Webster I – 2999 Webster Avenue
BRONX, NEW YORK

Remedial Investigation Report

NYC VCP Project Number: 13CVCP129X
NYC OER Site Number: 13EHN185X
E-Designation Site Number: E-249

Prepared for:

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LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
CAMP	Community Air Monitoring Plan
COC	Contaminant of Concern
CPP	Citizen Participation Plan
CSM	Conceptual Site Model
DER-10	New York State Department of Environmental Conservation Technical Guide 10
FID	Flame Ionization Detector
GPS	Global Positioning System
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IRM	Interim Remedial Measure
NAPL	Non-aqueous Phase Liquid
NYC VCP	New York City Voluntary Cleanup Program
NYC DOHMH	New York City Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
NYS DOH ELAP	New York State Department of Health Environmental Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
QEP	Qualified Environmental Professional
RI	Remedial Investigation
RIR	Remedial Investigation Report
SCO	Soil Cleanup Objective
SPEED	Searchable Property Environmental Electronic Database

CERTIFICATION

I, Deborah J. Thompson, am a Qualified Environmental Professional, as defined in RCNY § 43-1402(ar). I have primary direct responsibility for implementation of the Remedial Investigation for the Tyler Bronx Tunnel, LLC, (NYC OER Site No. 13EHN185X and VCP # 13CVCP129X). I am responsible for the content of this Remedial Investigation Report (RIR), have reviewed its contents and certify that this RIR is accurate to the best of my knowledge and contains all available environmental information and data regarding the property.

Deborah J Thompson 8/5/13 Deborah J Thompson

Qualified Environmental Professional Date Signature

EXECUTIVE SUMMARY

The Remedial Investigation Report (RIR) provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy pursuant to RCNY§ 43-1407(f). The remedial investigation (RI) described in this document is consistent with applicable guidance.

Site Location and Current Usage

The Site is located in the Bedford Park section of Bronx, New York and is identified as Block 3280 and Lot number 39 on the New York City Tax Map. Figure number 1 is a Site location map. The Site is 6,038 square feet and is bordered to the northeast by a three-story structure which houses ground floor commercial store fronts and upper level residential apartments and East 201st Street, to the southeast by Webster Avenue and a mixed-use building (Botanical Square), to the southwest by a commercial business (Vanity Fair Bathmart - 2971 Webster Avenue), and to the northwest by residential properties (single and multi-family) located along Decatur Avenue. The site topography is generally level and at grade with neighboring roadways. See Figure 2 for surrounding land use. At present, the Site is vacant (structure has been demolished/removed) and is awaiting development. The historical structure onsite includes a one-story, circa-1925 building (~50' x 67') was utilized until 1997 by Vanity Fair Bathmart, Inc. as a cabinet manufacturing, showroom, and office facility. Since 1997, the structure has been operated as a Garson Plumbing Supplies warehouse. Active site use ceased in April of 2012.

Summary of Proposed Redevelopment Plan

The proposed use of the Site will consist of an eight-story apartment housing structure with a cellar. Maximum excavation for the cellar is planned to be no greater than 9' 4" below sidewalk elevation. Layout of the proposed site development is presented in Figure 3. The current zoning designation is Residential R7D. The character of moderate and higher density R7D districts are generally found close to central and regional business districts and are usually mapped in proximity to mass transit. However, the character of these neighborhoods varies widely.

The rectangular shaped 0.14-acre parcel is currently awaiting demolition and development. It has 50 feet of lot frontage with a lot depth of 120.75 feet. Planned site improvement work includes the construction of an eight-story apartment complex with a rear yard. The building will contain thirty-seven units. The basement level will house mechanical and utility meter rooms, tenant laundry center, boiler room (natural gas fired system), refuse storage area, and service connections. The building will be serviced by one passenger elevator and an interior stairway. The newly developed building footprint area is 50' wide by 60' deep. Gross building square footage is approximately 25,280 feet. No on-site vehicle parking will be provided. The proposed development will not cover the entire footprint of the site as nearly half the property will be slated as a recreational area (see Figure 3). As the proposed site improvement work includes a building with a basement area, the planned maximum depth of excavation would be no greater than 9'4" below sidewalk grade. Earth moving would include the area within the building footprint, with a total maximum volume of approximately 1,033 yd^3. The excavation for the site structure is not anticipated to be below the groundwater table.

Summary of Past Uses of Site and Areas of Concern

The following environmental work plans and reports were developed for the Site:

Phase I Environmental Site Assessment,

July 6, 2012, prepared by Team Environmental Consultants, Inc.

