe excavating practices. The program also incorporates company standards for the monitoring of potentially hazardous atmospheres; protection from water hazards; analyzing and maintaining the stability of adjacent structures; daily competent person inspections; soil classification; sloping and benching; protective systems; and training.

The Competent Person will be the FTL or other designee with appropriate training and experience. The Competent Person will be assisted in his/her duties by other technical personnel such as the HSM, geologists, structural engineers and soils engineers.

No entry into excavations will be allowed for this phase of the project.

12.0 DISPOSAL PROCEDURES

All discarded materials, waste materials or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard or causing litter to be left on site.

All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary, labeled and segregated for disposal. All non-contaminated materials will be collected and bagged for appropriate disposal as non-hazardous solid waste. Additional waste disposal procedures may be developed as applicable.

13.0 EMERGENCY RESPONSE PLAN

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures which are addressed in the following subsections include communications, local emergency support units, preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures.

13.1 Responsibilities

13.1.1 Health and Safety Manager (HSM)

The HSM oversees and approves the Emergency Response/Contingency Plan and performs audits to determine that the plan is in effect and that all pre-emergency requirements are met. The HSM acts as a liaison to applicable regulatory agencies and notifies OSHA of reportable accidents.

13.1.2 Field Team Leader/Site Health and Safety Officer (FOL/HSO)

The FTL/SHSO is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The FTL/SHSO is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSM can ensure that OSHA is notified within the required time frame. The HSM will be notified of all OSHA recordable injuries, fires, spills, releases or equipment damage in excess of $500 within 24 hours.

13.1.3 Emergency Coordinator

The Emergency Coordinator for the project is the FTL/SHSO.

The Emergency Coordinator shall make contact with Local Emergency Response personnel prior to beginning work on site. In these contacts the emergency coordinator will inform interested parties about the nature and duration of work expected on the site and the type of contaminants and possible health or safety effects of emergencies involving these contaminants. The emergency coordinator will locate emergency phone numbers and identify hospital routes prior to beginning work on site. The emergency coordinator shall make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator will implement the Emergency Response/Contingency Plan whenever conditions at the site warrant such action.

13.1.4 Site Personnel

Site personnel are responsible for knowing the Emergency Response/Contingency Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency.

13.2 Communication

A variety of communication systems may be utilized during emergency situations. These are discussed in the following sections.

13.2.1 Hand Signals

Downrange field teams will employ hand signals where necessary for communication during emergency situations. Hand signals are found in Section 8.3.

13.2.2 Field Radios and Cell Phones

PWGC field personnel are provided cellular phones with telephone and two-way radio capabilities for site communication and emergency use.

13.3 Local Emergency Support Units

A route map from the site to the nearest hospital can be found in **Appendix F**. This map will be placed with the above emergency telephone numbers in all on-site vehicles.

13.4 Pre-Emergency Planning

PWGC will communicate directly with administrative personnel from the emergency room at the hospital to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from exposure to any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and in each site vehicle.

Before the field activities begin, the local emergency response personnel will be notified of the schedule for field activities and about the materials that are thought to exist on the site so that they will be able to respond quickly and effectively in the event of a fire, explosion, or other emergency. Before fieldwork on the site commences, each person who will be working there or observing the operations will complete a medical data sheet (**Appendix D**). These data sheets will be filled out during site-specific training and will be kept on the site.

In the event of an incident where a team member becomes exposed or suffers from an acute symptom of exposure to site materials and has to be taken to a hospital, a copy of his/her medical data sheet will be presented to the attending physician.

Table 13-1

Emergency Telephone Numbers

Contact	Firm or Agency	Telephone Number
Police		911
Fire		911
Hospital	Jamaica Hospital Medical Center	(718) 206-6000
Ambulance		911
Project Manager/Health and Safety Manager	Thomas Melia PWGC	(631) 589-6353
Field Team Lead/Site Health & Safety Officer	Ryan Morley PWGC	(631) 589-6353
NYSDEC Site Contact	Sadique Ahmed	(518) 402-9656
Poison Control Center		(800) 962-1253
Chemtrec		(800) 424-9300

13.5 Emergency Medical Treatment

The procedures and rules in this HASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the FTL/SHSO immediately. First aid equipment will be available on site at the following locations:

- First Aid Kit: Support Zone (or designated by FTL/SHSO upon arrival)
- Emergency Eye Wash: Support Zone (or designated by FTL/SHSO upon arrival)

During site-specific training, project personnel will be informed of the location of the first aid station(s) that has been set up. Unless they are in immediate danger, severely injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-

response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

There will be at least two people with current First Aid and CPR certification on each active work shift. When personnel are transported to the hospital, the FTL/SHSO will provide a copy of the Medical Data Sheet to the paramedics and treating physician.

Only in non-emergency situations will an injured person be transported to the hospital by means other than an ambulance. **A map and directions to the hospital can be found in Appendix F.**

13.6 Emergency Site Evacuation Routes and Procedures

In order to mobilize the manpower resources and equipment necessary to cope with a fire or other emergency, a clear chain of authority will be established. The EC will take charge of all emergency response activities and dictate the procedures that will be followed for the duration of the emergency. The EC will report immediately to the scene of the emergency, assess the seriousness of the situation, and direct whatever efforts are necessary until the emergency response units arrive. At his/her discretion, the EC also may order the closure of the site for an indefinite period.

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, an air horn will be sounded on the site. The horn will sound continuously for one blast, signaling that immediate evacuation of all personnel is necessary due to an immediate or impending danger. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the evacuation meeting point, which will be determined upon arrival at the site by the FTL/SHSO, prior to work beginning. This will then be conveyed to all crew members during the site-specific briefing.

The EC will give directions for implementing whatever actions are necessary. Any project team member may be assigned to be in charge of emergency communications during an emergency. He/she will attend the site telephone specified by the EC from the time the alarm sounds until the emergency has ended.

After sounding the alarm and initiating emergency response procedures, the EC will check and verify that access roads are not obstructed. If traffic control is necessary, as in the event of a fire or explosion, a project team

member, who has been trained in these procedures and designated at the site safety meeting, will take over these duties until local police and fire fighters arrive.

The EC will remain at the site to provide any assistance requested by emergency-response squads as they arrive to deal with the situation. A map showing evacuation routes, meeting places and the location of emergency equipment will be posted in all trailers and used during site-specific training.

13.7 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site (air horn will sound for a single continuous blast), and notification of local fire and police departments. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

13.7.1 Fire Prevention

Adhering to the following precautions will prevent fires:

- Good housekeeping and storage of materials;
- Storage of flammable liquids and gases away from oxidizers;
- No smoking in the exclusion zone or any work area;
- No hot work without a properly executed hot work permit;
- Shutting off engines to refuel;
- Grounding and bonding metal containers during transfer of flammable liquids;
- Use of UL approved flammable storage cans;
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities; and
- Monthly inspections of all fire extinguishers.

13.8 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet or recommended by the Corporate Medical Consultant will be followed, when necessary.

SKIN AND EYE CONTACT: Use copious amounts of soap and water. Wash/rinse affected areas thoroughly, and then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination. Skin should also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs.

INHALATION: Move to fresh air. Decontaminate and transport to hospital or local medical provider.

INGESTION: Decontaminate and transport to emergency medical facility.

PUNCTURE WOUND OR LACERATION: Decontaminate and transport to emergency medical facility.

13.9 Decontamination during Medical Emergencies

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or postponed. The FTL/SHSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on-site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed.

13.10 Accident/Incident Reporting

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone:

- Health and Safety Manager;
- Project Manager; and
- The employer of any injured worker who is not a PWGC employee.

Written confirmation of verbal reports are to be completed by the FTL/SHSO using the Incident Report Form and submitted within 24 hours. The incident report and investigation form is found in **Appendix G**. If the employee involved is not a PWGC employee, his employer will receive a copy of the report.

13.11 Adverse Weather Conditions

In the event of adverse weather conditions, the FTL/SHSO will determine if work can continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries;
- Potential for cold stress and cold-related injuries;
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds);
- Limited visibility (fog);
- Potential for electrical storms;
- Earthquakes; and
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The FTL/SHSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

13.12 Spill Control and Response

All small hazardous spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. Drains or drainage areas should be blocked. All spill containment materials will be properly disposed. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill. The following seven steps should be taken by the Emergency Coordinator:

- Determine the nature, identity and amounts of major spill components;
- Make sure all unnecessary persons are removed from the spill area;
- Notify appropriate response teams and authorities;
- Use proper PPE in consultation with the FTL/SHSO;

- If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosive proof equipment to contain or clean up the spill (diesel only vehicles, air operated pumps, etc.);
- If possible, try to stop the leak with appropriate material; and,
- Remove all surrounding materials that can react or compound with the spill.

13.13 Emergency Equipment

The following minimum emergency equipment shall be kept and maintained on-site:

- Industrial first aid kit;
- Burn kit and portable eye washes (one per field team);
- Fire extinguishers (one per work area); and
- Absorbent material /spill kit.

14.0 TRAINING

14.1 General Health and Safety Training

In accordance with PWGC corporate policy, and pursuant to 29 CFR 1910.120, hazardous waste site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations unless otherwise noted in the above reference. At a minimum, the training shall have consisted of instruction in the topics outlined in the standard. Personnel who have not met the requirements for initial training shall not be allowed to work in any site activities in which they may be exposed to hazards (chemical or physical).

14.1.1 Three Day Supervised On the Job Training

In addition to the required initial hazardous waste operations training, each employee shall have received three days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.

14.2 Annual Eight-Hour Refresher Training

Annual eight-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualifications for fieldwork. The training will cover a review of 1910.120 requirements and related company programs and procedures.

14.3 Site-Specific Training

Prior to commencement of field activities, all field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the site operations. It will include site and facility layout, hazards and emergency services at the site, and will highlight all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

14.4 On-Site Safety Briefings

Project personnel and visitors will be given on-site health and safety briefings daily by the FTL/SHSO to assist site personnel in safely conducting their work activities. A copy of the Daily Briefing Sign-In Sheet is contained in **Appendix H**. The briefings will include information on new operations to be conducted, changes in work practices or changes in the site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. The meetings will also be an opportunity to periodically update the crews on monitoring results. Prior to starting any new

activity, a training session using the Activity Hazard Analysis will be held for crew members involved in the activity.

14.5 First Aid and CPR

The HSM will identify those individuals requiring first aid and CPR training to ensure that emergency medical treatment is available during field activities. It is anticipated that a minimum of one field person on-site at any one time will have first aid and CPR training. The training will be consistent with the requirements of the American Red Cross Association or American Heart Association. If none are available on-site, then the HSM shall be notified.

14.6 Supervisory Training

Supervisors and health and safety personnel shall have completed an additional eight hours of specialized training in accordance with 29 CFR 1910.120.

15.0 LOGS, REPORTS AND RECORDKEEPING

Changes to the HASP will be documented in the Health and Safety log book and as appropriate, the HSM and/or PM will be notified. Daily tailgate meetings will be documented in the H&S log book as well as personnel on-site.

15.1 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training and documentation of three day OJT) and medical clearance for hazardous waste site work and respirator use will be maintained on-site. Records for all subcontractor employees will also be kept on-site.

15.2 Incident Report and Investigation Form

The incident report and investigation form is to be completed for all accidents and incidents, including near misses. The form can be found in **Appendix G**.

