



SITE CHARACTERIZATION
SOIL VAPOR INTRUSION DATA SUMMARY REPORT
FEBRUARY-MARCH 2008

WORK ASSIGNMENT D004433-22

MEEKER AVENUE PLUME TRACKDOWN
GREENPOINT/EAST WILLIAMSBURG INDUSTRIAL AREA

SITE NO. 2-24-121
KINGS COUNTY, NY

Prepared for:
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 Broadway, Albany, New York

Alexander B. Grannis, Commissioner

DIVISION OF ENVIRONMENTAL REMEDIATION

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Final
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**RESIDENTIAL AIR SAMPLING
FOR THE
MEEKER AVENUE PLUME TRACKDOWN
SITE NUMBER 2-24-121
GREENPOINT/EAST WILLIAMSBURG INDUSTRIAL AREA OF BROOKLYN
KINGS COUNTY, NEW YORK**

Prepared For:

**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
REMEDIAL BUREAU B
WORK ASSIGNMENT D004433-22**

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JUNE 2008

**MEEKER AVENUE PLUME TRACKDOWN
VAPOR INTRUSION INVESTIGATION REPORT**

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LIST OF ACRONYMS AND ABBREVIATIONS

%	percent
1,1-DCA	1,1-dichloroethane
1,1,1-TCA	1,1,1-trichloroethane
aka	also known as
ASP	Analytical Services Protocol
BP	British Petroleum
CD	compact disk
COC	chain-of-custody
Con-Test	Con-Test Analytical Laboratory
DCA	dichloroethane
DCE	dichloroethene, aka dichloroethylene
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Approval Program
EPM	Environmental Planning and Management, Inc.
FAP	Field Activities Plan
FSP	Field Sampling Plan
Freon 11	trichlorofluoromethane
Freon 12	dichlorodifluoromethane
Freon 113	1,1,2-trichloro-1,2,2-trifluoromethane
HASP	Health and Safety Plan
ID	inside diameter
L	liter
L/min	liters per minute
mg/kg	milligrams per kilogram (parts per million)
mL	milliliter
MW	monitoring well
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OD	outside diameter
PCE	perchloroethene, aka tetrachloroethene or tetrachloroethylene or perchloroethylene
PDF	portable document format
PID	photoionization detector
PMWP	Project Management Work Plan
ppb	parts per billion
ppbv	parts per billion by volume
ppm	parts per million
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
SAP	Sampling and Analysis Plan
SVI	soil vapor intrusion
TCE	trichloroethene, aka trichloroethylene
TCL	target compound list

LIST OF ACRONYMS AND ABBREVIATIONS

(Continued)

µg/kg	micrograms per kilogram (parts per billion)
µg/L	micrograms per liter (parts per billion)
µg/m ³	micrograms per cubic meter
UHP	ultra high purity
URS	URS Corporation
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WA	Work Assignment

1.0 INTRODUCTION

This Data Summary Report has been prepared to summarize the soil vapor intrusion (SVI) sampling and analytical results for the Meeker Avenue Plume Trackdown Site in the residential area of the Greenpoint/East Williamsburg Industrial Area section of Brooklyn, New York, located south of the Brooklyn Queens Expressway (BQE). The work for this site was issued to URS Corporation (URS) by the New York State Department of Environmental Conservation (NYSDEC) as Work Assignment (WA) Number D004433-22. This SVI Data Summary Report presents data and information gathered during the first round of SVI sampling conducted from February 25 through March 13, 2008.

1.1 Site Description and History

The Meeker Avenue Plume Trackdown Site is located in the Greenpoint/East Williamsburg Industrial Area section of the Borough of Brooklyn, New York (Figure 1). The Meeker Avenue Plume Trackdown site investigation area is located in a region of historic petroleum refining and storage operations that occupied a significant portion of the Greenpoint area since approximately 1866, and by 1870 over 50 refineries were located along the banks of Newtown Creek. Currently, bulk oil storage terminals exist north of the site, including the BP Terminal, and the ExxonMobil Brooklyn Terminal (Brooklyn Terminal). The former Paragon Oil facility was located on the site along Newtown Creek, north of Bridgewater Street, between Meeker Avenue and Apollo Street. Peerless Importers, Inc., currently is located on a portion of the former Paragon Oil facility along Newtown Creek..

In September 1978, the United States Coast Guard (USCG) noted the signs of an oil spill entering Newtown Creek from the area at the end of Meeker Avenue. A subsequent investigation concluded that the area of the spill under the Greenpoint/East Williamsburg Industrial Area was in excess of 52 acres and the total spill volume, as estimated in 1979, was approximately 17 million gallons of petroleum products. The current BP property was determined to be the source of the petroleum free product plume. Investigation and remediation activities were conducted by Roux Associates Inc. (Roux Associates) on behalf of ExxonMobil from 1990 to the present and have further defined the extent of the Off-Site Plume. The Off-Site Plume area consists of the area underlain by the petroleum free product plume that is not on the BP Terminal or the Peerless

Imported, Inc. properties. Currently, the extent of the Off-Site Plume area is less than what it was in 1990 due to the operation of the Off-Site Free Product Recovery System (Off-Site System). The Off-Site System has recovered approximately 3,900,000 gallons since it became operational in 1995 (Roux, October 31, 2007).

The original Meeker Avenue Plume Trackdown site investigation area was bounded by the former Mobil Brooklyn Refinery/current British Petroleum (BP) Terminal to the north (Norman Avenue/Bridgewater Street), Newtown Creek to the east, Lombardy Street to the south, and Kingsland Avenue to the west. During the first phase of fieldwork, the southern boundary of the site investigation area along Lombardy Street between Porter and Morgan Avenues was extended three blocks south to Richardson Street. During the second phase of fieldwork, the southern boundary of the site investigation area along Richardson Street between Vandervoort and Morgan Avenues was extended one block south to Frost Street. In addition, the boundary in the northwest corner of the site investigation area was extended west from Kingsland Avenue between Norman and Nassau Avenues to Monitor Street. The area located north of Nassau Avenue and east of Van Dam Street and south of Meeker Avenue is primarily used for commercial/industrial purposes. Residential areas are located in both the northwest portion of the site (extending from Van Dam Street between Nassau and Meeker Avenues, to the western site boundary) and within the southern portion of the site (along Beadel Street from Morgan to Porter Avenues and along Vandervoort Avenue from Lombardy Street to Division Place).

Based on the results of several investigations conducted in the area (see Section 1.2 for more details), chlorinated solvents such as tetrachloroethene (PCE) and trichloroethene (TCE) were found in soil vapor, soil, and groundwater in areas outside the historic petroleum spill. As these chemicals are not related to petroleum, the NYSDEC initiated this investigation in order to determine the source(s) of this contamination. For the SVI portion of the investigation, the focus was on the residential area of the site located south of the BQE.

1.2 Previous Investigations

In September 2005, Roux Associates on behalf of ExxonMobil sampled soil vapor at 23 temporary locations in and around the perimeter of the Off-Site Plume area (Roux, October 14, 2005). The soil vapor samples collected in September 2005 indicated the presence of PCE at a concentration of 10,200 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) at the monitoring point located on the

southwest corner of the Vandervoort Avenue and Anthony Street intersection, and 7,050 $\mu\text{g}/\text{m}^3$ at the monitoring point on the west side of Morgan Avenue between Nassau Avenue and Norman Avenue. Much lower concentrations of PCE were detected throughout the remainder of and around the perimeter of the Off-Site Plume area. In addition, TCE was detected at concentrations of 4,500 $\mu\text{g}/\text{m}^3$ at the monitoring point located on west side of Apollo Street between Nassau Avenue and Meeker Avenue, and 151,000 $\mu\text{g}/\text{m}^3$ at the monitoring point on the west side of Morgan Avenue between Nassau Avenue and Norman Avenue. Much lower concentrations of TCE were detected throughout the remainder of and around the perimeter of the Off-Site Plume area. It was determined that the chlorinated solvents detected (i.e., PCE and TCE) were from a different source than the petroleum free product plume.