Digital (PDF) copies of the above referenced reports are included in in Appendix A.

This Phase I identified no recognized environmental conditions (RECs) on the subject property.

Summary of the Work Performed under the Remedial Investigation

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed four soil borings across the entire project Site, and collected eight (including one duplicate sample) soil samples for chemical analysis from the soil borings to evaluate soil quality;

3. Installed three temporary groundwater monitoring wells throughout the Site to establish groundwater flow, and collected four (including one duplicate sample) groundwater samples for chemical analysis to evaluate groundwater quality;
4. Installation of three soil vapor probes around Site perimeter and collected three samples for chemical analysis.

Summary of Environmental Findings

1. Elevation of the property ranges from 62.51 to 63.25 feet.
2. Depth to groundwater ranges from 10.00 to 10.50 feet below current sidewalk grade at the Site.
3. Groundwater flow is generally from west to east beneath the Site.
4. Bedrock was not encountered during the RI at the Site.
5. The stratigraphy of the site, from the surface down, consists of fine to coarse sands.
6. Soil/fill samples collected during the RI showed no VOCs at detectable concentrations except trace levels of methylene chloride. No VOCs exceeded Track I Unrestricted Use SCOs. Several SVOCs were detected at a concentration above Restricted Residential SCOs and included Benzo(a)anthracene (1,370 ppb), Benzo(a) pyrene (1,630 ppb), Benzo(b)fluoranthene (1,830 ppb), and Chrysene (1,680 ppb) in one shallow sample only. All other SVOC concentrations were below Track I SCOs. PCBs were not detected in any of soil samples. Three pesticides including 4-4'-DDE (at 112 ppb), 4-4'-DDT (ranging from 7.2 to 249 ppb) and chlordane (at 33 ppb) were reported above Track I SCOs, but all below Restricted Residential SCOs. Shallow soils detected six metals including barium (at 575 ppm), chromium (max. 40.5 ppm), cooper (at 320 ppm), lead (max. 1,150 ppm), selenium (at 5.7 ppm), and zinc (max. 333 ppm) exceeded Track I Unrestricted Use SCOs, and of these, barium, copper and lead also exceeded Restricted Residential SCOs. Chromium was the only metal detected in one deep soil sample above Unrestricted Use SCOs. Most exceedances of metals, SVOCs and pesticides were

detected in a single soil sampling location (SB-1). Overall, findings for soil were unremarkable and did not show a source of contamination on this property.

7. Groundwater samples collected during the RI showed no detectable concentrations of SVOCs, PCBs or pesticides in any of the groundwater samples. VOCs were not detected in groundwater except trace concentrations of acetone (max. 9 ug/L) and methylene chloride (max. 15 ug/L) in all four groundwater samples, and all concentrations were below NYSDEC Part 703.5 Groundwater Quality Standards (GQS). Several metals including aluminum (max. 0.631 ppm), iron (max. 0.94 ppm) and sodium (max. 141 ppm) were detected above GQS in groundwater. Overall, findings for groundwater were unremarkable and did not show a source of contamination on this property.

8. Soil vapor samples collected during the RI showed low level detections for volatile organic compounds. With the exception of acetone (max of 92 $\mu g/m^3$), toluene (max of 65 $\mu g/m^3$) and xylene (max of 52 $\mu g/m^3$), most compounds were detected at concentrations less than 25 $\mu g/m^3$. Chlorinated compounds, PCE was detected in all three vapor samples ranging from 11 $\mu g/m^3$ – 81 $\mu g/m^3$. TCE was detected in all three vapor sample locations at low levels ranging from 2.7 $\mu g/m^3$ – 150 $\mu g/m^3$. TCE concentrations reported within the soil vapor samples are above New York State DOH soil vapor guidance matrix. TCE and PCE were not detected in groundwater samples.

REMEDIAL INVESTIGATION REPORT

1.0 SITE BACKGROUND

An E-Designation for Hazardous Materials (E-249) was placed on the Site by the New York City Department of City Planning (DCP) as part of the October 5, 2011, Bedford Park rezoning action (CEQR number 10DCP035X). As Tyler's Bronx Tunnel, LLC has committed to investigate and remediate the 6,038 square foot site located at 2999 Webster Avenue in the Bedford Park section of Bronx, New York, the site has been assigned project number 13EH-N185X by OER. Residential use is proposed for the property. The RI work was performed on April 11, 2013. This RIR summarizes the nature and extent of contamination and provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy that is protective of human health and the environment consistent with the use of the property pursuant to RCNY§ 43-1407(f).

