

# **THE CROSSING AT JAMAICA STATION**

**QUEENS, NEW YORK**

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## **Interim Remedial Measure Work Plan**

**NYSDEC BCP Number: C241183**

**AKRF Project Number: 12146**

**Prepared for:**

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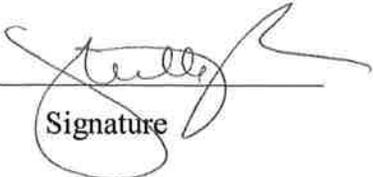
## APPENDICES

- Appendix A - Health and Safety Plan & Community Air Monitoring Plan
- Appendix B - Quality Assurance Project Plan

## CERTIFICATIONS

I, Michelle Lapin, certify that I am currently a NYS registered professional engineer and that this Interim Remedial Measures (IRM) 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).

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

073934-1                      12/2/16                      

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NYS Professional Engineer #                      Date                      Signature



It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

## 1.0 INTRODUCTION

This Interim Remedial Measure (IRM) Work Plan has been prepared by AKRF, Engineering, P.C. on behalf of CJ Plaza One LLC, which is the Volunteer in a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) for the site located at 147-22 Archer Avenue, in the Jamaica section of Queens, New York (BCP Site No. C241183) (the Site). The approximately 1.57-acre Site is currently vacant and is also identified as Block 9998, Lot 83. The Site location is shown on Figure 1.

The Volunteer entered into a May 12, 2016 Brownfield Cleanup Agreement (BCA) (BCA # C241183 04-16) with the NYSDEC. A Remedial Investigation (RI) was conducted in August and September 2016 to determine whether past uses had affected subsurface conditions. A Draft Remedial Investigation Report (RIR) was submitted to the NYSDEC in October 2016. The RI data identified the following:

### Soil

Several volatile organic compounds (VOCs), including acetone, benzene, carbon disulfide, ethylbenzene, methylene chloride, m/p-xylene, o-xylene, tetrachloroethene (PCE), toluene, and trichlorofluoromethane, were detected in 18 of the 28 soil samples analyzed. However, none exceeded the 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 Unrestricted Soil Cleanup Objectives (UUSCOs) or Restricted Residential Soil Cleanup Objectives (RRSCO).s).

Seven polycyclic aromatic hydrocarbons (PAHs), a class of semivolatile organic compounds (SVOCs) most commonly associated with fill materials, were detected in one or more soil samples above the UUSCOs, including: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene. Several PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene) also exceeded RRSCO.s in one or more samples collected within the upper two feet.

Metals were detected in all 28 soil samples analyzed with 7 metals (barium, cadmium, chromium, copper, lead, mercury, and/or zinc) exceeding UUSCO.s. Of these, lead exceeded the RRSCO of 400 parts per million (ppm) in 3 samples, with a maximum concentration of 1,570 ppm in SB-107 (0-2'), and barium was above the RRSCO of 400 ppm in one sample [SB-114 (0-2')] with a concentration of 454 ppm.

Three pesticides were detected above UUSCO.s (but well below RRSCO.s). Specifically, 4,4'-DDE was detected above its UUSCO of 0.0033 ppm in one soil sample [SB-103 (0-2')] at a concentration of 0.029 ppm and 4,4'-DDT was detected above the 0.0033 ppm UUSCO in samples SB-109 (0-2') and SB-110 (0-2'), with respective estimated concentrations of 0.0052 and 0.0046 ppm. Aldrin was detected above its UUSCO of 0.005 ppm in 3 soil samples at concentrations ranging from 0.0065 to 0.051 ppm. Polychlorinated biphenyls (PCBs) were not detected in any of the soil samples above laboratory detection limits.

### Soil Vapor

Tetrachloroethylene (PCE) was detected in 4 of the 7 samples at concentrations ranging from 83 to 350 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), above its New York State Department of Health (NYSDOH) Air Guideline Value (AGV) of 30  $\mu\text{g}/\text{m}^3$ . Additionally, 3 of these samples (SV-105, SV-109 and SV-110) also exceeded the NYSDOH matrix value of 100  $\mu\text{g}/\text{m}^3$  for PCE. Trichloroethene (TCE) was detected above its 2  $\mu\text{g}/\text{m}^3$  AGV and 5  $\mu\text{g}/\text{m}^3$  matrix value in one soil vapor sample (SV-105) at a concentration of 12  $\mu\text{g}/\text{m}^3$ .

### Groundwater

No VOCs were detected above Ambient Water Quality Standard (AWQS). Three PAHs [benzo(a)pyrene, benzo(k)fluoranthene, and/or indeno(1,2,3-cd)pyrene] were detected above AWQS in up to three samples.

Metals were detected in both the unfiltered (total) and filtered (dissolved) groundwater samples, with concentrations of sodium exceeding its AWQS of 20,000 parts per billion (ppb) in all 6 unfiltered groundwater samples and lead slightly exceeding its AWQS of 25 ppb in one groundwater sample (MW-108) at a concentration of 29.4 ppb. Sodium was also detected above the AWQS in the dissolved metals analysis. No PCBs or pesticides were detected in any of the groundwater samples analyzed.

The remedial investigations concluded that there is contaminated soil/soil vapor present at the Site that may be attributable to historical site uses, including automotive repair and fueling operations and manufacturing. The elevated levels of barium, lead and PAHs in shallow soil samples are most likely related to the observed fill material.

This IRM Work Plan has been prepared to address the potential for exposure by completing Site-wide removal of contaminated soil prior to redevelopment in accordance with the remedial objectives set forth in the November 2016 Remedial Action Work Plan (currently under review). The purpose of this Work Plan is to present the general guidelines and measures for soil removal as an interim remedial measure. The IRM Work Plan is based upon the findings presented in AKRF's Draft Remedial Investigation Report (RIR) submitted to the NYSDEC in October 2016, which included an assessment of the entire project area, and previous investigations conducted at the Site. The IRM Work Plan will be completed in accordance with the site specific Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP), which are included as Appendix A.

## **2.0 SITE DESCRIPTION AND HISTORY**

### **2.1 Site Description and Surrounding Land Use**

The approximately 1.57-acre Site is currently vacant and is also identified as Block 9998, Lot 83. A Site Location Map is provided as Figure 1. The Site is bounded by: Archer Avenue to the north, followed by commercial and industrial uses; a commercial building to the east; the Long Island Rail Road (LIRR) to the south; and Sutphin Boulevard to the west, followed by the LIRR. Properties in the surrounding areas are predominantly industrial and commercial, with some residential uses further north and south.

### **2.2 Site Geology, Hydrogeology and Subsurface Characteristics**

Topography is generally level. Based on reports compiled by the U.S. Geological Survey (Jamaica Quadrangle), the Site is approximately 49 feet above the mean sea level.

Soil observed during the RI consisted primarily of sand with varying amounts of gravel and silt. Fill was observed in the soil borings to varying depths up to approximately 13 feet below grade (fbg) and contained concrete, gravel, brick, and asphalt. The fill was underlain by apparent native sand, silt and gravel. Bedrock was not encountered in any of the borings, which were advanced to a maximum depth of approximately 18 fbg.

Groundwater beneath the Site was estimated to flow in an approximately southwesterly direction towards Jamaica Bay, located approximately 3.5 miles away.

### **2.3 Nearby Areas of Public Concern**

The area immediately surrounding the Site is predominantly residential, commercial, and industrial in nature. The proposed future use of the Site is residential (elevated above grade) with lower level commercial retail uses. The land use in the surrounding area is anticipated to remain residential/commercial, based on several new residential/commercial projects currently being developed in the neighborhood.

*On-Site Receptors:* As the Site is currently vacant, the only current on-site potential sensitive receptors are trespassers. During redevelopment, potential receptors will include construction workers and inspectors. Once the Site is redeveloped, potential receptors will include: residents, maintenance staff, and commercial workers/customers.

*Off-Site Receptors:* Potential off-site receptors within a 0.25-mile radius of the Site include: residents, commercial and construction workers, students, pedestrians, and cyclists, based on the following:

1. Commercial Businesses – existing and future
2. Residential Buildings – existing and future
3. Building Construction/Renovation – existing and future
4. Pedestrians, Trespassers, Cyclists – existing and future
5. Schools – existing and future

## 2.4 Site History

Historical research indicated that the western and central portions of the Site included a filling station, a garage, a kitchen cabinet manufacturer, and a garage with two buried gasoline storage tanks between circa 1942 and 1951, and various commercial uses, warehouses and automotive repair shops between circa 1981 and 2007.

## 3.0 PREVIOUS INVESTIGATIONS

Several environmental investigations have been completed at the Site and the surrounding area. A site plan showing sampling/testing locations is provided as Figure 2. A review of the previous sampling investigations is summarized below:

### Phase I Environmental Site Assessment (ESA), Hillmann Consulting, February 2014

A Phase I Environmental Site Assessment (ESA) conducted by Hillmann Consulting in February 2014 included a Site inspection, historical research, and a regulatory review for the Site. It identified the following Recognized Environmental Conditions (RECs):

- The Site was listed on the NYC E-Designation Database for Underground Storage Tanks Testing Protocol, as well as Air Quality, Window Wall Attenuation & Alternate Ventilation, and Exhaust Stack Location Limitations;
- An active 3,510-gallon No.2 fuel oil vaulted aboveground storage tank (AST) registered under PBS Number 2-153605 was observed in the basement of 93-01 Sutphin Boulevard (a former structure on the western portion of the Site);
- A filling station with five gasoline underground storage tanks (USTs) was shown at 93-01 Sutphin Boulevard on the 1942 to 1951 fire insurance maps;
- An inactive 275-gallon AST was observed in the basement of 147-22 Archer Avenue (a former structure on the central portion of the Site) and fire insurance maps from 1981 to 2006 identified an auto repair shop at this location;
- Fire insurance maps from 1942 to 1951 depicted two gasoline USTs beneath the 147-30 Archer Avenue building (northeastern portion of the Site); and

- A fuel oil fill port was noted outside 147-12 Archer Avenue. Fuel oil vent pipes were observed abutting 147-14 and 147-30 Archer Avenue.

Remedial Investigation Report (RIR), AKRF, May 2015

In connection with the E-Designation assigned to the property, AKRF conducted a Remedial Investigation at the Site in May 2015 that included the advancement of 11 soil borings, 2 temporary groundwater monitoring wells, and 9 soil vapor probes, with the collection and laboratory analysis of 22 soil samples, 4 groundwater samples (2 from geotechnical wells installed by others), and 9 soil vapor samples. Results were as follows:

- The soil sampling results were compared to UUSCOs and RRSCOs. Several VOCs and PCBs were detected at trace concentrations, all below UUSCOs. Several PAHs including benzo(a)anthracene [(maximum of 1,400 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ )], benzo(a)pyrene (maximum of 1,400  $\mu\text{g}/\text{kg}$ ), benzo(b)fluoranthene (maximum of 1,900  $\mu\text{g}/\text{kg}$ ), chrysene (maximum of 1,400  $\mu\text{g}/\text{kg}$ ), and indeno(1,2,3-cd)pyrene (maximum of 680  $\mu\text{g}/\text{kg}$ ) were detected above RRSCOs in three samples. Metals, including barium (maximum of 620  $\text{mg}/\text{kg}$ ), lead (maximum of 760  $\text{mg}/\text{kg}$ ), and mercury (maximum of 0.98  $\text{mg}/\text{kg}$ ) exceeded RRSCOs in one or more samples. The elevated metals concentrations were detected primarily in the shallow 0-2 foot interval and were likely attributable to fill materials. Two pesticides (4,4'-DDE, 4,4'-DDT) slightly exceeded UUSCOs in up to three samples, but were below their RRSCOs.
- Groundwater sampling results compared to AWQS indicated that one VOC, chloroform, was detected in 2 of the 4 samples at a maximum concentration of 50 micrograms per liter ( $\mu\text{g}/\text{L}$ ), above its AWQS of 7  $\mu\text{g}/\text{L}$ . Several other VOCs and semivolatile organic compounds (SVOCs) were detected at trace concentrations below AWQS. Nineteen metals were detected; with iron, manganese, antimony and sodium above AWQS in one or more samples (total and dissolved analysis). No PCBs were detected above the AWQS. One pesticide, chlordane, was detected in one sample at an estimated concentration of 0.187  $\mu\text{g}/\text{L}$ , above the AWQS of 0.05  $\mu\text{g}/\text{L}$ .
- Soil vapor results were compared to the indoor air guidelines in the New York State Department of Health (NYSDOH) *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, dated October 2006. Sampling identified 32 VOCs in the 9 samples at concentrations ranging from 0.95 to 830 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). Tetrachloroethene (PCE) exceeded its (NYSDOH) indoor Air Guideline Value (AGV) of 30  $\mu\text{g}/\text{m}^3$  in one sample with a concentration of 219  $\mu\text{g}/\text{m}^3$ . Trichloroethene (TCE) exceeded its AGV of 2  $\mu\text{g}/\text{m}^3$  in 3 samples (maximum concentration 10.3  $\mu\text{g}/\text{m}^3$ ).

AKRF conducted a Supplemental Subsurface Investigation on December 7 and 8, 2015, to satisfy the E-Designation requirements. It included advancement of 7 soil borings with the collection of 14 soil samples for laboratory analysis. The soil sampling results were compared to UUSCOs and RRSCOs. Results were as follows:

- The VOCs acetone and naphthalene were detected in 2 samples above UUSCOs (but below the RRSCOs), at concentrations ranging from 78  $\mu\text{g}/\text{kg}$  (acetone) to 19,000  $\mu\text{g}/\text{kg}$  (naphthalene). Several PAHs including benzo(a)anthracene (maximum of 41,000  $\mu\text{g}/\text{kg}$ ), benzo(a)pyrene (maximum of 30,000  $\mu\text{g}/\text{kg}$ ), benzo(b)fluoranthene (maximum of 38,000  $\mu\text{g}/\text{kg}$ ), benzo(k)fluoranthene (maximum of 9,400  $\mu\text{g}/\text{kg}$ ), chrysene (maximum of 34,000  $\mu\text{g}/\text{kg}$ ), dibenzo(a,h)anthracene (maximum of 6,100  $\mu\text{g}/\text{kg}$ ), and indeno(1,2,3-cd)pyrene (maximum of 23,000  $\mu\text{g}/\text{kg}$ ) were detected above RRSCOs (and UUSCOs) in 4 samples.

- Metals, including barium (maximum of 1,800 mg/kg), cadmium (maximum of 7.4 mg/kg), lead (maximum of 870 mg/kg), and mercury (maximum of 2.9 mg/kg) exceeded RRSCOs (and UUSCOs) in one or more samples. Arsenic, copper, and zinc exceeded UUSCOs but not RRSCOs. Elevated metals concentrations were detected in samples collected primarily within the upper 4 feet, and were most likely attributable to fill materials. Two pesticides (4,4'-DDE, 4,4'-DDT) slightly exceeded UUSCOs in up to three samples, but were below RRSCOs.

## 4.0 INTERIM REMEDIAL MEASURES

The proposed IRM includes excavation and removal of soil exceeding UUSCOs. This would include Site-wide excavation to remove at a minimum the upper two-foot layer of soil to remove material exceeding UUSCOs including any petroleum storage tanks, fill ports, and vent lines, should they be encountered. Additional remedial excavation beyond two feet will be conducted as necessary based on testing, as described in Section 4.3. This section outlines the scope of work for each IRM, and ensures that proper monitoring procedures, site controls, and handling and disposal of hazardous materials are implemented during the completion of the IRM.

### 4.1 Site Preparation

Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking and staking excavation areas will be performed prior to undertaking any Site remediation activities. For soil removal activities, temporary fencing will be utilized around the work area and secured at the end of each work day. The Volunteer and its contractors will be solely responsible for the identification of utilities that might be affected by work under the IRM and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this IRM.

### 4.2 Soil Removal

Remedial activities will include excavation of a minimum of 2 feet of soil/fill exceeding Track 1 Unrestricted Use Soil Cleanup Objectives (UUSCOs). Additional soil may be removed for remedial purposes pending further sampling. The remedial excavation will coincide with the development-related excavation. A site plan depicting the proposed soil excavation area is provided as Figure 3. The removal of materials from the Site will include: (1) excavation and off-site disposal of soil to comply with UUSCOs, plus additional soil/fill as needed for the proposed foundation; (2) removal of any petroleum storage tanks, fill ports, and vent lines encountered; and (3) removal of subsurface building materials from demolition. At a minimum, approximately 6,300 tons of contaminated soil will be removed (i.e., from the upper 2 feet of soil). In addition to the remedial excavation, approximately 29,000 tons of soil will be removed for development-related purposes and disposed of at facilities licensed to accept such material.

During the excavation activities, the excavated material will be inspected by AKRF field personnel for evidence of contamination (i.e., staining and/or odors) and field-screened using a photoionization detector (PID), which measures relative concentrations of volatile organic compounds (VOCs) in the soil. The excavation may be expanded horizontally and/or vertically if evidence of contamination is observed in the excavation.

### 4.3 Post Excavation Endpoint Sampling

Post-excavation endpoint samples will be collected from the excavation to confirm that soil contamination has been removed. Proposed endpoint sample locations are shown on Figure 4. In

addition, five endpoint samples consisting of four sidewalls and one bottom sample will be obtained following any petroleum storage tank removals. Post-excavation soil sampling will be conducted below the upper two-foot layer and subsequently at two-foot intervals, as warranted based on the results, to delineate the extent of soil exceeding UUSCOs below the shallow contamination layer. The exact depths and locations of the additional sampling will be coordinated with NYSDEC prior to initiating sampling activities and as specified in the NYSDEC DER-10.

