



**New York State Department of
Environmental Conservation
Division of Environmental Remediation**

**AVM Gowanda Site
SITE MANAGEMENT PLAN
Site No. 905025**



OCTOBER 2019

AVM GOWANDA SITE
CATTARAUGUS COUNTY
GOWANDA, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: 905025

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation
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Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

OCTOBER 2019

CERTIFICATION STATEMENT

I Matthew R. DeVinney, P.E. certify that I am currently a NYS registered professional engineer 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).

Matthew R. DeVinney P.E.
10-3-19 DATE



**AVM GOWANDA
CATTARAUGUS COUNTY
GOWANDA, NEW YORK**

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
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

LIST OF ACRONYMS (Continued)

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

ES EXECUTIVE SUMMARY

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

Site Identification: 905025 AVM Gowanda Site, One Industrial Place, Gowanda, Cattaraugus County, NY

Institutional Controls:	1. The property may be used for industrial or commercial use;
	2. All ECs must be operated and maintained as specified in this SMP;
	3. All ECs must be inspected at a frequency and in a manner defined in this SMP;
	4. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Cattaraugus 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;
	5. Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
	6. Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
	7. All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
	8. Monitoring to assess the performance and effectiveness of the Remedy must be performed as defined in this SMP;
	9. 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 Deed Restriction.
Engineering Controls:	<ol style="list-style-type: none"> 1. Groundwater Monitoring 2. Residential sub-slab depressurization systems 3. Maintenance ISCO injections, as necessary
Inspections:	Frequency
1. Groundwater monitoring wells	Annually (15-month seasonal rotation)

Site Identification: 905025 AVM Gowanda Site, One Industrial Place, Gowanda, Cattaraugus County, NY

Monitoring:	
1. Groundwater	Annually (15-month seasonal rotation)
Maintenance:	
1. Groundwater monitoring wells	1 and 2 - As Needed
2. Maintenance ISCO injections	3 and 4 - Annually
3. Communication with new owners of residential properties within the plume area sub-slab depressurization systems	
4. Communication with existing homeowners within the plume area to check the performance of their sub-slab depressurization systems	
Reporting:	
1. Periodic Review Report	Annually

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

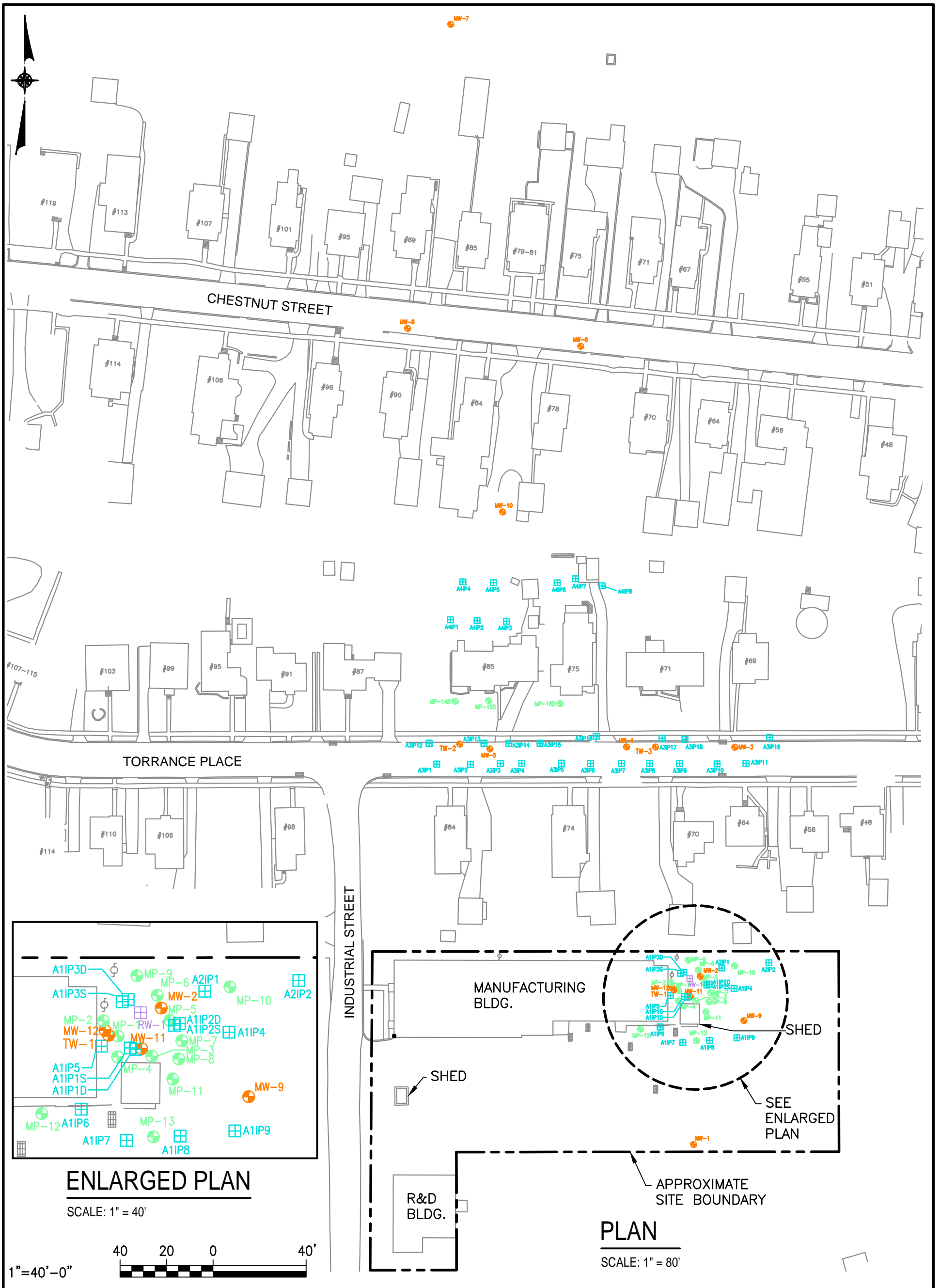
This Site Management Plan (SMP) is a required element of the remedial program for the American Voting Machine Corporation (AVM) Gowanda Inactive Hazardous Waste Site located in Gowanda, New York (hereinafter referred to as the “Site”). See Figure 1-1 for a site location map. The Site is a New York State Department of Environmental Conservation (NYSDEC) Class 2 Inactive Hazardous Waste Disposal Site (Site Registry Number 905025) which is administered by New York State Department of Environmental Conservation (NYSDEC).

A Record of Decision (ROD) was signed in March 2001 that selected groundwater extraction in combination with permeable passive/reactive iron wall as the remedy for the Site. After the ROD was completed, new technologies for the destruction of chlorinated solvents became available, specifically, In-Situ Chemical Oxidation Injection (ISCO). As a result, the Site was remediated through an ISCO injection program using sodium permanganate to address elevated volatile organic compound (VOC) concentrations in groundwater on and off-site. A figure showing the Site location and boundary of the Site is provided in Figure 1-2. The boundary of the Site is more fully described in the metes and bounds site description that is part of the Deed Restriction provided in Appendix A.

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



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AVM GOWANDA SITE
GOWANDA, NEW YORK
SITE LAYOUT PLAN

SCALE: AS NOTED

FIGURE 1-2

This SMP was prepared to manage remaining contamination at the site until the Deed Restriction 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 Deed Restriction 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 Deed Restriction. Failure to properly implement the SMP is a violation of the Deed Restriction; and
- Failure to comply with this SMP is also a violation of Environmental Conservation Law and 6 NYCRR Part 375, 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 D&B Engineers and Architects, P.C. on behalf of New York State Department of Environmental Conservation, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated August, 2015, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Deed Restriction 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 soil, or other significant change to the site

conditions. In accordance with the Deed Restriction 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 6 NYCRR 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 ECs 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 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 1-1 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 1-1: Notifications*

Name	Contact Information
Robert Strang Project Manager; NYS Department of Environmental Conservation	Phone: (518) 402-8642 Email: robert.strang@dec.ny.gov
Kristen Davidson, Citizen Participation Specialist; NYS Department of Environmental Conservation	Phone: (716) 851-7220 Email: kristen.davidson@dec.ny.gov
Chad Staniszewski, P.E. Region 9 Remediation Engineer NYS Department of Environmental Conservation	Phone: (716) 851-7220 Email: chad.staniszewski@dec.ny.gov
Steven G. Berninger, New York State Department of Health Bureau of Environmental Exposure Investigation	Phone: (518) 402-7860 Email: BEEI@health.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 Gowanda, Cattaraugus County, New York and is identified as Section 16, Block 28, Lots 1 and 2 on the Cattaraugus County Tax Map. The site is approximately 1.75-acres in area and is bounded by residential properties to the north and east and commercial properties to the south and the west (see Figure 1-2 – Site Layout Plan). The boundaries of the site are more fully described in Appendix A – Deed Restriction. The owner of the site parcel at the time of issuance of this SMP is:

Village of Gowanda.

2.2 Physical Setting

2.2.1 Land Use

The Site property is used by the Village of Gowanda for vehicle, equipment and material storage and other operations in support of its highway, sewer, water and parks departments. The Site property is flat and mostly covered by buildings and pavement. Grass covered areas adjoin the former manufacturing building to the north, southeast, east and west. Surface water drainage is provided via storm drains that discharge to Thatcher Brook and ultimately to Cattaraugus Creek. The Site property is served by municipal water and sanitary sewer systems. The surrounding residential and commercial/industrial areas are also served by public water and municipal sanitary sewers.

2.2.2 Geology

Regionally, the Site is located in the Saint Lawrence Physiographic province. The surficial geology in the vicinity of the Site consists of unconsolidated flood plain deposits represented by fine-grained sands to gravels which are sometimes overlain by silt (Cadwell, 1988). The bedrock geology in the vicinity of the Site has been classified as part of the

Machias Formation of the Canadaway Group (Fisher & Rickard, 1970), deposited during the Upper Devonian era. The sedimentary units consist of interbedded shale and siltstone with rare intermittent sandstone beds. Previous subsurface investigations at the Site indicate that, locally, the soils consist of an upper layer of fine to coarse sand and silt extending to a maximum depth of 9 feet below the ground surface (bgs). This layer is underlain by a fine to coarse sand and gravel extending to a maximum depth of approximately 17 feet bgs. The sand and gravel layer is underlain by a relatively thicker layer dominated by silt and fine-grained sand. This layer has been observed to a depth of approximately 31 feet bgs. The lowermost soil unit encountered at the Site consists of clay and silt extending to a depth of at least 155 feet, which is the maximum depth of historical investigation activities completed at the location. Bedrock was not encountered at the Site during boring or well installation activities completed as part of historical environmental investigation activities.

2.2.3 Hydrogeology

The Site is located in the southern portion of the Cattaraugus Creek Watershed. The Site, and resulting area of impacted groundwater, is underlain by moderately to highly permeable alluvium (alluvium is a general term referring to soil and sediment deposited by a river or stream) comprised of a varying mix of sand and gravel. Within this alluvium are buried stream channels filled with coarser sand and gravel that serve as preferential flow paths and, in part, control groundwater flow. The thickness of the alluvium ranges from 4 to 15 feet. Groundwater occurs within the alluvium under unconfined, or water table, conditions. Below the alluvium, is a dense glacial till that may serve as a barrier to further downward migration of contaminants. The surface of this till was eroded during post glacial stream flow, resulting in an uneven surface with the deepest area beneath Torrance Place. The water bearing alluvium is covered with up to 8 feet of flood plain silt and clay, that serves to retard upward migration of contaminant vapors from the water table. The average depth to groundwater at the Site is approximately 6 feet bgs. However, seasonal variations in precipitation may cause fluctuations in the groundwater elevation which cause variations of up to 5 feet below or above this average. Groundwater flow within the

alluvium is to the north/northwest under a moderate gradient, at an estimated rate of 2 to 4 feet per day. Groundwater monitoring well construction logs are provided in Appendix C.

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a summary of the available project records to document key investigative and remedial milestones for the Site. The AVM Gowanda Site was used for industrial operations since the early 1930s. From World War II until 1979 the facility was used as a metal stamping/machine shop. Gowanda Electronics Corp. (GEC) purchased the facility in 1979 from the AVM Corporation and used the facility for the manufacture of electronic components, and later for equipment storage until October 2008 when the Village acquired the property.

A Phase I and Phase II site investigation were completed in the spring of 1994 for the Site by Malcom Pirnie, Inc. These investigations revealed elevated levels of various metals, total petroleum hydrocarbons (TPHs) and trace levels of volatile organic compounds (VOCs) in surface soil samples. Soil excavation was performed on-site to a depth of approximately seven feet, excavating 568 tons of soil for off-site disposal. During the excavation program, it was discovered that VOC concentrations in the soil increased with depth and had migrated into the groundwater table resulting in groundwater contamination. A NYSDEC Immediate Investigation Work Assignment (IIWA) was issued in 1995 to investigate the existing subsurface and groundwater conditions near the source area and identify potential migration pathways.

In 1996, the NYSDEC issued a summary report detailing the identification of a significant groundwater contaminant plume, migrating from the source area northward to Torrance Place. Gowanda Electronics also installed an on-site groundwater extraction well with air stripper the same year as an Interim Remedial Measure (IRM). The Site was listed on the New York State Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 Site based on the results of the IIWA.

A Remedial Investigation (RI) was conducted from June 1997 through October 1998 to define the nature and extent of site contamination. Following the RI, potential remedial alternatives for the Site were identified, screened and evaluated in a Feasibility Study and outlined in a report in 2000. A Record of Decision (ROD) for groundwater extraction in combination with permeable passive/reactive iron wall as the selected remedy for the Site was signed in March 2001.

A Pre-Design Investigation was conducted in 2004 to evaluate the conditions both on and off-site, as well as to collect the information required for the design of the selected groundwater remedial activities. The Department installed Sub-Slab Depressurization Systems (SSDSs) in 18 nearby homes in 2004 to mitigate indoor air impacts exceeding New York State Department of Health (DOH) guidelines. The Department also installed a SSDS in the former manufacturing building (now used by the Village as office space) in 2010. Annually, the Department and/or Standby Engineer sends a notification regarding the SSDS to each respective property owner describing the system, periodic inspection protocols to be performed by the owner and asking the owner to contact the Department if the results of the inspections indicate that the system is no longer operating properly. Additionally, on an annual basis, the Department and/or Standby Engineer will review property ownership information. Properties under new ownership that originally declined to have an SSDS installed will be contacted with information regarding the Site and installing an SSDS in their home.

After the ROD was completed, new technologies for the destruction of chlorinated solvents became available, specifically, In-Situ Chemical Oxidation Injection (ISCO). A Supplemental Pre-Design Investigation Report was completed in July 2011 to evaluate the feasibility, effectiveness, and cost of implementing ISCO at the Site. The result of this investigation was that ISCO injections of hydrogen peroxide at the source area, and sodium and potassium permanganate along the plume would be an effective remedial action.

An ISCO pilot study was completed at the Site property between February 6, 2012 and March 23, 2012 to evaluate potential oxidants for the ISCO program. The pilot study

activities included the installation of injection wells, monitoring points and soil vapor extraction wells; soil and groundwater sampling; and injection of hydrogen peroxide and sodium permanganate into the subsurface. The pilot study results indicated that sodium permanganate could be injected into the subsurface with a radius of influence and flow rate within acceptable ranges for full-scale implementation of the chemical oxidation technology.

The full-scale injection event was completed between July 2012 and January 2015. Full injection event activities consisted of the injection of a sodium permanganate solution through a series of injection wells, monitoring points, and monitoring wells that were installed on-site in the source area as well as downgradient of the Site in the public right-of-ways and select private properties. The full scale ISCO injection remedy was comprised of three injection events which were completed in July 2012, October to November 2013, and December 2014 to January 2015, injecting approximately 12,000, 193,960, and 50,180 gallons of 10% sodium permanganate solution, respectively. Full scale ISCO injection was successful in destroying a significant amount of site related contaminants of concern (COCs) including the primary COC, trichloroethene.

However, site-related contaminants remain at concentrations above Class GA Groundwater Standards and Guidance Values in groundwater on- and off-site. Site-contaminants were also detected at concentrations greater than RR-SCOs in several subsurface soil samples collected from monitoring points and injection wells installed as part the sodium permanganate injection program. The concentrations were detected at on- and off-site locations and prior to completion of the injection activities. Post-injection soil samples were not collected as part of the injection program. Although saturated soil was likely treated as part of the remedial action, the potential for residual contamination in soil at the Site remains.

Additionally, DNAPL likely exist on the till and/or within the pore spaces of the soil beneath the Site. The DNAPL likely serves as a continuing source of groundwater contamination at the Site. Successful remediation of DNAPL or DNAPL-residual implies

removing the DNAPL mass from the subsurface or treating it in place. However, there are virtually no technologies available that have demonstrated the ability to efficiently remove or destroy DNAPL in a cost-effective manner. As such, it may not be technically and/or economically feasible to reduce contaminant concentrations in groundwater to levels below SCGs at this Site.

Direct contact with contaminated groundwater or subsurface soil (i.e., dermal absorption, inhalation and incidental ingestion) is unlikely. Potential impacts to wildlife are unlikely since the contamination is below the surface. Additionally, the extent of groundwater contamination terminates before it reaches Thatcher Brook or Cattaraugus Creek. Measurable impacts to indoor air quality have been identified in some homes located near the groundwater contaminant plume, resulting in potential direct exposure to VOCs through inhalation.

Based upon the results of the full-scale ISCO injection program it was concluded that:

- A groundwater monitoring program should be implemented to monitor groundwater plume characteristics and confirm that the remedial action objectives for the Site are being achieved;
- Homes located near the groundwater contaminant plume without indoor air mitigation systems should be evaluated for vapor intrusion and have mitigation systems installed, if needed;
- Pathways for human exposure to contamination that could potentially become complete in the future should be monitored via long term site management activities and controlled via institutional and/or engineering controls; and,
- Corrective measures, such as additional injection events, should be implemented if potential risks to public health and/or the environment are detected (i.e. contaminant concentrations rebound, plume characteristics change, etc.) as part of the long term site management activities.

An Explanation of Significant Difference (ESD) was prepared for the site in March 2018. The ESD summarized the progress of the cleanup at the Site and modified the remedy for the Site.

2.4 Remediation Goals

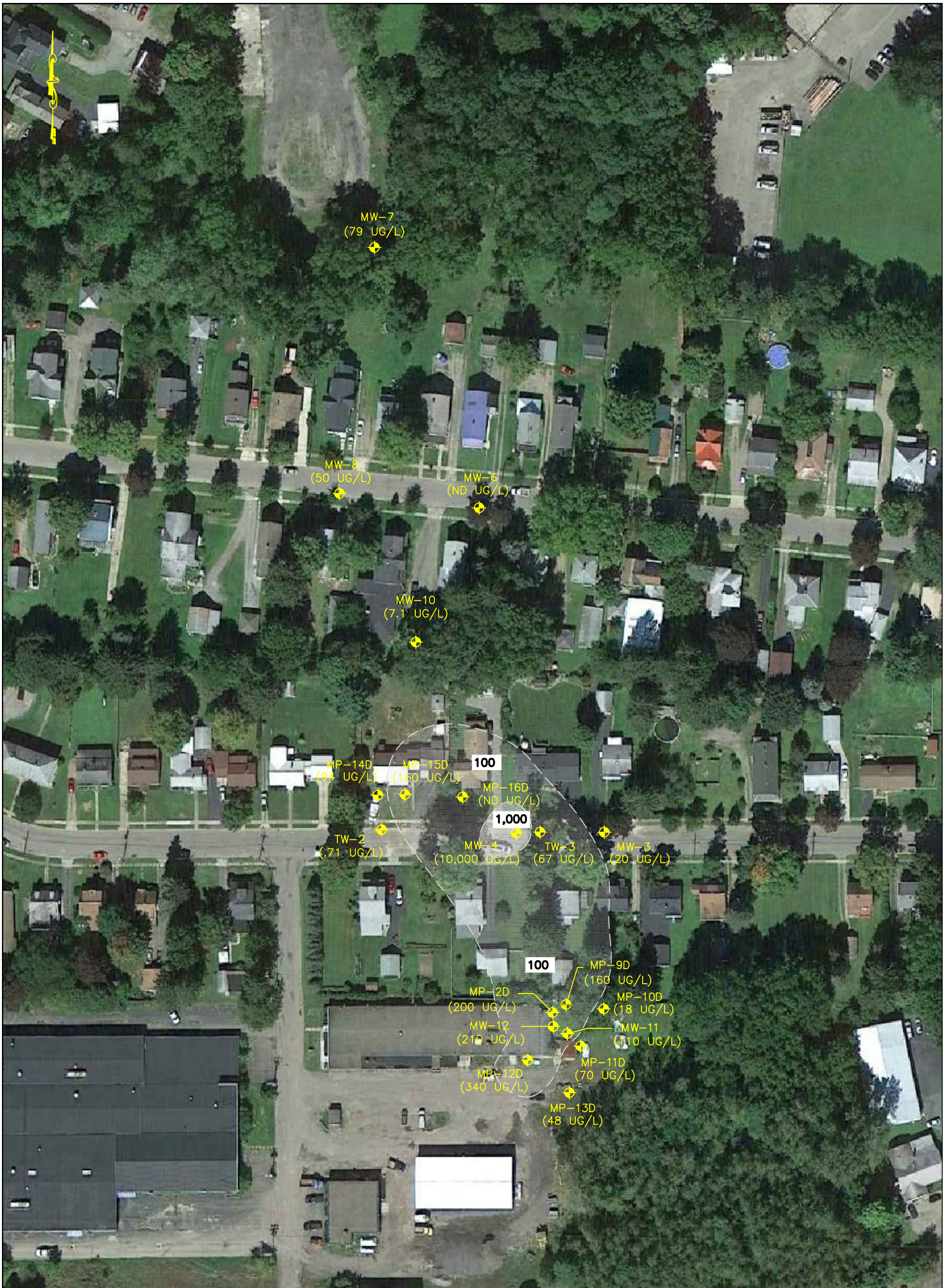
Goals for the remedial program for the Site are outlined in the Record of Decision dated March 2001. The overall remedial goal is to meet all Standards, Criteria and Guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through proper application of scientific engineering principals.

The goals selected for the site are as follows:

- Reduce, control or eliminate to the extent practicable, the continued migration of contaminated groundwater and suspected DNAPL throughout the residential area north of the site.
- Eliminate potential for direct exposure through the inhalation of contaminant vapors migrating into the homes located over the groundwater contaminant plume or dermal contact with contaminated groundwater or soil.
- Achieve NYSDEC groundwater quality standards to the extent practicable.
- Prevent migration of the contamination plume to Cattaraugus Creek.

2.5 Remaining Contamination

As discussed in Section 2.3, groundwater, both on-site and off-site, contains elevated concentrations of volatile organic compounds (VOCs). Though post-injection soil samples were not collected, contamination likely remains in Site soils. Exposure to VOCs through soil vapor intrusion is also likely. See Section 2.3 for a discussion on annual review of property ownership and SSDS installation and Section 3.3.2 for a discussion on the SSDSs already installed. The following figures summarize the results of samples of groundwater that exceed the SCGs after completion of the remedial action, as well as soil samples that exceeded the SCGs prior to completion of the remedial action.



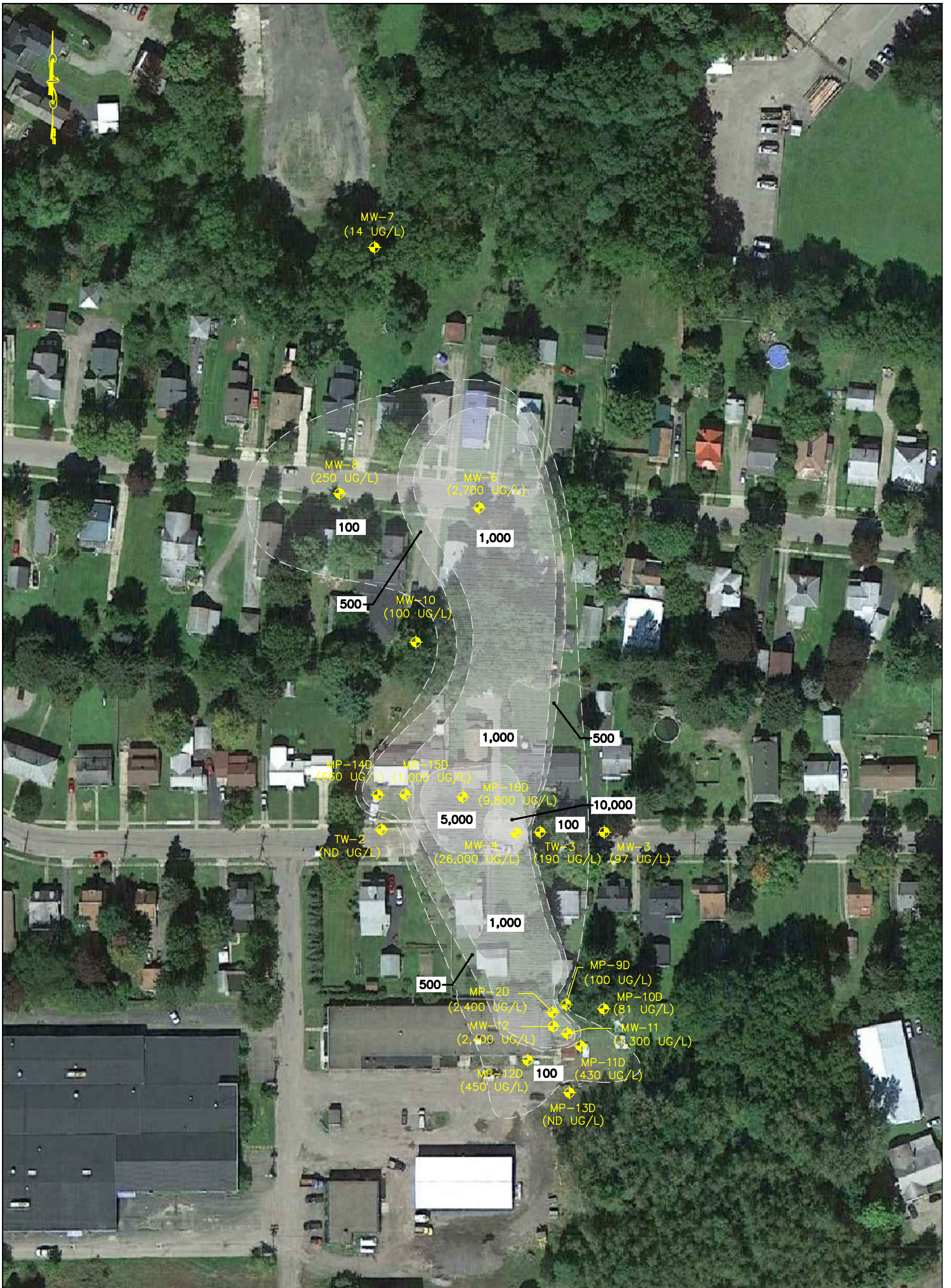
LEGEND

- ⊕ MONITORING WELL LOCATION
- (XX) CONTAMINANT CONCENTRATION

NOTES:

1. ALL CONCENTRATIONS SHOWN ARE IN MICROGRAMS PER LITER (UG/L) OR PARTS PER BILLION (PPB).
2. ALL MONITORING WELL LOCATIONS ARE APPROXIMATE.
3. AERIAL PHOTO TAKEN FROM GOOGLE EARTH.
4. ISOCONCENTRATION CONTOURS ARE ESTIMATED BASED ON AVAILABLE ANALYTICAL DATA AND MONITORING WELL LOCATIONS.
5. TCE = TRICHLOROETHENE.





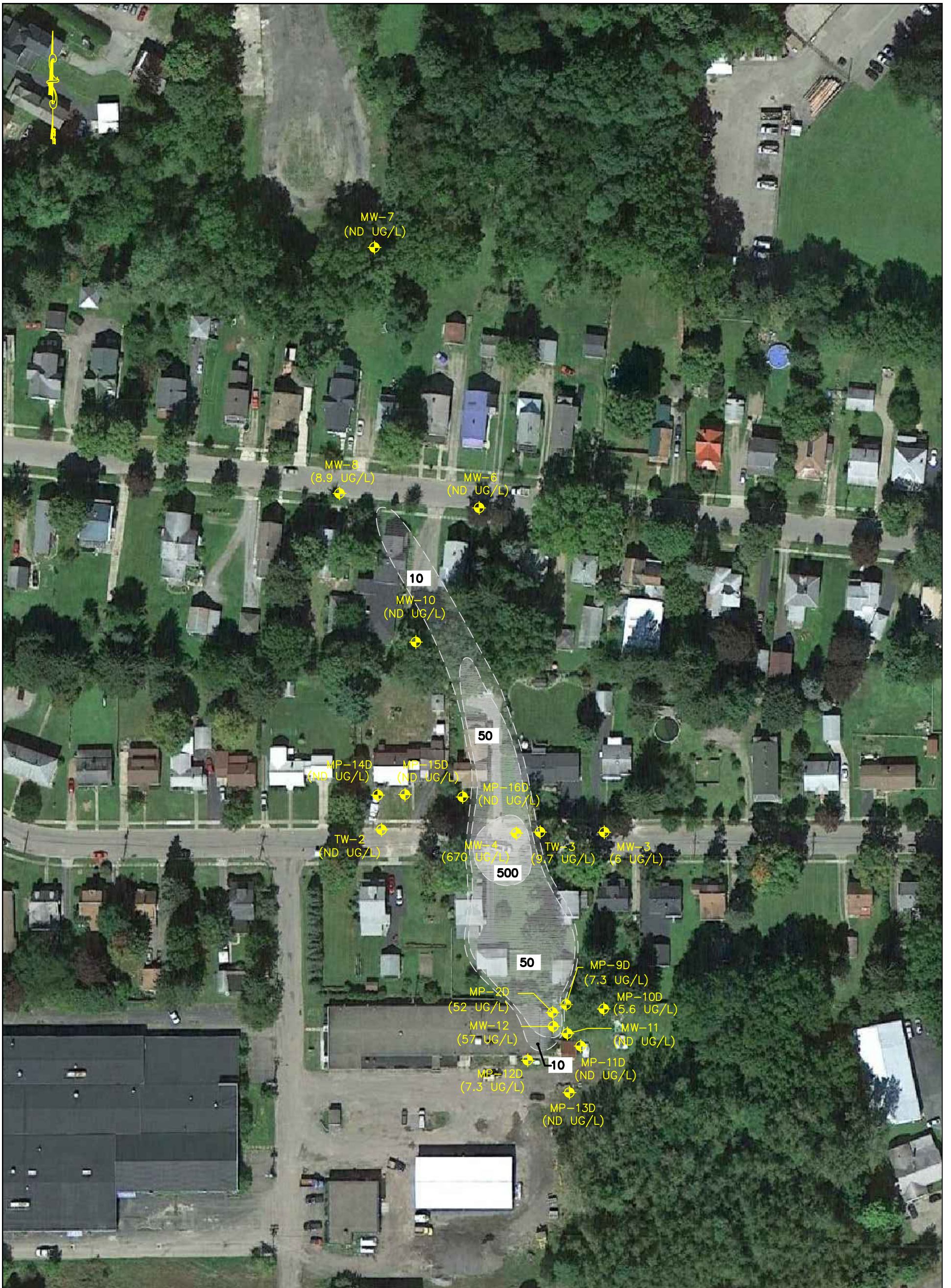
LEGEND

- ⊕ MONITORING WELL LOCATION
- (XX) CONTAMINANT CONCENTRATION

NOTES:

1. ALL CONCENTRATIONS SHOWN ARE IN MICROGRAMS PER LITER (UG/L) OR PARTS PER BILLION (PPB).
2. ALL MONITORING WELL LOCATIONS ARE APPROXIMATE.
3. AERIAL PHOTO TAKEN FROM GOOGLE EARTH.
4. ISOCONCENTRATION CONTOURS ARE ESTIMATED BASED ON AVAILABLE ANALYTICAL DATA AND MONITORING WELL LOCATIONS.
5. CIS-1,2-DCE = CIS-1,2-DICHLOROETHENE.





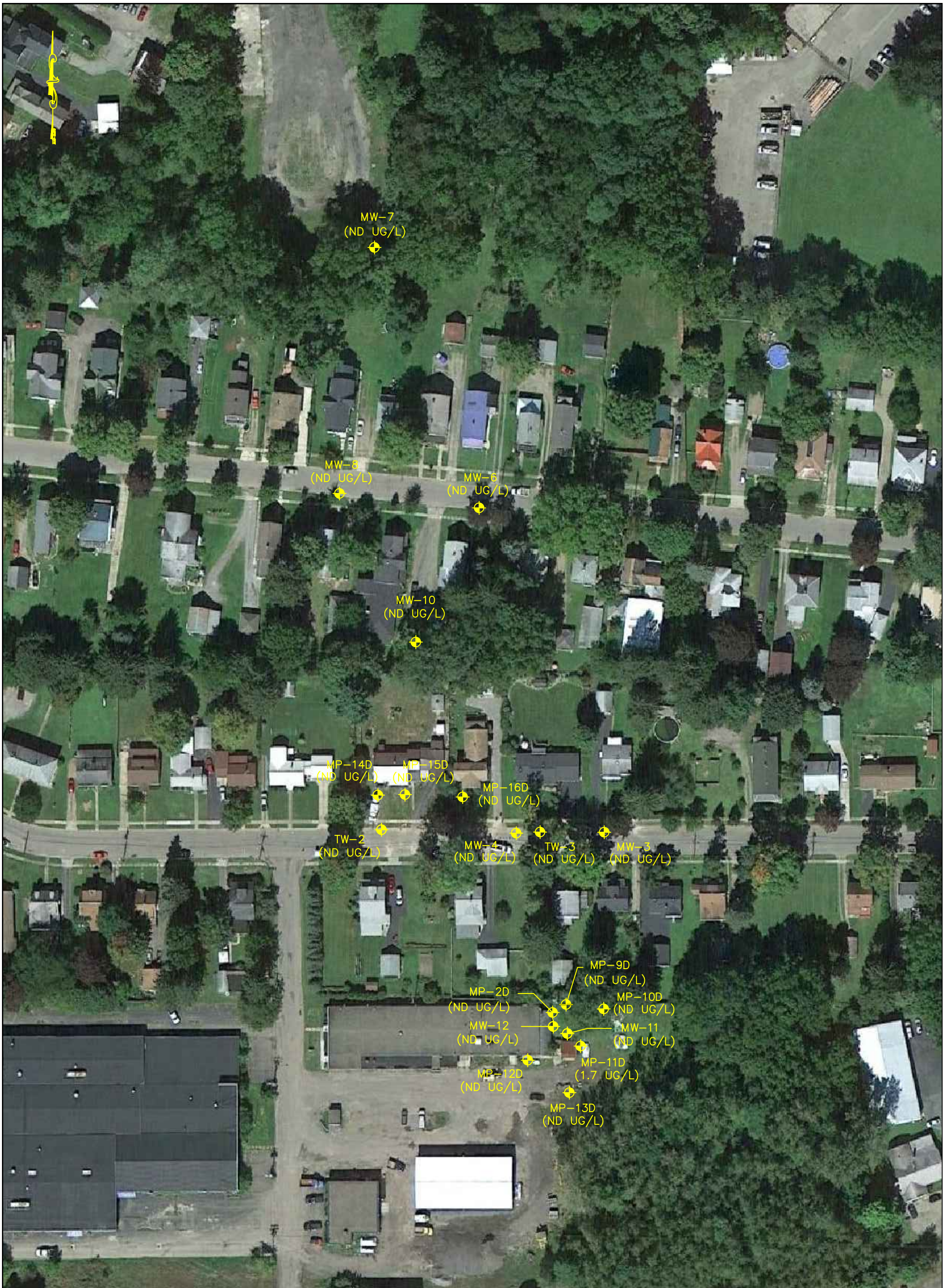
LEGEND

- ⊕ MONITORING WELL LOCATION
- (XX) CONTAMINANT CONCENTRATION

NOTES:

1. ALL CONCENTRATIONS SHOWN ARE IN MICROGRAMS PER LITER (UG/L) OR PARTS PER BILLION (PPB).
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4. ISOCONCENTRATION CONTOURS ARE ESTIMATED BASED ON AVAILABLE ANALYTICAL DATA AND MONITORING WELL LOCATIONS.
5. TRANS-1,2-DCE = TRANS-1,2-DICHLOROETHENE





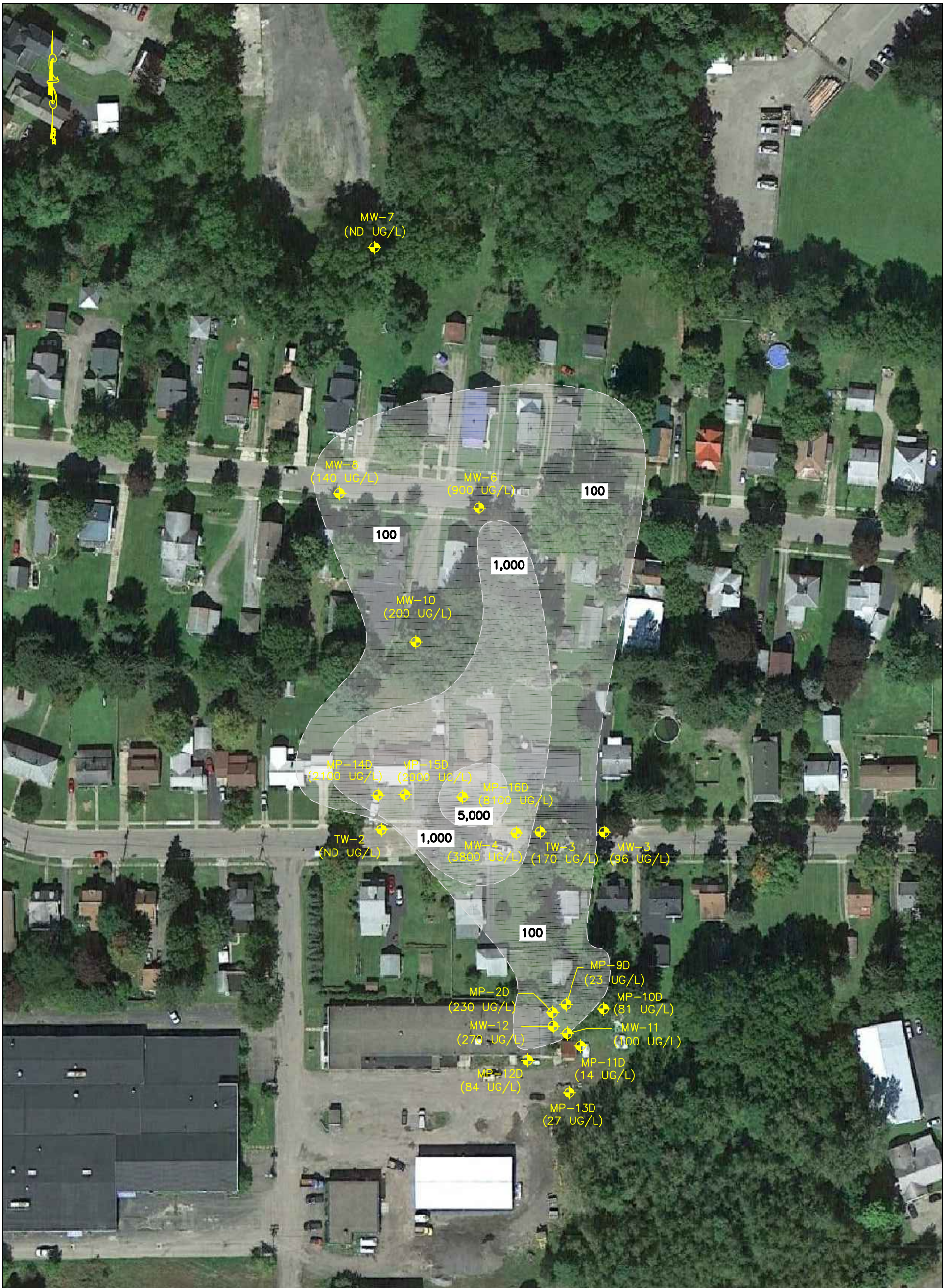
LEGEND

- ⊕ MONITORING WELL LOCATION
- (XX) CONTAMINANT CONCENTRATION

NOTES:

1. ALL CONCENTRATIONS SHOWN ARE IN MICROGRAMS PER LITER (UG/L) OR PARTS PER BILLION (PPB).
2. ALL MONITORING WELL LOCATIONS ARE APPROXIMATE.
3. AERIAL PHOTO TAKEN FROM GOOGLE EARTH.
4. ISOCONCENTRATION CONTOURS ARE ESTIMATED BASED ON AVAILABLE ANALYTICAL DATA AND MONITORING WELL LOCATIONS.
5. 1,1-DCE = 1,1-DICHLOROETHENE.





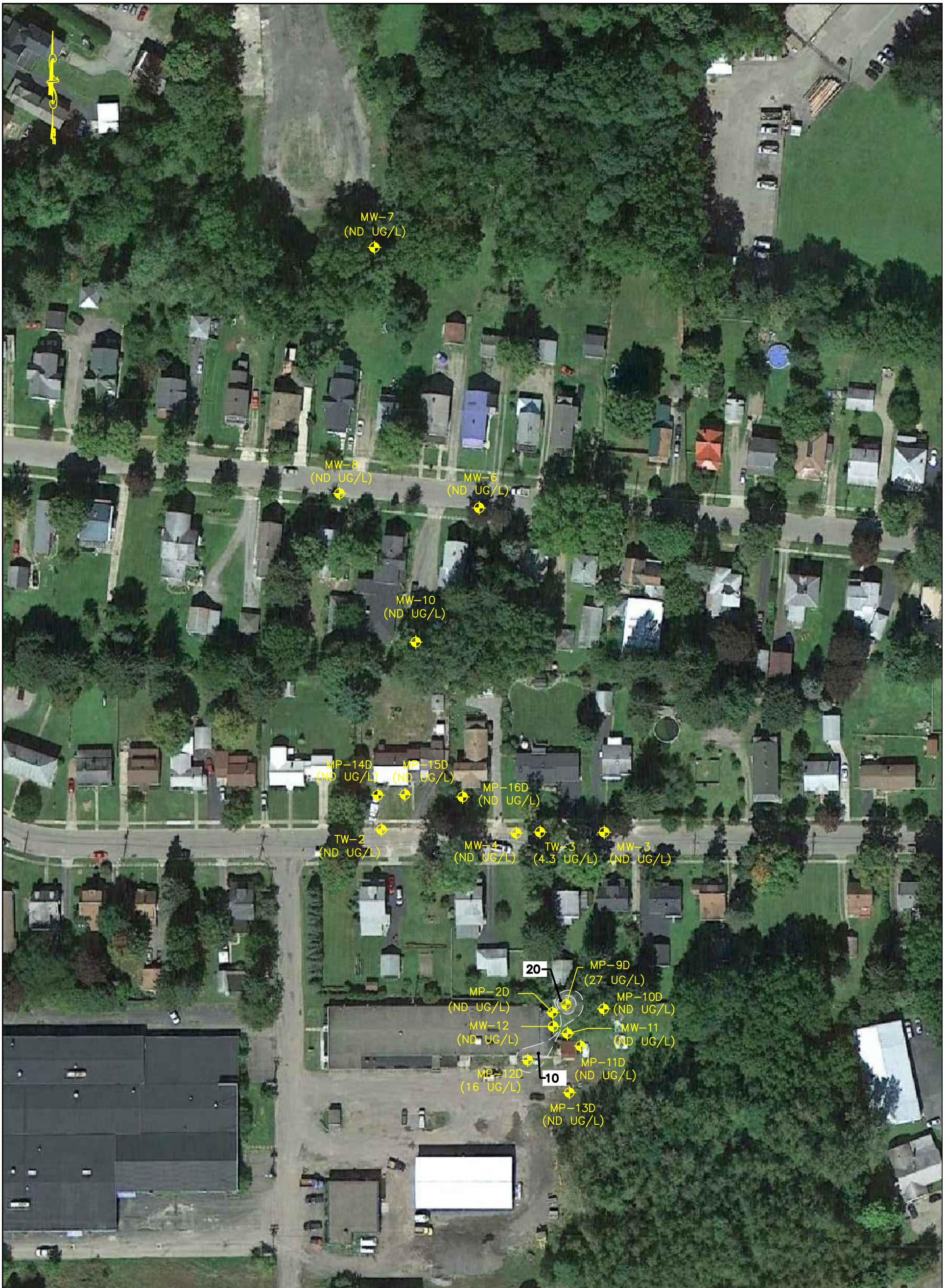
LEGEND

- ◆ MONITORING WELL LOCATION
- (XX) CONTAMINANT CONCENTRATION

NOTES:

1. ALL CONCENTRATIONS SHOWN ARE IN MICROGRAMS PER LITER (UG/L) OR PARTS PER BILLION (PPB).
2. ALL MONITORING WELL LOCATIONS ARE APPROXIMATE.
3. AERIAL PHOTO TAKEN FROM GOOGLE EARTH.
4. ISOCONCENTRATION CONTOURS ARE ESTIMATED BASED ON AVAILABLE ANALYTICAL DATA AND MONITORING WELL LOCATIONS.





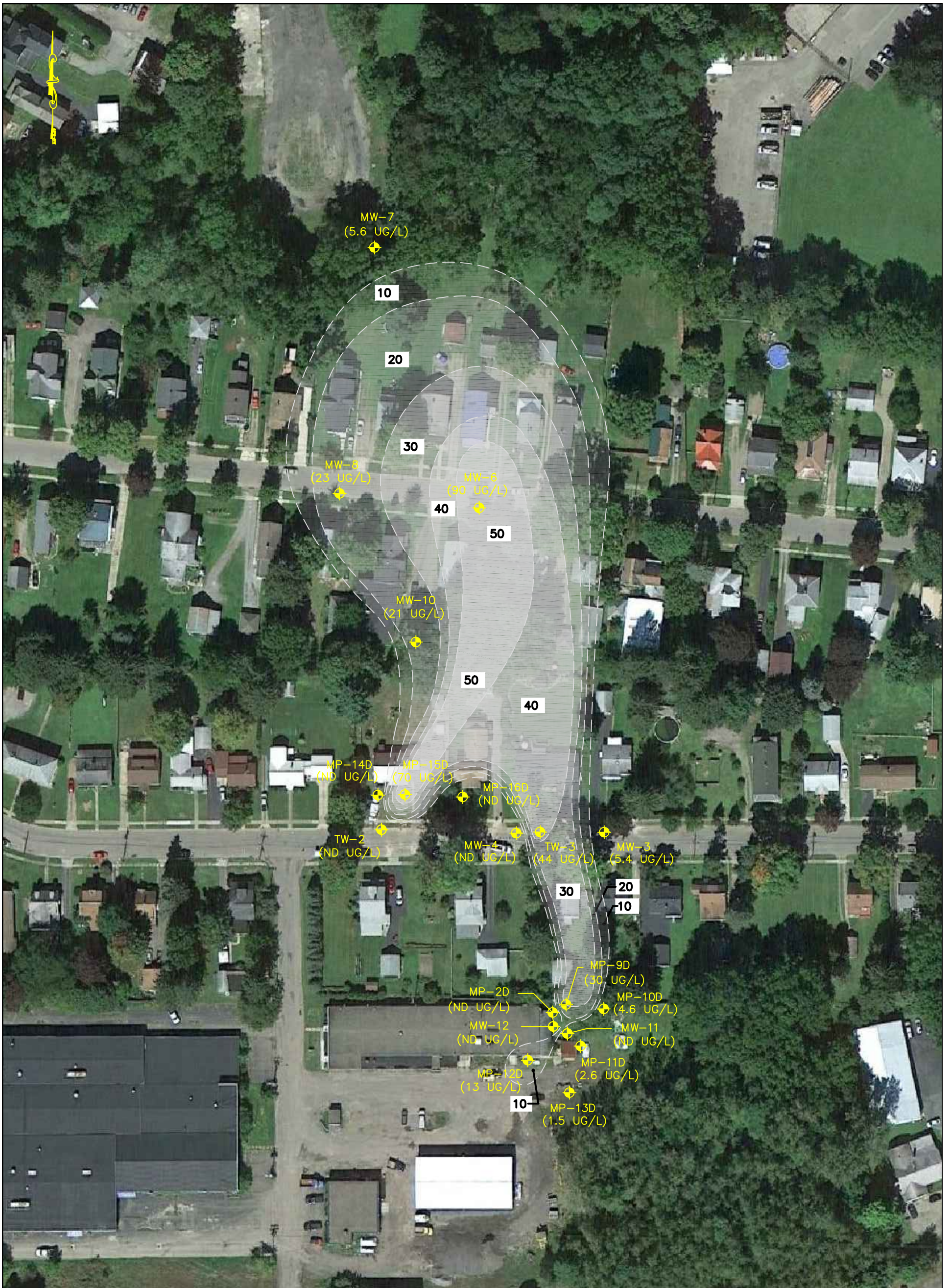
LEGEND

- ⊕ MONITORING WELL LOCATION
- (XX) CONTAMINANT CONCENTRATION

NOTES:

1. ALL CONCENTRATIONS SHOWN ARE IN MICROGRAMS PER LITER (UG/L) OR PARTS PER BILLION (PPB).
2. ALL MONITORING WELL LOCATIONS ARE APPROXIMATE.
3. AERIAL PHOTO TAKEN FROM GOOGLE EARTH.
4. ISOCONCENTRATION CONTOURS ARE ESTIMATED BASED ON AVAILABLE ANALYTICAL DATA AND MONITORING WELL LOCATIONS.
5. 1,1,1-TCA = 1,1,1-TRICHLOROETHANE.





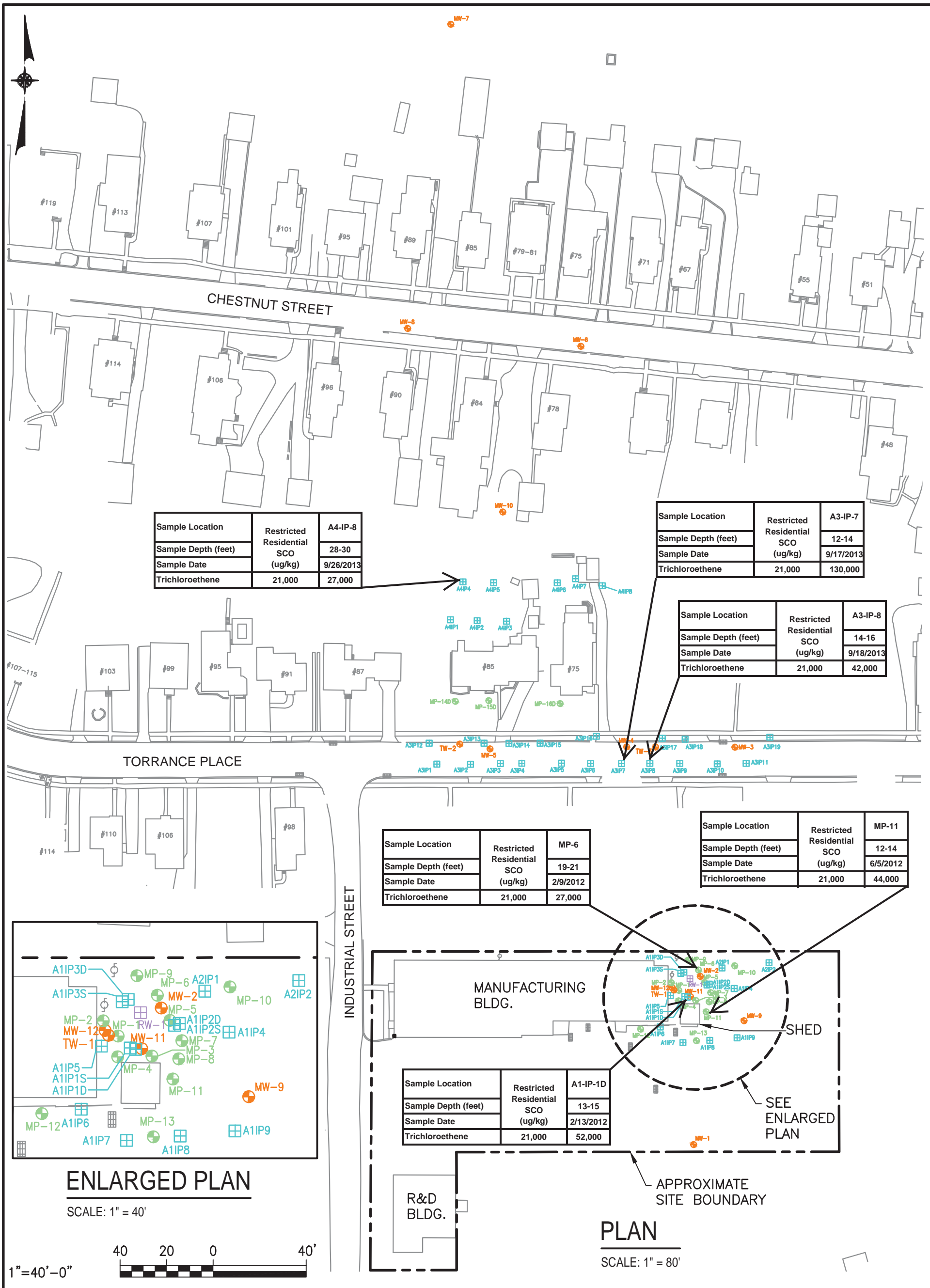
LEGEND

- ⊕ MONITORING WELL LOCATION
- (XX) CONTAMINANT CONCENTRATION

NOTES:

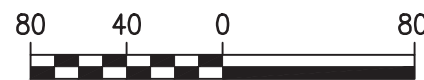
1. ALL CONCENTRATIONS SHOWN ARE IN MICROGRAMS PER LITER (UG/L) OR PARTS PER BILLION (PPB).
2. ALL MONITORING WELL LOCATIONS ARE APPROXIMATE.
3. AERIAL PHOTO TAKEN FROM GOOGLE EARTH.
4. ISOCONCENTRATION CONTOURS ARE ESTIMATED BASED ON AVAILABLE ANALYTICAL DATA AND MONITORING WELL LOCATIONS.
5. 1,1-DCA = 1,1-DICHLOROETHANE.





LEGEND

- UTILITY POLE
- MONITORING WELL
- MONITORING POINT
- REMEDIATION WELL
- INJECTION WELL
- CATCH BASIN



1" = 80'-0"

SCALE: AS NOTED

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

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

This plan provides:

- A description of all IC/ECs on the site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Deed Restriction;
- 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 IC/ECs, 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 IC/ECs required by the site remedy, as determined by the NYSDEC.

3.2 Institutional Controls

A series of ICs is required by the ESD to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and, (3) limit the use and development of the site to commercial or industrial uses only. Adherence to these ICs on the site is required by the Deed Restriction and will be

implemented under this SMP. ICs identified in the Deed Restriction may not be discontinued without an amendment to or extinguishment of the Deed Restriction. These ICs are:

- The property may be used for commercial or industrial use;
- All ECs must be operated and maintained as specified in this SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP.
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Cattaraugus 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 and the Excavation Work Plan;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall 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 Deed Restriction.
- The potential for vapor intrusion must be evaluated for any buildings developed on-site and any potential impacts that are identified must be monitored or mitigated; and
- Vegetable gardens and farming on the site are prohibited;

3.3 Engineering Controls

3.3.1 Long-Term Groundwater Monitoring

In accordance with the 2001 ROD and ESD, a long-term routine groundwater monitoring program has been implemented at the Site in order to monitor the effectiveness of the ISCO remedy. A groundwater monitoring well network was installed to monitor groundwater conditions both on-site and downgradient of the Site. Thirty-two groundwater monitoring points were installed on-site and downgradient as well as 14 groundwater monitoring wells. Monitoring well and monitoring point locations are provided on Figure 2-1. Routine groundwater monitoring of select wells will be performed on an annual basis with a 15-month seasonal rotation and is further detailed in Section 4.0.

Corrective measures, such as additional injection events, will be implemented if potential risks to public health and/or the environment are detected (i.e. contaminant concentrations rebound, plume characteristics change, etc.) as part of the long term site management activities.

3.3.2 – Off-Site Sub-Slab Depressurization Systems

SSDSs were installed in 18 nearby homes in 2004 to mitigate indoor air impacts exceeding New York State Department of Health (DOH) guidelines. The Department also installed a SSDS in the former manufacturing building (now used by the Village as office space) in 2010. Annually, the Department and/or Standby Engineer sends a notification regarding the SSDS to each respective property owner describing the system, periodic inspection protocols to be performed by the owner and asking the owner to contact the Department if the results of the inspections indicate that the system is no longer operating properly. Additionally, on an annual basis, the Department and/or Standby Engineer will review property ownership information. Properties under new ownership that originally declined to have an SSDS installed will be contacted with information regarding the Site and installing an SSDS in their home.

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 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:

Management

- Sampling locations, protocol and frequency;
- 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 once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. 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;
- An evaluation of the condition and continued effectiveness of ECs;
- 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:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Deed Restriction;
- 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 or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC must be given by noon of the following day. In addition, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs 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 Groundwater Sampling

Samples shall be collected from the nineteen groundwater monitoring wells/points on an annual basis with a 15-month seasonal rotation and will include 9 monitoring points (MP-2D and MP-9D through MP-16D) and 10 monitoring wells (MW-2, MW-3, MW-4, MW-6, MW-7, MW-8, MW-11, MW-12, TW-2 and TW-3). Sampling locations, required analytical parameters and schedule are provided in Table 4-1 – Post Remediation Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC. Detailed sample collection and analytical procedures and protocols are provided in Appendix G – Field Activities Plan and Appendix E – Quality Assurance Project Plan.

Table 4-1 – Post Remediation Sampling Requirements and Schedule

Sampling Location	Analytical Parameters	Schedule
	Target Compound List VOCs (EPA Method 8260)	
MP-2D, MP-9D through MP-16D, MW-2, MW-3, MW-4, MW-6, MW-7, MW-8, MW-11, MW-12, TW-2 and TW-3	X	Annually (15-month seasonal rotation)

The water table is encountered in all wells at approximately 7 ft bgs. Groundwater flow direction is to the north-northwest. Monitoring well construction details are provided in Table 4-2 and monitoring well construction logs are included in Appendix C of this document.

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.

Table 4-2 – Monitoring Well Construction Details

Monitoring Well ID	Well Location	Coordinates Northing (feet)	Coordinates Easting (feet)	Well Diameter (inches)	Elevation (above mean sea level)			
					Casing	Surface	Screen Top	Screen Bottom
MW-2	On-site	895745.31	1053571.79	2	775.15	776.00	766.00	756.00
MW-3	Torrance Place	895941.95	1053601.64	2	775.48	775.95	767.95	752.95
MW-4	Torrance Place	895941.49	1053508.25	2	775.24	775.67	768.67	753.67
MW-6	Chestnut	896286.82	1053468.76	2	770.63	771.26	765.76	760.76
MW-7	Walnut Street	896563.68	1053357.42	2	766.39	764.30	753.30	748.30
MW-8	Chestnut	896302.06	1053320.17	2	770.05	770.29	764.79	759.79
MW-11	On-site	895727.99	1053562.59	2	775.81	776.30	772.30	762.30
MW-12	On-site	895735.46	1053547.48	2	775.74	776.10	771.60	761.60
TW-2	Torrance Place	895944.74	1053364.90	2	774.78	775.09	758.09	748.09
TW-3	Torrance Place	895942.09	1053533.56	2	775.44	775.74	764.74	754.74
MP-2D	On-site	895739.39	1053547.03	2	--	--	--	--
MP-9D	On-site	895758.67	1053561.55	2	--	--	--	--
MP-10D	On-site	895753.98	1053601.49	2	--	--	--	--
MP-11D	On-site	895714.49	1053576.86	2	--	--	--	--
MP-12D	On-site	895699.54	1053520.64	2	--	--	--	--
MP-13D	On-site	895689.58	1053568.57	2	--	--	--	--
MP-14D	#85 Torrance	895981.29	1053361.31	2	774.70	775.13	765.13	760.13
MP-15D	#85 Torrance	895981.89	1053390.15	2	775.29	775.60	765.60	760.60
MP-16D	#75 Torrance	895979.28	1053451.43	2	775.66	776.11	766.11	761.11

Notes: *: Data from survey completed by Popli Consulting Engineers & Surveyors in 2004 and Clear Creek Land Surveying, LLC in 2012 and 2013

--: Data not available

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

4.3.1 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 Field Activities Plan provided as Appendix G of this document.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

Site operations and maintenance for the AVM Gowanda Site includes maintenance of the following components:

- Monitoring/Injection Well Repairs, Replacement and Decommissioning

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring and/or injection wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring and/or injection wells will be properly decommissioned and replaced (as per the Monitoring Plan), if an event renders the wells unusable and the NYSDEC determines that replacement is necessary.

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, decommissioning or replacement of monitoring and/or injection wells. Any repair, decommissioning or replacement will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of NYSDEC. Well abandonment will be performed in accordance with NYSDEC's documented entitled "Groundwater Monitoring Well Decommissioning Procedures", dated November 2009. Wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

This section provides a summary of vulnerability assessments that will be conducted for the site during periodic assessments, and briefly summarizes the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

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 is located in an area of minimal flooding; however, flooding has occurred during instances of severe weather. If flooding does occur in the future it is not expected to affect the monitoring well network as currently installed. Currently, site drainage consists of surface run-off and infiltration in permeable areas. The site and will be inspected annually and after any significant weather event to evaluate the condition of the site.

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).

Waste Generation

Monitoring, maintenance and reporting activities associated with the groundwater sampling result in material consumption and the generation of waste. A summary of the current material consumption and waste generation activities for the groundwater monitoring are summarized below:

- Personal protective equipment associated with groundwater sampling and groundwater injections, such as disposable gloves, etc.;
- Polyethylene tubing for groundwater sampling events;
- Containers used to transport chemicals used for groundwater injections;
- Packaging material and ice used to pack and preserve samples to be submitted for laboratory analysis;
- Paper and office supplies associated with monitoring logs, groundwater injections and report preparation; And,
- Repair and replacement of monitoring/injection wells.

Fossil Fuel Usage

Fossil fuels are used during groundwater injection by pumps that deliver chemicals to the subsurface. Groundwater monitoring does not directly use fossil fuels as part of its routine operation; however, fossil fuels are indirectly used during the completion of groundwater monitoring. Fossil fuels are also indirectly used during groundwater injections. Indirect fossil fuel use results from completion of the following Site related activities:

- Transportation to and from the Site for injection, monitoring and sampling.
- Off-site transportation and shipment of samples collected for laboratory analysis.

Water Usage

Water is used to dilute chemicals used during groundwater injections. The other Site engineering controls do not directly use water as part of its maintenance; however, minimal amounts of water are used during groundwater sampling to decontaminate sampling equipment.

Efforts will be made to minimize to the extent practicable the energy consumption, waste generation and water usage for implementation of this SMP.

6.2.1 Timing of Green Remediation Evaluations

Green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the Project Manager feels appropriate, e.g. during significant maintenance events or in conjunction with storm recovery activities.

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities. Reporting of these modifications will be presented in the PRR.

6.2.2 Frequency of Sampling and Other Periodic Activities

Transportation to and from the Site and use of consumables in relation to visiting the Site in order to collect and ship samples to a laboratory for analyses and perform maintenance injections have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be

accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources. The initial sampling frequency will be annually with a 15-month seasonal rotation to save resources and obtain seasonal variation data. The sampling period may be increased as results are obtained, contaminant levels stabilize and where contaminant rebound is not occurring. Recommendations regarding modifications to the sampling frequency and other periodic activities will be presented in the PRR for Department approval. Maintenance injections will only be implemented on an as-needed basis depending upon the results of the routine sampling and monitoring program, thus minimizing trips to the Site.

6.2.3 Metrics and Reporting

As discussed in Section 7.0 and as shown in Appendix F – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits; a set of metrics has been developed.

6.3 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that the NYSDEC 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;
- 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 focus 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.

7.0 REPORTING REQUIREMENTS

7.1 Site Management Reports

All site management inspection, maintenance, injection 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 injection information, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Table 7-1 and summarized in the Periodic Review Report.

Table 7-1: Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Periodic Review Report	Annually

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

All interim monitoring/inspections reports and maintenance injection reports (to be prepared on an as-needed basis) 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.

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be 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>.