1.1 SITE LOCATION AND CURRENT USAGE

The Site is located in the Bedford Park section of Bronx, New York and is identified as Block 3280 and Lot number 39 on the New York City Tax Map. Figure number 1 is a Site location map. The Site is 6,038 square feet and is bordered to the northeast by a three-story structure which houses ground floor commercial store fronts and upper level residential apartments and East 201st Street, to the southeast by Webster Avenue and a mixed-use building (Botanical Square), to the southwest by a commercial business (Vanity Fair Bathmart - 2971 Webster Avenue), and to the northwest by residential properties (single and multi-family) located along Decatur Avenue. The site topography is generally level and at grade with neighboring roadways. See Figure 2 for surrounding land use. At present, the Site is vacant (structure has been demolished/removed) and is awaiting development. The historical structure onsite includes a one-story, circa-1925 building (~50' x 67') was utilized until 1997 by Vanity Fair Bathmart, Inc. as a cabinet manufacturing, showroom, and office facility. Since 1997, the structure has been operated as a Garson Plumbing Supplies warehouse. Active site use ceased in April of 2012.

1.2 Proposed Redevelopment Plan

The proposed use of the Site will consist of an eight-story apartment housing structure with a cellar. Maximum excavation for the cellar is planned to be no greater than 9' 4" below sidewalk elevation. Layout of the proposed site development is presented in Figure 3. The current zoning designation is Residential R7D. The character of moderate and higher density R7D districts are generally found close to central and regional business districts and are usually mapped in proximity to mass transit. However, the character of these neighborhoods varies widely.

The rectangular shaped 0.14-acre parcel is currently awaiting development. It has 50 feet of lot frontage with a lot depth of 120.75 feet. Planned site improvement work includes the construction of an eight-story apartment complex with a rear yard. The building will contain forty-six units. The basement level will house mechanical and utility meter rooms, tenant laundry center, boiler room (natural gas fired system), refuse storage area, and service connections. The building will be serviced by one passenger elevator and an interior stairway. The newly developed building footprint area is 50' wide by 60' deep. Gross building square footage is approximately 25,280 feet. No on-site vehicle parking will be provided. The proposed development will not cover the entire footprint of the site as nearly half the property will be slated as a recreational area (see Figure 3). As the proposed site improvement work includes a building with a basement area, the planned maximum depth of excavation would be no greater than 9'4" below sidewalk grade. Additional site improvement also calls for the installation of an elevator with an estimated depth of excavation at five feet below grade. Earth moving would include the area within the building footprint, with a total maximum volume of approximately 1,033 yd^3. The excavation for the site structure is not anticipated to be below the groundwater table.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The subject and surrounding properties are located in an urban residential setting in the Borough of the Bronx, City and State of New York. Adjoining property usage is utilized for mainly for light commercial and multi-family residential properties. There are no identified sensitive receptors within a 250 to 500-foot radius of the site.

Figure 2 shows the surrounding land usage.

2.0 SITE HISTORY

2.1 PAST USES AND OWNERSHIP

An on-line New York City Department of Finance Database indicates the subject parcel (City of New York Block 3280, Lot 39) to have been acquired by Tyler's Bronx Tunnel, LLC in August of 2012. The property was formerly owned by Murvin Realty Group. No previously conducted title searches, documentation detailing historic property ownership, or contact information for former property owners was available. None of the owners on record appear to have been an industrial concern that would be expected to have utilized the property for the manufacturing, storage, or disposal of hazardous materials.

Historic Sanborn Fire Insurance Maps from 1900-1989 identified the 2999 Webster Avenue property to have historically contained retail and commercial businesses. No site or regulatory information as to historic use of the subject parcels for industrial or manufacturing purposes (i.e., activities expected to have routinely produced regulated hazardous materials or waste products) was available during performance of the Phase I ESA.

2.2 PREVIOUS INVESTIGATIONS

The Phase I report was prepared by Team Environmental Consultants, Inc. for Tyler's Bronx Tunnel, LLC dated July 6, 2012. This Phase I identified no recognized environmental conditions (RECs) on the subject property.

2.3 SITE INSPECTION

At present, the site is void of any improvements while awaiting development. Prior to initiation of the Phase II Environmental Site Assessment, a site inspection was performed on November 12, 2012 under the direction of Deborah J. Thompson, the Qualified Environmental Professional (QEP) certifying this report to evaluate areas of concern.

2.4 AREAS OF CONCERN

Based upon the findings of the Phase I ESA and the site inspection, there were no areas of concern where former activities are known or suspected to have resulted in generation, manufacture, refinement, transport, storage, handling, treatment, discharge, release and/or disposal of contaminated media. However, historic fill is suspected onsite.