Between June and September 2006, Roux Associates performed a soil vapor investigation in the Off-Site Plume area (Roux, November 10, 2006). A total of 50 permanent soil vapor monitoring points were installed. This included 20 nested monitoring points (one shallow and one deep) in the commercial/industrial area and 10 deep monitoring points in the residential area. Elevated concentrations of PCE were detected at 1,300 $\mu\text{g}/\text{m}^3$ at the monitoring point located at the northwest corner of the Morgan and Nassau Avenues intersection, and 930 $\mu\text{g}/\text{m}^3$ at the monitoring point on the west side of Van Dam Street between Nassau and Meeker Avenues. Elevated concentrations of TCE were detected at 8,200 $\mu\text{g}/\text{m}^3$ at the monitoring point on east side of Apollo Street between Bridgewater Street and Nassau Avenue and 700 $\mu\text{g}/\text{m}^3$ at the monitoring point on the northwest corner of Morgan and Nassau Avenues intersection.

In September 2005, Environmental Planning and Management, Inc. (EPM) completed an investigation for the New York State Department of Transportation (NYSDOT) in connection with the Kosciuszko Bridge Project (EPM, January 2006). The investigation included the collection and analysis of soil and groundwater samples. PCE was detected at a concentration of 7,760 micrograms per kilogram ($\mu\text{g}/\text{kg}$) in the 0-4 foot sample from a boring located at the southeast corner of the intersection of Gardner Avenue and Thomas Street. PCE was also detected at concentration of 89.9 micrograms per liter ($\mu\text{g}/\text{L}$), 569 $\mu\text{g}/\text{L}$, and 1,060 $\mu\text{g}/\text{L}$ in monitoring wells located at east side of Vandervoort Avenue between Anthony and Cherry Streets, the southwest corner of the Gardner Avenue and Thomas Street intersection, and the east side of Varick Avenue between Anthony and Cherry Streets, respectively.

URS has completed two phases of investigation activities at the site. Soil vapor samples from north of Meeker Avenue indicate that PCE and TCE have impacted soil vapor quality. The highest concentrations (2,400 $\mu\text{g}/\text{m}^3$ PCE, 740 $\mu\text{g}/\text{m}^3$ TCE) were found in the vicinities of a former dry cleaner located on the southwest corner of the intersection of Kingsland and Norman Avenues and a former metal working facility and research lab located on Sutton Avenue between Norman and Nassau Avenues (URS, October 2007d and URS, April 2008).

To the south of Meeker Avenue, soil vapor samples indicate potential sources of PCE and TCE as follows: near a former and current metal working facility on the east side of Vandervoort Avenue between Anthony and Lombardy Streets (1,100 $\mu\text{g}/\text{m}^3$ PCE, 1,000 $\mu\text{g}/\text{m}^3$ TCE); near a former dry cleaner in the block bound by Richardson and Frost Streets between Morgan and Vandervoort Avenues (310,000 $\mu\text{g}/\text{m}^3$ PCE, 19,000 $\mu\text{g}/\text{m}^3$ TCE); and near a former dry cleaner in the block bound by Beadel Street and Division Place between Morgan and Vandervoort Avenues (13,000 $\mu\text{g}/\text{m}^3$ PCE, 370 $\mu\text{g}/\text{m}^3$ TCE). A potential source of 1,1,1-trichloroethane (1,1,1-TCA) (6,600 $\mu\text{g}/\text{m}^3$) and 1,1-dichloroethane (1,1-DCA) (2,000 $\mu\text{g}/\text{m}^3$) was also identified near a former drum storage area and current metal recycling facility on the east side of Vandervoort Avenue between Lombardy and Beadel Streets (URS, October 2007d and URS, April 2008).

SVI sampling was conducted separately by Ecology & Environment, Inc., a technical consultant under the direction of the NYSDEC, in the residential area north of the BQE during the 2006-2007 heating season. During that investigation, a total of 52 residences were sampled. The results of this sampling event indicated that chemicals related to the historic petroleum spill were not migrating into area homes. However, several homes showed a potential for soil vapor intrusion by chemicals unrelated to the historic petroleum spill. Nine of these homes were re-sampled in March 2008 by Ecology & Environment under the direction of the NYSDEC. As the area north of the BQE was being investigated separately, the NYSDEC and the New York State Department of Health (NYSDOH) directed URS to focus this portion of the investigation to the residential area south of the BQE.

2.0 FIELD INVESTIGATION ACTIVITIES

URS completed a residential air sampling effort to further assess soil vapor intrusion in the Greenpoint/East Williamsburg Industrial Area neighborhood (Figure 2). The activities conducted during the February-March 2008 field investigation consisted of the following work tasks:

- Preparing a mailing list for the NYSDEC and NYSDOH.
- Contacting homeowners and/or tenants by phone to determine interest in participating in the SVI program;
- Canvassing the neighborhood by knocking on doors to identify potential participants;
- Scheduling of appointments for home surveys and indoor air sampling;
- Conducting interviews with homeowners and/or residents and completing indoor air quality questionnaires and building surveys;
- Conducting an inventory of household chemicals present in the sampling area and evaluating their potential to affect air sample results; and
- Collection of indoor air samples from 12 locations, which consisted of 12 basement/lower level indoor air samples plus 1 field duplicate, and 12 sub-slab soil vapor samples plus 1 field duplicate. During indoor air sampling, 10 outdoor air samples plus 1 field duplicate were also collected.

2.1 Indoor Air Investigation

URS conducted indoor air, outdoor air, and sub-slab vapor sampling at residences in the site area following procedures outlined in the Project Management Work Plan (PMWP) and budget estimate (URS, April 2007a); the Field Activities Plan (URS, April 2007b) which includes the Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP), and a Health and Safety Plan (HASP) (URS, April 2007c); and the *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, Final, (NYSDOH, October 2006). The SVI investigation was conducted from February 25 through March 13, 2008. The following modifications to the indoor air investigation program were implemented based on discussion with and per the direction of the NYSDEC and NYSDOH:

- The Field activities plan did not include the use of a tracer gas when collecting sub-slab samples for the SVI sampling program. The use of a tracer gas when collecting sub-slab samples was implemented into the program in order to improve the quality of sample collection procedures.
- In a February 8, 2008 e-mail agreement between the NYSDOH and NYSDEC, when a structure contains a basement or crawl space, the Department will no longer include first floor samples as part of the routine vapor intrusion structure sampling program. First floor samples will continue to be collected at slab-on-grade structures. To the extent that the samples have not been collected, the work plan can be modified to omit the requirement for first floor sampling. Therefore, the sampling program was modified accordingly.

Of the 58 residential structures in the area bound by Lombardy Street, Porter Avenue, Division Place and Morgan Avenue, only 12 were sampled due to one of the following reasons: the occupant/owners would not allow their homes to be sampled; the occupant/owners could not be contacted; the occupant/owners did not return multiple phone calls; scheduling conflicts with the occupant/owners; or the homes were vacant during the sampling period. Residential structures designated as H-01 through H-12 were sampled. Two residences (H-03 and H-05) required resampling of the basement indoor air samples following the completion of the initial field effort because the laboratory inadvertently contaminated the initial sample canisters. The resampling of basement indoor air samples from H-03 and H-05 was conducted on March 12-13, 2008, along with an outdoor air sample collected at H-03.

2.1.1 Indoor Air Quality Survey and Questionnaire

Prior to sampling, occupant/owner interviews and a building inventory of household chemicals were conducted by URS and Department personnel. Once the questionnaires were completed, the building inventory (basements only) for household chemicals was prepared. A RAE Systems ppbRAE Plus PGM 7240 part-per-billion (ppb)-range photoionization detector (PID) was used to screen indoor air and identify potential sources of volatile organic compounds (VOC) from household chemicals prior to collecting the air samples. During this inventory, a handout

(Attachment A) was provided to the occupants that list activities that should be avoided prior to and during the air sampling.

2.1.2 Indoor Air and Outdoor Ambient Air Sampling

URS selected the indoor air sampling locations in consultation with each occupant/owner. Where possible, the indoor air locations were placed in the breathing zone (approximately three feet above the floor), central to the building and away from the foundation walls, appliances, and apparent penetrations. URS marked the indoor sample locations on the building sketch found in the building questionnaire forms and took a photograph of each sample location.