15.3 Health and Safety Logbooks

The FTL/SHSO will maintain a logbook during site work. The daily site conditions, personnel, monitoring results and significant events will be recorded. The original logbooks will become part of the exposure records file.

16.0 FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have read, or have been informed of, and understand the provisions of the HASP. It is maintained on site by the FTL/SHSO as a project record. Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I will comply with the provisions contained therein.

Name (Print and Sign)	***Date***

APPENDIX A
CHEMICAL DATA SHEETS

Tetrachloroethylene

Synonyms & Trade Names Perchlorethylene, Perchloroethylene, Perk, Tetrachlorethylene

CAS No. 127-18-4	**RTECS No.** KX3850000 (/niosh-rtecs/KX3ABF10.html)	**DOT ID & Guide** 1897 160 (http://wwwapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/guidepage.aspx/guide160/) (http://www.cdc.gov/Other/disclaimer.html)
Formula $Cl_2C=CCl_2$	**Conversion** 1 ppm = 6.78 mg/m3	**IDLH** Ca [150 ppm] See: 127184 (/niosh/idlh/127184.html)

Exposure Limits **NIOSH REL** : Ca
Minimize workplace exposure concentrations. See Appendix A (nengapdxa.html)
OSHA PEL † (nengapdxg.html) : TWA 100 ppm
C 200 ppm (for 5 minutes in any 3-hour period), with a maximum peak of 300 ppm

Measurement Methods
NIOSH 1003 (/niosh/docs/2003-154/pdfs/1003.pdf) ;
OSHA 1001 (http://www.osha.gov/dts/sltc/methods/mdt/mdt1001/1001.html) (http://www.cdc.gov/Other/disclaimer.html)
See: NMAM (/niosh/docs/2003-154/) or OSHA Methods (http://www.osha.gov/dts/sltc/methods/index.html) (http://www.cdc.gov/Other/disclaimer.html)

Physical Description Colorless liquid with a mild, chloroform-like odor.

MW:	BP:	FRZ:	Sol:	VP:	IP:
165.8	250°F	-2°F	0.02%	14 mmHg	9.32 eV

Sp.Gr:	Fl.P:	UEL:	LEL:		
1.62	NA	NA	NA		

Noncombustible Liquid, but decomposes in a fire to hydrogen chloride and phosgene.

Incompatibilities & Reactivities Strong oxidizers; chemically-active metals such as lithium, beryllium & barium; caustic soda; sodium hydroxide; potash

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, liver, kidneys, central nervous system

Cancer Site [in animals: liver tumors]

Personal Protection/Sanitation (See protection codes (protect.html))
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid (See procedures (firstaid.html))
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection (pgintrod.html#mustread)

See also: INTRODUCTION (/niosh/npg/pgintrod.html) See ICSC CARD: 0076 (/niosh/ipcsneng/neng0076.html) See MEDICAL TESTS: 0179 (/niosh/docs/2005-110/nmed0179.html)

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Centers for Disease Control and Prevention 1600 Clifton Road Atlanta, GA 30329-4027, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - Contact CDC–INFO

APPENDIX B
ACTIVITY HAZARD ANALYSES

Project Identification 124-22 Queens Blvd. IRM	**Location** Various	**Estimated Dates** TBD
Phase of Work Mobilization/ Demobilization	**Page 1 of 1**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1. Mobilization and demobilization of equipment site tools, personnel	Slips/trips/falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Vehicular traffic	• Spotters will be used when backing up trucks and heavy equipment and when moving equipment.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1; • Ground personnel will stay clear of suspended loads; • Equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects; and • Overhead hazards will be identified prior to commencing work operations.
	Noise	• Ear plugs or ear muffs shall be worn for operations that exceed 85 decibels.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Biological hazards	• Be alert to the presence of biological hazards; • Wear insect repellent; • Follow procedures in Section 4.2.2 for tick bites; • FTL/SHSO should be aware of on-site personnel with allergic reactions in insect bites and stings.

Project Identification 124-22 Queens Blvd. IRM	**Location** Various	**Estimated Dates** TBD
Phase of Work Excavation	**Page 1 of 2**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1. Excavate to required depths; soil handing and transport	Chemical hazards	• Wear appropriate PPE per Table 6-1; • Perform air monitoring per Community Air Monitoring Plan; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Hand and power tool usage	• Equip electrical equipment with GFCI's; • Inspect electrical equipment and tools prior to use; • Daily inspections will be performed; • Remove broken or damaged tools from service; • Use the tool for its intended purpose; • Use in accordance with manufacturer instructions; and Tag and remove defective equipment.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and, • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Fire/Explosion	• ABC type fire extinguishers shall be readily available; • No smoking in work area.
	Biological hazards	• Be alert to the presence of biological hazards; • Wear insect repellent; • Follow procedures in Section 4.2.2 for tick bites; • FTL/SHSO should be aware of on-site personnel with allergic reactions in insect bites and stings.
	Heavy equipment	• Ground personnel will stay clear of suspended loads; • Ground personnel will stay out of the swing radius; • Eye contact with operators will be made before approaching equipment; • Equipment will not be approached on blind sides; • Equipment will be equipped with backup alarms or spotters shall be used.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and mark and repair if possible tripping hazards are present.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.

Project Identification 124-22 Queens Blvd. IRM	**Location** Various	**Estimated Dates** TBD
Phase of Work Drilling	**Page 2 of 2**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
	Noise	• Hearing protection mandatory at or above 85 dBA. • Instruct personnel how to properly wear heating protective devices. •Disposable ear plugs or other hearing protection required when working near noisy equipment..
	Steam/Heat/Splashing	• Use face shield and safety glasses or goggles; • Stay out of the splash/steam radius; • Do not direct steam at anyone; • Do not hold objects with your foot and steam area near it; • Direct spray to minimize spread of constituents of concern; and • Use shielding as necessary.
	Excavation hazards	• Follow 29 CFR 1926 Subpart P.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1; • Ground personnel will stay clear of suspended loads; • Equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects; and • Overhead hazards will be identified prior to commencing work operations.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Track Hazards	• Caution will be used when working in close proximity to the electrified third rail (see “Electrocution” above). • Workers are required to have completed NYCT Track Safety Training • Flag men will be used when necessary (e.g., working in limited access track areas).

Project Identification 124-22 Queens Blvd. IRM	**Location** Various	**Estimated Dates** TBD
Phase of Work Soil/Groundwater Sampling	**Page 1 of 1**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1.Collect soil/groundwater samples.	Chemical hazards	• Wear appropriate PPE per Table 6-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Site personnel will be instructed on proper lifting techniques; mechanical devices should be used to reduce manual handling of materials; team lifting should be utilized if mechanical devices are not available.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Track Hazards	• Caution will be used when working in close proximity to the electrified third rail (see "Electrocution" above). • Workers are required to have completed NYCT Track Safety Training • Flag men will be used when necessary (e.g., working in limited access track areas).

Project Identification 124-22 Queens Blvd. IRM	**Location** Various	**Estimated Dates** TBD
Phase of Work Decontamination	**Page 1 of 1**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1.Decontaminate equipment	Chemical hazards	• Wear appropriate PPE per Table 6-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Site personnel will be instructed on proper lifting techniques; mechanical devices should be used to reduce manual handling of materials; team lifting should be utilized if mechanical devices are not available.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Track Hazards	• Caution will be used when working in close proximity to the electrified third rail (see "Electrocution" above). • Workers are required to have completed NYCT Track Safety Training • Flag men will be used when necessary (e.g., working in limited access track areas).

APPENDIX C
HEAT/COLD STRESS PROTOCOLS

HEAT STRESS

Heat Stress (Hyperthermia)

Heat stress is the body's inability to regulate the core temperature. A worker's susceptibility to heat stress can vary according to his/her physical fitness, degree of acclimation to heat, humidity, age and diet.

1. Prior to site activity, the field team leader may make arrangements for heat stress monitoring (i.e., monitoring heart rate, body temperature, and body water loss) during actual site work if conditions warrant. In addition, the FTL is to ensure that each team member has been acclimatized to the prevailing environmental conditions, that personnel are aware of the signs and symptoms of heat sickness, that they have been adequately trained in first aid procedures, and that there are enough personnel on-site to rotate work assignments and schedule work during hours of reduced temperatures. Personnel should not consume alcoholic or caffeinated beverages but rather drink moderate levels of an electrolyte solution and eat well prior to commencing site work.
2. Although there is no specific test given during a baseline physical that would identify a person's intolerance to heat, some indicators are tobacco or medication use, dietary habits, body weight, and chronic conditions such as high blood pressure or diabetes.
3. *Heat cramps*, caused by profuse perspiration with inadequate fluid intake and salt replacement, most often afflict people in good physical condition who work in high temperature and humidity. Heat cramps usually come on suddenly during vigorous activity. Untreated, heat cramps may progress rapidly to heat exhaustion or heat stroke. First aid treatment: remove victim to a cool place and replace lost fluids with water.
4. Thirst is not an adequate indicator of heat exposure. Drinking fluid by itself does not indicate sufficient water replacement during heat exposure. A general rule, the amount of water administered should replace the amount of water lost, and it should be administered at regular intervals throughout the day. For every half pound of water lost, 8 ounces of water should be ingested. Water should be replaced by drinking 2 – 4 ounce servings during every rest period. A recommended alternative to water is an electrolyte drink split 50/50 with water.
5. Heat exhaustion results from salt and water loss along with peripheral pooling of blood. Like heat cramps, heat exhaustion tends to occur in persons in good physical health who are working in high temperatures and humidity. Heat exhaustion may come on suddenly as dizziness and collapse. Untreated, heat exhaustion may progress to heat stroke.
6. Treatment for heat exhaustion: Move the victim to a cool environment (e.g. air-conditioned room/car), lay victim down and fan him/her. If the air-conditioning is not available, remove the victim to a shaded

area, remove shirt, and fan. If symptoms do not subside within an hour, notify 911 to transport to hospital.

7. Heat stroke results from the body's inability to dissipate excess heat. A true medical emergency that requires immediate care, it usually occurs when one ignores the signs of heat exhaustion and continues strenuous activities. Working when the relative humidity exceeds 60% is a particular problem. Workers in the early phase of heat stress may not be coherent of they will be confused, delirious or comatose. Changes in behavior, irritability and combativeness are useful early signs of heat stroke.
8. Treatment of heat stroke: Move the victim to a cool, air-conditioned environment. Place victim in a semi-reclined position with head elevated and strip to underclothing. Cool victim as rapidly as possible, applying ice packs to the arms and legs and massaging the neck and torso. Spray victim with tepid water and constantly fan to promote evaporation. Notify 911 to transport to hospital as soon as possible.

SYMPTOMS OF HEAT STRESS

Heat cramps are caused by heavy sweating with inadequate fluid intake. Symptoms include;

- Muscle cramps
- Cramps in the hands, legs, feet and abdomen

Heat exhaustion occurs when body organs attempt to keep the body cool. Symptoms include;

- Pale, cool moist skin
- Core temperature elevated 1-2o
- Thirst
- Anxiety
- Rapid heart rate
- Heavy sweating
- Dizziness
- Nausea

Heat stroke is the most serious form of heat stress. Immediate action must be taken to cool the body before serious injury and death occur. Symptoms are;

- Red, hot, dry skin
- Lack of perspiration

- Seizures
- Dizziness and confusion
- Strong, rapid pulse
- Core temperature of 104o or above
- Coma

HEAT STRESS INDICATORS

Heat stress indicator:	When to measure:	If Exceeds:	Action:
Heart rate (pulse)	Beginning of rest period	110 beats per minute	Shorten next work period by 33%
Oral temperature	Beginning of rest period	99°F (after thermometer is under tongue for 3 minutes) 100.6°F (after thermometer is under tongue for 3 minutes)	Shorten next work period by 33% Prohibit work in impermeable clothing
Body Weight	1. Before workday begins 2. After workday ends		Increase fluid intake

COLD STRESS

Cold stress (Hypothermia)

In hypothermia the core body temperature drops below 95°F. Hypothermia can be attributed to a decrease in heat production, increased heat loss or both.