Phase I Report is presented in Appendix A.

3.0 PROJECT MANAGEMENT

3.1 PROJECT ORGANIZATION

The Qualified Environmental Profession (QEP) responsible for preparation of this RIR is Deborah J. Thompson.

3.2 HEALTH AND SAFETY

All work described in this RIR was performed in full compliance with applicable laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements.

3.3 MATERIALS MANAGEMENT

All material encountered during the RI was managed in accordance with applicable laws and regulations.

4.0 REMEDIAL INVESTIGATION ACTIVITIES

Tyler's Bronx Tunnel, LLC performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed four soil borings across the entire project Site, and collected eight (including one duplicate) soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed three groundwater monitoring wells throughout the Site to establish groundwater flow and collected four (including one duplicate) groundwater samples for chemical analysis to evaluate groundwater quality;
4. Installed three soil vapor probes around Site perimeter and collected three samples for chemical analysis.

4.1 GEOPHYSICAL INVESTIGATION

Geophysical surveys were not conducted as a part of this investigation.

4.2 BORINGS AND MONITORING WELLS

Drilling and Soil Logging

A qualified environmental driller advanced four investigative borings, and a QEP supervised the Site work, screened the soil samples for environmental impacts, and collect environmental samples for laboratory analysis during the site investigation. The rational for the soil borings, soil gas and groundwater sampling is as follows:

- Four sampling locations were proposed within the area surrounding the planned apartment building. All locations called for surficial (0-2' below grade) sampling, while three locations called for deep (9-11' below grade) soil samples so as to ensure that impacts to site soils have not occurred from potential on-site or known off-site source(s). The uppermost surficial material is typically deemed noteworthy for study as it constitutes the material with the highest potential which humans could have dermal contact and incidental ingestion. Three locations beneath/within the area of the proposed

building were subjected to groundwater sampling. Groundwater sampling to occur in this location to identify levels of possible contamination and confirm the presence or absence of targeted contaminants which could off-gas creating the potential to migrate into the building and cause vapor intrusion. Soil gas sampling is also proposed for this same rationale.

- Boring logs were prepared by a Geologist are attached in Appendix C. A map showing the location of soil borings and monitor wells is shown in Figure 4.

Note that due to recent demolition activities, borings SB-2, SB-3 and SB-4 for soil and groundwater and borings for SG-1 and SG-2 or soil gas sampling began at approximately five feet below sidewalk grade.

Groundwater Monitoring Well Construction

During the April 2013 field activities, temporary monitoring wells SB-2/MW-1, SB-3/MW-2 and SB-4/MW-3 were installed in soil borings SB-2 – SB-4. The wells were constructed by installing 1-inch PVC well screen and casing through the Geoprobe rods. Temporary well locations are shown in Figure 4. Temporary well construction details are summarized in the table below.

Temporary Well Construction Details

Well ID	Date Installed	Diameter/ Material of Construction	Total Depth (ft. bgs)	Screen Interval (ft. bgs)
SB-2/MW-1	4/11/13	1-inch, PVC	12	2-12
SB-3/MW-2	4/11/13	1-inch, PVC	12	2-12
SB-4/MW-3	4/11/13	1-inch, PVC	15	5-15

Water Level Measurement

The temporary wells installed during the April 2013 field activities (SB-2/MW-1, SB-3/MW-2 and SB-4/MW-3) were gauged using an oil-water interface probe to determine the

depth to water and to check for potential separate phase product. No product was detected in any of the wells. The depth to groundwater measurements are summarized in the following table.

Depth to Groundwater Measurements

Temporary Well ID	Date	DTW (feet bgs)
SB-2/GW	4/11/13	5.00
SB-3/GW	4/11/13	5.50
SB-4/GW	4/11/13	10.35

4.3 SAMPLE COLLECTION AND CHEMICAL ANALYSIS

Sampling performed as part of the field investigation was conducted for all Areas of Concern and also considered other means for bias of sampling based on professional judgment, area history, discolored soil, stressed vegetation, drainage patterns, field instrument measurements, odor, or other field indicators. All media including soil, groundwater and soil vapor have been sampled and evaluated in the RIR. Discrete (grab) samples have been used for final delineation of the nature and extent of contamination and to determine the impact of contaminants on public health and the environment. The sampling performed and presented in this RIR provides sufficient basis for evaluation of remedial action alternatives, establishment of a qualitative human health exposure assessment, and selection of a final remedy.

