AMERICAN ENVIRONMENTAL SOLUTIONS, INC.

REMEDIAL ALTERNATIVES REPORT

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
JANUARY 2010

PREPARED BY:

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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 EXECUTIVE SUMMARY

American Environmental Solutions Inc. (AES) has prepared this Remedial Alternatives Report (RAR) on behalf of HB Realty pursuant to the Brownfield Cleanup Program Guide (Draft) NYSDEC (2004) guide).

The scope of work presented in this RAR was developed in order to meet the investigative requirements of the Brownfield Cleanup Program (BCP), the NYSDEC's Spills Management Section and Hazardous Waste Remediation Section as described in the Remedial Investigation Work Plan prepared for the site and approved by NYSDEC in October 2007.

The site is located at 904 Burke Avenue, Bronx, New York (the site) and measures approximately .25 acres. The site is currently a vacant lot used for parking by an auto dealership. Previous operations at the site included an auto service and gasoline station.

HB Realty intends to complete the remediation of the site in the following manner:

- Excavate and dispose of all contaminated material to bedrock or groundwater;
- Sample groundwater monitoring wells quarterly to assess groundwater quality;
- Conduct a post-excavation soil vapor investigation to assess soil vapor contamination after all contaminated soils have been removed;
- Utilization of engineering controls in site redevelopment such as a vapor barrier and active sub-slab depressurization system if deemed necessary based on findings of post-excavation soil vapor analysis;
- Perform operations, maintenance and monitoring (OM&M) as necessary.

Site-specific contaminants of concern (COCs) were determined by comparison of contaminant levels to applicable standards, criteria, and guidance (SCGs) pertaining to the future land use proposed under HB Realty's redevelopment scenario. The SCG's applicable to the site and which will be used as the remediation goals for the project are as follows:

Soil: NYSDEC 6 NYCRR Part 375 effective December 14, 2006, Restricted Use Soil Cleanup Objectives for Commercial Sites (as shown on Table 375-6.8(b)).

Groundwater: The goal of attaining the Class GA standards, as set forth in Ambient Water Quality Standards and Guidance Values presented in the NYSDEC Memorandum dated June 1998.

2.0 PURPOSE

The purpose of this RAR is to provide various remediation alternatives that may be used to address environmental contamination issues at 904 Burke Avenue, Bronx, New York. A detailed analysis of remedial alternatives was performed using the evaluation criteria pursuant to 6 NYCRR Part 375, Draft Brownfield Cleanup Program Guide (NYSDEC, 2004) (the Guide) as well as relevant portions of DER-10 (NYSDEC, 2002). The preferred remedy for the site consists of the following components:

- Excavate and dispose of all contaminated soil to bedrock or groundwater;
- Quarterly groundwater sampling assess groundwater quality;
- Assess on-site soil vapor through post-excavation investigation;
- Incorporation of engineering controls into site redevelopment plans such as installation of a vapor barrier and active sub-slab depressurization system as necessary.

3.0 SITE DESCRIPTION AND HISTORY

The site is located on the southeast corner of Burke Avenue and Bronxwood Avenue in a primarily residential neighborhood in the Bronx, New York. Presently, the site is a vacant lot used for automobile storage for a car dealership. The site location is shown on Figure 1. The site was formerly developed with a single story concrete block building that was demolished by the property owner in early 2008. The site has been developed for approximately fifty years and was previously occupied by J&S Auto Repairs and Chanty Auto Repairs. The site was previously 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 was backfilled. Preliminary environmental investigations conducted at the site indicated significant soil and groundwater contamination associated with the former USTs exists at the site. Contaminants of concern included volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs).

At this time, redevelopment plans proposed involve the new construction of a one-story office building to be used for car dealership operations.

Residential single and multi-family properties are adjacent to the south and east of the site. Bronxwood Avenue is located adjacent to the west and Burke Avenue is adjacent on the north side of the site. A residential apartment building is located beyond Bronxwood to the west and a deli and residences are located across Burke Avenue to the north.

