AMERICAN ENVIRONMENTAL SOLUTIONS, INC.

REMEDIAL INVESTIGATION WORK PLAN

904 BURKE AVENUE LLC
904 BURKE AVENUE
BRONX, NY 10469
NYSDEC Spill Numbers 9900995/9811867
Site Number C203032

PREPARED FOR:

904 BURKE AVENUE LLC
3333 BOSTON ROAD
BRONX, NY 10469

REVISED
OCTOBER 2007

PREPARED BY:

AMERICAN ENVIRONMENTAL SOLUTIONS, INC.
42 WEST AVENUE
PATCHOGUE, NY 11772

SUBMITTED TO:

DIVISION OF ENVIRONMENTAL REMEDIATION
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
47-40 21st STREET
LONG ISLAND CITY, NEW YORK 11101

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1.0 PURPOSE AND SCOPE

1.1 Introduction

American Environmental Solutions Inc. (AES) prepared this Remedial Investigation Work Plan for our client 904 Burke Avenue LLC as part of the Brownfield Cleanup Program. The site is located at 904 Burke Avenue, Bronx, New York. A site location map is shown on Figure 1. The .25 acre site is partially developed with a single story concrete block building which is currently vacant. The site building was previously occupied by J&S Auto Repairs and Chanty Auto Repairs. The site has been developed for the last forty years. The site had previously been used as a gas station with ten 550-gallon gasoline underground storage tanks (USTs). The ten USTs were removed by Able Tank in December 1998 and the soil had been backfilled. The redevelopment of the site will consist of demolishing the existing site building and developing the site for future use.

One 275-gallon AST is located in the southeast corner of the site, adjacent to the building.

This Work Plan provides a detailed description of the tasks to be completed by AES as part of the remedial investigation of the site and describes the Interim Remedial Measures (IRMs) undertaken on-site.

Based on site conditions, AES proposed appropriate Interim Remedial Measures to mitigate the worsening environmental conditions at the property. IRM Work Plans were submitted to New York State Department of Environmental Conservation (NYSDEC) for review and approval. As part of the initial IRM, AES conducted vacuum enhanced fluid recovery (VEFR) on July 23, 2004 and continued to hand bail wells MW-2 and MW-3 in order to address petroleum sheen and odor discovered in the groundwater until December 2006, at which time, the bailing and monitoring of the three existing wells was temporarily suspended due to the open excavation area described below. As discussed further below, once the excavation area has been backfilled, the monthly hand bailing activities and monitoring of the existing wells will resume.

In addition, AES proposed an IRM to remove and dispose of contaminated material located on-site in order to eliminate the continued release of contaminants to groundwater and to reduce the impact of off-site migration. The IRM was approved by NYSDEC on July 24, 2006 and AES excavated approximately 400 tons of contaminated material that was disposed of at a permitted facility as required by NYSDEC regulations. The excavated material was screened with a photoionization detector and readings were recorded. Upon completion of the IRM activities endpoint soil samples and groundwater samples were collected and analyzed. Results of these sampling activities are summarized on Table 1 and 2. Approval of clean fill material to backfill the excavation from NYSDEC is pending. Upon receipt of NYSDEC approval the open excavation on-site will be backfilled.

Monitoring wells located on-site have not been bailed since December 2006 when contaminated material was excavated. The material was transported off-site for disposal in January 2007. The large open excavation existing on-site compromises the structural integrity of the site and results in the site being vulnerable to cave-ins. Although the three monitoring wells located on-site are still in tact, AES has been unable to bail monitoring wells on-site. As soon as fill material is approved by NYSDEC and the excavation is backfilled, well bailing and quarterly sampling will resume.

Based on the presence of contamination in soil and groundwater located on-site, it is likely that contamination may be present beneath the site building. Future development plans include the demolition of the site building and excavation to a depth of approximately ten feet below grade surface. The material excavated for the redevelopment of the site will be characterized for disposal and sent to a licensed, permitted facility according to all federal, state and local regulations. After demolition of the building is complete and the foundation is removed, a subsurface investigation will be conducted in the material beneath the building. The purpose of this sampling will be to determine the nature and extent of contamination beneath the building as well as to characterize the material for soil disposal purposes. Approximately eight soil samples and one groundwater sample will be collected upon building demolition. See Figure 2.

1.2 Investigation Objectives

Considering the physical limitations of the site, AES will install four groundwater-monitoring wells on-site and two off-site. Soil and groundwater samples will be collected for laboratory analysis in order to define the nature and extent of subsurface contamination associated with the former USTs as well as other potential sources of contamination within the site.

The specific objectives of the investigation include:

- Obtain site-specific hydrogeological data such as soil characteristics, depth to groundwater, groundwater flow direction, etc.;
- Identify possible off-site sources of subsurface contamination that may be contributing to the site contamination;
- Identify the sources of on-site contamination;
- Identify the nature and extent of contamination present within the site including the vertical and horizontal extent of soil and groundwater contamination and the types of contaminants present;
- Determine the appropriate type and size of the product recovery system to be used as an IRM at the site.
- Determine if additional quantities of contaminated soil may need to be excavated and disposed of off-site.
- Determine if release from the former USTs has resulted in off-site contamination.

1.3 Site Description

The site is located on the corner of Burke Avenue and Bronxwood Avenue. The site is bordered to the north by Burke Avenue, to the west by Bronxwood Avenue and to the south and east by residential buildings.

Presently, the .25 acre site is partially developed with a single story concrete block building which is currently vacant. Former site operations consisted of an automotive service station and

gas station.

Surrounding properties consist of residential and commercial properties. Across Burke Avenue to the north is Just for You Salon and residential buildings (905, 907). Adjoining properties to the south and east are residential single-family homes or apartments. Figure 3 shows a site schematic with surrounding properties.

The approximate location of the former USTs is shown on Figure 2. The location of decommissioned fill ports for these tanks is indicated on the sidewalk outside of the property gate.

1.4 Site Geology and Hydrogeology

Topography
The site is located in an area of Bronx, New York. The site is generally flat, with an average elevation of 15 to 20 feet above mean sea level.

Groundwater Flow
According to groundwater contour maps produced by the United States Geological Survey (USGS); groundwater within the general area of the site flows in a northeasterly direction. Depth to groundwater is approximately 8 to 10 feet below grade within the site.

There are no surface water bodies located on-site. The nearest surface water body is the Bronx River, approximately one quarter mile west of the site.

2.0 PREVIOUS SITE INVESTIGATIONS

Three previous environmental investigations were conducted for the subject property:

- Summary of Remedial Activities, May 27, 1999 Envirotrac

In April of 1999, Envirotrac was contracted by the former property owner, Mr. Robert Costa to excavate and dispose of contaminated material on-site, collect endpoint samples and backfill the excavation with clean material. Envirotrac performed three soil borings to three feet below grade and collected a composite soil sample for soil classification. Laboratory results indicated concentrations of VOCs above NYSDEC Spill Technology and Remediation Series (STARS) criteria and Spill No. 99-00995 was assigned.

In May of 1999, Envirotrac excavated the contaminated material, took endpoint samples and backfilled the pit with clean material. On May 4, 1999, 285 tons of contaminated material was removed and disposed of at Clean Waters of America, Inc., of New Hampshire for recycling. Four endpoint samples were taken and samples one and three were found to contain concentrations of benzene, ethylbenzene, and xylenes above STARS criteria.