The soil samples will be containerized in accordance with EPA analytical protocols. The samples will be submitted to an ELAP-certified laboratory for analysis of VOCs via EPA Method 8260, PAHs via EPA Method 8270, target compound list (TCL) Pesticides via EPA Method 8081, PCBs, and heavy metals using EPA Method 6000/7000 series. The laboratory will follow the NYSDEC – Analytical Services Protocol dated 1995. The laboratory will compile and submit the data package using NYSDEC ASP Category B deliverables. Further details regarding the specific sampling methodology and analytical procedures are presented in the QAPP (Appendix B). If a sample exceeds the SCOs, additional soil will be removed from area containing the exceedance and the area will be re-sampled to confirm the contamination has been removed.

#### 4.4 Pre-Excavation Soil Characterization

Disposal locations will be established at a later date and will be reported to the NYSDEC Project Manager (PM).

Pre-excavation waste characterization samples will be collected prior to commencing construction activities and as needed during Site excavation. Based on the waste characterization results, a properly permitted waste disposal facility will be selected for off-site disposal. The disposal facility information including location will be reported to the NYSDEC PM prior to commencing the disposal activities.

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

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

The following documentation will be obtained and reported by the QEP (under supervision of the Remedial Engineer) for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the QEP or his or her designee or BCP Volunteer to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the QEP or his or her designee. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

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

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

Bill of Lading system or equivalent will be used for off-site movement of non-hazardous wastes and contaminated soils. This information will be reported in the Final Engineering Report. Hazardous wastes derived from on-site will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

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

Waste characterization will be performed for off-site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results, and QA/QC will be reported in the FER. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

#### **4.5 Temporary Staging Procedures**

The pre-excavation characterization results will be used to attain acceptance by a soil disposal facility prior to initiating the soil removal activities. Direct loading of soil onto haul trucks will be performed to the extent feasible. If site conditions require temporarily staging of soil on-site prior to disposal, stockpiled soil will be managed in accordance with appropriate guidelines. Staged soil will be placed on and covered with polyethylene sheeting and secured with large rocks or other appropriate weights to protect against leaching or runoff of contaminants into groundwater or stormwater. Staged soil will be managed to minimize dust generation, run-off and erosion, using water, plastic covers, silt fences, and/or hay bales, as necessary. A dedicated water hose connected to a fire hydrant will be available on-site for dust control.

If separate piles are needed to address different disposal requirements (hazardous or non-hazardous), each pile will be separated by a sufficient distance to ensure that mixing of dissimilar or potentially dissimilar materials does not occur. The location and classification of each staging

area will be tracked on site drawings and updated, if necessary, at the end of each workday. Copies of Site drawings will be kept in the field log book.

As applicable, manifest forms and shipment manifest records would be completed as required by the appropriate regulatory agencies for verifying the material and quantity of each load in unit of volume and weight.

#### **4.6 Transportation**

Transportation of material leaving the site for off-site disposal will be in accordance with federal, state and local requirements (including 6 NYCRR Part 364 and U.S. DOT regulations) covering licensing of haulers and trucks, placarding, truck routes, manifesting, etc.

The schedule for truck arrival will be coordinated to meet the approved project schedule. The schedule will be compatible with the availability of equipment and personnel for material handling operations at the job site.

All vehicles leaving the project site will be inspected to ensure that contaminated soils adhering to the wheels or under carriage are removed prior to the vehicle leaving the site. Any situations involving material spilled in transit or mud and dust tracked off-site will be remedied. The access routes will be inspected for road conditions, overhead clearance, and weight restrictions.

Contaminated materials from other projects will not be combined with material from the construction area. The transporter will not deliver waste to any facility other than the disposal facility(s) listed on the shipping manifest.

#### **4.7 Site Control Measures**

The potential off-site transport of sediment, dust and organic vapors potentially generated during soil excavation activities will be controlled by: covering soil stockpiles and/or open excavations with 6-mil polyethylene sheeting; backfilling open excavations with uncontaminated fill material; decontaminating equipment used for soil excavation/sampling; providing drainage inlet protection for catch basins; and/or the use of odor-controlling spray foam, as warranted. These measures will be installed according to the requirements of all applicable or relevant and appropriate federal, state and local laws.

#### **4.8 Air Monitoring**

Work zone and community air monitoring and will be conducted during all work identified in this IRM Work Plan. The protocol for implementing the work zone air monitoring will be completed in accordance with the site-specific HASP and CAMP, which are provided in Appendix A.

#### **4.9 Quality Assurance/Quality Control**

Measures will be taken to provide for Quality Assurance (QA) and maintain Quality Control (QC) of environmental sampling and remedial activities conducted under the IRM Work Plan. A QAPP that describes the QA/QC protocols and procedures that will be followed during implementation of the IRM is included in Appendix B. Adherence to the QAPP will ensure that defensible data will be obtained during the implementation of the IRM.

#### **4.10 Surveying**

The limits of the remedial excavation will be surveyed by a New York State-licensed surveyor and incorporated into the site plan.

## 5.0 POST REMEDIATION DOCUMENTS

### Interim Remedial Measure Report/Final Engineering Report

Upon completion of Site remediation, an IRM Report will be prepared for inclusion in the Final Engineering Report (FER) for submission to the NYSDEC and NYSDOH. The IRM Report will include:

- Photographs of remedial activities;
- Monitoring and endpoint sampling results collected during implementation of the remedy;
- An accounting of the destination of any material removed from the Site and associated manifests/bills of lading and certificates of disposal from the respective receiving facilities; and
- Documentation of source approval and sampling for backfill materials imported from off-site.

## 6.0 SCHEDULE OF WORK

The following tentative schedule has been developed for the project:

### *Remedial Investigation Schedule*

<b>Task</b>	<b>Date</b>
Submission of IRM Work Plan to NYSDEC	December 8, 2016
30-Day Public Comment Period	December 12, 2016
NYSDEC Approval of IRM Work Plan	January 18, 2017
Start implementation of IRM Work Plan	January 23, 2017

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## 7.0 LIMITATIONS

The findings set forth in this report are strictly limited in scope and time to the date of the evaluation described herein. The conclusions and recommendations presented in the report are based solely on the services and any limitations described in this report.

This report may contain conclusions that are based on the analysis of data collected at the time and locations noted in this report or other reports through intrusive or non-intrusive sampling. However, further investigation might reveal additional data or variations of the current data, which may differ from our understanding of the conditions presented in this report and require the enclosed recommendations to be reevaluated or modified.

Chemical analyses may have been performed for specific parameters during the course of previous investigations conducted by AKRF or others. It should be noted that additional chemical constituents, not searched for during these investigations, may be present at the site. Due to the nature of the investigations and the limited data available, no warranty, expressed or implied, shall be construed with respect to undiscovered liabilities. The presence of biological hazards, radioactive materials, lead-based paint and asbestos-containing materials was not investigated, unless specified in the reports.

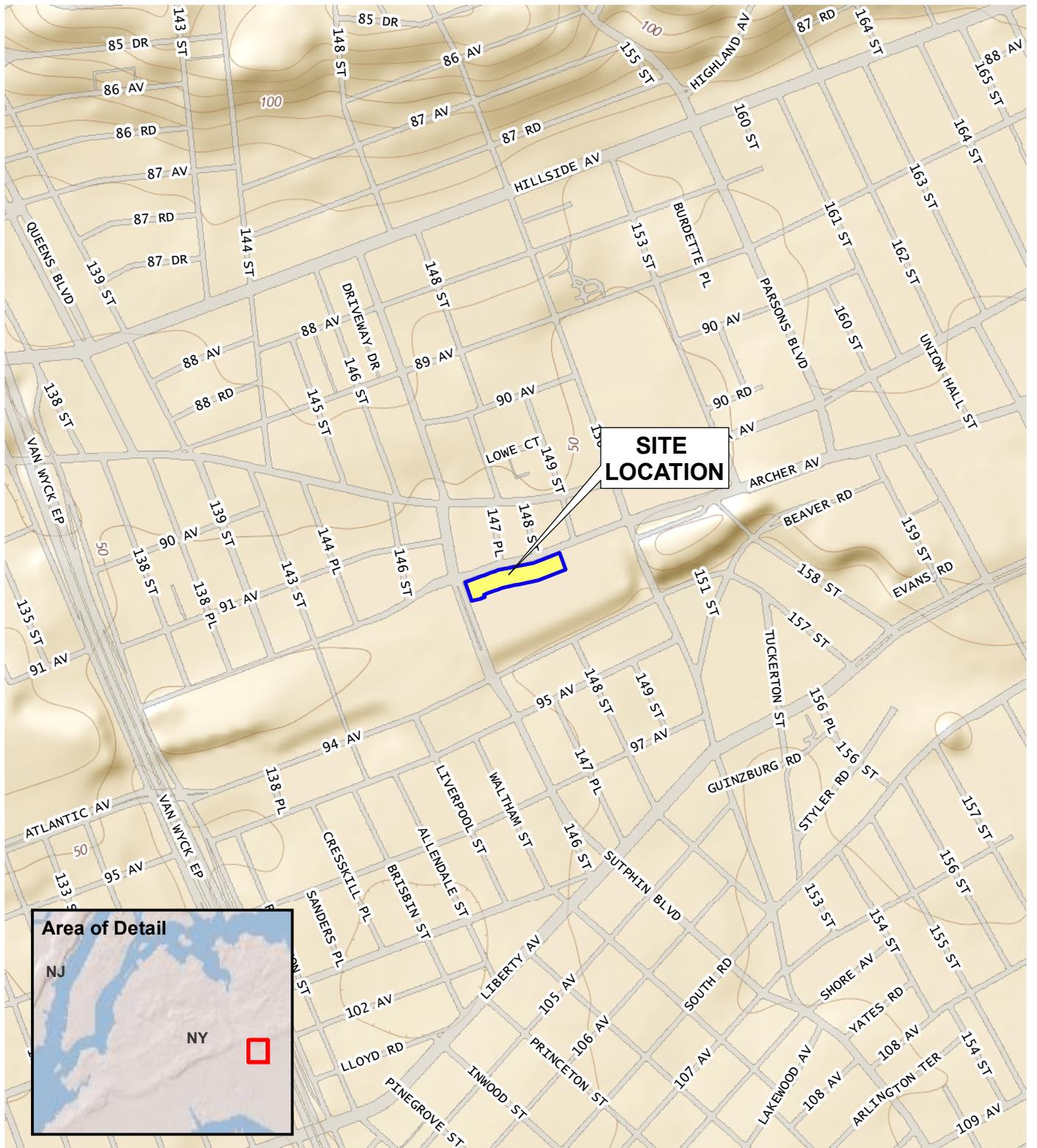
Interpretations of the data, including comparison to regulatory standards, guidelines or background values, are not opinions that these comparisons are legally applicable. Furthermore, any conclusions or recommendations should not be construed as legal advice. For such advice, the client is recommended to seek appropriate legal counsel. Disturbance, handling, transportation, storage and disposal of known or potentially contaminated materials is subject to all applicable laws, which may or may not be fully described as part of this report.

The analytical data, conclusions, and/or recommendations provided in this report should not be construed in any way as a classification of waste that may be generated during future disturbance of the project site. Waste(s) generated at the site including excess fill may be considered regulated solid waste and potentially hazardous waste. Requirements for intended disposal facilities should be determined beforehand as the data provided in this report or other reports may be insufficient and could vary following additional sampling.

This report may be based solely or partially on data collected, conducted, and provided by AKRF and/or others. No warranty is expressed or implied by usage of such data. Such data may be included in other investigation reports or documentation. In addition, these reports may have been based upon available previous reports, historical records, documentation from federal, state and local government agencies, personal interviews, and geological mapping. This report is subject, at a minimum, to the limitations of the previous reports, historical documents, availability and accuracy of collected documentation, and personal recollection of those persons interviewed. In certain instances, AKRF has been required to assume that the information provided is accurate with limited or no corroboratory evidence.

This report is intended for the use solely by BRP Development Corporation. Reliance by third parties on the information and opinions contained herein is strictly prohibited and requires the written consent of AKRF. AKRF accepts no responsibility for damages incurred by third parties for any decisions or actions taken based on this report. This report, along with any associated reports such as a Construction Health and Safety Plan, must be used, interpreted, and presented in their entirety.

## FIGURES



**SOURCE**  
USGS 7.5 Minute Topographic Map  
Jamaica Quad 2013



**The Crossing at Jamaica Station**  
Queens, New York

**SITE LOCATION**



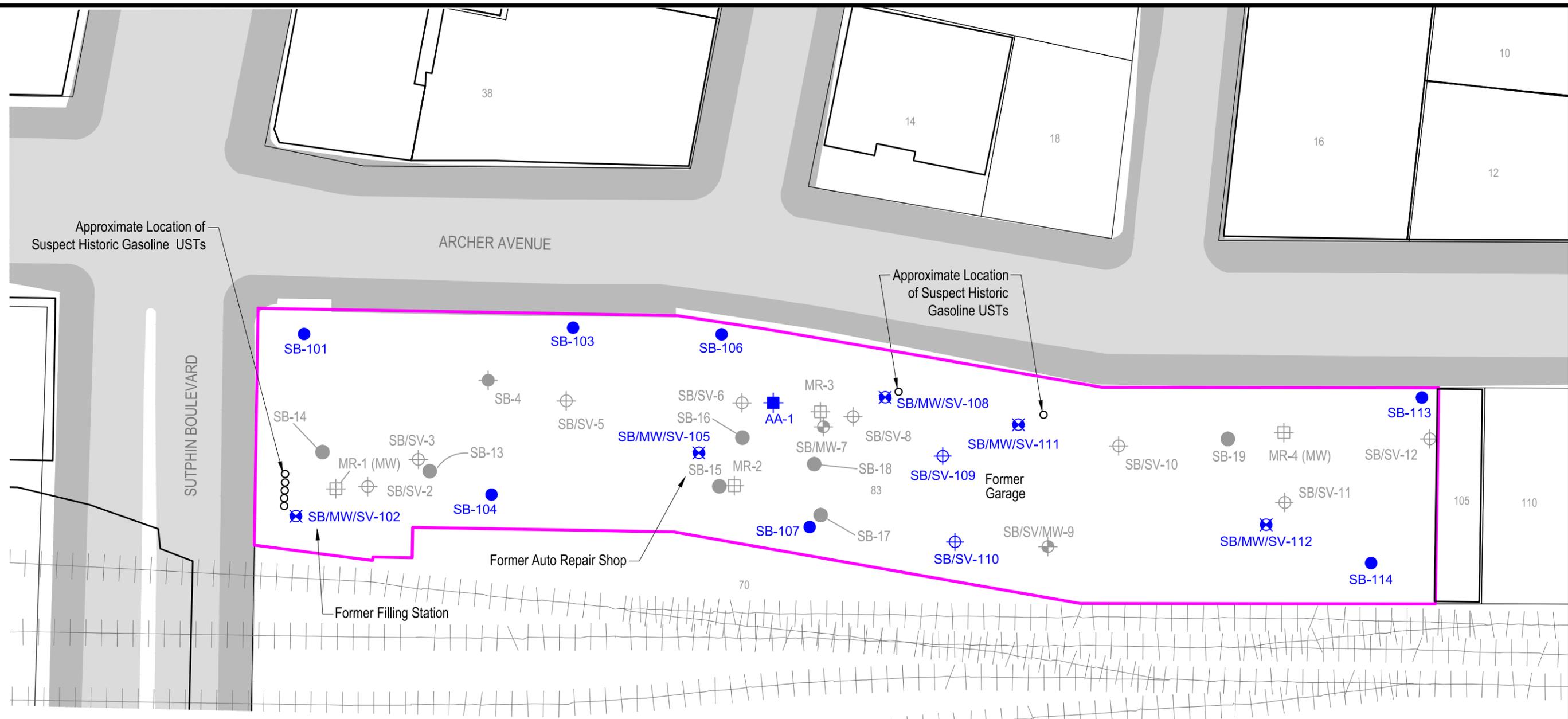
**Environmental Consultants**  
440 Park Avenue South, New York, N.Y. 10016

DATE  
**2/18/2016**

PROJECT No.  
**12146**

FIGURE  
**1**

©2016 AKRF, Inc. Environmental Consultants W:\Projects\12146 - THE CROSSING JAMAICA STATION QUEEN\Technical\HazMat\BCP RICAD\12146 Fig 2 Site Plan and Sample Locations.dwg



**LEGEND**

- PROPERTY BOUNDARY
- LOT LINE
- BUILDING LINE
- UST SUSPECT UNDERGROUND STORAGE TANK
- PREVIOUS SAMPLE LOCATION
- SOIL SAMPLE LOCATION
- SOIL AND SOIL VAPOR SAMPLE LOCATION
- SOIL/MONITORING WELL/SOIL VAPOR SAMPLE LOCATION
- AMBIENT AIR SAMPLE LOCATION

Map Source:  
ERLANDSEN-CROWELL & SHAW, "ALTA/ACSM Land Title Survey", Dated: April 2, 2014



DATE	9/22/2016
PROJECT NO.	12146
SCALE	as shown
FIGURE	2

ARCHER AVENUE



**LEGEND**

-  PROPERTY BOUNDARY
-  EXTENT OF EXCAVATION TO APPROXIMATELY 4' BELOW GRADE
-  EXTENT OF EXCAVATION TO APPROXIMATELY 6' BELOW GRADE
-  EXTENT OF EXCAVATION TO APPROXIMATELY 16' BELOW GRADE
-  EXTENT OF EXCAVATION TO APPROXIMATELY 17' BELOW GRADE
-  EXTENT OF EXCAVATION TO APPROXIMATELY 18' BELOW GRADE
-  EXTENT OF EXCAVATION TO APPROXIMATELY 21' BELOW GRADE
-  EXTENT OF EXCAVATION TO APPROXIMATELY 23' BELOW GRADE
-  NUMERIC GRID



Source: FX Fowle Architects, "The Crossing at Jamaica Station, High-Rise Building - Cellar Floor Plan", Drawing No.: A-101.00, Revision Date 8.15.2016.

