



**Associated
Environmental
Services, Ltd.**

**SUPPLEMENTAL REMEDIAL INVESTIGATION
WORK PLAN**

**3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK**

NYSDEC SPILL NO. 0710622

EDOCs

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1.0 INTRODUCTION

Associated Environmental Services, Ltd. (AES) respectfully submits this Supplemental Remedial Investigation Work Plan (Work Plan) for the property located at 3140 Coney Island Avenue in Brooklyn, New York (hereinafter referred to as the subject property). The subject property location is depicted on Figure 1.0. The supplemental remedial investigation will be conducted to address the requirements by the New York State Department of Environmental Conservation (NYSDEC) under Spill No. 0710622 relating to contaminant impacts from the former Brighton Cleaners dry cleaning operations at the subject property. The investigation will be conducted to acquire additional data as recommended in the AES February 12, 2010 Remedial Investigation Report (RIR) and subsequent comments by the NYSDEC via the April 22, 2010 electronic mail from NYSDEC Case Manager Jennifer Kann to AES Principal John Schretzmayer. The proposed work will determine the current groundwater quality and flow, and evaluate the potential for soil vapor intrusion within the adjacent residential building basement. The following Work Plan provides a brief description of the site history, the methods and procedures to be utilized to collect groundwater and soil vapor data, conduct laboratory analysis, and evaluate the resultant data to determine the environmental conditions at the subject property.

2.0 SITE BACKGROUND

The following section provides a description of the subject property and summarizes the previous investigations. A site plan of the property is provided on Figure 2.0.

2.1 Site Description

The subject property is located at 3140 Coney Island Avenue, Brooklyn, New York. The subject property is identified on the property tax map as Block 8678 and Lot 64. The subject property is located on the west side of Coney Island Avenue approximately 150 feet south of Ocean View Avenue and is bound by multi-family residential buildings to the north and south, and a vacant, dilapidated single-family residence to the west. The property is currently vacant but was formerly improved with a one-story commercial building which had a basement occupying the entire front of the property. A small metal shed was formerly located in the southwestern corner of the lot. An out-of-service 500-gallon underground storage tank (UST) is located in the northwestern corner of the property.

The building was formerly occupied by Brighton Cleaners and was reportedly utilized as a dry cleaning facility for at least 30 years. The building and metal shed were raised in 2009 in preparation for the redevelopment of the subject property as medical offices. The UST was placed out-of-service, but has not yet been removed pending the resolution of remedial measures for the subject property.

The subject property is located within the Pavement & buildings-Hooksan-Verrazano complex, 0 to 8 percent slopes, which is described as "nearly level to gently sloping urbanized areas of sandy sediments that have been substantially cut and filled mostly for residential use; a mixture of sandy soils and loamy-capped anthropogenic soils, with up to 80 percent impervious pavement and buildings covering the surface; located along the southern shorelines of Brooklyn and Queens." Groundwater beneath the subject property is encountered at approximately 10 feet below grade (bg) and is characterized as Class GA indicating it as a potential source of potable water. Based on regional data, groundwater flow is to the south. Groundwater is not utilized as a source of potable water at the subject property.

2.2 Previous Investigations

On September 28, 2007, a Phase II Subsurface Investigation was conducted to evaluate the recognized environmental concerns (RECs) associated with the former dry cleaning operations. The Phase II Subsurface Investigation consisted of drilling seven soil borings which were used to collect soil and groundwater samples.

Apparent petroleum staining and odor were noted in the soil samples collected from borings in the vicinity of the UST. A photo-ionization detector (PID) was used to screen the soil samples and elevated PID readings were detected in several of the soil samples. The results of laboratory analysis of these samples detected concentrations of semi-volatile organic compounds (SVOCs) above the NYSDEC Recommended Soil Cleanup Objectives (RSCOs). Additionally, the analysis of groundwater samples detected concentrations of volatile organic compounds (VOCs) above the NYSDEC Ambient Water Quality Standards and Guidance Values (Water Quality Values) provided in the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1.

Based on the results of the Phase II Subsurface Investigation, the NYSDEC was notified and Spill Number 0710622 was assigned to the subject property regarding the petroleum-impacted soil in the vicinity of the UST. The spill was closed but subsequently re-opened due to the concern for the impacted soil and groundwater associated with the former dry cleaning operations.