- Subsurface Investigation Plan, January 10, 2003, Miller Environmental Group (MEG)

In September 2002, MEG conducted preliminary soil sampling at the site for Mr. Costa in order to comply with NYSDEC requirements. A test pit was excavated in the location of the former

pump island and endpoint soil samples were collected. The results of these samples contained gasoline constituents above NYSDEC guidance values. The results were submitted to NYSDEC who required on-site delineation of the contamination and the installation of at least three monitoring wells.

- Sampling Summary Report, April 25, 2003, Miller Environmental Group (MEG)

As part of a Subsurface Investigation conducted in April of 2003, MEG installed seven soil borings in order to delineate the zone of contamination and determine the placement of monitoring wells as mandated by NYSDEC. Seven split spoon soil samples were taken and three monitoring wells were installed onsite. The installation of monitoring wells allowed for future resampling and determined the groundwater flow direction on-site.

Monitoring Well 2 (MW-2) was not sampled due to the fact it was found to contain approximately one tenth of a foot of free phase product. Monitoring Wells 1 and 3 (MW-1 and MW-3) were sampled. Elevated levels of MTBE and BTEX were detected in MW-3. Monitoring Well 1 (MW-1) contained levels below NYSDEC criteria.

3.0 SCOPE OF WORK

Task 1 Remedial Investigation Activities

AES proposes to install four groundwater monitoring wells within accessible areas of the site. One monitoring well will be installed on the northern section of the site, near the northeast corner of the property. The second monitoring well will be installed on the southern section of the site, just north of the building, approximately midway between the southwest and the southeast corners of the property. Another monitoring well will be installed in the southwest corner of the site. One additional monitoring well will be installed near the most contaminated section of the excavated area located on-site, structures and utilities permitting. Two additional wells will be installed off the property downgradient from the former UST locations, across Burke Avenue. Figure 2 provides the proposed locations of the six monitoring wells.

A mark-out of underground utility lines will be performed prior to the start of subsurface investigation activities by contacting the New York City and Long Island One-Call Center. A utility mark-out verification reference number for the site will be obtained and a record of utilities will be kept (e.g. Con Ed, Verizon, Cablevision, etc.)

The three monitoring wells already located on-site will be purged and sampled upon backfill of the open excavation as part of this investigation.

Task 1.1 Soil Sampling

During installation of the six monitoring wells, AES will collect soil samples for field screening and laboratory analysis. See Figure 2. Three soil samples per location will be collected, one above the local water table, one at the water table and one surface sample from the 0-2' interval. No soil samples will be taken below the water table. Each soil sample will be screened in the field for the presence of VOCs using a Photoionization Detector (PID). All field screening measurements will be recorded by AES. Soil samples with the highest PID reading from each location will be submitted to the laboratory for analysis. Analysis of soil samples will be in accordance with NYSDEC requirements and will include:

-TCL Volatile Organics
-TCL Semi-Volatile Organics
-TCL Pesticides/PCBs
-TAL Metals

The standard VOC analysis (Method 8260) is needed in order to fully assess the impact to soil as the result of any potential releases from the closed USTs.

One field blank, one trip blank and one blind duplicate sample will also be collected as part of the soil sampling program in accordance with the NYSDEC sampling protocols. Analysis of soil samples will be conducted by American Analytical Laboratories, a NYSDOH certified ELAP laboratory. The laboratory qualifications are shown in Appendix A.

During the collection of split spoon soil samples, blow counts, if required, and soil descriptions will be recorded by AES. The soil descriptions will be consistent with Burmeister soil classification systems and all observations which could further clarify the characteristics of the site geology will be noted, as appropriate. The presence of any unnatural stain, foreign objects, or other sample attributes which could further classify the sample will also be noted. A representative portion of the sample will be placed in a bottle (if there is adequate sample volume). The sample bottle will be labeled with the boring number, split spoon number and sample depth.

Task 1.2 Monitoring Well Installation

Monitoring wells will be installed using a truck mounted hollow-stem auger rig. Based on available information, depth to groundwater is estimated to be approximately 8 to 10 feet below grade. Therefore, the monitoring wells will be approximately 25 feet deep and will consist of 4-inch, schedule 40, PVC riser pipe connected to a 10-foot length of PVC well screen. Slot size of the well screen and appropriate gravel pack size will be dependent on aquifer characteristics. Figure 4 is a construction schematic for the proposed well construction. Four-inch monitoring wells are recommended because they can be converted into product recovery wells. Given existing information concerning the soil and groundwater quality, it is anticipated that all drill cuttings and development water will require drumming to allow for off-site disposal.

In the event that refusal is encountered with the use of hollow stem augers, a 3.5-inch O.D. solid stem auger will be utilized to drill through the obstructing object. In the event that the solid stem auger does not successfully penetrate the obstruction, AES will abandon the borehole and move over 3 to 5 feet and attempt a second hole. If continued refusal is encountered, other drilling methods will be considered. The wells will be installed so that the well screen will intercept free floating product. All wells will be sand packed and grouted in place and completed with a flush mounted locking manhole. After installation, the monitoring wells will be developed by pumping and surging until a proper hydraulic connection is made between the well screen and aquifer.

The existing three monitoring wells on the site will be purged and sampled as part of the remedial investigation activities. If it is determined that the existing wells are damaged, then replacement wells will be located at or within two feet of the original locations.

Upon completion of the groundwater monitoring wells, AES will survey the locations of the wells in addition to the three existing monitoring wells using an established datum in order to obtain water table elevations that will be used to determine groundwater flow direction within the site. Up to two rounds of static water level measurements will be collected by AES at each well

location to the nearest 0.01 foot using an interface probe which will also be capable of measuring floating product within the wells. At this time, data compiled upon installation of these monitoring wells will be utilized to construct groundwater plume maps for the site.

Task 1.3 Groundwater Sampling

AES will collect one round of groundwater samples from the six monitoring wells installed and from the three existing monitoring wells. Sampling procedures will be held in accordance with NYSDEC protocols. Analysis of samples will include:

- TCL Volatile Organics
- TCL Semi-Volatile Organics
- TCL Pesticides/PCBs
- TAL Metals

The standard VOC analysis (Method 8260) is needed in order to fully assess the impact to groundwater as a result of any potential releases from the closed USTs.

One field blank, one trip blank and one duplicate sample will also be collected as part of the groundwater sampling task in accordance with NYSDEC sampling protocols. Analysis of groundwater samples will be conducted by American Analytical Laboratories, a NYSDOH ELAP certified laboratory.

Task 1.4 Soil Gas Sampling

Based on the presence of volatile organic compounds in on-site soil and groundwater, soil gas sampling will be conducted in order to evaluate the potential for vapor intrusion. Five soil gas sampling points will be installed at the north, south, east and west boundaries of the property in order to assess the potential for migration of VOCs via the soil gas pathway.

AES will collect five soil gas samples at the locations shown on Figure 2. Samples will be collected by driving temporary soil gas probes to a depth of eight feet below grade surface or at least one foot above the water table. Once in place, each soil gas probe will be fitted with a polyethylene tube and purged using a vacuum pump gas probe and a total VOC measurement collected using a PID. The following procedures must be followed when collecting soil vapor samples:

- After installation of implants, one well volume (i.e. the volume of the sample probe and tube) must be purged prior to collecting the samples.
- Flow rates for both purging and collecting must not exceed 0.2 liters per minute.
- Temporary soil vapor implants must be sealed to the surface with a non-VOC containing product such as permagum grout or beeswax to prevent infiltration of outdoor air during sample collection.

After purging, a soil gas sample will be collected by connecting the tubing to a Summa canister. A Summa canister is a stainless steel vessel which has been decontaminated and certified to be free of VOCs. The Summa canister is prepared by the contract laboratory so that the sample vessel is under a high vacuum (<1 hr torr:<28" Hg). A grab sample from each soil gas probe will be collected by opening the canister valve and the vacuum is used to "pull" the sample into the canister. Each soil gas sample will be analyzed for VOCs by EPA Method TO-15.

