November 16, 2023

NYSDEC Division of Environmental Remediation
625 Broadway
Albany, NY, 12233-5060

Attn: Rafi Alam

Re: Supplemental Remedial Investigation Workplan
148-28 Hillside Avenue Site (C241199)

Dear Mr. Alam,

Please accept the below as a Supplemental Remedial Investigation Work Plan for 148-28 Hillside Avenue (BCP Site No. C241199). All sampling, analytical and reporting protocols will follow the Quality Assurance Project Plan contained in Appendix D of the approved RIWP and is attached to this workplan. RISB-17 through RISB-19 will be installed off-site to investigate soil quality beneath the adjacent property to the west in the vicinity of the onsite open NYSDEC spill 22-03747. IA/SS-1 through IA/SS-9 will be installed to evaluate the potential exposure pathway through soil gas to offsite receptors. The locations of RISB-17 through RISB-19 and IA/SS-1 through IA-SS-9 are specified in the attached Figure 1.

The Community Air Monitor Plan (CAMP) contained in the approved RIWP is attached to this workplan as Appendix A. CAMP reports will be submitted to NYSDEC and NYSDOH for review on a weekly basis. Data will be provided to NYSDEC and NYSDOH via email as soon as possible the same day if an exceedance occurs including a description of the exceedance, the cause of the exceedance, and corrective actions taken, if any. If the exceedance occurs after regular business hours, the Agencies will be notified as soon as possible the next business day. All data from the CAMP will be included in the resultant sampling report.

1. Preconstruction

Sampling events conducted beneath the Site have identified a tetrachloroethene (PCE) soil vapor plume beneath the entire site and chlorinated volatile organic compound (CVOC) contamination in soil along the western boundary of the Site.

2. Soil and Groundwater Sampling

Soil boring installations and sampling will follow the procedures outlined in the approved RIWP. Soil borings will be installed and sampled at the approximate locations indicated in the proposed sampling diagram (Figure 1).

RISB-17 through RISB-19 will be installed in the vicinity of the onsite open NYSDEC spill 22-03747. Samples will be collected 0-2 feet below ground surface, above the groundwater interface, and at intervals at locations where evidence of observable impact is present. At this time (according to the NYSDEC case manager), no groundwater samples are required as part of the offsite investigation.

Soil samples will be containerized and transported to Alpha Analytical Laboratories for certified laboratory analysis.

All Samples will be analyzed for:

- Volatile Organic Compounds by EPA Method 8260;
- Semi-volatile organic compounds by EPA Method 8270;
- 1,4-Dioxane by EPA Method 8270 in "selective ion monitoring" (SIM) mode;
- Pesticides/PCBs by EPA Method 8081/8082;
- Target Analyte List metals and cyanide by EPA Method 6010/7473;
- PFAS by EPA Method 537

3. Sub-Slab Soil Vapor Sampling

Soil vapor samples will be collected in accordance with the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH October 2006). Sub-slab soil vapor will be sampled at the approximate locations indicated in the proposed sampling diagram (Figure 1). Nine sub-slab soil vapor samples (SS-1 through SS-9) will be collected from the basement or first-floor grade of the occupied buildings. Temporary sub-slab vapor implants will be installed utilizing a power drill, a 1-foot-long drill bit, dedicated Teflon tubing and volatile organic compound (VOC) free putty for sealant. A helium tracer gas check shall be completed to confirm the competency of the seal. The sub-slab soil vapor probe(s) will be installed to a depth of 2 inches beneath the bottom of the existing building slab. 24-hours following soil vapor probe installation, one to three implant volumes shall be purged and the soil-gas sampling will begin to take place. Flow rate for both purging and sampling will not exceed 0.2 L/min.

A 6-Liter stainless steel Summa canister that has been batch certified clean by the laboratory with a flow regulator set to a flow rate of approximately 0.025 liters per minute will be connected to the Teflon tubing exiting each soil vapor probe. Once the canisters are in place, the flow regulators will be opened, and sampling will continue for approximately 4 hours until the canisters are full.

As part of the vapor intrusion evaluation, a tracer gas will be used in accordance with NYSDOH protocols to serve as a quality assurance/quality control (QA/QC) device to verify the integrity of the soil vapor probe seal. A container (box, plastic pail, etc.) will serve to keep the tracer gas in contact with the probe during testing. A portable monitoring device will be used to analyze a sample of soil vapor for the tracer gas prior to sampling. If the tracer sample results show a significant presence of the tracer, the probe seals will be adjusted to prevent infiltration.

4. Indoor Air Sampling

Indoor and outdoor air will be sampled concurrently with the sub-slab soil vapor samples at the approximate locations indicated in the proposed sampling diagram (Figure 1) during the upcoming heating season. Outdoor air sample OA-1 will be collected upwind of the area to be sampled.