The Crossing at Jamaica Station  
Queens, New York

PROPOSED REMEDIAL SITE EXCAVATION PLAN

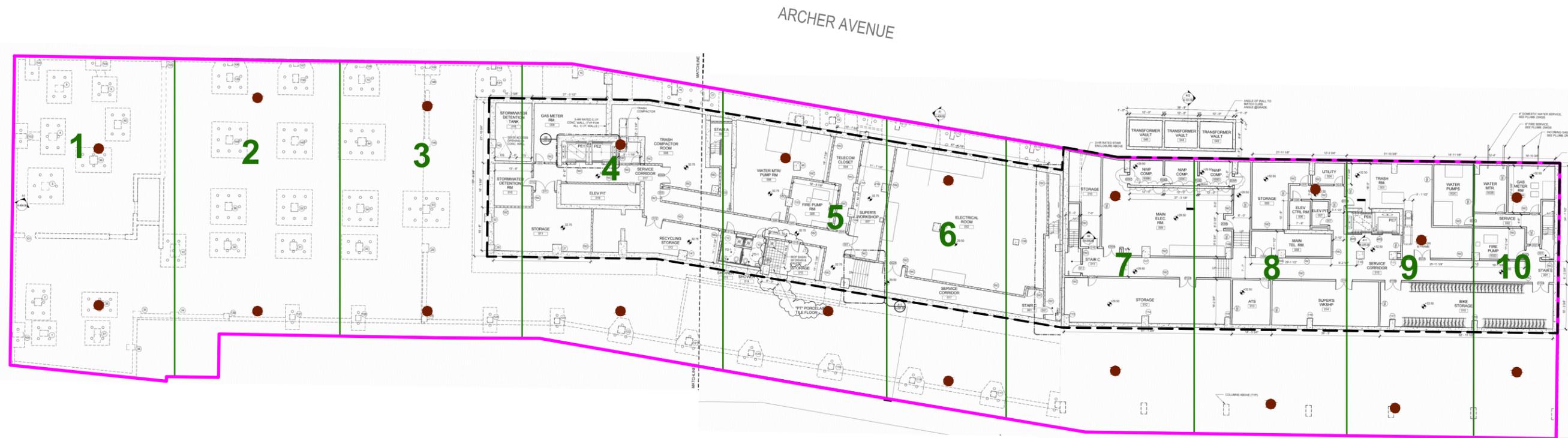
**AKRF**  
Environmental Consultants  
440 Park Avenue South, New York, NY 10016

DATE  
**12/2/2016**

PROJECT NO.  
**12146**

SCALE  
**as shown**

FIGURE  
**3**



**LEGEND**

- PROPERTY BOUNDARY
- PROPOSED CELLAR FOOTPRINT
- PROPOSED ENDPOINT SAMPLE LOCATION
- 1 NUMERIC GRID



Source: FX Fowle Architects, "The Crossing at Jamaica Station, High-Rise Building - Cellar Floor Plan", Drawing No.: A-101.00, Revision Date 8.15.2016.



**The Crossing at Jamaica Station**  
Queens, New York

**AKRF**  
Environmental Consultants  
440 Park Avenue South, New York, NY 10016

PROPOSED ENDPOINT SAMPLE LOCATIONS

DATE  
**12/2/2016**

PROJECT NO.  
**12146**

SCALE  
**as shown**

FIGURE  
**4**

**APPENDIX A**  
**HEALTH AND SAFETY PLAN & COMMUNITY AIR MONITORING PLAN**

# **The Crossing at Jamaica Station**

**147-22 ARCHER AVENUE**

**QUEENS, NEW YORK**

---

## **Health and Safety Plan and Community Air Monitoring Plan**

**AKRF Project Number: 12146**

**NYSDEC Site Number: C241183**

### **Prepared for:**

BRP Development Corp.  
767 Third Avenue, 33<sup>rd</sup> Floor  
New York, New York, 10017

### **Prepared by:**



**AKRF, Inc.**  
440 Park Avenue South, 7<sup>th</sup> Floor  
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646-696-0670

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**NOVEMBER 2016**

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        2.1.2 Physical Characteristics..... 2  
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**FIGURE**

Figure 1 – Hospital Location Map

**APPENDICES**

- Attachment A – Potential Health Effects from On-site Contaminants
- Attachment B – West Nile Virus/St. Louis Encephalitis Prevention
- Attachment C – Report Forms
- Attachment D – Emergency Hand Signals

## 1.0 INTRODUCTION

This Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) were prepared by AKRF, Inc. (AKRF) on behalf of CJ Plaza One LLC (the Volunteer) for the Site located at 147-22 Archer Avenue in the Jamaica section of Queens, New York. The approximately 1.57-acre site, also identified as Block 9998, Lot 83, is hereafter referred to as the "Site." The Site is bounded by Archer Avenue to the north, followed by commercial and industrial uses; a commercial building to the east; the Long Island Rail Road (LIRR) to the south, and Sutphin Boulevard to the west, followed by the LIRR. Properties in the surrounding areas consist of predominately industrial and commercial uses, with some residencies further north and south.

The Site is currently vacant. Historical reports indicated that the southwestern and central portions of the Site included a filling station, a garage, a kitchen cabinet manufacturer, and a garage door company with two buried gasoline storage tanks between 1942 and 1951, unspecified commercial uses, and automotive repair shops between 1981 and 2007. The eastern portion of the Site historically had residential, commercial, and religious uses.

Based on an evaluation of the data and information from previous investigations, there is some contaminated soil, groundwater, and soil vapor present at the Site that may be attributable to historic Site usage. Elevated levels of polycyclic aromatic hydrocarbons (PAHs) and heavy metals in soil are likely related to the historic fill materials, observed during the Remedial Investigation (RI). Elevated levels of PAHs and metals were also detected in groundwater beneath the Site. The solvent-related compounds tetrachloroethene (PCE) and trichloroethene (TCE) detected in soil vapor may be due to historic manufacturing and automotive repair operations at the Site. AKRF prepared a Remedial Action Work Plan (RAWP) to address soil, groundwater, and soil vapor contamination during remediation at the Site. This Health and Safety Plan (HASP) has been designed to provide workplace safety while completing the field requirements of the RAWP.

**2.0 HEALTH AND SAFETY GUIDELINES AND PROCEDURES****2.1 Hazard Evaluation****2.1.1 Hazards of Concern**

Check all that apply		
<input checked="" type="checkbox"/> Organic Chemicals	<input checked="" type="checkbox"/> Inorganic Chemicals	<input type="checkbox"/> Radiological
<input type="checkbox"/> Biological	<input type="checkbox"/> Explosive/Flammable	<input type="checkbox"/> Oxygen Deficient Atm.
<input checked="" type="checkbox"/> Heat Stress	<input checked="" type="checkbox"/> Cold Stress	<input type="checkbox"/> Carbon Monoxide
Comments: No personnel are permitted to enter permit confined spaces.		

**2.1.2 Physical Characteristics**

Check all that apply		
<input checked="" type="checkbox"/> Liquid	<input checked="" type="checkbox"/> Solid	<input type="checkbox"/> Sludge
<input checked="" type="checkbox"/> Vapors	<input type="checkbox"/> Unknown	<input type="checkbox"/> Other
Comments:		

**2.1.3 Hazardous Materials**

Check all that apply					
Chemicals	Solids	Sludges	Solvents	Oils	Other
<input type="checkbox"/> Acids	<input type="checkbox"/> Ash	<input type="checkbox"/> Paints	<input checked="" type="checkbox"/> Halogens	<input type="checkbox"/> Transformer	<input type="checkbox"/> Lab
<input type="checkbox"/> Caustics	<input type="checkbox"/> Asbestos	<input type="checkbox"/> Metals	<input checked="" type="checkbox"/> Petroleum	<input type="checkbox"/> Other DF	<input type="checkbox"/> Pharm
<input type="checkbox"/> Pesticides	<input type="checkbox"/> Tailings	<input type="checkbox"/> POTW	<input checked="" type="checkbox"/> Other Chlorinated	<input type="checkbox"/> Motor or Hydraulic Oil	<input type="checkbox"/> Hospital
<input checked="" type="checkbox"/> Petroleum	<input checked="" type="checkbox"/> Other	<input type="checkbox"/> Other	Organic	<input checked="" type="checkbox"/> Gasoline	<input type="checkbox"/> Rad
<input type="checkbox"/> Inks	Fill material		Solvents	<input checked="" type="checkbox"/> Fuel Oil	<input type="checkbox"/> MGP
<input type="checkbox"/> PCBs				<input checked="" type="checkbox"/> Waste Oil	<input type="checkbox"/> Mold
<input checked="" type="checkbox"/> Metals					<input type="checkbox"/> Cyanide
<input checked="" type="checkbox"/> Other: SVOCs					

## 2.1.4 Chemicals of Concern

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
Tetrachloroethylene	REL = Lowest possible PEL = 100 ppm STEL = 100 ppm	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination, headache, drowsiness, skin erythema (skin redness), and liver damage.
Trichloroethylene	REL = 25 ppm PEL = 100 ppm	Headaches, lung irritation, dizziness, poor coordination, impaired heart function, unconsciousness, and nerve, kidney and liver damage.
1,2 Dichloroethene	REL = 200 ppm PEL = 200 ppm	Nausea, drowsy, tiredness possible heart damage.
1,1 Dichloroethane	REL = 100 ppm PEL = 100 ppm	Irritation skin; central nervous system depression; liver, kidney, lung damage
1,1,1 Trichloroethane	REL = 350 ppm PEL = 350 ppm	Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage
Arsenic	REL= 0.002 mg/m <sup>3</sup> PEL= 0.010 mg/m <sup>3</sup>	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]
Lead	REL= 0.1 mg/m <sup>3</sup> PEL= 0.05 mg/m <sup>3</sup>	Weak, lassitude, insomnia; facial pallor, pale eye, anorexia, low-weight, malnutrition, constipation, abdominal pain, colic; anemia; gingival lead line; tremors, paralysis wrists and ankles; encephalopathy; kidney disease; irritation eyes; hypotension.
Mercury	REL= 0.05 mg/m <sup>3</sup> (Hg vapor) REL=0.1 mg/m <sup>3</sup> (other) PEL= 0.1 mg/m <sup>3</sup>	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria
Benzene	REL = 0.1 ppm PEL = 1 ppm STEL = 5 ppm	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude, dermatitis; bone marrow depression, potential occupational carcinogen.
Toluene	REL = 100 ppm PEL = 200 ppm STEL = 300 ppm	Irritation eyes, nose; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage.
Ethylbenzene	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma.
Xylenes	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, poor coordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.
Polyaromatic Hydrocarbons (PAHs)	REL= 0.1 mg/m <sup>3</sup> PEL= 5 mg/m <sup>3</sup>	Harmful effects on the skin, body fluids, and ability to fight disease after both short and long term exposure, birth defects, and potential occupational carcinogen.

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
Comments: REL = NIOSH Recommended Exposure Limit PEL = OSHA Permissible Exposure Limit STEL = OSHA Short Term Exposure Limit		

## 2.2 Designated Personnel

AKRF will appoint one of its on-site personnel as the Site Safety Officer (SSO). This individual will be responsible for the implementation of the HASP. The SSO will have a 4-year college degree in occupational safety or a related science/engineering field, and experience in implementation of air monitoring and hazardous materials sampling programs. Health and safety training required for the SSO and all field personnel is outlined in Section 2.3 of this HASP.

## 2.3 Training

All personnel who perform sampling activities in the work area while intrusive activities are being performed will have completed a 40-hour training course that meets OSHA requirements of 29 CFR Part 1910, Occupational Safety and Health Standards. In addition, all personnel will have up-to-date 8-hour refresher training. The training will allow personnel to recognize and understand the potential hazards to health and safety. All field personnel must attend a training program, whose purpose is to:

- Make them aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety; make them aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Each member of the field crew will be instructed in these objectives before he/she goes onto the Site. A site safety meeting will be conducted at the start of the project. Additional meetings shall be conducted, as necessary, for new personnel working at the Site.

## 2.4 Medical Surveillance Program

All AKRF and subcontractor personnel performing field work involving subsurface disturbance at the Site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120 (f). A physician's medical release for work will be confirmed by the SSO before an employee can begin Site activities. The medical release shall consider the type of work to be performed and the required PPE. The medical examination will, at a minimum, be provided annually and upon termination of hazardous waste Site work.

## 2.5 Site Work Zones

During any activities involving subsurface disturbance, the work area must be divided into various zones to prevent the spread of contamination, ensure that proper protective equipment is donned, and provide an area for decontamination.

The Exclusion Zone is defined as the area where exposure to impacted media could be encountered. The Contamination Reduction Zone (CRZ) is the area where decontamination procedures take place and is located next to the Exclusion Zone. The Support Zone is the area

where support facilities such as vehicles, fire extinguisher, and first aid supplies are located. The emergency staging area (part of the Support Zone) is the area where all workers on-site would assemble in the event of an emergency. A summary of these areas is provided below. These zones may be changed by SSO, depending on that day's activities. All field personnel will be informed of the location of these zones before work begins.

Appropriate barriers will be set up to secure the area and prevent any unauthorized personnel from approaching within 15 feet of the work area.

Site Work Zones			
Task	Exclusion Zone	CRZ	Support Zone
Soil Excavation and Storage Tank Removal Areas	15 feet from excavation border and excavation equipment or vehicles	15 feet from excavation border and excavation equipment or vehicles	As Needed

## 2.6 Air Monitoring

The purpose of the air monitoring program is to identify any exposure of the field personnel to potential environmental hazards in the soil and soil vapor. Results of the air monitoring will be used to determine the appropriate response action, if needed.

### 2.6.1 Work Zone Air Monitoring

Real time air monitoring will be performed with the PID and Dust Trak. Measurements will be taken prior to commencement of work and continuously during the work, as outlined in the following table. Measurements will be made as close to the workers as practicable and at the breathing height of the workers. The SSO shall set up the equipment and confirm that it is working properly. His/her designee may oversee the air measurements during the day. The initial measurement for the day will be performed before the start of work and will establish the background level for that day. The final measurement for the day will be performed after the end of work. The action levels and required responses are listed in the following table:

Instrument	Action Level	Response Action
PID	Less than 5 ppm in breathing zone	Level D or D-Modified
	Between 5 ppm and 50 ppm	Level C
	More than 50 ppm	Stop work. Resume work when readings are less than 50 ppm.
Dust Trak	Less than 1.25 mg/m <sup>3</sup> above background in breathing zone	Level D or D-Modified
	Less than 1.25 mg/m <sup>3</sup> above background in breathing zone	Stop work. Resume work when readings are less than 1.25 mg/m <sup>3</sup> .
mg/m <sup>3</sup> = micrograms per cubic meter ppm = parts per million		

## 2.6.2 Community Air Monitoring Plan

Community air monitoring will be conducted during all intrusive Site activities in compliance with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP). Real-time air monitoring for volatile compounds and particulates at the perimeter of the exclusion zone will be performed as described below.

### VOC Monitoring

Periodic monitoring for VOCs will be conducted during non-intrusive activities such as the collection of excavation soil endpoint samples using hand-held roving equipment. Periodic monitoring may include obtaining measurements upon arrival at a location and upon leaving the location.

Continuous monitoring for VOCs will be conducted during all ground intrusive activities, including excavation and tank removal (if encountered). Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background concentrations. VOCs will be monitored continuously at the downwind perimeter of the exclusion zone. Monitoring will be conducted with a PID equipped with a 10.6 eV lamp capable of calculating 15-minute running average concentrations. The following actions will be taken based on organic vapor levels measured:

- If total organic vapor levels exceed 5 ppm above background for the 15-minute average at the exclusion zone perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the exclusion zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the hot 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 above background for the 15-minute average.
- If the total organic vapor level is above 25 ppm at the perimeter of the exclusion zone, activities will be shutdown.

More frequent intervals of monitoring will be conducted if required as determined by the SSO. All PID readings will be recorded and available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, will also be recorded.

### Dust Monitoring

Continuous monitoring for particulates will be conducted during all ground intrusive activities, which will involve the measurement of respirable dust. Community air monitoring for dust particulates will be conducted using a MIE 1000 Personal DataRam or equivalent to measure the concentration of airborne respirable particulates less than 10 micrometers in size (PM<sub>10</sub>). The dust monitor will be capable of calculating 15-minute running average concentrations and equipped with an audible alarm to indicate

exceedance of action levels. An inspection of the monitoring stations will be conducted on at least an hourly basis. Background readings and any readings that trigger response actions will be recorded in the project logbook, which will be available on-site for NYSDOH and/or NYSDEC review. If the downwind particulate concentrations are greater than 100 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) above background (upwind concentrations), and no other obvious source is apparent, then it will be assumed that the elevated particulate concentrations are a result of Site activities. In such instances, dust suppression measures will be implemented and monitoring will be continued. Work will be allowed to continue with dust suppression if downwind particulate levels do not exceed 150  $\mu\text{g}/\text{m}^3$  above the background (upwind concentration) and provided that no visible dust is migrating from the work area. If particulate levels persist at 150  $\mu\text{g}/\text{m}^3$  above the background, work must be stopped until dust suppression measures bring particulate levels to below 150  $\mu\text{g}/\text{m}^3$  above background.

#### Major Vapor Emission Response Plan

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work site, or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted or vapor controls must be implemented.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the exclusion zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If either of the following criteria is exceeded in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented.

- Sustained organic vapor levels approaching 1 ppm above background for a period of more than 30 minutes, or
- Organic vapor levels greater than 5 ppm above background for any time period.

Upon activation, the following activities shall be undertaken as part of the Major Vapor Emission Response Plan:

- The NYSDEC, NYSDOH, and local police authorities will be immediately contacted by the SSO and advised of the situation;
- Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Site Health and Safety Officer; and
- All Emergency contacts will go into effect as appropriate.