The indoor air and outdoor air samples were collected in accordance with the procedures outlined in the FAP (URS, April 2007b) using laboratory evacuated 6-liter Summa® canisters with 24 hour flow regulators [i.e., calibrated at the flow rate of approximately 0.004 liters per minute (L/min)]. Upon opening the canister valve, the initial vacuum pressure was recorded from the built-in gauge on the flow controller on the Summa® Canister Sampling Field Data Sheet. After the 24 hour sampling period, the canister vacuum was recorded on the Summa® Canister Sampling Field Data Sheet and the valve was then closed.

Outdoor air samples were typically collected at each residence on each day that indoor air sampling was taking place. Only one outdoor air sample was collected if the locations being sampled on the same day were in close proximity to each other. All outdoor air samples were collected in the building's back yard for the purpose of canister security. Ten outdoor air samples and one field duplicate sample were collected during the indoor air sampling. The outdoor air samples were also collected over a 24-hour period concurrent with the indoor air samples and sub-slab samples.

Field duplicate samples were collected at location H-11. The field duplicates were collected through a common Teflon-lined polyethylene tube connected to a stainless steel 'T' fitting. Tubing from each side of the 'T' was connected to an independent flow controlled canister.

2.1.3 Sub-Slab Soil Vapor Sampling

URS selected a sub-slab sample collection location in each residence by observing the condition of the building floor slab for apparent penetrations such as concrete floor cracks, floor drains or sump holes. The location was ideally central to the building, away from the foundation walls, cracks, and apparent penetrations. The proposed location was reviewed with the occupant/owner and a description was given on how the sampling was to be performed. After receiving permission for sampling from the occupant/owner, URS marked the sub-slab sample locations on the building sketch found in the building questionnaire forms and a photograph was taken of each sample location. URS used a ppbRAE to screen indoor air and penetrations such as concrete floor cracks, floor drains, and sump holes prior to collecting the air samples.

Sub-slab samples were collected through $\frac{1}{8}$ inch inside diameter by $\frac{1}{4}$ inch outside diameter Teflon-lined polyethylene tubing inserted through a hole in the slab that was drilled with an electric hammer drill. The tubing was sealed to the slab floor with modeling clay. A helium tracer gas was utilized during the sampling of each sub-slab soil vapor. The tracer gas was used to verify that the infiltration of indoor (ambient) air was not occurring during sample collection. A two-quart enclosure was placed over each sample location. The sample tubing was run through an outlet and plumber's putty was used to seal the interface between the tubing and the enclosure. The enclosure was then sealed at the ground surface with a polyurethane foam gasket. A tank containing ultra high purity (UHP) helium [99.999 percent (%)] was connected to the side port of the enclosure and enough helium was released to displace any ambient air and to maintain a positive pressure within the enclosure. Following the application of the tracer gas, one liter of soil vapor was purged using a Gillian GilAir-3 air sample pump at a rate of approximately 0.02 L/min into a 1 liter Tedlar bag.

The contents of the tedlar bag were measured for helium using a Radiodetection/Dielectric MGD-2002 Multi-gas Detector and VOCs using the ppbRae. If the helium concentration was less than 10%, the tubing was connected to the Summa canister via the flow controller and sampling commenced. If the concentration of helium exceeded 10%, the clay seal was redone and seal retested. The contents of the Tedlar bag containing the sub-slab purged air was subsequently discharged outside the building.

The sub-slab samples were collected over a 24-hour period using 6-liter Summa® canisters equipped with flow controller valves pre-calibrated at the laboratory (i.e., calibrated at the flow rate of approximately 0.004 L/min). Upon opening the canister valve, the initial vacuum pressure was recorded from the built-in gauge on the flow controller onto a Summa® Canister Sampling Field Data Sheet. After the 24 hour sampling period, the canister vacuum was recorded on the Summa® Canister Sampling Field Data Sheet and the valve was then closed. The sub-slab tubing seal was tested again with helium to determine if the integrity of the seal remained acceptable. The sub-slab sample port was then filled to grade with hydraulic cement.

All indoor, sub-slab, and outdoor air samples were shipped under chain-of-custody (COC) via Federal Express to Con-Test Analytical Laboratory (Con-Test), located in East Longmeadow, MA. Con-Test is a NYSDOH Environmental Laboratory Approval Program (ELAP) certified laboratory for the analysis of VOCs by USEPA Method TO-15. All indoor air, outdoor air, and sub-slab soil vapor samples were analyzed for the target compound list (TCL) VOCs listed in Table 1, to a minimum detection limit of 1.0 µg/m³. TCE, carbon tetrachloride, and vinyl chloride in all indoor and outdoor air samples were analyzed to a minimum detection limit of 0.25 µg/m³.

3.0 RESULTS OF THE INVESTIGATION

3.1 Data Validation and Data Usability Summary Report

A summary of VOCs analytical results for the indoor air, outdoor air, and sub-slab samples is presented by location in Table 2. The data packages submitted by the laboratory were equivalent to the NYSDEC's Analytical Services Protocol (ASP) Category B Deliverable requirements. A Data Usability Summary Report (DUSR) was prepared following the guidelines provided in Department of Environmental Remediation (DER)-10 Technical Guidance For Site Investigation and Remediation, Draft, December 2002, *Guidance for the Development of Data Usability Summary Reports*. The complete validated analytical results and Form 1s are provided in the DUSR in Attachment B. The DUSR is provided in an Adobe Acrobat® portable document format (PDF) on a compact disk (CD).

3.2 Soil Vapor Intrusion Investigation Sampling Results

Indoor air and sub-slab analytical results were compared to Matrix 1 and Matrix 2 (NYSDOH Soil Vapor Intrusion Guidance, October 2006), which may be found in Attachment C. This was done to assess current and potential future exposures at each residence sampled. Based on the analytical results, all locations sampled except H-02 and H-11 had concentrations that resulted in "Mitigate" recommendations. The recommended action for H-11 is "Monitor/Mitigate".

The recommended action for H-02 following Matrix 1 would be "take reasonable and practical actions to identify source(s) and reduce exposure" based on the concentration of TCE found in indoor air. However, the outdoor air concentration for TCE at H-02 was 1.2 µg/m³ and maybe a possible source. The NYSDEC and NYSDOH will further evaluate these data and other data in order to determine what actions are necessary.

PCE concentrations in the sub-slab samples were detected at concentrations ranging from 51 µg/m³ to 70,000 µg/m³, with the highest concentration at H-06. Indoor air results for PCE ranged from 0.73 µg/m³ to 12 µg/m³ at H-08. Outdoor air results for PCE ranged from not detected to 0.88 µg/m³ at H-01.

TCE concentrations in the sub-slab samples were detected at concentrations ranging from 1.2 $\mu\text{g}/\text{m}^3$ to 3,300 $\mu\text{g}/\text{m}^3$, with the highest concentration at location H-06. Indoor air results for TCE ranged from not detected to 13 $\mu\text{g}/\text{m}^3$ at location H-07. Outdoor air results for TCE ranged from not detected to 5.5 $\mu\text{g}/\text{m}^3$ at H-01.

1,1,1-TCA concentrations in the sub-slab samples were detected at concentrations ranging from 2.6 $\mu\text{g}/\text{m}^3$ to 580 $\mu\text{g}/\text{m}^3$, with the highest concentration at H-06. Indoor air results for 1,1,1-TCA ranged from not detected to 1.4 $\mu\text{g}/\text{m}^3$ at H-01. 1,1,1-TCA was not detected in the outdoor air samples.

Freons (i.e., 1,1,2-trichloro-1,2,2-trifluoroethane, dichlorodifluoromethane, and trichlorofluoromethane) in the sub-slab samples were detected at concentrations ranging from not detected to 18,000 $\mu\text{g}/\text{m}^3$, with the highest concentration at H-03. Indoor air results for freons ranged from 0.49 $\mu\text{g}/\text{m}^3$ to 11 $\mu\text{g}/\text{m}^3$ at H-06. In the outdoor air samples the concentrations of freons ranged from 0.50 $\mu\text{g}/\text{m}^3$ to 2.7 $\mu\text{g}/\text{m}^3$ at H-01.