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the Department annually 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 - Deed Restriction. 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; and,

- Summary of any maintenance injections completed, 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 ROD and ESD;
 - 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;
 - 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; and,
 - The overall performance and effectiveness of the remedy.

A quantitative and qualitative overview of a site's environmental impacts must be provided through the completion of the Summary of Green Remediation Metrics

provided in Appendix F. This form as well as a summary of the Green Remediation evaluation will be included in the Periodic Review Report.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a Professional Engineer licensed to practice in New York State will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

“For each institutional or engineering control identified for the site, I certify that all of the following statements are true:

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering 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 deed restriction;*
- *The engineering control systems are performing as designed and are effective;*

- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program [and generally accepted engineering practices]; and*
- *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/Remedial Party or Owner’s/Remedial Party’s Designated Site Representative]. I have been authorized and designated by all site owners/remedial parties to sign this certification 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 or engineering 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, the RSO activities, findings and recommendations will be summarized in an RSO report which shall be submitted to the Department for approval. A general outline for the RSO report is provided in Appendix H. 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

D&B, 2016. In-Situ Chemical Oxidation Injection Program Summary Report – NYSDEC Site No. 905025. November 2016.

NYSDEC, 2001. Record of Decision AVM-Gowanda Site Persia (T), Cattaraugus County – NYSDEC Site No. 905025. March 2001.

NYSDEC, 2018. Explanation of Significant Difference AVM-Gowanda Site – NYSDEC Site No. 905025. March 2018.

D&B, 2016. In-Situ Chemical Oxidation Program AVM-Gowanda Site – NYSDEC Site No. 905025. November 2016.

D&B 2018, Summary letter.

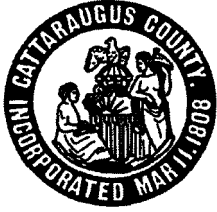
NYSDEC, 2010. DER-10 Technical Guidance for Site Investigation and Remediation. May 3, 2010.

NYSDEC, 2009. CP-43: Groundwater Monitoring Well Decommissioning Policy. November 3, 2009.

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

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

APPENDIX A – DEED RESTRICTION



James K. Griffith
CATTARAUGUS COUNTY CLERK

Cattaraugus County Center 303 Court Street
Little Valley, NY 14755

(716) 938-9111
Fax: (716) 938-2773

Instrument Number

110724-001

No. of Pages: 7
not including this one

Delivered By: PHILLIPS LYTLE LLP

Receipt No. 110724

Return To:

PHILLIPS LYTLE LLP
PO BOX 1279
JAMESTOWN, NY 14702-1279

DATE: 10/24/2008

Time: 09:42 AM

Document Type: DEED

Parties To Transaction: ONE INDUSTRIAL TO GOWANDA VILLAGE

Town/City: PE - Persia

Deed Information

Taxable
Consideration: \$0.00

Transfer Tax: \$0.00

RETT No: 00916

Mortgage Information

Taxable
Mortgage Amount

Basic Mtge. Tax:

Special Mtge. Tax:

Additional Mtge. Tax.

State of New York
Cattaraugus County Clerk

Mortgage Serial No.:

This sheet constitutes the Clerk endorsement required by Section 316-A(5) & Section 319 of the Real Property Law of the State of New York.

Cattaraugus County Clerk

Please do not remove this page.



QUIT CLAIM DEED

THIS INDENTURE, made the 13th day of May, 2008,

BETWEEN

ONE INDUSTRIAL PLACE, INC., having its principal office at One Magnetics Parkway, Gowanda, New York, 14070 ("**Grantor**") and

VILLAGE OF GOWANDA, NEW YORK, having its principal office at 27 East Main Street, Gowanda, New York 14070 ("**Grantee**").

WITNESSETH, that the Grantor, in consideration of ONE DOLLAR AND NO MORE (\$1.00 AND NO MORE), lawful money of the United States, paid by the Grantee, does hereby remise, release and quitclaim unto the Grantee and the successors and assigns of the Grantee forever, the real property described and/or depicted in attached Schedule A ("**Property**").

TOGETHER with the appurtenances and all the estate and rights of the Grantor in and to the Property, if any.

The Grantor and Grantee agree as follows:

THE Property and this conveyance are subject to all laws, statutes, codes, ordinances, rules and regulations, and subject to all matters of record, including but not limited to all encumbrances, easements, rights of way, agreements, covenants, conditions and restrictions, if any.

THE Property and this conveyance, in order to protect human health and the environment and promote community objectives, are subject to the deed restrictions and covenants set forth in attached Exhibit A ("**Deed Restrictions**").

TO HAVE and to hold the Property herein granted unto the Grantee and the successors and assigns of the Grantee forever.

THE Grantee accepts the Property in its "As Is" condition. Except as expressly set forth herein, this conveyance is made without any covenant, representation or warranty whatsoever.

THE Grantor, in compliance with Section 13 of the Lien Law, covenants that the Grantor will hold and apply the consideration first to the payment of the cost of any improvements before using any part of the same for any other purpose.

Phillips, Lytle J'town

-0-
5.00
49.25
165.00

SCHEDULE A

The Property

Parcel I:

ALL THAT TRACT OR PARCEL OF LAND, situate in the Town of Persia, Village of Gowanda, Cattaraugus County, State of New York, described as follows: BEGINNING in the east line of Lot 27, at the northeast corner of property now or formerly owned by the Gowanda Builders and Supply Company (also known as Gowanda Builders Supply & Coal Co.); running thence in a northerly direction and along the east line of Lot 27, a distance of 168.3 feet more or less; running thence westerly a distance of 398 feet more or less to the easterly side of Industrial Place (50 feet wide); thence along said easterly side of Industrial Place in a southerly direction 172.5 feet more or less; and thence easterly a distance of 400.25 feet, more or less, to the place of beginning.

SUBJECT TO building and use restrictions of record, public roads abutting the said premises, prior grants, reservations or leases of coal, oil, gas or other minerals as shown by instruments of record and easements or rights of way of record or apparent upon inspection of the premises.

EXCEPTING AND RESERVING to Vincent Caito, his heirs, successors and assigns, the necessary easements for water supply lines and electric lines that may cross the premises and serve other lands owned by Vincent Caito located west of Industrial Place, together with the right for Vincent Caito, at his option, to connect or disconnect to water sprinkler system and pump house located on the premises. Vincent Caito agrees that should he, his heirs, successors or assigns again connect to the existing water sprinkler system and pump house that the costs of repair, maintenance and replacement of the fire pump house and its equipment shall be shared equally with the party of the second part, its successors and assigns.

Parcel II:

ALL THAT TRACT OR PARCEL OF LAND, situate in the Village of Gowanda, Town of Persia, County of Cattaraugus and State of New York, being part of Lots 26 and 27, Township 6, Range 8 of the Holland Land Company's Survey, bounded and described as follows:

BEGINNING in the south line of Torrance Place, distant 393.32 feet west of its intersection with the centerline of Commercial Street, which point of beginning is also 104.0 feet west of the northwest corner of lands formerly owned by Frank Rizzo; thence westerly along the south line of Torrance Place, a distance of 104.25 feet; thence southerly at right angles, a distance of 145.25 feet; thence westerly at right angles, a distance of 53.75 feet to the northeast corner of lands conveyed to the Gowanda Electronics Corp., by deed recorded in Liber 792 of Deeds at page 358 in the east bounds of Lot 27; thence southerly along the east bounds of lot 27, being also the west bounds of Lot 26 and along the east line of lands so conveyed to the said Gowanda Electronics Corp., a distance of 168.30 feet to the south east corner of the Gowanda Electronics Corp.; thence westerly along the south line of lands so conveyed to the said Gowanda Electronics Corp., a distance of 400.25 feet to the southwest corner thereof in the east bounds of Industrial Place; thence southerly along the east bounds of Industrial Place, a distance of 121.50 feet; thence easterly at right angles, a distance of 242.30 feet; thence northeasterly at an interior angle of 157° 29', a distance of 188.43 feet; thence easterly at an interior angle of 195° 51', a distance of 181.70 feet; thence northerly at an interior angle of 85° 22' a distance of 197.65 feet; thence northerly and at right angles to Torrance Place, a distance of 145.25 feet to the place of beginning, containing 2.17 acres of land, more or less as shown on a survey by W. C. Buckland, L. S. dated July 24, 1989.

RESERVING to Buffalo Turbine Agricultural Equipment Co. Inc. a right of way over a 20' wide strip of land located at the southwest corner of the lands above described extending along the southerly bounds thereof from Industrial Place 242.30 feet easterly.

SUBJECT to, and together with, a Driveway Agreement recorded in Liber 376 of Deeds at page 114.

ALSO all other easements, rights of way and leases of record.

EXHIBIT A

Deed Restrictions

WHEREAS, the Property is the subject of a Voluntary Cleanup Agreement bearing Index No. B9-0507-96-05 entered into by Gowanda Electronics Corporation and signed on behalf of the Commissioner of the New York State Department of Environmental Conservation ("NYSDEC") on January 13, 1998; and

WHEREAS, the NYSDEC approved a remedy to eliminate or mitigate all significant threats to the environment presented by impairments at the Property and such remedy requires that the Property be subject to restrictive covenants;

NOW, THEREFORE, the Grantor (for itself and its successors and/or assigns) covenants and the Grantee acknowledges by virtue of acceptance of this deed (for itself and its successors and/or assigns) that the following controls apply to the use of the Property:

1. Institutional and Engineering Controls.

A. The Property may be used for commercial or industrial use as long as the following long-term engineering and institutional controls are employed:

i. Compliance with the site management plan ("Site Management Plan") for the existing treatment system that will include the following components: (a) an evaluation of the potential for vapor intrusion at any new buildings constructed on the Property, including provisions for mitigation of any impacts identified for these new buildings; and (b) identification of any use restrictions related to the treatment system located on a certain portion of the Property to be defined in the Site Management Plan;

ii. Compliance with the Site Management Plan for the new system to include an operation, monitoring and maintenance plan and a soils management plan;

iii. Restriction of the use of groundwater as a source of potable water without necessary water quality treatment as determined by the New York State Department of Health;

iv. Annual certification, unless the NYSDEC approves a less frequent certification period, by the Property owner prepared and submitted by a professional engineer or such other qualified environmental professional acceptable to the NYSDEC, until the NYSDEC notifies the Property owner in writing that this certification is no longer needed. This submittal will contain a certification that the institutional controls and engineering controls, are still in place, allow the NYSDEC access to the Property, and that nothing has occurred that will impair the ability of the controls to protect public health or the environment or that constitute a violation or failure to comply with the Site Management Plan.

B. The Property may not be used for a higher level of use such as unrestricted, residential or restricted-residential use and the above-stated engineering controls may not be discontinued

without an amendment or extinguishment of these Deed Restrictions agreed to in writing by the NYSDEC.

C. By accepting this deed, the Grantee covenants and agrees that these Deed Restrictions shall be incorporated in full or by reference in any leases, subleases, easements, rights of way, licenses, or other instruments granting a right to use the Property.

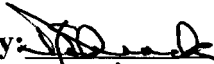
2. The NYSDEC, its agents, employees, or other representatives of New York State may enter the Property for the purpose of operating and maintaining the existing groundwater collection and treatment system at the Property and modifying it as necessary for its use as part of the off-site groundwater collection and treatment system (new system) and to inspect the Property in a reasonable manner and at reasonable times to assure compliance with the Deed Restrictions.

3. These Deed Restrictions are and shall be deemed a covenant that shall run with the land and the Property, shall be binding upon all future owners, lessees, sublessees, mortgagees, holders of rights under easements or rights of way, licenses and easements of all or any part of the Property, and shall provide that the Property owner, and its successors and assigns, consent to the enforcement by the NYSDEC or if the NYSDEC shall no longer exist, any New York State agency or agencies subsequently created to protect the environment of New York State and the health of the citizens of New York State ("Relevant Agency") of the prohibitions and restrictions of these Deed Restrictions and hereby covenants not to contest the authority of the Relevant Agency to seek enforcement.

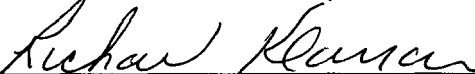
4. Any deed of conveyance of the Property, or any portion thereof, shall recite, unless the Relevant Agency has consented to the termination of such covenants and restrictions, that the said conveyance is subject to these Deed Restrictions.

IN WITNESS WHEREOF, the Grantor has caused these presents to be signed by its duly authorized officer this 28th day of May, 2008.

ONE INDUSTRIAL PLACE, INC.

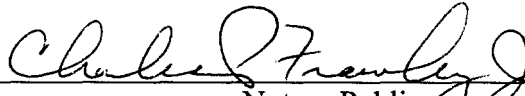
By: 
Name: DAVID C. SCHWACH
Title: PRESIDENT

VILLAGE OF GOWANDA, NEW YORK

By: 
Name: Richard L. Klauer
Title: Mayor

STATE OF NEW YORK)
)SS.:
COUNTY OF CATTARAUGUS)

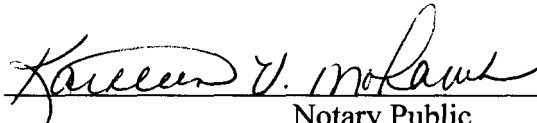
On the 28th day of May in the year 2008, before me, the undersigned, personally appeared David C. Schaack, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her capacity, and that by his/her signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.



Notary Public
CHARLES P. FRAWLEY, JR.
Notary Public - State of New York
No. 01FR5082686
Qualified in Erie County
My Commission Expires July 28, 2009

STATE OF NEW YORK)
)SS.:
COUNTY OF CATTARAUGUS)

On the 13th day of May in the year 2008, before me, the undersigned, personally appeared Richard L. Klancer, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he/~~she~~ executed the same in his/~~her~~ capacity, and that by his/~~her~~ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.



Notary Public
KATHLEEN V. MOHAWK
Notary Public, State of New York
No. 01MO6048168
Qualified in Erie County
Commission Expires Sept. 18, 2010

PLEASE RECORD AND RETURN TO:

VILLAGE OF GOWANDA
27 East Main Street
Gowanda, New York 14070

APPENDIX B – LIST OF SITE CONTACTS

Name	Phone/Email Address
Mayor David Smith, Town of Gowanda	716-532-3353
Frank DeVita, D&B Engineers and Architects., P.C.	516-364-9890 fdevita@db-eng.com
Robert Strang, NYSDEC	518-402-8642 robert.strang@dec.ny.gov
Chad Staniszewski, P.E, NYSDEC	(716)851-7220 chad.staniszewski@dec.ny.gov
NYSDEC Site Control	518-402-9553

APPENDIX C
MONITORING WELL BORING AND CONSTRUCTION LOGS

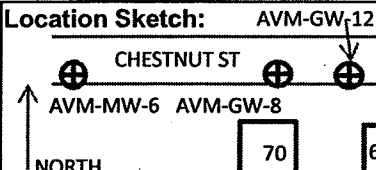
Driller: <u>SJB/Empire Geo Services, Inc.</u> Inspector: <u>D. Bishuk</u> Rig Type: <u>Geoprobe Model 6620DT</u> Method: <u>Hydraulic Direct Push; 4-ft Macrocore Samplers</u>	Dvirka and Bartilucci Boring Log Project Name: <u>AVM-Gowanda</u> Project #: <u>2593-03</u> Boring Depth: <u>20 ft bgs</u>	Boring ID: <u>AVM-GW-11</u> Sheet <u>1</u> of <u>1</u> Location: <u>100 ft N of AVM-MW-7</u>
---	--	--


Date: <u>4/6/2011</u> Time: <u>10:50</u> DTW: <u>10.51 ft bgs</u> Casing/Total Depth: <u>20 ft bgs</u>	Groundwater Observations	Start (Date & Time): <u>4/6/11 @09:35</u> Finish (Date & Time): <u>4/6/11 @ 11:40</u> Weather: <u>Mix of Snow & Rain 32°F</u> <u>Calm; No Wind</u> Elevation of Ground Surface: <u>NA</u>	Location Sketch:
---	--------------------------	---	-----------------------------

Sample Interval/ Depth below grade	Sample No.	Blows/ Recovery	Headspace (ppm)	Field Description	Well Schematic	Comments
0-4	1 09:35	NA/3.2 ft	312	0-1.2 ft Grayish Brown to Gray vf-c SAND & GRAVEL; Trace Silt (GP; Moist; Loose; Non-cohesive)		
1				1.2-2.2 ft Grayish Brown to Brown vf-f SAND & SILT (ML; Very moist; Cohesive; Pasty)		
2				2.2-2.7 ft Brown vf-f SAND; Little Silt (SW; Moist; Semi-cohesive)		
3				2.7-3.2 ft Brown vf-c SAND; Little f-m Gravel; Trace Silt (SP; Slightly moist; Non-cohesive; Subangular clasts)		
4	4-8 09:40	NA/3.0	8.5	4-4.5 ft Same as 2.7-3.2 ft 4.5-7 ft Brown to Olive Brown m-c SAND and f-m GRAVEL; Little Silt & vf-f Sand (GP; Slightly moist; Slightly cohesive; Subangular clasts)		
5						
6						
7						
8	8-12 09:55	NA/3.4	8.2	8-11.4 ft Same as 4.5-7 ft (GP; Moist; Wet at 10.5 ft; Slightly cohesive; Subangular clasts)		Wet at 10.5 feet bgs
9						
10						
11						
12	12-16 10:10	NA/4.0	5.7	12-12.7 ft Same as 8-11.4 ft (GP; Wet) 12.7-13.2 ft Brown CLAY; Some Silt; Trace m-c Sand & f Gravel (CH; Wet; Cohesive; High plasticity; Stiff)		
13				13.2-14.7 ft Gray vf-c SAND; Little f-m Gravel & Silt (SP; Wet; Semi-cohesive)		
14				14.7-16 ft Gray CLAY; Some Silt; Trace vf-c Sand & f Gravel (CH; Moist; Cohesive; High plasticity; Very stiff)		
15						
16	16-20 10:25	NA/4.0	5.1	16-20 ft Brownish Gray CLAY; Little Silt; Trace m-c Sand and f Gravel (CH; Moist; Cohesive; High plasticity; Extremely stiff and compact)		Install temporary 1-inch PVC well, 10 ft screen & 10 ft riser. 4/6/11 @ 11:15- Collect groundwater sample AVM-GW-11 for TCL VOCs.
17						
18						
19						
20				End of Boring at 20 ft bgs		

Soil Stratigraphy Summary Poorly-graded sand and gravel overlying inorganic clay with high plasticity

Driller: <u>SJB/Empire Geo Services, Inc.</u>	Dvirka and Bartilucci Boring Log	Boring ID: <u>AVM-GW-12</u>
Inspector: <u>D. Bishuk</u>	Project Name: <u>AVM-Gowanda</u>	Sheet <u>1</u> of <u>1</u>
Rig Type: <u>Geoprobe Model 6620DT</u>	Project #: <u>2593-03</u>	Location: <u>100 ft E of</u>
Method: <u>Hydraulic Direct Push; 4-ft Macrocore Samplers</u>	Boring Depth: <u>12 ft bgs</u>	<u>AVM-MW-6</u>

Date Time DTW Casing/Total Depth	Groundwater Observations		Start (Date & Time): <u>4/6/11 @ 12:25</u>	Location Sketch: AVM-GW-12 
	Date	<u>4/6/2011</u>	Finish (Date & Time): <u>4/6/11 @ 13:45</u>	
	Time	<u>12:50</u>	Weather: <u>Mix of Snow & Rain 32°F</u>	
	DTW	<u>6.50 ft bgs</u>	<u>Calm; No Wind</u>	
Casing/Total Depth	<u>12 ft bgs</u>	Elevation of Ground Surface: <u>NA</u>		

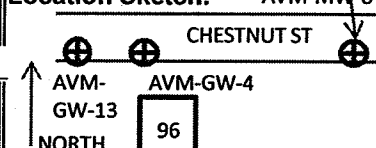
Sample Interval	Sample No.	Blows/Recovery	Headspace (ppm)	Field Description	Well Schematic	Comments	
0-4	1	NA/3.3 ft	3.5	0-0.5 ft Asphalt			
	12:25			0.5-1 ft Brick and Macadam consisting of Gray Brown f-m GRAVEL & vf-c SAND (GP; Dry; Non-cohesive; Brick & concrete fragments)			
				1-3.3 ft Rusty Brown to Brown vf-f SAND; Some Silt (SM; Moist to very moist; Semi-cohesive)			
4-8	2	NA/4.0	13.6	4-5.8 ft Brown vf-f SAND & SILT; Trace Clay (ML; Very moist; Wet at 5 ft; Cohesive; Pasty)			Wet at 5 feet bgs
	12:30			5.8-8 ft Olive Brown to Brown vf-c SAND; Some f-m Gravel & silt (SM; Wet; Semi-cohesive; Subrounded clasts)			
8-12	3	NA/4.0	18	8-12 ft Brown m-c SAND & f-m GRAVEL; Some Silt; Little vf-f Sand (GM; Semi-cohesive; Subrounded clasts)			
	12:40						
				End of Boring at 12 ft bgs			
						Install temporary 1-inch PVC well, 10 ft screen & 5 ft riser. 4/6/11 @ 13:15- Collect groundwater sample AVM-GW-12 for TCL VOCs.	


Soil Stratigraphy Summary Poorly-graded sand and gravel

Driller: SJB/Empire Geo Services, Inc.
 Inspector: D. Bishuk
 Rig Type: Geoprobe Model 6620DT
 Method: Hydraulic Direct Push; 4-ft Macrocore Samplers

Dvirka and Bartilucci Boring Log
 Project Name: AVM-Gowanda
 Project #: 2593-03
 Boring Depth: 12 ft bgs

Boring ID: AVM-GW-13
 Sheet 1 of 1
 Location: 100 ft W of AVM-MW-8

Groundwater Observations		Start (Date & Time): <u>4/6/11 @13:55</u>	Location Sketch: <u>AVM-MW-8</u> 
Date	<u>4/6/2011</u>	Finish (Date & Time): <u>4/6/11 @ 15:35</u>	
Time	<u>14:50</u>	Weather: <u>Mix of Snow & Rain 32-35°F</u>	
DTW	<u>5.96 ft bgs</u>	Calm: <u>No Wind</u>	
Casing/Total Depth	<u>12 ft bgs</u>	Elevation of Ground Surface: <u>NA</u>	

Sample Interval	Sample No.	Blows/Recovery	Headspace (ppm)	Field Description	Well Schematic	Comments
0-4	1	NA/3.5 ft	5.4	0-0.5 ft Asphalt		Wet at 4.5 feet bgs
	13:55			0.5-0.9 ft Brick		
				0.9-1.4 ft Macadam consisting of Gray vf-c SAND & f-m GRAVEL (GP; Dry; Non-cohesive)		
				1.4-3.5 ft Rusty Brown to Olive Brown SILT & CLAY; Some vf-f Sand (CL; Very moist at 3 ft; Cohesive; Low plasticity; Few sand laminations)		
4-8	2	NA/4.0	16	4-6 ft Same as 1.4-3.5 ft (CL; Very moist; Wet at 4.5 ft)		
	14:05			6-6.7 ft Olive Brown vf-m SAND; Some Silt (SM; Semi-cohesive)		
				6.7-7.1 ft Olive Gray vf-f SAND & SILT (ML; Wet; Cohesive; Pasty)		
				7.1-8 ft Rusty Brown to Olive Brown m-c SAND & f-m GRAVEL; Little vf-f Sand & Silt (GP; Wet; Loose; Non-cohesive; Subrounded clasts)		
8-12	3	NA/4.0	12.3	8-12 ft Brown vf-f SAND & SILT; Little f Gravel; Trace Gravel; (ML; Wet; Cohesive; Pasty)		
	14:40					

Soil Stratigraphy Summary Poorly-graded sand and gravel

Install temporary 1-inch PVC well, 10 ft screen & 5 ft riser.
 4/6/11 @ 15:10- Collect groundwater sample AVM-GW-12 for TCL VOCs.

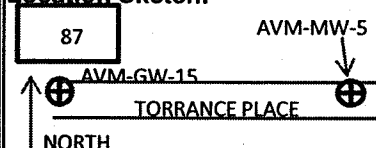
Driller: <u>SJB/Empire Geo Services, Inc.</u>	Dvirka and Bartilucci Boring Log	Boring ID: <u>AVM-GW-14</u>
Inspector: <u>D. Bishuk</u>	Project Name: <u>AVM-Gowanda</u>	Sheet <u>1</u> of <u>1</u>
Rig Type: <u>Geoprobe Model 6620DT</u>	Project #: <u>2593-03</u>	Location: <u>100 ft E of</u> <u>AVM-MW-3</u>
Method: <u>Hydraulic Direct Push; 4-ft Macrocore Samplers</u>	Boring Depth: <u>12 ft bgs</u>	


	Groundwater Observations	Start (Date & Time): <u>4/6/11 @ 15:45</u>	Location Sketch:
Date: <u>4/6/2011</u>		Finish (Date & Time): <u>4/6/11 @ 17:10</u>	
Time: <u>16:30</u>		Weather: <u>Mix of Snow & Rain 32-35°F</u>	
DTW: <u>5.01 ft bgs</u>		<u>Calm; No Wind</u>	
Casing/Total Depth: <u>12 ft bgs</u>		Elevation of Ground Surface: <u>NA</u>	

Sample Interval	Sample No.	Blows/Recovery	Headspace (ppm)	Field Description	Well Schematic	Comments	
0-4	1	NA/4.0 ft	24	0-0.5 ft Asphalt			
	15:45			0.5-1 ft Macadam consisting of Gray vf-c SAND & f-m GRAVEL (GP; Moist; Loose; Non-cohesive)			
				1-3.3 ft Light Brown SILT & CLAY; Some vf-f Sand (CL; Moist; Cohesive; Low plasticity)			
				3.3-4 ft Olive Brown m-c SAND & f-m GRAVEL; Little vf-f Sand & Silt (GP; Moist to very moist; Loose; Slightly cohesive; Subangular clasts)			
4-8	2	NA/2.3	30	4-6.3 ft Olive Brown vf-c SAND & f-m GRAVEL; Some Silt (GM; Wet; Semi-cohesive; Subangular clasts)			Wet at 4.5 feet bgs
	15:55						
8-12	3	NA/2.5	2.5	8-10.5 ft Brownish Green c SAND & f-c GRAVEL; Little vf-m Sand & Silt (GP; Wet; Loose; Slightly cohesive; Subrounded clasts)			
	16:10						
						Install temporary 1-inch PVC well, 10 ft screen & 5 ft riser. 4/6/11 @ 16:50- Collect groundwater sample AVM-GW-12 for TCL VOCs.	

Soil Stratigraphy Summary Poorly-graded sand and gravel

Driller: <u>SJB/Empire Geo Services, Inc.</u>	Dvirka and Bartilucci Boring Log	Boring ID: <u>AVM-GW-15</u>
Inspector: <u>D. Bishuk</u>	Project Name: <u>AVM-Gowanda</u>	Sheet <u>1</u> of <u>1</u>
Rig Type: <u>Geoprobe Model 6620DT</u>	Project #: <u>2593-03</u>	Location: <u>100 ft W of</u>
Method: <u>Hydraulic Direct Push; 4-ft Macrocore Samplers</u>	Boring Depth: <u>12 ft bgs</u>	<u>AVM-MW-5</u>

Date Time DTW Casing/Total Depth	Groundwater Observations			Start (Date & Time): <u>4/7/11 @08:20</u>	Location Sketch: 
	4/7/2011			Finish (Date & Time): <u>4/7/11 @ 09:50</u>	
	09:00			Weather: <u>Sunny 45°F; Calm; No Wind</u>	
	7.71 ft bgs			Elevation of Ground Surface: <u>NA</u>	
	12 ft bgs				

Sample Interval	Sample No.	Blows/Recovery	Headspace (ppm)	Field Description	Well Schematic	Comments	
0-4	1	NA/2.2 ft	<1	0-0.5 ft Asphalt			
	08:20			0.5-0.9 ft Macadam consisting of Gray vf-c SAND & f GRAVEL (GP; Dry; Loose; Non-cohesive)			
				0.9-1.4 ft Brown vf-c SAND; Some f Gravel; Little Silt (SP; Moist; Slightly cohesive)			
				1.4-2.2 ft Light Brown vf-m SAND; Some Silt & Clay; Little f-m Gravel; Trace c Sand (SC; Moist to very moist; Cohesive; Very slight plasticity)			
4-8	2	NA/2.6	2.7	4-4.9 ft Same as 1.4-2.2 ft (SC; Very moist)			
	15:55			4.9-6.6 ft Olive Brown f-m GRAVEL and m-c SAND; Little vf-f Sand & Silt (GP; Very moist; Wet at 6.5 ft; Loose; Slightly cohesive; Subrounded clasts)			
							Wet at 6.5 feet bgs
8-12	3	NA/2.1	<1	8-10.1 ft Same as 4.9-6.6 ft (GP; Wet; Slightly cohesive; Subrounded clasts)			
	16:10						
				End of Boring at 12 ft bgs			
						Install temporary 1-inch PVC well, 10 ft screen & 5 ft riser. 4/7/11 @ 09:30- Collect groundwater sample AVM-GW-12 for TCL VOCs.	

Soil Stratigraphy Summary Poorly-graded sand and gravel



Injection Point Log

ID NO. A1 IP-1D

Groundwater and Environmental Services, Inc.

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: NA

TOTAL DEPTH: 15 ft

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 6 ftbg

CASING EL.: NA

NYSDEC SITE No. 905025

BOREHOLE DIA.: 10.25 in.

WELL DIA.: 3/4 in. SS / 2 in. PVC

Logged By: Nicole Jarzyniecki

Drilling Method: Hollow Stem Auger (HSA)

Dates Drilled: 2-13-2012

Sampling Method: Post Hole Digger/2 in. dia. Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				Brown, fine-medium GRAVEL, some medium-coarse Sand, moist	Boring was Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
0-2	0-2	0.1	100			
2				Brown, medium-coarse SAND, little Clay, trace Gravel, moist		
2-4	2-4		100			
4				Brown, medium-coarse SAND, little Gravel, moist		Grout (0.5-8.9ftbg)
4-5	4-5		100			
6				Brown, fine-medium GRAVEL, some Silt, some fine-coarse Sand, wet		3/4 in. x 2 in. adaptor
5-7	5-7	0.9	30			
8				Brown-Reddish Brown, GRAVEL, some Silt, trace Sand, wet	Lab Sample; IP-3 (7-9ftbg)	
7-9	7-9	3.3	50			
10				Brown-Reddish Brown, GRAVEL, some Silt, trace Sand, wet		Bentonite Seal (8.9-9.5ftbg)
9-11	9-11	2.4	40			
12				Brown-Reddish Brown, GRAVEL, some Silt, trace Sand, wet		Sand Pack (9.5-15ftbg)
11-13	11-13	10.2	60			
14				Olive Brown-Greyish Brown, SILT, some Clay, trace Gravel, moist	Lab Sample; IP-3 (13-15ftbg)	
13-15	13-15	64.9	60			

Location:

Northing/Latitude:

Easting/Longitude:

Horizontal Datum:

Vertical Datum:

General Comments:

Bottom of split spoon sampling at 15 ft Augured to 15ft

ppm = parts per million; ftbg = Feet below grade

NA = not applicable; in. = inches

Bedrock not encountered

Symbol Key:

Apparent Water Level ▼

Lab Sample Location ☒



Injection Point Log

ID NO. A1 IP-1S

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 10.5 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6 ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 in.	WELL DIA.: 3/4 in. SS/ 2 in PVC

Logged By: Nicole Jarzyniecki	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 2-14-2012	Sampling Method: NA
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				Brown, fine-medium GRAVEL, some medium-coarse Sand, moist	Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-1ftbg)
0-2	0.1	2				Grout (1-4ftbg)
2				Brown, medium-coarse SAND, little Clay, trace Gravel, moist		
2-4		2				
4				Brown, medium-coarse SAND, little Gravel, moist		Bentonite Seal (4-4.5ftbg)
4-5		2				3/4 in. x 2 in. adaptor
6				Brown, fine-medium GRAVEL, some Silt, some fine-coarse Sand, wet		
5-7	0.9	.25				
8				Brown-Reddish Brown, GRAVEL, some Silt, trace Sand, wet		Sand Pack (4.5-10.5ftbg)
7-9	3.3	1				
10				Brown-Reddish Brown, GRAVEL, some Silt, trace Sand, wet	No field screening or samples collected. Based on IP-1D well logs	
9-11	2.4	1				

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Augured to 10.5 ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable ; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Injection Point Log

ID NO. A1 IP-2D

Groundwater and Environmental Services, Inc.

PROJECT: NYSDEC Persia Spill No. 9402665
 ADDRESS: 1 Industrial Place, Gowanda NY
 NYSDEC SITE No. 905025

SURFACE ELEV.: NA TOTAL DEPTH: 20ftbg
 WATER DEPTH: 4.5ftbg CASING EL.: NA
 BOREHOLE DIA.: 10.25ftbg WELL DIA.: 3/4 in. SS / 2 in. PVC

Logged By: Nicole Jarzyniecki
 Dates Drilled: 2-13-2012
 Drilling Company: Parratt-Wolff, Inc.
 Drill Rig Type: Truck Mounted

Drilling Method: Hollow Stem Auger (HSA)
 Sampling Method: Post Hole Digger/2" dia. Split Spoon
 Soil Class. System: Modified Burmeister
 Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						
0-2	0-2	0.1	2	Brown, fine-coarse SAND, little Gravel, moist	Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-1ftbg)
2-4	2-4	0.2	2	Brown, fine-coarse SAND, little Gravel, moist		
4-5	4-5	0.3	2	Brown, fine-coarse SAND, little Gravel, moist		3/4 in. x 2 in. adaptor
5-7	5-7	0.6	.25	Brown, SILT, some Gravel, trace fine-coarse Sand, trace clay, wet		
7-9	7-9	2.5	1.75	Brown, SILT, some Gravel, trace fine-coarse Sand, trace clay, wet	Lab Sample; A1 IP-2D (7-9ftbg)	Grout (1-13ftbg)
9-11	9-11	NA	0	NO RECOVERY		
11-13	11-13	3.4	.25	Olive Brown-Greyish Brown, fine-coarse SAND, some Gravel, trace Silt, wet		
13-15	13-15	2.6	.25	Olive Brown-Greyish Brown, fine-coarse SAND, some Gravel, trace Silt, wet		Bentonite Seal (13-14ftbg)
15-17	15-17	5.7	1.75	Olive Brown to Greyish Brown, GRAVEL, some Silt and Sand, trace Clay, wet,		Sand Pack (14-20ftbg)
17-19	17-19	9.3	1.75	Olive Brown to Greyish Brown, GRAVEL, some Silt and Sand, trace Clay, wet,	Lab Sample; A1 IP-2D (17-19ftbg)	
19-20				NO RECOVERY		

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Bottom of split spoon sampling at 20ftbg. Augured to 20ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in. = inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A1 IP-2S

Page 1 of 1

Groundwater and Environmental Services, Inc.

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: NA

TOTAL DEPTH: 12.5 ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 4.5 ftbg

CASING EL.: NA

NYSDEC SITE No. 905025

BOREHOLE DIA.: 10.25 in.

WELL DIA.: 3/4 in. SS / 2 in. PVC

Logged By: Nicole Jarzyniecki

Drilling Method: Hollow Stem Auger (HSA)

Dates Drilled: 2-15-2012

Sampling Method: Post Hole Digger/2" dia. Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modifiend Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						10 in. dia. Well Vault set in Concrete (0-1ftbg)
0-2	0-2	0.1	2	Brown, fine-coarse SAND, little Gravel, moist	Boring w Soft Dug to 5ftbg.	
2						
2-4	2-4	0.2	2	Brown, fine-coarse SAND, little Gravel, moist		
4						Grout (1-6ftbg)
4-5	4-5	0.3	2	Brown, fine-coarse SAND, little Gravel, moist		3/4 in. x 2 in. adaptor
6						Bentonite Seal (6-6.5ftbg)
5-7	5-7	0.6	.25	Brown, SILT, some Gravel, trace fine-coarse Sand, trace clay, wet		
8						
7-9	7-9	2.5	1.75	Brown, SILT, some Gravel, trace fine-coarse Sand, trace clay, wet		
10						
9-11	9-11	NA	0	NO RECOVERY	No field screening or samples collected; All data is based on A1 IP-2D	Sand Pack (6.5-12.5ftbg)
12						
11-12	11-12	3.4	.25	Olive Brown-Greyish Brown, fine-coarse SAND, some Gravel, trace Silt, wet		

Location:

Northing/Latitude:

Easting/Longitude:

Horizontal Datum:

Vertical Datum:

General Comments:

Augured to 12.5 ftbg

ppm = parts per million; ftbg = feet below grade

NA = not applicable; in. = inches

Bedrock not encountered

Symbol Key:

Apparent Water Level ▼

Lab Sample Location ☒



Injection Point Log

ID NO. A1 IP-3D(A)

Page 1 of 1

Groundwater and Environmental Services, Inc.

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 20ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: ~7 ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 in.	WELL DIA.: 2 in SS / 2 in. PVC

Logged By: Nicole Jarzyniecki	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 6/6/2012	Sampling Method: 2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				NO SAMPLE	Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-1ftbg)
2			Hand Clear	NO SAMPLE		
4			Hand Clear	NO SAMPLE		
6			No Sample	NO SAMPLE		
8			No Sample	NO SAMPLE		
10			No Sample	NO SAMPLE		Grout (1-11.5ftbg)
12	12-14	39.9	1	Brown, fine-medium GRAVEL and coarse SAND, trace Silt, wet	Augured to 12ftbg	Bentonite Seal (11.5-12ftbg)
14	14-16	12.0	1.75	Grey, medium SAND, wet	Lab Sample; A1 IP-3D(A) (12-14ftbg)	Sand Pack (12-18.5ftbg)
16	16-18	0.2	1.25	Dark Grey, fine GRAVEL, some medium-coarse Sand, wet		
18	18-20	14.3	1.75	Grey, SILT, some Clay, trace fine Gravel, dry		
20						

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Bottom of split spoon sampling from 12-20ftbg. Augured to 20ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in. = inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A1 IP-3D

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: NA

TOTAL DEPTH: 15ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 7

CASING EL.: NA

NYSDEC SITE No. 905025

BOREHOLE DIA.: 10.25 in.

WELL DIA.: 3/4 in. SS / 2 in. PVC

Logged By: Nicole Jarzyniecki

Drilling Method: Hollow Stem Auger (HSA)

Dates Drilled: 2-9-2012

Sampling Method: Post Hole Digger/2" dia. Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						
0-2	0-2	0.1	2	Brown, fine-coarse SAND, little Gravel, moist	Boring soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-1ftbg)
2-4	2-4	0.1	2	Brown, fine-coarse SAND, little Gravel, trace Cobbles, moist to wet		
4-5	4-5	0.1	2	Brown, fine-coarse SAND, some Silt, trace Clay and Gravel, wet		Grout (1-9ftbg)
5-7	5-7	5.4	1.75	Brown mottled with Olive Brown, SILT, some Sand, trace Gravel	Lab Sample; IP-3 (5-7ftbg)	3/4 in. x 2 in. adaptor
7-9	7-9	2.0	1.75	Brown, SILT and GRAVEL, trace Sand, wet		
9-11	9-11	6.3	.5	Brown, GRAVEL, some Silt, some Sand, wet		Bentonite Seal (9-9.5ftbg)
11-13	11-13	3.9	1	Brown, medium-coarse SAND and GRAVEL, wet	Lab Sample; A1 IP-3 (11-13ftbg)	
13-15	13-15	13.6	.5	Olive Brown to Greyish Brown, SILT and CLAY, moist to wet		Sand Pack (9.5-15ftbg)

Location:

Northing/Latitude:

Easting/Longitude:

Horizontal Datum:

Vertical Datum:

General Comments:

Bottom of split spoon sampling at 15ftbg. Augured to 15ftbg

ppm = parts per million; ftbg = feet below grade

NA = not applicable; in. = inches

Bedrock not encountered

Symbol Key:

Apparent Water Level ▼

Lab Sample Location ☒



Injection Point Log

ID NO. A1 IP-3S

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: NA

TOTAL DEPTH: 10.5ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 7ftbg

CASING EL.: NA

NYSDEC SITE No. 905025

BOREHOLE DIA.: 10.25 in.

WELL DIA.: 3/4 in. SS / 2 in. PVC

Logged By: Nicole Jarzyniecki

Drilling Method: Hollow Stem Auger (HSA)

Dates Drilled: 2-9-2012

Sampling Method: Post Hole Digger/2 in. dia. Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				Brown, fine-coarse SAND, little Gravel, moist	Boring Soft Dug to 5ftbg.	10" dia. Well Vault set in Concrete (0-0.5ftbg)
0-2	0.1	2				
2				Brown, fine-coarse SAND, little Gravel, trace Cobbles, moist to wet		Grout (0.5-4ftbg)
2-4	0.6	2				
4				Brown, fine-coarse SAND, some Silt, trace Clay and Gravel, wet		Bentonite Seal (4-4.5ftbg)
4-5	1.2	2				3/4 in. x 2 in. adaptor
6				Brown mottled with Olive Brown, SILT, some Sand, trace Gravel		
5-7	5.4	1.75				
8				Brown, SILT and GRAVEL, trace Sand, wet		
7-9	2.0	1.75				Sand Pack (4.5-10.5ftbg)
10				Brown, GRAVEL, some Silt, some Sand, wet	All information based on A1 IP-3D; No samples or screening completed at this well	
9-11	6.3	.75				

Location:

Northing/Latitude:

Easting/Longitude:

Horizontal Datum:

Vertical Datum:

General Comments:

Augured to 10.5ftbg

ppm = parts per million; ftbg = feet below grade

NA = not applicable; in. = inches

Bedrock not encountered

Symbol Key:

Apparent Water Level ▼

Lab Sample Location ☒



Injection Point Log

ID NO. A1 IP-4

Groundwater and Environmental Services, Inc.

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 19ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 6/3/2012	Sampling Method: Post Hole Digger/2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				NO SAMPLE	2in. SS Riser (0.5-2.5ftbg)	10" dia. Well Vault set in Concrete (0-1ftbg)
0-2	NA	NA	Hand Clear		Boring Soft Dug to 5ftbg.	
2				Brown, CLAY, some Silt, little fine Sand, trace fine-medium Gravel, moist		
2-4	0.0	0.0	Hand Clear			
4				NO SAMPLE		
4-5	NA	NA	Hand Clear			
5-6	0.0	0.0	2	Brown, fine-medium GRAVEL, some coarse Sand, little Silt, trace Clay		Grout (1-11.5ftbg)
6				Brown, fine-medium GRAVEL, some coarse Sand, trace Silt		
6-8	1.9	1.75	1.75			
8				Grey, fine-coarse GRAVEL, some coarse Sand, trace Silt and Clay		
8-10	5.3	5.3	1			
10				Grey, fine-coarse GRAVEL, some coarse Sand, trace Silt and Clay		
10-12	1.8	1.75	1.75			Bentonite Seal (11.5-12ftbg)
12				Grey, fine-medium GRAVEL, little coarse Sand		
12-14	1.4	1.4	2			
14				Grey, fine-medium GRAVEL, little medium-coarse Sand		
14-16	0.0	0.0	2			Sand Pack (12-19ftbg)
16				Grey, fine-medium SAND, trace Silt and Clay grades to Grey, fine-medium GRAVEL and medium-coarse SAND, trace Clay and Silt	Lab Sample; A1 IP-4 (16-18ftbg)	
16-18	6.5	6.5	2			
18				Grey, fine SAND and SILT, trace Clay	Refusal @ 19ftbg	

Location:

Nothing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Bottom of split spoon sampling at 16-18ftbg. Augured to 19ftbg
 ppm = parts per million; ftbg = feet below ground surface
 NA = not applicable; in. = inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A1 IP-5

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 14ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25ftbg	WELL DIA.: 2in. SS / 2in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 6/5/2012	Sampling Method: Post Hole Digger/2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				Brown, medium-coarse SAND some fine Gravel, moist	2in. SS Riser (0.5-2.5ftbg)	10in. dia. Well Vault set in Concrete (0-1ftbg)
0-2	0.0		Hand Clear			
2				Brown, medium-coarse SAND, trace fine Gravel, moist	Boring Soft Dug to 5ftbg.	
2-4	0.0		Hand Clear			
4				Brown, medium-coarse SAND, some Silt and Clay, trace fine-medium Gravel, moist		
4-5	0.0		Hand Clear			
5-6	0.0	.50		Brown, medium-coarse SAND and fine GRAVEL, some Clay and Silt		
6				Brown, fine-medium GRAVEL, some coarse Sand, trace Clay and Silt, wet		Grout (1-7.5ftbg)
6-8	1.2		1			Bentonite Seal (7.5-8ftbg)
8				Grey, fine-medium GRAVEL, some coarse Sand, trace Clay and Silt		
8-10	6.1		1.75			
10				Green-Grey, coarse SAND and fine GRAVEL		
10-12	0.5		1			
12				Grey, medium-coarse GRAVEL, some coarse Sand, trace Silt and Clay @ 13ftbg		Sand Pack (8-14ftbg)
12-14	8.3		1.75	Grey, fine SAND and CLAY, some Silt	Lab Sample; A1 IP-5 (12-14ftbg)	
14						

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Bottom of split spoon sampling at 14ftbg. Augured to 14ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in. = inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A1 IP-6

Page 1 of 1

Groundwater and Environmental Services, Inc.

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: NA

TOTAL DEPTH: 14ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 6ftbg

CASING EL.: NA

NYSDEC SITE No. 905025

BOREHOLE DIA.: 10.25ftbg

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger (HSA)

Dates Drilled: 6/12/2012

Sampling Method: Post Hole Digger/2 in. dia. Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				Brown, SAND and CLAY	2in. Stainless Steel Riser (0.5-2.5ftbg)	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
0-2	0-2	0.0	Hand Clear			
2				Grey, SILT, some Clay, trace fine Gravel, moist	Boring Soft Dug to 5ftbg.	
2-4	2-4	0.0	Hand Clear			Grout (0.5-6.5ftbg)
4				Grey, fine-medium GRAVEL, some Clay, trace Silt, wet		
4-5	4-5	0.1	Hand Clear			
5-6	5-6	1.2	.25	Tan, fine GRAVEL, some coarse Sand, little Silt		
6				Brown, fine-medium GRAVEL, some coarse Sand, trace Silt		Bentonite Seal (6.5-7ftbg)
6-8	6-8	222.3	1			
8				Brown, fine-medium GRAVEL, some coarse Sand, trace Silt	Lab Sample; A1 IP-6 (6-10ftbg)	
8-10	8-10	42.6	.25			
10				Grey, fine-medium GRAVEL and fine-coarse SAND		
10-12	10-12	27.3	1.5			
12				Grey, fine-medium GRAVEL and medium-coarse SAND		Sand Pack (7-14ftbg)
12-14	12-14	31.4	1.5			
14						

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 14ftbg. Augured to 14ftbg Refusal at 14ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in. = inch
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Injection Point Log

ID NO. A1 IP-7

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gownada	SURFACE ELEV.: NA	TOTAL DEPTH: 14ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25ftbg	WELL DIA.: 2in. SS / 2in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 6/7/2012	Sampling Method: Post Hole Digger/2in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: A1 IP-7	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				Tan, SILT some Clay, trace fine-coarse Gravel	2in. Stainless Steel Riser (0.5-2.5ftbg)	10in. dia. Well Vault set in Concrete (0-1ftbg)
0-2	0-2	0.4	Hand Clear			
2				Brown, CLAY, some Silt, trace fine-coarse Gravel, moist	Boring Soft Dug to 5ftbg.	Grout (1-7.5ftbg)
2-4	2-4	1.8	Hand Clear			
4				Grey, fine SAND, some Clay		
4-5	4-5	4.3	Hand Clear			
5-6	5-6	8.3	1.75	Brown, fine-medium GRAVEL, some coarse Sand, trace Clay		
6				Grey, fine-medium GRAVEL, some coarse Sand, trace Clay and Silt, wet		Bentonite Seal (7.5-8ftbg)
6-8	6-8	10.2	1.5			
8				Grey, fine-medium GRAVEL, some coarse Sand, trace Silt		
8-10	8-10	5.7	1			
10				Grey, fine-medium GRAVEL, some coarse Sand, trace Silt		
10-12	10-12	2.3	2			
12				12-13ftbg Grey, fine-medium GRAVEL, some coarse Sand, trace Silt; 13-14ftbg fine SAND and SILT, some Clay	Lab Sample; A1 IP-7 (12-14ftbg)	Sand Pack (8-14ftbg)
12-14	12-14	4.0	2			
14						

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Bottom of split spoon sampling at 14ftbg. Augured to 14ftbg
 ppm = parts per million; ftbg =feet below grade
 NA = not applicable; in. = inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A1 IP8

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 14ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 6/7/2012	Sampling Method: Post Hole Digger/2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				Dark Brown, SILT, some Clay	2in. Stainless Steel Riser (0.5-2.5ftbg)	10in. dia. Well Vault set in Concrete (0-0.5ftbg)
0-2	2.7		Hand Clear			
2				Brown, CLAY, trace Silt	Boring Soft Dug to 5ftbg.	Grout (1-7.5ftbg)
2-4	8.8		Hand Clear			
4				Grey, fine SAND, some Silt, trace Clay, moist		
4-5	2.2		Hand Clear			
5-6	17.6	.25		Grey, fine-medium GRAVEL and coarse SAND, some Clay		
6				Grey, fine-medium GRAVEL, some coarse Sand, some Silt and Clay, wet		Bentonite Seal (7.5-8ftbg)
6-8	75.6	1				
8				Grey, fine-medium GRAVEL and coarse SAND, trace Silt and Clay	Lab Sample; A1 IP8 (6-10ftbg)	
8-10	104.1	1.5				
10				Grey, fine-medium GRAVEL and coarse Sand, trace Silt and Clay		
10-12	2.4	1.75				
12				12-13ftbg Grey, fine-medium GRAVEL, some Silt; 13-14ftbg Grey, SILT, some Clay		Sand Pack (8-14ftbg)
12-14	3.2	2				
14						

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Bottom of split spoon sampling at 14ftbg. Augured to 14ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in. = inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A1 IP9

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 15ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25ftbg	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 6/7/2012	Sampling Method: Post Hole Digger/2 in dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				Dark Brown, SILT, trace Clay	2in. Stainless Steel Riser (0.5-2.5ftbg)	10 in. dia. Well Vault set in Concrete (0-1ftbg)
0-2	0-2	0.1	Hand Clear			
2				Brown, CLAY, some Silt	Boring Soft Dug to 5ftbg.	
2-4	2-4	0.4	Hand Clear			Grout (1-8.5ftbg)
4				Grey, Clay, some Silt		
4-5	4-5	0.2	Hand Clear			
5-6	5-6	1.1	.5	Grey, fine-medium SAND		
6				Grey, fine-medium GRAVEL, some coarse Sand, trace Silt and Clay		Bentonite Seal (8.5-9ftbg)
6-8	6-8	2.9	1.75			
8				Grey, fine-medium GRAVEL, some coarse Sand, trace Clay and Silt		
8-10	8-10	4.9	.75			
10				Grey, coarse SAND, some fine-medium Gravel, trace Silt		
10-12	10-12	11.5	2			
12				Grey, coarse SAND, some fine-medium Gravel, trace Silt		Sand Pack (9-15ftbg)
12-14	12-14	12.1	1		Lab Sample; A1 IP9 (12-14ftbg)	
14				Reufsals @ 15.5ftbg Dark Grey, SILT, some Clay		
14-16	14-16	4.3	1.75			

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Bottom of split spoon sampling at 15ftg. Augured to 15ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in. = inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A2 IP1

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 775.96	TOTAL DEPTH: 20 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 5.95 ftbg	CASING EL.: 775.71
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/10/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-13ftbg)
6	0-5	NA	Soft Dug			PVC Casing (3-15ftbg)
8						
10	5-10	NA	NA		Augured 5-10ftbg	
12	10-12	4.9	1	Grey, fine-medium GRAVEL, some fine-coarse Sand, trace Silt, wet		
14	12-14	7.4	.5	Grey, fine SAND and SILT, some fine-medium Gravel and medium-coarse Sand		Bentonite Seal (13-14ftbg)
16	14-16	2.4	2	Grey, fine GRAVEL and coarse SAND		Sand Pack (14-20ftbg)
18	16-18	15.5	2	Grey, medium-coarse SAND, some fine Gravel, trace Silt	Lab Sample; A2 IP1 (16-18ftbg)	PVC Screen (15-20ftbg)
20	18-20	5.6	2	Grey, medium-coarse SAND, some fine Gravel, trace Silt Till		

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 20ftbg; Split Spoon to 20ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in.= inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A2 IP2

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 775.95

TOTAL DEPTH: 18 ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 5.75

CASING EL.: 775.62

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/10/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-9ftbg)
6	0-5	NA	Soft Dug			PVC Casing (3-11ftbg)
8						
10	5-10	NA	NA		Augured 5-10ftbg	Bentonite Seal (9-10ftbg)
12	10-12	0.4	.5	Grey, fine GRAVEL, medium-coarse Sand, trace Silt, wet		
14	12-14	0.5	1.25	Grey, fine-medium GRAVEL and fine-coarse SAND, trace Silt		
16	14-16	0.5	1.25	Grey, fine-medium GRAVEL and fine-coarse SAND, trace Silt		PVC Screen (11-16ftbg)
				CLAY and SILT, trace fine Gravel		
18	16-18	3.6	1.5	Grey, CLAY and SILT, trace fine Gravel	Lab Sample; A2 IP2 (16-18ftbg)	Sand Pack (10-18ftbg)

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Augured to 20ftbg; Split Spoon to 20ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in.= inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP1

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 774.57

TOTAL DEPTH: 18ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 8.85ftbg

CASING EL.: 774.17

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/10/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-11ftbg)
6	0-8	NA	Soft Dug			PVC Casing (0.5-13ftbg)
8						
10	8-10	NA	NA		Augured 8-10ftbg	
12	10-12	2.5	1	Brown, fine-medium GRAVEL and medium-coarse SAND, some Silt and Clay, wet		Bentonite Seal (11-12ftbg)
14	12-14	7.5	1.5	Grey, fine-medium GRAVEL and medium-coarse SAND	Lab Sample; A3 IP1 (12-14ftbg)	
16	14-16	0.6	1	Brown, fine-medium GRAVEL and medium-coarse SAND, some Silt		Sand Pack (12-18ftbg)
18	16-18	0.8	2	Brown, fine-medium GRAVEL and medium-coarse SAND, some Silt		PVC Screen (13-18ftbg)
18				TILL		

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Augured to 18ftbg; Split Spoon to 18ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in.= inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP2

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 774.44	TOTAL DEPTH: 18ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 8.96 ftbg	CASING EL.: 774.88
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/10/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-11ftbg)
6	0-8	NA	Soft Dug			PVC Casing (0.5-13ftbg)
8						
10	8-10	NA	NA		Augured 8-10ftbg	
12	10-12	1.6	1.25	Brown, fine-medium GRAVEL and fine-coarse SAND, trace Silt, wet		Bentonite Seal (11-12ftbg)
14	12-14	5.7	1	Brown, fine-medium GRAVEL and fine-coarse SAND, trace Silt and Clay		
16	14-16	5.2	1	Grey, fine-medium GRAVEL and fine-medium SAND, some coarse Sand, trace Silt and Clay		Sand Pack (12-18ftbg)
18	16-18	7.2	1.5	Grey, fine-medium SAND		PVC Screen (13-18ftbg)
				Till	Lab Sample; A3 IP2 (16-18ftbg)	

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 18ftbg; Split Spoon to 18ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in.= inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP3

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 774.88

TOTAL DEPTH: 16ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 8.30 ftbg

CASING EL.: 774.05

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/11/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-7ftbg)
6	0-8	NA	Soft Dug			PVC Casing (3-9ftbg)
8						Bentonite Seal (7-8ftbg)
10	8-10	NA	NA		Augured 8-10ftbg	
12	10-12	4.4	1	Brown, fine-medium GRAVEL and fine-coarse SAND, some Silt and Clay, wet		
14	12-14	12.3	1.75	Grey, fine-medium GRAVEL and fine-coarse SAND, some Silt	Lab Sample; A3 IP3 (12-14ftbg)	Sand Pack (8-16ftbg)
14				TILL		PVC Screen (9-14ftbg)
16	14-16	0.7	1.75	TILL		

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Augured to 16ftbg; Split Spoon to 16ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in.= inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP4

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 774.96	TOTAL DEPTH: 14ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 7.68 ftbg	CASING EL.: 774.45
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/11/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-7ftbg)
6	0-8	NA	Soft Dug			PVC Casing (3-9ftbg)
8						Bentonite Seal (7-8ftbg)
10	8-10	NA	NA		Augured 8-10ftbg	
12	10-12	50.4	1.5	Grey, fine-medium GRAVEL and coarse SAND		
14	12-14	14.3	1.75	Grey, fine-medium GRAVEL and coarse SAND	Lab Sample; A3 IP4 (12-14ftbg)	Sand Pack (8-16ftbg) PVC Screen (9-14ftbg)

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Augured to 14ftbg; Split Spoon to 14ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in.= inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP5

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 775.11	TOTAL DEPTH: 14ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6.55 ftbg	CASING EL.: 774.60
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/17/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-6ftbg)
6	0-8	NA	Soft Dug			PVC Casing (3-8ftbg)
8						Bentonite Seal (6-7ftbg)
10	8-10	NA	NA	TILL in tip of spoon	Augured 8-10ftbg	Sand Pack (8-14ftbg)
12	10-12	25.8	.25	TILL	Lab Sample; A3 IP5 (10-14ftbg)	PVC Screen (8-13ftbg)
14	12-14	8.2	2	fine SAND and SILT, dry		

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 14ftbg; Split Spoon to 14ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in.= inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP6

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 775.22	TOTAL DEPTH: 16ftg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6.38 ftbg	CASING EL.: 774.87
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/17/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-8ftbg)
6	0-8	NA	Soft Dug			PVC Casing (3-10ftbg)
8						Bentonite Seal (8-9ftbg)
10	8-10	NA	NA		Augured 8-10ftbg	Sand Pack (9-15ftbg)
12	10-12	27.5	1	Grey, fine-medium GRAVEL and medium-coarse SAND, trace Silt and Clay		
14	12-14	145.1	1.5	Grey, fine GRAVEL and meduim-coarse SAND, some fine Sand and Silt	Lab Sample; A3 IP6 (12-14ftbg)	PVC Screen (10-15ftbg)
16	14-16	25.2	1.75	TILL		

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 16ftbg; Split Spoon to 16ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in.= inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP7

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 775.32

TOTAL DEPTH: 16ftg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 5.80 ftbg

CASING EL.: 774.86

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/17/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-8ftbg)
6	0-8	NA	Soft Dug			PVC Casing (3-10ftbg)
8						Bentonite Seal (8-9ftbg)
10	8-10	NA	NA		Augured 8-10ftbg	Sand Pack (9-15ftbg)
12	10-12	35.3	1.75	Grey, medium-coarse GRAVEL, some Silt and fine-coarse Sand		
				Grey, fine-medium SAND, trace fine Gravel		
				Grey, fine-coarse SAND, trace fine Gravel		PVC Screen (10-15ftbg)
14	12-14	120.8	2	TILL	Lab Sample; A3 IP7 (12-14ftbg)	
				TILL		
16	14-16	8.0	1			

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Augured to 16ftbg; Split Spoon to 16ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in.= inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP8

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 775.37	TOTAL DEPTH: 16ftg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 5.70 ftbg	CASING EL.: 774.86
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/23/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-13ftbg)
6	0-8	NA	Soft Dug			
8						PVC Casing (3-15ftbg)
10	8-10	NA	NA		Augured 8-10ftbg	
12	10-12	3.6	1.5	Grey, medium-coarse GRAVEL, some medium-coarse Sand, trace Silt		
14	12-14	63.2	1.75	Dark Grey, fine-coarse SAND, some fine Gravel		Bentonite Seal (13-14ftbg)
16	14-16	183.6	1.75	Dark Grey, fine-coarse SAND, some medium-fine Gravel, trace Silt	Lab Sample; A3 IP8 (14-16ftbg)	Sand Pack (14-20ftbg)
18	16-18	180.2	.5	Dark Grey, fine-medium SAND and SILT, trace fine Gravel		PVC Screen (15-20ftbg)
20	18-20	114.7	.5	TILL		

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 20ftbg; Split Spoon to 20ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in.= inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP9

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 775.49

TOTAL DEPTH: 20ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 5.68 ftbg

CASING EL.: 774.92

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/23/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-11ftbg)
0-8	NA	NA	Soft Dug			PVC Casing (3-13ftbg)
6						
8						
8-10	NA	NA	NA		Augured 8-10ftbg	
10				Brown-Grey, fine-medium GRAVEL, some coarse Sand, wet		
10-12	8.66	8.66	1.5			Bentonite Seal (11-12ftbg)
12				Grey, fine-medium GRAVEL and medium-coarse SAND, trace Clay		
12-14	15.2	15.2	1.75			
14				Grey, fine GRAVEL and medium-fine Sand, trace Silt		Sand Pack (12-20ftbg)
14-16	37.7	37.7	2		Lab Sample; A3 IP9 (14-16ftbg)	
16				Grey, fine-coarse SAND, some Silt, trace fine-medium Gravel		PVC Screen (13-18ftbg)
16-18	39.9	39.9	1.5			
18				TILL		
18-20	2.3	2.3	1			
20						

Location:

Northing/Latitude:

Easting/Longitude:

Horizontal Datum:

Vertical Datum:

General Comments:

Augured to 20ftbg; Split Spoon to 20ftbg

ppm = parts per million; ftbg = feet below grade

NA = not applicable; in.= inches

Bedrock not encountered

Symbol Key:

Apparent Water Level ▼

Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP10

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 775.61	TOTAL DEPTH: 18ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 5.80 ftbg	CASING EL.: 775.09
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/24/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-11ftbg)
6	0-8	NA	Soft Dug			
8						PVC Casing (3-13ftbg)
10	8-10	NA	NA		Augured 8-10ftbg	
12	10-12	5.9	1	Brown, fine-medium GRAVEL and coarse SAND, wet		Bentonite Seal (11-12ftbg)
14	12-14	13.6	2	Grey, fine GRAVEL and coarse SAND, trace Clay		
16	14-16	20.6	2	Grey, medium-fine SAND, trace Silt	Lab Sample; A3 IP10 (14-16ftbg)	Sand Pack (12-18ftbg)
18	16-18	0.7	1	TILL		PVC Screen (13-18ftbg)

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 18ftbg; Split Spoon to 18ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in. = inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP11

Page 1 of 1

Groundwater and Environmental Services, Inc.