Prevention

Institute the following steps to prevent overexposure of workers to cold:

1. Maintain body core temperature at 98.6oF or above by encouraging workers to drink warm liquids during breaks (preferably not coffee) and wear several layers of clothing that can keep the body warm even when the clothing is wet.
2. Avoid frostbite by adequately covering hands, feet and other extremities. Clothing such as insulated gloves or mittens, earmuffs and hat liners should be worn. To prevent contact frostbite (from touching metal and cold surfaces below 20°F), workers should wear gloves. Tool handles should be covered with insulating material.
3. Adjust work schedules to provide adequate rest periods. When feasible, rotate personnel and perform work during the warmer hours of the day.
4. Provide heated shelter. Workers should remove their outer layer(s) of clothing while in the shelter to allow sweat to evaporate.
5. In the event that wind barriers are constructed around an intrusive operation (such as drilling), the enclosure must be properly vented to prevent the buildup of toxic or explosive gases or vapors. Care must be taken to keep a heat source away from flammable substances.
6. Using a wind chill chart such as the one included below, obtain the equivalent chill temperature (ECT) based on actual wind speed and temperature. Refer to the ECT when setting up work warm-up schedules, planning appropriate clothing, etc. Workers should use warming shelters at regular intervals at or below an ECT of 20°F. For exposed skin, continuous exposure should not be permitted at or below an ECT of -25°F.

FROSTBITE

Personnel should be aware of symptoms of frostbite/hypothermia. If the following symptoms are noticed in any worker, he/she should immediately go to a warm shelter.

Condition	Skin Surface	Tissue Under Skin	Skin Color
Frostnip	Soft	Soft	Initially red, then white
Frostbite	Hard	Soft	White and waxy
Freezing	Hard	Hard	Blotchy, white to yellow-grey to grey

1. Frostnip is the incipient stage of frostbite, brought about by direct contact with a cold object or exposure of a body part to cool/cold air. Wind chill or cold water also can be major factors. This condition is not serious. Tissue damage is minor and the response to care is good. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostnip.
2. Treatment of frostnip: Care for frostnip by warming affected areas. Usually the worker can apply warmth from his/her bare hands, blow warm air on the site, or, if the fingers are involved, hold them in the armpits. During recovery, the worker may complain of tingling or burning sensation, which is normal. If the condition does not respond to this simple care, begin treatment for frostbite.
3. Frostbite: The skin and subcutaneous layers become involved. If frostnip goes untreated, it becomes superficial frostbite. This condition is serious. Tissue damage may be serious. The worker must be transported to a medical facility for evaluation. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostbite. The affected area will feel frozen, but only on the surface. The tissue below the surface must still be soft and have normal response to touch. DO NOT squeeze or poke the tissue. The condition of the deeper tissues can be determined by gently palpating the affected area. The skin will turn mottled or blotchy. It may also be white and then turn grayish-yellow.
4. Treatment of frostbite: When practical, transport victim as soon as possible. Get the worker inside and keep him/her warm. Do not allow any smoking or alcohol consumption. Thaw frozen parts by immersion, re-warming in a 100°F to 106°F water bath. Water temperature will drop rapidly, requiring additional warm water throughout the process. Cover the thawed part with a dry sterile dressing. Do not puncture or drain any blisters. NOTE: Never listen to myths and folk tales about the care of frostbite. Never rub a frostbitten or frozen area. Never rub snow on a frostbitten or frozen area. Rubbing the area may cause

serious damage to already injured tissues. Do not attempt to thaw a frozen area if there is any chance it will be re-frozen.

5. General cooling/Hypothermia: General cooling of the body is known as systemic hypothermia. This condition is not a common problem unless workers are exposed to cold for prolonged periods of time without any shelter.

Body Temp (°F)	Body Temp (°C)	Symptoms
99-96	37-35.5	Intense uncontrollable shivering
95-91	35.5-32.7	Violent shivering persists. If victim is conscious, has difficulty speaking.
90-86	32.6-30	Shivering decreases and is replaced by strong muscular rigidity. Muscle coordination is affected. Erratic or jerkey movements are produced. Thinking is less clear. General comprehension is dulled. There may be total amnesia. The worker is generally still able to maintain the appearance of psychological contact with his surroundings.
85-81	29.9-27.2	Victim becomes irrational, loses contact with his environment, and drifts into a stupor. Muscular rigidity continues. Pulse and respirations are slow and the worker may develop cardiac arrhythmias.
80-78	27.1-25.5	Victim becomes unconscious. He does not respond to the spoken word. Most reflexes cease to function. Heartbeat becomes erratic
Below 78	Below 25.5	Cardiac and respiratory centers of the brain fail. Ventricular fibrillation occurs; probably edema and hemorrhage in the lungs; death.

6. Treatment of hypothermia: Keep worker dry. Remove any wet clothing and replace with dry clothes, or wrap person in dry blankets. Keep person at rest. Do not allow him/her to move around. Transport the victim to a medical facility as soon as possible.

COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS AN EQUIVALENT TEMPERATURE (UNDER CALM CONDITIONS)

Estimated wind Speed (in mph)	Actual Temperature Reading (^{0}F)P											
	50	40	30	20	10	0	10	20	30	40	50	60
	Equivalent Chill Temperature (^{0}F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	15	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-146
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER in < hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute			GREAT DANGER Flesh may freeze within 30 seconds.				
	Trench foot and imersion foot may occur at any point on this chart											

Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

(1) Reproduced from American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1985-1986, p.01.

APPENDIX D
MEDICAL DATA SHEET

MEDICAL DATA SHEET

The brief medical data sheet should be completed by on-site personnel and will be kept in the Support Zone by the HSO as a project record during the conduct of site operations. It accompanies any personnel when medical assistance is needed or if transport to a hospital is required. This form is optional, but recommended.

Project Site:			
Name:			
Age:	Height:	Weight:	Blood Type:
Employer:			
Employer Phone #:			
Emergency Contact Name:			
Emergency Contact Phone #:			
Personal Physician Name:			
Personal Physician Phone #:			
Allergies or Sensitivities:			
Previous and/or Chronic Illnesses:			
Medications:			
Medical Restrictions:			

APPENDIX E
GENERAL HEALTH AND SAFETY WORK PRACTICES

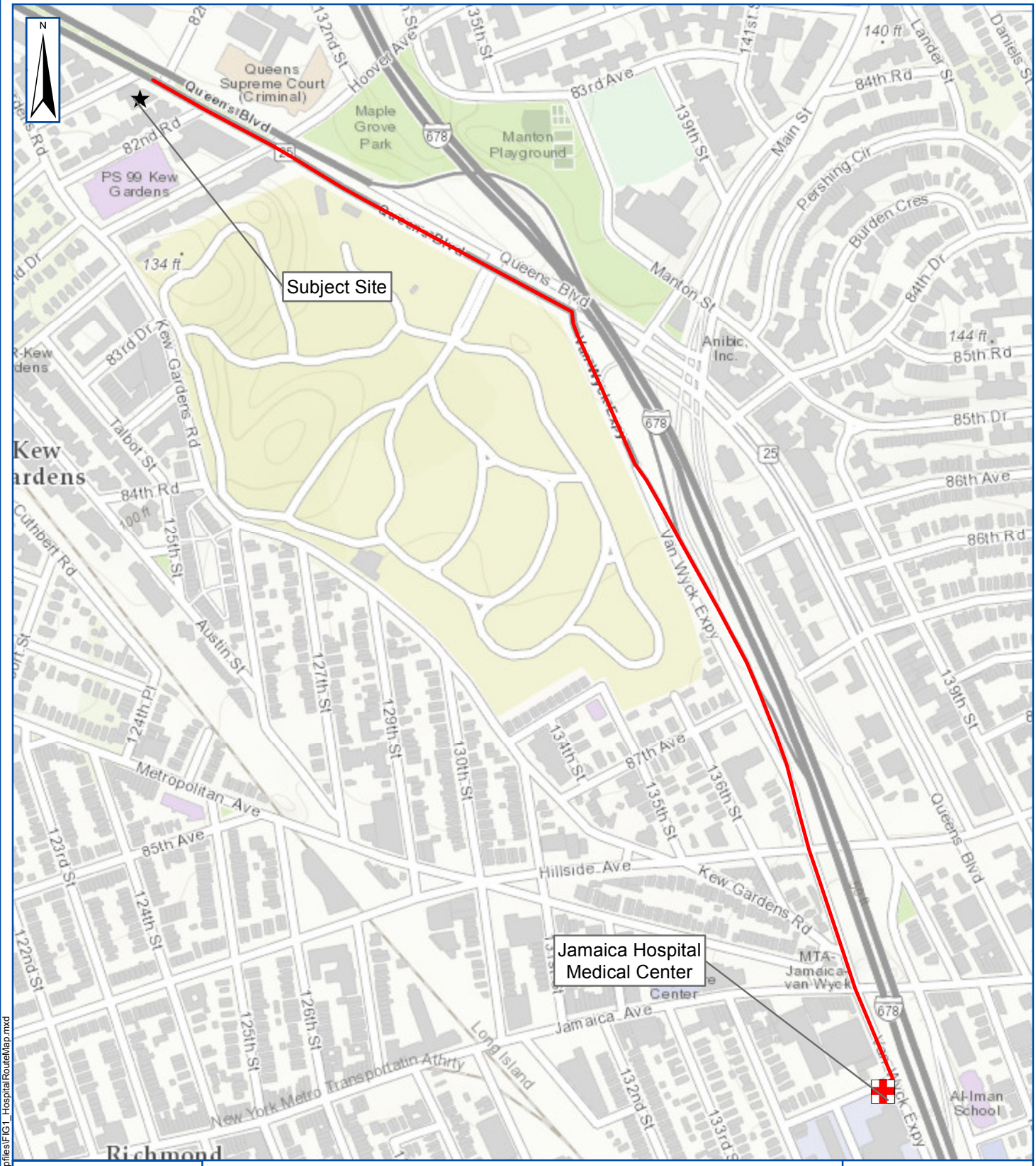
GENERAL HEALTH AND SAFETY WORK PRACTICES

1. Site personnel must attend each day's Daily Briefing and sign the attendance sheet.
2. Any individual taking prescribed drugs shall inform the FTL/HSO of the type of medication. The FTL/HSO will review the matter with the HSM and the Corporate Medical Consultant (CMC), who will decide if the employee can safely work on-site while taking the medication.
3. The personal protective equipment specified by the FTL/HSO and/or associated procedures shall be worn by site personnel. This includes hard hats and safety glasses which must be worn in active work areas.
4. Facial hair (beards, long sideburns or mustaches) which may interfere with a satisfactory fit of a respirator mask is not allowed on any person who may be required to wear a respirator.
5. Personnel must follow proper decontamination procedures and shower as soon as possible upon completion of work shift.
6. Eating, drinking, chewing tobacco or gum, smoking and any other practice that may increase the possibility of hand-to-mouth contact is prohibited in the exclusion zone or the contamination reduction zone. (Exceptions may be permitted by the HSM to allow fluid intake during heat stress conditions).
7. Lighters, matches, cigarettes and other forms of tobacco are prohibited in the Exclusion Zone.
8. Signs and demarcations shall be followed. Such signs and demarcation shall not be removed, except as authorized by the FTL/HSO.
9. No one shall enter a permit-required confined space without a permit and appropriate training. Confined space entry permits shall be implemented as issued.
10. Personnel must follow Hot Work Permits as issued.
11. Personnel must use the Buddy System in the Exclusion Zone.
12. Personnel must follow the work-rest regimens and other practices required by the heat stress program.
13. Personnel must follow lockout/tagout procedures when working on equipment involving moving parts or hazardous energy sources.
14. No person shall operate equipment unless trained and authorized.
15. No one may enter an excavation greater than four feet deep unless authorized by the Competent Person. Excavations must be sloped or shored properly. Safe means of access and egress from excavations must be maintained.
16. Ladders and scaffolds shall be solidly constructed, in good working condition, and inspected prior to use. No one may use defective ladders or scaffolds.