A Remedial Investigation was conducted in January 2010 to delineate the apparent impacts from the former dry cleaner operations. The Remedial Investigation collected soil and groundwater samples for laboratory analysis to determine the severity and extent of VOC impacts at the subject property. Soil samples were collected from nine soil borings drilled within and adjacent to the former location of the metal shed. The sample interval from each boring that exhibited the greatest likelihood of contamination (i.e., strong odors, heavy staining or elevated PID readings) was submitted for analysis. Groundwater samples were also collected from 11 locations within and adjacent to the subject property using screened sampling points. Whereas the VOCs associated with dry cleaning operations are more dense than water, groundwater samples were also collected from four depth intervals, 10 to 14 feet bg, 21 to 25 feet bg, 33 to 37 feet bg, and 48 to 52 feet bg.

Soil sample data collected from the subject property indicates that soil in the western portion of the subject property has been impacted by VOC concentrations in exceedance of the 6NYCRR Part 375 Table 375-6.8(a) UUSCOs. The primary impacts consist of elevated concentrations of tetrachloroethene (PCE) and its degradation byproducts; trichloroethene (TCE), cis-1,2-dichloroethene (c-1,2-DCE), and trans-1,2-dichloroethene (t-1,2-DCE). Similarly, groundwater data from beneath the subject property also indicates contaminant concentrations of PCE, TCE, c-1,2-DCE, t-1,2-DCE, vinyl chloride (VC) and 1,1-dichloroethene (1,1-DCE) are present in the shallow water table aquifer. The VOC impacts were detected in groundwater at deeper depths within the water table aquifer, however, the bulk of the contamination appears to be limited to above 25 feet bg.

The Remedial Investigation concluded that the contaminant impacts in both soil and groundwater appear focused around the former location of the metal storage shed in the southwestern portion of the subject property and extending northward to the UST area. The impacted soil appears limited to the area west of the former main building location. Groundwater impacts are primarily limited to the subject property with only slight exceedance of the Water Quality Values beneath the adjacent property to the south. The detection of various degradation byproducts in the soil and groundwater indicate the contamination is stagnant and is undergoing natural attenuation.



3.0 METHODOLOGY

The Supplemental Remedial Investigation will be conducted to characterize groundwater quality and flow and the determine the potential for soil vapor intrusion to adversely impacted indoor air quality in the adjacent residential building in compliance with the NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation. All field activities will be recorded on the appropriate field logs.

In this scope of work, the groundwater characterization will be limited to onsite and will quantify groundwater impacts in the apparent source area where the metal shed was formerly located and determine groundwater flow direction in order to assess potential plume migration. Onsite soil vapor testing is not proposed during this Supplemental Remedial Investigation as the current site conditions (i.e., no building or pavement over the surface of the subject property and known soil contamination) would not provide an accurate assessment of future conditions following the proposed remediation and redevelopment at the subject property. Onsite soil vapor evaluation and mitigation will be conducted following the remediation of contaminated soil. The following section describes the procedures and protocols proposed to conduct the Supplemental Remedial Investigation.

3.1 Groundwater Monitoring Wells

Three monitoring wells will be installed at the subject property. One well will be installed in the former area of the metal shed, one well will be installed adjacent to the out-of-service UST, and one well will be installed in the southeastern portion of the subject property. The locations of the proposed monitoring wells are shown on Figure 2. Based on regional groundwater flow data, the location of the monitoring wells will provide groundwater quality data immediately beneath the potential source of groundwater impacts, confirm on-site groundwater flow direction, and evaluate possible downgradient plume migration, if any. The monitoring well drilling and installation procedures are described below.

3.1.1 Monitoring Well Installation

The wells will be constructed of two-inch diameter, schedule 40 PVC with American Society of Testing Materials (ASTM) F-480 pipe threading and 10 feet of two-inch diameter, 0.010-inch (10 slot) PVC well screen. Solvent glue will not be used in assembling the well screen or riser casing. The well will be constructed so that approximately two feet of well screen will be installed above the water table with eight feet of screen below the water table.

The depth to water at the site is approximately 10 feet bg. The water-level in the borehole will be measured periodically during drilling and immediately before construction of the well. The borehole will be drilled to at least 10 feet below the depth of the static water table, and the depth of the borehole will be measured with a weighted tape just prior to well construction to determine if there has been any borehole collapse. The well casing and screen will be constructed of new materials which will be stored and assembled on clean plastic sheeting. Once the well is inserted into the borehole, the annulus

between the well casing and the borehole will be completed with sand pack, a bentonite seal, and backfilled to grade.

The sand pack (Morie No. 1 sand) will be emplaced so that it extends to a minimum depth of six inches below the bottom of the screen and a minimum depth of two feet above the top of the well screen. The depth to the top of the gravel pack will be confirmed by measuring down the annular space between the well casing and the borehole with a weighted tape. If heaving sands are encountered, the well will be pressurized and an upward flow of potable water will be maintained in the annular space to facilitate well installation. If difficulties are encountered during placement of the sand pack, then the sand may be tamped with a small diameter (two-inch) rod.

A bentonite seal (minimum of two feet) will be emplaced above the sand pack. The top of the bentonite seal will be measured with a weighted tape and hydrated with potable water prior to backfilling. A protective steel casing with locking cap will be installed after completion of the well, and the land will be graded so there is a gentle slope away from the well.

After the wells are installed and developed, an automatic laser level will be used to determine the elevation of the top of well casing to within 0.01 foot relative to an arbitrary site datum of 100 feet. The top of the well casing will be marked using an indelible ink marker to note the measuring point from which to collect water-level measurements within the well. The depth to water will be measured to the nearest 0.01 foot using a Solinst electronic oil/water interface probe and the readings subsequently recorded on the field log. The water table elevation will be then determined by subtracting the depth to water from the measuring point elevation.

3.1.2 Well Development Procedures

The monitoring wells will be developed using a disposable polyethylene bailer. The bailer will be repeatedly lowered into the well and briefly actuated within well to surge and flush sediments from the well. The wells will be developed until the turbidity is below 50 NTUs to provide sediment-free water for sampling. Development water will be disposed in the manner described in the waste disposal section below.

3.1.3 Groundwater Sampling Procedures

This section describes the types of equipment and procedures that will be used to obtain groundwater samples from the three new monitoring wells installed at the subject property. At a minimum, sampling procedure standards and techniques will be in accordance with the United States Environmental Protection Agency (USEPA) guidance document EPA/540/S-95/504.

The wells will be sampled in order of least suspected contamination to most suspected contamination to minimize potential cross-contamination. After removing the well cap for sampling, a PID reading will

be obtained from the well casing and breathing zone and recorded on the Sampling Log. The depth to water in each well will be measured to the nearest hundredth of a foot using an electronic water-level indicator and recorded on the field log. To avoid cross contamination between wells, the immersed portion of the water-level indicator will be cleaned between measurements with a detergent solution, followed by a distilled water rinse.

Prior to sampling, the wells will be purged using the low-flow sampling technique to remove standing water in each well. A variable-speed two-inch diameter submersible pump and dedicated polyethylene tubing will be used to purge the wells at a pumping rate no greater than one liter per minute (LPM). While purging the well, field parameters including pH, temperature, specific conductivity, dissolved oxygen, oxidation/reduction potential, and turbidity will be monitored at five-minute intervals using field calibrated Horiba U-52 portable meter within a flow-through cell. Each well will be purged when field parameters of the discharge water have stabilized (i.e., consecutive readings within 10 percent). Once the well is purged, the pumping rate will be slowly lowered to approximately 0.1 LPM to ensure that the groundwater sample is not agitated. The purged water will be disposed of in the manner described in the waste disposal section of this Work Plan.

New disposable surgical gloves will be worn during sample collection. Water from the pump discharge will be used to fill the sample bottles using care not aerate the sample. The VOC containers will be filled and capped, so that no headspace or air bubbles are present. In addition, overflowing bottles will be avoided to prevent the loss of floating substances or preservatives which may have already been added to the bottle. All sample bottle caps will be secured snugly, but not over-tightened.

Sample bottles will be packed on ice to maintain a temperature of approximately 4° Celsius. The samples will be submitted to Alpha Analytical, a New York State Department of Health (NYSDOH)-Environmental Laboratory Approval Program (ELAP)-certified laboratory located in Westborough, Massachusetts, for analysis.

The groundwater samples will be submitted for analysis of Target Compound List (TCL) VOCs using USEPA Method 8260. The analytical results will be provided as a New York Analytical Services Protocol (ASP) Category B data package. The analytical results will be compared to the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.

3.2 Sub-Slab Soil Vapor/Ambient Air Sampling

The issue of soil vapors migrating into and impacting the indoor air quality of a building has recently been identified by the NYSDEC and New York Department of Health (NYSDOH). The NYSDOH has issued a guidance document entitled *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* issued in October of 2006 (hereinafter, the NYSDOH Guidance Document).

The former site use as a dry cleaner has resulted in soil impacted by VOCs. In an attempt to evaluate whether VOC-impacted soil underlying the subject property presents a concern for soil vapor intrusion, sub-slab soil vapor sampling will be conducted beneath the poured concrete slab within the basement of the adjacent building located at 3142 Coney Island Avenue. The data will determine whether VOCs are present in the sub-slab soil vapor, and if they are migrating into the indoor air of the building. The location of the proposed sub-slab soil vapor sampling is provided on Figure 2.

The sub-slab soil vapor sampling point will be installed using hand-held power tools. The soil vapor point will consist of one-quarter inch polyethylene tubing set no greater than two inches beneath the bottom of the concrete floor slab. The annular space surrounding the tubing will be filled with washed #1 crushed stone as a filter pack. Modeling clay will be installed atop of the filter pack to prevent atmospheric air infiltration.

As a quality assurance/quality control (QA/QC) measure, helium will be introduced into a closed/sealed space surrounding the sampling tube as a tracer gas to confirm the integrity of the sample point seal to ensure that no atmospheric air intrusion affects the sub-slab soil vapor sample (e.g., no "short circuiting" occurs). A sealed space around the sampling tube will be formed utilizing an inverted container placed over the area where the sampling tubing exits the floor. The polyethylene sampling tubing will be run through an air-tight fitting installed on the top of the container and separate polyethylene tubing will be run from the helium supply through another air-tight fitting on the side of the container. While helium is introduced into the sealed container, a portable helium detector will be attached to the sub-slab sampling tubing to check for possible leaks in the floor seal. If helium is detected, the sub-slab sample point will be resealed and the QA/QC measure repeated until helium is not detected within the sub-slab sample point.

Once the QA/QC measure is completed, the sub-slab soil vapor sampling point will be purged using a PID to provide a preliminary screening of VOC in the sub-slab soil vapor. A laboratory-supplied vacuum Summa canister will be connected to the polyethylene tubing subsequent to the purging and the samples will be collected over a two hours using a flow regulator calibrated by the laboratory. Additionally, indoor and outdoor air quality samples will be collected concurrently and over the same duration as the sub-slab soil vapor samples. The indoor air and outdoor air samples will be collected using laboratory-supplied Summa canisters set atop three-foot tall stands in order to represent the air quality within the typical breathing zone (between three and five feet above grade, as required in the NYSDOH Guidance Document). The samples will be collected to establish indoor

and outdoor air ambient conditions at the subject property.

AES personnel will conduct an inspection of the basement to evaluate chemical use within the building. Labels would be reviewed to determine the chemical nature of various products including, but not limited to, cleaners, lubricants, glues/adhesives, paints, pool chemicals, etc. The data would be compared to the indoor air analytical data to determine if onsite chemical use has deleteriously impacted the indoor air quality of the building.

The sub-slab vapor and air samples will be analyzed for VOCs using USEPA Method TO-15. The analytical results will be provided as a New York ASP Category B data package. The analytical results will be compared to the NYSDOH Guidance Document decision matrices provided therein.

3.3 Waste Disposal

Drill cuttings from the monitoring well drilling activities will be placed on and covered with plastic sheeting pending disposal. The staged drill cuttings will be removed for disposal as part of the overall site remediation activities described below. Groundwater from well development and sampling activities will be containerized into US DOT-approved 55-gallon drums, labeled and stored in a staging area at the subject property. Soiled personal protective equipment, disposable sampling equipment, and supplies will be placed into US DOT-approved, 55-gallon drum and also placed in the staging area. The drums containing these materials will be labeled to identify their respective contents.

3.4 Quality Assurance

The following quality assurance measures will be conducted during the Supplemental Remedial Investigation. These measures will be conducted to provide accurate, representative data in the characterization of environmental conditions at the subject property.

3.4.1 Instrument Calibration

The field instruments used to field screen the groundwater parameters and soil vapor will be calibrated daily prior to the start of the sampling activities. The calibration and operation of the field instruments will be within manufacturer's recommendations during the Supplemental Remedial Investigation.

3.4.2 Decontamination Procedures

In order to ensure sample integrity and reduce the risk of cross-contamination, all non-disposable sampling equipment will be decontaminated before and after each use. The equipment will be washed with a detergent and water solution to remove all residual materials, rinsed with potable water, and then allowed to air dry. All disposable materials, such as the groundwater and soil vapor sampling tubing will be used new and then discarded after a single use.

3.4.3 Chain-of-Custody Protocol

The soil and groundwater samples submitted for laboratory analysis will be recorded on a chain-of-custody form. The chain-of-custody form includes information such as the site location, the sample date, the time of sample collection, the required analysis, preservatives utilized, sample designation, and the name and signature of the person who conducted the sampling. Finally, the chain-of-custody will be signed by the laboratory representative who received the samples for analysis. Completed copies of the chain-of-custody forms will be provided as attachment to the laboratory data packages.

3.5 Data Evaluation and Report Preparation

Upon receipt of the analytical data, a report will be prepared detailing the results of the investigation. The report will include a site plan figure depicting sampling locations and groundwater flow, summary data tables, site photographs and applicable appendices. The report will provide recommendations for additional site investigation to delineate contamination, and identify appropriate mitigation and remediation measures, as needed.

4.0 HEALTH AND SAFETY

The Supplemental Remedial Investigation will be conducted utilizing the following protocols and personal protective equipment (PPE). The worker's breathing zone will be monitored for VOCs using a photo-ionization detector (PID) to evaluate potential exposure to the contaminated media.

An AES Site Supervisor will be on-site to monitor the investigation activities, and ensure compliance with the protocols specified herein. Prior to the start of the field activities, the Site Supervisor will be responsible for the designation of the work zone, support zone, and clean zone. The work zone will be an area surrounding the immediate work being performed where the greatest potential hazards exist. Only the necessary workers required to perform the work will be permitted in this zone. A support zone will be established for the storage of equipment and personnel decontamination. A clean zone will be established for site control of visitors, equipment deliveries, and communications.

All air monitoring data will be documented on the field logs. Air monitoring instrument (i.e., PID) will be calibrated and maintained by the Site Supervisor in accordance with the manufacturer's specifications. The concentrations of contaminants (VOCs) shall be measured in employees' breathing zones several times during the task using the direct reading instrument. The specific frequency of the monitoring shall vary with monitoring performed more frequently during operations having a greater potential for exposure.

If VOCs concentrations are below 5 ppm above background, work activities can proceed as described above. If VOC levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area for a sustained period of 5 minutes, activities can resume provided VOC levels 200 feet from the work area are below 5 ppm over background. If VOC concentrations are above 25 ppm at the perimeter of the work area, activities must be shutdown pending re-evaluation and potential upgrade of the worker's PPE.

Based on the available site data, the investigation activities will be performed in Level D protection. However, should site conditions warrant, certain tasks of the investigation activities may be conducted in Level C protection. The following is a description of the personal protective equipment required for each level:

Level D:

- Hard hat.
- Disposable coveralls (optional).
- Steel-toe and shank, chemical-resistant boots.
- Chemical-resistant gloves.
- Hearing protection, NRR of 35 decibels (as necessary).

Level C:

- Full-face air purifying respirator equipped with HEPA filters.
- Hard hat.
- Disposable coveralls (optional).
- Steel-toe and shank, chemical-resistant boots.
- Chemical-resistant gloves.
- Hearing protection, NRR of 35 decibels (as necessary).

Disposable PPE will be properly bagged and disposed of. Employees will wash their hands and faces with detergent and water prior to eating or smoking. Smoking will not be permitted during work on site.

4.1 Safe Work Practices

- A copy of this Work Plan will be available for reference at the site during the planned field activities.
- The AES Site Supervisor will inform all workers of the potential physical and chemical site hazards. The Site Supervisor will be responsible for site access and control.
- Before any intrusive ground work begins, all underground utilities and structures must be checked and cleared.
- No eating, drinking, and smoking will be permitted in the work zone.
- No sources of ignition, such as matches or lighters, will be permitted in the work and support zones.
- The buddy system will be used in the work zone.

Any on-site person who becomes ill or injured must immediately notify the Site Supervisor. Should an emergency occur, the Site Supervisor will call 911 to summon help to the site. The Site Supervisor will inform any emergency personnel as to the nature of the work and provide available site data for their use, if requested.

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