Task 2 Remedial Investigation Report

AES will complete a Remedial Investigation Report summarizing the findings of this investigation for review by NYSDEC. AES will provide a water table contour map, boring logs, well construction logs, and analytical summary tables. The report will include a description of the nature and extent of contamination observed at the site based on field and laboratory data. The report will include AES's recommendations concerning the need for any IRMs and/or any additional investigations, if appropriate. Based on the results of the remedial investigation, AES will discuss with NYSDEC the need for additional soil and/or groundwater sampling to be conducted on-site.

If appropriate, AES will propose the installation of a product recovery system within two or more installed monitoring wells as an IRM. If selected for use, AES will provide the following information in the report concerning the product recovery system:

- Calculation of the amount of the product to be recovered;
- List of equipment to be used and its technical characteristics;
- Site plan depicting the locations of the recovery wells, equipment, and reservoirs for the collection of the recovered product;
- Disposal methods for the recovered product;
- Description of how the recovery process will be monitored, and criteria to cease operation of the recovery system.

Up to six (6) copies of the Draft Report will be submitted to NYSDEC for review and comment. AES will address one set of comments from NYSDEC and revise the report accordingly. Up to six (6) copies of the Final Report will be submitted to NYSDEC.

NYSDEC may request additional investigation activities are conducted on-site based on the findings of this remedial investigation.

4.0 SENSITIVE RECEPTORS

AES conducted a visual inspection of the area surrounding 904 Burke Avenue in order to identify sensitive receptors in the vicinity. The following locations were identified as sensitive receptors in the vicinity of the site (see Figure 3):

Leaders of Tomorrow Christian
3201 Barnes Avenue, #4
1 block west of the site (.12 miles)

Carolls Day Care Provider
3046 Matthews Avenue
.12 miles southwest of the site

Loida Ortiz Day Care Center
3021 Radcliffe Avenue
½ block south of site (.11 miles)

Public School 76 Bennington School
900 Adee Avenue
1 block south of the site (.12 miles)

Tender Love & Care Family Day
985 Burke Avenue
2 ½ blocks east of the site (.12 miles)

Engineering controls such as dust suppression techniques will be utilized to protect sensitive receptors in the vicinity of the site during site excavation and construction.

5.0 CITIZEN PARTICIPATION ACTIVITIES

The citizen participation activities have been designed based on state and federal regulatory requirements and policies regarding citizen participation. In particular Citizen Participation activities to be conducted are based on requirements contained in Environmental Conservation Law Article 27 Title 13, 6 NYCRR Part 375 adopted in May 1992 and NYSDEC Division of Environmental Remediation policies for conducting citizen participation. The activities discussed below are intended to keep the public informed and involved in the remedial program, and to insure that the state and federal regulatory requirements on citizen participation are met.

The *Citizen Participation Record for Remedial Investigation, Feasibility Study and Record of Decision* identifies CP activities required to be conducted during the Remedial Investigation (RI). The CP Record helps to document, for NYSDEC and the public, the activities that will be performed and tracks their completion. The Record of Decision (ROD) documents the decision-making process for choosing remedial actions. The preparation of these documents helps in identifying key issues of importance to the public as well as identifying particular groups or individuals that have an interest in remedial activities at the Site.

As part of the Citizen Participation Plan previously submitted for the site, NYSDEC has established a preliminary Site Contact List. These mailing lists will be updated during the RI on an as-needed basis. Those on the mailing lists will receive notices as to the availability of various key documents (e.g. RI Report, FS Report) when they are placed in the document repository and will also receive notice of upcoming meetings. They will also receive any information or fact sheets that may be developed.

At least three fact sheets will be prepared for distribution to the interested parties on the site contact list:

- The first fact sheet will be distributed prior to NYSDEC approval of the RIWP. This fact sheet will detail the major tasks associated with the RI and will include an invitation to a public meeting when appropriate. There will be a 30-day public comment period prior to NYSDEC approval of the RIWP. If there are public comments or questions concerning the RI, they will be addressed during and before completion of the RI.
- The second fact sheet will be prepared at the completion of the RI and will detail the major RI findings and conclusions.
- A third fact sheet will be prepared and distributed to the public detailing the NYSDEC Proposed Remedial Action Plan (PRAP). The PRAP is an analysis by the NYSDEC Department of Environmental Remediation (DER) of each alternative

considered for the remediation of a site and a rationale for selection of the alternative it recommends. The fact sheet will invite the public to attend a public meeting to discuss the PRAP, and NYSDEC will also disseminate a press notice regarding the public meeting. There will be a thirty-day public comment period to allow public review of the PRAP. Following public review and input, the PRAP may be modified. NYSDEC will then choose the remedial action through an ROD documenting NYSDEC's decision-making process.

6.0 PROJECT STAFFING AND MANAGEMENT

The AES project team consists of Brian Pendergast, Project Manager, Robert Brick and Joseph Gallo, Field Technicians. AES Qualifications package is included in Appendix B. All work will be conducted in accordance with the Health and Safety Plan (HASP) previously prepared by AES for the site and submitted in the document repositories. The HASP is included in Appendix A.

7.0 PROJECT SCHEDULE

The project schedule has been updated to reflect completed tasks and events as of March 2007. Based on AES' experience with similar projects and discussions with NYSDEC project personnel, project schedule assumes the following with regard to future project tasks and events:

- NYSDEC will approve the final work plan within two weeks of receipt and AES will undertake the fieldwork within two weeks of NYSDEC approval.
- All field investigation tasks will be completed within two weeks of starting the work.
- The laboratory data report will be submitted to AES by the project laboratory within three weeks of the laboratory receiving all samples selected for analysis.
- If required, a product recovery system will be installed by AES within two weeks of receiving the lab data report and NYSDEC approval.
- It will take two weeks to complete the draft Remedial Investigation Report from the date of receiving all lab data.
- NYSDEC review of the draft report will take four weeks.
- AES will take two weeks to address NYSDEC comments and finalize the report.

A Tabulated Implementation Schedule is included in Table 3.

8.0 QUALITY ASSURANCE PROJECT PLAN (QAPP)

8.1 Project Description

The data collection objectives are based AES's standard site investigation procedures. The analytical parameters will be in accord with those specified in the Work Plan. Soil will be sampled at grade from the drill rig MacroCores to minimize potential hazards to workers. Sample custody will be traced with a COC form and laboratory analysis will follow NYSDEC ASP-approved analytical methods.

8.2 Project Organization and Responsibilities

Soil samples for laboratory analysis will be collected by AES field personnel. Samples will be analyzed by American Analytical Laboratories, LLC. and data will be returned to AES. The laboratories statement of qualifications is shown in Appendix A. The project organization for data collection and review is as follows:

Field Activities – AES will be responsible for collecting samples, initiating the COC and transferring samples to the analytical lab.

Laboratory Analysis – The Lab Directors are responsible for laboratory soil sample analysis, laboratory quality assurance, and laboratory reports of the qualitative and agricultural analyses, respectively. The Lab Director will forward the analytical package to AES upon completion.

Quality Assurance Officer – AES and the laboratories are responsible for the initiation and implementation of audits and the compilation of QAPPs.

8.3 QA Objectives for Precision, Accuracy, Completeness, Representativeness and Comparability

Field QC Effort

Sample containers will be handled to minimize the introduction of foreign matter. Samples will be preserved as quickly as possible. Immediate resampling is required if there is any departure from the established sampling protocol, unless approved by the QAO. All departures from protocol must be noted in the field log notebook.