17. Fall protection or fall arrest systems must be in place when working at elevations greater than six feet for temporary working surfaces and four feet for fixed platforms.
18. Safety belts, harnesses and lanyards must be selected by the Supervisor. The user must inspect the equipment prior to use. No defective personal fall protection equipment shall be used. Personal fall protection that has been shock loaded must be discarded.
19. Hand and portable power tools must be inspected prior to use. Defective tools and equipment shall not be used.
20. Ground fault interrupters shall be used for cord and plug equipment used outdoors or in damp locations. Electrical cords shall be kept out walkways and puddles unless protected and rated for the service.
21. Improper use, mishandling, or tampering with health and safety equipment and samples is prohibited.
22. Horseplay of any kind is prohibited.
23. Possession or use of alcoholic beverages, controlled substances, or firearms on any site is forbidden.
24. Incidents, no matter how minor, must be reported immediately to the Supervisor.
25. Personnel shall be familiar with the Site Emergency Action Plan, which is contained in Section 12 of the HASP/EAP.

The above Health and Safety Rules are not all inclusive and it is your responsibility to comply with regulations set forth by OSHA, the client, PWGC Supervisors, and the FTL/HSO.

APPENDIX F
HOSPITAL ROUTE MAP AND DIRECTIONS



HOSPITAL ROUTE MAP

124-22 QUEENS BLVD
KEW GARDENS, NY

PWGC
Strategic Environmental and Engineering Solutions
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Project:	ACT1501
Date:	2/25/2016
Designed by:	TM
Drawn by:	JCG
Approved by:	TM
Figure No:	1

Document Path: G:\Projects\A-D\ACT1501\mapfiles\FIG1_HospitalRouteMap.mxd

APPENDIX G
INCIDENT REPORT FORM / INVESTIGATION FORM

INCIDENT / NEAR MISS REPORT AND INVESTIGATION - PAGE 1 OF 2

TYPE OF INCIDENT - CHECK ALL THAT APPLY

☐ INJURY/ILLNESS ☐ VEHICLE DAMAGE ☐ PROPERTY DAMAGE ☐ FIRE

☐ SPILL/RELEASE ☐ PERMIT EXCEEDENCE ☐ NEAR MISS ☐ OTHER

GENERAL INFORMATION

PROJECT NAME: DATE OF REPORT: REPORT NO.:

DATE OF INCIDENT: TIME: DAY OF WEEK:

LOCATION OF INCIDENT:

WEATHER CONDITIONS: ADEQUATE LIGHTING AT SCENE? ☐ YES ☐ NO ☐ N/A

DESCRIBE WHAT HAPPENED (STEP BY STEP - USE ADDITIONAL PAGES IF NECESSARY)

AFFECTED EMPLOYEE INFORMATION

NAME: EMPLOYEE: ☐ YES ☐ NO

HOME ADDRESS:

SOCIAL SECURITY NO.: HOME PHONE NO.:

JOB CLASSIFICATION: YEARS IN JOB CLASSIFICATION:

HOURS WORKED ON SHIFT PRIOR TO INCIDENT: AGE:

DID INCIDENT RELATE TO ROUTINE TASK FOR JOB CLASSIFICATION? ☐ YES ☐ NO

INJURY/ILLNESS INFORMATION

NATURE OF INJURY OR ILLNESS:

OBJECT/EQUIPMENT/SUBSTANCE CAUSING HARM:

FIRST AID PROVIDED? ☐ YES ☐ NO

IF YES, WHERE WAS IT GIVEN: ☐ ON-SITE ☐ OFF-SITE

IF YES, WHO PROVIDED FIRST AID:

WILL THE INJURY/ILLNESS RESULT IN: ☐ RESTRICTED DUTY ☐ LOST TIME ☐ UNKNOWN

INCIDENT / NEAR MISS REPORT AND INVESTIGATION - PAGE 2 OF 2 REPORT NO.
MEDICAL TREATMENT INFORMATION
WAS MEDICAL TREATMENT PROVIDED? ☐ YES ☐ NO
IF YES, WAS MEDICAL TREATMENT PROVIDED: ☐ ON-SITE ☐ DR.'S OFFICE ☐ HOSPITAL
NAME OF PERSON(S) PROVIDING TREATMENT:
ADDRESS WHERE TREATMENT WAS PROVIDED:
TYPE OF TREATMENT:
VEHICLE AND PROPERTY DAMAGE INFORMATION
VEHICLE/PROPERTY DAMAGED:
DESCRIPTION OF DAMAGE:
SPILL AND AIR EMISSIONS INFORMATION:
SUBSTANCE SPILLED OR RELEASED: FROM WHERE: TO WHERE:
ESTIMATED QUANTITY/DURATION:
CERCLA HAZARDOUS SUBSTANCE? ☐ YES ☐ NO
REPORTABLE TO AGENCY? ☐ YES ☐ NO SPECIFY:
WRITTEN REPORT: ☐ YES ☐ NO TIME FRAME:
RESPONSE ACTION TAKEN:
PERMIT EXCEEDENCE
TYPE OF PERMIT: PERMIT #:
DATE OF EXCEEDENCE: DATE FIRST KNOWLEDGE OF EXCEEDENCE:
PERMITTED LEVEL OR CRITERIA:
EXCEEDENCE LEVEL OR CRITERIA:
REPORTABLE TO AGENCY? ☐ YES ☐ NO SPECIFY:
WRITTEN REPORT: ☐ YES ☐ NO TIME FRAME:
RESPONSE ACTION TAKEN:
NOTIFICATIONS
NAMES OF PERSONNEL NOTIFIED: DATE/TIME:
CLIENT NOTIFIED: DATE/TIME:
AGENCY NOTIFIED: DATE/TIME:
CONTACT NAME:
PERSONS PREPARING REPORT
EMPLOYEE'S NAME:(PRINT) SIGN:
SUPERVISOR'S NAME:(PRINT) SIGN:

INVESTIGATIVE REPORT			
DATE OF INCIDENT:	DATE OF REPORT:	REPORT NUMBER:	
INCIDENT COST: ESTIMATED: $_____	ACTUAL: $_____		
OSHA RECORDABLE(S): ☐ YES ☐ NO # RESTRICTED DAYS ____ # DAYS AWAY FROM WORK ____			
CAUSE ANALYSIS			
IMMEDIATE CAUSES - WHAT ACTIONS AND CONDITIONS CONTRIBUTED TO THIS EVENT?			
BASIC CAUSES - WHAT SPECIFIC PERSONAL OR JOB FACTORS CONTRIBUTED TO THIS EVENT?			
ACTION PLAN			
REMEDIAL ACTIONS - WHAT HAS AND OR SHOULD BE DONE TO CONTROL EACH OF THE CAUSES LISTED?			
ACTION	PERSON RESPONSIBLE	TARGET DATE	COMPLETION DATE
PERSONS PERFORMING INVESTIGATION			
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:	
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:	
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:	
MANAGEMENT REVIEW			
PROJECT MANAGER: (PRINT)	SIGN:	DATE:	
COMMENTS:			
H&S MANAGER: (PRINT)	SIGN:	DATE:	
COMMENTS:			

EXAMPLES OF IMMEDIATE CAUSES

Substandard Actions

1. Operating equipment without authority
2. Failure to warn
3. Failure to secure
4. Operating at improper speed
5. Making safety devices inoperable
6. Removing safety devices
7. Using defective equipment
8. Failure to use PPE properly
9. Improper loading
10. Improper placement
11. Improper lifting
12. Improper position for task
13. Servicing equipment in operation
14. Under influence of alcohol/drugs
15. Horseplay

Substandard Conditions

1. Guards or barriers
2. Protective equipment
3. Tools, equipment, or materials
4. Congestion
5. Warning system
6. Fire and explosion hazards
7. Poor housekeeping
8. Noise exposure
9. Exposure to hazardous materials
10. Extreme temperature exposure
11. Illumination
12. Ventilation
13. Visibility

EXAMPLES OF BASIC CAUSES

Personal Factors

1. Capability
2. Knowledge
3. Skill
4. Stress
5. Motivation
6. Work Standards
7. Wear and tear
8. Abuse or misuse

Job Factors

1. Supervision
2. Engineering
3. Purchasing
4. Maintenance
5. Tools/equipment

MANAGEMENT PROGRAMS FOR CONTROL OF INCIDENTS

1. Leadership and administration
2. Management training
3. Planned inspections
4. Task analysis and procedures
5. Task observation
6. Emergency preparedness
7. Organizational rules
8. Accident/incident analysis
9. Personal protective equipment
10. Health control
11. Program audits
12. Engineering controls
13. Personal communications
14. Group meetings
15. General promotion
16. Hiring and placement
17. Purchasing controls

APPENDIX H
DAILY BRIEFING SIGN-IN SHEET

DAILY BRIEFING SIGN-IN SHEET

Date: _____ Project Name/Location: _____

Person Conducting Briefing: _____

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc.)

_____

_____

_____

2. OTHER ISSUES (HASP/EAP changes, attendee comments, etc.)

_____

_____

_____

3. ATTENDEES (Print Name):

1.	21.
2.	22.
3.	23.
4.	24.
5.	25.
6.	26.
7.	27.
8.	28.
9.	29.
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APPENDIX B
COMMUNITY AIR MONITORING PLAN

124-22 QUEENS BOUEVARD
KEW GARDENS, NEW YORK
NYSDEC BCP ID: C241177
BLOCK: 3359, LOT: 21

COMMUNITY AIR MONITORING PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

ON BEHALF OF:

Luciano, LLC
25 Aldgate Drive East
Manhasset, New York 11030

PREPARED BY:

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Thomas Melia, Sr. Project Manager thomasm@pwgrosser.com

PWGC Project Number: ACT1501

FEBRUARY 2016

124-22 QUEENS BOULEVARD, KEW GARDENS, NEW YORK
NYSDEC BCP ID C241177
COMMUNITY AIR MONITORING PLAN

CONTENTS

TABLES

APPENDICES

1.0 INTRODUCTION

P.W. Grosser Consulting Engineer & Hydrogeologist, PC (PWGC) has prepared the following Community Air Monitoring Plan (CAMP) for the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) site located at 124-22 Queens Boulevard in Kew Gardens, New York. This CAMP Is designed to provide measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial investigation) from potential airborne contaminant releases related to the implementation of an Interim Remedial Measure (IRM) at the subject property.