The analytical results were compared against the household product inventories. Products most commonly encountered were paints, paint thinners and strippers, lubricants (e.g., WD-40), cleaning supplies (e.g., laundry detergent, household bleach), and insecticides. The product contents include petroleum distillates, glycols, methylene chloride, acetone, toluene, and xylene. The presence of these products did not appear to contribute to the presence of chlorinated compounds of interest in the indoor air samples.

4.0 FUTURE ACTIVITIES

4.1 Residential Mitigation and Monitoring

The NYSDEC and NYSDOH will further evaluate the vapor intrusion sampling results from the February-March 2008 field investigation. The NYSDEC and NYSDOH may recommend that additional new residences be sampled, continued monitoring be performed on some residences, or that mitigation systems be installed in some of the residences sampled during this field investigation. Structures that are identified by the NYSDEC and NYSDOH for new sampling or continued monitoring will be sampled during the 2008-2009 heating season. The outdoor air in the area may be impacted by a nearby source. It is not known at this time if the source impacting soil gas is also impacting area outdoor air quality or if it is a separate source.

5.0 REFERENCES

- Environmental Planning & Management, Inc. (EPM). 2006. *Contaminated Material Investigation Findings Report*, Kosciuszko Bridge Project, Kings and Queens Counties, New York, PIN X729.77.123. Draft. January.
- New York State Department of Health. 2006. *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*. Final. October.
- New York State Department of Environmental Conservation. 2002. *Guidance for the Development of Data Usability Summary Reports*. Draft DER-10 Technical Guidance for Site Investigation and Remediation, Appendix 2B. Division of Environmental Remediation. December 25.
- Roux Associates, Inc. (Roux). 2005. *Off-Site Soil Vapor Investigation, Phase I & II Report*, Greenpoint, Brooklyn, NY. October 14.
- Roux. 2006. *Phase IV Soil Vapor Report, Off-Site Commercial/Industrial/Residential Area*, Brooklyn, New York. November 10.
- Roux. 2007. *3rd Quarter of 2007 Progress Report, Off-Site Free-Product Recovery System*, Greenpoint, Brooklyn, New York. October 31.
- URS Corporation. 2007a. Project Management Work Plan, Site #2-24-121, Meeker Avenue Plume Trackdown, Greenpoint Section of Brooklyn, Kings County, New York. Final. April.
- URS Corporation. 2007b. Field Activities Plan, Site #2-24-121, Meeker Avenue Plume Trackdown, Greenpoint Section of Brooklyn, Kings County, New York. Final. April.
- URS Corporation. 2007c. Health And Safety Plan, Site #2-24-121, Meeker Avenue Plume Trackdown, Greenpoint Section of Brooklyn, Kings County, New York. Final. April.
- URS Corporation. 2007d. Phase I Data Summary Report, Site #2-24-121, Meeker Avenue Plume Trackdown, Greenpoint Section of Brooklyn, Kings County, New York. Final. October.
- URS Corporation. 2008. Phase II Data Summary Report, Site #2-24-121, Meeker Avenue Plume Trackdown, Greenpoint/East Williamsburg Industrial Area, Kings County, New York. Final. April.
- United States Environmental Protection Agency. 2006. *Validating Volatile Organic Analysis of Ambient Air in Canister by Method TO-15*, HW-31, Revision 4. Region 2. October.

TABLES

TABLE 1
SUMMARY OF PARAMETERS ANALYZED
IN
SUB-SLAB, INDOOR, AND OUTDOOR AIR SAMPLES
BY USEPA METHODS TO-15
MEEKER AVENUE PLUME TRACKDOWN

1,1,1-Trichloroethane (1,1,1-TCA)	Bromomethane
1,1,2,2-Tetrachloroethane	Carbon disulfide
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	Carbon tetrachloride #
1,1,2-Trichloroethane	Chlorobenzene
*1,1-Dichloroethane (1,1-DCA)	*Chloroethane
*1,1-Dichloroethene (1,1-DCE)	Chloroform
1,2,4-Trichlorobenzene	Chloromethane
1,2-Dibromo-3-chloropropane	Cyclohexane
1,2-Dibromoethane (Ethylene dibromide)	Dibromochloromethane
1,2-Dichlorobenzene	Dichlorodifluoromethane (Freon 12)
*1,2-Dichloroethane (1,2-DCA)	Ethylbenzene
*cis-1,2-Dichloroethene (cis-1,2-DCE)	Isopropylbenzene (Cumene)
*trans-1,2-Dichloroethene (trans-1,2-DCE)	Methyl acetate
1,2-Dichloropropane	Methyl ethyl ketone (2-Butanone)
1,3-Dichlorobenzene	Methyl tert-butyl ether
cis-1,3-Dichloropropene	Methylcyclohexane
trans-1,3-Dichloropropene	Methylene chloride
1,4-Dichlorobenzene	Styrene
2-Hexanone	*Tetrachloroethene (PCE)
4-Methyl-2-pentanone	Toluene
Acetone	*Trichloroethene (TCE) #
Benzene	Trichlorofluoromethane (Freon 11)
Bromodichloromethane	*Vinyl chloride (VC) #
Bromoform	Xylene (total)

USEPA Method TO-15, VOCs in Air Collected in SUMMA[®] Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS): USEPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, January 1999.

*- Tetrachloroethene and its breakdown products.

- The minimum reporting limit in all indoor and outdoor air samples for these compounds is 0.25 microgram per cubic meter ($\mu\text{g}/\text{m}^3$); the reporting limits for all other compounds are at least $1 \mu\text{g}/\text{m}^3$. The minimum reporting limit for all compounds in sub-slab samples is $1 \mu\text{g}/\text{m}^3$.

TABLE 2
SAMPLE LOCATION H-01
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-01	H-01	H-01
Sample ID		H-AA-01	H-BS-01	H-AS-01
Matrix		Outdoor Air	Indoor Air	Subslab Vapor
Depth Interval (ft)		-	-	-
Date Sampled		02/25/08	02/25/08	02/25/08
Parameter	Units			
Volatile Organic Compounds				
1,1,1-Trichloroethane	UG/M3		1.4	40
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	1.5	0.59	0.88
1,2-Dichloroethene (trans)	UG/M3	0.24	0.31	1.1
1,3-Dichlorobenzene	UG/M3			0.35
1,4-Dichlorobenzene	UG/M3	0.74	0.63	0.67
4-Methyl-2-pentanone	UG/M3	0.72	1.1	
Acetone	UG/M3	11 J	26 J	
Benzene	UG/M3	1.6	2.2	0.60
Carbon disulfide	UG/M3			0.64
Carbon tetrachloride	UG/M3	0.54	0.54	2.8
Chloroform	UG/M3		0.70	47
Chloromethane	UG/M3	1.4	1.7	
Cyclohexane	UG/M3	0.42	1.0	10
Dichlorodifluoromethane	UG/M3	1.5	1.4	1.6
Ethylbenzene	UG/M3	1.1	2.0	0.98
Methyl ethyl ketone (2-Butanone)	UG/M3	4.4	14	4.3
Methyl tert-butyl ether	UG/M3	0.15	0.41	
Methylcyclohexane	UG/M3	0.66	1.5	53 D
Methylene chloride	UG/M3		120 D	
Styrene	UG/M3	0.24 J	0.52 J	0.43 J
Tetrachloroethene	UG/M3	0.88	1.4	310 D
Toluene	UG/M3	7.6	13	6.2
Trichloroethene	UG/M3	5.5	6.9	84
Trichlorofluoromethane	UG/M3	2.7 J	2.2 J	1.3 J
Xylene (total)	UG/M3	5.0	9.2	5.6