All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review.

### 2.6.3 Personal Protection Equipment

The personal protection equipment required for various kinds of site investigation tasks are based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, Appendix B, “General Description and Discussion of the Levels of Protection and Protective Gear.”

AKRF field personnel and other site personnel shall wear, at a minimum, Level D personal protective equipment. The protection will be based on the air monitoring described in this section.

Personal Protection Equipment Requirements		
LEVEL OF PROTECTION & PPE		All Tasks
<b>Level D</b> <input checked="" type="checkbox"/> Steel Toe Shoes <input checked="" type="checkbox"/> Hard Hat (within 25 ft of drill rig/excavator) <input checked="" type="checkbox"/> Work Gloves	<input checked="" type="checkbox"/> Safety Glasses <input type="checkbox"/> Face Shield <input checked="" type="checkbox"/> Ear Plugs (within 25 ft of drill rig/excavator) <input checked="" type="checkbox"/> Nitrile Gloves <input checked="" type="checkbox"/> Tyvek for drill operator if NAPL present	Yes
<b>Level C (in addition to Level D)</b> <input checked="" type="checkbox"/> Half-Face Respirator OR <input checked="" type="checkbox"/> Full Face Respirator <input type="checkbox"/> Full-Face PAPR	<input type="checkbox"/> Particulate Cartridge <input type="checkbox"/> Organic Cartridge <input checked="" type="checkbox"/> Dual Organic/Particulate Cartridge	If PID > 10 ppm (breathing zone)
Comments: Cartridges to be changed out at least once per shift unless warranted beforehand (e.g., more difficult to breath or any odors detected).		

### 2.7 General Work Practices

To protect their health and safety, all field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited, except in designated areas on the Site. These areas will be designated by the SSO.
- Workers must wash their hands thoroughly on leaving the work area and before eating, drinking, or any other such activity.
- The workers should shower as soon as possible after leaving the Site. Contact with contaminated or suspected surfaces should be avoided.
- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat/cold stress.

### 3.0 EMERGENCY PROCEDURES AND EMERGENCY RESPONSE PLAN

The field crew will be equipped with emergency equipment, such as a first aid kit and disposable eye washes. In the case of a medical emergency, the SSO will determine the nature of the emergency and he/she will have someone call for an ambulance, if needed. If the nature of the injury is not serious, i.e., the person can be moved without expert emergency medical personnel, he/she should be driven to the Jamaica Hospital Medical Center in Jamaica by on-site personnel. Directions to the hospital are provided below, and a hospital route map is attached.

#### 3.1 Hospital Directions

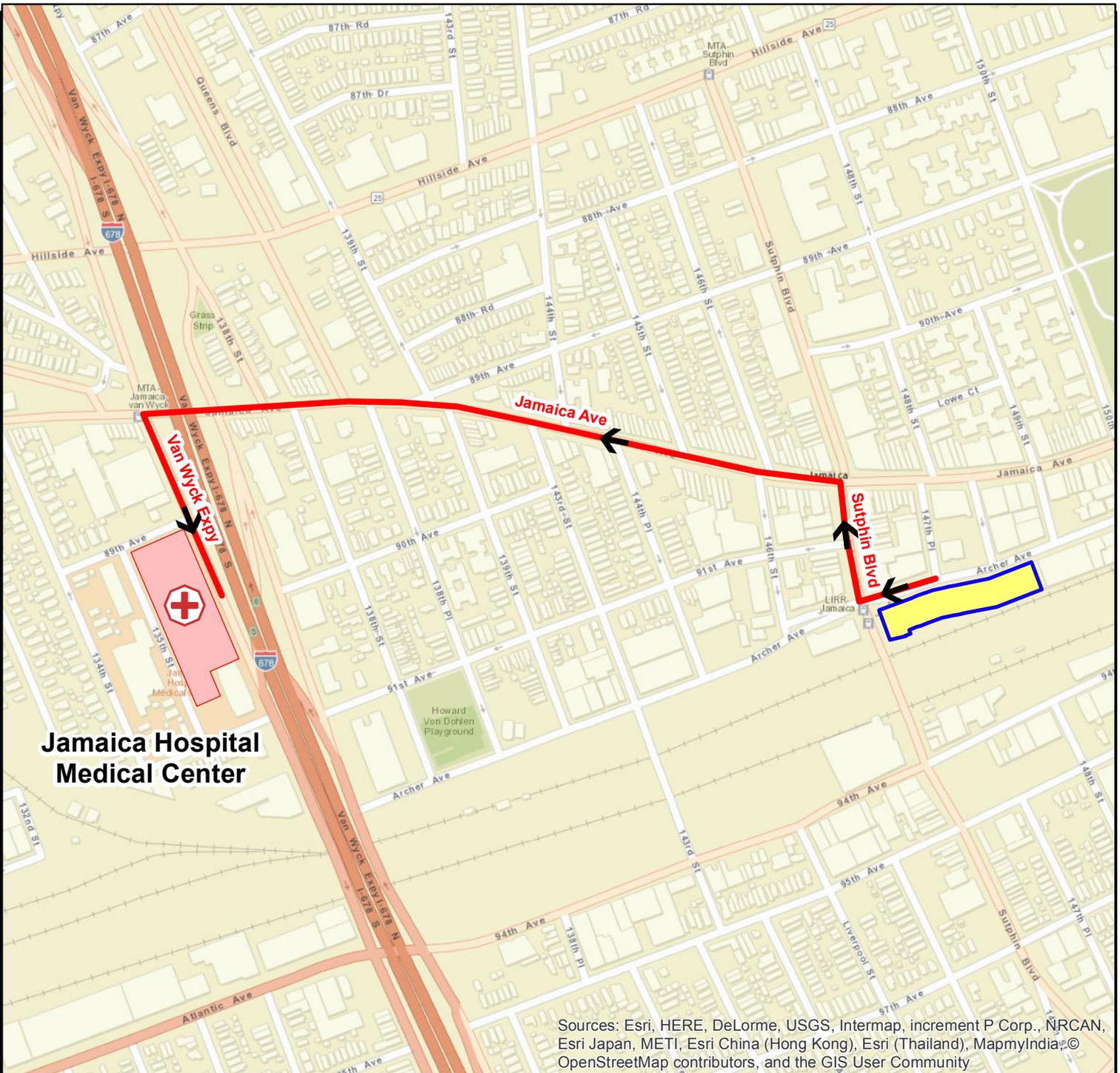
<b>Hospital Name:</b>	Jamaica Hospital Medical Center
<b>Phone Number:</b>	(718) 206-6066 (Emergency Department)
<b>Address/Location:</b>	8900 Van Wyck Expressway, Jamaica, NY 11418
<b>Directions:</b>	Head WEST on Archer Avenue toward Sutphin Boulevard Turn RIGHT onto Sutphin Boulevard Turn LEFT onto Jamaica Avenue Cross over the Van Wyck Expressway and turn immediately LEFT onto Van Wyck Expressway Service Road Emergency room will be on the right between 89th Avenue and 91st Avenue

#### 3.2 Emergency Contacts

Company	Individual Name	Title	Contact Number
AKRF, Inc.	Axel Schwendt	Project Director	646-388-9529 (office)
	Neoma Chefalo	Project Manager	646-388-9854 (office)
	Adrianna Bosco	SSO	646-388-9576 (office) 914-874-3358 (cell)
BRP Development Corp.	Andrew Cohen	Owner Representative	212-488-1739
New York State Department of Environmental Conservation	Mandy Yau	Project Manager	718-402-9774
New York State Department of Health	Krista Anders	Bureau Director	518-402-7880
Ambulance, Fire Department & Police Department	-	-	911
NYSDEC Spill Hotline	-	-	800-457-7362



**FIGURE 1 – HOSPITAL ROUTE MAP**



**Jamaica Hospital  
Medical Center**

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NJRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

**Legend**

-  Hospital Location
-  Project Site Location
-  Route to Hospital



Jamaica Hospital Medical Center  
8900 Van Wyck Expressway  
Jamaica, NY 11418

**The Crossing at Jamaica Station**  
Queens, New York



DATE  
**1/25/2016**

PROJECT No.  
**12146**

**HOSPITAL LOCATION MAP**

**Environmental Consultants**  
440 Park Avenue South, New York, N.Y. 10016

FIGURE  
**1**

**ATTACHMENT A**  
**POTENTIAL HEALTH EFFECTS FROM ON-SITE CONTAMINANTS**

This fact sheet answers the most frequently asked health questions (FAQs) about tetrachloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Tetrachloroethylene is a manufactured chemical used for dry cleaning and metal degreasing. Exposure to very high concentrations of tetrachloroethylene can cause dizziness, headaches, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Tetrachloroethylene has been found in at least 771 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

### What is tetrachloroethylene?

(Pronounced tět'rə-klôr' 0-ěth'ə-lēn')

Tetrachloroethylene is a manufactured chemical that is widely used for dry cleaning of fabrics and for metal-degreasing. It is also used to make other chemicals and is used in some consumer products.

Other names for tetrachloroethylene include perchloroethylene, PCE, and tetrachloroethene. It is a nonflammable liquid at room temperature. It evaporates easily into the air and has a sharp, sweet odor. Most people can smell tetrachloroethylene when it is present in the air at a level of 1 part tetrachloroethylene per million parts of air (1 ppm) or more, although some can smell it at even lower levels.

### What happens to tetrachloroethylene when it enters the environment?

- Much of the tetrachloroethylene that gets into water or soil evaporates into the air.
- Microorganisms can break down some of the tetrachloroethylene in soil or underground water.
- In the air, it is broken down by sunlight into other chemicals or brought back to the soil and water by rain.
- It does not appear to collect in fish or other animals that live in water.

### How might I be exposed to tetrachloroethylene?

- When you bring clothes from the dry cleaners, they will release small amounts of tetrachloroethylene into the air.
- When you drink water containing tetrachloroethylene, you are exposed to it.

### How can tetrachloroethylene affect my health?

High concentrations of tetrachloroethylene (particularly in closed, poorly ventilated areas) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death.

Irritation may result from repeated or extended skin contact with it. These symptoms occur almost entirely in work (or hobby) environments when people have been accidentally exposed to high concentrations or have intentionally used tetrachloroethylene to get a "high."

In industry, most workers are exposed to levels lower than those causing obvious nervous system effects. The health effects of breathing in air or drinking water with low levels of tetrachloroethylene are not known.

Results from some studies suggest that women who work in dry cleaning industries where exposures to tetrachloroethyl-

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ene can be quite high may have more menstrual problems and spontaneous abortions than women who are not exposed. However, it is not known if tetrachloroethylene was responsible for these problems because other possible causes were not considered.

Results of animal studies, conducted with amounts much higher than those that most people are exposed to, show that tetrachloroethylene can cause liver and kidney damage. Exposure to very high levels of tetrachloroethylene can be toxic to the unborn pups of pregnant rats and mice. Changes in behavior were observed in the offspring of rats that breathed high levels of the chemical while they were pregnant.

### How likely is tetrachloroethylene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that tetrachloroethylene may reasonably be anticipated to be a carcinogen. Tetrachloroethylene has been shown to cause liver tumors in mice and kidney tumors in male rats.

### Is there a medical test to show whether I've been exposed to tetrachloroethylene?

One way of testing for tetrachloroethylene exposure is to measure the amount of the chemical in the breath, much the same way breath-alcohol measurements are used to determine the amount of alcohol in the blood.

Because it is stored in the body's fat and slowly released into the bloodstream, tetrachloroethylene can be detected in the breath for weeks following a heavy exposure.

Tetrachloroethylene and trichloroacetic acid (TCA), a breakdown product of tetrachloroethylene, can be detected in the blood. These tests are relatively simple to perform. These tests aren't available at most doctors' offices, but can be per-

formed at special laboratories that have the right equipment.

Because exposure to other chemicals can produce the same breakdown products in the urine and blood, the tests for breakdown products cannot determine if you have been exposed to tetrachloroethylene or the other chemicals.

### Has the federal government made recommendations to protect human health?

The EPA maximum contaminant level for the amount of tetrachloroethylene that can be in drinking water is 0.005 milligrams tetrachloroethylene per liter of water (0.005 mg/L).

The Occupational Safety and Health Administration (OSHA) has set a limit of 100 ppm for an 8-hour workday over a 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that tetrachloroethylene be handled as a potential carcinogen and recommends that levels in workplace air should be as low as possible.

### Glossary

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Milligram (mg): One thousandth of a gram.

Nonflammable: Will not burn.

### References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Tetrachloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about trichloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Trichloroethylene is a colorless liquid which is used as a solvent for cleaning metal parts. Drinking or breathing high levels of trichloroethylene may cause nervous system effects, liver and lung damage, abnormal heartbeat, coma, and possibly death. Trichloroethylene has been found in at least 852 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

### What is trichloroethylene?

Trichloroethylene (TCE) is a nonflammable, colorless liquid with a somewhat sweet odor and a sweet, burning taste. It is used mainly as a solvent to remove grease from metal parts, but it is also an ingredient in adhesives, paint removers, typewriter correction fluids, and spot removers.

Trichloroethylene is not thought to occur naturally in the environment. However, it has been found in underground water sources and many surface waters as a result of the manufacture, use, and disposal of the chemical.

### What happens to trichloroethylene when it enters the environment?

- ❑ Trichloroethylene dissolves a little in water, but it can remain in ground water for a long time.
- ❑ Trichloroethylene quickly evaporates from surface water, so it is commonly found as a vapor in the air.
- ❑ Trichloroethylene evaporates less easily from the soil than from surface water. It may stick to particles and remain for a long time.
- ❑ Trichloroethylene may stick to particles in water, which will cause it to eventually settle to the bottom sediment.
- ❑ Trichloroethylene does not build up significantly in

plants and animals.

### How might I be exposed to trichloroethylene?

- ❑ Breathing air in and around the home which has been contaminated with trichloroethylene vapors from shower water or household products such as spot removers and typewriter correction fluid.
- ❑ Drinking, swimming, or showering in water that has been contaminated with trichloroethylene.
- ❑ Contact with soil contaminated with trichloroethylene, such as near a hazardous waste site.
- ❑ Contact with the skin or breathing contaminated air while manufacturing trichloroethylene or using it at work to wash paint or grease from skin or equipment.

### How can trichloroethylene affect my health?

Breathing small amounts may cause headaches, lung irritation, dizziness, poor coordination, and difficulty concentrating.

Breathing large amounts of trichloroethylene may cause impaired heart function, unconsciousness, and death. Breathing it for long periods may cause nerve, kidney, and liver damage.

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Drinking large amounts of trichloroethylene may cause nausea, liver damage, unconsciousness, impaired heart function, or death.

Drinking small amounts of trichloroethylene for long periods may cause liver and kidney damage, impaired immune system function, and impaired fetal development in pregnant women, although the extent of some of these effects is not yet clear.

Skin contact with trichloroethylene for short periods may cause skin rashes.

### How likely is trichloroethylene to cause cancer?

Some studies with mice and rats have suggested that high levels of trichloroethylene may cause liver, kidney, or lung cancer. Some studies of people exposed over long periods to high levels of trichloroethylene in drinking water or in workplace air have found evidence of increased cancer. Although, there are some concerns about the studies of people who were exposed to trichloroethylene, some of the effects found in people were similar to effects in animals.

In its 9<sup>th</sup> Report on Carcinogens, the National Toxicology Program (NTP) determined that trichloroethylene is “reasonably anticipated to be a human carcinogen.” The International Agency for Research on Cancer (IARC) has determined that trichloroethylene is “probably carcinogenic to humans.”

### Is there a medical test to show whether I've been exposed to trichloroethylene?

If you have recently been exposed to trichloroethylene, it can be detected in your breath, blood, or urine. The breath test, if it is performed soon after exposure, can tell if you have been exposed to even a small amount of trichloroethylene.

Exposure to larger amounts is assessed by blood

and urine tests, which can detect trichloroethylene and many of its breakdown products for up to a week after exposure. However, exposure to other similar chemicals can produce the same breakdown products, so their detection is not absolute proof of exposure to trichloroethylene. This test isn't available at most doctors' offices, but can be done at special laboratories that have the right equipment.

### Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level for trichloroethylene in drinking water at 0.005 milligrams per liter (0.005 mg/L) or 5 parts of TCE per billion parts water.

The EPA has also developed regulations for the handling and disposal of trichloroethylene.

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 100 parts of trichloroethylene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

### Glossary

Carcinogenicity: The ability of a substance to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or gas.

Milligram (mg): One thousandth of a gram.

Nonflammable: Will not burn.

ppm: Parts per million.

Sediment: Mud and debris that have settled to the bottom of a body of water.

Solvent: A chemical that dissolves other substances.

### References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Trichloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

This fact sheet answers the most frequently asked health questions (FAQs) about 1,2-dichloroethene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Exposure to 1,2-dichloroethene occurs mainly in workplaces where it is made or used. Breathing high levels of 1,2-dichloroethene can make you feel nauseous, drowsy, and tired. *cis*-1,2-Dichloroethene has been found in at least 146 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA). *trans*-1,2-Dichloroethene was found in at least 563 NPL sites. 1,2-Dichloroethene was found at 336 sites, but the isomer (*cis*- or *trans*-) was not specified.

## What is 1,2-dichloroethene?

(Pronounced 1,2-dī-klôr' õ-ěth'ēn)

1,2-Dichloroethene, also called 1,2-dichloroethylene, is a highly flammable, colorless liquid with a sharp, harsh odor. It is used to produce solvents and in chemical mixtures. You can smell very small amounts of 1,2-dichloroethene in air (about 17 parts of 1,2-dichloroethene per million parts of air [17 ppm]).

There are two forms of 1,2-dichloroethene; one is called *cis*-1,2-dichloroethene and the other is called *trans*-1,2-dichloroethene. Sometimes both forms are present as a mixture.

## What happens to 1,2-dichloroethene when it enters the environment?

- 1,2-Dichloroethene evaporates rapidly into air.
- In the air, it takes about 5-12 days for half of it to break down.
- Most 1,2-dichloroethene in the soil surface or bodies of water will evaporate into air.
- 1,2-Dichloroethene can travel through soil or dissolve in water in the soil. It is possible that it can contaminate groundwater.
- In groundwater, it takes about 13-48 weeks to break down.

- There is a slight chance that 1,2-dichloroethene will break down into vinyl chloride, a different chemical which is believed to be more toxic than 1,2-dichloroethene.

## How might I be exposed to 1,2-dichloroethene?

- Breathing 1,2-dichloroethene that has leaked from hazardous waste sites and landfills.
- Drinking contaminated tap water or breathing vapors from contaminated water while cooking, bathing, or washing dishes.
- Breathing 1,2-dichloroethene, touching it, or touching contaminated materials in the workplace.

## How can 1,2-dichloroethene affect my health?

Breathing high levels of 1,2-dichloroethene can make you feel nauseous, drowsy, and tired; breathing very high levels can kill you.

When animals breathed high levels of *trans*-1,2-dichloroethene for short or longer periods of time, their livers and lungs were damaged and the effects were more severe with longer exposure times. Animals that breathed very high

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levels of *trans*-1,2-dichloroethene had damaged hearts.

Animals that ingested extremely high doses of *cis*- or *trans*-1,2-dichloroethene died.

Lower doses of *cis*-1,2-dichloroethene caused effects on the blood, such as decreased numbers of red blood cells, and also effects on the liver.

The long-term (365 days or longer) human health effects after exposure to low concentrations of 1,2-dichloroethene aren't known. One animal study suggested that an exposed fetus may not grow as quickly as one that hasn't been exposed.

Exposure to 1,2-dichloroethene hasn't been shown to affect fertility in people or animals.

### How likely is 1,2-dichloroethene to cause cancer?

The EPA has determined that *cis*-1,2-dichloroethene is not classifiable as to its human carcinogenicity.

No EPA cancer classification is available for *trans*-1,2-dichloroethene.

### Is there a medical test to show whether I've been exposed to 1,2-dichloroethene?

Tests are available to measure concentrations of the breakdown products of 1,2-dichloroethene in blood, urine, and tissues. However, these tests aren't used routinely to determine whether a person has been exposed to this compound. This is because after you are exposed to 1,2-dichloroethene, the breakdown products in your body that are detected with these tests may be the same as those that come from exposure to other chemicals. These tests aren't available in most doctors' offices, but can be done at special laboratories that have the right equipment.

### Has the federal government made recommendations to protect human health?

The EPA has set the maximum allowable level of *cis*-1,2-dichloroethene in drinking water at 0.07 milligrams per liter of water (0.07 mg/L) and *trans*-1,2-dichloroethene at 0.1 mg/L.

The EPA requires that any spills or accidental release of 1,000 pounds or more of 1,2-dichloroethene must be reported to the EPA.

The Occupational Health Safety and Health Administration (OSHA) has set the maximum allowable amount of 1,2-dichloroethene in workroom air during an 8-hour workday in a 40-hour workweek at 200 parts of 1,2-dichloroethene per million parts of air (200 ppm).

### Glossary

Carcinogenicity: Ability of a substance to cause cancer.

CAS: Chemical Abstracts Service.

Fertility: Ability to reproduce.

Ingest: To eat or drink something.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Solvent: A chemical that can dissolve other substances.

### References

This ToxFAQs information is taken from the 1996 Toxicological Profile for 1,2-Dichloroethene produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 813 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

## What is benzene?

(Pronounced bĕn'zĕn')

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

## What happens to benzene when it enters the environment?

- Industrial processes are the main source of benzene in the environment.
- Benzene can pass into the air from water and soil.
- It reacts with other chemicals in the air and breaks down within a few days.
- Benzene in the air can attach to rain or snow and be carried back down to the ground.

- It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- Benzene does not build up in plants or animals.

## How might I be exposed to benzene?

- Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
- Indoor air generally contains higher levels of benzene from products that contain it such as glues, paints, furniture wax, and detergents.
- Air around hazardous waste sites or gas stations will contain higher levels of benzene.
- Leakage from underground storage tanks or from hazardous waste sites containing benzene can result in benzene contamination of well water.
- People working in industries that make or use benzene may be exposed to the highest levels of it.
- A major source of benzene exposures is tobacco smoke.

## How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

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The major effect of benzene from long-term (365 days or longer) exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men.

Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

### **How likely is benzene to cause cancer?**

The Department of Health and Human Services (DHHS) has determined that benzene is a known human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs.

### **Is there a medical test to show whether I've been exposed to benzene?**

Several tests can show if you have been exposed to benzene. There is test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood, however, since benzene disappears rapidly from the blood, measurements are accurate only for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

### **Has the federal government made recommendations to protect human health?**

The EPA has set the maximum permissible level of benzene in drinking water at 0.005 milligrams per liter (0.005 mg/L). The EPA requires that spills or accidental releases into the environment of 10 pounds or more of benzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 1 part of benzene per million parts of air (1 ppm) in the workplace during an 8-hour workday, 40-hour workweek.

### **Glossary**

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Chromosomes: Parts of the cells responsible for the development of hereditary characteristics.

Metabolites: Breakdown products of chemicals.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

### **References**

This ToxFAQs information is taken from the 1997 Toxicological Profile for Benzene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about ethylbenzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Ethylbenzene is a colorless liquid found in a number of products including gasoline and paints. Breathing very high levels can cause dizziness and throat and eye irritation. Ethylbenzene has been found in at least 731 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

### What is ethylbenzene?

(Pronounced ěth' əl bĕn' zĕn')

Ethylbenzene is a colorless, flammable liquid that smells like gasoline. It is found in natural products such as coal tar and petroleum and is also found in manufactured products such as inks, insecticides, and paints.

Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.

### What happens to ethylbenzene when it enters the environment?

- Ethylbenzene moves easily into the air from water and soil.
- It takes about 3 days for ethylbenzene to be broken down in air into other chemicals.
- Ethylbenzene may be released to water from industrial discharges or leaking underground storage tanks.
- In surface water, ethylbenzene breaks down by reacting with other chemicals found naturally in water.
- In soil, it is broken down by soil bacteria.

### How might I be exposed to ethylbenzene?

- Breathing air containing ethylbenzene, particularly in areas near factories or highways.
- Drinking contaminated tap water.
- Working in an industry where ethylbenzene is used or made.
- Using products containing it, such as gasoline, carpet glues, varnishes, and paints.

### How can ethylbenzene affect my health?

Limited information is available on the effects of ethylbenzene on people's health. The available information shows dizziness, throat and eye irritation, tightening of the chest, and a burning sensation in the eyes of people exposed to high levels of ethylbenzene in air.

Animals studies have shown effects on the nervous system, liver, kidneys, and eyes from breathing ethylbenzene in air.

### How likely is ethylbenzene to cause cancer?

The EPA has determined that ethylbenzene is not classified as to human carcinogenicity.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

No studies in people have shown that ethylbenzene exposure can result in cancer. Two available animal studies suggest that ethylbenzene may cause tumors.

### How can ethylbenzene affect children?

Children may be exposed to ethylbenzene through inhalation of consumer products, including gasoline, paints, inks, pesticides, and carpet glue. We do not know whether children are more sensitive to the effects of ethylbenzene than adults.

It is not known whether ethylbenzene can affect the development of the human fetus. Animal studies have shown that when pregnant animals were exposed to ethylbenzene in air, their babies had an increased number of birth defects.

### How can families reduce the risk of exposure to ethylbenzene?

Exposure to ethylbenzene vapors from household products and newly installed carpeting can be minimized by using adequate ventilation.

Household chemicals should be stored out of reach of children to prevent accidental poisoning. Always store household chemicals in their original containers; never store them in containers children would find attractive to eat or drink from, such as old soda bottles. Gasoline should be stored in a gasoline can with a locked cap.

Sometimes older children sniff household chemicals, including ethylbenzene, in an attempt to get high. Talk with your children about the dangers of sniffing chemicals.

### Is there a medical test to show whether I've been exposed to ethylbenzene?

Ethylbenzene is found in the blood, urine, breath, and

some body tissues of exposed people. The most common way to test for ethylbenzene is in the urine. This test measures substances formed by the breakdown of ethylbenzene. This test needs to be done within a few hours after exposure occurs, because the substances leave the body very quickly.

These tests can show you were exposed to ethylbenzene, but cannot predict the kind of health effects that might occur.

### Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level of 0.7 milligrams of ethylbenzene per liter of drinking water (0.7 mg/L).

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of ethylbenzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 100 parts of ethylbenzene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for ethylbenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

## What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl'ī-sī'klīk ār'ə-măt'īk hī'drə-kar'bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

## What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.

- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

## How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smoke-houses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

- ❑ Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

### How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

### How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

### Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any

health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

### Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air ( $0.2 \text{ mg/m}^3$ ). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is  $5 \text{ mg/m}^3$  averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed  $0.1 \text{ mg/m}^3$  for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

### Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about toluene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Exposure to toluene occurs from breathing contaminated workplace air, in automobile exhaust, some consumer products paints, paint thinners, fingernail polish, lacquers, and adhesives. Toluene affects the nervous system. Toluene has been found at 959 of the 1,591 National Priority List sites identified by the Environmental Protection Agency

### What is toluene?

Toluene is a clear, colorless liquid with a distinctive smell. Toluene occurs naturally in crude oil and in the tolu tree. It is also produced in the process of making gasoline and other fuels from crude oil and making coke from coal.

Toluene is used in making paints, paint thinners, fingernail polish, lacquers, adhesives, and rubber and in some printing and leather tanning processes.

### What happens to toluene when it enters the environment?

Toluene enters the environment when you use materials that contain it. It can also enter surface water and groundwater from spills of solvents and petroleum products as well as from leaking underground storage tanks at gasoline stations and other facilities.

When toluene-containing products are placed in landfills or waste disposal sites, the toluene can enter the soil or water near the waste site.

Toluene does not usually stay in the environment long.

Toluene does not concentrate or buildup to high levels in animals.

### How might I be exposed to toluene?

Breathing contaminated workplace air or automobile exhaust.

Working with gasoline, kerosene, heating oil, paints, and lacquers.

Drinking contaminated well-water.

Living near uncontrolled hazardous waste sites containing toluene products.

### How can toluene affect my health?

Toluene may affect the nervous system. Low to moderate levels can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, loss of appetite, and

**ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>**

hearing and color vision loss. These symptoms usually disappear when exposure is stopped.

Inhaling High levels of toluene in a short time can make you feel light-headed, dizzy, or sleepy. It can also cause unconsciousness, and even death.

High levels of toluene may affect your kidneys.

### **How likely is toluene to cause cancer?**

Studies in humans and animals generally indicate that toluene does not cause cancer.

The EPA has determined that the carcinogenicity of toluene can not be classified.

### **How can toluene affect children?**

It is likely that health effects seen in children exposed to toluene will be similar to the effects seen in adults. Some studies in animals suggest that babies may be more sensitive than adults.

Breathing very high levels of toluene during pregnancy can result in children with birth defects and retard mental abilities, and growth. We do not know if toluene harms the unborn child if the mother is exposed to low levels of toluene during pregnancy.

### **How can families reduce the risk of exposure to toluene?**

- Use toluene-containing products in well-ventilated areas.

- When not in use, toluene-containing products should be tightly covered to prevent evaporation into the air.

### **Is there a medical test to show whether I've been exposed to toluene?**

There are tests to measure the level of toluene or its breakdown products in exhaled air, urine, and blood. To determine if you have been exposed to toluene, your urine or blood must be checked within 12 hours of exposure. Several other chemicals are also changed into the same breakdown products as toluene, so some of these tests are not specific for toluene.

### **Has the federal government made recommendations to protect human health?**

EPA has set a limit of 1 milligram per liter of drinking water (1 mg/L).

Discharges, releases, or spills of more than 1,000 pounds of toluene must be reported to the National Response Center.

The Occupational Safety and Health Administration has set a limit of 200 parts toluene per million of workplace air (200 ppm).

### **References**

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Toluene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about xylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**SUMMARY: Exposure to xylene occurs in the workplace and when you use paint, gasoline, paint thinners and other products that contain it. People who breathe high levels may have dizziness, confusion, and a change in their sense of balance. This substance has been found in at least 658 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

## What is xylene?

(Pronounced zī'lēn)

Xylene is a colorless, sweet-smelling liquid that catches on fire easily. It occurs naturally in petroleum and coal tar and is formed during forest fires. You can smell xylene in air at 0.08–3.7 parts of xylene per million parts of air (ppm) and begin to taste it in water at 0.53–1.8 ppm.

Chemical industries produce xylene from petroleum. It's one of the top 30 chemicals produced in the United States in terms of volume.

Xylene is used as a solvent and in the printing, rubber, and leather industries. It is also used as a cleaning agent, a thinner for paint, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.

## What happens to xylene when it enters the environment?

- Xylene has been found in waste sites and landfills when discarded as used solvent, or in varnish, paint, or paint thinners.
- It evaporates quickly from the soil and surface water into the air.

- In the air, it is broken down by sunlight into other less harmful chemicals.
- It is broken down by microorganisms in soil and water.
- Only a small amount of it builds up in fish, shellfish, plants, and animals living in xylene-contaminated water.

## How might I be exposed to xylene?

- Breathing xylene in workplace air or in automobile exhaust.
- Breathing contaminated air.
- Touching gasoline, paint, paint removers, varnish, shellac, and rust preventatives that contain it.
- Breathing cigarette smoke that has small amounts of xylene in it.
- Drinking contaminated water or breathing air near waste sites and landfills that contain xylene.
- The amount of xylene in food is likely to be low.

## How can xylene affect my health?

Xylene affects the brain. High levels from exposure for short periods (14 days or less) or long periods (more than 1 year) can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of

ToxFAQs Internet home page via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels.

Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, and delayed growth and development. In many instances, these same concentrations also cause damage to the mothers. We do not know if xylene harms the unborn child if the mother is exposed to low levels of xylene during pregnancy.

### How likely is xylene to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that xylene is not classifiable as to its carcinogenicity in humans.

Human and animal studies have not shown xylene to be carcinogenic, but these studies are not conclusive and do not provide enough information to conclude that xylene does not cause cancer.

### Is there a medical test to show whether I've been exposed to xylene?

Laboratory tests can detect xylene or its breakdown products in exhaled air, blood, or urine. There is a high degree of agreement between the levels of exposure to xylene and the levels of xylene breakdown products in the urine. However, a urine sample must be provided very soon after exposure ends because xylene quickly leaves the body. These tests are not routinely available at your doctor's office.

### Has the federal government made recommendations to protect human health?

The EPA has set a limit of 10 ppm of xylene in drinking water.

The EPA requires that spills or accidental releases of xylenes into the environment of 1,000 pounds or more must be reported.

The Occupational Safety and Health Administration (OSHA) has set a maximum level of 100 ppm xylene in workplace air for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) also recommend exposure limits of 100 ppm in workplace air.

NIOSH has recommended that 900 ppm of xylene be considered immediately dangerous to life or health. This is the exposure level of a chemical that is likely to cause permanent health problems or death.

### Glossary

Evaporate: To change from a liquid into a vapor or a gas.

Carcinogenic: Having the ability to cause cancer.

CAS: Chemical Abstracts Service.

ppm: Parts per million.

Solvent: A liquid that can dissolve other substances.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for xylenes (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



**ATTACHMENT B**  
**WEST NILE VIRUS/ST. LOUIS ENCEPHALITIS PREVENTION**

## WEST NILE VIRUS/ST. LOUIS ENCEPHALITIS PREVENTION

The following section is based upon information provided by the CDC Division of Vector-Borne Infectious Diseases. Symptoms of West Nile Virus include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands, with most infections being mild. More severe infection may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death. Most infections of St. Louis encephalitis are mild without apparent symptoms other than fever with headache. More severe infection is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions (especially infants) and spastic (but rarely flaccid) paralysis. The only way to avoid infection of West Nile Virus and St. Louis encephalitis is to avoid mosquito bites. To reduce the chance of mosquito contact:

- Stay indoors at dawn, dusk, and in the early evening.
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Spray clothing with repellents containing permethrin or DEET (N, N-diethyl-meta-toluamide), since mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET. DEET in high concentrations (greater than 35%) provides no additional protection.
- Repellents may irritate the eyes and mouth.
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's directions for use, as printed on the product.

