Henry Johnson Boulevard Properties

ALBANY COUNTY

ALBANY, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: E401049

Prepared for:

City of Albany Community Development Agency
200 Henry Johnson Boulevard
Albany, New York 12210

Prepared by:

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Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

DECEMBER 2015

CERTIFICATION STATEMENT

I Stefan Bagnato certify that I am currently a Qualified Environmental Professional as is defined in 6 NYCRR Part 375 and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

_____ P.G., QEP

12/3/15 DATE

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SITE MANAGEMENT PLAN

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List of Acronyms

AS	Air Sparging
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
CLP	Contract Laboratory Program
COC	Certificate of Completion
CO2	Carbon Dioxide
CP	Commissioner Policy
DER	Division of Environmental Remediation
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
FER	Final Engineering Report
GHG	Green House Gas
GWE&T	Groundwater Extraction and Treatment
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PID	Photoionization Detector
PRP	Potentially Responsible Party
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Remedial Party
RSO	Remedial System Optimization

SAC	State Assistance Contract
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SOP	Standard Operating Procedures
SOW	Statement of Work
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program
VOC	Volatile Organic Compound

ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification: E401049 Henry Johnson Boulevard Properties

Institutional Controls:	1. The property may be used for commercial or industrial use, as permitted by zoning;
	2. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Albany County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
	3. Groundwater and other environmental or public health monitoring must be performed as defined in this SMP.
	4. Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP.
	5. All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP.
	6. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP.
	7. Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
	8. The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on the Environmental Easement, and any potential impacts that are identified must be monitored or mitigated.

Site Identification: E401049 Henry Johnson Boulevard Properties

	9. Vegetable gardens and farming on the site are prohibited.

Inspections:	Frequency
1. Site inspection	Annually
Monitoring:	
1. Groundwater Permanganate Presence	Semi-annually
2. Groundwater VOC Sampling	Every three years
Reporting:	
1. Site Inspection and Permanganate Presence	Annually
2. Periodic Review Report	Every three years

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the Henry Johnson Boulevard Properties Site located in Albany, New York (hereinafter referred to as the "Site"). See Figure 1. The Site is currently in the New York State (NYS) Environmental Restoration Program (ERP), Site No. E401049 which is administered by New York State Department of Environmental Conservation (NYSDEC).

The City of Albany Community Development Agency (ACDA) entered into a State Assistance Contract (SAC), on May 20, 2005 with the NYSDEC to remediate the site. A figure showing the site location and boundaries of this site is provided in Figure 1. The boundaries of the site are more fully described in the metes and bounds site description that is provided in Appendix A. The Environmental Easement is provided in the Final Engineering Report (FER).

After completion of the remedial work, some contamination was left at this site, which is hereafter referred to as "remaining contamination". Institutional (ICs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC, and recorded with the Albany County Clerk, requires compliance with this SMP and all ECs and ICs placed on the site.

This SMP was prepared to manage remaining contamination at the site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC);
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and the SAC (# C302759; Site # E401049) for the site, and thereby subject to applicable penalties.

All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the site is provided in Appendix B of this SMP.

This SMP was prepared by ARCADIS of New York, Inc., on behalf of ACDA, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May, 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the site.

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shut-down of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the site conditions. In accordance with the Environmental Easement for the site, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the SAC, 6NYCRR Part 375, and/or Environmental Conservation Law.
- 7-day advance notice of any field activity associated with the remedial program.
- 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan.
- Notice within 48-hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.
- Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the SAC, and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1 on the following page includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix B.

Table 1: Notifications*

Name	**Contact Information**
Larry Alden, NYSDEC Project Manager	518-402-9767; larry.alden@dec.ny.gov
Jim Quinn, NYSDEC Region 4 Regional HW Engineer	518-357-2273; james.quinn@dec.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The site is located in the City of Albany, Albany County, New York and is identified as Section 65.64 Block 5 and Lots 1, 2, 4, 5, and 23 on the Albany County Tax Map (see Figure 1). The site is an approximately 0.34-acre area and is bounded by Henry Johnson Boulevard to the north, residential or commercial properties of Clinton Avenue and First Street to the south, First Street to the east, and Clinton Avenue to the west (see Figure 1 – Site Layout Map). The boundaries of the site are more fully described in Appendix A – Metes and Bounds. The owner(s) of the site parcel(s) at the time of issuance of this SMP is/are:

City of Albany Community Development Agency

2.2 Physical Setting

2.2.1 Land Use

The Site consists of the following: vacant lots. The Site is zoned commercial and is currently vacant, with no site occupants.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include commercial and residential properties. The properties immediately south of the Site include commercial and vacant properties; the properties immediately north of the Site include commercial and vacant properties; the properties immediately east of the Site include commercial and vacant properties; and the properties to the west of the Site include commercial and vacant properties.

2.2.2 Geology

Overburden materials observed during the site investigations generally consisted of up to five feet of fill material overlying five to 10 feet of medium to fine sand and silt above

cohesive brown and gray clay. Bedrock was not encountered during the site investigations, but is mapped as the Normanskill shale (Fisher et al., 1970). A geologic cross section is shown in Figures 2 and 3. Representative Site-specific boring logs are provided in Appendix C.

2.2.3 Hydrogeology

The average depth to water measured in the monitoring well network is approximately eight feet below ground surface (bgs). As shown in the potentiometric map on Figure 4, the direction of groundwater flow is generally toward the south and southwest, which follows the topographic gradient of the site. Based on calculated hydraulic conductivity testing conducted on monitoring wells, the subsurface soil permeability across the site ranges from 0.09 to 0.33 ft/day. However, the presence of urban fill and buried utility corridors, which are prevalent at the site, could provide preferential pathways that may affect shallow groundwater flow. Groundwater elevation data is provided in Table 2. Representative groundwater monitoring well construction logs are provided in Appendix B.

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

2.3.1 Investigation

The review of Sanborn and other maps and photos of the area from 1920s through the present indicate that over time the individual parcels were generally utilized for either residential or commercial use. A service station was located at 132 Henry Johnson Boulevard and operated from approximately 1934 through the late 1980s. Based on the data collected during the site investigation, it also appears that the disposal of hazardous substances (solvents) may have occurred in the basements of some of the structures or these may have been present in the structures when demolition of these buildings took place.

Phase I and II Environmental Site Assessments (ESAs) were conducted at the site as part of a United States Environmental Protection Agency (USEPA) Brownfields Assessment, Demonstration Pilot Program grant by the City of Albany in 2004. The ESAs included among other things, surface, sub-surface soil and groundwater sampling and analysis.

A Remedial Investigation (RI) was performed to characterize the nature and extent of contamination at the site. The results of the RI are described in detail in the Remedial Investigation/Alternatives Analysis Report (Malcolm Pirnie, 2009). Generally, the RI determined that historical uses of the property at 124 HJB resulted in the release of chlorinated volatile organic compounds (VOCs) into soil and groundwater, present at concentrations greater than 6NYCRR Part 375 Protection of Groundwater SCOs and NYSDEC Class GA Standards. Leaking USTs on the former service station property at 132 Henry Johnson Boulevard were previously removed from this location by the NYSDEC; and while some petroleum-related compounds were detected in groundwater at concentrations above NYSDEC Class GA Standards at the time of the RI, they did not persist in subsequent sampling rounds.

Below is a summary of site conditions when the RI was performed between 2006 and 2009:

Soil

None of the soil samples collected from the site contained concentrations of VOCs or SVOCs greater than the 6NYCRR Part 375 CSCOs. Lead was detected in one surface soil sample and arsenic was detected in only one subsurface soil sample at concentrations above the applicable 6NYCRR Part 375 SCOs. Although PCBs were detected in one surface soil sample at a concentration greater that the 6NYCRR Part 375 SCOs, the sample was collected from a location at 124 Henry Johnson Boulevard that was within the subsequent excavation limits.

Site-Related Groundwater

Groundwater samples from monitoring well MW-4 and replacement well MW-4R (located at 124 HJB) contained CVOCs at concentrations greater than the applicable NYSDEC Class GA Standards. The concentrations of CVOCs have decreased by an order of magnitude at this monitoring location since originally sampled. Groundwater samples from MW-1 and MW-2R (located at 132 HJB) contain concentrations of MTBE greater than the corresponding NYSDEC Class GA Standard. Isopropylbenzene was present in groundwater samples collected from MW-3 (also located at 132 HJB) in April 2006 at a concentration greater than the respective NYSDEC Class GA Standard This compound was not detected in the two subsequent rounds of groundwater samples (July and October, 2006) collected from this well.

Metals were detected at all of the groundwater sampling locations evaluated during the RI at concentrations greater than the applicable NYSDEC Class GA Standards. Iron, magnesium, manganese, and sodium exceedances were reported in nearly all of the groundwater samples collected from on- and off-site monitoring wells. Selenium and/or thallium were detected in several on- and off-site groundwater samples at concentrations greater than the corresponding NYSDEC Class GA Standards. Arsenic, lead , and nickel were reported in either the July or October, 2006 samples from monitoring wells MW-8, MW13, and MW-4, respectively, at concentrations greater than the respective NYSDEC Class GA Standards.

Site-Related Soil Vapor Intrusion

All of the soil vapor and ambient air samples collected during the RI contained VOCs. Chlorinated VOCs were detected in soil vapor samples collected within and immediately up-gradient of the 124 Henry Johnson Boulevard parcel at concentrations that were significantly greater than other soil vapor or ambient air samples collected during the RI. While the New York State Department of Health (NYSDOH) does not regulate these compounds in soil vapor, they are evaluated in conjunction with the concentrations of chemicals of concern found in other environmental media related to the site. Analytical results for off-site air and soil vapor samples collected from 335 Clinton Avenue showed

relatively low concentrations of several VOCs that were generally consistent with ambient air and background levels. Based on review of these data, there does not appear to be a vapor intrusion risk at this address.

2.3.2 Remediation

The site was remediated in accordance with the NYSDEC-approved Soil Removal Action Work Plan dated October, 2006, its subsequent addendum, and the Interim Remedial Action Work Plan dated May 2011.

The following is a summary of the Remedial Actions performed at the site:

1. Five underground storage tanks used for petroleum products were removed from the property at 132 Henry Johnson Boulevard in 1991, along with approximately three hundred cubic yards of petroleum contaminated soils. Several of the tanks had apparently been leaking and a spill was reported to the NYSDEC spill hotline (#9109113). The spill report states that some residual petroleum contaminated soils were left in place at this parcel during the tank closures due to the proximity to the sidewalk and the underground utilities.
2. Based on the RI sampling results, a Soil Removal Action (SRA) was conducted at 124 Henry Johnson Boulevard in June 2007. Approximately 363 tons of PCE-impacted soil was removed from an approximately 810 ft2 area to a depth of approximately 12 feet bgs. Based on the results of the SRA, field observations made during the site investigation, and the analytical results for samples collected on- and off-site, the main source of contamination at the site has been removed.
3. Due to the previous removal of chlorinated solvent-impacted soil during the SRA, an IRM was implemented to target residual groundwater contamination, largely in the vicinity of the SRA at 124 Henry Johnson Boulevard. Because the area of impacted groundwater is relatively small and provisions for future in-situ chemical oxidation were considered and implemented during the SRA (the installation of two feet of gravel) at the bottom of the excavation, site conditions were already conducive to full-scale implementation and a full-scale

permanganate injection pilot study was conducted in November 2011. The IRM involved the injection of approximately 3,000 gallons of 4% sodium permanganate in the vicinity of the SRA at124 Henry Johnson Boulevard.

4. Based on post-injection groundwater monitoring, residual chlorinated solvent-impacted groundwater remained at the site. To address these residual impacts, sustained release potassium permanganate/sodium persulfate cylinders were deployed in monitoring wells IW-1, MW-10R, and MW-22R in July 2015.

Remedial activities were completed at the site in July 2015.

2.3.3 Non-Investigation/Remediation Activities

The abandoned, unoccupied building at 339 Clinton Avenue was demolished in June 2011 by the City due to structural safety concerns, such that all site parcels are now undeveloped.

Supplemental soil sampling was conducted in October 2014 following observed rebound of chlorinated solvent-impacted groundwater concentrations. Consistent with prior sampling during the Phase II Environmental Site Assessment, Remedial Investigation, and SRA 2 confirmation sampling, the results of the October 2014 soil sampling indicated that significant residual soil CVOC mass is not likely present in the down-gradient vicinity of SRA 2.

2.4 Remediation Goals

The Remediation Goals for the Site as listed in the Record of Decision dated March 30, 2010 are to eliminate or reduce to the extent practicable:

- Exposures of persons at or around the site to VOCs in groundwater and soil vapor;
- Exposures of persons at or around the site to metals in soil;
- The release of contaminants from groundwater to indoor air of future buildings constructed on the site, through soil vapor intrusion.
- Further, the remediation goals for the site include attaining to the extent practicable:

- Ambient groundwater quality standards.

2.5 Remaining Contamination

Based on the data obtained from the RI, residual chlorinated VOC contamination in groundwater remains within the site at concentrations greater than applicable NYSDEC Class GA Groundwater Standards, particularly at the 124 Henry Johnson Boulevard parcel. Given the absence of buildings on the site, direct contact, ingestion, or inhalation of VOCs from subsurface groundwater during future construction work and/or utility access and repairs is the only potential human exposure pathway to the residual contamination.

Additionally, it should be noted that residual sodium permanganate may be present in site groundwater and presents a potential exposure risk to future construction work and/or utility access and repairs as permanganate is a very strong oxidizer.

Figures 5 and 6 and Tables 3 and 4, respectively, summarize the results of soil and groundwater sampling conducted at the site.

3.0 INSTITUTIONAL CONTROL PLAN

3.1 General

Since remaining contamination exists at the site, Institutional Controls (ICs) are required to protect human health and the environment. This IC Plan describes the procedures for the implementation and management of all IC at the site. The IC Plan is one component of the SMP and is subject to revision by the NYSDEC.

This plan provides:

- A description of all ICs on the site;
- The basic implementation and intended role of each IC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of ICs, such as the implementation of the Excavation Work Plan (EWP) (as provided in Appendix D) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the ICs required by the site remedy, as determined by the NYSDEC.

3.2 Institutional Controls

A series of ICs is required by the ROD to: (1) prevent future exposure to remaining contamination; and, (2) limit the use and development of the site to commercial or industrial uses only, as permitted by zoning. Adherence to these ICs on the site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on Figure 1 and in Appendix A. These ICs are:

- The property may be used for : commercial or industrial use, as permitted by zoning;

- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Albany County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.

- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;

- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;

- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;

- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;

- Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.

- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on Figure 1 and in Appendix A, and any potential impacts that are identified must be monitored or mitigated; and

- Vegetable gardens and farming on the site are prohibited.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of site management for the site are included in the Quality Assurance Project Plan provided in Appendix E.

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., groundwater);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly groundwater standards; and
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site – wide Inspection

Site-wide inspections will be performed at a minimum of once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site-wide inspections will also be performed after all severe weather conditions that may affect monitoring devices. During these inspections, an inspection form will be completed as provided in Appendix F – Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- General site conditions at the time of the inspection;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that site records are up to date.

Inspections of all remedial components installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date.

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster occurs that reduces or has the potential to reduce the effectiveness of ICs in place at the site, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the ICs implemented at the site by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be

provided to the NYSDEC within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

4.3 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from the existing monitoring well network on a routine basis. Sampling locations, required analytical parameters and schedule are provided in Table 5 – Post-Remediation Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 5 – Post Remediation Sampling Requirements and Schedule

Sampling Location	Field Parameters	Analytical Parameters	Schedule
	Permanganate Presence/ Concentration	TCL VOCs (USEPA Method 8260)	
Monitoring Wells	X		Semi-annually
Monitoring Wells		X	Every three years

Groundwater samples will be collected every three years from the existing monitoring wells listed in Table 6 in accordance with the USEPA Low Flow-Low Purge Sampling Protocol. A peristaltic pump will be used to collect the groundwater samples. Prior to sampling, the water level and (if present) light non-aqueous phase liquid (LNAPL) thickness in each well will be measured using an oil-water interface probe. Field parameters including pH, specific conductivity, temperature, turbidity, oxidation-reduction potential (ORP), and dissolved oxygen will be measured during well purging using a flow-through cell system. Purged groundwater will be visually assessed for the potential presence of LNAPL. Groundwater samples will be sent to a NYSDOH ELAP-approved analytical laboratory under chain-of-custody procedures for analysis of TCL VOCs by USEPA Method 8260B.

Detailed sample collection and analytical procedures and protocols are provided in Appendix G – Field Activities Plan and Appendix E – Quality Assurance Project Plan.

4.4.1 Groundwater Sampling

Groundwater monitoring will be performed on a periodic basis to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

The network of monitoring wells has been installed to monitor up-gradient, on-site and down-gradient groundwater conditions at the site. The existing network of on-site wells were generally all constructed of 10-foot screens that straddle the water table, at approximately 8 feet bgs. Coupled with the fact that source removal has been completed, the most recent round of groundwater sampling results (Figure 6) indicate that the depth and extent of residual contamination is limited.

Table 6 summarizes the wells identification number, as well as the purpose, location, depths, diameter and screened intervals of the wells. As part of the groundwater monitoring, one up-gradient well, four on-site wells and two down-gradient wells are sampled to evaluate the effectiveness of the remedy.

Table 6 – Monitoring Well Construction Details

Monitoring Well ID	Well Location	Coordinates (longitude/ latitude)	Well Diameter (inches)	Elevation (above mean sea level)			
				Surface	Casing	Screen Top	Screen Bottom
MW-11R	Up-gradient	42.661203° N, 73.761092° W	2	182.67	182.29	180.29	170.29
IW-1	On-site	42.661190° N, 73.761156° W	4	182.67	182.53	173.53	170.53

MW-4R	On-site	42.661144° N, 73.761163° W	2	181.48	181.18	177.18	167.18
MW-22R	On-site	42.661088° N, 73.761216° W	2	181.09	180.74	175.74	165.74
MW-10R	On-site	42.661080° N, 73.761250° W	2	180.88	180.52	178.52	168.52
MW-13	Down-gradient	42.660759° N, 73.761137° W	2	172.84	172.44	170.44	160.44
MW-14	Down-gradient	42.660850° N, 73.761307° W	2	175.10	174.82	172.82	162.82

Monitoring well construction logs are included in Appendix C of this document.

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced, if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC.

The sampling frequency may only be modified with the approval of the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC.

Deliverables for the groundwater monitoring program are specified in Section 7.0 – Reporting Requirements.

4.4.2 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in Appendix F - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific Quality Assurance Project Plan provided as Appendix E of this document.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

The site remedy does not rely on any mechanical systems, such as groundwater treatment systems, sub-slab depressurization systems or air sparge/soil vapor extraction systems to protect public health and the environment. Therefore, the operation and maintenance of such components is not included in this SMP.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

The site remedy does not rely on any mechanical systems or above-grade infrastructure. Therefore, a vulnerability assessment has not been conducted and is not included in this SMP.

6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of any green remediation evaluations to be completed for the site during site management, and as reported in the Periodic Review Report (PRR).

The site remedy relies solely upon passive, sustained release permanganate treatment to address residual groundwater impacts and thus uses no energy, creates no emissions, generates no waste, uses no water, and does not disturb land or ecosystems.

Therefore, green remediation evaluations will not be conducted during site management and are not included in this SMP.

6.3 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that the NYSDEC or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focuses on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness and remedial time frames. Green remediation technology and principals are to be considered when performing the RSO.

7.0. REPORTING REQUIREMENTS

7.1 Site Management Reports

All site management inspection, maintenance and monitoring events will be recorded on the appropriate site management forms provided in Appendix F. These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Table 7 and summarized in the Periodic Review Report.

Table 7: Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Inspection Report	Annually
Periodic Review Report	Every three years, or as otherwise determined by the Department

* The frequency of events will be conducted as specified until otherwise approved by the NYSDEC.

All interim monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air, etc);

- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and

- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuISTM database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the Department beginning sixteen (16) months after the Certificate of Completion is issued. After submittal of the initial Periodic Review Report, the next PRR shall be submitted every three years to the Department or at another frequency as may be required by the Department. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in Appendix A - Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances

highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends.

- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.

- A site evaluation, which includes the following:

  - The compliance of the remedy with the requirements of the site-specific RAWP, ROD or Decision Document;

  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;

  - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;

  - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan; and

  - Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document.

  - The overall performance and effectiveness of the remedy.

7.2.1 Certification of Institutional Controls

At the end of each certifying period, as determined by the NYSDEC, the following certification will be provided to the Department:

"For each institutional identified for the site, I certify that all of the following statements are true:

- *The institutional control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*

- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*

- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental easement.*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner's Designated Site Representative] for the site."

The signed certification will be included in the Periodic Review Report.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The Periodic Review Report may need to be submitted in hard-copy format, as requested by the NYSDEC project manager.

7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional control, a Corrective Measures Work Plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC.

7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.3), upon completion of an RSO, an RSO report must be submitted to the Department for approval. A general outline for the RSO report is provided in Appendix G. The RSO report will document the research/ investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model and present recommendations. RSO recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located, Site Control and the NYSDOH Bureau of Environmental Exposure Investigation.

8.0 REFERENCES

ARCADIS of New York, Inc., 2014, Supplemental Sampling Summary Report, Henry Johnson Boulevard Properties, Albany, New York.

ARCADIS of New York, Inc., 2015, Sustained Release Permanganate Treatment Report, Henry Johnson Boulevard Properties, Albany, New York.

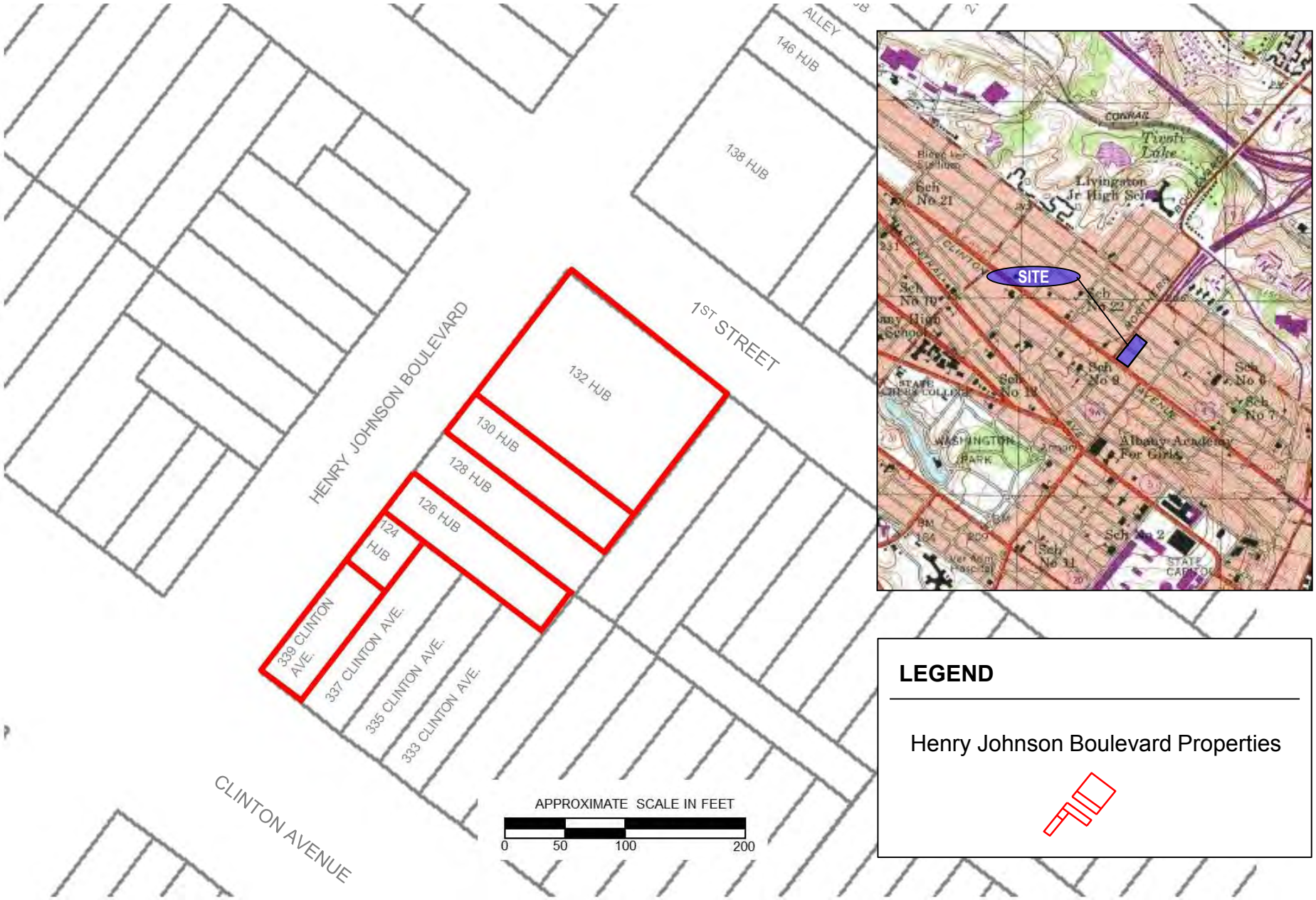
Malcolm Pirnie, Inc., 2003, Phase I Environmental Site Assessment, Henry Johnson Boulevard Properties, Albany, New York.

Malcolm Pirnie, Inc., 2005, Phase II Environmental Site Assessment, Henry Johnson Boulevard Properties, Albany, New York.

6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).



ARCADIS
Infrastructure · Water · Environment · Buildings

HENRY JOHNSON BOULEVARD PROPERTIES
ALBANY, NEW YORK
SITE # E401049

SITE LOCATION

FIGURE 1

HENRY JOHNSON BOULEVARD

(A.K.A. NORTHERN BOULEVARD)
ASPHALT PAVEMENT

SOIL REMOVAL AREA 2

CONC. CURB

ST. NO. 124 | ST. NO. 126 | ST. NO. 128 | ST. NO. 130 | ST. NO. 132

SB-88
SB-42/MW10
SB-92
SB-93
SB-91
SB-94
SB-2
SB-90
SV-7
MW-10R
SB-89
SB-43
SV-7R
MW-22R
SB-87
FORMER BUILDING
FOUNDATION REMAINS
BLOCK WALL
SB-1/MW-4R
SV-9R
IW-1
SV-10
MW-11R
SB-54/MW11
SB-33/SV-12
SB-15 MW-3
SB-13 MW-1
A'
A
SV-4
SB-63/MW14
ST. NO. 339
ST. NO. 337
ST. NO. 335
ST. NO. 333
ST. NO. 331
BUILDING
BLOCK WALL
SB-17 MW-2
MW-2R
SB-28/SV-13
POLE
SB-40/SV-11
SV-5
SB-35/SV-14
SB-61/MW-12
CONC. WALL
SB-26/MW-8
SB-44/MW-9
SB-62/MW13
SB-65/MW16
SV-8
VACANT LOT

CLINTON AVE.
ASPHALT PAVEMENT

LEGEND

SB-1/MW-4R	REPLACEMENT WELL
SV-7R	REPLACEMENT VAPOR POINT
SB-54/MW-11	SOIL BORING/MONITORING WELL
SB-11	SOIL VAPOR MONITORING POINT
SB-43	SOIL BORING
	INJECTION WELL
	LIMITS OF WORK

10 0 10 20
SCALE: 1" = 20'

ARCADIS
Advancing Water, Environment, Infrastructure

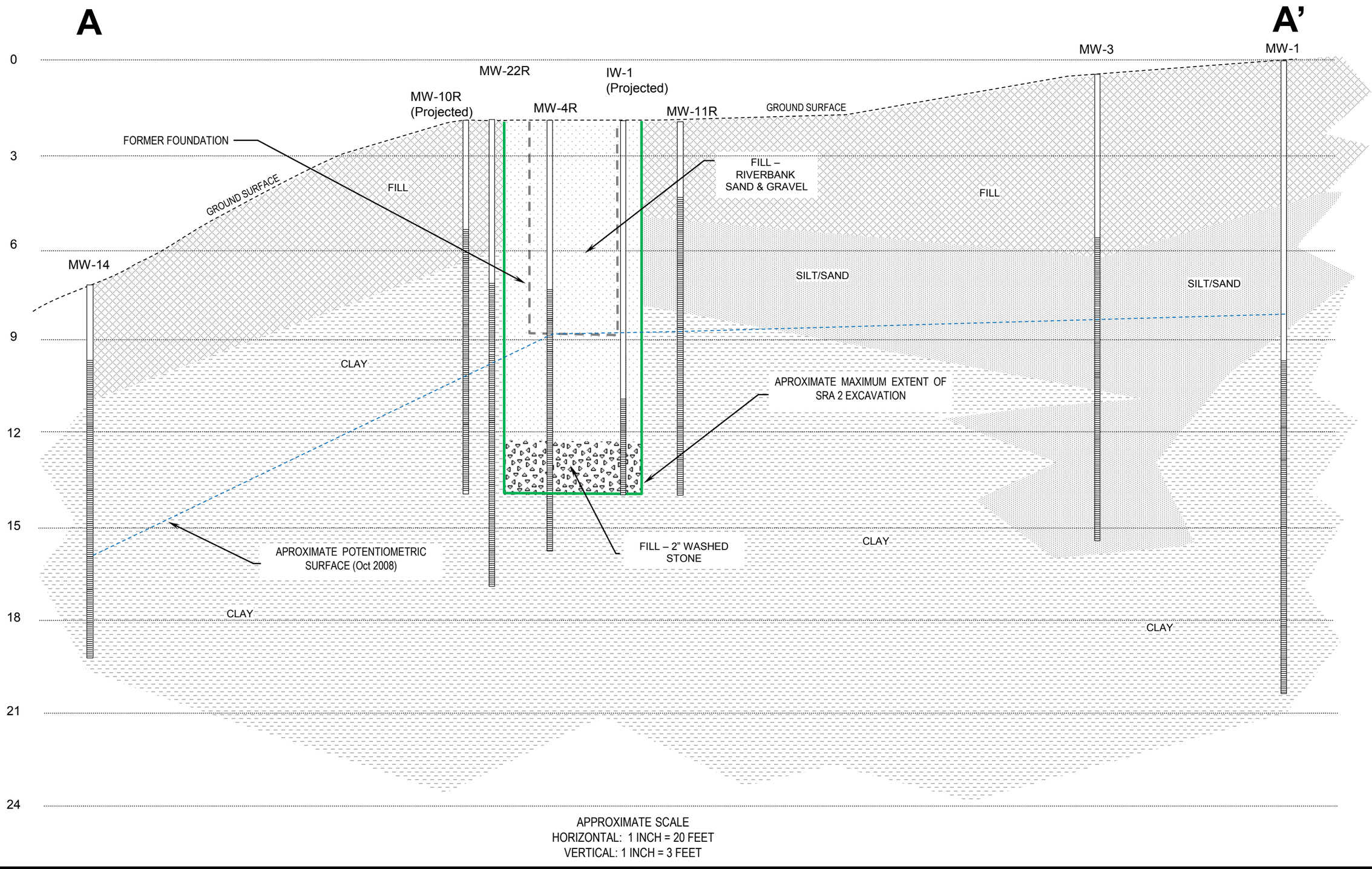
CITY OF ALBANY
ALBANY, NEW YORK
HENRY JOHNSON BOULEVARD ERP

SAMPLING LOCATIONS

SCALE: AS SHOWN

SEPTEMBER 2015

FIGURE 2



F:\PROJECT\4279009\FILE\FIGURE1(11x17)ppt.