The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air.

Based on previous investigations at the site, the primary contaminant of concern for this site is tetrachloroethene (PCE) and dust particulates.

1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- 29 CFR 1910.120(h): This regulation specifies that air shall be monitored to identify and quantify levels of airborne hazardous substances and health hazards, and to determine the appropriate level of protection for workers.
- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan (Appendix 1A): This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination off-site through the air.
- New York State Department of Environmental Conservation's (NYSDEC's) Fugitive Dust and Particulate Monitoring from DER-10 Technical Guidance for Site Investigation and Remediation (Appendix 1B) - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites: This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2.0 AIR MONITORING

The following sections contain information describing the types, frequency and location of real-time monitoring.

2.1 Real Time Monitoring

This section addresses the real-time monitoring that will be conducted within the work area, and along the site's downwind perimeter, during all ground intrusive activities, such as drilling and excavation.

2.1.1 Work Area

The following instruments will be used for work area monitoring:

- PhotoionizationDetector (PID)
- Dust Monitor

Table 1-1 presents a breakdown of each main activity and provides the instrumentation, frequency and location of the real-time monitoring for the site. Table 1-2 lists the Real-Time Air Monitoring Action Levels to be used in all work areas.

2.1.2 Community Air Monitoring Requirements

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before investigation activities begin. These points will be monitored periodically in series during the site work.

Fugitive respirable dust will be monitored using a MiniRam Model PDM-3 aerosol monitor or equivalent, which is capable of measuring particulate matter less than 10 micrometers in size (PM-10). Air will be monitored for VOCs with a portable Photovac MicroTip PID or equivalent. Table 1-1 presents a breakdown of each main activity and provides the instrumentation, frequency and location of the real-time monitoring for the site. Table 1-2 lists the Real-Time Air Monitoring Action Levels to be used in all work areas. All air monitoring data is documented in a site log book by the designated site safety officer. PWGC's site safety officer or delegate must ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. All instruments will be zeroed daily and checked for accuracy. A daily log will be kept. If additional monitoring is required, the protocols will be developed and appended to this plan.

Table 1-1
Frequency and Location of Air Monitoring

ACTIVITY	AIR MONITORING INSTRUMENT	FREQUENCY AND LOCATION
Drilling, Sampling, Excavation	PID	Continuous in Breathing Zone (BZ) and downwind perimeter of the work area during all ground intrusive activities or if odors become apparent during non-intrusive activities. Every 30 minutes in the BZ and at the downwind perimeter of the work area during non-intrusive activities.
Drilling, Sampling, Excavation	Particulate (Dust, Mist or Aerosol) Meter	Continuous at the downwind perimeter of the work area during all ground intrusive activities. Every 30 minutes at the downwind perimeter of the work area during non-intrusive activities.

Table 1-2
Real-Time Air Monitoring Action Levels

INSTRUMENT	MONITORING LOCATION	ACTION LEVEL	SITE ACTION	REASON
PID	Breathing Zone	0-25 ppm, non-transient	None	Exposure below established exposure limits
PID	Breathing Zone	25-100 ppm, non-transient	Don APR	Based on potential exposure to VOCs
PID	Breathing Zone	>100 ppm, non-transient	Don ASR or SCBA, Institute vapor/odor suppression measures, Notify HSM.	Increased exposure to site contaminants, potential for vapor release to public areas.
PID	Work Area Perimeter*	< 1 ppm	None	Exposure below established exposure limits.
PID	Work Area Perimeter*	> 1 ppm	Stop work and implement vapor release response plan until readings return to acceptable levels, Notify HSM.	Increased exposure to site contaminants, potential for vapor release to public areas
Particulate (Dust, Mist or Aerosol) Meter	Work Area Perimeter*	< 150 µg/m^3	None	Exposure below established exposure limits.
Particulate (Dust, Mist or Aerosol) Meter	Work Area Perimeter*	>150 µg/m^3	Stop work and immediately confirm the upwind background level. Implement dust suppression measures if the downwind PM-10 particulate level is 100 µg/m^3 greater than the upwind background level for a 15-minute period or if airborne dust is observed leaving the work area. Work may continue with dust suppression techniques provided that the downwind PM-10 particulate levels do not exceed 150 µg/m^3 above the upwind background level and provided that no visible dust is migrating from the work area. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 µg/m^3 above the upwind background level, stop work and reevaluate activities. Work may resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 µg/m^3 of the upwind background level and visible dust migration is prevented.	Increased exposure to site contaminants

3.0 VAPOR EMISSION RESPONSE PLAN

This section is excerpted from the NYSDOH guidance for Community Air Monitoring Plan - Ground Intrusive Activities.

If the ambient air concentration of organic vapors exceeds 1 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. Vapor suppression measures can also be taken at this time. If the organic vapor level decreases below 1 ppm above background, work activities can resume.

If the organic vapor level is above 1 ppm at the perimeter of the work area, activities must be shut down. When work shutdown occurs, downwind air monitoring as directed by the Site Health & Safety Officer (SHSO) will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission Response Plan Section.

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures: When work areas are within 20 feet of potentially exposed populations or occupied structures, continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s) (with appropriate pre-determined response levels and actions.) Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of work.
If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m3 or less at the monitoring point.

Depending upon the nature of contamination and remedial activities, other parameters (e.g., exclusivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work with Co-located Residences or Facilities: Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g., weekends or evenings) when building occupancy is at a minimum.

4.0 MAJOR VAPOR EMISSION RESPONSE PLAN

If organic levels greater than 1 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If efforts to abate the emission source (see Section 5.0) are unsuccessful and if organic vapor levels are approaching 1 ppm above background for more than 15 minutes, then the Major Vapor Emission Response Plan shall automatically be placed into effect.

However, the Major Vapor Emission Response Plan shall be immediately placed in effect if organic vapor levels are greater than 10 ppm above background.

Upon activation, the following activities will be undertaken:

1. All emergency Response Contacts as listed in the Health & Safety Plan will go into effect.
2. The local police authorities will immediately be contacted by the Health & Safety Officer and advised of the situation.
3. Frequent air monitoring will be conducted at 15-minute intervals. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Health and Safety Officer.

5.0 VAPOR AND DUST SUPRESSION TECHNIQUES

5.1 Vapor Suppression

Vapor suppression techniques must be employed when action levels warrant the use of these techniques.

The techniques to be implemented for control of VOCs from stockpiled soil or from the open excavation will include one or more of the following:

- Cover with plastic
- Cover with “clean soil”
- Application of hydro-mulch material or encapsulating foam
- Limit working hours to favorable wind and temperature conditions

5.2 Dust Suppression

Reasonable dust-suppression techniques must be employed during all work that may generate dust, such as drilling, excavation, grading, and placement of clean fill. The following techniques were shown to be effective for controlling the generation and migration of dust during remedial activities:

- Wetting equipment and excavation faces;
- Spraying water on buckets during excavation and dumping;
- Hauling materials in properly covered containers; and,
- Restricting vehicle speeds to 10 mph.

It is imperative that utilizing water for suppressing dust will not create surface runoff.

6.0 DATA QUALITY ASSURANCE

6.1 Calibration

Instrument calibration shall be documented in the designated field logbook. All instruments shall be calibrated in accordance with manufacturer's instructions and specifications before each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

6.2 Operations

All instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on-site by the FOL/HSO for reference.

6.3 Data Review

The Field Team Leader FOL/SHSO will interpret all monitoring data based on Table 1-2 and his/her professional judgment. The FOL/HSO shall review the data with the HSM to evaluate the potential for worker and community exposure, upgrades/downgrades in level of protection, comparison to direct reading instrumentation and changes in the integrated monitoring strategy.

Monitoring and sampling data, along with all sample documentation will be periodically reviewed by the HSM.

7.0 RECORDS AND REPORTING

All readings must be recorded and available for review by personnel from NYSDEC and NYSDOH. Should any of the action levels be exceeded, the NYSDEC Division of Air Resources and NYSDOH must be notified immediately (within one business day).

The notification shall include a description of the control measures implemented to prevent further exceedances

APPENDIX A
NYSDOH GENERIC CAMP

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 B
FUGITIVE DUST AND PARTICULATE MONITORING FROM DER-10 TECHNICAL GUIDANCE FOR SITE INVESTIGATIONS AND REMEDATION

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.

PWGC
Strategic Environmental Engineering Solutions

APPENDIX C
QUALITY ASSURANCE PROJECT PLAN

124-22 QUEENS BOUEVARD
KEW GARDENS, NEW YORK
NYSDEC BCP ID: C241177
BLOCK: 3359, LOT: 21

QUALITY ASSURANCE PROJECT PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

ON BEHALF OF:

Luciano, LLC
25 Aldgate Drive East
Manhasset, New York 11030

PREPARED BY:

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PWGC Project Number: ACT1501

FEBRUARY 2016

124-22 QUEENS BOULEVARD, KEW GARDENS, NEW YORK
NYSDEC BCP ID C241177
QUALITY ASSURANCE PROJECT PLAN

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124-22 QUEENS BOULEVARD, KEW GARDENS, NEW YORK
NYSDEC BCP ID C241177
QUALITY ASSURANCE PROJECT PLAN

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1.0 INTRODUCTION

P.W. Grosser Consulting, Inc. (PWGC) has prepared this Quality Assurance Project Plan (QAPP) for Interim Remedial Measure (IRM) activities to be undertaken at the property located at 124-22 Queens Boulevard in Kew Gardens, New York (BCP ID: C241177). This QAPP has been prepared to define the quality assurance (QA) and quality control (QC) measures to be implemented, to verify the integrity of the work to be performed at the site, and that the data collected will be of the appropriate type and quality needed for the intended use. Specifically, this QAPP addresses the following:

- Description of Project
- Organization and Responsibilities of Project Personnel
- Project Objectives, including Quality Assurance Objectives for Data
- Overview of Field Sampling Program and Procedures
- Sample Packaging and Shipping
- Sample Documentation
- Sample Analytical Program
- Quality Assurance/Quality Control Procedures

IRM activities, as specified in the IRM Work Plan for the site, will include:

- In situ verification sampling/waste characterization
- Soil excavation and disposal

1.1 Site Location and Description

The subject site is located at 124-22 Queens Boulevard in the Kew Gardens neighborhood of the Borough of Queens, New York. The site is situated on the southwest side of Queens Boulevard, between 82nd Road and 82nd Avenue. The property is identified as Block: 03359 Lot: 0021 by the New York City Department of Assessment. The site measures approximately 7,700 square feet (0.18 acre).

The property is currently occupied by a two-story commercial building with a partial basement. The building is currently vacant with the exception of a drycleaner in the northernmost first-floor unit; the drycleaner is expected to vacate the building in the near future (prior to implementation of this IRM).

The subject site was recently purchased by Luciano LLC with plans for redevelopment consisting of an 11-story mixed use building with a basement. The building will consist of an open-air parking garage on the basement level (along with machine/utility spaces), commercial space on the first through third floors, and residential space on

the fourth through eleventh floors. Construction of the proposed building foundation will require that the majority of the site be excavated to approximately 11 feet below grade, with portions excavated slightly deeper (footings, elevator pit, etc.).

An application for the New York State Brownfield Clean-up Program (BCP) for the project was submitted in August 2015. NYSDEC issued a letter of incompleteness on September 14, 2015; a revised BCP application for the site is currently pending. BCP number C241177 has been assigned to the site.