The laboratory will provide quality control samples. Field duplicates will be collected at a minimum frequency of one in twenty, unless otherwise specified. The ratio of matrix spike and matrix spike duplicates will be one in twenty. Field blanks will be included at one per decontamination event, not to exceed one per day. Analyte-free water provided by the laboratory must be used for field blanks.

Field QC for instruments such as photoionization detectors (PIDs), combustible gas analyzers and flame ionization detectors (FIDs) include routine calibration and maintenance as specified in operating manuals. PIDs will be calibrated daily in the field with isobutylene. FIDs will be calibrated daily in the field with methane. The combustible gas indicator (CGI) will be calibrated at the start of every workday and at least twice thereafter during the day. All instruments will be calibrated in accordance with the manufacture's recommendations.

Calibration Procedures and Frequency

This section describes procedures for maintaining the accuracy of instruments and measuring equipment used in the field. These instruments and equipment should be calibrated prior to each use. Instruments and equipment used to gather, generate or measure environmental data will be validated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications.

Field sampling equipment will be examined to assure that it is in operating condition. This includes checking the manufacturer's operating manual, the instrument maintenance record and instruments. Field personnel will recalibrate an instrument that is not operating properly. Repair notes from previous sampling trips will be reviewed so that prior equipment problems are not overlooked and to ensure that necessary repairs have been made.

Field instrument calibration will be performed at the intervals specified by the manufacturer or more frequently, depending on the site-specific conditions. When an internally calibrated field instrument fails to meet calibration/checkout procedures, it is to be taken out of service.

Field Instrument Maintenance, Spare Parts and Backup Equipment

Periodic preventative maintenance is required for all field measurement equipment. Any equipment that requires routine maintenance will be tagged with a maintenance label, indicating the date of required maintenance, the person maintaining the equipment and the next maintenance date. AES's equipment manager will keep information on the equipment life history in individual equipment logs for each instrument. Backup equipment may be brought to the work site so that sampling and monitoring tasks are not substantially impeded or delayed.

All field equipment will be examined to ensure that it is good working order and checked for accuracy. Equipment checks must assure that batteries are fully charged. Extra batteries must accompany the field equipment. Copies of basic repair procedures and preventative maintenance procedures are available from the equipment manager.

Accuracy, Precision and Sensitivity of Analysis

All field instruments will be regularly tested for accuracy and precision based on manufacturer's specifications. Accuracy and precision tests will be conducted after instruments have been calibrated. Comparing readings to known standards will best instrument accuracy. Precision will generally be measured by taking repetitive measurements of a stable solution.

The accuracy of vapor level readings will be determined by comparing meter readings to the vapor level of an isobutylene calibration gas. The precision of vapor level readings will be determined by taking repetitive vapor level measurements and will be expressed as a standard deviation. Precision and accuracy data for each of the instruments discussed above will be recorded in the instrument's log.

Completeness, Representation and Comparability

Completeness will be evaluated by carefully comparing project objectives with the proposed data acquisition scheme and resulting data gaps in the required information. Completeness is a qualitative measure of the valid data compared to the data that was to be collected according to project plans. An evaluation of data completeness includes and evaluation of the percentage of field samples collected versus the number of field samples proposed in the project plans and an evaluation of the success of the laboratory analyses. The completeness goal is generally 100 percent, with less complete data acquisition from unplanned interruptions in the work.

Representation should be considered a qualitative objective rather than a characteristic, which can

be described, in quantitative terms. Representation is the degree to which the data accurately and precisely represent the investigated characteristics. Therefore, representation must be evaluated based on whether the analytical results adequately characterize the sample and whether the samples adequately characterize the media.

The sampling methods and locations are designed to provide data representative of site conditions considering the existing database and the physical setting. Representativeness can only be achieved by ensuring that all sampling and field measurements are done properly using standard protocols including sample preservation, handling and holding times.

Comparability is a measure of the confidence with which one data set can be compared to another. The following measures will be taken to ensure the comparability of the data;

- Standardized sampling and analysis procedures will be followed at all times.
- Standard handling and shipping procedures will be followed at all times.
- The laboratory that does the analysis must provide sample containers.
- Measurements of depth, distance, elevation, concentration, etc., must be reported in consistent units.

The extent to which the analytical data are comparable depends on the consistency of sampling and analytical methods. Standard methods will be used to analyze all samples so that analytical procedures can be duplicated.

QA Review of Reports, Plans and Specifications

The technical review process will consist of quality control in the preparation of reports, plans and specifications. The Project Manager will review project concepts, details and report conclusions and is responsible for internal review. The Project Manager must review and approve all significant changes in the work. The Project Manager and Quality Assurance Officer are responsible for the final review and approval of all reports, plans and specifications.

8.4 Laboratory Qualifications

American Analytical Laboratories will maintain, throughout the duration of the work, the appropriate New York State Department of Health ELAP Certifications. Laboratory qualifications, standard operating procedures (SOPs) and certificates are shown in Appendix B. Analytical data will be compiled in a database. Data will be organized in such a way that all samples will be traced from collection through analysis.

8.5 Sampling Procedures

Sample Containers, Labels and Preservatives

The laboratory that does the analysis will provide sample containers, labels and preservatives. Labels will be affixed to sample containers and filled our prior to or at the time of sample collection. Labels must not be filled out after the fact. The following information will be written on the label at the time of collection:

- Sample number
- Name of collector
- Date and time of collection
- Place of collection
- Preservation method
- Type of analysis

Record Keeping – Field Log Book

All information relating to field sampling must be recorded in a bound logbook with numbered pages. This will include data transcribed on sample labels and COC forms as a check on sample identification. Any other data on sampling and site conditions will be recorded. The following entries will be made in the logbook: daily weather conditions, general observations, preservation, sample collector's name, date, time, sample code, sample type, sample treatment and a description of the sampling location. One book is to be used for each project. When a book is full, a supplemental book is to be used.

Sample Shipment

Samples will be transported under proper COC to the laboratory by hand or by overnight courier, such as Federal Express. The laboratory will provide shipping containers. Individual sample containers will be wrapped and padded to prevent breakage. Shipping containers will be iced to ensure that samples remain at approximately 4°C during shipment.

8.6 Sample Custody

The COC form will be completed by field personnel and accompany every sample shipment to document sample possession from the time of collection until the sample has been received by the laboratory. The COC form includes the following information:

- Laboratory that will perform the analysis;
- Names of the samplers;
- Sample I.D. No.;
- Date and time of sample collection;
- Sample matrix or source, i.e., soil;
- Sample location or method;
- Whether the sample has been filtered, fixed or preserved;
- Number of sample containers;
- Type of analysis including EPA method number, where appropriate;
- Project name and number;
- Name of the person to whom the results should be addressed;
- Name of the person/company to whom the invoice will be addressed;
- Signature(s) of the samples;
- Signature(s) of anyone who had custody of the samples, i.e., delivered the samples; and
- Date and time that sample custody was relinquished by AES and the sample was received by the laboratory.

A sample will be considered under a persons' custody if: 1) it is in a person's physical

possession; 2) it is in view of the person after he has taken possession; 3) it is secured by that person in a way that no one can tamper with the sample; or 4) it is secured by that person in an area which is restricted to authorized personnel. Samples are considered to be in shipping company possession (i.e., Federal Express) when custody seals are placed on sample containers prior to shipment. COC forms will be placed inside the sealed cooler used for shipment.