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 775.72

TOTAL DEPTH: 26ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 6.60 ftbg

CASING EL.: 775.05

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/24/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg) 2in. SS Riser (0.5-3ftbg)
2						
4						Grout (0.5-17ftbg)
6	0-8	NA	Soft Dug			
8						PVC Casing (3-19ftbg)
10	8-10	NA	NA		Augured 8-10ftbg	
12	10-12	3.9	1	Brown, fine-medium GRAVEL and coarse SAND, wet		
14	12-14	10.0	1.5	Brown, fine-medium GRAVEL and coarse SAND, wet		
16	14-16	37.6	1.5	Grey, fine GRAVEL and coarse SAND, trace Silt		
18	16-18	91.8	2	Grey, medium-coarse SAND, some fine-medium Gravel		Bentonite Seal (17-18ftbg)
20	18-20	164.5	1.75	Grey, fine-coarse SAND, trace Silt	Lab Sample; A3 IP11 (18-20ftbg)	
22	20-22	67.8	1.5	Grey, fine-coarse SAND, trace Silt		Sand Pack (18-24 ftbg)
24	22-24	57.2	1.5	Grey, fine-medium GRAVEL and fine-coarse SAND		PVC Screen (19-24ftbg)
26	24-26	0.5	1.75	Grey, fine-medium SAND		

Location:

Northing/Latitude:

Easting/Longitude:

Horizontal Datum:

Vertical Datum:

General Comments:

Augured to 26ftbg; Split Spoon to 26ftbg

ppm = parts per million; ftbg = feet below grade

NA = not applicable; in. = inches

Bedrock not encountered

Symbol Key:

Apparent Water Level ▼

Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP12

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 774.44

TOTAL DEPTH: 18ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 8.60

CASING EL.: 773.88

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/26/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-11ftbg)
6	0-8	NA	Soft Dug			PVC Casing (3-13ftbg)
8						
10	8-10	NA	NA		Augured 8-10ftbg	
12	10-12	0.9	1	Brown, fine-medium GRAVEL, some coarse Sand and Silt, wet		Bentonite Seal (11-12ftbg)
14	12-14	1.0	2	Brown, fine-medium GRAVEL and medium-coarse SAND, trace Silt	Lab Sample; A3 IP12 (12-14ftbg)	Sand Pack (12-18ftbg)
16	14-16	0.5	2	Brown, fine-medium GRAVEL, some coarse Sand		PVC Screen (13-18ftbg)
18	16-18	1.0	1	TILL		

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Augured to 18ftbg; Split Spoon to 18ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in.= inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP13

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 774.63

TOTAL DEPTH: 18ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 8.58

CASING EL.: 774.03

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/13/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-9ftbg)
6	0-8	NA	Soft Dug			
8						PVC Casing (3-11ftbg)
10	8-10	NA	NA		Augured 8-10ftbg	Bentonite Seal (9-10ftbg)
12	10-12	22.5	1	Brown, fine-medium GRAVEL and coarse SAND, trace Silt and Clay, wet		
14	12-14	35.1	1.25	Brown, fine-medium GRAVEL and coarse SAND	Lab Sample; A3 IP13 (12-14ftbg)	
16	14-16	27.4	1.75	Grey, fine SAND and SILT		PVC Screen (11-16ftbg)
18	16-18	3.9	1	Grey, fine SAND and SILT		

Location:

Northing/Latitude:

Easting/Longitude:

Horizontal Datum:

Vertical Datum:

General Comments:

Augured to 18ftbg; Split Spoon to 18ftbg

ppm = parts per million; ftbg = feet below grade

NA = not applicable; in.= inches

Bedrock not encountered

Symbol Key:

Apparent Water Level ▼

Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP14

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 774.77

TOTAL DEPTH: 14ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 7.90

CASING EL.: 774.22

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/19/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-7ftbg)
6	0-8	NA	Soft Dug			PVC Casing (3-9ftbg)
8						Bentonite Seal (7-8ftbg)
10	8-10	NA	NA	Grey, fine-medium GRAVEL and coarse SAND, trace Silt	Augured 8-10ftbg	Sand Pack (8-14ftbg)
12	10-12	27.6	1	Grey, fine GRAVEL and coarse SAND, trace Silt	Lab Sample; A3 IP14 (10-12.5ftbg)	
12.5	12-12.5	19.5	1	TILL		
14	12.5-14	8.9	.75			PVC Screen (9-14ftbg)

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Augured to 14ftbg; Split Spoon to 14ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in.= inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP15

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 774.91	TOTAL DEPTH: 14ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6.81	CASING EL.: 774.29
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/19/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-7ftbg)
6	0-8	NA	Soft Dug			PVC Casing (3-9ftbg)
8						Bentonite Seal (7-8ftbg)
10	8-10	NA	NA	Grey, fine SAND and SILT, trace Clay	Augured 8-10ftbg	Sand Pack (8-14ftbg)
12	10-12	52.7	1.75		Lab Sample; A3 IP15 (10-12ftbg)	
14	12-14	8.1	1	Grey, TILL		PVC Screen (9-14ftbg)

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 14ftbg; Split Spoon to 14ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in.= inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP16

Page 1 of 1

Groundwater and Environmental Services, Inc.

PROJECT: NYSDEC AVM Gowanda
 ADDRESS: 1 Industrial Place, Gowanda NY
 NYSDEC SITE No. 905025

SURFACE ELEV.: 775.65
 WATER DEPTH: 6.54 ftbg
 BOREHOLE DIA.: 4.25 in.
 TOTAL DEPTH: 18ftg
 CASING EL.: 775.03
 WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald
 Dates Drilled: 9/19/2013
 Drilling Company: Parratt-Wolff, Inc.
 Drill Rig Type: Truck Mounted

Drilling Method: Hollow Stem Auger
 Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
 Soil Class. System: Modified Burmeister
 Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-9ftbg)
6	0-8	NA	Soft Dug			PVC Casing (3-11ftbg)
8						
10	8-10	NA	NA		Augured 8-10ftbg	Bentonite Seal (9-10ftbg)
12	10-12	49.9	.5	Brown/Grey, fine-coarse SAND, some fine Gravel, trace Silt		
14	12-14	30.7	.5	Grey, medium-coarse SAND, some fine Gravel, trace Silt	Lab Sample; A3 IP16 (10-14ftbg)	Sand Pack (10-18ftbg)
16	14-16	1.1	1.75	Grey, fine SAND, some Silt		PVC Screen (11-16ftbg)
18	16-18	2.3	1.5	TILL		

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 18ftbg; Split Spoon to 1ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in.= inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP17

Page 1 of 1

Groundwater and Environmental Services, Inc.

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 776.00	TOTAL DEPTH: 20 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6.17 ftbg	CASING EL.: 775.36
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/18/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-11ftbg)
6	0-8	NA	Soft Dug			PVC Casing (3-13ftbg)
8						
10	8-10	NA	NA		Augured 8-10ftbg	
12	10-12	7.0	1	Grey, fine-medium GRAVEL and medium-coarse SAND, trace Silt and Clay, wet		Bentonite Seal (11-12ftbg)
14	12-14	10.1	1	Grey, fine-medium GRAVEL, some coarse Sand, trace Silt		Sand Pack (12-18.5ftbg)
16	14-16	43.0	1.75	Grey, fine-medium SAND, trace fine Gravel and Silt	Lab Sample; A3 IP17 (14-16ftbg)	PVC Screen (13-18ftbg)
18	16-18	31.2	2	Grey, fine-medium GRAVEL and medium-coarse SAND, trace Clay and Silt		
20	18-20	NA	NA	No Recovery		

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 20ftbg; Split Spoon to 20ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in.= inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP18

Page 1 of 1

Groundwater and Environmental Services, Inc.

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 776.00

TOTAL DEPTH: 18 ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 6.44 ftbg

CASING EL.: 775.52

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/12/2013

Sampling Method: 2 in. dia. x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-9ftbg)
6	0-8	NA	Soft Dug			PVC Casing (3-11ftbg)
8						
10	8-10	NA	NA		Augured 8-10ftbg	Bentonite Seal (9-10ftbg)
12	10-12	6.0	1	Grey, fine-medium GRAVEL, some coarse Sand, trace Silt and Clay, wet		
14	12-14	15.6	1.5	Grey, fine-medium GRAVEL and medium-coarse SAND, some fine Sand and Silt		Sand Pack (10-16ftbg)
16	14-16	30.5	2	Grey, fine GRAVEL and fine-coarse Sand, trace Silt and Clay	Lab Sample; A3 IP18 (14-16ftbg)	PVC Screen (11-16ftbg)
18	16-18	4.3	1.5	TILL		

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Augured to 18ftbg; Split Spoon to 18ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in.= inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Injection Point Log

ID NO. A3 IP19

Page 1 of 1

Groundwater and Environmental Services, Inc.

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 776.33

TOTAL DEPTH: 24 ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 6.44 ftbg

CASING EL.: 775.86

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/12/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Truck Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg) 2in. SS Riser (0.5-3ftbg)
2						
4						Grout (0.5-11ftbg)
6	0-8	NA	Soft Dug			PVC Casing (3-13ftbg)
8						
10	8-10	NA	NA		Augured 8-10ftbg	
12	10-12	2.3	.5	Brown, fine-medium GRAVEL, some fine-coarse Sand, trace Silt		Bentonite Seal (11-12ftbg)
14	12-14	14	1.5	Brown/Grey, fine-coarse GRAVEL, some Silt and fine-medium Gravel		Sand Pack (12-22ftbg)
16	14-16	43.3	2	Grey, fine GRAVEL and medium-coarse Sand, some Silt	Lab Sample; A3 IP19 (14-16ftbg)	PVC Screen (13-18ftbg)
18	16-18	25.8	2	Grey, fine SAND, trace fine GRAVEL		
20	18-20	2.2	2	Grey, fine SAND, trace fine GRAVEL		
22	20-22	5.7	1	Grey, fine SAND, trace fine GRAVEL		
24	22-24	2.1	2	Till		

Location:

Northing/Latitude:

Easting/Longitude:

Horizontal Datum:

Vertical Datum:

General Comments:

Augured to 24ftbg; Split Spoon to 24ftbg

ppm = parts per million; ftbg = feet below grade

NA = not applicable; in.= inches

Bedrock not encountered

Symbol Key:

Apparent Water Level ▼

Lab Sample Location ☒



Injection Point Log

ID NO. A4 IP1

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 774.44

TOTAL DEPTH: 18 ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 9.35

CASING EL.: 774.21

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/26/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Track Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-8ftbg)
6	0-5	NA	Soft Dug			PVC Casing (3-10ftbg)
8						Bentonite Seal (8-9ftbg)
10	5-10	NA	NA		Augured 5-10ftbg	Sand Pack (9-18ftbg)
12	10-12	1.1	1	Brown, fine GRAVEL and SAND, trace Silt and Clay, moist		
14	12-14	1.3	1	Brown, fine-medium GRAVEL, some Sand and Silt, wet	Lab Sample; A4 IP1 (12-14ftbg)	PVC Screen (10-15ftbg)
16	14-16	0.7	2	Grey, TILL, dry		
18	16-18	0.1	2	Grey, TILL, dry		

Location:

Northing/Latitude:

Easting/Longitude:

Horizontal Datum:

Vertical Datum:

General Comments:

Augured to 18ftbg; Split Spoon to 18ftbg

ppm = parts per million; ftbg = feet below grade

NA = not applicable; in.= inches

Bedrock not encountered

Symbol Key:

Apparent Water Level ▼

Lab Sample Location ☒



Injection Point Log

ID NO. A4 IP2

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 774.64	TOTAL DEPTH: 9.25 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 9.25 ftbg	CASING EL.: 774.30
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/26/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Track Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-7ftbg)
6	0-5	NA	Soft Dug			PVC Casing (3-9ftbg)
8						Bentonite Seal (7-8ftbg)
10	5-10	NA	NA		Augured 5-10ftbg	PVC Screen (9-11ftbg)
12	10-12	2.3	1.5	Brown, medium GRAVEL, some fine Sand and Silt, wet		
14	12-14	11.6	2	Brown, fine GRAVEL, some Sand and Silt, trace Clay, wet	Lab Sample; A4 IP2 (12-14ftbg)	Sand Pack (8-14ftbg)

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 14ftbg; Split Spoon to 14ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in.= inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A4 IP3

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 774.87	TOTAL DEPTH: 18 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 8.75 ftbg	CASING EL.: 774.56
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/24/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Track Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-8ftbg)
6	0-5	NA	Soft Dug			PVC Casing (3-10ftbg)
8						Bentonite Seal (8-9ftbg)
10	5-10	NA	NA		Augured 5-10ftbg	PVC Screen (10-15ftbg)
12	10-12	4.8	1	Brown, fine-medium GRAVEL, some Sand, trace Silt Grey, TILL, moist		Sand Pack (9-18ftbg)
14	12-14	12.2	1	Brown-Grey, fine-medium GRAVEL, some fine Sand, wet	Lab Sample; A4 IP3 (12-14ftbg)	
16	14-16	0.7	1.5	Grey, TILL, dry		
18	16-18	0.2	1.5			

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Augured to 18ftbg; Split Spoon to 18ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in.= inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Injection Point Log

ID NO. A4 IP4

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 774.23	TOTAL DEPTH: 20 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 8.87 ftbg	CASING EL.: 773.71
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/24/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Track Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-11ftbg)
6	0-5	NA	Soft Dug			PVC Casing (3-12ftbg)
8						
10	5-10	NA	NA		Augured 5-10ftbg	
12	10-12	3.5	1	Brown, fine GRAVEL, some Silt and fine Sand, trace Clay, wet	Lab Sample; A4 IP4 (10-12ftbg)	Bentonite Seal (11-12ftbg)
14	12-14	0.5	1.5			Sand Pack (11-20ftbg)
16	14-16	0.0	1			PVC Screen (12-17ftbg)
18	16-18	1.2	1	Brown, fine GRAVEL, trace fine Sand, wet		
20	18-20	0.0	1.5	Grey, TILL, dry		

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 20ftbg; Split Spoon to 20ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in.= inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A4 IP5

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 774.23

TOTAL DEPTH: 18 ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 8.97 ftbg

CASING EL.: 773.88

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/24/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Track Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-8ftbg)
0-5	0-5	NA	Soft Dug			PVC Casing (3-10ftbg)
6						Bentonite Seal (8-9ftbg)
5-10	5-10	NA	NA		Augured 5-10ftbg	Sand Pack (9-18ftbg)
10				No Recovery		
10-12	10-12	NA	NA			
12				Grey, fine, medium GRAVEL, some fine Sand, wet	Lab Sample; A4 IP5 (12-14ftbg)	PVC Screen (10-15ftbg)
12-14	12-14	19.1	1			
14				Grey, TILL, dry		
14-16	14-16	4.0	1.5			
16						
16-18	16-18	0.2	1.5			
18						

Location:

Northing/Latitude:

Easting/Longitude:

Horizontal Datum:

Vertical Datum:

General Comments:

Augured to 18ftbg; Split Spoon to 18ftbg

ppm = parts per million; ftbg = feet below grade

NA = not applicable; in. = inches

Bedrock not encountered

Symbol Key:

Apparent Water Level ▼

Lab Sample Location ☒



Injection Point Log

ID NO. A4 IP6

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 774.66	TOTAL DEPTH: 16ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 8.33 ftbg	CASING EL.: 774.11
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/24/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Track Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-8ftbg)
0-5	0-5	NA	Soft Dug			PVC Casing (3-10ftbg)
6						Bentonite Seal (8-9ftbg)
5-10	5-10	NA	NA		Augured 5-10ftbg	Sand Pack (9-15ftbg)
10				Brown, medium SAND, some Silt, moist		
10-12	10-12	6.9	2	Grey, medium GRAVEL, trace fine Sand, wet		
12					Lab Sample; A4 IP6 (12-14ftbg)	PVC Screen (10-15ftbg)
12-14	12-14	17.7	2	Grey, TILL, dry		
14						
14-16	14-16	2.0	1.5			
16						

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 16ftbg; Split Spoon to 16ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in.= inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Injection Point Log

ID NO. A4 IP7

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda

SURFACE ELEV.: 774.91

TOTAL DEPTH: 18ftbg

ADDRESS: 1 Industrial Place, Gowanda NY

WATER DEPTH: 8.28 ftbg

CASING EL.: 774.41

NYSDEC SITE No. 905025

BOREHOLE DIA.: 4.25 in.

WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald

Drilling Method: Hollow Stem Auger

Dates Drilled: 9/24/2013

Sampling Method: 2 in. dia.x 2 ft. long Split Spoon

Drilling Company: Parratt-Wolff, Inc.

Soil Class. System: Modified Burmeister

Drill Rig Type: Track Mounted

Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-8ftbg)
0-5	NA	NA	Soft Dug			PVC Casing (3-10ftbg)
6						Bentonite Seal (8-9ftbg)
5-10	NA	NA	NA		Augured 5-10ftbg	Sand Pack (9-18ftbg)
10	10-12	13.4	1	Brown, fine-medium GRAVEL, trace Sand and Silt, wet	Lab Sample; A4 IP7 (10-12ftbg)	
12	12-14	2.8	2	Grey, fine GRAVEL		PVC Screen (10-15ftbg)
14	14-16	0.2	1	Grey, fine-medium SAND, trace Silt, wet		
16	16-18	0.0	2	Grey, TILL, dry		
18						

Location:

Northing/Latitude:

Easting/Longitude:

Horizontal Datum:

Vertical Datum:

General Comments:

Augured to 18ftbg; Split Spoon to 18ftbg

ppm = parts per million; ftbg = feet below grade

NA = not applicable; in.= inches

Bedrock not encountered

Symbol Key:

Apparent Water Level ▼

Lab Sample Location ☒



Injection Point Log

ID NO. A4 IP8

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 775.20	TOTAL DEPTH: 30ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: ? ftbg	CASING EL.: 774.83
NYSDEC SITE No. 905025	BOREHOLE DIA.: 4.25 in.	WELL DIA.: 2 in. SS / 2 in. PVC

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger
Dates Drilled: 9/26/2013	Sampling Method: 2 in. dia.x 2 ft. long Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring Soft Dug to 8ftbg.	10 in. dia. Well Vault set in Concrete (0-0.5ftbg)
2						2in. SS Riser (0.5-3ftbg)
4						Grout (0.5-18ftbg)
6	0-8	NA	Soft Dug			
8						
10	8-10	NA	NA		Augured 8-10ftbg	PVC Casing (3-20ftbg)
12	10-12	1.7	.75	Brown, fine-medium SAND and SILT, trace fine-medium Gravel, wet		
14	12-14	8.7	1.25	Grey, medium-coarse SAND, trace fine-medium Gravel		
16	14-16	16.2	1.5	Grey, fine SAND, some Silt	Lab Sample; A4 IP8 (14-16ftbg)	
18	16-18	5.1	2	Grey, fine SAND, trace Silt		
20	18-20	1.1	1	Grey, fine SAND		Bentonite Seal (18-19ftbg)
22	20-22	63.8	1	Grey, fine-medium SAND, some fine Gravel, trace Silt		Sand Pack (19-30ftbg)
24	22-24			Spoon Dropped to 30ftbg		PVC Screen (20-25ftbg)
26	24-26			NR		
28	26-28			NR		
30	28-30	142.6	1.5	Grey, fine SAND, trace Gravel		

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Augured to 30ftbg; Split Spoon to 30ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in.= inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-1

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 15 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 4.5 ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 in.	WELL DIA.: 2 in./ 2 in.

Logged By: Nicole Jarzyniecki	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 2-8-2012	Sampling Method: Post Hole Digger/2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						
0-2	0-2		100	Brown, medium-coarse SAND, some Gravel and large Cobbles, moist,	Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-1ftbg) Sand Pack (1-1.5ftbg) Grout (1.5-2.0ftbg) Bentonite Seal (2.0-2.5ftbg)
2-4	2-4		100	medium-coarse SAND, some Gravel and Cobbles, moist		
4-5	4-5		100	Brown, medium-coarse SAND, some Gravel and Cobbles, moist		
5-7	5-7	0.1	10	Greyish Brown-Olive Brown, SAND and GRAVEL, little Silt, wet		Sand Pack (2.5-8.0ftbg)
7-9	7-9	1.3	30	Brown, coarse - medium SAND, some Gavel, little Silt, trace Clay, wet		Bentonite Seal (8-8.5ftbg)
9-11	9-11	1.0	25	Brown - Redish Brown, fine- coarse SAND, some Gravel, trace Silt, wet		
11-13	11-13	6.5	100	Greyish Brown to Olive, GRAVEL, some fine-medium Sand, little Silt, wet,	Lab Sample; MP-1 (11-13ftbg)	Sand Pack (8.5-15ftbg)
13-15	13-15	28.5	60	Olive-Grey to Olive Brown, SILT and SAND, trace Clay, wet		

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 15ftbg. Augured to 15ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-2

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 15ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 4.5 ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 in.	WELL DIA.: 2 in./ 2 in.

Logged By: Nicole Jarzyniecki	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 2-8-2012	Sampling Method: Post Hole Digger/2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				Brown, medium-coarse SAND, some Gravel, moist	As per GES protocol the boring was cleared to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-1ftbg) Sand Pack (1-1.5ftbg) Grout (1.5-2.0ftbg) Bentonite Seal (2.0-2.5ftbg)
0-2	5.8	100				
2				Brown, medium-coarse SAND, some Gravel, moist		
2-4	0.1	100				
4				Brown, medium-coarse SAND, some Gravel, moist		
4-5	0.6	100				
6				Brown, fine-coarse SAND, some Gravel, trace Silt, wet		Sand Pack (2.5-8.0ftbg)
5-7	0.6	20				
8				Brown-Olive Brown, SAND and Gravel, some Silt, wet		Bentonite Seal (8-8.5ftbg)
7-9	7.9	30				
10				Brown-Olive Brown, SILT and SAND, some Gravel, wet		
9-11	8.4	35				
12				Brown to Olive Brown, SAND and Silt, some Gravel, wet,	Lab Sample; MP-2 (11-15ftbg)	Sand Pack (8.5-15ftbg)
11-13	12.5	35				
14				Greyish Brown-Olive Brown, SILT and CLAY, little Gravel, trace Sand, wet		
13-15	22.0	40				

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 15 ftbg. Augured to 15 ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-3

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 15.5 ftbg
ADDRESS: 1 Industrial Place, Gowanda	WATER DEPTH: 6 ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 in.	WELL DIA.: 2 in./ 2 in.

Logged By: Nicole Jarzyniecki	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 2-12-2012	Sampling Method: Post Hole Digger/2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						
	0-2	0.0	2	Brown, fine-coarse SAND, some Gravel, dry	Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-1ftbg) Sand Pack (0.8-1.0ftbg) Grout (1-2ftbg) Bentonite Seal (2.0-2.5ftbg)
2	2-4	0.0	2	Brown, fine-coarse SAND, some Gravel, dry		
4	4-5	0.0	2	Brown, fine-coarse SAND, some Clay, little Gravel, trace Silt, moist		
6	5-7	0.1	.25	Brown, Greyish Brown, fine-medium SAND and SILT, trace Gravel, moist		Sand Pack (2.5-9ftbg)
8	7-9	1.1	.5	Olive Brown-Greyish Brown, GRAVEL, trace Silt, trace Sand, wet		
10	9-11	3.7	.75	Greyish Brown, GRAVEL and fine-medium SAND, some Silt, wet	Lab Sample; MP-3 (9-11ftbg)	Bentonite Seal (9-9.5ftbg)
12	11-13	0.4	.25	Olive Brown, GRAVEL and SILT, trace sand, wet		Sand Pack (9.5-15.5ftbg)
14	13-15	36.7	.5	Greyish Brown-Olive Brown, SILT, some Clay, trace Sand and Gravel, wet		

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 15 ftbg. Augured to 15.5ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-4

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 17ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 4.5ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25ftbg	WELL DIA.: 2 in./ 2in.

Logged By: Nicole Jarzyniecki	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 2-7-2012	Sampling Method: Post Hole Digger/2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeiste
Drill Rig Type: Modified Burmeister	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						
0-2	0-2	0.1	2	Brown, fine-coarse SAND, little Gravel, dry to slightly moist	Boring Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-.7ftbg) Grout (0.7-1.7ftbg) Bentonite Seal (1.7-2.2ftbg)
2-4	2-4	0.1	2	Brown, fine-coarse SAND, little Gravel, slightly moist		
4-5	4-5	0.1	2	Brown, fine-coarse SAND, little Gravel, trace Silt, wet		
5-7	5-7	0.4	.25	Brown, medium-coarse SAND, some Silt increasing with depth, wet		Sand Pack (2.2-8.5ftbg)
7-9	7-9	1.5	.5	Brown, medium-coarse SAND, some Silt, wet		Sand Pack (8.5-9ftbg)
9-11	9-11	3.9	.5	Greyish Brown, SILT, some Gravel, little Sand, wet		Bentonite Seal (9-9.5ftbg)
11-13	11-13	3.9	1	Brown, fine GRAVEL, some Silt, wet	Lab Sample; MP-4 (11-15ftbg)	Sand Pack (9.5-17ftbg)
13-15	13-15	12.9	1	Brown-Greyish Brown, fine Gravel, some Silt, wet		
15-17	15-17	19.0	.75	Greyish Brown, SILT and CLAY, trace Sand and Gravel, wet		

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 17ftbg. Augured to 16.5ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-5

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 19 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 4 ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 ftbg	WELL DIA.: 2 in./ 2 in.

Logged By: Nicole Jarzyniecki	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 2-14-2012	Sampling Method: Post Hole Digger/2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						
	0-2	0.2	2	Brown, fine-coarse SAND, little Gravel, moist	Boring Soft Dug to 5ftbg.	10 in dia. Well Vault set in Concrete (0-0.8ftbg) Sand Pack (0.8-1ftbg) Grout (1-2.0ftbg) Bentonite Seal (2.0-2.5ftbg)
2	2-4	0.1	2	Brown, fine-coarse SAND, some Gravel, moist to wet		
4	4-5	0.1	2	Brown, fine-coarse SAND, some Gravel and Cobbles, moist to wet		
6	5-7	0.1	.75	Olive Brown, SILT, some Sand, trace Gravel, wet		Sand Pack (2.5-11ftbg)
8	7-9	1.9	.75	Olive Brown-Brown, GRAVEL, some Silt and fine-medium Sand, wet		
10	9-11	3.5	.25	Olive Brown-Brown, GRAVEL, some Silt and fine-medium Sand, wet		
12	11-13	5.1	1	Olive Brown-Brown, GRAVEL, some Silt and fine-medium Sand, wet	Lab Sample; MP-5 (11-13ftbg)	Bentonite Seal (11.5-13ftbg)
14	13-15	1.7	.25	Olive Brown-Brown, GRAVEL, some Silt and fine-medium Sand, wet		
16	15-17	2.5	1.25	Olive Brown-Brown, GRAVEL, some Sand, little Silt, wet		Sand Pack (13-19ftbg)
18	17-19	3.7	1	Olive Brown-Brown, SAND, some Silt, little Clay, trace Gavel, wet		

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 19 ftbg. Augured to 19ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-6

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 21 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6 ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 in.	WELL DIA.: 2 in./ 2 in.

Logged By: Nicole Jarzyniecki	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 2-9-2012	Sampling Method: Post Hole Digger/2" dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						
	0-2	0.2	2	Brown, fine-medium SAND, little Gravel, moist	Boring was Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.8 ftbg) Sand Pack (0.8-1 ftbg) Grout (1.0-2.0ftbg) Bentonite Seal (2.0-2.5ftbg)
2	2-4	0.2	2	Brown, fine-medium SAND, little Gravel, moist		
4	4-5	0.2	2	Brown, fine-medium SAND, little Gravel, moist		
6	5-7	0.0	.5	Greyish Brown-mottled with Redish Brown, fine-medium SAND and SILT, moist		Sand Pack (2.5-9.5ftbg)
8	7-9	0.5	.5	Greyish Brown-Olive Brown, SILT and GRAVEL, trace Sand, wet		
10	9-11	3.7	1.75	Olive Brown-Greyish Brown, GRAVEL, some Sand and Silt, wet		Bentonite Seal (9.5-11.5ftbg)
12	11-13	4.6	1.75	Olive Brown-Greyish Brown, GRAVEL, some Silt, little Sand, trace Silt	Lab Sample; MP-6 (11-13 ftbg)	
14	13-15	2.1	.75	Olive Brown-Greyish Brown, SAND and SILT, some Gravel, wet		
16			0	NO RECOVERY		Sand Pack (11.5-21ftbg)
18		3.5	1	Olive Brown, medium-coarse SAND, some Gravel, wet		
20		250	.5	Brown-Blackish Brown, SILT and CLAY, wet (sheen on water)	Lab Sample; MP-6 (19-20 ftbg)	

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 21 ftbg. Augured to 21ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-7

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 19 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6 ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 in.	WELL DIA.: 2 in./ 2 in.

Logged By: Nicole Jarzyniecki	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 2-15-2012	Sampling Method: Post Hole Digger/2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						
	0-2	0.0	2	Brown, fine-coarse SAND, little Gravel, dry to moist	Boring was Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.8 ftbg) Sand Pack (0.8-1ftbg) Grout (1-2.ftbg) Bentonite Seal (2.0-2.5ftbg)
2	2-4	0.0	2	Brown, fine-coarse SAND, little Gravel, dry to moist		
4	4-5	0.0	2	Brown, fine-coarse SAND, little Gravel, little blackish grey Silt, dry to moist		
6	5-7	0.5	.5	Greyish Brown, SILT, some fine-medium Sand, little Gravel, little Clay, wet		Sand Pack (2.5-11ftbg)
8	7-9	2.0	.5	Olive Brown-Greyish Brown, GRAVEL , trace Clay, little Silt, some fine-coarse Sand, wet		
10	9-11	0.9	.5	Olive Brown-Greysih Brown, SILT, some Gravel and Silt, trace Sand, trace Clay, wet		
12	11-13	1.7	2	Olive Brown, SILT and GRAVEL, trace fine-medium Sand, trace clay, wet		Bentonite Seal (11.5-13ftbg)
14	13-15	4.6	1	Greyish Brown, fine-coarse SAND and GRAVEL, wet		
16	15-17	5.0	1	Greyish Brown, fine-coarse SAND and GRAVEL, wet	Lab Sample; MP-7 (15-17ftbg)	Sand Pack (13-19ftbg)
18	17-19	1.7	.5	Olive Brown, SILT and CLAY, trace Gravel and Sand, moist		

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 19 ftbg. Augured to 19 ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-8

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 18.6 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6 ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25ftbg	WELL DIA.: 2 in./ 2 in.

Logged By: Nicole Jarzyniecki	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 2-20-2012	Sampling Method: Post Hole Digger/2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						
0-2	0.0	N.A.		Dark Brown, SAND, trace fine Gravel, moist	Boring was Soft Dug to 5ftbg.	10 in. dia. Well Vault set in Concrete (0-0.8ftbg) Grout (0.8-1.5ftbg) Bentonite Seal (1.5-2.5ftbg)
2-4	0.0	N.A.		Dark Brown, SAND, trace fine Gravel, moist		
4-6	0.0	N.A.		Brown and Grey, SILT and fine SAND, trace Gravel, moist		
6-8	0.0	N.A.		Brown and Grey, SILT and fine SAND, trace Gravel and Cobbles, wet		
8-10	0.0	.25		Light Grey, fine-coarse SAND and GRAVEL, wet		
10-12	1.5	1		Light Grey, fine-coarse SAND and GRAVEL, wet		
12-14	1.8	.75		Grey and Brown, fine-medium SAND and GRAVEL, wet		
14-16	0.8	.25		Grey and Brown, fine-medium SAND and GRAVEL, wet	Sand Pack (2.5-11.5ftbg)	
16-18	2.2	2		Light Grey, SILT, dry		
18	5.8	2			Lab Sample; MP-8 (16-18ftbg)	Bentonite Seal (11.5-12.5ftbg) Sand Pack (12.5-18.5ftbg)

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 19 ftbg. Augured to 19 ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-9

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 20 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25ftbg	WELL DIA.: 2 in./ 2 in.

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 5/31/2012	Sampling Method: Post Hole Digger/2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				Tan, SILT and CLAY (loam), Dry	Boring was Soft Dug to 5ftbg.	10" dia. Well Vault set in Concrete (0-1ftbg) Grout (1-2ftbg) Bentonite Seal (2-2.5ftbg)
0-2	0.2		Hand Clear	Tan, SILT and CLAY (loam), Dry		
2				Tan, SILT and CLAY (loam), Dry		
2-4	0.2		Hand Clear			
4				Brown, fine-coarse GRAVEL, Cobbles, trace Silt and Clay, wet		
4-5	0.0		Hand Clear			
5-6	0.2		.25	Brown, SILT with some fine Gravel, dry		Sand Pack (2.5-13.5ftbg)
6				Brown, fine-medium GRAVEL, some Sand, trace Clay, wet		
6-8	0.7		1			
8				Brown, fine-medium GRAVEL, some Clay and Sand, wet		
8-10	0.5		1			
10				Brown, Olive Green, fine-medium GRAVEL, some medium-coarse Sand, trace Silt, wet		
10-12	2.4		1.75		Lab Sample; MP-4 (11-15ftbg)	
12				Brown and Grey, fine-medium GRAVEL and coarse SAND, wet		
12-14	2.6		2			Bentonite Seal (13.5-14ftbg)
14				Grey, fine-medium GRAVEL, some fine-coarse Sand, wet		
14-16	6.0		1.75			Sand Pack (14-20ftbg)
16				Grey/Black, medium-coarse SAND, some fine-medium Gravel, wet		
16-18	4.4		1.75			
18				Brown, fine-medium GRAVEL, some Clay, wet		
18-20	5.1		1			
20				Grey, medium-coarse SAND and fine GRAVEL		
20-22	8.0		1			
22						

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 22 ftbg. Augured to 22 ftbg
ppm = parts per million;ftbg = feet below grade
NA = not applicable; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-10

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 20ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25ftbg	WELL DIA.: 2in./ 2in.

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 6/1/2012	Sampling Method: Post Hole Digger/2" dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Burmister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						
0-2	0-2	0.0	Hand Clear	Brown, fine-coarse GRAVEL, some coarse Sand, dry	Boring was Soft Dug to 5ftbg.	10in. dia. Well Vault set in Concrete (0-1ftbg) Grout (1-2ftbg) Bentonite Seal (2-2.5ftbg)
2-4	2-4	0.0	Hand Clear	Brown, fine-coarse GRAVEL, some coarse Sand, dry		
4-5	4-5	0.0	Hand Clear	Brown, medium-coarse SAND, some fine-medium Gravel, dry		
5-6	5-6	0.8	2	Brown, medium-coarse SAND, some fine-medium Gravel, dry		Sand Pack (2.5-13.5ftbg)
6-8	6-8	1.0	1.75	Grey, fine-medium GRAVEL, some coarse Sand, trace Clay, wet		
8-10	8-10	2.4	1.75	Brown, fine-medium GRAVEL, some coarse Sand and Clay, wet		
10-12	10-12	2.4	.5	Brown-Grey, medium-coarse GRAVEL, some coarse Sand, trace Clay, wet		
12-14	12-14	2.7	.5	Grey, fine GRAVEL and medium-coarse SAND, trace Clay, wet		Bentonite Seal (13.5-14ftbg)
14-16	14-16	2.4	.5	Grey, fine-medium GRAVEL, some coarse SAND, wet		
16-18	16-18	2.1	.25	Grey, fine-medium GRAVEL, some coarse Sand, wet		Sand Pack (14-20ftbg)
18-20	18-20	3.3	1.75	Grey, fine-medium GRAVEL, some coarse SAND, wet	Lab Sample; MP-10 (18-20ftbg)	

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 18-22ftbg. Augured to 22ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-11

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 14ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 5ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 in.	WELL DIA.: 2 in./ 2in.

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 5/31/2012	Sampling Method: Post Hole Digger/2" dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						
0-2	0.0		Hand Clear	Tan, SILT and CLAY, trace fine-coarse Gravel, dry	Boring Soft Dug to 5ftbg.	10" dia. Well Vault set in Concrete (0-1ftbg) Grout (1-2ftbg)
2-4	0.0		Hand Clear	Brown, CLAY, some Silt and fine-coarse Gravel, dry		Bentonite Seal (2-2.5ftbg)
4-5	0.0		Hand Clear	Brown, CLAY and fine-medium GRAVEL, dry		
5-6	74.3		1.25	Brown, CLAY and fine-medium GRAVEL, dry		Sand Pack (2.5-8ftbg)
6-8	97.8		1	Grey, medium-coarse GRAVEL, some coarse Sand, trace Clay, wet		
8-10	44.9		1.75	Grey, medium-coarse GRAVEL, some coarse Sand, trace Silt and Clay, wet	Lab Sample; MP-11 (6-10ftbg)	Bentonite Seal (8-8.5ftbg)
10-12	1.2		.75	Grey, medium-coarse GRAVEL, some coarse Sand, trace Silt and Clay, wet		
12-13	76.9		2	Grey, medium-coarse GRAVEL, some coarse Sand, trace Silt and Clay, wet		Sand Pack (8.5-14ftbg)
13-14	12.4		2	Grey, fine SAND, some Silt and Clay (dense and dry)	Lab Sample; MP-11 (12-14ftbg)	

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 6-10ftbg and 12-14ftbg. Augured to 14ftbg
ppm = parts per million; bgs = below ground surface
NA = not applicable; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-12

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 14 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6 ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 in.	WELL DIA.: 2 in./ 2 in.

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 6/4/2012	Sampling Method: Post Hole Digger/2" dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				Brown, SILT some Clay, dry	Boring was Soft Dug to 5ftbg.	10in. dia. Well Vault set in Concrete (0-1ftbg)
0-2	2.1		Hand Clear			Grout (1-2ftbg)
2				Brown, CLAY trace Silt and fine Gravel, dry		Bentonite Seal (2-2.5ftbg)
2-4	1.4		Hand Clear			
4				Brown, fine-medium GRAVEL, some Clay, trace Silt, wet		
4-5	1.8		Hand Clear			
5-6	0.8		1	Brown, CLAY, trace Silt and fine Gravel, moist		Sand Pack (2.5-8ftbg)
6				Brown, CLAY, trace Silt and fine Gravel, moist		
6-8	0.8		.25			
8				Grey, fine-medium GRAVEL, some Clay, trace Silt, wet		Bentonite Seal (8-8.5ftbg)
8-10	2.4		.25			
10				Grey, medium-coarse SAND and fine-medium GRAVEL, wet		
10-12	3.7		1			
12				Grey, medium-coarse GRAVEL, some coarse Sand, trace Silt and Clay, wet		Sand Pack (8.5-14ftbg)
12-14	141.7		1.75		Lab Sample; MP-12 (12-14ftbg)	
14				Grey, CLAY and SILT (Very Compact)		

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 12-14ftbg. Augured to 14ftbg
ppm = parts per million; bgs = below ground surface
NA = not applicable; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-13

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: NA	TOTAL DEPTH: 14ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH: 6ftbg	CASING EL.: NA
NYSDEC SITE No. 905025	BOREHOLE DIA.: 10.25 in.	WELL DIA.: 2 in./ 2 in.

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 6/5/2012	Sampling Method: Post Hole Digger/2 in. dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0				Grey, CLAY and fine SAND, trace Silt, dry	Boring was Soft Dug to 5ftbg.	10in. dia. Well Vault set in Concrete (0-1ftbg)
0-2	1.7		Hand Clear			Grout (1-2ftbg)
2				Grey, CLAY and fine SAND, trace Silt, dry		Bentonite Seal (2-2.5ftbg)
2-4	0.6		Hand Clear			
4				Grey, fine SAND and CLAY, dry		
4-5	2.4		Hand Clear			
5-6	1.9		.75	Grey, fine-medium GRAVEL, some Clay, trace Silt, dry		Sand Pack (2.5-8ftbg)
6				NO RECOVERY		
6-8	-		0			
8				Grey, fine-medium GRAVEL and medium-coarse SAND, wet		Bentonite Seal (8-8.5ftbg)
8-10	1.7		.5			
10				Grey, fine-medium GRAVEL and medium-coarse SAND, wet		
10-12	1.7		.75			
12				Grey, fine-medium GRAVEL and medium-coarse SAND, wet		Sand Pack (8.5-14ftbg)
12-13	9.4		1.25			
13-14	9.4		1.75	Grey, SILT and CLAY, wet	Lab Sample; MP-13 (12-14ftbg)	

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Bottom of split spoon sampling at 12-14ftbg. Augured to 14ftbg
 ppm = parts per million; bgs = below ground surface
 NA = not applicable; in. = inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-14

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda	SURFACE ELEV.: 775.13	TOTAL DEPTH: 16 ftbg
ADDRESS: 1 Industrial Place, Gowanda NY	WATER DEPTH:	CASING EL.: S=774.66/D=774.70
NYSDEC SITE No. 905025	BOREHOLE DIA.: 6.25 in.	WELL DIA.: 2 in. / 2 in.

Logged By: Scott McDonald	Drilling Method: Hollow Stem Auger (HSA)
Dates Drilled: 9/25/2012	Sampling Method: Post Hole Digger/2" dia. Split Spoon
Drilling Company: Parratt-Wolff, Inc.	Soil Class. System: Modified Burmeister
Drill Rig Type: Truck Mounted	Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						10" dia. Well Vault set in Concrete (0-0.5 ftbg)
2						Sand Pack (0.5-1.5 ftbg)
4						Bentonite Seal (1.5-2.5 ftbg)
6	0-8	Soft Dug	NA		Boring was Soft Dug to 8ftbg.	PVC Screen (3-8ftbg)
8						Sand Pack (2.5-8.5 ftbg)
10	8-10	NA	NA			Bentonite Seal (8.5-9.5ftbg)
12	10-12	3.7	1	Tan, medium-coarse SAND, some fine Gravel, trace Clay and Silt, wet		
14	12-14	19.5	1	Tan, fine GRAVEL, some medium-coarse Sand	Lab Sample; MP-14 (12-14ftbg)	
16	14-16	4.6	1	TILL		PVC Screen (10-15 ftbg)

Location:

Nothing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Bottom of split spoon sampling at 12-14ftbg. Augured to 14ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in. = inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-15

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda
ADDRESS: 1 Industrial Place, Gowanda NY
NYSDEC SITE No. 905025

SURFACE ELEV.: 775.60
WATER DEPTH:
BOREHOLE DIA.: 6.25 in.

TOTAL DEPTH: 14 ftbg
CASING EL.: S=77.24/D=77.29
WELL DIA.: 2 in. / 2 in.

Logged By: Scott McDonald
Dates Drilled: 9/25/2012
Drilling Company: Parratt-Wolff, Inc.
Drill Rig Type: Truck Mounted

Drilling Method: Hollow Stem Auger (HSA)
Sampling Method: Post Hole Digger/2" dia. Split Spoon
Soil Class. System: Modified Burmeister
Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0						10" dia. Well Vault set in Concrete (0-0.5 ftbg)
2					Boring was Soft Dug to 8ftbg.	Sand Pack (0.5-1.5 ftbg)
						Bentonite Seal (1.5-2.5 ftbg)
4						PVC Screen (3-8ftbg)
6	0-8	Soft Dug	NA			Sand Pack (2.5-8.5 ftbg)
8						Bentonite Seal (8.5-9.5ftbg)
10	8-10	NA	NA			
12	10-12	17.2	1.5	Brown, medium-coarse SAND, some fine Gravel and Clay. wet		
14	12-14	10.2	1.75	Brown, medium-coarse SAND, some fine Gravel and Clay TILL	Lab Sample; MP-15 (10-12ftbg)	
						PVC Screen (10-15 ftbg)

Location:

Northing/Latitude:
Easting/Longitude:
Horizontal Datum:
Vertical Datum:

General Comments:

Bottom of split spoon sampling at 14 ftbg. Augured to 15ftbg
ppm = parts per million; ftbg = feet below grade
NA = not applicable; in. = inches
Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
Lab Sample Location ☒



Monitoring Point Log

ID NO. MP-16

Groundwater and Environmental Services, Inc.

Page 1 of 1

PROJECT: NYSDEC AVM Gowanda
 ADDRESS: 1 Industrial Place, Gowanda NY
 NYSDEC SITE No. 905025

SURFACE ELEV.: 776.11
 WATER DEPTH:
 BOREHOLE DIA.: 6.25 in.

TOTAL DEPTH: 15 ftbg
 CASING EL.: S=775.64/D=775.66
 WELL DIA.: 2 in. / 2 in.

Logged By: Scott McDonald
 Dates Drilled: 9/23/2012
 Drilling Company: Parratt-Wolff, Inc.
 Drill Rig Type: Truck Mounted

Drilling Method: Hollow Stem Auger (HSA)
 Sampling Method: Post Hole Digger/2" dia. Split Spoon
 Soil Class. System: Modified Burmeister
 Field Screening: PID 10.9 eV Lamp (Readings in ppm)

Depth (feet)	Sample Interval (feet)	Field Screening (ppm)	Recovery (feet)	Sample Lithology	Comments	Completion Details
0					Boring was Soft Dug to 8ftbg.	10" dia. Well Vault set in Concrete (0-0.5 ftbg)
2						Sand Pack (0.5-1.5 ftbg) Bentonite Seal (1.5-2.5 ftbg)
4						PVC Screen (3-8ftbg)
6	0-8	Soft Dug	NA			Sand Pack (2.5-8.5 ftbg)
8						Bentonite Seal (8.5-9.5ftbg)
10	8-10	NA	NA		Augured 8-10ftbg	
12	10-12	164.4	1.5	Grey, medium-fine GRAVEL and medium-coarse SAND, wet		
14	12-14	66.7	2	Grey, fine GRAVEL and coarse SAND, some Silt	Lab Sample; MP-16 (10-12ftbg)	Sand Pack (9.5-15ftbg)
				TILL		PVC Screen (10-15 ftbg)

Location:

Northing/Latitude:
 Easting/Longitude:
 Horizontal Datum:
 Vertical Datum:

General Comments:

Bottom of split spoon sampling at 14 ftbg. Augured to 15ftbg
 ppm = parts per million; ftbg = feet below grade
 NA = not applicable; in. = inches
 Bedrock not encountered

Symbol Key:

Apparent Water Level ▼
 Lab Sample Location ☒

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 D-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 D-1: Notifications*

Name	Contact Information
Robert Strang, Project Manager; NYS Department of Environmental Conservation	Phone: (518) 402-8642 Email: robert.strang@dec.ny.gov
Kristen Davidson, Citizen Participation Specialist; NYS Department of Environmental Conservation	Phone: (716) 851-7220 Email: kristen.davidson@dec.ny.gov
Chad Staniszewski, P.E. Region 9 Remediation Engineer NYS Department of Environmental Conservation	Phone: (716) 851-7220 Email: chad.staniszewski@dec.ny.gov
Steven G. Berninger, New York State Department of Health Bureau of Environmental Exposure Investigation	Phone: (518) 402-7860 Email: BEEI@health.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 I 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 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 Section 10 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.

All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. The most appropriate route shall take 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; (g) community input [where necessary].

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

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 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities, the site will be restored in a manner that complies with the Record of Decision and Explanation of Significant Difference.

D-10 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). 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-11 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-12 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-13 COMMUNITY AIR MONITORING PLAN

The location of air sampling stations shall be based on generally prevailing wind conditions. These 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-14 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 soil. 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-15 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-16 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

**AVM GOWANDA
QUALITY ASSURANCE
PROJECT PLAN**

Prepared for:

**NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION**

Prepared by:

**D&B ENGINEERS AND ARCHITECTS, P.C.
WOODBURY, NEW YORK**

OCTOBER 2019

**GENERIC QUALITY ASSURANCE
PROJECT PLAN**

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1.0 INTRODUCTION

The purpose of this Quality Assurance Project Plan (QAPP) is to describe the detailed sample collection and analytical procedures that, when implemented, will result in the acquisition of documented, high-quality valid data, which will be legally defensible (should the need exist), for use in field investigations conducted for work assignments issued to D&B Engineers and Architects, P.C. (D&B) by the New York State Department of Environmental Conservation (NYSDEC) under the Standby Contract for Engineering Services D007620. The QAPP provides general information and references standard operating procedures applicable to the analytical sampling program detailed in each site-specific Work Plan. This information includes definitions and generic goals for data quality and required types and quantities of Quality Assurance/Quality Control (QA/QC) samples. The procedures address field documentation; sample handling, custody, and shipping; instrument calibration and maintenance; auditing; data reduction, validation, and reporting; corrective action requirements; and QA/QC reporting specific to the analyses performed by the contracted laboratory.

The field sampling program may include some or all of the following specific activities and environmental matrices:

- Sampling and analysis of 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.

This document has been prepared in conformance with the NYSDEC guidelines for preparation of QAPP Plans, including the 2005 Analytical Services Protocol (ASP).

2.0 DATA USE OBJECTIVES

The data generated from the field investigations will be used to determine the nature, extent and source(s) of contamination at the site, prepare a qualitative human health risk and environmental assessment/site hazard assessment, and develop a cost-effective, environmentally sound, long-term remediation plan consistent with the planned use of the site. The data will also be utilized to monitor for the health and safety of workers at the site and potential off-site receptors.

2.1 Site Hazard Assessment Report

A Site Hazard Assessment Report may be prepared, if requested by the NYSDEC and/or is warranted by the work assignment. The assessment report may include one or more of the following recommendations:

- No additional actions required.
- Additional sampling is required.
- Remediation and additional sampling are required.

2.2 Data Quality Requirements and Assessment

Data quality requirements and assessments are provided in the 2005 NYSDEC ASP, which includes the detection limit for each parameter and sample matrix. Note that quantification limits, estimated accuracy, accuracy protocol, estimated precision and precision protocol are determined by the laboratory and will be in conformance with the requirements of the 2005 NYSDEC ASP, where applicable. Table 2-1 presents a summary of the data quality requirements.

Table 2-1

DATA QUALITY REQUIREMENTS

<u>Parameter</u>	<u>Sample Matrix</u>	<u>CRDL*</u>	<u>Estimated Accuracy</u>	<u>Accuracy Protocol**</u>	<u>Estimated Precision</u>	<u>Precision Protocol**</u>
Volatile Organics	Liquid	10	0.87 - 1.18 ug/l	Vol. IV, Part XIX,	0.11 - 0.84 ug/l	Vol. IV, Part XIX,

*Contract Required Detection Limits - units are ug/l for liquid samples, ug/kg for solid samples.

** Reference: NYSDEC 7/05 ASP.

Table 2-1 (continued)

**DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION, ACCURACY, AND COMPLETENESS**

<u>Matrix/Parameter</u>	<u>Precision (%)</u>	<u>Accuracy (%)</u>
<u>Water</u> VOCs ^(a)	See Table 2-1a	See Table 2-1a

NOTES:

- (a) Accuracy will be determined as percent recovery of surrogate spike compounds and matrix spike compounds. Surrogate and matrix spike compounds for VOCs are listed in Table 2-2a. Precision will be estimated as the relative standard deviation of the percent recoveries per matrix.

Source: 2005 NYSDEC ASP

Table 2-1a

**DATA QUALITY REQUIREMENTS
ACCURACY REQUIREMENTS FOR VOCs**

	<u>Spike Recovery Limits (%)</u>
<u>Surrogate Compound</u>	<u>Water</u>
Toluene-d8	88-110
4-Bromofluorobenzene	86-115
1,2-Dichloroethane-d4	76-114
<u>Matrix Spike Compound</u>	
1,1-Dichloroethene	61-145
Trichloroethane	71-120
Chlorobenzene	75-130
Toluene	76-125
Benzene	76-127

Source: NYSDEC ASP

In addition to meeting the requirements provided in the 2005 NYSDEC ASP, the data must be of sufficient quality to ensure that sampling data accurately characterizes site conditions. Data obtained during the site investigations will be compared to specific Standards, Criteria and Guidelines (SCGs). The SCGs to be utilized on a preliminary basis for screening purposes include:

Matrix

SCG

Groundwater and Surface Water

NYSDEC Division of Water Technical and Operational Guidance Series (TOGs) (1.1.1) - Ambient Water Quality Standards and Guidance Values, dated June 1998, addendum April 2000.

Final selection of SCGs for site remediation and development will be based on the intended use of the property, potential receptors and potential contaminant migration pathways. These SCGs would consider the United States Environmental Protection Agency (USEPA) Region III Risk-Based Concentration Table.

The methods of analysis will be in accordance with the 2005 NYSDEC ASP. Specific analytical procedures and laboratory QA/QC descriptions are not included in this QAPP, but will be available upon request from the laboratory selected to perform the analyses. The laboratory will be New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified for organic and inorganic analyses.

2.2.1 Data Precision

Precision is the mutual agreement among individual measurements of the same property and is a measure of the random error component of the data collection process. The overall precision of the data is the sum of that due to sampling and analysis. The sampling precision is assessed by the collection of field duplicates. To determine the analytical precision of the method and/or laboratory analyst, a routine program of laboratory control sample analyses is performed, and precision is determined using a moving range value. The results of the replicate

sample analyses are used to calculate the relative percent difference (RPD), which is then used to evaluate precision associated with sampling and analysis.

For replicate results R_1 and R_2 :

$$RPD = (2[R_1 - R_2] / [R_1 + R_2]) \times 100$$

2.2.2 Data Accuracy

Accuracy is the agreement between a measurement and the true value. It is a measure of the bias or systematic error of the entire data collection process. Sampling accuracy is assessed by evaluating the results of field and trip blank samples. To determine the accuracy of an analytical method and/or the laboratory analyst, a periodic program of laboratory control sample spiking is conducted. The results of sample spiking are used to calculate the percent recovery (%R) as a measurement bias associated with the sample matrix.

$$\%R = 100(S_1 - S_2) / T_1$$

where

S_1 = Observed spiked sample concentration;

S_2 = Sample concentration without spike addition; and,

T_1 = True concentration of the spike.

2.2.3 Data Representativeness

Representativeness is the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a quantitative parameter that is used to assess the design and implementation of the sampling program. The sampling program has been designed so that the samples collected are as representative as possible of the medium being sampled and that a

sufficient number of samples will be collected. Representativeness is addressed by the description of the sampling techniques and the rationale used to select the sampling locations.

Representative samples will be collected as follows:

- Groundwater (Monitoring Wells/Points) - Samples will be collected with a dedicated/disposable bailer or decontaminated low-flow submersible pump after the monitoring well has been purged of three to five well casing volumes until field measurements for pH, conductivity, temperature and turbidity have stabilized, or until the well is purged dry (whichever comes first) and the well has been allowed to recharge.

2.2.4 Data Comparability

Comparability is the extent to which comparisons among different measurements of the same quantity or quality will yield valid conclusions. For NYSDEC projects, comparability among measurements will be achieved through the use of standard procedures and uniform concentration units. All data will be presented in the units designated by the methods specified by a NYSDOH ELAP certified laboratory, and the 2005 NYSDEC ASP. In addition, sample locations, collection procedures and analytical methods from earlier studies will be evaluated for comparability with current procedures/methods.

2.2.5 Data Completeness

Completeness is the adequacy in quantity of valid measurements to prevent misinterpretation and to answer important questions. Percent completeness is calculated as the ratio of usable data to total data. The acceptability of 100% of the data is desired as a goal for this project. The acceptability of less than 100% complete data, meeting all laboratory QA/QC protocols/ standards, will be evaluated on a case-by-case basis.

3.0 SAMPLING DESIGN

The following presents a general discussion of the sampling that may be conducted during field investigations for work assignments.

- Groundwater - Groundwater samples will be obtained from monitoring wells, direct-push probes or hydropunch sampling devices, which will be installed as part of the site investigation, or from monitoring wells, which were installed previously at the site, to determine if disposal of waste material on-site has impacted groundwater.

4.0 SAMPLING AND ANALYSES

4.1 Field Duplicates

Field duplicate samples may be collected to demonstrate the accuracy of field screening and un-validated laboratory data with limited analytical deliverables. If all environmental samples are analyzed by ASP methods, duplicate samples (if collected) will be taken at a frequency of at least 5% (1 in 20). However, if duplicate samples are collected for confirmation of field screening and laboratory data with limited analytical deliverables, at least 20% of the samples will be verified with duplicate samples analyzed by ASP methods for Target Compound List (TCL) analytes. These ASP method duplicate sample requirements apply to each distinct matrix.

4.2 Matrix Spikes/Matrix Spike Duplicates and Spiked Blanks

Matrix spike samples are quality control procedures, consistent with 2005 NYSDEC ASP specifications, used by the laboratory as part of its internal Quality Assurance/Quality Control program. The matrix spikes (MS) and matrix spike duplicates (MSD) are aliquots of a designated sample (water) which are spiked with known quantities of specified compounds. MS/MSD samples are used to evaluate the matrix effect of the sample upon the analytical methodology, as well as to determine the precision of the analytical method used. Samples to be analyzed as MS/MSDs may be designated in the field (that is, additional aliquots of a particular sample from the site may be collected) or they may be selected by the laboratory.

A matrix spike blank is an aliquot of analyte-free water, prepared in the laboratory, and spiked with the same solution used to spike the MS and MSD. The matrix spike blank (MSB) will be subjected to the same analytical procedure as the MS/MSD and used to indicate the appropriateness of the spiking solution by calculating the spike compound recoveries. The procedure and frequency regarding the MS, MSD and MSB samples are defined in the NYSDEC ASP.

4.3 Analytical Parameters

All samples collected during site management activities will be properly labeled and shipped under chain of custody documentation to the laboratory for analysis. Unless noted otherwise, all samples will be analyzed by a NYSDOH Environmental Laboratory Accreditation Program (ELAP) approved laboratory by an analytical method utilizing the most current NYSDEC Analytical Services Protocol (ASP) for the following Department of Environmental Remediation (DER)-10 required analytical parameters:

- Target compound list (TCL) volatile organic compounds (VOCs) plus the 10 highest concentration tentatively identified compounds (TICs)

Table 4-1 presents a summary of the parameters/sample fraction to be analyzed together with the sample location, type of sample, sample matrix, type of sample container, method of sample preservation, holding time and analytical method. Superfund category deliverables are required for all analytical results in order to perform complete validation of the results.

4.4 Field Blank (Field Rinse Blank)/Equipment Blank

Field blanks are samples of water used for field decontamination purposes. Specifically, field blanks will include potable, site-supplied water used in decontamination activities and laboratory-supplied, reagent-grade, deionized water used for the final rinse in decontamination activities. Based upon discussions with the NYSDEC, field blanks will not be required for field investigations in which dedicated, disposable sampling equipment (for example, bailers or sterile scoops) are being utilized for sample collection. However, an equipment blank is required when a split spoon is utilized since it will be decontaminated on-site after each use. Equipment blanks will be collected at a rate of one per day and analyzed for the same parameters as that of the samples collected with that equipment. The equipment blank will be collected by pouring laboratory supplied deionized water over/through the decontaminated equipment early in the field effort to assess the quality of the potable water supply used in decontamination activities.

4.5 Trip Blanks (Travel Blanks)

Trip blanks are containers of reagent-grade deionized water which are kept with the field sample containers from the time they leave the laboratory until the time they are returned to the laboratory. The primary purpose of a trip blank is to detect sources of contamination which may be introduced into the sample during sample collection or transit that might potentially influence contaminant values reported in actual samples, both quantitatively and qualitatively. The following have been identified as potential sources of contamination:

- Laboratory reagent water;
- Sample containers;
- Cross contamination in shipment;
- Ambient air or contact with analytical instrumentation during preparation and analysis at the laboratory; and
- Laboratory reagents used in analytical procedures.

A trip blank will consist of a set of 40 ml sample vials filled at the laboratory with laboratory demonstrated analyte free water. Trip blanks will be handled, transported and analyzed in the same manner as the samples acquired that day, except that the sample containers themselves are not opened in the field. Rather, these sample containers only travel with the sample cooler. The temperature of the trip blanks will be maintained at 4°C while on-site and during shipment. Trip blanks will return to the laboratory with the same set of bottles they accompanied in the field.

The purpose of a trip blank is to control sample bottle preparation and blank water quality as well as sample handling. Thus, the trip blank will travel to the site with the empty sample bottles and back from the site with the collected samples in an effort to simulate sample handling conditions. Contaminated trip blanks may indicate inadequate bottle cleaning or blank water of questionable quality. Trip blanks will be implemented only when collecting water samples, including field blanks, and analyzed for volatile organic compounds only.

Table 4-1

SUMMARY OF MONITORING PARAMETERS

<u>Sample Location</u>	<u>Sample Type</u>	<u>Sample Matrix</u>	<u>Sample Fraction</u>	<u>Container Type/Size/No.</u>	<u>Sample Preservation</u>	<u>Maximum Holding Time*</u>	<u>Analytical Method</u>
Water Supply Wells, Monitoring Wells	Grab	Groundwater	Volatile Organics	Glass, clear/ 40 mL/3 ICHEM 300 series or equivalent	Cool to 4°C or	5 days after VTSR for analysis	7/05 NYSDEC ASP, Method 8260**

VTSR - Verified Time of Sample Receipt at the laboratory

*Holding times based on the NYSDEC 7/05 ASP

**Most recent version of method

4.6 Method Blanks/Holding Blanks

A method blank is an aliquot of laboratory water which is spiked with the same internal and surrogate compounds as the samples. The purpose of the method blank is to define and determine the level of laboratory background contamination. Frequency, procedure and maximum laboratory containment concentration limits are specified in the 2005 NYSDEC ASP. A holding blank is an aliquot of analyte-free water that is stored with the environmental samples in order to demonstrate that the samples have not been contaminated during laboratory storage. This blank will be analyzed using the same analytical procedure as the samples.

5.0 STANDARD OPERATING PROCEDURES

Environmental samples will be collected from different locations as part of the field investigation. For the AVM Gowanda site, groundwater samples shall be collected. Sample locations will consist of nineteen monitoring wells/points, including 9 monitoring points (MP-2D and MP-9D through MP-16D) and 10 monitoring wells (MW-2, MW-3, MW-4, MW-6, MW-7, MW-8, MW-11, MW-12, TW-2 and TW-3).

General sampling approaches and equipment are described in this section. A summary of the sampling program, including sample media, depths, equipment, rationale and analytical parameters, is provided in Table 5-1.

The materials involved in groundwater sampling are critical to the collection of high-quality monitoring information, particularly where the analyses of volatile, pH sensitive or reduced chemical constituents are of interest. The materials for bailers and pump parts will be PTFE (e.g., Teflon^R), stainless steel and/or polyethylene.

Table 5-1

SUMMARY OF SAMPLING PROGRAM

<u>Environmental Media</u>	<u>Sample Location</u>	<u>Sample Point</u>	<u>Sample Depth</u>	<u>Equipment</u>	<u>Rationale</u>	<u>Sample Analysis</u>
Groundwater	On-site or Off-site	Probe location	At surface of water in probe	Disposable polyethylene tubing with bottom check valve	To determine groundwater contamination	TCL +30 and TAL parameters + CN 2005 NYSDEC ASP
Groundwater	On-site or Off-site	Monitoring well	At surface of water in well	Disposable polyethylene bailer (after purge of three well volumes)	To determine groundwater contamination	TCL VOA+10 2005 NYSDEC ASP

There will be several steps taken after the transfer of the water sample into the sample container that are necessary to properly complete collection activities. Once the sample is transferred into the appropriate container, the container will be capped and, if necessary, the outside of the container will be wiped with a clean paper towel to remove excess sampling material. The container will not be submerged in water in an effort to clean it. Rather, if necessary, a clean paper towel moistened with distilled/deionized water will be used.

The sample container will then be properly labeled. Information such as sample number, location, collection time and sample description will be recorded in the field log book. Associated paperwork (e.g., Chain of Custody forms) will then be completed and will stay with the sample. The samples will be packaged in a manner that will allow the appropriate storage temperature to be maintained during shipment to the laboratory. Samples will be delivered to the laboratory within 24 to 48 hours of collection, depending on required analysis.

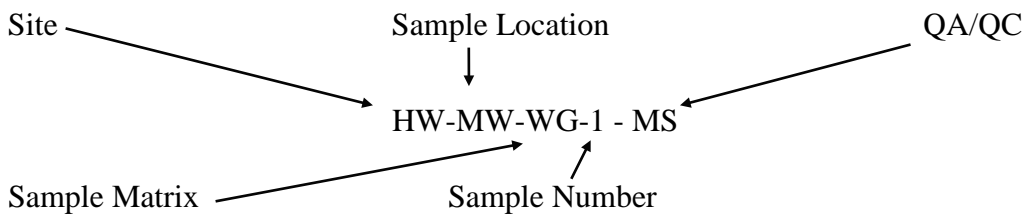
5.1 Sample Identification

All samples collected will be labeled with a sample identification code that is compatible with the NYSDEC EQuIS format. The code will identify the site, sample location, sample matrix and series numbers for sample locations with more than one sample. Samples will be labeled according to the following system:

- Site: - Site name (i.e., Hazardous Waste “HW”)
- Sample Location: - Monitoring Well “MW”
- Sample Matrix (as listed in NYSDEC EQuIS reference values):
 - WG – Groundwater
- Sample Number: - For circumstances where more than one sample of the same type and/or from the same location will be collected, a consecutive sample number will be assigned. When more than one sample is collected from a borehole in a sampling round at different depths, the depth will be indicated on the sample container and in the field log book.

- Quality Assurance/Quality Control (QA/QC): - Matrix Spike “MS”
 - Matrix Spike Duplicate “MSD”
 - Field Blank “FB”
 - Trip Blank “TB”

Based upon the above sample identification procedures, an example of a sample label may be:



5.2 Sample Handling, Packaging and Shipping

All samples will be placed in the appropriate containers as specified in the 2005 NYSDEC ASP. The holding time criteria identified in the 7/05 NYSDEC ASP Exhibit I will be followed as specified in Table 4-1.

Prior to packaging any samples for shipment, the sample containers will be checked for proper identification and compared to the field log book for accuracy. The samples will then be wrapped with a cushioning material and placed in a cooler (or laboratory shuttle) with a sufficient amount of bagged ice or “blue ice” packs in order to keep the samples at 4°C until arrival at the laboratory.

All necessary documentation required to accompany the sample during shipment will be placed in a sealed plastic bag and taped to the underside of the cooler lid. The cooler will then be sealed with fiber (duct) or clear packing tape, and custody seals will be placed in such a manner that any opening of the cooler prior to arrival at the laboratory can be detected.

All samples will be shipped to ensure laboratory receipt within 24-48 hours of sample collection in accordance with NYSDEC and method specific requirements. The laboratory will be notified prior to the shipment of the samples.

5.3 Groundwater (Monitoring Well)

Sampling protocols for the collection of groundwater samples from monitoring wells will consist of the following minimum procedures:

1. Measure the depth of water using a decontaminated water level indicator and compute the volume of standing water in the well.
2. Remove three to five times the volume of standing water from the well until field measurements (pH, conductivity, temperature and turbidity) stabilize, or until the well is dry, whichever occurs first. Turbidity should be less than 50 NTUs prior to collection of a sample for metals analysis.
3. Remove the laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form.
4. Obtain a sample by using a disposable polyethylene bailer.
5. If the turbidity of the sample is greater than 50 NTUs, the metals; (iron and manganese) portion of the sample will be filtered in the field or by the laboratory. Both the filtered (soluble metals) and unfiltered (total metals) samples will be analyzed.
6. Gently pour the sample into the sample container taking care not to spill on the outside of the container or overfill container and replace the cover on the sample container. Samples for volatile organic analyses will have no air space in the sample vial prior to sealing. This is done by filling the vial such that there is a meniscus on top. Carefully slide the septum, Teflon side down, onto the top of the vial and cap the vial. Check for bubbles by turning the vial upside down and tapping it lightly. If bubbles appear, reopen the vial, remove the septum and add more sample (or resample). Replace the septum, recap and check for bubbles. Continue until vial is bubble-free.
7. Return sample container to sample cooler.
8. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

6.0 DECONTAMINATION PROCEDURES

Whenever possible, all field sampling equipment should be sterile/disposable and dedicated to a particular sampling point. In instances where this is not possible, a field cleaning/decontamination procedure will be used in order to mitigate cross contamination between sample locations. A decontamination station/pad will be established for all field activities. This will be an area located away from the source of contamination so as not to adversely impact the decontamination procedure, but close enough to the sampling locations to keep equipment transport handling to a minimum after decontamination.

6.1 Field Decontamination Procedures

All non-disposable equipment will be decontaminated at appropriate intervals (e.g., prior to initial use, prior to moving to a new sampling location and prior to leaving the site). Different decontamination procedures are used for various types of equipment that are used to collect samples. When using field decontamination, sampling should commence in the area of the site with the lowest contamination, if known or probable, and proceed through to the areas of highest contamination.

6.2 Decontamination Procedure for Drilling/Probing Equipment

All equipment such as drill rigs and other mobile equipment will receive an initial cleaning prior to use at the site. The frequency of subsequent cleanings while on-site will depend on how the equipment is actually used in relation to collecting environmental samples. Decontamination fluids generated during steam cleaning/decontamination activities, will be collected in New York State Department of Transportation (NYSDOT) approved 55-gallon drums. The drums will be labeled as investigation-derived wastewater and temporarily stored in a secured area of the site on wooden pallets in a plastic-lined containment area pending characterization and proper disposal.

After the initial decontamination, cleaning may be reduced to those areas that are in close proximity to materials being sampled. Drill rig/probe items such as augers, drill/probe rods and drill bits will be cleaned in between sample locations.

Drilling/probing equipment will be decontaminated in the following manner:

- Wash thoroughly with nonresidual detergent (alconox) and tap water using a brush to remove particulate matter or surface film. This is necessary in order to remove any solids buildup on the back of the rig, auger flights, drill rods, drilling head, etc. Any loose paint chips, paint flakes and rust must also be removed.
- Steam clean (212°F).
- Once decontaminated, remove all items from the decontamination area.

6.3 Decontamination Procedure for Sampling Equipment

Teflon, PVC, polyethylene and stainless steel sampling equipment decontamination procedures will be the following:

- Wash thoroughly with nonresidual detergent (alconox) and clean potable tap water using a brush to remove particulate matter or surface film.
- Rinse thoroughly with tap water.
- Rinse thoroughly with acid (HNO₃) (only if metals samples are to be collected).
- Rinse thoroughly with distilled water.
- Rinse in a well-ventilated area with methanol (pesticide grade) and air dry.
- Rinse thoroughly with distilled water and air dry.
- Wrap completely in clean aluminum foil with dull side against the equipment. For small sampling items, such as scoops, decontamination will take place over a drum specifically used for this purpose.

The first step, a soap and water wash, will be performed to remove all visible particulate matter and residual oils and grease. This step will be followed by a tap water rinse and a

distilled/deionized water rinse to remove the detergent. Next, a high purity solvent rinse will be used for trace organics removal. Methanol has been chosen because it is not an analyte of concern on the Target Compound List. The solvent will be allowed to evaporate and then a final distilled/deionized water rinse will be performed. This rinse removes any residual traces of the solvent. The aluminum wrap will protect the equipment and keep it clean until it is used at another sampling location.

6.4 Decontamination Procedure for Well Casing and Development Equipment

Field cleaning of well casings will consist of a manual scrubbing to remove foreign material and steam cleaning, inside and out, until all traces of oil and grease are removed. This material will then be stored in such a manner so as to preserve it in this condition. Special attention to threaded joints will be necessary to remove cutting oil or weld burn residues.

Materials and equipment that will be used for the purposes of well development will also be decontaminated by steam cleaning. An additional step will involve flushing the interior of any hose, pump, etc. with a nonphosphate detergent solution and potable water rinse prior to the development of the next well. This liquid waste will be disposed of on-site, if possible after testing.

7.0 LABORATORY SAMPLE CUSTODY, SAMPLE RECEIPT, STORAGE, SECURITY, AND DISPOSAL PROCEDURES

A NYSDOH ELAP certified laboratory meeting the requirements for sample custody procedures, including cleaning and handling sample containers and analytical equipment, will be used to analyze samples collected during the site investigation. Upon receipt of shipped samples at the laboratory, the laboratory's sample custodian will inspect the samples for integrity and check the shipment against the chain-of-custody. Discrepancies are reported to the laboratory's project manager who contacts the D&B project manager for resolution.

When the shipment and the chain-of-custody are in agreement, the sample custodian will enter the samples into the Laboratory Information Management System and will assign each sample a unique laboratory number. This number will be affixed to each sample bottle. The sample custodian will then enter the sample and analysis information into the laboratory computer system.

The selected laboratory must satisfy the sample chain-of-custody requirements by implementing the following standard operating procedure for laboratory/sample security within the laboratory facility:

- Samples are stored in a secure area;
- Access to the laboratory is through a monitored area;
- Visitors sign a visitor's log and are escorted while in the laboratory;
- Only the designated sample custodians have keys to sample storage area(s); and,
- Transfers of samples in and out of storage are documented.

While in the laboratory, samples that require storage at $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ will be stored in a locked refrigerator unless they are being used for analysis. The laboratory's sample custodian will be responsible for sample storage and security to ensure that:

- Samples and extracts are stored for 60 days after the final analytical data report has been forwarded to D&B. The samples, extracts, and sample digestion byproducts are then discarded in accordance with Occupational Safety and Health Administration guidance; and,
- Samples are not stored with standards or sample extracts.

The selected laboratory's Standard Operating Procedures will be made available upon request.

8.0 SAMPLE DOCUMENTATION

Proper management and documentation of field and sampling activities is essential to ensure that all necessary work is conducted in accordance with the sampling plan and QAPP in an efficient and high-quality manner. Field management procedures will include following proper chain of custody procedures to track a sample from collection through analysis, noting when and how samples are split (if required); preparing a Location Sketch; completing Sample Information Records; completing Chain of Custody Forms; maintaining a daily Field Log Book; preparing Daily Field Activity Reports; and completing Field Change Forms. Copies of each of these forms are provided in Appendix A. Proper completion of these forms and the field log book are necessary to support the consequent actions that may result from the sample analysis. This documentation will support that the samples were collected and handled properly.

8.1 Location Sketch

For each sampling point, a Location Sketch will be completed using permanent references and distances to the sampling point noted, if possible.

8.2 Sample Information Record

At each sampling location, a Sample Information Record Form is filled out including, but not limited to, the following information:

- Site name
- Sample crew
- Sample location
- Field sample identification number
- Date
- Time of sample collection

- Weather conditions
- Temperature
- Sample matrix
- Method of sample collection and any factor that may affect its quality adversely
- Well information (groundwater only)
- Field test results
- Analysis to be performed
- Remarks

8.3 Chain of Custody

The Chain of Custody Form will be completed and is initiated at the laboratory with container preparation and shipment to the site. The form remains with the sample at all times and bears the name of the person assuming responsibility for the samples. This person is tasked with ensuring secure and appropriate handling of the containers and samples. When the form is complete, it will indicate that there was no lapse in sample accountability.

A sample is considered to be in an individual's custody if any of the following conditions are met:

- It is in the individual's physical possession, or
- It is in the individual's view after being in his or her physical possession, or
- It is secured by the individual so that no one can tamper with it, or
- The individual puts it in a designated and identified secure area.

In general, Chain of Custody Forms are provided by the laboratory selected to perform the analytical services. At a minimum, the following information will be provided on these forms:

- Project name and address
- Project number
- Sample identification number
- Date
- Time
- Sample location
- Sample type
- Analysis requested
- Number of containers and volume taken
- Remarks
- Type of waste
- Sampler(s) name(s) and signature(s)
- Spaces for relinquished by/received by signature and date/time.

For this particular study, forms provided by the laboratory will be utilized.

The Chain of Custody Form will be filled out and signed by the person performing the sampling. The original of the form will travel with the sample and will be signed and dated each time the sample is relinquished to another party, until it reaches the laboratory or analysis is completed. The field sampler will keep one copy and a copy will be retained for the project file. The sample bottle will also be labeled with an indelible marker with a minimum of the following information:

- Sample number
- Analysis to be performed
- Date of collection

A copy of the completed form will be returned by the laboratory with the analytical results.

8.4 Split Samples

Whenever samples are being split with another party, a Receipt for Samples Form will be completed and signed. A copy of the Chain of Custody Form will accompany this form.

8.5 Field Log Book

Field log books will be bound and have consecutively numbered water resistant pages. All pertinent information regarding the site and sampling procedures will be documented. Notations will be made in log book fashion, noting the time and date of all entries. Information recorded in this logbook will include, but not be limited to, the following:

The first page of the log will contain the following information:

- Project name and address
- Name, address and phone number of field contact
- Waste generator and address, if different from above
- Type of process (if known), generating waste
- Type of waste
- Suspected waste composition, including concentrations

Daily entries will be made for the following information:

- Purpose of sampling
- Location of sampling point

- Number(s) and volume(s) of sample(s) taken
- Description of sampling point and sampling methodology
- Date and time of collection, arrival and departure
- Collector's sample identification number(s)
- Sample distribution and method of storage and transportation
- References, such as sketches of the sampling site or photographs of sample collection
- Field observations, including results of field analyses (e.g., pH, temperature, specific conductance) and water levels
- Signature of personnel responsible for completing log entries.

8.6 Daily Field Activity Report

At the end of each day of field work, the Field Operations Manager, or designee, will complete this report noting personnel on-site and summarizing the work performed that day, equipment, materials and supplies used, results of field analyses, problems and resolutions. This report will be signed and subject to review.

8.7 Field Changes and Corrective Actions

Whenever there is a required or recommended investigation/sampling change or correction, a Field Change Form will be completed by the Field Operations Manager and approved by the Project Manager.

9.0 CALIBRATION PROCEDURES AND PREVENTIVE MAINTENANCE

Periodic preventive maintenance may be required for all equipment. Instrument manuals will be kept on file for reference if equipment needs repair. The troubleshooting section of factory manuals may be used in assisting personnel in performing routine/minor maintenance tasks. The frequency of preventative maintenance for field equipment is indicated in each operating instruction manual.

The following information regarding equipment will be maintained at the project site:

1. Equipment calibration and operating procedures which will include provisions for documentation of frequency, conditions, standards and records reflecting the calibration procedures, methods of usage and repair history of the measurement system. Calibration of field equipment will be performed daily at the sampling site so that any background contamination can be taken into consideration and the instrument calibrated accordingly.
2. A schedule of preventive maintenance tasks, consistent with the instrument manufacturer's specific operation manuals that will be carried out to minimize down time of the equipment.
3. Critical spare parts, necessary tools and manuals will be on hand to facilitate equipment maintenance and repair.

Calibration procedures and preventive maintenance, in accordance with the NYSDEC 2005 ASP for laboratory equipment, will be contained in the laboratory's standard operating procedures (SOP), which will be available upon request.

10.0 PERFORMANCE OF FIELD AUDITS

During field activities, the QA/QC officer will accompany sampling personnel into the field, in particular in the initial phase of the field program, to verify that the site sampling program is being properly conducted, and to identify problems so that corrective action can be taken early in the field program. Prior to an audit, the designated lead auditor will prepare an audit checklist. During an audit and upon its completion, the auditor will discuss the findings with the individuals audited and discuss and agree on corrective actions to be initiated. All findings will be documented in an audit report and provided to the Field Operations Manager.

The Field Operations Manager will then prepare and submit, to the QA/QC Officer and Project Manager, a plan for implementing the corrective action to be taken on non-conformances indicated in the audit report, the date by which the corrective action will be completed, and actions taken to prevent reoccurrence. If the corrective action has been completed, supporting documentation will be attached to the reply. The auditor will ascertain, through a re-audit or other means, if appropriate and timely corrective action has been implemented.

A copy of the Field Audit Form is provided in Appendix A. Records of audits will be maintained in the project files.

11.0 CONTROL AND DISPOSAL OF CONTAMINATED MATERIAL

During construction and sampling of the monitoring wells and contaminated water may be generated from decontamination water, development water and purge water.

11.1 Decontamination Fluids

It is anticipated that decontamination fluids will be generated during steam cleaning activities, which will be collected in New York State Department of Transportation (NYSDOT) approved 55-gallon drums. The drums will be labeled as investigation-derived wastewater and temporarily stored in a secured chain-link fence area of the site on wooden pallets in a plastic-lined containment area pending characterization and proper disposal.

11.2 Development and Purge Water

It is anticipated that development and purge water will be generated during development and sampling of the monitoring wells. Development and purge water will be contained in NYSDOT approved 55-gallon drums. Groundwater from several monitoring wells maybe combined provided they are associated with the same disposal site and aquifer. The drums will be labeled as investigation-derived wastewater from the corresponding well and temporarily stored in a secured area of the property on wooden pallets in a plastic-lined containment area pending characterization and proper disposal as defined in DER-10 and the approved site-specific work plan. It should be noted that NAPL shall never be discharged to the ground.

11.3 Personal Protective Equipment

Personal protective equipment (PPE) will be placed in 55-gallon drums or roll-off containers and secured on-site for proper disposal.

11.4 Dedicated Sampling Equipment

In general, all dedicated groundwater sampling equipment (dedicated disposable polyethylene bailer and dedicated polypropylene line) will be placed in 55-gallon drums or roll-off containers and secured on-site for disposal.

12.0 DOCUMENTATION, DATA REDUCTION AND REPORTING

A NYSDOH ELAP certified laboratory meeting the New York State requirements for documentation, data reduction and reporting will be used. All data will be cataloged according to sampling locations and sample identification nomenclature which is described in Section 5.1 of this QAPP Plan. The laboratory analysis will be reported in the NYSDEC ASP Category B deliverables format. In addition, the laboratory will be providing an electronic data deliverable (EDD) for each data set in the most current NYSDEC EQUIS format.

NYSDEC “Sample Identification and Analytical Requirement Summary” and “Sample Preparation and Analysis Summary” forms (for organic and inorganic analysis) will be completed and included with each data package. These forms are contained in Appendix B of this QAPP. The sample tracking forms are required and supplied by the 2005 NYSDEC ASP.

13.0 DATA VALIDATION

Data validation will be performed in order to define and document analytical data quality in accordance with USEPA and NYSDEC requirements that investigation data must be of known and acceptable quality. The analytical and validation processes will be conducted in conformance with the NYSDEC 2005 ASP and NYSDEC DER-10.

Since the NYSDEC Analytical Services Protocol is based on the USEPA CLP, the USEPA Functional Guidelines for Evaluating Organics and Inorganics Analyses for the Contract Laboratory Program (CLP) will assist in formulating standard operating procedures (SOPs) for the data validation process. The data validation process will ensure that all analytical requirements specific the QAPP are followed. Procedures will address validation of routine analytical services (RAS) results based on the NYSDEC Target Compound List and Target Analyte List for standard sample matrices.

The data validation process will provide an informed assessment of the laboratory's performance based upon contractual requirements and applicable analytical criteria. The report generated as a result of the data validation process will provide a base upon which the usefulness of the data can be evaluated by the end user of the analytical results. The overall level of effort and specific data validation procedure to be used will be equivalent to a "100% validation" of all analytical data in any given data package.

During the review process, it will be determined whether the contractually required laboratory submittals for sample results are supported by sufficient back-up data and QA/QC results to enable the reviewer to conclusively determine the quality of data. Each data package will be checked for completeness and technical adequacy of the data. Upon completion of the review, the reviewers will develop a QA/QC data validation report for each analytical data package.

"Qualified" analytical results for any one field sample will be established and presented based on the results of specific QC samples and procedures associated with its sample analysis

group or batch. Precision and accuracy criteria (i.e., QC acceptance limits) will be used in determining the need for qualifying data. Where test data have been reduced by the laboratory, the method of reduction will be described in the report. Reduction of laboratory measurements and laboratory reporting of analytical parameters will be verified in accordance with the procedures specified in the NYSDEC and USEPA program documents for each analytical method (i.e., recreate laboratory calculations and data reporting in accordance with the method specific procedure).

The standard operating guideline manuals and any special analytical methodology required will specify documentation needs and technical criteria and will be taken into consideration in the validation process. Copies of the complete data package and the validation report, including the laboratory results data report sheets, with any qualifiers deemed appropriate by the data reviewer, and a supplementary field QC sample result summary statement, will be provided with the site investigation report.

The following is a description of the two-phased approach to data validation which will be used in the remedial investigation. The first phase is called checklisting and the second phase is the analytical quality review, with the former being a subset of the latter.

- Checklisting - The data package will be checked for correct submission of the contract required deliverables, correct transcription from the raw data to the required deliverable summary forms and proper calculation of a number of parameters.
- Analytical Quality Review - The data package will be closely examined to recreate the analytical process and verify that proper and acceptable analytical techniques have been performed. Additionally, overall data quality and laboratory performance will be evaluated by applying the appropriate data quality criteria to the data to reflect conformance with the specified, accepted QA/QC standards and contractual requirements.

At the completion of the data validation, a Summary Data Validation/Usability Report will be prepared as part of the site investigation report.

If the NYSDEC decides that a complete validation is not required, a Data Usability Summary Report (DUSR) will be prepared.

The DUSR is prepared by reviewing and evaluating the analytical data. The parameters to be evaluated in reference to compliance with analytical method protocols include all chain-of-custody forms, holding times, raw data (instrument print out data and chromatograms), calibrations, blanks, spikes, controls, surrogate recoveries, duplicates and sample data. If available, field sampling notes should also be reviewed, and any quality control problems should be evaluated as to their effect on the usability of the sample data.

The DUSR shall describe the samples and analysis parameters reviewed. Data deficiencies, analytical protocol deviations and quality control problems shall be described and their effect on the data discussed.

Resampling and reanalysis recommendations will be made, if necessary. Data qualifications are documented for each sample analyte following the NYSDEC ASP 7/05 guidelines.

14.0 PERFORMANCE AND SYSTEM AUDITS

A NYSDOH ELAP certified laboratory which has satisfactorily completed performance audits and performance evaluation samples will be used to perform sample analyses for the investigation.

15.0 CORRECTIVE ACTION

A NYSDOH ELAP certified laboratory will meet the requirements for corrective action protocols, including sample “clean up” to attempt to eliminate/mitigate matrix interference.

The 2005 NYSDEC ASP includes both mandatory and optional sample cleanup and extraction methods. Cleanup is required by the 2005 NYSDEC ASP in order to meet contract required detection limits. There are several optional cleanup and extraction methods noted in the 2005 NYSDEC ASP.

It should be noted that if these optional cleanup and extraction methods are utilized, holding time requirements will not be exceeded due to negligence of the laboratory. Subsequent to selection of the analytical laboratory for this project, a meeting or conference call will be undertaken with the laboratory to discuss these issues and establish procedures to ensure effective and timely communications among all parties.

APPENDIX A

FIELD FORMS



BORING LOG

BORING SHEET OF

JOB NAME/ CLIENT	PROJECT NO.	AREA OF CONCERN	
ADDRESS		ELEVATION/DATUM	
DRILLING CONTRACTOR	DRILLER	INSPECTOR	
DRILLING RIG	TYPE/SIZE BIT	START DATE	END DATE
SAMPLER TYPE	HAMMER WEIGHT/DROP	TOTAL DEPTH	WATER LEVEL

SAMPLES			DEPTH	WATER	DESCRIPTION OF SOILS	REMARKS
NUMBER	RECOVERY IN FEET	BLOWS PER 6"				(PID, STAINING, ODORS, ETC.)
1			4		(SAA = Same As Above) f - fine m - medium c - coarse lt - light dk - dark tr - trace ltl - little	FP = Free Product N/S = No Staining, N/O = No odors SO = Slight Odor, MO = Moderate Odor STO = Strong Odor
2			8			
3			12			
4			16			
5			20			



FIELD CHANGE FORM

Project Name: _____

Project Number: _____ Field Change Number: _____

Location: _____ Date: _____

Field Activity Description: _____

Reason for Change: _____

Recommended Disposition: _____

Field Operations Officer (D&B Consulting Engineers) (Signature) _____ Date

Disposition: _____

On-site Supervisor (NYSDEC) (Signature) _____ Date

Distribution: Project Manager (D&B) _____
Project Manager (NYSDEC) _____
Field Operations Officer _____
On-site Supervisor (NYSDEC) _____
Others as Required: _____



Project No.:
Project Name:

Test Pit No.:
Sheet of
By:

Contractor:

Operator:
Equipment:

Geologist:
Test Pit Method:

Date Started:
Date Completed:

Test Pit Completion Depth:
Ground Surface Elevation:
Test Pit Dimension(s):

Weather Conditions:

Depth (ft.)	OVA (ppm)	PID (ppm)	Description of Materials	Remarks
-0-				
-1-				
-2-				
-3-				
-4-				
-5-				
-6-				
-7-				
-8-				
-9-				
-10-				

NOTES:

Date: _____

SAMPLE INFORMATION RECORD

Site: _____ Sample Crew: _____

Sample Location/Well No. _____

Field Sample I.D. Number _____ Time _____

Weather _____ Temperature _____

Sample Type:

Groundwater _____ Sediment _____

Surface Water/Stream _____ Air _____

Soil _____ Other (describe, i.e. water, septage, etc.) _____

Well Information (fill out for groundwater samples)

Depth to Water _____ Measurement Method _____

Depth of Well _____ Measurement Method _____

Volume Removed _____ Removal Method _____

Field Test Results

Color _____ pH _____ Odor _____

Temperature (°F) _____ Specific Conductance (umhos/cm) _____

Other (OVA, Methane Meter, etc.) _____

Constituents Sampled

Remarks:

Well Casing Volumes

GAL/FT	1¼" = 0.077	2" = 0.16	3" = 0.37	4" = 0.65
	1½" = 0.10	2½" = 0.24	3½" = 0.50	6" = 1.46



Date: _____

AIR MONITORING FORM

Project Name: _____

Project Number: _____ Instrument: _____

Recorded by: _____ Calibration Date: _____

Weather Conditions: _____

Time	Location	Wind Speed and Direction	Reading	Observations

Recording Procedures/Remarks: _____

Date: _____

LOCATION SKETCH

Project _____ Sample Crew _____

Sample(s) Location(s) _____

Sample(s) and/or Well Number(s) _____

Location of sample points, wells, borings, etc., with reference to three permanent reference points.
Measure all distances, clearly label roads, wells and permanent features.

N



Date: _____

DAILY FIELD ACTIVITY REPORT

General work performed today by D&B Engineers:

List specific inspection(s) performed and results (include problems and corrective actions):

List type and location of tests performed and results (include equipment used and monitoring results):

Verbal comments received from subcontractor (include construction and testing problems, and recommendations/resulting actions):

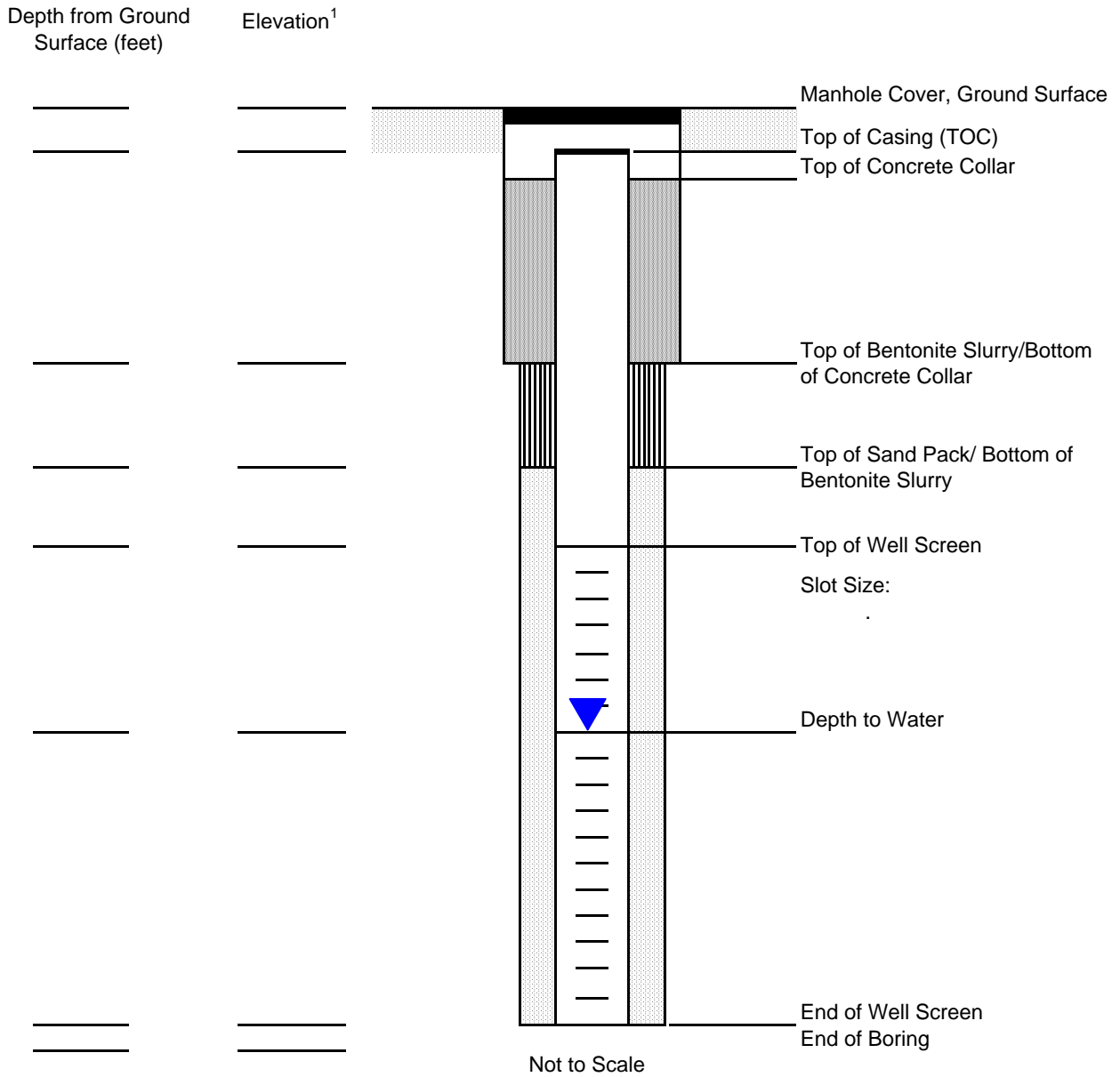
Prepared by: _____

Reviewed by: _____

WELL CONSTRUCTION LOG

WELL:
SHEET OF

PROJECT NAME: _____	WELL NUMBER: _____
ADDRESS: _____	DRILLING METHOD: _____
INSTALLATION DATE: _____	DRILLER: _____
DEVELOPMENT DATE: _____	GAUGING DATE: _____
HEIGHT OF STICK-UP: _____	DEPTH TO WATER ² : _____
ELEVATION ¹ : _____	DEPTH TO PRODUCT ² : _____
DATUM: _____	SCREEN MATERIAL: _____
CASING MATERIAL: _____	SEAL TYPE: _____
FILTER PACK TYPE: _____	



Notes:
¹Feet above datum
²Feet below top of casing

FIELD AUDIT FORM

Site: _____ Date: _____

Persons On-site: _____ QA/QC Officer Conducting Audit: _____

Project: _____

- | | | |
|---|-----|----|
| 1. Is safety equipment in use (hardhats, respirators, gloves etc.): | YES | NO |
| 2. Is a decontamination station, equipment and supplies on-site and in working order: | YES | NO |
| Methanol | YES | NO |
| Alconox | YES | NO |
| D.I. Water | YES | NO |
| Scrub Brushes | YES | NO |
| Steam Cleaner | YES | NO |

Comments: _____

3. Is the decontamination pad set up so water is contained: YES NO

Comments: _____

4. Is the site/investigation areas secured (fence, markers, etc.) or otherwise in accordance with project requirements: YES NO

Comments: _____

FIELD AUDIT FORM
(continued)

- | | | |
|--|-----|----|
| 5. Is contaminated material properly stored and in a secure area or otherwise in accordance with project requirements: | YES | NO |
| Are the drums of waste (water, soil, ppe) labeled properly: | YES | NO |

Comments:

- | | | |
|---|-----|----|
| 6. Are field forms filled out properly, legibly and timely: | | |
| Field Log Book | YES | NO |
| Chain of Custody | YES | NO |
| Equipment Calibration Log | YES | NO |
| Daily Field Activity Report | YES | NO |
| Location Sketch | YES | NO |
| Sample Information Record | YES | NO |
| Equipment Usage Form | YES | NO |
| Boring Logs | YES | NO |

Comments:

- | | | |
|--|-----|----|
| 7. Is the proper sampling and field measurement equipment, including calibration supplies on-site: | YES | NO |
|--|-----|----|

Comments:

FIELD AUDIT FORM
(continued)

8.	Are there adequate sample containers, including deionized water for		
	QA/QC:	Field Blanks	YES NO
		Trip Blanks	YES NO

Comments: _____

9.	Is the equipment decontaminated in accordance with project requirements:		
		Sampling equipment	YES NO
		Construction equipment	YES NO

Comments: _____

10.	Is field measurement equipment calibrated:		
		Daily	YES NO
		Properly	YES NO

Comments: _____

11.	Are samples collected and labeled properly:		
-----	---	--	--

Comments: _____

**FIELD AUDIT FORM
(continued)**

12. Are samples stored at 4°C: YES NO

Comments: _____

13. Are coolers properly sealed and packed for shipment including Chain of Custody taped to underside of lid: YES NO

Comments: _____

14. Is a copy of the Field Investigation Work Plan available on-site: YES NO

Comments: _____

15. Is a copy of each equipment manual on-site: YES NO

Comments: _____

16. Is a copy of the QA/QC Plan available on-site: YES NO

Comments: _____

**FIELD AUDIT FORM
(continued)**

17. Are investigation personnel familiar with the Work Plan and QA/QC Plan: YES NO

Comments: _____

18. Are quality control samples taken:
 Trip Blanks YES NO
 Field Blanks YES NO

19. Are samples shipped in a timely and appropriate manner: YES NO

Comments: _____

20. Has the laboratory been contacted regarding planned shipment of samples: YES NO

Comments: _____

21. Certification - Based upon my audit at the above project, I hereby certify/do not certify compliance with QA/QC requirements for the project:

_____ _____
Dated Signed

**FIELD AUDIT FORM
(continued)**

General Comments:

APPENDIX B

**NYSDEC SAMPLE IDENTIFICATION, PREPARATION
AND ANALYSIS SUMMARY FORMS**

APPENDIX C

TARGET COMPOUND AND TARGET ANALYTE LISTS

**Volatiles Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)
for Aqueous Samples**

	Volatile Analyte	CAS Number	Trace Water By SIM (µg/L)	Trace Level Water (µg/L)	Low Level Water (µg/L)
1.	Dichlorodifluoromethane	75-71-8		0.50	5.0
2.	Chloromethane	74-87-3		0.50	5.0
3.	Vinyl Chloride	75-01-4		0.50	5.0
4.	Bromomethane	74-83-9		0.50	5.0
5.	Chloroethane	75-00-3		0.50	5.0
6.	Trichlorofluoromethane	75-69-4		0.50	5.0
7.	1,1-Dichloroethene	75-35-4		0.50	5.0
8.	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		0.50	5.0
9.	Acetone	67-64-1		5.0	10.0
10.	Carbon Disulfide	75-15-0		0.50	5.0
11.	Methyl Acetate	79-20-9		0.50	5.0
12.	Methylene chloride	75-09-2		0.50	5.0
13.	trans-1,2-Dichloroethene	156-60-5		0.50	5.0
14.	Methyl tert-Butyl Ether	1634-04-4		0.50	5.0
15.	1,1-Dichloroethane	75-34-3		0.50	5.0
16.	cis-1,2-Dichloroethene	156-59-2		0.50	5.0
17.	2-Butanone	78-93-3		5.0	10.0
18.	Bromochloromethane	74-97-5		0.50	5.0
19.	Chloroform	67-66-3		0.50	5.0
20.	1,1,1-Trichloroethane	71-55-6		0.50	5.0
21.	Cyclohexane	110-82-7		0.50	5.0
22.	Carbon tetrachloride	56-23-5		0.50	5.0
23.	Benzene	71-43-2		0.50	5.0
24.	1,2-Dichloroethane	107-06-2		0.50	5.0
25.	1,4-Dioxane	123-91-1	1.0	25	125
26.	Trichloroethane	79-01-6		0.50	5.0

**Volatiles Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)
for Aqueous Samples (Continued)**

	Volatile Analyte	CAS Number	Trace Water By SIM (µg/L)	Trace Level Water (µg/L)	Low Level Water (µg/L)
27.	Methylcyclohexane	108-87-2		0.50	5.0
28.	1,2-Dichloropropane	78-87-5		0.50	5.0
29.	Bromodichloromethane	75-27-4		0.50	5.0
30.	cis-1,3-Dichloropropene	10061-01-5		0.50	5.0
31.	4-methyl-2-pentanone	108-10-1		5.0	10.0
32.	Toluene	108-88-3		0.50	5.0
33.	Trans-1,3-Dichloropropene	10061-02-6		0.50	5.0
34.	1,1,2-Trichloroethane	79-00-5		0.50	5.0
35.	Tetrachloroethene	127-18-4		0.50	5.0
36.	2-Hexanone	591-78-6		5.0	10.0
37.	Dibromochloromethane	124-48-1		0.50	5.0
38.	1,2-Dibromoethane	106-93-4	0.05	0.50	5.0
39.	Chlorobenzene	108-90-7		0.50	5.0
40.	Ethylbenzene	100-41-4		0.50	5.0
41.	Xylenes (Total)	1330-20-7		0.50	5.0
42.	Styrene	100-42-5		0.50	5.0
43.	Bromoform	75-25-2		0.50	5.0
44.	Isopropylbenzene	98-82-8		0.50	5.0
45.	1,1,2,2-Tetrachloroethane	79-34-5		0.50	5.0
46.	1,3-Dichlorobenzene	541-73-1		0.50	5.0
47.	1,4-Dichlorobenzene	106-46-7		0.50	5.0
48.	1,2-Dichlorobenzene	95-50-1		0.50	5.0
49.	1,2-Dibromo-3-chloropropane	96-12-8	0.05	0.50	5.0
50.	1,2,4-Trichlorobenzene	120-82-1		0.50	5.0
51.	1,2,3-Trichlorobenzene	87-61-6		0.50	5.0

**Semivolatiles Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)
for Aqueous Samples**

	Semivolatile Analyte	CAS Number	Low Water By SIM ¹ (µg/L)	Water (µg/L)
1.	Benzaldehyde	100-52-7		5.0
2.	Phenol	108-95-2	0.10	5.0
3.	Bis-(2-chloroethyl) ether	111-44-4		5.0
4.	2-Chlorophenol	95-57-8	0.10	5.0
5.	2-Methylphenol	95-48-7	0.10	5.0
6.	2,2'-Oxybis (1-chloropropane) ³	108-60-1		5.0
7.	Acetophenone	98-86-2		5.0
8.	4-Methylphenol	106-44-5	0.10	5.0
9.	N-Nitroso-di-n-propylamine	621-64-7		5.0
10.	Hexachloroethane	67-72-1		5.0
11.	Nitrobenzene	98-95-3		5.0
12.	Isophorone	78-59-1		5.0
13.	2-Nitrophenol	88-75-5	0.10	5.0
14.	2,4-Dimethylphenol	105-67-9	0.10	5.0
15.	Bis (2-chloroethoxy) methane	111-91-1		5.0
16.	2,4-Dichlorophenol	120-83-2	0.10	5.0
17.	Naphthalene	91-20-3	0.10	5.0
18.	4-Chloroaniline	106-47-8		5.0
19.	Hexachlorobutadiene	87-68-3		5.0
20.	Caprolactam	105-60-2		5.0
21.	4-Chloro-3-methylphenol	59-50-7	0.10	5.0
22.	2-Methylnaphthalene	91-57-6		5.0
23.	Hexachlorocyclopentadiene	77-47-4		5.0
24.	2,4,6-Trichlorophenol	88-06-2	0.10	5.0
25.	2,4,5-Trichlorophenol ⁴	95-95-4	0.20	10.0
26.	1,1'-Biphenyl	92-52-4		5.0
27.	2-Chloronaphthalene	91-58-7		5.0

**Semivolatiles Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)
for Aqueous Samples (Continued)**

	Semivolatile Analyte	CAS Number	Low Water By SIM ¹ (µg/L)	Water (µg/L)
28.	2-Nitroaniline ⁴	88-74-4		10.0
29.	Dimethylphthalate	131-11-3		5.0
30.	2,6-Dinitrotoluene	606-20-2		5.0
31.	Acenaphthylene	208-96-8	0.10	5.0
32.	3-Nitroaniline ⁴	99-09-2		10.0
33.	Acenaphthene	83-32-9	0.10	5.0
34.	2,4-Dinitrophenol ⁴	51-28-5	0.20	10.0
35.	4-Nitrophenol ⁴	100-02-7	0.20	10.0
36.	Dibenzofuran	132-64-9		5.0
37.	2,4-Dinitrotoluene	121-14-2		5.0
38.	Diethylphthalate	84-66-2		5.0
39.	Fluorene	86-73-7	0.10	5.0
40.	4-Chlorophenyl-phenyl ether	7005-72-3		5.0
41.	4-Nitroaniline ⁴	100-01-6		10.0
42.	4,6-Dinitro-2-methylphenol ⁴	534-52-1	0.20	10.0
43.	N-Nitrosodiphenylamine	86-30-6		5.0
44.	1,2,4,5-Tetrachlorobenzene	95-34-3		5.0
45.	4-Bromophenyl-phenylether	101-55-3		5.0
46.	Hexachlorobenzene	100-52-7		5.0
47.	Atrazine	108-95-2	0.10	5.0
48.	Pentachlorophenol	111-44-4	0.20	10.0
49.	Phenanthrene	95-57-8	0.10	5.0
50.	Anthracene	95-48-7	0.10	5.0
51.	Carbazole	108-60-1		5.0
52.	Di-n-butylphthalate	98-86-2		5.0

**Semivolatiles Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)
for Aqueous Samples (Continued)**

	Semivolatile Analyte	CAS Number	Low Water By SIM ¹ (µg/L)	Water (µg/L)
53.	Fluoroanthene	106-44-5	0.10	5.0
54.	Pyrene	621-64-7		5.0
55.	Butylbenzylphthalate	67-72-1		5.0
56.	3,3'-Dichlorobenzidine	98-95-3		5.0
57.	Benzo (a) anthracene	78-59-1		5.0
58.	Chrysene	88-75-5	0.10	5.0
59.	Bis (2-ethylhexyl) phthalate	105-67-9	0.10	5.0
60.	Di-n-octylphthalate	111-91-1		5.0
61.	Benzo (b) fluoranthene	120-83-2	0.10	5.0
62.	Benzo (k) fluoranthene	91-20-3	0.10	5.0
63.	Benzo (a) pyrene	106-47-8		5.0
64.	Indeno (1,2,3-cd) pyrene	87-68-3		5.0
65.	Benzo (a,h) anthracene	105-60-2		5.0
66.	Benzo (g,h,i) perylene	59-50-7	0.10	5.0

Semivolatile Notes

¹ CRQLs for optional analysis of water and soil samples using SIM (Selected Ion Monitoring) techniques for PAHs and phenols.

² Denotes soil, sediment, tissue, or mixed phase samples.

³ Previously known as bis (2-Chloroisopropyl) ether.

⁴ Seven semivolatile compounds are calibrated using only a four point initial calibration, eliminating the lowest standard. Therefore, the CRQL values for these eight compounds are 2 times higher for all matrices and levels.

**Pesticide Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)
For Aqueous and Solid Samples**

	Pesticide Analyte	CAS Number	Water (µg/L)	Solids ¹ (µg/Kg)
1.	alpha-BHC	319-84-6	0.050	1.7
2.	beta-BHC	319-85-7	0.050	1.7
3.	delta-BHC	319-86-8	0.050	1.7
4.	gamma-BHC (Lindane)	58-89-9	0.050	1.7
5.	Heptachlor	76-44-8	0.050	1.7
6.	Aldrin	309-00-2	0.050	1.7
7.	Heptachlor epoxide ²	1024-57-3	0.050	1.7
8.	Endosulfan I	959-98-8	0.050	1.7
9.	Dieldrin	60-57-1	0.10	3.3
10.	4,4'-DDE	72-55-9	0.10	3.3
11.	Endrin	72-20-8	0.10	3.3
12.	Endosulfan II	33213-65-9	0.10	3.3
13.	4,4'-DDD	72-54-8	0.10	3.3
14.	Endosulfan sulfate	1031-07-8	0.10	3.3
15.	4,4'-DDT	50-29-3	0.10	3.3
16.	Methoxychlor	72-43-5	0.10	3.3
17.	Endrin ketone	53494-70-5	0.10	3.3
18.	Endrin aldehyde	7421-93-4	0.10	3.3
19.	alpha-Chlordane	5103-71-9	0.050	1.7
20.	gamma-Chlordane	5103-74-2	0.050	1.7
21.	Toxaphene	8001-35-2	5.0	34

Pesticide Notes

¹ There is no differentiation between the preparation of low and medium soil samples in this method for the analysis of pesticides.

² Only the exo-epoxy isomer (isomer B) of heptachlor epoxide is reported on the data reporting forms (Exhibit B).

**PCB Aroclor Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)
For Aqueous and Solid Samples**

	Aroclor Analyte	CAS Number	Water (µg/L)	Solids ¹ (µg/Kg)
1.	Arochlor-1016	12674-11-2	1.0	33
2.	Arochlor-1221	11104-28-2	1.0	33
3.	Arochlor-1232	11141-16-5	1.0	33
4.	Arochlor-1242	53469-21-9	1.0	33
5.	Arochlor-1248	12672-29-6	1.0	33
6.	Arochlor-1254	11097-69-1	1.0	33
7.	Arochlor-1260	11096-82-5	1.0	33
8.	Arochlor-1262	37324-23-5	1.0	33
9.	Arochlor-1268	11100-14-4	1.0	33

Aroclor PCB Notes

¹ There is no differentiation between the preparation of low and medium soil samples in this method for the analysis of Aroclor PCBs.

**Inorganic Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQLs)
For Aqueous and Solid Samples**

	Analyte	CAS Number	ICP-AES ¹ CRQL for Water (µg/L)	ICP-AES ¹ CRQL for Solids (mg/Kg)	ICP-MS ¹ for Water (µg/L)
1.	Aluminum	7429-90-5	200	40	30
2.	Antimony	7440-36-0	60	12	2
3.	Arsenic	7440-38-2	15	3	1
4.	Barium	7440-39-3	200	40	10
5.	Beryllium	7440-41-7	5	1	1
6.	Cadmium	7440-43-9	5	1	1
7.	Calcium	7440-70-2	5000	1000	--
8.	Chromium	7440-47-3	10	2	2
9.	Cobalt	7440-48-4	50	10	0.5
10.	Copper	7440-50-8	25	5	2
11.	Iron	7439-89-6	100	20	--
12.	Lead	7439-92-1	10	2	1
13.	Magnesium	7439-95-4	5000	1000	--
14.	Manganese	7439-96-5	15	3	0.5
15.	Mercury ²	7439-97-6	0.2	0.1	--
16.	Nickel	7440-02-0	40	8	1
17.	Potassium	7440-09-7	5000	1000	--
18.	Selenium	7782-49-2	35	7	5
19.	Silver	7440-22-4	10	2	1
20.	Sodium	7440-23-5	5000	1000	--
21.	Thallium	7440-28-0	25	5	1
22.	Vanadium	7440-62-2	50	10	1
23.	Zinc	7440-66-6	60	12	1
24.	Cyanide ²	57-12-5	10	1	--

Inorganic Notes

¹ Any analytical method specified in Exhibit D, may be utilized as long as the documented instrument or method detection limits (IDLs or MDLs) are less than one half the Contract Required Quantitation Level (CRQL) requirements. Higher quantitation levels may only be used in the following circumstance:

If the sample concentration exceeds five times the quantitation limit of the instrument or method in use, the value may be reported even though the instrument or method detection limit may not equal the Contract Required Quantitation Limit. This is illustrated in the example below:

For lead:

Method in use = ICP

Instrument Detection Limit (IDL) = 40

Sample concentration = 220

Contract Required Quantitation Level (CRQL) = 3

The value of 220 may be reported even though instrument detection limit is greater than Contract Required Quantitation Limit. The instrument or method detection limit must be documented as described in Exhibit E.

² Mercury is analyzed by cold vapor atomic absorption. Cyanide is analyzed by colorimetry/spectrophotometry.

APPENDIX F
SITE MANAGEMENT FORMS

ENGINEERING AND INSTITUTIONAL CONTROL INSPECTION FORM

I. Site Background Information

A. Site Name and Location:

Site name as it appears on the Environmental Easement: _____

Name of the current property owner(s): _____

Site Street Address: _____

Municipality (-ies): _____ County (-ies): _____

Blocks: _____

Lots: _____

Source information obtained from: _____

B. Person responsible for preparing Engineering and Institutional Control Evaluation Form:

Person's Name: _____

Person's Title: _____

Company Name: _____

Relationship to the Site (check as appropriate): Owner _____ Operator _____

Lessee _____ Person Who Conducted the Cleanup _____

Other (describe) _____

Street Address: _____

City: _____ State: _____

Telephone Number: (____) ____-____

Fax Number: (____) ____-____

E-mail Address: _____

Yes ____ No ____

If "Yes", provide an explanation. If necessary, attach additional sheets.

B. Evaluation of Engineering and Institutional Controls

1. Zoning or Land Use Changes (Complete below)

a. Land use at the time the Environmental Easement was filed (check all that apply):

Non-Residential ____ Residential ____ Agricultural ____ Other ____

b. Current land use (check all that apply):

Non-Residential ____ Residential ____ Agricultural ____ Other ____

c. Has there been an actual or pending zoning or land-use change?

Yes ____ No ____

2. Inspections (Complete below)

Have periodic inspections of the site identified any excavation or other disturbance activities that have taken place within the restricted areas?

Yes ____ No ____

Date(s) of Disturbance: _____

Duration of Disturbance: Years ____ Months ____ Days ____

Date the NYSDEC was notified: _____

Date Work Plan Approved: _____

Description of the disturbance and methods to address the disturbance. If necessary, attach additional sheets.

Name of Contact Person Relative to the Disturbance:

Title: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____

Telephone Number: _____

Email Address: _____

3. Changes to Laws and Regulations (Complete below)

- a. Are there any subsequently promulgated or modified environmental laws or regulations, which apply to the site?

Yes ____ No ____

- b. If "Yes", has the evaluation also determined that the Environmental Easement and engineering control, as applicable, meets the requirements of the new laws and regulations?

Yes ____ No ____

- c. The Environmental Easement and engineering control, as applicable that did not meet the requirements of the new laws and regulations has been addressed in the following manner to bring them into compliance. If necessary, attach additional sheets.



Date: _____

DAILY FIELD ACTIVITY REPORT

Report Number: _____ Project Number: _____

Field Log Book Page Number: _____

Project: _____

Address: _____

Weather: (AM) _____ Rainfall: (AM) _____ Inches
 (PM) _____ (PM) _____ Inches

Temperature: (AM) _____ °F Wind Speed: (AM) _____ MPH Wind Direction: (AM) _____
 (PM) _____ °F (PM) _____ MPH (PM) _____

Site Condition: _____

Personnel Site:	On	<u>Name</u>	<u>Affiliation</u>	<u>Arrival Time</u>	<u>Departure Time</u>

Subcontractor Work Commencement: (AM) _____ (PM) _____
 Subcontractor Work Completion: (AM) _____ (PM) _____



Date: _____

DAILY FIELD ACTIVITY REPORT

Work Performed by subcontractor(s) (includes equipment and labor breakdown):



Date: _____

DAILY FIELD ACTIVITY REPORT

General work performed today by D&B Engineers:

List specific inspection(s) performed and results (include problems and corrective actions):

List type and location of tests performed and results (include equipment used and monitoring results):

Verbal comments received from subcontractor (include construction and testing problems, and recommendations/resulting actions):

Prepared by: _____

Reviewed by: _____

Date: _____

DAILY EQUIPMENT CALIBRATION LOG

Project Name: _____

Project Number: _____

Calibrated by: _____

Instrument Name and Model Number	Calibration Method	Time	Readings and Observations

Summary of Green Remediation Metrics for Site Management

Site Name: _____ Site Code: _____

Address: _____ City: _____

State: _____ Zip Code: _____ County: _____

Initial Report Period (Start Date of period covered by the Initial Report submittal)

Start Date: _____

Current Reporting Period

Reporting Period From: _____ To: _____

Contact Information

Preparer's Name: _____ Phone No.: _____

Preparer's Affiliation: _____

I. Energy Usage: Quantify the amount of energy used directly on-site and the portion of that derived from renewable energy sources.

	Current Reporting Period	Total to Date
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
Of that Electric usage, provide quantity:		
Derived from renewable sources (e.g. solar, wind)		
Other energy sources (e.g. geothermal, solar thermal (Btu))		

Provide a description of all energy usage reduction programs for the site in the space provided on Page 3.

II. Solid Waste Generation: Quantify the management of solid waste generated on-site.

	Current Reporting Period (tons)	Total to Date (tons)
Total waste generated on-site		
OM&M generated waste		
Of that total amount, provide quantity:		

Transported off-site to landfills		
Transported off-site to other disposal facilities		
Transported off-site for recycling/reuse		
Reused on-site		

Provide a description of any implemented waste reduction programs for the site in the space provided on Page 3.

III. Transportation/Shipping: Quantify the distances travelled for delivery of supplies, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	Total to Date (miles)
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service		
Waste Removal/Hauling		

Provide a description of all mileage reduction programs for the site in the space provided on Page 3. Include specifically any local vendor/services utilized that are within 50 miles of the site.

IV. Water Usage: Quantify the volume of water used on-site from various sources.

	Current Reporting Period (gallons)	Total to Date (gallons)
Total quantity of water used on-site		
Of that total amount, provide quantity:		
Public potable water supply usage		
Surface water usage		
On-site groundwater usage		
Collected or diverted storm water usage		

Provide a description of any implemented water consumption reduction programs for the site in the space provided on Page 3.

V. Land Use and Ecosystems: Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

	Current Reporting Period (acres)	Total to Date (acres)
Land disturbed		
Land restored		

Provide a description of any implemented land restoration/green infrastructure programs for the site in the space provided on Page 3.

Description of green remediation programs reported above (Attach additional sheets if needed)
Energy Usage:
Waste Generation:
Transportation/Shipping:
Water usage:
Land Use and Ecosystems:
Other:

CERTIFICATION BY CONTRACTOR
I, _____ (Name) do hereby certify that I am _____ (Title) of the Company/Corporation herein referenced and contractor for the work described in the foregoing application for payment. According to my knowledge and belief, all items and amounts shown on the face of this application for payment are correct, all work has been performed and/or materials supplied, the foregoing is a true and correct statement of the contract account up to and including that last day of the period covered by this application.

Date Contractor

Date: _____

SAMPLE INFORMATION RECORD

Site: _____ Sample Crew: _____

Sample Location/Well No. _____

Field Sample I.D. Number _____ Time _____

Weather _____ Temperature _____

Sample Type:

Groundwater _____ Sediment _____

Surface Water/Stream _____ Air _____

Soil _____ Other (describe, i.e. water, septage, etc.) _____

Well Information (fill out for groundwater samples)

Depth to Water _____ Measurement Method _____

Depth of Well _____ Measurement Method _____

Volume Removed _____ Removal Method _____

Field Test Results

Color _____ pH _____ Odor _____

Temperature (°F) _____ Specific Conductance (umhos/cm) _____

Other (OVA, Methane Meter, etc.) _____

Constituents Sampled

Remarks:

Well Casing Volumes

GAL/FT	1¼" = 0.077	2" = 0.16	3" = 0.37	4" = 0.65
	1½" = 0.10	2½" = 0.24	3½" = 0.50	6" = 1.46

WELL NUMBER		WELL INFORMATION				Date:	
MW	Well Diameter (inches)	Total (1) Depth (ft)	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	Personnel:	
PERMIT NUMBER						Site Name:	
NA						Site Location:	
						Job Number:	

(1) Use a previously determined total depth. Confirm the total depth of well after sampling.
 TOC = top of casing

PURGING INFORMATION							WATER QUALITY METER CALIBRATION READINGS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/m)	Total Purge Vol. (L)	Temp:	pH:	Cond:
							D.O.:	ORP:	Turbidity:
							Rental Meter Name:		
							Rental Meter Serial No.:		

(2) Below TOC

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)											
	Criteria:	<0.3 ft	± 3%	± 0.1 su	± 3%	± 10%	± 10 mv	± 10% ⁽³⁾			
Time	Flow Rate (ml/m)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (ppm)	ORP (mv)	Turbidity (NTU)	Initials	Water Conditions/Comments	
Sample Name:		Sample Time:			Number of Bottles:						
Analytical Parameters:									Sample Start Time:		
Weather Conditions:									Sample Finish Time:		

Revised 01/05

(3) For values greater than 1.
 Note: Indicator parameters have stabilized when 3 consecutive readings taken every 5 mins are within criteria above

APPENDIX G – FIELD SAMPLING PLAN



New York State Department of Environmental Conservation

Generic Field Activities Plan

Prepared for:

**New York State Department of
Environmental Conservation**

Standby Engineering Contract

April 2011

Revised February 2013

Prepared by:

D&B/TRC Joint Venture



GENERIC FIELD ACTIVITIES PLAN

Prepared for:

**NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION**

STANDBY ENGINEERING CONTRACT

Prepared by:

**D&B/TRC JOINT VENTURE
WOODBURY, NEW YORK**

APRIL 2011

REVISED FEBRUARY 2013

GENERIC FIELD ACTIVITIES PLAN

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1.0 INTRODUCTION

As part of the New York State Division of Environmental Remediation's mission to protect public health and the environment of the State of New York by: investigating and remediating contaminated properties; responding to unauthorized discharges of contaminants and their cleanup; regulating bulk storage, hazardous waste and radiation facilities and the transporters of hazardous and solid waste, the New York State Department of Environmental Conservation (NYSDEC) has awarded Dvirka and Bartilucci Consulting Engineers/TRC Engineers, Inc. (D&B/TRC) Joint Venture a Standby Engineering Contract. Under this standby contract, NYSDEC will be issuing work assignments to the D&B/TRC Joint Venture to provide engineering services as identified in each work assignment.

The purpose of this Generic Field Activities Plan is to specify field investigation and sampling procedures to be utilized for environmental sampling activities and to provide general information on elements of the field investigations that will be performed as required. The Joint Venture's approach for implementing field investigations includes field sampling activities designed to confirm the presence or absence of chemicals of concern (COCs) attributable to past and present operational and/or storage activities at the site, and to quantify the concentrations of potential COCs through field screening and laboratory analysis. The work assignment specific field programs may include some or all of the following specific activities:

- Records review search;
- Soil background sampling;
- Surface soil sampling;
- Exploratory test pits and subsurface soil sampling;
- Soil borings and subsurface soil sampling;
- Soil vapor survey;
- Community Air Monitoring Plan;
- Geophysical survey;

- Surface water, sediment and wetland sampling;
- On-site field screening analysis of surface and subsurface soil utilizing immunoassay colorimetric quantification;
- Monitoring well installations;
- Groundwater sampling;
- Bedrock core sampling;
- In-situ hydraulic conductivity testing and short-term aquifer testing;
- Downhole logging;
- Geotechnical logging and analyses;
- Air screening survey;
- Ambient/Indoor air sampling;
- Fish and wildlife resources impact sampling and analyses including toxicity testing sampling, bioassay sampling and biota tissue sampling;
- Asbestos bulk sampling;
- Paint chip sampling;
- Wipe sampling;
- Lead field analysis utilizing an x-ray fluorescence (XRF) analyzer;
- Hazardous Materials Surveys; and
- Investigative-derived waste characterization and handling.

Information relating to site-specific field investigations will be provided in a Site-Specific Work Plan. Any changes or revisions to the investigation techniques and sample analytical methodology provided in the Generic Field Activities Plan, together with the rationale for these changes, will be included in the Site-Specific Work Plan.

The following sections provide a description of field activities that will be conducted. For detailed description of screening, sampling and analytical procedures, refer to the Generic Quality Assurance Project Plan prepared for the Standby Engineering Contract.

1.1 Rationale

The rationale for performance of field activities will be based on the identification and delineation of source and extent of contamination as well as the identification of potential receptors and migration pathways, while obtaining practical information for use in the evaluation of remedial technologies and selection of a remedial plan. The approach will provide for a cost-effective field program and allow for accelerated development of a remediation plan for the site.

2.0 GENERAL FIELD GUIDELINES AND SITE SURVEYS

2.1 Site Hazards

Potential on-site surface hazards, such as sharp objects, overhead power lines, energized areas and building hazards will be identified prior to initiation of fieldwork. Generally, such hazards will be identified during the initial site visit, prior to the first day of fieldwork, and incorporated into the site-specific health and safety plan.

2.2 Site Survey/Base Map

A base map will be prepared by a New York State licensed surveyor for horizontal and vertical control to map relevant features on the site including property boundaries, structures, roads, previous excavations, and existing piezometers and monitoring wells. During site characterization (SC) activities, the base map will be used to plot soil borings, monitoring wells, sample locations, and any other items of interest noted during the field work. Horizontal and vertical coordinates for physical structures, sampling locations, piezometers, and monitoring wells will be integrated into the base map. Vertical and horizontal control of the monitoring well/piezometer casing will allow for calculation of groundwater elevations for the development of groundwater surface elevation contour maps. The surveyor will establish elevations with respect to bench marks in the vicinity of the site property. Vertical measurements will be referenced to the North American Vertical Datum of 1988 and be reported to within approximately 0.01 feet.

Horizontal control will be established by traverse runs to establish location with respect to the New York State planar coordinate grid system and be provided in New York State planar and UTM coordinates (NAD83). Horizontal traverses will be tied into established benchmarks. Horizontal transverse runs will be tied back to initial control points as a check for closure, and error of closure will be recorded. The horizontal locations of physical structures, sampling points, and other items of interest will be reported to within approximately 0.1 feet.

Vertical and horizontal control of the soil borings and monitoring wells allow for the preparation of geologic and hydrogeologic cross sections. Additional on-site and off-site sampling points, such as surface soil and soil vapor survey locations, will be surveyed, if necessary.

Control points for use in the preparation of a topographic map of the study area will also be surveyed, if necessary. Coordination between the aerial photographer and the surveyor will be required in order to select the necessary control points for preparation of the topographic map.

In addition, for the purposes of supplying NYSDEC with the appropriate coordinates required for inclusion in their EQUIS database, all sample locations will be designated with the appropriate latitude and longitude values.

When deemed appropriate and necessary, sampling points and physical site features may be established with a Global Positioning System (GPSTM) field survey unit, that is capable of locating points within remote and overgrown areas through the use of an extension pole-mounted receiver that can be held above the vegetation by field personnel. If desired, the coordinates for each sample location can be pre-programmed into the GPSTM Asset Surveyor as way-points for use in navigating to the location in the field. The horizontal locations of physical structures, sampling points, and other items of interest will be reported to within approximately 3 feet.

2.3 Utility Survey

Aboveground and underground utilities, including electric lines, gas lines and communication lines will be identified prior to initiation of drilling and other subsurface work. On-site underground utilities in the vicinity of proposed drilling locations will be located through performance of a utility survey. The utility markout will be performed using non-intrusive ground penetrating radar (GPR) and RF utility locating techniques. GPR can be used to locate buried objects, but is subject to interferences from buried metal, clay layers in the subsurface and concrete that contains certain aggregate types. Any off-site underground utilities in public rights of way in the vicinity of proposed drilling locations will be located and marked by a

representative of One Call Center as required by New York Code 753. New York State law requires that Dig Safely New York be notified at least 2 working days, and not more than 10 working days, before subsurface work is conducted. Non-participating members will be identified and contacted separately.

2.4 Geophysical Survey

A geophysical survey may be conducted to identify subsurface features and buried utilities beneath a site. An approach to developing an investigatory strategy will consist of the identification and location of areas of concern (AOCs) for each type of physical structure or feature suspected to be buried beneath the site. To meet these objectives of a geophysical survey, the following geophysical techniques may be employed:

- Terrain Conductivity Electromagnetic (EM) Method;
 - EM response to metal makes this technique particularly well suited for identification of buried metal objects such as USTs, buried utilities, or buried drums and equipment. The EM method is equally sensitive to metal objects on the ground surface, as well as some naturally occurring geologic features.
- Radio Frequency (RF) Utility Locating Method; and
 - A Radio-detection RD400/PDL2 multi-frequency RF utility locating system consisting of a receiver/tracer and a remote transmitter may be used in 60 hertz passive mode to identify active buried electrical lines
- Ground Penetrating Radar (GPR) Method.
 - A GPR system may be used to confirm location of utilities and identified buried features using the RF and EM methods, and to search for non-metallic utilities or objects, such as fiberglass, polyvinyl chloride (PVC), or other plastic piping.

2.5 Field Log Books

All field activities will be carefully documented in field log books. Entries will be of sufficient detail that a complete daily record of significant events, observations, and

measurements is obtained. The field log book will provide a legal record of the activities conducted at the site. Accordingly:

- Field books will be assigned a unique identification number.
- Field books will be bound with consecutively numbered pages.
- Field books will be controlled by the Field Team Leader while field work is in progress.
- Entries will be written with waterproof ink.
- Entries will be signed and dated at the conclusion of each day of fieldwork.
- Erroneous entries made while fieldwork is in progress will be corrected by the person that made the entries. Corrections will be made by drawing a single line through the error, entering the correct information, and initialing the correction.
- Corrections made after departing the field will be made by the person who made the original entries. Corrections will be made by drawing a single line through the error, entering the correct information, and initialing and dating the time of the correction.

At a minimum, daily field book entries will include the following information:

- Location of field activity
- Date and time of entry
- Names and titles of field team members
- Names and titles of any site visitors and site contacts
- Weather information, for example, temperature, cloud coverage, wind speed and direction
- Purpose of field activity
- A description of the field work conducted
- Sample media (soil, sediment, groundwater, etc.)
- Sample collection method
- Number and volume of sample(s) collected

- Description of sampling point(s)
- Volume of groundwater removed before sampling
- Analytical parameters
- Date and time of collection
- Sample identification number(s)
- Field observations
- Any field measurements made, such as pH, temperature, conductivity, water level, etc.
- References for maps and photographs of the sampling site(s)

3.0 FIELD EQUIPMENT DECONTAMINATION AND MANAGEMENT OF INVESTIGATION-DERIVED WASTES

3.1 Decontamination Area

If NYSDEC requires a site-specific decontamination area, then a temporary decontamination area lined with polyethylene sheeting will be constructed for steam cleaning the drilling equipment. The location of the decontamination area will be coordinated with NYSDEC representatives. Drilling equipment may be decontaminated using the sampling equipment methods described in Section 3.2.1. Water generated from the steam-cleaning activities will be managed as described in Section 3.3.

3.2 Equipment Decontamination

The following procedures will be used to decontaminate equipment used during the field activities:

- All drilling equipment including the drilling rig, augers, bits, rods, tools, split-spoon samplers and tremie pipe will be cleaned with a high-pressure steam-cleaning unit before beginning work.
- Tools, drill rods and augers will be placed on sawhorses or polyethylene plastic sheets following steam cleaning. Direct contact with the ground will be avoided.
- All augers, rods and tools will be decontaminated between each drilling location according to the above procedures.
- The back of the drill rig and tools, augers and rods will be decontaminated at the completion of the work and prior to leaving the site.

3.2.1 Sampling Equipment Decontamination

Suggested Materials

- Potable water

- Phosphate-free detergent (*such as* Simple Green) or nonresidual anionic detergent (such as Alconox)
- Distilled water
- Aluminum foil
- Plastic/polyethylene sheeting
- Plastic buckets and brushes
- Personal protective equipment in accordance with the HASP

Procedures

- Prior to sampling, all non-dedicated sampling equipment (bowls, spoons, interface probes, etc.) will be either steam cleaned or washed with potable water and a phosphate-free detergent (such as Simple Green) or non-residual anionic detergent (such as Alconox). Decontamination may take place at the sampling location in pails, buckets, etc.
- The sampling equipment will then be rinsed with potable water followed by a deionized water rinse.
- Between rinses, equipment will be placed on polyethylene sheets or aluminum foil, if necessary. At no time will washed equipment be placed directly on the ground.
- Equipment will be wrapped in polyethylene plastic or aluminum foil for storage, or transportation from the designated decontamination area to the sampling location.

3.3 Management of Investigation Derived Wastes

3.3.1 Decontamination Fluids

It is anticipated that decontamination fluids will be generated during steam cleaning activities, which will be collected in New York State Department of Transportation (NYSDOT) approved 55-gallon drums. The drums will be labeled as investigation-derived wastewater and temporarily stored in a secured chain-link fence area of the site on wooden pallets in a plastic-lined containment area pending characterization and proper disposal.

3.3.2 Drill Cuttings

It is presumed that all drill cuttings generated during soil boring and monitoring well installation activities are contaminated. Therefore, all drill cuttings will be managed in accordance with DER-10 as follows: contained in NYSDOT approved 55-gallon drums or stored on protective sheeting and covered with protective sheeting if cuttings are to remain on the ground at the end of the day, as stipulated in the site-specific work plan. The soil may also be returned to the borehole from which it was generated within 12 inches of the surface (24 inches if site is residential). If the soil is drummed it will be segregated by drill location as is practical. The drums will be labeled as investigation-derived waste soil from the corresponding boring or source area and temporarily stored in a secured area of the site on wooden pallets in a plastic-lined containment area pending characterization and proper disposal. Disposal of IDW will be in accordance with applicable federal, state and local regulations as specified in DER-10.

3.3.3 Development and Purge Water

It is anticipated that development and purge water will be generated during development and sampling of the monitoring wells. Development and purge water will be contained in NYSDOT approved 55-gallon drums. Groundwater from several monitoring wells may be combined provided they are associated with the same disposal site and aquifer. The drums will be labeled as investigation-derived wastewater from the corresponding well and temporarily stored in a secured area of the property on wooden pallets in a plastic-lined containment area pending characterization and proper disposal as defined in DER-10 and the approved site-specific work plan. NAPL will never be discharged to the environment.

3.3.4 Personal Protective Equipment

Personal protective equipment (PPE) will be placed in 55-gallon drums or roll-off containers and secured on-site for proper disposal.

3.3.5 Dedicated Sampling Equipment

In general, after use all dedicated soil sampling equipment (Macrocore sampler liners and catchers), groundwater sampling equipment (dedicated disposable bailers, rope and tubing) and soil disposable sampling equipment (i.e., bailers, tongue depressors, scoops, etc.) will be placed in 55-gallon drums or roll-off containers and secured on-site for disposal.

4.0 FIELD INVESTIGATION TECHNIQUES

The following is a description of the field activities and records review requirements that may be conducted during a site characterization (SC), remedial investigation (RI) or other specific work assignment. The following techniques will provide information to evaluate on-site and off-site sampling conditions, further define the extent of contamination and aid in the performance of remedial design and construction, if required. All field investigation activities will be performed in accordance with NYSDEC Department of Environmental Remediation (DER-10) and NYSDEC Spill Guidance Manual (SGM). Site-specific sampling locations and site-specific sampling methods will be provided in the Site-Specific Work Plan.

4.1 Analytical Requirements for Soil, Sediment, Surface Water, Groundwater, Soil Vapor and Ambient Air Samples

Soil, sediment, or surface water samples collected during field activities will be properly labeled and shipped under Chain of Custody documentation to the laboratory for analysis. Unless noted otherwise, samples will be analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) approved laboratory by an analytical method utilizing the most current NYSDEC Analytical Services Protocol (ASP) for the following Department of Environmental Remediation (DER-10), NYSDEC Spill Guidance Manual (SGM) and New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York required analytical parameters:

- The full target compound list (TCL) for volatile organic compounds (VOCs) plus the 10 highest concentration tentatively identified compounds (TICs);
- TCL SVOCs plus the 20 highest concentration TICs;
- TCL Pesticides and Herbicides;
- TCL polychlorinated biphenyls (PCBs);
- Target Analyte List (TAL) metals/inorganic compounds;

- For investigations of known petroleum releases, utilize the suite of contaminants in the fuel oil and gasoline tables (i.e., Tables 2 and 3) of the NYSDEC Commissioner Policy CP-51 on Soil Cleanup Guidance; and
- For investigations of non-petroleum releases, sample analysis will use methods appropriate for the stored or discharged material.

Site-specific analytical methods, if different from this Generic Field Activities Plan, will be provided in the Site-Specific Work Plan, together with the rationale for selection. See the Quality Assurance Project Plan (QAPP) for more detailed analytical procedures.

4.2 Records Review Search

In accordance with DER-10, a records review and records search report may be completed if the following criteria are met at the site:

- If no areas of concern (AOCs) are identified which require an SC or RI, then a records review and records search report will be conducted to meet the minimum requirements of Section 3.12 of DER-10;
- If AOCs are identified which require further characterization or RI, a separate records search report need not be prepared. Instead, information obtained in a records search of these AOCs will be incorporated into the SC or RI report.

4.3 Building Interiors

A building interior investigation to assess the potential impacts to inside, beneath, and outside building structures may be completed if the following criteria are observed at the site:

- Contaminants of concern (COCs) observed inside the building that have the potential to migrate to and impact the environment inside, beneath, and outside the building;
- COCs or contaminated media observed outside the building that have the potential to migrate inside the building;

- Suspect asbestos-containing material (ACM), suspect lead-based paint (LBP), and/or suspect lead-based coatings (LBC) are observed in the building, and if damaged or disturbed, have the potential to impact the environment inside, beneath, and outside the building; and
- PCB-containing building materials (i.e. window caulking and light ballasts), with concentrations greater than 10,000 parts per million (ppm), are observed in the building, and if damaged or disturbed, have the potential to impact the environment inside, beneath, and outside the building.

4.3.1 Physical Structures and Features Inside Buildings

The building interiors investigation of potential contaminants within buildings may consist of aboveground storage tanks (ASTs), underground storage tanks (USTs), and any above or below ground physical structure or feature within the building that can convey solid or liquid COCs to the environment outside or under the building. These physical structures or features include, but are not limited to, piping, plumbing, floor drains, vents, trenches, gutters, leaders, troughs, sumps, cracks/fissures in floors, walls, or ceilings, and heating, ventilation, and air conditioning (HVAC) ductwork, that create potential migration pathways inside the building.

An approach to developing an investigatory strategy will consist of the identification and location of AOCs for each type of physical structure or feature within the building. Investigatory strategies for ASTs and USTs will follow the procedures outlined in Section 4.10.1. In the event surface water or sediment is present within AOCs identified within the building, surface water and sediment samples will be collected to determine if waste disposal and on-site contamination has impacted the environment inside, beneath, and outside the building or nearby surface water bodies. Surface water and sediment sampling will follow the field investigation techniques outlined in Section 4.11 and samples will be analyzed for DER-required analytical parameters as defined in Section 4.1. If building structures or features convey COCs to outside the building, then surface and subsurface soil samples will be collected at the discharge point to soil. Surface and subsurface soil sampling will follow the field investigation techniques outlined in Section 4.8 and 4.16.2 and analyzed for DER-required analytical parameters as defined in Section 4.1.

In the event stained surfaces (i.e., concrete or other porous flooring or building materials) are observed within the building, samples of the impacted material will be collected to characterize the nature and extent of contamination inside, beneath, and outside the building.

4.3.2 Suspect Asbestos-Containing Material

An asbestos survey to determine the presence, extents and condition of ACM present within buildings may be completed. The asbestos survey will be conducted by a New York State Department of Labor (NYSDOL) licensed Asbestos Inspector (Inspector) in a manner consistent with accepted principles and practices established and prescribed by the United States Environmental Protection Agency (USEPA) and NYSDOL Industrial Code Rule 56 (ICR-56). Asbestos bulk sampling protocols will be performed using appropriate personal protective equipment and in accordance with ICR-56 protocols for multi-layered building systems and materials utilizing the sampling guidelines described in the Generic Quality Assurance Project Plan (QAPP). Site-specific sampling methods, if different from this Generic Field Activities Plan, will be provided in the Site-Specific Work Plan, together with the rationale for selection.

4.3.3 Suspect Lead-Based Paint and Associated Lead-Based Coatings

A lead survey to determine the presence, extents and condition of lead-based paint (LBP) and lead-based coatings (LBC) within buildings may be completed. The lead survey will be conducted by a United States Environmental Protection Agency (USEPA) certified lead risk assessor (Assessor). The lead survey will be performed utilizing the applicable provisions of the USEPA and United States Department of Housing and Urban Development (HUD) standards.

The lead survey will be conducted by either the physical collection of paint chip samples for laboratory analysis or field analysis utilizing an x-ray fluorescence (XRF) analyzer. Paint chip sampling is slightly destructive to building materials, while the XRF sampling activities are non-destructive to building materials. Whether paint chip or XRF sampling methodologies are employed, the Assessor will collect samples or a representative group of selected paints on various substrates throughout the building. During the lead survey, accessible portions of the

building will be visually assessed to identify coated building components. The coated components will be grouped by the same color, texture, and substrate material. The Assessor will be selective in the screening process of various coated building components such as wood, metal, concrete, plaster, and gypsum wall board, amongst others, to provide a representative profile of potential LBP and LBC substrates. In addition, since LBP and LBC were used up to the time lead was banned in 1978, older painted surfaces and coatings and multi-layered painted surfaces will be targeted for screening over individual layers of newer paint.

Detailed sampling procedures are described in the Generic Quality Assurance Project Plan (QAPP). Site-specific sampling methods, if different from this Generic Field Activities Plan, will be provided in the Site-Specific Work Plan, together with the rationale for selection.

4.4 Soil Vapor Sampling

4.4.1 Equipment and Supplies

- Slide hammer or Geoprobe®
- Stainless steel drive points (expendable)
- Teflon® tubing or Teflon® - lined tubing
- Tubing plug, cap or ball valve
- Glass beads or clean silica sand
- Bentonite chips or bentonite powder
- Sampling forms (**Appendix A**)
- Helium gas
- Helium gas detector
- Photoionization detector (units: parts per billion (ppb))
- Helium chamber/enclosure

- Vacuum pump
- Summa® Canister with pressure gauge and flow regulator

Temporary soil vapor probes will be installed using the procedure outlined below and will be recorded on the vapor intrusion forms found in **Appendix A**.

4.4.2 Soil Vapor Probe Installation

- Install soil vapor probes using a direct-push drill rig (e.g., GeoProbe® or similar) or manually using a slide hammer. Probes will consist of expendable, stainless-steel drive points with stainless steel screens attached to food-grade (inert) Teflon® tubing through which the soil vapor sample will be drawn.
- Attach the drive points to a drive rod (stainless-steel tube) and drive the rod to the target depth and/or 6 inches more, as determined in consultation with the NYSDEC and the New York State Department of Health (NYSDOH).
- Lower the stainless steel screen implant/sampling tubing in through the center of the drive rods such that there is approximately 1 to 2 feet of sample tubing in excess at the surface (to connect to sample media) and thread the screen to the expendable drive point at the base of the drive rods.
- Pull up the drive rods by 6 inches increments and fill the annular space with glass beads or clean silica. The filter pack material should extend 1 to 2 feet above the top of the stainless steel screen. The depth of the filter pack material should always be adequate to prevent the bentonite above from going over the drive point and sample inlet screen.
- Place bentonite in the annulus above the filter pack material to provide a seal in the borehole. Ideally, place the bentonite annular seal at least 3 feet thick (hydrate intermittently during placement of the seal), although adjustments to this thickness may be required based on site-specific conditions. The entire borehole must be filled to the ground surface with either entirely bentonite or with natural fill between two bentonite seals (one above the filter pack material and one at the ground surface).
- For permanent installations, install flush mounted protective covers to protect the probe and the tubing.
- Cut the end of the tubing to allow proper closure of the flush-mounted protective cover, but with a sufficient length of tubing exposed at the surface to facilitate connection of sampling equipment.

- Cap the sample tubing following installation and following collection of each sample.

4.4.3 Collection of Soil Vapor Samples

Prior to sample setup and collection, field personnel should do the follow:

- Record weather information (i.e., temperature, barometric pressure, rainfall, wind speed, and wind direction) at the beginning of the sampling event.
- Record substantial changes to these conditions that may have occurred over the past 24 to 48 hours and that do occur during the course of sampling. The information may be measured with on-site equipment or obtained from a reliable source of local measurements (e.g., a local airport).
- Sampling personnel must avoid activities immediately before and during the sampling that may contaminate the sample (e.g., using markers, adhesive tapes, fueling vehicles, etc.).
- Identify sampling locations on a plot plan that also identifies buildings, other landmarks, and potential sources of VOC contamination to both the surface and outdoor air. Record the depth of the probe screen below grade.
- If necessary, connect additional Teflon® tubing to the tubing extending from the soil vapor probe to allow for connection to sample collection equipment.
- Calculate the volume of air in the probe, tubing (volume = πr^2h), including any additional tubing added in the step above and the annular space between the probe and the native material if sand or glass beads were used.
- Connect a vacuum pump or gas-tight syringe (~60 cubic centimeters [cc]) to the sample tubing. At a flow rate of no more than 0.2 liter per minute (l/min), purge air from the tubing until one to three of the above-calculated air volumes are removed. Screen the purge air with a calibrated PID capable of detecting down to a ppb concentration.
- During purging, evaluate the potential for ambient air to be introduced in the soil vapor sample through the annulus of the soil vapor probe or tubing connections using a tracer gas such as helium. The procedures for the tracer gas evaluation are described below (Section 4.4.4). Note that the bentonite used in the probe installation should have sufficient time to seal before the samples are collected (typically a minimum of 24 hours). The tracer gas evaluation will verify if the seal is sufficient.

- Use an evacuated Summa® passivated (or equivalent) stainless-steel canister to collect the soil vapor sample. The canister will be provided by the laboratory, along with a flow controller equipped with an in-line particulate filter and a vacuum gauge. The flow controller will be pre-calibrated by the laboratory for the desired flow rate or duration of sample collection. The sampling flow rate should always be less than 0.2 l/min. The canisters will be “batch certified clean” by the laboratory.
- Remove the protective brass plug from the canister. Connect the pre-calibrated flow controller to the canister.
- Record the identification numbers for the canister and flow controller. Record the initial canister pressure on the vacuum gauge (check equipment-specific instructions for taking this measurement). A canister with a significantly different pressure than originally recorded by the testing laboratory should not be used for sampling. Record these numbers and values on the Chain of Custody form for each sample and on the field sampling form (Appendix A).
- Connect the tubing from the soil vapor probe to the flow controller.
- Completely open the valve on the canister. Record the time that the valve was opened (beginning of sampling) and the canister pressure on the vacuum gauge.
- Photograph the canister (with the sample ID visible, note: any sample ID tags should be generated prior to sample date and used only for photo) and the area surrounding the canister.
- Monitor the vacuum pressure in the canister routinely during sampling.
- Stop sample collection when the canister still has a minimum amount of vacuum remaining. Check with the laboratory supplying the canister and flow controller for the ideal final vacuum pressure. Typically, the minimum vacuum is between 2 and 5 inches of mercury (in. Hg), but not zero. If there is no vacuum remaining, the sample may be rejected and have to be collected again in a new canister.
- Complete the Soil Vapor (Canister) Sample Collection Field Form. An example of the Soil Vapor (Canister) Sample Collection Field Form is provided in Appendix A.
- Remove the flow controller from the canister and replace the protective brass plug.
- Attach labels/tags (sample name, time/date of sampling, etc.) to the canister as directed by the laboratory.
- Air samples will be analyzed by an ELAP-certified laboratory. The detection limit for soil vapor analytical results will be 1 ug/m³ for all compounds.
- Place the canister and other laboratory-supplied equipment in the packaging provided by the laboratory.

- Enter the information required for each sample on the Chain of Custody form, making sure to include the identification numbers for the canister and flow controller, and the initial and final canister pressures on the vacuum gauge.
- Include the required copies of the Chain of Custody form in the shipping packaging, as directed by the laboratory. The field crew will retain a copy of the Chain of Custody for the project file.
- Deliver or ship the samples to the laboratory within one business day of sample collection and via overnight delivery (when shipping).

Provided that no additional sampling is expected to be conducted, either pull out (if practical) or abandon in place the sampling probe. When abandoning, cut the tubing back as far down as practical and cover to surface with native soil.

4.4.4 Tracer Gas Evaluation

The tracer gas evaluation provides a means to evaluate the integrity of the soil vapor probe seal and assess the potential for introduction of ambient air into the soil vapor sample. A tracer gas evaluation should be conducted on all soil vapor and sub-slab soil vapor samples. After the initial round of sampling and with the approval of the regulating agency, the use of tracer gas may be reduced to a minimum of 10 percent for permanent and semi-permanent probes if the initial round results showed installations with competent seals.

The following tracer gas evaluation procedure uses in-field tracer gas measurements and tracer gases (e.g., helium) that can be measured by portable detectors.

- Retain the tracer gas around the sample probe by filling an air-tight chamber (such as a plastic bucket) positioned over the sample location.
- Make sure the chamber is suitably sealed to the ground surface.
- Introduce the tracer gas (typically helium) into the chamber. The chamber will have tubing at the top of the chamber to introduce the tracer gas into the chamber and a valved fitting at the bottom to let the ambient air out while introducing tracer gas. A tracer gas detector will be attached to the valve fitting at the bottom of the chamber to verify the presence of the tracer gas. Close the valve after the chamber has been enriched with tracer gas at concentrations >50%.

- The chamber will have a gas-tight fitting or sealable penetration to allow the soil vapor sample probe tubing to pass through and exit the chamber.
- After the chamber has been filled with tracer gas, attach the sample probe tubing to a pump that will be pre-calibrated to extract soil vapor at a rate of no more than 0.2 l/min. Purge the tubing using the pump. Calculate the volume of air in the tubing and probe and purge one to three tubing/probe volumes prior measuring the tracer gas concentration.
- Use the tracer gas detector to measure the tracer gas concentration in the pump exhaust.
- Record the tracer gas concentrations in the chamber and in the soil vapor sample.

If the evaluation indicates a high concentration of tracer gas in the sample (>10% of the concentration of the tracer gas in the chamber), then the surface seal is not sufficient and requires improvement via repair or replacement prior to commencement of the sample collection. A non-detectable level of tracer gas is preferred; however, if the evaluation indicates a low potential for introduction of ambient air into the sample (<10% of the concentration of the tracer gas in the chamber), then proceed with the soil vapor sampling. While lower concentrations of tracer gas are acceptable, the impact of the detectable leak on sample results should be evaluated in the sampling report.

4.5 Sub-Slab and Indoor Air Sampling

Three types of air samples will be collected for laboratory analysis during the vapor intrusion investigation: (1) indoor air; (2) sub-slab air sample; and (3) background ambient air sample. Procedures for obtaining these air samples are described in this section. Prior to the vapor intrusion sampling, complete the Indoor Air Quality Questionnaire and Building Inventory. An example of the Indoor Air Quality Questionnaire and Building Inventory is provided in **Appendix A**.

4.5.1 Equipment and Supplies

- Hand drill with concrete bit

- Teflon® tubing
- Beeswax or Permagem®
- Vacuum pump or syringe
- Sampling form
- Building inventory form
- Camera
- Caulk (if needed to seal hole following sample collection)

4.5.2 Sub-slab Samples

4.5.2.1 - Sub-Slab Vapor Probe Installation

Temporary sampling probes will be installed using the following procedures:

- If appropriate, record weather information (i.e., temperature and wind direction) at the beginning of the sampling event. Record substantial changes to these conditions that may occur during the course of sampling. The information may be measured with on-site equipment or obtained from a reliable source of local measurements (e.g., a local airport).
- Insert a section of food-grade Teflon® or other appropriate tubing through a 3/8-inch (approx.) hole drilled through the slab. If necessary, advance the drill bit 2 to 3 inches into the sub-slab material to create an open cavity.
- Install the tubing inlet to the specified sampling depth below the slab, no further than 2 inches into the sub-slab material.
- Seal the annular space between the hole and tubing using 100% beeswax or another inert, non-shrinking sealing compound such as Permagem®.

4.5.2.2 - Sub-Slab Vapor Sample Collection

Sub-slab vapor samples will be collected by following the steps outlined below.

- Purge the tubing using a vacuum pump or gas-tight syringe (~60 cc). Calculate the volume of air (volume = πr^2h) in the tubing and purge one to three tubing volumes prior to sample collection at a rate no greater than 0.2 l/min. Screen the purge air with a calibrated PID capable of detecting down to a ppb concentration.
- During purging, evaluate the potential for ambient air to be introduced in the soil vapor sample through the annulus of the soil vapor probe or tubing connections using a tracer gas such as helium. The procedures for the tracer gas evaluation are described in Section 4.4.4. The tracer gas evaluation will verify if the seal is sufficient.
- Use an evacuated Summa® passivated (or equivalent) canister to collect the sub-slab vapor sample. The canister will be provided by the laboratory, along with a flow controller equipped with an in-line particulate filter and a vacuum gauge. The flow controller will be pre-calibrated by the laboratory for the desired flow rate or duration of sample collection. The canisters will be batch certified as clean by the laboratory.
- Record the identification numbers for the canister and flow controller. Remove the protective brass plug from canister. Record the initial canister pressure using the laboratory supplied vacuum gauge (check equipment-specific instructions for taking this measurement). A canister with a significantly different pressure than originally recorded by the testing laboratory should not be used for sampling. Record these numbers and values on the Chain of Custody form and field sampling form (**Appendix A**) for each sample.
- Close the valve, remove the vacuum gauge and connect the pre-calibrated flow controller to the canister.
 - Connect the tubing from the sub-slab vapor sampling probe to the flow controller.
 - Open the valve on the canister. Record the date and time that the valve is opened (beginning of sampling) and the canister pressure on the vacuum gauge provided with the canister by the laboratory.
 - Photograph the canister and the area surrounding the canister.
- Close the valve on the vacuum pressure in the canister after the scheduled duration of sample collection. Record the date and time that the valve was closed (completion of sampling).
- Remove the flow controller from the canister. Record the final canister pressure using the laboratory supplied vacuum gauge (check equipment-specific instructions for taking this measurement).
- Complete the Sub-slab Vapor (Canister) Sample Collection Field Form. An example of the Sub-slab Vapor (Canister) Sample Collection Field Form is provided in **Appendix A**.

Note: Make sure that the canister still has a minimum amount of vacuum remaining. Check with the laboratory supplying the canister and flow controller for the ideal final vacuum pressure. Typically, the minimum vacuum is between 2 and 5 inches of mercury, but not zero. If there is no vacuum remaining, the sample will be rejected and collected again in a new canister.

- After closing the valve, remove the vacuum gauge from the canister and replace the protective brass plug.
- Seal (with hydraulic cement) all holes made through the slab and remove debris, materials and or waste that may be produced during the sampling activities.
- Attach labels/tags (sample name, time/date of sampling, etc.) to the canister as directed by the laboratory.
- Air samples will be analyzed by an ELAP-certified laboratory. The detection limit for soil vapor analytical results will be 1 ug/m³ for all compounds.
- Place the canister and other laboratory-supplied equipment in the packaging provided by the laboratory.
- Enter the information required for each sample on the Chain of Custody form, making sure to include the identification numbers for the canister and flow controller, and the initial and final canister pressures on the vacuum gauge.
- Include the required copies of the Chain of Custody form in the shipping packaging, as directed by the laboratory. The field crew will retain a copy of the Chain of Custody for the project file.
- Deliver or ship the samples to the laboratory as soon as practical.

4.5.3 Indoor Air Samples

Prior to initiating the indoor air survey a detailed chemical survey should be completed within the structure where the samples will be collected. Potential sources of VOCs should be identified and photographed as appropriate. Labels of indoor products should be reviewed for VOC contents; any findings must be recorded on the NYSDOH Indoor Air Quality (IAQ) Questionnaire and Building Inventory Field Form (Appendix A). If potential indoor air sources are present, the sources should be removed and stored in an alternative location away from the sample collection area. As part of the indoor air sampling it should be established whether the building has a positive or negative pressure with respect to outdoors.

Indoor air samples will be collected following the steps outlined below:

- Record outdoor weather information (i.e., temperature and wind direction) and indoor temperature at the beginning of the sampling event. Record substantial changes to these conditions that may occur during the course of sampling. The information may be measured with on-site equipment or obtained from a reliable source of local measurements (e.g., a local airport).
- Use an evacuated Summa® passivated (or equivalent) stainless-steel canister to collect the indoor air sample. The canister will be provided by the laboratory, along with a flow controller equipped with an in-line particulate filter and a vacuum gauge. The flow controller will be pre-calibrated by the laboratory for the desired flow rate or duration of sample collection. The canisters will be individually certified as clean by the laboratory.
- Place the canister at the sampling location. Sample location will be collocated with sub-slab soil vapor samples and in consultation with the NYSDEC and NYSDOH. If the sample should be collected from breathing height (e.g., 3 to 5 feet above ground), then mount the canister on a stable platform such that the sample inlet will be at the proper height.
- Record the identification numbers for the canister and flow controller. Remove the protective brass plug from canister. Record the initial canister pressure using the laboratory supplied vacuum gauge (check equipment-specific instructions for taking this measurement). A canister with a significantly different pressure than originally recorded by the testing laboratory should not be used for sampling. Record these numbers and values on the Chain of Custody form for each sample.
- Close the valve, remove the vacuum gauge and connect the pre-calibrated flow controller to the canister.
- Open the valve on the vacuum pressure in the canister. Record the date and time that the valve was opened (beginning of sampling) and the canister pressure on the vacuum gauge provided with the canister by the laboratory.
- Photograph the canister and the area surrounding the canister.
- Close the valve on the vacuum pressure in the canister after the scheduled duration of sample collection. Record the date and time that the valve was closed (completion of sampling).
- Remove the flow controller from the canister. Record the final canister pressure using the laboratory supplied vacuum gauge (check equipment-specific instructions for taking this measurement).

- Complete the Indoor Air (Canister) Sample Collection Field Form. An example of the Indoor Air (Canister) Sample Collection Field Form is provided in **Appendix A**.

Note: Make sure that the canister still has a minimum amount of vacuum remaining. Check with the laboratory supplying the canister and flow controller for the ideal final vacuum pressure. Typically, the minimum vacuum is between 2 and 5 inches of mercury, but not zero. If there is no vacuum remaining, the sample will be rejected and collected again in a new canister.

- After closing the valve, remove the vacuum gauge from the canister and replace the protective brass plug.
- Attach labels/tags (sample name, time/date of sampling, etc.) to the canister as directed by the laboratory.
- Place the canister and other laboratory-supplied equipment in the packaging provided by the laboratory.
- Air samples will be analyzed by an ELAP-certified laboratory. Detection limits for TCE, vinyl chloride and carbon tetrachloride analytical results will be 0.25 ug/m³ for indoor air. All other compounds should achieve a 1 ug/m³ detection limit for indoor air analytical results.
- Enter the information required for each sample on the Chain of Custody form, making sure to include the identification numbers for the canister and flow controller, and the initial and final canister pressures on the vacuum gauge.
- Include the required copies of the Chain of Custody form in the shipping packaging, as directed by the laboratory. The field crew will retain a copy of the Chain of Custody for the project file.
- Deliver or ship the samples to the laboratory as soon as practical.

4.6 Ambient Air Samples

The following procedures will be followed for the collection of ambient air samples:

- Select a location upwind of the building or other area that is being evaluated.
- Record weather information (i.e., temperature and wind direction) at the beginning of the sampling event. Record substantial changes to these conditions that may occur during the course of sampling. The information may be measured with on-site equipment or obtained from a reliable source of local measurements (e.g., a local airport).

- Use an evacuated Summa® passivated (or equivalent) stainless-steel canister to collect the ambient air sample. The canister will be provided by the laboratory, along with a flow controller equipped with an in-line particulate filter and a vacuum gauge. The flow controller will be pre-calibrated by the laboratory for the desired flow rate or duration of sample collection. The canisters will be individually certified as clean by the laboratory.
- Place the canister at the sampling location. If the sample should be collected from breathing height (e.g., 3 to 5 feet above ground), then mount the canister on a stable platform such that the sample inlet will be at the proper height.
- Record the identification numbers for the canister and flow controller. Remove the protective brass plug from canister. Record the initial canister pressure using the laboratory supplied vacuum gauge (check equipment-specific instructions for taking this measurement). A canister with a significantly different pressure than originally recorded by the testing laboratory should not be used for sampling. Record these numbers and values on the Chain of Custody form for each sample.
- Close the valve, remove the vacuum gauge and connect the pre-calibrated flow controller to the canister.
- Open the valve on the vacuum pressure in the canister. Record the date and time that the valve was opened (beginning of sampling) and the canister pressure on the vacuum gauge provided with the canister by the laboratory.
- Photograph the canister and the area surrounding the canister.
- Close the valve on the vacuum pressure in the canister after the scheduled duration of sample collection. Record the date and time that the valve was closed (completion of sampling).
- Remove the flow controller from the canister. Record the final canister pressure using the laboratory supplied vacuum gauge (check equipment-specific instructions for taking this measurement).
- Complete the Ambient Air (Canister) Sample Collection Field Form. An example of the Ambient Air (Canister) Sample Collection Field Form is provided in **Appendix A**.

Note: Make sure that the canister still has a minimum amount of vacuum remaining. Check with the laboratory supplying the canister and flow controller for the ideal final vacuum pressure. Typically, the minimum vacuum is between 2 and 5 inches of mercury, but not zero. If there is no vacuum remaining, the sample will be rejected and collected again in a new canister.

- After closing the valve, remove the vacuum gauge from the canister and replace the protective brass plug.

- Attach labels/tags (sample name, time/date of sampling, etc.) to the canister as directed by the laboratory.
- Air samples will be analyzed by an ELAP-certified laboratory. Detection limits for TCE, vinyl chloride and carbon tetrachloride analytical results will be 0.25 ug/m³ for ambient air. All other compounds should achieve a 1 ug/m³ detection limit for ambient air analytical results.
- Place the canister and other laboratory-supplied equipment in the packaging provided by the laboratory.
- Enter the information required for each sample on the Chain of Custody form, making sure to include the identification numbers for the canister and flow controller, and the initial and final canister pressures on the vacuum gauge.
- Include the required copies of the Chain of Custody form in the shipping packaging, as directed by the laboratory. The field crew will retain a copy of the Chain of Custody for the project file.
- Deliver or ship the samples to the laboratory as soon as practical.

4.7 Community Air Monitoring Plan

If required by a work assignment (i.e., during intrusive activities) a community air monitoring plan (CAMP) will be implemented in accordance with the NYSDOH's Generic Community Monitoring Plan in DER-10.

4.8 Surface Soil Sampling

Surface soil samples will be collected on-site at locations of known or suspected spill or disposal areas and areas of visually stained soil or stressed vegetation to determine the nature and extent of surficial soil contamination on-site. The number of samples collected will be based upon the size of the area being investigated and surface observation.

The number and location of surface soil samples to be collected will be provided in the Site-Specific Work Plan. Surface soil samples will be collected using either a disposable polyethylene scoop, sterile wooden tongue depressor or decontaminated stainless steel

equipment (i.e., spoons, trowels, or hand augers). Soil samples collected at each location will be segregated into a sample container for laboratory analysis and a separate soil screening jar or sealed container, which will be used for VOC headspace screening using a photo-ionization detector (PID) and visual classification. Samples of obvious discoloration, stains, odors, or potential release locations will be preferentially collected for laboratory analysis. Surface soil samples will be analyzed for DER-required analytical parameters as defined in Section 4.1. Samples will be collected at a depth of 0 to 2 inches below the vegetative cover. If the area is paved, samples will be collected 0 to 2 inches below the pavement. If VOCs are the only COC, then the surface soil sample will be collected at a depth of 0 to 6 inches below the vegetative cover. If assessing the impact of soil contamination on ecological resources, then the surface soil sample will be collected from a depth of 0 to 6 inches below the vegetative cover and from a deeper soil interval at 1 to 2 feet below ground surface. Detailed sampling procedures are described in the Generic QAPP. Site-specific sampling methods, if different from this Generic Field Activities Plan, will be provided in the Site-Specific Work Plan, together with the rationale for selection.

4.9 Soil Background Evaluation and Sampling

The SC and RI will establish on-site surface soil background conditions through a comparative evaluation of analytical results of COCs from on-site locations to background analytical results from upgradient and upwind locations that are unaffected by current or historical site operations, as documented by the records search. Background surface soil samples will be collected from a minimum of five background sample locations from unaffected and off-site locations in accordance with surface soil sampling procedures outlined in Section 4.6. Background soil samples will not be collected from the following locations:

- Potentially or known contaminated areas;
- Parking lots, roads or roadside shoulders;
- On or in the vicinity of active or former railroad tracks;
- Areas of suspect of known HFM;

- Storm drains or ditches receiving runoff not impacted by the site or adjacent contaminated sites; or
- Depositional areas outside the influence of known contaminant sources.

Analytical results of individual background samples will be evaluated in consultation with DER and NYSDOH to determine a background level for the site and will not be averaged from multiple sample analyses. If concentrations of COCs at any sampling location on the site exceed the background level developed from the background samples, an RI will be conducted to delineate the nature and extent of contamination on the site based on the background level, rather than Part 375-6 Unrestricted Use Soil SCGs. If site-specific remediation levels based on background concentrations are used, then a more extensive sampling program, in consultation with DER, will be required to facilitate a statistical analysis of background concentrations of COCs compared to on-site concentrations of COCs.

4.10 Tanks, Storage Facilities, Water Treatment, Drainage Structures and Waste Systems

Area specific requirements for tanks, storage facilities, water treatment, drainage structures, and other waste systems will follow provisions included in NYSDEC DER-10. The subsections below present area specific requirements for each type of structure or system.

4.10.1 Storage Tanks and Appurtenances

If present, an investigation of active and inactive bulk storage tanks and appurtenances, such as piping, dispensers, and fill ports will include the following structures and systems:

- ASTs over unpaved soil or broken pavement in contact with soil;
- ASTs over unbroken paved surfaces;
- USTs and distribution systems;
- Above-grade piping;

- Below-grade piping; and
- Loading and unloading areas.

ASTs Over Unpaved Soil or Broken Pavement in Contact with Soil

When the bottom of an AST is currently or suspected to be previously in close or direct contact with the soil, soil samples will be collected from the following AOCs and will meet the following criteria:

- A minimum of two surface soil samples will be collected from the following AOCs and in accordance with Section 4.6, unless the AST was installed and maintained in compliance with 6 NYCRR Parts 614 or 599:
 - Areas of known or suspected contamination based on soil discoloration/odors;
 - Areas of historical paving repairs or replacement;
 - Areas of soil beneath valves or low areas where spills or leaks from valves may accumulate; and
 - Additional soil samples will be taken around large ASTs to satisfy the DER-10 ruling of one sample per 100 linear feet of tank perimeter. The soil samples will be collected from a depth of at least 6 inches bgs if VOCs were stored.
- A minimum of one soil boring will be installed adjacent to or within 2 feet of the AST located furthest hydraulically downgradient to a completion depth of 4 feet below the current water table, or deeper where appropriate. The soil boring will employ continuous two-foot split spoon sampling methodologies or another DER-approved comparable sampling technique. Results of soil headspace VOC screening and visual inspection of the split spoon soil samples will be the primary criteria for selecting the subsurface soil samples as outlined in Section 4.16.2 and will be submitted for laboratory analysis of DER-required analytical parameters as indicated in Section 4.1;
- If no evidence of soil contamination exists in the vicinity of the AST, a groundwater sample will be collected from the current water table within 5 feet of the AST on the predicted hydraulically downgradient side.

ASTs Over Unbroken Paved Surfaces

When the shell or bottom of an AST is installed over unbroken paved surfaces, soil samples will be collected from the following AOCs and will meet the following criteria:

- Areas of stained soil will be investigated and soil samples will be submitted for laboratory analysis of DER-required analytical parameters as indicated in Section 4.1, if the following conditions are met or suspected:
 - If stained soil is observed adjacent to the paving or pad;
 - If the potential contaminant would not cause discoloration of soil (e.g., PCBs); and
 - If a record review indicates that a historical release(s) or other evidence that a discharge has occurred.
- Paved containment areas will be sampled at the drainage discharge point, if present;
- Soil beneath pavement will be sampled when the pavement has deteriorated and promotes COC contact with the soil, or if it is suspected that pavement was not present over the life of the existing or former AST; and
- If AST pads contain special considerations such as concrete slabs with berms or synthetic liners that make boring through the paving or pad impractical, then soil sampling will be conducted in accordance with Section 4.10.2 for Storage and Staging Areas.

USTs and Distribution Systems

USTs and distribution systems containing potential COCs will be evaluated to identify past and current releases. All USTs must be in compliance with applicable state, federal, and local regulations, upgraded as necessary or closed in accordance with NYSDEC DER-10 Section 5.5. When USTs are active and not being closed, soil samples will be collected from the following AOCs for laboratory analysis of DER-required analytical parameters as indicated in Section 4.1 and will meet the following criteria:

- Soil immediately adjacent to each UST or group of USTs will be investigated and soil samples will be collected within 2 feet of the tank with one sample collected near each end, and additional soil samples collected along the length of the entire tank. These soil samples will be collected and submitted for laboratory analysis in accordance with Section 4.1 of this Generic Field Activities Plan, all provisions and exceptions of Section 3.9 of NYSDEC DER-10, and the following sampling frequency based on tank capacity and/or length indicated below:
 - For USTs having a capacity range of 56-2,000 gallons or up to 10 feet in length, a minimum of four soil samples will be collected from around the perimeter of the tank;
 - For USTs having a capacity range of 2,001-10,000 gallons or up to 30 feet in length, a minimum of six soil samples will be collected from around the perimeter of the tank;
 - For USTs having a capacity range of 10,001-25,000 gallons or up to 40 feet in length, a minimum of eight soil samples will be collected from around the perimeter of the tank; and
 - For USTs having a capacity of greater than 25,000 gallons or greater than 40 feet in length, a minimum of 10 soil samples will be collected from around the perimeter of the tank.
- Soil immediately beneath each UST or group of USTs will be investigated and soil samples will be collected from 0-2 feet below the bottom of the UST, unless the UST is within the saturated zone as indicated below;
- Saturated soil beneath each UST or group of USTs will be investigated using the following procedure:
 - If the contents of the UST currently or previously contained liquids with a density less than water, then a soil sample will be collected from one foot above to one foot below the current water table. A groundwater sample will also be collected at this depth. Additionally, to verify the tank contents of out-of-service tanks, one sample will be collected of product or residue remaining in the tank and analyzed for fingerprinting methodologies or other NYSDEC-approved method; or
 - If the contents of the UST currently or previously contained liquids with a density greater than water, a soil sample will be collected from 0-2 feet below the bottom of the tank. A groundwater sample will also be collected at this depth. Additionally, to verify the tank contents of out-of-service tanks, one sample will be collected of product or residue remaining in the tank and analyzed for fingerprinting methodologies or other NYSDEC-approved method.
- If the UST is located on bedrock, then a bedrock monitoring well will be installed.

Above Grade Piping

Above grade piping will be evaluated only when there is evidence of past or present discharges (i.e., discolored or stained soil or surfaces). Soil sampling will be conducted in accordance with Section 4.10.5 for Discharge and Waste Disposal Systems.

Below Grade Piping

Below grade piping will be evaluated to identify past and current releases. Soil samples will be collected 0-6 inches below existing piping and within 2 feet of the piping and will be submitted for laboratory analysis of DER-required analytical parameters as indicated in Section 4.1. Soil sample locations will be biased to include joints, dispensers, and other potential discharge areas (i.e., elbows; repairs; etc.). The number of soil samples to be collected will be based on the length of piping as follows:

- When total piping length is 1-15 feet, a minimum of one soil sample will be collected;
- An additional soil sample will be collected for each additional 20 linear feet of piping from 16 to 50 feet of piping length; and
- When total piping length exceeds 50 feet, soil sampling frequency may be reduced subject to DER's approval and proper justification.

Loading and Unloading Areas

Loading and unloading areas will be evaluated to identify past and current releases. One soil sample per fill connection or valve discharge point will be collected over exposed soil associated with tanks. In the event that the loading and unloading area is located over an impervious cover, soil sampling will be conducted in accordance with Section 4.10.2 for Pads Associated with Storage and Staging Areas.

4.10.2 Storage and Staging Areas

Types of storage and staging areas that will be evaluated to identify past and current releases will include, but are not limited to, the following temporary or permanent areas:

- Dumpster staging areas;
- Transformer and associated electrical equipment staging areas;
- Exposed soil areas adjacent to tank loading and unloading areas on pads;
- Exposed soil areas adjacent to aboveground vessels on pads;
- Heat exchanger areas and other outdoor equipment; and
- Drum storage pads.

One soil sample will be collected per side of pads adjacent to exposed soil for sides up to 30 feet long. If pad sides exceed 30 feet long, an additional soil sample will be collected for each additional 30 feet of length. The soil samples will be collected immediately adjacent to the pad and biased toward a suspected location of greatest potential contamination (i.e., joints). If bermed pads or pads surrounded by impermeable cover are observed, then soil samples will be collected in accordance with Section 4.10.4 for Drainage Systems. Soil samples collected will be submitted for laboratory analysis of DER-required analytical parameters as indicated in Section 4.1. Soil samples will be collected beneath a pad when the following criteria are met:

- Evidence of pad deterioration exists that may allow migration of COCs through cracks to the soil;
- The pad or its surface has been modified or repaved; or
- Aerial photographs or site history indicate potential for previous discharges to the soil beneath the pad.

4.10.3 Surface Impoundments

DER-10 identifies surface impoundments to include, but not limited to, lagoons, fire ponds, waste ponds, waste pits, storm water detention basins, open excavations, natural depressions or diked areas, which are designed to hold an accumulation of liquid substances or substances containing free liquids. Sediment within any surface impoundments will be sampled if the impoundment receives runoff from potential AOCs. The sediment quantity within the impoundment will be estimated. The integrity of impermeable liners within active surface impoundments, which may be damaged as a result of sample collection, will be verified by physical inspection and/or evaluation of monitoring well water quality data associated with the surface impoundment, if available. Sediment core samples will be collected for laboratory analysis and detailed characterization of sediment type, thickness of sediment layers (if multi-layered), and vertical extent of sediment in accordance with Section 4.11 for Sediment. Sediment samples will be collected from the following AOCs and will meet the following criteria:

- Areas of inflow and outflow;
- Areas where sediment is expected to accumulate (i.e., deltas; bathymetric low areas; etc.);
- Distinct layers of sediment thicker than 6 inches, as evidenced by color, particle size, or other physical characteristics, will be sampled individually.

4.10.4 Drainage Systems

DER-10 identifies drainage systems to include, but not limited to, floor drains or associated collection systems, roof leader discharge points, swales, culverts, storm sewer and spill containment collection systems, and boiler and compressor discharges, which are designed to convey drained water away from buildings or structures to a discharge point. If the point of discharge is unknown, tracer tests (i.e., dye or smoke) will be conducted to determine the discharge point(s). Soil samples will be collected from the following AOCs if COCs are suspected to have been previously or currently discharged and will meet the following criteria:

- Floor drain and associated collection systems;
 - A soil sample will be collected from the point of discharge for any floor drain or collection system, if the system discharges were, or may have been, discharged to soil, groundwater, or surface water;
 - The integrity of each floor drain or collection system identified will be documented to isolate COC releases at potential leak areas by utilization of video inspections, hydrostatic tests, or pressure tests, or by representative soil sampling at potential leak areas;
 - Representative soil sampling at known or suspected leak areas will be conducted to characterize COC discharges, if the following scenarios are identified:
 - Plastic piping is currently or historically used on a floor drain or collection system and there is historical records or visual evidence that confirms or suggests that corrosives (including organic solvents) were discharged to these systems; and
 - There are historical records or visual evidence that confirms or suggests that a floor drain or collection system has had a history of past COC discharges, ruptures, or repairs.
- If present, roof leader discharges will be investigated to characterize COC discharges, if storage units or process equipment operations using COCs vent, or may have vented, to the roof. A soil sample will be collected beneath each roof leader discharge point;
- An investigation of swales and culverts will be conducted when historical records, visual evidence, or reasonable suspicion indicates that a swale or culvert currently or previously received runoff from potentially or known contamination sources. An approach to developing an investigatory strategy will consist of the identification and location of AOC for each swale and/or culvert identified. Sediment and/or soil samples will be collected:
 - At the points where suspected COCs from runoff or spills enter or have entered the swale or culvert drainage system; and
 - If there is evidence that runoff has scoured sediment from the receiving structure, additional sediment samples will be collected from depositional zones within the swale or culvert drainage system in hydraulically downgradient locations.
- An investigation of storm sewer and spill containment systems will be conducted when historical records, visual evidence, or reasonable suspicion indicates that the storm sewer and spill containment system currently or previously received runoff from potentially or known contaminant sources. An approach to developing an

investigatory strategy will consist of the identification and location of AOC for each storm sewer and spill containment system identified. Soil, sediment, and groundwater samples will be collected from the following AOCs and will meet the following criteria:

- Sediment samples will be collected at the manhole, catch basin, sump, or other structure where COC runoff or discharges enter the storm sewer or spill containment collection system;
- Soil samples will be collected via a soil boring program from the area around catch basins, manholes, sumps, or other collection structures that currently or previously contained contaminants, and the hydraulic integrity has been compromised (i.e., leakage through cracks through the floor and walls) as follows:
 - A soil sample from one soil boring will be collected from a depth corresponding to the bottom of the structure and located within 2 feet of the downstream side of the structure; and
 - If highly permeable soil is encountered and headspace VOC screening indicates that VOC soil sampling is required, a soil sample will be collected from either the next lower permeability soil horizon change encountered, at 0-6 inches above the saturated zone, or at 9.5-10 feet bgs, whichever is encountered first.
- Groundwater discharging from storm sewer systems which contain dry weather flow (i.e., defined as five days of no precipitation following the most recent precipitation event) will be sampled at the discharge point and analyzed for a suite of potential COCs discharged or potentially discharged into the system.
- An investigation of boiler and compressor discharge systems will be conducted when historical records, visual evidence, or reasonable suspicion indicates that a potential contaminant discharge has occurred. Soil, sediment, and groundwater samples will be collected in accordance with Section 4.10.5 for Discharge and Waste Disposal Systems.

4.10.5 Discharge and Waste Disposal Systems

DER-10 identifies discharge and waste disposal systems to include, but not limited to, discharge areas and areas of discolored/stained soil or stressed vegetation, aboveground treatment systems, and underground wastewater treatment systems such as tanks, septic tanks, separators, neutralization pits, septic leach fields, cesspools and seepage pits. An approach to developing an investigatory strategy will consist of the identification and location of AOC for

each discharge and waste disposal system identified. Soil, sediment, and groundwater samples will be collected from the following AOCs and will meet the following criteria:

Discharge Areas and Areas of Discolored/Stained Soil or Stressed Vegetation

Each discharge or stressed vegetation AOC identified will be investigated independently in the following manner:

- Initial surface soil samples will be collected in accordance with Section 4.8 for Surface Soil Sampling. Results of soil headspace VOC screening and visual inspection of the soil samples for soil discoloration and staining, as well as areas of stressed vegetation will be the primary criteria for selecting the soil samples to be submitted for laboratory analysis and will be biased toward areas of greatest suspected contamination;
- Surface soil sample frequency will be at least 1 sample per 900 square feet for areas up to 300 feet in perimeter; and
- Surface soil sample frequency may be reduced for larger areas, subject to DER's review of documentation pursuant to subdivision 1.6(c) of DER-10 specifying justification and adequacy of reduced sampling frequency.

Aboveground Treatment Systems

Each aboveground treatment system identified will be investigated independently and in accordance with Section 4.10.1 for aboveground storage tanks.

Underground Waste Treatment Systems

DER-10 subdivides underground waste treatment systems into three categories as follows:

- Tanks, septic tanks, separators, and neutralization pits;
- Septic leach fields; and
- Cesspools and seepage pits.

When AOCs are identified for tanks, septic tanks, separators, and/or neutralization pits, one aqueous and one sludge sample will be collected from each structure in each AOC and will be submitted for laboratory analysis of DER-required analytical parameters as indicated in Section 4.1. A records search and diligent inquiry will be conducted and thorough documentation will be provided to DER to provide supporting evidence that only sanitary waste was ever discharged to the waste disposal system and that no present or former floor drains, sinks, or other units in process areas were ever connected to the system. The requirements for aqueous and sludge sampling may be waived if documentation acceptable to DER in accordance with Section 1.6(c) of DER-10 is provided in the site characterization report specifying why aqueous and sludge sampling is unnecessary to confirm that only sanitary waste was discharged to the system during the lifespan of the system.

If septic leach fields are identified, a soil boring program and/or test pit excavation program will be completed as specified below and as outlined in Sections 4.12 and 4.16 for on-site septic disposal fields. The soil boring/test pit program will include the following minimum requirements:

- At least one soil boring or test pit will be installed per 500 square feet of leach field area, with a minimum of 4 soil borings installed per leach field;
- Soil borings will be located within 2 feet of the edge of the bed area in active leach fields;
- Soil borings will be located/positioned directly over laterals or installed on an angle so that soil samples are collected below the infiltration surface and at a point directly below laterals within abandoned leach fields;
- Soil borings will be located to include the first 5 feet of the infiltrative surface and will be spaced so that soil samples are representative of the entire leach field; and
- Soil samples will be collected at a depth corresponding to 0-6 inches below the bottom of the infiltrative surface.

A soil boring/test pit program may be avoided if documentation acceptable to DER pursuant to subdivision 1.6(c) of DER-10 is provided in the site characterization report specifying why soil borings/test pits are unnecessary to confirm that only sanitary waste was discharged to the system during the lifespan of the system.

If cesspools, seepage pits, and dry wells are identified, soil, sediment, sludge, and groundwater samples shall be collected as specified below and as outlined in Sections 4.10, 4.11 and 4.16, from the following AOCs and will meet the following criteria:

- One representative sludge or sediment sample will be collected from each pool, pit, or well identified and submitted for laboratory analysis;
- A soil boring will be installed through each pool, pit, or well identified and underlying soil will be evaluated for evidence of discharge. Soil samples will be collected, so they are biased to the suspected location of greatest contamination. Soil sample location should be based on professional judgment, area history, discolored/stained soil, stressed vegetation, drainage patterns, field instrument measurements, odor, or other field indicators. If it is not possible or impractical to core through the suspected structure, the boring will be placed within 2 feet of the hydraulically downgradient side of the suspected structure and will extend to a minimum of 2 feet below the pit bottom;
- If the suspected structure contains perforated sidewalls, perforated rings, or is of brick, block, or stone construction, a soil boring will be placed immediately adjacent to the outside of the structure. If elevated headspace VOC concentrations are detected in the soil boring, then the soil boring will be extended until background readings are achieved or groundwater or bedrock is encountered, whichever comes first. The 2 foot split spoon interval exhibiting the highest headspace VOC concentration will be collected and submitted to a laboratory for analysis of VOCs, at a minimum. If deemed necessary, additional laboratory analysis will target other COCs that may have been discharged. If no results of field observations reveal visual staining, odors, or elevated headspace VOC concentrations in the soil boring, then a sediment sample will be collected from inside the structure, if present.
- If collection lines are identified within cesspools and seepage pits, samples will be collected in accordance with Section 4.10.4 for Drainage Systems.

An investigation of cesspools and seepage pits may be avoided if documentation acceptable to DER pursuant to subdivision 1.6(c) of DER-10 is provided in the site characterization report specifying why sampling is unnecessary to confirm that only sanitary waste or storm water was discharged to the system

4.10.6 Dry Well Sampling

Dry wells or leaching pools that have been located and are suspected sources of contamination will be sampled. In the dry wells that contain liquid, both the liquid and sediment/sludge (if present) will be collected and analyzed. If accessible, sampling will be performed from above the enclosure to avoid confined space entry. Prior to sample collection, the access point will be monitored with a PID and portable combustible gas/oxygen/hydrogen sulfide detector to determine the level of personal protection required. The procedures in the site-specific HASP will be followed.

Samples will be collected utilizing a decontaminated long-handled polyethylene scoop. If the depth to liquid or sediment is greater than 10 feet, a disposable bailer (for water samples) and decontaminated push sampler or split spoon sampler (for sediment samples) will be utilized. If the dry well has been abandoned and is not directly accessible for sampling, soil borings or soil probes will be installed immediately adjacent to the dry well or leaching pool to collect samples. Further discussion of direct push sampling and soil boring installation is provided in Section 4.13 and 4.16, respectively.

If both liquid and sediment are encountered, the liquid samples will be collected first in order to avoid introduction of sediment into the water column. The detailed sampling procedures are provided in the Generic QAPP. Liquid and sediment samples will be analyzed for DER-required analytical parameters as defined in Section 4.1. Site-specific sampling locations will be described in the Site-Specific Work Plan.

4.11 Surface Water, Sediment, and Wetland Sampling

Surface water and sediment samples within natural or man-made streams, gullies, culverts, or surface water bodies such as rivers, streams, lakes, ponds, or wetlands will be collected to determine if known, suspected historical, or ongoing discharges of waste disposal and on-site contamination may potentially impact nearby surface water bodies. Samples will be collected from these surface water bodies if it is believed to be impacted by surface runoff, storm water discharge or groundwater discharge.

Surface water and sediment characterization of a site will consider evidence of impacts to a surface water body or wetland by current or historical discharges. Prior to collecting sediment samples, a reconnaissance of stream courses, water bodies, and wetland perimeters will be performed to identify the following AOCs, if present:

- Depositional areas to be targeted for sediment sampling within rivers, streams, lakes, ponds, and wetlands. The reconnaissance will document existing depositional features within the water bodies. Acceptable sediment sampling locations include, but are not limited to, depositional features such as deltas, bars, chute channels, terraces, levees, bathymetric low areas of pools, wetland inlets and outlets, and floodplain deposits proximal to the main channel;
- Depositional areas adjacent to stressed vegetation, petroleum sheens, seeps, and discolored or stained soil or sediment along the shoreline, surface, or bottom;
- If present, areas where stream or wetland impacts from historical discharges are documented in historical ecological studies that document differences in organism population density and diversity in areas potentially impacted by the site relative to areas not impacted by the site;
- Areas of existing on-site groundwater contamination in excess of applicable groundwater SCGs; and
- Areas where concentrations of COCs in soil, sediment, and/or surface water exceed applicable SCGs within the water body or wetland, where the contamination may be attributable to a discharge or disposal from:
 - Contaminated groundwater migration from the site;
 - Subsurface non-aqueous phase liquid (NAPL) migration;

- Storm sewers, ditches or other methods of conveyance; or
- Erosion of COC-impacted soil from the site.

During sediment characterization activities, the following data will be recorded:

- Sediment grain size using the Unified Soil Classification System;
- Nature and thickness of sediment layers and laminations; and
- Vertical extent of sediment.

At a minimum, sediment samples will be collected in the following locations:

- As close as possible to man-made discharge points, groundwater discharge points, erosional areas or other suspect locations where COCs may have been currently or previously released to the water body or wetland;
- Adjacent to the border of the terrestrial portion of the site and the water body or wetland;
- At the first identifiable location of major sediment deposition. The major depositional sediment sampling locations will be collected:
 - In non-tidal streams at points downstream of the source area(s) of AOCs;
 - In tidal creeks and tidal marshes at points upstream, adjacent, and downstream of the source area(s) of AOCs to account for flow direction changes associated with tidal fluctuations;
 - In lakes and ponds at points in a systematic array moving away from the COC point source or site border; and
 - In wetlands at the following points;
 - In a systematic array moving away from the COC point source or site border;
 - At any identifiable depositional features along areas of probable flow through the wetland thalweg; and
 - At any identifiable point where water discharges from the wetland.

- From any wetland or floodplain depositional features which may receive sediment from adjacent or upstream locations of known or suspected COC-impacts to sediment;
- If a water body crosses the site, then sediment samples will be collected at the points of entry and exit from the site; and
- When deemed necessary, recreational areas will be evaluated for human exposures to sediment and the sampling depths will be predetermined in consultation with DER and NYSDOH.

Surface water samples will be collected 0 to 6 inches below the surface of the water or at the mid-depth location, if possible. Sediment samples will be collected utilizing a dedicated, disposable long-handle polyethylene scoop to depths that accommodate DER requirements for ecological assessments where accumulated sediment thickness allows as follows:

- 0 to 6 inches below the surface of the sediment;
- 6 to 12 inches below the surface of the sediment;
- 1 to 2 feet below the surface of the sediment;
- For areas of deep sediment greater than 2 feet thick, soil borings will be advanced and split spoon samples collected at regular intervals to the base of accumulated sediment;
- From distinct layers of sediment that are thicker than 6 inches, which are identifiable by color, particle size, or other physical characteristics; and
- From intervals laden with free-phase product, NAPL, or grossly contaminated media as defined in DER-10 Section 1.3.

Where practical and justifiable, surface water samples will be collected at the same locations as sediment samples. The surface water samples will be collected before the sediment samples and downstream samples will be collected before upstream to prevent the introduction of sediment into the water samples. Surface water, sediment, and wetland samples will be analyzed for DER-required analytical parameters as defined in Section 4.1. Sampling locations will be identified in the Site-Specific Work Plan. Where ongoing discharges of COCs are identified, an Interim Remedial Measures (IRM) program will be considered if impacts can be mitigated by immediate action.

4.12 Test Pit Excavation and Sampling

The test pits will be excavated with a backhoe with an appropriate bucket reach. The selection of samples from the test pits will be based on visual observation, such as staining, odor and PID/FID measurements. Samples will be obtained from the backhoe bucket immediately after retrieval utilizing a disposable polyethylene scoop, clean stainless steel hand trowel, clean hand bucket auger with an extension handle, or sterile wooden tongue depressor. Subsurface soil samples will be placed in appropriate sample containers, sealed, and submitted for laboratory analysis for DER-required analytical parameters as defined in Section 4.1. Personnel will not enter the pit to collect samples.

The protocol for test pit excavation, sampling and backfill will be the following:

- The excavation perimeter will be adequately marked off using flagging tape.
- The test pit excavation will be monitored with a PID. Monitoring will continue throughout the test pit excavation program.
- Photographs of the test pit will be taken before, during, and after the excavation.
- Materials removed from the test pits will be placed on and covered with polyethylene sheeting. Visually uncontaminated soil exhibiting no elevated headspace VOC concentrations from the surface and near subsurface of the test pit (i.e., typically 2 to 3 feet bgs), will be removed and placed in a separate stockpile on polyethylene sheeting. Excavated soil, which indicates visual contamination or elevated headspace VOC concentrations, will be placed on and covered with polyethylene sheeting.
- The test pit excavation will be terminated when water table or buried drums, are encountered during test pit construction.
- A record of excavation and sample collection will be maintained. Test pit materials will be visually described using the Modified Burmeister or Unified Soil Classification System. At each desired soil sampling interval (i.e., typically each 2-ft interval), a soil sample will be collected from the backhoe bucket and placed in a sealed container for VOC headspace screening using a PID. Evidence of stained soil, separate phase liquid, fill material, buried debris and presence of groundwater will be documented.

- Following completion of the test pit, the locations of subsurface soil samples collected for laboratory analysis will be based on evidence of contamination such as visual staining, odors, or elevated headspace VOC concentrations above background.
- The excavation will be filled in the reverse order of soil removal. The visually uncontaminated soil from the upper 2-3 feet will be used as final cover over any existing impacted soil/source materials when placed back in the excavation. If insufficient volume of uncontaminated soil is available to fill the void space during backfilling of the excavation, either clean soil from the surrounding area or imported clean fill material will be placed on top of the pit.
- Following backfilling of the excavation, a labeled stake denoting the test pit number will be placed at the test pit location to facilitate location surveying.

In general, only the backhoe bucket, which will come into contact with contaminated soil, will require decontamination. Test pit locations will be identified in the Site-Specific Work Plan.

4.13 Direct Push Soil Sampling

Direct push sampling techniques allow for the relatively rapid collection of soil samples with minimal disturbance of the ground surface and generation of soil cuttings. Soil samples can be collected with a probe from various depths in the vicinity of the suspected contaminant source to determine the depth of the source and degree of contamination in the vadose zone. The geology of the site must be evaluated to determine if direct push (soil probe) sampling techniques are feasible. If probe sampling is not feasible at a site due to the subsurface geology, sampling will then be completed utilizing standard drilling techniques such as hollow stem augers with split spoon sampling. For more information on borehole construction and split spoon sampling, see Section 4.16. The exact locations of the probe points will be provided in the Site-Specific Work Plan. The probes will be installed utilizing a decontaminated screen point and sampler fitted with a disposable acetate liner. Detailed sampling procedures are provided in the QAPP. Probe holes will be abandoned according to procedures described in Section 4.17.

4.14 Direct Push Groundwater Screening and Sampling

Collection of groundwater samples utilizing direct push sampling techniques include utilization of a groundwater probe or Hydropunch sampler. Direct push sampling techniques will be utilized to collect groundwater samples to define the horizontal and vertical extent of groundwater contamination on-site and off-site.

The direct push sampling techniques are useful for preliminary contaminant plume delineation based on actual groundwater sampling. The geology and hydrogeology of the site must be evaluated to determine if it is amenable to direct push sampling techniques. Probe sampling is typically only applicable in unconsolidated deposits. If probe sampling is not applicable to a site due to the presence of gravel, boulders or bedrock, sampling may need to be conducted using conventional drilling techniques as described in Section 4.16.

4.14.1 Groundwater Probe Sampling

Groundwater probes will be installed utilizing a decontaminated screened sampler. Decontaminated probe and rods will be driven until the sampler tip has been driven about 1 foot below the target sampling depth. Once that depth has been reached, the expandable drive point will be disengaged and the rods pulled back a distance of about 2 feet to expose the screened sampler. Disposable polyethylene tubing equipped with a bottom check valve will be used to convey groundwater to the surface for collection. Each sample, upon retrieval, will be analyzed in the field for pH, conductivity, turbidity and temperature.

Refer to the Generic QAPP for detailed sampling procedures. Site-specific sampling locations will be provided in the Site-Specific Work Plan. Probe holes will be sealed and abandoned according to Section 4.17.

4.14.2 Hydropunch Sampling

The Hydropunch is a device that is attached to decontaminated drill rods and driven into the soil with a hydraulic hammer. The Hydropunch cannot be used in gravelly, bouldery or bedrock formations, and samples must be taken several feet below the water table surface. Obtaining groundwater samples in fine grained zones, such as clays and silts, may require excessive collection times and cause high turbidity. In heterogeneous formations, bypassing contaminant zones entirely or spreading contaminant zones, is another drawback of this method.

The Hydropunch samples will be collected by first drilling to the top of the desired sample interval. The Hydropunch sampler will then be placed in the borehole and driven approximately 4 feet into the sample interval. The sampler will be retracted to expose the decontaminated Hydropunch screen and allow groundwater to enter the sampler. After allowing several minutes to pass, to allow the groundwater to equilibrate, the sample will be collected with a small diameter disposable polyethylene bailer. Each sample will be analyzed in the field for pH, conductivity, turbidity and temperature. Refer to the Generic QAPP for more detailed sampling procedures.

After collection of the groundwater samples, the Hydropunch sampler will be removed and the boring will be continued to the next sampling interval. Prior to collecting the next sample, the Hydropunch sampler and associated equipment will be decontaminated in accordance with the Generic QAPP and a new screen will be attached to the sampler. When a sample location has been completed, the borehole will be sealed and abandoned as described in Section 4.17. The locations and depths of probe and/or Hydropunch samples will be provided in the Site-Specific Work Plan.

4.15 Private Water Supply Sampling

Based upon a review of available information, the location and number of private water supply wells in the vicinity of the site will be identified. Based upon the proximity to the site, the potential for the well to be impacted by contamination emanating from the site and recent

available sample analysis information, a determination will be made as to the need to collect a sample.

The sample(s) will be obtained from each well at a point in the plumbing before filtration/treatment devices, if they exist and access is available. A more detailed description of water supply sampling procedures is provided in the Generic QAPP.

4.16 Monitoring Well Drilling and Groundwater Monitoring

Groundwater monitoring involves periodic sampling and analysis of groundwater from monitoring wells. The effective design of monitoring wells requires careful consideration of the hydrogeology and subsurface geochemistry at the site. Information obtained from site reconnaissance, geophysical investigations or nearby existing wells can be useful in deciding appropriate monitoring well drilling, construction and development methods for the site. The design of a monitoring well should be based upon site-specific conditions and cannot be completed using a "one-size-fits-all" method or material. The goal of monitoring well design is to construct wells that will produce depth and location-specific hydrogeologic and chemical data. Precautions must be made to ensure that well completion and development procedures minimize disturbance to the natural geologic environment and groundwater samples. Additionally, monitoring well installation techniques must minimize the potential for cross-contamination through the subsurface.

4.16.1 Drilling Methods

The selection of drilling and well completion methods for monitoring well construction will be based on site-specific conditions, including geologic materials to be penetrated, anticipated depth of drilling, potential for cross-contamination and accessibility to boring locations on the site. The selection of an appropriate drilling method for the construction of monitoring wells will be based on minimizing both the disturbance of geologic materials penetrated and the introduction of air, fluids and mud. The use of drilling mud and additives will be avoided, where possible, because the introduction of any foreign material has the potential for

interfering with the chemical quality of water obtained from the monitoring wells and determination of aquifer characteristics through the use of slug tests. The following evaluations of various drilling techniques are based on these factors and the physical limits of each method.

4.16.1.1 - Hollow Stem Augers

The hollow stem auger method is among the most desirable drilling methods for the construction of monitoring wells. Hollow stem auger drill rigs are generally mobile, relatively fast and inexpensive to operate in unconsolidated materials. No drilling fluids are used and disturbance to the geologic materials penetrated is minimal. Depths of borings constructed using augers vary based upon soil types; however, borings up to 100 feet and greater are possible (maximum depth limit is about 200 feet). Clayey soil restricts the depth to which auger drilling can be accomplished. Augers cannot be typically used in bedrock, unless it is highly weathered, and the use of hollow stem auger drilling in heaving sand environments may also present difficulty.

4.16.1.2 - Cable Tool

The cable tool drilling method is relatively slow, but still offers advantages, such as low cost per foot, ability to create large diameter borings and ability to increase permeability of bedrock, make it a useful choice for monitoring well construction in unconsolidated formations and relatively shallow consolidated formations. The method allows for the collection of formation samples and the detection of permeable zones. The installation of a steel casing as drilling progresses also provides a stable annulus for the construction of a monitoring well.

4.16.1.3 - Air Rotary

Rotary drilling methods operate on the principle of circulating either a fluid or air to remove the drill cuttings and maintain an open hole as drilling progresses. The different types of rotary drilling are named according to the type of fluid and the direction of fluid flow. Air rotary drilling forces air down the drill rods and back up the borehole to remove the drill cuttings. The

use of air rotary drilling is best suited for use in hard rock formations. In soft, unconsolidated formations, a casing is driven to keep the formations from caving. In highly fractured formations, it is often difficult to maintain air circulation and casing may be required. The air from the compressor on the rig must be filtered to ensure that the oil from the compressor is not introduced into the geologic system to be monitored. The use of air rotary drilling techniques must be used with care in highly polluted or hazardous environments. Contaminated solids, water and vapors can be blown out of the hole and are difficult to contain. Protection of the drill crew and observers is correspondingly difficult.

4.16.1.4 - Air Rotary with Casing Hammer

Air rotary drilling with casing driving capability increases the utility of this type of drilling method. Typical air rotary problems associated with drilling in soft, unconsolidated and highly fractured formations are minimized. The utility of constructing monitoring wells in the casing prior to its removal also makes this type of drilling technique more appealing. Concerns about oil in the circulating air and containment of contaminant cuttings, water and vapor, must also be considered.

4.16.1.5 - Reverse Circulation Rotary

Reverse circulation rotary drilling has limited application for the construction of monitoring wells. Large quantities of fluid are circulated down the hole and pumped back to the surface through the drill stem. Mud rotary offers better control of contaminated cuttings and water removed from the borings, and does not cause exposure to vapors as in air rotary techniques. The hydrostatic pressure of the water in the borehole is used to maintain an open borehole. If permeable formations are encountered, large quantities of water will infiltrate into these formations, altering in-situ water quality. Similarly, water bearing units with differing hydrostatic heads will have the opportunity for free interchange of waters, altering the quality of water in the unit of lower hydrostatic head. Because of the large quantities of water normally required for this type of drilling, and the high potential for water to enter the formations to be sampled, this type of drilling is not typically utilized.

4.16.1.6 - Mud Rotary

Mud rotary drilling operates in the same fashion as the air rotary drilling technique, except that water and drilling mud are circulated down the drill pipe and back up the borehole to remove drill cuttings. Mud rotary drilling offers better control of contaminated cuttings and water removed from the boring and does not cause exposure to vapors as in air rotary techniques. The borehole is held open by the hydrostatic pressure of the circulating mud and the mud cake that develops on the borehole wall during the drilling process. Viscosity of the drilling mud is controlled to minimize the infiltration of the drilling fluid into porous formations penetrated by the drilling equipment. The use of drilling mud can cause groundwater chemistry or in-situ permeability to be altered by introduction of mud into the borehole. Monitoring wells installed in mud-rotary borings often require extra well development and may detect solutes attributable to the mud that cause an inaccurate assessment of groundwater chemistry. Under certain conditions, mud rotary techniques can be effective by using a continuous supply of potable water without additives. Alternatively, mud can be used to advance a boring to a depth several feet above the zone of interest, at which time mud can be replaced with potable water and the borehole continued to final depth.

Based upon the advantages and disadvantages of the various drilling methods described above, the preferred drilling methods are to utilize hollow stem augers for drilling in the overburden and mud rotary using potable water without additives in the bedrock. However, the final selection of the drilling method will be based on site-specific geologic and hydrogeologic conditions. Alternate methods of drilling must be specified in the Site-Specific Work Plan together with the rationale for selection.

4.16.2 Subsurface Soil Sampling

Subsurface soil samples will be collected during construction of monitoring wells and soil borings. Soil borings will be constructed to delineate the extent of subsurface soil contamination. During construction of each borehole, split spoon samples will be obtained to

provide stratigraphic information on the site, as well as information on soil quality. The depth of the boring will be determined in the Site-Specific Work Plan.

Soil samples obtained from decontaminated split spoons will be examined and logged for geologic characteristics, odors, separate phase liquids, and staining, and screened with a PID. The data obtained from screening will be used to select soil samples from each borehole for chemical analysis. All subsurface soil samples selected for chemical analysis will be collected from within the unsaturated zone unless contamination at the water table interface is evident, in which case, samples of soil in the saturated zone may be selected. The number and locations of the samples to be collected, and the rationale for sample selection will be provided in the Site-Specific Work Plan.

In addition to collection of samples for chemical analysis, samples may be collected and analyzed for grain size, including sieve and hydrometer analysis. It may be necessary to combine consecutive split spoon samples to obtain sufficient sample mass for testing. Grain size analyses will be performed in accordance with ASTM D422. Geotechnical analysis is discussed further in Section 4.20.

4.16.3 Bedrock Sampling

Rock core samples (NX diameter or larger) will be collected in 5-foot runs starting at the top of competent bedrock and extending to depths determined in the Site-Specific Work Plan. Rock Quality Designation (RQD) will be determined for each core by dividing the total length of the core by the total length of recovered segments greater than 4 inches in length, exclusive of any mechanical (drilling induced) fractures. RQD is useful in quantifying the degree of fracturing for a given segment of a rock formation. Rock cores will be collected for logging purposes only and will not undergo chemical analysis. Logging of bedrock coring will include observations regarding drilling rate, drill water recovery, sudden drops in drill tools and lithology of drill cuttings.

4.16.4 Overburden Monitoring Wells and Piezometers

Monitoring well and piezometer boreholes constructed in the overburden will be advanced using decontaminated 4-1/4 inch ID hollow stem augers. If difficulties with "running sands" are encountered which hinder soil sampling, potable water will be added to the hollow stem augers to maintain a positive hydrostatic head. Additionally, if difficulties with elevated levels of explosive or toxic gases, such as methane and hydrogen sulfide are encountered, potable water or mud may be introduced into the hollow stem augers to suppress the gas. If the depth of boring or nature of unconsolidated deposits prevent the efficient use of 4-1/4-inch ID hollow stem augers, then other methods such as those described in Section 4.16 may be considered. The use of alternative drilling methods, if any, will be described and justified in the Site-Specific Work Plan.

The final depth of each borehole will be below the water table at a depth that will allow 6 inches of sand pack to be placed between the screen bottom and bottom of the boring, as well as allow the screen to intersect the water table. For mid-depth or deep overburden wells, the borings must be deep enough to allow 6 inches of sand pack between well screen bottom and boring bottom, and allow the screen to intersect the zone of concern. If the boring is drilled too deep, for any reason, the borehole must be filled to a depth of 6 inches below the planned screen location with a bentonite slurry or other suitable impermeable material. At a minimum, overburden borings will be constructed for the installation of monitoring wells and piezometers that screen the water table. The actual number and depth of borings will be determined on a site-specific basis and contained in the Site-Specific Work Plan.

Monitoring wells will be installed for the purpose of groundwater sampling and piezometers will be installed when sampling is not required, but water level data is necessary. The following discussion regarding monitoring wells also pertains to piezometers. The depth of overburden monitoring wells will be determined on the basis of the geology and hydrogeology of the site and the goals of the monitoring program. In the case of overburden wells, the goal in general is to monitor the potential effects of near surface contaminants on groundwater. It is also essential to document and monitor the downward migration of contaminants that may be

migrating from the site. At a minimum, overburden monitoring wells will screen the water table and be constructed to a depth to adequately determine the vertical extent of groundwater contamination.

In order to properly define the movement of contaminants both vertically and horizontally, it is essential to collect depth-discreet water level data. Monitoring wells completed at the water table will provide a portion of the data needed to determine the vertical direction of groundwater movement. Water levels from several of these wells, if they are completed in the same hydrogeologic unit, will also provide information on the horizontal direction of shallow groundwater flow. If the overburden area of concern is relatively thick, then a series of mid-depth or deep monitoring wells will be required to properly assess groundwater conditions. The need for and depth of mid-depth or deep overburden wells will be provided in the Site-Specific Work Plan.

The diameter of monitoring wells should be the minimum practical size that will be compatible with the strength requirements of the well materials and allow for groundwater sampling. Small diameter monitoring wells will decrease the amount of water to be removed for well development and purging, and minimize the potential need for containment of contaminated water. Additionally, small diameter wells will minimize the potential impact on groundwater chemistry caused by disturbance during well drilling. Overburden monitoring wells will be constructed of decontaminated 2-inch ID, Schedule 40, 0.010-inch slot PVC well screen and threaded, flush joint PVC casing. No solvents will be utilized to construct the wells. In site-specific cases where non-aqueous phase liquids are present or suspected, the use of stainless steel wire-wrap screens may be considered. In addition, when site-specific conditions dictate, different size screen openings may be utilized. Justification for the use of alternate screen material and size will be provided in the Site-Specific Work Plan.

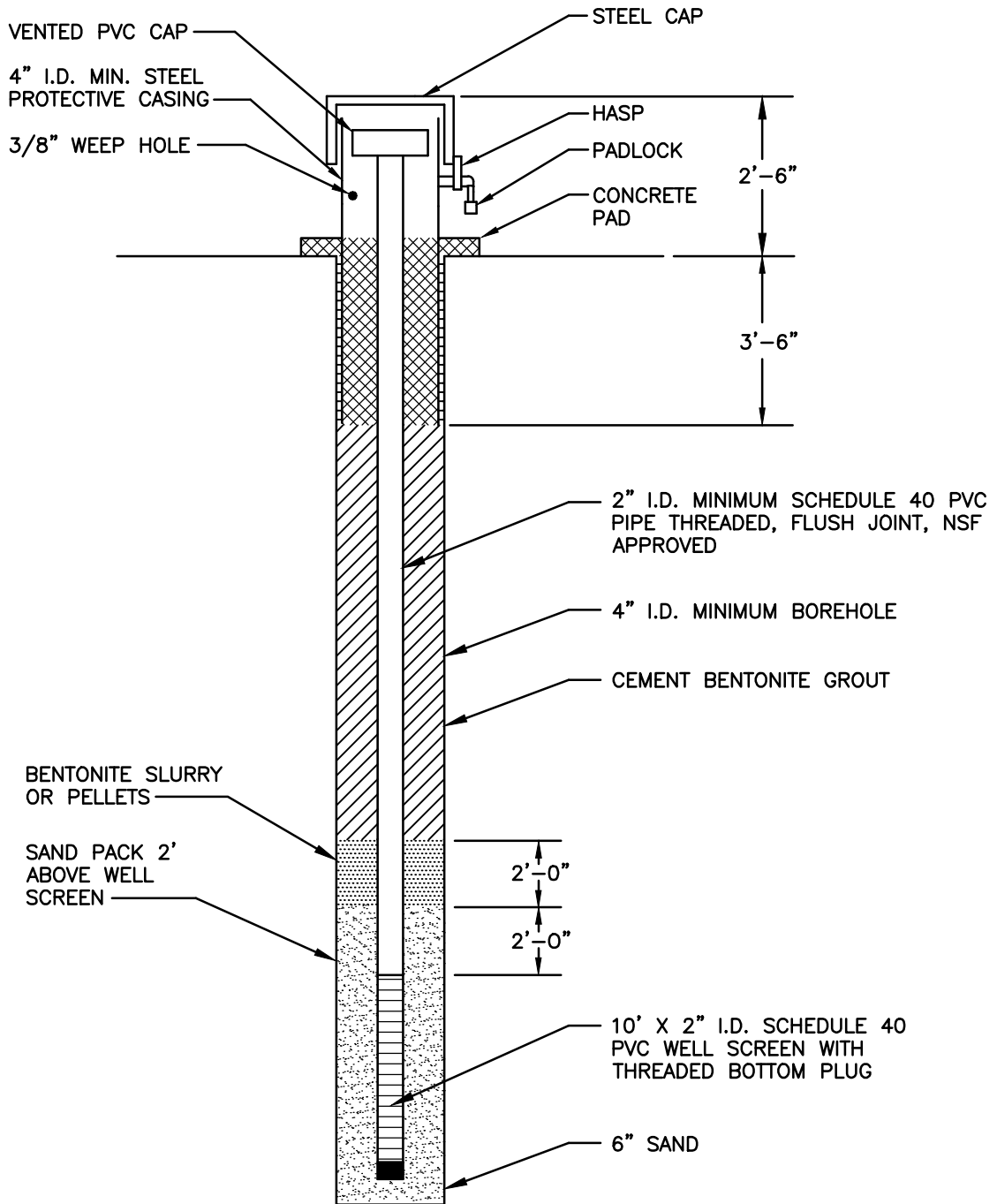
The well screen in a monitoring well will be long enough to permit entry of water from the vertical zone to be monitored. The length of the screen will be kept to a minimum for water level data to be obtained from the well to represent information that is depth-discreet. (In wells where the length of the screen is long, the resulting water level represents an average water level

for the materials opposite the screen, and is sometimes insufficient to determine accurate groundwater flow characteristics.) The overburden water table monitoring well screens will generally be 10 feet long. The screen will be installed with 5 feet below the water table in order to intercept the water table under varying seasonal groundwater elevations. However, at sites where there are large known or suspected variations in seasonal or annual water table elevations, 15-foot screens may be necessary. The selection of screen lengths will be provided in the Site-Specific Work Plan, together with the rationale for selection. A generalized well construction diagram is shown in Figure 4-1.

At the completion of borehole construction and soil sampling, the well screen and riser pipe will be lowered into the hollow stem auger and set at the desired depth. Sand pack of a grain size appropriate for the selected screen opening size and geologic conditions will be placed into the annular space to a minimum height of 2 feet above the top of the well screen using a tremie pipe or other suitable method. Generally, No. 2 morie sand will be used. During this time, the auger will be slowly removed. The well pipe will also be pulled up no more than 1/2-foot to allow sand material to fill the borehole beneath the well screen. Upon completing the placement of the sand pack, a minimum 2-foot thick bentonite pellet, chip or slurry seal will be tremied in the annular space. Bentonite pellets or bentonite chips, if used, will be hydrated with potable water and allowed to swell for a minimum of 1/2 hour before introducing the cement bentonite grout in the remaining annular space. The cement-bentonite grout will be pressure pumped into the annular space by the tremie method.

The monitoring wells will be completed with approximately 2-1/2 feet of riser above ground surface and protected with a locking steel casing with minimum diameter of 4 inches. The protective casing will be at least 5 feet in length and secured into the borehole using concrete sand or gravel mix. The surface seal will be completed with a 3-foot diameter formed concrete pad and will be constructed to drain surface water away from the well. The protective casing will have a locking cap and weep hole, and be marked with the monitoring well identification. In cases where monitoring wells will be installed in roadways, parking lots or

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GENERIC FIELD ACTIVITIES PLAN



PLAN FOR CONSTRUCTION OF
OVERBURDEN MONITORING WELLS

FIGURE 4-1

through floors, flush mount protective casings will be used. In such cases, a locking watertight PVC well cap will be installed inside of a curb box with bolted, watertight cover. Protective casing types will be specified with justification in the Site-Specific Work Plan.

4.16.5 Bedrock Monitoring Wells and Piezometers

Bedrock monitoring wells and piezometers will be necessary at sites with shallow bedrock or permeable overburden materials which allow vertical migration of contaminants to bedrock. Monitoring wells will be installed for the purpose of groundwater sampling and piezometers will be installed when sampling is not required, but water level data is necessary. The following discussion regarding monitoring wells also pertains to piezometers.

Bedrock wells will be located in clusters with shallow wells, whenever possible. These wells will provide necessary data for determining vertical groundwater quality and flow direction and gradient. These wells will be completed in the shallowest, relatively permeable zone in bedrock. This zone may include weathered bedrock found at the overburden-bedrock interface. Bedrock monitoring wells will be completed with screens, sand packs and bentonite seals in order to maximize discreet groundwater sampling and prevent the possibility of cross-contamination of groundwater between fractures or voids in the bedrock, or overlying overburden materials. Due to the potential for cross-contamination by dense non-aqueous phase liquids through fractures, open-hole bedrock wells are not preferred. Should open-hole wells be necessary, the Site-Specific Work Plan will provide details and justification.

Monitoring well boreholes constructed in bedrock will be advanced using a cutting tool with a minimum inside diameter of 4 inches. In situations where rock is cored at a smaller diameter, the hole must be reamed to 4 inches before monitoring well installation. Only potable water will be allowed in the hole unless other methods are agreed to as provided in the Site-Specific Work Plan. Sampling of drill water will be required if the water source cannot be documented with water quality data to be potable.

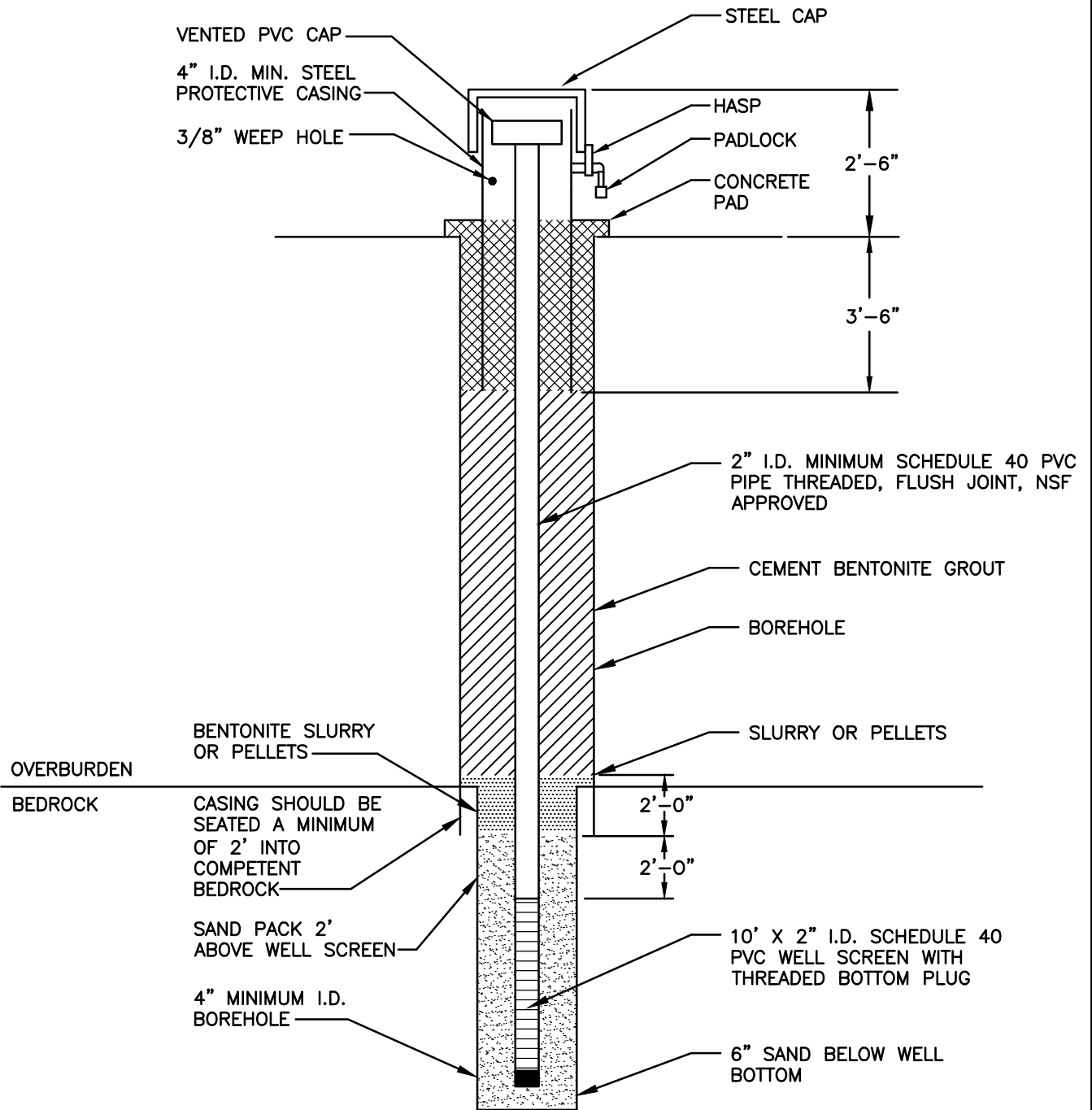
As previously described, at a minimum, the boreholes will be advanced to a depth of 1/2 foot beyond the desired screen interval to allow for a sand pack to be placed on the bottom of the boring. Typical details of well construction specifications are shown in Figure 4-2.

When overburden is penetrated and is contaminated, or suspected to be contaminated, consideration will be given to drilling a double-cased boring with the outer casing keyed into and sealed into the bedrock (or overburden confining unit). Double casing will be considered when the potential exists for shallow contaminants to be "dragged" to a deeper, uncontaminated zone by drilling. Drilling through a confining layer that underlies a contaminated zone will require double casing. Details of and rationale for double casing drilling and well construction techniques will be provided in the Site-Specific Work Plan. Bedrock monitoring well completions will be the same as for overburden wells as discussed in Section 4.16. Specific details and rationale for the installation of monitoring wells and piezometers will be provided in the Site-Specific Work Plan.

4.16.6 Borehole and Monitoring Well Logging

All borehole construction and monitoring well installation will be logged and documented by a geologist or environmental scientist. Notes will be kept in both bound field books and on boring logs and monitoring well construction logs. The boring logs will include the depths of stratigraphic changes, description of all samples, details of drilling techniques, listing of soil samples collected for laboratory analyses, measurements made with PIDs. Well construction specifications will be provided in the monitoring well construction logs. The Modified Burmeister or Unified Soil Classification System will be used to describe soil samples recovered from the borings. A Daily Field Activity Report will be completed whenever there are drilling activities (or any other field activities) undertaken as part of the investigation.

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GENERIC FIELD ACTIVITIES PLAN



PLAN FOR CONSTRUCTION OF
BEDROCK MONITORING WELLS

FIGURE 4-2

4.16.7 Monitoring Well Development

Monitoring wells will be developed by pumping and surging until the turbidity of the groundwater achieves a reading of 50 NTUs (nephelometric turbidity units) or less, or until NYSDEC approves cessation of development. Well development will be supplemented by measurements of field parameters, including temperature, pH and specific conductance. Development will continue until the field parameters stabilize for a minimum of three consecutive readings of 10 percent variability or less, or as approved by the NYSDEC. When possible, well development water should be recharged on-site. Refer to Section 3.0 for further discussion on containment and disposal of development water. All equipment used for the development of monitoring wells will be decontaminated prior to use and between wells.

4.16.8 Groundwater Level Measurement

Groundwater level measurements will be obtained from each of the wells newly installed, as well as existing wells. Groundwater level measurements of all wells will be made within an 8-hour period of uniform weather conditions. Additionally, water levels will be obtained from surface water bodies that are suspected of influencing groundwater flow on or near the site by installing a fixed measuring point such as a staff gauge or permanent mark, on a fixed surface and measuring the depth to the surface of the water body. The measuring points will be surveyed for location and elevation.

All water level measurements will be made using a fixed reference point at each measurement location. Downhole instruments will be decontaminated between each measurement location. The static water level will be measured to the nearest 0.01 foot. Groundwater level data will be used to construct groundwater surface elevation maps and used to determine local horizontal flow direction, as well as vertical gradients.

4.16.9 Groundwater Sampling

The depth to the water level and depth to well bottom will be measured in order to calculate the liquid bore volume necessary for purging. Prior to collection of groundwater level measurements, the headspace of the well will be measured utilizing a PID as soon as the well cover is opened. Depth to water will be measured with respect to a reference point established at the top of the well casing. Water level measurements will be obtained using a decontaminated electronic water level indicator. If NAPL is encountered/observed an oil water-interface probe will be utilized to measure the NAPL thickness. If LNAPL is observed in a well, then a groundwater sample would not be collected, but rather a sample of the LNAPL would be collected.

The wells will be purged until a minimum of three to five well volumes have been removed or until the well is dry, whichever occurs first. The number of well volumes purged will be a function of the pH, temperature and conductivity, and will continue until stabilization of these parameters is achieved. Purge water will be recharged on-site, if possible. Refer to the Generic QAPP for further discussion on containment and disposal of purge water.

Disposable polyethylene bailers with disposable nylon or polypropylene rope will be used for purging and sampling of the wells. Deep wells or wells that require large volumes of water to be removed may be purged and sampled using decontaminated, downhole pumps and decontaminated or disposable tubing. Once the well has been sufficiently purged, sampling will begin. If groundwater recovery is very slow, it may be necessary to wait several hours, or overnight, for sufficient volume to become available for the necessary sample analyses. Locations of the monitoring wells will be identified in the Site-Specific Work Plan together with the rationale for selection. Groundwater samples will be analyzed for DER-required analytical parameters as defined in Section 4.1. Specific monitoring well sampling procedures are listed in the Generic QAPP.

If low-flow sampling techniques are recommended for a specific sampling program then the appropriate equipment will be utilized including a low flow pump, controller and dedicated

tubing. The purge rate will be kept to less than 500 milliliters per minute (ml/m). Initially, the required purge volume will be calculated and once the minimum purge volume is removed then field quality indicator parameters (i.e. temperature, conductivity, ph, dissolved oxygen and turbidity) will be monitored. Indicator parameters will be monitored every 5 minutes and recorded in the field log. The well shall be considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings.

4.17 Probe Hole, Borehole and Well Abandonment

Direct push probe holes and soil borings which are not completed as monitoring wells will be fully sealed in a manner appropriate for the geologic conditions to prevent contaminant migration through the borehole. Sealing of the well or borehole will include the following methods: overboring or removal of the casing to the greatest extent possible followed by perforation of any casing left in place; removal of all casing and other well construction material within the upper 5 feet of the boring or within 5 feet of the proposed excavation level; sealing by pressure injection with cement bentonite grout using a tremie pipe to a depth extending the entire length of the boring to within 5 feet below the ground surface or the proposed excavation level; sealing the remaining 5 feet to ground surface with neat cement grout; and restoration of the sealed site to a safe condition. Well abandonment will follow the methods described in NYSDEC Commissioner Policy CP-43: Groundwater Monitoring Well Decommissioning Policy dated November 2009.

4.18 In-Situ Hydraulic Conductivity Testing

In-situ hydraulic conductivity testing provides useful information regarding the groundwater flow characteristics in the geologic units of concern. Hydraulic conductivity testing will be performed on monitoring wells installed as part of the remedial investigation or extraction wells specifically designed and installed for testing, to define the hydraulic properties of an aquifer, groundwater flow rate and the potential for migration of groundwater contaminants. Depending upon site conditions, one or more of the following tests will be

performed as part of the site-specific investigation. Details on the selected method will be provided in the Site-Specific Work Plan.

4.18.1 Slug Tests

In-situ hydraulic conductivity testing (slug tests) may be conducted on monitoring wells installed as part of the investigation. Slug test data will be collected using falling and rising heads at each well. Hydraulic conductivity calculations will be made using the Bouwer and Rice or other similar method for analyzing slug test data.

Slug testing involves measuring the rate at which water, in a monitoring well, returns to its initial level after a sudden injection or withdrawal of a known volume. Changes in water level over time will be recorded. All downhole equipment will be decontaminated between wells. The data will be recorded using an electronic datalogger and pressure transducer.

4.18.2 Packer Tests

Packer tests may be performed in bedrock borings to determine the relative permeability of fractures encountered during drilling. Packer testing, if necessary, will be performed during bedrock drilling and the results will be used to determine the placement of well screens in bedrock wells. Packers are inflatable devices that are inserted at a selected depth and inflated using water or gas to seal off a portion of the borehole. Either single or double packers may be used, depending on site conditions and the need to isolate specific fractures. The packer test is performed by inflating the packer(s) and injecting potable water into the open hole beneath or between the packer(s). The head or pressure on water injected is monitored over time. The data recorded from the packer test will be interpreted to provide hydraulic conductivity information.

4.18.3 Pumping Test

Pumping tests on monitoring wells are often difficult to perform and, therefore, wells specifically designed for pumping tests may be installed, if necessary. It may be necessary to

extract large volumes of water in order to obtain useful information regarding aquifer characteristics including hydraulic conductivity. Disposing of the water pumped and obtaining accurate water level readings must also be addressed. Constant rate pumping tests for periods of several hours are normally required. Monitoring wells within the study area/site must be monitored for draw down during the test.

Generally, the test well is pumped for several hours at a fixed, known rate. Groundwater elevations in the pumping well and adjacent monitoring wells are recorded at periodic time intervals using an electronic datalogger with pressure transducers or water level measuring device. Data collected during the test is graphed and interpreted using curve matching and mathematical regression techniques. Pumping test data provides aquifer characteristics, including hydraulic conductivity and specific yield, over a relatively large area compared to slug tests. This data is generally necessary for the design of remedial alternatives involving pumping or extraction of groundwater. The Site-Specific Work Plan will provide the rationale and design for pumping tests.

4.19 Downhole Logging

Downhole logging is useful for providing subsurface information in existing wells for which soil samples or logs are not available. Downhole logging can also provide subsurface information not normally available from visual inspection of soil or rock samples. Downhole logging is applicable when detailed information is needed from domestic water wells or pre-existing monitoring wells.

Downhole surveys produce continuous logs of borehole characteristics that cannot be obtained through visual logging of samples or drilling observations. Methods for geologic and hydrogeologic characterization using downhole logging most commonly use probes that are lowered on a cable. These probes transmit signals to surface instruments that generate logs or charts that relate changes with respect to depth of the parameter being measured. Provided below are descriptions of downhole logging technologies that can be performed.

4.19.1 Geophysical Logging

Most borehole geophysical techniques for characterizing bedrock and unconsolidated deposits fall into three categories comprising electrical or electromagnetic methods; nuclear methods; and acoustic or seismic methods. Additional borehole logging methods include caliper, temperature and fluid flow logging.

The type of borehole (cased or uncased) and whether it is filled with fluid or is dry, are major considerations in the selection of borehole logging techniques. Most electrical methods, for example, require an uncased borehole and either drilling fluid or water in the hole. Several different types of logs can be run in the same borehole and compared to facilitate stratigraphic interpretations. Based upon site-specific conditions and goals of the investigation, different suites of logging techniques may be used. A typical suite of logs in a fluid filled borehole may include spontaneous potential, single point resistance, natural gamma, neutron, caliper, fluid conductivity, temperature and acoustic velocity logging. Measurement of groundwater flow using impeller-flow meter logging equipment in boreholes is an especially useful technique for locating zones of high permeability within a borehole. Temperature logging is also useful in identifying zones of recharge to the well. Specific borehole geophysical methods will be determined on a site-specific basis and described in the Site-Specific Work Plan, together with the rationale for selection.

4.19.2 Borehole Television Camera

Borehole television surveys provide information regarding stratigraphic characterization, fracture frequency size and orientation, and vertical correlation of bedrock cores. A television camera is attached to a flexible multi-lead video cable and lowered down the borehole for visual inspection of the borehole walls. The depth of the probe is measured and displayed on the TV monitor. The camera is mounted with a light and can be positioned remotely to view the borehole at different angles. Proper magnification of the picture can allow the observation of flow direction, velocity and turbidity of groundwater. Downhole cameras are particularly useful

for identifying flow into or out of fractures. Borehole cameras could best be used in the investigation of sites to identify fractures and their susceptibility to high permeability flow.

4.20 Geotechnical Analyses

Several geotechnical analyses may be appropriate to characterize soil conditions and groundwater flow, and predict the effectiveness of remedial alternatives at a site. Based upon site-specific conditions and possible remedial alternatives, geotechnical analyses can be performed in a laboratory or in the field. The following sections briefly describe several available geotechnical methods to be utilized.

4.20.1 Laboratory Analyses

Included in laboratory analytical techniques are sieve analyses, hydrometer testing and laboratory permeability testing. Information from these analyses can be used to define aquifer properties such as permeability and storability, and soil response, such as caking or mobilization, to remediation attempts. Collection of samples for these tests involves retrieving minimum quantities of samples to properly perform the analyses and using specialized sampling tools, such as a Shelby tube or Denison sampler, to collect undisturbed samples. Samples collected for sieve and hydrometer analyses will be performed in accordance with ASTM Method D422 and ASTM Method D1140, respectively. Similarly, samples collected for permeability analyses will be analyzed in accordance with ASTM Method D4318. The need for these types of samples and analysis will be determined on a site-specific basis and contained in the Site-Specific Work Plan.

4.20.2 Cone Penetrometer

A cone penetrometer is used for stratigraphic logging in soft soil. A cone penetrometer can measure subsurface hydraulic characteristics, including pressure head, soil permeability and water-bearing zones. The cone penetration test involves hydraulically pushing a cone-shaped instrument into the soil and measuring its resistance to penetration. Resistance is measured by sensitive strain gauges that transmit electronic signals to a datalogger. A cone penetrometer can

estimate the hydraulic properties of a soil by measuring the pore pressure changes in response to the stresses created by the cone penetrometer. The use of a cone penetrometer is dependent upon the characteristics of unconsolidated materials at the site. The materials must be relatively soft and free of gravel or cobbles. The need for use of a cone penetrometer will be determined on a site-specific basis.

4.21 Historic Fill Material Characterization

DER-10 defines historic fill material (HFM) as non-indigenous or non-native imported material, contaminated prior to emplacement, and historically deposited or disposed on or in the general vicinity of a site to create usable land by filling water bodies, wetlands, or topographic depressions, which is in no way connected with the subsequent operation at the location of emplacement. HFM may consist of solid waste including, but not limited to, coal ash, wood ash, municipal solid waste incinerator ash, construction and demolition debris, dredge sediment, railroad ballast, and refuse and land clearing debris, which was used prior to October 1962. HFM excludes soil or soil-like wastes in areas operated as a landfill by a municipality or other persons, chemical production wastes, and wastes produced on the site from processing of metal or mineral ores, residues, slag, or tailings.

If HFM is identified during the SC or during development of the RI work plan, then the HFM will be characterized in an RI to identify the location, physical characteristics, and horizontal and vertical extents of HFM on and in the general vicinity of a site. To accomplish HFM characterization, the investigation may require the installation of soil borings, test pits, excavation trenches, and/or appropriate geophysical techniques. If required, the HFM investigation will include:

- Logging and mapping of the location, physical characteristics, and horizontal and vertical extents of all COC-impacted HFM and non-historic fill material encountered;
- Installation of a minimum of four soil borings or test pits per acre of HFM with a minimum of four soil borings or test pits. The location of the soil borings or test pits will be representative of the horizontal and vertical extent of the fill and will be

advanced through the fill material until either a meadow mat representing pre-fill ground surface, native soil, or bedrock is encountered;

- If the contaminated fill extends below the groundwater table, then the soil borings or test pits will extend below the groundwater table as necessary to establish the vertical extent of the HFM and non-historic fill material;
- The horizontal extents of COC-impacted HFM and non-historic fill material will be delineated by:
 - Installation of a minimum of four soil borings or test pits in non-fill areas spaced equidistantly around the perimeter of the COC-impacted HFM and non-historic fill material areas;
 - If the ubiquitous nature of COC-impacted HFM and non-historic fill material can be readily demonstrated to be distributed site-wide by aerial photos or other applicable documentation, then this data can be used in lieu of perimeter soil borings or test pits; and
 - Delineation of HFM is not required beyond the property boundary, unless directed by DER to further delineate potential off-site contamination due to migration from the site.
- Separate characterization of each type of historic fill present (e.g., coal ash and construction and demolition debris are two distinct HFMs) to determine the nature and fill-specific contaminant levels. Separate characterization will be accomplished as follows:
 - Collect a minimum of four soil samples per acre per each type of historic fill. The actual number and location of soil samples collected will be based on the variability of fill types and concentrations of COCs present in an individual historic fill area;
 - At least one soil sample will be collected from each soil boring and submitted for laboratory analysis as follows:
 - Rubble, ash, cinders, and dredge spoils will be analyzed for total petroleum hydrocarbons (TPH), priority pollutant metals in all samples, carcinogenic and noncarcinogenic polycyclic aromatic hydrocarbons (per USEPA Priority Pollutant List), and PCBs on 25 percent of samples collected with a bias towards samples having the highest TPH concentrations. If any inquiries into the origin of the HFM and site history suggest additional COCs may be present at the site, then these analytes will be added to the contaminant analysis list for the site;
 - Headspace VOC screening will be conducted on all soil samples collected during soil boring and test pit installations. All soil samples exhibiting

headspace VOC concentrations greater than five times established background concentrations will be submitted for laboratory analysis of TCL VOCs; and

- If multiple HFM are encountered in soil borings or test pits, a minimum of one soil sample will be selected for laboratory analysis from each type of fill material encountered.
- If an HFM contains additional AOCs within the fill area unrelated to the HFM, then these AOCs will be investigated independently to differentiate between COCs in the HFM and those from site discharges. The investigation of these AOCs will identify the nature and extent of COCs and the concentration gradient in each AOC into the HFM; and
- A minimum of one groundwater sample will be collected within each HFM area, in order to assess whether concentrations of COCs in each HFM have impacted site groundwater.

4.22 Field Testing Technologies

4.22.1 Immunoassay Colorimetric Field Quantification of Analytes

On-site field screening analysis, when deemed appropriate, will utilize methanol extraction of soil and immunoassay colorimetric quantification of selected analytes to provide real-time screening results. The selected analytes may include, but not limited to, total benzene, toluene, ethylbenzene, and xylenes (Total BTEX), naphthalene, total petroleum hydrocarbons (TPH), polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). Immunoassay field-screening analyses will be accomplished using the Total BTEX/Naphthalene/TPH RaPID Assay, PAH RaPID Assay, and PCB RaPID Assay field kits supplied by Strategic Diagnostics, Inc. of Newark, Delaware, or equivalent. These field kits apply the principles of enzyme linked immunosorbent assay (ELISA) to the determination of BTEX/Naphthalene, PAHs, and PCBs. These field kits are capable of detecting very low levels of BTEX/Naphthalene, PAHs, and PCBs. More detailed sampling procedures are provided in the Generic QAPP. Site-specific sampling locations will be identified in the Site-Specific Work Plan.

4.22.2 X-Ray Fluorescence Devices

On-site XRF field analysis, when deemed appropriate, will utilize a Niton[®] SL3t XRF (or equivalent), equipped with a 50kV x-ray tube. In order to measure concentrations of lead in a material, the desired sample is positioned in front of the XRF probe window. Field measurement can be accomplished using either in-situ or intrusive analysis modes. If operated in the in-situ mode, the probe window is placed in direct contact with the paint, coating, sediment, or soil surface to be analyzed. When the XRF analyzer is operated in the intrusive mode, a soil or sediment sample must be collected, prepared, and placed in a sample cup. The sample cup is then placed on top of the window inside a protective cover for analysis.

4.23 Fish and Wildlife Resources Impact Analysis

The purpose of a Fish and Wildlife Resources Impact Analysis (FWRIA), as defined by DER-10, is two-fold as follows:

- To identify potential or existing impacts to fish and wildlife resources from site contaminants of ecological concern via a Resource Characterization Study (RCS); and
- If the results of the RCS indicate that further assessment is needed, an Ecological Impact Assessment (EIA) is required to further define and evaluate the adverse impacts to fish and wildlife resources.

An FWRIA is not needed, if one or more of the following criteria are met:

- The remediation at the site will be directed toward a specific discharge or spill event that does not adversely impact fish and wildlife resources;
- The AOCs at the site consist solely of USTs or underground discharge tank system, where no significant surface water and groundwater impacts have occurred;
- The site is a point source of contamination to groundwater (i.e., dry cleaner or gas station) which will be prevented from discharging to surface water, and there is no widespread soil contamination and no existing habitat where endangered, threatened, or special concern species reside; and

- There are no fish, wildlife, or ecological resources present on or in the vicinity of the site.

The RCS conducted at the site will develop an investigatory strategy consisting of the following:

- Identification of all fish and wildlife resources based upon knowledge of the site and a records review search of NYSDEC files and other sources;
- Generation of a fish and wildlife resources base map showing the following minimum components:
 - Habitats supporting rare, threatened, and endangered species;
 - NYS regulated wetlands;
 - Waterways including all classified waters;
 - Wild, scenic and recreational rivers;
 - Significant coastal fish and wildlife habitats, streams, and lakes; and
 - State forests, forest or nature preserves, parks, or other designated open or green spaces.

If the results of the RCS indicate that further assessment is needed, a work plan prepared for DER review and comment and an EIA will be conducted at the site that will further define and evaluate the adverse impacts to fish and wildlife resources in the following manner:

- Collection of additional soil, sediment, and/or surface water samples, as deemed necessary by DER, to further delineate or characterize the contaminants of ecological concern (CECs);
- Use of passive in-situ concentration/extraction samplers (PISCES), as deemed necessary by DER, to identify sources of organochlorine compounds with extremely low solubility in surface water;
- Collection of toxicity testing samples or bioassays of contaminated soil, sediment or surface water, as deemed necessary by DER, according to the latest USEPA, ASTM, or other approved methods for assessing acute and chronic effects;
- Collection and analysis of biota tissue samples, as deemed necessary by DER;

- Completion of a terrestrial, aquatic or marine population and/or community assessment, as deemed necessary by DER; and
- Completion of any additional ecological assessments or other evaluations as requested by DER.

The FWRIA will describe the findings of the RCS and EIA and the potential or existing impacts to fish and wildlife resources as a separate section of the RI report. The FWRIA section of the report will develop appropriate ecologically-based, site-specific cleanup objectives for site CECs and recommend measures for incorporation into the remedy selection report to eliminate or mitigate potential and existing adverse impacts.

5.0 FIELD INSTRUMENTS AND CALIBRATION

All field analytical equipment will be calibrated immediately prior to each day's use and more frequently, if required. The calibration procedures will conform to manufacturer's standard instructions. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. Instrument calibrations will be documented in the project field logbook and in an instrument calibration log. Records of instrument calibration will be maintained by the Field Team Leader and will be subject to audit by the Project Quality Assurance Manager (PQAM). Copies of the instrument manuals and/or instruction sheets will be maintained on-site by the Field Team Leader.

The following field instruments may be used during the investigation:

- Photoionization Detector (PID)
- Dust meter (real-time aerosol monitor)
- pH Meter
- Specific Conductivity Meter and Temperature Probe
- Turbidity Meter
- Niton[®] SL3t XRF (or equivalent), equipped with a 50kV x-ray tube
- Total BTEX/Naphthalene/TPH RaPID Assay, PAH RaPID Assay, and PCB RaPID Assay or equivalent immunoassay field kits

5.1 Portable Photoionization Analyzer

- The photoionization analyzer will be a RaeSystems MiniRae 2000 (or equivalent), equipped with a 10.6 eV lamp, unless otherwise specified. The MiniRae is capable of ionizing and detecting compounds with an ionization potential of less than 10.6 eV. This accounts for up to 73% of the volatile organic compounds on the Target Compound List.

- Calibration must be performed at the beginning and end of each day of use with a standard calibration gas having an approximate concentration of 100 parts per million of isobutylene. If the unit experiences abnormal perturbation or erratic readings, additional calibration will be required.
- All calibration data must be recorded in field notebooks and on calibration log sheets to be maintained on-site.
- A battery check must be completed at the beginning and end of each working day.

5.2 Dust Meter

- The operator shall ensure that the instruments respond properly to the substances that they are designed to monitor. Real time aerosol monitors, such as the MiniRAM, or equivalent must be zeroed at the beginning of each sampling period. The specific instructions for calibration and maintenance provided for each instrument should be followed.
- All calibration data must be recorded in field notebooks and on calibration log sheets to be maintained on-site.
- A battery check must be completed at the beginning and end of each working day.

5.3 pH Meter

- Calibration of the pH meter must be performed at the start of each day of use and after very high or low readings, as required by this plan, according to manufacturer's instructions.
- National Institute of Standards and Technology - traceable standard buffer solutions which bracket the expected pH range will be used. The standards will be pH of 4.0, 7.0 and 10.0 standard units.
- The use of the pH calibration must be used to set the meter to display the value of the standard being checked.

5.4 Specific Conductivity Meter and Temperature Probe

- Calibration checks using the conductivity standard must be performed at the start of each day of use, after five to ten readings or after very high or low readings, as required by this plan, according to manufacturer's instructions.
- The portable conductivity meter must be calibrated using a reference solution of 200 umhos/cm on a daily basis. Readings must be within five percent to be acceptable.
- The thermometer of the meter must be calibrated against the field thermometer on a weekly basis.

5.5 Turbidity Meter

- The turbidity meter must be checked at the start of each day of use and at the end of the day according to manufacturer's instructions.

5.6 X-Ray Fluorescence Analyzer

- The XRF analyzer will be a Niton[®] SL3t (or equivalent), equipped with a 50kV x-ray tube. The Niton[®] SL3t is capable of approximately two times the x-ray flux of a 40 kV x-ray tube, lower detection limits for higher Z-elements, and shorter measurement times.
- To determine whether the XRF analyzer is operating within resolution and stability tolerances, an energy calibration check should be run. The energy calibration check determines whether the characteristic x-ray lines are shifting, which would indicate drift within the instrument. The energy calibration check should be run at a frequency consistent with the manufacturer's recommendations. Generally, calibration should be run at the beginning of each working day, and at any other time when the instrument operator suspects that drift may be occurring during field analysis. If the energy calibration check does not meet the manufacturer's criteria, then the pure element sample should be repositioned and reanalyzed. If the criteria are still not met, then an energy calibration should be performed as described in the manufacturer's manual. With some XRF analyzers, once a spectrum is acquired from the energy calibration check, the peak can be optimized and realigned to the manufacturer's specifications using their software. If the unit experiences abnormal perturbation or erratic readings, additional calibration will be required.
- Manufacturer's typically recommend that XRF analyzers be allowed to warm up for 15 to 30 minutes before analysis of samples. This instrument warm up will help alleviate drift or energy calibration problems later during analysis.

5.7 Immunoassay Colorimetric Field Test Kits

Immunoassay field-screening analyses will be accomplished using the Total BTEX/Naphthalene/TPH RaPID Assay, PAH RaPID Assay, and PCB RaPID Assay field kits supplied by Strategic Diagnostics, Inc. of Newark, Delaware, or equivalent. In order to obtain accurate and defensible field analytical results, field personnel must follow the specific instructions for usage, methodologies, and maintenance for each field test kit provided by the manufacturer.

APPENDIX A

FIELD FORMS

ENGINEERING AND INSTITUTIONAL CONTROL INSPECTION FORM

I. Site Background Information

A. Site Name and Location:

Site name as it appears on the Environmental Easement: _____

Name of the current property owner(s): _____

Site Street Address: _____

Municipality (-ies): _____ County (-ies): _____

Blocks: _____

Lots: _____

Source information obtained from: _____

B. Person responsible for preparing Engineering and Institutional Control Evaluation Form:

Person's Name: _____

Person's Title: _____

Company Name: _____

Relationship to the Site (check as appropriate): Owner _____ Operator _____

Lessee _____ Person Who Conducted the Cleanup _____

Other (describe) _____

Street Address: _____

City: _____ State: _____

Telephone Number: (____) ____-____

Fax Number: (____) ____-____

E-mail Address: _____

C. Case Specific Information (Complete all that apply)

- Site Name: _____
- Site Registry Number: _____
- Date of final Remediation Report and/or Certificate of Completion: _____
- Name and program of assigned Project Manager at issuance of Environmental Easement:

D. Existing Site Conditions

- Describe the physical characteristics of the site (features, topography, drainage, vegetation, access, etc.). If necessary, attach additional sheets.

- Describe the current site operations/use. If necessary, attach additional sheets.

- Describe visual integrity/condition engineering control. If necessary, attach additional sheets.

II. Protectiveness Evaluation

A. Environmental Easement and Engineering Control Information (Complete below)

- Provide the following information for the recorded Environmental Easement:

Book Number: _____

Page Number: _____

Date the date the Environmental Easement was filed in the office of the county recording officer: _____

- Have any amendments and/or additional filings been recorded that may modify or supersede the Environmental Easement?

Yes ____ No ____

If "Yes", provide an explanation. If necessary, attach additional sheets.

B. Evaluation of Engineering and Institutional Controls

1. Zoning or Land Use Changes (Complete below)

a. Land use at the time the Environmental Easement was filed (check all that apply):

Non-Residential ____ Residential ____ Agricultural ____ Other ____

b. Current land use (check all that apply):

Non-Residential ____ Residential ____ Agricultural ____ Other ____

c. Has there been an actual or pending zoning or land-use change?

Yes ____ No ____

2. Inspections (Complete below)

Have periodic inspections of the site identified any excavation or other disturbance activities that have taken place within the restricted areas?

Yes ____ No ____

Date(s) of Disturbance: _____

Duration of Disturbance: Years ____ Months ____ Days ____

Date the NYSDEC was notified: _____

Date Work Plan Approved: _____

Description of the disturbance and methods to address the disturbance. If necessary, attach additional sheets.

Name of Contact Person Relative to the Disturbance:

Title: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____

Telephone Number: _____

Email Address: _____

3. Changes to Laws and Regulations (Complete below)

- a. Are there any subsequently promulgated or modified environmental laws or regulations, which apply to the site?

Yes ____ No ____

- b. If "Yes", has the evaluation also determined that the Environmental Easement and engineering control, as applicable, meets the requirements of the new laws and regulations?

Yes ____ No ____

- c. The Environmental Easement and engineering control, as applicable that did not meet the requirements of the new laws and regulations has been addressed in the following manner to bring them into compliance. If necessary, attach additional sheets.

Date: _____

AIR MONITORING FORM

Project Name: _____

Project Number: _____ Instrument: _____

Recorded by: _____ Calibration Date: _____

Weather Conditions: _____

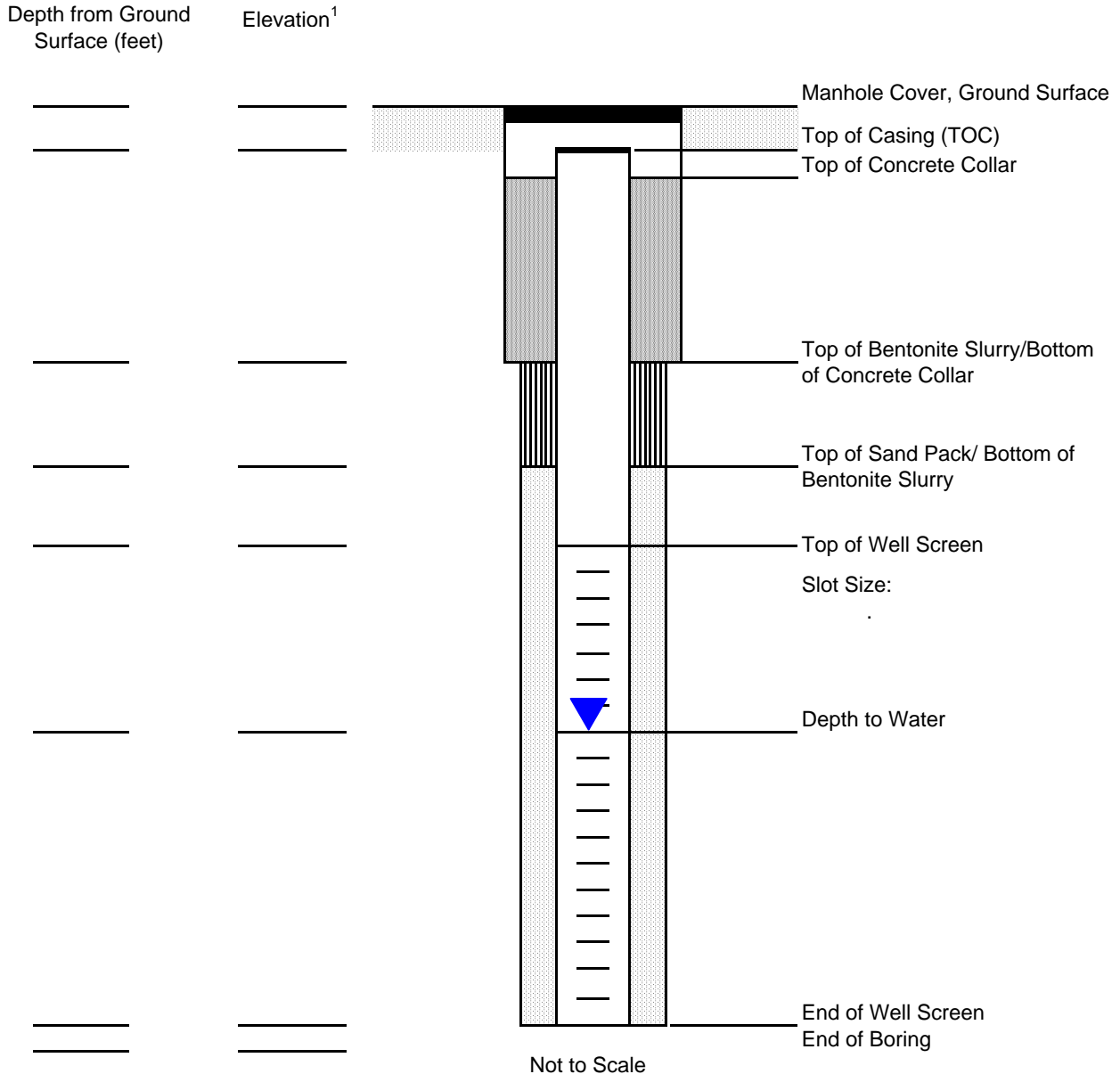
Time	Location	Wind Speed and Direction	Reading	Observations

Recording Procedures/Remarks: _____

WELL CONSTRUCTION LOG

WELL:
SHEET OF

PROJECT NAME: _____	WELL NUMBER: _____
ADDRESS: _____	DRILLING METHOD: _____
INSTALLATION DATE: _____	DRILLER: _____
DEVELOPMENT DATE: _____	GAUGING DATE: _____
HEIGHT OF STICK-UP: _____	DEPTH TO WATER ² : _____
ELEVATION ¹ : _____	DEPTH TO PRODUCT ² : _____
DATUM: _____	SCREEN MATERIAL: _____
CASING MATERIAL: _____	SEAL TYPE: _____
FILTER PACK TYPE: _____	



Notes:
¹Feet above datum
²Feet below top of casing



BORING LOG

BORING SHEET OF

JOB NAME/ CLIENT	PROJECT NO.	AREA OF CONCERN	
ADDRESS		ELEVATION/DATUM	
DRILLING CONTRACTOR	DRILLER	INSPECTOR	
DRILLING RIG	TYPE/SIZE BIT	START DATE	END DATE
SAMPLER TYPE	HAMMER WEIGHT/DROP	TOTAL DEPTH	WATER LEVEL

SAMPLES			DEPTH	WATER	DESCRIPTION OF SOILS	REMARKS
NUMBER	RECOVERY IN FEET	BLOWS PER 6"				
1			4		(SAA = Same As Above) f - fine m - medium c - coarse lt - light dk - dark tr - trace ltl - little	(PID, STAINING, ODORS, ETC.) FP = Free Product N/S = No Staining, N/O = No odors SO = Slight Odor, MO = Moderate Odor STO = Strong Odor
2			8			
3			12			
4			16			
5			20			

WELL NUMBER	WELL INFORMATION					Date:
MW	Well Diameter (inches)	Total (1) Depth (ft)	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	Personnel:
PERMIT NUMBER						Site Name:
NA						Site Location:
						Job Number:

(1) Use a previously determined total depth. Confirm the total depth of well after sampling.
TOC = top of casing

PURGING INFORMATION							WATER QUALITY METER CALIBRATION READINGS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/m)	Total Purge Vol. (L)	Temp:	pH:	Cond:
							D.O.:	ORP:	Turbidity:
							Rental Meter Name:		
							Rental Meter Serial No.:		

(2) Below TOC

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:										
	<0.3 ft	± 3%	± 0.1 su	± 3%	± 10%	± 10 mv	± 10%⁽³⁾			
Time	Flow Rate (ml/m)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (ppm)	ORP (mv)	Turbidity (NTU)	Initials	Water Conditions/Comments
Sample Name:		Sample Time:		Number of Bottles:						
Analytical Parameters:									Sample Start Time:	
Weather Conditions:									Sample Finish Time:	

Revised 01/05

(3) For values greater than 1.
Note: Indicator parameters have stabilized when 3 consecutive readings taken every 5 mins are within criteria above.



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CHAIN OF CUSTODY RECORD

Page of

Special Handling:
 TAT- Indicate Date Needed: _____
 All TATs subject to laboratory approval.
 Min. 24-hour notification needed for rushes.
 Samples disposed of after 30 days unless otherwise instructed.

Report To: _____

Invoice To: _____

Project No.: _____

Project Mgr.: _____

P.O. No.: _____ RQN: _____

Site Name: _____
 Location: _____
 State: _____

Sampler(s): _____

1=Na₂SO₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid 7=CH₃OH
 8= NaHSO₄ 9=_____ 10=_____ 11=_____

DW=Drinking Water GW=Groundwater WW=Wastewater
 O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
 X1=_____ X2=_____ X3=_____

List preservative code below:

QA/QC Reporting Level
 Level I Level II
 Level III Level IV
 Other _____
 State specific reporting standards: _____

Notes:

Containers:
 # of VOA Vials _____
 # of Amber Glass _____
 # of Clear Glass _____
 # of Plastic _____

Analyses:

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix

G=Grab C=Composite

Relinquished by: _____ Received by: _____ Date: _____ Time: _____

E-mail to _____
 EDD Format: _____

Condition upon receipt: Iced Ambient °C _____

APPENDIX H

REMEDIAL SYSTEM OPTIMIZATION TABLE OF CONTENTS

REMEDIAL SYSTEM OPTIMIZATION FOR [AVM GOWANDA SITE]

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APPENDIX I – HEALTH AND SAFETY PLAN

SITE-SPECIFIC HASP

The following site-specific information will be filled out by project personnel for each site and will be posted on-site:

Site Name: AVM Gowanda
 Address: One Industrial Place
Gowanda, Cattaraugus County, NY
 Telephone: _____
 Date of HASP Preparation: October 1, 2019
 Dates of Field Investigation: TBD
 Entry Objectives: To manage remaining contamination at the site in accordance with the associated Site Management Plan (SMP) to ensure protection of public health and the environment.

	Name	Phone
NYSDEC Project Manager:	<u>Robert Strang</u>	<u>(518) 402-8642</u>
D&B Project Manager:	<u>Frank DeVita</u>	<u>(516) 364-9890</u>
D&B Site Project Manager:	<u>Matt Hoskins</u>	<u>(516) 364-9890</u>
D&B HSO:	<u>Matt Hoskins</u>	<u>(516) 364-9890</u>
Field team staff:	<u>TBD</u>	_____
	_____	_____
	_____	_____

Subcontractors: _____

Medical Assistance
 Hospital: Brooks-TLC Health Systems
 Address: 845 Main Rd, Irving, NY 14081

SITE-SPECIFIC HASP

Emergency
Telephone: (716) 951-7000 (Emergencies call 911)

Directions: Take Torrance Pl to make a right onto Jamestown St.
Continue onto NY-438 N. (14.4 mi)
Take the 4th exit at the traffic circle and continue onto
Seneca Rd. Continue for 0.2 mi.
The hospital will be on the left.

Please attach a route to hospital

Emergency Telephones

Agent/Facility	Telephone	Emergency No.
EMS - Ambulance	(716) 532-4884	911
Police Department	(716) 532-2020	911
Fire Department	(716) 938-2213	911
Hospital	(716) 951-7000	911
Poison Control Center	1-800-222-1222	1-800-222-1222

Additional site related information (may include special hazards, site control, waste storage and disposal, PPE, decon area location, special engineering controls, etc.).

Use PPE typically associated with groundwater sampling (i.e. disposable gloves).

Wastes accumulated on-site (i.e. disposable gloves, polyethylene tubing, decontamination water, groundwater monitoring well purge, etc.) shall be handled, transported, and disposed of in accordance with all applicable local, State, and Federal regulations.