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-01 = Outdoor Air H-BS-01 = Basement Air H-AS-01 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-02
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-02	H-02	H-02
Sample ID		H-AA-02	H-BS-02	H-AS-02
Matrix		Outdoor Air	Indoor Air	Subslab Vapor
Depth Interval (ft)		-	-	-
Date Sampled		02/26/08	02/26/08	02/26/08
Parameter	Units			
Volatile Organic Compounds				
1,1,1-Trichloroethane	UG/M3			5.5
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	0.59	0.61	1.1
1,2-Dichloroethene (trans)	UG/M3			1.1
1,4-Dichlorobenzene	UG/M3	0.47	0.90	0.42
4-Methyl-2-pentanone	UG/M3	0.70	0.67	1.1
Acetone	UG/M3	6.1 J	10 J	9.3 J
Benzene	UG/M3	1.5	1.5	0.26
Carbon disulfide	UG/M3			1.1
Carbon tetrachloride	UG/M3	0.50	0.52	0.51
Chloroform	UG/M3		0.51	0.61
Chloromethane	UG/M3	1.3	1.3	
Cyclohexane	UG/M3	0.46	0.60	
Dichlorodifluoromethane	UG/M3	1.5	1.6	1.9
Ethylbenzene	UG/M3	0.76	1.4	0.42
Methyl ethyl ketone (2-Butanone)	UG/M3	2.6	3.2	3.9
Methylcyclohexane	UG/M3		0.65	
Styrene	UG/M3	0.23 J	0.85 J	
Tetrachloroethene	UG/M3	0.73	0.73	51
Toluene	UG/M3	5.2	6.6	2.2
Trichloroethene	UG/M3	1.2	0.28	1.6
Trichlorofluoromethane	UG/M3	1.8 J	1.8 J	2.5 J
Xylene (total)	UG/M3	3.3	5.0	2.4

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-02 = Outdoor Air H-BS-02 = Basement Air H-AS-02 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-03
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-03	H-03	H-03	H-03
Sample ID		H-AA-03	H-AS-03	H-AA-03	H-BS-03
Matrix		Outdoor Air	Subslab Vapor	Outdoor Air	Indoor Air
Depth Interval (ft)		-	-	-	-
Date Sampled		02/26/08	02/26/08	03/12/08	03/12/08
Parameter	Units				
Volatile Organic Compounds					
1,1,1-Trichloroethane	UG/M3		400 D		0.96
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	1.5	9.3	0.62	1.0
1,1-Dichloroethane	UG/M3		5.5		
1,1-Dichloroethene	UG/M3		27		
1,2-Dichloroethene (cis)	UG/M3		6.5		
1,2-Dichloroethene (trans)	UG/M3		2.6		
1,3-Dichlorobenzene	UG/M3		0.61		
1,4-Dichlorobenzene	UG/M3	0.41			
2-Hexanone	UG/M3			0.81	1.2
4-Methyl-2-pentanone	UG/M3	0.91	1.3	0.59	0.93
Acetone	UG/M3	12 J	13 J	9.7 J	14 J
Benzene	UG/M3	1.3	2.1	1.1	1.5
Carbon disulfide	UG/M3		1.4		
Carbon tetrachloride	UG/M3	0.54	1.2	0.45	0.46
Chloroform	UG/M3		16		0.36
Chloromethane	UG/M3	1.7	1.0	0.55 J	0.66 J
Cyclohexane	UG/M3	0.55	2.0	6.2	5.6
Dichlorodifluoromethane	UG/M3	1.5	8.8	0.77	0.91
Ethylbenzene	UG/M3	0.84	2.0	0.25	0.43
Methyl acetate	UG/M3			2.0	2.3
Methyl ethyl ketone (2-Butanone)	UG/M3	5.4	4.9	4.1	7.5
Methylcyclohexane	UG/M3		3.0		0.69
Methylene chloride	UG/M3			1.0	1.4

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-03 = Outdoor Air H-BS-03 = Basement Air H-AS-03 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-03
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-03	H-03	H-03	H-03
Sample ID		H-AA-03	H-AS-03	H-AA-03	H-BS-03
Matrix		Outdoor Air	Subslab Vapor	Outdoor Air	Indoor Air
Depth Interval (ft)		-	-	-	-
Date Sampled		02/26/08	02/26/08	03/12/08	03/12/08
Parameter	Units				
Volatile Organic Compounds					
Styrene	UG/M3	0.24 J	0.72 J	0.44	0.60
Tetrachloroethene	UG/M3	0.87	4,100 D	0.33	2.6
Toluene	UG/M3	6.1	11	4.8	6.2
Trichloroethene	UG/M3	1.9	1,300 D		0.55
Trichlorofluoromethane	UG/M3	2.5 J	18,000 D	1.2	2.7
Xylene (total)	UG/M3	3.7	11	1.1	1.9

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-03 = Outdoor Air H-BS-03 = Basement Air H-AS-03 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-04
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-03	H-04	H-04
Sample ID		H-AA-03	H-BS-04	H-AS-04
Matrix		Outdoor Air	Indoor Air	Subslab Vapor
Depth Interval (ft)		-	-	-
Date Sampled		02/26/08	02/26/08	02/26/08
Parameter	Units			
Volatile Organic Compounds				
1,1,1-Trichloroethane	UG/M3		0.48	210 J
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	1.5	0.62	3.0
1,2-Dichloroethene (trans)	UG/M3			1.4
1,4-Dichlorobenzene	UG/M3	0.41	0.73	0.67
4-Methyl-2-pentanone	UG/M3	0.91	1.5	0.61
Acetone	UG/M3	12 J	23 J	6.4 J
Benzene	UG/M3	1.3	2.2	0.56
Carbon disulfide	UG/M3			2.5
Carbon tetrachloride	UG/M3	0.54	0.55	
Chloroform	UG/M3		0.75	2.0
Chloromethane	UG/M3	1.7	1.7	
Cyclohexane	UG/M3	0.55	1.7	0.44
Dichlorodifluoromethane	UG/M3	1.5	1.7	2.7
Ethylbenzene	UG/M3	0.84	3.2	1.4
Isopropylbenzene (Cumene)	UG/M3		0.52	
Methyl acetate	UG/M3		0.86 J	
Methyl ethyl ketone (2-Butanone)	UG/M3	5.4	5.1	
Methylcyclohexane	UG/M3		3.5	
Methylene chloride	UG/M3		6.6	
Styrene	UG/M3	0.24 J	0.36 J	
Tetrachloroethene	UG/M3	0.87	5.3	2,700 D
Toluene	UG/M3	6.1	18	4.8
Trichloroethene	UG/M3	1.9	1.6	190 J
Trichlorofluoromethane	UG/M3	2.5 J	1.7 J	98 J
Xylene (total)	UG/M3	3.7	14	8.0

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-03 = Outdoor Air H-BS-04 = Basement Air H-AS-04 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-05
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-03	H-03	H-05	H-05
Sample ID		H-AA-03	H-AA-03	H-AS-05	H-BS-05
Matrix		Outdoor Air	Outdoor Air	Subslab Vapor	Indoor Air
Depth Interval (ft)		-	-	-	-
Date Sampled		02/26/08	03/12/08	02/26/08	03/12/08
Parameter	Units				
Volatile Organic Compounds					
1,1,1-Trichloroethane	UG/M3			120	0.45
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	1.5	0.62	3.9	1.4
1,1-Dichloroethane	UG/M3			1.7	0.18
1,2-Dichlorobenzene	UG/M3			0.61	
1,2-Dichloroethene (trans)	UG/M3			1.1	
1,4-Dichlorobenzene	UG/M3	0.41		0.75	0.46
2-Hexanone	UG/M3		0.81		1.1
4-Methyl-2-pentanone	UG/M3	0.91	0.59	1.1	0.67
Acetone	UG/M3	12 J	9.7 J	8.4 J	10 J
Benzene	UG/M3	1.3	1.1	0.70	1.0
Carbon tetrachloride	UG/M3	0.54	0.45		0.46
Chloroform	UG/M3			31	0.48
Chloromethane	UG/M3	1.7	0.55 J		0.53 J
Cyclohexane	UG/M3	0.55	6.2	0.72	0.36
Dichlorodifluoromethane	UG/M3	1.5	0.77	4.2	0.81
Ethylbenzene	UG/M3	0.84	0.25	0.88	0.41
Methyl acetate	UG/M3		2.0		
Methyl ethyl ketone (2-Butanone)	UG/M3	5.4	4.1		4.5
Methylcyclohexane	UG/M3			1.6	
Methylene chloride	UG/M3		1.0		33
Styrene	UG/M3	0.24 J	0.44		0.22
Tetrachloroethene	UG/M3	0.87	0.33	19,000 D	1.2
Toluene	UG/M3	6.1	4.8	4.0	7.4
Trichloroethene	UG/M3	1.9		650 D	
Trichlorofluoromethane	UG/M3	2.5 J	1.2	340 J	1.4
Xylene (total)	UG/M3	3.7	1.1	4.8	1.8