**ATTACHMENT C**  
**REPORT FORMS**

## WEEKLY SAFETY REPORT FORM

Week Ending: \_\_\_\_\_ Project Name/Number: \_\_\_\_\_

Report Date: \_\_\_\_\_ Project Manager Name: \_\_\_\_\_

Summary of any violations of procedures occurring that week:

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Summary of any job related injuries, illnesses, or near misses that week:

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Summary of air monitoring data that week (include and sample analyses, action levels exceeded, and actions taken):

---

---

---

Comments:

---

---

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Name: \_\_\_\_\_ Company: \_\_\_\_\_

Signature: \_\_\_\_\_ Title: \_\_\_\_\_



**INJURED - ILL:**

Name: \_\_\_\_\_ SSN: \_\_\_\_\_

Address: \_\_\_\_\_ Age: \_\_\_\_\_

Length of Service: \_\_\_\_\_ Time on Present Job: \_\_\_\_\_

Time/Classification: \_\_\_\_\_

**SEVERITY OF INJURY OR ILLNESS:**

\_\_\_ Disabling                      \_\_\_ Non-disabling                      \_\_\_ Fatality

\_\_\_ Medical Treatment                      \_\_\_ First Aid Only

**ESTIMATED NUMBER OF DAYS AWAY FROM JOB:** \_\_\_\_\_

**NATURE OF INJURY OR ILLNESS:** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**CLASSIFICATION OF INJURY:**

- |                    |                       |                            |
|--------------------|-----------------------|----------------------------|
| ___ Abrasions      | _____ Dislocations    | _____ Punctures            |
| ___ Bites          | _____ Faint/Dizziness | _____ Radiation Burns      |
| ___ Blisters       | _____ Fractures       | _____ Respiratory Allergy  |
| ___ Bruises        | _____ Frostbite       | _____ Sprains              |
| ___ Chemical Burns | _____ Heat Burns      | _____ Toxic Resp. Exposure |
| ___ Cold Exposure  | _____ Heat Exhaustion | _____ Toxic Ingestion      |
| ___ Concussion     | _____ Heat Stroke     | _____ Dermal Allergy       |
| ___ Lacerations    |                       |                            |

Part of Body Affected: \_\_\_\_\_

Degree of Disability: \_\_\_\_\_

Date Medical Care was Received: \_\_\_\_\_

Where Medical Care was Received: \_\_\_\_\_

Address (if off-site): \_\_\_\_\_

(If two or more injuries, record on separate sheets)

**PROPERTY DAMAGE:**

Description of Damage: \_\_\_\_\_

Cost of Damage: \$ \_\_\_\_\_

**ACCIDENT/INCIDENT LOCATION:** \_\_\_\_\_

**ACCIDENT/INCIDENT ANALYSIS:** Causative agent most directly related to accident/incident (Object, substance, material, machinery, equipment, conditions)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Was weather a factor?: \_\_\_\_\_

Unsafe mechanical/physical/environmental condition at time of accident/incident (Be specific):

\_\_\_\_\_  
\_\_\_\_\_

Personal factors (Attitude, knowledge or skill, reaction time, fatigue):

\_\_\_\_\_

**ON-SITE ACCIDENTS/INCIDENTS:**

Level of personal protection equipment required in Site Safety Plan:

\_\_\_\_\_

Modifications:

Was injured using required equipment?:

\_\_\_\_\_

If not, how did actual equipment use differ from plan?:

\_\_\_\_\_  
\_\_\_\_\_

**ACTION TAKEN TO PREVENT RECURRENCE:** (Be specific. What has or will be done? When will it be done? Who is the responsible party to insure that the correction is made?)

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**ACCIDENT/INCIDENT REPORT REVIEWED BY:**

\_\_\_\_\_  
SSO Name Printed

\_\_\_\_\_  
SSO Signature

**OTHERS PARTICIPATING IN INVESTIGATION:**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

**ACCIDENT/INCIDENT FOLLOW-UP:**      Date: \_\_\_\_\_

Outcome of accident/incident: \_\_\_\_\_

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Physician's recommendations: \_\_\_\_\_

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Date injured returned to work: \_\_\_\_\_  
Follow-up performed by: \_\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

**ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM**

**ATTACHMENT D**  
**EMERGENCY HAND SIGNALS**

## EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communication. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

Where radio communications is not available, the following air-horn and/or hand signals will be used:

### EMERGENCY HAND SIGNALS

**OUT OF AIR, CAN'T BREATHE!**



**Hand gripping throat**

**LEAVE AREA IMMEDIATELY,  
NO DEBATE!**

( No Picture) Grip partner's wrist or place both hands around waist

**NEED ASSISTANCE!**



**Hands on top of head**

**OKAY! – I'M ALL RIGHT!  
- I UNDERSTAND!**



**Thumbs up**

**NO! - NEGATIVE!**



**Thumbs down**

**APPENDIX B**  
**QUALITY ASSURANCE PROJECT PLAN**

# **THE CROSSING AT JAMAICA STATION**

**147-22 ARCHER AVENUE**

**QUEENS, NEW YORK**

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**Quality Assurance Project Plan**

**NYSDEC BCP Number: C241183**

**AKRF Project Number: 12146**

**Prepared for:**

BRP Development Corp.  
767 Third Avenue, 33rd Floor  
New York, NY 10017

**Prepared by:**



**AKRF Engineering, P.C.**  
440 Park Avenue South  
New York, New York 10016  
(212) 696-0670

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**NOVEMBER 2016**

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## **1.0 INTRODUCTION**

This Quality Assurance Project Plan (QAPP) describes the protocols and procedures that will be followed during implementation of the Remedial Action Work Plan (RAWP) at the Crossing at Jamaica Station site (the Site) by BRP Development Corp. (the Volunteer). The Site is located at 147-22 Archer Avenue in the Jamaica section of Queens, New York. The Site is also identified as Block 9998, Lot 83 on the New York City Tax Map. The objective of the QAPP is to provide for Quality Assurance (QA) and maintain Quality Control (QC) of environmental investigative, sampling, and remedial activities conducted during Site remediation and excavation. Adherence to the QAPP will ensure that defensible data will be obtained while completing the remedial work.

## **2.0 PROJECT TEAM**

The project team will be drawn from AKRF professional and technical personnel and AKRF's subcontractors. All field personnel and subcontractors will have completed a 40-hour training course and updated 8-hour refresher course that meet the Occupational Safety and Health Administration (OSHA) requirements of 29 CFR Part 1910. The following sections describe the key project personnel and their responsibilities.

### **2.1 PROJECT DIRECTOR**

The project director will be responsible for the general oversight of all aspects of the project, including scheduling, budgeting, data management, and decision-making regarding the field program. The project director will communicate regularly with all members of the AKRF project team and the New York State Department of Environmental Conservation (NYSDEC) to ensure a smooth flow of information between involved parties. Axel Schwendt will serve as the project director for the RAWP. Mr. Schwendt's resume is included in Attachment A.

### **2.2 PROJECT MANAGER**

The project manager will be responsible for directing and coordinating all elements of the RAWP. She will prepare reports and participate in meetings with the Site owner and/or the NYSDEC. Neoma Chefalo will serve as the project manager for the RAWP. Ms. Chefalo's resume is included in Attachment A.

### **2.3 REMEDIAL ENGINEER**

The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program. The Remedial Engineer will certify in the Final Engineering Report (FER) that the remedial activities were observed by qualified environmental professionals under her supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. The Remedial Engineer for this project will be Michelle Lapin, P.E. Ms. Lapin's resume is included in Attachment A.

### **2.4 FIELD TEAM LEADER**

The field team leader will be responsible for supervising the daily sampling and health and safety activities in the field and will ensure adherence to the work plan and Health and Safety Plan (HASP). He will report to the Project Manager on a regular basis regarding daily progress and any deviations from the work plan. The field team leader will be a qualified, responsible person,

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able to act professionally and promptly during soil disturbing activities. Adrianna Bosco will be the field team leader for the RAWP. Ms. Bosco's resume is included in Attachment A.

## **2.5 PROJECT QUALITY ASSURANCE/QUALITY CONTROL OFFICER**

The Quality Assurance/Quality Control (QA/QC) Officer will be responsible for adherence to the QAPP. He will review the procedures with all personnel prior to commencing any fieldwork and will assess implementation of the required procedures. Marcus Simons will serve as the QA/QC officer for the RAWP.

## **2.6 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL OFFICER**

The laboratory QA/QC officer will be responsible for quality control procedures and checks in the laboratory and ensuring adherence to laboratory protocols. He/she will track the movement of samples from the time they are checked in at the laboratory to the time that analytical results are issued. He/she will conduct a final check on the analytical calculations and sign off on the laboratory reports. The laboratory QA/QC officer will be determined upon selection of a contract laboratory(s) for the RAWP.

# **3.0 STANDARD OPERATING PROCEDURES**

The following sections describe the standard operating procedures (SOPs) for the remedial activities included in the RAWP. During these operations, safety monitoring will be performed as described in the project Health and Safety Plan (HASP) and all field personnel will wear appropriate personal protective equipment.

## **3.1 REMEDIAL MEASURES**

### **3.1.1 Excavation of Soil Contamination Areas**

Previous investigations including subsurface soil borings, groundwater sampling, and soil vapor sampling indicated some limited potential for contamination at the Site, with elevated concentrations of certain metals, semivolatile organic compounds (SVOCs) and pesticides, and certain chlorinated volatile organic compounds (VOCs) in soil vapor, including tetrachloroethene (PCE) and trichloroethene (TCE). If encountered, contaminated soil would be excavated, properly characterized and removed for off-site disposal. Soil sampling will be conducted as necessary in the event that contamination is discovered at the Site during construction excavation or test pit activities

### **3.1.2 Tank Removal**

In the event that tanks are confirmed or encountered at the Site, the tanks and any appurtenances will be cleaned, removed and disposed of in accordance with accepted industry standards and applicable Federal, State, and local regulatory agency requirements. Tank and soil removal from the vicinity of discovered underground storage tanks will be conducted in consultation with the NYSDEC.

Typical tank removal procedures are summarized below:

1. Open fill cap or vent pipe and measure for product. Collect a sample of the product. Tank contents will be sampled in accordance with applicable federal, state and local requirements and tested in accordance with the requirements of the receiving facility. Proper disposal of tank contents at an approved facility will be dictated by sample results.

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2. Excavate to expose the tank. Vacuum liquid tank contents and pumpable tank bottom residue.
  3. Excavate around the tank with care to avoid release of tank and piping contents. Hand excavation around the tank may be necessary. The sides of all excavated areas will be properly stabilized in accordance with OSHA regulations. Continuously monitor the excavated areas in the worker breathing zone for the presence of flammable, toxic or oxygen deficient atmosphere with a photoionization (PID), a combustible gas indicator (CGI), and an oxygen meter.
  4. Inert the tank of flammable vapors using dry ice and verify using an oxygen meter (less than 7 percent). An access hole will be cut in the tank and the tank will be thoroughly cleaned of residual liquids and sludges.
  5. Entry of the tank, if necessary, shall be conducted in conformance with OSHA confined space requirements.
  6. Remaining fuels, loose slurry, sludge materials and wastewater will be collected in DOT-approved drums, sampled and analyzed for disposal characterization. After disposal characterization, waste material will be removed and disposed of in accordance with applicable regulations.
  7. Remove the tank and all associated piping from the ground and clean the outside of the tank. The tank and piping will be rendered "not reusable," removed from the site and disposed of according to applicable regulations with proper documentation. Remove and dispose of all concrete tank support structures or vaults as encountered.
  8. After tank removal, examine for evidence of petroleum releases in accordance with NYSDEC requirements.
  9. Suspect materials will be field-screened with a PID. If soil contamination is present, excavate and remove contaminated soil from the tank areas in accordance with the RAWP. Material will be excavated until field screening with a PID yields concentrations of less than 20 parts per million (ppm) and until there are no remaining visible signs of contamination or odors. Endpoint sampling will be conducted as directed by the NYSDEC.
  10. Photo-document all procedures and record all procedures in a bound field notebook.

## 3.2 SOIL SAMPLING

### 3.2.1 Soil Screening

During the remedial excavation and potential tank removal activities, the excavated material will be inspected by AKRF field personnel for evidence of contamination (i.e., separate phase liquid, staining, sheening and/or odors) and field-screened using a PID calibrated at the start of each day in accordance with the manufacturer's instructions. In the event that contamination is discovered during Site excavation, the excavation will be expanded laterally and in depth until there is no evidence of contamination. If a release is documented, soil exhibiting evidence of contamination will be removed in the same manner as the contamination excavation areas.

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### 3.2.2 Soil Sampling

Depending upon conditions encountered during construction and monitoring of the Site, soil sampling may be required. Soil sampling will be conducted according to the following procedures:

- Characterize the sample according to the modified Burmister soil classification system.
- Collect an aliquot of soil from each sampling location and place in labeled sealable plastic bags. The bag should be labeled with the soil boring number and the depth the sample was collected. Place the plastic bags in a chilled cooler to await selection of samples for laboratory analysis.
- After selecting which samples will be analyzed in the laboratory, fill the required laboratory-supplied sample jars with the soil from the selected sampling location or labeled sealable plastic bags. Seal and label the sample jars as described in Section 4.4 of this QAPP and place in an ice-filled cooler.
- Decontaminate any soil sampling equipment between sample locations as described in Section 3.5 of this QAPP.
- Record boring number, sample depth and sample observations (evidence of contamination, PID readings, soil classification) in field log book and boring log data sheet, if applicable.

### 3.3 EXCAVATION BACKFILL

Backfilling is not anticipated to occur as part of the proposed development. If development plans are altered to include importing soil onto the Site for use as backfill, material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated properties, will not be imported to the Site. All imported soil (if any) will meet the backfill and cover soil quality standards established in 6 NYCRR 375-6.7(d). Approval will also be based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria. Soil will be considered appropriate for use as on-site imported backfill if contaminant concentrations are below the lesser of the 6 NYCRR Part 375 Restricted Residential and Groundwater Protection SCOs. Soil that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC or NYCOER. Solid waste will not be imported onto the Site.

Native material from a virgin quarry source will not be sampled prior to use as backfill on the Site. All other imported material (if any) will be tested via collection of one composite sample per 1,000 cubic yards of material from each source. Samples will be analyzed for VOCs using EPA Method 8260, SVOCs using EPA Method 8270, TAL metals using EPA Method 6000/7000 series, polychlorinated biphenyls (PCBs) using EPA Method 8082, pesticides using EPA Method 8081, and herbicides using EPA Method 8151.

### 3.4 MATERIALS REUSE ON-SITE

There is no plan to reuse or relocate any on-site soil/fill as part of the development. If plans are altered to include reuse of on-site material, contaminated soil, or any material in direct contact with the contaminated soil, may not be separated for reuse on-site and will be disposed of in accordance with applicable regulations. Organic matter (wood, roots, stumps, etc.) or other solid is prohibited for reuse on-site. Soil that does not exhibit evidence of contamination during field screening, and is free of demolition debris will be stockpiled and tested at a frequency of one

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sample per 1,000 cubic yards and characterized for reuse. Each sample will be tested for TCL VOCs by EPA Method 8260, TCL SVOCs by EPA Method 8270, PCBs by EPA Method 8082, pesticides by EPA Method 8081, and TAL metals by EPA Method 6000/7000 series. Samples will be shipped to the laboratory with appropriate chain of custody documentation. The samples will be analyzed in a laboratory following New York State Department of Health (NYSDOH) Analytical Services Protocol (ASP) Category B deliverables. Soil from representative samples that meet the Site Specific SCOs (identified in the RAWP) can be reused onsite as backfill.

### 3.5 DECONTAMINATION OF SAMPLING EQUIPMENT

All non-disposable sampling equipment (hand augers, sampling spoons, etc.) will be either dedicated or decontaminated between sampling locations. The decontamination procedure will be as follows:

1. Scrub using tap water/Simple Green<sup>®</sup> mixture and bristle brush.
2. Rinse with tap water.
3. Scrub again with tap water/ Simple Green<sup>®</sup> and bristle brush.
4. Rinse with tap water.
5. Rinse with distilled water.
6. Air-dry the equipment, if possible.

Decontamination will be conducted within five-gallon buckets to capture decontamination water.

### 3.6 MANAGEMENT OF INVESTIGATION DERIVED WASTE

All excavated soil will be stockpiled and disposed of in accordance with the RAWP. If field evidence of gross contamination is identified, decontamination wastewater will be drummed and staged near the point of generation, and will be properly disposed of off-site based on laboratory results. If free of visible contamination, disposable personal protective equipment (PPE) and sampling equipment (scoops, gloves, rope, etc.) will be placed in heavy-duty plastic bags and disposed of properly.

## 4.0 SAMPLING AND LABORATORY PROCEDURES

### 4.1 SOIL SAMPLING

Endpoint soil sampling will be conducted according to the following procedures:

- Field screening for evidence of contamination (e.g., odors, staining, elevated PID measurements). Using a hand auger or sampling spoon, remove a small amount of soil from the bottom or sidewall of the excavation. A grab sample can also be collected from the excavator bucket after targeted soil removal from the excavation. Place the soil in a zip-lock bag and insert the PID through the sealed bag to obtain an organic vapor concentration measurement.
- After selecting which samples will be analyzed in the laboratory, fill the required laboratory-supplied sample jars with the soil from the selected sampling location or labeled sealable plastic bags. Seal and label the sample jars as described in Section 4.4 of this QAPP and place in an ice-filled cooler.
- Decontaminate any soil sampling equipment between sample locations as described in Section 3.5 of this QAPP.

- Record boring number, sample depth and sample observations (evidence of contamination, PID readings, soil classification) in field log book and boring log data sheet, if applicable.

#### 4.2 LABORATORY METHODS

Table 1 summarizes the laboratory methods that will be used to analyze field samples as well as the sample container type, preservation, and applicable holding times. An Environmental Laboratory Approval Program (ELAP)-certified laboratory will be used for all chemical analyses in accordance with DER-10 2.1(b) and 2.1(f), including Category B Deliverables.

**TABLE 1  
LABORATORY ANALYTICAL METHODS FOR ANALYSIS GROUPS**

Matrix	Analysis	EPA Method	Bottle Type	Preservative	Hold Time
Soil	TCL VOCs	8260	Encore sampler (3) or Terracore Sampler (1)	4 °C 0°C within 24 hrs	48 hours to extract 14 days to analyze
	TCL SVOCs	8270	Glass 8 oz. Jar	4 °C	14 days to extract 40 days to analyze
	TAL Metals	6000/7000	Glass 8 oz. Jar	4 °C	6 months (28 days for Hg)
	Pesticides	8081	Glass 8 oz. Jar	4 °C	14 days to extract 40 days to analyze
	PCBs	8082	Glass 8 oz. Jar	4 °C	14 days to extract 40 days to analyze

#### 4.3 QUALITY CONTROL SAMPLING

In addition to the laboratory analysis of the investigative soil samples and characterization soil samples for reuse and off-site disposal, additional analysis will be included for quality control measures, as required by the Category B sampling techniques. These samples will include field blanks, trip blanks, matrix spike/matrix spike duplicates (MS/MSD), and blind duplicate samples at a frequency of one sample per 20 field samples collected. Table 2 provides a summary of the field samples and QA/QC samples to be analyzed by the laboratory.

**TABLE 2  
FIELD SAMPLE AND QC SAMPLE QUANTITIES**

Sample Type	Parameters	EPA Method	Field Samples	QC Samples			
				Field Blank	Trip Blank	MS/MSD	Blind Duplicate
Soil	VOCs	EPA 8260	20	1	1	1	1
	SVOCs	EPA 8270	20	--	--	1	1
	TAL Metals	EPA 6000/7000	20	--	--	1	1
	Pesticides	EPA 8081	20	--	--	1	1
	PCBs	EPA 8082	20	--	--	1	1

**4.4 SAMPLE HANDLING****4.4.1 Sample Identification**

All samples will be consistently identified in all field documentation, chain-of-custody (COC) documents, and laboratory reports using an alpha-numeric code. Groundwater samples will be identified by the monitoring well number, and soil samples will be identified with the sample depth interval (in parenthesis). Soil samples will be labeled with the depth interval and its location carefully measured and logged in the field book.

The blind duplicate samples will be labeled with a dummy sample location to ensure that they are submitted as blind samples to the laboratory. The dummy identification will consist of the sample type followed by a letter. Trip blanks and field blanks will be identified with “TB” and “FB”, respectively, with the collection date in a YYYY/MM/DD format (e.g., TB20170102 for a trip blank collected on January 2, 2017).

Table 3 provides examples of the sampling identification scheme.

**TABLE 3  
EXAMPLES OF SAMPLE NAMES**

<b>Sample Description</b>	<b>Sample Designation</b>
Excavation Endpoint Soil sample EP-1 collected from two feet on January 2, 2017	EP-1 (2) 20170102
Matrix spike/matrix spike duplicate sample from EP-1 on January 2, 2017	EP-1-MS/MSD 20170102
Blind duplicate sample from two feet at EP-1 on January 2, 2017	EP-X (2) 20170102

**4.4.2 Sample Labeling and Shipping**

All sample containers will be provided with labels containing the following information:

- Project identification
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Sampler’s initials

Once the samples are collected and labeled, they will be placed in chilled coolers and stored in a cool area away from direct sunlight to await shipment to the laboratory. All samples will be shipped to the laboratory at least twice per week. At the start and end of each workday, field personnel will add ice to the coolers as needed.

The samples will be prepared for shipment by placing each sample in a sealable plastic bag, then wrapping each container in bubble wrap to prevent breakage, adding freezer packs and/or fresh ice in sealable plastic bags and the chain-of-custody (COC) form. Samples will be shipped overnight (e.g., Federal Express) or transported by a laboratory courier. All coolers shipped to the laboratory will be sealed with mailing tape and a COC seal to ensure that the coolers remain sealed during delivery.

#### **4.4.3 Sample Custody**

Field personnel will be responsible for maintaining the sample coolers in a secured location until they are picked up and/or sent to the laboratory. The record of possession of samples from the time they are obtained in the field to the time they are delivered to the laboratory or shipped off-site will be documented on COC forms. The COC forms will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; and signatures of individuals involved in sample transfer, and the dates and times of transfers. Laboratory personnel will note the condition of the custody seal and sample containers at sample check-in.

#### **4.5 FIELD INSTRUMENTATION**

Field personnel will be trained in the proper operation of all field instruments at the start of the field program. Instruction manuals for the equipment will be on file at the Site for referencing proper operation, maintenance and calibration procedures. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork, if applicable. If an instrument fails calibration, the project manager or QA/QC officer will be contacted immediately to obtain a replacement instrument. A calibration log will be maintained to record the date of each calibration, any failure to calibrate and corrective actions taken. The PID will be calibrated each day using 100 ppm isobutylene standard gas.

**ATTACHMENT A**

**RESUMES OF PROJECT QA/QC OFFICER, PROJECT DIRECTOR, PROJECT MANAGER, AND FIELD  
TEAM LEADER**

# MICHELLE LAPIN, P.E.

## SENIOR VICE PRESIDENT

Michelle Lapin is a Senior Vice President with more than 25 years of experience in the assessment and remediation of hazardous waste issues. She leads the firm's Hazardous Materials group and offers extensive experience providing strategic planning and management for clients. Ms. Lapin has been responsible for the administration of technical solutions to contaminated soil, groundwater, air and geotechnical problems. Her other duties have included technical and report review, proposal writing, scheduling, budgeting, and acting as liaison between clients and regulatory agencies, and project coordination with federal, state, and local authorities.

Ms. Lapin's hydrogeologic experience includes groundwater investigations, formulation and administration of groundwater monitoring programs and remediation throughout the Northeast. Her experience with groundwater contamination includes Level B hazardous waste site investigations; leaking underground storage tank studies, including hazardous soil removal and disposal and associated soil and water issues; soil gas/vapor intrusion surveys; and wetlands issues. Ms. Lapin is experienced in coordinating and monitoring field programs concerning hazardous waste cell closures. She has directed hundreds of Phase I, Phase II, and Phase III investigations and remediations, many of them in conjunction with developers, law firms, lending institutions, and national retail chains. She is also experienced in the cleanup of contaminated properties under Brownfield Cleanup Program (BCP) regulations.

## RELEVANT EXPERIENCE

### West 61st Street Rezoning/Residential Development, New York, NY

Ms. Lapin is directing the firm's hazardous materials work for this mixed-use development in Manhattan. The Algin Management Company hired AKRF to prepare an environmental impact statement (EIS) for the proposed rezoning of the western portion of the block between West 60th and 61st Streets, between Amsterdam and West End Avenues. The purpose of the proposed action was to facilitate the development of two 30-story residential towers with accessory parking spaces, and landscaped open space. The EIS examined a "worst case" condition for rezoning the block, which allowed Algin to build a residential building of approximately 375,000 square feet at their site. The building now contains 475 apartments, 200 accessory parking spaces, a health club, and community facility space. This site, with the services of AKRF, entered into New York State's Brownfield Cleanup Program (BCP). On-site issues included underground storage tanks remaining from previous on-site buildings, petroleum contamination from these tanks and possibly from off-site sources, and other soil contaminants (metals, semi-volatile organic compounds, etc.) from fill materials and previous on-site buildings. AKRF oversaw the adherence to the Construction Health and Safety Plan (HASP), which was submitted to and approved by the New York State Department of Environmental Conservation (NYSDEC), and

## BACKGROUND

### Education

M.S., Civil Engineering, Syracuse University, 1985

B.S., Civil Engineering, Clarkson University, 1983

### Professional Licenses/Certifications

New York State P.E.

State of Connecticut P.E.

### Professional Memberships

Member, National Society of Professional Engineers (NSPE), National and CT Chapters

Member, American Society of Civil Engineers (ASCE), National and CT Chapters

Member, Connecticut Business & Industry Association (CBIA), CBIA Environmental Policies Council (EPC)

Board Member, New York City Brownfield Partnership

### Years of Experience

Year started in company: 1994

Year started in industry: 1986

monitored the waste streams, to ensure that the different types of waste were disposed of at the correct receiving facilities. This oversight also included confirmation and characteristic soil sampling for the receiving facilities and NYSDEC. A “Track 1” Clean up of the majority of the property (the portion including the buildings) was completed and the final Engineering Report was approved by the NYSDEC. AKRF has also completed a smaller portion of the property as a “Track 4” cleanup, which includes a tennis court and landscaped areas.

### Hudson River Park, New York, NY

Ms. Lapin is directing AKRF’s hazardous materials work during construction of Hudson River Park, a five-mile linear park along Manhattan’s West Side. As the Hudson River Park Trust’s (HRPT’s) environmental consultant, AKRF is overseeing preparation and implementation of additional soil and groundwater investigations (working with both NYSDEC and the New York City Department of Environmental Protection (NYCDEP)), all health and safety activities, and removal of both known underground storage tanks and those encountered during construction. Previously, the firm performed hazardous materials assessments as part of the environmental impact statement (EIS) process, including extensive database and historical research, and soil and groundwater investigations. Ms. Lapin has been the senior consultant for the soil and groundwater investigations and remediation, and the asbestos investigations and abatement oversight.

### Fiterman Hall Deconstruction and Decontamination Project, New York, NY

The 15-story Fiterman Hall building, located at 30 West Broadway, originally constructed as an office building in the 1950s, had served as an extension of the City University of New York (CUNY) Borough of Manhattan Community College (BMCC) since 1993. The building was severely damaged during the September 11, 2001, World Trade Center (WTC) attack when 7 WTC collapsed and struck the south façade of the building, resulting in the partial collapse of the southwest corner of the structure. The building was subsequently stabilized, with breaches closed and major debris removed. Because extensive mold and WTC dust contaminants remain within the building, it must be taken down. The project required the preparation of two environmental assessment statements (EASs)—one for the deconstruction and decontamination of Fiterman Hall and one for the construction of a replacement building on the site. AKRF prepared the EAS for the Deconstruction and Decontamination project, which included the decontamination of the interior and exterior of the building, the removal and disposal of all building contents, and the deconstruction of the existing, approximately 377,000-gross-square-foot partially collapsed structure. Ms. Lapin reviewed the EAS’s deconstruction and decontamination plans. The cleanup plan was submitted to the United States Environmental Protection Agency (USEPA).

### Columbia University Manhattanville Academic Mixed-Use Development, New York, NY

Ms. Lapin served as Hazardous Materials Task Leader on this EIS for approximately 4 million square feet of new academic, research and neighborhood uses to be constructed north of Columbia University’s existing Morningside campus. The Hazardous Materials work included Phase I Environmental Site Assessments for the properties within the site boundaries, and estimates for a Subsurface (Phase II) Investigation of the entire development area. The firm’s Hazardous Materials group has performed over 30 individual Phase I Environmental Site Assessments for properties within the development area. In addition, a Preliminary Environmental Site Assessment (PESA) was completed in conjunction with the EIS. Based on the Phase I studies, AKRF conducted a subsurface (Phase II) investigation in accordance with an NYCDEP-approved investigative work plan and health and safety plan. Subsurface activities included the advancement of soil borings, groundwater monitor wells, and the collection of soil and groundwater samples for laboratory analysis. This study estimated costs to remediate contaminated soil, groundwater and hazardous building materials, including lead-based paint and asbestos-containing materials.

### Yonkers Waterfront Redevelopment Project, Yonkers, NY

For this redevelopment along Yonkers’ Hudson River waterfront, Ms. Lapin headed the remedial investigation and remediation work that included Phase I assessments of 12 parcels, investigations of underground storage tank removals and

associated soil remediation, remedial alternatives reports, and remedial work plans for multiple parcels. Several of the city-owned parcels were remediated under a Voluntary Cleanup Agreement; others were administered with state Brownfields grants. Hazardous waste remediation was completed on both brownfield and voluntary clean-up parcels, which enabled construction of mixed-use retail, residential development, and parking.

#### East 75th/East 76th Street Site, New York, NY

Ms. Lapin served as Senior Manager for this project that encompassed coordination and direct remediation efforts of this former dry cleaning facility and parking garage prior to the sale of the property and its ultimate redevelopment for use as a private school. A preliminary site investigation identified 20 current and former petroleum and solvent tanks on the property. A soil and groundwater testing program was designed and implemented to identify the presence and extent of contamination resulting from potential tank spills. This investigation confirmed the presence of subsurface petroleum contamination in the soil and solvent contamination from former dry cleaning activities in the bedrock. AKRF completed oversight of the remediation under the State's Voluntary Cleanup Program. Remediation, consisting of tank removals and excavation of contaminated soil and the removal of solvent-contaminated bedrock down to 30 feet below grade, has been completed. AKRF completed oversight of the pre-treatment of groundwater prior to discharge to the municipal sewer system and an off-site study to determine impacts to groundwater in downgradient locations.

#### Avalon on the Sound, New Rochelle, NY

For Avalon Bay Communities, Ms. Lapin managed the investigations and remediation of two luxury residential towers and an associated parking garage. Remediation of the first phase of development (the first residential tower and the parking garage) included gasoline contamination from a former taxi facility, fuel oil contamination from multiple residential underground storage tanks, and chemical contamination from former on-site manufacturing facilities. The remediation and closure of the tank spills was coordinated with the New York State Department of Environmental Conservation (NYSDEC). The initial investigation of the Phase II development—an additional high-rise luxury residential building—detected petroleum contamination. A second investigation was conducted to delineate the extent of the contamination and estimate the costs for remediation. AKRF oversaw the remediation and conducted the Health and Safety monitoring. The remediation was completed with closure and approvals of the NYSDEC.

#### East River Science Park, New York, NY

Originally, New York University School of Medicine (NYUSOM) retained the firm to prepare a full Environmental Impact Statement (EIS) for its proposed East River Science Park (ERSP). As originally contemplated, the proposed complex was to occupy a portion of the Bellevue Hospital campus between East 30th Street and approximately East 28th Street and would have included a clinical practice, research, and biotech facilities, housing units, a child care center, and a conference center and parking.

Ms. Lapin managed the Phase I Environmental Site Assessment and other hazardous materials-related issues. Events relating to September 11, 2001 delayed the project for several years. When it resurfaced with a new developer and a diminished scope, Ms. Lapin updated the hazardous materials issues and consulted with the new developer regarding remediation strategies and involvement of regulatory agencies. For the actual remediation/development, the city requested oversight by AKRF to represent its interests (the city is retaining ownership of the land). Ms. Lapin completed directing the remediation oversight on behalf of the City of New York for the remediation of this former psychiatric hospital building, laundry building and parking areas. The new 550,000 square-foot development includes a biotechnology center, street level retail, and an elevated plaza.

# MARCUS SIMONS

## SENIOR VICE PRESIDENT

Marcus Simons is a Senior Vice President of AKRF with 20 years of environmental consulting experience, specializing in the assessment and cleanup of contaminated sites, including federal and state superfund, RCRA, TSCA, brownfield, voluntary cleanup and spill sites. His expertise includes health risk assessment, development of sampling plans, economic evaluations of remedial alternatives, and regulatory analysis. He is also AKRF's Health and Safety Officer with extensive experience of Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) issues during sampling and remediation of contaminated sites.

Mr. Simons directs much of AKRF environmental due diligence work (recently managing environmental due diligence on Tishman/Blackrock's Peter Cooper/Stuyvesant Town acquisition, reportedly the largest real estate transaction in US history), including supervising preparation of numerous Phase I and Phase II Environmental Site Assessments, as well as more complex multi-site and litigation-related projects. Mr. Simons manages preparation of the contaminated-materials portions of AKRF's Environmental Impact Statements and Environmental Assessments and has experience with procedures for hazardous material requirements under NEPA and New York SEQRA/CEQR and E-designation programs. He also has extensive experience in statistics, selection of sites for controversial facilities, and federal and state wetland regulations and waterfront permitting. In addition to analytical work, Mr. Simons has considerable experience in presenting results to regulatory agencies and the general public.

Mr. Simons has managed some of the most complex cleanup sites in New York State including: the recently completed cleanup of a 12-acre PCB-contaminated former utility property in Flushing, Queens where a 3 million square foot retail/residential building is nearing completion (remediation was performed under the State Brownfield Cleanup Program, though the site was also subject to City jurisdiction under its E-Designation program); cleanup of the nation's largest former dental factory in Staten Island for reuse as single family housing; the investigation of several former manufactured gas plants; and the investigation and remediation associated with the reconstruction of the West Side Highway and Hudson River Park in Manhattan (from the Battery to 59th Street). Mr. Simons also has extensive experience with transportation projects (Second Avenue Subway, MTA/LIRR East Side Access, Cross Harbor Freight Movement Study, Route 9A Reconstruction), large-scale rezoning projects (Long Island City, Downtown Brooklyn, Jamaica) and public and private redevelopment work (Atlantic Yards, School Construction Authority, Queens West).

### BACKGROUND

#### Education

M.S., Engineering and Public Policy,  
Carnegie-Mellon University, 1988

M.A. and B.A. (Honors), Mathematics/  
Engineering, Cambridge University,  
England, 1986

#### Certifications

Hazardous Waste Operations and  
Emergency Response Standard  
(HAZWOPER) – 40 Hour Site Worker and  
8 Hour Site Supervisor

#### Years of Experience

Year started in company: 1995

Year started in industry: 1988

## RELEVANT EXPERIENCE

### CE Flushing Site, Flushing, NY

Mr. Simons directed the remediation of a former industrial site in Flushing, Queens, NY prior to its redevelopment as a 3 million square foot retail/residential complex. The property was cleaned up under the NYS Department of Environmental Conservation Brownfield Cleanup Program and the NYC Department of Environmental Protection's E-Designation requirements. The remedial measures included the removal of aboveground and underground storage tanks, excavation and off-site disposal of TSCA, RCRA and non-hazardous wastes, NAPL removal, and removal and investigation of on-site drainage structures. The remediation and subsequent construction involved obtaining (or obtaining waivers from) numerous permits including those for NYSDEC Tidal Wetlands, NYSDEC Long Island Wells, NYSDEC SPDES/Stormwater and NYCDEP Sewer Use.

### Peter Cooper Village/Stuyvesant Town, New York, NY

Mr. Simons directed the purchaser's environmental due diligence efforts for the bidding and subsequent acquisition of this 80-acre property in Manhattan. Much of the 110-building complex is underlain by former manufactured gas plants and Con Edison entered the site into NYSDEC's Voluntary Cleanup Program. Going forward Mr. Simons will manage oversight of activities that involve disturbance of MGP-contaminated soils, as well as future testing and potentially remediation.