Soil Sampling

DT Consulting Services, Inc. (DTCS) mobilized to the site with Todd J. Syska, Inc. (Geoprobe services contractor) on April 11, 2013 to perform the subsurface investigation. Employing a Geoprobe track-mounted drill rig, soil samples were collected at four pre-selected borehole locations continuously from ground surface to an approximate depth of twelve feet below grade surface (bgs). Soil samples were obtained by advancing a twenty-four inch long,

two inch outer diameter, stainless open spoon sampler equipped with a disposable acetate liner into the undisturbed soils. To prevent cross-contamination, all sampling equipment was decontaminated between each soil boring field location. The decontamination procedure is as follows:

- Wash with a detergent solution (Alconox);
- Rinse with potable water;
- Rinse with de-ionized water; and
- Air dry

A DTCS Geologist performed soil VOC screening and classification immediately following the collection of subsurface sampling cores. The field screening was conducted using a calibrated Mini-Rae Photoionization Detector (PID). Upon removal from the subsurface, headspace VOC screening was completed on each four foot soil sample interval (i.e. 0-4'/4-8'). This screening was performed by placing the selected soil sample in a Ziploc® style freezer bag, sealing the bag, and after a short pause, yielding stabilized readings with a PID calibrated to 100 parts-per-million (ppm) isobutylene standard. During performance of the field investigation, headspace screening yielded non-detect total petroleum hydrocarbons in parts-per-million (ppm) within each soil profile analyzed.

As detected during this investigation, the lithology of overburden materials encountered at the subject property can be characterized as light brown sandy loam (fill) (0-4' bgs), underlain by fine silts and sand (4-12' bgs). The bedrock surface was not encountered while performing this investigation. Groundwater, encountered approximately 5.0 – 10.35' bgs across the site did not display any signs of environmental impact (i.e., odor or sheen) in any of the three sampling locations.

Boring logs were prepared by a Geologist are attached in Appendix C. A map showing the location of soil borings and monitor wells is shown in Figure 3.

Eight soil samples were submitted for chemical analysis during this RI. Field quality controls for laboratory confirmation samples include the collection and analysis of a field duplicate and a trip blank. The frequency of collection for the specified QC field samples is as follows:

- ✓ A trip blank was prepared before the sample bottles are sent by the laboratory. A trip blank was included with each shipment of samples where sampling and analysis for VOC is planned (water matrix only).

- ✓ One field duplicate was planned during the course of this investigation. A duplicate sample was collected by initially collecting twice as much material as is normally collected for a sample. After mixing, the material will be apportioned into two sets of containers.

The samples collected for analysis required preservation prior to shipment. Preservation of the sample ensures sample integrity and prevents or minimizes degradation or transformation of the constituents to be analyzed. Specific preservation requirements included proper handling, packaging in laboratory-supplied sample containers, and chilled to 4° Celsius (°C) for shipping to the contract analytical laboratory. The DTCS Field Team used field logbooks or specific field forms to record pertinent information regarding subsurface characteristics, field screening results, and confirmatory sampling activities. Field staff recorded the project name and number, date, sampling personnel on site, other personnel present, weather conditions, and other relevant events to sampling activity in a chronological order. The field log book and/or analysis forms are maintained in the project file. Each sample was also recorded onto a chain-of-custody (COC) form. The form included the project name and number, names of the field sampling personnel, the sample number, date and time the sample was collected, whether the sample is a composite or grab sample, sample location, number of containers per sample number, constituents to be analyzed, and pertinent comments. The form documented the date, time, and signature of person(s) relinquishing and receiving custody of the samples.

Data on soil sample collection for chemical analyses, including dates of collection and sample depths, is reported in Table 1. Figure 4 shows the location of samples collected in this investigation. Laboratories and analytical methods are shown below.

Groundwater Sampling

During the April 2013 field program, groundwater samples were obtained using a peristaltic pump and dedicated, disposable polyethylene tubing. Each well was purged of at least three well

volumes prior to sampling. Low flow sampling techniques were implemented. All samples were collected directly into clean, laboratory-supplied containers, placed in ice-filled coolers, and shipped via courier in accordance with EPA protocols.

Three groundwater samples (including one duplicate) were collected for chemical analysis during this RI. Groundwater sample collection data, including analytical methods and laboratories, is reported in Table 2. Sampling logs with information on purging and sampling of groundwater monitor wells are included in Appendix C. Figure 4 shows the location of groundwater sampling. Laboratories and analytical methods are shown below.