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-03 = Outdoor Air H-BS-05 = Basement Air H-AS-05 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-06
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-06	H-06	H-06
Sample ID		H-AA-06	H-BS-06	H-AS-06
Matrix		Outdoor Air	Indoor Air	Subslab Vapor
Depth Interval (ft)		-	-	-
Date Sampled		02/27/08	02/27/08	02/27/08
Parameter	Units			
Volatile Organic Compounds				
1,1,1-Trichloroethane	UG/M3			580
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	0.51	0.51	9.5
1,1-Dichloroethane	UG/M3			41
1,1-Dichloroethene	UG/M3			30
1,2-Dichloroethene (cis)	UG/M3			39
1,2-Dichloroethene (trans)	UG/M3			15
4-Methyl-2-pentanone	UG/M3	0.29	0.36	
Acetone	UG/M3	4.9 J	6.9 J	15 J
Benzene	UG/M3	0.70	0.88	4.0
Carbon tetrachloride	UG/M3	0.46	0.47	7.2
Chloroform	UG/M3			33
Chloromethane	UG/M3	1.1	1.0	
Cyclohexane	UG/M3		0.23	3.4
Dichlorodifluoromethane	UG/M3	0.99	1.1	
Ethylbenzene	UG/M3		0.31	
Methylene chloride	UG/M3	0.82	0.72	
Tetrachloroethene	UG/M3		4.3	70,000 D
Toluene	UG/M3	3.2	4.7	25
Trichloroethene	UG/M3		0.41	3,300
Trichlorofluoromethane	UG/M3	1.0	11	13,000 D
Xylene (total)	UG/M3	0.63	1.8	5.8

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-06 = Outdoor Air H-BS-06 = Basement Air H-AS-06 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-07
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-07	H-07	H-07
Sample ID		H-AA-07	H-BS-07	H-AS-07
Matrix		Outdoor Air	Indoor Air	Subslab Vapor
Depth Interval (ft)		-	-	-
Date Sampled		02/27/08	02/27/08	02/27/08
Parameter	Units			
Volatile Organic Compounds				
1,1,1-Trichloroethane	UG/M3			68
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	0.55	0.56	1.1
1,1-Dichloroethene	UG/M3			0.74
1,2-Dichloroethene (trans)	UG/M3		0.98	0.49
4-Methyl-2-pentanone	UG/M3			0.70
Acetone	UG/M3	7.2 J		18 J
Benzene	UG/M3	1.0	1.5	0.71
Carbon disulfide	UG/M3		0.17	1.2
Carbon tetrachloride	UG/M3	0.49	0.50	
Chloroform	UG/M3		1.5	12
Chloromethane	UG/M3	1.9	1.6	
Cyclohexane	UG/M3	0.59	2.8	0.43
Dichlorodifluoromethane	UG/M3	1.3	1.3	1.8
Ethylbenzene	UG/M3	0.44	1.3	0.90
Methylcyclohexane	UG/M3		3.6	
Methylene chloride	UG/M3		35	
Styrene	UG/M3	0.22	0.39	
Tetrachloroethene	UG/M3	0.28	1.4	230
Toluene	UG/M3	2.8	9.5	4.4
Trichloroethene	UG/M3		13	23
Trichlorofluoromethane	UG/M3	1.4	0.90	2.0
Xylene (total)	UG/M3	2.0	5.3	5.1

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-07 = Outdoor Air H-BS-07 = Basement Air H-AS-07 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-08
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-08	H-08	H-08
Sample ID		H-AA-08	H-BS-08	H-AS-08
Matrix		Outdoor Air	Indoor Air	Subslab Vapor
Depth Interval (ft)		-	-	-
Date Sampled		02/28/08	02/28/08	02/28/08
Parameter	Units			
Volatile Organic Compounds				
1,1,1-Trichloroethane	UG/M3			2.6
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	0.55	0.76	0.98
1,2-Dichloroethane	UG/M3		0.60	
1,2-Dichloroethene (trans)	UG/M3			0.50
1,4-Dichlorobenzene	UG/M3	0.32	3.7	0.95
4-Methyl-2-pentanone	UG/M3	0.29	0.68	
Acetone	UG/M3	4.9 J	19 J	8.4 J
Benzene	UG/M3	0.99	1.6	0.46
Carbon tetrachloride	UG/M3	0.48	0.52	0.78
Chloroform	UG/M3		1.4	
Chloromethane	UG/M3	1.7	1.8	
Cyclohexane	UG/M3	0.37	1.1	
Dichlorodifluoromethane	UG/M3	1.4	7.0	4.7
Ethylbenzene	UG/M3	0.53	1.8	0.98
Methyl acetate	UG/M3		0.71	
Methyl ethyl ketone (2-Butanone)	UG/M3		27	6.3
Methylcyclohexane	UG/M3		1.7	
Methylene chloride	UG/M3		3.7	
Styrene	UG/M3		0.54	
Tetrachloroethene	UG/M3	0.67	12	1,700 D
Toluene	UG/M3	3.7	17	4.0
Trichloroethene	UG/M3		0.28	1.2
Trichlorofluoromethane	UG/M3	1.3	1.3	1.6
Xylene (total)	UG/M3	2.3	7.5	4.7

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-08 = Outdoor Air H-BS-08 = Basement Air H-AS-08 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-09
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-08	H-09	H-09
Sample ID		H-AA-08	H-BS-09	H-AS-09
Matrix		Outdoor Air	Indoor Air	Subslab Vapor
Depth Interval (ft)		-	-	-
Date Sampled		02/28/08	02/28/08	02/28/08
Parameter	Units			
Volatile Organic Compounds				
1,1,1-Trichloroethane	UG/M3		0.37	310
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	0.55	0.49	22
1,1-Dichloroethane	UG/M3			12
1,1-Dichloroethene	UG/M3			20
1,2-Dichloroethene (cis)	UG/M3			2.1
1,2-Dichloroethene (trans)	UG/M3			1.3
1,4-Dichlorobenzene	UG/M3	0.32	0.36	
4-Methyl-2-pentanone	UG/M3	0.29	0.38	
Acetone	UG/M3	4.9 J	9.6 J	6.8 J
Benzene	UG/M3	0.99	1.5	1.4
Carbon disulfide	UG/M3			1.5
Carbon tetrachloride	UG/M3	0.48	0.54	13
Chloroform	UG/M3		1.0	74
Chloromethane	UG/M3	1.7	1.3	
Cyclohexane	UG/M3	0.37	0.79	
Dichlorodifluoromethane	UG/M3	1.4	1.2	2.7
Ethylbenzene	UG/M3	0.53	1.7	2.0
Methyl acetate	UG/M3		0.72	
Methyl ethyl ketone (2-Butanone)	UG/M3		14	
Methylcyclohexane	UG/M3		0.90	
Methylene chloride	UG/M3		1.4	
Styrene	UG/M3		0.34	
Tetrachloroethene	UG/M3	0.67	6.7	11,000 D

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-08 = Outdoor Air H-BS-09 = Basement Air H-AS-09 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-09
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-08	H-09	H-09
Sample ID		H-AA-08	H-BS-09	H-AS-09
Matrix		Outdoor Air	Indoor Air	Subslab Vapor
Depth Interval (ft)		-	-	-
Date Sampled		02/28/08	02/28/08	02/28/08
Parameter	Units			
Volatile Organic Compounds				
Toluene	UG/M3	3.7	14	5.0
Trichloroethene	UG/M3		0.27	300
Trichlorofluoromethane	UG/M3	1.3	1.2	3.8
Xylene (total)	UG/M3	2.3	7.5	8.3

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-08 = Outdoor Air H-BS-09 = Basement Air H-AS-09 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-10
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-10	H-10	H-10
Sample ID		H-AA-10	H-BS-10	H-AS-10
Matrix		Outdoor Air	Indoor Air	Subslab Vapor
Depth Interval (ft)		-	-	-
Date Sampled		02/28/08	02/28/08	02/28/08
Parameter	Units			
Volatile Organic Compounds				
1,1,1-Trichloroethane	UG/M3			150
1,1,2,2-Tetrachloroethane	UG/M3			0.85
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	0.50	0.52	48
1,1-Dichloroethane	UG/M3			2.6
1,1-Dichloroethene	UG/M3			1.8
1,2-Dichloroethene (trans)	UG/M3			1.0
4-Methyl-2-pentanone	UG/M3	0.24		0.88
Acetone	UG/M3	4.5 J	8.1 J	15 J
Benzene	UG/M3	1.0	1.4	1.4
Carbon tetrachloride	UG/M3	0.44	0.45	6.2
Chloroform	UG/M3		0.31	14
Chloromethane	UG/M3	1.1	1.5	
Cyclohexane	UG/M3	0.45	0.84	0.89
Dichlorodifluoromethane	UG/M3	0.95	0.92	2.5
Ethylbenzene	UG/M3	0.40	0.33	0.93
Methylcyclohexane	UG/M3		0.76	3.2
Methylene chloride	UG/M3	0.89	3.9	10
Tetrachloroethene	UG/M3	0.36	1.0	1,300 JD
Toluene	UG/M3	3.8	6.7	3.6
Trichloroethene	UG/M3			110
Trichlorofluoromethane	UG/M3	1.1	1.1	3.3
Xylene (total)	UG/M3	2.0	1.2	3.7

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-10 = Outdoor Air H-BS-10 = Basement Air H-AS-10 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-11
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-11	H-11	H-11	H-11	H-11
Sample ID		0229-FD3	H-AA-11	0229-FD2	H-BS-11	0229-FD1
Matrix		Outdoor Air	Outdoor Air	Indoor Air	Indoor Air	Subslab Vapor
Depth Interval (ft)		-	-	-	-	-
Date Sampled		02/29/08	02/29/08	02/29/08	02/29/08	02/29/08
Parameter	Units	Field Duplicate (1-1)		Field Duplicate (1-1)		Field Duplicate (1-1)
Volatile Organic Compounds						
1,1,1-Trichloroethane	UG/M3					37
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	0.55	0.53	0.57	0.50	
1,4-Dichlorobenzene	UG/M3	0.25		0.44	0.94	
4-Methyl-2-pentanone	UG/M3	0.56	0.45	0.81	1.1	
Acetone	UG/M3	5.1 J	5.7 J	15 J	13 J	14 J
Benzene	UG/M3	0.68	0.71	1.8	3.8	0.73
Carbon tetrachloride	UG/M3	0.48	0.46	0.49	0.48	1.2
Chloroform	UG/M3			0.57	0.45	90
Chloromethane	UG/M3	1.1	1.6	1.9	2.3	
Cyclohexane	UG/M3	0.18		0.73	2.5	
Dichlorodifluoromethane	UG/M3	0.95	0.96	1.1	1.0	1.2
Ethylbenzene	UG/M3	0.28	0.27	0.73	2.8	0.51
Methyl ethyl ketone (2-Butanone)	UG/M3			5.8	5.1	
Methylcyclohexane	UG/M3			0.67	1.7	
Methylene chloride	UG/M3	1.4	4.9	2.6	1.5	0.69
Styrene	UG/M3			0.72	8.1	
Tetrachloroethene	UG/M3	0.84	0.70	5.3	5.1	160
Toluene	UG/M3	3.5	3.6	6.4	19	1.4
Trichloroethene	UG/M3				0.71	27
Trichlorofluoromethane	UG/M3	1.1	1.4	2.2	1.9	2.2
Xylene (total)	UG/M3	1.2	1.0	3.1	8.7	2.3

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-11 or 0229-FD3 = Outdoor Air H-BS-11 or 0229-FD2 = Basement Air H-AS-11 or 0229-FD1 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-11
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-11
Sample ID		H-AS-11
Matrix		Subslab Vapor
Depth Interval (ft)		-
Date Sampled		02/29/08
Parameter	Units	
Volatile Organic Compounds		
1,1,1-Trichloroethane	UG/M3	38
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	
1,4-Dichlorobenzene	UG/M3	
4-Methyl-2-pentanone	UG/M3	
Acetone	UG/M3	12 J
Benzene	UG/M3	0.77
Carbon tetrachloride	UG/M3	1.2
Chloroform	UG/M3	91
Chloromethane	UG/M3	
Cyclohexane	UG/M3	
Dichlorodifluoromethane	UG/M3	1.6
Ethylbenzene	UG/M3	0.51
Methyl ethyl ketone (2-Butanone)	UG/M3	
Methylcyclohexane	UG/M3	
Methylene chloride	UG/M3	
Styrene	UG/M3	
Tetrachloroethene	UG/M3	160
Toluene	UG/M3	1.2
Trichloroethene	UG/M3	28
Trichlorofluoromethane	UG/M3	2.0
Xylene (total)	UG/M3	2.1

Flags assigned during chemistry validation are shown.

See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-11 or 0229-FD3 = Outdoor Air H-BS-11 or 0229-FD2 = Basement Air H-AS-11 or 0229-FD1 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

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Only Detected Results Reported.

TABLE 2
SAMPLE LOCATION H-12
SOIL VAPOR INTRUSION ANALYTICAL RESULTS
MEEKER AVENUE PLUME TRACKDOWN SITE

Location ID		H-12	H-12	H-12
Sample ID		H-AA-12	H-BS-12	H-AS-12
Matrix		Outdoor Air	Indoor Air	Subslab Vapor
Depth Interval (ft)		-	-	-
Date Sampled		03/05/08	03/05/08	03/05/08
Parameter	Units			
Volatile Organic Compounds				
1,1,1-Trichloroethane	UG/M3			62
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/M3	0.55	0.58	31
1,1-Dichloroethane	UG/M3			4.1
1,1-Dichloroethene	UG/M3			2.5
1,4-Dichlorobenzene	UG/M3		0.34	
2-Hexanone	UG/M3	0.48		0.79
4-Methyl-2-pentanone	UG/M3	0.53	0.67	0.63
Acetone	UG/M3	5.6 J	12 J	
Benzene	UG/M3	0.98	9.9	1.1
Carbon disulfide	UG/M3		0.14	0.88
Carbon tetrachloride	UG/M3	0.44	0.48	6.4
Chloroform	UG/M3		0.86	11
Chloromethane	UG/M3	1.2	1.4	
Cyclohexane	UG/M3	0.41	4.9	
Dichlorodifluoromethane	UG/M3	0.92	1.1	1.6
Ethylbenzene	UG/M3	0.58	0.92	1.8
Isopropylbenzene (Cumene)	UG/M3			5.2
Methyl ethyl ketone (2-Butanone)	UG/M3		3.5	
Methylcyclohexane	UG/M3		6.7	
Methylene chloride	UG/M3	1.4	1.9	
Styrene	UG/M3		0.29	1.6
Tetrachloroethene	UG/M3	0.73	2.8	2,600 D
Toluene	UG/M3	7.1	11	2,100 D
Trichloroethene	UG/M3	0.28	0.64	240
Trichlorofluoromethane	UG/M3	0.95	1.0	2.7
Xylene (total)	UG/M3	2.3	4.4	9.6

Flags assigned during chemistry validation are shown.