8.7 Data Reduction, Validation and Reporting

QC protocols must specify at least one laboratory duplicate analysis for each twenty samples of each parameter, or one set of QA/QC samples per sampling event even if the sample collection is less than twenty. The laboratory will include field blanks to test for atmospheric cross-contamination.

The laboratory will ensure that data is valid when analyses yield results within QC limits, as defined by the QC charts and QA objectives for precision and accuracy. These analyses include: external performance evaluation audits, split sample analyses, duplicate sample analyses, spiked sample analyses, detection limits analyses and instrument calibrations.

Laboratories must be able to document all the QC criteria that will be used to reduce and validate their data as required by the laboratory QA plan. This includes how control charts were developed and the specific precision and accuracy requirements for each parameter.

Validation of Field Data Package

The field data package will be reviewed by the project QA officer and Project Manager for completeness and accuracy. The AES Project Manager will check field logbooks weekly to ensure that they are properly maintained and updated. If not, corrective action will be taken immediately. The data validation procedures will include an evaluation of the field data. Data validation checklists will be used as guides in evaluating sample collection, field records and analytical performance. The field data package includes all field records and measurements developed by the sampling team. The field data package validation procedure will consist of:

- A review of field data contained in sampling logs for completeness.
- A verification that equipment blanks and field blanks were properly prepared, identified and analyzed.
- A check on field measured parameters to ensure proper equipment calibration.
- A review of COC forms for proper completion, signatures of field personnel and the laboratory sample custodian dates.

8.8 Internal Quality Control, Performance and System Audits

The technical review process will consist of quality control in the preparations of reports, plans and specifications. The Project Manager will review project concepts, details, report conclusions and is responsible for the internal review. The Project Manager must review and approve all significant changes in the work. The Project Manager and Quality Assurance Officer are responsible for the internal review and approval of all reports and data before they are sent to Contractor and Engineer.

8.9 Corrective Action

AES will initiate corrective actions in the event of:

1. Failure to calibrate field equipment;
2. Failure to calibrate laboratory equipment; or
3. Failure of data to fall within QC limits, as defined by the laboratory's QC Charts.

The corrective action procedure for each listed item is represented below, respectively:

1. Repair or replace field equipment. Check calibration.
2. Follow calibration/troubleshooting procedures outlined by manufacturer.
3. Check for sample interferences. Check calibration.

The individual or laboratory conducting the test will be responsible for initiating the corrective action. All problems and solutions will be documented and all analyses since the last in-control point will be repeated or discarded. If AES detects laboratory errors, AES's laboratory contract requires the laboratory to rectify the problems in a timely manner (including resampling), at the laboratory's expense.

Key personnel for the project are listed below and resumes are included in Appendix C, AES Statement of Qualifications:

Project Manager
Brian Pendergast
President
Office (631) 475-0020
Cell (631) 235-9668

Field Technician
Joseph Gallo
Office (631) 475-0020
Cell (631) 487-2257

Field Technician
Robert Brick
Office (631) 475-0020
Cell (631) 487-2503

All staff changes, if necessary, will be made only with NYSDEC's approval.

9.0 ON & OFF-SITE QUALITATIVE EXPOSURE ASSESSMENT

9.1 Introduction

A qualitative exposure assessment was conducted for the site to evaluate the potential human health and environment exposures from contamination at the site. The analysis included: identification of potential exposure pathways by first identifying contaminated media, identifying points of exposure and exposure routes during three phases of site development: site preparation (including demolition of existing site building), remediation and construction and future use (assuming the site is redeveloped). Where exposure pathways were established, contaminants of concern (COCs) were identified, engineering and institutional controls were described and conclusions concerning qualitative risks were developed.

Thus, the exposure pathway analysis uses the characterization provided earlier in this report to:

- Identify potential pathways of exposure to those contaminants identified (including fate and transport of contaminants for various receptors),
- Identify potential contaminants of concern (COCs) for each environmental media, and
- Conclude whether significant exposures to human health will result after site redevelopment.

Results of this health exposure pathway analysis were used to determine the need for remedial action on the site and to assist with the identification and selection (if needed) of remedies, engineering controls, or institutional controls for environmental media of concern to human health. No significant areas of vegetation or habitat exist on site. The proposed redevelopment will provide landscaped areas on site. No further assessment of ecological exposure associated with the site is applicable.

9.2 Identification of Exposure Pathways

An exposure pathway begins with a source of contaminant release resulting in the contamination of an environmental medium. A complete exposure pathway also requires a point of potential contact with the contaminant matrix (i.e., exposure point), an exposure route, (i.e., inhalation, ingestion, or dermal contact) and a receptor population. If an exposure pathway is not complete because it does not include a contaminated matrix, a point of potential contact, an exposure route or receptor, then no risk exists. For current and future land use scenarios, only exposure pathways that potentially exist for the site are discussed.

Site Preparation Phase During the site preparation phase, site security will screen visitors and guide them away from exposed contaminated areas. Workers on the site have potential exposure pathways to the contaminated materials and media on-site. During this phase the site building may be demolished. Workers on-site during demolition will potentially be exposed to hazardous substances in the building and to demolition debris as well as dust. Excavation for site construction may result in short term exposure to subsurface soils, soil gas, and groundwater by individuals involved in excavation activities. Exposure pathways are evaluated for short term inhalation, ingestion, and dermal contact by workers. Each potential pathway is described below,

mitigating factors are described and the exposure pathways retained for analysis in subsequent phases of site development are identified.

Approximately one-third of the site is covered by the site building. A large portion of the site has been excavated and soils were transported off-site to a permitted facility to mitigate migration of contaminants from soil to groundwater. Site soils remaining may be exposed leaving dermal exposure pathways open to site workers (receptors). If contaminated shallow subsurface soils may become airborne in the form of fugitive dust during excavation work, engineering controls such as dust suppression will be implemented to mitigate such exposure. An institutional control will protect worker in that 40 CFR 1910.120 specifies that site contractors are responsible to apprise and protect those workers with potential to contact contaminated media through training, use of monitoring equipment, engineering controls, and personal protective equipment (PPE). Site workers thus will have no completed exposure pathway to contaminated soil. As noted above, visitors to the site will be guided to avoid contaminated soils.

Potential exposure routes via ingestion, inhalation, and dermal contact were considered for groundwater. Ingestion of potable water is not a potential exposure pathway for groundwater because all on-site water use is currently provided by New York City municipal system which derives its water from regulated upstate sources. In addition, no supply wells were identified at the site and under New York City Health Code and NYSDEC supply well regulations on-site groundwater cannot be used as drinking water supply. The naturally saline character of the groundwater would also make it unsuitable as a potable water source. However, since on-site groundwater may have short-term exposure pathway for workers near excavations to the groundwater, a short-term exposure pathway is possible throughout the redevelopment. The controls provided to protect workers from exposure (described above for soils) afford protection against completion of the groundwater exposure pathway for workers and visitors during the site preparation for development.

VOCs in the soil and soil gas have the potential to migrate into the existing site building during the preparation for redevelopment and later phases. Thus, potential exposure pathways for on-site buildings are associated with soil gas. The existing structure is in disrepair and not safe for entry. Workers associated with building demolition will be protected by the institutional control of worker health and safety precautions specified by 40 CFR 1910.120. The pathway is therefore not completed for workers or visitors during the site preparation phase. Nevertheless, a potential exposure pathway was identified for soil gas for the remedial, construction and future use scenarios.

Building demolition will be planned to minimize the potential release of contaminants. Dust suppression will be implemented during demolition. Workers will be informed of any hazards and OSHA's requirements according to 40 CFR 1910.120 are designed to protect workers. Monitoring and protective equipment will be provided to the extent required by a health and safety evaluation by the contractor. The Community Air Monitoring Plan for the site will assure that operations do not allow significant releases off-site.