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HENRY JOHNSON BOULEVARD ERP
CITY OF ALBANY, NY

124 HJB – CROSS SECTION & EXCAVATION BACKFILL SUMMARY

FIGURE 3

POTENTIOMETRIC CONTOUR

170 GROUNDWATER ELEVATION (FT AMSL)

HENRY JOHNSON BOULEVARD

(A.K.A. NORTHERN BOULEVARD)

ASPHALT PAVEMENT

SOIL REMOVAL AREA 2

CONC. CURB

ST. NO. 124 ST. NO. 126 ST. NO. 128 ST. NO. 130 ST. NO. 132

ST. NO. 339 ST. NO. 337 ST. NO. 335 ST. NO. 333 ST. NO. 331

CLINTON AVE.

ASPHALT PAVEMENT

SB-42/MW10 SV-7 MW-10R 174.02 MW-22R 173.75 SV-7R

FORMER BUILDING

SB-1/MW-4R 176.42 SV-9R IW-1 176.37 SV-10 MW-11R 175.33

FOUNDATION REMAINS BLOCK WALL

SB-54/MW11

SB-33/SV-12 SB-15 MW-3 176.07 SB-13 MW-1

SV-4 SB-63/MW14 165.43 SV-5 SB-62/MW13 163.88

BUILDING BUILDING BUILDING

SB-65/MW16 SV-6 VACANT LOT

SB-43/SV-11 SB-61/MW-12

SB-37 MW-2 MW-9R SB-39/SV-13 POLE SB-35/SV-14 SB-25/MW-8 177.32 SB-44/MW-9 166.79 CONC. WALL

174 176 172 170 168 166 164

LEGEND

SB-1/MW-4R	REPLACEMENT WELL
SV-7R	REPLACEMENT VAPOR POINT
SB-54/MW-11	SOIL BORING/MONITORING WELL
SB-11	SOIL VAPOR MONITORING POINT
	INJECTION WELL
	LIMITS OF WORK

10 0 10 20

SCALE: 1" = 20'

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ALBANY, NEW YORK
HENRY JOHNSON BOULEVARD ERP

POTENTIOMETRIC CONTOUR MAP (11/5/15)

SCALE: AS SHOWN

ARCADIS–US

NOVEMBER 2015

FIGURE 4

User:CADD Spec:ACAD File:G:\ACAD\PROJ\4279\009\HENRY JOHNSON ERP\CHEMOX-BASE.DWG Scale:1:1 Date:03/03/2014 Time:10:37 Layout:Layout

HENRY JOHNSON BOULEVARD

(A.K.A. NORTHERN BOULEVARD)

ASPHALT PAVEMENT

CLINTON AVE.

ASPHALT PAVEMENT

SOIL REMOVAL AREA 2

HJB-SB-93	10/27/14
Compound	Depth (ft bgs)
	2-3
Methylene Chloride	4.5 J
Tetrachloroethene	14 J

HJB-SB-42	6/13/06	
Compound	Depth (ft bgs)	
	5-7	10-12
TCL VOCs	ND	ND

HJB-SB-88	10/27/14
Compound	Depth (ft bgs)
	4-5
Methylene Chloride	2.7 JL
Tetrachloroethene	5.2 JL

HJB-SB-92	10/27/14
Compound	Depth (ft bgs)
	3-4
Tetrachloroethene	1.5 J

HJB-SB-94	10/27/14
Compound	Depth (ft bgs)
	1-2
Tetrachloroethene	2.8 JL

HJB-SB-2	7/13/04
Compound	Depth (ft bgs)
	1-2
Tetrachloroethene	810

HJB-SB-91	10/27/14
Compound	Depth (ft bgs)
	3-4
Methylene Chloride	1.8 JL
Tetrachloroethene	1.3 JL

HJB-SRA-2S	5/30/07
Compound	Depth (ft bgs)
	3.5
Tetrachloroethene	130

HJB-SB-43	6/13/06	
Compound	Depth (ft bgs)	
	5-7	10-12
TCL VOCs	ND	ND

HJB-SB-89	10/27/14
Compound	Depth (ft bgs)
	5-6
Tetrachloroethene	810 J
Trichloroethene	17 J

HJB-SB-90	10/27/14
Compound	Depth (ft bgs)
	3-4
Methylene Chloride	2.1 JL
Tetrachloroethene	110 JL
Trichloroethene	1.2 JL

HJB-SB-87	10/27/14
Compound	Depth (ft bgs)
	7-8
Acetone	7.5 J
Tetrachloroethene	2.8 J

ST. NO. 124 ST. NO. 126 ST. NO. 128 ST. NO. 130 ST. NO. 132

ST. NO. 337 ST. NO. 335 ST. NO. 333

SB-88 SB-92 SB-93 SB-91 SB-94 SB-2 SB-90 SB-89 SB-43 SB-7R MW-22R MW-10R SB-87 SB-1/MW-4R SV-9R IW-1 MW-11R SV-10 SB-42/MW12 SB-84/MW11

SV-4 SB-63/MW14 SV-5 SB-62/MW13 SB-65/MW16 SV-8 SB-40/SV-11 SB-61/MW-12 SB-44/MW-9

SB-33/SV-12 SB-15 MW-3 SB-13 MW-1 SB-17 MW-2 MW-2R SB-28/SV-13 SB-35/SV-14 SB-26/MW-8

BUILDING BUILDING BLOCK WALL FOUNDATION REMAINS VACANT LOT CONC. WALL POLE

NOTE: Soil VOC concentrations for detected compounds given in ug/kg.

- Concentration exceeds corresponding 6 NYCRR Part 375 Commercial Soil Cleanup Objective.
- Concentration exceeds corresponding 6 NYCRR Part 375 Residential Soil Cleanup Objective.
- Concentration exceeds corresponding 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objective.

LEGEND

SB-1/MW-4R	REPLACEMENT WELL
SV-7R	REPLACEMENT VAPOR POINT
SB-54/MW-11	SOIL BORING/MONITORING WELL
SB-11	SOIL VAPOR MONITORING POINT
SB-43	SOIL BORING
	INJECTION WELL
	LIMITS OF WORK

SRA-2 CONFIRMATION SAMPLE

10 0 10 20

SCALE: 1" = 20'

ARCADIS

CITY OF ALBANY
ALBANY, NEW YORK
HENRY JOHNSON BOULEVARD ERP

SUMMARY OF SOIL VOC SAMPLING RESULTS

SCALE: AS SHOWN

NOVEMBER 2014

FIGURE 5

NOTE: Groundwater VOC concentrations for detected compounds given in µg/L.

= Concentration exceeds corresponding NYSDEC Class GA Groundwater Standard.

HJB-MW-10 Compound	Class GA Standard	Jul-06	Oct-06	Jun-11
MTBE	10	ND	1 J	ND
Tetrachloroethene	5	ND	ND	1.6 J

...RY JOHNSON BOULEVARD

(A.K.A. NORTHERN BOULEVARD)

ASPHALT PAVEMENT

SOIL REMOVAL AREA 2

HJB-MW-10R Compound	Class GA Standard	Sep-11	Jul-12	Feb-13	Aug-13	Feb-14	Aug-14	Mar-15	Nov-15
cis-1,2-Dichloroethene	5	ND	ND	ND	1.2 BJ	ND	ND	ND	Not sampled, MnO4- present
MTBE	10	ND	ND	ND	0.53 J	ND	ND	ND	
Tetrachloroethene	5	160	2,300 D	300 D	77	51	120	110	
Trichloroethene	5	1.4 J	24	5.6 DJ	2.7 BJ	ND	1.7 J	1.5 J	
Vinyl Chloride	2	ND	ND	ND	0.66 J	ND	ND	ND	

HJB-IW-1 Compound	Class GA Standard	Jun-11	Sep-11	Jul-12	Feb-13	Aug-13	Feb-14	Aug-14	Mar-15	Nov-15
cis-1,2-Dichloroethene	5	47	75	Not sampled, MnO4- present	Not sampled, MnO4- present	Not sampled, MnO4- present	Not sampled, MnO4- present	25	17	Not sampled, MnO4- present
Tetrachloroethene	5	100	140					90	110	
Trichloroethene	5	16	30					14	14	
Vinyl Chloride	2	3.3 J	3.7					2.2 J	ND	

HJB-MW-22 / MW-22R Compound	Class GA Standard	Jun-11	Sep-11	Jul-12	Feb-13	Aug-13	Feb-14	Aug-14	Mar-15	Nov-15
1,1-Dichloroethene	5	ND	ND	ND	0.61 J	0.69 J	1.8 J	1.3 J	250 U	Not sampled, MnO4- present
cis-1,2-Dichloroethene	5	ND	3.2 J	33	3.6 J	20	40	52	55 J	
Tetrachloroethene	5	9.3	160	2,600 D	2,700 D	4,100 D	7,100 D	4,500 D	5,900	
Trichloroethene	5	ND	11	90	50	99	140	140	91 J	
Vinyl Chloride	2	ND	ND	ND	ND	ND	1.2 J	2 J	250 U	

HJB-MW-11/11R Compound	Class GA Standard	Jul-06	Oct-06	Jul-07	Jun-11	Sep-11	Jul-12	Feb-13	Aug-13	Feb-14	Aug-14	Mar-15	Nov-15
Methylene Chloride	5	ND	ND	ND	1.4 J	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	10	ND	4 J	ND	ND	1.4 J	ND	ND	ND	ND	1.5 J	3.3 J	ND

HJB-MW-4/4R Compound	Class GA Standard	Apr-06	Jul-06	Oct-06	Jul-07	Jun-11	Sep-11	Jul-12	Feb-13	Aug-13	Feb-14	Aug-14	Mar-15	Nov-15
cis-1,2-Dichloroethene	5	180	340 JE	460 JE	10	48	27	Not sampled, MnO4- present	Not sampled, MnO4- present	Not sampled, MnO4- present	Not sampled, MnO4- present	Not sampled, MnO4- present	Not sampled, MnO4- present	30
Tetrachloroethene	5	6,000 D	15,000 D	19,000 D	5,000 D	170	16							130
Trichloroethene	5	190 DJ	680 DJ	1,600 DJ	30	22	5.4							17
Vinyl Chloride	2	8	10 J	8	ND	2.6 J	1 J							1.8 J

HJB-MW-14 Compound	Class GA Standard	Jul-06	Nov-06	Jun-11	Jul-12	Feb-13	Aug-13	Feb-14	Aug-14	Mar-15	Nov-15
Acetone	50	ND	ND	12	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND	ND	0.62 J	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50	2 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	10	ND	ND	ND	ND	1.2 J	ND	ND	ND	ND	ND

HJB-MW-12 Compound	Class GA Standard	Jul-06	Oct-06	Jun-11	Jul-12	Feb-13
Acetone	50	ND	ND	5.3	ND	3.1 J
Bis(2-ethylhexyl)phthalate	50	6 J	ND	ND	ND	ND
Naphthalene	10	ND	ND	3.4 J	ND	ND
Tetrachloroethene	10	ND	ND	ND	ND	2.3 J

HJB-MW-13 Compound	Class GA Standard	Jul-06	Oct-06	Jun-11	Jul-12	Feb-13	Aug-13	Feb-14	Aug-14	Mar-15	Nov-15
Methylene Chloride	5	ND	ND	ND	ND	ND	1 J	ND	ND	ND	ND
Tetrachloroethene	10	ND	ND	ND	0.95 J	1.3 J	ND	ND	ND	ND	ND

ST. NO. 124 ST. NO. 126 ST. NO. 128 ST. NO. 130 ST. NO. 132

ST. NO. 339 ST. NO. 333 ST. NO. 331

CLINTON AVE.

ASPHALT PAVEMENT

FORMER BUILDING

FOUNDATION REMAINS BLOCK WALL

BUILDING

CONC. WALL

SB-1/MW-4R SV-9R MW-10R MW-22R SV-7R SV-4 SV-5 SB-63/MW14 SB-62/MW13 SB-61/MW-12 SB-40/SV-11 SV-10 MW-11R IW-1 SB-54/MW11 SB-65/MW10 SB-33/SV-12 SB-15 MW-3 SB-13 MW-1 SB-17 MW-2 MW-9R SB-29/SV-13 SB-36/SV-14 SB-25/MW-8 SB-44/MW-9

LEGEND

- SB-1/MW-4R — REPLACEMENT WELL
- SV-7R — REPLACEMENT VAPOR POINT
- SB-54/MW-11 — SOIL BORING/MONITORING WELL
- SB-11 — SOIL VAPOR MONITORING POINT
- INJECTION WELL
- LIMITS OF WORK

10 0 10 20

SCALE: 1" = 20'

ARCADIS Infrastructure · Water · Environment · Buildings

CITY OF ALBANY
ALBANY, NEW YORK
HENRY JOHNSON BOULEVARD ERP

SUMMARY OF GROUNDWATER VOC SAMPLING RESULTS

ARCADIS–US

NOVEMBER 2015

FIGURE 6

User: CADD Spec: ACAD File: G:\ACAD\PROJ\4279\009\HENRY JOHNSON ERP\CHEMOX-BASE.DWG Scale: 1:1 Date: 03/03/2014 Time: 10:37 Layout: Layout

TABLE 2
SUMMARY OF GROUNDWATER ELEVATIONS
HENRY JOHNSON BOULEVARD PROPERTIES ERP
CITY OF ALBANY, NEW YORK

Well	Measuring Point Elevation	4/11/2006		4/12/2006		7/26/2006		8/15/2006		10/30/2006		8/22/2007		10/15/2008		6/14/2011		2/11/2014		6/25/2014		8/22/2014		3/5/2015		11/5/2015	
		DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)
MW-1	187.55	7.59	179.96	7.46	180.09	7.04	180.51	7.29	180.26	8.52	179.03	8.43	179.12	8.28	179.27	NM	-	NM	-	7.17	180.38	7.51	180.04	NM	-	NM	-
MW-2R	187.05	-	-	-	-	8.5	178.55	8.82	178.23	9.78	177.27	9.66	177.39	X	-	NM	-	NM	-	NM	-	NM	-	NM	-	NM	-
MW-3	186.17	8.39	177.78	8.28	177.89	8.41	177.76	8.02	178.15	8.68	177.49	10.22	175.95	X	-	NM	-	NM	-	8.80	177.37	9.98	176.19	NM	-	10.10	176.07
MW-4	181.51	4.75	176.76	4.89	176.62	5.01	176.50	5.52	175.99	4.8	176.71	-	-	-	-	NM	-	NM	-	-	-	-	-	-	-	-	-
MW-4R	181.18	-	-	-	-	-	-	-	-	-	-	6.54	-	4.73	-	4.78	176.40	5.71	175.47	5.03	176.15	5.90	175.28	6.36	174.82	4.76	176.42
MW-6R	195.52	-	-	-	-	-	-	-	-	-	-	7.71	187.81	X	-	NM	-	NM	-	NM	-	NM	-	NM	-	NM	-
MW-7	188.62	-	-	-	-	5.23	183.39	6.37	182.25	4.06	184.56	6.58	182.04	NM	-	NM	-	NM	-	NM	-	NM	-	NM	-	NM	-
MW-8	186.22	-	-	-	-	8.89	177.33	8.92	177.30	8.77	177.45	9.37	176.85	X	-	NM	-	NM	-	9.11	177.11	9.11	177.11	NM	-	8.90	177.32
MW-9	179.7	-	-	-	-	7.07	172.63	8.06	171.64	10.13	169.57	10.10	169.60	9.32	170.38	NM	-	NM	-	7.07	172.63	9.82	169.88	NM	-	13.00	166.70
MW-10	181.24	-	-	-	-	7.63	173.61	8.17	173.07	5.70	175.54	6.44	174.80	5.25	175.99	4.35	176.89	-	-	-	-	-	-	-	-	-	-
MW-10R	180.52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.86	172.66	6.32	174.20	7.55	172.97	9.75	170.77	6.50	174.02
MW-11	181.56	-	-	-	-	6.53	175.03	7.72	173.84	5.00	176.56	-	-	-	-	NM	-	NM	-	-	-	-	-	-	-	-	-
MW-11R	182.29	-	-	-	-	-	-	-	-	-	-	7.22	-	6.77	-	6.90	175.39	7.06	175.23	6.97	175.32	7.31	174.98	7.90	174.39	6.96	175.33
MW-12	177.82	-	-	-	-	7.03	170.79	8.42	169.40	7.61	170.21	8.31	169.51	7.31	170.51	NM	-	NM	-	6.08	171.74	8.58	169.24	NM	-	NM	-
MW-13	172.44	-	-	-	-	9.02	163.42	9.60	162.84	8.68	163.76	9.13	163.31	8.87	163.57	8.81	163.63	8.86	163.58	8.88	163.56	9.20	163.24	8.83	163.61	8.56	163.88
MW-14	174.82	-	-	-	-	9.46	165.36	9.61	165.21	9.34	165.48	9.61	165.21	9.51	165.31	9.63	165.19	9.90	164.92	9.63	165.19	9.54	165.28	9.92	164.90	9.39	165.43
MW-15	180.98	-	-	-	-	9.25	171.73	9.35	171.63	8.98	172.00	9.23	171.75	9.19	171.79	NM	-	NM	-	NM	-	NM	-	NM	-	NM	-
MW-16	173.35	-	-	-	-	7.41	165.94	9.18	164.17	X	-	X	-	X	-	NM	-	NM	-	NM	-	NM	-	NM	-	NM	-
MW-17	191.57	-	-	-	-	-	-	-	-	-	-	6.05	185.52	5.40	186.17	NM	-	NM	-	NM	-	NM	-	NM	-	NM	-
MW-18	189.82	-	-	-	-	-	-	-	-	-	-	6.62	183.20	5.28	184.54	NM	-	NM	-	NM	-	NM	-	NM	-	NM	-
MW-19	194.52	-	-	-	-	-	-	-	-	-	-	7.30	187.22	6.35	188.17		194.52		194.52		194.52		194.52		194.52	NM	-
MW-20	185.89	-	-	-	-	-	-	-	-	-	-	-	-	5.41	180.48		185.89		185.89		185.89		185.89		185.89	NM	-
MW-21	195.98	-	-	-	-	-	-	-	-	-	-	-	-	7.15	188.83		195.98		195.98		195.98		195.98		195.98	NM	-
MW-22	181.56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.25	173.31	-	-	-	-	-	-	-	-	-	-
MW-22R	180.74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.16	172.58	6.65	174.09	7.93	172.81	9.96	170.78	6.99	173.75
MW-A	189.88	-	-	-	-	-	-	-	-	5.71	184.17	6.00	183.88	5.67	184.21	-	-	-	-	-	-	-	-	-	-	-	-
MW-B	192.6	-	-	-	-	-	-	-	-	5.99	186.61	7.40	185.20	NM	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-C	187.12	-	-	-	-	-	-	-	-	6.35	180.77	6.85	180.27	6.25	180.87	-	-	-	-	-	-	-	-	-	-	-	-
MW-D	188.17	-	-	-	-	-	-	-	-	-	-	-	-	4.74	183.43	-	-	-	-	-	-	-	-	-	-	-	-
MW-E	185.79	-	-	-	-	-	-	-	-	-	-	-	-	5.79	180.00	-	-	-	-	-	-	-	-	-	-	-	-
IW-1	182.53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.10	176.43	7.09	175.44	6.40	176.13	7.28	175.25	7.73	174.80	6.16	176.37

Notes:
"R" denotes replacements wells
X - Could not locate

TABLE 3
SUMMARY OF REMAINING SOIL SAMPLE EXCEEDANCES
HENRY JOHNSON BOULEVARD PROPERTIES
ALBANY, NEW YORK

Sample/Boring ID	375	6 NYCRR Part 375	6 NYCRR Part 375	SB-87	SB-88		SB-89	SB-90	SB-91	SB-92	SB-93	SB-94
Sample Depth (feet)	Unrestricted Use	Residential	Commercial	7-8	4-5	DUP-01	5-6	3-4	3-4	3-4	2-3	1-2
Sampling Date	Soil Cleanup	Soil Cleanup	Soil Cleanup	10/27/14	10/27/14	10/27/14	10/27/14	10/27/14	10/27/14	10/27/14	10/27/14	10/27/14
Matrix	Objective	Objective	Objective	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
VOCs												
Acetone	50	100,000	500,000	7.5 J	6.1 U	6.4 UJ	42 UJ	5.2 U	4.9 U	5.5 U	6.4 UJ	5.6 U
Methylene Chloride	50	51,000	500,000	7.2 UJ	2.7 JL	6.4 UJ	42 UJ	2.1 JL	1.8 JL	5.5 U	4.5 J	2.8 JL
Tetrachloroethene	1,300	5,500	150,000	2.8 J	5.2 JL	2.7 J	810 J	110 JL	1.3 JL	1.5 J	14 J	5.6 U
Trichloroethene	470	10,000	200,000	7.2 UJ	6.1 U	6.4 UJ	17 J	1.2 JL	4.9 U	5.5 U	6.4 UJ	5.6 U

Notes:

- Concentration exceeds corresponding 6 NYCRR Part 375 Commercial Soil Cleanup Objective.

- Concentration exceeds corresponding 6 NYCRR Part 375 Residential Soil Cleanup Objective.

- Concentration exceeds corresponding 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objective.

U - The compound was not detected at the indicated concentration.
J - The concentration given is an estimated value.
L - Biased low; sample not collected according to 5035-L/5035A-L specifications.

TABLE 4
SUMMARY OF DETECTED VOCS IN GROUNDWATER
HENRY JOHNSON BOULEVARD PROPERTIES ERP
CITY OF ALBANY, NEW YORK

Well ID	NYSDEC	IW-1			
Sample ID	Class GA	HJB-IW-1	HJB-IW-1	HJB-IW-1	HJB-IW-1
Duplicate	Standard or				
Sampling Date	Guidance Value	6/14/2011	9/13/2011	8/22/2014	3/5/2015
Matrix		WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs					
1,1,1,2-Tetrachloroethane		5 U	5 U	5 U	5 U
1,1-Dichloroethane		5 U	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U
Acetone	50	5 U	5 U	5 U	5 U
Benzene	1	5 U	5 U	5 U	5 U
Carbon Disulfide		5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U
Chloroethane	5	5 U	5 U	5 U	5 U
Chloroform	7	2.7 J	5 U	1.5 J	1.5 J
cis-1,2-Dichloroethene	5	**47**	**75**	**25**	**17**
cis-1,3-Dichloropropene		5 U	5 U	5 U	5 U
Dibromochloromethane	50	5 U	5 U	5 U	5 U
Dibromomethane		5 U	5 U	5 U	5 U
Dichlorodifluoromethane		5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U
Hexachlorobutadiene		5 U	5 U	5 U	5 U
Iodomethane		5 U	5 U	5 U	5 U
Isopropylbenzene	5	5 U	5 U	5 U	5 U
m,p-Xylene	5	5 U	5 U	5 U	5 U
Methyl tert-butyl ether	10	5 U	5 U	5 U	5 U
Methylene Chloride	5	1.1 J	5 U	5 U	5 U
Naphthalene	10	5 U	5 U	5 U	5 U
Tetrachloroethene	5	**100**	**140**	**90**	**110**
trans-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene		5 U	5 U	5 U	5 U
Trichloroethene	5	**16**	**30**	**14**	**14**
Trichlorofluoromethane	5	5 U	5 U	5 U	5 U
Vinyl acetate		5 U	5 U	5 U	5 U
Vinyl Chloride	2	**3.3 J**	**3.7**	**2.2 J**	5 U

Notes
- Concentration exceeds NYSDEC Class GA Standard
U - The compound was not detected at the indicated concentration
J - Compound detected below the reporting limit or is estimated
E - Concentration exceeded the calibration range.
N - Positively identified TICS.
B - The analyte was found in the method blank as well as sample.
D - Concentration was obtained from a diluted analysis.
NA - Not Analyzed.

TABLE 4
SUMMARY OF DETECTED VOCS IN GROUNDWATER
HENRY JOHNSON BOULEVARD PROPERTIES ERP
CITY OF ALBANY, NEW YORK

Well ID	NYSDEC	MW-4 / MW-4R								
Sample ID	Class GA	HJB-MW-4	HJB-MW-4	HJB-MW-4	HJB-MW-4R	HJB-MW-4R	HJB-MW-4R	MW-DUP-091311	HJB-MW-4R	DUP1-110515
Duplicate	Standard or									
Sampling Date	Guidance Value	4/12/2006	7/28/2006	10/31/2006	7/5/2007	6/14/2011	9/13/2011	9/13/2011	11/5/2015	11/5/2015
Matrix		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs										
1,1,1,2-Tetrachloroethane		3 J	1 J	1 J	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane		5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5	5	**7 J**	**6**	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	50	7	5 UJ	8	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	1	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Disulfide		5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	5	5 U	1 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	7	5 U	5 UJ	1 J	2 J	5 U	5 U	5 U	1.1 J	1.1 J
cis-1,2-Dichloroethene	5	**180**	**340 JE**	**460 JE**	**10**	**48**	**27**	**53**	**30**	**30**
cis-1,3-Dichloropropene		5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	50	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane		5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane		5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachlorobutadiene		5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iodomethane		5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Isopropylbenzene	5	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylene	5	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl tert-butyl ether	10	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene Chloride	5	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	10	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5	**6,000 D**	**15,000 D**	**19,000 D**	**5,000 D**	**170**	**16**	**140**	**130**	**130**
trans-1,2-Dichloroethene	5	5 U	2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene		5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	**190 DJ**	**680 DJ**	**1,600 DJ**	**30**	**22**	**5.4**	**20**	**17**	**16**
Trichlorofluoromethane	5	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl acetate		5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	2	**8**	**10 J**	**8**	5 U	**2.6 J**	1 J	**2.5 J**	1.8 J	1.8 J

Notes

- Concentration exceeds NYSDEC Class GA Standard

U - The compound was not detected at the indicated concentratio
J - Compound detected below the reporting limit or is estimated
E - Concentration exceeded the calibration range.
N - Positively identified TICS.
B - The analyte was found in the method blank as well as sample.
D - Concentration was obtained from a diluted analysis.
NA - Not Analyzed.