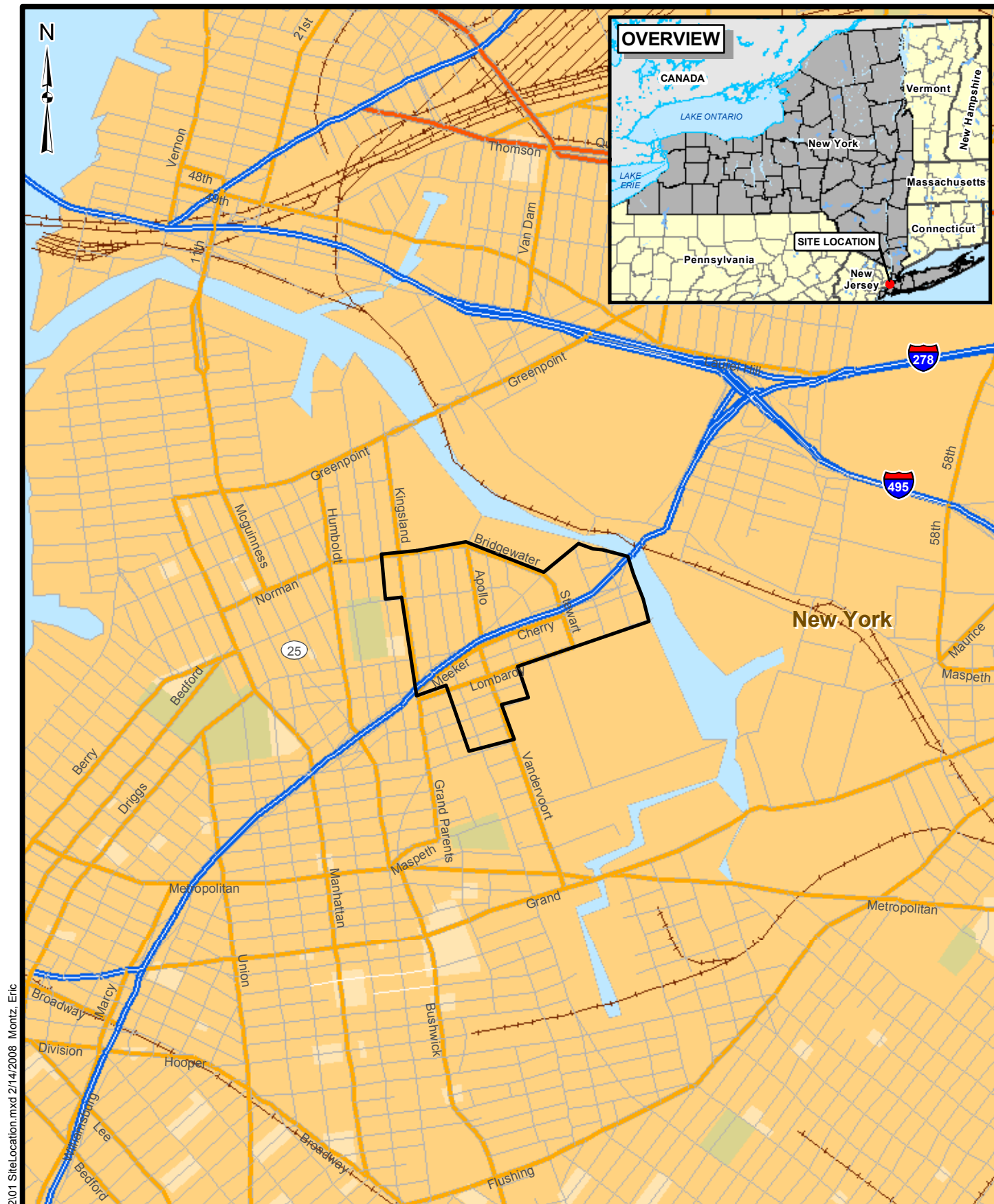
See Soil Vapor/Indoor Air Decision Matrix 1 or Matrix 2 for recommendations. (NYSDOH Soil Vapor Intrusion Guidance, October 2006)

H-AA-12 = Outdoor Air H-BS-12 = Basement Air H-AS-12 = Subslab Soil Vapor UG/M3 - Micrograms per cubic meter.

J - The reported concentration is an estimated value. D - Result reported from a secondary dilution analysis. Blank - Not Detected

Only Detected Results Reported.

FIGURES



SOURCE:
ESRI Data and Maps

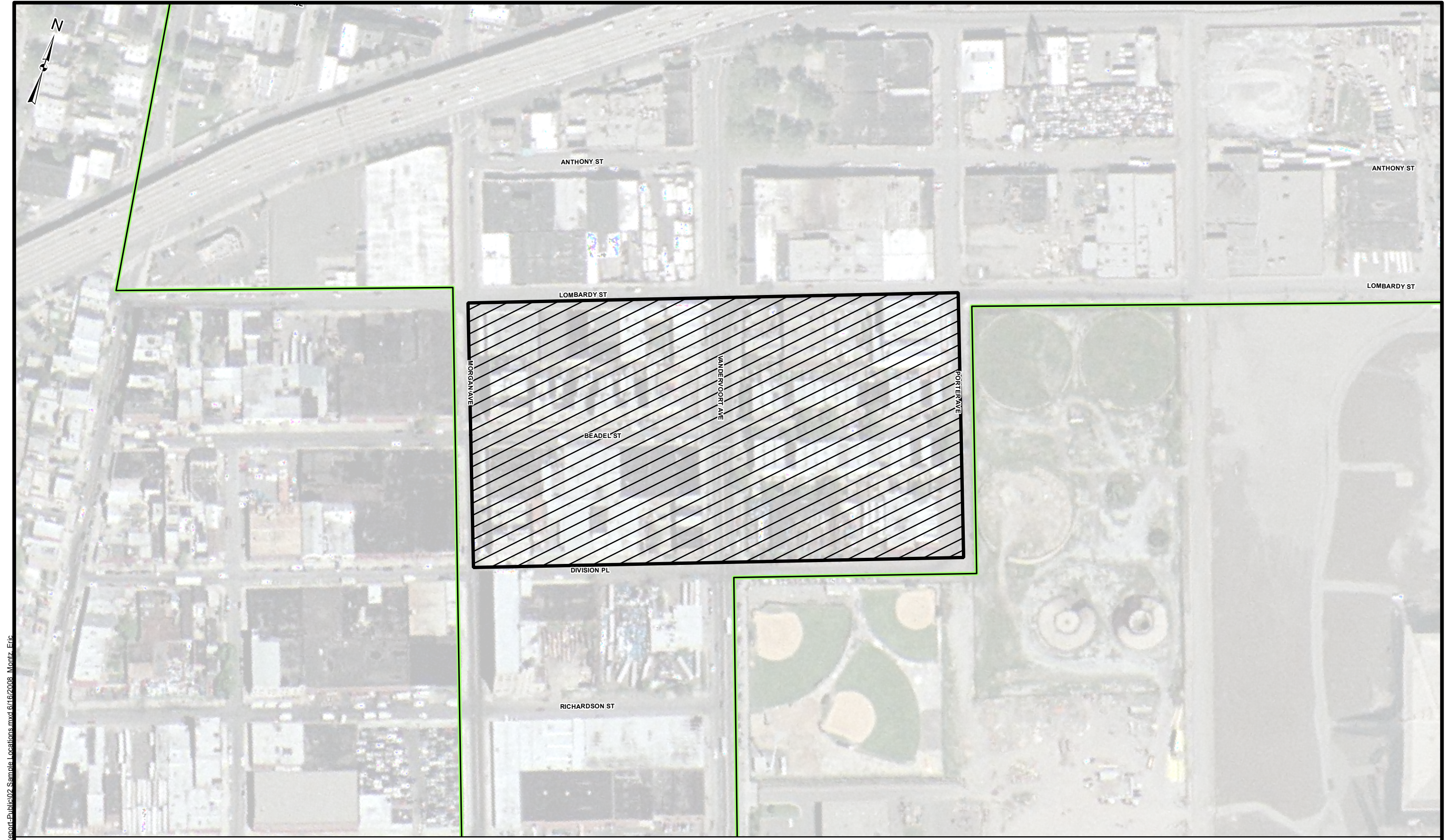
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Feet

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MEEKER AVENUE PLUME TRACKDOWN SITE
SITE LOCATION MAP


FIGURE 1


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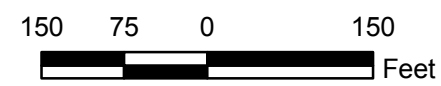


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Legend

 Sampling Area

 Project Boundary



MEEKER AVENUE PLUME TRACKDOWN SITE
SOIL VAPOR INTRUSION SAMPLING AREA




FIGURE 2