Indoor air samples will be collected by placing an individually cleaned and laboratory certified 6-Liter stainless steel Summa canisters on surfaces approximately 3 feet above the floor. Each Summa canister will be equipped with a flow regulator. Samples IA-1, IA-2 and IA-4 are in commercial buildings. The canisters for these samples will be set to a flow rate of approximately 0. 0125 liters per minute, which will fill in approximately 8 hours. Samples IA-3 and IA-5 are in

residential buildings. The canisters for these samples will be set to a flow rate of approximately 0.004 liters per minute, which will fill in approximately 24 hours. The cannisters will be opened to initiate sampling, which will continue for the approximate durations until the canisters are almost full, and the regulators are closed.

Letters will be transmitted to the owners of off-site properties to request access. A template for the transmittal letters is attached.

If indoor air or soil vapor exceedances are present in the proposed sampling locations or no access is granted, step-out sampling locations IA-6/SS-6 through IA-9/SS-9 will be sampled. IA-6/SS-6 is in a commercial building. The canister for IA-6 will be set to a flow rate of approximately 0.0125 liters per minute, which will fill in approximately 8 hours. IA-7/SS-7 through IA-9/SS-9 are in residential buildings. The canisters for IA-7 through IA-9 would be set to a flow rate of approximately 0.004 liters per minute, which will fill in approximately 24 hours.

5. Quality Assurance/Quality Control

5.1 Quality Assurance/Quality Control Procedures

QA/QC procedures will be used to provide performance information with regard to accuracy, precision, sensitivity, representation, completeness, and comparability associated with the sampling and analysis for this investigation. Field QA/QC procedures will be used (1) to document that samples are representative of actual conditions at the Site and (2) identify possible cross-contamination from field activities or sample transit. Laboratory QA/QC procedures and analyses will be used to demonstrate whether analytical results have been biased either by interfering compounds in the sample matrix, or by laboratory techniques that may have introduced systematic or random errors to the analytical process. A summary of the field and laboratory QA/QC procedures is provided below.

5.2 Field QA/QC

Field QA/QC will include the following procedures:

- Calibration of field equipment, including PID, on a daily basis;
- Analysis of trip blank (VOCs only) and duplicate samples;
- Use of dedicated and/or disposable field sampling equipment;
- Proper sample handling and preservation;
- Proper sample chain of custody documentation; and
- Completion of report logs.

The above procedures will be executed as follows:

- Two duplicate samples (one soil and one groundwater sample) will be collected to evaluate field sampling precision or reproducibility of measurements of the same parameter under the given set of conditions;
- Disposable sampling equipment, including acetate sleeves, latex gloves, and disposable bailers (or sample tubing), will be used to minimize cross-contamination between samples;
- For each of the parameters analyzed, a sufficient sample volume will be collected to adhere to the specific analytical protocol, and provide sufficient sample for reanalysis if necessary;
- Because plasticizers and other organic compounds inherent in plastic containers may contaminate samples requiring organic analysis, samples will be collected in glass containers, with the exception of the nitrate-preserved groundwater sample for metals analysis;

- Appropriate sample preservation techniques, including cold temperature storage at 4º C, will be utilized to ensure that the analytical parameters concentrations do not change between the time of sample collection and analysis; and
- Samples will be analyzed prior to the expiration of the respective holding time for each analytical parameter to ensure the integrity of the analytical results.

5.3 *Sample Custody*

Sample handling in the field will conform to appropriate sample custody procedures. Field custody procedures include proper sample identification, chain-of-custody forms, and packaging and shipping procedures. Sample labels will be attached to all sampling bottles before field activities begin to ensure proper sample identification. Each label will identify the site and sample location. Styrofoam or bubble wrap will be used to absorb shock and prevent breakage of sample containers. Ice or ice packs will be placed in between the plastic bags for sample preservation purposes. After each sample is collected and appropriately identified, the following information will be entered into the chain-of-custody form:

- Site name;
- Sampler(s)' name(s) and signature(s);
- Names and signatures of persons involved in the chain of possession of samples;
- Sample number;
- Number of containers;
- Sample location;
- Date and time of collection;
- Type of sample, sample matrix and analyses requested;
- Preservation used (if any); and
- Any pertinent field data collected (pH, temperature, conductivity, DO).

The sampler will sign and date the "Relinquished" blank space prior to removing one copy of the custody form and sealing the remaining copies of the form in a Ziploc plastic bag taped to the underside of the sample cooler lid. The sample cooler will be sealed with tape prior to delivery or shipment to the laboratory.

5.4 Report Logs

Field logs and borings logs will be completed during the course of this investigation. A field log will be completed on a daily basis which will describe all field activities including:

- Project number, name, manager, and address;
- The date and time;
- The weather conditions;
- On-site personnel and associated affiliations;
- Description of field activities; and
- Pertinent sample collection information including sample identification numbers, description of samples, location of sampling points, number of samples taken, method of sample collection and any factors that may affect its quality, time of sample collection, name of collector, and field screening results.

A boring log will be completed for each boring and will include the following information:

- Project number, name, manager, and location;
- The date and time;
- Drilling company and method used;
- Boring number;
- Total boring depth and water table depths; and

- Pertinent soil sample information including sample number, interval, depth, amount recovered, color, composition, percent moisture, visual and olfactory observations of contamination, and PID readings.