1.2 Site History

The northern portion of the site has been occupied by a dry cleaner since at least 1986. Environmental investigations performed in April and July of 2015 identified tetrachloroethene (PCE) impact in soil and soil vapor beneath the site. Additional information regarding the history of the site, including details of previous environmental investigations is included in the IRM Work Plan.

2.0 PROJECT ORGANIZATION AND PERSONNEL RESPONSIBILITIES

The investigative efforts defined in the RAWP plan will be coordinated by PWGC on behalf of Luciano, LLC. The New York State Department of Environmental Conservation (NYSDEC) is the lead regulatory agency overseeing remedial action at the site. An organization structure has been developed to identify the roles and responsibilities of the various parties involved with the project, as discussed below.

The **NYSDEC Project Manager** will be responsible for reviewing and approving work plans and amendments, coordinating approval of requested modifications, and providing guidance on regulatory requirements.

The **PWGC Project Director** will provide technical expertise for review of the project plans, reports and ongoing field activities. The program manager will be responsible for the coordination of the overall BCP with the NYSDEC. The Project Director will act as the project's Quality Assurance Manager.

The **PWGC Project Manager** will be responsible for the day to day project management, task leadership, and project engineering support and for the planning and implementation of IRM activities. The Project Manager is responsible for ensuring that the requirements of the IRM are implemented. The project manager will also act as the site Health and Safety Manager (HSM).

The **PWGC Field Team Leader** will be responsible for sample collection, oversight of subcontractor personnel, and coordination of daily field activities. The Field Team Leader will act as the Site Health and Safety Officer ensuring implementation of the Site Health and Safety Plan.

A NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory (to be determined) will be contracted to perform required analyses and reporting, including Analytical Services Protocol (ASP) Category B Deliverables, which will allow for data validation.

Subcontractors will perform remedial construction, surveying, drilling, and/or sampling at the direction of the Field Team Leader in accordance with this work plan.

3.0 QUALITY ASSURANCE PROJECT OBJECTIVES

The objective of RA monitoring activities for the site is to obtain sufficient data at a known quality level to assess the effectiveness of the selected remedy in eliminating, reducing, or controlling risks to human health and the environment.

3.1 Data Quality Objective Process

Data quality objectives (DQOs) are qualitative and quantitative statements that specify the quality of the data required to support decisions during remedial activities. DQOs can be defined as what the end user expects to obtain from the analysis results, and are developed through a seven-step process:

- Step 1 State the problem
- Step 2 Identify the decision
- Step 3 Identify inputs to the decision
- Step 4 Define the study boundaries
- Step 5 Develop a decision rule
- Step 6 Specify limits on decision errors
- Step 7 Optimize the decision for obtaining data

For the site, screening data generated by rapid, less precise methods of analysis (PID screening, collection of groundwater field parameters, etc.) will achieve a data use level for site characterization and monitoring. Definitive laboratory analytical data generated during endpoint soil sampling will achieve a data use level to support an assessment of the overall effectiveness of the site remedy. Specifically, these data will be used to:

- Monitor the extent of soil impact at the site and confirm that soils with VOC concentrations in excess of NYSDEC SCOs have been removed.

Known contaminants present in samples collected from the site include VOCs. The principal contaminants of concern at the site is PCE. Site contaminants and their respective site cleanup objectives are discussed in greater detail in the IRM Work Plan.

3.2 Data Quality Categories

DQOs are composed of written expectations for precision, accuracy, representativeness, completeness and comparability of a data set (see Section 3.3). The DQO process provides a logical basis for linking the QA/QC procedures to the intended use of the data, primarily through the decision maker's acceptable limits on decision error. Two descriptive data categories - screening data and definitive data - will be used for the site.

Screening data are generated by rapid, less precise methods of analysis and are deemed non-critical to project objectives. Portable instruments to be used during remedial action to collect screening data include:

- Photoionization detector (PID) or Flame ionization detector (FID)
- Aerosol/dust monitor

Definitive data are generated using specific analytical methods and guidelines and have satisfied known QA/QC requirements. Analytical data provided by an off-site laboratory shall be definitive data, and are deemed critical to project objectives. QA/QC elements of definitive data include determination and documentation of calibrations, detection limits, method blanks, and matrix spike recoveries.

3.3 QA/QC Characteristics

The overall QA/QC objective for IRM monitoring activities is to develop and implement procedures that will provide data of known and documented quality. QA/QC characteristics for data include precision, accuracy, representativeness, completeness, and comparability (PARCC). Data quality objectives for each of these parameters are determined based on the level of data required. Descriptions of these characteristics are provided below, and specific QA objectives for both screening and definitive data are presented in Table 3-1. Analytical matrices and methods are provided on the table.

Table 3-1
QA Objectives for Field and Laboratory Data

Parameter	Measurement	Matrix	Method	Units	Precision	Accuracy	CRQL/MDL	Completeness
VOCs	Screening	Air	Field Measurement	ppm	±1%	N/A	N/A	90%
VOCs	Definitive	Soil	EPA Method 8260	ppm	±25% RPD	172%R	1-5 ppb	90%

Notes:
Abbreviations include:

%R = Percent Recovery
GC = Gas Chromatography
N/A = Not Applicable
NTU = Nephelometric Turbidity Units
TAL = Target Analyte List
TCL = Target Compound List
CRQL = Contract Required Quantitation Limit
MDL = Method Detection Limit
VOCs = Volatile Organic Compounds
RPD = Relative Percent Difference

* Precision dependent on meter and scale.

Precision is the measurement of agreement in repeated tests of the same or identical samples, under prescribed conditions. Analytical precision can be expressed in terms of Standard Deviation (SD), Relative Standard Deviation (RSD) and/or Relative Percent Difference (RPD). The precision of analytical environmental samples has two components - laboratory precision and sampling precision. Laboratory precision is determined by replicate measurements of laboratory duplicates and by analysis of reference materials. The objectives for laboratory precision are specified in the analytical methodologies and are presented on Table 3-1. The precision of the field sampling effort is determined by the analysis of field duplicate samples. Field duplicate analysis will be performed at a rate of five percent (i.e., one duplicate collected for every 20 samples). Acceptance criteria for duplicates analyzed by an off-site laboratory shall be an RPD of 25 percent. The precision limits provided in Table 3-1 for the screening measurements are acceptance criteria for duplicate and calibration analyses of field measurement parameters.

Accuracy is the degree of agreement of a measured sample result or average of results with an accepted reference or true value. It is the quantitative measurement of the bias of a system, and is expressed in terms of percent recovery (%R). Measurements of accuracy for the laboratory include surrogate spike, laboratory control spike, matrix spike and matrix spike duplicate samples. The laboratory must meet or exceed control limit objectives, as stated in Table 3-1 and the applicable methodologies.

Representativeness is the degree to which the results of the analyses accurately and precisely represent a characteristic of a population, a process condition, or an environmental condition. In this case, representativeness is the degree to which the data reflect the contaminants present and their concentration magnitudes in the sampled site areas. Representativeness of data will be ensured through the selection of sampling locations and implementation of approved sampling procedures. Results from environmental field duplicate sample analyses can be used to assess representativeness, in addition to precision.

Completeness is defined as the percentage of samples that meet or exceed all the criteria objective levels for accuracy, precision and detection limits within a defined time period or event. It is the measure of the number of data "points" which are judged to be valid, usable results. The objective for completeness for this project is 90 percent, and will be calculated by dividing the number of usable data results (i.e., all results not considered to be "rejected" and all samples able to be analyzed) by the number of possible data results (i.e., the total number of field samples collected), and then multiplying by 100 percent.

Comparability is the degree of confidence with which results from two or more data sets, or two or more laboratories, may be compared. To achieve comparability, standard environmental methodologies will be employed in the field and in the laboratory. See Table 3-1 and Section 6.0 for analysis methods and detection limits for this field investigation.

3.4 Impact of Failure to Meet Data Quality Objectives

The QA objectives presented in Table 3-1 represent the data quality necessary to meet the project's technical goals. The QA/QC efforts discussed in this QAPP focus on controlling measurement error, and ultimately providing a database for estimating the uncertainty in the measurement data for the project. QA objectives will be evaluated throughout the RA monitoring effort to see if the results for the project meet the stated objectives. If these objectives are not being met, the precision and/or accuracy of the sampling data will be decreased, and corrective actions shall be taken, as documented in Section 13.0.

4.0 REMEDIAL ACTION MONITORING ACTIVITIES

This section provides an overview of the planned IRM monitoring operations by matrix and type of procedures. It also includes activities that may be necessary in the future to supplement the existing groundwater monitoring well network (i.e., site survey; monitoring well installation, etc.). Field monitoring and sampling activities include the following:

- Mobilization and demobilization
- In situ verification sampling/waste characterization
- Soil excavation and removal
- Final verification sampling

4.1 Remedial Action Monitoring Procedures

RA monitoring activities to be performed at the site will be conducted in accordance with established technical guidelines, methods, policies and Standard Operating Procedures (SOPs). The subsections below present an overview of the sampling program procedures; a more detailed discussion of the monitoring activities is presented in the RAWP.

4.1.1 Mobilization and Demobilization

The mobilization effort will consist of logistical planning, identification of sampling locations, equipment mobilization to the site, and field personnel orientation. The orientation meeting will familiarize the sampling team with a brief history of the site, health and safety requirements, and RA monitoring procedures. Mobilization and demobilization will take place before and after completion of routine periodic RA monitoring events. Demobilization will consist of site area clean-up, staging and inventory of monitoring-derived wastes, decontamination and demobilization of field equipment, and organization of monitoring records.

4.1.2 In Situ Verification Sampling/Waste Characterization

Prior to removal of impacted soils from the site, in situ verification soil samples will be collected from the excavation area to confirm the areal extent and depth of impacted soils. In conjunction with this, waste characterization samples will be collected to allow for a disposal facility to be selected a waste approval granted prior to the start of excavation activities. In situ samples will be collected using a Geoprobe® direct-push drill rig (or equivalent). Verification sampling procedures and frequency will be as specified in the IRM Work Plan.

4.1.3 Soil Excavation and Removal

Soils will be excavated from the proposed excavation area utilizing an excavator. Soils will be screened during excavation and stockpiled on the eastern portion of the site. Soils will be screened utilizing a photoionization detector (PID) capable of detecting the presence of VOCs. Soils exhibiting significantly elevated PID responses or

odors may be segregated and stockpiled from other soils being excavated. Trees, shrubs and underbrush within the excavation area will be cleared and disposed of as necessary.

4.1.4 Final Verification Sampling

Following removal of impacted soils from the site final verification soil samples will be collected from the excavation area to confirm the effectiveness of remedial activities. Verification sampling frequency will be as specified in the IRM Work Plan.

5.0 SAMPLE CUSTODY AND DOCUMENTATION

Each day that samples are collected, a chain-of-custody/request for analysis form will be completed and submitted to the laboratory with samples to be analyzed. A copy of the chain-of-custody will be retained by the Project Manager. The chain-of-custody will include the project name, sampler's signature, sample IDs, date and time of sample collection, and analysis requested.

Samples will be packaged and shipped in a manner that maintains sample preservation requirements during transport (i.e., ice to keep samples cool until receipt at the laboratory), ensures that sample holding times can be achieved by the laboratory, and prevents samples from being tampered with.

If a commercial carrier ships samples, a bill of lading (waybill) will be used as documentation of sample custody. Receipts for bills of lading and other documentation of shipment shall be maintained as part of the permanent custody documentation. Commercial carriers are not required to sign the chain-of-custody as long as it is enclosed in the shipping container and evidence tape (custody seal) remains in place on the shipping container.

Identification and documentation of samples are important in maintaining data quality. Strict custody procedures are necessary to ensure the integrity of the environmental samples. Sections below address sample identification, packaging, shipping, and documentation.

5.1 Sample Identification System

The method of identification of a sample depends on the type of measurement or analysis performed. When field screening measurements (e.g., pH, conductivity) are made, data are recorded directly in logbooks. Identifying information such as project name, sample location and depth, date and time, name of sampler, field observations, remarks, etc. shall be recorded.

Each sample collected for off-site laboratory analysis during the field investigation will be specifically designated by PWGC for unique identification. Samples will be identified using a letter code to indicate sample collection methodology. A letter code (see below) will follow, along with the name and/or number that identifies the specific location where the sample was collected. Field equipment blanks will be denoted by the letter code "FB" and trip blanks with "TB". Sample collection date and time will be recorded in the field logbook, chain of custody as well as the sample label.

Letter code prefixes for RA monitoring activities are as follows:

- EP Verification Soil Sample
- FB Field Blank Sample
- TB Trip Blank Sample

At a minimum, all location and identification information for the samples shall be recorded in the field sampling logbook, and on the appropriate chain of custody record form for shipment.

5.2 Sample Custody, Packaging and Shipping

Sample custody shall be strictly maintained and carefully documented each time sample material is collected, transported, received, prepared, and analyzed. Custody procedures are necessary to ensure the integrity of the samples, and samples collected during RA monitoring activities must be traceable from the time the samples are collected until they are disposed of and/or stored, and their derived data are used in the subsequent monitoring report. Sample custody is defined as (1) being in the sampler's possession; (2) being in the sampler's view, after being in the sampler's possession; (3) being locked in a secured container, after being in the sampler's possession; and (4) being placed in a designated secure area.

5.2.1 Field Custody, Packaging and Shipping Procedures

Field custody procedures shall be implemented for each sample collected. The field sampler shall be responsible for the care and custody of the samples until they are properly transferred or dispatched. To maintain the integrity of the samples, the samples are to be stored in a designated, secure area and/or be custody sealed in the appropriate containers prior to shipment.

Each environmental sample will be properly identified and individually labeled. Labels will be filled out in indelible ink with at least the following information: sample identification (see Section 5.1), type and matrix of sample, date and time of sample acquisition, name of sampler, analysis required, and preservation (as necessary). The sample label will be securely attached to the sample container.

Environmental samples being analyzed by off-site laboratories will be properly packaged and shipped for analysis. Samples are to be packed with sufficient wet ice to cool the samples to 4^{o}C. Additionally, each cooler will be packed with a cooler temperature blank. Lastly, the cooler should be filled with adequate cushioning material to minimize the possibility of container breakage.

A laboratory supplied completed chain of custody form will be included with all sample shipments.

When the samples are being shipped by an overnight delivery service to the laboratory, the chain of custody form and any other paperwork shall be checked against the sample labels and field documentation, and then placed in a waterproof sealable plastic bag and taped securely to the inside lid of the cooler. The cooler must then be secured, with custody seals affixed over the lid opening in at least two locations, and the cooler wrapped with strapping tape (without obscuring the custody seals). Orientation "this end up" arrows shall be drawn or attached on two sides of the cooler, and a completed overnight delivery service shipping label shall be attached to the top of the cooler.

Samples to be shipped by an overnight delivery service shall be shipped within 24 hours of sample collection and arrive at the laboratory within 24 hours of sample shipment. A member of the field team will notify the laboratory of a sample shipment.

5.2.2 Laboratory Custody Procedures

The following generally summarizes laboratory custody procedures; more detailed operations are presented in the laboratory's SOPs.

- A designated sample custodian will accept custody of the shipped samples and will verify that the information on the sample labels matches that on the chain of custody record(s),
- The laboratory custodian will use the sample label number or assign a unique laboratory number to each sample label and will assure that all samples are transferred to the proper analyst or stored in the appropriate secure area; and,
- Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted or returned to the custodian or sample storage area. Internal chain of custody records shall be maintained by the laboratory.

The laboratory shall communicate with PWGC personnel by telephone, email or facsimile, as necessary, throughout the process of sample scheduling, shipment, analysis and data reporting, to ensure that samples are properly processed. If a problem occurs during sample shipment or receipt (e.g., a sample container arrives broken or with insufficient sample volume, a sample was not preserved correctly, a sample was not listed on the chain of custody, etc.), the laboratory shall immediately notify the appropriate person for resolution.

Samples received by the laboratory will be retained until analyses and QA checks are completed. When sample analyses and necessary QA checks have been completed, the unused portion of the sample and the sample

container must be disposed of properly by the laboratory. All identifying tags, data sheets, and laboratory records shall be retained as part of the permanent documentation.

6.0 ANALYTICAL REQUIREMENTS

Analytical services will be provided by a NYSDOH ELAP approved laboratory. The laboratory will follow NYSDEC Analytical Sampling Protocol (ASP) and provide data in results only format, with the exception of the final round of sampling in which data will be reported with Category B deliverables (ASP-B). Analyses not available using ASP-B will be provided in results only format. Samples will be analyzes as follows:

6.1.1 Verification Soil Samples

Verification soil samples will be collected as described in the IRM. Each verification soil sample will be analyzed for VOCs by USEPA Method 8260. Soil samples will be collected in a Terracore sampling kit (or equivalent). Glassware will be supplied pre-cleaned and pre-preserved by the analytical laboratory. Sample preservation will consist of: storage in a cooler on ice to a temperature of 4ºC. The hold time for VOC analysis is 14 days.

7.0 DECONTAMINATION PROCEDURES

In order to minimize the potential for cross-contamination, non-dedicated drilling and sampling equipment shall be properly decontaminated prior to and between sampling/drilling locations.

7.1.1 General Procedures

Drilling equipment will be decontaminated in a designated area. Sampling equipment and probes will be decontaminated in an area covered with plastic sheeting near the sampling location. Waste material generated during decontamination activities will be containerized, stored and disposed of in accordance with the procedures detailed in Section 5.9. Decontamination of sampling equipment shall be kept to a minimum, and wherever possible, dedicated sampling equipment shall be used. Personnel directly involved in equipment decontamination shall wear appropriate protective equipment.

7.1.2 Drilling Equipment

Drilling equipment shall be decontaminated by steam cleaning prior to performance of the first boring/excavation and between all subsequent borings/excavations. This shall include hand tools, casing, augers, drill rods, temporary well material and other related tools and equipment. Water used during drilling and/or steam cleaning operations shall be from a potable source.

7.1.3 Sampling Equipment

Sampling equipment (i.e., trowels, knives, split-spoons, bowls, hand augers, etc...) will be decontaminated prior to each use as follows:

- Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
- Generous tap water rinse
- Distilled water rinse

7.1.4 Meters and Probes

All meters and probes that are used in the field (other than those used solely for air monitoring purposes, e.g., PID meters) will be decontaminated between uses as follows:

- Laboratory-grade detergent and tap water solution wash
- Tap water rinse
- Distilled water rinse (triple rinse)

Decontamination of sampling equipment will be kept to a minimum in the field, and wherever possible, dedicated disposable sampling equipment will be used. Decontamination fluids will be stored in US Department of Transportation (DOT)-approved 55-gallon drums or in an on-site storage tank (liquids only) until proper disposal.

Personnel directly involved in equipment decontamination will wear protective clothing in accordance with the project Health and Safety Plan (HASP).

8.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE REQUIREMENTS

This section will discuss the type and quantities of QA/QC samples to be utilized during implementation of the field program.

8.1 Field Quality Control Samples

The subsections below present general information and guidance on field QC samples, including definition and frequency of QC blanks. Field QC samples will be labeled and shipped according to the procedures outlined in Section 5.0.

8.1.1 Field Blanks

A field blank will be collected to evaluate the potential for contamination of environmental samples from inadequate decontamination of field equipment. Field blanks shall be collected by pouring laboratory supplied distilled/deionized (DI) water over and/or through decontaminated non-disposable equipment or disposable equipment, and collecting the rinsate. Field blanks will be collected at a frequency of one per decontamination event per type of sampling equipment, not to exceed one per day per sample matrix. Preservation and analysis of field blanks will be identical to that of the associated environmental samples.

8.1.2 Trip Blanks

A trip blank serves to detect possible cross-contamination of samples resulting from handling, storage and shipment procedures. In the event that VOC analysis is necessary, trip blanks will accompany VOC glassware in transit through sample collection and shipment to the laboratory. In addition, trip blanks are stored by the laboratory under the same conditions as the environmental samples. A trip blank will accompany each cooler containing samples submitted for VOC analysis (if any), and will be preserved as per the groundwater samples and analyzed identically to the associated environmental samples. VOC samples will be consolidated in one cooler for daily shipment, if possible, to minimize the number of trip blanks required in the field program. Due to the lack of VOC impact identified at the site, it is not anticipated that trip blanks will be necessary during remedial action.

8.1.3 Temperature Blanks

A temperature blank will be sent with each cooler of samples to verify that the cooler temperature has been maintained at 4ºC. One non-preserved VOA vial shall be filled with either potable or DI water, and labeled with "USEPA cooler temperature indicator" and the date. If supplied, the laboratory's temperature blank will be used in place of the VOA vial. The laboratory shall record the temperature of the blank water on the chain of custody immediately upon cooler arrival.

8.1.4 Field Environmental Duplicate Samples

Duplicate environmental samples will be analyzed by the off-site laboratories to evaluate the reproducibility of the sampling procedures. Duplicate samples will be collected at a rate of five percent of the total samples for each specific matrix for each type of analysis (i.e., one duplicate for up to every 20 samples). The duplicate samples will be collected from the same location and at the same time as the original environmental sample; however, the duplicated samples will be "coded" in such a manner that the laboratory will not be able to determine of which original field sample they are duplicated (i.e., "blind" duplicates). For example, the duplicate sample of location EP001 may be "coded" as location EP051, as long as there are not more than fifty endpoint samples being collected (i.e., the coded sample name should not be assigned a legitimate sample location identification). An explanation of the duplicate "coding" must be written in the field logbook. Preservation and analysis of duplicate samples will be identical to those for the environmental samples. Precision of field data will be evaluated based on the calculation of Relative Percent Difference (RPD), with acceptance criteria of 25 percent for the off-site laboratory samples. Blind duplicate samples will be collected in the same manner as the environmental samples.

8.2 Laboratory Quality Control Samples

General information and guidance on laboratory QC samples are presented in the subsections below. A summary of QC procedures, frequencies, criteria, and corrective actions for the samples, as determined by the applicable method guidelines.

8.2.1 Method Blanks/Preparation Blanks

A method blank (for organics) or a preparation blank (for inorganics) will be analyzed with every batch of samples to ensure that contamination has not occurred during the analytical process. Method blanks consist of a portion of analyte-free water or solid that is processed through the entire sample procedure the same as an environmental sample.