Soil Vapor Sampling

Three soil vapor probes were installed and three soil vapor samples were collected for chemical analysis during this RI at a depth of approximately 4-10 feet bgs. Soil vapor sampling locations are shown in Figure 4. Soil vapor sample collection data is reported in Table 2. Soil vapor sampling logs are included in Appendix C. Methodologies used for soil vapor assessment conform to the *NYS DOH Final Guidance on Soil Vapor Intrusion, October 2006.*

The vapor implants were installed with the Geoprobe. To accomplish this task, a temporary sampling point was installed consisting of a two inch diameter core. Following the installation of the core, the point was sealed off above ground surface using bentonite slurry to prevent surface air infiltration. Coupled with the laboratory-supplied SUMMA canister, subsurface sampling included the use of a helium tracer set up at grade level. This allows delivery of the tracer that will be detected in the subsurface vapor analysis, if vapors from above grade are leaking through the constructed seal, into the sample zone below. Following the helium tracer setup and recording of initial canister pressure, the sampling zone was purged of a minimum of three volumes of vapors through dedicated tubing to ensure representative sampling of subsurface conditions and field screened with a photoionization detector or PID. Laboratory-grade helium, a Model MGD-2002 Multi-Gas Leak Locater and pre-cleaned buckets were used for the leak tracer test. Once the Teflon tubing was sealed to the ground at each sampling location, the tubing was extended through a hole in the top of an upside-down, pre-cleaned five gallon bucket that was sealed to the ground. The tubing extending from the hole at the top of the

bucket was then connected to the helium detector. A second hole was drilled in the bottom of the bucket, where helium was injected. Once the bucket filled up with helium, the tank was turned off. Then it was necessary to wait a few minutes to check if the helium was able to infiltrate through the seal into the ground. Afterwards, as a control measure, the helium detector was placed under the bucket to make sure that it was able to detect helium.

The NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York states that a helium concentration less than 10 percent does not indicate a significant leak. Both the "before and after" helium test performed on the sub-slab vapor point, returned zero ppm results and consequently showed no evidence of any significant leaks.

Soil vapor sampling was collected for analysis employing a six liter SUMMA canister equipped with a laboratory-calibrated flow control device to facilitate the collection of the samples for a 2-hour sample duration time. During both purging and sampling, the flow rate was restricted to less than (<) 0.2 liters per minute and connected directly to the dedicated tubing. Following sampling, the pressure of the SUMMA canister was recorded and the temporary well point backfilled with cement slurry.

Samples collected in Summa canisters were certified clean by the laboratory and analyzed by using USEPA Method TO-15. A sample log sheet was maintained summarizing sample identification, date and time of sample collection, sampling depth, identity of samplers, sampling methods and devices, soil vapor purge volumes, volume of the soil vapor extracted, vacuum of canisters before and after the samples are collected, apparent moisture content of the sampling zone, and chain of custody protocols.

Chemical Analysis

Chemical analytical work presented in this RIR has been performed in the following manner:

Factor	Description
Quality Assurance Officer	The chemical analytical quality assurance is directed by Deborah Thompson
Chemical Analytical	Chemical analytical laboratory(s) used in the RI is NYS ELAP

Laboratory	certified and were York Analytical Laboratories, Inc.
Chemical Analytical Methods	Soil analytical methods: • TAL Metals by EPA Method 6010C (rev. 2007); • VOCs by EPA Method 8260C (rev. 2006); • SVOCs by EPA Method 8270D (rev. 2007); • Pesticides by EPA Method 8081B (rev. 2000); • PCBs by EPA Method 8082A (rev. 2000); Groundwater analytical methods: • TAL Metals by EPA Method 6010C (rev. 2007); • VOCs by EPA Method 8260C (rev. 2006); • SVOCs by EPA Method 8270D (rev. 2007); • Pesticides by EPA Method 8081B (rev. 2000); • PCBs by EPA Method 8082A (rev. 2000); Soil vapor analytical methods: • VOCs by TO-15 VOC parameters.

Results of Chemical Analyses

Laboratory data for soil, groundwater and soil vapor are summarized in Tables 3 - 5, respectively.

5.0 ENVIRONMENTAL EVALUATION

5.1 GEOLOGICAL AND HYDROGEOLOGICAL CONDITIONS

Stratigraphy

While conducting the investigation on-site, characteristics and thickness of geologic units were documented in a field log. Summaries of this data maybe referenced in Appendix C, attached. Soils from grade to approximately twelve feet below grade surface consisted of fine silts and sand. Field screening with a calibrated PID did not produce positive responses in any soil boring location across the site. The groundwater table was encountered within soil horizon consisting of fine sand and silts. The bedrock surface was not encountered during this investigation.