### MTA New York City Transit Manhattan East Side Transit Alternative (MESA)/Second Avenue Subway, New York, NY

Mr. Simons directed the contaminated material assessment for this multi-billion dollar transit initiative that would provide subway service to Manhattan's East Side. The assessment identified several hundred facilities along the alignment that could have impacted soil and/or groundwater and could require special materials handling and enhanced health and safety procedures. Additional evaluation of these sites is underway.

### Ferry Point Park, Bronx, NY

Mr. Simons developed the material acceptance criteria (soil standards for capping materials) for the development of Ferry Point Park (including a golf course) in the Bronx. The New York City Department of Environmental Protection DEP and the New York State Departments of Health (DOH) and Environmental Conservation (DEC) agreed for the first time to relax their strict (TAGM 4046) criteria for clean soil, based on statistical analyses of background conditions and risk-based modeling.

### Prince's Point, Staten Island, NY

Mr. Simons managed the complex cleanup (including the relocation of a contaminated tidal creek) of the nation's largest former dental factory site on Staten Island's waterfront. The site was on the State Superfund list. The future use of the site as single-family residential property entailed extensive negotiations with NYSDEC and NYSDOH. The project required obtaining (or obtaining waivers from) numerous permits including those for NYSDEC Tidal and Fresh Water Wetlands, USACOE (Nationwide) Permits, NYSDEC Coastal Erosion Hazard Area, NYSDEC SPDES and Stormwater, FEMA Modifications to Land in Floodplain, and USEPA Notification of PCB Waste Activity.

### Route 9A Reconstruction, New York, NY

AKRF directed extensive studies for the reconstruction in Lower Manhattan proposed by the New York State Department of Transportation (NYSDOT) in cooperation with the Federal Highway Administration (FHWA). The project is arguably the most complex environmental analyses performed for a federally funded transportation project in New York City in the last 10 years. The firm was responsible for all environmental tasks as well as the preparation for the Draft, Supplementary,

and Final Environmental Impact Statements (EISs) and Section 4(f) Evaluation for this 5-mile \$250 million reconstruction of Route 9A as part of the recovery effort following the events of September 11th, 2001. Mr. Simons managed the extensive hazardous materials investigations and prepared the contract specifications for contaminated soil and tank removal, including Health and Safety oversight.

#### Hudson River Park, New York, NY

Mr. Simons is managing hazardous materials issues for the ongoing Hudson River Park construction, located adjacent to the Route 9A roadway. Construction is ongoing and Mr. Simons directs health and safety oversight and remediation during construction.

#### Jamaica Rezoning, Queens, NY

As part of the preparation of an Environmental Impact Statement, Mr. Simons managed the hazardous materials assessment of a multi-block area. In addition to conducting the assessment, Mr. Simons made recommendation as to the properties where “E-Designations” (city-recorded institutional controls on future development) should be placed.

#### Outlet City, Long Island City, Queens, NY

In Long Island City, Mr. Simons managed the investigation and interim remediation of an old factory complex where large volumes of creosote were spilled. The investigations and interim remedial measures (IRMs) took place under the New York State’s Voluntary Cleanup Program (VCP).

#### MTA/LIRR East Side Access Project, New York, NY

Mr. Simons managed the hazardous materials investigations for multiple sites in the Bronx, Manhattan, and Queens associated with the Environmental Impact Statement (EIS) for the Long Island Rail Road connection to Grand Central Terminal. Mr. Simons continues to be involved in health and safety oversight related to the construction of the project.

#### New York City Department of Transportation, Lead Paint Removal and Disposal on Bridges Project, New York, NY

Mr. Simons conducted a regulatory analysis of related to the removal of lead paint from nearly 800 bridges. This analysis included an evaluation of the regulatory compliance of various proposed procedures with federal and state hazardous and solid waste management requirements.

#### American Felt and Filter Company, New Windsor, NY

Mr. Simons prepared a Remedial Investigation (including exposure assessment) and Feasibility Study for the country’s oldest active felt manufacturing facility, located in Orange County. This solvent-contaminated site is on the State Superfund List.

# AXEL E. SCHWENDT

## PROFESSIONAL GEOLOGIST

Mr. Schwendt is a Technical Director geologist for AKRF and has 15 years of experience in the environmental consulting field. Mr. Schwendt has extensive experience in Phase II studies involving subsurface soil and groundwater investigations, and has been involved in all aspects of soil and groundwater remediation, including those related to manufactured gas plants (MGP). He has designed, managed and implemented large-scale site investigations and remedial measures for various properties, including those under different regulatory programs such as the New York State Department of Environmental Conservation's (NYSDEC) Voluntary Cleanup Program and Brownfield Cleanup Program, New York State's Spill Response Program, the Mayor's Office of Environmental Remediation (OER) E-Designation Program, New Jersey's Industrial Site Recovery Act (ISRA), and Pennsylvania's Land Recycling program. Mr. Schwendt manages the hazardous materials tasks for the company's Environmental Impact Statements (EISs) and also conducts and manages Phase I Environmental Site Assessments (ESAs) for various individual clients and industries as well as for area-wide rezoning projects.

Mr. Schwendt has extensive experience in underground and aboveground storage tank (UST and AST) management, including tank removals, installations, and upgrades. He has designed and implemented remedial investigations surrounding UST and AST releases and overseen the installation and maintenance of pump-and-treat and other remedial systems. He has performed storage tank compliance audits and maintenance inspections all across the country and prepared Spill Prevention, Control, and Countermeasures Plans (SPCC Plans) for over 100 individual facilities, including designing and conducting the personnel training programs.

Mr. Schwendt worked with several other firms prior to joining AKRF, which provided him with a variety of skills. He has expertise with Chemical Bulk Storage Spill Prevention Reports, Environmental Emergency Response Plans, Integrated Contingency Plans, and multi-phase compliance audits, including some international projects. He has also performed various types of hydrogeologic testing, including pilot tests, slug tests, pump tests and groundwater modeling, and has been responsible for data review and management.

## RELEVANT EXPERIENCE

### Verdopolis JFK Airport Facility, Queens, NY

On behalf of Verdopolis JFK, AKRF prepared documentation for a New York State Department of Environmental Conservation (NYSDEC) Part 360 Solid Waste Management Facility Permit application. The facility, which would be constructed at the abandoned Hangar 16 site of the John F. Kennedy International Airport (JFK Airport), would process 180,000 tons per year of source separated, pre-consumer organic waste generated largely by food preparation facilities at JFK Airport and convert the food waste into usable products. Mr. Schwendt assisted in preparing the application package,

## BACKGROUND

### Education

B.A., Earth Science and Environmental Studies, Tulane University, 1991

M.S., Geology, University of Delaware, 2002

### Years of Experience

Year started in company: 2002

Year started in industry: 1995

including preparation of the Engineering Report, Operations and Maintenance Plan, Contingency Plan, Facility Closure Plan, Hiring and Training Plan, Chemical Bulk Storage Spill Prevention Report, and the Spill Control Prevention and Countermeasure Plan (SPCC Plan). Mr. Schwendt also prepared a Phase I Environmental Site Assessment (Phase I ESA) of the property to ascertain potential environmental conditions that may be exposed during site development activities.

#### 2477 Third Avenue, Bronx, NY

Mr. Schwendt prepared the application to enter the former 2477 Third Avenue gasoline station property into the New York State Department of Environmental Conservation's (NYSDEC) Brownfield Cleanup Program (BCP). Since its acceptance into the program, Mr. Schwendt has been managing and coordinating the remedial investigation of the site, including shallow and deep aquifer groundwater testing, delineation of known areas of soil contamination, soil vapor analyses, and investigation for potential non-aqueous phase liquid (DNAPL) from past industrial activities in the surrounding area. Mr. Schwendt was responsible for developing work plans for approval by the NYSDEC and New York State Department of Health (NYSDOH), and preparation of summary reports for public comment. As part of the project, Mr. Schwendt coordinated with the client, lawyers, and architects of the planned development, tenants of neighboring properties, NYSDEC, NYSDOH, and the New York City Department of Environmental Protection (NYCDEP).

#### E-Designated Properties, New York City, NY

Mr. Schwendt has assisted various public and private clients with addressing E-Designations assigned by NYCDEP to properties throughout New York City. He has prepared the required Phase I ESAs and, if warranted, implemented Phase II testing to the satisfaction of NYCDEP. Based on the results of the testing, he has prepared Remedial Action Plans (RAPs) and Construction Health and Safety Plans (CHASPs) for approval by the NYCDEP, which included strategies for mitigating on-site environmental conditions and plans for incorporating environmental engineering controls into proposed construction projects. Mr. Schwendt's clients promptly received the Notice of Satisfaction necessary to acquire building permits from the New York City Department of Buildings (DOB).

#### Lincoln Center Development Project, New York, NY

On behalf of the Lincoln Center Development Project, Inc., Mr. Schwendt conducted a Subsurface (Phase II) Investigation in the area of a UST farm located beneath the lower garage level of the West 62nd Street parking garage at Lincoln Center. The Phase II study was prompted by a request from NYSDEC to properly investigate and close out the tanks. The tank farm includes seventeen (17) 550-gallon gasoline USTs and one (1) 550-gallon waste oil UST. Mr. Schwendt also managed the closure of the 18 USTs to the satisfaction of the NYSDEC.

#### Columbia University Manhattanville Rezoning and Academic Mixed-Use Development, New York, NY

Mr. Schwendt managed the hazardous materials task on the environmental impact statement (EIS) for approximately 4 million square feet of new academic, research and neighborhood uses to be constructed north of Columbia University's existing Morningside Heights campus. The work included a Preliminary Environmental Site Assessment (PESA) for the whole project area and more than 25 individual Phase I ESAs for properties within the site boundaries. In addition, Mr. Schwendt conducted a subsurface investigation at the site to characterize the subsurface conditions and used the analytical data to evaluate any potential environmental risks and/or the need for remedial action at the site prior to future development. Based on the results of the investigation, Mr. Schwendt prepared a Remedial Action Plan (RAP) and Construction Health and Safety Plan (CHASP) for the proposed project, which was approved by NYCDEP.

#### Long Island Power Authority (LIPA), Long Island, NY

Mr. Schwendt managed the preparation of Phase I ESAs and Phase II Investigations, along with the hazardous materials chapters for EISs for properties owned or to be acquired by LIPA to identify potential sources of environmental contaminants prior to power station and power line installation.

### Storage Deluxe, Various Locations, NY

Mr. Schwendt is currently the project manager assisting Storage Deluxe with the ongoing expansion of their self-storage facilities located primarily in New York City's five boroughs and in Westchester County. He manages environmental due diligence needs related to their property transactions and conducts analyses as needed, including Phase I ESAs, Phase II investigations, and geophysical surveys, as well as consulting on petroleum bulk storage tank management. He assists Storage Deluxe in making decisions with respect to environmental risk issues.

### South Bronx Overall Economic Development Corporation (SoBRO) Port Morris Brownfield Opportunity Areas (BOA), Bronx, NY

Mr. Schwendt is assisting SoBRO with the in-depth and thorough analysis of existing conditions, opportunities, and reuse potential for properties located in the proposed Port Morris Brownfield Opportunity Area with an emphasis on the identification and reuse potential of strategic brownfield sites that may be catalysts for revitalization. His work so far has included preparing Phase I ESAs and conducting Phase II investigations for the catalyst sites and advising on the suitability of enacting zoning changes to permit various property uses. Mr. Schwendt also assisted SoBRO with the BOA application process.

### Brooklyn Bridge Park, Brooklyn, NY

AKRF is providing environmental planning and review services for the development of a new 70-acre park that will revitalize 1.5 miles of the East River waterfront. Mr. Schwendt was involved with the completion of the Environmental Impact Statement and conducted a Phase I ESA and Phase II Subsurface Investigation for the proposed park area. He serves as the park's on-call consultant for addressing environmental conditions as development progresses and has conducted several tank removals and contaminated soil delineation and remediation projects for various sections of the park.

### Kings Plaza, LLC Total Energy Plant, Brooklyn, NY

Mr. Schwendt conducted an environmental compliance review of the Kings Plaza Total Energy Plant (TEP) in Brooklyn, New York. Mr. Schwendt observed operations and reviewed environmental permits, agency correspondence, operating records, recordkeeping and monitoring procedures, and regulatory reporting requirements. As a result of the review, Mr. Schwendt provided the TEP with recommendations for the management of various waste streams associated with facility operations and prepared a Spill Control Prevention and Countermeasure Plan (SPCC Plan) for the facility.

### St. George Ferry Terminal, Staten Island, NY

Mr. Schwendt prepared a Spill Prevention, Control, and Countermeasures Plan (SPCC Plan) for the Department of Transportation (DOT) St. George Ferry Terminal facility in Staten Island. The facility houses various bulk containers which store over 600,000-gallons of petroleum used to fuel boilers and emergency generators, provide oil for maintenance and repair of equipment and vessels, and to fuel the ferry vessels. Mr. Schwendt also advised the DOT on how to upgrade the facility's fueling systems to comply with the SPCC and NYSDEC regulations.

### Titan Property Management, Rego Park, NY

Mr. Schwendt was involved with an extensive site investigation for a property involved in the New York State Voluntary Cleanup Program. The property was resting on a plume of PCE contamination. The goal of the investigation was to determine whether the property is the source of the contamination and to collect data to provide information for the design and implementation of a site remedial system. The investigation involved extensive soil, soil gas, and groundwater investigation, and included the investigation of surrounding properties.

# NEOMA CHEFALO

## ENVIRONMENTAL SCIENTIST

Neoma Chefalo is an Environmental Scientist with experience in Due Diligence Phase I and Phase II Environmental Site Assessments (ESAs) and National Environmental Policy Act (NEPA) screenings, Lab Pack Chemistry, environmental consulting, environmental sciences and project management. Ms. Chefalo has technical experience in Phase I ESAs, historical land-use research, Section 106 surveys, NEPA screenings, Phase II ESAs, asbestos and lead-based paint testing, environmental inspections, governmental file reviews, and soil and groundwater sampling investigations. Ms. Chefalo also has experience in the environmental field including NEPA screenings, Phase I and Phase II ESAs of historic, commercial, industrial and residential properties, asbestos surveys, and soil and groundwater sampling programs. In addition, Ms. Chefalo has experience with Section 106 surveys.

### BACKGROUND

#### Education

B.A., Environmental Studies, University of San Francisco, 2003

#### Certifications

Section 106 and NEPA Training

OSHA 40-hour Health & Safety Training for Hazardous Waste Operations

New York State Asbestos Inspector

### RELEVANT EXPERIENCE

#### New York City School Construction Authority, Various Locations, New York City

Under an on-call contract, AKRF provides the New York City School Construction Authority (NYCSCA) with hazardous materials consulting services. Ms. Chefalo is involved with various due diligence and environmental assessment projects including Phase I Environmental Site Assessments (ESAs); Phase II (Subsurface) Environmental Site Investigations (soil, groundwater and soil gas investigations); Indoor Air Quality (IAQ) Assessments; Underground Storage Tank (UST) inspections; and peer review of consultant due diligence reports.

#### Rockaway Turnpike, Lawrence, Nassau County, NY

Ms. Chefalo provided oversight for tank removal/closure activities and subsequent soil and groundwater sampling with regulatory spill closure procedures for this former gasoline filling station.

#### 2477 Third Avenue, Bronx, NY

Ms. Chefalo conducted a Phase I Environmental Site Assessment (ESA) and a subsequent Phase II Environmental Site Investigation including soil and groundwater sampling for this former gasoline filling station, which was entered into New York's Brownfield Cleanup Program (BCP). Ms. Chefalo also assisted with the BCP application process for the facility.

#### Hudson River Park, New York, NY

AKRF serves as an on-call consultant for the ongoing development of the Hudson River Park, the approximately 5 to 6 mile section of waterfront property from Battery Place to 59th Street along the western edge of Manhattan. Ms. Chefalo conducts environmental construction monitoring and subsurface investigations, provides guidance on construction and environmental health and safety issues, interfaces with regulatory agencies as necessary, and oversees tank removals and the mitigation of environmental conditions encountered during site development activity.

### Weill Cornell Medical Center Ambulatory Care Facility, New York, NY

AKRF prepared an Environmental Assessment Statement (EAS) and supplemental studies for a new Ambulatory Care Facility at Cornell University's Joan and Sanford I. Weill Medical College (WMC) in Manhattan. The college requested several variances (rear yard, sky exposure plane, lot coverage, and transfer of floor area across zoning district boundaries) from the New York City Board of Standards and Appeals (BSA) to facilitate construction of a new facility on the southwest corner of East 70th Street and York Avenue. Ms. Chefalo conducted a Phase I Environmental Site Assessment (ESA) and authored the hazardous materials chapter of the EAS.

### Pedestrian Bridges Reconstruction Project, New York, NY

The New York City Department of Design and Construction (DDC) hired AKRF to provide environmental consulting services. Ms. Chefalo conducted a Phase I Environmental Site Assessment (ESA) and wrote the hazardous materials chapter of the Environmental Impact Statement (EIS) for the reconstruction of two Americans with Disabilities Act (ADA) compliant pedestrian bridges.

### The New School Reconstruction, New York, NY

Ms. Chefalo conducted a Phase I Site Assessment (ESA) and wrote the hazardous materials chapter of a study for the reconstruction of this educational facility.

### 677 11th Avenue, New York, NY

Rockrose Development hired AKRF to provide environmental consulting services. Ms. Chefalo conducted a Phase I Environmental Site Assessment (ESA) and Phase II Sub-slab soil gas monitoring of this auto repair and storage facility.

### 55 Water Street, New York, NY

Goldman Sachs constructed a 53-story trading facility in Lower Manhattan. While with another firm, Ms. Chefalo conducted a Phase I Environmental Site Assessment (ESA) and National Environmental Policy Act (NEPA) land use screening for this project.