8.2.2 Matrix Spikes/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate samples (also known as spike/duplicate samples) will be used to assess precision and accuracy of the analytical methods. In this procedure, three aliquots of an actual field sample are collected at a specific location, and two aliquots are “spiked” by the addition of known amounts of an analyte or analytes and these samples are then analyzed identically to the field samples. A comparison of the resulting concentration to the original sample concentration and among the two “spiked” sample concentrations provides information on the ability of the analytical procedure to generate a correct result from the sample. Matrix spike/matrix spike duplicate samples will be collected in the field at a rate of five percent, and will be analyzed on a per batch basis, with up to 20 samples per week constituting a batch. The validity of matrix spike/matrix spike duplicate recovery and relative percent difference values will be determined using the acceptance criteria

8.2.3 Laboratory Control Samples

A laboratory control sample (LCS) consists of an analyte-free water or solid phase sample that is spiked with target analytes at a known concentration. The LCS shall be analyzed for every batch of samples (i.e., 1 per 20) to assess the ability of the analytical procedure to generate a correct result without matrix effects/interferences affecting the analysis. The percent recoveries for the LCS compounds will be compared to QC limits stated in the appropriate methods.

8.2.4 Surrogate Compounds

Surrogates (also known as System Monitoring Compounds) are compounds of known concentrations added to every organic analysis sample for analytical chromatography methods at the beginning of the sample preparation to monitor their recovery. Surrogate recoveries will be used to assess potential matrix interferences and to monitor any potential effects of sample preparation and analysis on final analyte concentrations. The recovery values will be compared to values established in the applicable methodologies to determine the validity of the data.

8.2.5 Internal Standards

Internal standards are used to provide instrument correction for variation in instrument performance and injection volumes. Internal standards also establish relative response factors for the analytes.

8.2.6 Interference Check Samples

An interference check sample (ICS), which contains target analytes at known concentrations, verifies the laboratory's interelement and background correction factors. Analysis of ICS samples is unique to metals analysis using the inductively coupled plasma (ICP) method.

9.0 INSTRUMENT CALIBRATION AND PREVENTIVE MAINTENANCE

9.1 Calibration

Equipment will be inspected and approved by the Field Team Leader before being used. Equipment will be calibrated to factory specifications, if required. Monitoring equipment will be calibrated following manufacturers recommended schedules. Daily field response checks and calibrations will be performed as necessary (i.e. PID calibrations) following manufacturers standard operating procedures. Equipment calibrations will be documented in a designated field logbook.

The Field Team Leader or his designee will be responsible for ensuring that instrumentation are of the proper range, type and accuracy for the measurement/test being performed, and that all of the equipment are calibrated at their required frequencies, according to their specific calibration protocols/procedures.

All field measurement instruments must be calibrated according to the manufacturer's instructions prior to the commencement of the day's activities. Exceptions to this requirement shall be permitted only for instruments that have fixed calibrations pre-set by the equipment manufacturer. Calibration information shall be documented on in a designated field logbook. Information to be recorded includes the date, the operator, and the calibration standards (concentration, manufacturer, lot number, expiration date, etc.). All project personnel using measuring equipment or instruments in the field shall be trained in the calibration and usage of the equipment and are personally responsible for ensuring that the equipment has been properly calibrated prior to its use.

In addition, all field instruments must undergo response verification checks at the end of the day's activities and at any other time that the user suspects or detects anomalies in the data being generated. The checks consist of exposing the instrument to a known source of analyte (e.g., the calibration solution), and verifying a response. If an unacceptable instrument response is obtained during the check the data shall be labeled suspect, the problem documented in the site logbook, and appropriate corrective action taken.

Any equipment found to be out of calibration shall be recalibrated. When instrumentation is found to be out of calibration or damaged, an evaluation shall be made to ascertain the validity of previous test results since the last calibration check. If it is necessary to ensure the acceptability of suspect items, the originally required tests shall be repeated (if possible), using properly calibrated equipment. Any instrument consistently found to be out of calibration shall be repaired or replaced.

9.2 Preventive Maintenance

Field equipment shall be maintained at its proper functional status in accordance to manufacturer manual specifications. A check of the equipment shall be performed before field activities begin, and any potential spare parts (e.g., batteries, connectors, etc.) and maintenance tools will be brought on site, to minimize equipment downtime during the field activities. Visual checks of the equipment will be conducted on a daily basis. Routine preventive maintenance shall be performed to assure proper operation of the equipment. Any maintenance performed on field equipment will be documented in the designated field logbook, and shall be undertaken by personnel who have the appropriate skills and/or training in the type of maintenance required.

10.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE REQUIREMENTS

Quality Control (QC) procedures will be followed in the field and at the laboratory to ensure that reliable data are obtained. When performing field sampling, care shall be taken to prevent the cross-contamination of sampling equipment, sample bottles, and other equipment that could compromise sample integrity. QC samples, including blind duplicates, equipment blanks, trip blanks, method blanks, matrix spike and matrix spike duplicates, and their frequency to be collected in the field are detailed below. Field QC samples will be labeled and shipped according to the procedures outlined in Section 8.0.

10.1 Field Blanks

A field blank will be collected to evaluate the potential for contamination of environmental samples from inadequate decontamination of field equipment. Field blanks shall be collected by pouring laboratory supplied distilled/deionized (DI) water over and/or through decontaminated non-disposable equipment or disposable equipment, and collecting the rinsate. Field blanks will be collected at a frequency of one per day per sample matrix. Preservation and analysis of field blanks will be identical to that of the associated environmental samples.

10.2 Trip Blanks

A trip blank serves to detect possible cross-contamination of samples resulting from handling, storage and shipment procedures. Trip blanks will accompany VOC glassware in transit through sample collection and shipment to the laboratory. In addition, trip blanks are stored by the laboratory under the same conditions as the environmental samples. A trip blank will accompany each cooler containing samples submitted for VOC analysis, and will be preserved as per the groundwater samples and analyzed identically to the associated environmental samples. VOC samples will be consolidated in one cooler for daily shipment, if possible, to minimize the number of trip blanks required in the field program. Due to the lack of VOC impact identified at the site, it is not anticipated that trip blanks will be necessary during remedial action.

10.3 Temperature Blanks

A temperature blank will be sent with each cooler of samples to verify that the cooler temperature has been maintained at 4ºC. One non-preserved VOA vial shall be filled with either potable or DI water, and labeled with "cooler temperature indicator" and the date. If supplied, the laboratory's temperature blank will be used in place of the VOA vial. The laboratory shall record the temperature of the blank water on the chain of custody immediately upon cooler arrival.

10.4 Field Environmental Blind Duplicate Samples

Blind duplicate environmental samples will be analyzed by the off-site laboratories to evaluate the reproducibility of the sampling procedures. Duplicate samples will be collected at a rate of five percent of the total samples for

each specific matrix for each type of analysis (i.e., one duplicate for up to every 20 samples). The duplicate samples will be collected from the same location and at the same time as the original environmental sample; however, the duplicated samples will be "coded" in such a manner that the laboratory will not be able to determine of which original field sample they are duplicated. For example, the duplicate sample of location MW01 may be "coded" as location MW21, as long as there are not more than twenty groundwater monitoring wells being sampled (i.e., the coded sample name should not be assigned a legitimate sample location identification). An explanation of the duplicate "coding" must be written in the field logbook. Preservation and analysis of duplicate samples will be identical to those for the environmental samples. Blind duplicate samples will be collected in the same manner as the environmental samples.

11.0 DATA REDUCTION, VALIDATION AND REPORTING

Standard methods and references will be used as guidelines for data handling, reduction, validation, and reporting. All data for the project will be compiled and summarized with an independent verification at each step in the process to prevent transcription/typographical errors. Any computerized entry of data will also undergo verification review.

11.1 Data Reduction

11.1.1 Field Data Reduction

Field instrumentation data will be reported by site personnel in field logbooks associated with the monitoring event. At the end of each monitoring event, the field screening data results shall be summarized in tabulated form, as warranted.

11.1.2 Laboratory Data Reduction

All data generated by the off-site laboratory will be reported in a specified format containing all required elements to perform data validation. Analytical results shall be presented on standard NYSDEC ASP-B forms (when necessary) or equivalents, and include the dates the samples were received and analyzed, and the actual methodology used. Laboratory QA/QC information required by the method protocols will be compiled, including the application of data QA/QC qualifiers as appropriate. In addition, laboratory worksheets, laboratory notebooks, chains-of-custody, instrument logs, standards records, calibration records, and maintenance records, as applicable, will be provided in the laboratory data packages to determine the validity of data.

11.1.3 Project Data Reduction

Following receipt of the laboratory analytical results by PWGC, the data results will be compiled and presented in an appropriate tabular form. Where appropriate, the impacts of QA/QC qualifiers resulting from laboratory or external validation reviews will be assessed in terms of data usability.

11.1.4 Non-Direct Measurements

If information necessary for the project has not been measured directly in the field, non-direct measurement data may be obtained from literature files, texts, computer databases, etc. References utilized will be acknowledged sources within the specific discipline. An explanation of the rationale behind using the reference and a description of any concern regarding the use of the referenced data (e.g., uncertainty, conflicting literature, etc.) shall be made within the report. Non-direct measurement data, after usage, will be filed within the project files for the length of the project.

11.2 Data Usability and Validation

The main purpose of the data is for use in defining the extent of contamination at the site, to aid in evaluation of potential human health and ecological exposure assessments, and to support remedial action decisions. Based upon this, data use usability and validation will be performed as described below. Complete data packages will be archived in the project files, and if deemed necessary additional validation can be performed using procedures in the following sections. It is anticipated that data validation will be performed on data collected during the final round of sampling, only.

11.2.1 Data Usability and Validation Requirements

Data usability and validation are performed on analytical data sets, primarily to confirm that sampling and chain-of-custody documentation are complete, sample IDs can be tied to specific sampling locations, samples were analyzed within the required holding times, and analyses are reported in conformance to NYSDEC ASP, Category 2 data deliverable requirements as applicable to the method utilized.

11.2.2 Data Usability and Validation Methods

If deemed necessary by NYSDEC, a data usability evaluation for the data collected during the RA and a data usability summary report (DUSR) will be prepared. The DUSR will be prepared in accordance with NYSDEC DER-10, Appendix 2B.

Independent third party data validation will be performed on 5% of the sample data, or on one sample from each sample delivery group (SDG), whichever is greater. Data validation will be performed by a qualified subcontractor independent of the project.

12.0 CORRECTIVE ACTION

Review and implementation of systems and procedures may result in recommendations for corrective action. Any deviations from the specified procedures within approved project plans due to unexpected site-specific conditions shall warrant corrective action. All errors, deficiencies, or other problems shall be brought to the immediate attention of the PWGC PM, who in turn shall contact the Quality Assurance/Data Quality Manager or his designee (if applicable).

Procedures have been established to ensure that conditions adverse to data quality are promptly investigated, evaluated and corrected. These procedures for review and implementation of a change are as follows:

- Define the problem.
- Investigate the cause of the problem.
- Develop a corrective action to eliminate the problem, in consultation with the personnel who defined the problem and who will implement the change.
- Complete the required form describing the change and its rationale (see below for form requirements).
- Obtain all required written approvals.
- Implement the corrective action.
- Verify that the change has eliminated the problem.

During the project, all changes to the RA monitoring program or GWET system operation will be documented in field logs/sheets and the PWGC PM will be advised.

If any problems occur with the laboratory or analyses, the laboratory must immediately notify PWGC PM, who will consult with other PWGC project staff. All approved corrective actions shall be controlled and documented.

All corrective action documentation shall include an explanation of the problem and a proposed solution which will be maintained in the project file or associated logs. Each report must be approved by the necessary personnel (e.g., the PM) before implementation of the change occurs. The PWGC PM shall be responsible for controlling, tracking, implementing and distributing identified changes.