5.5 Laboratory QA/QC

An ELAP-certified laboratory will be used for all sample analyses. The laboratory will follow the following QA/QC protocols. All samples will be delivered to the laboratory within 24 hours of sample collection. Samples will be received by laboratory personnel, who will inspect the sample cooler(s) to check the integrity of the custody seals. The cooler(s) will then be opened, the samples unpackaged, and the information on the chain-of-custody form examined. If the shipped samples match those described on the chain-of-custody form, the laboratory sample custodian will sign and date the form on the next "Received" blank and assume responsibility for the samples. If problems are noted with the sample shipment, the laboratory custodian will sign the form and record problems in the "Remarks" box. The custodian will then immediately notify the Project Manager so appropriate follow-up steps can be implemented on a timely basis.

A record of the information detailing the handling of a particular sample through each stage of analysis will be maintained by the laboratory. The record will include:

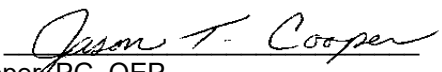
- Job reference, sample matrix, sample number, and date sampled;
- Date and time received by laboratory, holding conditions, and analytical parameters;
- Extraction date, time and extractor's initials (if applicable), analysis date, time, and analyst's initials; and
- QA batch number, date reviewed, and reviewer's initials.

NYSDEC ASP Category B Data Deliverables will be submitted for all of the samples representing the final delineation of the nature and extent of contamination for a remedial investigation. Data validation packages and Data Usability Summary Reports (DUSRs) will be provided in the RIR to support the remedial investigation. The DUSRs for this project will be prepared by Lori Beyer, L.A.B. Validation Corp., East Northport, NY.

I, Jason Cooper certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Off-Site Soil Vapor Intrusion Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Feel free to contact me if you have any questions or comments concerning the above.

Very truly yours,

Signature:  Date: November 15, 2023
Jason Cooper, PG, QEP

Notes

Legend

	Site Boundary
	Former Building Boundary
	Former Petroleum Storage Facilities
	Former Storm and Floor Drains
MW-1	Monitoring Well
SB-1	Soil Boring
SV-1	Soil Vapor Point
OA-1	Outdoor Air Sample
IA-1	Indoor Air Sample
SS-1	Sub-Slab Sample
IA-1	Step-Out Indoor Air Sample
SS-1	Step-Out Sub-Slab Sample

Title

Offsite Sampling Diagram

No.	Revision/Issue	Date

Advanced Cleanup Technologies
Environmental Consultants

200 Broadhollow Road-Suite 207
Melville, New York 11747

Project Name and Address

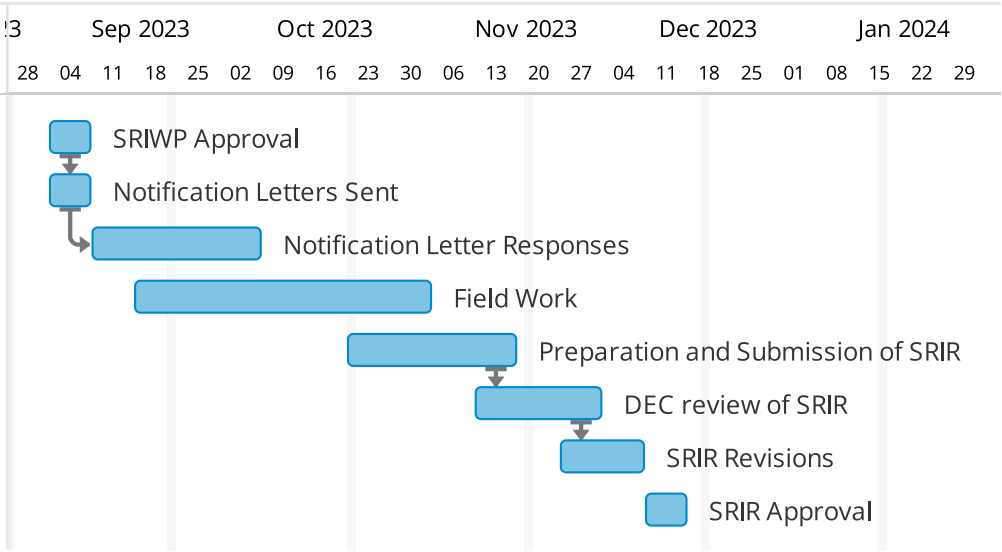
148-26 Hillside Avenue
148-26 Hillside Avenue
Jamaica, NY
11435

Project	Figure
BCP Site C241199	1
Date: 3/28/2023	
Scale: As Noted	

8346-JANY 148-28 Hillside Avenue, Jamaica, ...

Read-only view, generated on 25 Aug 2023

	ACTIVITIES	START	DUE
0	SRIWP Approval	07/Sep	07/Sep
1	Notification Letters Sent	09/Sep	10/Sep
2	Notification Letter Responses	11/Sep	02/Oct
3	Field Work	19/Sep	31/Oct
4	Preparation and Submission of SRIR	24/Oct	14/Nov
5	DEC review of SRIR	15/Nov	29/Nov
6	SRIR Revisions	29/Nov	06/Dec
7	SRIR Approval	11/Dec	11/Dec



APPENDIX A

CAMP

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

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals Structures

- When work areas are within 20 feet of potentially exposed populations or occupied structures, the 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). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). 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 the 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.