Hydrogeology

The average depth to groundwater is 5 – 10.35 feet across the site. Note again that recent demolition activities left a fair portion of the site approximately five feet below sidewalk grade. Based on surface topography, groundwater would be expected to flow in an easterly direction. Actual groundwater flow can be affected by many factors including subsurface openings or obstructions such as basements, underground utilities, parking garages, bedrock geology, and other factors beyond the scope of this assessment. Groundwater in the Bronx is not used as a source of potable water.

5.2 SOIL CHEMISTRY

Soil/fill samples collected during the RI showed no VOCs exceeded Track I SCOs. All SVOC concentrations were below Track I SCOs with the exception of Benzo(a)anthracene, Benzo(a) pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene and Chrysene and Diben(a,h)anthracene were marginally above Track I SCOs in one shallow sample only. No PCBs were detected. All pesticides concentrations were below Track II SCOs. Six metals including Chromium (maximum 55.3 ppm), Cooper (maximum 69.2 ppm), Lead (maximum 333 ppm), Nickel (maximum 48 ppm), Selenium (maximum 4.4 ppm) and Zinc (maximum 586 ppm) exceeded

Track I SCOs but all values were well below Track II Restricted Residential SCOs. Overall, findings for soil were unremarkable and did not show a source of contamination on this property.

Volatile Organic Compounds

Soil testing detected two VOCs (acetone and methylene chloride) with concentrations above laboratory detection limits. Acetone was detected in three samples at concentrations ranging from 2.9 to 9.3 µg/kg, well below the Track I SCO of 100,000 µg/kg. Methylene chloride was detected in four soil samples at concentrations ranging from 3.3 to15 µg/kg, well below the Track I SCO of 100,000 µg/kg. The analytical data is summarized in Table 3 and the analytical data report is provided in Appendix D.

Semi-volatile Organic Compounds

Nine semi-volatile compounds were detected throughout the site. All of the detected SVOCs were polycyclic aromatic hydrocarbons (PAHs). SVOCs were encountered in five of the eight 2Bsoil samples (SB-1, SB-1 (duplicate), SB-2B, SB-3B and SB-4B) at concentrations ranging from 81.7 µg/kg (Benzo(a)anthracene) to 1,830 µg/kg (Benzo(b)fluoranthene). All SVOC concentrations were below Track I SCOs with the exception of benzo(a)anthracene (1,370 µg/kg), benzo(a) pyrene (1,630 µg/kg), benzo(b)fluoranthene (1,830 µg/kg) and chrysene (1,680 µg/kg) reported marginally above 6 NYCRR Part 375 Restricted Residential SCOs. All these compounds were detected in one shallow soil location. All of the remaining samples were returned with non-detect sample concentrations from the laboratory. The exceedances are attributed to the presence of historic urban fill materials and any combusted materials therein. The analytical data is summarized in Table 3 and the analytical data report is provided in Appendix D.

TAL Metals

Metals were detected in all of the soil boring samples analyzed, owing to their natural presence in rock and soil minerals. Several metals exceeded 6 NYCRR Part 375 Unrestricted Use SCOs and included Barium, Chromium, Cooper, Lead, Selenium and Zinc. All metal exceedances were well below Track II Restricted Residential SCOs with the exception of

Barium, Copper, Lead and Selenium. Elevated metals concentrations are likely attributed to historic fill material and increase vehicular traffic found in urban areas. Research has shown that vehicular traffic has traditionally been the most widespread lead source, owing to the emissions from motor vehicles powered with leaded gasoline. The analytical data is summarized in Table 3 and the analytical data report is provided in Appendix D.

Pesticides and PCBs

Two pesticides 4,4-DDE and 4,4'-DDT were detected at a concentrations ranging from 9.7 µg/kg within Soil boring SB-2B through 249 µg/kg within Soil boring SB-1 . All remaining soil borings were returned with non-detect sample concentrations. At the reported concentrations, each detected pesticides were found to fall below Restricted Residential SCOs.

PCBs were detected at trace concentrations. Total PCB concentrations ranged from 0.0324 µg/kg within SB-3B and 0.0422 µg/kg within SB-4A. At these concentrations, total PCBs detected were well below the Track I SCO of 100 µg/kg for this compound.

The analytical data is summarized in Table 3 and the analytical data report is provided in Appendix D.

Conclusions

The detection of targeted compounds as encountered during this investigation appears to be concentrated in the vicinity of surficial soil samples denoted as soil borings SB-3 and SB-4. Historically, the area surrounding these sampling locations was occupied by a commercial establishment. All of the identified borings had sample concentrations which fall below Track II Restricted Residential SCOs.