Other contaminated media may include the existing site building and building materials. Management of the materials for off-site or on-site disposal will be by qualified workers under the protection of 40 CFR 1910.120.

No off-site exposure pathways are anticipated. During construction dust may migrate but a Community Air Monitoring Plan will be implemented for the site in order to protect workers and

off-site potential receptors.

The potential exposure pathways of significance identified in the site preparation phase for soils, groundwater and soil gas are described in Table 2 and are retained for the subsequent exposure analyses. Other contaminated media were not retained for further analysis in the exposure assessment, since there were no pathways retained after the site preparation scenario.

Remediation and Construction Phase The remedial/construction phase exposure scenario evaluates potential exposure to all of the contaminated media remaining after the site preparation period to the extent that activities during site redevelopment might lead to completing an exposure pathway for a receptor. The receptors are remedial, construction and utility workers; site security prevents trespasser exposure and visitors will be required to be accompanied by a knowledgeable person who can prevent exposure of visitors.

Site activities will potentially expose workers and any accompanying visitors to contaminants in surface or subsurface soil. Individuals involved in future site development, construction or remedial activities may be exposed to contaminated soils on a short-term basis. Workers may be exposed to soil vapors or groundwater near excavations to the water table. However, the exposure pathway for these workers will be addressed through the use of engineering controls, PPE and appropriate site health and safety monitoring, as required by CFR 1910.120. Contractors will be notified of site conditions.

Off-site receptors will be protected by engineering controls (dust suppression) and the Community Air Monitoring Plan implemented for the site.

Potential exposure pathways during site redevelopment will be controlled by monitoring, engineering controls, and PPE as mandated by OSHA regulations (40 CFR 1910.120). Those regulations constitute an institutional control that prevents completion of the exposure pathways for the redevelopment scenario.

Future Land Use Scenario The property is being redeveloped for ongoing commercial or institutional use. Proposed improvements to the property include construction of a new building. The majority of the surface area of the site is anticipated to be paved or covered by the building footprint. Landscaped areas will be covered with at least two feet of clean fill. Any utilities required will be constructed in clean fill to prevent worker contact with contaminated soil. Dermal exposure, incidental ingestion and inhalation exposure to dust from soils do not constitute complete exposure pathways in the future land use scenario.

Upon completion of remediation of contaminated soil additional soil gas sampling will be conducted. Results of additional soil vapor sampling will be utilized to design engineering controls which may be implemented during site redevelopment to mitigate future occupants' exposure to such vapors. Confirmatory air testing will be conducted to determine the effectiveness of the remedial program/engineering controls implemented after building construction to document that no VOCs/SVOCs are accumulating in indoor air from the subsurface soils. Thus, a future human inhalation pathway is unlikely. No other exposure route exists for COCs in soil. No future exposure pathways are complete for site workers, occupants or visitors.

Groundwater may provide a medium from which there could be a short-term exposure route for COCs in groundwater to the extent that remediation or construction activities result in contact

with groundwater. During excavation/construction activities, such potential short-term exposure pathways can be eliminated through engineering controls, personal protective equipment, and site health and safety monitoring. On-site groundwater is not considered to be a potential future exposure medium. Groundwater is not considered to constitute a complete exposure pathway in the future for individuals conducting site excavations because groundwater at the site is at depths greater than excavation work will occur. Institutional controls will be implemented and all water at the future site will be derived from the NYC system. No future exposure pathways or risk will exist for site occupants and visitors.

9.3 Contaminants of Concern

Contaminated environmental media on-site include soil, groundwater and possibly soil vapor to be managed during site redevelopment for future use.

Soil COCs Contaminants of concern contained in soil include ethylbenzene, benzene and xylenes.

Groundwater COCs Contaminants of concern contained within groundwater are shown on Table 1: Groundwater Sample Results

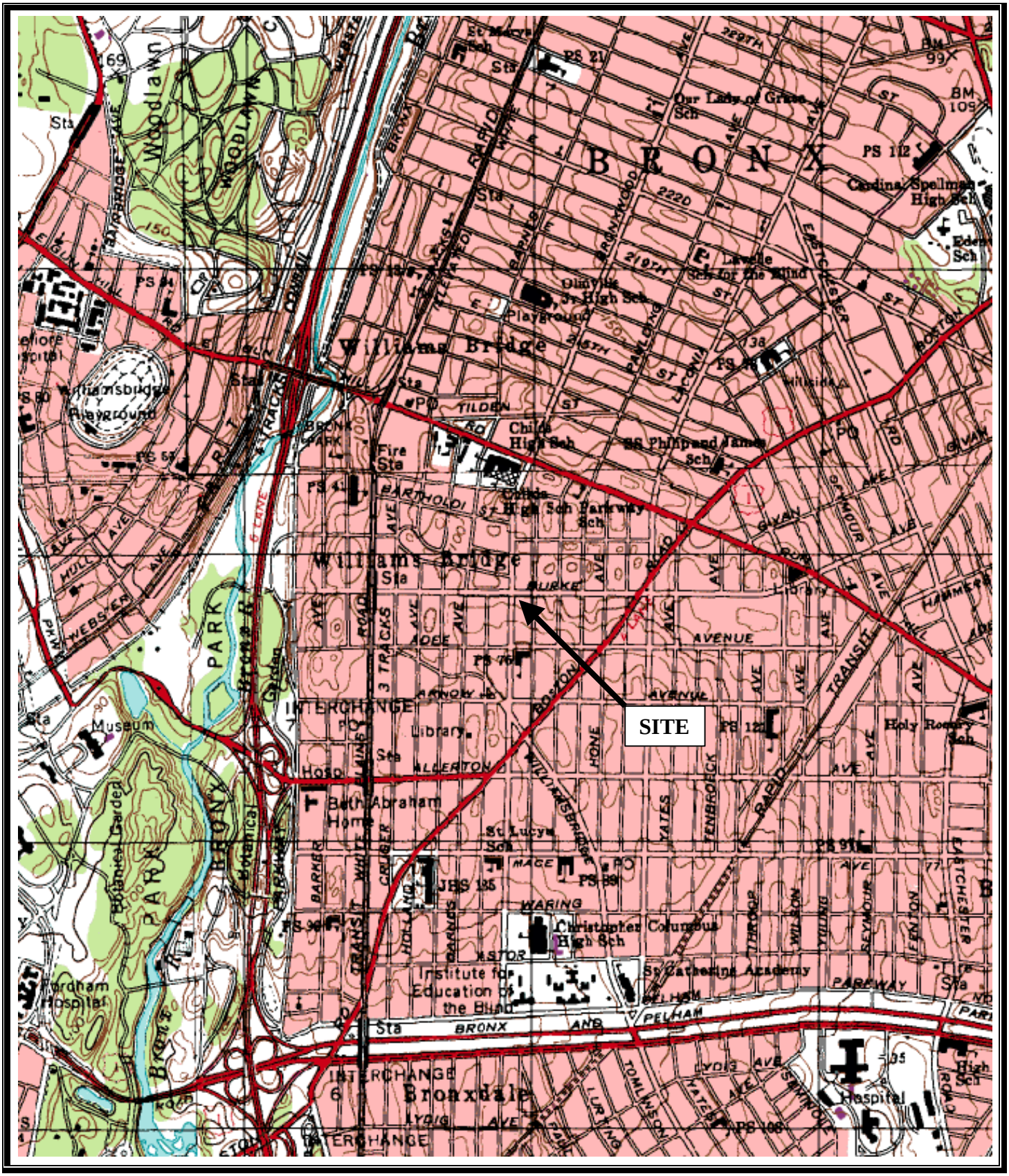
Soil Vapor COCs Contaminants of concern contained within soil vapors have not been determined at this time. COCs will be determined upon completion of soil gas sampling activities to be conducted on-site as part of this RI.