Sample Vapor Intrusion

Investigation Notification Letter

November 16, 2023

RAJ EQUITIES INC
148-09 88th Ave,
Jamaica, NY
11435

Re: Vapor Intrusion Investigation at 148-09 88th Ave, Jamaica, NY 11435

Dear Property Owner,

On September 27 and October 3, 2022, air samples were collected at the property located at 148-26 Hillside Ave, Jamaica, NY 11435. A total of five soil vapor samples were collected at 10 feet below ground surface.

The results of the investigation indicate that a maximum concentration of 1,760 micrograms per cubic meter (ug/m^3) of Tetrachloroethene (PCE) and 11 ug/m^3 of Trichloroethene (TCE) were detected in soil vapor beneath the site. PCE is used in dry cleaning practices and as a degreaser. TCE is a manufactured chemical commonly used to remove grease from metal.

The New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) have requested that this sampling also be performed at properties adjacent to 148-26 Hillside Ave to determine if any PCE or TCE contamination could be entering those properties from 148-26 Hillside Ave, which formerly utilized PCE in historical auto repair operations.

The NYSDEC and NYSDOH would like us to investigate your property located at 148-09 88th Ave, Jamaica, NY 11435 to determine the soil vapor and indoor air levels in your building. We are requesting access to your building's basement for the purposes of collecting these samples. The work will involve drilling a small hole (1/2-inch diameter) through the basement floor and setting up small vacuum canisters to collect air samples over a 24-hour period. A technician will set up the canisters in the morning, leave and then come back after 24 hours to retrieve them and patch the hole. The sampling will not disrupt any use of the building. This sampling will be performed by CA RICH Geology Services, D.P.C. on behalf of the owner of 148-26 Hillside Ave in accordance with a NYSDEC-approved work plan and under the oversight of the NYSDEC and NYSDOH. **You will not be responsible for any costs associated with this work and your basement will be restored to pre-sample conditions**.

Please be aware that pursuant to Environmental Conservation Law (ECL 27-2405), property owners or owners' agents (such as landlords) are required to notify all their tenants and occupants in buildings that were sampled of the test results attached.

If you agree to provide access for the investigation in your building, we agree to minimize any and all inconvenience to you in connection with this work. If we accidentally damage your property in any way, we agree to repair any damages caused by this work, and to restore your basement to essentially the way it was before we entered. Our contractors will also maintain insurance that would cover any accidents on the job. Finally, you are not responsible to pay for any of this work under any circumstances. The results will be sent to you via certified US mail.

If you have any health-related questions, please contact Jim Sullivan from NYSDOH at 518-402-5584.

Please sign the first attached paragraph below and return one of the two copies of this signed letter in the enclosed self-addressed stamped envelope so that this work can be scheduled. You can keep the other copy for your records. After we receive this letter back with your signature, we will call you at the number you provide below to schedule an appropriate day and time to schedule the sampling at your property. If you refuse to grant us access to perform this work, please sign the second attached paragraph below and send that page back to us in the enclosed envelope. Thank you for your cooperation.

Sincerely,

Jessica Proscia

Jessica Proscia
Senior Project Manager

As the property owner, I **agree** to allow Hillside 168 Inc. by their contractor CA RICH Geology Services, D.P.C. to enter my property located at 148-09 88th Ave, Jamaica, NY 11435to perform a vapor intrusion investigation requested by NYSDOH and NYSDEC under the terms and conditions in this letter agreement.

_____ _____
Property Owner Signature Telephone Number(s) to schedule appointment

_____ _____
Print Name Print Address

As the property owner, I **refuse** to allow Hillside 168 Inc. by their contractor CA RICH Geology Services, D.P.C. to enter my property located at 148-09 88th Ave, Jamaica, NY 11435to perform a vapor intrusion investigation requested by NYSDOH and NYSDEC under the terms and conditions in this letter agreement.

_____ _____
Property Owner Signature Telephone Number(s) to schedule appointment

_____ _____
Print Name Print Address

Enc. Summary of Vapor Intrusion Investigation Results
Tenant Notification Fact Sheet for Tetrachloroethene and Trichloroethene

cc: R. Alam, H. Dudek, NYSDEC
J. Sullivan, S. McLaughlin, NYSDOH

New York State Department of Health
Tenant Notification Fact Sheet for Tetrachloroethene (Perc)

This fact sheet is provided to fulfill New York State Department of Health (NYS DOH) requirements for preparation of generic fact sheets under Article 27 (Title 24, Section 27-2405) of the Environmental Conservation Law.

Tetrachloroethene (Perc)

Tetrachloroethene (also known as perchloroethylene or Perc) is a man-made volatile organic chemical that is widely used in the dry-cleaning of fabrics, including clothes, and in manufacturing other chemicals. It was also used for degreasing metal parts and in consumer products, including some paint and spot removers, water repellents, brake and wood cleaners, glues, and suede protectors.

Sources of Perc in Indoor Air

Household products containing Perc could be a possible source for Perc in indoor air. Perc also may evaporate from dry-cleaned clothes or dry-cleaning operations into indoor air. Another source could be evaporation from contaminated well water that is used for household purposes. Perc may also enter homes through soil vapor intrusion, which occurs when the chemical evaporates from groundwater, enters soil vapor (air spaces between soil particles), and migrates through building foundations into the building's indoor air. Perc has also been found at low concentrations in outdoor air.

Levels Typically Found in Air

The NYS DOH reviewed and compiled information from studies in New York State as well as from homes and office buildings across the United States on typical levels of Perc in indoor and outdoor air. Levels of Perc in the indoor air of homes and office settings and in outdoor air are expected to be below 10 micrograms per cubic meter (mcg/m^3).

Health Risks Associated with Exposure

An association exists between exposure of people in the workplace to high levels of Perc in air and certain forms of cancer. Perc causes cancer in laboratory animals exposed to high levels over their lifetimes. Overall, the studies of humans and in animals do not prove that Perc causes cancer in people, but are highly suggestive that there may be an increased risk for cancer in people who are exposed to Perc (particularly at high concentrations) over long periods of time

People exposed to high levels of Perc in air had nervous system effects and slight changes to their liver and kidneys. Some studies show a slightly increased risk for some types of reproductive effects among workers (including dry-cleaning workers) exposed to Perc and other chemicals. The reproductive effects associated with exposure included increased risks for spontaneous abortion, menstrual and sperm disorders, and reduced fertility. The data suggest, but do not prove, that the effects were caused by Perc and not by some other factor or factors. Exposure to high levels of Perc has caused liver and kidney damage in laboratory animals and effects on the nervous system. Taken together, the human and animal studies indicate that human exposure to high levels of Perc causes effects on the nervous system, and suggest that human exposure to high levels of Perc may increase the risk for liver and kidney toxicity.

NYS DOH Air Guideline

The NYS DOH guideline for Perc in air is 30 mcg/m^3. This level is lower than the levels that have caused health effects in animals and humans. The guideline is based on the assumption that people

are continuously exposed to Perc in air all day, every day for as long as a lifetime. This is rarely true for most people who, if exposed, are likely to be exposed for only part of the day and part of their lifetime. In setting this level, the NYS DOH also considered the possibility that certain members of the population (infants, children, the elderly, and those with pre-existing health conditions) may be especially sensitive to the effects of Perc.

The purpose of the guideline is to help guide decisions about the nature of the efforts to reduce Perc exposure. Reasonable and practical actions should be taken to reduce Perc exposure when indoor air levels are above those typically found in indoor air, even when they are below the guideline of 30 mcg/m^3. The urgency to take actions increases as indoor air levels increase, especially when air levels are above the guideline. The NYS DOH recommends taking immediate action to reduce exposure when an air level is ten times or more higher than the guideline (that is, when the air level is 300 mcg/m^3 or higher).

Ways to Limit Exposure to Perc in Indoor Air

In all cases, the specific actions to limit exposure to Perc in indoor air depend on a case-by-case evaluation of the situation. Removing household sources of Perc and maintaining adequate ventilation will usually help reduce indoor air levels of the chemical. A sub-slab depressurization system can reduce the amount of Perc entering indoor air by soil vapor intrusion. Use of an activated carbon filter on the water supply can reduce the amount of the chemical in contaminated well water that could evaporate into indoor air.

Reportable Detection Level

The reportable detection level for a chemical can vary depending on the analytical method used, the laboratory performing the analysis, and several other factors. Most laboratories that use the analytical methods recommended by the NYS DOH for measuring Perc in air (and approved by the National Environmental Laboratory Accreditation Conference or New York State's Environmental Laboratory Approval Program) can routinely detect the chemical at concentrations below 1 mcg/m^3.

Additional Information

Additional information on Perc, ways to reduce exposure, indoor air contamination resulting from soil vapor intrusion, indoor and outdoor air levels and the Environmental Conservation Law can be found on the NYS DOH website at www.health.state.ny.us/environmental/indoors/air/contaminants.

If you have further questions about Perc and the information in this fact sheet, please call the NYS DOH at 1-518-402-7800 or 1-800-458-1158 (extension 2-7800), e-mail to **ceheduc@health.state.ny.us**, or write to the following address:

New York State Department of Health
Center for Environmental Health
Outreach and Education Group
Empire State Plaza-Corning Tower, Room 1642
Albany, New York 12237

New York State Department of Health
December, 2013

New York State Department of Health
Tenant Notification Fact Sheet for Trichloroethene (TCE)

This fact sheet is provided to fulfill New York State Department of Health (NYSDOH) requirements for preparation of generic fact sheets under Article 27 (Title 24, Section 27-2405) of the Environmental Conservation Law.

Trichloroethene (TCE)

Trichloroethene (also known as trichloroethylene or TCE) is a human-made chemical. It is volatile, meaning it readily evaporates at room temperature into the air, where you can sometimes smell it. It is used as a solvent to remove grease from metal, a paint stripper, an adhesive solvent, an ingredient in paints and varnishes, and in the manufacture of other chemicals and products (for example, furniture and electric/electronic equipment).

Exposure to TCE

People may be exposed to TCE in air, water, and food, or when TCE or material containing TCE (for example, soil) gets on the skin. For most people, almost all TCE exposure is from indoor air.

Sources of TCE in Air

TCE may get into indoor air when TCE-containing products (for example, glues, adhesives, paint removers, spot removers, and metal cleaners) are used. Another source could be evaporation from contaminated well water that is used for household purposes. TCE may enter homes through soil vapor intrusion, which occurs when TCE evaporates from contaminated groundwater, enters soil vapor (air spaces between soil particles), and migrates through cracks or other openings in the foundation and into the building. TCE gets into outdoor air when it is released from industrial facilities and when it evaporates from areas where chemical wastes are stored or disposed.

Levels Typically Found in Air

The background indoor air levels of TCE in homes and office buildings not near known environmental sources of TCE are almost always 1 microgram per cubic meter of air (1 mcg/m^3) or less. Background outdoor air levels also are almost always 1 mcg/m^3 or less.

Health Risks Associated with Exposure to TCE

Most people, if exposed to TCE, are exposed to air levels much lower than those known to cause health effects in humans (for example, workplace air levels 90,000 to 800,000 mcg/m^3). TCE exposure can cause effects on the central nervous system, liver, kidneys, and immune system of humans. TCE exposure is associated with reproductive effects in men and women, and may affect fetal development during pregnancy. However, the studies suggest, but do not prove, that the reproductive and developmental effects were caused by TCE, and not by some other factor. The United States Environmental Protection Agency (USEPA) classifies TCE as a chemical that causes cancer in humans by all routes of exposure. Whether a person experiences a

health effect depends on how much of the chemical he or she is exposed to, how often the exposure occurs, and how long the exposures last. Individual characteristics such as age, health, lifestyle, and genetics also play a role.

NYSDOH Air Guideline

NYSDOH recommends that TCE levels in air not exceed 2 mcg/m^3. This replaces the previous guideline of 5 mcg/m^3. The guideline was set at an air level that is lower than levels known to cause, or suspected of causing, health effects in humans, including sensitive populations (for example, children, pregnant women) and animals. The guideline is based on the assumption that people are continuously exposed to TCE in air all day, every day for months or as long as a lifetime. Continuous exposure is rarely true for most people, who, if exposed, are more likely to be exposed for a part of the day, part of a week, or part of their lifetime.

The guideline is used to help guide decisions regarding the urgency of efforts to reduce TCE exposure. At TCE air levels above the guideline, the higher the level, the greater the urgency to take action to reduce exposure. But as with any chemical in indoor air, the NYSDOH always recommends taking action to reduce exposure when the air concentration of a chemical is above background, even if it is below the guideline.

Indoor air concentrations substantially above the guideline clearly indicate a significant TCE source and the need for action to reduce exposure. In particular, NYSDOH has concerns about exposure during pregnancy, particularly during the first trimester, to air concentrations higher than 20 mcg/m^3 because the major steps of heart development occur during this period and TCE may be a risk factor for fetal heart defects in humans. Thus, NYSDOH recommends taking immediate and effective action to reduce exposure when an air concentration is equal to, or above 20 mcg/m^3.

Ways to Limit Exposure to TCE in Indoor Air

In all cases, the specific recommended actions to limit exposure to TCE in indoor air depend on a case-by-case evaluation of the situation. Removing household sources of TCE and maintaining adequate ventilation will usually help reduce indoor air levels of the chemical. A sub-slab depressurization system can reduce the amount of TCE entering indoor air by soil vapor intrusion. Use of an activated carbon filter on the water supply can reduce the amount of the chemical in contaminated well water that evaporates into indoor air.

Concerns about Exposure to TCE

Most people, if exposed to TCE, are exposed to air levels much lower than those known to cause health effects in humans. However, if you are concerned that you, your children, or others have been exposed to TCE, discuss your symptoms/signs with your health care provider. There are special tests to measure TCE and related chemicals in your blood, breath, or urine, and your health care provider can compare the results to those of people without known exposure to TCE or to workers with high exposure to TCE.

Reportable Detection Level

The reportable detection level for a chemical can vary depending on the analytical method used, the laboratory performing the analysis, and several other factors. Most laboratories that use the analytical methods

recommended by the NYSDOH for measuring TCE in air (and approved by the National Environmental Laboratory Accreditation Conference or New York State's Environmental Laboratory Approval Program) can routinely detect the chemical at levels below 1 mcg/m^3.

Additional Information

Additional information on TCE, ways to reduce exposure, indoor air contamination resulting from soil vapor intrusion, indoor and outdoor air levels and the Environmental Conservation Law can be found on the NYSDOH website at www.health.state.ny.us/environmental/indoors/air/contaminants/.

If you have further questions about TCE and the information in this fact sheet, please call the NYSDOH at 1-518-402-7800 or 1-800-458-1158, e-mail to ceheduc@health.state.ny.us, or write to the following address:

New York State Department of Health
Center for Environmental Health
Outreach and Education Group
Empire State Plaza-Corning Tower, Room 1642
Albany, New York 12237

Updated August 2015

APPENDIX B

QAPP

QUALITY ASSURANCE PROJECT PLAN

148-26 Hillside Avenue
QUEENS, NEW YORK
Block 9694, Lot 417

NYSDEC BCP No.
C241199

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Revised November 2023

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1.0 INTRODUCTION

CA RICH Geology Services, D.P.C. (CA RICH) has prepared this Quality Assurance Project Plan (QAPP) for site activities to be undertaken at the property located at 148-28 Hillside Avenue Queens, New York (the site). 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:

- 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

1.1 Project Scopes and Goals

Investigations to date have consisted of shallow soil, soil vapor, and indoor air sampling at the Site. The proposed project scope is to perform a comprehensive investigation of on and offsite soil, soil vapor, and groundwater quality. The project goal is to fully evaluate the nature and extent of contamination from the Site.

1.2 Clean-up Criteria

Soil quality data will be compared to NYSDEC Part 375-6.8(a) Unrestricted Used Soil Cleanup Objectives, Part 375-6.8(b) Protection of Groundwater for applicable compounds, Restricted Commercial Use Soil Cleanup Objectives (SCOs). Groundwater quality data will be compared to NYSDEC Part 703 Groundwater Quality Standards (Class GA) or Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards. Soil vapor quality data will be compared to NYSDOH soil vapor screening levels contained in Matrix A, B and C of the NYSDOH Guidance and Indoor Air Guidelines. A site map depicting sampling

locations is attached below.

2.0 PROJECT ORGANIZATION AND PERSONNEL RESPONSIBILITIES

The investigative efforts defined in the RIWP will be coordinated by CA RICH on behalf of the NYSDEC. The NYSDEC is the lead regulatory agency overseeing the investigation 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, Rafi Alam,** will be responsible for reviewing and approving work plans and amendments, coordinating approval of requested modifications, and providing guidance on regulatory requirements.

The **Environmental Contractor Project Director, Jessica Proscia of CA RICH,** 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 project with the NYSDEC. The Project Director will act as the project's Quality Assurance Manager.

The **Environmental Contractor Project Manager, Karen Tyll of Tyll Engineering and Consulting PC,** will be responsible for the day to day project management, task leadership, and project engineering support and for the planning and implementation of RIWP activities. The Project Manager will be responsible for ensuring that the requirements of the RIWP are implemented. The project manager will also act as the site Health and Safety Manager (HSM).

The **Environmental Contractor Quality Assurance Officer, Jason Cooper of CA RICH,** will be responsible for quality assurance and quality control for sampling and laboratory performance.

The **Environmental Contractor Field Team Leader, Thomas Brown of CA RICH,** 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, **Alpha Analytical Laboratories, Inc.** (NYSDOH # 11148**),** will be contracted to perform required analyses and reporting, including Analytical Services Protocol (ASP) Category B Deliverables, which will allow for data validation.

NYSDEC ASP Category B Data Deliverables will be submitted for all of the samples representing the final delineation of the nature and extent of contamination for a remedial investigation. Data validation packages and Data Usability Summary Reports (DUSRs) will be provided in the RIR to support the remedial investigation. The DUSRs for this project will be prepared by L.A.B. Validation Corp. and qualifications for preparing the DUSR report is provided in Appendix E.

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

3.0 QUALITY ASSURANCE PROJECT OBJECTIVES

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

3.1 Data Quality Categories

Data quality objectives (DQO) are qualitative and quantitative statements that specify the quality of the data required to support decisions during remedial and monitoring activities. DQOs composed of written expectations for precision, accuracy, representativeness, completeness and comparability of a data set (see Section 3.2). 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. One descriptive data categories - definitive data - will be used for the site.

Definitive data is 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.

3.2 QA/QC Characteristics

The overall QA/QC objective for RIWP 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:

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 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.

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 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 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 100 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 Section 6.0 for analysis methods and detection limits for this RIWP activities.

4.0 SITE MONITORING ACTIVITIES

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 RIWP.

4.1 Soil Sampling

Soil samples will be collected continuously from grade to the water table surface. Soil samples will be collected in either four or five-foot increments in dedicated acetate liners contained within a Geoprobe Macrocore sampler and screened utilizing a Photoionization Detector (PID). Soil recovered from each macro core sampler will be visually characterized for color, texture, and moisture content and screened with a photoionization detector (PID). The presence of visible staining and elevated PID readings will be noted. Soil samples will be collected for laboratory analysis as prescribed in Section 3.2 of the RIWP.

4.2 Sub-slab Soil Vapor Sampling

Sub-slab soil vapor sample will be collected utilizing dedicated Teflon tubing implanted within 6 inches of the base of the basement slab and backed with coarse sand. A 6-Liter stainless steel Summa canister with a flow regulator set to collect an entire sample in 4 to 6 hours will be connected to the other end of Teflon tubing. Once the canister is in place, the flow regulator will be opened and sampling will continue until the canister is full. Soil vapor samples will be transmitted under chain of custody to ELAP-certified laboratory.

All samples will be analyzed for VOCs in accordance with USEPA Method TO-15.

4.3 Groundwater Sampling

Groundwater samples will be collected from cased monitoring wells no sooner than two weeks following well development. The depth to water elevation will be measured with an electronic conductivity meter. Dedicated polyethylene tubing will be inserted within the casing of the monitoring well. A peristaltic pump will be utilized to purge and sample the groundwater well. Groundwater samples will be collected utilizing low-flow techniques in accordance with USEPA guidance for Low-Stress (Low-Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells (EPASOP-GW4, Revised 9/19/17).

The groundwater samples will be placed into laboratory supplied sampling containers. Nitric

acid will be utilized as a preservative for total Metals. The samples will be placed in a chilled cooler pending refrigeration. A courier will be utilized to transport the samples to the designated analytical laboratory. Proper chain of custody documentation will accompany the samples.

Following sample collection, boreholes not converted into monitoring wells will be backfilled with soil cuttings, if appropriate and an upper bentonite seal and capped with concrete. Contaminated soil cuttings will be placed in sealed and labeled DOT approved 55-gallon drums pending off-site disposal at a permitted facility.

4.4 Indoor and Outdoor Air Sampling

Indoor air samples will be collected by placing 6-Liter stainless steel Summa canisters on surfaces approximately 3 feet above the floor. Each Summa canister will be equipped with a flow regulator set to a flow rate of approximately 0.0125 liters per minute. The canisters will be opened to initiate sampling, which will continue for approximately 8 hours until the canisters are almost full and the regulators are closed.

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., vacuum pressure, flow rate) 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 should be specifically designated for unique identification. Samples should 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 should be recorded in the field logbook, chain of custody as well as the sample label.

Letter code prefixes for RIWP activities are as follows:

SB	Delineation 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 and Packaging

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 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 and Packaging 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.

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

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 ACT 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.

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.

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).

7.1 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. 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.

7.2 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.

7.3 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

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 5.1.

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. 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 identically to the associated environmental samples. Due to the lack of VOC impact identified at the site, it is not anticipated that trip blanks will be necessary during the final soil sampling.

8.1.3 Temperature Blanks

A temperature blank will be sent with each cooler of samples to be analyzed for VOCs 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 "NYSDEC 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 solid that is processed through the entire sample procedure the same as an environmental sample.

8.2.2 Laboratory Control Samples

A laboratory control sample (LCS) consists of an analyte- solid phase sample that is spiked with target analytes at a known concentration. The LCS shall be analyzed 1 per 20 samples 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. MS/MSD will be collected on groundwater and soil samples at a rate of 1 per 20 samples per matrix.

8.2.3 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.

8.2.4 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.

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 generally be calibrated in the field to factory specifications. Monitoring equipment will be calibrated following manufacturers recommended schedules. Daily field response checks and calibrations will be performed as necessary 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 is 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, 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 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.

10.1 Data Reduction

10.1.1 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.

10.1.2 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 Analytical Sampling Protocol (ASP) forms or equivalents and reported with Category B (ASP-B) deliverables and include the dates the samples were received and analyzed, and the actual methodology used with the exception of interim sampling in which data will be reported in Category A (ASP-A) format.

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.

10.1.3 Project Data Reduction

Following receipt of the laboratory analytical results by Advanced Cleanup Technologies, Inc., 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.

10.2 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.

10.2.1 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 data deliverable requirements as applicable to the method utilized.

All data should be provided to NYSDEC in draft form prior to being validated by a third party data validator namely L.A.B. Validation Corp. and qualifications for preparing the DUSR report is provided in Appendix F. The data validation report should be included in the PRR.

10.2.2 Data Usability and Validation Methods

If deemed necessary by NYSDEC, a data usability evaluation for the data collected during the RIWP and a data usability summary report (DUSR) will be prepared. The DUSR will be prepared in accordance with USEPA National Function Guidelines for Organic Superfund Methods Data Review, January 2017 (EPA-540-R-2017-002); USEPA National Function Guidelines for Inorganic Superfund Methods Data Review, January 2017 (EPA-540-R-2017-002); and USEPA Region 2 SOPs.

11.0 CORRECTIVE ACTION

Review and implementation of systems and procedures may result in recommendations for corrective action. Any deviations from the specified procedures within approved RIWP due to unexpected site-specific conditions shall warrant corrective action. All errors, deficiencies, or other problems shall be brought to the immediate attention of Jason Stewart of ACT, who in turn shall contact the Quality Assurance/Data Quality Manager or her designee.

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 SI monitoring program will be documented in field logs/sheets and Karen Tyll of Tyll Engineering and Consulting PC will be advised.

If any problems occur with the laboratory or analyses, the laboratory must immediately notify Karen Tyll of Tyll Engineering and Consulting PC , who will consult with CA RICH 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. Karen Tyll of Tyll Engineering and Consulting PC shall be responsible for controlling, tracking, implementing and distributing identified changes.