YOUR TRIP TO:

845 Main Rd



23 MIN | **14.7 MI** 🚗

Est. fuel cost: \$1.47

Trip time based on traffic conditions as of 11:03 AM on October 2, 2019. Current Traffic: Light

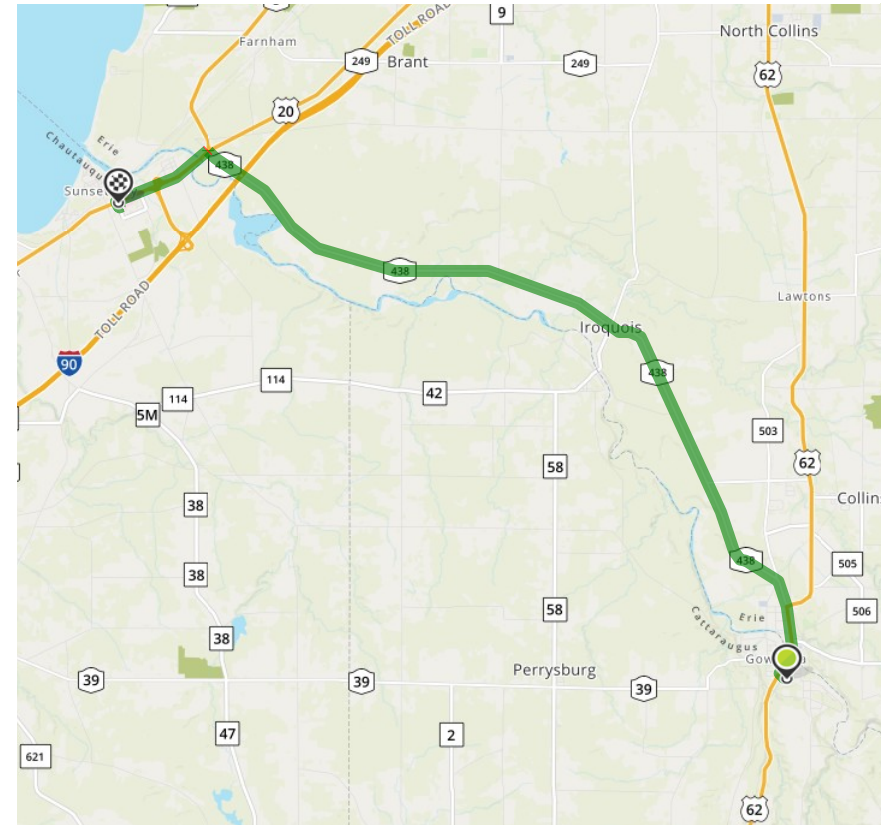


Print a full health report of your car with HUM vehicle diagnostics (800) 906-2501

1. Start out going **north** on Industrial Pl toward Torrance Pl.
Then 0.05 miles 0.05 total miles
2. Turn **left** onto Torrance Pl.
Then 0.15 miles 0.20 total miles
3. Turn **right** onto Jamestown St/US-62 E. Continue to follow US-62 E.
Then 0.38 miles 0.58 total miles
4. Turn **slight left** onto Buffalo St/US-62 E/NY-39. Continue to follow Buffalo St.
Buffalo St is just past Legion Dr.
Then 1.09 miles 1.67 total miles
5. Buffalo St becomes Route 438.
Then 11.33 miles 13.00 total miles
6. Enter next roundabout and take the 4th exit onto Main Rd/Great Lakes Seaway Trail/US-20 E/NY-5.
Then 1.59 miles 14.59 total miles
7. Turn **left** onto Seneca Rd.
If you reach Ontario Rd you've gone a little too far.
Then 0.07 miles 14.66 total miles
8. Turn **left**.
If you reach Southerland Rd you've gone about 0.1 miles too far.
Then 0.01 miles 14.67 total miles
9. Turn **right**.
Then 0.05 miles 14.72 total miles
10. 845 Main Rd, Irving, NY 14081-9706, 845 MAIN RD.

📍 Save to My Maps

Use of directions and maps is subject to our [Terms of Use](#). We don't guarantee accuracy, route conditions or usability. You assume all risk of use.





New York State Department of Environmental Conservation

Generic Health and Safety Plan

Prepared for:

**New York State Department of
Environmental Conservation**

Standby Engineering Contract

April 2011

Prepared by:

D&B/TRC Joint Venture



GENERIC HEALTH AND SAFETY PLAN

Prepared for:

**NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION**

STANDBY ENGINEERING CONTRACT

Prepared by:

**D&B/TRC JOINT VENTURE
WOODBURY, NEW YORK**

APRIL 2011

CERTIFICATION

This Health and Safety Plan (HASP) has been prepared under the supervision of, and has been reviewed by, a Certified Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene.

A handwritten signature in black ink, appearing to read "Bruce Groves". The signature is written in a cursive style with large, sweeping loops.

(Bruce Groves, CIH)

A B I H N o . a r k

HEALTH AND SAFETY PLAN

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7	Heat/Cold Stress Guidelines
8	Incident Notification Form
9	Emergency Information
10	Postings
11	Site-Specific Information

1.0 INTRODUCTION

1.1 General

This Health and Safety Plan (HASP) is prepared to meet the requirements contained in 29 CFR §1910.120 and §1926, NIOSH/OSHA/USCG/USEPA Guidance Manual for Hazardous Waste Site Activities (NIOSH No. 85-115), USEPA "Standard Operating Safety Guides," and Superfund Amendments and Reauthorization Act (SARA), Title I, Section 126. The HASP addresses activities associated with field investigations conducted at New York State Department of Environmental Conservation (NYSDEC) Superfund sites. Compliance with the HASP is required of all on-site personnel entering and/or conducting investigation activities at the site. Personnel conducting activities at the sites will be subject to the requirements of this HASP and accountable to the authorities having jurisdiction at the site. Site-specific information regarding health and safety will be included in a site-specific work plan, if required.

1.2 Purpose and Scope of the HASP

This HASP sets forth the requirements for on-site health and safety supervision, air monitoring, medical monitoring, personal protective equipment, controls, safe work practices and proper decontamination in order to ensure health and safety during activities associated with field investigation in the restricted zones of a site.

1.3 Site Description

The sites covered under this plan include a wide variety of active and inactive commercial and industrial facilities. Specific information pertaining to each site will be provided in a site-specific work plan, if required.

2.0 PERSONNEL ORGANIZATION AND RESPONSIBILITIES

Investigation of sites will require the interaction of contractors, site facility operators and technical specialists, both on-site and off-site. The project team will comprise representatives of the New York State Department of Environmental Conservation (NYSDEC), Dvirka and Bartilucci Consulting Engineers (D&B), the environmental consultant and various contractors.

2.1 Project Director

The Project Director will have overall responsibility for implementation of the corporate and site-specific Health and Safety Plan, if required, and the supervision and monitoring of employees and contractors.

2.2 Project Manager

The Project Manager will assure that all elements of this HASP are implemented where applicable and that all project staff are protected and working in a safe manner.

2.3 Health and Safety Officer (HSO)

The HSO will be responsible for preparation of the site-specific HASP, if required, and has the final authority to resolve health and safety issues at the site. The HSO has overall responsibility for ensuring that the policies and procedures of this HASP are implemented.

The HSO will provide regular support for all health and safety activities, including recommendations for upgrading or downgrading the level of personal protection, as needed.

The HSO will be on-site as needed during the field investigation. The HSO has the authority to stop work at any time unsafe work conditions are present. Any potentially hazardous condition posing a risk beyond the defined role or mission is anticipated to require the HSO to consult with the Field Operations Manager (FOM) and Project Director.

The HSO will be a Certified Hazardous Materials Manager (CHMM), Certified Safety Professional (CSP), Certified Industrial Hygienist (CIH) or designee, and will be available off-site on an as-needed basis to provide technical support to the FOM. Any decisions requiring use or selection of personal protection equipment (PPE), or monitoring devices other than those in the HASP, will be approved by the HSO or designee.

2.4 Field Operations Manager and Alternate HSO

The FOM, or designee, will serve as the Alternative HSO and will be responsible for conducting the work and for assuring that the work is conducted in accordance with the requirements of the HASP. The FOM will be on-site as needed during the field investigation and will manage all day-to-day activities of all parties on the site.

The FOM will be responsible for implementing safety precautions and procedures during all investigation phases, and has final authority to resolve health and safety issues at the site when the HSO is not on-site.

2.5 Physician

A physician will be responsible for all medical review, diagnosis and certification of all site personnel. An on-call physician will be available for each investigation designated in the site-specific work plan, if required.

2.6 General Health and Safety Requirements for all Employees

The following general health and safety requirements will apply to all persons working at the site:

- All persons working on the investigation team will read, sign and become familiar with the HASP (a copy of the Health and Safety Plan Review Acknowledgment Form is provided in Exhibit 1). If any information is unclear, the reader will contact the

HSO for clarification prior to any field work. A copy of the plan will be available for review through the Project Manager, FOM or designee.

- No one will be allowed in active investigation areas without the prior knowledge and approval of the HSO, Project Manager or FOM. All active areas that could pose a potential threat to health and safety will be designated with warning tape or other measures to prevent access by other site personnel or the public.
- Sufficient backup personnel will be available for all site activities. At a minimum, two persons will be present at any location during investigation activities.
- All personnel involved in the investigation at the site will notify the HSO, Project Manager or FOM of any unsafe conditions or activities.
- Standard hygiene practices will be implemented, such as no smoking, eating or drinking during site investigation work activities. A thorough washing of hands and face prior to smoking, eating or drinking will be conducted.
- Workers will avoid unnecessary contamination, such as walking through, sitting on, leaning on or kneeling in areas that are known or suspected to be contaminated.
- All site personnel will observe their partners for any signs of adverse effects associated with the work activity, and will inform their partner or supervisor of any unusual signs or symptoms that they are experiencing themselves.

3.0 HAZARD ASSESSMENT AND RISK ANALYSIS

3.1 Potential Health Hazards

The general hazard potential at hazardous waste sites is characterized in Table 3-1. The primary concern at these sites is to protect workers from potential exposure to contaminated soil, vapors, dust, groundwater and other contaminated materials when conducting the field investigation. In addition to the chemical hazards, physical, biological, radiological and underground hazards may also exist. These hazards are identified on Table 3-2 and are discussed below.

3.1.1 Health Hazard Identification

A list of the chemical contaminants that are commonly found at hazardous waste sites is found in Table 3-2. These chemical contaminants may be present, along with other compounds, at levels which, upon release and contact, may result in concentrations approaching the OSHA Pemiissible Exposure Limits (PELs). There may also be chemicals or mixtures of chemicals for which no information at the time of preparation of this HASP have been identified. Workers should be observant of any unplanned occurrences (unusual odor, soil colorations, etc.).

3.1.2 Health Hazard Evaluation

The primary potential health hazards of concern to workers from contaminants are from the inhalation of vapors and dusts, and skin exposure to corrosive substances or skin absorptive poisons. Potential for these exposures exist when conducting field programs using various investigation techniques.

Table 3-1

SUMMARY OF CHARACTERISTICS AND HEALTH HAZARDS

Type of site	Active and inactive commercial and industrial facilities
Apparent hazard	Low-moderate (in general)
Potential source	Contaminated surface and subsurface soil, groundwater, wastewater, drainage water, surface water, sediment and sanitary waste/sludge
Contamination characteristics	Toxic, corrosive, flammable
Form of hazards	Dust, liquids, vapors
Routes of exposure	Inhalation, ingestion, dermal contact

Table 3-2

SUMMARY OF POTENTIAL HAZARDS

CHEMICAL HAZARDS	Volatile organic compounds
	Semivolatile organic compounds
	Pesticides
	PCBs
	Metals
	Cyanide
PHYSICAL HAZARDS	Noise
	Slips, trips, falls
	Deteriorated overhead surfaces
	Heavy equipment traffic
	Heat or cold stress
	Striking and struck by (heavy equipment)
BIOLOGICAL HAZARDS	Pigeon droppings
	Rabies carrying animals (rats, raccoons, etc.)
	Poisonous snakes (weather dependent)
	Stinging insects (weather dependent)
	Poisonous plants (weather dependent)
ELECTRICAL HAZARDS	Overhead or underground power lines
	Lightning
	Electrical equipment
FIRE/EXPLOSION HAZARDS	Combustible gas
OXYGEN DEFICIENCY	Working in confined spaces
RADIATION HAZARDS	Wastes
UNDERGROUND HAZARDS	Contaminated media
	Gas lines
	Water lines
	Sewer/storm lines
	Electrical lines
	Telecommunication lines

During work on-site, air monitoring will be performed in accordance with Section 7.2 — Air Monitoring. OSHA PELs and American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) may be exceeded during investigation activities. A list of PELs and Health Hazards of Typical Contaminants of Concern are listed on Table 3-3. This list must be updated based on site specific contaminants of concern in the site specific Health and Safety Plan. The activities to be performed during typical site investigations are summarized in Table 3-4. Air monitoring will be performed during the implementation of these activities. Further discussion of air monitoring is provided in Section 7.2 and in the event of the potential exposure, personal protective equipment requirements are provided in Section 5.

3.1.3 Potential Exposures

Potentially contaminated samples include soil, groundwater, wastewater, sludge, storm water, surface water and sediment. The expected risk of exposure to these chemicals would be from inhalation, ingestion, skin or eye contact with volatile compounds, contaminated dusts, etc. Potential exposures can be mitigated through appropriate investigation procedures, work practices, air monitoring and personal protective equipment. Duration and frequency of exposure will be short and intermittent over a period of several weeks. All personnel related to the investigation will keep upwind of all soil disturbances and sampling activities, when possible. In addition, splashing of liquids and generation of dust should be minimized by employing careful handling practices.

3.1.4 Physical and Biological Hazards

Anticipated potential physical hazards from routine investigative work are low to moderate, but still require consideration due to their ability to cause injury. Workers may encounter sharp objects, pinch points or unsecured footing. Improper or careless use of sampling, drilling and excavation equipment increases the risks of accidents from underground and overhead utilities, and operation of the equipment. When working around machinery, there

Table 3-3

PERMISSIBLE EXPOSURE LIMITS AND HEALTH HAZARDS OF
CONTAMINANTS OF CONCERN

Chemical	OSHA Permissible Exposure Limits	Primary Health Hazard (Target Organs)
Acetone	1,000 ppm, IDLH 2,500 ppm	Eyes, skin, respiratory system (RS), central nervous system (CNS)
Benzene	1 ppm, IDLH 500 ppm	Eyes, skin, RS, blood, CNS, bone marrow
Chlorobenzene	100 ppm, IDLH 1000 ppm	Eyes, skin, liver, RS, CNS
1,1-Dichloroethene	100 ppm, IDLH 3000 ppm	Skin, liver, lungs, kidneys, CNS
1,2-Dichloroethene	200 ppm, IDLH 1000 ppm	Eyes, RS, CNS
Chloroform	TLV 10 ppm, C 50 ppm	Eyes, skin, liver, Reproductive System
1,1,2-Trichloroethane	10 ppm, IDLH 100 ppm	Eyes, RS, liver, kidneys, CNS
1,1-Dichloroethylene	None (carcinogen)	Eyes, skin, blood, liver, kidneys, CNS
Trichloroethene	100 ppm, IDLH 1000 ppm	Eyes, skin, RS, heart, liver, CNS
Tetrachloroethene (Perchloroethene)	100 ppm, C 200 ppm	Eyes, RS, skin, liver, kidneys, CNS
1,1,1-Trichloroethane	350 ppm, IDLH 700 ppm	Eyes, skin, CNS, cardiovascular system (CVS), liver
Ethylbenzene	100 ppm, IDLH 800 ppm	Eyes, skin, RS, CNS
1,4-Dichlorobenzene	75 ppm, IDLH 150 ppm	Eyes, RS, liver, kidneys, skin
1,3-Dichlorobenzene	Not listed	Not listed
Ethene	Not listed	Not listed
Methane	Not listed	Not listed
Methylene Chloride	25 ppm, IDLH 2300 ppm	Eyes, skin, CVS, CNS
Toluene	200 ppm, IDLH 500 ppm	Eyes, skin, RS, CNS, liver, kidneys
Vinyl Chloride	1 ppm, C 5 ppm	Liver, CNS, blood, RS, lymphatic system

C - Ceiling Limit

IDLH - Immediately Dangerous to Life and Health

ST - Short Term Exposure Limit

Table 3-3 (continued)

**PERMISSIBLE EXPOSURE LIMITS AND HEALTH HAZARDS OF
CONTAMINANTS OF CONCERN**

Chemical	OSHA Permissible Exposure Limits	Primary Health Hazard (Target Organs)
Benzene	1 ppm, ST* 5 ppm	Eyes, skin, respiratory system (RS), blood, central nervous system (CNS), bone marrow
Toluene	200 ppm C**300 ppm	Eyes, skin, RS, CNS, liver, kidneys
Ethylbenzene	100 ppm	Eyes, skin, RS, CNS
Xylene	100 ppm	Eyes, skin, RS, CNS, gastrointestinal (GI) tract, blood, liver, kidneys
Naphthalene	10 ppm	Eyes, skin, blood, liver, kidneys, CNS
Fluoranthene	0.2 mg/m ³	No specific hazard listed
Coal Tar Pitch (phenanthrene, anthracene, pyrene, chrysene and benzo(a)pyrene)	0.2 mg/m ³	RS, skin, bladder, kidneys
Arsenic	0.010 mg/m ³	Liver, kidneys, skin, lungs, lymphatic system
Barium	0.5 mg/m ³	Eyes, nose, throat, lungs, heart and GI tract
Cadmium	0.005 mg/m ³	RS, kidneys, prostate, blood
Chromium	0.5 mg/m ³	Eyes, skin, RS
Lead	0.050 mg/m ³	Eyes, GI tract, CNS, kidneys, blood, gingival tissue
Mercury	C**0.1 mg/m ³	Eyes, skin, RS, CNS, kidney
Selenium	0.2 mg/m ³	Eyes, skin, RS, liver, kidneys, blood, spleen
Silver	0.01 mg/m ³	Nasal septum, skin, eyes
PCBs	0.5 mg/m ³ (skin)	Skin, eyes, liver, reproductive system
Hydrogen Cyanide	10 ppm (11 mg/m ³)	CNS, CVS, thyroid, blood
Cyanide (potassium or sodium cyanide, as CN)	5.0 mg/m ³	Heart, eyes, nose, throat, skin

ST - Short Term Exposure Limit
C - Ceiling Limit

Table 3-4

ACTIVITIES TO BE PERFORMED DURING INVESTIGATIONS

Soil vapor sampling
Dry well, storm water drainage system and on-site sanitary system sampling
Test pit excavation
Surface soil sampling
Borehole construction and subsurface soil sampling
Monitoring well construction
Groundwater sampling
Surface water and surface water sediment sampling
Ambient air sampling

are also potential electrical hazards. In addition, workers may be exposed to poison ivy, stinging and biting insects, ticks and vermin. Personnel working at sites should take precautions against possible deer tick bites. Deer ticks are carrier of spirochete (*borrelia bergdorffii*) which causes Lyme Disease that can be transmitted to humans when bitten. To prevent tick bites, personnel should wear long pants made of light-colored, tightly woven cloth; tuck pant legs inside of socks; use an insect repellent; check themselves frequently and wash themselves thoroughly at the end of each day. Heat/cold stress, sunlight and UV radiation, and biological hazards are also potential hazards. Refer to Exhibit 6 for heat/cold stress guidelines.

Open excavations, pits, trenches, drill pit, sanitary system and other confined spaces as defined in 29 CFR 1910.14b(c)(1) and 29 CFR 1910.14b(d)(2) also represent hazards and under no circumstances will they be entered unless written procedures are in place for confined space entry. D&B's corporate confined space entry procedure is provided as Exhibit 2. Anyone performing confined space operations has received the necessary training. Oxygen content, flammable gasses or vapors and toxic air contaminants monitoring must be performed in accordance with Exhibit 2.

3.1.5 Radiological Hazards

Humans receive a continuous exposure to ionizing radiation that results from natural sources such as cosmic radiation from outer space and from radioactive materials in the earth and materials both around and within the body. This is referred to as "background radiation" and is part of the normal environment. The degree of injury inflicted on an individual by radiation exposure depends on such factors as the total dose, the rate at which the dose is received, the kind of radiation as well as the body parts receiving it.

Extensive work has been performed in an attempt to relate radiation dose to resulting damage. Based upon all the studies performed "maximum permissible levels" of exposure have been established which denote the radiation dose that can be tolerated with little chance of later development of adverse effects. A Geiger counter will be utilized as a screening tool to ensure that no source other than natural radioactive materials or background levels are present on-site.

Readings indicative of elevated radioactive activity will be cause to assess the current levels of personnel protective equipment and determine their adequacy. The HSO will be consulted immediately if investigative activities result in elevated Geiger counter readings.

3.2 Activity Safety and Health Hazard Analysis

Field activities for hazardous waste sites will include collecting samples from various locations and environmental media using techniques including:

- Soil vapor sampling;
- Dry well, storm water drainage system and on-site sanitary system sampling;
- Test pit excavation;
- Direct push sampling;
- Surface soil sampling;
- Borehole construction and subsurface soil sampling;
- Monitoring well construction;
- Groundwater sampling;
- Surface water and surface water sediment sampling; and
- Ambient air sampling.

Potential safety risks will vary with the specific activity and equipment used, and with the sampling sites themselves. When any new data is collected, potential health and safety hazards will be evaluated with respect to the current and planned activities at the site. All sampling work in which the potential hazards have not been identified may require additional precautions to assure protection against potential hazards. Any modifications of the investigation work plan will require evaluation to determine if the existing Health and Safety Plan is adequate in protecting on-site investigators.

With the installation of groundwater monitoring wells and soil borings, soil and groundwater sampling, test pit excavations, and dry well, storm water drainage system and sanitary system sampling during the investigation, some safety risks inherent with these activities may be expected. There is the potential for mechanical and physical "struck-by" hazards associated with the equipment and sampling activities. There are also potential electrical hazards from underground lines, overhead lines and use of electrical equipment and tools. The location of all underground utilities must be determined in areas where subsurface investigation is to be performed. Utility companies will be contacted to provide "mark-outs" on and off site at all investigation locations prior to initiation of subsurface activities. The property owner will also be contacted to determine utility locations on site. When conducting work inside structures, machinery lockout/tagout must be performed. A Lockout/Tagout Program has been established to protect employees from injuries that could result from the unexpected or unplanned start-up or movement of machinery or equipment during maintenance, installation, adjustment or servicing operations. This policy sets forth procedures which will be used to ensure that employees are provided with the information and equipment they need to perform these tasks safely. Exhibit 4 provides lockout/tagout procedures.

With regard to projects where excavating and trenching operations are being undertaken, personnel shall not enter the excavation for collection of a sample. D&B's corporate excavation trenching operations guidelines are provided as Exhibit 3.

The direct handling of contaminated drums, containers or concentrated/pure chemicals is not expected during the investigation. In the event that such materials are encountered during the field program, the operation will cease and uncovered drums which have been damaged will be immediately covered with soil to minimize release of volatile compounds. This condition will be recorded and reported to NYSDEC, and the field team will be instructed to secure the area until health and safety risks are properly assessed and the course of further action is determined.

The activities to be conducted at hazardous waste sites typically represent low to moderate health risk relative to the potential to encounter contaminated material. The risk

associated with safety hazards is also low to moderate. Potential levels of airborne contaminants may dictate use of appropriate personal protective equipment as deemed necessary by the HSO.

Initial work will be conducted in Level D personal protection. Monitoring equipment to be used includes: portable PID/FID, and combustible gas, oxygen, hydrogen sulfide indicator and Geiger counter. Additional instrumentation and sampling systems may be utilized if deemed necessary by the HSO or designee. The HSO or designee may modify these requirements as deemed necessary.

Proper wearing of protective equipment and employment of stringent personal hygiene practices should reduce potential health hazards.

Restricting access of on-site personnel to all equipment operations, maintaining safe distances from equipment and wearing proper safety equipment will reduce risk of injuries.

4.0 TRAINING REQUIREMENTS

4.1 General Health and Safety Training

All on-site personnel assigned to or regularly entering areas of the site other than the Support Zone (once established) will be trained in accordance with 29 CFR 1910.120. This training will be required for personnel performing or supervising work; for health, safety, security, or administrative purposes; for maintenance; or for any other site related function.

The training will include a minimum of 40 hours of general health and safety training meeting the requirements of 29 CFR 1910.120(e)(3)(i), and 8-hour annual refresher training. All management and supervisory personnel on-site must have received an additional 8 hours of training in accordance with 29 CFR 1910.120(e)(4). Instructors providing the training must meet the criteria outlined in 29 CFR 1910.120(e)(5). Documentation of all such training will be made available to the HSO, HSO designee or FOM before any person will be allowed to enter any potentially contaminated area (namely, the Exclusion Zone or the Contaminant Reduction Zone - see Section 8.0 for further discussion of Work Zones). Visitors who will enter the exclusion and contamination reduction zones must meet the training requirements listed above.

4.2 Site-Specific Training

All site personnel will attend a site-specific training meeting and will become familiar with the HASP and site-specific information, and certify their understanding of this plan (see Exhibit 1). This meeting will include, at a minimum, discussion in the following areas:

- Site specific hazard analysis (chemical/physical hazards);
- Standard safety operating procedures;
- Personal hygiene;
- Safety equipment to be used;
- Personal protective equipment to be worn, including care, use and proper fitting;

- Decontamination procedures;
- Areas of restricted access and prohibitions in work areas;
- Emergency procedures and plans;
- On-site and off-site communications;
- Hazardous materials handling procedures;
- Air monitoring instrumentation use and calibration;
- Hazardous materials recognition; and
- The "Buddy System" to be used at the site.

Visitors entering the Exclusion and Contaminant Reduction Zones will also be briefed on similar information. This briefing will be conducted by the HSO or the FOM/Alternate HSO. Abbreviated awareness briefings for visitors who remain in the Support Zone will also be provided by the HSO, HSO designee or FOM.

Documentation of training for all on-site personnel will be included in the site-specific HASP or provided to the HSO prior to commitment of field activities. Personnel who have not successfully completed the required training will not be permitted to enter the Exclusion Zone or the Contaminant Reduction Zone.

New employees involved in hazardous activities will be indoctrinated by the HSO prior to entering the site to work. All training requirements will be completed by a new employee prior to indoctrination. Indoctrination will be comprised of the site-specific refresher briefing, the task/operation safety and health risk analysis and accident prevention plan.

5.0 PERSONAL PROTECTIVE EQUIPMENT

5.1 General

All on-site personnel will be issued appropriate personal protective equipment (PPE). All PPE is to be used properly and protective clothing is to be kept clean and well maintained. The HSO or designee will maintain constant communication with the Project Director when conducting air monitoring as discussed in Section 7.2 and consult the Project Director with regard to "action levels" at which the specified minimum levels of protection are either upgraded or downgraded based upon air monitoring results and direct contact potential. Action levels are described in Section 7.2 The HSO or designee has the authority to require the use of additional equipment, if necessary, for specific operations, or may tailor PPE specifications to best fit the hazard control requirements as appropriate.

5.2 General Site Safety Equipment Requirements

The following is the basic work uniform and will be worn primarily outside the Exclusion Zone and the Contaminant Reduction Zone at the site. Equipment includes:

- Coveralls - (optional, may be disposable type);
- Boots/shoes - (OSHA compliant construction footwear);
- Hard hat with splash shield, if needed - ANSI approved; and
- Gloves (optional).

5.3 Level D Protection

Level D protection will be initially worn in the Exclusion Zone and Contaminant Reduction Zone during intrusive sampling and investigative activities. Equipment includes:

- Coveralls - One or two piece disposable suit, tyvek or equivalent;

- Gloves - Outer (neoprene, nitrile, or equivalent); Inner (nitrile);
- Boots - Outer (vulcanized rubber or equivalent); Inner (steel toe and shank) or equivalent combination (ANSI approved);
- Safety glasses or goggles (ANSI approved);
- Hard hat with splash shield, if needed (ANSI approved); and
- Hearing protection (if work is near heavy or noisy equipment).

5.4 Level C Protection

Level C protection will be selected when a modified level of respiratory protection is needed. Selection will be made when air monitoring results for the site or individual work areas exceed the action level criteria as described in Section 7.2 of this HASP. Equipment includes:

- Respirators - Full facepiece, air purifying respirator with combination organic vapor and particulate (P100) air cartridges (OSHA/NIOSH approved);
- Coveralls- Hooded one or two piece chemical resistant suit, PE - Tyvek or equivalent (modification of protective suits may be made upon the approval of the HSO);
- Gloves - Outer (nitrile or equivalent); Inner (nitrile);
- Boots - Outer (neoprene or equivalent), Inner (steel toe and shank) or equivalent combination (ANSI approved);
- Two-way radio communications (for remote operations);
- Hard hat with splash shield (ANSI approved); and
- Hearing protection (if work is near heavy or noisy equipment).

5.5 Level B Protection

Level B protection requires full chemical resistant clothing with a full facepiece SCBA or supplied air respirator. Generally, this level of protection is generally not expected for investigations at hazardous waste sites. However, provision will be made to have this equipment available should its use be determined to be required based on all monitoring as performed in

accordance with Section 7.2 of this HASP. Investigation activities which may result in this level of protection being required will not be implemented until the equipment has been transported to the site. The HSO will be notified should air monitoring indicate this level of protection is required. The use of Level B protection will only be implemented when sufficiently trained personnel (minimum of two) are available on-site.

5.6 Confined Spaces

Under no circumstances will confined spaces be entered unless discussed with the Project Director and HSO, and the site-specific HASP is prepared to incorporate additional safety requirements, and all personnel are trained appropriately to deal with confined space hazards. D&B's corporate confined space entry procedure is provided as Exhibit 2.

5.7 Standing Orders

5.7.1 Eye Protection

Prescription lens inserts will be provided or personal contact lenses may be used for full-face respirators. All eye and face protection will conform to OSHA 1910.133.

5.7.2 Respiratory Protection

Programs for respiratory protection will conform to OSHA 1910.134 and ANSI Z88.2-1980. A respiratory program addressing respirator care and cleaning is described in Exhibit 5.

5.7.3 Respirator Fit-testing

Personnel unable to pass a fit-test will not engage in any investigation activities that will require level C or higher protection.

5.7.4 Respirator Maintenance and Repair

Each respirator will be individually assigned and not interchanged between workers without cleaning and sanitizing. Cartridges/canisters and filters will be changed daily or upon breakthrough, whichever occurs first. If breakthrough occurs, a reevaluation by the HSO of the protection level will be made. A procedure for assuring periodic cleaning, maintenance, and change of filters will be followed by each respirator wearer. This procedure is described in Exhibit 5.

5.7.5 Head Protection

A hard hat will be worn by all personnel. All head protection will conform to the requirements in OSHA 1910.135.

5.7.6 Reuse and Retirement of PPE

All non-disposable Level D or C personal protective equipment worn on-site will be decontaminated before being reissued. The FOM, HSO or designee is responsible for ensuring all non-disposable personal protective equipment is decontaminated before being reissued. Disposable PPE will be properly disposed of according to NYSDEC requirements and regulations.

5.7.7 Foot Protection

All safety boots will conform to OSHA 1910.136.

5.7.8 Noise Protection

Power equipment may generate excessive noise levels (in excess of 85 decibels). Proper ear protection will be provided and used in accordance with OSHA 1926.52.

6.0 MEDICAL SURVEILLANCE

All on-site personnel involved in hazardous waste operations will have satisfactorily completed a comprehensive medical examination prior to the initiation of investigation activities at the site. Medical examinations are required for any and all personnel entering Exclusion or Contamination Reduction Zones.

Medical examinations are not required for people making periodic deliveries provided they do not enter Exclusion or Contamination Reduction Zones.

The date of physical examination of each site worker will be documented. A specific Medical Data Sheet for each individual will be filed with the HSO or designee prior to commencing operations and with the Project Manager.

All personnel who will enter the Exclusion Zone or the Contaminant Reduction Zone will be provided with medical surveillance at the start of their employment (entrance examination) and at the end of the on-site personnel's employment (exit examination). Medical surveillance protocol is the physician's responsibility, but will meet the requirements of OSHA Standard 29 CFR 1910.120 for all personnel. The protocol will be selected by the physician. Additional clinical tests may be included at the discretion of the attending physician performing the medical examination. Non-scheduled medical exams may be conducted as determined necessary by the physician, but will be conducted:

- After acute exposure to any toxic or hazardous material.
- At the discretion of the Project Director and/or the physician, when an employee has been exposed to potentially dangerous levels of toxic or hazardous materials.
- At the discretion of the Project Director and/or the physician, and at the request of an employee with demonstrated symptoms of exposure to toxic or hazardous materials.

In addition to non-scheduled exams, any medical, biological or radiological monitoring required by an OSHA standard when OSHA Action Levels are exceeded will be performed.

Companies contracted to perform work on-site in the Exclusion Zone or Contaminant Reduction Zone will provide equivalent medical surveillance to their on-site personnel and supply documentation to that effect.

6.1 Documentation and Record Keeping

The examining physician will notify the Project Director in writing that the individual has received a medical examination and advise as to any specific limitations upon such individual's ability to work at the project site, which were identified as a result of the examination. Appropriate action will be taken in light of the advice given pursuant to this paragraph.

The ability of on-site personnel to wear respiratory protection during hazardous waste activities will be certified by the physician. Cardiopulmonary system examination and pulmonary function testing are minimum requirements.

The physician will maintain and provide access for employees to his medical surveillance records according to OSHA requirement 29 CFR 1910.120.

7.0 ENVIRONMENTAL AND PERSONAL MONITORING PROGRAM

7.1 General

In order to protect site workers from harmful levels of airborne toxic materials, potentially explosive gases, or excessively cold conditions, regular environmental and personnel monitoring will be accomplished to document exposures and to decide when to increase protective measures.

7.2 Air Monitoring

Particular phases of work will require the utilization of specific air monitoring equipment to detect relative levels of contaminants or identify unknown environments.

Air monitoring will be conducted by the HSO, FOM or designee for the express purpose of safeguarding the health and welfare of site workers and the general public residing in the vicinity of the site.

7.2.1 Air Monitoring Instrumentation

On-site air monitoring will be performed using the following direct reading instruments:

- Portable photo ionization device (PID) for the detection of organic vapors
- Portable combustible gas/oxygen/hydrogen sulfide detector will be available for determining lower explosive limits, oxygen and hydrogen sulfide levels in any identified confined spaces. Under no circumstances will confined spaces be entered unless discussed with the Project Director, the HASP is revised to incorporate additional safety requirements and all personnel are trained appropriately to deal with confined space hazards.
- Geiger counter for detecting radiological contamination (if appropriate)
- Colorometric detector tubes for detecting specific contaminants.
- Respirable dust monitor(s) will be used to monitor particulate emissions.

All monitoring and surveillance equipment will be operated, maintained and calibrated each working day in accordance with the manufacturer's instructions and quality assurance procedures. Organic vapor monitoring will be conducted by trained field staff prior to, during and following sampling, and disturbance of soils or sediments at a sampling site. Should contamination levels indicate high hazard potential, the HSO will review monitoring procedures and results.

A daily air monitoring form or entries in a daily log book will be used to record monitoring data. (See Exhibit 6.)

Instruction and calibration manuals for the proper use of these, as well as other field instrumentation, will be provided as a separate document available for use at the site.

Monitoring and surveillance equipment can be impacted by cold weather, communication transmissions and possibly high voltage electrical transmission wires and other interferences. Any unusual meter responses will be noted on the air monitoring form and a diagnosis of potential influencing factors made to determine and eliminate the cause.

7.2.2 Air Monitoring Locations and Action Level Criteria

The primary areas to be monitored during the site investigation are the work zones established around sampling, drilling or excavation locations. Air monitoring protocols for each area will differ, since target populations, contaminant concentrations and atmospheric conditions will vary. Monitoring will be conducted within these work zones and at the site perimeter.

Air monitoring conducted at the sampling locales will focus on workers' breathing zones and may include personal breathing zone samples. Air monitoring just outside of these locations will consist of instruments attempting to quantify the types and degrees of emissions originating from sampling sites.

7.2.2.1 - Duration, Frequency and Protocol

Monitoring will be conducted daily or as deemed necessary by the HSO or designee during all activities in the Exclusion Zone, particularly during intrusive activities. The HSO or designee may modify the work zone sampling frequency upon review of previously analyzed work zone samples.

7.2.2.2 - Background Air Monitoring

Background monitoring for contaminants will be conducted at the upwind perimeter of the Exclusion Zone prior to allowing workers to enter the Exclusion Zone. Monitoring will occur continuously, or at the discretion of the HSO or designee, downwind and crosswind while work is occurring in the Exclusion Zone. Data will be annotated in the Air Monitoring Form for that day. Indoor air quality monitoring will also be conducted when working inside.

Changes in wind direction will require reassessment of air monitoring locations. Wind directions may be determined with the aid of a wind sock (if appropriate). Levels of contaminants that warrant use of respiratory protection by site workers may require initiation of site perimeter and personal sampling as deemed necessary by the HSO or designee.

7.2.2.3 - Exclusion Zone Air Monitoring

Air monitoring conducted in the Exclusion Zone will focus on real time measurement of toxic compounds that pose inhalation hazards, levels of flammable compounds for explosive hazards, and oxygen deficient atmospheres. A summary of the action levels are provided in Table 7-1.

Table 7-1

ACTION LEVELS FOR INVESTIGATIONS

Action Level

Action To Be Taken

PID

Background

Level D (See Section 5.3)

Background to 5 units* above background in breathing zone, and no vinyl chloride or benzene present.

Halt work, evacuate area and allow area to ventilate prior to resuming work. Should levels persist, upgrade to **Level C** protection (See Section 5.4) if required upon approval by HSO and FOM.

Greater than 5 units* above background in breathing zone, and no vinyl chloride or benzene present.

Halt work, evacuate work area and allow area to ventilate prior to resuming work. Should levels persist, contact FOM and upgrade to **Level B** (See Section 5.5) protection if required upon approval by HSO and FOM.

DRAEGER COLORIMETRIC TUBE

Positive color change for vinyl chloride or benzene \leq 0.5 ppm

Halt work, evacuate area and allow area to ventilate prior to resuming work. Contact FOM. If levels persist, upgrade to **Level C** protection if required upon approval by HSO and FOM.

Vinyl chloride or benzene 0.5 - 1.0 ppm

Halt work, evacuate area and allow area to ventilate prior to resuming work. Contact FOM. If levels persist, upgrade to **Level B** protection if required upon approval by HSO and FOM.

Vinyl chloride or benzene $>$ 1 ppm

Shut down work activities. Monitor site to check for off-site migration.

COMBUSTIBLE GAS METER

Greater than 10% Lower Explosive Limit (LEL)

Halt work, evacuate area and allow area to ventilate to below 10% LEL prior to resuming work. Notify FOM.

OXYGEN

Less than 20.5%

Continuous monitoring. Consider engineering controls.

Less than 19.5%

Evacuate work area. Institute ventilation and engineering controls. Maintain site conditions for at least 15 minutes before proceeding. Notify FOM.

* Units equal total ionizable organic/inorganic vapors and gases.

** Reading sustained for 1 minute (60 seconds) or longer.

Table 7-1 (continued)

ACTION LEVELS FOR INVESTIGATIONS

Action Level

Action To Be Taken

OXYGEN (continued)

Greater than 22%

Continuous monitoring and identify combustion sources.

Greater than 23.5%

Evacuate and institute engineering controls as necessary before proceeding. Explosive condition may be present. Notify FOM.

HYDROGEN SULFIDE

Less than 10 ppm at breathing zone

Level **D** and continuous monitoring.

Above 10 ppm at breathing zone

Halt work, evacuate area and allow area to ventilate to below 10 ppm. If levels persist, upgrade to Level **B** protection if required upon approval by HSO and FOM.

GEIGER COUNTER

Above background

Halt work, evacuate work area and confer with HSO

DUST MONITOR

Respirable dust >100 ug/m³ above BKGD

Implement dust suppression techniques to reduce dust levels

Respirable dust >150 ug/m³

Monitoring upwind background levels and implement dust suppression techniques. If levels persist, halt work, contact HSO and FOM. Work can only resumed if control measures can be implemented to remedy the situation.

* Units equal total ionizable organic/inorganic vapors and gases.

** Reading sustained for 1 minute (60 seconds) or longer.

Vapor Emission

If the ambient air concentration of total organic vapors exceeds 5 ppm (or 5 units) above background at the perimeter of the Exclusion Zone, work at that location will be stopped, and the area evacuated until a review of work procedures, air monitoring needs, and use of appropriate respiratory protection and equipment is performed by the HSO or FOM. In addition, downwind monitoring at the site perimeter will be performed to determine whether off-site contaminant migration is occurring. Work will proceed only after review and approval by the HSO or FOM, and the appropriate corrective action is taken or level of protection established. More frequent intervals of monitoring will be conducted as directed by the HSO, including Draeger tube screening for specific contaminants.

If the organic vapor level decreases to below 5 ppm (5 units), and vinyl chloride and benzene are not present, activities can resume, but more frequent intervals of monitoring, as directed by the HSO, must be conducted and must include monitoring for vinyl chloride and benzene. If the organic vapor levels are greater than 5 ppm but less than 25 ppm over background at the perimeter of the Exclusion Zone, activities can resume provided Level B protection is worn and the area is monitored for vinyl chloride until levels fall below background.

If the organic vapor level is above 25 ppm at the perimeter of the Exclusion Zone, work activities must be shut down. When work shutdown occurs, downwind air monitoring as directed by the HSO will be implemented to ensure that vapor emissions do not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

7.2.2.4 - Community Air Monitoring Plan

Air monitoring for volatile organic compounds will be accomplished at the upwind and downwind perimeter of the Exclusion Zone to document real time levels of contaminants which might be moving off-site. The plan must include the following:

- VOCs will be monitored at the downwind perimeter of the Exclusion Zone daily at 2-hour intervals. If total organic vapor levels exceed 5 ppm above background, activities must be halted and monitoring continued under the provisions of Major Vapor Emission Response Plan (see below). All readings must be recorded and be available for NYSDEC and New York State Department of Health (NYSDOH) personnel to review.

Major Vapor Emission

If organic levels greater than 5 ppm (or 5 units) above background are identified 200 feet downwind from the Exclusion Zone or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind, or half the distance to the nearest residential or commercial property from the Exclusion Zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (10-foot zone).

If either of the following criteria are exceeded in the 20-foot zone, then the Major Vapor Emission Response Plan will be implemented:

- Organic vapor levels approaching 5 ppm above background for a period of more than 30 minutes; or
- Organic vapor levels greater than 10 ppm above background for any time period.

Major Vapor Emission Response Plan

Upon activation, the following actions will be undertaken:

1. The local emergency response will be immediately contacted by the HSO and advised of the situation.

2. Frequent air monitoring will be conducted at 30 minute intervals within the 20 foot zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the HSO.
3. All emergency contacts will go into effect as appropriate.

Off-Site Migration Procedures

The same procedures and protocols practiced by on-site workers will aid in preventing any potential adverse conditions with respect to areas adjacent to the site. That is, these procedures are designed to assist in eliminating or minimizing the potential for extensive off-site migration. In the unlikely event that such migration occurs, the following notification procedures and work procedures are listed below:

1. Notification of local police, fire and rescue personnel advising them of the remedial investigation activities and the schedule of events on-site.
2. Immediate notification of NYSDEC, NYSDOH and local officials in the event of a threatening hazardous condition that may effect the health and safety of on-site workers and the surrounding community.
3. Decontamination procedures for equipment to prevent off-site migration of contaminants.
4. Use of a flame or photo ionization detector to monitor volatile organic vapors and potential off-site migration of contaminants.
5. Wetting down the ground surface or using clean cover material or calcium chloride to suppress particulate dust in the event that dust levels in the air of the work area are exceeded.

General visual observation will also be used during all intrusive activities to identify airborne releases (vapors, smoke, etc.), changes in the coloration of excavated materials, changes to the structural integrity of the surface or mechanical integrity of the equipment. Should such conditions be noticed or encountered, work will be halted, and the area evacuated until such time the FOM can be contacted and specific procedures for characterizing and handling the hazard can be developed.

The HSO or designee will observe site conditions daily with special attention to the aforementioned conditions. Depending on site conditions, additional personal protection measures will be implemented during the course of site work.

7.2.3 Heat/Cold Stress Monitoring

Heat/cold stress guidelines are described in detail in Exhibit 7.

7.3 Quality Assurance and Control

All monitoring instruments will be protected from surface contamination during use to allow easy decontamination. All instrumentation will be calibrated before and after use, and operational checks conducted periodically in the field over the duration of the day's field activities.

The following data will be recorded by the HSO or designee on the Air Monitoring Data form (Exhibit 3):

- Date and time of monitoring;
- Air monitoring location;
- Instrument, model number, serial number;
- Calibration/background levels; and
- Results of monitoring.

Interpretation of the data and any further recommendations will be made by the HSO or designee.

Air monitoring results will be provided verbally to the FOM following each site scan that indicates volatile organic vapor concentrations in excess of the action levels. Results will then be documented in writing and provided to the FOM by the end of that work day.

8.0 SITE CONTROL MEASURES

8.1 Work Zones

Site investigations will be subject to the designation of work zones. The Restricted Zone (RZ) will be identified as the area within which all project operations take place. At each sampling site, three work areas will be established: the Exclusion Zone (EZ), Contaminant Reduction Zone (CRZ) and Support Zone (SZ). Only authorized personnel will be allowed in the RZ. Typically, a 5-foot wide (or distance determined by the HSO or FOM) strip of land bordering the EZ is considered the CRZ. In addition to this strip of land, a specially demarcated area that connects the decontamination area to the CRZ is treated as an extension of the CRZ. All other areas inside the restricted area that are not an active Exclusion or Contaminant Reduction Zone are treated as a Support Zone.

8.1.1 Exclusion Zone

The Exclusion Zone includes the intrusive activities and isolates the area of contaminant generation, and restricts (to the extent possible) the spread of contamination from active areas of the site to support areas and off-site locations. This area will encompass all intrusive work. The Exclusion Zone is demarcated by the Hot Line (i.e., a tape or rope line or physical barrier). Personnel entering the Exclusion Zone must:

- Enter through a controlled access point (the Contaminant Reduction Zone);
- Wear the prescribed level of protection; and
- Be authorized to enter the Exclusion Zone.

Personnel, equipment and materials exiting the Exclusion Zone will be subject to decontamination in the containment reduction zone. Equipment and materials (e.g., drill rods) will be decontaminated at decontamination facilities.

Specific access for emergency services to areas of specific site operations will be established by the HSO prior to commencing any operation. The delineated area of the Exclusion Zone may vary with task.

8.1.2 Contaminant Reduction Zone

The extent and configuration of the CRZ will be at the discretion of the HSO or FOM. Certain safety equipment (e.g., emergency eye wash, fire extinguisher and first aid kit) will be located near the sampling location.

The level of protection to be used for decontamination will typically be Level D. However, the HSO will determine appropriate levels of protection based upon air monitoring readings, and visual inspection of personnel and equipment operations in the Exclusion Zone. Equipment operators (e.g., truck drivers) physically performing tasks outside the EZ may be exempt from this requirement as approved by the HSO or FOM. Personnel shall remove all personal protective equipment in the CRZ.

8.1.3 Support Zone

Equipment and materials, paperwork, MSDS, emergency equipment and communications equipment will be stored in the Support Zone. A log of all persons entering the site will be maintained by the FOM.

8.2 Operations Start-Up

No personnel will be positioned downwind of Exclusion Zone during intrusive activities and sampling, if possible.

8.3 Buddy System

All on-site personnel will utilize a buddy system when any task performed at the site requires:

- Personnel to assist in performing an activity;
- Intrusive work performed in the Exclusion Zone;
- Use of protective clothing; and
- Communication between the Exclusion Zone and outside the Exclusion Zone.

The FOM, HSO or designee will enforce the buddy system and has the authority to modify the criteria stated above to deal with changing site-specific and environmental conditions.

In order to ensure that help will be provided in an emergency, all on-site personnel will be in line-of-sight contact or in communication with the HSO or FOM when working in the Exclusion Zone.

8.4 Site Communications Plan

- Internal communications on-site should be instituted prior to initiating any task in the Exclusion Zone.
- Internal communications will be used by on-site supervisory personnel.
- The FOM, HSO or designee will ensure that all site personnel are trained to use internal communications to:
 - alert personnel on-site of emergencies;
 - pass along safety information (such as for heat stress, cold stress control, or rest period time, etc.);
 - changes in work scope, scheduling or sequencing of operations; and
 - maintain site control (such as notification of vandalism, intruders or violations of HASP protocol).

- Verbal communications and hand signals will be used for all tasks associated with the project. However, for those tasks performed in Level D or Level C, radio communications may be used.
- Any Exclusion Zone work activity being performed out of the line of sight may require use of radio communications.
- Air horns will be positioned at any Exclusion Zone work area to be used for emergency response only. The HSO or designee will designate air horn blast sequences for identification of work location, type of emergency and need for evacuation of all personnel.
- Wind direction indicators will be installed such that a line-of-sight is maintained with all personnel in all work zones. The HSO or designee will designate specific locations for wind direction indicators.
- All moving machinery, bulldozers, cranes, dump trucks, etc. will have working backup alarms.
- External communications (outside the site) will be maintained and used to coordinate emergency response, report to management and maintain contact with essential off-site personnel.
- All on-site personnel will be informed of external communications hardware (such as telephone, etc.) and the necessary telephone numbers to contact in the event of an emergency situation (fire, police, ambulance, etc.).
- All emergency numbers will be available at the site (see the site specific work plan for listing of important telephone numbers).
- Appropriate action will be taken should any hazardous environmental condition be observed on site. These conditions and the appropriate action to be taken will be as follows:

Observation	Potential Hazard	Action
Muddy condition	Personnel slip, equipment instability	Monitor work until condition improves
Lightning	Electrocution	Stop work until condition subsides
Horn blasts or other notification by site personnel	Site emergency	Stop work - evacuate to van or trailer - follow emergency notification procedures
Personal injury	Other personnel may be affected	Follow emergency notification procedures
Personal fatigue	Cold stress	Follow cold stress guidelines

Observation	Potential Hazard	Action
Windy condition	Overhead hazards, visual impairment	Stop work until condition subsides

8.5 Medical Assistance and General Emergency Procedures

Site-specific information regarding medical assistance and emergency numbers will be listed in the site-specific HASP. Emergency medical information for substances potentially present on-site will be addressed, if known.

8.5.1 General Emergency Procedures

The following standard emergency procedures will be used by on-site personnel. The HSO or designee will be notified of any on-site emergencies and will be responsible for ensuring that the appropriate procedures are followed.

- Personnel Injury: Personnel holding a current first aid/CPR certification shall administer first aid and/or CPR, if appropriate. Arrange for medical attention.
- Fire/Explosion: Alert the fire department. Personnel will move a safe distance from the involved area.

8.6 Safe Work Practices

Workers will adhere to established safe work practices for their respective specialties. The need to exercise caution in the performance of specific work tasks is made more acute due to:

- Physical, chemical and toxicological properties of contaminated material present;
- Other types of hazards present, such as heavy equipment, falling objects, loss of balance or tripping;
- Weather restrictions;

- Restricted mobility and reduced peripheral vision caused by the protective gear itself;
- Need to maintain the integrity of the protective gear; and/or
- Increased difficulty in communicating caused by respirators.

Work at the site will be conducted according to established protocols and guidelines for the safety and health of all involved. Among the most important of these principles are the following:

8.6.1 General

- In any unknown situation, always assume the worst conditions and plan responses accordingly.
- Because no personal protective equipment is 100 percent effective, all personnel must minimize contact with contaminated materials. Plan work areas, decontamination areas and procedures accordingly.
- Smoking, eating, chewing gum or tobacco, or drinking in the Contaminant Reduction Zone and the Exclusion Zone will not be allowed. Oral ingestion of contaminants is the second most likely means of introducing toxic substances into the body (inhalation is the first).
- Work breaks should be planned to prevent stress related accidents or fatigue related to wearing protective gear.
- Medicine and alcohol can increase the effects from exposure to toxic chemicals and cold stress. Prescribed drugs should not be taken if working in the Contaminant Reduction Zone or Exclusion Zone, unless approval has been given by the physician. Alcoholic beverage consumption will be prohibited on the site.
- Personnel must be observant of not only one's own immediate surrounding, but also those of others. Everyone will be working under constraints; therefore, a team effort is needed to notice and warn of impending dangerous situations. Extra precautions are necessary when working near heavy equipment and while utilizing personal protective gear because vision, hearing and communication will be restricted.
- All facial hair that interferes with the respirator facepiece fit, must be removed prior to donning a respirator for all tasks requiring Level C or Level B protection.

- Personnel must be aware that chemical contaminants may mimic or enhance symptoms of other illnesses or intoxication. Avoid use of alcohol or working while ill during the duration of task assignment.

8.6.2 Site Personnel

- All personnel at the site will be identified to the HSO and FOM.
- All personnel operating in respective work zones will dress according to the protection levels set forth in this HASP.
- No red head wooden matches or lighters of any kind will be allowed in the Contaminant Reduction Zone or Exclusion Zone.
- All personnel will notify the HSO or FOM of any unusual occurrences that might effect the overall safe operation of the site.
- Any time a fire extinguisher is used, personnel will notify the HSO or FOM of what took place.
- All injuries and accidents will be immediately reported to the HSO or FOM and the appropriate reports filed.

8.6.3 Traffic Safety Rules

- Any vehicles that will not be involved in the site operations will be secured and the motor shut down.
- Only personnel assigned to this remedial investigation will be allowed to enter the site. Any other people, whether from OSHA, USEPA or vendors supplying equipment, etc., will have to be met prior to entering the site.
- At no time will any equipment be allowed to block any access road. If in the moving of equipment, a temporary blockage will exist, that equipment will have an operator available to move that equipment.
- The locations of all fire fighting equipment, valves, hydrants, hose storage places and fire extinguishers will be indicated to all personnel so that they will not be inadvertently blocked at any time.
- Project personnel may be required to wear safety vests when working on or adjacent to roadways and must comply with all applicable rules and regulations for traffic safety.

8.6.4 Equipment Safety Rules

- Proper loading and operation of trucks on-site will be maintained in accordance with DOT requirements covering such items as grounding, placarding, driver qualifications and the use of wheel locks.
- Operation of heavy construction equipment will be in accordance with OSHA regulations 29 CFR 1910 and 1926.
- All equipment that is brought on-site will be available for inspection by the HSO.
- The HSO, or designee, will assign protective equipment to all site personnel and this equipment will be made available for inspection at anytime.
- All equipment will be installed with appropriate equipment guards and engineering controls. These include rollover protective structures.
- Safe distances will be maintained when working around heavy equipment.
- All equipment and tools to be operated in potentially explosive environments will be intrinsically safe and not capable of sparking or be pneumatically or hydraulically driven. Portable electric tools and appliances can be used where there is no potential for flammable or explosive conditions use three-wire grounded extension cords to prevent electric shocks. Ground fault interrupters will be used as well.
- With hydraulic power tools, fire-resistant fluid that is capable of retaining its operating characteristics at the most extreme temperatures will be used.
- Cutting or welding operations will not be carried out without the approval of the HSO and FOM.
- At the start of each work day and on a weekly basis, inspection of brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, and splash protection will be made by the equipment operators.
- All non-essential personnel will be kept out of the work area.
- Loose-fitting clothing, loose long hair and wearing of jewelry around moving machinery will be prohibited.
- Cabs will be free of all non-essential items and all loose items will be secured.
- The rated load capacity of a vehicle will not be exceeded.

- Dust control measures will be employed to prevent the movement of dust from contaminated areas to clean areas. The method employed will be determined and reviewed by the HSO and the FOM.
- Equipment operators will report to their supervisor(s) any abnormalities such as equipment failure, oozing liquids, unusual odors, etc.
- When an equipment operator must negotiate in tight quarters, a second person will be used to ensure adequate clearance.
- A signalman will be used to direct backing as necessary.
- Refueling will be done in safe areas. Engines will not be fueled while vehicle is running. Ignition sources near a fuel area will be prohibited.
- All blades and buckets will be lowered to the ground and parking brakes set before shutting off the vehicles.
- An ongoing maintenance program for all tools and equipment will be implemented by the responsible subcontractor equipment supervisor. All tools and moving equipment will be regularly inspected to ensure that parts are secured and intact with no evidence of cracks or areas of weakness, that the equipment turns smoothly with no evidence of wobble, and that it is operating according to manufacturer's specifications.
- Tools will be stored in clean, secure areas so that they will not be damaged, lost or stolen.
- All heavy equipment that is used in the Exclusion Zone will be kept in that zone until the investigation is complete or the equipment is decontaminated. Equipment will be completely decontaminated before moving it into the Support Zone.

8.6.5 Drilling and Excavation and Equipment Safety Rules

Drill rig and excavator operation, maintenance and safety will be the responsibilities of the drill rig/excavator operator.

8.6.6 Electrical Safety

Electrical hazards can exist at sites because of downed power lines, contact with subsurface utilities or improper use of electrical equipment. The presence of underground electric lines will be checked before any digging or excavating is undertaken. When using cranes

or material handlers, care will be taken that the machinery does not come in contact with any energized lines. Equipment must maintain the following distances from energized overhead power lines:

- 10 feet up to 50 kV
- 10 feet plus 4 inches for every 10 kV over 50 kV

The following should be used for protecting personnel from electrical shocks:

- Ground equipment
- Double-insulating tools
- Over-current devices such as fuses and circuit breakers
- Ground fault circuit interrupter
- Tools and flexible cords will be inspected for damage that could lead to shock

8.6.7 Daily Housekeeping

The site and all work zones will be kept in an orderly fashion and the site is to be left safe and secure upon completion of each day's work.

8.6.8 Site Personnel Conduct

- All site personnel will conduct themselves properly and in accordance with generally accepted good work practice.
- At all times, the HSO will monitor all safe operations at the site. Any operation not within the scope of the HASP will be discussed fully before that operation begins.

9.0 PERSONAL HYGIENE AND DECONTAMINATION

9.1 General

- All personnel performing or supervising remedial work within a hazardous work area, or exposed or subject to exposure to hazardous chemical vapors, liquids or contaminated solids, will observe and adhere to the personal hygiene-related provisions of this section.
- Any personnel found to be repeatedly disregarding the personal hygiene-related provisions of the HASP will be barred from the site by the HSO.
- All on-site personnel will wear personal protective equipment as required at all times whenever entering the Exclusion Zone or the Decontamination Area.
- Personal hygiene and decontamination facilities, in accordance with OSHA 29 CFR 1910.120 (N), will be provided on-site, when necessary, and include the following:
 - Storage and disposal containers for used disposable outerwear.
 - Hand washing facilities.
 - An uncontaminated lunch area.
 - An uncontaminated rest/break area.
 - Chemical toilet, if no other facilities are located on-site.
- All personnel must enter and leave the work site through the facilities. The portable chemical toilet (if required), if possible, will be located in the Support Zone.
- The personal hygiene and decontamination facilities will be provided so that any personnel leaving the Exclusion Zone may perform decontamination, safely remove all protective outer clothing, and wash face and hands.
- Decontamination will be performed prior to taking breaks, eating lunch or leaving the work site.
- All site personnel will be given orientation training to the use and operation of the personal hygiene and decontamination facilities.

9.2 Contamination Prevention

To minimize contact with contaminated substances and lessen the potential for contamination, the following will be adhered to:

- Personnel will make every effort not to walk through any areas of obvious contamination (i.e., liquids, discolored surfaces, smoke/vapor clouds, etc.).
- Personnel will not kneel or sit on the ground in the Exclusion Zone and/or the Decontamination Area.

9.3 Personal Hygiene Policy

- Smoking and chewing tobacco will be prohibited except in a designated break area.
- Eating and drinking will be prohibited except in the designated lunch or break area.
- All outer protective clothing (e.g., chemically protective suits, gloves, and boots) will be removed and personnel will thoroughly cleanse their hands and other exposed areas before entering the break or lunch area.
- Drinking of replacement fluids will be permitted in a designated area outside the Exclusion Zone. Personnel will, as a minimum, remove outer and inner gloves, respirator and coverall top, and wash hands prior to drinking replacement fluids.
- All personnel should change into fresh clothing after each working period or shift. Showering is mandatory upon return to each individual's rest place.

9.4 Personnel Decontamination Procedures

Decontamination procedures are followed by all personnel leaving the Exclusion Zone. Generalized procedures for decontamination follow. All procedures apply for Level C personal protection, however for Level D only steps 2, 3, and 8 apply. The HSO may modify these procedures based on site conditions.

Step 1 Drop tools, monitors, samples, and trash at designated drop stations (i.e., plastic containers or drop sheets).

- Step 2** Scrub outer boots and outer gloves with decon solution or detergent and water. Rinse with water.
- Step 3** Remove tape from outer boots (if applicable) and remove boots and discard tape in disposal container. Place boots on boot rack.
- Step 4** Remove tape from outer gloves (if applicable) and remove only outer gloves and discard in disposal container.
- Step 5** This is the last step in the decontamination procedure if the worker has left the Exclusion Zone to exchange the cartridges on his/her air purifying respirator. The cartridges should be exchanged, new outer gloves and boot covers donned, the joints taped, if necessary, and the worker returns to duty.
- Step 6** Remove outer garments and discard in disposal container. New outer garments will be issued at the beginning of each work day or as deemed necessary by the HSO.
- Step 7** Remove respirator and place or hang in the designated area.
- Step 8** Remove inner gloves and discard in disposal container.

Note: Disposable items (i.e., coveralls, gloves, and boots) will be changed on a daily basis unless there is reason to change more frequently. Dual respirator cartridges will be changed daily, unless more frequent changes are deemed appropriate by site surveillance data or by assessments made by the HSO.

Pressurized sprayers or other designated equipment will be available in the decontamination area for wash down and cleaning of samples and equipment.

A waterless hand cleaner and paper towels may be used for hands, arms and any other skin surfaces potentially in contact with contaminated material.

Respirators (if used) will be decontaminated daily and taken from the drop area. The masks will be disassembled, the cartridges set aside and all other parts placed in a cleansing solution. After an appropriate time in the solution, the parts will be removed and rinsed with tap water. Old cartridges will be discarded in the contaminated trash container for disposal. In the morning, the masks will be reassembled and new cartridges installed, if appropriate. Personnel will inspect their own masks and readjust the straps for proper fit.

9.5 Emergency Decontamination

Decontamination will be delayed if immediate medical treatment is required to save a life. Decontamination will then be performed after the victim is stabilized. When decontamination can be performed without interfering with medical treatment, or a worker has been contaminated with an extremely toxic or corrosive material that could cause additional injury or loss of life, decontamination will be performed immediately.

When decontamination cannot be done, the victim will be wrapped in a chemical protective barrier (clothing or sheeting) to reduce contamination of other personnel. Emergency and off-site medical personnel will be informed of potential contamination and will be instructed about specific decontamination procedures. When the victim is transported off the site, personnel knowledgeable of the incident, the site and decontamination procedure will accompany the victim.

9.6 General Equipment Decontamination

- All vehicles and equipment used in the Exclusion Zone will be decontaminated prior to leaving the site.
- No vehicles will leave the decontamination area until they are properly inspected and approved by the HSO or FOM for general cleanliness of frame and tires.
- No vehicle will leave the site unless it is in a broom-clean condition and free of loose dirt or material on tailgates, axles, wheels, etc.
- The HSO or designee will monitor all vehicles to confirm proper decontamination prior to exiting. Approval will be based on visual inspection of all exposed surfaces.
- Equipment decontamination wash water residues will be collected for disposal.
- Personnel engaged in vehicle decontamination will wear Level C or Level D equipment with respiratory protection consistent with the air monitoring results collected by the HSO, and perform personal decontamination at the completion of equipment decontamination.
- Only clean water will be used for personnel, equipment and vehicle decontamination.

9.7 Small Equipment Decontamination Procedures

Small equipment will be protected from contamination as much as possible by draping, masking or otherwise covering the instruments with plastic (to the extent feasible) without hindering operation of the unit. For example, the photoionization detector can be placed in a clear plastic bag to allow reading the scale and operation of the controls.

- Step 1 Remove coverings from equipment left in the drop area and place the coverings in appropriate waste containers.
- Step 2 Brush or wipe any soil or moisture with a disposal paper wipe. Place soiled wipes in appropriate containers.
- Step 3 Place bare units in a clean plastic tub and wiped off with a damp, clean, disposable wipe. Equipment will then be allowed to air dry.
- Step 4 Following decontamination, check and recharge equipment, as necessary, for the next day's operations.
- Step 5 Prior to entering the Exclusion Zone, recover all small equipment with new, protective coverings, if necessary.

9.8 Heavy Equipment Decontamination Procedures

A decontamination area for the drill rig and excavator will be set up. A wash/rinse will be performed on all surfaces that came in contact with contaminants (e.g., augers). Prior to removing any heavy equipment or vehicles from the Exclusion Zone, they must be thoroughly decontaminated. Specific procedures are as follows:

- Step 1 Initially, inspect equipment/vehicles to determine if gross decontamination is required first. Particular attention must be paid to tires, under surfaces, points of contact with the ground, and horizontal surfaces where dust or aerosols might settle.
- Step 2 If visible contamination is present, the equipment/vehicle must be moved to the decontamination pad where gross contamination will be scraped, brushed or swept off.
- Step 3 Following gross decontamination, or if visible contamination is no longer present, wash the equipment/vehicle with high pressure washer as deemed necessary by the

HSO or designee. Efforts should be made to minimize water usage to reduce wastewater quantities.

Step 4 Prior to releasing any heavy equipment or vehicles from the Contaminant Reduction Zone, decontamination personnel will contact the HSO for final approval.

10.0 EMERGENCY RESPONSE AND CONTINGENCY PLAN

10.1 General

This plan has been prepared in accordance with 29 CFR 1910.120 (1) and will address the following potential emergencies:

- Emergencies outside the site.
- Emergencies within the site.
- Chemical exposures.
- Site evacuation.

10.2 Emergency Equipment

Specially marked and readily accessible emergency equipment will be provided on-site.

10.3 Special Requirements

- The Project Director or FOM will be on-call for any after hour emergencies resulting from adverse weather conditions. Incidents resulting from adverse weather will be reported to the HSO who will in turn contact the Project Director.
- First aid kit locations will be specially marked and have adequate water and other supplies necessary to cleanse and decontaminate burns wounds, or lesions. First aid stations will also stock buffer solutions for treating acid and caustic burns.

10.4 Emergency/Accident Reporting and Investigation

In the event of an emergency associated with the site work, the HSO or FOM will, without delay take: 1) diligent action to remove or otherwise minimize the cause of the emergency; 2) alert the Project Director; and 3) institute whatever measures are necessary to prevent any repetition of any conditions or actions leading to, or resulting in, the emergency.

Notification of the Project Director will occur immediately and initially be verbal with written notification occurring within 24 hours of the incident (i.e., accident, explosion, serious exposure, etc.). The Incident Notification Form, provided in Exhibit 8, will be used for written notifications and documentation.

10.5 Emergency Medical Care

- Site-specific emergency medical information will be provided in the site-specific investigation work plan.
- The hospital will be informed by the HSO or FOM of potential medical emergencies that could result from site operations and advised on the types of hazardous materials that are on site. In the event of an incident requiring their assistance, specific details of hazardous materials should be provided to the hospital medical staff, if available.
- A list of emergency information and a map to the nearest medical facility/hospital will be posted at every work site telephone. Copies of this map will also be available to be placed in vehicles used to transport injured personnel to the medical facility.

10.6 Emergencies Outside the Site

- All work in the site area will stop when advised by any authorized personnel and will remain so until otherwise instructed.
- The HSO and FOM will be fully advised of any work that may affect the safety of on-site employees or property.
- Actions to be taken by on-site personnel in the event of an outside emergency will include:
 - All operations will cease immediately and all equipment will be shut down and secured.
 - All personnel will leave vehicles in work zone in a safe manner making sure any remaining vehicles will not hamper any emergency traffic in the area or block any fire hydrants or foam supply systems.
 - All personnel will evacuate to a prearranged muster area.
 - All personnel will remain in the muster area to await further instructions.

10.7 Emergencies Within the Site

- The HSO will monitor all operations from the roadway and assist any emergency personnel responding to an emergency within this work zone.
- It will be the HSO's responsibility to maintain communications with public works personnel.
- In the event of an emergency within the work zone at the site, the emergency notification procedures will be followed.
- In all emergency situations, it will be the responsibility of the HSO to ensure that all site personnel are accounted for.

10.8 Personnel Exposures

The emergency procedures which will be used in the event of acute exposure (eyes, skin contact, inhalation) are described in Exhibit 9.

10.9 Site Evacuation

The site area will be evacuated, and fire and police departments will be notified in the event of fire, explosion or their potential. Depending on the cause and magnitude of the conditions requiring evacuation, three stages have been designated. See Exhibit 9 for details.

11.0 POSTINGS

Postings will be available on-site. These postings will cover four specific areas:

- Use of personal protective equipment;
- Personal hygiene;
- Provisions for smoking, eating, chewing and drinking; and
- Emergency information.

These postings may be added to, based on need to disseminate information or policy. All postings will be coordinated for approval prior to posting. The specified postings are provided in Exhibit 10. The site-specific emergency information for each site will be included on Exhibit 11 and will be posted at each site.

EXHIBIT 1

HEALTH AND SAFETY PLAN REVIEW ACKNOWLEDGEMENT FORM

INSTRUCTIONS: This form is to be completed by each person working on the subject work-site. Upon completion, this form is to be given to the HSO.

JOB NUMBER: _____

CLIENT/PROJECT: _____

DATE: _____

I represent that I have read and understand the contents of the above mentioned Health and Safety Plan and agree to perform my work in accordance with this plan:

Signature

Name Printed

Company/Office

Date Signed

EXHIBIT 2
CONFINED SPACE OPERATIONS GUIDELINES

1.0 PURPOSE

To establish safe procedures for employees of D&B who have potential to be exposed to the hazards of a confined space pursuant to 29 CFR 1910.146

2.0 SCOPE

Applies to the activities of all employees of D&B/WFC exposed to the hazards of a confined space. 3.0 DEFINITIONS

Attendant - A trained individual stationed outside the confined space who monitors the authorized entrant.

Authorized Entrant - A trained individual who's name is listed on the entry permit and who is authorized by the employer to enter a confined space.

Confined Space — A space that:

- 1) Is large enough and so configured that an employee's entire body can enter and perform assigned work (for example, storage tanks, stacks, pits, basements, silos, boilers, ventilation and exhaust ducts, manholes, sewers, tunnels, underground utility vaults); and
- 2) Has limited or restricted means for entry or exit; and
- 3) Is not designed for continuous employee occupancy.

Emergency — any occurrence or event internal or external to the permit space that could endanger entrants.

Engulfment — the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entry — The act of intentionally passing through an opening into a confined space. Entry occurs as soon as any part of the entrant's body breaks the plane of the opening into the space.

Entry Permit — A written or printed document provided by the employer that authorizes the confined space entry and identifies acceptable conditions for entry into a confined space. At a multi employer site all affected employers must be in agreement regarding who will issue a Permit.

EXHIBIT 2 (continued)

CONFINED SPACE OPERATIONS GUIDELINES

Entry Supervisor — the person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned for authorizing entry, overseeing entry operations, and for terminating the confined space entry.

Hazardous Atmosphere — an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from one or more of the following causes:

- 1) Flammable gas, vapor, or mist in excess of 10% of its lower flammable limit (LFL)
- 2) Airborne combustible dust at a concentration that meets or exceeds its LFL
- 3) Atmospheric oxygen concentration below 19.5% or above 23.5%
- 4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit (PEL) is published in OSHA 1919 Subpart Z, Toxic and Hazardous Substances, which could result in employee exposure in excess of its dose or permissible exposure limit
- 5) Any other atmospheric condition that is immediately dangerous to life or health.

Hot Work Permit — the employer's written authorization to perform operations (for example, welding, cutting, burning and heating) capable of providing a source of ignition.

Immediately Dangerous to Life or Health (IDLH) — any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit required confined space.

Isolation — the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding, blocking, bleeding, and lockout or tagout of all sources of energy.

Line Breaking — the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

Oxygen Deficient Atmosphere — an atmosphere containing less than 19.5 % oxygen.

Oxygen Enriched Atmosphere — an atmosphere containing greater than 23.5 % oxygen.

Permit Required Confined Space (PRCS) — a confined space that has one or more of the following characteristics:

- 1) contains or has potential to contain a hazardous atmosphere, or
- 2) contains a material with the potential for engulfment of an entrant, or
- 3) has inwardly converging walls or floors that could trap or asphyxiate an entrant, or

EXHIBIT 2 (continued)
CONFINED SPACE OPERATIONS GUIDELINES

4) contains any other recognized serious safety or health hazard.

Permit System — the employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

Prohibited Condition — any condition in a permit system that is not allowable by the permit during the period when entry is authorized.

Rescue Service — the personnel designated to rescue employees from permit required spaces.

Retrieval System — the equipment used for non-entry rescue of persons from permit required spaces.

Testing — the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

4.0 RESPONSIBILITIES

Entry Supervisor - The entry supervisor is responsible for:

- 1) Knowing the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- 2) Completing the Entry Permit, verify that all requirements of the Permit have been met and all equipment specified in the permit is in place before endorsing the permit and allowing entry to begin.

Health and Safety Coordinator (HSC) - The HSC is responsible for:

- 1) Coordinating training for personnel designated as an Authorized Entrant, Attendant or Entry Supervisor.
- 2) Reviewing and updating this program annually to include new revisions by OSHA.
- 3) Conducting annual field audits of this program.

On-Site Health and Safety Representative (HSR) - The HSR is responsible for:

- 1) Making sure that the Permit requirements are implemented
- 2) Reporting all incidents or PRCS guidelines deficiencies
- 3) Making on-site H&S decisions related to field operations

HSR may take on an Entry Supervisor's responsibilities, if assigned.

Authorized Entrant - The authorized entrant is responsible for:

- 1) Knowing the hazards and understanding the consequences of exposure

EXHIBIT 2 (continued)
CONFINED SPACE OPERATIONS GUIDELINES

- 2) Maintaining contact with the Attendant
- 3) Understanding and utilizing the provided personal protective equipment
- 4) Exiting the permit space if evacuation is ordered by the Attendant
- 5) Alert the Attendant whenever:
 - the entrant recognizes any warning sign or symptom of exposure to a dangerous situation
 - the entrant detects a prohibited condition
- 6) Exit from the permit space as quickly as possible whenever:
 - An order to evacuate is given by the Attendant or the entry supervisor
 - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation
 - The entrant detects a prohibited condition
 - An evacuation alarm is activated

Attendant— The Attendant is responsible for:

- 1) Knowing the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure
- 2) Continuously maintaining an accurate count and identity of authorized entrants in the permit space.
- 3) For remaining outside the permit space until relieved by another Attendant.
- 4) Maintaining continuous communication with all Authorized Entrants
- 5) Monitoring activities inside and outside the space to determine if it is safe for entrants to remain in the space and ordering the authorized entrants to evacuate the permit space immediately under any of the following conditions:
 - If the Attendant detects a prohibited condition of the entry
 - If the Attendant detects the behavioral effects of hazard exposure in an Authorized Entrant
 - If the Attendant detects a situation outside the space that could endanger the Authorized Entrants
 - If the Attendant cannot effectively and safely perform all of his or her required duties
- 6) Summoning rescue or emergency services as soon as the Attendant determines that authorized entrants may need assistance to escape from permit required confined space (P R C S) hazards
- 7) Perform non-entry rescue as specified in the rescue procedure.

5.0 GUIDELINES

D&B/WFC will use these guidelines for any entry into a PRC S for testing, maintenance, inspection, or repair activities.

EXHIBIT 2 (continued)
CONFINED SPACE OPERATIONS GUIDELINES

5.1 General

In general, the HSC or HSR should evaluate the workplace and identify the number, type and location of all confined space areas within the site that personnel may need to enter to perform work. Once the confined spaces have been identified, as defined in Section 3.0, a determination must be made if the space(s) requires an Entry Permit.

If a confined space has been defined as a PRCS, the HSC, HSR or his/her designee must inform site personnel of the existence, location and danger posed by the space. This can be accomplished by posting a danger sign with appropriate language (e.g. DANGER — PERMIT REQUIRED CONFINED SPACE).

NO ENTRY INTO A PRCS SHALL OCCUR WITHOUT A

PERMIT. **5.2 Reclassifying Permit-Required Confined Spaces**

PRCS can be temporarily reclassified as either a Non-Permit Confined Space or Alternate Space, providing the following is met.

5.2.1 Reclassification to a Non-Permit Confined Spaces

Some identified confined spaces are classified PRCS based solely upon the space containing hazards which can effectively be eliminated through lockout/tagout procedures. For a PRCS to be temporarily reclassified as a non-permit space, there must be no potential for the space to contain other hazards. The permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated. All measures for eliminating hazards within the space should be documented and reviewed by the HSC. Upon work completion and after the control measures have been removed, the space must be reclassified as a PRCS.

5.2.2 Reclassifying PRCS to Alternate Space

If the only hazard in a PRCS is a hazardous atmosphere, then it is possible to potentially reclassify the space as an Alternate Space. In order to consider such spaces as non-permit spaces, all atmospheric hazards must be eliminated without entry into the space. Monitoring and inspection data, collected during routine entry operations, must show that the atmospheric hazards were effectively abated through the use of ventilation equipment. The HSC or HSR shall verify an evaluation of designated Alternate Spaces. Although an Entry Permit is not required for entrance into an Alternate Space, the following precaution must be followed:

EXHIBIT 2 (continued)

CONFINED SPACE OPERATIONS GUIDELINES

Entrants must be trained in the potential hazards of the space
Continuous ventilation shall be established and maintained throughout the entry period. The ventilation must be sufficient to maintain the space safe for entry

Prior to entry the space must be tested for oxygen content, flammable gases and vapors, potential toxic air contaminants

If a hazardous atmosphere is detected entrants must evacuate the space and the space then becomes a PRCS.

5.3 Hazard Identification

The Hazard Assessment Form in Appendix A can be used to assess the hazards of each confined space prior to entry.

5.4 Entry Permit

The Entry Permit (Appendix B) is a checklist designed to ensure that the proper precautions are implemented prior to entry.

All blocks on the permit must be completed. If an item is not applicable then "N/A" must be written in the space. NO blank spaces are to appear on the permit. The permit must be signed by the Entry Supervisor and posted at the entrance to the confined space until the entry is completed or the work shift ends. The permit is applicable for a single work shift. The entry permit will serve as safety briefing outline before entry and will be available for review by all affected employees.

The entry permit will identify:

1. The location of the confined space, a description of the entry task, date of entry and duration of permit.
2. Known and potential hazards that may be encountered during the confined space entry.
3. All mechanical apparatus within the confined space such as agitators and pumps, which if activated could injure the worker.
4. Isolation procedures to be implemented.
 - a. Blanking and/or disconnecting of all lines
 - b. Electrical lockout and tagout
 - c. Mechanical isolation and tagout
 - d. Mechanical ventilation (volumes)

EXHIBIT 2 (continued)
CONFINED SPACE OPERATIONS GUIDELINES

5. Safety and protective equipment required (specify routine and emergency requirements):
 - a. Level of respiratory protection
 - b. Personal protective equipment
 - c. Safety harness and/or lifelines
 - d. Extraction devices
 - e. Tools and equipment to be taken into the confined space by the entrant.

6. Pre-entry atmospheric monitoring and acceptable levels of contaminants:
 - a. Oxygen level (19.5 — 23.5 %)
 - b. Combustible gas/vapor level (< 10% LEL)
 - c. Toxic substances level less than established TLV, PEL

7. Provisions for continuous atmospheric monitoring:
 - a. Equipment
 - b. Evacuation criteria

8. Equipment/procedures to maintain acceptable atmospheric conditions: a. Purging, ventilation, flushing, inerting

9. Identification of entry team (authorized and eligible):
 - a. Personnel to make entry (authorized entrant)
 - b. Personnel on stand-by (Attendant)

10. Emergency procedures and first aid:
 - a. Communication procedures
 - b. Equipment location
 - c. Rescue team

11. Training required (Specifics beyond Section 5.8 should be noted):
 - a. Authorized Entrant, Attendant and Entry Supervisor
 - b. Non-entry rescue
 - c. Respirator use

EXHIBIT 2 (continued)
CONFINED SPACE OPERATIONS GUIDELINES

d. PPE

5.5 Work Practices

5.5.1 *Pre-Entry*

As part of the pre-entry procedure, the Entry Supervisor, HSC or HSR will review the entry permit with all authorized entrants and Attendants. The Entry Supervisor, HSC or HSR must make sure that all the necessary steps have been taken to ensure that there are safe conditions prior to issuing an entry permit. These steps include:

- *Pre-entry briefing:*
- *Preparation of the Entry Permit including:*
 - ✓ *Initial Atmospheric Testing* as necessary for oxygen deficiency or enrichment, for combustible gases, and for toxic gases and vapors
 - ✓ *Hazard Control/Elimination* to ensure that proper hazard control/elimination measures have been taken
 - ✓ *Space Preparation and Site Control* to ensure that unauthorized personnel do not impact the entry operation, that all necessary entry equipment can be staged effectively, that housekeeping at the entry location and in the space itself is adequate and that rescue services can locate and access the entry space as needed
 - ✓ *Training* which identifies the level of training required for all personnel involved with the entry
 - ✓ *Emergency Rescue Procedures* identifying the level and type of emergency services required for the entry
 - ✓ *Equipment and Instrumentation* required for monitoring, hazard control, safety, rescue

5.5.2 *Purging and Ventilation*

All confined space enclosures containing a hazardous atmosphere shall be subject to purging and continuous ventilation prior to an entry. Continuous ventilation may not be required if the confined space meets all of the following criteria:

1. No oxygen deficiency or enrichment (19.5 - 23.5 %)

EXHIBIT 2 (continued)
CONFINED SPACE OPERATIONS GUIDELINES

2. LEL measurements are less than 10%
3. Toxicity measurement is less than 10% of the established IDLH of the airborne contaminant present

5.5.3 Isolation/Lockout and Tagging

Except for such confined spaces as manholes, sewers, and tunnels, where complete isolation is not physically possible, all confined spaces shall be completely isolated from all other systems by such means as lockout/tagout, double block and bleed, or physical disconnection of all lines into the confined space.

5.5.4 Buddy System

All tasks involving confined space entry will be performed by a team of not less than two (2) persons with specific duties as described in Section 4.0 Responsibilities.

5.5.5 Communication

The Authorized Entrants and the Attendant must maintain continuous communication with each other during the entire confined space entry. If visual contact and/or verbal communication cannot be maintained, the following code may be used which utilizes the lifeline:

Person Outside Confined Space	Person In Confined Space
1 Pull - Come out	1 Pull - Send help
2 Pulls- Back out	2 Pulls- Keep slack out of line
3 Pulls- Advance	3 Pulls- I am going ahead
4 Pulls- Are you okay?	4 Pulls- I am okay

If the person inside the confined space does not respond to the pull code, assume that there is trouble and begin effecting emergency procedures.

5.5.6 Testing and Monitoring

When preparing for an entry into a PRCS, appropriate initial testing must be conducted to assure that the atmosphere in the confined space is safe. Monitoring will be conducted for oxygen content, combustible gases/vapors, toxic contaminants, and any other contaminants identified. Air monitoring should be conducted continuously while personnel are within the confined space.

EXHIBIT 2 (continued)
CONFINED SPACE OPERATIONS GUIDELINES

Entry into a confined space without proper personal protective equipment will not be permitted under the following conditions:

1. Oxygen concentrations less than 19.5% (148 mm Hg*) or greater than 23.5% (178 mm Hg*) * *Based on Atmospheric Pressure of 760 mm HG (Sea Level)*
2. Flammability measurements greater than 10% of the lower explosive limits (LEL)
3. Toxicity measurements indicating an IDLH atmosphere's existence in the confined space.

Initial atmospheric samples shall be drawn while outside the confined space at the following locations:

1. Outside the entry point(s)
2. Immediately inside the entry point(s)
3. Every four feet from the entrance.

All initial-monitoring results will be recorded on the entry permit.

5.6 Equipment

Equipment necessary for safe entry, including testing, monitoring, communication, and personal protective equipment must be available prior to entry. Personnel using the equipment must be trained in proper use and maintenance of such equipment.

5.6.1 Safety Equipment

Additional safety equipment such as safety belts, body harnesses, or wristlets with lifelines shall be provided and used for all confined space entries, as determined by Entry Supervisor, HSC or HSR. If necessary, lifelines shall be attached to a mechanical extraction device outside the confined space so the Attendant can perform non-entry rescue.

5.6.2 Illumination

Illumination must be provided, as necessary, pursuant to 29 CFR 1910.120(m).

CONFINED SPACE OPERATIONS GUIDELINES

5.6.3 Equipment Requirements

All tools and other equipment, including monitoring instruments, for use in PRCS shall be inspected for compliance with the following requirements:

1. Tools and equipment will be kept clean and in a good state of repair.
2. All electrical equipment including portable tools, lighting, and power cords should meet approvals in accordance with OSHA regulations found in 29 CFR 1910 subpart S, including provisions for ground fault circuit interruption.
3. Only explosion proof temporary lighting listed by the Underwriters Laboratory should be used during PRCS entry and be equipped with all necessary guards.
4. Air activated tools must be used where flammable liquids are present and be bonded to the confined space.
5. Compressed gas cylinders, except those that are part of SCBA or resuscitation equipment, shall never be permitted inside a confined space. Cylinders used to supply compressed gases to a confined space shall be turned off at the cylinder valve when not in use and the supply lines will be removed.
6. Ladders, scaffolding, and staging shall be adequately designed and secured in conformance with OSHA regulations found in 29 CFR 1910 subpart D.
7. Any equipment or instrumentation subject to use in a confined space where flammable atmospheres may occur shall be listed as explosion proof or intrinsically safe by a recognized testing laboratory.

5.7 Rescue

If it becomes necessary to remove a worker from a confined space, the Attendant should act in accordance with the predetermined emergency rescue plan as follows:

- A. The Attendant will communicate through the predesignated communication network and request assistance. The following information should be given:
 1. The location of the confined space
 2. Request for emergency oxygen supply and first-aid kit

EXHIBIT 2 (continued)

CONFINED SPACE OPERATIONS GUIDELINES

3. Request for self-contained air supply with full-face mask, safety harness, and lifeline
 4. Call for professional medical assistance
- B. The Attendant will only attempt a non-entry rescue. At no time will the Attendant place himself/herself inside the confined space to perform an in-space rescue.
- C. If the person within the confined space is secured to a winch, begin hauling him/her out. This procedure must be performed at speed that will not further injure the person.
- D. If the lifeline is not secured to a winch, the Attendant will secure lifeline.

5.8 Employee Information and Training

Employees shall be trained to recognize confined spaces, the hazards of working in a confined space, and demonstrate understanding, knowledge, and skills necessary for the safe performance of their assigned duties during any confined space entry. The HSC will also ensure employees are trained before an employee is assigned the duties of Entrant, Attendant or Entry Supervisor.

Training shall include:

1. Hazard recognition associated with confined space operations
2. Emergency entry and egress procedures
3. Respiratory Protection
4. First aid
5. Cardiopulmonary resuscitation
6. Lockout and tagout procedures
7. Personal Protective Equipment
8. Rescue operations
9. The Permit System
10. Work practices (see Section 5.4)

EXHIBIT 2 (continued)
CONFINED SPACE OPERATIONS GUIDELINES

5.9 Subcontractors

Subcontractors shall be provided with all available information on existing confined spaces, their hazards, necessary permits (if applicable), and any other workplace hazards, safety rules and emergency procedures necessary to complete the task safely.

5.10 Recordkeeping

Copies of the entry permits and personnel exposure record will be maintained by the HSC as required under 29 CFR 1910.20.

6.0 REFERENCES

1. ANSI Z117.1-1989 "Safety Requirements for Confined Space"
2. 29 CFR 1910.146, Proposed Rulemaking "Permit Required Confined Spaces"
3. 29 CFR 1910.120(m) Hazardous Waste Operations (Illumination)
4. 29 CFR 1910 Subpart S (Electrical)
5. 29 CFR 1910 Subpart D (Walking-Working Surfaces)

7.0 APPENDICES

Appendix A- Hazard Assessment Form
Appendix B- Entry Permit

EXHIBIT 3
EXCAVATION/TRENCHING OPERATIONS GUIDELINES

1.0 PURPOSE

To establish safe operating procedures for employees working in or near excavation or trenching operations at D&B work sites.

2.0 SCOPE

Applies to all D&B activities where excavation or trenching operations take

place. 3.0 DEFINITIONS

Adjacent area — The horizontal surface area surrounding the excavation, which extends outward from the excavation edge up to a distance that is half the depth of the excavation.

Competent Person — A competent person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authority to take prompt corrective measures to eliminate the hazard.

Excavation — Any manmade cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation.

Protective system — Shoring, Shielding, Sloping or equivalent.

Trench — A narrow excavation made below the earth's surface. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet.

4.0 RESPONSIBILITIES

Health and Safety Coordinator (HSC) responsible for revising the Trenching and Excavation program to include new OSHA updates. The HSC is also responsible for ensuring trenching and excavation training is available for applicable D&B employees. The HSC or a designee may conduct site inspections of all trenching and excavations that D&B employees will be exposed to.

All Site Personnel must follow these procedures when working in or around an excavation or trench.

EXHIBIT 3 (continued)

EXCAVATION/TRENCHING OPERATIONS GUIDELINES

5.0 GUIDELINES

D&B personnel may be providing oversight on projects where excavation and trenching operations are being undertaken. *D&B WILL NEVER BE PLACED IN THE ROLE OF THE DESIGNATED "COMPETENT PERSON", MAKING DECISIONS ON THE SAFETY CONDITIONS AND PROCEDURES OF THE EXCAVATION AND TRENCHING OPERATIONS.* D&B personnel should identify the contractor/subcontractor/sub-consultant "Competent Person". D&B personnel will also understand the basic H&S requirements for excavating and trenching to protect themselves and other D&B personnel.

5.1 Hazards Associated with Excavation/Trenching

The principle hazards associated with excavation/trenching are:

- Suffocation, crushing or other injury from falling material.
- Damage/failure of installed underground services and consequent hazards.
- Tripping, slipping or falling.
- Possibility of explosive, flammable, toxic or oxygen-deficient atmosphere in excavation.

5.2 Requirements for Protective Systems

- Whenever there is a potential for cave-in.
- The excavation is 5 or more feet in depth, as determined by the competent person, pursuant to 29 CFR Part 1926.501.

5.3 Inspections

The designated "competent person" from the contractor/subcontractor/sub-consultant will perform inspections pursuant to 29 CFR 1926.651 k(1) when employee exposure to hazards are reasonably anticipated:

- Each day before employees enter the excavation,
- After every rain storm,

EXHIBIT 3 (continued)

EXCAVATION/TRENCHING OPERATIONS GUIDELINES

- As needed throughout the shift, or
- As soil conditions change.

During the inspection the "competent person" must:

- Ensure the protective system is adequate for the soil classification and the external loads placed on the adjacent area,
- Evaluate the excavation, the adjacent area and the protective system, for
 - Hazardous atmosphere
 - Potential situations that could lead to cave-in
 - Indications of failure of a protective system
 - Cracks in the ground parallel to the top of the excavation
 - Any other hazardous conditions
- Verify that ladders or other means of access/egress to excavations shall be provided at:
 - maximum spacing of 100 feet on the perimeter of open excavations and
 - maximum spacing of 25 feet for trench excavations greater than 4 feet in depth.

5.4 Entering the Excavation

D&B employee shall *NOT* enter an excavation unless the D&B site supervisor has coordinated with the contractor/subcontractor/sub-consultant competent person to ensure the excavation has been inspected and is safe.

6.0 REFERENCES

1. OSHA Regulations 29 CFR 1926 Subpart P - Excavations

EXHIBIT 4

LOCKOUT/TAGOUT GUIDELINES

1.0 PURPOSE

Lockout/Tagout guidelines have been established to protect D&B employees from injuries that could result from the unexpected or unplanned start-up or movement of machinery or equipment during inspections, maintenance, installation, adjustment, or servicing operations. These guidelines provide D&B personnel with information regarding the hazards and control measures associated with the release of such hazardous energy pursuant to OSHA Standard 29 CFR 1910.147.

If D&B is expected to take measures to control hazardous energy for site-specific operations, then a written Energy Control Procedure must be prepared for each site. Such procedures will include steps for equipment shutdown, isolation, application of locks and tags, dissipation of stored energy, verification of equipment isolation, removal of locks and tags, and restoration of energy to machines.

The components of the Lockout/Tagout Program include:

- a. Energy Control Procedures, if applicable
- b. Employee notification
- c. Contractor activities
- d. Employee training
- e. Periodic audits of the Energy Control Procedures, if applicable

2.0 SCOPE

These guidelines apply to all D&B employees who perform activities (such as surveying, construction, installation, set-up, adjustment, inspection, maintenance, and repair) where a hazardous energy release potential exists. This applies to any source of electrical, hydraulic, pneumatic, potential (stored), chemical, thermal, or other energy.

3.0 DEFINITIONS

Affected Employee - an employee who performs job duties in an area in which lockout or tagout is performed. An affected employee does not perform servicing or maintenance on machines or

EXHIBIT 4 (continued)
LOCKOUT/TAGOUT GUIDELINES

equipment and **is not** responsible for implementing energy control procedures or applying locks or tags.

Authorized Employee - an employee who performs servicing or maintenance on machines or equipment and who implements energy control procedures, including the application of locks or tags. (Note: A single employee may be both authorized and affected if he/she performs servicing or maintenance under Lockout/Tagout on a machine or equipment he/she normally operates).

Capable of Being Locked Out - an energy isolating device is considered to be capable of being locked out if it meets **one** of the following criteria:

- it is designed in such way so that a lock can be attached
- it is designed with any other integral part through which a lock can be affixed
- it has a locking mechanism built into it
- it can be locked without dismantling, rebuilding, or replacing the energy isolating device or permanently altering its energy control capability. (For example, although many valves are not designed with an integral locking device, they can be secured with chains, blocking braces, or wedges, which can then be locked).

Energized - machines and equipment are energized when they are connected to an energy source or they contain residual or stored energy.

Energy-Isolating Device - a mechanical device that physically prevents the transmission or release of energy -- including, but not limited to: manually operated circuit breakers; disconnect switches; valves, and blocks. The term does not apply to pushbuttons, selector switches, or other control circuit devices.

Energy Source - any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Energy Control Procedure - a written procedure which contains the information and steps an Authorized Employee needs to follow in order to safely isolate equipment to perform servicing or maintenance under Lockout/Tagout. Note, only Authorized Employees are permitted to use the Energy Control Procedures.

Lockout - the act of padlocking and tagging an energy-isolating device in the off or safe position. In cases where more than one employee is involved, provision will be made so that each Authorized Employee can affix his/her own lock and tag.

"Other" Employees - all D&B employees who are not Authorized or Affected Employees.

EXHIBIT 4 (continued)
LOCKOUT/TAGOUT GUIDELINES

Tagout - the act of placing an energy-isolating device in the off or safe position and placing a tag on it to indicate that the equipment **may not** be operated until the tag is removed.

4.0 RESPONSIBILITIES

The *Health and Safety Coordinator (HSC)* has an overall responsibility for the Lockout/Tagout Program. The HSC will coordinate Lockout/Tagout training for all authorized and affected employees, if necessary, and assess authorized employee's knowledge of the Lockout/Tagout Program.

The *On-Site Health and Safety Representative (HSR)* will:

- Be knowledgeable about the types and magnitude of hazardous energy sources and the hazards associated with the unexpected or unplanned start-up or movement of machinery or equipment during maintenance, installation, adjustment, or servicing operation.
- Be knowledgeable in the methods to control hazardous energy, verify that each authorized and affected D&B personnel has received Lockout/Tagout training before they begin work in an area where Energy Control Procedures are used
- Ensure that D&B /WFC personnel correctly obtain, review and apply the appropriate Energy Control Procedures, when required, and maintain adequate supply of Lockout devices and equipment
- Be responsible for developing new or modify existing Energy Control Procedures for each job site, if required, and attached them to the Site-Specific Health and Safety Plan (HASP)
- Coordinate Lockout/Tagout operations which, involve outside contractors.

Authorized Employees — D&B Authorized Employees, if designated, are responsible to correctly apply Energy Control Procedures, including the application of locks or tags. Authorized employees will:

- Be knowledgeable about the types and magnitude of hazardous energy and the hazards employed with the unexpected or unplanned start-up or movement of machinery or equipment during maintenance, installation, adjustment, or servicing operations

EXHIBIT 4 (continued)
LOCKOUT/TAGOUT GUIDELINES

- Be knowledgeable in the methods used to control hazardous energy (Energy Control Procedures)
- Notify affected employees prior to application of Lockout/Tagout devices and after the devices are removed
- Coordinate the Lockout/Tagout activities when a Lockout/Tagout operation continues beyond one (1) shift.

Affected and "other" employees are generally responsible for operating or working near machines upon which Lockout/Tagout operations are performed. Affected employees will:

- Understand the purpose of Energy Control Procedures and the importance of not attempting to start-up or use machines that have been locked or tagged.
- Recognize when Energy Control Procedures are being implemented.

5.0 GUIDELINES FOR LOCKOUT/TAGOUT

5.1 General

It is anticipated that for most jobs, D&B personnel will not be responsible for developing Energy Control Procedures. However, when working in the areas of potential hazardous energy release, each employee must recognize the types and magnitudes of hazardous energy sources and the hazards associated with the unexpected or unplanned start-up or movement of machinery or equipment. They must also observe safe work practices.

Only authorized employees are permitted to implement the Energy Control Procedures.

5.2 Work Practices

Following is a typical sequence to implement the Lockout/Tagout procedures.

- a. Prepare for Shutdown* - Authorized employees must review the applicable Energy Control Procedure. If a specific Energy Control Procedure does not exist for a machine then the HSC or designee must ensure that a procedure is developed
- b. Notify Affected Employees* - Authorized employees must verbally notify affected employees prior to application of lockout or tagout devices

EXHIBIT 4 (continued)
LOCKOUT/TAGOUT GUIDELINES

- c. Shut Down Machinery or Equipment*
- d. Isolate Machinery or Equipment from Energy Source* - Place manually operated circuit breakers, disconnect switches, valves and related equipment into the "off" or safe position. Place blocks where necessary to physically isolate the machinery or equipment from its energy source to prevent the transmission or release of energy.
- e. Apply Lockout and/or Tagout Devices* - Each authorized employee or outside contractor involved in the work which requires the use of Lockout/Tagout must personally place his/her lock and identification tag on each identified energy isolating device. The tag must be filled out with the authorized employee's name, the date it was placed, and the reason for the Lockout/Tagout operation. Each authorized employee must maintain possession of the key to his/her lock during the entire work operation. Where an energy-isolating device is not designed to accept a lock, a signed and dated tag may be used according to procedures specified in Section 5.4. After applying locks and tags, the energy isolating devices must be tested to make certain they cannot be moved into the "on" position.
- f. Release Stored Energy* in air lines, water lines, etc by bleeding off excess pressure. Bleed-off valves must be locked and/or tagged out in the open position. Disconnected lines must be tagged out. Restrain potential energy using safety blocks.
- g. Verify that Machinery or Equipment is De-energized* - Using normal operating controls, attempt to start the machinery or equipment to make sure that it has been completely de-energized.

5.3 Release from Lockout/Tagout

Upon completion of work requiring the use of Lockout/Tagout procedures, the following sequence can be used to restore machinery or equipment to service:

- a. Check Equipment* - Following completion of the work, the authorized employees who performed the work must inspect the area around the machinery or equipment to ensure that all tools or other nonessential items have been removed, machine guards have been reinstalled, and the machinery or equipment components are operationally intact and safe to energize.
- b. Check Work Area* - The authorized employees who performed the work must inspect the work area to make certain all employees are safely positioned away from the machinery or equipment.

EXHIBIT 4 (continued)

LOCKOUT/TAGOUT GUIDELINES

- c. *Removal of Lockout/Tagout Devices* - Locks and/or tags must be removed from each energy isolating device by the authorized employee or outside contractor who placed it. If the authorized employee or outside contractor is not available to remove his/her own lockout/tagout device, use the Emergency Lock or Tag Removal Procedures described in Section 5.7.
- d. *Restore Energy to Machinery/Equipment* - Place manually operated circuit breakers, disconnect switches, valves, etc. into the "on" position. Remove safety blocks
- e. *Notify Affected Employees* - Authorized employees must verbally notify affected employees following removal of locks and tags and the re-energization of the machinery or equipment.

5.4 Use of a Tagout System Only

In cases where machinery or equipment **is not** capable of being locked out, it will be necessary to use a completed "Do Not Operate" tag to provide the highest level of safety available without the use of locks. The tag must be filled out with the authorized employee's name, the date it was placed, and the reason for the Tagout operation. Note that tags alone **may not** be used as a substitute when the use of locks is specified in the applicable Energy Control Procedure. Only authorized employees are permitted to implement tagout. The following conditions apply to the use of tags without locks:

- a. Only authorized D&B employees are permitted to place a "Do Not Operate" tag;
- b. The tag must be placed at the same location that a lock would have been attached with a self-locking plastic or nylon tie wrap capable of withstanding at least 50 pounds of force;
- c. The lockout tag can only be removed by the authorized employee who installed it. If the authorized employee is not available to remove his/her own tag, use the emergency lock or tag removal procedures in section 5.7.

5.5 Energy Control Procedures

Generally, Energy Control Procedures are developed by the client or the owner of the equipment and made available to D&B project personnel. If such procedures are not available, D&B can develop, if required, a site-specific written Energy Control Procedure, which will contain the steps and techniques to be used by authorized employees to properly de-energize machinery and equipment prior to the initiation of work.

EXHIBIT 4 (continued)
LOCKOUT/TAGOUT GUIDELINES

When the operations involves more than one (1) authorized employee or outside contractor, provision must be made to ensure that each individual can place his/her lock and tag on each energy isolating device identified in the applicable Energy Control Procedure.

5.6 Shifts or Personnel Change

When Lockout/Tagout must continue beyond one (1) shift or when there is personnel change, the following procedures apply:

- a. At the end of the shift, each authorized employee who is leaving work must remove his/her "Do Not Operate" tag(s) from each energy isolating device. Each oncoming authorized employee must affix his/her own personal "Do Not Operate" tag(s) on the padlock(s) to which his/her key corresponds and maintain possession of the padlock key(s)
- b. Verify that machinery or equipment is de-energized using the procedures described in Section 5.2 g
- c. Proceed with operations.

5.7 Emergency Lock or Tag Removal

In the event that the authorized employee or outside contractor who attached a lock or tag is not available to unlock or remove a lock or tag, the HSC, HSR or a designee may remove the lock or tag only using the following procedures:

- a. Verify that the authorized employee or outside contractor who placed the lock or tag is not at the facility
- b. Attempt to contact the authorized employee or outside contractor whose lock is still in place
- c. Ensure that all work has been completed and the equipment machinery is safe to return to service
- d. The HSC, HSR or a designee may cut the lock off using a saw or bolt cutters. Where tagout only is being used, tags may be removed by designated personnel using appropriate methods

LOCKOUT/TAGOUT GUIDELINES

- e. Ensure that the authorized employee or outside contractor whose lock or tag has been removed is informed before he/she returns to work
- f. Review the lockout/tagout requirements with the authorized employee or outside contractor who left their lock or tag on the isolated equipment

5.8 Testing and Positioning of Machines and Equipment

In some situations, it may be necessary for authorized employees to operate equipment for testing or positioning before it is ready to be used. These situations require the temporary removal of Lockout/Tagout devices only during the limited time necessary for the testing or positioning. Use the following procedures for testing and positioning of machines or equipment:

- a. Release the machine, equipment or component from Lockout/Tagout
- b. Perform the testing and positioning
- c. De-energize and re-apply locks and tags.

5.9 Hardware and Tags

If Logout/Tagout will be employed by D&B authorized employees, the HSC is responsible for providing the resources to ensure that an adequate supply of Lockout/Tagout devices and equipment will be maintained for each project site. Lockout/Tagout hardware is issued to all authorized employees for use with this program. The HSC or his/hers designee will maintain a master list of all lockout padlocks and keys.

6.0 EMPLOYEE TRAINING

An initial training program will be provided to all authorized and affected employees, as required. The HSC has overall responsibility for coordinating employee training, including as needed "refresher" training.

Each HSR must verify that all employees have received initial lockout/tagout training prior to starting work involving the control of hazardous energy. The HSC must identify any employees who require re-training when there is a change in Energy Control Procedures, a change in equipment or processes which presents a new hazard, or when observations reveal that there are inadequacies in employees' knowledge or use of Energy Control Procedures.

EXHIBIT 4 (continued)
LOCKOUT/TAGOUT GUIDELINES

Authorized employees will receive site specific training in the recognition of hazardous energy, the sources, types and magnitudes of energy and the elements of the Energy Control Procedures. Affected employees will receive training in the purpose and use of Energy Control Procedures.

7.0 CONTRACTORS/SUBCONTRACTORS

Outside contractors and subcontractors performing operations which require the use of Lockout/Tagout must use *THEIR OWN* Energy Control Procedures

8.0 PERIODIC INSPECTIONS OF ENERGY CONTROL PROCEDURES

D&B will conduct periodic evaluations of the Lockout/Tagout Program including a review of Energy Control Procedures, as applicable. Authorized Employee(s) (other than those utilizing the Energy Control Procedure) will perform periodic inspections.

EXHIBIT 5

CARE AND CLEANING OF RESPIRATORS

General Requirements

Any organization using respirators on a routine basis should have a program for their care and cleaning. The purpose of a program is to assure that all respirators are maintained at their original effectiveness. If they are modified in any way, their Protection Factors may be voided. Usually one person in an organization is trained to inspect, clean, repair, and store respirators.

The program should be based on the number and types of respirators, working conditions, and hazards involved. In general, the program should include:

- Inspection (including a leak check)
- Cleaning and Disinfection
- Repair
- Storage

Inspection

Inspect respirators after each use. Inspect a respirator that is kept ready for emergency use monthly to assure it will perform satisfactorily.

On air-purifying respirators, thoroughly check all connections for gaskets and "O" rings and for proper tightness. Check the condition of the facepiece and all its parts, connecting air tubes, and headbands. Inspect rubber or elastic parts for pliability and signs of deterioration.

Maintain a record for each respirator inspection, including date, inspector, and any unusual conditions for findings.

EXHIBIT 5 (continued)

CARE AND CLEANING OF RESPIRATORS

Cleaning and Disinfection

Collect respirators at a central location. Brief employees required to wear respirators on the respirator program and assure them that they will always receive a clean and sanitized respirator.

Such assurances will boost morale. Clean and disinfect respirators as follows:

- Remove all cartridges, canisters, and filters, plus gaskets or seals not affixed to their seats.
- Remove elastic headbands.
- Remove exhalation cover.
- Remove speaking diaphragm.
- Remove inhalation valves.
- Wash facepiece and breathing tube in cleaner/sanitizer powder mixed with warm water, preferably at 120 to 140°F. Wash components separately from the facemask, as necessary. Remove heavy soil from surfaces with a hand brush.
- Remove all parts from the wash water and rinse twice in clean, warm water.
- Air dry parts in a designated clean area.
- Wipe facepieces, valves, and seats with a damp lint-free cloth to remove any remaining soap or other foreign material.

Note: Most respirator manufacturers market their own cleaners/sanitizers as dry mixtures of a bactericidal agent and a mild detergent. One-ounce packets for individual use and bulk packages for quantity use are usually available.

EXHIBIT 5 (continued)

CARE AND CLEANING OF RESPIRATORS

Repairs

Only a trained person with proper tools and replacement parts should work on respirators. No one should ever attempt to replace components or to make adjustments or repairs beyond the manufacturers' recommendations. It may be necessary to send high pressure side components of SCBA's to an authorized facility for repairs.

Make repairs as follows:

- Disassemble and hand clean the pressure-demand and exhalation valve assembly (SCBA's only). Exercise care to avoid damage to the rubber diaphragm.
- Replace all faulty or questionable parts or assemblies. Use parts only specifically designed for the particular respirator.
- Reassemble the entire respirator and visually inspect the completed assembly.
- Insert new filters, cartridges, or canisters, as required. Make sure that gaskets or seals are in place and tightly sealed.

Storage

Follow manufacturers' storage instructions, which are always furnished with new respirators or affixed to the lid of the carrying case. In addition, these general instructions may be helpful:

- After respirators have been inspected, cleaned, and repaired, store them so to protect against dust, excessive moisture, damaging chemicals, extreme temperatures, and direct sunlight.

EXHIBIT 5 (continued)

CARE AND CLEANING OF RESPIRATORS

Storage (continued)

- Do not store respirators in clothes lockers, bench drawers, or tool boxes. Place them in wall compartments at work stations or in a work area designated for emergency equipment. Store them in the original carton or carrying case.
- Draw clean respirators from storage for each use. Each unit can be sealed in a plastic bag, placed in a separate box, and tagged for immediate use.

EXHIBIT 5 (continued)

RESPIRATORY CERTIFICATION RECORDS

RESPIRATORY PROTECTION PROGRAM
RECORD OF RESPIRATOR USE

Name _____ Date _____

Social Security Number _____ Age _____

Location _____

Department _____ Supervisor _____

Area to be used in _____

Type of Respirator _____ Fitted By _____

Medical Approval Date _____

Medical Facility/Physician _____

Specific contaminants for which respiratory protection is necessary:

EMPLOYEE STATEMENT

I, an employee of _____, have received the above-referenced respirator. I have been fitted and properly instructed on its uses and limitations. I, also, understand that it is my responsibility to properly clean, maintain and store my respirator in a clean area unless other arrangements have been made to assure maintenance and care of the respiratory protection.

Signature _____

Date _____

EXHIBIT 6

AIR MONITORING RESULTS REPORT

Date: _____

Duration of Monitoring: _____

Work Location and Task: _____

Instrument Reading _____ (Time)	Instrument Reading _____ (Time)	Instrument Reading _____ (Time)
---------------------------------------	---------------------------------------	---------------------------------------

_____	_____	_____
_____	_____	_____

(Note: If instruments have recorders, just attach tape to report. Also note any action levels when exceeded.)

Instrument Calibration: _____

Perimeter Samples Collected: _____

Personnel Samples Collected: _____

Perimeter and Personnel Sample Results From Previous Day (attach data once received):

Comments: _____

Name

Title (Site Safety Officer)

Signature _____

EXHIBIT 7

HEAT/COLD STRESS GUIDELINES

1.0 WORKING CONDITIONS AS RELATED TO HEAT STRESS

1.1 Personal Protective Clothing

All of the protective ensemble does not lend itself to the release of body heat generated during work. With this in mind, the following will be taken into consideration during the work schedule so as to minimize the heat stress to all personnel:

- All personnel will be advised to wear lightweight undergarments with short sleeves, under the chemical protective coverall.
- Personnel will be advised that extra clothing be on-site for use as the workday progresses due to the clothing becoming wet from perspiration.
- Dressing-out will be done in a designated trailer and be scheduled so as not to extend time in the protective ensembles.
- The dress-out area will have a table with fresh water and/or other water replenishing liquids along with disposable cups. All personnel will be expected to drink liquids before each work cycle. The SSO will supervise the dressing and water intake.
- As the job progresses and more information becomes available as to the materials that the workers are coming in contact with, consideration as to modifications to the protective ensemble will be examined. Such things as allowing personnel to keep the protective garment's hood down allowing for the release of heat. All decisions regarding the protective ensemble will be the SSO's decision based on available information.
- After completion of each work cycle, personnel will pass through personnel decontamination and remove their protective ensembles in the designated area. All personnel will then be medically monitored, if deemed necessary by the SSO. Liquid replenishment will be mandatory after each work cycle.
- Eating facilities will allow for meal periods to be taken in the designated lunch area. On days of extreme temperatures, the use of air conditioning in the decontamination trailer will be limited so as not to have personnel exposed to temperature extremes.

EXHIBIT 7 (continued)

HEAT/COLD STRESS GUIDELINES

1.2 Causes of Heat Stress

Wearing the expected levels of protection on-site can put personnel at risk of developing heat stress. This section will discuss heat stress and what steps will be taken to monitor personnel for the signs of it.

The body's chemical activities take place in a limited temperature range. Heat is generated by these processes. Any heat not needed to sustain the activities must be lost from the body to maintain a balance. HYPOTHERMIA is an abnormally high body temperature. The three main avenues for the release of body heat are:

- Respiration is our breathing pattern. Care should be taken that the body is not fooled into believing it is cool based on skin temperature.
- Radiation is how heat is released from the skin. Blood will pool on the surface of the skin as body temperatures increase. The protective ensemble specified for this site will not allow for this type of heat release.
- Evaporative Heat Loss normally allows for a body to cool itself by the evaporation of perspiration. Because the protective ensemble stops any contact with moving air the sweat coming off of the body will not evaporate.

If any of these release mechanisms is out of balance, the following conditions can occur and may be considered emergencies needing care:

- HEAT RASH is a common occurrence in areas where body parts rub causing friction. The level of protection will heighten its effects. Proper treatment would be personal washing of the affected areas and administering powder to help healing.
- HEAT CRAMPS occur when people are exposed to heat for extended periods of time. Due to the wearing of the required protective ensemble, this will be expected. The person will sweat heavily and drink large quantities of water. The more the person sweats, the more electrolytes are lost. If enough body salts are lost, the individual will begin to experience body cramps and pain in the extremities.

EXHIBIT 7 (continued)

HEAT/COLD STRESS GUIDELINES

Proper treatment includes slow replenishment of body fluids augmented by a proper salt solution along with cooling the individual down, taking care not to expose the person to extreme cooling measures. The worker will not be allowed to return to work until the SSO has monitored and approved re-entry.

- **HEAT EXHAUSTION** occurs as the blood pools at the skin surface in an attempt to cool the body. Sweating is profuse, skin is moist and cool, and the patient will experience dizziness, nausea, or fainting. This condition is an indicator of overwork in the environmental conditions. Treatment includes all for heat cramps with an extended rest period before re-entry. Depending on the worker's physical condition, rest periods may be from 30-60 minutes. After experiencing heat exhaustion, the worker should be closely monitored for symptoms reoccurring.
- **HEAT STROKE** can occur if heat exhaustion is not cared for. This occurs when the body loses its ability to regulate its temperature. Sweating stops and, if not treated, can lead to death. Signs and symptoms include dry red skin with no perspiration along with nausea, dizziness and confusion. A strong, rapid pulse should be carefully monitored as this condition can lead to coma. Proper treatment begins by understanding that this is a true medical emergency and requires activating the emergency medical system as covered in other sections. When notifying the Emergency Medical Response organization, emphasis should be placed on the words **HEAT STROKE** and the need for rapid transportation to the medical facility. (See Appendix A of the SSHP). Emergency medical treatment in the field includes immediate cooling of the body with total body immersion preferable. Water temperature should be cool enough to absorb the high body heat but not cold. Ice packs can be applied to the person's head area and under the arms. Due to the personnel needed to treat the patient while awaiting emergency medical care, all work will stop and all attention will be devoted to the person in stress. The First Aid Technician will evaluate all personnel after the patient is transported to determine if they also are showing signs of heat stroke.

To facilitate treatment of all of the above, the trailer, with its air conditioning, fresh water supply and shower, will be used if necessary. In all cases requiring treatment, emergency decontamination procedures based on the individual's degree of contamination will be done before entry into the trailer. Remember: *You* are your own best indicator of signs of heat stress.

EXHIBIT 7 (continued)

HEAT/COLD STRESS GUIDELINES

2.0 COLD STRESS

The purpose of this section is to make all workers on-site aware of the problems associated with cold weather operations. As with heat related emergencies, cold weather injuries are progressive. That means that if the worker is aware of the problems beforehand he may prevent further damage and remain working.

Cold related injuries may be divided into two types:

- **LOCAL COOLING** affects the particular part of the body coming in direct contact with the cold air. This is commonly known as **FROSTBITE**.
- **GENERAL COOLING** affects the entire body and is known as **HYPOTHERMIA**. Hypothermia is a true medical emergency and should be recognized as such and treated immediately by trained medical personnel.

As stated, cold related injuries are progressive. The body loses heat either by **CONDUCTION** or direct transfer of body heat into the cold environment. An example would be an unprotected head allowing the surface area of the head to come in direct contact with the colder air. The other means by which the body loses heat is by **CONVECTION**. This occurs when colder air is allowed to pass over the body surface. When that air is also moist or the garments work become wet, a **WATER CHILL** or more commonly recognized **WIND CHILL** occurs. An example of wind chill would be a 20 mph wind during a 10 degree day would produce the same effect as -25 degree temperature. Both of these conditions may be easily prevented by proper work attire and safe work practices. Hardhat liners prevent the wind from blowing under the brim but will also affect your hearing ability.

EXHIBIT 7 (continued)

HEAT/COLD STRESS GUIDELINES

Lose layers of work clothes rather than bulky garments will allow the wearer to adapt to changing conditions. Use of rubber overboots will prevent leather workboots from getting wet and are excellent for stationary work to stop cold penetration.

Signs to Look For:

FROSTNIP, the first stage of frostbite occurs when a body part comes in direct contact to a cold object or cold air. This condition is not serious and can be remedied by warming of the region. The real problem is that a numbing effect can occur and keep the worker from realizing that he is going into the next stage SUPERFICIAL FROSTBITE.

The skin and under layers become effected. If not treated this can become a FREEZING condition in which the deeper structures of the body become effected.

CONDITION	SKIN SURFACE	TISSUE UNDER SKIN	SKIN COLOR
frostnip	soft	soft	red-white
frostbite	hard	soft	white/waxy
freezing	hard	hard	white/gray

HYPOTHERMIA occurs when the body is unable to maintain its proper temperature of 98.6 degrees. It is important for the worker to realize that this can occur in temperatures of 50 degrees and below. Submersion of a body part in cold water will also cause hypothermia very quickly. Some early signs are:

1. Shivering
2. Numbness in extremities
3. Drowsiness

EXHIBIT 7 (continued)

HEAT/COLD STRESS GUIDELINES

4. Slow breathing and pulse rates
5. Failing eyesight
6. Loss of coordination, inability to do easy tasks
7. Freezing of body parts

Proper treatment begins by activation of emergency medical service procedure. Hypothermia required prompt qualified medical treatment. Initial site action would revolve around getting the affected worker out of the weather and begin the warming process. The most important thing to realize is that Hypothermia is a **MEDICAL EMERGENCY**.

Workers exposed to cool temperatures for extended period of time can experience lesions in the form of red swollen areas that seem hot and itchy. These chronic lingering lesions are known as **CHILBLAINS**. Although not an emergency, the Chilblains indicate that the worker is not adequately protecting the affected area.

A common problem in wet work areas is **TRENCH FOOT**. The worker whose feet remain unprotected by leather footwear in water close to freezing will have swollen limbs that appear waxy and mottled in color. The affected limb will appear cold to the touch. Basic treatment revolves around getting the worker to a warm place and slowly removing the wet footwear. The obvious way to prevent **TRENCH FOOT** is to wear rubber protective footwear.

Some suggestions to prevent cold weather operation problems:

1. Plan ahead as to the proper work clothes to be worn.
2. Avoid early overheating which dampens clothes and hastens the release of body heat by evaporation.
3. Use of windbreaks in the work zone.

EXHIBIT 7 (continued)

HEAT/COLD STRESS GUIDELINES

4. Elimination of standing water or avoid prolonged immersion in that water.
5. Provision of heated rest area (i.e., trailer or vehicle).
6. Avoid overheating of the rest area. Extreme temperature differentials between the work area and the rest area will lead to chilling upon return to work.
7. Proper diet and eating habits.
8. Avoid or cut down smoking which constricts the blood vessels.

REMEMBER, YOU ARE THE BEST PROVIDER OF INFORMATION ABOUT HOW YOU FEEL. THE BEST WAY TO PREVENT INJURIES FROM COLD WEATHER OPERATIONS IS TO RECOGNIZE THE EARLY SIGNS AND PREVENT SERIOUS INJURY.

EXHIBIT 8

INCIDENT NOTIFICATION FORM

TO: Project Manager

Date: _____

FROM: HSO and/or _____
(someone who has direct knowledge of the incident)

1. Contractor's Name: _____

2. Organization: _____

3. Telephone Number: _____

4. Location: _____

5. Reporter Name: _____

6. Name of Injured: _____ Birth date:

7. Company Employing Injured: _____

8. Date of Incident: _____

9. Company Employing Injured: _____

10. Location of Incident: _____

11. Brief Summary of Incident (provide pertinent details including type of operation at time of incident):

12. Cause, if known: _____

13. Casualties, if any: _____

EXHIBIT 8 (continued)
INCIDENT NOTIFICATION FORM

14. Details of Any Existing Chemical Hazards or Contamination:

15. Estimated Property Damage: _____

16. Affect on Contract Schedule: _____

17. Actions Taken by Contractor: _____

18. What Medical Help was Given: _____

19. Doctor and/or Hospital (if known): _____

20. When did Employee Return to Work: _____

21. Other Damages/Injuries Sustained (public or private):

22. Additional Information:

EXHIBIT 9

EMERGENCY INFORMATION

1. Emergencies Within the Site

- Contact the HSO On-Site
- Contact the FOM
- Contact Public Works
- Report the following:
 - Location of emergency in relation to a specific recognizable landmark.
Nature of emergency:
FIRE, if so of what kind and what equipment is involved.
EMERGENCY MEDICAL INCIDENT, ALL INJURIES, ACCIDENTS OR FIRES.
Communication will include:
Number of injured people.
Nature of injuries.
If Project Field Team Members can't handle injuries with its resources, what emergency medical services will be needed.
 - If any outside personnel must enter the site, any hazards will be communicated and those people will be supervised by the HSO.
In the event that any site personnel wearing protective equipment in the Exclusion Zone becomes injured, the HSO or designated individual will do whatever decontamination is necessary to remove that equipment.
Any emergency treatment information dealing with the injury will accompany the injured party so that those treating that person will have any and all information.
REQUEST FOR POLICE. If any person entering the site who does not belong there becomes a problem, Police will be notified. If that person either endangers the safe operation of Project Field Team members or himself, the HSO will suspend all work until that person can be removed.
If site personnel will be evacuating the site due to emergency.

2. Personnel Exposures Within the Site

- Contact the HSO On-Site
- Contact the FOM
- Provide treatment as follows:
 - Eye Exposure - treat by immediate flushing with distilled water (portable eyewash). Transport for examination and treatment. Site-Specific hospital information can be found in Section 5.1.1.
Skin Exposure - remove contaminated clothing and treat by washing with soap and water.

EXHIBIT 9 (continued)

EMERGENCY INFORMATION

Inhalation - if a person inhales a large amount of organic vapor, the person will be removed from the work area to fresh air and artificial respiration will be administered if breathing has ceased. The affected person will be transported to the hospital by ambulance or emergency vehicle if overexposure to lungs has occurred.

Personal Injuries - in case of severe injury, the victim will receive emergency first aid at the site, as appropriate, and will be transported by ambulance or emergency vehicle to the hospital. An accident form must be completed for any accident or occupational exposure and forwarded to the Project Manager.

3. Evacuating the Site

- Contact the HSO On-Site
- Contact the FOM
- Follow the directions below:

Upwind withdrawal - withdraw to a safe upwind location if:

- Air quality concentration contain excessive concentrations of volatile organics, combustible gases, or oxygen percentage above or below safe levels for the level of protection being worn. The field team will withdraw to a safe upwind location determined by the HSO.

A minor accident occurs. The victim will undergo decontamination procedures and be transported to a safe upwind location. Field operations will resume after first aid and/or decontamination procedures have been administered to the affected individual.

- Protective clothing and/or respirator malfunctions.

Withdrawal from site - evacuate the site if:

Explosive levels of combustible gases, toxic gases, or volatile organics are recorded.

- A major accident or injury occurs.
- Fire and/or explosion occurs.

Shock-sensitive, unstable, or explosive materials are discovered.

High levels of radioactive materials are discovered.

- Evacuation of nearby facilities - a continuous release of toxic, flammable, or explosive vapors from the site could affect people off-site. Air quality should be monitored downwind to assess the situation. The FOM, or on-site designee, is responsible for determining if circumstances exist for any level of off-site contamination warranting concern for people off-site. he should always assume worst case conditions until proven otherwise. If conditions are marginal, evacuation should be conducted until acceptable conditions resume. Key personnel identified in the HASP should be contacted when evacuation of nearby facilities becomes necessary.

EXHIBIT 9 (continued)
EMERGENCY INFORMATION

TABLE I
EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communications. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

Where radio communication is not available, the following air-horn and/or hand signals will be used:

EMERGENCY AIR-HORN SIGNALS

HELP!	Three short blasts	. . .
EVACUATION!	Three long blasts	—
ALL CLEAR!	Alternating long and short blasts	• •

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN'T BREATH	Hand gripping throat
LEAVE AREA IMMEDIATELY, NO DEBATE!	Grip partner's wrist or place both hands around waist
NEED ASSISTANCE	Hands on top of head
OKAY! - I'M ALRIGHT! - I UNDERSTAND!	Thumbs up
NO! - NEGATIVE!	Thumbs down

EXHIBIT 9 (continued)

EMERGENCY INFORMATION

TABLE II

LOCATION OF EMERGENCY EQUIPMENT

EQUIPMENT	TYPE	LOCATION(S)
Fire Extinguisher Dry Chemical	20A-80B:C	
First Aid Kit		
Eye Wash	Portable	
Emergency Sprayer	Portable	
Communication	Air Horns Each work area.	
Map	Hospital Route	

EXHIBIT 10

POSTING 1- USE OF PERSONAL PROTECTIVE EQUIPMENT

- WHO** This posting applies to all site workers, supervisors, and visitors, *without exception*.
- WHEN** Prior to entering the Contaminant Reduction Zone (CRZ) or Exclusion Zone (EZ) provisions of this posting will be followed.
- WHAT** This posting outlines the initial forms of PPE required to be worn while working in the CRZ and EZ. Particular types or forms of PPE may be altered based on the authority of the HSO. Specific guidelines are provided in Section 7.0 of this HASP. Disposable PPE will not be worn more than one work shift of workday. In some instances disposable PPE may have to be replaced more than once during a workday. The HSO will determine the frequency of replacing disposable PPE. Reusable PPE will be properly decontaminated, cleaned, sterilized (if appropriate), and stored. Doubts regarding what to wear will be directed to the HSO for resolution.
- WHY** The levels of protection specified in the SSHP were chosen to protect individuals from potentially harmful exposures to chemicals or physical hazards. No changes to PPE specifications are authorized without the permission of the HSO.

EXHIBIT 10 (continued)

POSTING 2 - PERSONAL HYGIENE

WHO This posting applies to all site workers, supervisors, and visitors, but is intended primarily for site workers.

WHEN Before beginning work, during scheduled breaks, and at the end of a workday.

WHAT This posting summarizes the policy on personal hygiene that applies to all site personnel. Personal hygiene includes those activities such as washing hands, showering, shaving, etc., that are conducive to keeping one's body clean and mind refreshed. For the individual's sake, and his/her coworkers, each worker will be responsible for maintaining a high level of personal hygiene. This is especially critical prior to breaks where food, beverages, or smoking will occur. If proper personal hygiene is not followed, potential ingestion, absorption, or inhalation of toxic materials may occur. Particular attention must be paid to close shaving whenever respirators are worn. Facial hair and long hair will interfere with respirator fit and will allow excessive contaminant penetration.

WHY To avoid accidental ingestion, absorption, or inhalation of hazardous materials. To maintain an elevated state of awareness, thus reducing potential mental errors and accidents.

EXHIBIT 10 (continued)

POSTING 3 - PROVISIONS FOR SMOKING,
EATING, CHEWING, AND DRINKING

WHO This posting applies to all site workers, supervisors, and visitors, *without exception*.

WHEN At all times personnel are on-site. This regulation will specifically apply during breaks and rest periods.

WHAT Site personnel are forbidden to smoke, eat, chew, or drink in the Exclusion Zone or Contaminant Reduction Zone. Only those areas specified as break areas or common areas in the Support Zone may be used for smoking, eating, chewing, or drinking. The rest/break facility and office trailers in the Support Zone may be used. Individuals found to be repeatedly disregarding these provisions will be released.

The only exception to this posting involves access to electrolytic fluids in the Contaminant Reduction Zone when the HSO has determined heat stress warrants regular replenishing of lost body fluids.

WHY To protect personnel from accidental exposures to hazardous materials, smoking, eating, chewing, and drinking is prohibited everywhere except designated break areas. To avoid potential fires and explosions, smoking is prohibited everywhere except designated break areas and office trailers.

EXHIBIT 11

SITE-SPECIFIC INFORMATION

The following site-specific information will be filled out by project personnel for each site and will be posted on-site:

Site Name: _____
Address: _____

Telephone: _____
Date of HASP Preparation: _____
Dates of Field Investigation: _____
Entry Objectives: _____

	Name	Phone
Site Organizational Structure:	_____	_____
Project Director:	_____	_____
Project Manager:	_____	_____
HSO:	_____	_____
FOM/Alternate HSO:	_____	_____
Field team staff:	_____	_____
	_____	_____
	_____	_____
Subcontractors:	_____	_____
	_____	_____
	_____	_____
	_____	_____

Medical Assistance
Physician: _____
Hospital: _____
Address: _____

EXHIBIT 11 (continued)

SITE-SPECIFIC INFORMATION

Emergency Telephone: _____

Directions: _____

Please attach a route to hospital

Emergency Telephones

Agent/Facility	Telephone	Emergency No.
EMS - Ambulance		911
Police Department		911
Fire Department		911
Hospital		
Poison Control Center		

Additional site related information (may include special hazards, site control, waste storage and disposal, PPE, decon area location, special engineering controls, etc.).