TABLE 4
SUMMARY OF DETECTED VOCS IN GROUNDWATER
HENRY JOHNSON BOULEVARD PROPERTIES ERP
CITY OF ALBANY, NEW YORK

Well ID	NYSDEC	MW-10 / MW-10R										
Sample ID	Class GA	HJB-MW-10	HJB-MW-10	HJB-MW-10	HJB-MW-10R	HJB-MW-10R	HJB-MW-10R	HJB-MW-10R	DUP-082713	HJB-MW-10R	HJB-MW-10R	HJB-MW-10R
Duplicate	Standard or											
Sampling Date	Guidance Value	7/27/2006	10/30/2006	6/14/2011	9/12/2011	7/18/2012	2/13/2013	8/27/2013	8/27/2013	2/11/2014	8/22/2014	3/5/2015
Matrix		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs												
1,1,1,2-Tetrachloroethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Disulfide		17	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	1 J	5 U	1.2 BJ	1.3 BJ	5 U	5 U	5 U
cis-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachlorobutadiene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iodomethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Isopropylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl tert-butyl ether	10	5 U	1 J	5 U	5 U	0.66 J	5 U	0.53 J	0.54 J	5 U	5 U	5 U
Methylene Chloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5	5 U	5 U	1.6 J	**160 D**	**2,300 D**	**300 D**	**77**	**76**	**51**	**120**	**110**
trans-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	1.4 J	**24**	**5.6 DJ**	2.7 BJ	2.7 BJ	5 U	1.7 J	1.5 J
Trichlorofluoromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl acetate		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	2	5 U	5 U	5 U	5 U	5 U	5 U	0.66 J	0.66 J	5 U	5 U	5 U

Notes

- Concentration exceeds NYSDEC Class GA Standard

U - The compound was not detected at the indicated concentratio
J - Compound detected below the reporting limit or is estimated
E - Concentration exceeded the calibration range.
N - Positively identified TICS.
B - The analyte was found in the method blank as well as sample.
D - Concentration was obtained from a diluted analysis.
NA - Not Analyzed.

TABLE 4
SUMMARY OF DETECTED VOCS IN GROUNDWATER
HENRY JOHNSON BOULEVARD PROPERTIES ERP
CITY OF ALBANY, NEW YORK

Well ID	NYSDEC	MW-11 / MW-11R											
Sample ID	Class GA Standard or Guidance Value	HJB-MW-11	HJB-MW-11	HJB-MW-11R	HJB-MW-11R	HJB-MW-11R	HJB-MW-11R	HJB-MW-11R	HJB-MW-11R	HJB-MW-11R	HJB-MW-11R	HJB-MW-11R	HJB-MW-11R
Duplicate													
Sampling Date		7/27/2006	10/30/2006	7/5/2007	6/14/2011	9/13/2011	7/18/2012	2/13/2013	8/27/2013	2/11/2014	8/22/2014	3/5/2015	11/5/2015
Matrix		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs													
1,1,1,2-Tetrachloroethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Disulfide		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachlorobutadiene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iodomethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Isopropylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl tert-butyl ether	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene Chloride	5	5 U	5 U	5 U	1.4 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5	5 U	4 J	5 U	5 U	1.4 J	5 U	5 U	5 U	5 U	1.5 J	3.3 J	5 U
trans-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl acetate		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	2	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Notes

- Concentration exceeds NYSDEC Class GA Standard

U - The compound was not detected at the indicated concentratio
J - Compound detected below the reporting limit or is estimated
E - Concentration exceeded the calibration range.
N - Positively identified TICS.
B - The analyte was found in the method blank as well as sample.
D - Concentration was obtained from a diluted analysis.
NA - Not Analyzed.

TABLE 4
SUMMARY OF DETECTED VOCS IN GROUNDWATER
HENRY JOHNSON BOULEVARD PROPERTIES ERP
CITY OF ALBANY, NEW YORK

Well ID	NYSDEC	MW-12				
Sample ID	Class GA	HJB-MW-12	HJB-MW-12	HJB-MW-12	HJB-MW-12	HJB-MW-12
Duplicate	Standard or					
Sampling Date	Guidance Value	7/27/2006	10/30/2006	6/14/2011	7/18/2012	2/13/2013
Matrix		WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs						
1,1,1,2-Tetrachloroethane		5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane		5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U
Acetone	50	5 U	5 U	5.3	5 U	3.1 J
Benzene	1	5 U	5 U	5 U	5 U	5 U
Carbon Disulfide		5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U
Chloroethane	5	5 U	5 U	5 U	5 U	5 U
Chloroform	7	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	50	5 U	5 U	5 U	5 U	5 U
Dibromomethane		5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane		5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U
Hexachlorobutadiene		5 U	5 U	5 U	5 U	5 U
Iodomethane		5 U	5 U	5 U	5 U	5 U
Isopropylbenzene	5	5 U	5 U	5 U	5 U	5 U
m,p-Xylene	5	5 U	5 U	5 U	5 U	5 U
Methyl tert-butyl ether	10	5 U	5 U	5 U	5 U	5 U
Methylene Chloride	5	5 U	5 U	5 U	5 U	5 U
Naphthalene	10	5 U	5 U	3.4 J	5 U	5 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	2.3 J
trans-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane	5	5 U	5 U	5 U	5 U	5 U
Vinyl acetate		5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	2	5 U	5 U	5 U	5 U	5 U

Notes
- Concentration exceeds NYSDEC Class GA Standard
U - The compound was not detected at the indicated concentratio
J - Compound detected below the reporting limit or is estimated
E - Concentration exceeded the calibration range.
N - Positively identified TICS.
B - The analyte was found in the method blank as well as sample.
D - Concentration was obtained from a diluted analysis.
NA - Not Analyzed.

TABLE 4
SUMMARY OF DETECTED VOCS IN GROUNDWATER
HENRY JOHNSON BOULEVARD PROPERTIES ERP
CITY OF ALBANY, NEW YORK

Well ID	NYSDEC	MW-13									
Sample ID	Class GA Standard or Guidance Value	HJB-MW-13	HJB-MW-13	HJB-MW-13	HJB-MW-13	HJB-MW-13	HJB-MW-13	HJB-MW-13	HJB-MW-13	HJB-MW-13	HJB-MW-13
Duplicate											
Sampling Date		7/28/2006	10/31/2006	6/14/2011	7/18/2012	2/13/2013	8/27/2013	2/11/2014	8/22/2014	3/5/2015	11/5/2015
Matrix		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs											
1,1,1,2-Tetrachloroethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Disulfide		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachlorobutadiene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iodomethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Isopropylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl tert-butyl ether	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene Chloride	5	5 U	5 U	5 U	5 U	5 U	1 J	5 U	5 U	5 U	5 U
Naphthalene	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5	5 U	5 U	5 U	0.95 J	1.3 J	5 U	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl acetate		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	2	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Notes
- Concentration exceeds NYSDEC Class GA Standard
U - The compound was not detected at the indicated concentratio
J - Compound detected below the reporting limit or is estimated
E - Concentration exceeded the calibration range.
N - Positively identified TICS.
B - The analyte was found in the method blank as well as sample.
D - Concentration was obtained from a diluted analysis.
NA - Not Analyzed.

TABLE 4
SUMMARY OF DETECTED VOCS IN GROUNDWATER
HENRY JOHNSON BOULEVARD PROPERTIES ERP
CITY OF ALBANY, NEW YORK

Well ID	NYSDEC	MW-14									
Sample ID	Class GA	HJB-MW-14	HJB-MW-14	HJB-MW-14	HJB-MW-14	HJB-MW-14	HJB-MW-14	HJB-MW-14	HJB-MW-14	HJB-MW-14	HJB-MW-14
Duplicate	Standard or										
Sampling Date	Guidance Value	7/28/2006	11/1/2006	6/14/2011	7/18/2012	2/13/2013	8/27/2013	2/11/2014	8/22/2014	3/5/2015	11/5/2015
Matrix		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs											
1,1,1,2-Tetrachloroethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	50	5 U	5 U	12	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Disulfide		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachlorobutadiene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iodomethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Isopropylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl tert-butyl ether	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene Chloride	5	5 U	5 U	5 U	5 U	5 U	0.62 J	5 U	5 U	5 U	5 U
Naphthalene	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	1.2 J	5 U	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl acetate		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	2	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Notes
- Concentration exceeds NYSDEC Class GA Standard
U - The compound was not detected at the indicated concentratio
J - Compound detected below the reporting limit or is estimated
E - Concentration exceeded the calibration range.
N - Positively identified TICS.
B - The analyte was found in the method blank as well as sample.
D - Concentration was obtained from a diluted analysis.
NA - Not Analyzed.

TABLE 4
SUMMARY OF DETECTED VOCS IN GROUNDWATER
HENRY JOHNSON BOULEVARD PROPERTIES ERP
CITY OF ALBANY, NEW YORK

Well ID	NYSDEC	MW-22 / MW-22R											
Sample ID	Class GA Standard or Guidance Value	HJB-MW-22	HJB-MW-22R	HJB-MW-22R	DUP 071812	HJB-MW-22R	HJB-MW-22R	HJB-MW-22R	DUP 021114	HJB-MW-22R	DUP MW-X	HJB-MW-22R	DUP-01-030515
Duplicate													
Sampling Date		6/14/2011	9/12/2011	7/18/2012	7/18/2012	2/13/2013	8/27/2013	2/11/2014	2/11/2014	8/22/2014	8/22/2014	3/5/2015	3/5/2015
Matrix		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs													
1,1,1,2-Tetrachloroethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
1,1-Dichloroethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U	0.61 J	0.69 J	1.9 J	1.8 J	1.3 J	1.9 J	250 U	250 U
Acetone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Benzene	1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Carbon Disulfide		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Chloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Chloroform	7	5 U	0.72 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
cis-1,2-Dichloroethene	5	5 U	3.2 J	**33**	**40**	3.6 J	**20**	**40**	**39**	**52**	**55**	**55 J**	250 U
cis-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Dibromochloromethane	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Dibromomethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Dichlorodifluoromethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Hexachlorobutadiene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Iodomethane		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Isopropylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
m,p-Xylene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Methyl tert-butyl ether	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Methylene Chloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Naphthalene	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Tetrachloroethene	5	**9.3**	**160**	**2,600 D**	**3,100 D**	**2,700 D**	**4,100 D**	**7,100 D**	**7,000 D**	**4,500 D**	**4,800 D**	**5,900**	**6,100**
trans-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
trans-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Trichloroethene	5	5 U	**11**	**90**	**110**	**50**	**99**	**140**	**140**	**140**	**150**	**91 J**	**85 J**
Trichlorofluoromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Vinyl acetate		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	250 U	250 U
Vinyl Chloride	2	5 U	5 U	5 U	5 U	5 U	5 U	1.2 J	1.1 J	2 J	2 J	250 U	250 U

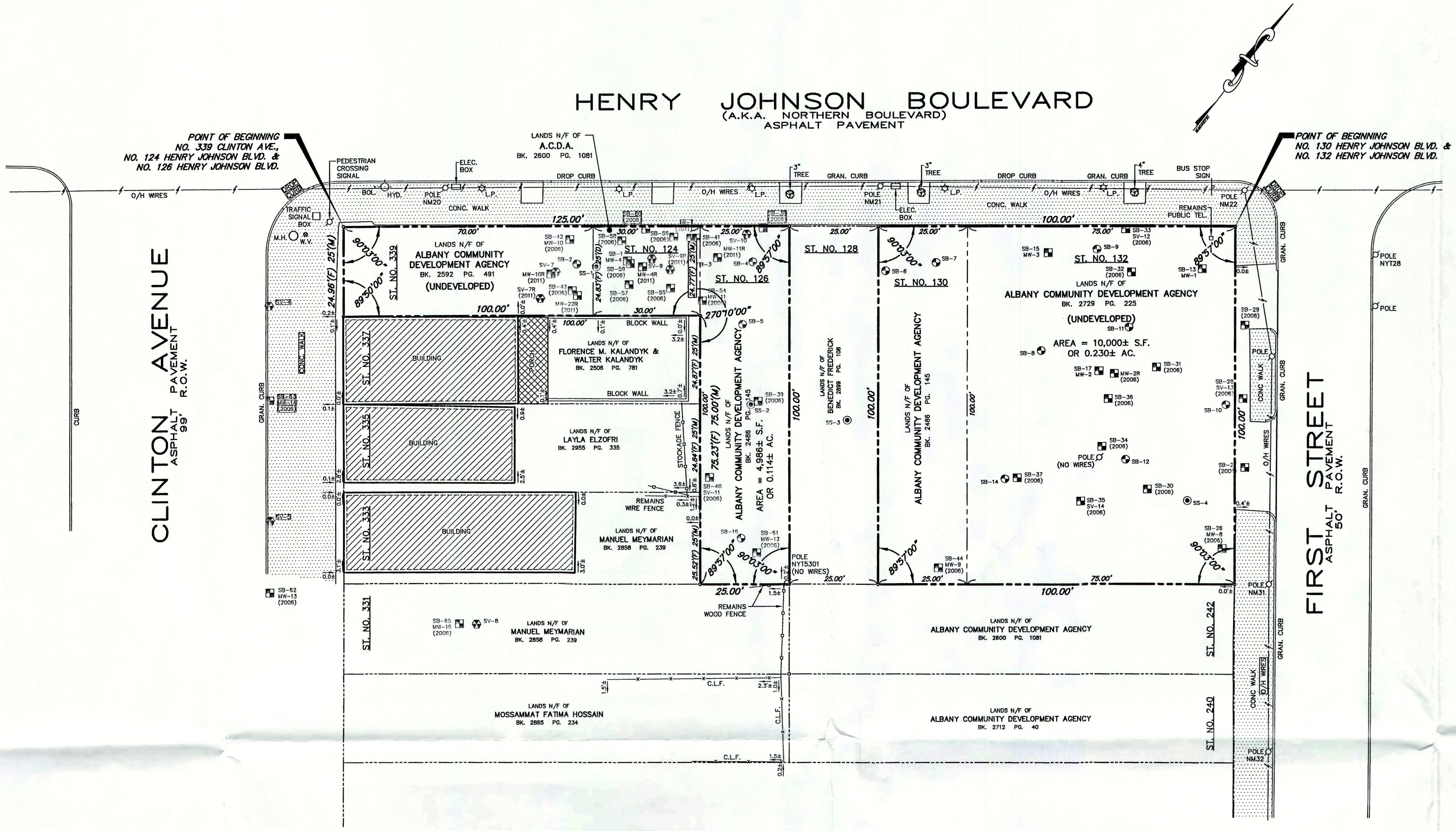
Notes

- Concentration exceeds NYSDEC Class GA Standard

U - The compound was not detected at the indicated concentratio
J - Compound detected below the reporting limit or is estimated
E - Concentration exceeded the calibration range.
N - Positively identified TICS.
B - The analyte was found in the method blank as well as sample.
D - Concentration was obtained from a diluted analysis.
NA - Not Analyzed.

APPENDIX A –METES AND BOUNDS

Environmental Easement is provided as an appendix to the Final Engineering Report

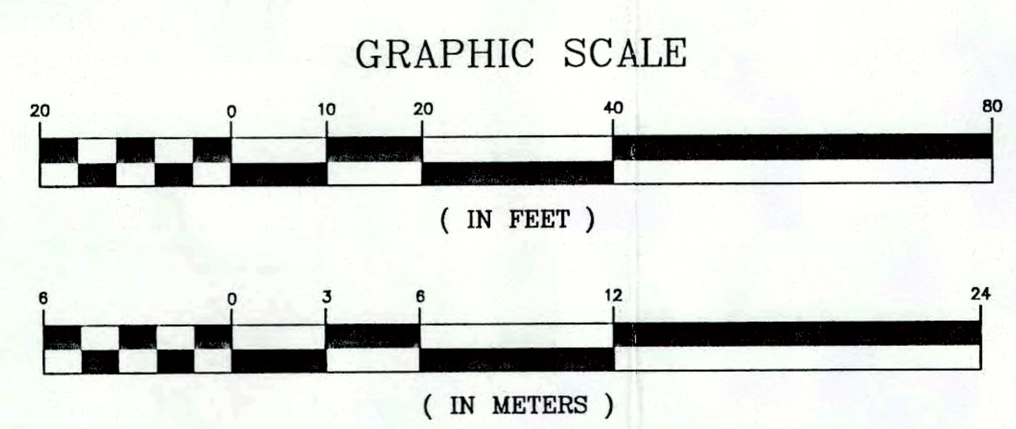


SITE LOCATION MAP

SCALE : 1" = 2000'

LEGEND

- PROPERTY LINE
- CURB
- M.H. — MANHOLE
- HYD. — HYDRANT
- W.V. — WATER VALVE
- BOL. — BOLLARD
- POLE — UTILITY POLE
- L.P. — LIGHT POLE
- OVERHEAD WIRES
- SIGN
- STOCKADE FENCE
- REMAINS OF WOOD FENCE
- CHAIN LINK FENCE
- REMAINS OF WIRE FENCE
- SB-16 — SOIL BORING LOCATION
- SS-3 — SOIL SAMPLING LOCATION
- SB-15 MW-3 — MONITORING WELL LOCATION
- SS1 — SOIL SAMPLE LOCATION (LOCATED AUGUST 16, 2006)
- SB-17 MW-8 (2006) — SOIL BORING/MONITORING WELL LOCATION (LOCATED AUGUST 16, 2006)
- SV-1 — SOIL VAPOR POINT (LOCATED AUGUST 16, 2006)
- MW-11R (2011) — MONITORING WELL LOCATION (LOCATED DECEMBER 16, 2011)
- SV-9R (2011) — SOIL VAPOR POINT (LOCATED DECEMBER 16, 2011)
- IW-1R (2011) — INJECTION WELL LOCATION (LOCATED DECEMBER 16, 2011)



ENVIRONMENTAL EASEMENT DESCRIPTION – ERP Site No. E401049

LEGAL DESCRIPTION

Street No. 339 Clinton Avenue and Nos. 124–126 Henry Johnson Boulevard, City of Albany, NY

All that piece or parcel of land situate, lying and being located in the City of Albany, County of Albany and State of New York, being more particularly bounded and described as follows:

Beginning at a point in the southeasterly line of Henry Johnson Boulevard at its intersection with the northeasterly line of Clinton Avenue; running thence northeasterly along the southeasterly line of Henry Johnson Boulevard for a distance of 125.00' to a point; thence southeasterly along a line forming an interior angle of 89°–57'–00" with the last course, 100.00' to a point; thence southwesterly along a line forming an interior angle of 90°–03'–00" with the last course, 25.00' to a point; thence northwesterly along a line forming an interior angle of 89°–57'–00" with the last course, 75.23' to a point; thence southwesterly along a line forming an interior angle of 270°–10'–00" with the last course, 100.00' to a point in the northeasterly line of Clinton Avenue; thence northwesterly along the northeasterly line line of Clinton Avenue forming an interior angle of 89°–50'–00" with the last course, 24.96' to the point or place of beginning, said last course forming an interior angle of 90°–03'–00" with the first herein described course, and containing 4,986± square feet or 0.114 Acres, more or less. Henry Johnson Boulevard referenced herein was formerly known as Northern Boulevard and also Knox Street.

Subject to all rights, easements, covenants and restrictions of record.

Subject to any state of facts an up to date Abstract of Title would disclose

Street Nos. 130–132 Henry Johnson Boulevard, City of Albany, NY

All that piece or parcel of land situate, lying and being located in the City of Albany, County of Albany and State of New York, being more particularly bounded and described as follows:

Beginning at a point in the southeasterly line of Henry Johnson Boulevard at its intersection with the southwesterly line of First Street; running thence southwesterly along the southeasterly line of Henry Johnson Boulevard for a distance of 100.00' to a point; thence southeasterly along a line forming an interior angle of 90°–03'–00" with the last course, 100.00' to a point; thence southwesterly along a line forming an interior angle of 89°–57'–00" with the last course, 100.00' to a point in the southwesterly line of First Street; thence northeasterly along the southwesterly line of First Street forming an interior angle of 90°–03'–00" with the last course, 100.00' to the point or place of beginning, said last courselast course forming an interior angle of 89°–57'–00" with the first herein described course, and containing 10,000± square feet or 0.230 Acres, more or less. Henry Johnson Boulevard referenced herein was formerly known as Northern Boulevard and also Knox Street.

Subject to all rights, easements, covenants and restrictions of record.

Subject to any state of facts an up to date Abstract of Title would disclose

TOTAL ENVIRONMENTAL EASEMENT AREA = 14,986± sq. ft. = 0.344± acres

NOTES:

1. BOUNDARY EVIDENCE SHOWN HEREON WAS COMPILED FROM AN ACTUAL FIELD SURVEY CONDUCTED ON JULY 21, 2004, UPDATED FEB. 3 & 4, 2005 AND LAST UPDATED DEC. 20, 2011 AND REFLECTS VISIBLE CONDITIONS EXISTING AT THOSE OCCASIONS.
2. TAX MAP DESIGNATION: 65.64–5–1, 2, 4, 5 & 23
3. THE OFFSETS OR DIMENSIONS SHOWN HEREON, FROM PROPERTY LINES TO BUILDINGS ARE FOR BUILDING REFERENCE AND LOCATION AND ARE NOT INTENDED TO MONUMENT THE PROPERTY LINES OR TO GUIDE THE ERECTION OF FENCES, ADDITIONAL STRUCTURES, OR ANY OTHER IMPROVEMENT.
4. SUBJECT TO ALL RIGHTS, EASEMENTS, COVENANTS AND RESTRICTIONS OF RECORD.
5. SUBJECT TO ANY STATE OF FACTS AN UP–TO–DATE ABSTRACT OF TITLE WOULD DISCLOSE.
6. ALBANY COUNTY CLERK'S OFFICE RECORDS WERE SEARCHED FOR EASEMENTS OF RECORD FOR A PERIOD OF A MINIMUM OF 40 YEARS IN THE PAST. NO EASEMENTS OF RECORD FOUND.
7. THE LOCATION OF UNDERGROUND IMPROVEMENTS OR ENCROACHMENTS, IF ANY EXIST OR ARE SHOWN HEREON, ARE NOT CERTIFIED.
8. EASEMENTS FOR SURFACE AND SUB–SURFACE UTILITIES AND STRUCTURES WHETHER RECORDED OR UNRECORDED ARE NOT WARRANTIED UNLESS PHYSICALLY EVIDENT ON THE PREMISES AT THE TIME OF THE SURVEY.
9. (D) DENOTES DEED.
   (F) DENOTES FIELD.
   (M) DENOTES MAP.

MAP REFERENCES:

1. "MAP OF PROPERTY IN THE CITY OF ALBANY AND TOWN OF WATERVLIET BELONGING TO WILLIAM B. SCOTT, AS SUBDIVIDED BY R.H. BINGHAM, CITY SURVEYOR, 1868," PREPARED BY THEODORE G. HAILER, AND FILED IN THE ALBANY COUNTY CLERK'S OFFICE ON JUNE 4TH, 1868, AS MAP 178 9–1/2 A.

THE INSTITUTIONAL CONTROLS FOR THIS EASEMENT ARE SET FORTH IN THE SITE MANAGEMENT PLAN (SMP). A COPY OF THE SMP MUST BE OBTAINED BY ANY PARTY WITH AN INTEREST IN THE PROPERTY. THE SMP CAN BE OBTAINED FROM ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NEW YORK, 12233 OR AT derweb@gw.dec.state.ny.us

THIS SURVEY, SUBJECT TO ALL NOTES CONTAINED HEREON, IS CERTIFIED TO THE FOLLOWING LISTED PARTIES AS BEING THE RESULTS OF A FIELD SURVEY AND CORRELATION OF FIELD EVIDENCE WITH MAPS AND DEEDS OF RECORD.

- PEOPLE OF THE STATE OF NEW YORK ACTING THROUGH ITS COMMISSIONER OF THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

CERTIFICATIONS INDICATED HEREON SIGNIFY THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE EXISTING CODE OF PRACTICE FOR LAND SURVEYS ADOPTED BY THE NEW YORK STATE ASSOCIATION OF PROFESSIONAL LAND SURVEYORS, INC. SAID CERTIFICATIONS SHALL RUN ONLY TO THE PERSON FOR WHOM THIS SURVEY HAS BEEN PREPARED AND ON THEIR BEHALF TO THE TITLE COMPANY, GOVERNMENTAL AGENCY AND/OR LENDING INSTITUTION LISTED HEREON AND TO THE ASSIGNEES OF THE LENDING INSTITUTION. CERTIFICATIONS ARE NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS OR SUBSEQUENT OWNERS.

UNAUTHORIZED ALTERATION OR ADDITION TO A SURVEY MAP BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209, SUB–DIVISION 2, OF THE NEW YORK STATE EDUCATION LAW.

ONLY COPIES FROM THE ORIGINAL OF THIS SURVEY MARKED WITH AN ORIGINAL OF THE LAND SURVEYOR'S EMBOSSED SEAL SHALL BE CONSIDERED VALID TRUE COPIES.

ERP – SITE NO. E401049

Rev no	Date	Description	By
A	02/09/12	REVISED PER N.Y.S.D.E.C. COMMENTS	J.P.P.

REVISIONS

L. SIPPERLY & ASSOCIATES
ENGINEERS • SURVEYORS • LAND PLANNERS
698 TROY–SCHENECTADY ROAD, LATHAM, N.Y. 12110
PHONE: (518) 782–1800 FAX: (518) 782–1252

LICENSED LAND SURVEYOR · LYNN T. SIPPERLY · STATE OF NEW YORK · 47421

9/10/15
Date

DESIGNED BY:	
DRAWN BY:	EN./J.P.P.
CHECKED BY:	J.P.P./L.T.S.
APPROVED BY:	L.T.S.
SCALE:	1" = 20'
DATE:	JAN. 12, 2012

BOUNDARY SURVEY OF LANDS

KNOWN AS

NO. 339 CLINTON AVE. & NO. 124 & 126 HENRY JOHNSON BLVD. & NO. 130 & 132 HENRY JOHNSON BLVD.

CITY OF ALBANY

COUNTY OF ALBANY — STATE OF NEW YORK

SHEET NUMBER 1

1 OF 1

REV. NO.	DWG. NO.
A	D–12002

APPENDIX B – LIST OF SITE CONTACTS

Name	Phone/Email Address
Luis Perez, ACDA	(518) 434-5298; perezl@ci.albany.ny.us
Stefan Bagnato, ARCADIS	(518) 250-7300; stefan.bagnato@arcadis.com
Larry Alden, NYSDEC PM	518-402-9767; larry.alden@dec.ny.gov
Jim Quinn, NYSDEC Region 4 Regional HW Engineer	518-357-2273; james.quinn@dec.ny.gov

APPENDIX C – REPRESENTATIVE SITE-SPECIFIC BORING LOGS AND WELL CONSTRUCTION LOGS

MALCOLM PIRNIE	TEST BORING LOG	BORING No.SB78/MW6R

PROJECT	Henry Johnson Boulevard	LOCATION	Albany, NY			SHEET 1 OF 1
CLIENT						PROJECT No. 4279009
DRILLING CONTRACTOR	Aztech					MEAS. PT. ELEV.
PURPOSE	Remedial Investigation					GROUND ELEV.
WELL MATERIAL						DATUM
DRILLING METHOD(S)	Geoprobe		SAMPLE	CORE	CASING	DATE STARTED 6/19/07
DRILL RIG TYPE	Truck	TYPE			PVC	DATE FINISHED 6/18/07
GROUND WATER DEPTH	6.5'	DIA.	"		2	DRILLER Chris
MEASURING POINT		WEIGHT	#			PIRNIE STAFF J. Wyckoff
DATE OF MEASUREMENT	6/19/07	FALL	"			

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. DEPTH	WELL Constr.	REMARKS
					Brown v. fine SAND, Coal, Ash, Brick, Gravel.			
2	3		0		Brown SILT & CLAY, moist, firm, cohesive.	2.0		1.5
4					Brick, Ash.	4.0		4.0
6	1.5		0					5.0
					Brown SILT & CLAY, v. firm, cohesive, wet @ 6.5'.	7.0		Collect sample 6'-8' bgs.
8					SAA, more plastic.	8.0		
10	2		0					
12					Brown/Green v. fine SAND.	11.5		
					Tan/Green CLAY, mottled, v. firm, cohesive.	12.0		
14	<1		0					15.0
								15.5
16						16.0		

MALCOLM PIRNIE	TEST BORING LOG	BORING No. SB42/MW10

PROJECT	Henry Johnson Boulevard	LOCATION	Albany, NY		SHEET	1 OF 1
CLIENT					PROJECT No.	4279009
DRILLING CONTRACTOR	Aztech				MEAS. PT. ELEV.	
PURPOSE	Remedial Investigation				GROUND ELEV.	
WELL MATERIAL					DATUM	
DRILLING METHOD(S)	Geoprobe		SAMPLE	CORE	CASING	DATE STARTED 6/13/06
DRILL RIG TYPE	Truck	TYPE			PVC	DATE FINISHED 6/13/06
GROUND WATER DEPTH	7.0'	DIA.	"		2	DRILLER Chris
MEASURING POINT		WEIGHT	#			PIRNIE STAFF J. Wyckoff
DATE OF MEASUREMENT	6/13/06	FALL	"			

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. DEPTH	WELL Constr.	REMARKS
					Dark brown med-coarse sand, pea gravel, loose, moist.			0.5
								1.5
2	2		0		Brick, brown clay, firm, moist, cohesive.	2.0		
4					Gray/brown clay, firm, cohesive.	4.0		
6	3.5		0					▼ Collected sample 6-7' bgs
8					SAA.	8.0		
10	3		0					
12						12.0		12.0

MALCOLM PIRNIE	TEST BORING LOG	BORING No. SB54/MW11

PROJECT	Henry Johnson Boulevard	LOCATION	Albany, NY			SHEET 1 OF 1
CLIENT						PROJECT No. 4279009
DRILLING CONTRACTOR	Aztech					MEAS. PT. ELEV.
PURPOSE	Remedial Investigation					GROUND ELEV.
WELL MATERIAL						DATUM
DRILLING METHOD(S)	Geoprobe		SAMPLE	CORE	CASING	DATE STARTED 6/15/06
DRILL RIG TYPE	Truck	TYPE			PVC	DATE FINISHED 6/15/06
GROUND WATER DEPTH	6.0'	DIA.	"		2	DRILLER Chris
MEASURING POINT		WEIGHT	#			PIRNIE STAFF J. Wyckoff
DATE OF MEASUREMENT	6/15/06	FALL	"			

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. / DEPTH	WELL Constr.	REMARKS
					Brown fine-med sand and silt, some clay, brick, slightly cohesive, moist.	0.5		
						1.5		
2	3		0		Ash, asphalt, brick.	1.5		
					Brown clay, mottled, firm, moist, cohesive, some organics.	3.0		
4					Brown silt and fine sand, slightly cohesive.	4.0		
6	3		0		Brown/gray clay, firm, moist, cohesive.	6.0		▼ Collected sample 5-6' bgs
8					SAA.	8.0		
10	3		0					
12						12.0		12.0 Collected sample 11-12' bgs

MALCOLM PIRNIE

TEST BORING LOG

BORING No. SB61/MW12

PROJECT	Henry Johnson Boulevard	LOCATION	Albany, NY	SHEET	1 OF 1
CLIENT				PROJECT No.	4279009
DRILLING CONTRACTOR	Aztech			MEAS. PT. ELEV.	
PURPOSE	Remedial Investigation			GROUND ELEV.	
WELL MATERIAL				DATUM	
DRILLING METHOD(S)	Geoprobe		SAMPLE / CORE / CASING	DATE STARTED	6/20/06
DRILL RIG TYPE	Truck	TYPE	/ / PVC	DATE FINISHED	6/20/06
GROUND WATER DEPTH	10.0'	DIA.	" / / 2	DRILLER	Chris
MEASURING POINT		WEIGHT	#	PIRNIE STAFF	J. Wyckoff
DATE OF MEASUREMENT	6/20/06	FALL	"		

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION (KEY - Color, Major, Minor Moisture, Etc.)	ELEV. DEPTH	WELL Constr.	REMARKS
2	2.5		0		Dark brown/black, fine-med sand, silt, trace clay, moist.		2.0	
					Brown silt and clay, mottled, moist, cohesive.	2.0		Collected sample 0-2' bgs
4							4.0	
6	3		0		Brown clay, moist, firm, cohesive, mottled.	4.0		
8					SAA.	8.0		
10	2		0		Brown clay, some very fine brown-sand and silty zones.	10.0		Collected sample 9-11' bgs
12					Gray very fine sand and silt.	12.0		
					Gray/brown clay, mottled, firm, cohesive.	13.0		
14	2.5		0				15.0	
16						16.0		

MALCOLM PIRNIE

TEST BORING LOG

BORING No. SB62/MW13

PROJECT	Henry Johnson Boulevard	LOCATION	Albany, NY	SHEET	1 OF 1
CLIENT				PROJECT No.	4279009
DRILLING CONTRACTOR	Aztech			MEAS. PT. ELEV.	
PURPOSE	Remedial Investigation			GROUND ELEV.	
WELL MATERIAL				DATUM	
DRILLING METHOD(S)	Geoprobe		SAMPLE / CORE / CASING	DATE STARTED	6/21/06
DRILL RIG TYPE	Truck	TYPE	/ / PVC	DATE FINISHED	6/21/06
GROUND WATER DEPTH	6.0'	DIA.	" / / 2	DRILLER	Chris
MEASURING POINT		WEIGHT	#	PIRNIE STAFF	J. Wyckoff
DATE OF MEASUREMENT	6/21/06	FALL	"		

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. / DEPTH	WELL Constr.	REMARKS
					Refusal (Interval was removed with augers).			0.5 1.0
2	2		0		Brown medium-coarse sand and pea gravel, loose, some brick.	2.0		
4					Brown fine sand and silt, some clay, moist, cohesive.	3.5		
					SAA, some brick, coal.	4.0		
6	3		0					▼ Collected sample 5-7' bgs
					SAA, with no brick or coal.	7.0		
8					SAA, with Increased clay content, less silt and sand.	8.0		
10	3		0		Brown clay, mottled, moist, firm, cohesive.	10.0		
12						12.0		12.0

MALCOLM PIRNIE	TEST BORING LOG	BORING No. SB63/MW14

PROJECT	Henry Johnson Boulevard	LOCATION	Albany, NY		SHEET	1 OF 1
CLIENT					PROJECT No.	4279009
DRILLING CONTRACTOR	Aztech				MEAS. PT. ELEV.	
PURPOSE	Remedial Investigation				GROUND ELEV.	
WELL MATERIAL					DATUM	
DRILLING METHOD(S)	Geoprobe		SAMPLE	CORE	CASING	DATE STARTED 6/21/06
DRILL RIG TYPE	Truck	TYPE			PVC	DATE FINISHED 6/21/06
GROUND WATER DEPTH	6.0'	DIA.	"		2	DRILLER Chris
MEASURING POINT		WEIGHT	#			PIRNIE STAFF J. Wyckoff
DATE OF MEASUREMENT	6/21/06	FALL	"			

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. / DEPTH	WELL Constr.	REMARKS
					Concrete @ surface (refusal)	0.5		
						1.5		
2			0					
4					Brown clay, mottled, firm, moist, cohesive.	4.0		
6	2.5		0					Collected sample 6-8' bgs
					Brown fine sand and silt, saturated, loose.	7.0		
8					Brown clay, mottled, firm, cohesive, moist.	7.5		
					SAA, occasional pea size gravel (drop stone?).	8.0		
10	3		0					
12						12.0		

MALCOLM PIRNIE	TEST BORING LOG	BORING No. SB65/MW16

PROJECT	Henry Johnson Boulevard	LOCATION	Albany, NY			SHEET 1 OF 1
CLIENT						PROJECT No. 4279009
DRILLING CONTRACTOR	Aztech					MEAS. PT. ELEV.
PURPOSE	Remedial Investigation					GROUND ELEV.
WELL MATERIAL						DATUM
DRILLING METHOD(S)	Geoprobe		SAMPLE	CORE	CASING	DATE STARTED 7/12/06
DRILL RIG TYPE	Truck	TYPE			PVC	DATE FINISHED 7/12/06
GROUND WATER DEPTH	6.0'	DIA.	"		2	DRILLER Chris
MEASURING POINT		WEIGHT	#			PIRNIE STAFF J. Wyckoff
DATE OF MEASUREMENT	7/12/06	FALL	"			

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. / DEPTH	WELL Constr.	REMARKS
2	1		0		Top 0.5' dark brown fine sand and silt, pea gravel, loose, moist, brick. Bottom 0.5' tank fine sand and silt, gravel, paint chips, glass, some gray/brown clay, moist, slightly cohesive.			0.5 1.5
4					Tan/gray clay, mottled, firm, cohesive.	4.0		
6	3.5		0		Tan/gray clay and silt, cohesive, clay is mottled gray/tan, clay is more gray.	6.0		Collected sample 5-7' bs
8					Gray clay, some silty zones (brown silt), clay is cohesive, plastic.	8.0		
10	2.5		0					Collected sample 10-12' bgs
12						12.0		12.0

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TEST BORING LOG

BORING No.SB-87

PROJECT **HJB Properties**	LOCATION **Albany, NY**	SHEET **1** OF **1**	
CLIENT **Albany Community Development Agency**		PROJECT No. **04279009.0000**	
DRILLING CONTRACTOR **Precision Environmental Services Inc.**		MEAS. PT. ELEV.	
PURPOSE **Supplemental Soil Sampling**		GROUND ELEV.	
WELL MATERIAL		DATUM	
DRILLING METHOD(S) **Direct Push**	SAMPLE / CORE / CASING	DATE STARTED **10/27/14**	
DRILL RIG TYPE **Geoprobe**	TYPE	DATE FINISHED **10/27/14**	
GROUND WATER DEPTH **8.0'**	DIA. **"**	DRILLER **Michael Dudley**	
MEASURING POINT	WEIGHT **#**	PIRNIE STAFF **A.Goodrich**	
DATE OF MEASUREMENT	FALL **"**		

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. DEPTH	WELL Constr.	REMARKS
			0.3		FILL, little cobbles, little brick. Dry.			
2			0.2					
			0.2					
			0.3		Brown coarse to medium SAND and CLAY, little brick. Moist.	3.0		
4			0.2					
					No Recovery.	5.0		
6			0.2		Brown-gray CLAY, some brick, trace silt. Moist.	6.0		
			0.2		Brown-gray CLAY, some brick, trace silt. Wet.	7.0		Sample SB-87 (7'-8') submitted for VOCs analysis. MS/MSD collected.
8					No Recovery.	8.0		
10					Gray CLAY. Saturated.	10.0		
			0.2					
12						12.0		End of boring.

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TEST BORING LOG

BORING No.SB-88

PROJECT **HJB Properties**	LOCATION **Albany, NY**	SHEET **1** OF **1**	
CLIENT **Albany Community Development Agency**		PROJECT No. **04279009.0000**	
DRILLING CONTRACTOR **Precision Environmental Services Inc.**		MEAS. PT. ELEV.	
PURPOSE **Supplemental Soil Sampling**		GROUND ELEV.	
WELL MATERIAL		DATUM	
DRILLING METHOD(S) **Direct Push**	SAMPLE / CORE / CASING	DATE STARTED **10/27/14**	
DRILL RIG TYPE **Geoprobe**	TYPE	DATE FINISHED **10/27/14**	
GROUND WATER DEPTH **5.0'**	DIA. **"**	DRILLER **Michael Dudley**	
MEASURING POINT	WEIGHT **#**	PIRNIE STAFF **A.Goodrich**	
DATE OF MEASUREMENT	FALL **"**		

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. DEPTH	WELL Constr.	REMARKS
			0.9		Brown FILL and NATIVE SOIL, little cobbles, little brick. Dry.			
			0.4					
2			0.6		Brown CLAY, little silt. Moist.	2.0		
			0.5					
4			0.3		Brown CLAY, little silt. Wet.	4.0		Sample SB-88 (4'-5') submitted for VOCs analysis. DUP collected.
			0.4					
6			0.7					
			0.4					
8					No Recovery.	8.0		
10			0.1		Gray CLAY. Saturated.	10.5		
			0.5					
12						12.0		End of boring.

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TEST BORING LOG

BORING No.SB-89

PROJECT **HJB Properties**	LOCATION **Albany, NY**				SHEET **1** OF **1**
CLIENT **Albany Community Development Agency**					PROJECT No. **04279009.0000**
DRILLING CONTRACTOR **Precision Environmental Services Inc.**					MEAS. PT. ELEV.
PURPOSE **Supplemental Soil Sampling**					GROUND ELEV.
WELL MATERIAL					DATUM
DRILLING METHOD(S) **Direct Push**		SAMPLE	CORE	CASING	DATE STARTED **10/27/14**
DRILL RIG TYPE **Geoprobe**	TYPE				DATE FINISHED **10/27/14**
GROUND WATER DEPTH **6.0'**	DIA.	"			DRILLER **Michael Dudley**
MEASURING POINT	WEIGHT	#			PIRNIE STAFF **A.Goodrich**
DATE OF MEASUREMENT	FALL	"			

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. DEPTH	WELL Constr.	REMARKS
2			0.2		Brown FILL and NATIVE SOIL, little cobbles, little gravel. Moist.			
			0.4					
4					No Recovery.	4.0		
			0.6		Brown fine to medium GRAVELLY SAND and CLAY. Wet.	5.0		Sample SB-89 (5'-6') submitted for VOCs analysis.
6			0.3		Gray CLAY. Wet.	6.0		
			0.5					
8					No Recovery.	8.0		
10								
			978.6		Gray CLAY. Saturated.	11.0		
12						12.0		End of boring.

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TEST BORING LOG

BORING No.SB-90

PROJECT	**HJB Properties**	LOCATION	**Albany, NY**	SHEET	**1** OF **1**
CLIENT	**Albany Community Development Agency**			PROJECT No.	**04279009.0000**
DRILLING CONTRACTOR	**Precision Environemental Services Inc.**			MEAS. PT. ELEV.	
PURPOSE	**Supplemental Soil Sampling**			GROUND ELEV.	
WELL MATERIAL				DATUM	
DRILLING METHOD(S)	**Direct Push**	SAMPLE	CORE / CASING	DATE STARTED	**10/27/14**
DRILL RIG TYPE	**Geoprobe**	TYPE		DATE FINISHED	**10/27/14**
GROUND WATER DEPTH	**5.0'**	DIA.	"	DRILLER	**Michael Dudley**
MEASURING POINT		WEIGHT	#	PIRNIE STAFF	**A.Goodrich**
DATE OF MEASUREMENT		FALL	"		

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. DEPTH	WELL Constr.	REMARKS
2			0.5 0.4		FILL and NATIVE SOIL, little brick, little gravel. Dry.			
			0.3		Brown CLAY, little gravelly sand. Moist.	3.5		Sample SB-90 (3'-4') submitted for VOCs analysis.
4						4.0		▼
6			0.3 0.3 0.5		Gray SILTY CLAY. Wet.			
8					No Recovery.	8.0		
			3.1		Gray SANDY CLAY. Saturated.	9.0		
10			118 1.4		Gray CLAY. Saturated.	10.0		
12						12.0		End of boring.

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TEST BORING LOG

BORING No.SB-91

PROJECT **HJB Properties**	LOCATION **Albany, NY**				SHEET **1** OF **1**
CLIENT **Albany Community Development Agency**					PROJECT No. **04279009.0000**
DRILLING CONTRACTOR **Precision Environmental Services Inc.**					MEAS. PT. ELEV.
PURPOSE **Supplemental Soil Sampling**					GROUND ELEV.
WELL MATERIAL					DATUM
DRILLING METHOD(S) **Direct Push**		SAMPLE	CORE	CASING	DATE STARTED **10/27/14**
DRILL RIG TYPE **Geoprobe**	TYPE				DATE FINISHED **10/27/14**
GROUND WATER DEPTH **5.0'**	DIA.	"			DRILLER **Michael Dudley**
MEASURING POINT	WEIGHT	#			PIRNIE STAFF **A.Goodrich**
DATE OF MEASUREMENT	FALL	"			

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. DEPTH	WELL Constr.	REMARKS
					No Recovery.			
2			0.5		Brown FILL and NATIVE SOIL. Moist.	2.5		Sample SB-91 (3'-4') submitted for VOCs analysis.
			0.4					
4			0.4		No Recovery.	4.0		▼
			0.4		Gray CLAY. Wet.	5.0		
6			0.7					
			1.1					
8					No Recovery.	8.0		
						9.0		
10								
12			0.5		Gray CLAY. Saturated.			
						12.0		End of boring.

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TEST BORING LOG

BORING No.SB-92

PROJECT **HJB Properties**	LOCATION **Albany, NY**	SHEET **1** OF **1**	
CLIENT **Albany Community Development Agency**		PROJECT No. **04279009.0000**	
DRILLING CONTRACTOR **Precision Environmental Services Inc.**		MEAS. PT. ELEV.	
PURPOSE **Supplemental Soil Sampling**		GROUND ELEV.	
WELL MATERIAL		DATUM	
DRILLING METHOD(S) **Direct Push**	SAMPLE / CORE / CASING	DATE STARTED **10/27/14**	
DRILL RIG TYPE **Geoprobe**	TYPE	DATE FINISHED **10/27/14**	
GROUND WATER DEPTH **5.0'**	DIA. **"**	DRILLER **Michael Dudley**	
MEASURING POINT	WEIGHT **#**	PIRNIE STAFF **A.Goodrich**	
DATE OF MEASUREMENT	FALL **"**		

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. DEPTH	WELL Constr.	REMARKS
					No Recovery.			
2			0.6		Brown FILL and NATIVE SOIL. Moist.	2.0		
			0.1		Brown FILL and NATIVE SOIL, some clay. Moist.	3.5		Sample SB-92 (3-4') submitted for VOCs analysis.
4					No Recovery.	4.0		▼
			0.0		Gray-brown CLAY. Wet.	5.0		
6			0.1					
			0.1					
8					No Recovery.	8.0		
			0.0		Gray-brown CLAY. Saturated.	9.0		
10			0.1					
			0.0					
12						12.0		End of boring.

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TEST BORING LOG

BORING No.SB-93

PROJECT **HJB Properties**	LOCATION **Albany, NY**	SHEET **1** OF **1**	
CLIENT **Albany Community Development Agency**		PROJECT No. **04279009.0000**	
DRILLING CONTRACTOR **Precision Environmental Services Inc.**		MEAS. PT. ELEV.	
PURPOSE **Supplemental Soil Sampling**		GROUND ELEV.	
WELL MATERIAL		DATUM	
DRILLING METHOD(S) **Direct Push**	SAMPLE / CORE / CASING	DATE STARTED **10/27/14**	
DRILL RIG TYPE **Geoprobe**	TYPE	DATE FINISHED **10/27/14**	
GROUND WATER DEPTH **4.0'**	DIA. **"**	DRILLER **Michael Dudley**	
MEASURING POINT	WEIGHT **#**	PIRNIE STAFF **A.Goodrich**	
DATE OF MEASUREMENT	FALL **"**		

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. DEPTH	WELL Constr.	REMARKS
0			0.0		BrownFILL and NATIVE SOIL, little cobbles. Moist.			
			0.0					
2			0.0		Brown CLAY. Moist.	2.5		Sample SB-93 (2'-3') submitted for VOCs analysis.
			0.0		Brown CLAY. Wet.	3.0		▼
4	3.5		0.0					
					Brown-gray CLAY. Saturated.	5.0		
6								
8					Brown-gray CLAY. Saturated.	8.0		
			0.0					
10			0.0					
			0.0					
12			0.0			12.0		End of boring.

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TEST BORING LOG

BORING No.SB-94

PROJECT **HJB Properties**		LOCATION **Albany, NY**			SHEET **1** OF **1**
CLIENT **Albany Community Development Agency**					PROJECT No. **04279009.0000**
DRILLING CONTRACTOR **Precision Environmental Services Inc.**					MEAS. PT. ELEV.
PURPOSE **Supplemental Soil Sampling**					GROUND ELEV.
WELL MATERIAL					DATUM
DRILLING METHOD(S) **Direct Push**			SAMPLE	CORE	CASING
DRILL RIG TYPE **Geoprobe**		TYPE			
GROUND WATER DEPTH **4.0'**		DIA.	"		
MEASURING POINT		WEIGHT	#		DRILLER **Michael Dudley**
DATE OF MEASUREMENT		FALL	"		PIRNIE STAFF **A.Goodrich**

DATE STARTED **10/27/14**

DATE FINISHED **10/27/14**

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. DEPTH	WELL Constr.	REMARKS
			0.0		Brown FILL and NATIVE SOIL, trace cobbles. Moist.			Sample SB-94 (1'-2') submitted for VOCs analysis.
			0.0					
2			0.0		Brown CLAY. Moist to wet.	2.0		
			0.0		Brown CLAY. Wet.	3.0		▼
4			0.0		Brown-gray CLAY. Saturated.	4.0		
			0.0					
6			0.0					
			0.0					
8			0.0		Brown-gray CLAY. Saturated.	8.0		
			0.4					
10			0.0					
			0.0					
12						12.0		End of boring.

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TEST BORING LOG

BORING No.IW-1

PROJECT	**Henry Johnson Blvd Properties**	LOCATION	**Albany, NY**	SHEET	**1** OF **1**
CLIENT	**Albany Community Development Agency**			PROJECT No.	**04279009.0000**
DRILLING CONTRACTOR	**Aztech Technologies**			MEAS. PT. ELEV.	
PURPOSE	**Chem-Ox Well Installation**			GROUND ELEV.	
WELL MATERIAL	**4" Sch 80 PVC**			DATUM	
DRILLING METHOD(S)	**HSA**	SAMPLE	CORE / CASING	DATE STARTED	**6/2/11**
DRILL RIG TYPE	TYPE			DATE FINISHED	**6/2/11**
GROUND WATER DEPTH '	DIA.	"		DRILLER	**James**
MEASURING POINT	WEIGHT	#		PIRNIE STAFF	**S. Bagnato**
DATE OF MEASUREMENT	FALL	"			

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. / DEPTH	WELL Constr.	REMARKS
					Observed cuttings: Brown-Gray SAND & GRAVEL		0.5	
2								
4								
6								
8							8.0	
							9.0	
10								
12						12.0	12.0	

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TEST BORING LOG

BORING No.MW-4R

PROJECT	**Henry Johnson Blvd Properties**	LOCATION	**Albany, NY**
CLIENT	**Albany Community Development Agency**		
DRILLING CONTRACTOR	**Aztech Technologies**		
PURPOSE	**Chem-Ox Well Installation**		
WELL MATERIAL	**2" Sch 40 PVC**		
DRILLING METHOD(S)	**HSA**	SAMPLE	CORE / CASING
DRILL RIG TYPE		TYPE	
GROUND WATER DEPTH	'	DIA.	"
MEASURING POINT		WEIGHT	#
DATE OF MEASUREMENT		FALL	"

SHEET	**1** OF **1**
PROJECT No.	**04279009.0000**
MEAS. PT. ELEV.	
GROUND ELEV.	
DATUM	
DATE STARTED	**9/6/11**
DATE FINISHED	**9/6/11**
DRILLER	**Chris**
PIRNIE STAFF	**S. Bagnato**

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. DEPTH	WELL Constr.	REMARKS
2						0.5 1.5		
4						4.0		
6								
8								
10								
12								
14						14.0		

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TEST BORING LOG

BORING No.MW-10R

PROJECT	**Henry Johnson Blvd Properties**	LOCATION **Albany, NY**	SHEET **1** OF **1**
CLIENT	**Albany Community Development Agency**		PROJECT No. **04279009.0000**
DRILLING CONTRACTOR			MEAS. PT. ELEV.
PURPOSE	**Chem-Ox Well Installation**		GROUND ELEV.
WELL MATERIAL			DATUM
DRILLING METHOD(S)		SAMPLE / CORE / CASING	DATE STARTED **9/6/11**
DRILL RIG TYPE	TYPE		DATE FINISHED **9/6/11**
GROUND WATER DEPTH '	DIA.	"	DRILLER **Chris**
MEASURING POINT	WEIGHT	#	PIRNIE STAFF **S. Bagnato**
DATE OF MEASUREMENT	FALL	"	

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. / DEPTH	WELL Constr.	REMARKS
2						0.5 1.5 2.0		
4								
6								
8								
10								
12						12.0		

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TEST BORING LOG

BORING No.MW-22

PROJECT	**Henry Johnson Blvd Properties**	LOCATION	**Albany, NY**
CLIENT	**Albany Community Development Agency**		
DRILLING CONTRACTOR	**Aztech Technologies**		
PURPOSE	**Chem-Ox Well Installation**		
WELL MATERIAL	**2" Sch 40 PVC**		
DRILLING METHOD(S)	**HSA**		
DRILL RIG TYPE		TYPE	
GROUND WATER DEPTH	'	DIA.	"
MEASURING POINT		WEIGHT	#
DATE OF MEASUREMENT		FALL	"

	SAMPLE	CORE	CASING
TYPE			
DIA.	"		
WEIGHT	#		
FALL	"		

SHEET	**1** OF **1**
PROJECT No.	**04279009.0000**
MEAS. PT. ELEV.	
GROUND ELEV.	
DATUM	
DATE STARTED	**6/2/11**
DATE FINISHED	**6/2/11**
DRILLER	**James**
PIRNIE STAFF	**S. Bagnato**

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. DEPTH	WELL Constr.	REMARKS
					Observed cuttings: Brown to Gray SILT & CLAY			
								0.5
								1.5
2								
4								
								5.0
6								
8								
10								
12								
14								
						15.0		15.0

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TEST BORING LOG

BORING No.MW-22R

PROJECT	**Henry Johnson Blvd Properties**	LOCATION	**Albany, NY**
CLIENT	**Albany Community Development Agency**		
DRILLING CONTRACTOR	**Aztech Technologies**		
PURPOSE	**Chem-Ox Well Installation**		
WELL MATERIAL	**2" Sch 40 PVC**		
DRILLING METHOD(S)	**HSA**	SAMPLE	CORE / CASING
DRILL RIG TYPE		TYPE	
GROUND WATER DEPTH	'	DIA.	"
MEASURING POINT		WEIGHT	#
DATE OF MEASUREMENT		FALL	"

SHEET	**1** OF **1**
PROJECT No.	**04279009.0000**
MEAS. PT. ELEV.	
GROUND ELEV.	
DATUM	
DATE STARTED	**9/6/11**
DATE FINISHED	**9/6/11**
DRILLER	**Chris**
PIRNIE STAFF	**S. Bagnato**

DEPTH FT.	SAMPLE TYPE, RECOVERY, NUMBER	BLOWS ON SAMPLE SPOON PER 6"	PID	GRAPHIC LOG	GEOLOGIC DESCRIPTION KEY - Color, Major, Minor Moisture, Etc.	ELEV. / DEPTH	WELL Constr.	REMARKS
2							0.5 1.5 5.0 15.0	
4								
6								
8								
10								
12								
14								

APPENDIX D – EXCAVATION WORK PLAN (EWP)

D-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the site owner or their representative will notify the NYSDEC. Table 1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix B.

Table 1: Notifications*

Larry Alden, NYSDEC PM	518-402-9767; larry.alden@dec.ny.gov
Jim Quinn, NYSDEC Region 4 Regional HW Engineer	518-357-2273; james.quinn@dec.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;

- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;
- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix H of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

D-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a qualified environmental professional during all excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Sections D-5 and D-7 of this Appendix.

D-3 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

D-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

D-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes are as follows: Vehicles will proceed northbound on Henry Johnson Boulevard and enter Interstate I-90. All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

D-6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of material from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

D-7 MATERIALS REUSE ON-SITE

Chemical criteria for on-site reuse of material have been approved by NYSDEC and consist of the 6 NYCRR Part 375 Protection of Groundwater Soil Cleanup Objectives. The qualified environmental professional will ensure that procedures defined for materials

reuse in this SMP are followed and that unacceptable material does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

D-8 FLUIDS MANAGEMENT

All liquids to be removed from the site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

D-9 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards consist of the 6 NYCRR Part 375 Protection of Groundwater Soil Cleanup Objectives. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

D-10 STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

D-11 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

D-12 COMMUNITY AIR MONITORING PLAN

Air sampling station locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

D-13 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

D-14 DUST CONTROL PLAN

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

D-15 OTHER NUISANCES

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

APPENDIX E – QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

REMEDIAL INVESTIGATION/ ALTERNATIVES ANALYSIS

HENRY JOHNSON BOULEVARD POPERTIES
ALBANY, NEW YORK

City of Albany
Albany Community Development Agency
Albany, New York

Prepared by:

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Latham, New York 12110

February 2006
4279009

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1.0 INTRODUCTION AND PROJECT ORGANIZATION

1.1 BACKGROUND/OBJECTIVES

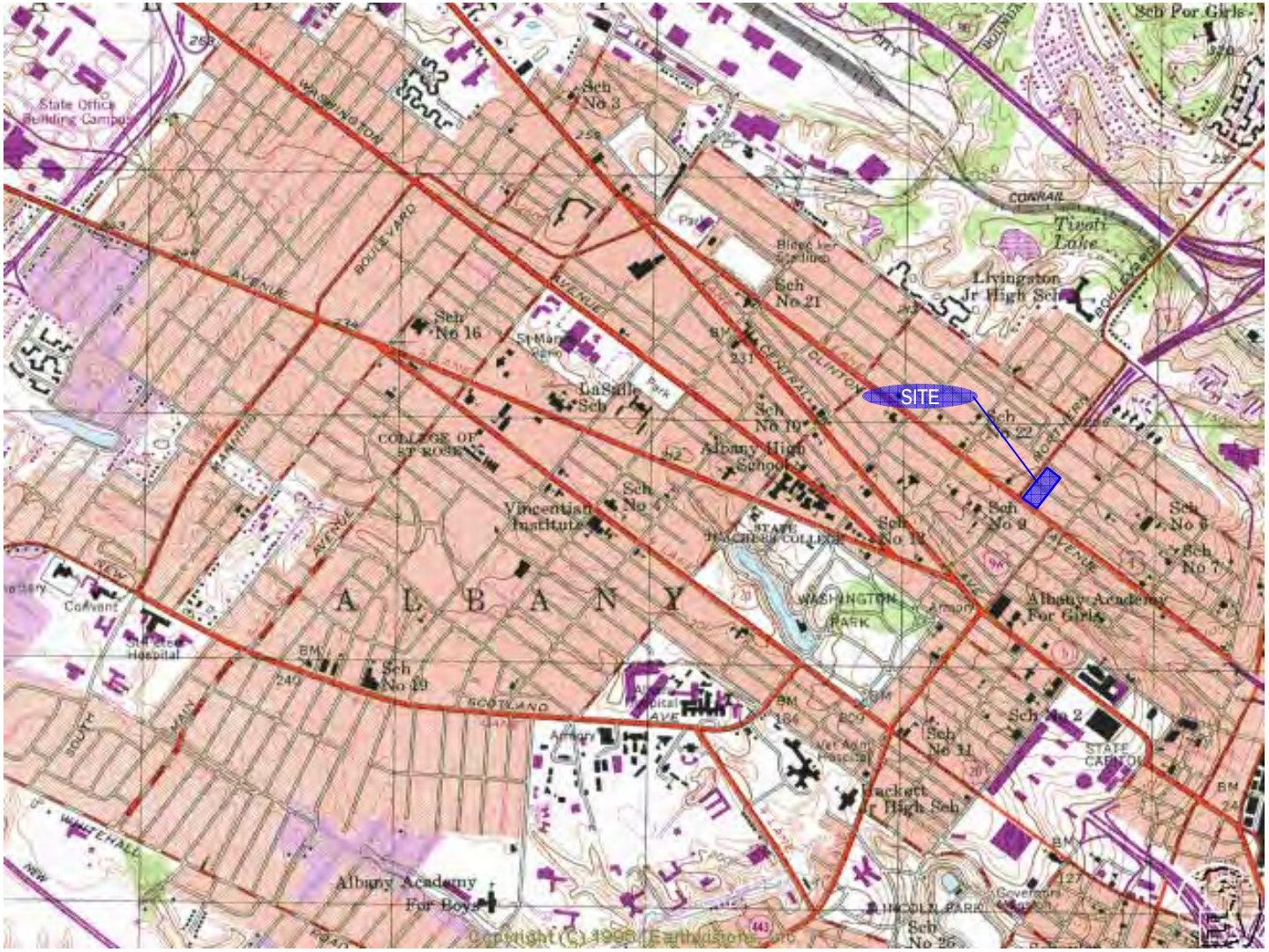
The City of Albany (City), New York has been selected to receive a grant under the New York State Department of Environmental Conservation (NYSDEC) Environmental Restoration Program (ERP) to support economic development in the City through the identification, assessment, cleanup, and redevelopment of Brownfields properties.