9.4 Exposure Assessment Conclusions

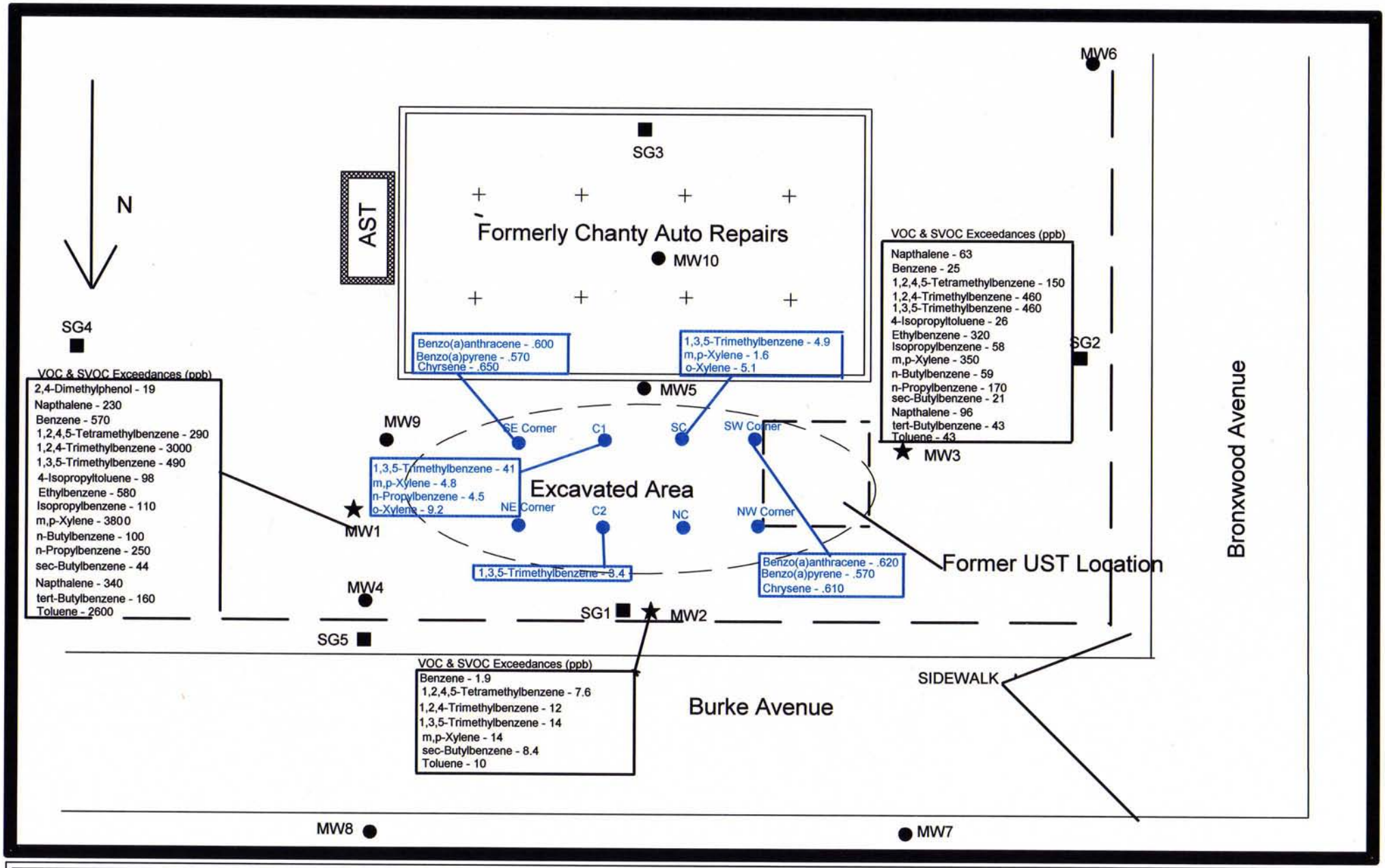
As discussed above, a qualitative exposure assessment focusing on health exposure pathway analysis was conducted to determine site COCs and likely exposure routes during three phases of development: site preparation, remediation and construction and future use. COCs identified include benzene, toluene, ethylbenzene, xylenes and MTBE.

During site preparation workers are potential receptors. They may potentially be exposed to VOC containing soil vapors indoors or fugitive dust from building demolition or excavation. Workers may contact contaminated wastes in removing them from the site or soils or groundwater when working in excavations on-site. Any resulting exposure pathways are expected to be of limited duration to individuals conducting excavation work and can be appropriately addressed by using PPE and/or engineering controls. Workers at the site may be trained in accordance with 40 CFR 1910.120 as an institutional control to protect workers.

The remedial and construction phase will cap residual contamination at the site and may include installation of a vapor barrier. Additional soil gas sampling will be performed upon completion of site redevelopment in order to confirm that soil vapors are not permeating through the foundation of the new building. No exposure pathways associated with site development or remediation were identified for workers, occupants or visitors in the future. Although exposure routes may exist for workers doing intrusive work at the site (i.e. by inhalation, ingestion or dermal contact with COCs) pathways will be addressed with engineering controls, PPE and appropriate health and safety monitoring to prevent completion of any exposure pathway. No completed exposure pathways for currently existing contamination will exist during future site use.