Appropriate Interim Remedial Measures were undertaken on-site to mitigate worsening environmental conditions at the property prior to commencement of Remedial Investigation activities. IRM Work Plans were submitted to New York State Department of Environmental Conservation (NYSDEC) for their 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.

In July of 2006, 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. Upon completion of the IRM activities, endpoint soil samples and groundwater samples were collected and analyzed.

Clean fill materials to backfill the excavation were sampled and subsequently approved by NYSDEC in October 2007. On October 25 & 26, 2007 the area excavated on-site for contaminated soil removal was backfilled with approximately 350 tons of material.

AES returned to the site on January 18, 2008 to bail and sample the two monitoring wells already existing on-site (MW-2 and MW-3). Pre-existing well MW-1 was destroyed during site excavation and/or building demolition.

The building formerly existing on-site was demolished in 2008. Soil samples collected from this area during the remedial investigation indicated elevated levels of metals and SVOCs.

4.0 SUMMARY OF REMEDIAL INVESTIGATION

A remedial investigation was conducted at the site from April 2008 through March 2009 pursuant to the Remedial Work Plan prepared by AES and subsequently approved by NYSDEC in October 2007. The scope of work conducted included on and off-site groundwater sampling, soil vapor sampling and soil sampling.

4.1 Groundwater Monitoring

AES installed four new groundwater monitoring wells and collected soil and groundwater samples on-site during the remedial investigation conducted from April 2008 through March 2009. Pre-existing monitoring well MW-1 was reinstalled because it had been destroyed or collapsed. Pre-existing monitoring wells MW-2 and MW-3 were also sampled during this investigation. In addition, four off-site monitoring wells were installed and sampled.

Laboratory of groundwater samples indicated the presence of VOCs and SVOCs, some compounds in concentrations significantly exceeding the NYSDEC Water Quality Standard and Guidance Values particularly in MW-2 and off-site wells MW-7A and MW-12. Contaminants of concern include benzene, ethylbenzene, toluene, and xylenes. Groundwater flow direction in the area of the site generally flows to the northeast.

4.2 Soil Vapor Sampling

Four soil gas probes were installed on July 16th and 17th, 2008 in order to collect soil gas samples. Soil gas sampling points were installed at the north, south, east and west perimeters of the site using a Geoprobe provided by Enviroprobe Service, Inc. of Westmont, New Jersey. The samples were shipped to Con-Test Analytical Laboratory (NYSDOH ELAP # 10899) of East Longmeadow, Massachusetts.

Laboratory analysis of soil vapor samples indicated elevated compound concentrations in three of the five samples collected including acetone, benzene, hexane, 1,2,4-trimethylbenzene and toluene. Generally, soil gas samples exhibited compound concentrations in the low parts per billion with the exception of SG-1. SG-1, located at the northern perimeter of the site, exhibited significant contamination.

AES installed three additional off-site soil vapor sampling points in December 2009. SG-6, SG-7 and SG-8 were installed across Burke Avenue to the north of the site in the sidewalk in front of the buildings located at 901, 905 and 911 Burke Avenue to assess the potential for migration of vapors associated with the site. Samples were delivered to York Analytical Laboratories (NYSDOH ELAP # 10854) of Stratford, Connecticut for analysis. Laboratory results indicated compound detections in concentrations below USEPA criteria.

4.3. Soil Sampling

During monitoring well installation, AES collected soil samples for field screening and laboratory analysis. Three soil samples per location were collected, one above the water table, one at the water table and one surface sample from the 0-2' interval. No soil samples were collected from below the water table. Each soil sample was screened in the field for the presence of VOCs using a Photoionization Detector (PID). The soil sample exhibiting the highest PID reading from each location was submitted to the laboratory for analysis. Sample locations not exhibiting elevated PID readings were submitted to the laboratory based on visual characteristics/staining and/or odor. One sample was submitted to the laboratory from each interval at location MW-5A based on visual appearance and odor.

In addition, eight soil samples were collected from 0-2' in the area beneath the slab of the former site building. Samples were collected using a hand auger.

Laboratory analysis of soil samples collected generally indicated concentrations of VOCs, SVOCs and metals below NYSDEC Part 375 Restricted Use Criteria for Commercial sites with the exception of three samples collected from the area below the former site building which exhibited elevated levels of metals and SVOCs.

5.0 EXPOSURE AND RISK ASSESSMENT

The nature of contamination on-site generally consists of groundwater which may have been impacted by SVOCs and VOCs and soil impacted with SVOCs and metals. This contamination may have some limited off-site impacts, however, the VOCs are primarily associated with the underground storage tanks (USTs) which were formerly located on-site. The most significant off-site migration pathway would be groundwater which generally flows to the northeast of the subject property.

Based on sampling activities conducted during the remedial investigation, the most significant area of concern identified on site is located in the vicinity of MW-2 and SG-1 at the northern perimeter of the site. In addition the area beneath the former site building can also be identified as an area of concern due to elevated levels of metals and SVOCs in soil. Areas of concern are shown on Figure 2.

5.1 On-Site Exposure Assessment

Based on the soil gas sampling results, on-site exposure to soil vapor may occur on-site. Currently the site is undeveloped and used for automobile storage. Future development plans include new construction of a one-story office building. Further evaluation of soil vapor on-site may be necessary when development plans are finalized after contaminated materials are excavated and removed. A vapor barrier and an active sub-slab depressurization system may be utilized in future development plans to mitigate on-site exposure to soil vapor.

On-site exposure to soil contaminants may occur if future development plans result in fugitive dust generation at the site. In addition, if surface soils are disturbed by wind on-site exposure may occur. Dust suppression techniques may be utilized to mitigate the exposure to site contaminants during site redevelopment. On-site exposure to contaminated soils may occur through respiratory, ingestion and dermal exposure pathways

5.2 Off-Site Exposure Assessment

The results of the remedial investigation indicated there is no evidence of an off-site site component to the on-site contaminant plume. It should be noted that the contaminant concentrations in groundwater decreased dramatically between well locations MW-2 and MW-7A and MW-12, an indication of a relatively localized on-site contaminant plume.

Off-site exposure to soil contaminants may occur if future development plans result in fugitive dust generation at the site through respiratory, ingestion and dermal exposure pathways. In addition, if surface soils are disturbed by wind off-site exposure may occur. A Community Air Monitoring Plan will be prepared during site development to protect sensitive receptors in the vicinity. Dust suppression techniques may be utilized to mitigate the exposure to on-site contaminants.

The site is currently unpaved therefore surface soils may be subject to wind erosion. Future development plans include construction of a single-story office building. Areas surrounding the building will be paved and used for automobile parking. Paving exposed soils will prevent on-site contaminants from migrating off-site.

6.0 REMEDIAL GOALS AND REMEDIAL ACTION OBJECTIVES

The remedial action objectives (RAOs) form the basis for identifying remedial technologies and developing alternatives in this RAR. They have been developed with an understanding of the issues to be considered in remedy development and selection set forth in Section 4 of the Guide. This section identifies RAOs for soil and groundwater.

6.1 Identification of Remedial Action Objectives and Remediation Goals

Site specific COC's were determined by comparison of contaminant levels to the potentially applicable standards, criteria, and guidance (SCGs) and to the current and future land use proposed under HB Realty's redevelopment scenario. The SCGs to be used for the site consider both the identified COC's and the potential exposure pathways and receptors. The SCGs applicable to the Site and which will be used as the remediation goals for the project are as follows:

Soil: NYSDEC 6 NYCRR Part 375 effective December 14, 2006, Restricted Use Soil Cleanup Objectives for Commercial Sites (as shown on Table 375-6.8(b)).

Groundwater: The goal of attaining the Class GA standards, as set forth in Ambient Water Quality Standards and Guidance Values presented in the NYSDEC Memorandum dated June 1998.

6.1.1 Remedial Action Goals and Objectives for Soil

As described in this RAR, laboratory analysis of soil samples indicated elevated levels of metals and SVOCs from the area beneath the former site building.

The following RAOs were identified for site soil:

- Protect potential current and future construction workers, site workers and visitors from unacceptable risk resulting from direct-contact (via dermal contact or ingestion) with soils containing contaminants exceeding the NYSDEC Part 375 criteria for Commercial sites;

- Reduce the potential leaching of contaminants from site soil;

- Prevent potential inhalation of particulates by current or future construction workers, site workers and visitors due to dispersion of soils exhibiting elevated compound concentrations;

- Reduce the potential for transport via erosion and stormwater runoff.

6.1.2 Remedial Action Goals and Objectives for Groundwater

Groundwater is not used or planned for use at the site or in the vicinity of the site for drinking purposes. Therefore, no existing or reasonably anticipated future ingestion pathway is complete for groundwater contaminants at levels that exceed the Class GA standards (which are based on a potable use scenario). However, contaminants in groundwater at the site may have the potential to migrate to soil vapor.

The following RAOs were identified for the site groundwater:

- Protect construction workers, site workers, and visitors from inhalation of vapors associated with contaminants in groundwater exceeding the Class GA standards.

- Protect construction workers, site workers and visitors from dermal contact with contaminants in groundwater exceeding the Class GA standards.

- Reduce groundwater contaminants to NYS Ambient Water Quality Standards or acceptable health risk levels given the intended commercial use of the site.

7.0 ALTERNATIVES ANALYSIS

The remediation alternatives discussed below are considered consistent with section 4.3 of the Guide and technically feasible and applicable to the waste types and physical conditions at the site. Each site-specific remedial alternative developed in the following paragraphs address the media requiring remediation at the site. Furthermore, it should be noted that evaluated remedial alternatives may include engineering controls, which are consistent with the NY BCP Track 4 approach.

7.1. SOIL ALTERNATIVES ANALYSIS

Alternative S-1: No Action

The "No Action Alternative" would leave contaminated soil in-place. The impacts could potentially migrate off-site and impact adjacent properties, and possibly human health. This option would not be protective of public health and the environment.

Alternative S-2: Soil Vapor Extraction

Soil Vapor Extraction (SVE) is an in-situ soil remediation technology in which a vacuum is applied to the soil to induce the controlled flow of air and remove volatile and some semi-volatile contaminants from the soil. The gas leaving the soil may be treated to recover or destroy the contaminants, depending on local and state air discharge regulations. Air injection is effective for facilitating extraction of deep contamination, contamination in low permeability soils, and contamination in the saturated zone. The duration of operation and maintenance for in-situ SVE is typically medium to long-term.

Alternative S-3: Excavation and Off-Site Disposal of Contaminated Soil

This alternative includes the excavation all contaminated soil at the site to bedrock or groundwater. Excavated material will be transported off-site to a permitted facility for disposal pursuant to all federal, state and local regulations. Post-excavation sampling would be conducted following excavation activities to verify that all contaminated material has been removed.

7.2. GROUNDWATER ALTERNATIVES ANALYSIS

Alternative GW-1: No Action
The "No Action Alternative" would leave contaminated groundwater in-place at its present state. The contaminated water could potentially migrate off-site and have a negative impact on the regional groundwater.

Alternative GW-2: Natural Attenuation and Groundwater Monitoring
Natural attenuation is a viable alternative and may prove effective in achieving remedial goals. This remedial technique is a long-term technique for addressing groundwater contaminants. This alternative would involve quarterly groundwater sampling and analysis to verify that contaminant concentrations are stable or decreasing over time.

Alternative GW-3: Groundwater Extraction
This alternative involves the use of a vacuum enhanced fluid recovery system. Contaminated water would be extracted from the wells through the use of a vacuum truck. Contaminated water would be disposed pursuant to all federal, state and local regulations. Remaining water would be routinely monitored and sampled during construction to ensure that the contaminant concentrations are stable or decreasing.

Alternative GW-4: In-Situ Treatment – Oxygen Release Compound (ORC®) Application
During site excavation, oxygen release compound may be applied if groundwater is encountered as a polishing agent to reduce groundwater contamination. ORC application involves the introduction of oxygen into contaminated groundwater to enhance natural bio-degradation of contaminants. Oxygen Release Compound (ORC®) is a formulation of intercalated magnesium peroxide that releases oxygen slowly and facilitates the aerobic degradation of a range of environmental contaminants including petroleum hydrocarbons, certain chlorinated hydrocarbons, ether oxygenates and nitroaromatics. Once in the aquifer, tiny ORC particles can absorb or reside in the soil matrix and produce a controlled release of oxygen for periods of up to one year.

8.0 EVALUATION OF ALTERNATIVES

8.1 SOIL EVALUATION OF ALTERNATIVES

Alternative S-1: No Action
Although there is no cost associated with this alternative, this alternative is not protective of public health and the environment and therefore not a viable option for the site.

Alternative S-2: Soil Vapor Extraction (SVE)
Soil vapor extraction would be difficult to implement at the site as there it is currently undeveloped and has limited access to power. The site will be undergoing construction which complicate utilization of an SVE system. Soil vapor extraction is not a cost efficient option with long term and more complex operations, maintenance and monitoring.

Alternative S-3: Excavation and Off-Site Disposal of Contaminated Soil
This alternative would remove all contaminated soil remaining on-site. The site will be excavated to bedrock or groundwater. Post-excavation sampling will be conducted to verify that all contaminated soil has been removed. The excavation of contaminated soil would quickly reduce the potential for migration of contaminants from soil to groundwater, further improving the

quality of the groundwater. This alternative would be a more economical and efficient approach to remediation at the site.

8.2 GROUNDWATER EVALUATION OF ALTERNATIVES

Alternative GW-1: No Action

Although there is no cost associated with this alternative, this alternative would not be protective of public health and the environment and therefore is not a viable option for the site.

Alternative GW-2: Natural Attenuation and Groundwater Monitoring

Natural attenuation and groundwater monitoring is a long-term remedial technique. All groundwater monitoring wells will be sampled and analyzed for TAL/TCL quarterly to verify that contaminants are decreasing. This is a viable remedy for the site as AES anticipates contaminants in groundwater will decrease dramatically after all contaminated material is excavated and transported off-site for disposal, accelerating natural attenuation.

Alternative GW-3: Groundwater Extraction

This alternative is typically utilized when free product is present in wells. At this time there is not a significant amount of free product in wells on-site and therefore this alternative is not the preferred remedy.

Alternative GW-4: In-Situ Treatment – Oxygen Release Compound (ORC®) Application

ORC has been proven to effectively work as a polishing agent to remediate groundwater contamination. Typically a network of twenty or thirty injection wells is necessary to implement in-situ treatment through ORC. Due to constraints including shallow bedrock located beneath the site, installation of a network of injection wells would not be practical for the site.

9.0 RECOMMENDED REMEDIES

The recommended remedy for the site consists of the following components.

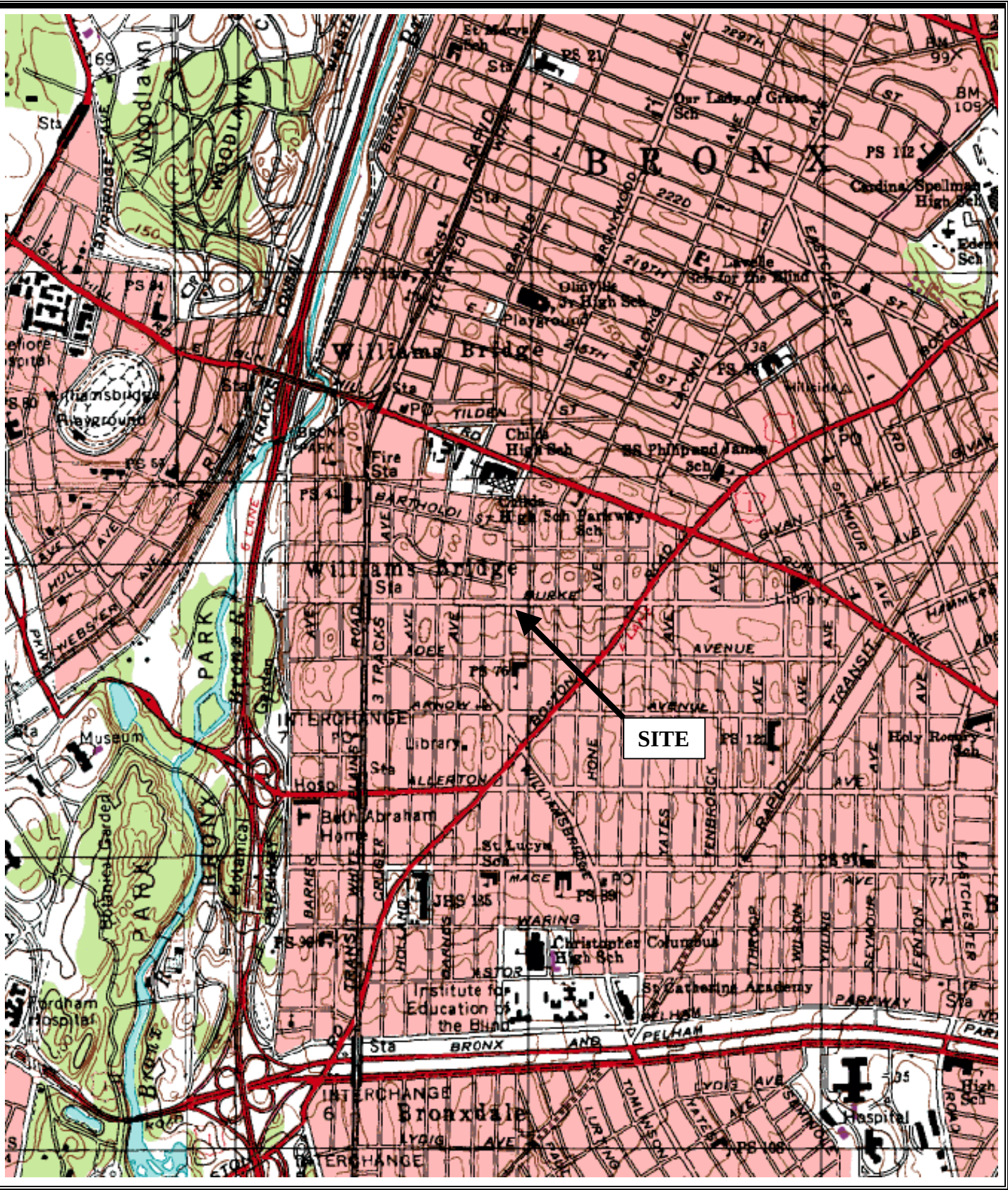
- Soil – Excavation and off-site disposal of contaminated soil.
- Groundwater – Natural Attenuation with Groundwater Monitoring

9.1 Recommend Soil Remedy

Alternative S-3 (soil excavation and off-site disposal of contaminated soil) has been selected as the recommended alternative for the soil remediation. The excavation of contaminated soil would reduce the potential for migration of contaminants from soil to groundwater, further improving the quality of the groundwater. All contaminated soil located on-site will be removed and transported off-site for disposal. Soil will be sampled for disposal facility requirements to classify the material prior to disposal. Post excavation sampling will be conducted to verify that all contaminated soil has been removed. A vapor barrier and active sub-slab depressurization system will be incorporated into the future development plans for the site to mitigate future occupant exposure to soil vapor if necessary. This is the most economical and efficient alternative for soil remediation.

9.2 Recommended Groundwater Remedy

Alternative GW-2 Natural Attenuation with Groundwater monitoring has been selected as the recommended alternative for groundwater. AES anticipates groundwater contamination will decrease after contaminated soil excavation. All groundwater monitoring wells will be sampled and analyzed on a quarterly basis for TAL/TCL to assess groundwater quality.



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

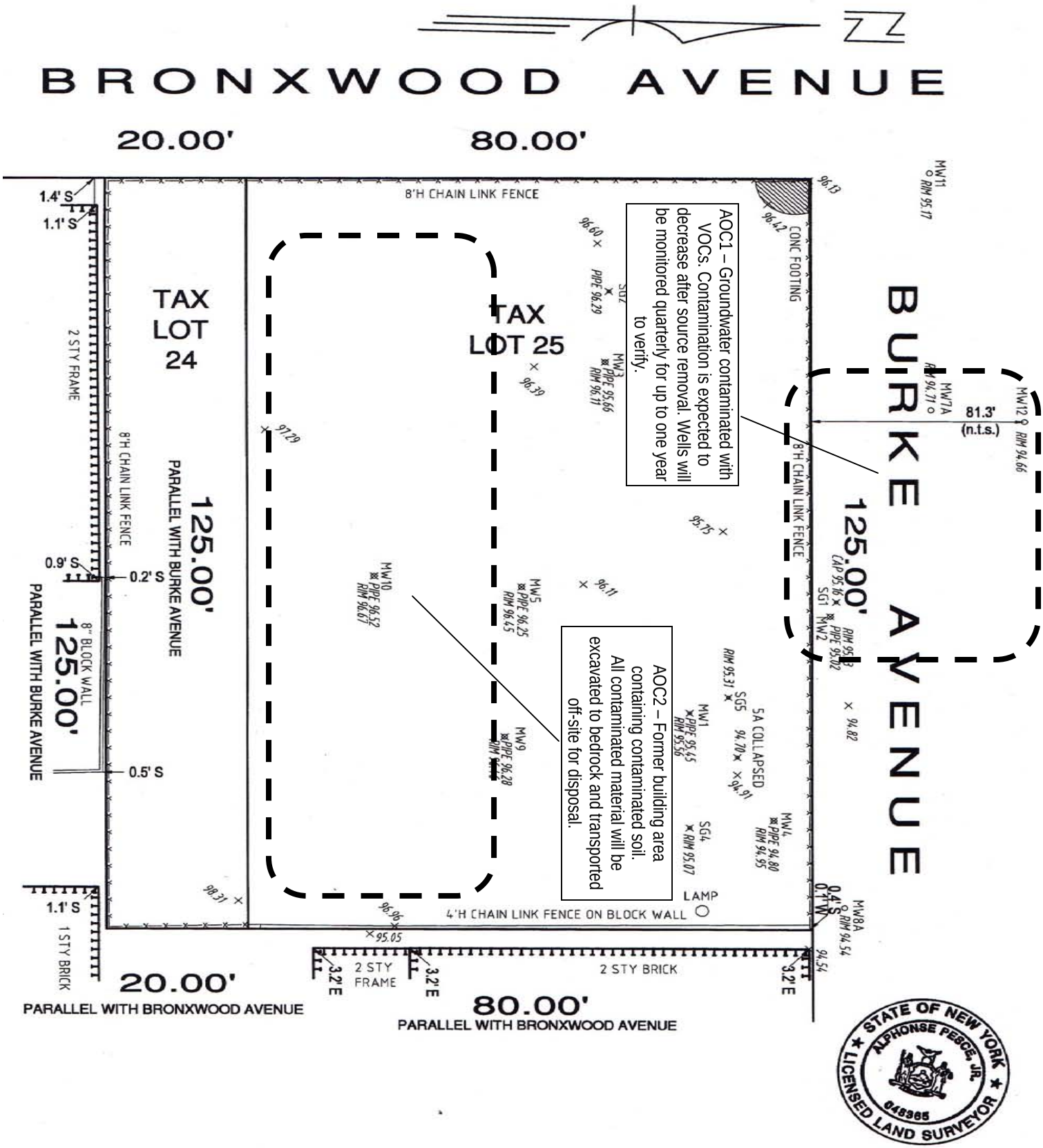


FIGURE 2

AREAS OF CONCERN

SURVEY OF MONITORING WELLS:
BRONXWOOD AVENUE & BURKE AVENUE
BOROUGH & COUNTY OF BRONX
CITY & STATE OF NEW YORK

SEC: 16 **BLOCK:** 4574 **LOTS:** 24 & 25 # 09-025
Date of Survey: DECEMBER 18, 2008 **JOB #:** 08-425
Survey Updated: MARCH 18, 2009 **Scale:** 1" = 15'

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