The Henry Johnson Boulevard (HJB) Properties, located in the northeastern portion of the City of Albany, consist of 10 properties. The location of the properties included in the Assessment is shown on Figure 1-1. One property fronts on Clinton Avenue, two properties front on Second Street, and seven properties front on HJB. Since the submittal of the Phase II ESA, one of the buildings on the site was demolished. Currently, one vacant building is located on the site at 339 Clinton Avenue. Vacant site properties contain grasses, small shrubs, and trees. Limited vegetation is present in the backfill materials where the building was recently demolished. One of the vacant lots contains remnants of an asphalt parking lot.

This Quality Assurance Project Plan (QAPP) presents, in specific terms, the policies, organizations, objectives, functional activities, and quality assurance (QA) and quality control (QC) activities designed to achieve the data quality goals of the project at the Henry Johnson Boulevard Properties site.

The QA addressed herein is applicable to both the field sampling activities and the laboratory analyses of field samples. Laboratory analyses and QC procedures will be in accordance with the USEPA SW846 analytical methodologies and the 1989 NYSDEC Analytical Services Protocol (ASP). A laboratory certified by the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) and the NYSDEC for ASP analyses will be utilized to analyze all samples collected during the Remedial Investigation (RI).

The methods and procedures presented in this site-specific QAPP are in accordance with NYSDEC Draft Division of Environmental Restoration (DER)-10 Technical Guidance for Site Investigation and Remediation, USEPA Guidance for the Data Quality Objectives



SOURCE: 7.5 MINUTE TOPOGRAPHIC MAP
ALBANY QUADRANGE, NEW YORK
UNITED STATES GEOLOGIC SURVEY 1980.

SCALE IN FEET

0 1000 2000 4000

MALCOLM PIRNIE

HENRY JOHNSON BOULEVARD PROPERTIES
ALBANY, NEW YORK

SITE LOCATION

FIGURE 1-1

Process (EPA QA/G-4) (USEPA, 2000), and draft NYSDOH Soil Vapor Intrusion Guidance (NYSDOH, 2005).

1.2 PROJECT ORGANIZATION AND RESPONSIBILITY

The City has entered into a State Assistance Contract with the NYSDEC for the execution of the Project. As such, the City will have the overall responsibility of assuring that the Project is conducted in accordance with the guidelines set forth in the Assistance Contract. The City has retained Malcolm Pirnie, Inc. (Malcolm Pirnie) to implement the Project on their behalf.

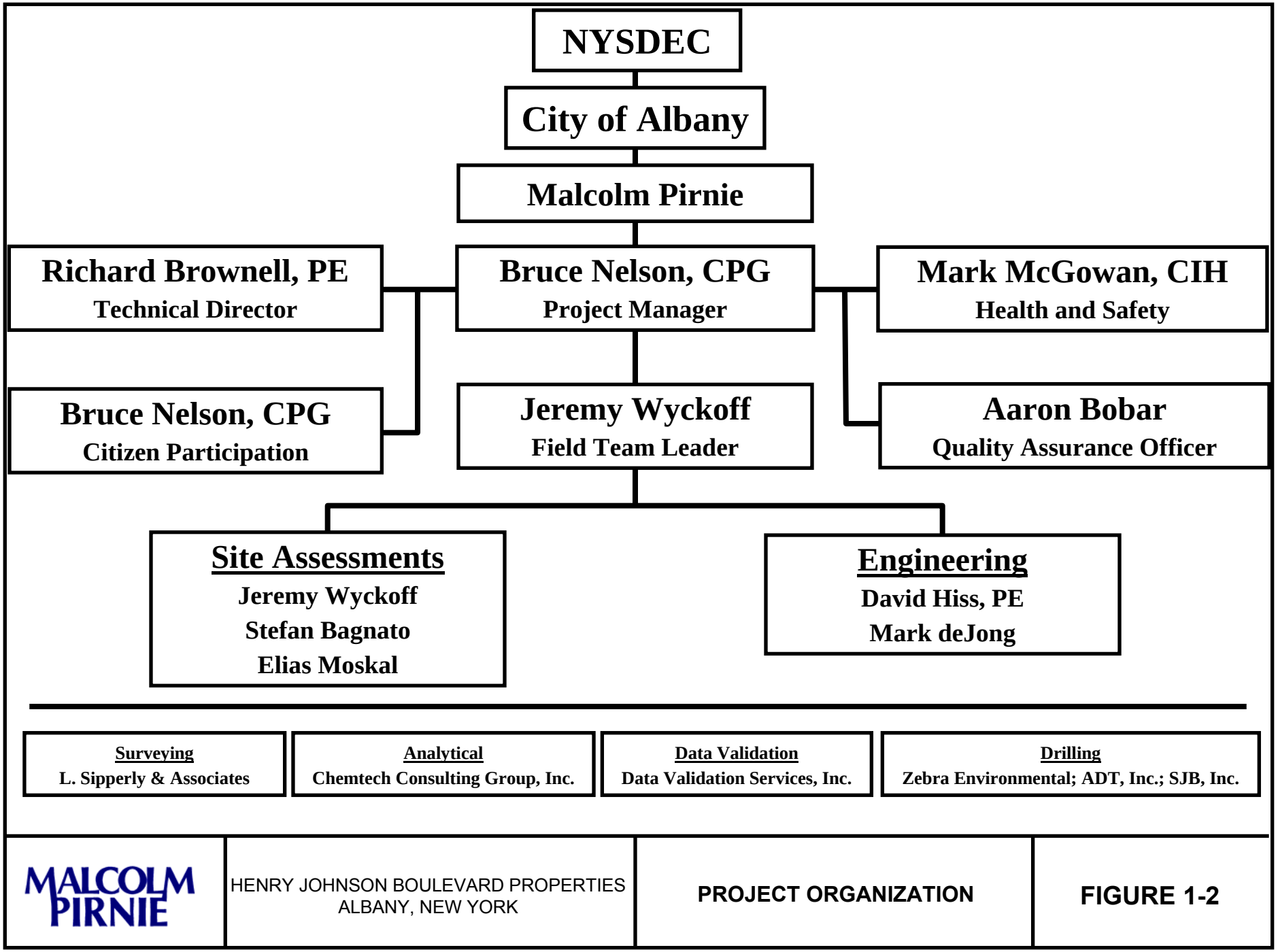
1.2.1 Project Organization

The Project Organization is presented on Figure 1-2. The responsibilities for key Malcolm Pirnie staff positions are summarized below:

- ***Bruce Nelson – Project Manager****:* Responsible for planning and implementation of the Remedial Investigation/Alternatives Analysis (RI/AA) on behalf of the City.
- ***Jeremy Wyckoff – Field Team Leader****:* Directs all field activities. Assists Project Manager with implementation of RI/AA activities. Ensures that Health and Safety procedures are observed in the field.
- ***Richard Brownell (Technical Director):*** Responsible for independent technical review of project scope, objectives, quality, and reports.
- ***Bruce Nelson – Citizen Participation Coordinator*****:** Responsible for coordinating community involvement in the Demonstration Pilot process.
- ***Mark McGowan – Health and Safety*****:** Responsible for identifying and prescribing appropriate protective measures for field investigations.

1.2.2 Subcontractors

Subcontractors will be required for data validation, survey, laboratory analytical services, drilling, and excavation and removal of contaminated soil. Subcontractors will be selected in accordance with the provisions of the State Assistance Contract.



MALCOLM PIRNIE

HENRY JOHNSON BOULEVARD PROPERTIES
ALBANY, NEW YORK

PROJECT ORGANIZATION

FIGURE 1-2

2.0 QUALITY ASSURANCE OBJECTIVES

2.1 DATA REQUIREMENTS/LEVELS OF CONCERN

The purpose of the Remedial Investigation/Alternatives Analysis (RI/AA) is to characterize the nature and extent of contaminants at the site in accordance with the RI/AA Work Plan. RI/AA analytical sampling results will be used to assess if contaminant concentrations in soil, groundwater, and air exceed State Standards Criteria and Guidance Values (SCGs). The SCGs for this project are as follows:

- Groundwater: New York State Class GA Standards.
- Soil: NYSDEC Technical and Administrative Guidance Memo (TAGM) HWR-94-4046 Cleanup Objectives.
- Indoor and Outdoor Air: draft NYSDOH Soil Vapor Intrusion Guidance Air Guideline Values.

The SCGs for this project are presented in Appendix A. Data gathered during the RI will be used to identify cost-effective, environmentally sound, long-term measures for remediation of the site, if required.

2.2 DATA QUALITY OBJECTIVES DEVELOPMENT

2.2.1 Problem Definition

The objective of the investigation is to evaluate environmental conditions at the site and to assess whether remedial measures are necessary to be protective of human health and the environment. Further, the investigation will assess whether groundwater contaminants have migrated off-site. Potential exposure scenarios include:

- Incidental contact or ingestion of surface soil containing metals or semi volatile organic compounds (SVOCs) at concentrations greater than NYSDEC TAGM 4046 recommended cleanup objectives.
- Incidental contact of construction workers with subsurface soil and groundwater containing volatile organic compounds (VOCs), SVOCs, and metals in soil and groundwater at concentrations greater than NYSDEC TAGM 4046 recommended cleanup objectives or NYSDEC Class GA standards.

- Inhalation of subsurface soil vapors containing VOCs at concentrations greater than NYSDOH guideline values.

2.2.2 Decision Identification

Samples will be collected in areas identified in the Work Plan. If the above-mentioned contaminants of concern (COCs) are present at concentrations greater than the applicable NYSDEC standards or NYSDOH guidance values, then remedial measures and/or additional investigation may be necessary to protect human health and the environment.

2.2.3 Decision Inputs

The decision identified above will be based on concentrations of COCs in surface soil, subsurface soil, groundwater, soil vapor, and air samples obtained through laboratory analysis using USEPA SW846 analytical protocols and validated by a third party data validator through the preparation of a Data Usability Summary Report (DUSR).

2.2.4 Study Boundaries

The sample population will include groundwater, soil, soil vapor, and air collected the Henry Johnson Boulevard properties and at downgradient locations, in addition to off-site background surface soil.

2.2.5 Tolerable Limits and Decision Errors

Potential sources of error include sampling error associated with the inherent variability in surface and subsurface physical conditions, and measurement error associated with sample collection techniques and/or analytical procedures. The most critical decision error would be the conclusion that COCs were not present at concentrations greater than the applicable standards, when, in truth, COCs were indeed present at those concentrations (the false rejection). To ensure that the data collected during the investigation is of sufficient quality to support the critical decision, all analytical work shall be conducted using USEPA SW846 analytical methods in accordance with NYSDEC ASP, 1989, Revised 1991, and subsequent revisions. Table 2-1 lists the methods that will be used for this project. To measure and control the quality of analysis and to ensure that the DQOs are met, certain QA

TABLE 2-1
SUMMARY OF SAMPLE ANALYSIS METHODS
HENRY JOHNSON BOULEVARD PROPERTIES
CITY OF ALBANY, NEW YORK

Analyte(s)	Matrix	Method(s)
TCL+TICS Volatile Organic Compounds	soil/water	SW-846 8260B
TCL+TICS Semi-Volatile Organic Compounds	soil/water	SW-846 8270C
Target Analyte List (TAL) of 23 metals	soil/water	6010B/7470A/7471A
Volatile Organic Compounds	air/soil vapor	TO-15

TCL+TICS - Target Compound List + Tentatively Identified Compounds

parameters are defined and utilized in data analysis activities in this project. They are defined as follows:

- ***Precision*** - is a measure of mutual agreement among individuals of the same property, usually under prescribed similar conditions. Precision is expressed in terms of standard deviation and is evaluated based on the calculated relative percent difference (RPD) of standard matrix spikes, sample matrix spikes, and sample duplicates (field duplicates and laboratory duplicates). The evaluation of precision for this project will be based on the RPD between duplicate standard matrix spikes, duplicate sample matrix spikes, and sample duplicates. The maximum allowable RPD for this project will be in accordance with ASP protocol requirements and current laboratory acceptance ranges.

- ***Accuracy*** - is the degree of difference between measured or calculated values and true values. The difference is expected to be within the precision interval for the measurement to be deemed accurate. For this project, accuracy will be measured based on the average percent recovery of standard matrix control spikes. Accuracy criteria for this project will be in accordance with ASP protocol requirements.

- ***Representativeness*** - expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. To assure that the samples delivered to the laboratory for analysis are representative of the site conditions, quality assurance procedures for sample collection and handling (discussed below) will be followed whenever samples are collected.

- ***Completeness*** - is a measure of the amount of the data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions. The goal and objective is 100 percent completeness. However, due to unforeseen field conditions, laboratory conditions and analytical limitations (such as matrix interference or required dilution) that could result in data qualification, it may not be possible to achieve 100 percent completeness. The minimum level of laboratory completeness is expected to be 95 percent for each analytical parameter. The minimum level of project completeness will be 90 percent. This is expected to be achieved by ensuring proper sample packaging and extraction procedures. The project manager has the responsibility of deciding whether re-sampling and reanalysis are required to meet the data quality objectives. The project manager will then inform the laboratory coordinator and the QA supervisor of the decision.

- ***Comparability*** - is the confidence with which one data set can be compared with another. All data will be calculated and reported in units consistent with standard

procedures so that the results of the analyses can be compared with those of other laboratories. The objectives of the analytical laboratory for comparability are to:

1. Demonstrate traceability of standards to NIST or EPA sources;
2. Use standard methodology;
3. Report results from similar matrices in standard units;
4. Apply appropriate levels of quality control within the context of the laboratory QA program;
5. Participate in inter-laboratory studies to document laboratory performance; and
6. Follow NYSDEC data validation process, which recommends the use of USEPA data validation guidelines.

- ***Sensitivity*** - The data generated during the RI will be sensitive enough to meet SCG criteria.

2.3 DATA QUALITY OBJECTIVES (DQOs)

In this section the DQOs for each data collection activity are described along with the necessary QA/QC requirements. Anticipated QA/QC samples for these data collection activities are presented in Tables 2-2, 2-3, and 2-4.

2.3.1 Air

Air monitoring will be performed during all ground intrusive RI activities to provide information concerning the health and safety of the workers at the site and for the population in nearby residences and businesses. The air monitoring results will be used to select appropriate personal protective equipment (PPE) and to stop work in the event that perimeter levels exceed those indicated in the Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP). The air monitoring will be conducted using portable field instrumentation to screen the site. As such, the DQO for air monitoring is to provide real-time data with instruments sensitive enough to measure contaminant levels that threaten health and safety.

VOCs will be monitored on a continuous basis during drilling activities. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. VOC monitoring will be conducted using a MiniRae 2000 photoionization detector (PID). The PID will be calibrated at least daily using the span

TABLE 2-2
SUMMARY OF AQUEOUS SAMPLES
HENRY JOHNSON BOULEVARD PROPERTIES
CITY OF ALBANY, NEW YORK

Sample Type	Total Samples	ANALYSIS				
		TCL VOCs*	TCL SVOCs*	TAL Metals**	NAP	Geochem
INVESTIGATIVE SAMPLES						
Groundwater	22	22	22	22	22	1
QA/QC SAMPLES						
Field Duplicates	6	2	2	2	-	-
Matrix Spikes	6	2	2	2	-	-
Matrix Spike Duplicates	6	2	2	2	-	-
Trip Blanks	5	5	-	-	-	-
TOTALS	45	33	28	28	22	1

* - plus Tentatively Identified Compounds
** - Target Analyte List of 23 metals
NAP - Natural Attenuation Parameters
Geochem - Geochemical Parameters

TABLE 2-3
SUMMARY OF SURFACE AND SUBSURFACE SOIL SAMPLES
HENRY JOHNSON BOULEVARD PROPERTIES
CITY OF ALBANY, NEW YORK

Sample Type	Total Samples	ANALYSIS		
		TCL VOCs*	TCL SVOCs*	TAL Metals**
INVESTIGATIVE SAMPLES				
Surface Soil Samples	9	-	1	9
Subsurface Soil Boring Samples	32	32	32	32
QA/QC SAMPLES				
Field Duplicates	2	2	2	2
Matrix Spikes	2	2	2	2
Matrix Spike Duplicates	2	2	2	2
Field Blanks	2	2	2	2
TOTALS	49	40	41	49

* - plus Tentatively Identified Compounds
** - Target Analyte List of 23 metals
NAP - Natural Attenuation Parameters
Geochem - Geochemical Parameters

TABLE 2-4
SUMMARY OF SOIL VAPOR INTRUSION PATHWAY SAMPLES
HENRY JOHNSON BOULEVARD PROPERTIES
CITY OF ALBANY, NEW YORK

Sample Type	Total Samples*	ANALYSIS VOCs
INVESTIGATIVE SAMPLES		
Indoor and Outdoor Air	12	12
Soil Vapor	15	15
QA/QC SAMPLES		
Field Duplicates	2	2
TOTALS	29	29

*Total number dependant upon building survey

calibration gas recommended by the manufacturer. The PID will calculate 15-minute running average concentrations. These averages will be compared to the action levels specified in Table 2-5.

TABLE 2-5

AIR MONITORING REQUIREMENTS

Analyte	Instrument	Action Level	Description
VOCs	Photoionization Detector	0-5 ppm*	No Action
		5-25 ppm*	Halt work, take corrective action to lower emissions below 5 ppm.
		>25ppm*	Stop Work
Respirable Dust	Mini-RAM	0-0.1 mg/m^3*	No Action
		>0.1 mg/m^3*	Employ dust suppression techniques to keep particulates <0.15 mg/m^3*.
		>0.15 mg/m^3*	Stop Work and re-evaluate activities.

*Sustained measurement above background in breathing zone.

Particulate concentrations will be monitored continuously at the downwind perimeter of the each work area during all ground intrusive activities. Real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) will be used for the particulate monitoring. The equipment will be equipped with an audible alarm to indicate exceedance of the action levels summarized below. Any fugitive dust migration will also be visually assessed during all work activities. Action levels for PPE requirements and stop work determinations are presented in Table 2-5.

2.3.2 Groundwater

Groundwater will be sampled and analyzed to characterize the nature and extent of groundwater contamination both on and off-site. Field instrumentation will be used during sampling activities to ensure the collection of representative samples. As such, data from the field instrumentation must be of sufficient quality to measure groundwater conditions prior to sampling (as discussed in Section 3.1.6.3). Analytical data will be used to identify the extent of groundwater contamination, to aid in determining contaminant source locations, and to determine if any SCGs have been exceeded. To meet these objectives, the data from the groundwater samples must be of known quality. Therefore USEPA SW846 analytical methodologies with NYSDEC ASP Category B deliverables have been chosen for all groundwater analyses. These deliverables are characterized by rigorous QA/QC protocols and documentation, which historically have provided high quality data able to meet the DQOs for this data. It is likely that subsurface conditions at the site are highly variable, therefore all groundwater samples will be considered critical samples. Groundwater sample analyses are summarized in Table 2-2.

2.3.3 Soil

The objective of the soil sampling program is to assess background conditions, evaluate the extent of SVOCs, and metals in surface soil, and assess petroleum impacts at off-site locations. To be useful in meeting these objectives, the data from the soil samples must be of known quality. To support the DQOs, USEPA SW846 analytical methodologies with NYSDEC ASP Category B deliverables have been chosen for soil analyses. These deliverables are capable of producing high quality data characterized by rigorous QA/QC protocols and documentation. Soil sample analyses are summarized in Table 2-3. All surface soil samples will be critical samples for the evaluation of potential risks to human health and the environment.

2.3.4 Soil Vapor Intrusion Pathways

Indoor and outdoor air, and soil vapor, and sub-slab soil vapor samples will be collected from on-site and off-site locations to evaluate the potential for current and future exposures from soil vapors containing VOCs. To be useful in meeting these objectives, the

data from the air and soil vapor samples must be of known quality. To support the DQOs, USEPA Method TO-15 with full data package deliverables have been chosen for these analyses. Sample analyses are summarized in Table 2-4. All air and soil vapor intrusion pathway samples will be for the evaluation of potential risks to human health and the environment.

3.0 FIELD INVESTIGATION PROCEDURES

3.1 SAMPLING PROCEDURES AND EQUIPMENT

The field investigation procedures that will be followed during this RI/AA are summarized below.

3.1.1 Decontamination of Sampling Equipment

Cross contamination of samples from any source is to be avoided. All sampling equipment must be clean and free from the residue of any previous samples. All non-dedicated sampling equipment must be cleaned initially and prior to being re-used. The following is the procedure for decontamination and does not apply to heavy equipment or drilling equipment, with the exception split spoons or equivalent samplers. All heavy equipment and drilling equipment will be steam cleaned in a predesignated location prior to use and between locations.

To accomplish this, the following procedures will be followed:

- Wash and scrub with low phosphate detergent;
- Rinse with tap water;
- Rinse with 10 percent HNO_3, ultra-pure (1 percent HNO_3 for carbon steel);
- Rinse with tap water;
- Rinse with isopropanol (pesticide grade or better);
- Rinse thoroughly with deionized water;
- Air dry; and
- Wrap in aluminum foil for transport.

Monitoring well evacuation tubing and equipment, such as pneumatic bladder pumps, will be decontaminated by thoroughly washing all internal and external surfaces with soapy water and rinsing with deionized water prior to use. All tubing must be dedicated to individual monitoring wells (i.e., tubing cannot be re-used).

Field instrumentation should be cleaned per manufacturer's instructions. Probes, such as those used in pH and conductivity meters, and thermometers must be rinsed prior to and after each use with deionized water.

3.1.2 Soil Sampling

3.1.2.1 Soil Sampling Objectives

Soil samples will be collected to:

- Assess background conditions;
- Evaluate the extent of SVOCs and metals in surface soil;
- Evaluate the extent of VOCs, SVOCs, and metals in subsurface soil;
- Assess related impacts at off-site well locations.

Specific sampling objectives are outlined in the Work Plan.

3.1.2.2 Soil Sampling Equipment

The following equipment will be used to collect Macrocore® soil samples:

- Photoionization Detector.
- Roll of polyethylene sheeting.
- Stainless steel spatula or spoon.
- Stainless steel trowel.
- Stainless steel bowl.
- Latex gloves (disposable).
- Neoprene gloves.
- Certified, precleaned sample containers.
- Aluminum foil.
- Field logbook and pen.
- Decontamination equipment.

3.1.2.3 Soil Sampling Procedures – Hollow Stem Auger Drilling

A two-inch diameter split-spoon sampler will be driven into the subsurface to create a borehole approximately 2.25 to 2.5 inches in diameter. Subsurface soil samples will be removed from the borehole in two-foot intervals. The total number of two-foot samples collected from each soil boring will be dependent on the final depth of the boring. A qualified inspector will characterize the soil samples and record his/her observations on a field boring log.

After soil characterization and logging, the soil cores will be split and screened for VOCs using a PID. The criteria for PID sensitivity shall be the same as that discussed in Section 2.3.

Any soil samples designated for VOC analysis shall be collected directly from the sampling device. After collecting the sample for VOC analysis, the remaining soil from the two-foot sample interval will be emptied into a stainless steel bowl and homogenized for

additional analyses. The location(s) for collection of field duplicates, field blanks, and matrix spike/matrix spike duplicate samples shall be determined in the field based on subsurface soil conditions.

The boring will be drilled to the bottom of each sample interval using 4.25-inch diameter hollow stem augers prior to driving the next two-foot split spoon. This method will ensure that soil sampled is representative of the accurate depth interval.

3.1.2.4 Soil Sampling Procedures – Direct Push Drilling

A concrete coring device or apparatus sufficient to penetrate four to six inches of asphalt or concrete may be required to advance the soil borings in certain areas of the site. Following the opening of the soil boring hole a Macro-Core soil sampler will be driven into the subsurface to create a borehole approximately 1-1/2-inch to two inches in diameter. Subsurface soil samples will be removed from the borehole in four-foot intervals in plastic tubes. The total number of four-foot tubes collected from each soil boring will be dependent on the final depth of the boring. A qualified inspector will characterize the soil samples and record his/her observations on a field boring log.

After soil characterization and logging, the plastic tube will be cut along its length and the soil core will be screened for VOCs using a PID. The criteria for PID sensitivity shall be the same as that discussed in Section 2.3. Soil samples designated for VOC analysis shall be collected directly from the sampling device. After collecting the sample for VOC analysis, the remaining soil from the two-foot sample interval will be emptied into a stainless steel bowl and homogenized for additional analyses. The location(s) for collection of field duplicates, field blanks, and matrix spike/matrix spike duplicate samples shall be determined in the field based on subsurface soil conditions.

3.1.2.5 Soil Sampling Procedures – Surface Soil

The upper two inches of soil, excluding vegetative cover, will be collected using a stainless steel trowel and transferred into a stainless steel bowl. A qualified inspector will characterize the soil samples and record his/her observations in the field log. After soil characterization, the soil will be homogenized for analyses. The location(s) for collection of

field duplicates, field blanks, and matrix spike/matrix spike duplicate samples shall be determined in the field.

3.1.2.6 Soil Sampling Procedures – Excavation Soil

If required, soil from IRM excavation side walls and bottom will be collected by the subcontractor, and transferred into a stainless steel bowl. A qualified inspector will characterize the soil samples and record his/her observations in the field log. Soil samples designated for VOC analysis shall then be collected, and the remaining soil homogenized for additional analyses. The location(s) for collection of field duplicates, field blanks, and matrix spike/matrix spike duplicate samples shall be determined in the field.

3.1.3 Monitoring Well Installation

3.1.3.1 Installation Objectives

Monitoring wells will be installed at the site to collect groundwater samples for chemical quality analysis. Groundwater elevations will be measured in the wells to evaluate the horizontal components of groundwater flow.

3.1.3.2 Installation Equipment

A truck mounted rotary drilling rig equipped with 4.25-inch hollow-stem augers will be used to create an eight-inch diameter borehole. The two-inch diameter PVC monitoring well and riser pipe will be advanced through the borehole to the water table by hand. Probes and any other large pieces of equipment that come into contact with the soil must be steam cleaned before use and between boreholes. If visibly contaminated with free phase products or any other contaminants, probes and other equipment must be decontaminated by the following procedure:

- Wash and scrub with low-phosphate detergent.
- Tap water rinse.
- Rinse with isopropanol.
- Thoroughly rinse with deionized, demonstrated analyte free water.
- Air dry.

Decontamination solutions shall be provided by the selected subcontractor and will be included in the mobilization/demobilization cost. Decontamination fluids shall be handled in accordance with Section 3.5, Investigation Derived Waste.

3.1.3.3 Monitoring Well Installation Procedures

Upon reaching the bottom of the soil boring a minimum of six inches of clean filter pack sand will be emplaced into the bottom of the casing. The monitoring well assembly, consisting of two-inch I.D. schedule-40 PVC casing with approximately 10 feet of continuous 0.01-inch slot Schedule-40 PVC screen, will be inserted through the temporary casing. Monitoring well screens will be placed at the intervals as described in the Work Plan.

Clean filter pack sand will then be poured into the annular space between the hollow stem augers and the monitoring well assembly as the augers are slowly removed. The filter pack sand will extend approximately two feet above the screened interval. A minimum one-foot thick layer of bentonite pellets will be placed above the filter pack by slowly dropping the pellets along the side of the monitoring well casing. If the bentonite pellets are emplaced above the water table, they will be hydrated with potable water. After allowing sufficient time for the bentonite to hydrate, the augers will continue to be removed and the remainder of the annulus will be tremie grouted to the surface with a cement-bentonite grout. The cement-bentonite grout will consist of a mixture of Portland cement and water in the proportion of five to six gallons of water per 94-pound bag of cement, with approximately 3 to 5 percent bentonite powder.

The PVC riser will be sealed at the ground surface with Portland cement. The PVC riser will be sealed at the ground surface with Portland cement and will be capped with a locking expansion cap. Each well will be completed at the surface with a steel flush-mounted cover and concrete pad.

If a double cased soil boring is necessary to prevent the downward migration of contaminants, the following procedures will be followed. A truck mounted rotary drilling rig equipped with 8.25-inch inside diameter hollow-stem augers will be used to drill through the overburden and into the confining layer. A two inch diameter split spoon sampler will be advanced prior to advancing the 8.25 inch auger to ensure that the target depth into the

confining layer is achieved and that the auger does not penetrate the confining layer before it is properly cased. A qualified inspector will characterize each two-foot split-spoon sample and record his/her observations in the field log. Split-spoon sample collection and will be conducted as indicated in Section 3.1.2.3. Upon reaching the target depth into the confining layer, 6-inch carbon steel casing will be inserted through the 8.25 inch auger spacing. A cement-bentonite grout will then be placed into the annular space between the hollow stem augers and steel casing as the augers are slowly removed. The steel casing will be grouted into place to the ground surface and allowed to cure for at least 24 hours. Once the grout has cured, the borehole will be advanced through the confining layer using a 5.875 inch tri-cone roller bit and water rotary techniques. Four-inch flush casing will then be installed in the borehole and advanced a minimum of 10 feet using "drive and wash" techniques to facilitate the collection of soil samples and well installation. Once the designated well depth is reached, the monitoring well assembly, consisting of two-inch I.D. schedule-40 PVC casing with approximately 10 feet of continuous 0.01-inch slot Schedule-40 PVC screen, will be inserted through the casings. Monitoring well screens will be placed at the intervals designated in the Work Plan.

Clean filter pack sand will then be poured into the annular space across the entire screen length and approximately two feet above the screened interval as the 4-inch flush casing is gradually removed. A minimum one-foot thick layer of bentonite pellets will be placed above the filter pack by slowly dropping the pellets along the side of the monitoring well casing. If the bentonite pellets are emplaced above the water table, they will be hydrated with potable water. After allowing sufficient time for the bentonite to hydrate, the remainder of the annulus will be tremie-grouted to the surface with a cement-bentonite grout. The cement-bentonite grout will consist of a mixture of Portland cement and water in the proportion of five to six gallons of water per 94-pound bag of cement, with approximately 3 to 5 percent bentonite powder.

The PVC riser will be sealed at the ground surface with Portland cement and will be capped with a locking expansion cap. Each well will be completed at the surface with a steel flush-mounted cover and concrete pad.

3.1.4 Water Level Measurements

3.1.4.1 Measurement Objectives

Water levels in monitoring wells will be measured and used in conjunction with horizontal and vertical ground survey data to determine horizontal and vertical components of groundwater flow. Water level measurements will also be used to determine the volume of standing water in monitoring wells for development and purging activities.

3.1.4.2 Measurement Equipment

The following equipment will be used for the measurement of water levels:

- Electronic water level indicator and/or oil-water interface probe.
- Field logbook and pen.
- Photoionization Detector.
- Deionized water.
- Low phosphate detergent.

3.1.4.3 Measurement Procedure

At each monitoring well, the expansion cap will be removed and the head space and breathing zone's air quality will be monitored with a PID. The criteria for PID sensitivity shall be the same as that discussed in Section 2.3. This step may be omitted in subsequent rounds of water level measurements in those monitoring wells that yielded no detectable amounts of vapors or gases from prior sampling rounds. If air quality readings in the breathing space around the well exceed action levels set in the Health and Safety Plan (HASP) (and in Section 2.3), appropriate measures will be taken as listed in the HASP.

Prior to measuring water levels, a measurement mark will be established on the PVC well riser by cutting a small notch into the riser at its highest point. The elevation of the measurement point will be surveyed to the nearest 0.01 feet relative to the on-site datum.

The battery of the electric water level indicator or oil-water interface probe will be checked by pushing the battery check button, and waiting for the audible signal to sound or the instrument light to come on. The water level indicator or oil water interface probe will be decontaminated before collecting a measurement in each monitoring well by using an alconox wash and deionized water rinse. The instrument will then be turned on and the probe will be slowly lowered into the monitoring well, until the audible signal is heard or the instrument light goes on, indicating that the sensor in the probe has made contact with the water surface in the monitoring well. If an oil-water interface probe is used, two distinct

tones are possible. An intermittent tone indicates the presence of water while a steady tone indicates the presence of a NAPL.

The depth to water will be recorded to the nearest one-hundredth of a foot, from the top of the measuring mark on the monitoring well riser. An oil-water interface probe will be used to determine if LNAPL and/or DNAPL is present in each well. The thickness, volume, and consistency of the NAPL will be recorded in the field log book, in addition to the date, time, monitoring well number, and depth to water.

To determine if DNAPL is present in each well, an oil-water interface probe will be slowly lowered through the water column to the bottom of the well. If the steady audible tone changes to intermittent as the probe is passed through the water column or at the bottom of the well, the suspected presence of DNAPL, depth of reported tone, and thickness of DNAPL will be reported in the field log book.

3.1.5 Monitoring Well Development

3.1.5.1 Development Objectives

Monitoring wells installed at the site will be developed to improve their hydraulic properties by removing sediment from the monitoring well and clearing the monitoring well screen of fine particles.

3.1.5.2 Development Equipment

The following equipment will be needed to develop the monitoring wells:

- Electric water level indicator.
- Polyethylene or nalgene tubing and foot-valve.
- Bottom-filling PVC bailer.
- Bailer cord.
- Temperature, pH, dissolved oxygen, specific conductivity and turbidity meters.
- Photoionization Detector.
- Field logbook and field logs.
- Roll of polyethylene sheeting.
- Decontamination equipment.

3.1.5.3 Development Procedures

Monitoring well development will be conducted using one or more of the following techniques:

- Bailing.
- Inertial Pumping.
- Surge Block.

Monitoring well development will be conducted at least 24 hours after installation. Prior to developing each monitoring well, the initial water level and total depth will be measured. Following well development, the total depth will again be measured to determine the quantity of sediment removed.

All equipment placed into the monitoring well will be either decontaminated prior to its introduction into the monitoring well, in accordance with Section 3.1.1, or it will be dedicated. Monitoring well development will proceed with repeated alternating sequences of surging and removal of water from the monitoring well, until the discharge water is relatively sediment free.

The effectiveness of the development procedure will be monitored after each well volume has been removed by field parameter measurements such as turbidity, pH, temperature, and conductivity measurements. These field measurements and other observations will be recorded on a Well Development/Purging Log, presented in Appendix B.

In general, monitoring well development will be discontinued after a minimum of 10 well volumes have been removed and stabilization of field parameter measurements has occurred, or when the turbidity of the discharge water reaches 50 Nephelometric Turbidity Units (NTUs) or less.

Water generated during the development process will be disposed in accordance with Section 3.5.

3.1.6 Groundwater Sampling

3.1.6.1 Sampling Objectives

Groundwater samples will be collected for chemical quality analysis. Specific sampling objectives are outlined in the Work Plan. Samples will be collected at least one week after the monitoring wells have been developed.

3.1.6.2 Sampling Equipment

The following equipment will be needed to collect groundwater samples for analysis:

- Electric water level indicator.
- Pneumatic bladder pump.
- Teflon®-lined polyethylene tubing and foot-valve.
- Temperature, pH, dissolved oxygen, specific conductivity and turbidity meters.
- Photoionization Detector.
- Field logbook and field logs.
- Laboratory prepared sample containers.

- Roll of polyethylene sheeting.
- Decontamination equipment.

3.1.6.3 Sampling Procedures

Groundwater sampling will be conducted in accordance with the USEPA Low-Flow Sampling Protocol (USEPA 1998). A piece of polyethylene sheeting will be fitted over the monitoring well and laid on the ground. The sampling equipment will be placed on the polyethylene sheeting. The expansion cap will be removed and the headspace at the top of the monitoring well will be measured with a PID. This step may be omitted in those monitoring wells which have already demonstrated in the previous rounds of water level measurement that they contain no or insignificant amounts of vapors or gases. The PID will be calibrated before the start of each sampling event.

Clean, new Teflon®-lined polyethylene tubing will be attached to the pneumatic bladder pump, which will be decontaminated between monitoring well locations, as described in Section 2.1.1. The pump will be lowered into the water column to a maximum depth of two feet above the bottom of the well. A foot-valve will be used in conjunction with the tubing to eliminate back flow from the pump. The well will be purged at a rate suitable to minimize drawdown. Field parameters, consisting of pH, specific conductance, temperature, dissolved oxygen, reduction potential, turbidity, and water level will be measured in each monitoring well prior to, during, and after purging (just before sampling) through the use of a flow-through cell. Both the pH and the specific conductivity meters will be calibrated for water temperature before each sampling event.

The volume of water removed from each monitoring well will be dependent upon the amount of time required for stabilization of the field parameters. In general, the well will be

considered stabilized for sample collection when field parameters have stabilized for three consecutive readings as follows:

- pH: +/- 0.1 standard units
- Specific Conductance: +/- 3%
- Reduction Potential: +/- 10 millivolts
- Dissolved Oxygen: +/- 10%
- Turbidity: +/- 10%

When the field parameters have stabilized, the volume of water purged will be recorded, and groundwater in the monitoring well will be sampled through the pump at the same flow rate used to purge the well. The purge water will be discharged in accordance with Section 3.5.

The analytical parameters and order of sample collection for groundwater samples will be:

1. In-situ measurements: temperature, pH, specific conductance and dissolved oxygen;
2. Volatile organic compounds (VOCs);
3. Semi-volatile organic compounds (SVOCs);
4. Metals;
5. Natural Attenuation Parameters (NAP); and
6. Geochemical Parameters.

NAP includes carbon dioxide, methane, ethane, ethene, dissolved organic carbon, nitrate, nitrite, sulfate, ferrous iron, and alkalinity. Geochemical parameters include Total Kjeldahl Nitrogen, hardness, total dissolved solids, and total organic carbon.

The sample bottles will be pre-preserved by the laboratory. The preservation requirements are presented in Table 3-1. The sample bottles will be immediately placed in a cooler held at 4°C.

Disposable gloves will be worn by the sampling personnel and changed between sampling points.

Data to be recorded in the field logbook will include purging and sampling methods, depth to water, volume of water removed during purging, pH, temperature and specific conductivity values, and PID readings.

TABLE 3-1
SAMPLE CONTAINER, PRESERVATION, AND HOLDING TIME REQUIREMENTS
HENRY JOHNSON BOULEVARD PROPERTIES
CITY OF ALBANY, NEW YORK

Matrix	Analysis	Container	Preservation	Holding Time
Soil	TCL+TICs Volatiles	1 - 4 oz. glass	Cool to 4 deg. C	14 days
	TCL+TICs Semi-Volatiles	1 - 4 oz. glass	Cool to 4 deg. C	7 days
	TAL Metals	1 - 8 oz. glass	Cool to 4 deg. C	180 days
Groundwater	TCL+TICs Volatiles	2 - 40 ml glass w/ septum cap	HCl, Cool to 4 deg. C	14 days
	TCL+TICs Semi-Volatiles	2 - 2 liter amber glass	Cool to 4 deg. C	7 days
	TAL Metals	1 liter polyethylene	HNO_3, Cool to 4 deg. C	180 days
Natural Attenuation Parameters:	Carbon Dioxide	2 - 40 ml glass w/ septum cap	Cool to 4 deg. C	N/A
	Methane	2 - 40 ml glass w/ septum cap	Cool to 4 deg. C	14 days
	Ethane	2 - 40 ml glass w/ septum cap	Cool to 4 deg. C	14 days
	Ethene	2 - 40 ml glass w/ septum cap	Cool to 4 deg. C	14 days
	Dissolved Organic Carbon	1 - 125ml glass	Cool to 4 deg. C	28 days
	Nitrate/Nitrite Nitrogen	1 - 50 ml glass w/ septum cap	H_2SO_4, Cool to 4 deg. C	28 days
	Sulfate and Chloride	1 - 50 ml glass w/ septum cap	Cool to 4 deg. C	28 days
	Ferrous Iron	1 - 250 ml amber glass	HCl, Cool to 4 deg. C	Analyze Immediately
	Alkalinity	1 - 200 ml plastic	Cool to 4 deg. C	14 days
Geochemical Parameters:	Total Kjeldahl Nitrogen	1 - 500 ml glass	H_2SO_4, Cool to 4 deg. C	28 days
	Hardness	1 - 50 ml glass w/ septum cap	HNO_3, Cool to 4 deg. C	6 months
	Total Dissolved Solids	1 - 100 ml plastic	Cool to 4 deg. C	7 days
	Total Organic Carbon	1 - 25 ml glass	H_2SO_4, Cool to 4 deg. C	28 days
Air and Soil Vapor	TO-15 Volatiles	6 liter Summa Canister	Not Applicable	14 days

3.1.7 Hydraulic Conductivity Test Procedures

3.1.7.1 Testing Objectives

Rising head hydraulic conductivity tests will be conducted at selected monitoring wells to aid in estimating groundwater flow rates.

3.1.7.2 Testing Equipment

The following equipment will be needed to perform hydraulic conductivity testing:

- Data logger and transducer.
- Electronic water level indicator.
- Field log book and pen.
- PVC or stainless bailer.
- Peristaltic pump and polyethylene tubing.
- PVC slug.

3.1.7.3 Testing Procedures

Equipment being introduced into the well to conduct hydraulic conductivity tests will be decontaminated using the procedures outlined in the Section 2.1.1. Water levels will also be measured prior to conducting the test and recorded in the field log book.

Hydraulic conductivity testing will only be conducted on wells which have achieved static equilibrium after development or purging.

Water level fluctuations will be monitored using either a water level probe to record the water level change, or a pressure transducer linked to a data logger. The method of measurement is similar for both cases in that they both measure the change in water levels from a static condition after an initial perturbation. The static water level will be taken and recorded on the field log before conducting the test.

When using a data logger and transducer, the transducer will be placed approximately 5 to 10 feet below the static water level (where possible) and a solid slug will be added to the well. After the slug is added to the well, the water level will rise. If the data logger is used, the pressure above the transducer will change and the pressure change will be recorded. This change in pressure will be calculated internally to true water levels based on the original

static water level entered. If a transducer and data logger are used, the frequency of readings will follow a logarithmic scale as shown below:

ELAPSED TIME	INTERVAL
0-5 seconds	0.5 seconds
5-20 seconds	1.0 seconds
20-120 seconds	5.0 seconds
2-10 minutes	30 seconds
10-100 minutes	2 minutes
100-1,000 minutes	10 minutes

The test will continue until either the water level recovers fully to static, until approximately 70 percent of the original static level is reached, or for a total of two hours; whichever comes first.

If a water level probe is used in place of the pressure transducer and data logger, manual readings of water level change will be recorded. The readings will be collected on a separate logarithmic time scale and recorded on field logs.

The data collected will be reduced and analyzed using analytical methods such as Bouwer and Rice, 1976 and Bouwer 1989.

3.1.8 Air and Soil Vapor Sampling

3.1.8.1 Air and Soil Vapor Sampling Objectives

Air and soil vapor sampling is intended to evaluate the potential for migration of VOCs in the subsurface to the indoor air and the potential for current and future human exposures. Prior to sampling a product inventory will be performed to evaluate potential confounding sources of VOCs. The following are the types of samples that will be collected:

- Indoor and outdoor air samples.
- Soil vapor samples.
- Sub-slab soil vapor samples.

Indoor air samples will be collected to evaluate the condition of the air inside each building. Outdoor background air samples will be collected to determine the concentration of VOCs in the ambient air in the vicinity and upwind of the suspected source area. Soil vapor will be sampled from monitoring points installed at on-site and off-site locations to evaluate the potential for soil vapor exposures. Sub-slab soil vapor sampling will evaluate

potential soil vapor intrusion pathways. Sampling will be conducted under typical operating conditions of site and of each building sampled. Indoor and outdoor air, soil vapor, and sub-slab soil vapor samples will be collected concurrently to ensure that samples are representative of observed site conditions. The number of samples for each specific sampling activity is outlined in the Work Plan.

3.1.8.2 Tracer Gas Test

A tracer gas test will be performed in accordance with NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH, 2005) to confirm if the soil vapor probes were constructed in a manner that minimize the entrainment of ambient air into the soil vapor samples. Tracer gas testing will be performed at each soil vapor and sub-slab soil vapor sampling location. Tracer gas testing will be conducted using the following procedures:

- Place a 1-liter container over the probe and seal the container at the ground surface with a hydrated bentonite seal. One quarter-inch diameter flexible Teflon® tubing will extend from the soil vapor sampling point through the container to facilitate connection to the Summa canister air sampling train described in Section 3.1.8.3
- SF_6 will be released within the container until the concentration of the gas is 100 percent.
- The SF_6 will be allowed to equilibrate prior to collecting the sample.
- Air samples will then be collected at each location as described in Section 3.1.8.5 and 3.8.1.6

The tracer gas will be included in the target list of analytes for laboratory analysis. If concentrations of SF_6 are detected at a concentration > 20 % of the initial concentration in soil vapor or sub-slab soil vapor samples collected at the site, ambient air entrainment has occurred indicating that the integrity of the soil vapor sampling probe seal was compromised.

3.1.8.3 Air Sampling Equipment

As discussed in the Work Plan, air soil vapor from each sampling location will be collected using a Summa canister sampling train. The typical Summa canister sampling train consists of the following:

- Summa canister.
- Flow controller.
- Particulate filter.
- Pressure gage.
- Fittings and a sampling line.

The laboratory will evacuate the canister to a minimum vacuum of negative 28 inches (± 2 inches) of mercury (in. Hg) prior to sampling. After sampling, the final vacuum will be recorded on a chain of custody form to confirm sample integrity. A pressure gauge will be used to monitor the vacuum before, during, and after sampling. A seven micron particulate filter will be used upstream of the flow controller to prevent blockage of the flow controller. Flow controllers will be adjusted to ensure that flow rates do not exceed 0.2 liters per minute. The sampling line will consist of new, unused, 1/4-inch diameter flexible Teflon® tubing. All parts of the sampling train coming into direct contact with the sample will be made of stainless steel or Teflon®. The following general set-up procedure will be followed for each sampling location:

- Place Summa canister at sampling location.
- Note the environmental conditions in the sample area on the air sampling sheet.
- Assemble the Summa canister sampling train. Follow the laboratory instructions for pressure measurement, particulate filter placement, and flow controller attachment.
- Begin sampling following the procedures described below.

3.1.8.4 Air Sampling Procedures – Indoor and Outdoor Air

The following procedures will be implemented for the collection of indoor and outdoor air samples:

- Remove the brass plug fitting covering the 6-liter stainless steel Summa canister sampling port using a wrench.
- Connect the pressure gage or flow controller with integral pressure gage to the Summa canister sampling port. Open the valve on the canister and quickly

measure the vacuum within the canister. If the vacuum is greater than 26 inches of mercury, then the canister is acceptable for sampling. Any canisters with a vacuum less than 26 inches of mercury should not be used for sampling. Close the valve and record the measurement on the sampling sheet.

- Assemble the sampling train. Each fitting should be hand tightened and then tightened with a wrench approximately ¼ turn.
- Initiate sampling by opening the Summa canister valve. Record starting time on the sampling sheet.
- During sampling, the pressure will be monitored periodically to ensure that the flow controller is operating properly.
- When the time corresponding to the calibrated flow controller (for indoor air – 24 hours) has elapsed, close the canister valve. Disassemble the sampling train. Check the vacuum within the canister using the pressure gage and record the measurement on the sampling sheet.
- Since the flow rate into the canister can fluctuate due to variations in atmospheric conditions, the measured final vacuum may range from 4 to 12 in. Hg. If the measured vacuum is above 12 in. Hg or below 3 in. Hg, the sample may be flagged and re-sampling may be needed.
- Place the brass cap on the sampling port of the canister and tighten. The air sampling is complete.
- Place the air sample in the travel box and complete the chain-of-custody forms and identification tag on the canister.
- Send the canister to the laboratory via next day airmail service for analysis of VOCs by Method TO-15.

3.1.8.5 Air Sampling Procedures – Soil Vapor

The procedures for soil vapor collection point construction are as follows:

- Auger to the desired sample depth using a small-diameter auger.
- Upon reaching the target depth, place six inches of clean, coarse grained, silica sand at the bottom of the borehole.
- Suspend, by means of Teflon®-lined tubing, a stainless steel vapor collection point to the top of the sand layer.
- Add additional sand to the borehole until the sand extends up to approximately one foot above the top of the vapor collection point. The thickness of the sand may be less than one foot depending on the depth of the vapor point.
- Add a minimum of three feet of bentonite chips or pellets above the sand layer, if possible. Hydrate the bentonite using potable water.

- Backfill the remainder of the annulus to the ground surface using cement 95 percent bentonite and 5 percent grout.
- Complete the soil vapor point with a steel flush-mounted well cover.
- Cap the Teflon® tubing and allow a minimum of 24 hours for the bentonite and grout to seal the borehole.
- Prior to sampling, attach a stainless steel three-way valve to the Teflon®-lined tubing to facilitate purging and sampling.
- Implement tracer gas test a described in Section 3.1.8.3
- Prior to sampling, purge one volume of the vapor implant and Teflon®-lined tubing using a peristaltic or air sampling pump. Close the valve once purging is complete.
- Upon completion of purging, connect the Teflon®-lined tubing to the Summa canister sampling train.
- Set up the soil gas sampling train as discussed in Section 3.1.8.4 using a 6-liter Summa canister and flow controller.
- Open the valve and begin sampling using the same procedure as that used for ambient air sampling in Section 3.1.8.4. Soil vapors will be collected using two-hour flow controllers. When possible, samples will be collected over the same time interval as concurrent indoor and outdoor air samples.

3.1.8.6 Air Sampling Procedures – Sub-slab Soil Vapor

Sub-slab soil vapor samples will be collected using permanent probes installed beneath the floor slab. The sub-slab soil vapor probes will be attached to the Summa canister sampling train consistent with the methods described in Section 3.1.8.4. Sub-slab soil vapor monitoring probes will be installed using the following instructions:

- Core through concrete slab using a two inch rotary coring tool.
- Hand auger sub-slab materials to desired depth.
- Upon reaching the target depth, place six inches of clean, coarse grained, silica sand at the bottom of the borehole.
- Suspend, by means of Teflon®-lined tubing, a stainless steel vapor collection point to the top of the sand layer and verify that the probe is no greater than two inches below the bottom of the concrete slab.
- Add additional sand to the borehole until the sand fills the annulus to the bottom of the concrete slab.
- Backfill the remainder of the annulus to the top of the slab using cement

95 percent bentonite and 5 percent grout.

- Cap the Teflon® tubing and allow a minimum of 24 hours for the grout to seal the borehole.
- Prior to sampling, a stainless steel three-way valve will be attached to the Teflon®-lined tubing to facilitate purging and sampling.
- Implement tracer gas test described in Section 3.1.8.3.
- Prior to sampling, purge one volume of the vapor implant and Teflon®-lined tubing using a peristaltic or air sampling pump. Close the valve once purging is complete.
- Upon completion of purging, connect the Teflon®-lined tubing to the Summa canister sampling train.
- Set up the soil gas sampling train as discussed in Section 3.1.8.4 using a 6-liter Summa canister and flow controller set for a two-hour collection time.
- Open the valve and begin sampling using the same procedure as that used for ambient air sampling in Section 3.1.8.4. Sub-slab soil samples will be collected using two-hour flow controllers. When possible, samples will be collected over the same time interval as concurrent indoor and outdoor air samples.

3.2 FIELD QUALITY CONTROL SAMPLES

Quality control procedures will be employed to ensure that sampling, transportation and laboratory activities do not bias sample analytical quality. Trip blanks, field blanks, duplicate samples, matrix spike samples and matrix spike duplicates will provide a quantitative basis for validating the analytical data. A summary of the anticipated QA/QC samples for each media is included in Tables 2-2 and 2-3.

3.2.1 Trip Blanks

The trip blanks will be prepared by the laboratory by filling 40 ml vials with a Teflon®-lined septum with deionized, analyte-free water. The trip blank will accompany the day's sample containers at all times. One trip blank will be returned to the laboratory with each cooler containing aqueous samples for VOC analysis. The trip blank will be analyzed for volatile organic compounds, to detect possible contamination during shipment. Trip

blanks will remain in the shipping cooler from the time of packing, in the laboratory, to arrival back at the laboratory.

3.2.2 Field Blanks

A field blank consists of an empty set of laboratory-cleaned sample containers. At the field location, deionized, analyte-free water is passed through decontaminated sampling equipment and placed in the empty set of sample containers for analysis of the same parameters as the samples collected with the sampling equipment. One field blank will be collected per every 20 environmental samples, per media.

3.2.3 Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample pairs are analyzed by the laboratory to provide a quantitative measure of the laboratory's precision and accuracy. When performing USEPA SW846 volatile organic or organic extractable analysis with NYSDEC Category B deliverables, the laboratory must be supplied with triple sample volume for each Sample Delivery Group (SDG) in order to perform matrix spike and matrix spike duplicate analyses. This does not include field or trip blanks. Blanks do not require separate matrix spike or duplicate analyses regardless of their matrix.

The limits on an SDG are:

- Each Case for field samples, or
- Each 20 field samples within a Case, or
- Each 14 calendar-day period during which field samples in a Case are received (said period beginning with receipt of the first sample in the SDG); whichever comes first.

Field personnel will specify samples for MS/MSD analysis. Extra volume is not required for aqueous samples for inorganic analysis. Non-aqueous samples (soils/sediment) do not require that any extra volume of sample be submitted to the laboratory for MS/MSD samples.

3.2.4 Field Duplicates

For each sample matrix, a field duplicate sample will be collected at a rate of one sample per 20 environmental samples per media. The duplicate sample is collected at the same location as the environmental sample. The field duplicate sample is identified using the sample designation system described in Section 3.3. The identity of the field duplicate is not revealed to the laboratory. The analytical results of the environmental sample will be compared to the field duplicate sample, to evaluate field sampling precision.

3.3 SAMPLE DESIGNATION

A sample numbering system will be used to identify each sample. This system will provide a tracking procedure to allow retrieval of information about a particular sample, and will assure that each sample is uniquely numbered. The sample identification will consist of at least three components as described below. Identification numbers for soil boring samples will also have a fourth component.

- ***Project Identification:*** The first component consists of a two-letter designation, which identifies the project site. For this project, the two-letter designation will be HJ for Henry Johnson.

- ***SampleTtype:*** The second component, which identifies the sample type, will consist of a two-letter code as follows:
  - MW - Monitoring well (Groundwater Sample).
  - SB - Soil Boring.
  - SS - Surface Soil.
  - AS- Air Sample.

- ***Sample Location:*** The third component identifies the sample location using a two-digit number.

- ***Sample Identification:*** The fourth component will only be used for soil boring samples and air samples, to indicate the interval from which the sample was collected.

- ***Quality Assurance/Quality Control Samples***: The samples will be labeled with the following suffixes:
  - FB - Field Blank.
  - MS - Matrix Spike.
  - MSD - Matrix Spike Duplicate.
  - TB - Trip Blank.

Duplicate samples will be numbered uniquely as if they were samples. A record of identification for duplicate samples will be maintained.

Examples of identification numbers are given below:

HJ-SB-02-10: Soil boring, boring location number 2, 10 feet below ground surface.

HJ-MW-3-MSD: Monitoring well groundwater sample, monitoring well sample location 3, matrix spike duplicate.

HJ-MW-TB: Trip blank for monitoring well groundwater sample.

HJ-AS-04-07: Air sample, air sample location number 4, screened interval is seven feet below ground surface.

3.4 FIELD DOCUMENTATION

3.4.1 Introduction

Documentation of an investigative team's field activities often provides the basis for technical site evaluations and other such related written reports. All records and notes generated in the field will be considered controlled evidentiary documents and may be subject to scrutiny in litigation.

Personnel designated as being responsible for documenting field activities must be aware that all notes may provide the basis for preparing responses for legal interrogatories. Field documentation must provide sufficient information and data to enable reconstruction of field activities. Numerically serialized field logbooks provide the basic means for documenting field activities. The following information must be provided on the inside front cover of each field logbook:

- Project Name (Site Name).
- Site Location.
- Site Manager.
- Date of Issue.
- Control and maintenance of field logbooks is the responsibility of the Field Team Leader.

3.4.2 Documentation of Field Activities

Field logbook entries must be legibly written and provide an unbiased, concise, detailed picture of all field activities. Use of preformatted data reporting forms must be identifiable and referenced to field notebook entries.

Step-by-step instructions and procedures for documenting field activities are provided below and in following sub-sections. Instruction and procedures relating to the format and technique in which field logbook entries are made are as follows:

- Leave the first two pages blank. They will provide space for a table of contents to be added when the field logbook is complete.
- The first written page for each day identifies the date, time, site name, location, Malcolm Pirnie personnel and their responsibilities, other non-personnel and observed weather conditions. Additionally, during the course of site activities, deviations from the work plan must also be documented.
- All photos taken must be traceable to field logbook entries. It is recommended to reference photo locations on the site sketch or map.
- All entries must be made in ink. Waterproof ink is recommended.
- All entries must be accompanied by the appropriate military time (such as 1530 instead of 3:30).
- Errors must be lined through and initialed. No erroneous notes are to be made illegible.
- The person documenting must sign and date each page as it is completed.
- Isolated logbook entries made by a team member other than the team member designated responsible for field documentation, must be signed and dated by the person making the entry.
- Additions, clarifications, or corrections made after completion of field activities must be dated and signed.

3.4.3 General Site Information

General site characteristics must be recorded. Information may include:

- Type of access into facility (locked gates, etc.).
- Anything that is unexpected on-site (e.g., appearance of drums that have not been previously recorded).
- Information obtained from interview with access or responsible party personnel (if applicable), or other interested party contact on-site.
- Names of any community contacts on-site.
- A site map or sketch may be provided. It can be sketched into the logbook or

attached to the book.

3.4.4 Sample Activities

- A chronological record of each sampling activity must be kept.
- Explanation of sampling at the location identified in the sampling plan (e.g., discolored soil, stressed vegetation).
- Exact sample location, using permanent recognizable landmarks and reproducible measurements.
- Sample matrix.
- Sample descriptions, i.e., color, texture, odor (e.g., soil type, murky water) and any other important distinguishing features.
- Decontamination procedures, if used.

As part of chain-of-custody procedures, recorded on-site sampling information must include sample number, date, time, sampling personnel, sample type, designation of sample as a grab or composite, and any preservative used. Sample locations should be referenced by sample number on the site sketch or map. The offer and/or act of providing sample splits to a thirty party (e.g., the responsible party representative; state, county, or municipal, environmental and/or health agency, etc.) must be documented.

3.4.5 Sample Dispatch Information

When sampling is complete, all sample documentation such as chain-of-custody forms shall be copied and copies placed in the project files. A notation of numbers of coolers shipped, carrier and time delivered to pick-up point should be made in a field notebook.

3.5 CONTROL AND DISPOSAL OF INVESTIGATION DERIVED WASTE

Investigation derived wastes will be handled in accordance with the NYSDEC Proposed Decision TAGM. Disposal of contaminated groundwater generated during Site Investigations and the Final TAGM - Disposal of Drill Cuttings. As borings are advanced, spillage and disposal of potentially contaminated soils and water will be minimized through the implementation of the procedures described below.

Drill cuttings and spoils generated at each boring will be placed (shoveled) on polyethylene sheeting. After completing the boring, the cuttings/spoils will be returned to the borehole provided that the borehole will not be used for the installation of a monitoring well, that it did not penetrate an aquitard or aquiclude and that the cuttings/spoils do not contain oily (product) substances. The boring will then be topped off with a cement/bentonite grout cap.

Excess cuttings/spoils which are not returned to the borehole will be spread out and dewatered (dewatering will be allowed to infiltrate the ground) next to the borehole. Groundwater that is purged from monitoring wells or discharged during drilling activities may be disposed of at each site and allowed to infiltrate into the ground based on the following conditions:

1. There is a defined site which is the source of the groundwater contamination;
2. There is no free product observed such as LNAPLs and DNAPLs;
3. Recharge pits are used to preclude run-off from the site and the pits are covered with clean soil when no longer needed; and
4. The infiltrating groundwater is being returned to the same water-bearing zone from which it is being purged.

If the above criteria are not met, the materials will be containerized in United Nations (UN)-approved, 55-gallon steel drums. Soils and water will be drummed separately; the contents will be identified on weather-resistant labels attached to drum exteriors. Open-topped drums will be used to containerize soils and close-topped drums will be used to containerize water.

Depending on the levels of personal protection used during the field investigation, some disposable personal protective equipment (PPE) and decontamination fluids will be generated. Attempts will be made to wash surface contamination off so that PPE (e.g., Tyvek coveralls, gloves, and other disposable items) may be disposed of as ordinary solid waste. If contamination is suspected, these materials will be collected and containerized in (UN)-approved 55-gallon steel drums (separately from contaminated soils and water); the contents will be identified with weather-resistant labels attached to drum exteriors. Containerized materials will be labeled and staged a designated location. Malcolm Pirnie will maintain a log of the containers and their contents; the contents will be evaluated upon

receipt of results of the analytical data obtained during field investigations. Handling, transportation, and disposal of these materials will be in accordance with requirements of RCRA and other applicable federal, state, and local regulations. Nonhazardous disposable items will be contained and disposed of in a dumpster or via a licensed waste hauler, as appropriate.

4.0 SAMPLE AND DOCUMENT CUSTODY PROCEDURES

4.1 SAMPLE HANDLING

The analytical laboratory will provide the sample containers necessary for all soil and groundwater samples. Container closures will be screw-on type and made of inert materials. Sample containers will be cleaned and prepared by the laboratory prior to being sent to the site. Trip blanks will be used to check for false positives due to laboratory cleaning procedures or cross contamination during sample shipment.

All samples collected will be identified with a sample label. A label will be attached to each bottle and each sample will be identified with a unique sample number.

Immediately following sample collection, each sample container will be marked with the following information:

- Sample Code.
- Project Number.
- Date/Time.
- Sample Type.
- Requested Analysis.
- Preservative, if used.
- Sampler's Initials.

The sample code will indicate the site location, media sampled and the sample station.

After all sample identification information has been recorded, each sample label will be covered with waterproof clear plastic tape to preserve its integrity. All samples will be recorded and tracked under strict chain-of-custody protocols. In the field, each sample will be checked for proper labeling. The samples will then be packed into coolers with ice and shipped to the laboratory. A chain-of-custody form will be completed for each cooler. The form will be signed and dated by the person who collected the samples, the person the samples were relinquished to for transport to the laboratory, and the laboratory sample controller/custodian who receives the samples.

4.2 COMPLETION OF CHAIN-OF-CUSTODY RECORD

A chain-of-custody record is a printed form that accompanies a sample or group of samples as custody is transferred from person to person. A sample chain-of-custody form is included in Appendix B. It documents custody transfer from person to person and sample information recorded on bottle labels. A chain-of-custody record is a controlled document.

As soon as practicable after sample collection, preferably after decontamination, the following information must be entered on the chain-of-custody form. All information is to be recorded in black ink.

1. ***Malcolm Pirnie project number.*** Enter the seven-digit alphanumeric designation assigned by Malcolm Pirnie that uniquely identifies the project site.

2. ***Project name.*** Enter site name.

3. ***Samplers.*** Sign the name(s) of the sampler(s).

4. ***Station number.*** Enter the sample number for each sample in the shipment. This number appears on the Malcolm Pirnie, Inc. sample identification label.

5. ***Date.*** Enter a six-digit number, indicating the year, month, and day of sample collection(YYMMDD); for example, 051125.

6. ***Time.*** Enter a four-digit number indicating the military time of collection; for example, 1354.

7. ***Composite or grab.*** Indicate the type of sample.

8. ***Station location.*** Describe the location where the sample was collected.

9. ***Number of containers.*** For each sample number, enter the number of sample bottles that are contained in the shipment.

10. ***Remarks.*** Enter any appropriate remarks.

4.2.1 Transferring Custody From Malcolm Pirnie, Inc. Shipper to Common Carrier

Instructions for Malcolm Pirnie, Inc. shipper transferring custody of samples to a common carrier are given below.

1. Sign, date, and enter time under "Relinquished by" entry.

2. Enter name of carrier (e.g., UPS, Federal Express) under "Received by."

3. Enter bill-of-lading of Federal Express airbill number under "Remarks."

4. Place the original of the chain-of-custody form in the appropriate sample shipping package. Retain a copy with field records.

5. Sign and date the custody seal. The custody seal is part of the chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field.

6. Wrap the seal across filament tape that has been wrapped around the package at least twice.

7. Fold the custody seal over on itself so that it sticks together.

8. Complete other carrier-required shipping papers.

Common carriers will usually not accept responsibility for handling chain-of-custody forms; this necessitates packing the record in the sample package.

4.2.2 Transferring Custody From Malcolm Pirnie, Inc. Sampler Directly to Carrier

To transfer custody of samples from the Malcolm Pirnie, Inc. sampler directly to a carrier, proceed as above, except eliminate the Malcolm Pirnie, Inc. shipper's signature.

5.0 CALIBRATION PROCEDURES AND FREQUENCY

5.1 INTRODUCTION

Instruments must be properly calibrated to produce technically valid data. Documented calibration and calibration check results verify that the instruments used for measurement are in proper working order and the data produced is reliable. The calibration requirements described or referenced in this section are necessary to support the data quality objectives for this project. When calibration requirements are met, the data will support the focused investigation decisions dealing with the nature and extent of contamination and safety concerns. In the event that the data is used in court, documented calibrations are necessary to ensure that the data is legally defensible.

5.2 CALIBRATION PROCEDURES FOR FIELD EQUIPMENT

5.2.1 Field Equipment

The following table provides a list of the tasks that will require field equipment, and the specific field instruments that will be used for each task and which require calibration.

TASK	**FIELD INSTRUMENT**
Monitoring Well Installation	Mini Rae Photoionization Detector
Groundwater Sampling	Mini Rae Photoionization Detector Horiba U-22 Water Quality Checker *pH Meter* *Temperature Probe* *Specific Conductivity Meter* *Turbidimeter* *Oxidation-Reduction Meter* *Dissolved Oxygen Meter*
Air Monitoring	MIE DataRam Dust Monitor Mini Rae Photoionization Detector

5.2.2 General Procedures

The manufacturer specifications for operation and maintenance procedures for the field equipment to be used during these tasks are provided in Appendix C. General calibration procedures and requirements are described below:

- All instruments will be calibrated at least once a month.
- All instruments will have the calibrations checked at a minimum at the start of each day before measurements are made.
- The calibration and calibration checks will indicate that the sensitivity of the instrument (practical detection limit) is adequate to meet project needs and that the instrument is accurate over the working range.
- All calibration information will be recorded in the field log book. This includes date and time, technician signature, calibration procedure, calibration results, calibration problems, recalibration and maintenance, and instrument serial numbers.
- All calibration standards will be of National Bureau of Standards (NBS) quality and their sources listed and documented so that standards are traceable. In addition, only technicians trained in the use of the field instruments will operate them. If the instrument readings are incorrect at the time of the initial calibration, the instrument will either be calibrated by the technician or returned to the manufacturer for calibration. If the instrument readings are incorrect after a continuing calibration check, the preceding sample results will be reviewed for validity, and reanalyzed if necessary.

5.3 LABORATORY CALIBRATION PROCEDURES

All samples analyzed according to the USEPA SW846 analytical methodologies shall follow the procedures described in the applicable Statement of Work (SOW). The calibration procedures and frequency are specifically described for each analysis contained in the SOW. All calibration results shall be recorded and kept on file, and will be reviewed and evaluated by the data validator as part of analytical data validation procedures.

Instrument calibration will be checked with a reference standard prior to the analysis of any sample. The standards used for calibrations will be traceable to the NBS, and each calibration will be recorded in the laboratory notebook for the particular analysis. Any printouts, chromatograms, etc., generated for the calibration will be kept on file.

6.0 ANALYTICAL PROCEDURES

Environmental samples collected for laboratory analysis during the RI/AA will be analyzed by a NYSDEC ASP-certified laboratory for VOCs, SVOCs, and metals, using USEPA SW846 analytical methodologies accompanied by NYSDEC ASP Category B deliverables or full data packages for all air samples. Table 2-1 summarizes the analytical procedures and their sources that will be utilized for this site. The analytical methods listed in Table 2-1 are sufficient to support the DQOs for this project. In particular, the detection limits of these methods are adequate to support the DQOs. The SW846 standard operating procedures (SOPs) used for the analysis of VOCs (Method 8260B), SVOCs (Method 8270C), and metals (Methods 6010B, 7470A, and 7471A), for the selected analytical laboratory will be submitted upon laboratory selection.

7.0 DATA REDUCTION, VALIDATION AND REPORTING

7.1 INTRODUCTION

The purpose of this section is to ensure that the large amounts of data produced by the laboratory are presented in a clear and useable format. In addition, data quality and technical validity must be verified prior to data use. The samples collected at this site will be analyzed according to USEPA SW846 analytical methodologies, in which data reduction and reporting schemes are well developed and clearly defined. The employment of this method ensures comparability with other similarly analyzed environmental samples. Reduction, validation and reporting specifications for these analyses are detailed below.

7.2 DATA REDUCTION

Data reduction is the process by which raw analytical data generated from the analytical instrument systems is converted into useable concentrations. The raw data, which takes the form of area counts or instrument responses, is processed by the laboratory and converted into concentrations expressed in terms of milligrams per liter (mg/l) or milligrams per kilogram (mg/kg), parts per million (ppm), micrograms per liter (μg/l) or micrograms per kilogram (μg/kg), parts per billion (ppb), or micrograms per cubic meter ($\mu g/m^3$). These concentrations are the standard method for expressing the level of contamination present in environmental samples.

The process used to convert the instrument output into useable concentrations is clearly defined in the USEPA SW846 methodologies. The resulting concentrations are comparable to other environmental samples in general and will be comparable to data previously collected for this site.

7.3 DATA VALIDATION

Although rigorous validation of the data generated by the laboratory will be performed by a third party data validation subcontractor, the laboratory will be responsible

for reviewing data to determine if any analytical problems exist. Specifically, the laboratory will develop a case narrative describing how closely the data meet the DQOs presented in this QAPP.

7.4 DATA REPORTING

The laboratory will report TCL data consistent with ASP reporting requirements. The QA reporting will include accuracy and precision protocols performed on the appropriate QA samples, in accordance with ASP requirements.

Field sample precision will be assessed through analysis of duplicate samples and relative percent difference (RPD) calculations. Accuracy will be assessed through the analysis of check standards and the calculation of the percent recovery (%R) of spikes. Field data will also be assessed in relation to specific project needs.

One copy of the ASP Category B data packages will be delivered to a third party data validation subcontractor for data assessment. The data packages will include the case narrative. The data validation report and the data usability report will be submitted to the NYSDEC as part of the corresponding RI Report. This package will include sampling analysis and summary forms. Data validation will be performed using guidance from the following documents:

- *USEPA Region 2 Evaluation of Metals Data for the Contract Laboratory Program (SOP# HW2 Rev. 11).*
- *USEPA Region 2 Validating Semivolatile Organic Compounds by SW-846 Method 8270 (SOP# HW22 Rev. 2).*
- *USEPA Region 2 Validating Volatile Organic Compounds by SW-846 Method 8260B (SOP# HW24 Rev. 1).*
- *USEPA Region 2 Validating Polychlorinated Biphenyls by SW-846 Method 8082 (SOP# HW23B Rev 1.0).*

7.5 RECONCILIATION WITH DATA QUALITY OBJECTIVES

Calculations and determinations for data precision, accuracy and completeness will be performed in accordance with ASP protocol requirements by the contract laboratory.

Following data reporting by the contract laboratory, a third party data validator will review the data packages, compare to ASP and project requirements, determine data usability, and make recommendations. If the results do not meet the project specifications, the data will be flagged as questionable and the cause of the failure (i.e., analytical methods, equipment failure, or sampling error) will be evaluated. The Project Manager and Technical Director will be responsible for decisions regarding use of questionable data. Potential outcomes of this evaluation will include limitations on the use of the data, rejection of the data, and/or re-sampling. Any limitations on the use of the data will be detailed in the Remedial Investigation Report. Corrective action procedures are discussed further in Section 12.

8.0 INTERNAL QUALITY CONTROL CHECKS

8.1 INTRODUCTION

In order to monitor the quality of the analytical data generated for this focused investigation, an appropriate number of quality control (QC) methods will be employed for all field and laboratory measurement systems. The employment of QC methods permits the validation of the analytical methodology utilized and provides a measure of the suitability of the methodology to meet the DQOs prior to the beginning of measurement or analysis. Once the measurement and analysis has begun, the employment of QC methods permits the monitoring of the system output for quality. The QC results presented with the environmental sample data, allows the data to be assessed for quality, and a determination made on how well the data has met the DQOs.

Laboratory generated data is used to accurately identify and quantify hazardous substances, while field generated data is used in conjunction with the laboratory data for further investigation of contamination at the site. Both laboratory and field internal QC programs include steps to assure the data are reliable for the extent they will be used in the focused investigation. In general, laboratory QC programs are more rigorous than field QC programs.

8.2 FIELD QUALITY CONTROL

The intended data uses have been identified and the DQOs established for all field measurement activities in Sections 3 and 5 of this QAPP. Section 3 contains SOPs, which describe the use and calibration of field instruments. QC methods will be used to demonstrate that the instruments are capable of producing reliable data. The QC checks employed for field instruments are as follows:

QC METHOD	PURPOSE	FREQUENCY
Calibration Check Sample	Insures proper working order of instrument. Measures instrument accuracy and sensitivity.	Daily
Background Sample	Provides measure of instrument reliability.	Daily
Duplicate Sample	Measures instrument precision.	5%
Trip Blanks	Measures potential contamination from sample transport, the environment and/or shipping.	Minimum of one per cooler of aqueous volatile samples
Field Blanks	Measures potential contamination due to poor sampling device decontamination procedures.	One per every 20 environmental samples per media.

The calibration check samples will be analyzed daily and duplicate samples will be analyzed at a minimum frequency of five percent. The calibration check verifies that the instrument is capable of accurately identifying and quantifying contaminants of concern. The duplicates provide a quantitative measurement of the precision of the instrument. Background samples are similar to blanks and provide information regarding instrument reliability. The information is recorded in field logbooks. The field technician uses the results from these QC methods to monitor the instrument at the time of the analysis. If QC results indicate a problem with the instrument, corrective action will be taken and, if necessary, the samples will be reanalyzed. Because field measurements are generally easy to repeat, measurements should be repeated as necessary so the data are as complete as possible. The QC results are used as an indication of data quality and reliability when the data are being reviewed.

8.3 LABORATORY QUALITY CONTROL

The scope and description of QC samples and QC methods are well detailed in the applicable USEPA SW846 methodologies for the particular analysis. The methodologies for organic and inorganic analyses describe the type of QC samples and required QC methods, and the required frequency of analysis. QC limits have been established for standards, blanks, duplicates, matrix spikes, and surrogates, and are contained in the methodologies. QC data will be reviewed by Malcolm Pirnie personnel to assess the validity of the data and determine if the DQOs have been met.

9.0 QUALITY ASSURANCE AUDITS

9.1 INTRODUCTION

To monitor the capability and performance of all investigation activities, Malcolm Pirnie QA personnel may conduct audits. Audits are conducted to determine the suitability and capability of project activities to meeting project quality goals. On-site field audits will be conducted to monitor the field techniques, procedures and the overall implementation of the QAPP procedures. These may be conducted periodically by the site Quality Assurance Officer (QAO). Data quality audits (DQAs), are conducted to determine if the data generated by the sampling and analysis satisfies the predetermined DQOs. The site QAO will be responsible for conducting DQAs of all data generated from project activities.

9.2 FIELD AUDITS

Field audits will include an evaluation of:

1. Sample collection and analytical activities.
2. Equipment calibration techniques and records.
3. Decontamination and equipment cleaning.
4. Equipment suitability and maintenance/repair.
5. Background and training of personnel.
6. Sample containers, preservation techniques and chain-of-custody.
7. Data log books.

Field audit forms are provided in Appendix B. A written QA audit report will be prepared by the site QAO and submitted to the Project Officer and Project Manager. The report will identify any deficiencies found and recommend corrective action. Follow-up reports describing corrective actions which have been completed will be submitted to the Project Officer and Project Manager.

9.3 PERFORMANCE AUDITS (PAs)

Data Quality Audits (DQAs) are conducted to determine if the data is adequate to support the DQOs and to determine the cause of deficiencies in the event that the data quality is not adequate. This audit will be conducted by the site QAO after the data has been fully validated. The site QAO will first determine to what extent the data can be used to support the decision-making process. Secondly, the site QAO will identify the cause of any deficiencies in the data, whether technical, managerial, or both.

10.0 PREVENTATIVE MAINTENANCE

10.1 PURPOSE

The purpose of the preventative maintenance program is to ensure that the sampling, field testing and analytical equipment perform properly thereby avoiding erroneous results, and minimizing equipment downtime. The preventative maintenance program also provides for the documentation of all maintenance to be used as evidence of instrument maintenance and for scheduling of future maintenance. This section describes the equipment maintenance program for field instruments and those responsible for implementation of the program at the Arbor Hill Gateway Properties site. The specific equipment maintenance procedures are given in the equipment SOPs and the preventative maintenance SOPs presented in Appendix C. The laboratory preventative maintenance program is the responsibility of the laboratory and only the minimum requirements are mentioned here.

10.2 RESPONSIBILITIES

TITLE	RESPONSIBILITIES
Field Team Leader	Keeping all maintenance records. Development and implementation of maintenance program.
Equipment Manager	Maintaining storage of equipment within the Malcolm Pirnie equipment inventory. Carrying out all maintenance according to schedule. Informing field team members of specific maintenance requirements. Keeping records of all maintenance performed under his care. Sending out equipment for service/repair. Maintaining adequate supply of spare parts.
Field Personnel	Maintenance of all equipment located on-site on a regular basis and after each use. Keeping supply of spare parts on-hand.

10.3 PREVENTATIVE MAINTENANCE PROGRAM

The preventative maintenance program consists of three parts, normal upkeep, service and repair, and formal recordkeeping. Normal upkeep consists of daily procedures that include cleaning, lubrication and checking the batteries of the equipment. The following is a partial list of normal upkeep procedures and a partial list of important spare parts:

- Normal upkeep for environmental monitoring equipment performed daily or after each use:
  1. Cleaning.
  2. Lubrication of moving parts.
  3. Check/charge battery.
  4. Inspect for damage.
  5. Check for operation problems.
  6. Inspect all hoses and lines.

- Partial list of important spare parts for environmental monitoring instruments planned for use at the Henry Johnson Boulevard Properties site:
  1. Fuses.
  2. Mini rae-UV lamp.
  3. Probes.
  4. Spare battery.

The normal upkeep is performed daily after each use and includes inspecting for damage, signs of problems, and charging the batteries if necessary. Specific equipment upkeep procedures are described in the SOP for each instrument in Appendix C.

Minor service and repair will be performed by the Equipment Manager who is trained in the service and repair of field instruments. Equipment in need of major or more complex repair and service will be sent to the manufacturer.

All maintenance, servicing and repair of equipment shall be recorded and kept on file. Field personnel shall record maintenance and instrument problems in the field instrument log books. These will ultimately be kept on file by the Field Team Leader. The Equipment Manager shall keep a record of all equipment released to the field and a record of all maintenance and service on file.

10.4 LABORATORY INSTRUMENT MAINTENANCE

Preventative maintenance procedures will be clearly defined and written for each measurement system. Maintenance activity, preventative or repair, will be documented on standard forms, which are maintained in log books. Written procedures will include maintenance schedules, problem identification procedures, space for describing problems and repair notes, and failure analysis protocols. Service contracts and regularly scheduled in-house maintenance will be included, along with a list of critical spare parts. Laboratory instrument maintenance and calibration and corrective action procedures are incorporated in the SOPs listed in Section 6.0.

10.5 RENTAL EQUIPMENT

Rental equipment will be obtained only from known, reputable rental suppliers. The equipment will require a pre-receipt to verify accuracy, maintenance and upkeep of the equipment.

11.0 DATA ASSESSMENT

11.1 OVERVIEW

All analytical data received by Malcolm Pirnie from the analytical laboratories will be assessed to determine to what extent the data can be used in making sound project decisions. The goal of data assessment is to characterize the data so that project decisions are made using data that is of sufficient quality to support those decisions. The levels of quality needed to support the various project decisions have been stated in the form of the DQOs. Where the DQOs are met, the data is useful in making necessary decisions.

In order to determine how well the DQOs have been met, all data will be reviewed and validated by a qualified data validation subcontractor. The data will be reviewed and validated with the intended data uses and DQOs being utilized to aid in decisions regarding data usefulness.

11.2 DATA ASSESSMENT

11.2.1 Task I – Completeness

Data assessment will include a review of the data package to determine completeness. A complete data package will consist of the following eight components.

1. All sample chain-of-custody forms.
2. The case narrative(s) including all sample/analysis summary forms.
3. Quality Assurance/Quality Control summaries including all supporting documentation.
4. All relevant calibration data including all supporting documentation.
5. Instrument and method performance data.
6. Documentation showing the laboratory's ability to attain the contract specific method detection limits for all target analytes in all required matrices.
7. All data report forms including examples of the calculations used in determining final concentrations.

8. All raw data used in the identification and quantitation of the contract specified target compounds.

All deficiencies in the requirement for completeness shall be reported to the consultant immediately. The laboratory shall be contacted by the Project QAO or data validator and shall be given 10 calendar days to produce the documentation necessary to remove the deficiencies.

11.2.2 Task II – Compliance

The Validator shall review the submitted data package to determine compliance with those portions of the work plan that pertain to the production of laboratory data. Compliance is defined by the following criteria.

1. The data package is complete as defined in Task 1 above.

2. The data has been produced and reported in a manner consistent with the data requirements of the QAPP and the laboratory subcontract.

3. All protocol required QA/QC criteria have been met.

4. All instrument tune and calibration requirements have been met for the time frame during which the analytes were completed.

5. All protocol required initial and continuing calibration data is present and documented.

6. All data reporting forms are complete for all samples submitted. This will include all sample dilution/concentration factors and all premeasurement sample cleanup procedures.

7. All problems encountered during the analytical process have been reported in the case narrative along with any and all actions taken by the laboratory to correct these problems.

The data validation task requires that the Validator conduct a detailed comparison of the reported data with the raw data submitted as part of the supporting documentation package. It is the responsibility of the Validator to determine that the reported data can be completely substantiated by applying protocol-defined procedures for the identification and

quantitation of the individual analytes. To assist the Validator in this determination the following documents are recommended for SW-846 Methods 8260B, 8270C, 6010B; and 7470A/7471A; however, the EPA Functional Guidelines will be used for format only. The specific requirements noted in the Project Quality Assurance Project Plan are prerequisite, for example, holding times or special analytical project needs, to those noted in the Functional Guidelines.

1. USEPA SW846 protocols.

2. Data validation standard operating procedures (SOPs) such as:
   a. USEPA Region 2 Validating Volatile Organic Compounds by SW-846 Method 8260B (SOP#HW24 Rev. 1);
   b. USEPA Region 2 Validating Semivolatile Organic Compounds by SW-846 Method 8270 (SOP#22 Rev. 2);
   c. USEPA Region 2 Evaluation of Metals Data for the Contract Laboratory Program (SOP# HW2 Rev. 11); and
   d. USEPA Region 2 Validating PCB Compounds by SW-846 Method 8082 (SOP#HW-23B Rev. 1).

11.3 REPORTS

The Validator shall submit a Data Usability Summary Report covering the results of the data review process. This report shall include the following:

1. A general assessment of the data package as determined by the accomplishment of Section 11.2, above.

2. Detailed descriptions of any and all deviations from the required protocols. (These descriptions must include references to the portions of the protocols involved in the alleged deviations).

3. Any and all failures in the Validator's attempt to reconcile the reported data with the raw data from which it was derived. (Again, specific references must be included). Telephone logs should be included in the validation report.

4. A detailed assessment by the Validator of the degree to which the data has been comprised by any deviations from protocol, QA/QC breakdowns, lack of analytical control, etc., that occurred during the analytical process.

5. The report shall include, as an attachment, a copy of the laboratory's case narrative including the NYSDEC required sample and analysis summary sheets.

6. The report shall include an overall appraisal of the data package.

7. The validation report shall include a chart presented in a spreadsheet format, consisting of site name, sample numbers, data submitted to laboratory, year of analytical protocol used, matrix, fractions analyzed, e.g., volatiles, semi-volatiles, Metals, CN, PCBs. Space should be provided for a reference to the NYSDEC ASP when non-compliance is involved and a column for an explanation of such violation.

12.0 CORRECTIVE ACTION

12.1 NON-CONFORMANCE REPORTS

Corrective action will be undertaken when a non-conforming condition is identified. A non-conforming condition occurs when QA objectives for precision, accuracy, completeness, representativeness or comparability are not met, or when procedural practices or other conditions are not acceptable.

A non-conformance report will be prepared by the site QAO, approved by the Technical Manager, and issued to the Project Manager and other appropriate parties. The non-conformance report will describe the unacceptable condition and the nature of corrective measures recommended and will include a discussion of specific data involved, the impact to data quality, and ultimate data usability. A schedule for compliance will also be provided.

12.2 CORRECTIVE ACTION

The non-conformance report will be transmitted to a responsible officer of the ASP laboratory, the City of Albany Representative, the Project Officer and the Project Manager. The non-conformance report will specify, in writing, the corrective action recommended including measures to prevent a recurrence of the original deficiency. Appropriate documentation of corrective action will also be prepared. The site QAO will monitor implementation of the corrective action, and provide written record as to whether the original problem has been resolved.

12.3 STOP-WORK ORDER

A Stop-Work Order may be issued, upon authorization, by the site QAO, if corrective action does not adequately address a problem or if no resolution can be reached. To issue a Stop-Work Order, written authorization is required from the Project Manager and the City of Albany Representative. If disagreement occurs among these individuals, it will be brought before successively higher levels of management until the issue is resolved.

12.4 DOCUMENTATION OF THE STOP-WORK ORDER

The conditions and need for a Stop-Work Order will be documented in sufficient detail to permit evaluation of the deficiency and determination of proper corrective action. Pertinent communications will be attached to the Stop-Work Order and referenced in the appropriate spaces. Such communications include discussions, correspondences, or telephone conversations that pertain to evaluation of the problem and potential solutions, and implementation of the preferred solution.

12.5 RESUMPTION OF WORK

In order for work to resume following a Stop-Work Order, the Project Manager and the City of Albany Representative must rescind it in writing.

12.6 COURSE AND ACTION TO PREVENT RECURRENCE

The site QAO is responsible for tracking non-conforming conditions, evaluating the effectiveness of corrective measures, and assuring that the necessary steps have been taken to prevent recurrence of the original problem.

12.7 FIELD CHANGES

The Project Manager is responsible for all site activities. In this capacity the Project Manager will at times be required to modify site programs in response to changing site conditions. At such times the responsible Field Team Leader will notify the Project Manager of the anticipated change, and obtain the approval of the Project Manager and implement the necessary changes. The Project Manager will notify in writing the site QAO, the Project Officer, and the City of Albany Representative. A copy of the notification will be attached to the file copy of the affected document. If an unapproved action has been taken during a

period of deviation, the action will be evaluated to determine the significance of any departure from established procedures.

Changes in the program will be documented on a field change request, which is signed by the Field Team Leader and the Project Manager. The Project Manager will maintain a log for the control of field change requests.

The Project Manager is responsible for controlling, tracking and implementing the identified changes. Completed field change requests are distributed to affected parties which will include as a minimum: Project Officer, Project Manager, site QAO, Field Team Leader, and the City of Albany Representative.

13.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Malcolm Pirnie field staff will promptly report any difficulties to the Project Manager. The laboratory will provide a written description on any quality assurance, problems to Malcolm Pirnie with submission of the analytical data packages.

Following any quality assurance audits, the site QAO will submit a Quality Assurance report to the Project Manager describing the performance of the quality assurance program. Problems or issues that arise independent of audits, may be identified to project management at any time.

14.0 REFERENCES

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APPENDIX A

Standards Criteria and Guidance Values

State Standards Criteria and Guidance Values (SCGs)
Soil and Groundwater
Henry Johnson Boulevard Properties
Albany, New York

Analyte	NYSDEC TAGM 4046 Soil Cleanup Objective (ug/kg)	NYSDEC Class GA Standard (ug/L)
VOCs		
1,1,1-Trichloroethane	800	
1,1,2,2-Tetrachloroethane	600	5
1,1,2-Trichloroethane		
1,1,2-Trichlorotrifluoroethane		
1,1-Dichloroethane	200	5
1,1-Dichloroethene	400	5
1,2,4-Trichlorobenzene	3400	
1,2-Dibromo-3-Chloropropane		
1,2-Dibromoethane		
1,2-Dichlorobenzene	7900	
1,2-Dichloroethane	100	0.6
1,2-Dichloropropane		
1,3-Dichlorobenzene	1600	
1,4-Dichlorobenzene	8500	
2-Butanone		50
2-Hexanone		
4-Methyl-2-Pentanone	1000	
Acetone	200	
Benzene	60	1
Bromodichloromethane		50
Bromoform		
Bromomethane		5
Carbon Disulfide	2700	
Carbon Tetrachloride	600	5
Chlorobenzene	1700	5
Chloroethane	1900	5
Chloroform	300	7
Chloromethane		
cis-1,2-Dichloroethene		5
cis-1,3-Dichloropropene		
Cyclohexane		
Dibromochloromethane	NA	50
Dichlorodifluoromethane		
Ethyl Benzene	5500	5
Isopropylbenzene	5000	5
m/p-Xylenes	1200	5
Methyl Acetate	NA	
Methyl Cyclohexane		
Methyl tert-butyl Ether	120	10
Methylene Chloride	100	5
o-Xylene	600	
Styrene		
t-1,3-Dichloropropene		
Tetrachloroethene	1400	5
Toluene	1500	5
trans-1,2-Dichloroethene	300	5

State Standards Criteria and Guidance Values (SCGs)
Soil and Groundwater
Henry Johnson Boulevard Properties
Albany, New York

Analyte	NYSDEC TAGM 4046 Soil Cleanup Objective (ug/kg)	NYSDEC Class GA Standard (ug/L)
Trichloroethene	700	5
Trichlorofluoromethane		5
Vinyl Chloride	200	2
Total Confident Conc. VOC	10000	
Total TICs		
SVOCs		
1,1-Biphenyl		
2,2-oxybis(1-Chloropropane)		
2,4,5-Trichlorophenol	100	
2,4,6-Trichlorophenol		
2,4-Dichlorophenol	400	
2,4-Dimethylphenol		1
2,4-Dinitrophenol	200	1
2,4-Dinitrotoluene		
2,6-Dinitrotoluene	1000	5
2-Chloronaphthalene		
2-Chlorophenol	800	
2-Methylnaphthalene	36400	
2-Methylphenol	100	
2-Nitroaniline	430	
2-Nitrophenol	330	
3,3-Dichlorobenzidine		
3+4-Methylphenols	900	
3-Nitroaniline	500	
4,6-Dinitro-2-methylphenol		
4-Bromophenyl-phenylether		
4-Chloro-3-methylphenol	240	
4-Chloroaniline	220	
4-Chlorophenyl-phenylether		
4-Nitroaniline		
4-Nitrophenol	100	
Acenaphthene	50000	
Acenaphthylene	41000	
Acetophenone		
Anthracene	50000	50
Atrazine		
Benzaldehyde		
Benzo(a)anthracene	224	0.002
Benzo(a)pyrene	61	ND

State Standards Criteria and Guidance Values (SCGs)
Soil and Groundwater
Henry Johnson Boulevard Properties
Albany, New York

Analyte	NYSDEC TAGM 4046 Soil Cleanup Objective (ug/kg)	NYSDEC Class GA Standard (ug/L)
Benzo(b)fluoranthene	1100	0.002
Benzo(g,h,i)perylene	50000	
Benzo(k)fluoranthene	1100	0.002
bis(2-Chloroethoxy)methane		
bis(2-Chloroethyl)ether		
bis(2-Ethylhexyl)phthalate	50000	50
Butylbenzylphthalate	50000	50
Caprolactam		
Carbazole		
Chrysene	400	0.002
Dibenz(a,h)anthracene	14	
Dibenzofuran	6200	
Diethylphthalate	7100	50
Dimethylphthalate	2000	50
Di-n-butylphthalate	8100	50
Di-n-octyl phthalate	50000	50
Fluoranthene	50000	50
Fluorene	50000	50
Hexachlorobenzene	410	
Hexachlorobutadiene		
Hexachlorocyclopentadiene		
Hexachloroethane		
Indeno(1,2,3-cd)pyrene	3200	0.002
Isophorone	4400	
Naphthalene	13000	10
Nitrobenzene	200	
N-Nitroso-di-n-propylamine		
N-Nitrosodiphenylamine		50
Pentachlorophenol	1000	1
Phenanthrene	50000	50
Phenol	30	1
Pyrene	50000	50
Total Confident Conc. SVOC	500000	
Total TICs		
METALS (Total)		
Arsenic	7500 or SB	25
Barium	300000 or SB	1000
Cadmium	1000 or SB	5
Chromium	10000	50
Lead	SB	25
Mercury	100	0.7
Selenium	2000 or SB	10
Silver	SB	50

Notes:
SB - Site Background

APPENDIX B

Field Forms

MALCOLM PIRNIE

WELL DEVELOPMENT/ PURGING LOG

WELL NUMBER: _____ DATE: _____

PROJECT NAME: _____

PROJECT NUMBER: _____

SAMPLERS: _____

A: Total Casing and Screen Length: _____

B: Casing Internal Diameter: _____

C: Water Level Below Top of Casing: _____

D: Volume of Water in Casing: _____

$v = 0.0408 (B)^2 \times (A-C) = D$

v = 0.0408 ( )^2 x (-) = _____ gal.

Well I.D.	Vol. Gal./ft.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETER	ACCUMULATED VOLUME PURGED											
Time												
Gallons												
Well Volume												
Conductivity (mohm/cm)												
Dissolved Oxygen												
REDOX (mV)												
pH												
Temperature (^{o}C)												
Turbidity												
Salinity												
TDS												

Notes: _____

APPENDIX C

Instrument Specifications

MiniRAE 2000

Portable Handheld VOC Monitor

The rugged **MiniRAE 2000** is the smallest pumped handheld volatile organic compound (VOC) monitor on the market. Its Photoionization Detector's (PID) extended range of 0-10,000 ppm makes it an ideal instrument for applications from environmental site surveying to HazMat/Homeland Security.

Key Features

Proven PID technology The patented 3D sensor provides a 3-second response up to 10,000 ppm and sets a new standard for resistance to moisture and dirt.

Self-cleaning lamp and sensor Our patented self-cleaning lamp and sensor minimize the need for maintenance and calibration.

The MiniRAE 2000 lamp and sensor can be taken apart in seconds for easy maintenance without any tools!

Measure more chemicals than with any other PID With over 100 Correction Factors built into the **MiniRAE 2000** memory and the largest printed list of Correction
Factors in the world (300+), RAE Systems offers the ability to accurately measure more ionizable chemicals than any other
PID. When a gas is selected from the MiniRAE 2000's library, the alarm points are automatically loaded into the meter.

User friendly screens make it easy to use for simple applications and flexible enough for sophisticated operations.

Drop-in battery When work schedules require putting in more than the 10 hours supplied by the standard NiMH battery, the drop-in alkaline pack supplied with every MiniRAE 2000 lets you finish the job.

Rugged Rubber Boot The standard rubber boot helps assure that the MiniRAE 2000 survives the bumps and knocks of tough field use.

Strong, built-in sample pump draws up to 100 feet (30m) horizontally or vertically.

Tough flexible inlet probe

Large keys operable with 3 layers of gloves.

Easy-to-read display with backlight.

Stores up to 267 hours of data at one minute intervals for downloading to PC (with the datalogging option).

3-year 10.6 eV lamp warranty

Applications

HazMat/Homeland Security

- Initial PPE (personal protective equipment) assessment
- Leak detection
- Perimeter establishment and maintenance
- Spill delineation
- Decontamination
- Remediation

Industrial Hygiene/Safety

- Confined Space Entry (CSE)
- Indoor Air Quality (IAQ)
- Worker exposure studies

Environmental

- Soil and water headspace analysis
- Leaking underground storage tanks
- Perimeter fenceline monitoring
- Fugitive emissions (EPA Method 21)
- Vapor recovery breakthrough
- Landfill monitoring

ATEX

ISO 9001 CERTIFIED

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rev12_ 04.05

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Tel: 852.2669.0828

RAE SYSTEMS

MiniRAE 2000

Specifications*

Default Sensor Settings**

Gas Monitor (ppm)	Range (ppm)	Resolution Time (T90)	Response
VOCs	0 - 999 ppm	0.1 ppm	< 3 sec
	100 - 10,000 ppm	1 ppm	< 3 sec

Detector Specifications

Size	8.2"L x 3.0"W x 2.0"H (21.8 x 7.62 x 5.0 cm)
Weight	20 oz with battery pack (553g) w/o rubber boot
Sensor	Photoionization sensor with standard 10.6 eV or optional 9.8eV or 11.7 eV UV lamp
Battery	• Rechargeable, external, field replaceable Nickel-Metal-Hydride (NiMH) battery pack • Alkaline battery holder (for 4 AA batteries)
Operating Period	10 hours continuous operation
Display	Large LCD, backlight activated manually, with alarms or darkness
Keypad	1 operation and 2 programming keys
Direct Readout	• VOCs as ppm by volume • High and low values • STEL and TWA (in hygiene mode) • Battery and shut down voltage
Alarms	90 dB buzzer and flashing red LED to indicate exceeded preset limits • High: 3 beeps and flashes per second • Low: 2 beeps and flashes per second • STEL and TWA: 1 beep and flash per second • Alarms automatic reset or latching with manual override • Optional plug-in pen size vibration alarm • User adjustable alarm limits
Calibration	Two point field calibration of zero and standard reference gas. Calibration memory of 8 calibration gases, alarm limits, span values and calibration date
Datalogging	Optional 267 hours (at one minute intervals) with date/time. Header information includes monitor serial number, user ID, site ID, date and time
Sampling Pump	• Internal, integrated flow rate 400 cc/min • Sample from 100' (30m) horizontally or vertically
Low Flow Alarm	Auto shut-off pump at low flow condition
Communication	Download data and upload instrument set-up from PC through RS-232 link to serial port
Temperature	14° to 104°F (-10° to 40°C)
Humidity	0% to 95% relative humidity (non-condensing)
EM/RFI	Highly resistant to EMI /RFI. Compliant with EMC Directive 89/336/EEC
IP-rating	IP-55: protected against dust, protected against low pressure jets of water from all directions
Hazardous Area Approval	• US and Canada: UL and cUL, Classified for use in Class I, Division 1, Groups A, B, C and D hazardous locations • Europe: ATEX II IG EEx ia IIC T4
Attachment	Durable bright yellow rubber boot w/belt clip & wrist strap
Warranty	Lifetime on non-consumable components (per RAE Systems Standard Warranty), 3 years for 10.6.V PID lamp, 1 year for pump and battery

* On going projects to enhance our products means that these specifications are subject to change

** Performance based on isobutylene calibration

MiniRAE 2000 and Accessories

Monitor only includes:

- 10.6eV, 9.8eV or 11.7eV as specified
- RAE Systems UV lamp: 10.6eV, 9.8eV or 11.7eV as specified
- 5-inch Flex-I-Probe
- External filter
- Rubber boot with belt clip
- Alkaline battery adapter
- Tool kit
- Lamp cleaning kit
- Nickel-Metal-Hydride battery
- 120/230 V AC/DC wall adapter (if specified)
- Operation and maintenance manual

Monitor with accessories kit adds:

- Hard transport case with pre-cut foam
- 5 porous metal filters and O-rings
- Organic vapor zeroing adapter
- Gas outlet port and tubing

Optional calibration kit adds:

- 10 ppm isobutylene calibration gas, 34L
- Calibration regulator and flow controller

Datalogging monitor adds:

- ProRAE Suite software package for Windows 98, NT, 2000 and XP
- Computer interface cable

Optional Guaranteed Cost of Ownership Program:

- 4-year repair and replacement guarantee
- Annual maintenance service

DISTRIBUTED BY:

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RAE SYSTEMS

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"Your Needs Are Our Business"

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Horiba

Model U-22
Water Quality Monitoring System

The Horiba U-22 Monitoring System offers laboratory quality measurements in a portable package ready for use in tough field conditions.

The versatility & monitoring capabilities of the U-22 make it an excellent choice in lake, well, groundwater, ocean sewer and irrigation water applications

FEATURES

-- Fits in two inch wells
-- Up to one month data logging
-- Measurement at depths as low as 100 meters
-- Measures 10 parameters simultaneously; pH, DO, Conductivity, Salinity, TDS, Seawater specific gravity, Temperature, Depth, and ORP
-- Automatic one point or manual two point calibration
-- Immersed sensor detection
-- Large digit LCD

SPECIFICATIONS

PARAMETERS	MEASURING PRINCIPLE	RANGE	RESOLUTION	REPEATABILITY	ACCURACY
pH · Two point calibration · Automatic Temp. Compensation	Glass Electrode Method	pH 0~14	0.01 pH	+/- 0.05 pH	+/- 0.1 pH
Dissolved Oxygen · Salt correction (0 to 40ppt/automatic) · Automatic Temp Compensation	Diaphragm gavanic battery method	0~19.99 mg/L	0.01 mg/L	+/- 0.1 mg/L	+/- 0.2 mg/L
Conductivity · Auto Range · Automatic Temp conversion (25° C) · SI units	4 AC Electrode Method	0 ~ 9.99 S/m	0.1% F.S	+/- 1%	+/- 3%
Salinity	Conductivity Conversion	0~4 %	0.01%	+/- 0.1%	+/- 0.3%
TDS Conversion factor setting	Conductivity Conversion	0 ~ 99.9 g/L	0.1% F.S	+/- 2g/L	+/- 5g/L
Seawater Specific Gravity ·Display σt, σo, σ15	Conductivity Conversion	0~50σt	0.1σt	+/-2σt	+/-5σt
Temperature	Thermistor Method	0~55°C	0.01°C	+/-0.3°C	+/-1.0°C
Turbidity Unit Selection	Penetration and scattering method	0~800 NTU	0.1 NTU	+/-3%	+/-5%
Water Depth	Pressure Method	0~100m	1m	+/-3%	+/-5%
ORP	Platinum Electrode Method	+/-1999mV	1mV	+/-5mV	+/-15mV

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Braddock, PA 15104

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fieldenvironmental.com

Visit us soon on the web
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fieldenvironmental.com

Inquiries and orders
800-393-4009

APPENDIX F – SITE MANAGEMENT FORMS

SITE INSPECTION FORM

Henry Johnson Boulevard Properties
Albany New York

Date: _____ Weather: _____

Inspector: _____

	No	Yes
1) Is there a change in site/property use since last inspection?	____	____
2) Is there a change in site/property vegetation since last inspection?	____	____
3) Is there evidence of excavation since last inspection?	____	____
4) Is there any damage to monitoring wells or vapor points since last inspection?	____	____

Comments: *(Required for each Yes answer)*

_____

_____

_____

_____

Additional Comments/Concerns/Recommendations/Sketches:

Signed: _____ Date: _____

ARCADIS
Infrastructure · Water · Environment · Buildings

WELL DEVELOPMENT/ PURGING LOG

WELL NUMBER: _____ DATE: _____

PROJECT NAME: Henry Johnson Boulevard Properties Long-Term Monitoring
PROJECT NUMBER: 04279009.000
SAMPLERS: _____

A: Total Casing and Screen Length: _____
B: Casing Internal Diameter: _____
C: Water Level Below Top of Casing: _____
D: Volume of Water in Casing: _____

PARAMETER	ACCUMULATED VOLUME PURGED											
Time												
Gallons												
Well Volume												
Temperature (°C)												
pH												
REDOX (mV)												
Conductivity (mohm/cm)												
Turbidity												
Dissolved Oxygen												
TDS												
Salinity												

ANALYTE	CONCENTRATION
Nitrate (mg/l)	
Nitrite (mg/l)	
Sulfate (mg/l)	
Chloride (mgl)	
Alkalinity (mg/l)	
Ferrous Iron (mg/l)	

Well I.D.	Vol. Gal./ft.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

Notes: _____

APPENDIX G

REMEDIAL SYSTEM OPTIMIZATION TABLE OF CONTENTS

REMEDIAL SYSTEM OPTIMIZATION FOR HENRY JOHNSON BOULEVARD PROPERTIES

TABLE OF CONTENTS

APPENDIX H – HEALTH AND SAFETY PLAN AND COMMUNITY AIR MONITORING PLAN

Albany Community Development Agency
200 Henry Johnson Boulevard • Albany, New York 12210

HENRY JOHNSON BOULEVARD PROPERTIES
ALBANY, NEW YORK

Site Management Plan
Appendix H:
Generic Health & Safety Plan for Subsurface Work

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ENVIRONMENTAL RESTORATION PROGRAM
PROJECT #E401049

September 2015

Prepared By:

ARCADIS of New York, Inc.

855 Route 146, Suite 210
Clifton Park, New York 12065
518-250-7300

04279009.0000

ARCADIS
Infrastructure · Water · Environment · Buildings

Contents

Figures

Tables

1. Introduction

1.1. Objective

This Generic Health and Safety Plan (HASP) has been prepared as a generic appendix to the Site Management Plan (SMP) for potential future subsurface work that will encounter residual contamination at the site. The purpose of this document is to provide hazard information and minimum Health and Safety protocols and procedures that will be implemented during subsurface work activities to promote worker safety and protect the general public.

The following topics are presented and discussed in this Generic HASP:

- Organizational roles and responsibilities;
- Analysis of potential risks associated with subsurface work;
- General overview of safety practices and programs;
- Discussion of site control procedures, including decontamination and site monitoring; and,
- Contingency plans.

2. Roles and Responsibilities

2.1. City of Albany

In the event of subsurface construction work or utility access for repairs or upgrades, the City will provide this SMP and HASP to all applicable contractors and subcontractors to ensure that appropriate soil management and health and safety protocols are followed to prevent human exposure to residual petroleum contamination at the site.

2.2. Subcontractors

Subcontractors for any future subsurface work at the site will be required to read, understand, and conform to the policies, requirements, and information presented in this Generic HASP and Appendices, including:

- Following the guidelines for personal protective equipment (PPE), engineering controls, and work practices identified in the Generic HASP and subcontractor's HASP;
- Understand and comply with 29 Code of Federal Regulations (CFR) Part 1910 and 1926 rules and regulations as applicable to the tasks the subcontractor will be performing;
- Notify the City of identified or potential safety or health hazards, emergencies, or injuries;
- Comply with applicable OSHA and/or New York State training and medical surveillance requirements.
- Comply with the SMP.

Subcontractors shall be solely responsible for the health and safety of their employees and shall comply with all applicable laws and regulations. In accordance with 1910.120(b)(1)(iv) and (v), the City will inform subcontractors of the site emergency response procedures, and any potential fire, explosion, health, safety or other hazards by making this Generic HASP and site information obtained by others available during regular business hours. All contractors and subcontractors are responsible for:

1. Developing their own Health and Safety Plan, including a written Hazard Communication Program and any other written hazard specific or safety programs

required by federal, state and local laws and regulations, that details subcontractor tasks, potential or actual hazards identified as a result of a risk analysis of those tasks, and the engineering controls, work practices and personal protective equipment to be utilized to minimize or eliminate employee exposure to the hazard;

2. Providing their own personal protective equipment;

3. Providing documentation that their employees have been health and safety trained in accordance with applicable federal, state and local laws and regulations;

4. Providing evidence of medical surveillance and medical approvals for their employees; and

5. The contractor and/or subcontractor shall designate their own Site Safety Officer (SSO). The subcontractor SSO is responsible for ensuring that their employees comply with their own specific HASP and taking any other additional measures required by the SMP.

Providing a copy of this Generic HASP and Appendices to subcontractors does not establish, nor is it intended to establish, a "joint employer" relationship between the Contractor and ARCADIS of New York, Inc. This allowance does not establish, nor is it intended to establish, a direct or indirect employer/employee relationship with subcontractor's employees.

3. Site Information, Hazards, and Control

3.1. Nature of Contamination and Exposure Pathway

Based on data obtained from the RI/AA, residual petroleum and chlorinated VOC contamination remains at the site near the City and utility right-of-way. The main categories of contaminants that exceed 6 NYCRR Part 375 CSCOs are volatile organic compounds (VOCs) associated with petroleum constituents and chlorinated solvents. Given the absence of buildings on the site, direct contact, ingestion, or inhalation of VOCs from subsurface soil, groundwater, or soil vapor during future construction work and/or utility access and repairs remains the only potential human exposure pathway to the residual contamination.

Additionally, it should be noted that residual sodium permanganate maybe present in site groundwater and presents a potential exposure risk to future construction work and/or utility access and repairs as permanganate is a very strong oxidizer.

3.2. Emergency Information

Local emergency information is provided in Table 1. Hospital directions are provided in Figure 1.

Table 1.
Emergency Information

Local Resources	Service Name	Telephone Number
Emergency Medical Services	Mohawk Ambulance Service	Emergency 911
Hospital (see attached map)	Albany Medical Center	Emergency 911
Fire Department	Albany Fire Department	Emergency 911
Police/Security	Albany Police Department	Emergency 911
Hazmat/Spill/Other Response	Albany Fire Department	Emergency 911

3.3. Hazard Analysis

Potential chemical exposure during future subsurface work from the residual contamination would be to volatile organic compounds (VOCs), primarily tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene, and vinyl chloride in groundwater at concentrations estimated up to 200 parts per billion (ppb). The lowest permissible exposure limits for these compounds for an 8-hour time weighted average are approximately 10-200 ppm, depending on the compound. During routine

excavation and utility access, the route of exposure would be contact with contaminated soil or groundwater. However, the potential for contact is low and will be controlled through the use of appropriate PPE and work practices.

Additionally, potential exposure during future subsurface work could be to residual sodium permanganate (used for groundwater treatment) in groundwater at concentrations up to 4%.

3.4. Safety Procedures and Site Control Measures

3.4.1. Work Zones

The contractor or subcontractor's SSO will coordinate access control and security for subsurface work at the site. A safe perimeter will be established at the boundary of any excavation and/or safe distance from excavators and other heavy equipment. These boundaries will be identified by safety cones, caution tape, and or temporary fencing.

3.4.2. Environmental Monitoring

Given the potential for exposure of the residual soil contamination, and to confirm that work activities do not generate airborne contaminants, VOCs and particulate matter (dust) will be monitored on a continuous basis during all ground-intrusive activities. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. VOC monitoring will be conducted using a MiniRae 2000 photoionization detector (PID). The PID will be calibrated at least daily using the span calibration gas recommended by the manufacturer. The PID will calculate 15-minute running average concentrations. These averages will be compared to the action levels specified below. Real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) will be used for the particulate monitoring. The equipment will be equipped with an audible alarm to indicate exceedance of the action levels summarized below. Any fugitive dust migration will also be visually assessed during all work activities.

Action Levels - VOCs

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than

25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, all work activities will be stopped.

Action Levels – Particulate Matter

- If the downwind PM-10 particulate level is 0.1 milligrams per cubic meter (mg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 0.15 mg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 0.15 mg/m3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 0.15 mg/m3 of the upwind level and in preventing visible dust migration.

All 15-minute average readings will be recorded and be available for review by the New York State Department of Environmental Conservation (NYSDEC) or the NYS Department of Health (NYSDOH). Instantaneous readings, if any, used for decision purposes will also be recorded.

COMMUNITY AIR MONITORING PLAN
REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS
HENRY JOHNSON BOULEVARD PROPERTIES, ALBANY, NEW YORK

To provide a measure of protection for any potential downwind receptors, and to confirm that work activities do not generate airborne contaminants, continuous monitoring for volatile organic compounds (VOCs) and particulate matter (dust) will be conducted during all ground intrusive activities at the site. Monitoring will be conducted at the downwind perimeter of each work area.

VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

Volatile organic compounds (VOCs) will be monitored on a continuous basis during ground intrusive activities. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. VOC monitoring will be conducted using a MiniRae 2000 photoionization detector (PID). The PID will be calibrated at least daily using the span calibration gas recommended by the manufacturer. The PID will calculate 15-minute running average concentrations. These averages will be compared to the action levels specified below.

Action Levels

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, all work activities will be stopped.

All 15-minute average readings will be recorded and be available for review by the New York State Department of Environmental Conservation (NYSDEC) or the NYS Department of Health (DOH). Instantaneous readings, if any, used for decision purposes will also be recorded.

PARTICULATE MONITORING, RESPONSE LEVELS, AND ACTIONS

Particulate concentrations will be monitored continuously at the downwind perimeter of the each work area during all ground intrusive activities. Real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) will be used for the particulate monitoring. The equipment will be equipped with an audible alarm to indicate exceedance of the action levels summarized below. Any fugitive dust migration will also be visually assessed during all work activities.

Action Levels

- If the downwind PM-10 particulate level is 0.1 milligrams per cubic meter (mg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 0.15 mg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 0.15 mg/m^3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 0.15 mg/m^3 of the upwind level and in preventing visible dust migration.

All particulate monitoring measurements readings will be recorded and made available for NYSDEC and NYSDOH review.