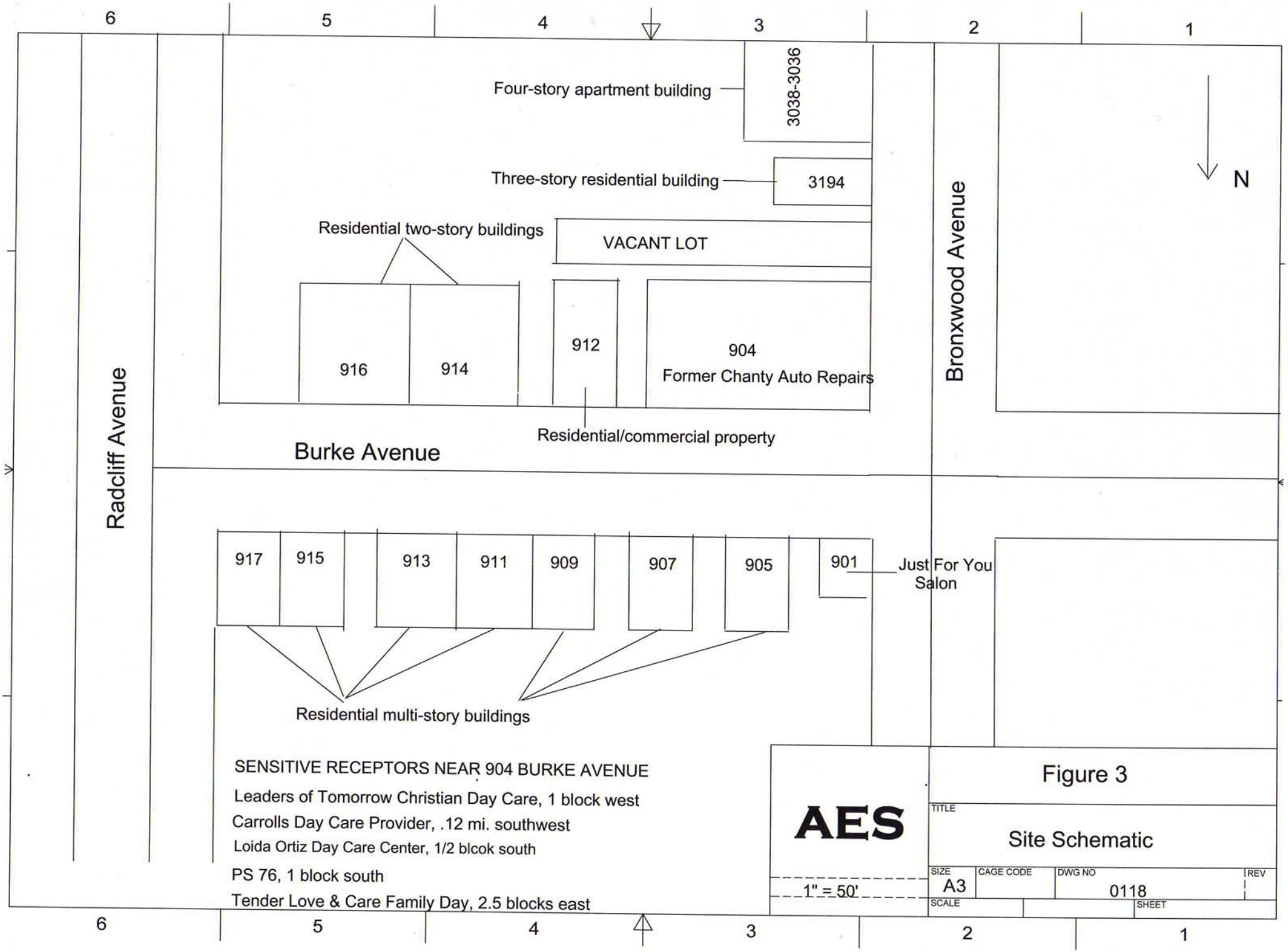
Site Location Map **904 Burke Avenue** **Bronx, New York**	AES Project No. 0118 Remedial Investigation Work Plan	**Figure 1** **American Environmental Solutions, Inc.**

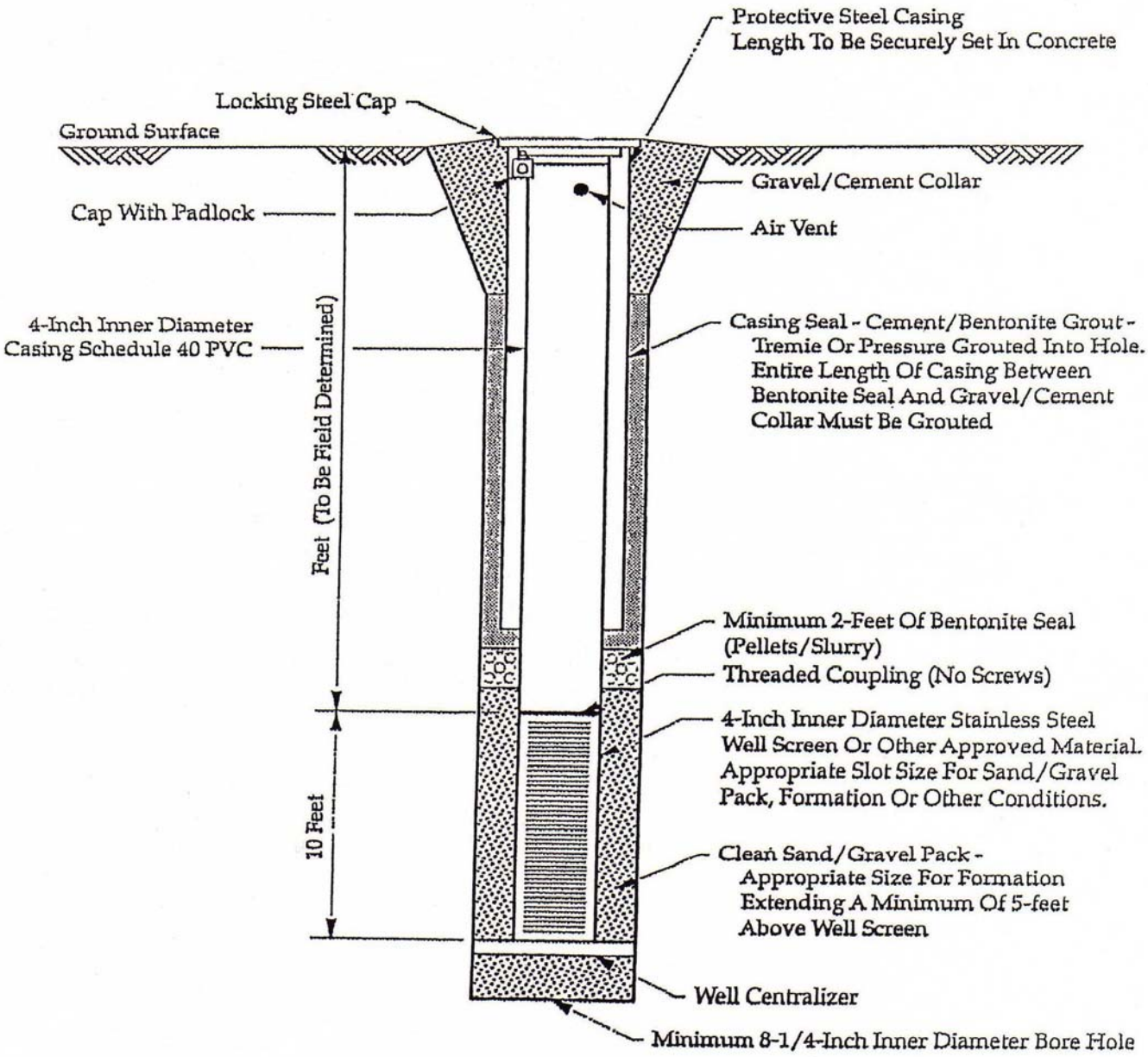


Remedial Investigation Work Plan
904 Burke Avenue, Bronx

Revised Figure 2: Proposed Sample Locations
Prepared by: AES
1"=15'

- PROPOSED MONITORING WELL/SOIL SAMPLE LOC.
- PROPOSED SOIL GAS SAMPLING POINT
- EXISTING MONITORING WELL
- POST DEMOLITION SOIL SAMPLE
- ENDPOINT SAMPLE LOCATION/VOC & SVOC EXCEEDANCES (ppm)


6
5
4
3
2
1
Four-story apartment building
3038-3036
Three-story residential building
3194
Residential two-story buildings
VACANT LOT
916
914
912
904
Former Chanty Auto Repairs
Residential/commercial property
Radcliff Avenue
Bronxwood Avenue
N
Burke Avenue
917
915
913
911
909
907
905
901
Just For You Salon
Residential multi-story buildings
SENSITIVE RECEPTORS NEAR 904 BURKE AVENUE
Leaders of Tomorrow Christian Day Care, 1 block west
Carrolls Day Care Provider, .12 mi. southwest
Loida Ortiz Day Care Center, 1/2 blcok south
PS 76, 1 block south
Tender Love & Care Family Day, 2.5 blocks east
AES
1" = 50'
Figure 3
TITLE
Site Schematic
SIZE
A3
CAGE CODE
DWG NO
0118
REV
SCALE
SHEET



Sample Well Construction **904 Burke Avenue** **Bronx, New York**	AES Project No. 0118 Remedial Investigation Work Plan	**Figure 4** **American Environmental Solutions, Inc.**