Data collected during the RI is sufficient to delineate the vertical and horizontal distribution of contaminants in soil/fill at the Site. A summary table of data for chemical analyses performed on soil samples is included in Table 3. Figure 5 has shown that all of the detected values for soil/fill did not exceed the 6 NYCRR Part 375-6.8(b) or Track 2 Soil Cleanup Objectives.

5.3 GROUNDWATER CHEMISTRY

Volatile Organic Compounds

Groundwater analytical results indicated non-detectable concentrations for all targeted volatile organic compounds. Estimated concentrations of VOCs including chloroform and tetrachloroethene were reported, but were below groundwater standards. Table 4 includes a summary of the groundwater analytical results for VOCs.

Semi-volatile Organic Compounds

All SVOC parameters were returned with non-detectable sample concentrations. A summary of the groundwater analytical results for SVOCs are included in Table 4.

TAL Metals

Total metals analysis (unfiltered) indicated the presence of 9 metals, including aluminum, barium, calcium, iron, magnesium, manganese, potassium, sodium and zinc. All detected total metals reported by the laboratory were found to be within Groundwater Quality Standards (GQS) with the exception of aluminum, iron and sodium. Table 4 includes the groundwater analytical results for metals.

Pesticides and PCBs

All targeted PCBs and pesticide compounds were returned with non-detect sample concentrations from the laboratory. Table 4 includes a summary of the groundwater analytical results for PCBs and pesticides.

Conclusions

Groundwater samples collected during the RI showed no significant detections in the dissolved phase contaminant concentrations of VOCs, TAL Metals, Pesticides and PCBs. Only three TAL Metals, namely aluminum, iron and sodium were found to slightly exceed groundwater quality guidance values. The detection of these compounds is most likely the result of presence of suspended sediment (including urban fill materials) entrained in the samples.

Data collected during the RI is sufficient to delineate the distribution of contaminants in groundwater at the Site. A summary table of data for chemical analyses performed on groundwater samples is included in Table 4. Exceedances of applicable groundwater standards are shown.

Figure 6 shows the location and posts the values for groundwater that exceed the New York State 6NYCRR Part 703.5 Class GA groundwater standards.

5.4 SOIL VAPOR CHEMISTRY

The results of soil vapor sampling indicate that twenty-five VOCs are present within the three soil gas samples collected on-site. A summary table of data for all chemical analytical work performed on soil vapor is included in Table 2. The full analytical report is included in Appendix D

The major on-site vapor concentrations (total concentrations of VOCs) range from 0.62 microgram per cubic meter (µg/m³) to 150 µg/m³ in soil gas SG-1 - SG-3. PCE was detected all three vapor samples ranging from 11 µg/m^3 to 81 µg/m^3 and are below State DOH soil vapor guidance matrix. TCE was detected in all three vapor samples ranging from 27 µg/m^3 to 150 µg/m^3 and are above the NY State DOH soil vapor guidance matrix. The on-site vapors in these samples are consistent with solvents found in building materials, cleaning products, paints, and metal degreasing agents and hydrocarbon constituents.

Conclusions

Soil vapor samples collected during the RI showed significant detections of tetrachloroethylene in soil vapor at concentrations ranging from 2.7 -150 µg/m³. All other laboratory reportable compounds were below USEPA OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils and/or NYS DOH Final Guidance on Soil Vapor Intrusion (October 2006).

Data collected during the RI is sufficient to delineate the distribution of contaminants in soil vapor at the Site. A summary table of data for chemical analyses performed on soil vapor samples is included in Table 5.

Figure 7 shows the location and posts the values for soil vapor samples with detected concentrations above the mean sample concentrations as documented in NYS DOH Final Guidance on Soil Vapor Intrusion (October 2006).

5.5 PRIOR ACTIVITY

Based on an evaluation of the data and information from the RIR, disposal of significant amounts of hazardous waste is not suspected at this site.

5.6 IMPEDIMENTS TO REMEDIAL ACTION

There are no known impediments to remedial action at this property.

Site-Specific Standards, Criteria and Guidance

- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (October 1994)
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- NYSDOH Indoor Air Sampling & Analysis Guidance (August 8, 2001 or subsequent update)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (draft October 2004 or subsequent final draft)
- DER Interim Strategy for Groundwater Remediation at Contaminated Sites in New York State
- 6 NYCRR Part 612 - Registration of Petroleum Storage Facilities (February 1992)
- 6 NYCRR Part 613 - Handling and Storage of Petroleum (February 1992)
- 6 NYCRR Part 614 - Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)
- 40 CFR Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks