SWEDEN-3 CHAPMAN
SWEDEN, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: 828040A

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
1	09/06/2012	Addition of Recorded Declaration of Covenants and Restrictions and Environmental Easement.	09/07/2012
2	June 2021	Update sampling methods, sampling locations, and analytical parameter list. Change frequency of Periodic Review Reports to every five years.	

JUNE 2021

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.

6-25-2021 DATE

SWEDEN-3 CHAPMAN SITE
SWEDEN, 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
RSO	Remedial System Optimization

List of Acronyms (continued)

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

EXECUTIVE SUMMARY

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

Site Identification:	828040A – Sweden-3 Chapman Site, Beadle Road, Sweden, NY.
Institutional Controls:	1. This Site is listed in the Registry of Inactive Hazardous Waste Sites as Class 4;
	2. Compliance with the Declaration of Covenants and Restrictions by the Declarant and the Declarant's successors and assigns with all elements of this SMP;
	3. Compliance with the Environmental Easement, Deed restrictions and this SMP by the Grantor and the Grantor's successors and assigns;
	4. The property may not be used for the purposes other than the current land use as a closed landfill without the express written waiver of such prohibition by the NYSDEC or Relevant Agency;
	5. All ECs must be operated and maintained as specified in this SMP;
	6. All ECs on the controlled property must be inspected and certified at a frequency and in a manner defined in the SMP;
	7. Groundwater monitoring must be performed as defined in this SMP;
	8. The potential for soil vapor intrusion must be evaluated for any building developed in the area, and any potential impacts that are identified must be monitored or mitigated;
	9. Data and information pertinent to site management for the controlled property must be reported at the frequency and in a manner defined in this SMP;
	10. Vegetable gardens and farming on the Site are prohibited;
	11. On-site environmental monitoring devices, including but not limited to, groundwater monitoring wells, sumps, and injection wells must be protected and replaced as necessary to ensure the devices function in the manner specified in this SMP;
	12. The use of the groundwater underlying the property is prohibited without treatment rendering it safe for its intended purpose, as appropriate, unless the user first obtains permission to do so from the NYSDEC or Relevant Agency;
	13. All future activities on the property that will disturb remaining contaminated material are prohibited unless they are conducted in accordance with this SMP;

Institutional Controls (Cont.)	14. The site owner or remedial party will submit to NYSDEC a written statement that certifies, under penalty of perjury, that controls employed at the controlled property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC and nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such controlled property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted every 5 years, or an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable.
Engineering Controls:	1. Composite landfill cover system 2. Access Road and Site fence 3. Monitoring Wells and landfill sump for long-term monitoring

Inspections:	Frequency
1. Landfill cover system 2. Site security 3. Monitoring Wells	Annually
Monitoring:	
Select Groundwater Monitoring Wells	Annually
Maintenance:	
1. Groundwater Monitoring Wells 2. Landfill cover system 3. Site fence 4. Access road	As needed
Reporting:	
1. Site Management Report	As requested by NYSDEC
2. Periodic Review Report	Every 5 years

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

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element for the remediation of the Sweden-3 Chapman Site located in the Town of Sweden, New York (hereinafter referred to as the "Site") (**Figure 1-1 - Site Location Map**). The Site is currently in the New York State (NYS) Inactive Hazardous Waste Disposal Site Remedial Program, administered by New York State Department of Environmental Conservation (NYSDEC), and is identified as Site No. 828040A.

Threats from the disposal of hazardous waste at this site were addressed by the implementation of the remedy identified for the site by the March 1994 Record of Decision, February 2006 Explanation of Significant Differences (ESD), January 2009 ESD, and in-situ chemical oxidation (ISCO) injection events conducted in 2013 and 2015. The Site location and boundaries are provided in **Figure 1-2 – Site Plan**. The boundaries of the Site are more fully described in the metes and bounds descriptions attached as **Appendix A**.

After completion of the remedial work, some subsurface 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. Execution and recording of a Declaration of Covenants and Restrictions (June 2011) and an Environmental Easement (August 2012) were filed with the Monroe County Clerk's Office to restrict land use and prevent future exposure to any contamination remaining at the Site and are provided as **Appendix B**, which requires compliance with this SMP and all ECs and ICs placed on the Site.

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

It is important to note that:

- This SMP details the Site-specific implementation procedures that are required by the Environmental Easement and Declaration of Covenants and Restrictions Environmental Easement and Declaration of Covenants and Restrictions. Failure to properly implement the SMP is a violation of the Environmental Easement and Declaration of Covenants and Restrictions Environmental Easement and Declaration of Covenants and Restrictions, which is grounds for revocation of the Certificate of Completion (COC);

- Failure to comply with this SMP is also a violation of Environmental Conservation Law and 6 NYCRR Part 375, and is 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 C** of this SMP.

This SMP was prepared by D&B Engineers and Architects (D&B), on behalf of NYSDEC, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement and Declaration of Covenants and Restrictions Environmental for the Site.

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shut-down of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the Site conditions. In accordance with the Environmental Easement and Declaration of Covenants and Restrictions 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:

1. 60-day advance notice of any proposed changes in Site use that are required under the terms of the Order on Consent, 6NYCRR Part 375 and/or Environmental Conservation Law.

2. 7-day advance notice of any field activity associated with the remedial program.

3. 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan. If the ground-intrusive activity qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.

4. Notice within 48-hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.

5. Notice within 48 hours of any non-routine maintenance activities.

6. 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.

7. 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:

1. At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Order on Consent or Record of Decision, and all approved work plans and reports, including this SMP.

2. 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 below 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 C**.

Table 1-1: Notifications*

Name	**Contact Information**	**Required Notification****
Robert Strang, Assistant Engineer NYSDEC Project Manager	(518) 402-8642 robert.strang@dec.ny.gov	All Notifications
Jeffrey Dyber NYSDEC Section Chief	(518) 402-9621 jeffrey.dyber@dec.ny.gov	All Notifications
Kelly Lewandowski NYSDEC Site Control	(518) 402-9553 kelly.lewandowski@dec.ny.gov	Notifications 1 and 8
Christopher Mannes NYSDEC Region 7	(315) 426-7519 christopher.mannes@dec.ny.gov	All Notifications
Shaun J. Surani New York State Department of Health Bureau of Environmental Exposure Investigation	Phone: (518) 402-7860 shaun.surani@health.ny.gov	Notifications 4, 6, and 7
Stephanie Webb, Region 7 Citizen Participation Specialist; NYS Department of Environmental Conservation	Phone: (315) 426-7441 stephanie.webb@dec.ny.gov	Notifications 1, 3, 6, and 7

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

**Note: Numbers in this column reference the numbered bullets in the notification list in this section.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The Site is located in the town of Sweden, Monroe County, New York and is identified as parcel numbers 098.04-1-20.1 and 098.04-1-16.1 on the Monroe County Tax Map. The Site covers an area of approximately 20 acres and is bounded by White Road to the north, Beadle Road to the south, Route 19 to the east, and Redman Road to the west (**Figure 1-2**). A 2-acre inactive and closed construction and demolition (C&D) debris landfill is on the site. The boundaries of the Site are more fully described in **Appendix A** and **Appendix B**. The owners of the Site parcels at the time of issuance of this SMP is/are:

George III and Nancy Luce
6000 Redman Road
Brockport, NY, 14420

Harold Polle & Barbara Hinchey
1338 Beadle Road
Brockport, NY, 14420

The Owner of the Site parcels at the time of disposal was Webster Chapman, III (address unknown).

The operator(s) of the Site parcel(s) at the time of issuance of the SMP is/are:

NYSDEC -The site is currently inactive.

2.2 Physical Setting

2.2.1 <u>Land Use</u>

The Site consists of the former capped C&D debris landfill that is surrounded by a chain link security fence bordered by a wooded wetland to the north, east and west. A single-family residence is located approximately 300 feet south of the southern site fence. Site access is from Beadle Road, in the southeast corner of the Site, and runs north to provide access to the Site. The access road is bounded by private property on both the east and west side until the road enters the Site.

2.2.2 Geology

Native overburden material at the site consists of sand, silt, and clay, as well as a highly compacted glacial till. The overburden varies in depth from 17 ft to 23 feet. Bedrock beneath the till is black-gray fractured carbonate bedrock of the Lockport Group. The top few feet of the bedrock are highly weathered.

The primary water bearing zones in the glacial overburden are higher permeability lacustrine and outwash deposits composed of silts, sands, and gravels. These units are not commonly area-extensive and rarely provide sufficient groundwater supplies for residents in the area. Site specific boring logs are provided in **Appendix D** for the existing groundwater monitoring well network.

2.2.3 Hydrogeology

Groundwater at the Site generally flows to the northeast and is encountered in three distinct water-bearing zones. These three groundwater-bearing zones comprise the following hydrostratigraphic units: overburden glacial deposits; overburden/weathered bedrock interface; and fractured dolostone bedrock.

Unconfined glacial overburden deposits overlie a predominantly semi-confined fractured dolostone bedrock aquifer. Bedrock horizons in the eastern wetlands region of the Site exhibit artesian hydraulic characteristics indicative of confined bedrock conditions.

Groundwater is first encountered in permeable horizons within the shallow overburden glacial deposits (shallow zone). These overburden deposits range in depths from 0.5 feet to 26.0 feet below surface and consist of lacustrine silty clay and silty, gravelly glacial till.

The second water-bearing zone is encountered at the overburden/weathered bedrock interface (intermediate zone). This hydrostratigraphic unit generally yields appreciable quantities of groundwater as a result of the higher relative permeabilities associated with this unit. The occurrence and preferential movement of groundwater along this more permeable zone is due to increased secondary porosity resulting from weathering and increased fracturing of the upper bedrock units. The thickness of this zone is variable and depends on the degree of weathering and the extent and density of fracturing. The maximum thickness of this interval encountered at the Site was approximately 10 feet. The hydraulic connection of fracture zones in this weathered interval was observed during the drilling program over lateral distances of 10-15 feet (MW-3I/MW-3D).

The third water-bearing zone and the primary aquifer in the area is the regionally extensive fractured dolostone bedrock (deep zone). This aquifer can provide significant groundwater supplies. The permeability of this aquifer is a function of secondary porosity occurring throughout the bedrock. A significant water-bearing zone is commonly encountered at the top of bedrock as a result of increased secondary porosity due to zones of bedrock weathering and increased fractures.

2.3 Investigation and Remedial History

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

The approximately two acre landfill was used during the late-1960s and early-1970s for construction and demolition debris disposal. Large amounts of drummed hazardous and industrial wastes were also disposed of at the Site. The landfill was apparently formed by dumping from higher terrain into the wetland.

In 1985, NYSDEC conducted a preliminary investigation of the site and found numerous drums on the surface and buried within the toe of the former landfill. Sampling of several drums and soil at the site indicated the presence of hazardous waste including several spent industrial solvents. In 1992, an interim remedial measure (IRM) consisting of a drum removal action was conducted. Over 2,300 drums of hazardous and industrial waste were removed, while 2,075 tons of impacted soil and debris were stockpiled on-site.

Additionally, in 1992, NYSDEC conducted a remedial investigation/feasibility study (RI/FS) at the Site. The investigation included a hydrogeologic investigation; a subsurface source area investigation; and sampling of soil, surface water, and ambient air. The investigation indicated that the drum disposal at the site caused subsurface soil and groundwater contamination. The monitoring well data indicated that the groundwater is impacted with chlorinated and non-chlorinated VOCs.

The RI/FS also included on-site surface and subsurface soil analysis which identified three residual VOC source areas remaining in and adjacent to the landfill. Based on the results obtained from the RI/FS and the solicitation of public comments, NYSDEC selected a remedy for the site in a Record of Decision (ROD) dated March 4, 1994. The ROD called for excavation of impacted soils including two small areas located in the northeast section of the landfill, treatment of the soils with low temperature thermal desorption (LTTD) or bio-treatment, backfill of the treated soil on the existing landfill, placement of a Part 360 cap (cover system consisting of a filter fabric layer, a 40-mil very flexible polyethylene [VFPE] geomembrane layer, and a geocomposite drainage layer topped with a 1.5-foot barrier protection layer and a 6-inch vegetative soil layer), and construction of a groundwater interceptor trench to capture groundwater for on-site treatment.

The state-funded remedial construction was completed in 1999, with long-term maintenance of the landfill cap and groundwater monitoring in progress in accordance with the 1999 Post-Closure Monitoring and Maintenance Plan. During subsequent site management activities, periodic groundwater sampling events showed a significant concentration of several volatile organic compounds (VOCs) in groundwater wells located to the northeast of the landfill area. Concentration of tetrachloroethene (PCE) were found to be as high as 16,000 parts per billion (ppb). The removal of soil from these two areas did not effectively mitigate the groundwater contamination found in the on-site groundwater monitoring wells.

As a result of elevated VOC detections in groundwater monitoring wells to the northeast of the landfill, additional Site characterization activities were conducted in 2003, 2007, and 2008 which involved the installation of additional monitoring wells and a subsurface soil sampling program. Several soil borings were installed in the northeast area of the landfill in order to delineate the VOC impacts within the subsurface. During the field work, no evidence of a contaminant source, such as a drum or tank, was encountered. However, the soil samples obtained from an area located in the northeast and adjacent to the impacted wells indicated high concentrations of PCE ranging from 0.001 to 2,570 parts per million (ppm). Based on the results of that investigation, an approximate area measuring 60 feet by 70 feet containing significant VOC contamination was discovered that required remediation.

A Focused RI/FS was completed by the NYSDEC to evaluate different remedial alternatives to address the VOC impacted area. A remedial strategy was developed for the VOC contamination based on the site evaluation conducted as part of the Focused RI/FS, and the proposed remedy outlined in the 2006 Explanation of Significant Differences (ESD) and the subsequent 2009 ESD. The subsequent remedy was conducted in 2010 and included the excavation and off-Site disposal of approximately 3,000 tons of non-hazardous VOC impacted soil. A small portion of the landfill cover system was removed as part of these excavation activities and subsequently replaced. In addition, following backfill activities, two injection wells (IW-1 and IW-2) were installed within the excavation limits and RegenOX Oxygen Release Compound (ORC), manufactured by Regenesis, Inc., was injected into the excavated area. ORC was also injected into MW-22I as a result of oxidant daylighting near IW-2. The solution was expected to act as an oxidant and either completely oxidize the remaining VOC contaminants to carbon dioxide or convert them into non-hazardous compounds. A figure depicting the limits of excavation and endpoint sampling result from the 2010 Final Engineering Report (EA, 2010) documenting the 2010 remedial activities is provided as **Appendix E.**

In 2012, the NYSDEC requested a workplan be submitted to address the elevated concentrations of VOCs observed in groundwater in the area where ORC was applied. In June 2013, an ISCO Workplan was submitted to NYSDEC. This plan outlined a method to address the elevated concentrations of VOCs observed in groundwater with the injection of sodium permanganate. In August and September 2013, in accordance with the ISCO Workplan, six additional injection wells and two monitoring wells were installed and all wells in the vicinity were developed. From September 30 through October 4, 2013, approximately 10,000 gallons of 10% sodium permanganate solution was injected into the network of injection wells. Several post-injection site visits were conducted to monitor the effectiveness of the injection event. In 2015, an additional ISCO injection event was conducted and an additional approximately 10,000 gallons of 10% sodium permanganate solution was injected into the network of injection wells. Long-term maintenance of the landfill cap and long-term groundwater monitoring is ongoing to evaluate the effectiveness of the Site remedial activities.

2.4 Remedial Action Objectives

The remediation goals or remedial action objectives (RAOs) for the Site as listed in the Record of Decision dated March 1994 are as follows:

- Reduce, control, or eliminate the contamination present within the soils/waste on Site to levels which are protective of the groundwater resources;
- Eliminate the potential for direct human or animal contact with contaminated subsurface soils;
- Mitigate the impacts of contaminated groundwater to the environment and public health;
- Provide for attainment of SCGs for groundwater quality at the limits of the area of concern.

2.5 Remaining Contamination

2.5.1 Soil

While the source area of PCE was removed and confirmatory samples were collected, the potential exists that contamination remains within the soil. In addition, construction and demolition debris remain under the landfill cap.

2.5.2 Groundwater

VOC Results in Groundwater

Residual contamination consisting of PCE, TCE, 1,2-DCE and vinyl chloride remains in the Site groundwater at concentrations exceeding Class GA standards. Based on historical data, sampling locations included in the routine sampling program were reduced in 2020 to 24 monitoring wells, two injection wells, the sump, and the residential well. While Site contamination was not detected in the residential water supply well, this well will continue to be sampled as a precautionary measure. The highest concentrations of the contaminants of concern were observed in 2020 in the monitoring well cluster near the eastern side of the landfill area and summarized below.

- PCE exceeded the NYSDEC Class GA groundwater standard of 5 µg/L at 6 of 26 wells sampled in 2020 at a maximum concentration of 180J µg/L observed at SMW-1I.

- TCE exceeded the NYSDEC Class GA groundwater standard of 5 µg/L at 7 of 26 wells sampled in 2020 at a maximum concentration of 280J µg/L observed at MW-16I.

- 1,2-DCE exceeded the NYSDEC Class GA groundwater standard of 5 µg/L at 18 of 26 wells sampled in 2020 at a maximum concentration of 2,000 µg/L observed at MW-16I and MW-25I.

- Vinyl chloride exceeded the NYSDEC Class GA groundwater standard of 2 µg/L at 12 of 26 wells sampled in 2020 at a maximum concentration of 1,400 µg/L observed at MW-25I.

These results are consistent with historical VOC groundwater monitoring result exceedances, shown on **Figure 2-1** (shallow), **Figure 2-2** (intermediate), **Figure 2-3** (deep) and 2020 groundwater monitoring results are summarized in **Table 2-1** (below).

Emerging Contaminant Results in Groundwater

Five Site wells and the private well at the adjacent residential property were sampled for the emerging contaminants per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane in March

2018. Two compounds exceeded screening values presented in the Sampling, Analysis, and Assessment of PFAS (NYSDEC, 2021).

Perfluorooctanesulfonic acid (PFOS) was detected at 18 nanograms per liter (ng/L) in injection well IW-2 and perfluorooctanoic acid (PFOA) was detected at 18 ng/L in injection well IW-2 and at 14 ng/L in monitoring well SMW-1D, both above the 10 ng/L groundwater screening value for these analytes. 1,4-Dioxane was detected at 4.6E µg/L in the sample collected from monitoring well MW-25I above the 1 µg/L groundwater screening value. Other emerging contaminants detected below groundwater screening value and are shown in **Table 2-2** (below).

Table 2-1
Sweden-3 Chapman Site
Groundwater Samples
Volatile Organic Compounds

Sample ID Sampling Date Dilution Factor Units	MW-1I 12/3/2020 1 ug/L	MW-1D 12/3/2020 1 ug/L	MW-2I 12/3/2020 1 ug/L	MW-2D 12/3/2020 1 ug/L	MW-4I 12/3/2020 1 ug/L	MW-9I 12/3/2020 1 ug/L	MW-9D 12/3/2020 1 ug/L	MW-10S 12/3/2020 1 ug/L	NYSDEC Class GA Standard or Guidance Value ug/l
1,2-Dichloroethene, Total	U	**18**	**10**	**19**	U	**11**	**32**	3.1	5
4-Methyl-2-pentanone (MIBK)	U	U	U	U	U	U	U	U	--
Tetrachloroethylene	U	U	0.63 J	U	U	U	U	U	5
Trichloroethylene	U	U	0.68 J	**5.2** J	U	0.57 J	1.9 J	U	5
1,1-Dichloroethene	U	U	U	U	U	U	U	U	5
cis-1,2-Dichloroethene	U	**18**	**8.7**	**19**	U	**11**	**32**	2.1	5
trans-1,2-Dichloroethene	U	U	1.5	U	U	U	U	0.95 J	5
Vinyl Chloride	U	**3.6**	**20**	1	U	**5**	**12**	**12**	2
2-Butanone (MEK)	--	--	--	--	--	--	--	--	50
Acetone	--	--	--	--	--	--	--	--	50

Footnotes/Qualifiers:
ug/l: Micrograms per liter
--: No standard or not analyzed
U: Analyzed for but not detected
J: Estimated value or limit
Exceeds Class GA Standard or Guidance Value

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Table 2-1
Sweden-3 Chapman Site
Groundwater Samples
Volatile Organic Compounds

Sample ID Sampling Date Dilution Factor Units	MW-10I 12/3/2020 1 ug/L	MW-10D 12/3/2020 1 ug/L	MW-13S 12/3/2020 1 ug/L	MW-13I 12/3/2020 1 ug/L	MW-14I 12/3/2020 5 ug/L	MW-16S 12/3/2020 5 ug/L	MW-16I 12/3/2020 25 ug/L	MW-16I(DUP-1) 12/3/2020 50 ug/L	NYSDEC Class GA Standard or Guidance Value ug/l
1,2-Dichloroethene, Total	U	U	12	7.5	190	310	2000	1900	5
4-Methyl-2-pentanone (MIBK)	U	U	U	U	U	U	U	U	--
Tetrachloroethylene	U	U	U	U	U	7.2 J	150 J	160 J	5
Trichloroethylene	U	U	U	U	U	18 J	280 J	260 J	5
1,1-Dichloroethene	U	U	U	U	U	3 J	U	U	5
cis-1,2-Dichloroethene	U	U	12	7.5	190	310	2000	1900	5
trans-1,2-Dichloroethene	U	U	U	U	U	U	U	U	5
Vinyl Chloride	U	U	70	16	U	U	73	83	2
2-Butanone (MEK)	--	--	--	--	--	--	--	--	50
Acetone	--	--	--	--	--	--	--	--	50

Footnotes/Qualifiers:
ug/l: Micrograms per liter
--: No standard or not analyzed
U: Analyzed for but not detected
J: Estimated value or limit
Exceeds Class GA Standard or Guidance Value

D&B ENGINEERS AND ARCHITECTS, P.C.

Table 2-1
Sweden-3 Chapman Site
Groundwater Samples
Volatile Organic Compounds

Sample ID Sampling Date Dilution Factor Units	MW-19S 12/3/2020 1 ug/L	MW-19I 12/3/2020 1 ug/L	MW-21I 12/3/2020 10 ug/L	MW-21I_HS 12/3/2020 2 ug/L	MW-21I_HS(DUP-3) 12/3/2020 1 ug/L	MW-22I 12/3/2020 1 ug/L	MW-23I 12/3/2020 4 ug/L	MW-23I_HS 12/3/2020 1 ug/L	NYSDEC Class GA Standard or Guidance Value ug/l
1,2-Dichloroethene, Total	2	U	**380**	--	--	**6.8**	**5.5 J**	--	5
4-Methyl-2-pentanone (MIBK)	U	U	U	--	--	U	U	--	--
Tetrachloroethylene	U	U	U	--	--	U	U	--	5
Trichloroethylene	U	U	U	--	--	**0.89 J**	U	--	5
1,1-Dichloroethene	U	U	U	--	--	U	U	--	5
cis-1,2-Dichloroethene	2	U	**380**	--	--	**6.8**	**5.5**	--	5
trans-1,2-Dichloroethene	U	U	U	--	--	U	U	--	5
Vinyl Chloride	U	U	U	--	--	U	U	--	2
2-Butanone (MEK)	--	--	--	--	--	--	--	--	50
Acetone	--	--	--	U	U	--	--	3 J	50

Footnotes/Qualifiers:
ug/l: Micrograms per liter
--: No standard or not analyzed
U: Analyzed for but not detected
J: Estimated value or limit
Exceeds Class GA Standard or Guidance Value

Table 2-1
Sweden-3 Chapman Site
Groundwater Samples
Volatile Organic Compounds

Sample ID Sampling Date Dilution Factor Units	MW-24I 12/3/2020 1 ug/L	MW-25I 12/3/2020 50 ug/L	MW-25I_HS 12/3/2020 10 ug/L	IW-1 12/3/2020 1 ug/L	IW-1(DUP-2) 12/3/2020 1 ug/L	IW-2 12/3/2020 1 ug/L	SMW-1I 12/3/2020 5 ug/L	SMW-1D 12/3/2020 1 ug/L	NYSDEC Class GA Standard or Guidance Value ug/l
1,2-Dichloroethene, Total	**5.3**	**2000**	--	**90**	**96**	**39**	**260**	1.3 J	5
4-Methyl-2-pentanone (MIBK)	U	U	--	U	U	U	U	U	--
Tetrachloroethylene	**5.1 J**	U	--	**31**	**32 J**	**15**	**180 J**	U	5
Trichloroethylene	4	U	--	**30 J**	**33 J**	**16 J**	**190 J**	U	5
1,1-Dichloroethene	U	U	--	0.44 J	0.47 J	U	U	U	5
cis-1,2-Dichloroethene	**5.3**	**2000**	--	**90**	**96**	**39**	**260**	1.3	5
trans-1,2-Dichloroethene	U	U	--	U	U	U	U	U	5
Vinyl Chloride	U	**1400**	--	**2.5**	**2.3**	**3.1**	U	U	2
2-Butanone (MEK)	--	--	--	--	--	--	--	--	50
Acetone	--	--	U	--	--	--	--	--	50

Footnotes/Qualifiers:

ug/l: Micrograms per liter

--: No standard or not analyzed

U: Analyzed for but not detected

J: Estimated value or limit

Exceeds Class GA Standard or Guidance Value

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Table 2-1
Sweden-3 Chapman Site
Groundwater Samples
Volatile Organic Compounds

Sample ID / Sampling Date / Dilution Factor / Units	SUMP 12/3/2020 1 ug/L		RESIDENTIAL 12/3/2020 1 ug/L		NYSDEC Class GA Standard or Guidance Value ug/l
1,2-Dichloroethene, Total	3.9			U	5
4-Methyl-2-pentanone (MIBK)		U		U	--
Tetrachloroethylene	0.82	J		U	5
Trichloroethylene	**5.8**			U	5
1,1-Dichloroethene		U		U	5
cis-1,2-Dichloroethene	2.4			U	5
trans-1,2-Dichloroethene	1.5			U	5
Vinyl Chloride	**5.8**			U	2
2-Butanone (MEK)	--		--		50
Acetone	--			U	50

Footnotes/Qualifiers:
ug/l: Micrograms per liter
--: No standard or not analyzed
U: Analyzed for but not detected
J: Estimated value or limit
Exceeds Class GA Standard or Guidance Value

Table 2-2
Sweden-3 Chapman Site
Groundwater and Residential Water Samples
PFAS and 1,4-Dioxane

Sample ID Sampling Date	IW-02 3/15/2018	MW-05I 3/15/2018	MW16I 3/16/2018	MW-25I 3/15/2018	SMW-1D 3/16/2018	SMW-1D (DUP) 3/16/2018	Residential 3/15/2018	Residential 7/25/2018	Residential (DUP) 7/25/2018	NYSDEC Groundwater Standard
PFAs in ng/l										
Perfluorobutanoic acid (PFBA)	49 B	5.5 B	16	73 B CL	19	21	1.9 B			100
Perfluoropentanoic acid (PFPeA)	U	U	U	U	1.5 J	0.58 J	U			100
Perfluorohexanoic acid (PFHxA)	4.3	U	U	14	20	21	U			100
Perfluoroheptanoic acid (PFHpA)	2.1	0.36 J	U	1.1 J	2.8	2.5	U	U	U	100
Perfluorooctanoic acid (PFOA)	18	2.7	U	3.6	14	14	U	U	U	10
Perfluorononanoic acid (PFNA)	U	U	U	U	0.63 J	0.55 J	U	U	U	100
Perfluorodecanoic acid (PFDA)	U	0.6 J	U	U	0.28 J	0.3 J	U			100
Perfluoroundecanoic acid (PFUnA)	U	U	U	U	U	U	U			100
Perfluorododecanoic acid (PFDoA)	U	U	U	U	U	U	U			100
Perfluorotridecanoic Acid (PFTriA)	U	U	U	U	U	U	U			100
Perfluorotetradecanoic acid (PFTeA)	U	U	U	U	U	U	U			100
Perfluorobutanesulfonic acid (PFBS)	2.1	U	U	U	U	0.84 J	U	U	U	100
Perfluorohexanesulfonic acid (PFHxS)	1.4 J B	0.2 J B	0.17 J B	0.31 J B	0.82 J B	0.75 J B	0.17 J	U	U	100
Perfluoroheptanesulfonic Acid (PFHpS)	0.23 J	U	U	U	U	U	U			100
Perfluorooctanesulfonic acid (PFOS)	18	0.55 J	U	U	3.3	3	U	U	U	10
Perfluorodecanesulfonic acid (PFDS)	U	U	U	U	U	U	U			100
Perfluorooctane Sulfonamide (FOSA)	U	U	U	U	U	U	U			100
N-methyl perfluorooctane	U	U	U	U	U	U	U			100
sulfonamidoacetic acid (NMeFOSAA)										100
N-ethyl perfluorooctane	U	U	U	U	U	U	U			100
sulfonamidoacetic acid (NEtFOSAA)										100
6:2FTS	U	U	U	U	U	U	U			100
8:2FTS	U	U	U	U	U	U	U			100
Total PFAS	95.13	9.91	16.17	92.01	62.33	64.52	0	0	0	500
1,4-Dioxane (P-Dioxane) in ug/l	0.56	U	0.73	4.6 E	0.27	0.24	U	U	U	1

Footnotes/Qualifiers:
ng/l: Nanogram per liter
ug/l: Micrograms per liter
B: Compound was found in the blank and sample
E: Concentration exceeds the calibration range
U: Analyzed for but not detected
UB: Qualified as non detect due to blank result
J: Estimated value or limit
JH: Estimated value bias high
CL: The peak identified by the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be a high bias

Exceeds NYSDEC Standard

D&B ENGINEERS AND ARCHITECTS, P.C.

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 ICs/ECs at the Site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC project manager.

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 Environmental Easement and Declaration of Covenants and Restrictions;
- 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 F**) 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 project manager.

Responsibilities of the owner with respect to this SMP and IC/EC plan are outlined in **Appendix G** – Responsibilities of Owner.

3.2 Institutional Controls

A series of ICs is required by the ROD to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and (3) limit the use of the Site to its current use as a closed and capped landfill. The ICs are placed on the entire area bound by the property line of the Site which is illustrated in **Figure 1-2** and further described in **Appendix A** and **Appendix B**. The Site is managed as part of New York State's Superfund Program. The Site's inclusion in the Registry as a Class 4 Inactive Hazardous Waste Site acts as an Institutional Control for the Site.

An additional ICs for the Site in the form of a deed restriction and an environmental easement were granted to the NYSDEC and filed with the Monroe County Clerk's office and are provided in **Appendix B.**

- Compliance with the Declaration of Covenants and Restrictions by the Declarant and the Declarant's successors and assigns with all elements of this SMP;
- Compliance with the Environmental Easement, Deed restrictions and this SMP by the Grantor and the Grantor's successors and assigns;
- The property may not be used for the purposes other than the current land use as a closed landfill;
- All ECs must be operated and maintained as specified in the SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP;
- Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;
- The potential for vapor intrusion must be evaluated for any buildings developed at the Site, and any potential impacts that are identified must be monitored or mitigated;
- Data and information pertinent to Site management must be reported at the frequency and in a manner as defined in the SMP;
- Vegetable gardens and farming on the Site are prohibited;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in the SMP;
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH, Monroe County Department of Health or Relevant Agency 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;

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

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

- An evaluation shall be performed to determine the need for further investigation and remediation should large scale redevelopment occur; if any of the existing structures are demolished, or if the subsurface is otherwise made accessible; and

- 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.

3.3 Engineering Controls

Exposure to remaining contamination at the Site is prevented by the backfill and topsoil material placed into the remedial excavation areas, a cover system consisting of a Part 360 cap (filter fabric layer, a 40-mil VFPE geomembrane layer, a geocomposite drainage layer topped with a 1.5 ft barrier protection layer, and a 6 in. vegetative soil layer), a Site fence and locked gates to prevent unauthorized access, and groundwater monitoring wells and a landfill sump for long-term groundwater monitoring. The limits of the 2010 remedial excavation are shown on the post excavation survey map provided as **Appendix E**. The EWP provided in **Appendix F** outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed, or if any underlying remaining contamination is disturbed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) provided in **Appendix H** and associated Community Air Monitoring Plan (CAMP) prepared for the specific Site activities. Any disturbance of the Site cover system must be overseen by a qualified environmental professional as defined in 6 NYCRR Part 375, a Professional Engineer (PE) who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State.

3.3.1 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered to have been completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10. Unless waived by the NYSDEC, confirmation samples of applicable environmental media are required before terminating any remedial actions at the Site. Confirmation samples require Category B deliverables and a Data Usability Summary Report (DUSR).

As discussed below, the NYSDEC may approve termination of a groundwater monitoring program. When a remedial party receives this approval, the remedial party will decommission all site-related monitoring, injection and recovery wells as per the NYSDEC CP-43 policy.

The remedial party will also conduct any needed site restoration for areas that may have been affected by Site activities. In addition, the remedial party will conduct any necessary restoration of vegetation coverage, trees and wetlands, and will comply with NYSDEC and United States Army Corps of Engineers regulations and guidance. Also, the remedial party will ensure that no ongoing erosion is occurring on the Site.

3.3.1.1 – Part 360 Cap

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

3.3.1.2 - Monitoring Wells

Groundwater monitoring activities will continue, as determined by the NYSDEC project manager in consultation with NYSDOH project manager, until residual groundwater concentrations are found to be consistently below ambient water quality standards, the Site SCGs, or have become asymptotic at an acceptable level over an extended period. In the event that monitoring data indicates that monitoring is no longer required, a proposal to discontinue monitoring will be submitted by the remedial party. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC project manager. If groundwater contaminant levels become asymptotic at a level that is not acceptable to the NYSDEC, additional source removal, treatment and/or control measures will be evaluated.

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 and may only be revised with the approval of the NYSDEC project manager. 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 I**.

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

- Sampling and analysis of all appropriate media (e.g., groundwater, indoor air, soil vapor, soils);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly groundwater standards and Part 375 SCOs for soil; and
- Evaluating Site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;

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

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

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site-wide Inspection

A Site-wide inspection will be performed annually. These periodic inspections must be conducted when the ground surface is visible (i.e. no snow cover). Site-wide inspections will be performed by a qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or duration of the inspections will require approval from the NYSDEC project manager. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. The following remedial components will be included in this inspection:

- Cap Grading
- Cap Vegetation
- Access Road
- Groundwater Monitoring Wells
- Gates and Site Perimeter Fences

During these inspections, an inspection form will be completed as provided in **Appendix J** – 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 Environmental Easement and Declaration of Covenants and Restrictions;
- 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.

4.2.1 Routine Inspections

This section covers the annual routine inspection and maintenance of the landfill cap area and other miscellaneous features of the remediation. Should inspectors find other problems, corrective action such as those described below in nonroutine maintenance will be developed.

Cap Grading

Cap grading promotes controlled drainage by eliminating depressions in the cap. Depressions can reoccur after closure due to decomposition/settling of the underlying waste. Only minor settlement of the Site consolidation area is anticipated because underlying waste is comprised almost entirely of compacted soil, but excessive or localized settlement could cause subsidence which could cause water to pond or concentrate runoff. Ponded water could kill vegetation, promote cap veneer instability, or promote infiltration through the cap into the underlying waste. Concentrated runoff, where stormwater collects as shallow concentrated flow, can lead to significant erosion of the cover soil.

Significant depressions may also cause rupture of the underlying cap components, including the filter fabric layer, a 40-mil VFPE geomembrane layer, and a geocomposite drainage layer. Though such damage would be difficult to identify without subsurface investigation, the possibility of such damage should be borne in mind when evaluating the impact of subsidence and other changes in cap grading.

Check for the following:

- Obvious subsidence, depressions, or cracks;
- Evidence of ponded water;
- Stressed vegetation;
- Evidence of signs of erosion occurring at a localized change in grade;
- Evidence of breaching of drainage channel side walls; and
- Animal burrows.

Cap Vegetation

Cap Vegetation prevents erosion of the cap soils. Inadequate cap vegetation will allow erosion to occur in the barren area, and could be caused by mowing too low, inadequate moisture, soil compaction, infertile soils, bad seed, ponded water, methane leakage from the gas venting layer/pipes, or other causes.

Check for the following:

- Areas of sparse, dead, or missing vegetation;
- Small rill erosion; and
- Animal burrows.

Site Access Road

The access road provides access to the Site and is surrounded by private property.

Check for the following:

- The condition of the road surface; and
- Signs of ponding or erosion within the adjacent lined channels.

Groundwater Monitoring Wells

Groundwater monitoring wells allow for sampling and monitoring of groundwater at the site in proximity to the consolidated area cap and remediated areas.

Monitoring wells and other sampling locations listed in Table 4-2, below, should be checked for the following:

- Signs of damage to the casing or collar;
- Degraded condition of the lock and cover;
- Degraded condition of the weep hole from casing; and
- Evidence of tampering.

Gates, Fences, and other Security Features

Gates. fences, and other security features should be fully inspected at each visit to ensure that no unauthorized access is occurring to the site. Additionally, signs of other site usage should be noted.

Check for the following:

- Cutting or bending or fence fabric;
- Missing locks, hinges, etc. from gates;
- Motorbike or snowmobile tracks;
- Shotgun shell casings;
- Cans or other trash; and
- Other signs of unauthorized access or vandalism.

4.2.2 Non-Routine Inspections

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 project manager must be given by noon of the following day. In addition, an inspection of the Site will be conducted within five (5) days of the event to verify the effectiveness of the IC/ECs implemented at the Site by a qualified environmental professional, as defined in 6 NYCRR Part 375. Written confirmation must be provided to the NYSDEC project manager within seven (7) days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

4.3 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from select groundwater monitoring wells on an annual basis. Sampling locations, required analytical parameters, and schedule are provided in **Table 4-1** – Post Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

Table 4-1 – Post Remediation Sampling Requirements and Schedule

Sampling Location	Analytical Parameters				Schedule
	VOCs (EPA Method 8260C) List #1[1]	VOCs (EPA Method 8260C) List #2[2]	PFAS (EPA Method 537.1)	1,4-Dioxane (EPA Method 8270D SIM)	
MW-1I	X				Annually
MW-1D	X				Annually
MW-2I	X				Annually
MW-2D	X				Annually
MW-4I[3]					Removed From Monitoring Network
MW-5I[3]					Removed From Monitoring Network
MW-5D[3]					Removed From Monitoring Network
MW-7S[3]					Removed From Monitoring Network
MW-8S[3]					Removed From Monitoring Network
MW-8D[3]					Removed From Monitoring Network
MW-9I	X				Annually
MW-9D	X				Annually
MW-10S	X				Annually
MW-10I	X				Annually
MW-10D	X				Annually
MW-11I[3]					Removed From Monitoring Network
MW-11D[3]					Removed From Monitoring Network
MW-12S[3]					Removed From Monitoring Network
MW-12I[3]					Removed From Monitoring Network
MW-12D[3]					Removed From Monitoring Network
MW-13S	X				Annually
MW-13I	X				Annually
MW-14I	X				Annually
MW-16S	X				Annually
MW-16I	X				Annually
MW-17S[3]					Removed From Monitoring Network
MW-17I[3]					Removed From Monitoring Network
MW-18S[3]					Removed From Monitoring Network
MW-18I3					Removed From Monitoring Network

Sampling Location	Analytical Parameters				Schedule
	VOCs (EPA Method 8260C) List #1[1]	VOCs (EPA Method 8260C) List #2[2]	PFAS (EPA Method 537.1)	1,4-Dioxane (EPA Method 8270D SIM)	
MW-18D[3]					Removed From Monitoring Network
MW-19S[3]					Removed From Monitoring Network
MW-19I[3]					Removed From Monitoring Network
MW-20I[3]					Removed From Monitoring Network
MW-21I	X				Annually
MW-22I	X				Annually
MW-23I	X	X			Annually
MW-24I	X				Annually
MW-25I	X	X		X	Annually
IW-1	X				Annually
IW-2	X		X		Annually
SMW-1I	X				Annually
SMW-1D	X		X		Annually
Sump	X				Annually
Residential Well	X	X			Annually

Notes:

1. List #1 includes 1,2-dichloroethene, 4-methyl-2-pentanone (MIBK), tetrachloroethylene, trichloroethylene 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride.
2. List #2 includes acetone.
3. Select wells have been removed the monitoring list because of consecutive monitoring results being below regulatory criteria. If associated well interval (i.e., suffix S,I,D) exceeds regulatory criteria, then monitoring for all associated intervals is conducted.

Detailed sample collection procedures are presented below, and analytical procedures and protocols are provided in **Appendix I** – Quality Assurance Project Plan.

4.3.1 Groundwater Sampling

Groundwater monitoring will be conducted annually to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager. The network of monitoring wells has been installed to monitor on-site and downgradient groundwater conditions at the Site.

The network of monitoring wells has been installed to monitor the groundwater plume. The well screens/open bedrock intervals range from between 5 feet below ground surface (bgs) to 55 feet bgs. A synoptic round of groundwater elevation measurements will be collected from all monitoring wells during the groundwater monitoring event to evaluate trends in groundwater levels. The water table has historically been encountered in wells between -3 feet to 15 feet bgs as artesian well conditions have been observed at select bedrock wells (MW-10D, MW-11D, SMW-1D). Monitoring well locations are shown on **Figure 1-2**, construction details are provided in **Table 4-2** (below) and monitoring well construction logs are included in **Appendix D**.

Table 4-2 – Monitoring Well Construction Details

Monitoring Well ID[3]	Well Location	Coordinates		Top of Riser[1] (ft AMSL)	Screen Interval[2] (ft bgs)
		Northing	Easting		
MW-1I	Cross-gradient	1153394.1000	1314932.5000	626.28	19.17-29.17
MW-1D	Cross-gradient	1153396.3000	1314920.6000	627.24	29.80-54.80
MW-2I	Downgradient	1153518.2000	1315278.2000	623.45	9.66-19.66
MW-2D	Downgradient	1153511.0000	1315291.8000	624.51	20.12-45.22
MW-4I	Upgradient	1152997.2000	1315272.7000	637.95	25.11-30.11
MW-5I	Upgradient	1152782.5000	1314775.0000	654.96	34.33-44.33
MW-5D	Upgradient	1152787.8000	1314775.6000	654.12	49.70-69.60
MW-7S	Downgradient	1153447.3000	1315359.9000	624.41	4.79-11.79
MW-8S	Upgradient	1153162.5000	1315363.8000	625.19	6.83-13.83
MW-8D	Upgradient	1153153.4000	1315360.5000	625.32	22.56-46.06
MW-9I	Downgradient	1153617.7000	1315094.4000	622.85	20.67-25.67
MW-9D	Downgradient	1153620.2000	1315114.8000	624.09	27.50-52.50
MW-10S	Downgradient	1153703.5000	1315359.4000	622.11	7.62-14.62
MW-10I	Downgradient	1153709.3000	1315353.4000	621.33	14.33-18.33
MW-10D	Downgradient	1153708.6000	1315374.2000	620.98	26.30-48.80
MW-11I	Downgradient	1153465.3000	1315620.7000	621.57	11.97-15.97

Monitoring Well ID[3]	Well Location	Coordinates		Top of Riser[1] (ft AMSL)	Screen Interval[2] (ft bgs)
		Northing	Easting		
MW-11D	Downgradient	1153461.3000	1315605.0000	621.55	20.67-41.17
MW-12S	Downgradient	1153851.3000	1315758.8000	621.64	9.64-14.64
MW-12I	Downgradient	1153847.3000	1315817.4000	621.49	19.39-23.39
MW-12D	Downgradient	1153853.2000	1315815.7000	622.23	28.50-50.50
MW-13S	Downgradient	1153812.3000	1315460.3000	621.09	9.08-16.08
MW-13I	Downgradient	1153806.7000	1315464.2000	621.27	17.16-21.16
MW-14I	Downgradient	1153522.3000	1315427.0000	621.38	16.33-20.33
MW-16S	Downgradient	1153349.4000	1315500.6000	622.91	7.24-12.24
MW-16I	Downgradient	1153333.9000	1315501.9000	623.19	16.45-26.45
MW-17S	Downgradient	1153605.7000	1315818.3000	622.61	8.42-13.42
MW-17I	Downgradient	1153595.5000	1315813.8000	622.23	18.13-23.13
MW-18S	Downgradient	1153814.4000	1314942.2000	625.64	8.75-13.75
MW-18I	Downgradient	1153822.0000	1314936.0000	625.70	15.72-22.72
MW-18D	Downgradient	1153803.5000	1314942.6000	NA[4]	23.41-50.41
MW-19S	Downgradient	1153983.0000	1315456.5000	621.76	9.36-14.36
MW-19I	Downgradient	1153988.0000	1315462.9000	621.59	17.89-24.89
MW-20I	Downgradient	1154160.1000	1315577.3000	622.59	14.79-24.79
MW-21I	Downgradient	1153383.0000	1315660.6000	622.65	13.39-23.39
MW-22I	Cross-gradient	1153330.8000	1315354.0000	628.84	14.64-24.64
MW-23I	Cross-gradient	1153390.8000	1315329.9000	628.38	14.40-24.40
MW-24I	Cross-gradient	NA	NA	NA	NA
MW-25I	Cross-gradient	NA	NA	NA	NA
IW-1	Cross-gradient	1153325.8390	1315398.6580	624.04	12.07-15.07
IW-2	Cross-gradient	1153348.5280	1315398.2120	623.73	14.68-17.68
SMW-1I	Cross-gradient	1153355.4610	1315446.5020	622.52	8.95-13.95

Monitoring Well ID[3]	Well Location	Coordinates		Top of Riser[1] (ft AMSL)	Screen Interval[2] (ft bgs)
		Northing	Easting		
SMW-1D	Cross-gradient	1153365.3620	1315443.6550	621.38	15.55-36.55
Sump	Cross-gradient	NA	NA	NA	NA
Residential Well	Upgradient	NA	NA	NA	NA

Note:

1. Top of Riser elevation for deep wells refers to top of casing.
2. Screened interval for deep wells corresponds to the open bedrock borehole.
3. Bolded wells are currently being monitored for the parameters listed in Table 4-1. Select wells have been removed from the monitoring list because of consecutive monitoring results being below regulatory criteria.
4. NA – not available.

Groundwater monitoring has historically been conducted using passive (no purge) sampling techniques. Site groundwater monitoring wells and the leachate sump are to be sampled using pre-filled passive diffusion bags (PDBs) and HydroSleeves (HSs), both provided by EON Products© or alternate vendors.

Samples being analyzed for for PFAS and 1,4-dioxane parameters shall not be collected using PDBs or HSs. Before deploying the PDBs, samples for PFAS and 1,4-dioxane are to be collected following *Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells* (USEPA, 2017) utilizing a peristaltic pump with silicone and high-density polyethylene tubing. Water quality readings are to be recorded with a multiparameter water quality meter with a flow through cell during groundwater purging and prior to sampling.

The PDBs are designed as sealed polyethylene membranes filled with deionized water and no air gaps. The PDB shall reside in the vertical column of water designated for sampling for a duration no shorter than two weeks. Available volatile organic compounds (VOCs) diffuse through the sampler wall during the residence time of immersion. The semi-permeable membrane allows the interior volume of deionized water to equilibrate by diffusion to the concentration of VOC's in the designated sampling area (i.e., screened or open bedrock interval). Due to the PDBs limitations to reliably diffuse acetone, HSs shall be installed below the PDBs for locations that require acetone monitoring.

HSs are classified as a no-purge (passive) grab sampling device, used to collect a groundwater sample directly from the screened interval of a well without having to purge the well prior to sample collection. It excludes water from any other part of the water column in the well through the use of a self-sealing check valve at the top of the sampler. It is a single-use (disposable) sampler that is not intended for reuse, so there are no decontamination requirements for the sampler itself.

Dedicated suspension/tether ropes and weights are installed in each monitoring well to facilitate PDB and HS deployment and secured to the bottom of the well cap. Zip ties are used to attach the top and bottom of the passive sampling devices to stainless steel split ring connectors or directly through the suspension/tether rope. Once the passive samplers are securely attached, they are lowered into the well to the desired depth.

As indicated above, samplers should remain in the well for a minimum equilibration period of two weeks, but not to exceed three months. The advisability of longer deployment times is determined by individual well characteristics, although generally bag integrity is not a problem. A demonstration may be required to verify the validity of PDB deployments longer than three months. To avoid loss of analytes, do not retrieve the PDB unless ready to sample it immediately. Samples should be decanted into laboratory containers immediately upon retrieval.

To collect samples, remove the sampling bags from the well and remove them from the tether by carefully using a small snipping tool to cut the zip-ties that hold the sampler to the rings on the tether. Be careful to not let anything touch the area of the sample bag where the discharge tube (“juice box straw”) will be inserted. For well locations where HSs are installed, the tether must be pulled upward rapidly to open the top valve, allowing water to be collected. Puncture the sampling bag using the discharge straw and allow to discharge for a second or two and then fill the laboratory supplied containers in the usual manner.

Groundwater monitoring activities to assess remaining contamination shall continue until NYSDEC has determined that residual levels of contaminants in groundwater are consistently below NYSDEC standards, have become asymptotic at an acceptable level over an extended period of time or until NYSDEC determines that continued operation is technically impracticable or not feasible. Monitoring shall continue until permission to discontinue is granted in writing by NYSDEC. If groundwater contaminant concentrations become asymptotic at levels that are not acceptable to NYSDEC, additional source removal, treatment, and/or control measures will be evaluated.

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced if an event renders the wells unusable. Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

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

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

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

4.3.2 Soil Vapor Intrusion Sampling

As identified above, evaluation of the potential for vapor intrusion will be performed for any buildings constructed on the Site and will include provisions for mitigation of any impacts identified and will require approval from the NYSDEC project manager. Soil vapor sampling will be conducted in accordance with New York State Department of Health Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH 2006).

4.3.3 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in **Appendix J** - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional details regarding monitoring and sampling protocols are provided in the Field Activities Plan provided as **Appendix K**.

4.3.4 Management of Investigation Derived Waste

Used disposable equipment and personal protective equipment can be double bagged in polyethylene trash bags, sealed, and disposed of as non-hazardous municipal solid waste.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

The Site remedy does not rely on any active mechanical systems, such as groundwater treatment systems or air sparge/soil vapor extraction systems to protect public health and the environment. Therefore, the operation and maintenance of such components is not included in this SMP. However, the Site Remedy does rely on passive mechanical systems to monitor and protect public health and the environment.

5.1.1 Routine Maintenance

Routine maintenance for the Site includes maintenance of the following components:

- Vegetative surface cover; and
- Monitoring well repairs, replacement and decommissioning.

Vegetative Surface Cover

Mowing shall be performed at least annually, or as necessary, to maintain a dense vegetation cover, and to suppress the growth of woody vegetation. Mowing height shall be no lower than 6 inches. Mowing should be scheduled during a period of dry weather to prevent scarring and/or rutting of the surface.

Monitoring 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 wells will be properly decommissioned and replaced (as per the Monitoring Plan), if an event renders the wells unusable and the NYSDEC Project Manager 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 Project Manager 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 "CP-43: Groundwater Monitoring Well Decommissioning Policy", 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 Project Manager.

5.1.2 Non-Routine Maintenance

Non-routine final cover maintenance will be undertaken if signs of excessive differential settlement or subsidence of the final cover system are found during routine inspections, which could affect the proper functioning of the final cover. These areas will be regraded and reseeded as soon as the area can be safely accessed.

Minor repairs to the final cover system will be completed if determined necessary by the final cover system inspections. Minor repairs will generally consist of regrading, reseeding, and stabilization activities to repair erosion features or depressions caused by the settlement of waste. All repairs will be performed using low ground pressure type equipment suitable for fine grading. Additional soil suitable for the development of vegetation will be placed and graded as necessary. The soil will be placed in a manner to match the surrounding grade and the area will be reseeded either by broadcasting or hydroseeding, depending on the size of the repair. Temporary erosion controls such as tack mulch, rolled erosion fabrics, and silt fences will be installed, as necessary.

In general, regrading, seeding and stabilization activities will be performed in accordance with applicable sections of the specifications and drawings developed during the landfill closure design and NYSDEC's document entitled "DER-10 Technical Guidance for Site Investigation and Remediation", dated May 2010.

Erosion control will be performed in a manner consistent with procedures set forth in NYSDEC's document entitled "New York Standards and Specifications for Erosion and Sediment Control", dated August 2005. Erosion and sediment control procedures will be developed and implemented as necessary to prevent erosion and sediment migration based on the actual site conditions and surface water drainage patterns at the time of work. All erosion and sediment control procedures will be maintained until suitable vegetation has been established.

If final cover differential settlement is suspected to have potentially compromised one or more of the deeper layers of the final cover such as the geotextile or geomembrane, a qualified engineer will inspect the area of final cover in question. The engineer will then decide as to whether excavation down to the geosynthetic layers is necessary to facilitate inspection and possible repair. If necessary, excavation of topsoil and the various barrier protection soil layers will be completed in the area of settlement, and at least 4 to 5 feet beyond, to expose a sufficient portion of the geosynthetic layers for inspection/repair.

The engineer will then complete an inspection of the geosynthetic layers, noting items such as stress/deformation and/or trampolining of geosynthetics, damaged seams, or other visible damage. The area will be inspected to assess underlying subgrade. If deemed necessary, the geosynthetic layers will be removed to evaluate the underlying layer/subgrade. Prior to restoration of the geosynthetic layers, compaction may be performed to further consolidate waste beneath the final cover to reduce the potential for additional future settlement. Structural fill soil may also be placed above the waste layer to match surrounding grades and provide a suitable subgrade for the geosynthetics repair, if necessary. The geosynthetics would then be reinstalled over the area by a qualified geosynthetics installer in accordance with the specifications approved during the design, as may be adjusted based on prevailing practice. Due to availability of qualified installers and/or ability to perform repairs based on site conditions/weather, a temporary patch of low permeability soil and/or geomembrane cover may be placed over the area prior to making the final repairs. Finally, soil suitable for the development of vegetative cover will be placed over the restored portion of the final cover. Stabilization and reseeding will be completed in a manner consistent with procedures set forth in NYSDEC's entitled "New York Standards and Specifications for Erosion and Sediment Control".

All non-routine maintenance events must be documented in Site management forms. Examples of Site Management Forms are provided in **Appendix J**. In addition, all non-routine maintenance events shall be detailed in each respective Site Management Report, as well as the Periodic Review Report (PRR) for that respective reporting period.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climate 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.

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.

Several of the monitoring wells are located in freshwater wetlands that experiences normal seasonal flooding. Flooding is not expected to affect the monitoring well network as currently installed. The Site 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 PRR.

Waste Generation

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

- Disposable sampling equipment and personal protective equipment associated with groundwater sampling, such as disposable gloves, passive sampling equipment, etc.
- Packaging material and ice used to pack and preserve samples to be submitted for laboratory analysis.
- Paper and office supplies associated with Site logs, monitoring logs and report preparation.

Electric Usage

The Site management does not directly use electricity as part of its routine operation.

Fossil Fuel Usage

Fossil fuels are used during groundwater injection by pumps that deliver chemicals to the subsurface if additional injections were conducted. The current Site management does not directly use fossil fuels as part of its routine operation; however, fossil fuels are indirectly used during the completion of maintenance and monitoring activities. Indirect fossil fuel use results from completion of the following Site related activities:

- Transportation to and from the Site for monitoring and sampling activities and routine maintenance.
- Off-Site transportation and shipment of samples collected for laboratory analysis.
- Disposal of waste generated at the Site.

Water Usage

Water is used to dilute chemicals used during groundwater injections if additional injections were to be conducted. The other 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.

6.2.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the NYSDEC 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 Remedial Systems

Remedial systems will be operated properly considering the current Site conditions to conserve materials and resources to the greatest extent possible. Consideration will be given to operating rates and use of reagents and consumables. Spent materials will be sent for recycling, as appropriate.

6.2.3 Building Operations

Structures, including buildings and sheds, will be operated and maintained to provide for the most efficient operation of the remedy, while minimizing energy, waste generation and water consumption. Currently, structures are not a component of the Site remedy.

6.2.4 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site and use of consumables in relation to visiting the Site to conduct inspections and/or collect samples and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities has 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.

6.2.5 Metrics and Reporting

As discussed in Section 7.0 and as shown in **Appendix L** – Green Remediation Metrics, 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 project manager or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;

- There is an anticipated transfer of the Site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

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

The RSO study will 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. Green remediation technology and principals are to be considered when performing the RSO.

7.0. REPORTING REQUIREMENTS

7.1 Site Management Reports

All Site management inspection, maintenance and monitoring events will be recorded on the appropriate Site management forms provided in **Appendix J**. These forms are subject to NYSDEC revision. All site management inspection, maintenance, and monitoring events will be conducted by a qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the Site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of **Table 7-1** and summarized in the Periodic Review Report.

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

Task/Report	Reporting Frequency*
Site Management Reports	As requested by NYSDEC
Periodic Review Report	5 years

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

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

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);

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

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

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

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

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;

- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and

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

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC 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 PRR will be submitted every five years to the NYSDEC project manager or at another frequency as may be required by the NYSDEC project manager. 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 B** – Environmental Easement and Declaration of Covenants and Restrictions. 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 PRR. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the Site.

- Results of the required annual Site inspections and severe condition inspections, if applicable.

- All applicable Site management forms and other records generated for the Site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.

- Identification of any wastes generated during the reporting period, along with waste characterization data, manifests, and disposal documentation.

- 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, including, but not limited to:

- Trend monitoring graphs that present groundwater contaminant levels from before the start of the remedy implementation to the most current sampling data;
- Trend monitoring graphs depicting system influent analytical data on a per event and cumulative basis;
- O&M data summary tables;
- A current plume map for sites with remaining groundwater contamination; and
- A groundwater elevation contour map for each gauging event.

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

• A Site evaluation, which includes the following:

  - The compliance of the remedy with the requirements of the Site-specific RAWP, ROD or Decision Document;
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan;
  - An evaluation of 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 RAWP, ROD, or Decision Document; and
  - The overall performance and effectiveness of the remedy.

• A performance summary for all treatment systems at the Site during the calendar year, including information such as:

  - The number of days the system operated for the reporting period;
  - The average, high, and low flows per day;

- The contaminant mass removed and the cost per pound of mass removed during the certification period and during the life of the treatment system;
- A description of breakdowns and/or repairs along with an explanation for any significant downtime;
- A description of the resolution of performance problems;
- Alarm conditions;
- Trends in equipment failure;
- A summary of the performance, effluent and/or effectiveness monitoring; and
- Comments, conclusions, and recommendations based on data evaluation.

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 Environmental Easement and Declaration of Covenants and Restrictions;*

- *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, or failure to conduct site management activities, a Corrective Measures Work Plan will be submitted to the NYSDEC project manager 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 project manager

7.4 Remedial System Optimization Report

If an RSO is to be performed (see Section 6.3), upon completion of a RSO, the RSO report must be submitted to the NYSDEC project manager for approval. A general outline for the RSO report is provided in **Appendix M**. 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

Dunn Geoscience Engineering Company, P.C., 1993. *RI/FS Report, Sweden-3 Chapman Site, Sweden, NY.* (November 1993).

NYSDEC, 1994. *Record of Decision, Sweden-3 Chapman Site, Site No. 828040A, Town of Sweden, Monroe County.* (March 1994).

NYSDEC, 2006. *Explanation of Significant Difference, Sweden-3 Chapman Site, Site No. 828040A, Town of Sweden, Monroe County.* (February 2006).

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Groundwater & Environmental Services, Inc., 2012. *Groundwater Sampling Workplan, Sweden-3 Chapman Site, Redman Road, Town of Sweden (Monroe County), NY, NYSDEC Site No. 828040A.* (January 2012).

EA Engineering, P.C., 2012. *Site Management Plan, Sweden-3 Chapman Site, Site No. 828040A, Town of Sweden, Monroe County, NY.* (September 2012).

Groundwater & Environmental Services, Inc., 2013. *Periodic Review Report, Sweden-3 Chapman Site, Town of Sweden, Monroe County, NY, Site No. 828040A.* (March 2013).

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Groundwater & Environmental Services, Inc., 2016. *2015 Annual Site Management Report, Sweden-3 Chapman Site, Town of Sweden, Monroe County, NY, Site No. 828040A.* (August 2016).

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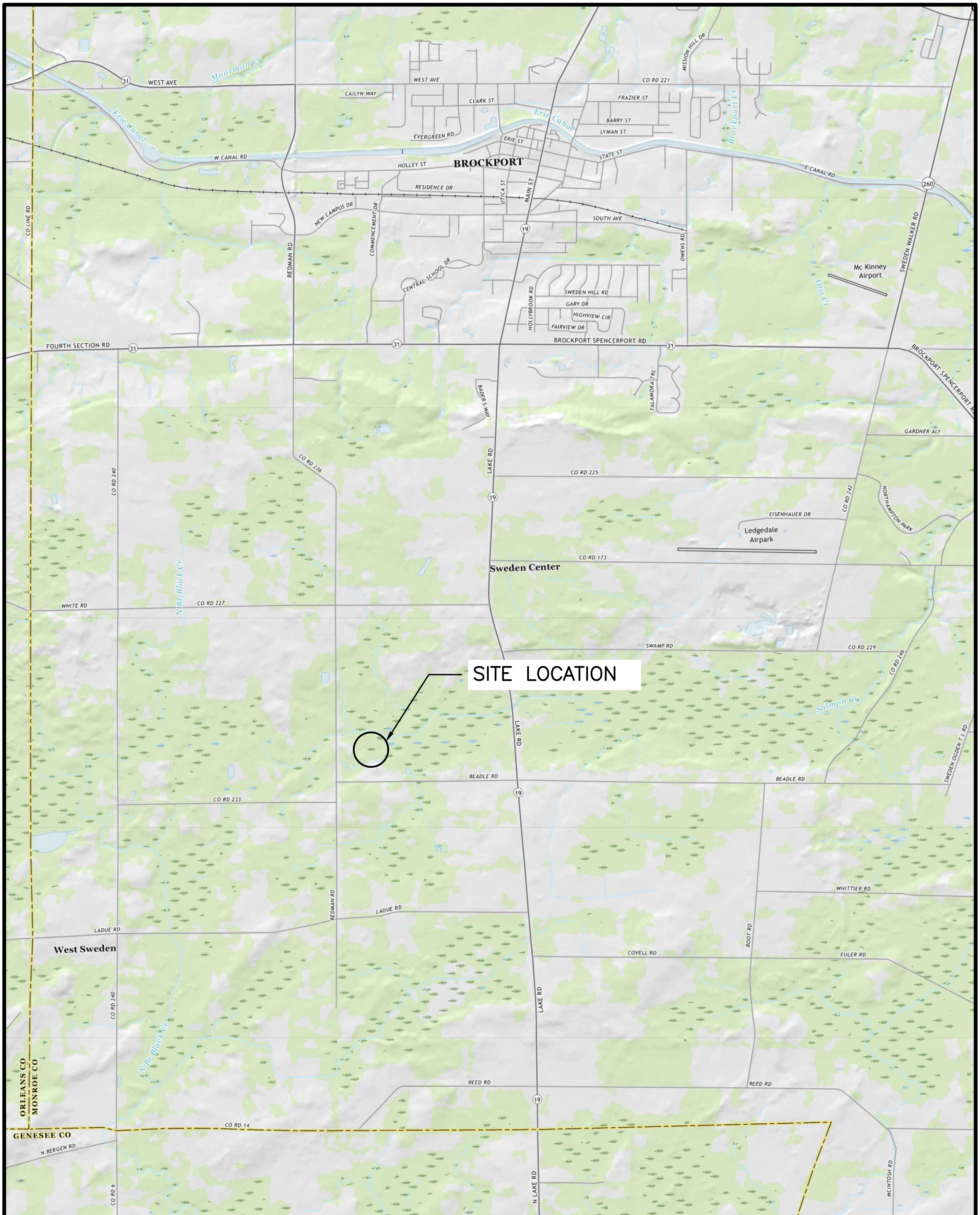
Groundwater & Environmental Services, Inc., 2018. 2017 *Periodic Review Report, Sweden-3 Chapman Site, Town of Sweden, Monroe County, NY, Site No. 828040A.* (March 2018).

D&B, 2020. *2018 Site Management Report, NYSDEC Site No. 828040A, Sweden-3 Chapman Site, Town of Sweden, Monroe County, NY.* (January 2020).

D&B, 2020. *2019 Site Management Report, NYSDEC Site No. 828040A, Sweden-3 Chapman Site, Town of Sweden, Monroe County, NY.* (February 2020).

NYSDEC, 2021. *Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS)*. (January 2021).

FIGURES



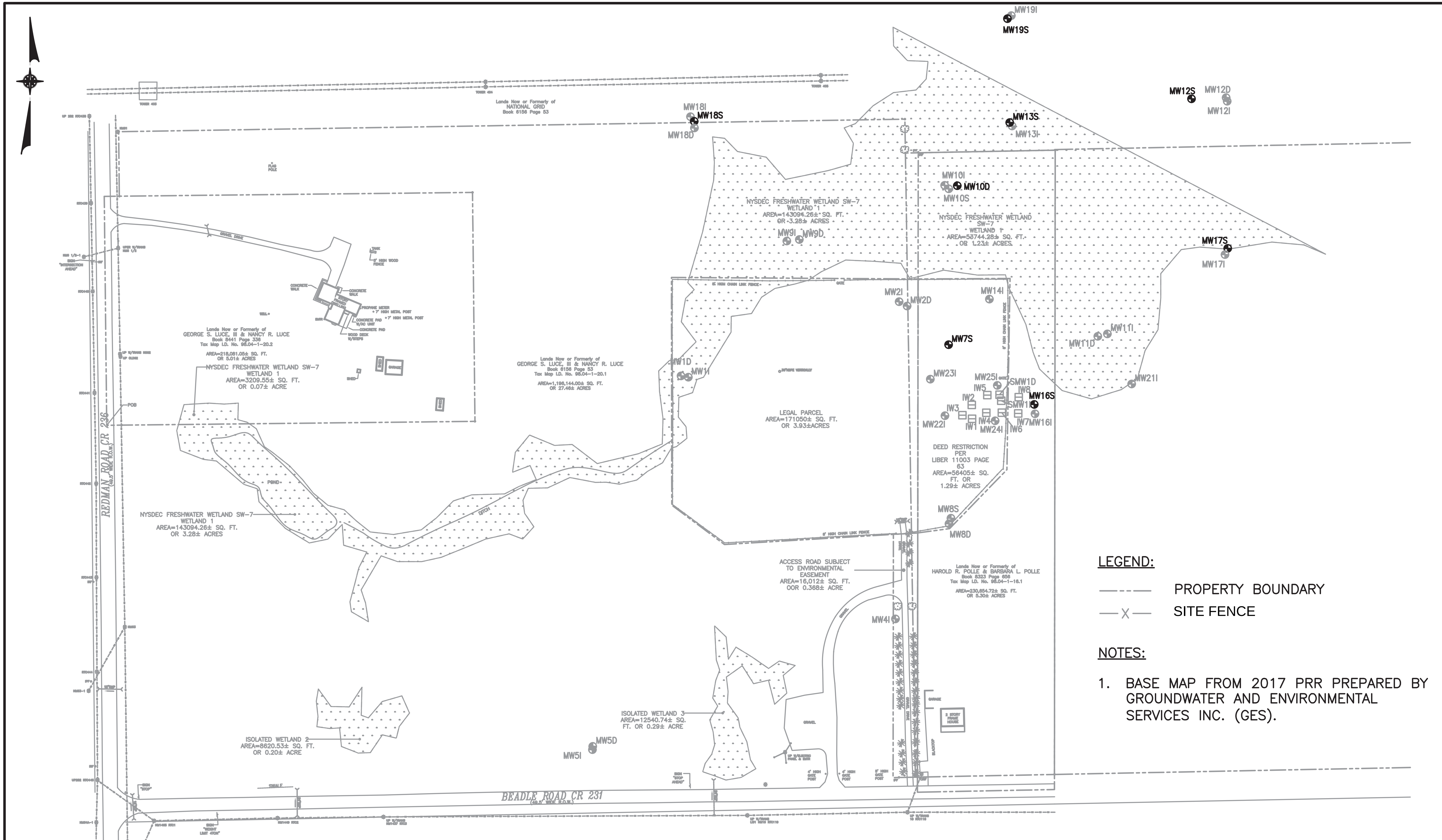
SWEDEN-3 CHAPMAN SITE (8-28-040A)
SITE MANAGEMENT PLAN
SWEDEN, NEW YORK

D&B ENGINEERS AND ARCHITECTS

SITE LOCATION MAP

FIGURE 1-1

F:\3150-45U\dwg\3150-45U-LOCATION-MAP.dwg, Layout1, 3/2/2021 9:33:56 AM, rferrell



NOTES:

1. BASE MAP FROM 2017 PRR PREPARED BY GROUNDWATER AND ENVIRONMENTAL SERVICES INC. (GES).

D&B ENGINEERS AND ARCHITECTS, P.C.

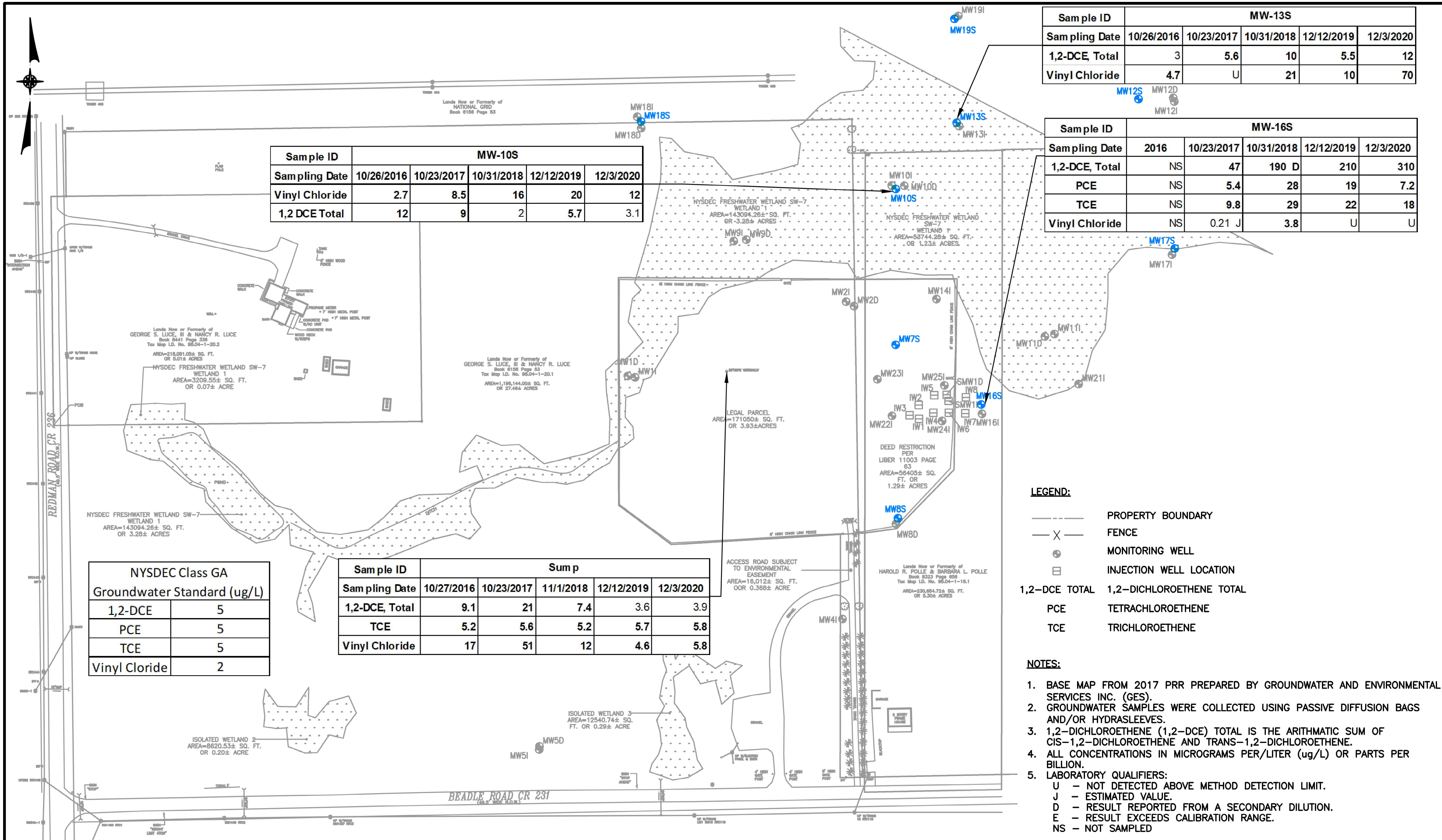
SWEDEN-3 CHAPMAN SITE
SWEDEN, NEW YORK

SCALE:1" =150'

SITE PLAN

FIGURE 1-2

F:\3150-45U\dwg\3150-45U-C-SP01-SITE PLAN-09-18-19.dwg, SITE PLAN, 9/20/2019 11:03:54 AM, kalesius



Sample ID	MW-13S				
Sampling Date	10/26/2016	10/23/2017	10/31/2018	12/12/2019	12/3/2020
1,2-DCE, Total	3	5.6	10	5.5	12
Vinyl Chloride	4.7	U	21	10	70

Sample ID	MW-16S				
Sampling Date	2016	10/23/2017	10/31/2018	12/12/2019	12/3/2020
1,2-DCE, Total	NS	47	190 D	210	310
PCE	NS	5.4	28	19	7.2
TCE	NS	9.8	29	22	18
Vinyl Chloride	NS	0.21 J	3.8	U	U

Sample ID	MW-10S				
Sampling Date	10/26/2016	10/23/2017	10/31/2018	12/12/2019	12/3/2020
Vinyl Chloride	2.7	8.5	16	20	12
1,2 DCE Total	12	9	2	5.7	3.1

NYSDEC Class GA Groundwater Standard (ug/L)	
1,2-DCE	5
PCE	5
TCE	5
Vinyl Cloride	2

Sample ID	Sump				
Sampling Date	10/27/2016	10/23/2017	11/1/2018	12/12/2019	12/3/2020
1,2-DCE, Total	9.1	21	7.4	3.6	3.9
TCE	5.2	5.6	5.2	5.7	5.8
Vinyl Chloride	17	51	12	4.6	5.8

LEGEND:

PROPERTY BOUNDARY

FENCE

MONITORING WELL

INJECTION WELL LOCATION

1,2–DCE TOTAL 1,2–DICHLOROETHENE TOTAL

PCE TETRACHLOROETHENE

TCE TRICHLOROETHENE

NOTES:

1. BASE MAP FROM 2017 PRR PREPARED BY GROUNDWATER AND ENVIRONMENTAL SERVICES INC. (GES).
2. GROUNDWATER SAMPLES WERE COLLECTED USING PASSIVE DIFFUSION BAGS AND/OR HYDRASLEEVES.
3. 1,2–DICHLOROETHENE (1,2–DCE) TOTAL IS THE ARITHMATIC SUM OF CIS–1,2–DICHLOROETHENE AND TRANS–1,2–DICHLOROETHENE.
4. ALL CONCENTRATIONS IN MICROGRAMS PER/LITER (ug/L) OR PARTS PER BILLION.
5. LABORATORY QUALIFIERS:
   U – NOT DETECTED ABOVE METHOD DETECTION LIMIT.
   J – ESTIMATED VALUE.
   D – RESULT REPORTED FROM A SECONDARY DILUTION.
   E – RESULT EXCEEDS CALIBRATION RANGE.
   NS – NOT SAMPLED

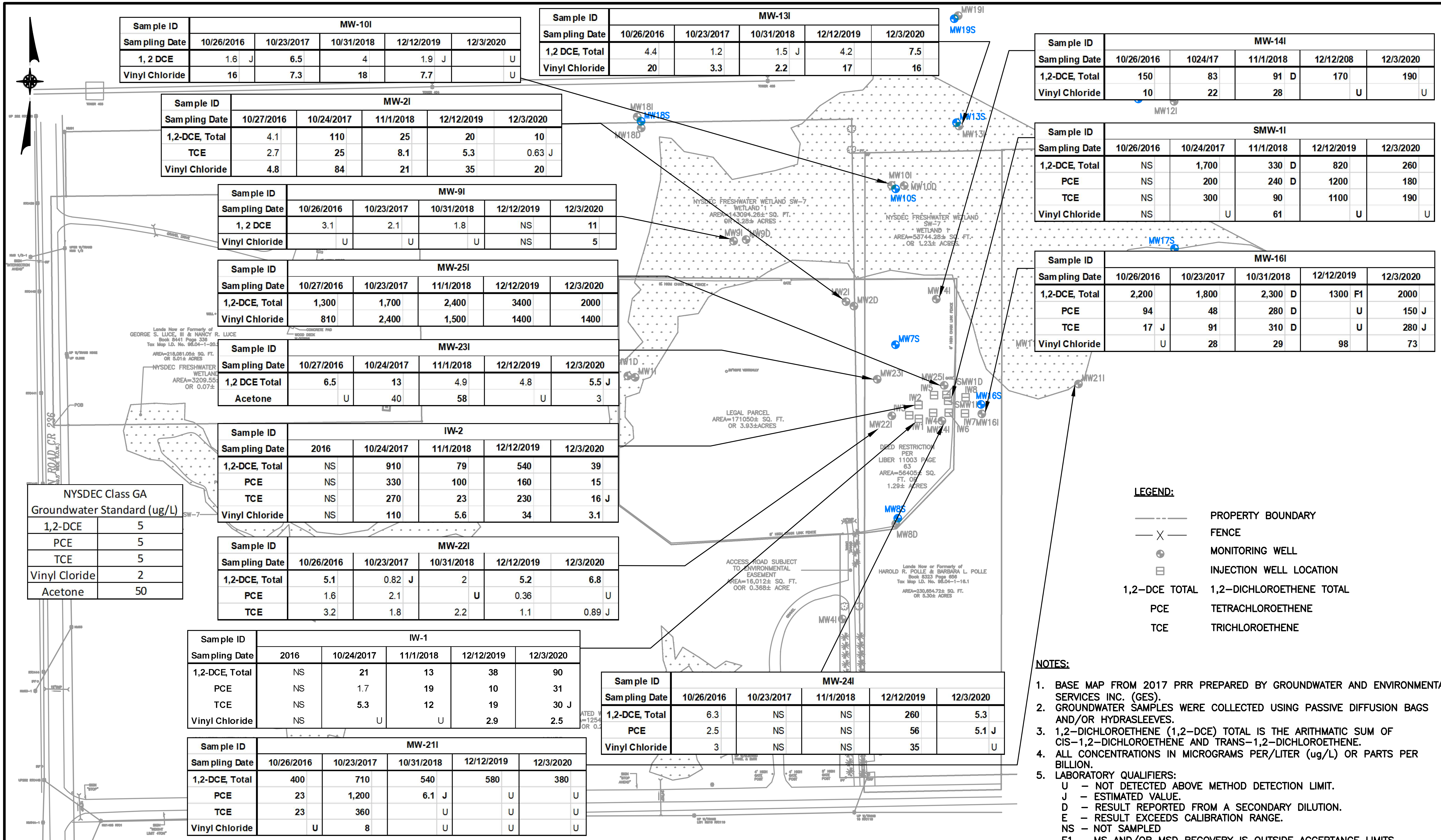
D&B ENGINEERS AND ARCHITECTS, P.C.

SWEDEN-3 CHAPMAN SITE
SWEDEN, NEW YORK

SCALE:1" =150'

SCG EXCEEDANCES IN SHALLOW GROUNDWATER

FIGURE 2-1



Sample ID	MW-10I				
Sampling Date	10/26/2016	10/23/2017	10/31/2018	12/12/2019	12/3/2020
1, 2 DCE	1.6 J	6.5	4	1.9 J	U
Vinyl Chloride	16	7.3	18	7.7	U

Sample ID	MW-13I				
Sampling Date	10/26/2016	10/23/2017	10/31/2018	12/12/2019	12/3/2020
1,2 DCE, Total	4.4	1.2	1.5 J	4.2	7.5
Vinyl Chloride	20	3.3	2.2	17	16

Sample ID	MW-14I				
Sampling Date	10/26/2016	1024/17	11/1/2018	12/12/208	12/3/2020
1,2-DCE, Total	150	83	91 D	170	190
Vinyl Chloride	10	22	28	U	U

Sample ID	MW-2I				
Sampling Date	10/27/2016	10/24/2017	11/1/2018	12/12/2019	12/3/2020
1,2-DCE, Total	4.1	110	25	20	10
TCE	2.7	25	8.1	5.3	0.63 J
Vinyl Chloride	4.8	84	21	35	20

Sample ID	SMW-1I				
Sampling Date	10/26/2016	10/24/2017	11/1/2018	12/12/2019	12/3/2020
1,2-DCE, Total	NS	1,700	330 D	820	260
PCE	NS	200	240 D	1200	180
TCE	NS	300	90	1100	190
Vinyl Chloride	NS	U	61	U	U

Sample ID	MW-9I				
Sampling Date	10/26/2016	10/23/2017	10/31/2018	12/12/2019	12/3/2020
1, 2 DCE	3.1	2.1	1.8	NS	11
Vinyl Chloride	U	U	U	NS	5

Sample ID	MW-16I				
Sampling Date	10/26/2016	10/23/2017	10/31/2018	12/12/2019	12/3/2020
1,2-DCE, Total	2,200	1,800	2,300 D	1300 F1	2000
PCE	94	48	280 D	U	150 J
TCE	17 J	91	310 D	U	280 J
Vinyl Chloride	U	28	29	98	73

Sample ID	MW-25I				
Sampling Date	10/27/2016	10/23/2017	11/1/2018	12/12/2019	12/3/2020
1,2-DCE, Total	1,300	1,700	2,400	3400	2000
Vinyl Chloride	810	2,400	1,500	1400	1400

Sample ID	MW-23I				
Sampling Date	10/27/2016	10/24/2017	11/1/2018	12/12/2019	12/3/2020
1,2 DCE Total	6.5	13	4.9	4.8	5.5 J
Acetone	U	40	58	U	3

Sample ID	IW-2				
Sampling Date	2016	10/24/2017	11/1/2018	12/12/2019	12/3/2020
1,2-DCE, Total	NS	910	79	540	39
PCE	NS	330	100	160	15
TCE	NS	270	23	230	16 J
Vinyl Chloride	NS	110	5.6	34	3.1

NYSDEC Class GA Groundwater Standard (ug/L)	
1,2-DCE	5
PCE	5
TCE	5
Vinyl Cloride	2
Acetone	50

Sample ID	MW-22I				
Sampling Date	10/26/2016	10/23/2017	10/31/2018	12/12/2019	12/3/2020
1,2-DCE, Total	5.1	0.82 J	2	5.2	6.8
PCE	1.6	2.1	U	0.36	U
TCE	3.2	1.8	2.2	1.1	0.89 J

Sample ID	IW-1				
Sampling Date	2016	10/24/2017	11/1/2018	12/12/2019	12/3/2020
1,2-DCE, Total	NS	21	13	38	90
PCE	NS	1.7	19	10	31
TCE	NS	5.3	12	19	30 J
Vinyl Chloride	NS	U	U	2.9	2.5

Sample ID	MW-24I				
Sampling Date	10/26/2016	10/23/2017	11/1/2018	12/12/2019	12/3/2020
1,2-DCE, Total	6.3	NS	NS	260	5.3
PCE	2.5	NS	NS	56	5.1 J
Vinyl Chloride	3	NS	NS	35	U

Sample ID	MW-21I				
Sampling Date	10/26/2016	10/23/2017	10/31/2018	12/12/2019	12/3/2020
1,2-DCE, Total	400	710	540	580	380
PCE	23	1,200	6.1 J	U	U
TCE	23	360	U	U	U
Vinyl Chloride	U	8	U	U	U

LEGEND:

PROPERTY BOUNDARY
FENCE
MONITORING WELL
INJECTION WELL LOCATION
1,2–DCE TOTAL — 1,2–DICHLOROETHENE TOTAL
PCE — TETRACHLOROETHENE
TCE — TRICHLOROETHENE

NOTES:

1. BASE MAP FROM 2017 PRR PREPARED BY GROUNDWATER AND ENVIRONMENTAL SERVICES INC. (GES).
2. GROUNDWATER SAMPLES WERE COLLECTED USING PASSIVE DIFFUSION BAGS AND/OR HYDRASLEEVES.
3. 1,2–DICHLOROETHENE (1,2–DCE) TOTAL IS THE ARITHMATIC SUM OF CIS–1,2–DICHLOROETHENE AND TRANS–1,2–DICHLOROETHENE.
4. ALL CONCENTRATIONS IN MICROGRAMS PER/LITER (ug/L) OR PARTS PER BILLION.
5. LABORATORY QUALIFIERS:
   - U – NOT DETECTED ABOVE METHOD DETECTION LIMIT.
   - J – ESTIMATED VALUE.
   - D – RESULT REPORTED FROM A SECONDARY DILUTION.
   - E – RESULT EXCEEDS CALIBRATION RANGE.
   - NS – NOT SAMPLED
   - F1 – MS AND/OR MSD RECOVERY IS OUTSIDE ACCEPTANCE LIMITS.

D&B ENGINEERS AND ARCHITECTS

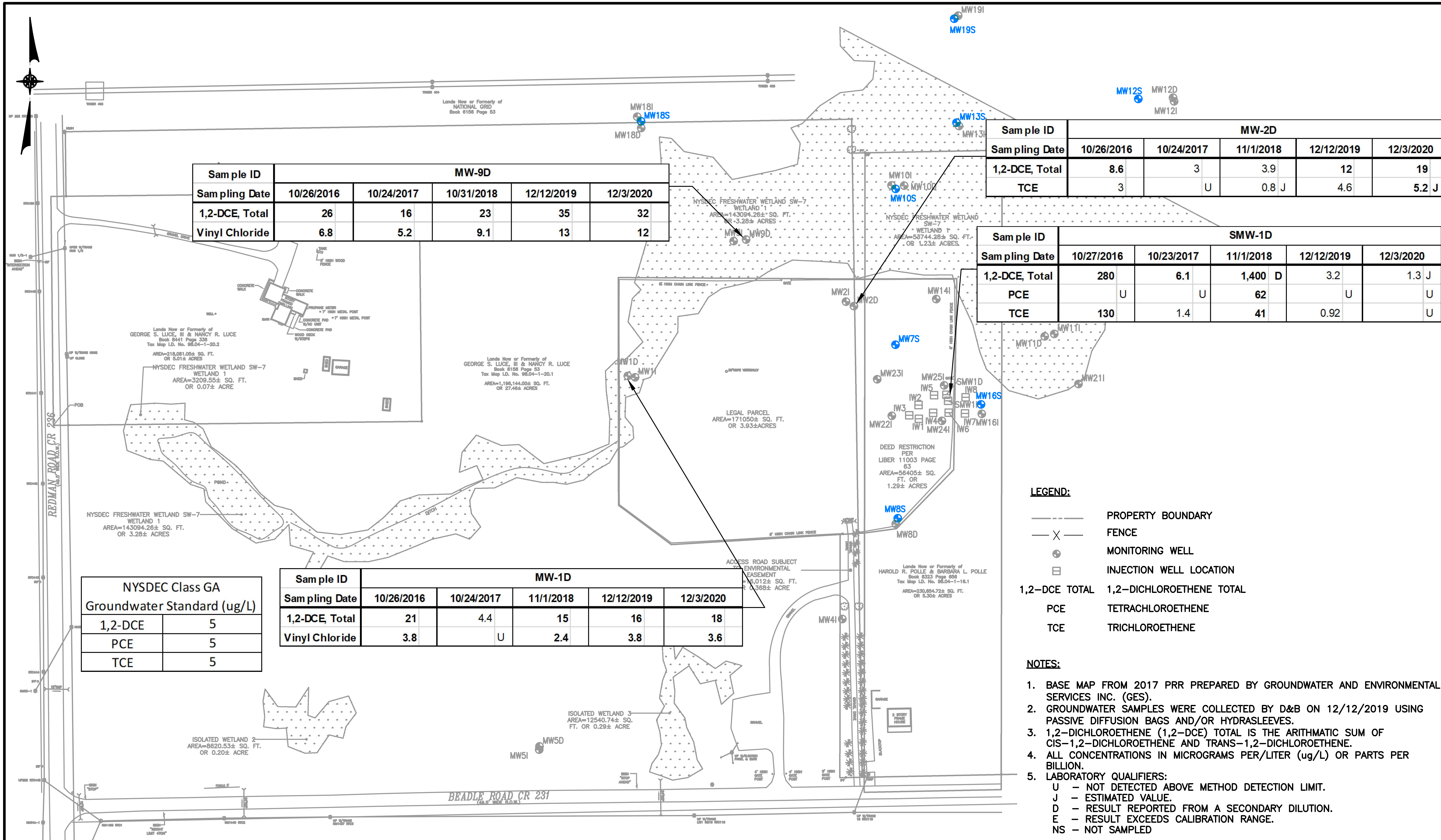
SWEDEN-3 CHAPMAN SITE
SWEDEN, NEW YORK

SCG EXCEEDANCES IN INTERMEDIATE GROUNDWATER

SCALE:1" =150'

FIGURE 2-2

F:\3150-45U\dwg\3150-45U-C-SP01-INTERMEDIATE-09-18-19.dwg, Layout1, 4/19/2021 1:41:44 PM, rferrell



Sample ID	MW-9D				
Sampling Date	10/26/2016	10/24/2017	10/31/2018	12/12/2019	12/3/2020
1,2-DCE, Total	26	16	23	35	32
Vinyl Chloride	6.8	5.2	9.1	13	12

Sample ID	MW-2D				
Sampling Date	10/26/2016	10/24/2017	11/1/2018	12/12/2019	12/3/2020
1,2-DCE, Total	8.6	3	3.9	12	19
TCE	3	U	0.8 J	4.6	5.2 J

Sample ID	SMW-1D				
Sampling Date	10/27/2016	10/23/2017	11/1/2018	12/12/2019	12/3/2020
1,2-DCE, Total	280	6.1	1,400 D	3.2	1.3 J
PCE	U	U	62	U	U
TCE	130	1.4	41	0.92	U

Sample ID	MW-1D				
Sampling Date	10/26/2016	10/24/2017	11/1/2018	12/12/2019	12/3/2020
1,2-DCE, Total	21	4.4	15	16	18
Vinyl Chloride	3.8	U	2.4	3.8	3.6

NYSDEC Class GA Groundwater Standard (ug/L)	
1,2-DCE	5
PCE	5
TCE	5

LEGEND:

- PROPERTY BOUNDARY
- FENCE
- MONITORING WELL
- INJECTION WELL LOCATION
- 1,2-DCE TOTAL — 1,2-DICHLOROETHENE TOTAL
- PCE — TETRACHLOROETHENE
- TCE — TRICHLOROETHENE

NOTES:

1. BASE MAP FROM 2017 PRR PREPARED BY GROUNDWATER AND ENVIRONMENTAL SERVICES INC. (GES).
2. GROUNDWATER SAMPLES WERE COLLECTED BY D&B ON 12/12/2019 USING PASSIVE DIFFUSION BAGS AND/OR HYDRASLEEVES.
3. 1,2-DICHLOROETHENE (1,2-DCE) TOTAL IS THE ARITHMATIC SUM OF CIS-1,2-DICHLOROETHENE AND TRANS-1,2-DICHLOROETHENE.
4. ALL CONCENTRATIONS IN MICROGRAMS PER/LITER (ug/L) OR PARTS PER BILLION.
5. LABORATORY QUALIFIERS:
   - U – NOT DETECTED ABOVE METHOD DETECTION LIMIT.
   - J – ESTIMATED VALUE.
   - D – RESULT REPORTED FROM A SECONDARY DILUTION.
   - E – RESULT EXCEEDS CALIBRATION RANGE.
   - NS – NOT SAMPLED

D&B ENGINEERS AND ARCHITECTS

SWEDEN-3 CHAPMAN SITE
SWEDEN, NEW YORK

SCG EXCEEDANCES IN DEEP GROUNDWATER

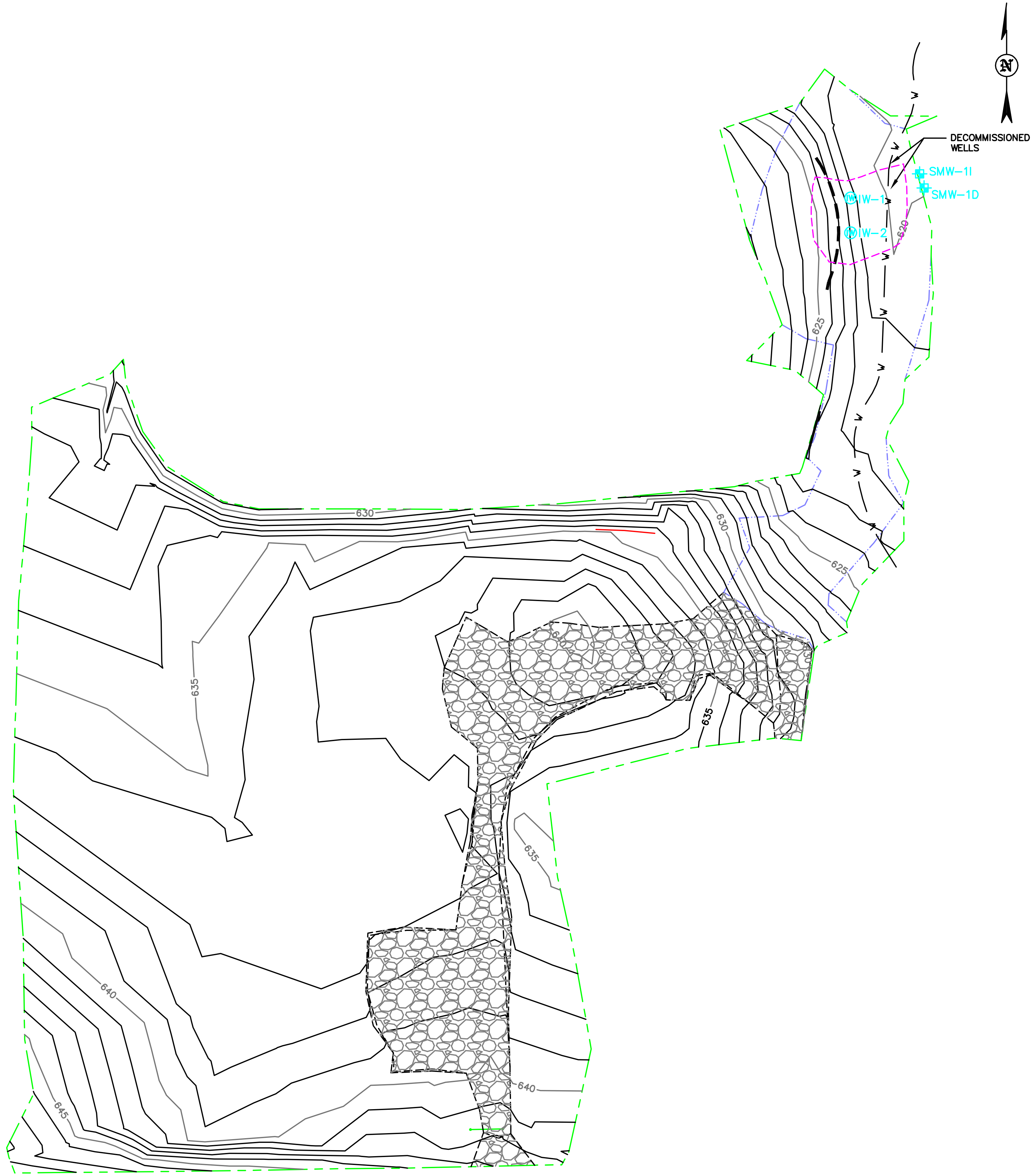
SCALE:1" =150'

FIGURE 2-3

F:\3150-45U\dwg\3150-45U-C-SP01-DEEP-09-18-19.dwg, Layout1, 4/19/2021 9:40:42 AM, rferrell

APPENDIX A

RECORD SURVEY AND METES AND BOUNDS DESCRIPTION



LEGEND:

- SMW-1D REPLACEMENT MONITORING WELL
- IW-2 NEW INJECTION WELL
- CP-20 CONTROL POINT
- EXISTING INTERMEDIATE CONTOUR
- 630 EXISTING INDEX CONTOUR
- SURVEY LIMITS
- PROPERTY LINE
- W WETLAND
- MW-5D EXISTING GROUNDWATER MONITORING WELL
- APPROXIMATE EXISTING TREELINE
- EXISTING TREES
- EXISTING FENCE
- REPAIRED ANCHOR TRENCH LOCATION
- GRAVEL ACCESS ROAD
- SEEDED AND COVERED AREA
- EXCAVATION/REMEDIATION LIMIT

WELL TABLE

ID	NORTHING	EASTING	ELEVATION	DESCRIPTION
IW-1	1153348.6	1315398.8	621.05	GROUND
			624.11	CASING
			623.60	RISER
IW-2	1153326.0	1315398.8	621.49	GROUND
			624.29	CASING
			623.90	RISER
SMW-1I	1153364.2	1315443.5	621.35	GROUND
			622.73	CASING
			621.31	RISER
SMW-1D	1153355.0	1315446.5	620.52	GROUND
			622.50	CASING
			622.36	RISER
MW-19I	1153987.8	1315462.9	619.39	GROUND
			621.79	CASING
			621.65	RISER
MW-19S	1153983.0	1315456.7	619.55	GROUND
			622.03	CASING
			621.80	RISER

NOTES:

1. FINAL CONDITIONS SURVEY OF AREAS IMPACTED BY CONSTRUCTION ACTIVITIES PERFORMED ON MAY 14, 2010 BY ENSOL, INC. FINAL CONDITIONS GRADES WERE APPENDED TO PRE-CONSTRUCTION SURVEY GRADES FROM A JANUARY 25, 2010 SURVEY BY ENSOL, INC.
2. SITE HORIZONTAL COORDINATES ARE REFERENCED TO NAD 83/96- NEW YORK STATE PLANE COORDINATE SYSTEM, WEST ZONE (3103). SITE ELEVATIONS ARE REFERENCED TO THE NAVD 88 DATUM.
3. BASE MAPPING/BOUNDARY SURVEY INFORMATION FROM A MARCH 2008 DRAWING BY POPLI CONSULTING ENGINEERS AND SURVEYORS, TITLED "ALTA/ACSM LAND TITLE SURVEY- SWEDEN-3 CHAPMAN SITE".
4. MONITORING WELLS 19S AND 19I LISTED IN THE WELL TABLE ARE NOT SHOWN ON THE FINAL CONDITIONS PLAN. THEY ARE LOCATED TO THE NORTH OF THE PROJECT AREA ON THE NORTH SIDE OF THE POWER LINE CLEARING ON THE NATIONAL GRID POWER LINE RIGHT-OF-WAY.

SCALE: 40' 0' 40' 80'

FINAL CONDITIONS

SWEDEN-3 CHAPMAN REMEDIAL ACTION PROJECT
NYSDEC SITE NUMBER 8-28-040A

THE ENVIRONMENTAL SERVICE GROUP (NY), INC.

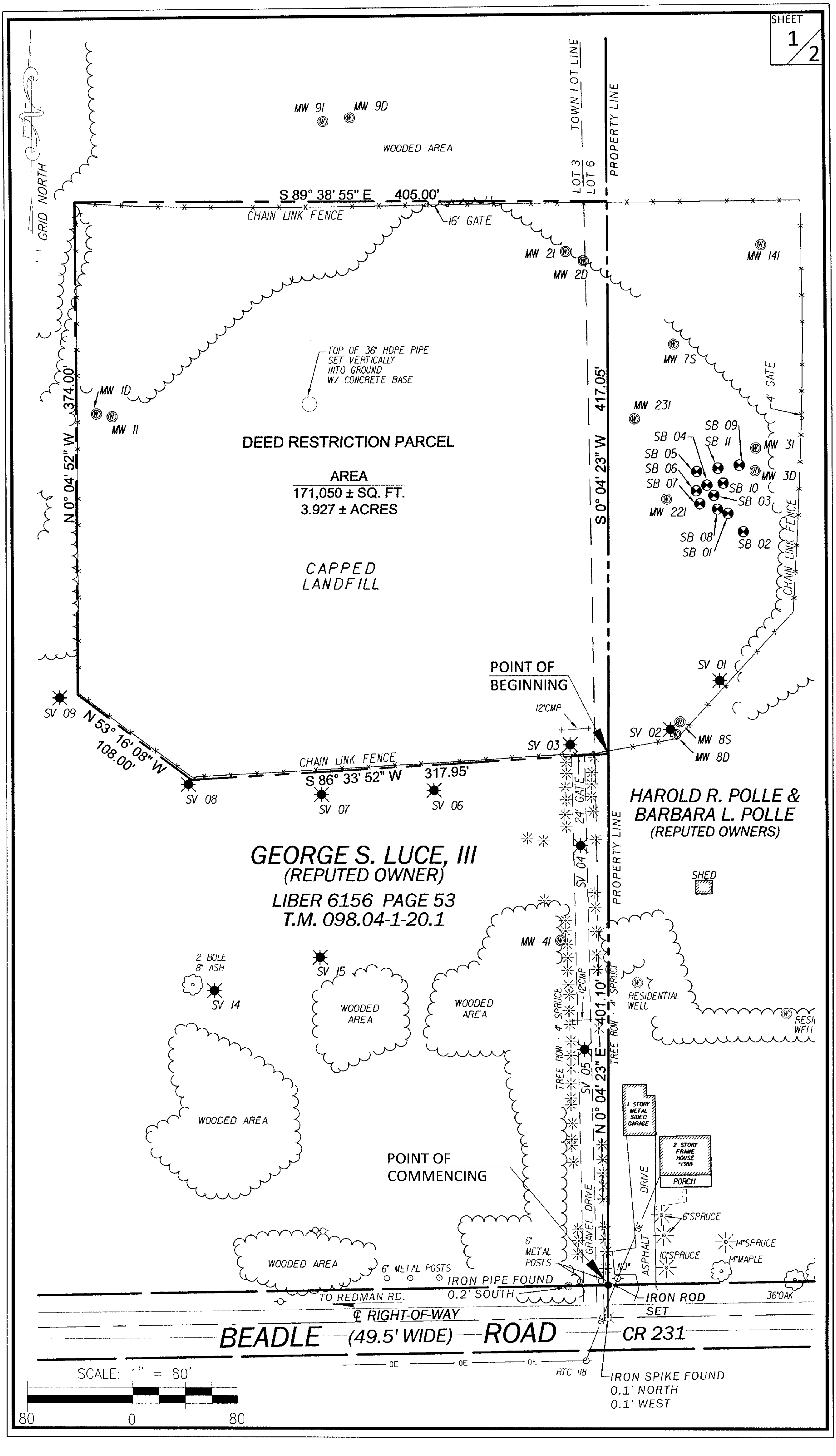
TOWN OF SWEDEN, STATE OF NY

EnSol, Inc.
Environmental Solutions
661 MAIN STREET
NIAGARA FALLS, NY 14301
PHONE (716) 285-3920
FAX (716) 285-3928

FIGURE 3

JUNE 2010

PN: 02-8888-075


SHEET 1/2
GRID NORTH
TOWN LOT LINE
PROPERTY LINE
LOT 3
LOT 6
MW 9I
MW 9D
WOODED AREA
S 89° 38' 55" E 405.00'
CHAIN LINK FENCE
16' GATE
MW 2I
MW 2D
MW 14I
MW 7S
TOP OF 36" HDPE PIPE SET VERTICALLY INTO GROUND W/ CONCRETE BASE
MW 1D
MW 1I
N 0° 04' 52" W 374.00'
S 0° 04' 23" W 417.05'
4' GATE
MW 23I
DEED RESTRICTION PARCEL
AREA
171,050 ± SQ. FT.
3.927 ± ACRES
SB 09
SB 11
SB 04
SB 05
SB 06
SB 07
SB 10
SB 03
SB 08
SB 01
SB 02
MW 3I
MW 3D
MW 22I
CHAIN LINK FENCE
CAPPED LANDFILL
POINT OF BEGINNING
SV 01
12"CMP
SV 02
MW 8S
MW 8D
SV 09
N 53° 16' 08" W 108.00'
SV 03
CHAIN LINK FENCE
S 86° 33' 52" W 317.95'
SV 08
SV 07
SV 06
24' GATE
HAROLD R. POLLE &
BARBARA L. POLLE
(REPUTED OWNERS)
GEORGE S. LUCE, III
(REPUTED OWNER)
LIBER 6156 PAGE 53
T.M. 098.04-1-20.1
SV 04
PROPERTY LINE
SHED
MW 4I
2 BOLE 8" ASH
SV 15
SV 14
WOODED AREA
WOODED AREA
12"CMP
TREE ROW - 4' SPRUCE
RESIDENTIAL WELL
RESI WELL
N 0° 04' 23" E 401.10'
SV 05
TREE ROW - 4' SPRUCE
WOODED AREA
1 STORY METAL SIDED GARAGE
2 STORY FRAME HOUSE #1388
PORCH
DRIVE
POINT OF COMMENCING
GRAVEL DRIVE
6"SPRUCE
14"SPRUCE
10"SPRUCE
14"MAPLE
ASPHALT
WOODED AREA
6" METAL POSTS
6" METAL POSTS
IRON PIPE FOUND 0.2' SOUTH
IRON ROD SET
36"OAK
TO REDMAN RD.
℄ RIGHT-OF-WAY
BEADLE (49.5' WIDE) ROAD
CR 231
RTC 118
IRON SPIKE FOUND 0.1' NORTH 0.1' WEST
SCALE: 1" = 80'
80 0 80

RESTRICTION PARCEL DESCRIPTION

All that piece or parcel of property, situate in the Town of Sweden, County of Monroe, State of New York, being a portion of lands owned by George S. Luce, III as recorded in Liber 6156 of Deeds, at Page 53 on file in the Monroe County Clerk's Office and also part of Lot 3 and Lot 6, of the 6th Section, Township 3 of the Triangular Tract, and more particularly described as follows:

COMMENCING at a point on the northerly right of way of County Route 231 (Beadle Road), an existing county highway 49.5 feet wide, at its intersection with the division line between the property of George S. Luce, III (reputed owner) on the west and the property of Harold R. Polle and Barbara L. Polle (reputed owners) on the east, thence; N 0° 04' 23" E along the last mentioned division line a distance of 401.10 feet to the point of BEGINNING, thence; Through the property of of George S. Luce, III (reputed owner) the following four (4) courses and distances:

1. S 86° 33' 52" W a distance of 317.95 feet to a point, thence;
2. N 53° 16' 08" W a distance of 108.00 feet to a point, thence;
3. N 0° 04' 52" W a distance of 374.00 feet to a point, thence;
4. S 89° 38' 55" E a distance of 405.00 feet to a point on the first mentioned division line, thence;

S 0° 04' 23" W, along the first mentioned division line, 417.05 feet to the point of beginning, being 171,050 ± square feet or 3.927 acres, more or less.

CERTIFICATION

To the People of the State of New York acting through its commissioner of the Department of Environmental Conservation, and George S. Luce, III; this map is based on an ALTA/ACSM Land Title Survey prepared by Popli Design Group for the Sweden 3 - Chapman Site, in March of 2009.

DEED RESTRICTION PARCEL

FOR THE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SWEDEN 3 - CHAPMAN SITE

GEORGE S. LUCE, III

(REPUTED OWNER)

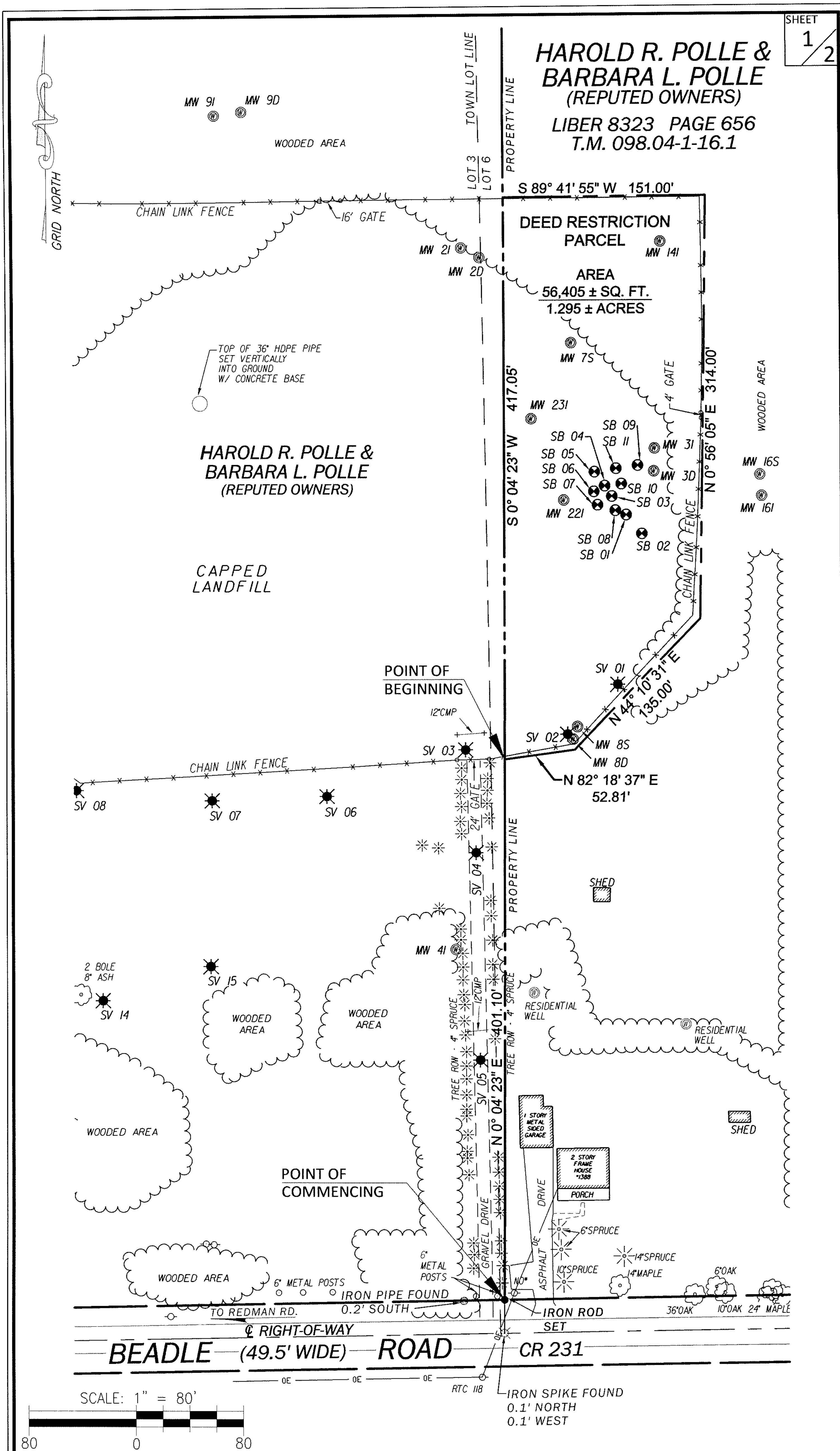
BEING PART OF LOT 3 AND LOT 6, OF THE 6TH SECTION,
TOWNSHIP 3 OF THE TRIANGULAR TRACT
TOWN OF SWEDEN, COUNTY OF MONROE, STATE OF NEW YORK

DATE	SCALE	
FEBRUARY 10, 2011	N/A	Unauthorized alteration or addition to a survey map bearing a licensed land surveyor's seal is a violation of section 7209, sub-division 2, of the New York State Education Law.

POPLI DESIGN GROUP
ARCHITECTURE + ENGINEERING
555 Penbrooke Drive
Penfield NY 14526
585 388 2060 [tel]
[fax] 585 388 2070

STATE OF NEW YORK
MICHAEL ANTHONY VENTURO
050079
LICENSED LAND SURVEYOR

MICHAEL A. VENTURO, LS 50079
FOR: POPLI DESIGN GROUP


SHEET 1/2
HAROLD R. POLLE &
BARBARA L. POLLE
(REPUTED OWNERS)
LIBER 8323 PAGE 656
T.M. 098.04-1-16.1
GRID NORTH
TOWN LOT LINE
LOT 3
LOT 6
PROPERTY LINE
MW 9I
MW 9D
WOODED AREA
S 89° 41' 55" W 151.00'
CHAIN LINK FENCE
16' GATE
DEED RESTRICTION
PARCEL
MW 14I
MW 2I
MW 2D
AREA
56,405 ± SQ. FT.
1.295 ± ACRES
TOP OF 36" HDPE PIPE SET VERTICALLY INTO GROUND W/ CONCRETE BASE
MW 7S
4' GATE
N 0° 56' 05" E 314.00'
S 0° 04' 23" W 417.05'
MW 23I
HAROLD R. POLLE &
BARBARA L. POLLE
(REPUTED OWNERS)
SB 09
SB 04
SB 11
SB 05
SB 06
SB 07
SB 10
SB 03
SB 08
SB 01
SB 02
MW 3I
MW 3D
MW 22I
MW 16S
MW 16I
CAPPED
LANDFILL
CHAIN LINK FENCE
POINT OF
BEGINNING
12"CMP
SV 01
SV 02
SV 03
N 44° 10' 31" E
135.00'
MW 8S
MW 8D
N 82° 18' 37" E
52.81'
SV 08
SV 07
SV 06
24' GATE
SV 04
SHED
MW 4I
2 BOLE
8" ASH
SV 15
SV 14
WOODED AREA
RESIDENTIAL WELL
12"CMP
TREE ROW - 4' SPRUCE
N 0° 04' 23" E 401.10'
SV 05
1 STORY METAL SIDED GARAGE
2 STORY FRAME HOUSE #1385
PORCH
DRIVE
POINT OF
COMMENCING
GRAVEL DRIVE
6'SPRUCE
14'SPRUCE
14"MAPLE
10'SPRUCE
ASPHALT
6"OAK
6" METAL POSTS
IRON PIPE FOUND
0.2' SOUTH
TO REDMAN RD.
IRON ROD
SET
36"OAK
10"OAK
24" MAPLE
℄ RIGHT-OF-WAY
BEADLE (49.5' WIDE) ROAD CR 231
RTC 118
IRON SPIKE FOUND
0.1' NORTH
0.1' WEST
SCALE: 1" = 80'
80
0
80

SHEET 2/2

RESTRICTION PARCEL DESCRIPTION

All that piece or parcel of property, situate in the Town of Sweden, County of Monroe, State of New York, being a portion of lands owned by Harold R. Polle and Barbara L. Polle as recorded in Liber 8323 of Deeds, at Page 656 on file in the Monroe County Clerk's Office and also part of Lot 6, of the 6th Section, Township 3 of the Triangular Tract, and more particularly described as follows:

COMMENCING at a point on the northerly right of way of County Route 231 (Beadle Road), an existing county highway 49.5 feet wide, at its intersection with the division line between the property of Harold R. Polle and Barbara L. Polle (reputed owners) on the east and the property of George S. Luce, III (reputed owner) on the west, thence; N 0° 04' 23" E along the last mentioned division line a distance of 401.10 feet to the point of BEGINNING, thence; Through the property of of Harold R. Polle and Barbara L. Polle (reputed owners) the following four (4) courses and distances:

1. N 82° 18' 37" E a distance of 52.81 feet to a point, thence;
2. N 44° 10' 31" E a distance of 135.00 feet to a point, thence;
3. N 0° 56' 05" E a distance of 314.00 feet to a point, thence;
4. S 89° 41' 55" W a distance of 151.00 feet to a point on the first mentioned division line, thence;

S 0° 04' 23" W, along the first mentioned division line, 417.05 feet to the point of beginning, being 56,405 ± square feet or 1.295 acres, more or less.

CERTIFICATION

To the People of the State of New York acting through its commissioner of the Department of Environmental Conservation, and Harold R. Polle and Barbara L. Polle; this map is based on an ALTA/ACSM Land Title Survey prepared by Popli Design Group for the Sweden 3 - Chapman Site, in March of 2009.

DEED RESTRICTION PARCEL

FOR THE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SWEDEN 3 - CHAPMAN SITE

HAROLD R. POLLE & BARBARA L. POLLE

(REPUTED OWNERS)

BEING PART OF LOT 6, OF THE 6TH SECTION,
TOWNSHIP 3 OF THE TRIANGULAR TRACT
TOWN OF SWEDEN, COUNTY OF MONROE, STATE OF NEW YORK

DATE	SCALE	
FEBRUARY 10, 2011	N/A	Unauthorized alteration or addition to a survey map bearing a licensed land surveyor's seal is a violation of section 7209, sub-division 2, of the New York State Education Law.

POPLI DESIGN GROUP
ARCHITECTURE + ENGINEERING
555 Penbrooke Drive
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STATE OF NEW YORK
MICHAEL ANTHONY VENTURO
50079
LICENSED LAND SURVEYOR

MICHAEL A. VENTURO, LS 50079
FOR: POPLI DESIGN GROUP

APPENDIX B

RECORDED ENVIRONMENTAL EASEMENT AND DECLARATION OF COVENANTS AND RESTRICTIONS

MONROE COUNTY CLERK'S OFFICE

ROCHESTER,NY

THIS IS NOT A BILL. THIS IS YOUR RECEIPT

Receipt # 760306

Index DEEDS

Book 11158 Page 13

No. Pages : 10

Instrument EASEMENT AGREEMENT

Date : 08/21/2012

Time : 04:34:49PM

Control # 201208210919

TT # TT0000001152

Ref 1 #

Employee : TracyC

Return To:
BOX 105

LUCE,GEORGE S III
LUCE,NANCY R

PEOPLE OF THE STATE OF NEW YORK

COUNTY FEE TP584	$	5.00
COUNTY FEE NUMBER PAGES	$	45.00
RECORDING FEE	$	45.00
STATE FEE TRANSFER TAX	$	0.00

Total	$	95.00

State of New York

MONROE COUNTY CLERK'S OFFICE
WARNING - THIS SHEET CONSTITUTES THE CLERKS ENDORSEMENT, REQUIRED BY SECTION 317-a(5) & SECTION 319 OF THE REAL PROPERTY LAW OF THE STATE OF NEW YORK. DO NOT DETACH OR REMOVE.

CHERYL DINOLFO
MONROE COUNTY CLERK

PI182-201208210919-10

<u>TRANSFER AMT</u>

TRANSFER AMT $1.00

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 27 day of June, 2012, between Owner(s) George S. Luce III and Nancy R. Luce, natural persons residing at 6000 Redman Road, City of Brockport, County of Monroe, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

Box 105 — (Sue H.)

WHEREAS, Grantor, is the owner of real property located on Redman Road in the Town of Sweden, County of Monroe and State of New York, known and designated on the tax map of the County Clerk of Monroe as tax map parcel numbers: Section 098.04 Block 1 Lot 20.1, being the same as that property conveyed to Grantor by deed dated May 28, 1982 and recorded in the Monroe County Clerk's Office in Liber 6156 of Deeds at Page 53. The portion of property subject to this Environmental Easement (the "Controlled Property") comprises approximately 4.3 +/- acres that includes a gravel access road leading to the Property, and is hereinafter more fully described in the Land Title Survey dated August 3, 2011 and revised on September 1, 2011 and September 14, 2011 prepared by C.T. Male Associates, which will be attached to the Site Management Plan. The Controlled Property descriptions are is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

JUN 21 PM 4:34

NOW THEREFORE, in consideration of the mutual covenants contained herein, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement")

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:
its current use as a closed and capped landfill.

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP.

(4) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(5) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(6) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(7) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP.

(8) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the 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 this Environmental Easement and to perform the activities required by Subparagraphs 2.A.2, 2.A.3, 2.A.4, 2.A.5, 2.A.7 and 2.A.8.

NRL. 6/27/12

B. The Controlled Property shall not be used for Residential, Restricted Residential, Commercial or Industrial purposes as defined in 6NYCRR 375-1.8(g)(i), (ii), (iii) and (iv), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Department or its agents, employees or other representatives shall perform the actions described in Subparagraphs 2.A.2, 2.A.3, 2.A.4, 2.A.5, 2.A.7 and 2.A.8 and Grantor shall provide access to the Department for the performance of these actions. The performance of these activities is a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. Copies of the SMP may be obtained from:

Site Control Section
Division of Environmental Remediation NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of this Easement.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that upon request by NYSDEC it shall provide a certification to the Department that the Controlled Property is not being used for any purpose other than a landfill, that groundwater underlying the Controlled Property is not being used for drinking water or industrial purposes unless permitted and that no contaminated material was disturbed by Grantor except in accordance with the SMP. .

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions and to perform the actions described in Subparagraphs 2.A.2, 2.A.3, 2.A.4, 2.A.5, 2.A.7 and 2.A.8.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 7 1-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

C. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: 828040A
Office of General Counsel NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

George S. Luce III and Nancy R. Luce:

By: George S. Luce III Nancy R. Luce

Print Name: George S. Luce III + Nancy R. Luce

Title: Grantors Date: 6/7/2012

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF MONROE)

On the 7 day of June, in the year 2012, before me, the undersigned, George S. Luce III + Nancy R. Luce personally appeared , personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Mindy L. Zoghlin

Notary Public - State of New York

MINDY L. ZOGHLIN
NOTARY PUBLIC, State of New York
Registration #02ZO4986874
Qualified in Monroe County
Commission Expires September ~~15, 20~~13
30

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: ________________________
Robert Schick, Acting Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 27th day of June, in the year 2012, before me, the undersigned, personally appeared Robert Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, 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 - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 2014

SCHEDULE "A" PROPERTY DESCRIPTION

CAPPED LANDFILL

All that piece or parcel of property, situate in the Town of Sweden, County of Monroe, State of New York, being a portion of lands owned by George S. Luce, III as recorded in Liber 6156 of Deeds, at Page 53 on file in the Monroe County Clerk's Office and also part of Lot 3 and Lot 6, of the 6th Section, Township 3 of the Triangular Tract, and more particularly described as follows:

COMMENCING at a point on the northerly right of way of County Route 231 (Beadle Road), an existing county highway 49.5 feet wide, at its intersection with the division line between the property of George S. Luce, III (reputed owner) on the west and the property of Harold R. Palle and Barbara L. Polle (reputed owners) on the east, thence; North 0 deg. 04 min. 23 sec. East along the last mentioned division line a distance of 401.10 feet to the point of BEGINNING, thence; Through the property of George S. Luce, III (reputed owner) the following four (4) courses and distances:

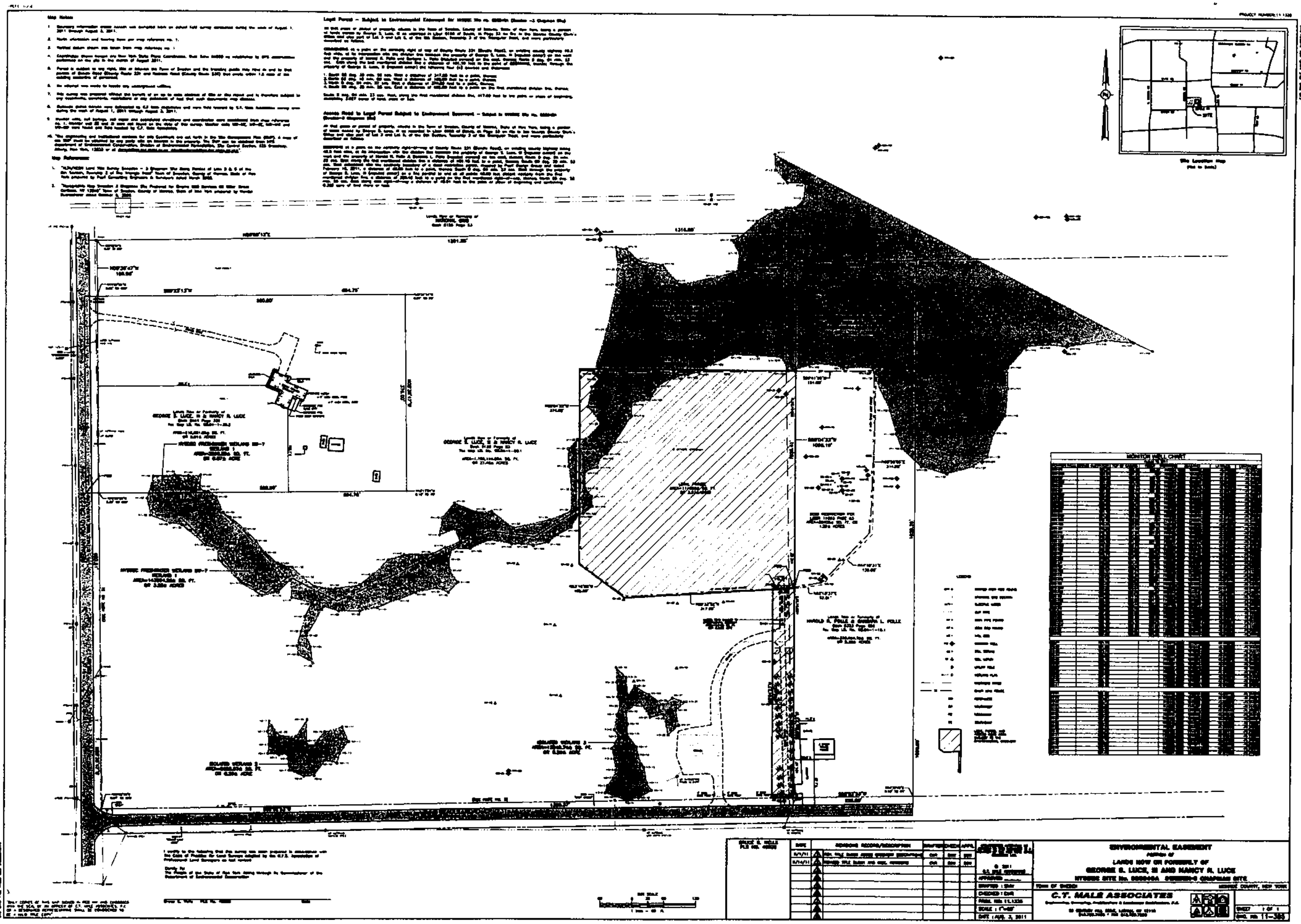
1. South 86 deg. 33 min. 52 sec. West a distance of 317.95 feet to a point, thence;
2. North 53 deg. 16 min. 08 sec. West a distance of 108.00 feet to a point, thence;
3. North 0 deg. 04 min. 52 sec. West a distance of 374.00 feet to a point, thence;
4. South 89 deg. 38 min. 55 sec. East a distance of 405.00 feet to a point on the first mentioned division line, thence;

South 0 deg. 04 min. 23 sec. West, along the first mentioned division line, 417.05 feet to the point or place of beginning, containing 3.927 acres of land, more or less.

ACCESS ROAD

All that piece or parcel of property, situate in the Town of Sweden, County of Monroe, State of New York, being a portion of lands owned by George S. Luce, III as recorded in Liber 6156 of Deeds, at Page 53 on file in the Monroe County Clerk's Office and also part of Lot 3 and Lot 6, of the 6th Section, Township 3 of the Triangular Tract, and more particularly described as follows:

BEGINNING at a point on the northerly right-of-way of County Route 231 (Beadle Road), an existing county highway being 49.5 feet wide, at its intersection with the division line between the property of George S. Luce, III (reputed owner) on the west and the property of Harold R. Polle & Barbara L. Polle (reputed owners) on the east, thence; North 0 deg. 04 min. 23 sec. East along the last mentioned division line a distance of 401.10 feet to a point, thence; South 86 deg. 33 min. 52 sec. West coincident with the southerly boundary of a deed restriction parcel, mapped by Popli Design Group and dated February 10, 2011, a distance of 40.08 feet to a point, thence; South 0 deg. 04 min. 23 sec. West through the property of George S. Luce, III (reputed owner) on a line parallel to and at all points 40.00 feet distant westerly from the first mentioned division line, a distance of 399.48 feet to a point on the first mentioned right-of-way, thence; North 88 deg. 52 min. 53 sec. East along said right-of-way a distance of 40.01 feet to the point or place of beginning and containing 0.368 acre of land more or less.


ENVIRONMENTAL EASEMENT
LANDS NOW OR FORMERLY OF
GEORGE S. LUCE, II AND NANCY R. LUCE
MONROE COUNTY, NEW YORK
C.T. MALE ASSOCIATES
SHEET 1 OF 1
MONITOR WELL CHART
Site Location Map
SCALE : 1"=60'
DATE : AUG. 3, 2011

D. Chiusano

MONROE COUNTY CLERK'S OFFICE

ROCHESTER,NY

THIS IS NOT A BILL. THIS IS YOUR RECEIPT

Receipt # 545566

Index DEEDS

Book 11003 Page 63

No. Pages : 6

Instrument DECLARATION OF COVENANTS

Date : 06/01/2011

Time : 01:16:21PM

Control # 201106010519

TT # TT0000012711

Ref 1 #

Employee : RachelR

Return To:
AECOM
100 CORPORATE PARKWAY
SUITE 341
AMHERST,NY 14226-

POLLE,HAROLD R
POLLE,BARBARA L

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION

COUNTY FEE TP584	$	5.00
COUNTY FEE NUMBER PAGES	$	25.00
RECORDING FEE	$	45.00
STATE FEE TRANSFER TAX	$	0.00

RECEIVED
OCT 14 2011

Total	$	75.00

State of New York

MONROE COUNTY CLERK'S OFFICE

WARNING - THIS SHEET CONSTITUTES THE CLERKS ENDORSEMENT, REQUIRED BY SECTION 317-a(5) & SECTION 319 OF THE REAL PROPERTY LAW OF THE STATE OF NEW YORK. DO NOT DETACH OR REMOVE.

CHERYL DINOLFO

MONROE COUNTY CLERK

TRANSFER AMT

TRANSFER AMT $1.00

LT1-1-201106010519-1

LT2-11003-63-6

DECLARATION of COVENANTS and RESTRICTIONS

Pollesk

THIS COVENANT is made the **11th day of May 2011**, by Harold R. Polle and Barbara L. Polle, natural persons residing at 1388 Beadle Road, Brockport, New York 14420 and having an office for the transaction of business at same.

WHEREAS, the Sweden-3 Chapman Site is the subject of a remedial program performed by the New York State Department of Environmental Conservation (the "Department") , namely that parcel of real property located on 1388 Beadle Road (Tax Account Number 0.98.04-1-16.1) in the Town of Sweden, County of Monroe, State of New York, which is part of lands conveyed by Clifton Rife and Billie F. Rife to Harold R. Polle and Barbara L. Polle formerly known as Barbara L. Hinchey by deed dated April 18, 1980 and recorded in the Monroe County Clerk's Office on April 21, 1980 in Liber 5788 of Deeds at Page 348, on April 5, 1993 in Liber 8323 of Deeds at Page 656, and on November 25, 1980 in Easement Liber 5896 of Deeds, Page 268, and being more particularly described in Appendix "A," attached to this declaration and made a part hereof, and hereinafter referred to as "the Property"; and

WHEREAS, the Department approved a remedy to eliminate or mitigate all significant threats to the environment presented by the contamination disposed at the Property and such remedy requires that the Property be subject to restrictive covenants.

NOW, THEREFORE, Harold R. Pohle and Barbara L. Polle, for themselves and their successors and/or assigns, covenants that:

First, the Property subject to this Declaration of Covenants and Restrictions is as shown on a map attached to this declaration as Appendix "B" and made a part hereof.

Second, unless prior written approval by the Department or, if the Department shall no longer exist, any New York State agency or agencies subsequently created to protect the environment of the State and the health of the State's citizens, hereinafter referred to as "the Relevant Agency," is first obtained, where contamination remains at the Property subject to the provisions of the Site Management Plan ("SMP"), there shall be no construction, use or occupancy of the Property that results in the disturbance or excavation of the Property which threatens the integrity of the engineering controls or which results in unacceptable human exposure to contaminated soils.

Third, the owners of the Property shall not disturb, remove, or otherwise interfere with the installation, use, operation, and maintenance of engineering controls required for the Remedy, which are described in the SMP, unless in each instance the owner first obtains a written waiver of such prohibition from the Department or Relevant Agency.

Fourth, the owners of the Property shall prohibit the Property from ever being used for purposes other than for its current land use as a landfill without the express written waiver of such prohibition by the Department or Relevant Agency.

2011 JUN -1 PM 1:16

Fifth, the owners of the Property shall prohibit the use of the groundwater underlying the Property without treatment rendering it safe for drinking water or industrial purposes, as appropriate, unless the user first obtains permission to do so from the Department or Relevant Agency.

Sixth, the owners of the Property upon request shall provide a certification to the Department or Relevant Agency, that the Property is not being used for any purpose other than a landfill and that the groundwater underlying the Property is not being for drinking water or industrial purposes unless permitted.

Seventh, the owners of the Property shall continue in full force and effect any institutional and engineering controls required for the Remedy and maintain such controls, unless the owners first obtain permission to discontinue such controls from the Department or Relevant Agency, in compliance with the approved SMP, which is incorporated and made enforceable hereto, subject to modifications as approved by the Department or Relevant Agency.

Eighth, this Declaration is and shall be deemed a covenant that shall run with the land and shall be binding upon all future owners of the Property, and shall provide that the owners and their successors and assigns consent to enforcement by the Department or Relevant Agency of the prohibitions and restrictions that the Department or Relevant Agency requires to be recorded, and the owners and their successors and assigns hereby covenant not to contest the authority of the Department or Relevant Agency to seek enforcement.

Ninth, any deed of conveyance of the Property, or any portion thereof, shall recite, unless the Department or Relevant Agency has consented to the termination of such covenants and restrictions, that said conveyance is subject to this Declaration of Covenants and Restrictions.

IN WITNESS WHEREOF, the undersigned have executed this instrument the day written below.

By: Barbara L Polle

Print Name: Barbara Polke

Title: Homeowner Date: 5/9/11

By: David R. Polle

Print Name: Ronald R. Polle

Title: Homeowner Date: 5/11/11

STATE OF NEW YORK)

) s.s.:

COUNTY OF MONROE)

On the 9 day of May, in the year 2011, before me, the undersigned, personally appeared BARBARA L Polle, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

RICHARD AMORESE
NOTARY PUBLIC, STATE OF NEW YORK
No. 01AM6103138
QUALIFIED IN MONROE COUNTY
COMMISSION EXPIRES DEC 15, 20 11

Richard Amorese
Notary Public State of New York

STATE OF NEW YORK)

) s.s.:

COUNTY OF Monroe

On the 11th day of May 2011, in the year 2011, before me, the undersigned, personally appeared Harold Polle, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Jennifer Noble
Notary Public State of New York

JENNIFER L. NOBLE
Notary Public - State of New York
No. 01NO6106845
Qualified in Monroe County
My Commission Expires March 15, 2012

Appendix A - Metes and Bounds Description

SHEET 2/2

RESTRICTION PARCEL DESCRIPTION

All that piece or parcel of property, situate in the Town of Sweden, County of Monroe, State of New York, being a portion of lands owned by Harold R. Polle and Barbara L. Polle as recorded in Liber 8323 of Deeds, at Page 656 on file in the Monroe County Clerk's Office and also part of Lot 6, of the 6th Section, Township 3 of the Triangular Tract, and more particularly described as follows:

COMMENCING at a point on the northerly right of way of County Route 231 (Beadle Road), an existing county highway 49.5 feet wide, at its intersection with the division line between the property of Harold R. Polle and Barbara L. Polle (reputed owners) on the east and the property of George S. Luce, III (reputed owner) on the west, thence; N 0° 04' 23" E along the last mentioned division line a distance of 401.10 feet to the point of BEGINNING, thence; Through the property of of Harold R. Polle and Barbara L. Polle (reputed owners) the following four (4) courses and distances:

1. N 82° 18' 37" E a distance of 52.81 feet to a point, thence;
2. N 44° 10' 31" E a distance of 135.00 feet to a point, thence;
3. N 0° 56' 05" E a distance of 314.00 feet to a point, thence;
4. S 89° 41' 55" W a distance of 151.00 feet to a point on the first mentioned division line, thence;

S 0° 04' 23" W, along the first mentioned division line, 417.05 feet to the point of beginning, being 56,405 ± square feet or 1.295 acres, more or less.

CERTIFICATION

To the People of the State of New York acting through its commissioner of the Department of Environmental Conservation, and Harold R. Polle and Barbara L. Polle; this map is based on an ALTA/ACSM Land Title Survey prepared by Popli Design Group for the Sweden 3 - Chapman Site, in March of 2009.

DEED RESTRICTION PARCEL

FOR THE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SWEDEN 3 - CHAPMAN SITE

HAROLD R. POLLE & BARBARA L. POLLE

(REPUTED OWNERS)

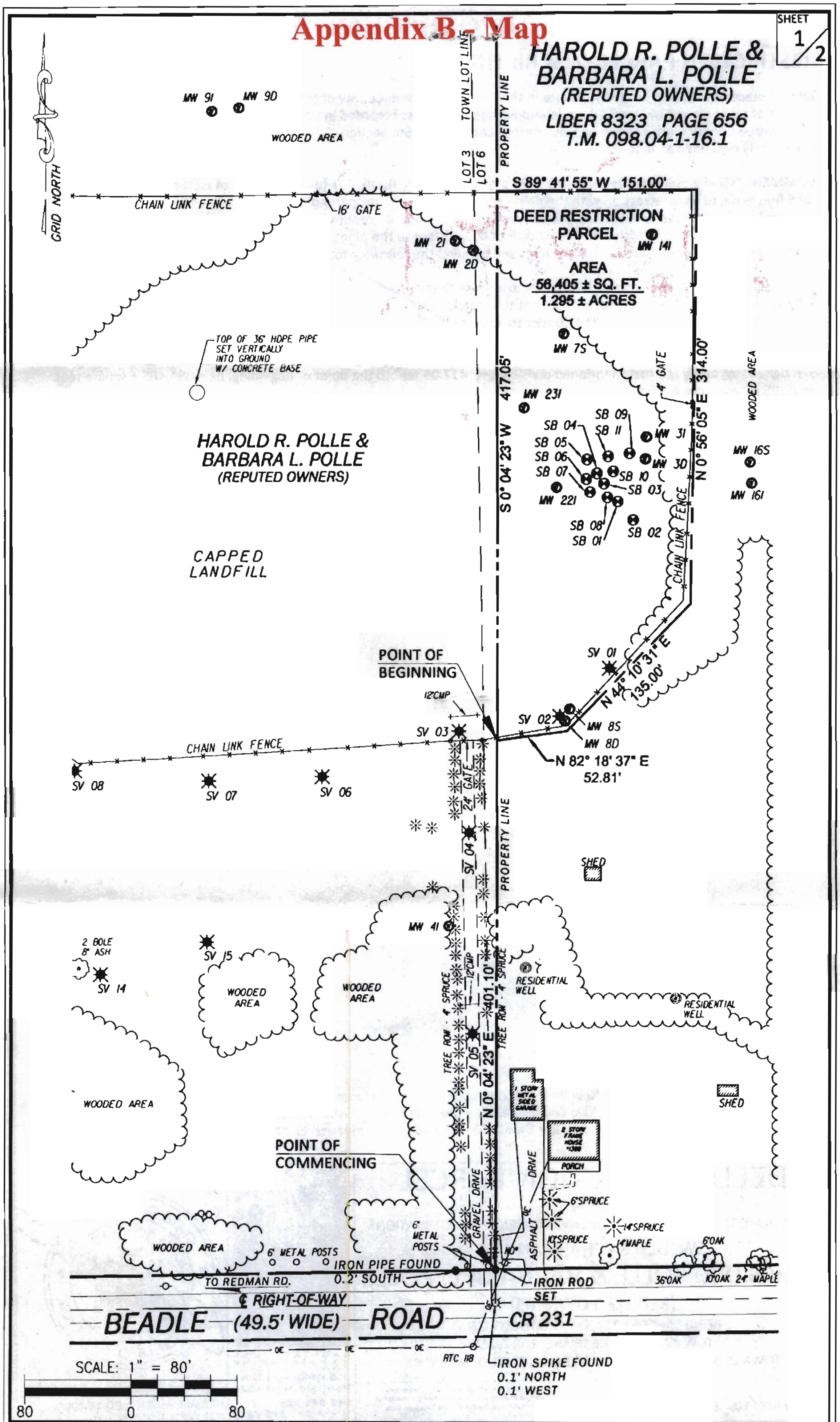
BEING PART OF LOT 6, OF THE 6TH SECTION,
TOWNSHIP 3 OF THE TRIANGULAR TRACT
TOWN OF SWEDEN, COUNTY OF MONROE, STATE OF NEW YORK

OPLI ESIGN ROUP
ARCHITECTURE · ENGINEERING
555 Penbrooke Drive
Penfield NY 14526
585 388 2060
585 388 2070

STATE OF NEW YORK
MICHAEL ANTHONY VENTURO
50079
LICENSED LAND SURVEYOR

DATE	SCALE		
FEBRUARY 10, 2011	N/A	Unauthorized alteration or addition to a survey map bearing a licensed land surveyor's seal is a violation of section 7209, sub-division 2, of the New York State Education Law	MICHAEL A. VENTURO, LS 50079 FOR: POPLI DESIGN GROUP

Appendix B - Map



APPENDIX C

LIST OF SITE CONTACTS

APPENDIX C - LIST OF SITE CONTACTS

This Appendix should include a listing of all Site contacts. The below table should be edited as necessary to include all Site contacts necessary for implementation of the SMP.

Name	Contact Information
Robert Strang, Assistant Engineer NYSDEC Project Manager	(518) 402-8642 robert.strang@dec.ny.gov
Jeffery Dyber NYSDEC Section Chief	(518) 402-9621 jeffrey.dyber@dec.ny.gov
Kelly Lewandowski NYSDEC Site Control	(518) 402-9553 kelly.lewandowski@dec.ny.gov
Christopher Mannes NYSDEC Region 7	(315) 426-7519 christopher.mannes@dec.ny.gov
Shaun J. Surani New York State Department of Health Bureau of Environmental Exposure Investigation	(518) 402-7860 shaun.surani@health.ny.gov
Stephanie Webb, Region 7 Citizen Participation Specialist; NYS Department of Environmental Conservation	(315) 426-7441 stephanie.webb@dec.ny.gov

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

APPENDIX D

MONITORING WELL BORING AND CONSTRUCTION LOGS

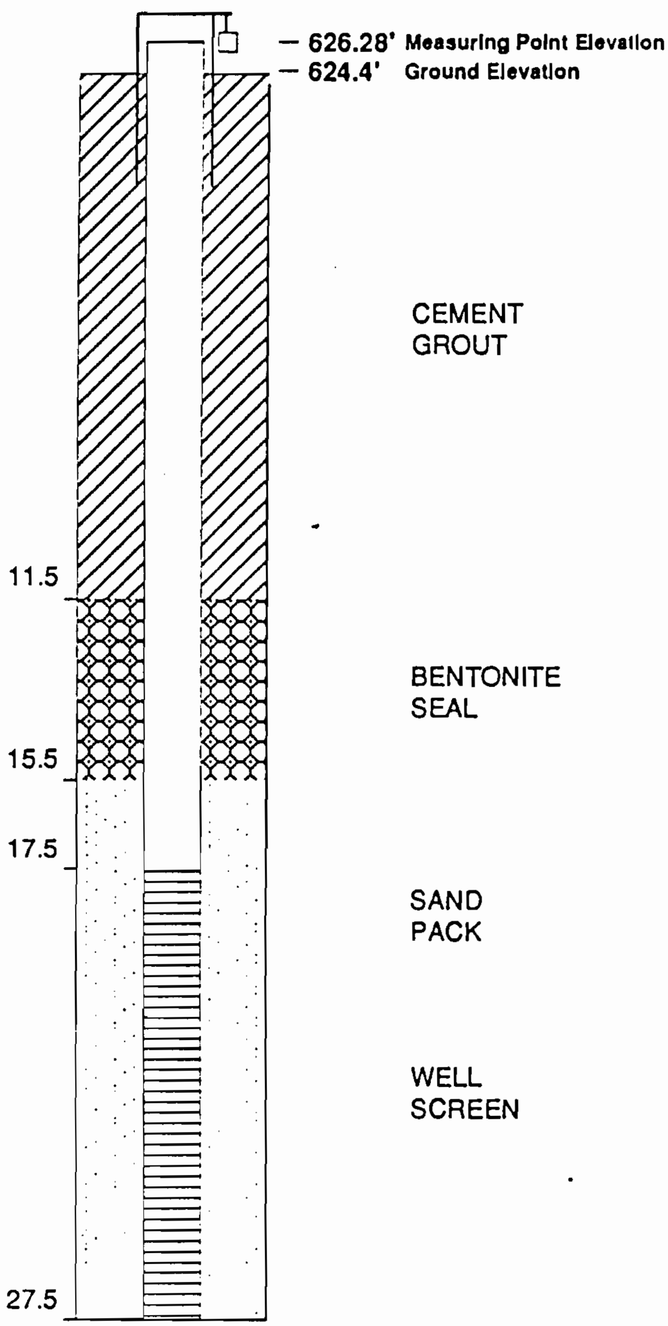
MONITORING WELL LOG

WELL NO. MW-1I

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 10/01/90 to 10/01/90
Date Developed: 10/03/90

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: D. Rowlinson
Drilling Contractor: American Auger and Ditch Co.

Type of Well: Top of Rock Groundwater Monitoring
Static Water Level Elev. ______ Date: 11/20/90
Measuring Point (M.P.): Surface
Total Depth of Well: 29.38'
Total Depth of Boring: 27.5'

Drilling Method
Type: Hollow Stem Auger — Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon — Diameter: 2.0"
Weight: 140 # — Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Sch. 40 PVC — Diameter: 2"
Joint Type: Flush Thread — Length: 19.5'

Screen
Material: Sch. 40 PVC — Diameter: 2"
Slot Size: 0.010" — Length: 10.0'
Strat. Unit Screened: Till/Rock Interface

Filter Pack
Sand: X — Gravel: ______ — Natural: ______
Grade: US Silica #3
Amount: 150 lbs. — Interval: 15.5'-27.5'

Seal(s)
Type: Bentonite Slurry — Interval: 11.5'-15.5'
Type: Cement Grout — Interval: 0.0'-11.5'
Type: ______ — Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 22.5'

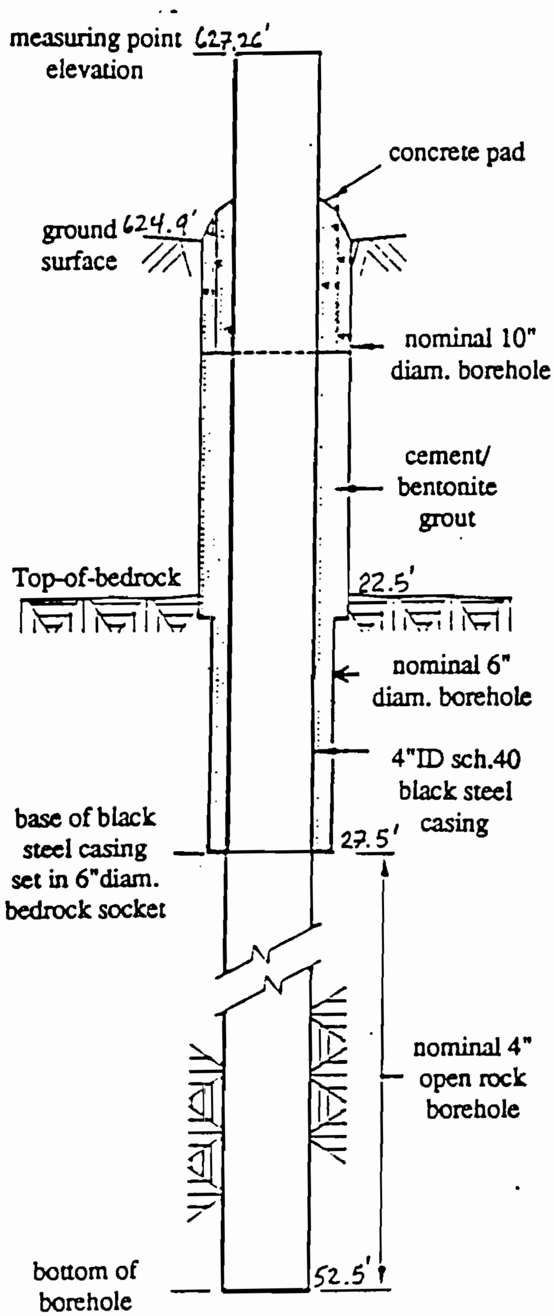
MONITORING WELL LOG

WELL NO. MW-1D

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 05/08/92 to 05/20/92
Date Developed: 5/20/92

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Bedrock Groundwater Monitoring
Static Water Level Elev.: ______ Date: 6/11/92
Measuring Point (M.P.): Surface
Total Depth of Well: 54.5'
Total Depth of Boring: 52.5'

Drilling Method
Type: HSA/Core Diameter: 6.25"/4"OD
Casing: HSA/Steel

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Steel Diameter: 4"ID
Joint Type: Thread/Coupling Length: 27.5'

Screen
Material: Open Hole Diameter: 4"
Slot Size: NA" Length: NA
Strat. Unit Screened: Dolostone Bedrock

Filter Pack
Sand ______ Gravel ______ Natural ______
Grade: NA
Amount: NA Interval: NA

Seal(s)
Type: Cement Grout Interval: 0.0'-27.5'
Type: ______ Interval: ______
Type: ______ Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 22.5'

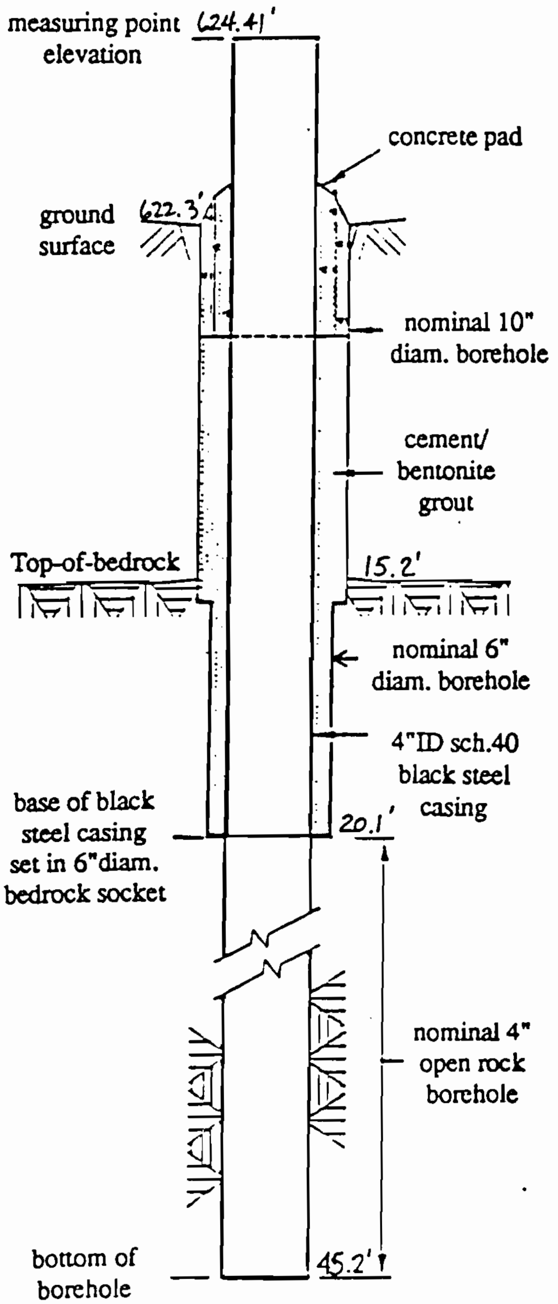
MONITORING WELL LOG

WELL NO. MW-2D

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project SWEDEN-3 CHAPMAN RI/FS
Client NYSDEC
Location 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No. D002520-14
Date Drilled 05/11/92 to 05/19/92
Date Developed 5/20/92

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Geologist P. Steck

Drilling Contractor American Auger and Ditch Co.

Type of Well Bedrock Groundwater Monitoring

Static Water Level Elev. ______ Date 6/11/92

Measuring Point (M.P.) Surface

Total Depth of Well 47.5'

Total Depth of Boring 45.2'

Drilling Method
- Type HSA/Core Diameter 6.25"/4"OD
- Casing HSA/Steel

Sampling Method
- Type SplitSpoon Diameter 2.0"
- Weight 140 # Fall 30"
- Interval 2.0' Continuous

Riser Pipe Left in Place
- Material Steel Diameter 4"ID
- Joint Type Thread/Coupling Length 20.1'

Screen
- Material Open Hole Diameter 4"
- Slot Size NA" Length NA
- Strat. Unit Screened Dolostone Bedrock

Filter Pack
- Sand ______ Gravel ______ Natural ______
- Grade NA
- Amount NA Interval NA

Seal(s)
- Type Cement Grout Interval 0.0'-20.1'
- Type ______ Interval ______
- Type ______ Interval ______

Locking Casing Yes

Notes: Top of Rock at 15.2'

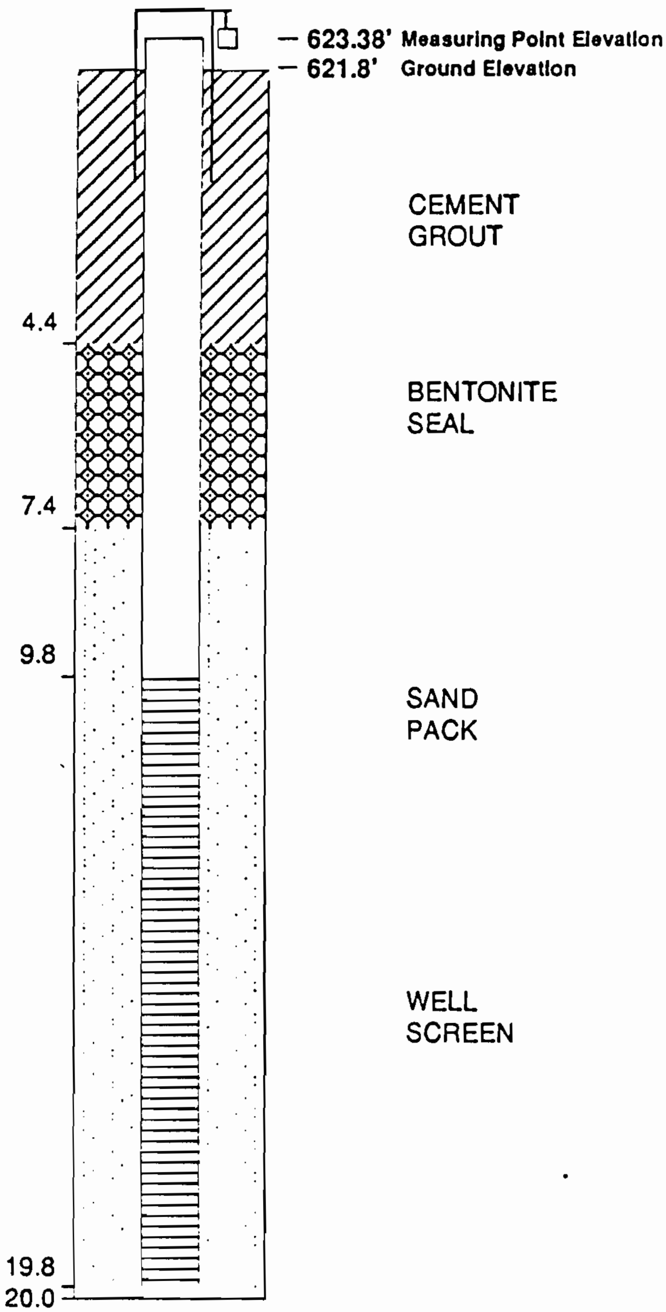
MONITORING WELL LOG

WELL NO. MW-2I

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No. D002520-14
Date Drilled: 09/28/90 to 09/28/90
Date Developed: 10/02/90

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: D. Rowlinson

Drilling Contractor: American Auger and Ditch Co.

Type of Well: Top of Rock Groundwater Monitoring

Static Water Level Elev. ______ Date 11/20/90

Measuring Point (M.P.): Surface

Total Depth of Well: 21.58'

Total Depth of Boring: 20.0'

Drilling Method
- Type: Hollow Stem Auger — Diameter: 4.25"ID
- Casing: HSA

Sampling Method
- Type: SplitSpoon — Diameter: 2.0"
- Weight: 140 # — Fall: 30"
- Interval: 2.0' Continuous

Riser Pipe Left In Place
- Material: Sch. 40 PVC — Diameter: 2"
- Joint Type: Flush Thread — Length: 12.0'

Screen
- Material: Sch. 40 PVC — Diameter: 2"
- Slot Size: 0.010" — Length: 10.0'
- Strat. Unit Screened: Till/Rock Interface

Filter Pack
- Sand: X — Gravel: ______ — Natural: ______
- Grade: US Silica #3
- Amount: 200 lbs. — Interval: 7.4'-19.8'

Seal(s)
- Type: Bentonite Pellets — Interval: 4.4'-7.4'
- Type: Cement Grout — Interval: 0.0'-4.4'
- Type: ______ — Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 15.1'

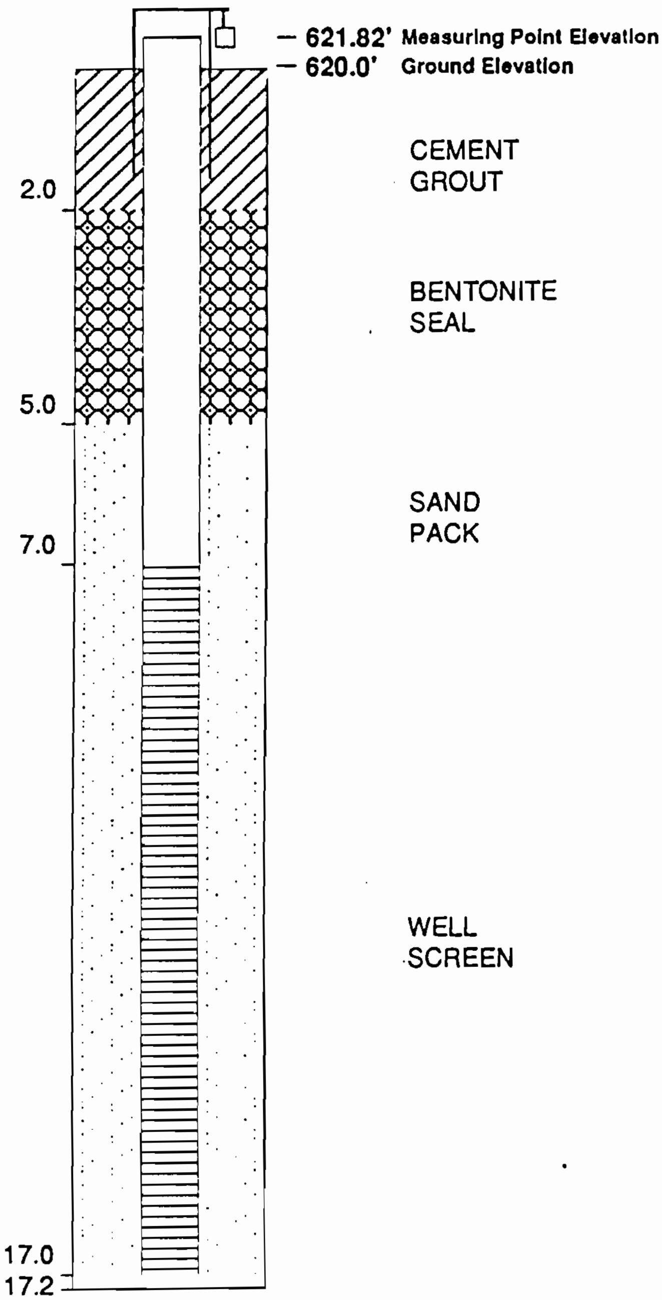
MONITORING WELL LOG

WELL NO. MW-3I

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 09/27/90 to 09/27/90
Date Developed: 10/02/90

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: D. Rowlinson
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Top of Rock Groundwater Monitoring
Static Water Level Elev. ______ Date 11/20/90
Measuring Point (M.P.): Surface
Total Depth of Well: 19.02'
Total Depth of Boring: 17.2'

Drilling Method
Type: Hollow Stem Auger Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Sch. 40 PVC Diameter: 2"
Joint Type: Flush Thread Length: 9.0'

Screen
Material: Sch. 40 PVC Diameter: 2"
Slot Size: 0.010" Length: 10.0'
Strat. Unit Screened: Till/Rock Interface

Filter Pack
Sand: X Gravel: ______ Natural: ______
Grade: US Silica #3
Amount: 300 lbs. Interval: 5.0'-17.0'

Seal(s)
Type: Bentonite Pellets Interval: 2.0'-5.0'
Type: Cement Grout Interval: 0.0'-2.0'
Type: ______ Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 15.6'

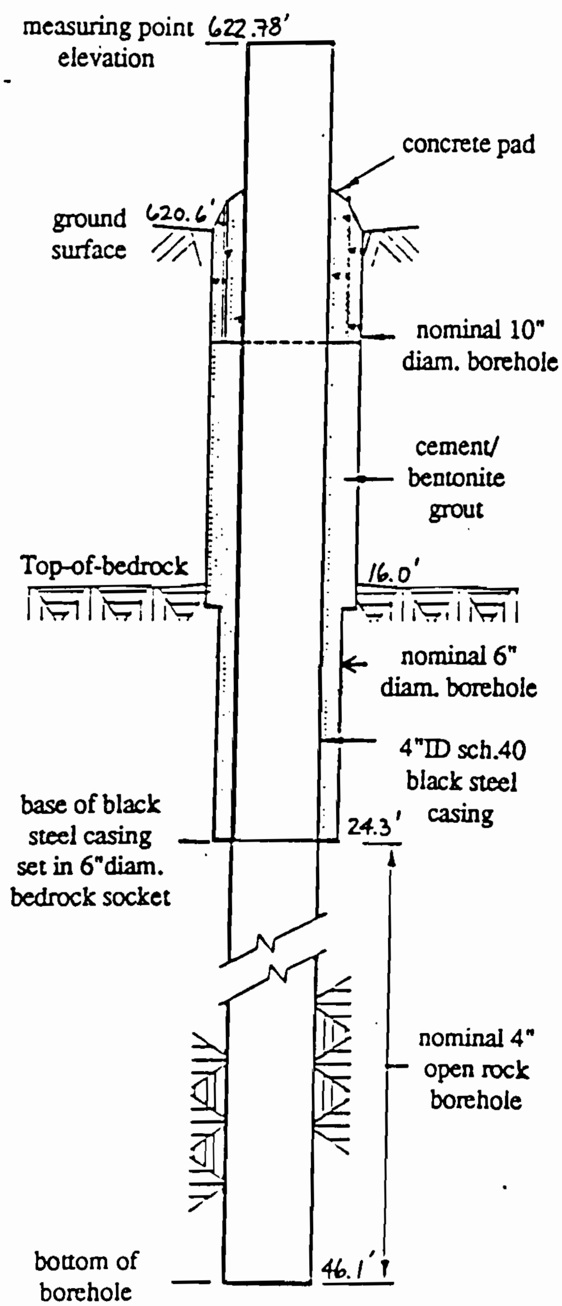
MONITORING WELL LOG

WELL NO. MW-3D

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 05/13/92 to 05/19/92
Date Developed: 5/20/92

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Bedrock Groundwater Monitoring
Static Water Level Elev.: ____ Date: 6/11/92
Measuring Point (M.P.): Surface
Total Depth of Well: 48.5'
Total Depth of Boring: 46.1'

Drilling Method
Type: HSA/Core Diameter: 6.25"/4"OD
Casing: HSA/Steel

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Steel Diameter: 4"ID
Joint Type: Thread/Coupling Length: 24.3'

Screen
Material: Open Hole Diameter: 4"
Slot Size: NA" Length: NA
Strat. Unit Screened: Dolostone Bedrock

Filter Pack
Sand ____ Gravel ____ Natural ____
Grade: NA
Amount: NA Interval: NA

Seal(s)
Type: Cement Grout Interval: 0.0'-24.3'
Type: ____ Interval: ____
Type: ____ Interval: ____

Locking Casing: Yes

Notes: Top of Rock at 16.0'

MONITORING WELL LOG

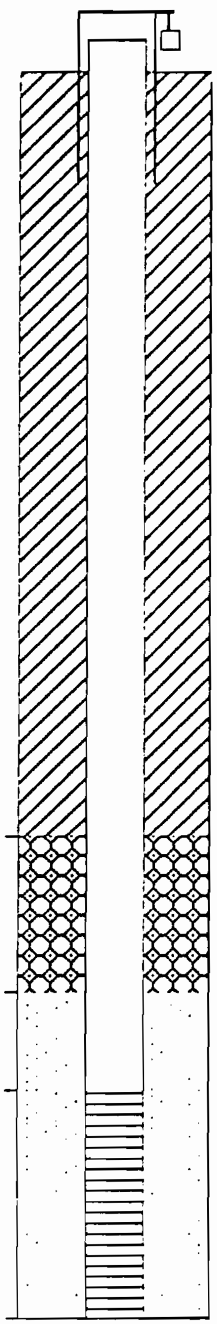
WELL NO. MW-4I

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

dunn

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 09/26/90 to 09/26/90
Date Developed: 10/03/90

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: D. Rowlinson

Drilling Contractor: American Auger and Ditch Co.

Type of Well: Top of Rock Groundwater Monitoring

Static Water Level Elev.: ______ Date: 11/20/90

Measuring Point (M.P.): Surface

Total Depth of Well: 29.63'

Total Depth of Boring: 27.7'

Drilling Method
- Type: Hollow Stem Auger Diameter: 4.25"ID
- Casing: HSA

Sampling Method
- Type: SplitSpoon Diameter: 2.0"
- Weight: 140 # Fall: 30"
- Interval: 2.0' Continuous

Riser Pipe Left in Place
- Material: Sch. 40 PVC Diameter: 2"
- Joint Type: Flush Thread Length: 19.5'

Screen
- Material: Sch. 40 PVC Diameter: 2"
- Slot Size: 0.010" Length: 5.0'
- Strat. Unit Screened: Till/Rock Interface

Filter Pack
- Sand: X Gravel: ______ Natural: ______
- Grade: US Silica #3
- Amount: 150 lbs. Interval: 20.5'-27.7'

Seal(s)
- Type: Bentonite Slurry Interval: 17.0'-20.5'
- Type: Cement Grout Interval: 0.0'-17.0'
- Type: ______ Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 27.1'

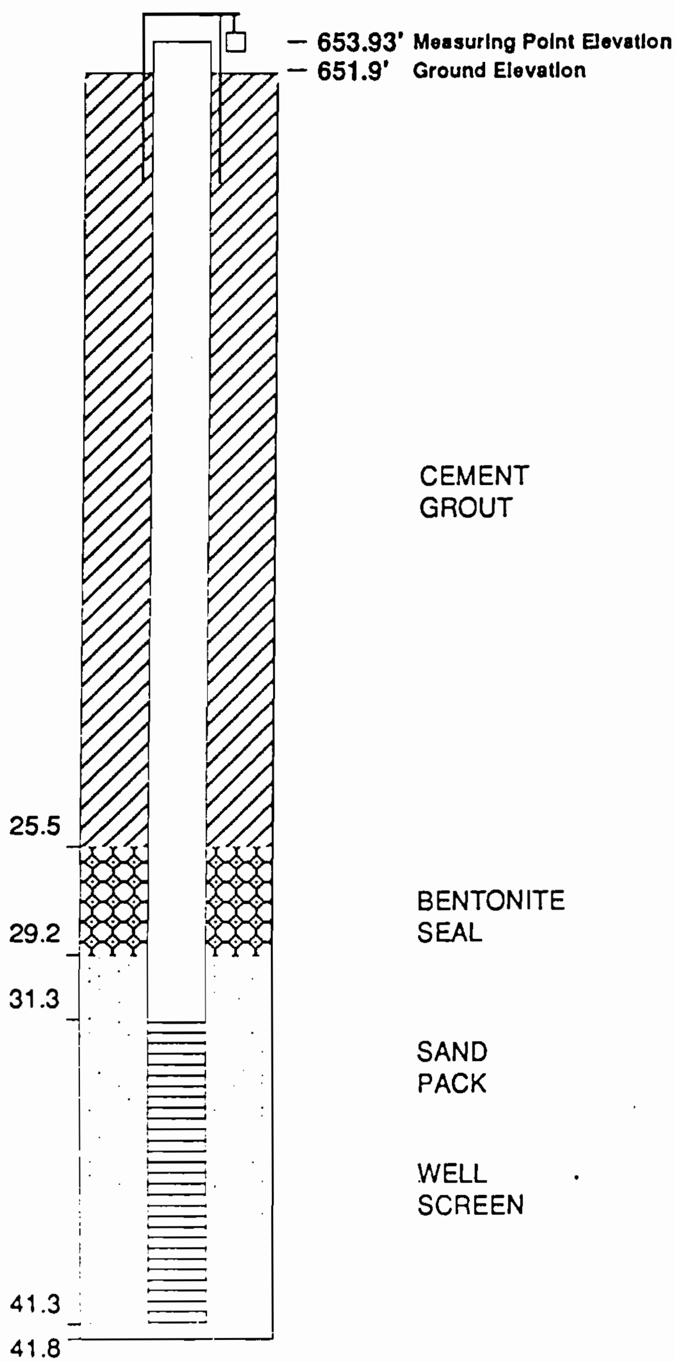
MONITORING WELL LOG

WELL NO. MW-5I

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 09/25/90 to 09/25/90
Date Developed: 10/03/90

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: D. Rowlinson
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Top of Rock Groundwater Monitoring
Static Water Level Elev. ______ Date: 11/20/90
Measuring Point (M.P.): Surface
Total Depth of Well: 43.83'
Total Depth of Boring: 41.8'

Drilling Method
Type: Hollow Stem Auger — Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon — Diameter: 2.0"
Weight: 140 # — Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Sch. 40 PVC — Diameter: 2"
Joint Type: Flush Thread — Length: 33.2'

Screen
Material: Sch. 40 PVC — Diameter: 2"
Slot Size: 0.010" — Length: 10.0'
Strat. Unit Screened: Till/Rock Interface

Filter Pack
Sand: X — Gravel: ______ — Natural: ______
Grade: US Silica #3
Amount: 175 lbs. — Interval: 29.2'-41.8'

Seal(s)
Type: Bentonite Slurry — Interval: 25.5'-29.1'
Type: Cement Grout — Interval: 0.0'-25.5'
Type: ______ — Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 36.8'

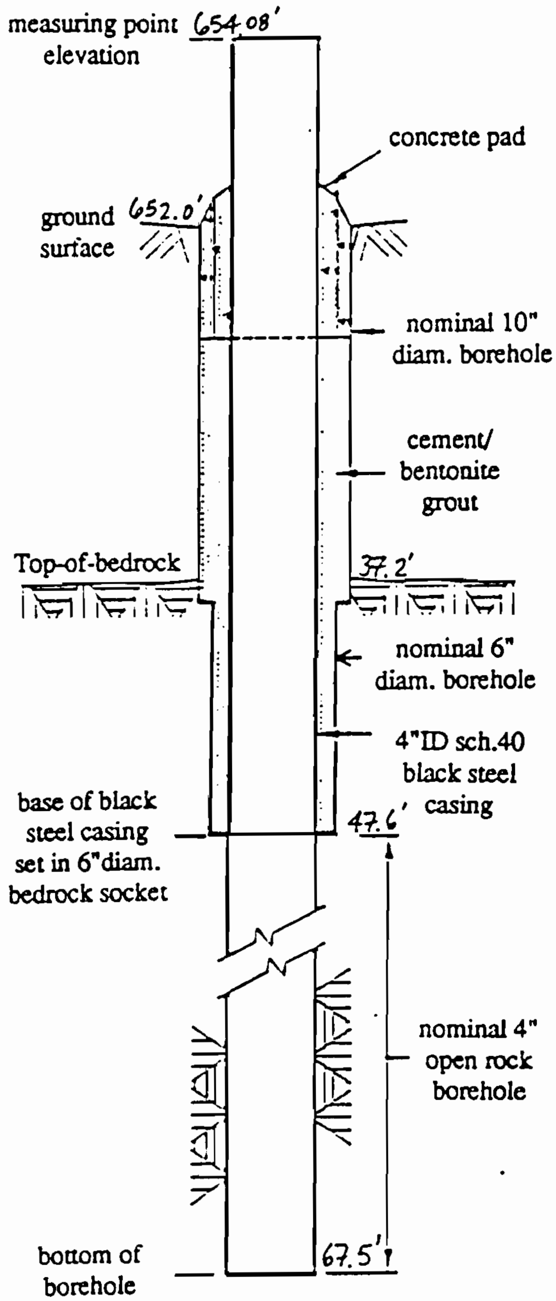
MONITORING WELL LOG

WELL NO. MW-5D

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 05/05/92 to 05/18/92
Date Developed: 5/19/92

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Bedrock Groundwater Monitoring
Static Water Level Elev.: ______ Date: 6/11/92
Measuring Point (M.P.): Surface
Total Depth of Well: 69.58'
Total Depth of Boring: 67.5'

Drilling Method
- Type: HSA/Core Diameter: 6.25"/4"OD
- Casing: HSA/Steel

Sampling Method
- Type: SplitSpoon Diameter: 2.0"
- Weight: 140 # Fall: 30"
- Interval: 2.0' Continuous

Riser Pipe Left in Place
- Material: Steel Diameter: 4"ID
- Joint Type: Thread/Coupling Length: 47.6'

Screen
- Material: Open Hole Diameter: 4"
- Slot Size: NA" Length: NA
- Strat. Unit Screened: Dolostone Bedrock

Filter Pack
- Sand ______ Gravel ______ Natural ______
- Grade: NA
- Amount: NA Interval: NA

Seal(s)
- Type: Cement/Bentonite Interval: 0.0'-47.6'
- Type: ______ Interval: ______
- Type: ______ Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 37.2'

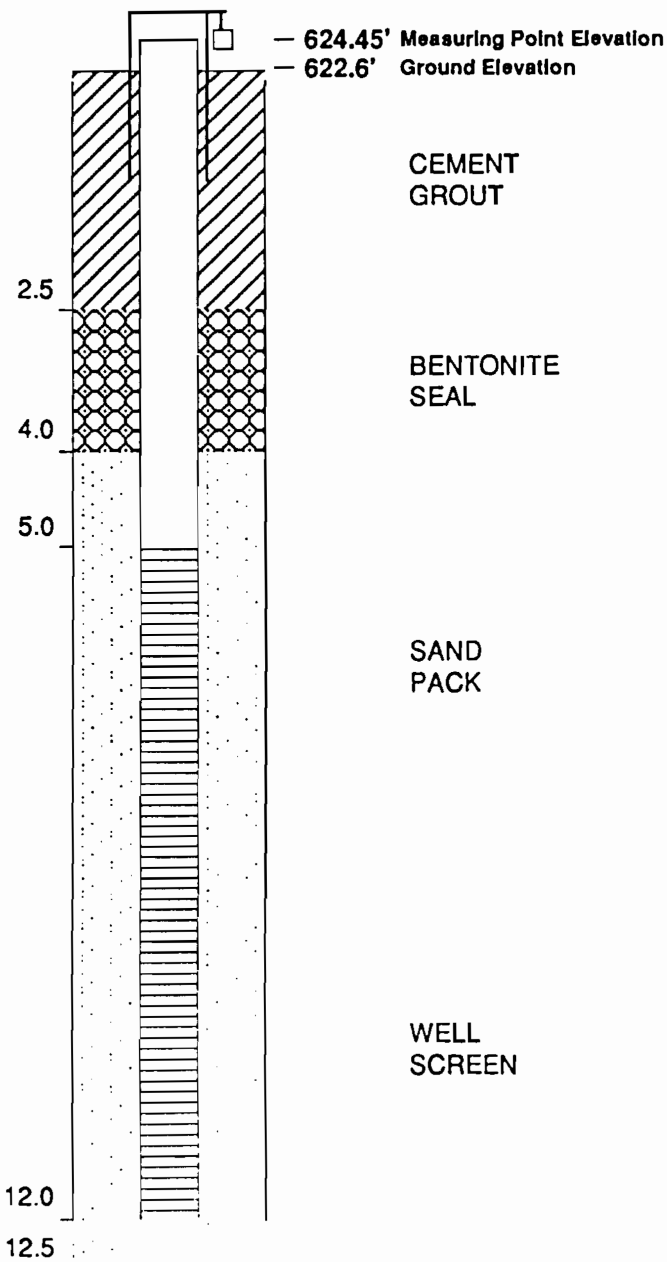
MONITORING WELL LOG

WELL NO. MW-6S

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 05/14/92 to 05/14/92
Date Developed: 5/21/92

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Overburden Groundwater Monitoring
Static Water Level Elev.: ______ Date: 6/11/92
Measuring Point (M.P.): Surface
Total Depth of Well: 13.85'
Total Depth of Boring: 12.5'

Drilling Method
Type: Hollow Stem Auger — Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon — Diameter: 2.0"
Weight: 140 # — Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Sch. 40 PVC — Diameter: 2"
Joint Type: Flush Thread — Length: 6.5'

Screen
Material: Sch. 40 PVC — Diameter: 2"
Slot Size: 0.010" — Length: 7.0'
Strat. Unit Screened: Till

Filter Pack
Sand: X — Gravel: ______ — Natural: ______
Grade: U.S. Silica #3
Amount: 100 lbs. — Interval: 4.0'-12.5'

Seal(s)
Type: Bentonite Pellets — Interval: 2.5'-4.0'
Type: Cement Grout — Interval: 0.0'-2.5'
Type: ______ — Interval: ______

Locking Casing: Yes

Notes:

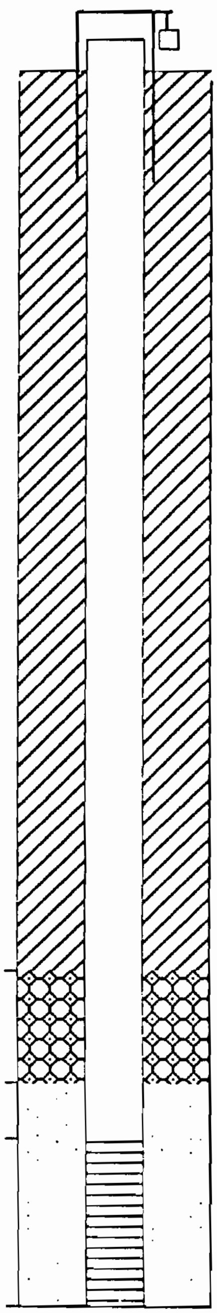
MONITORING WELL LOG

WELL NO. MW-6I

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 09/29/92 to 09/29/92
Date Developed: 10/13/92

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Top of Rock Groundwater Monitoring
Static Water Level Elev.: ______ Date: 10/21/92
Measuring Point (M.P.): Surface
Total Depth of Well: 23.96'
Total Depth of Boring: 22.0'

Drilling Method
Type: Hollow Stem Auger Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Sch. 40 PVC Diameter: 2"
Joint Type: Flush Thread Length: 21.0'

Screen
Material: Sch. 40 PVC Diameter: 2"
Slot Size: 0.010" Length: 3.0'
Strat. Unit Screened: Till/Rock Interface

Filter Pack
Sand: X Gravel: ______ Natural: ______
Grade: US Silica #3
Amount: 150 lbs. Interval: 18.0'-22.0'

Seal(s)
Type: Bentonite Slurry Interval: 16.0'-18.0'
Type: Cement Grout Interval: 0.0'-16.0'
Type: ______ Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 20.5'

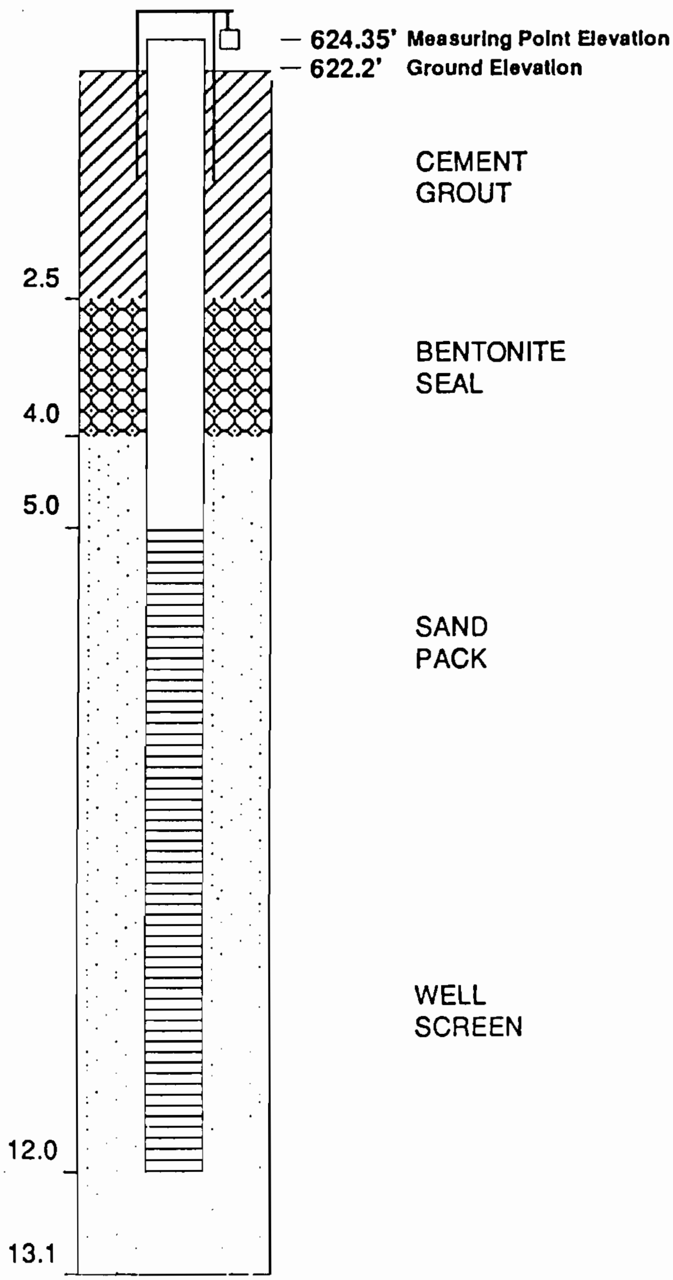
MONITORING WELL LOG

WELL NO. MW-7S

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 05/14/92 to 05/14/92
Date Developed: 5/21/92

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Overburden Groundwater Monitoring
Static Water Level Elev.: ______ Date: 6/11/92
Measuring Point (M.P.): Surface
Total Depth of Well: 14.20'
Total Depth of Boring: 13.1'

Drilling Method
Type: Hollow Stem Auger Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Sch. 40 PVC Diameter: 2"
Joint Type: Flush Thread Length: 7.2'

Screen
Material: Sch. 40 PVC Diameter: 2"
Slot Size: 0.010" Length: 7.0'
Strat. Unit Screened: Till

Filter Pack
Sand: X Gravel: ______ Natural: ______
Grade: U.S. Silica #3
Amount: 100 lbs. Interval: 4.0'-13.0'

Seal(s)
Type: Bentonite Pellets Interval: 2.5'-4.0'
Type: Cement Grout Interval: 0.0'-2.5'
Type: ______ Interval: ______

Locking Casing: Yes

Notes:

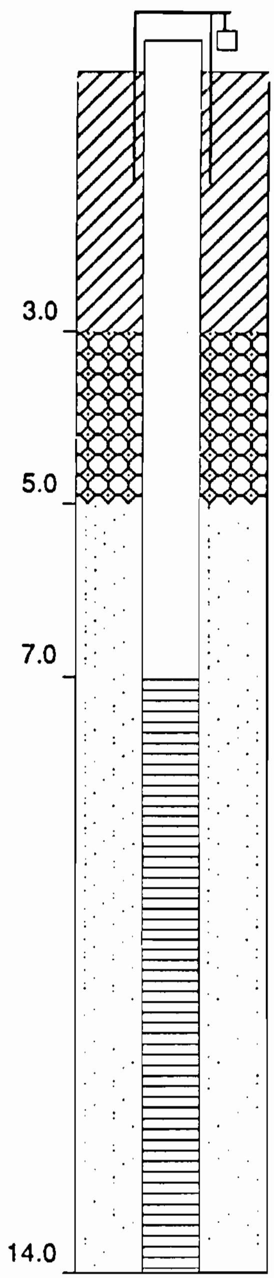
MONITORING WELL LOG

WELL NO. MW-8S

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 05/15/92 to 05/15/92
Date Developed: 5/21/92

WELL CONSTRUCTION DETAIL



— 625.12' Measuring Point Elevation
— 623.1' Ground Elevation

CEMENT GROUT

BENTONITE SEAL

SAND PACK

WELL SCREEN

INSPECTION NOTES

Geologist: P. Steck

Drilling Contractor: American Auger and Ditch Co.

Type of Well: Overburden Groundwater Monitoring

Static Water Level Elev. ______ Date: 6/11/92

Measuring Point (M.P.): Surface

Total Depth of Well: 16.02'

Total Depth of Boring: 14.0'

Drilling Method

Type: Hollow Stem Auger   Diameter: 4.25"ID

Casing: HSA

Sampling Method

Type: SplitSpoon   Diameter: 2.0"

Weight: 140 #   Fall: 30"

Interval: 2.0' Continuous

Riser Pipe Left in Place

Material: Sch. 40 PVC   Diameter: 2"

Joint Type: Flush Thread   Length: 8.7'

Screen

Material: Sch. 40 PVC   Diameter: 2"

Slot Size: 0.010"   •Length: 7.0'

Strat. Unit Screened: Till

Filter Pack

Sand: X   Gravel: ______   Natural: ______

Grade: U.S Silica #3

Amount: 100 lbs.   Interval: 5.0'-14.0'

Seal(s)

Type: Bentonite Pellets   Interval: 3.0'-5.0'

Type: Cement Grout   Interval: 0.0'-3.0'

Type: ______   Interval: ______

Locking Casing: Yes

Notes:

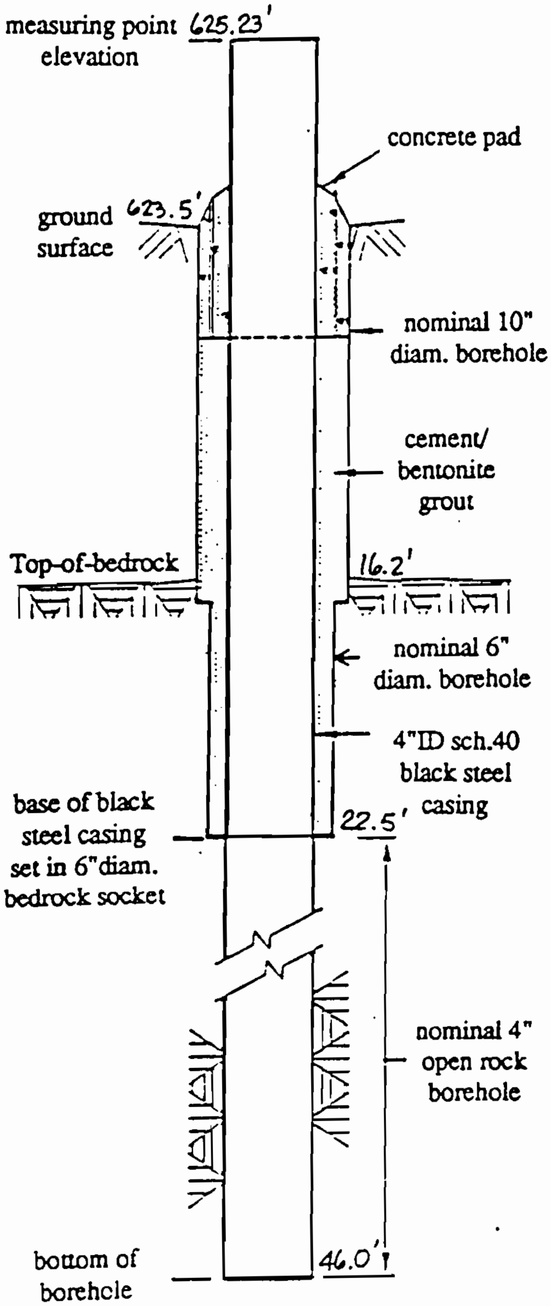
MONITORING WELL LOG

WELL NO. MW-8D

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 05/07/92 to 05/19/92
Date Developed: 5/19/92

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Geologist: P. Steck

Drilling Contractor: American Auger and Ditch Co.

Type of Well: Bedrock Groundwater Monitoring
Static Water Level Elev.: ______ Date: 6/11/92
Measuring Point (M.P.): Surface
Total Depth of Well: 48.5'
Total Depth of Boring: 46.0'

Drilling Method
Type: HSA/Core Diameter: 6.25"/4"OD
Casing: HSA/Steel

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Steel Diameter: 4"ID
Joint Type: Thread/Coupling Length: 22.5'

Screen
Material: Open Hole Diameter: 4"
Slot Size: NA" Length: NA
Strat. Unit Screened: Dolostone Bedrock

Filter Pack
Sand ______ Gravel ______ Natural ______
Grade: NA
Amount: NA Interval: NA

Seal(s)
Type: Cement Grout Interval: 0.0'-22.5'
Type: ______ Interval: ______
Type: ______ Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 16.2'

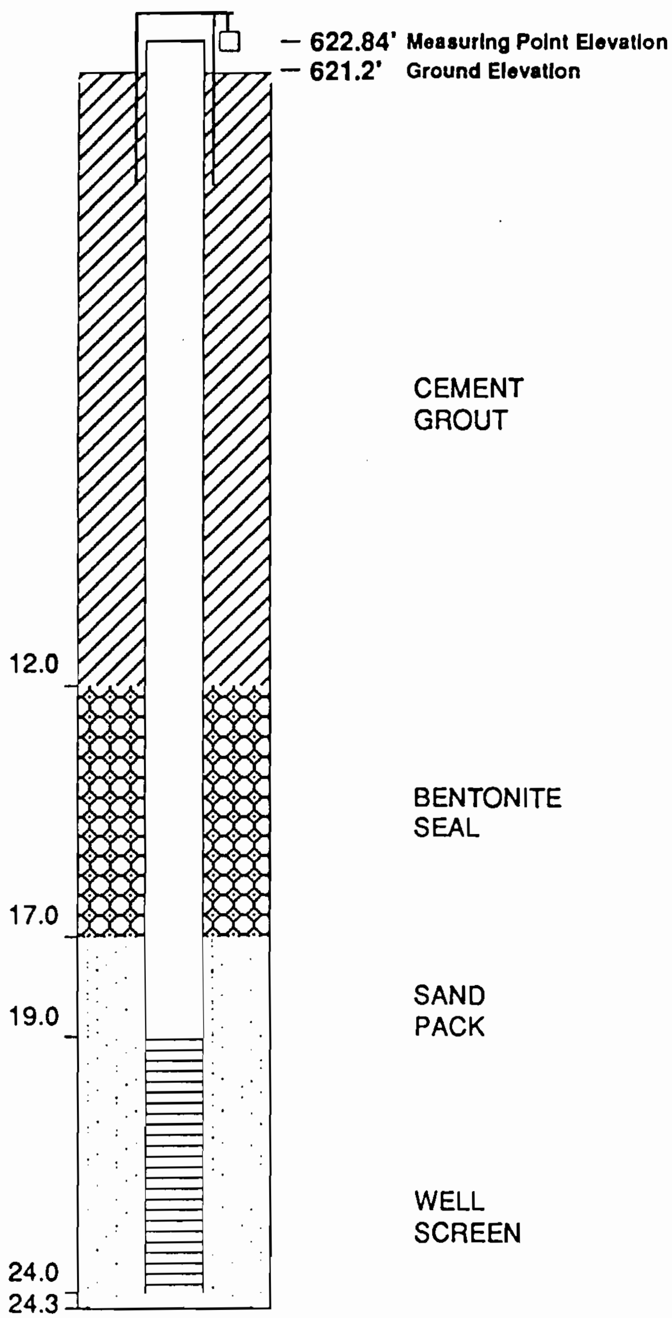
MONITORING WELL LOG

WELL NO. MW-9I

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 10/02/92 to 10/02/92
Date Developed: 10/14/92

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.

Type of Well: Top of Rock Groundwater Monitoring
Static Water Level Elev. ________ Date 10/21/92
Measuring Point (M.P.): Surface
Total Depth of Well: 26.04'
Total Depth of Boring: 24.3'

Drilling Method
Type: Hollow Stem Auger Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left In Place
Material: Sch. 40 PVC Diameter: 2"
Joint Type: Flush Thread Length: 21.0'

Screen
Material: Sch. 40 PVC Diameter: 2"
Slot Size: 0.010" Length: 5.0'
Strat. Unit Screened: Till/Rock Interface

Filter Pack
Sand: X Gravel: ____ Natural: ____
Grade: US Silica #3
Amount: 300 lbs. Interval: 17.0'-24.3'

Seal(s)
Type: Bentonite Slurry Interval: 12.0'-17.0'
Type: Cement Grout Interval: 0.0'-12.0'
Type: ____ Interval: ____

Locking Casing: Yes

Notes: Top of Rock at 22.3'

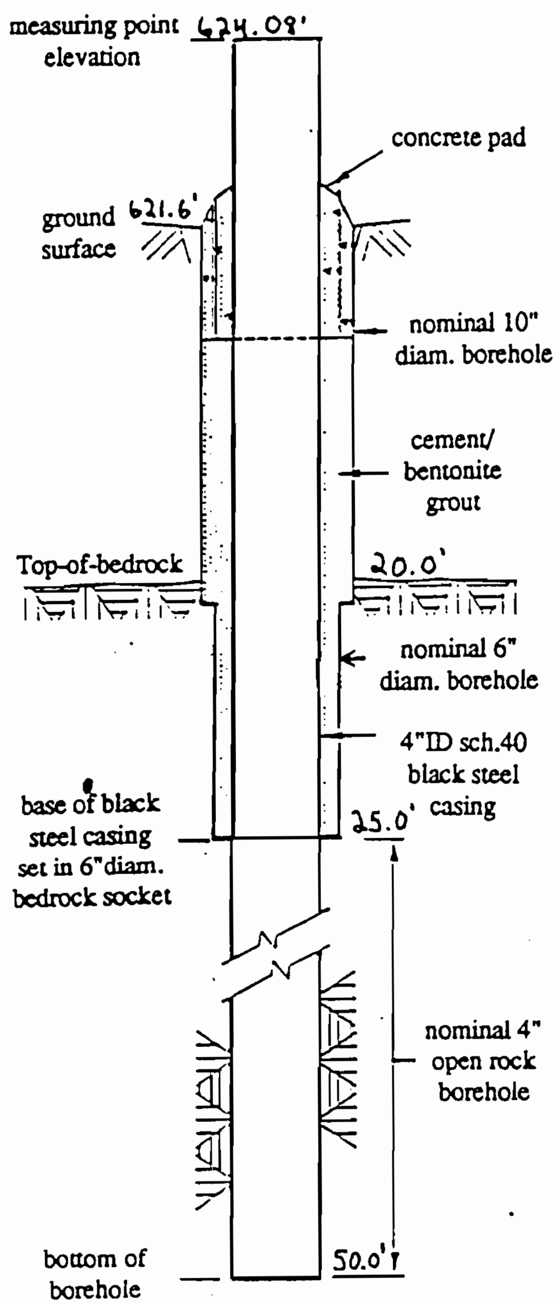
MONITORING WELL LOG

WELL NO. MW-9D

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 09/30/92 to 10/06/92
Date Developed: 10/13/92

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Bedrock Groundwater Monitoring
Static Water Level Elev.: ______ Date: 10/21/92
Measuring Point (M.P.): Surface
Total Depth of Well: 52.50'
Total Depth of Boring: 50.0'

Drilling Method
Type: HSA/Core Diameter: 6.25"/4"OD
Casing: HSA/Steel

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Steel Diameter: 4"ID
Joint Type: Thread/Coupling Length: 25.0'

Screen
Material: Open Hole Diameter: 4"
Slot Size: NA Length: NA
Strat. Unit Screened: Dolostone Bedrock

Filter Pack
Sand: ______ Gravel: ______ Natural: ______
Grade: NA
Amount: NA Interval: NA

Seal(s)
Type: Cement Grout Interval: 0.0'-25.0'
Type: ______ Interval: ______
Type: ______ Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 20.0'

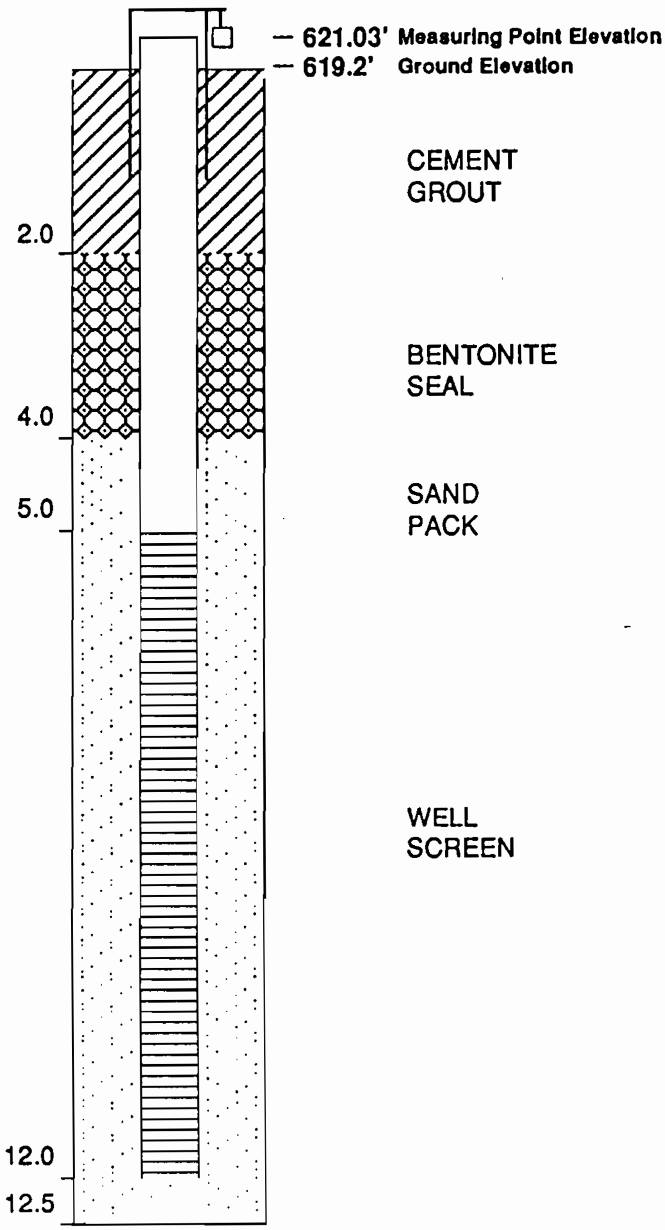
MONITORING WELL LOG

WELL NO. MW-10S

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: Sweden-3 Chapman Site
Client: NYSDEC
Location: Brockport, New York
Wk.Assign.No.: D-002520-14
Date Drilled: 03/03/93 to 03/03/93
Date Developed: 3/13/93

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Overburden Groundwater Monitoring
Static Water Level Elev.: ______ Date: 3/17/93
Measuring Point (M.P.): Surface
Total Depth of Well: 12.5'
Total Depth of Boring: 12.5'

Drilling Method
Type: Hollow Stem Auger Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Sch. 40 PVC Diameter: 2"
Joint Type: Flush Thread Length: 7.0'

Screen
Material: Sch. 40 PVC Diameter: 2"
Slot Size: 0.010" Length: 7.0'
Strat. Unit Screened: Till

Filter Pack
Sand: X Gravel: ______ Natural: ______
Grade: U.S. Silica #3
Amount: 300 lbs. Interval: 4.0'-12.5'

Seal(s)
Type: Bentonite Pellets Interval: 2.0'-4.0'
Type: Cement Grout Interval: 0.0'-2.0'
Type: ______ Interval: ______

Locking Casing: Yes

Notes:

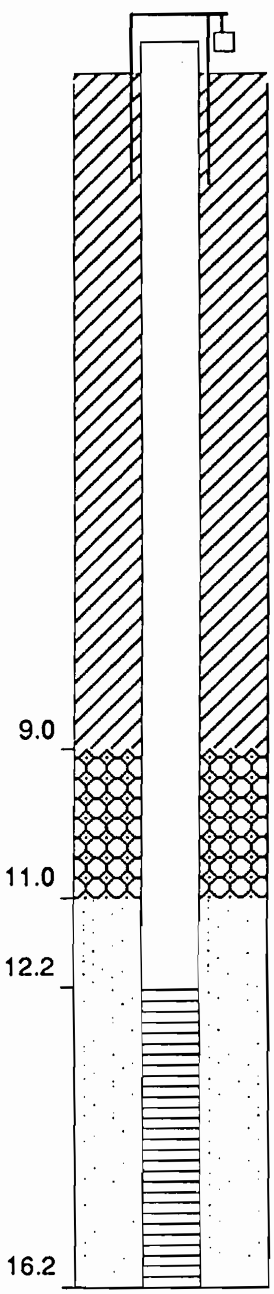
MONITORING WELL LOG

WELL NO. MW-10I

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 10/08/92 to 10/08/92
Date Developed: 10/15/92

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Top of Rock Groundwater Monitoring
Static Water Level Elev. ______ Date: 10/21/92
Measuring Point (M.P.): Surface
Total Depth of Well: 18.62'
Total Depth of Boring: 16.2'

Drilling Method
Type: Hollow Stem Auger — Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon — Diameter: 2.0"
Weight: 140 # — Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Sch. 40 PVC — Diameter: 2"
Joint Type: Flush Thread — Length: 14.62'

Screen
Material: Sch. 40 PVC — Diameter: 2"
Slot Size: 0.010" — Length: 4.0'
Strat. Unit Screened: Till/Rock Interface

Filter Pack
Sand: X — Gravel: ______ — Natural: ______
Grade: US Silica #3
Amount: 150 lbs. — Interval: 11.0'-16.2'

Seal(s)
Type: Bentonite Slurry — Interval: 9.0'-11.0'
Type: Cement Grout — Interval: 0.0'-9.0'
Type: ______ — Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 14.0'

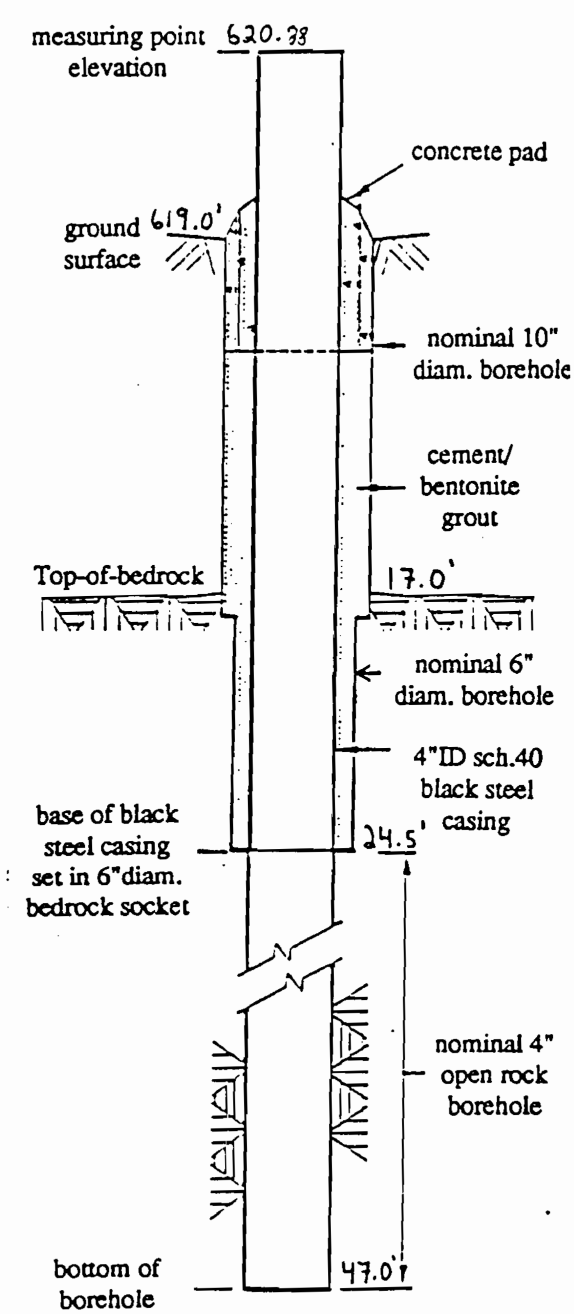
MONITORING WELL LOG

WELL NO. MW-10D

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 10/06/92 to 10/13/92
Date Developed: 10/14/92

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.

Type of Well: Bedrock Groundwater Monitoring
Static Water Level Elev.: ______ Date: 10/21/92
Measuring Point (M.P.): Surface

Total Depth of Well: 49.20'
Total Depth of Boring: 47.0'

Drilling Method
Type: HSA/Core Diameter: 6.25"/4"OD
Casing: HSA/Steel

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Steel Diameter: 4"ID
Joint Type: Thread/Coupling Length: 24.5'

Screen
Material: Open Hole Diameter: 4"
Slot Size: NA Length: NA
Strat. Unit Screened: Dolostone Bedrock

Filter Pack
Sand: ______ Gravel: ______ Natural: ______
Grade: NA
Amount: NA Interval: NA

Seal(s)
Type: Cement Grout Interval: 0.0'-22.0'
Type: ______ Interval: ______
Type: ______ Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 17.0'

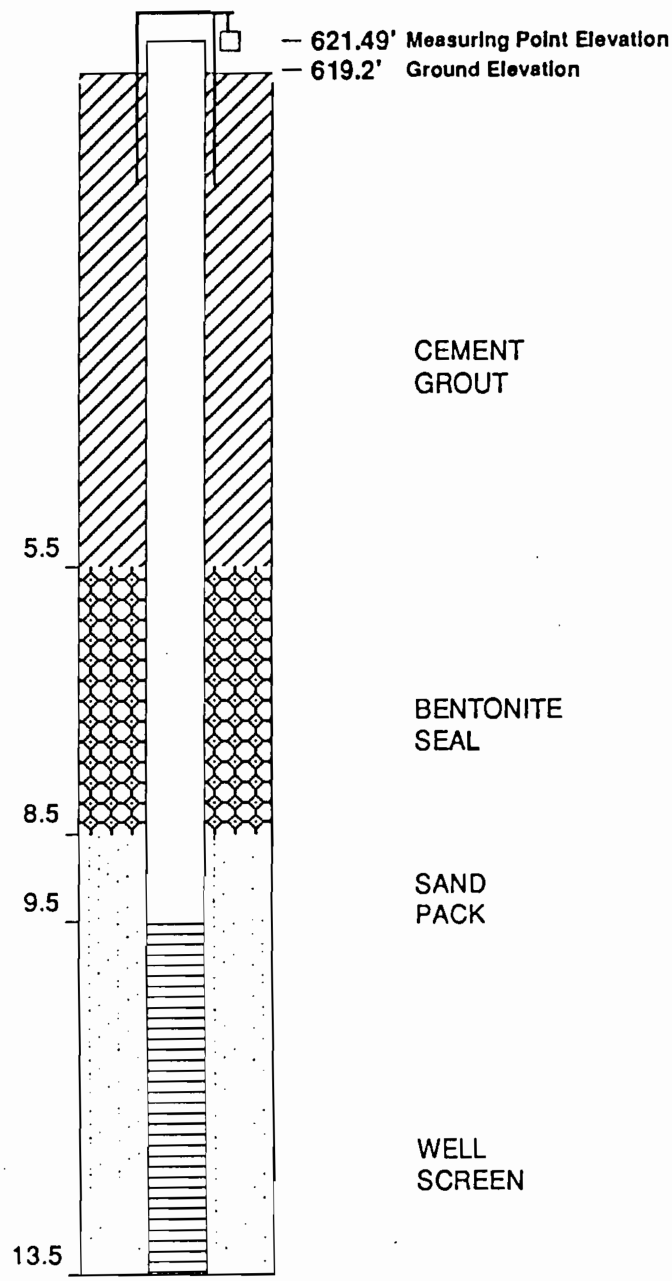
MONITORING WELL LOG

WELL NO. MW-11I

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 10/08/92 to 10/08/92
Date Developed: 10/13/92

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Top of Rock Groundwater Monitoring
Static Water Level Elev.: ______ Date: 10/21/92
Measuring Point (M.P.): Surface
Total Depth of Well: 15.64'
Total Depth of Boring: 13.5'

Drilling Method
Type: Hollow Stem Auger — Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon — Diameter: 2.0"
Weight: 140 # — Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Sch. 40 PVC — Diameter: 2"
Joint Type: Flush Thread — Length: 12.0'

Screen
Material: Sch. 40 PVC — Diameter: 2"
Slot Size: 0.010" — Length: 4.0'
Strat. Unit Screened: Till/Rock Interface

Filter Pack
Sand: X — Gravel: ______ — Natural: ______
Grade: US Silica #3
Amount: 150 lbs. — Interval: 8.5'-13.5'

Seal(s)
Type: Bentonite Slurry — Interval: 5.5'-8.5'
Type: Cement Grout — Interval: 0.0'-5.5'
Type: ______ — Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 11.5'

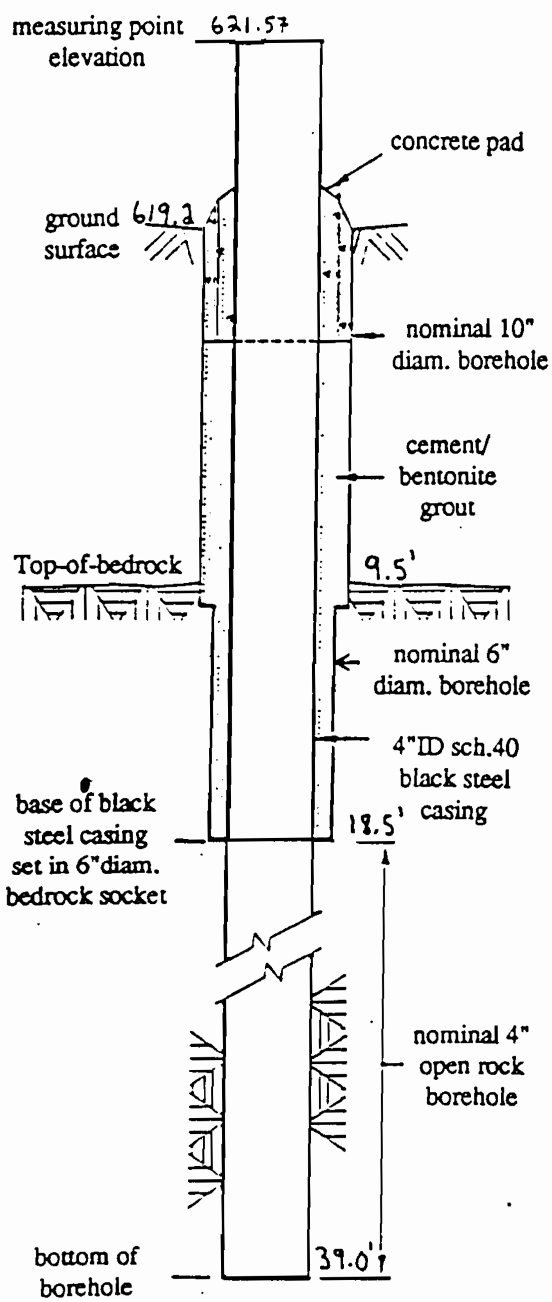
MONITORING WELL LOG

WELL NO. MW-11D

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 10/08/92 to 10/12/92
Date Developed: 10/13/92

WELL CONSTRUCTION DETAIL



NOT TO SCALE

INSPECTION NOTES

Geologist: P. Steck

Drilling Contractor: American Auger and Ditch Co.

Type of Well: Bedrock Groundwater Monitoring

Static Water Level Elev.: ______ Date: 10/21/92

Measuring Point (M.P.): Surface

Total Depth of Well: 42.33'

Total Depth of Boring: 39.0'

Drilling Method
- Type: HSA/Core — Diameter: 6.25"/4"OD
- Casing: HSA/Steel

Sampling Method
- Type: SplitSpoon — Diameter: 2.0"
- Weight: 140 # — Fall: 30"
- Interval: 2.0' Continuous

Riser Pipe Left in Place
- Material: Steel — Diameter: 4"ID
- Joint Type: Thread/Coupling — Length: 18.5'

Screen
- Material: Open Hole — Diameter: 4"
- Slot Size: NA — Length: NA
- Strat. Unit Screened: Dolostone Bedrock

Filter Pack
- Sand ______ Gravel ______ ural ______
- Grade: NA
- Amount: NA — Interval: NA

Seal(s)
- Type: Cement Grout — Interval: 0.0'-16.0'
- Type: ______ — Interval: ______
- Type: ______ — Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 9.5'

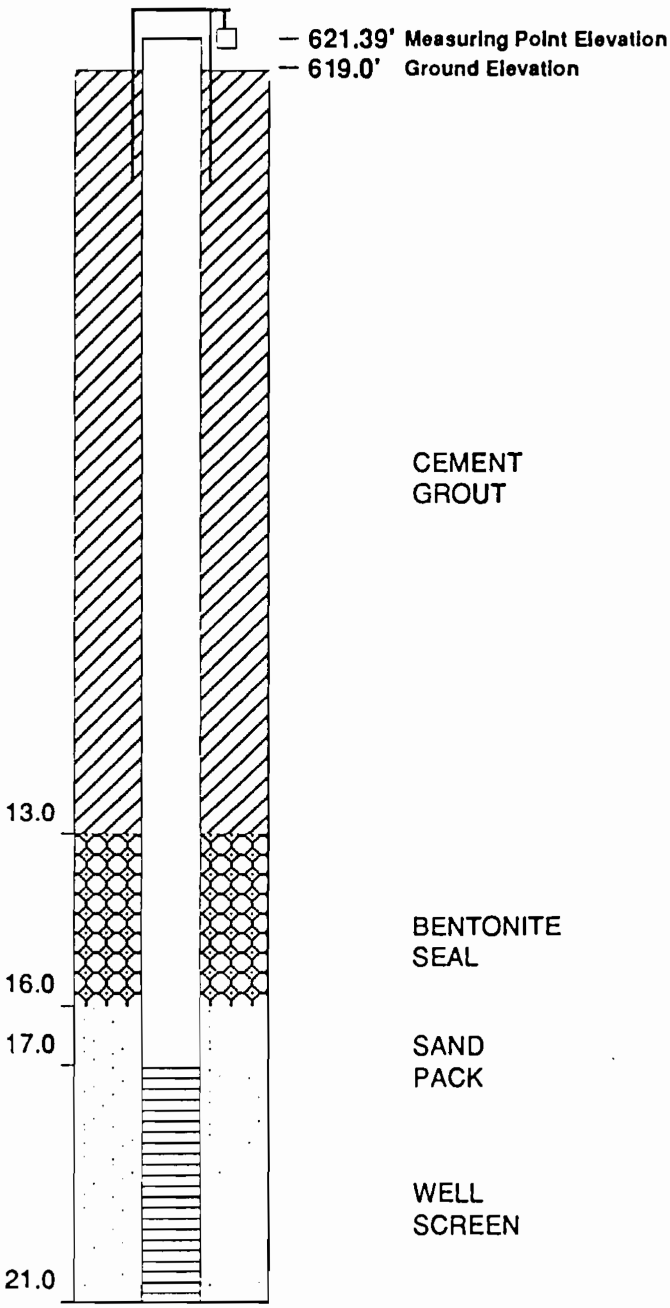
MONITORING WELL LOG

WELL NO. MW-12I

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 10/14/92 to 10/15/92
Date Developed: 10/16/92

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: P. Steck

Drilling Contractor: American Auger and Ditch Co.

Type of Well: Top of Rock Groundwater Monitoring
Static Water Level Elev.: ______ Date: 10/21/92
Measuring Point (M.P.): Surface
Total Depth of Well: 23.38'
Total Depth of Boring: 21.0'

Drilling Method
- Type: Hollow Stem Auger Diameter: 4.25"ID
- Casing: HSA

Sampling Method
- Type: SplitSpoon Diameter: 2.0"
- Weight: 140 # Fall: 30"
- Interval: 2.0' Continuous

Riser Pipe Left in Place
- Material: Sch. 40 PVC Diameter: 2"
- Joint Type: Flush Thread Length: 19.5'

Screen
- Material: Sch. 40 PVC Diameter: 2"
- Slot Size: 0.010" Length: 4.0'
- Strat. Unit Screened: Till/Rock Interface

Filter Pack
- Sand: X Gravel: ______ Natural: ______
- Grade: US Silica #3
- Amount: 300 lbs. Interval: 16.0'-21.0'

Seal(s)
- Type: Bentonite Slurry Interval: 13.0'-16.0'
- Type: Cement Grout Interval: 0.0'-13.0'
- Type: ______ Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 18.0'

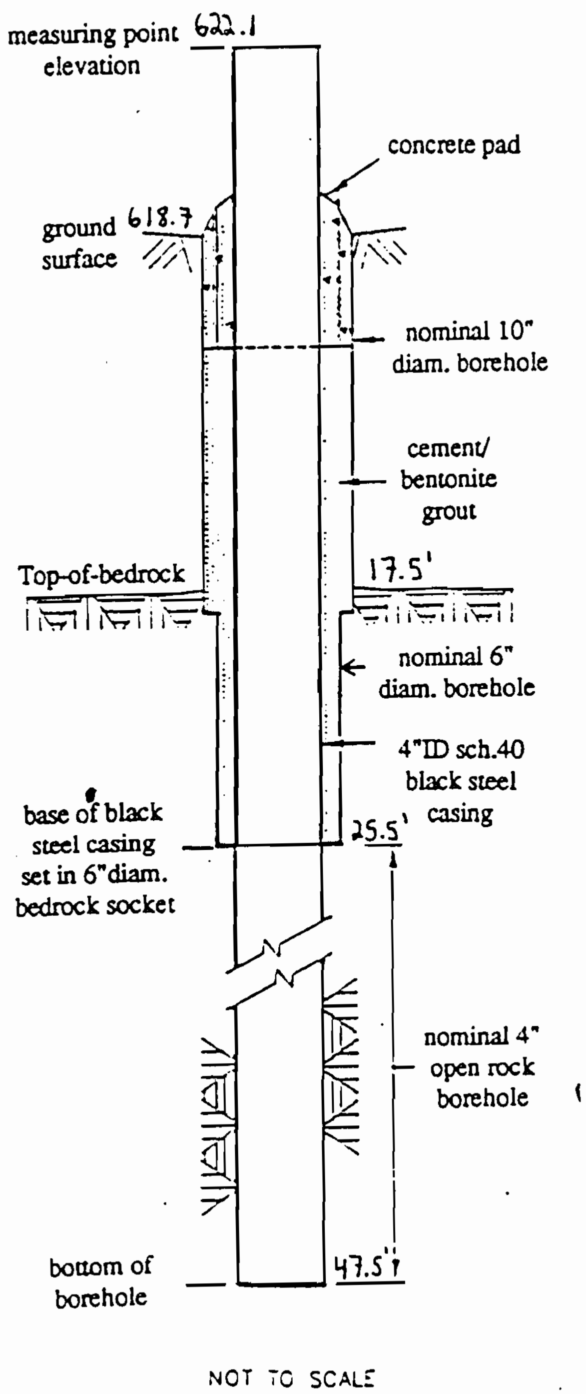
MONITORING WELL LOG

WELL NO. MW-12D

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: SWEDEN-3 CHAPMAN RI/FS
Client: NYSDEC
Location: 1390 BEADLE RD., BROCKPORT NY
Wk.Assign.No.: D002520-14
Date Drilled: 10/14/92 to 10/15/92
Date Developed: 10/16/92

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.

Type of Well: Bedrock Groundwater Monitoring
Static Water Level Elev.: ______ Date: 10/21/92
Measuring Point (M.P.): Surface
Total Depth of Well: 50.58'
Total Depth of Boring: 47.5'

Drilling Method
Type: HSA/Core Diameter: 6.25"/4"OD
Casing: HSA/Steel

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Steel Diameter: 4"ID
Joint Type: Thread/Coupling Length: 25.5'

Screen
Material: Open Hole Diameter: 4"
Slot Size: NA Length: NA
Strat. Unit Screened: Dolostone Bedrock

Filter Pack
Sand: ______ Gravel: ______ Natural: ______
Grade: NA
Amount: NA Interval: NA

Seal(s)
Type: Cement Grout Interval: 0.0'-22.5'
Type: ______ Interval: ______
Type: ______ Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 17.5'

BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

Project: SWEDEN-3 CHAPMAN LANDFILL

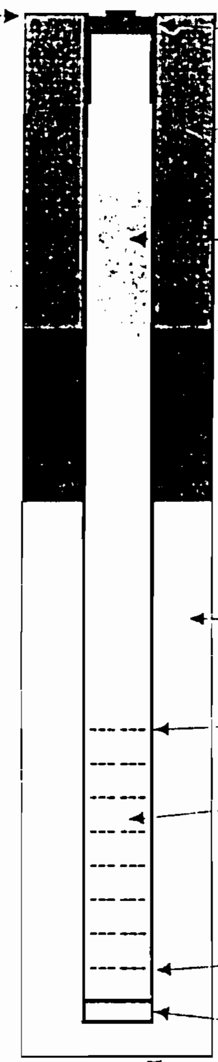
Well Number: MW12S

Date Started: 6/7/99

File No: 99-14D

Date Completed: 6/7/99

Ground elevation



Type of protective casing: 6" STEEL

Type of backfill: SCRATFET

Type of riser: 2" PVC

Depth to top of seal: 3.5'

Type of seal: CHIPS

Depth to bottom of seal/ depth to top of sand pack: 5.5' 00

6' #00

Type of sand pack: #00 SAND

Depth to top of well screen: 7.5'

Type of well screen: 10 Slot 2" PVC.

Depth to bottom of well screen: 12.1'

Depth to tip of well: 12.5'

Depth to bottom of borehole: 13'

USED 3-BAGS OF #00 SAND

1-BAG OF CHIPS

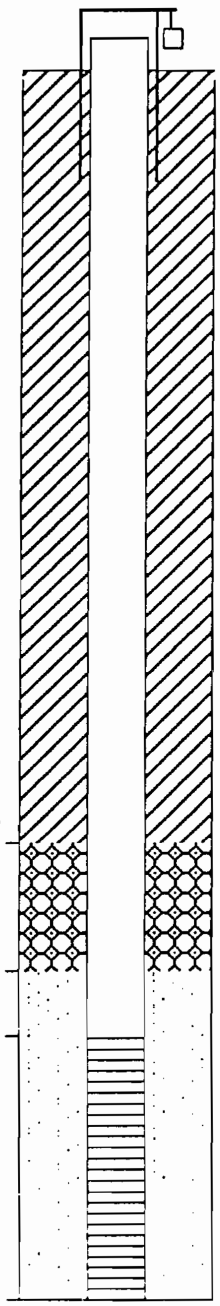
MONITORING WELL LOG

WELL NO. MW-13I

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: Sweden-3 Chapman Site
Client: NYSDEC
Location: Brockport, New York
Wk.Assign.No.: D-002520-14
Date Drilled: 03/04/93 to 03/04/93
Date Developed: 3/13/93

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Top of Rock Groundwater Monitoring
Static Water Level Elev. ______ Date: 3/17/93
Measuring Point (M.P.): Surface
Total Depth of Well: 19.0'
Total Depth of Boring: 19.0'

Drilling Method
Type: Hollow Stem Auger — Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon — Diameter: 2.0"
Weight: 140 # — Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Sch. 40 PVC — Diameter: 2"
Joint Type: Flush Thread — Length: 17.0'

Screen
Material: Sch. 40 PVC — Diameter: 2"
Slot Size: 0.010" — Length: 4.0'
Strat. Unit Screened: Till/Rock Interface

Filter Pack
Sand: X — Gravel: ______ — Natural: ______
Grade: US Silica #3
Amount: 100 lbs. — Interval: 14.0'-19.0'

Seal(s)
Type: Bentonite Slurry — Interval: 12.0'-14.0'
Type: Cement Grout — Interval: 0.0'-12.0'
Type: ______ — Interval: ______

Locking Casing: Yes

Notes: Top of Rock at 16.8'

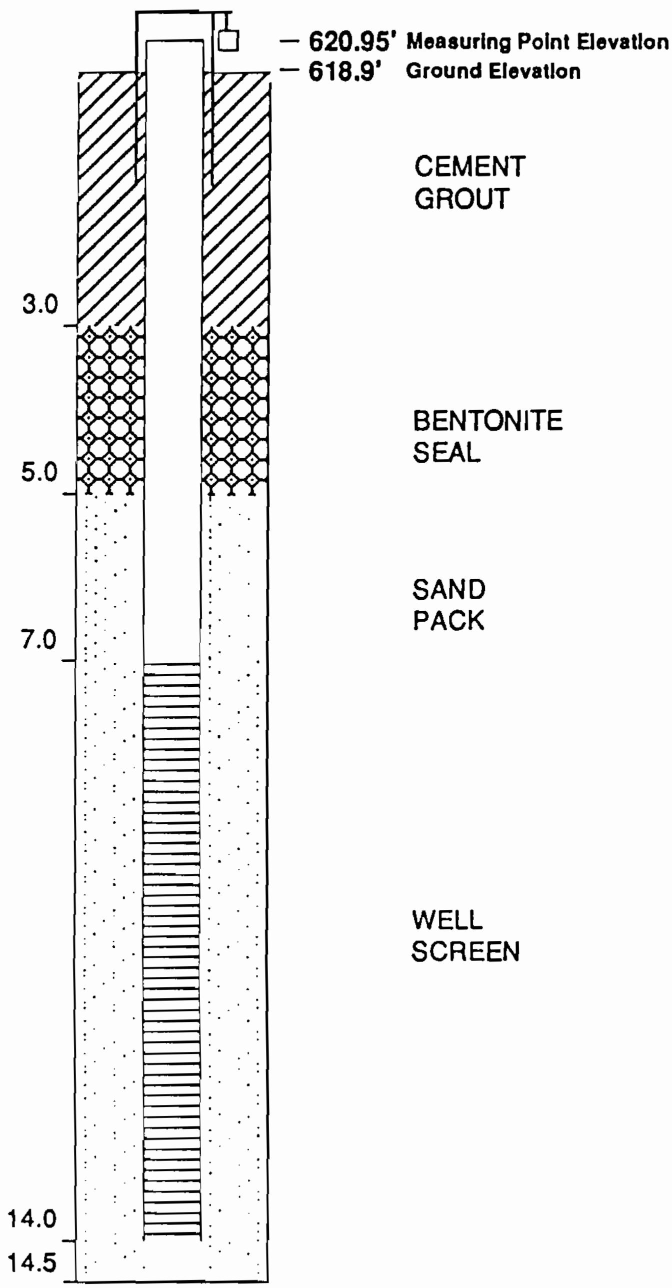
MONITORING WELL LOG

WELL NO. MW-13S

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: Sweden-3 Chapman Site
Client: NYSDEC
Location: Brockport, New York
Wk.Assign.No.: D-002520-14
Date Drilled: 03/04/93 to 03/04/93
Date Developed: 3/13/93

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Overburden Groundwater Monitoring
Static Water Level Elev.: ______ Date: 3/17/93
Measuring Point (M.P.): Surface
Total Depth of Well: 14.5'
Total Depth of Boring: 14.5'

Drilling Method
Type: Hollow Stem Auger Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left in Place
Material: Sch. 40 PVC Diameter: 2"
Joint Type: Flush Thread Length: 9.0'

Screen
Material: Sch. 40 PVC Diameter: 2"
Slot Size: 0.010" Length: 7.0'
Strat. Unit Screened: Till

Filter Pack
Sand: X Gravel: ______ Natural: ______
Grade: U.S. Silica #3
Amount: 400 lbs. Interval: 5.0'-14.5'

Seal(s)
Type: Bentonite Pellets Interval: 3.0'-5.0'
Type: Cement Grout Interval: 0.0'-3.0'
Type: ______ Interval: ______
Locking Casing: Yes

Notes:

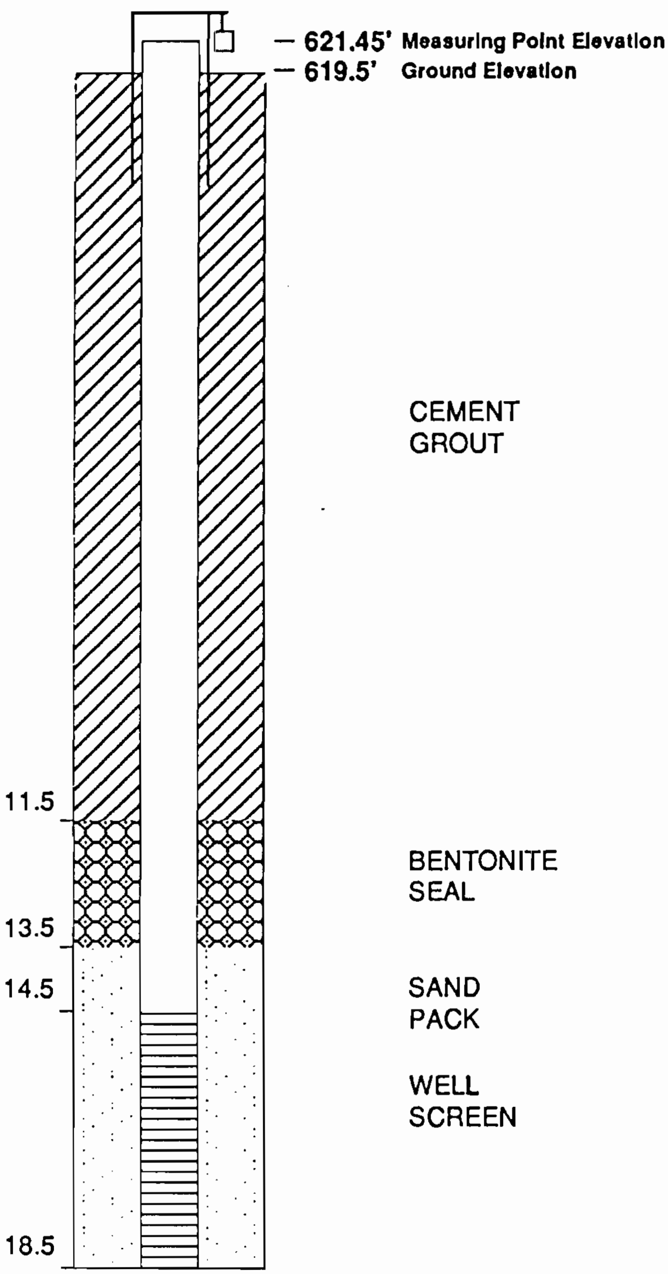
MONITORING WELL LOG

WELL NO. MW-14I

DUNN GEOSCIENCE ENGINEERING CO.
ALBANY, NY 12205
(518) 458-1313

Project: Sweden-3 Chapman Site
Client: NYSDEC
Location: Brockport, New York
Wk.Assign.No.: D-002520-14
Date Drilled: 03/02/93 to 03/02/93
Date Developed: 3/13/93

WELL CONSTRUCTION DETAIL



INSPECTION NOTES

Geologist: P. Steck
Drilling Contractor: American Auger and Ditch Co.
Type of Well: Top of Rock Groundwater Monitoring
Static Water Level Elev.: ______ Date: 3/17/93
Measuring Point (M.P.): Surface
Total Depth of Well: 18.5'
Total Depth of Boring: 18.5'

Drilling Method
Type: Hollow Stem Auger Diameter: 4.25"ID
Casing: HSA

Sampling Method
Type: SplitSpoon Diameter: 2.0"
Weight: 140 # Fall: 30"
Interval: 2.0' Continuous

Riser Pipe Left In Place
Material: Sch. 40 PVC Diameter: 2"
Joint Type: Flush Thread Length: 16.2'

Screen
Material: Sch. 40 PVC Diameter: 2"
Slot Size: 0.010" Length: 4.0'
Strat. Unit Screened: Till/Rock Interface

Filter Pack
Sand: X Gravel: ____ Natural: ____
Grade: US Silica #3
Amount: 300 lbs. Interval: 11.5'-18.5'

Seal(s)
Type: Bentonite Slurry Interval: 11.5'-13.5'
Type: Cement Grout Interval: 0.0'-11.5'
Type: ____ Interval: ____

Locking Casing: Yes

Notes: Top of Rock at 16.5'

BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

Project: 99-140

File No:

Well Number: MW-~~105~~ 16S

Date Started: 5/14/99

Date Completed: 5/14/99

Ground elevation

Type of protective casing: 4" Steel

Type of backfill: Sotcrete

Type of riser: 2" PVC

Depth to top of seal: 2.5'

Type of seal: Bentonite Chips

Depth to bottom of seal/ depth to top of sand pack: 3.5'

Type of sand pack: #00 to 3.5' #N00 to 4'

Depth to top of well screen: 4.5'

Type of well screen: .010 slot 2" PVC

Depth to bottom of well screen: 9.5'

Depth to tip of well: 9.5'

Depth to bottom of borehole: 10'

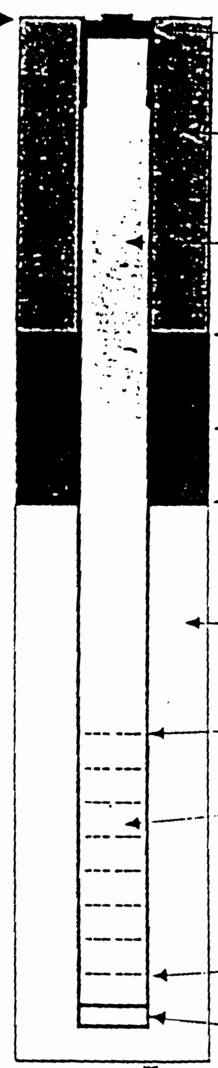
...RON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

Project: 99-140

File No:

Well Number: MW-~~10I~~ alt 16I
Date Started: 5/13/99
Date Completed: 5/14/99

Ground elevation



Type of protective casing: 4" Steel

Type of backfill: Grout

Type of riser: 2" PVC

Depth to top of seal: 10'

Type of seal: Bentonite Chips

Depth to bottom of seal/ 12'
depth to top of sand pack: 12'

Type of sand pack: # N00 SAND

Depth to top of well screen: 13.8'

Type of well screen: .010 Slot 2" PVC

Depth to bottom of well screen: 23.8'

Depth to tip of well: 23.8'

Depth to bottom of borehole: 23.8'

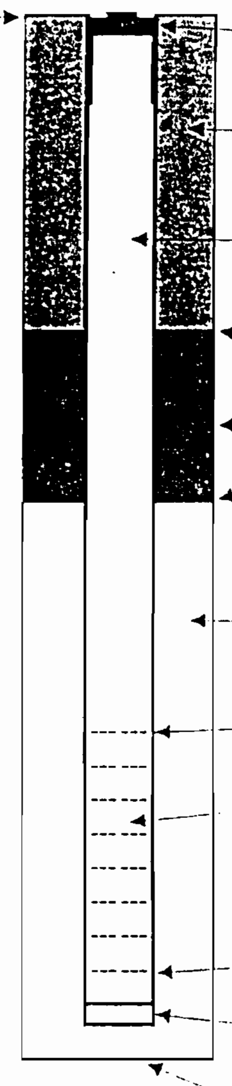
BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

MW-17I

Project: 99-140

Well Number: 5/17/99
Date Started: 5/17/99
File No:
Date Completed:

Ground elevation



Type of protective casing: 4" Steel

Type of backfill: grout

Type of riser: 2" PVC

Depth to top of seal: 11.5'

Type of seal: Bento chips

Depth to bottom of seal/ 13.5'
depth to top of sand pack: 13.5'

Type of sand pack: #N00 Sand

Depth to top of well screen: 15.5'

Type of well screen: .010 Slot 2" PVC

Depth to bottom of well screen: 20.5'

Depth to tip of well: 20.5'

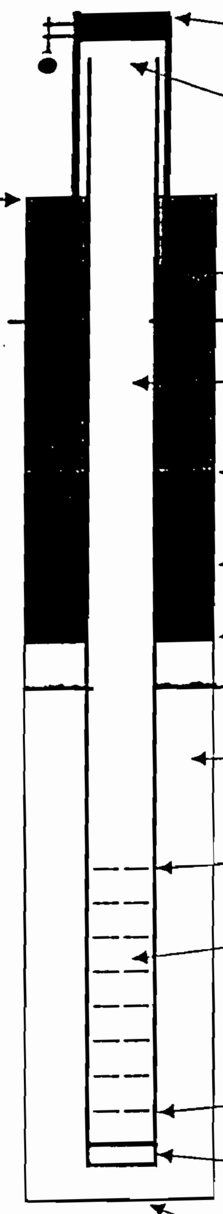
Depth to bottom of borehole: 20.5'

BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

Project: 99-140

File No:

Well Number: MW-17S
Date Started: 5/18/99
Date Completed: 5/18/99



Ground elevation

Type of protective casing: 4" Steel

Height of riser above ground surface: 3'

Type of backfill: concrete

Depth to top of Bentonite Grout: 1'

Type of riser: 2" PVC

Depth to top of seal: 3'

Type of seal: Bentonite chips

Depth to bottom of seal/ 5'
depth to top of fine sand pack: 5'

Depth to top of Coarse Sand pack: —

Type of sand pack: #N00 SAND

Depth to top of well screen: 6'

Type of well screen: .010 Slot PVC

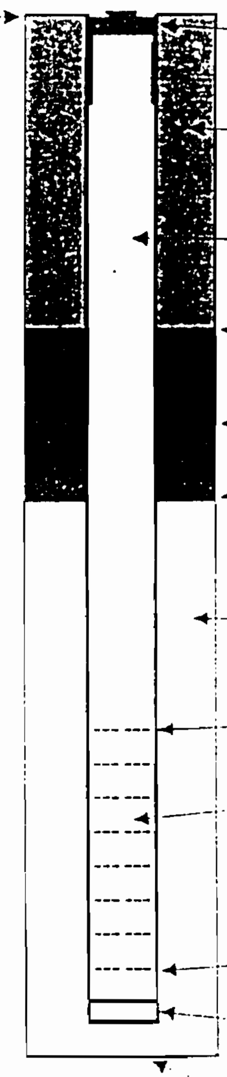
Depth to bottom of well screen: 11'

Depth to tip of well: 11'

Depth to bottom of borehole: 11.5'

BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

Project: SWEDEN-3 CHAPMAN LANDFILL
Well Number: MW 8I
Date Started: 6/9/99
File No: 99-140
Date Completed: 6/10/99



Ground elevation

Type of protective casing: 4" STEEL

Type of backfill: GROUT TO 3'

Type of riser: 2" PVC

Depth to top of seal: 11.5'

Type of seal: CHIPS

Depth to bottom of seal/ depth to top of sand pack: 12.5'

Type of sand pack: #00

Depth to top of well screen: 13.5

Type of well screen: 10 SLOT 2" PVC

Depth to bottom of well screen: 20.1'

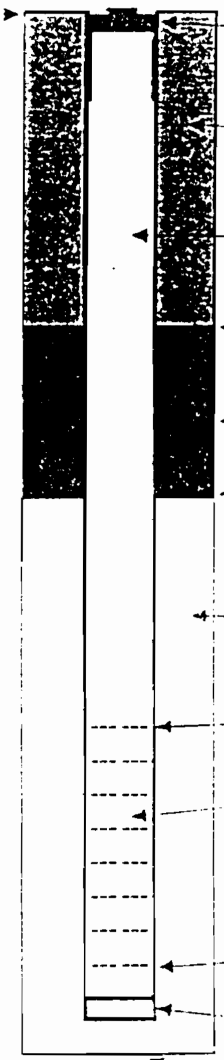
Depth to tip of well: 20.5

Depth to bottom of borehole: 21'

USED
2-BAGS OF #00 SAND
1-CHIPS

BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7921
FAX (716) 759-7923

Project: SWEDEN -3 CHAPMAN LANDFILL
Well Number: MW18S
Date Started: 6/9/99
File No: 99-140
Date Completed: 6/9/99



Ground elevation

Type of protective casing: 4" STEEL

Type of backfill: SLRAHOT

Type of riser: 2" PVC

Depth to top of seal: 3.5'

Type of seal: CHIPS

Depth to bottom of seal, depth to top of sand pack: 5.5' WITH 0 SAND 6' WITH N00 SAND

Type of sand pack: N00

Depth to top of well screen: 6.5'

Type of well screen: 10 SLOT PVC

Depth to bottom of well screen: 11.1'

Depth to tip of well: 11.5'

Depth to bottom of borehole: 11.5'

USED 2-BAGS OF N00 SAND
1-BAG OF CHIPS

BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

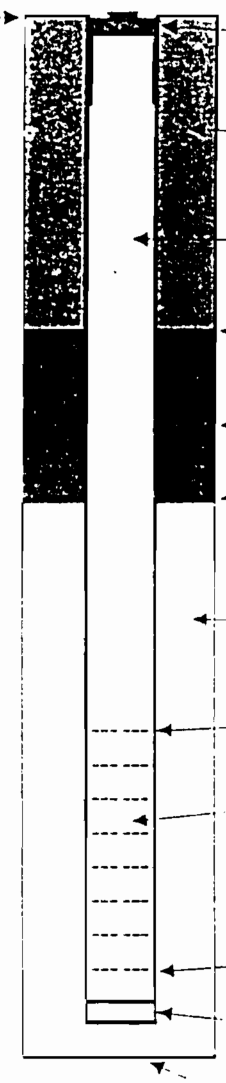
Project: SWEDEN -3 CHAPMAN LANDFILL

Well Number: MW-8D

Date Started: 6/7/99

File No: 99-140

Date Completed: 6/11/99



Ground elevation

Type of protective casing: 4" STEEL

Type of backfill:

Type of riser: 4" STEEL

Depth to top of seal:

Type of seal:

Depth to bottom of seal/depth to top of sand pack:

Type of sand pack:

Depth to top of well screen:

Type of well screen:

Depth to bottom of well screen:

Depth to tip of well:

Depth to bottom of borehole: 48'

TOP OF ROCK IS 16'
put 4" CASING IN AT 21'

OPEN ROCK WELL

USED 6 BAGS OF GROUT
1- SCRATCH

BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

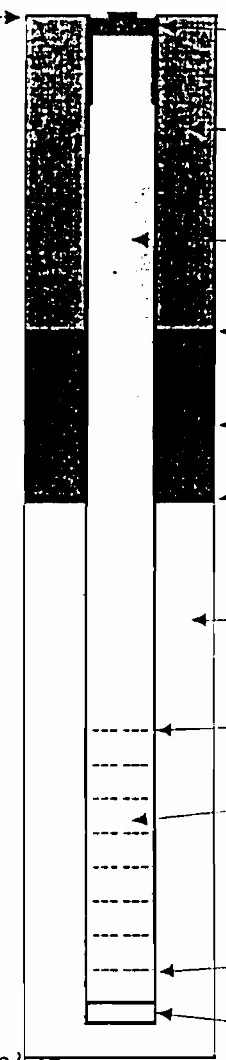
Project: SWEDEN-3 CHAPMAN LANDFILL

Well Number: MW19I

Date Started: 6/2/99

File No: 99-140

Date Completed: 6/3/99



Ground elevation

Type of protective casing: 6" STEEL

Type of backfill: GROUT TO 3'

Type of riser: 2" PVC

Depth to top of seal: 12.5'

Type of seal: CHIPS

Depth to bottom of seal/ depth to top of sand pack: 14.5'

Type of sand pack: NOO

Depth to top of well screen: 15.5'

Type of well screen: 10 SLOT 2" PVC

Depth to bottom of well screen: 22.5'

Depth to tip of well: 22.5'

Depth to bottom of borehole: 23.5'

USED 1½ BAG OF NOO SAND
1 BAG OF CHIPS

BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

Project: SWEDEN-3 CHAPMAN LANDFILL

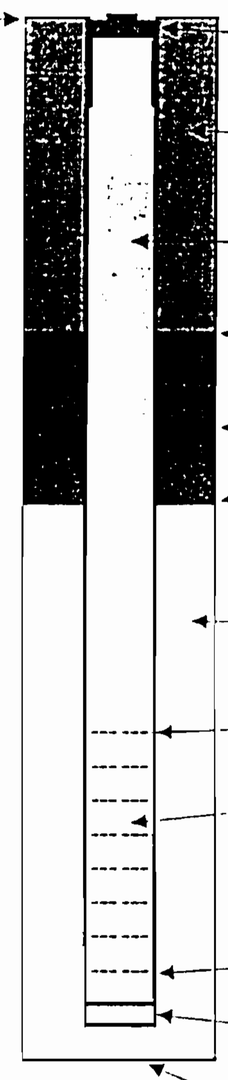
Well Number: MW19S

Date Started: 6/4/99

File No: 99-140

Date Completed: 6/4/99

Ground elevation



Type of protective casing: 6" STEEL

Type of backfill: SCRAHET

Type of riser: 2" PVC

Depth to top of seal: 3'

Type of seal: CHIPS

Depth to bottom of seal/ depth to top of sand pack: 5'

Type of sand pack: NOOSAND

Depth to top of well screen: 7'

Type of well screen: 10 SLOT 2" PVC

Depth to bottom of well screen: 11.5'

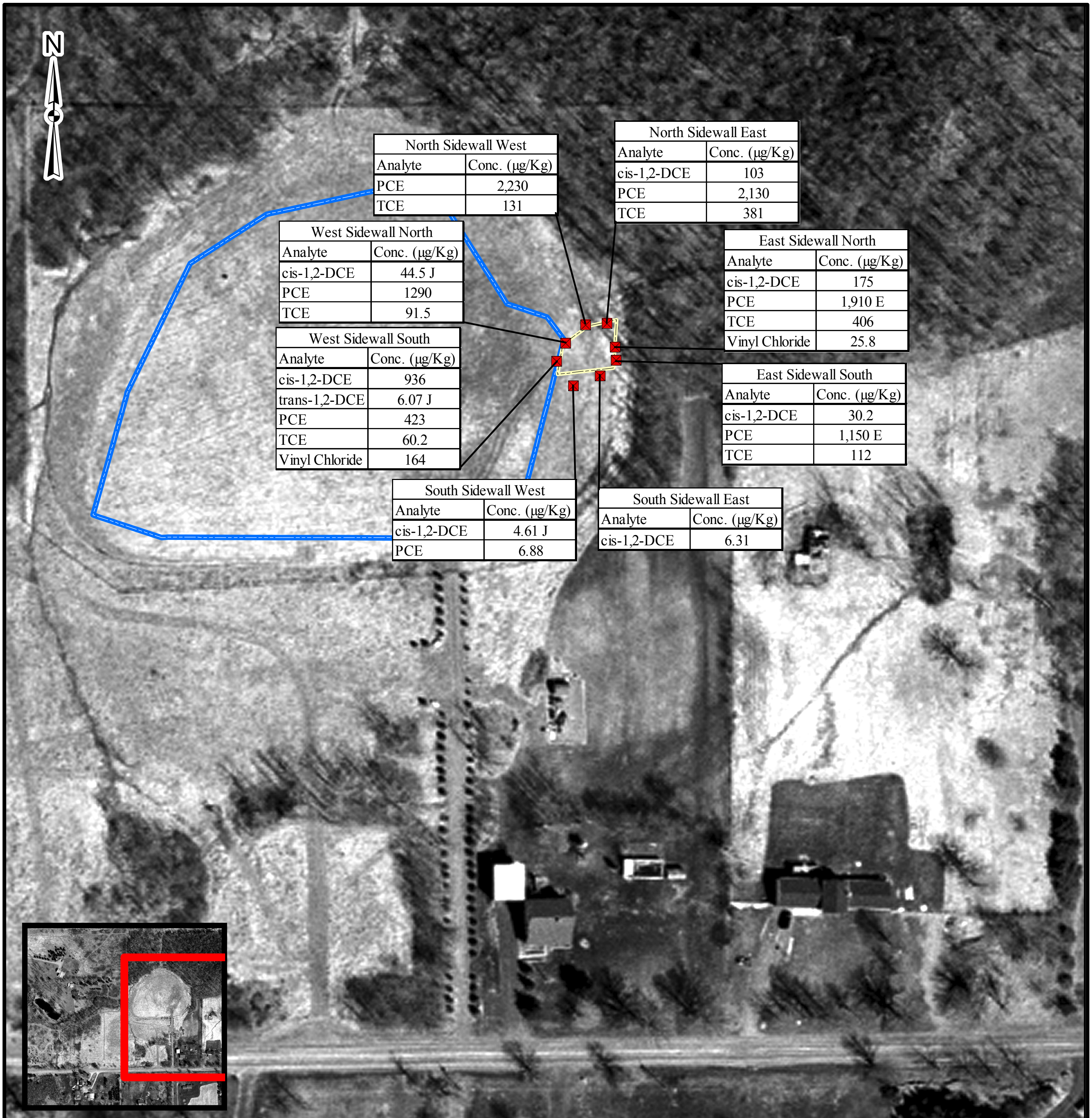
Depth to tip of well: 12'

Depth to bottom of borehole: 12.5'

USED 2½ BAGS OF NOOSAND
1 - CHIPS

APPENDIX E

FIGURE 3 FROM FER DEPICTING LIMITS OF 2010 EXCAVATION AND ENDPOINT SAMPLING LOCATIONS



North Sidewall West	
Analyte	Conc. (µg/Kg)
PCE	2,230
TCE	131

North Sidewall East	
Analyte	Conc. (µg/Kg)
cis-1,2-DCE	103
PCE	2,130
TCE	381

West Sidewall North	
Analyte	Conc. (µg/Kg)
cis-1,2-DCE	44.5 J
PCE	1290
TCE	91.5

East Sidewall North	
Analyte	Conc. (µg/Kg)
cis-1,2-DCE	175
PCE	1,910 E
TCE	406
Vinyl Chloride	25.8

West Sidewall South	
Analyte	Conc. (µg/Kg)
cis-1,2-DCE	936
trans-1,2-DCE	6.07 J
PCE	423
TCE	60.2
Vinyl Chloride	164

East Sidewall South	
Analyte	Conc. (µg/Kg)
cis-1,2-DCE	30.2
PCE	1,150 E
TCE	112

South Sidewall West	
Analyte	Conc. (µg/Kg)
cis-1,2-DCE	4.61 J
PCE	6.88

South Sidewall East	
Analyte	Conc. (µg/Kg)
cis-1,2-DCE	6.31

Legend

- Approximate Edge of Landfill
- Excavation Boundary
- Confirmatory Soil Sampling Location

Feet
0 25 50 100

Source: NYS Office of Cyber Security and Critical Infrastructure Coordination (CSCIC)

SWEDEN-3 CHAPMAN SITE (8-28-040A)
FINAL ENGINEERING REPORT
SWEDEN, NEW YORK

FIGURE 3
EXCAVATION AREA AND ENDPOINT SAMPLING LOCATIONS

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
SEF	MES	MES	SEF	AS SHOWN	SEPTEMBER 2010	14474.33	GIS/PROJECTS/ FIGURE7.MXD

APPENDIX F

EXCAVATION WORK PLAN

APPENDIX F – EXCAVATION WORK PLAN (EWP)

F-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 F-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 C.

Table F-1: Notifications*

Name	Contact Information
Robert Strang, Assistant Engineer NYSDEC Project Manager	(518) 402-8642 robert.strang@dec.ny.gov
Kelly Lewandowski NYSDEC Site Control	(518) 402-9553 kelly.lewandowski@dec.ny.gov
Christopher Mannes NYSDEC Region 7	(315) 426-7519 christopher.mannes@dec.ny.gov
Shaun J. Surani New York State Department of Health Bureau of Environmental Exposure Investigation	Phone: (518) 402-7860 shaun.surani@health.ny.gov
Stephanie Webb, Region 7 Citizen Participation Specialist; NYS Department of Environmental Conservation	Phone: (315) 426-7441 stephanie.webb@dec.ny.gov

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

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, any modifications to truck routes, and any work that may impact an engineering control;

- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;
- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix H of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

F-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a qualified environmental professional during all excavations into known or potentially contaminated material (remaining contamination) or a breach of the cover system. A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will perform the screening. Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Sections F-6 and F-7 of this Appendix.

F-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.

F-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State 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. A site utility stakeout will be completed for all utilities prior to any ground intrusive activities at 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. Material accumulated from the street cleaning and egress cleaning activities will be disposed off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations.

F-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 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.

F-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 6 NYCRR Part 360, 364 and 373) 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 project manager. Unregulated off-site management of materials from this site will not occur without formal NYSDEC project manager 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, (e.g., 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 transported off-site for disposal at a facility operating under the appropriate permit (360 permit, 373 permit or equivalent out of state approval) and authorized to accept the material based upon its classification.

F-7 MATERIALS REUSE ON-SITE

The qualified environmental professional as defined in 6 NYCRR part 375 will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material (i.e., contaminated) 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.

Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the site use criteria presented in NYSDEC DER-10 Appendix 5 – Allowable Constituent Levels for Imported Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances [October 2020 or date of current version, whichever is later] guidance values. Approvals for modifications to the analytical parameters must be obtained from the NYSDEC project manager prior to the sampling event.

Soil/fill material for reuse on-site will be segregated and staged as described in Sections F-2 and F-3 of this EWP. The anticipated size and location of stockpiles will be provided in the 15-day notification to the NYSDEC project manager. Stockpile locations will be based on the location of site excavation activities and proximity to nearby site features. Material reuse on-site will comply with requirements of NYSDEC DER-10 Section 5.4(e)4. Any modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC project manager.

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.

F-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 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.

F-9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities within the limits of the landfill area, the cover system will be restored in a manner that complies with the landfill closure design. The existing cover system is comprised of a minimum of a filter fabric layer, a 40-mil VFPE geomembrane layer, a geocomposite drainage layer topped with a 1.5 ft barrier protection layer, and a 6 in. vegetative soil layer A demarcation layer, consisting of orange snow fencing material, white geotextile or equivalent material, etc. will be installed for any excavation on the Site to provide a visual reference to the top of the new remaining contamination zone, the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this SMP. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP.

F-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional, as defined in 6 NYCRR Part 375, 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 6 NYCRR 375-6.7(d). Based on an evaluation of the land use and protection of groundwater, the resulting soil quality standards are listed in Table F-2. 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 project manager. 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.

Table F-2: Soil Quality Standards

Contaminant	Restricted Residential Use	Protection of Groundwater Use	Site Specific Soil Quality Standards
Metals			
Arsenic	16	16	16
Barium	400	820	400
Beryllium	72	47	47
Cadmium	4.3	7.5	4.3
Chromium, hexavalent [h]	110	19	19
Chromium, trivalent [h]	180	NS	180
Copper	270	1,720	270
Total Cyanide [h]	27	40	27
Lead	400	450	400
Manganese	2,000	2,000	2,000
Total Mercury	0.81	0.73	0.73
Nickel	310	130	130
Selenium	180	4	4
Silver	180	8.3	8.3
Zinc	10,000	2,480	2,480
PCBs/Pesticides			
2,4,5-TP Acid (Silvex)	100	3.8	3.8

Contaminant	Restricted Residential Use	Protection of Groundwater Use	Site Specific Soil Quality Standards
4,4'-DDE	8.9	17	8.9
4,4'-DDT	7.9	136	7.9
4,4'- DDD	13	14	13
Aldrin	0.097	0.19	0.19
alpha-BHC	0.48	0.02	0.02
beta-BHC	0.36	0.09	0.09
Chlordane (alpha)	4.2	2.9	2.9
delta-BHC	100	0.25	0.25
Dibenzofuran	59	210	59
Dieldrin	0.2	0.1	0.1
Endosulfan I	24	102	24
Endosulfan II	24	102	24
Endosulfan sulfate	24	1,000	24
Endrin	11	0.06	0.06
Heptachlor	2.1	0.38	0.38
Lindane	1.3	0.1	0.1
Polychlorinated biphenyls	1	3.2	1
Semivolatiles			
Acenaphthene	100	98	98
Acenapthylene	100	107	100
Anthracene	100	1,000	100
Benz(a)anthracene	1	1	1
Benzo(a)pyrene	1	22	1
Benzo(b)fluoranthene	1	1.7	1
Benzo(g,h,i)perylene	100	1,000	100
Benzo(k)fluoranthene	3.9	1.7	1.7
Chrysene	3.9	1	1
Dibenz(a,h)anthracene	0.33	1,000	0.33
Fluoranthene	100	1,000	100
Fluorene	100	386	100
Indeno(1,2,3-cd)pyrene	0.5	8.2	0.5
m-Cresol	100	0.33	0.33
Naphthalene	100	12	12
o-Cresol	100	0.33	0.33
p-Cresol	100	0.33	0.33
Pentachlorophenol	6.7	0.8	0.8
Phenanthrene	100	1,000	100
Phenol	100	0.33	0.33
Pyrene	100	1,000	100
Volatiles			
1,1,1-Trichloroethane	100	0.68	0.68
1,1-Dichloroethane	26	0.27	0.27
1,1-Dichloroethene	100	0.33	0.33
1,2-Dichlorobenzene	100	1.1	1.1
1,2-Dichloroethane	3.1	0.02	0.02
cis-1,2-Dichloroethene	100	0.25	0.25
trans-1,2-Dichloroethene	100	0.19	0.19

Contaminant	Restricted Residential Use	Protection of Groundwater Use	Site Specific Soil Quality Standards
1,3-Dichlorobenzene	49	2.4	2.4
1,4-Dichlorobenzene	13	1.8	1.8
1,4-Dioxane	13	0.1	0.1
Acetone	100	0.05	0.05
Benzene	4.8	0.06	0.06
Butylbenzene	100	12	12
Carbon tetrachloride	2.4	0.76	0.76
Chlorobenzene	100	1.1	1.1
Chloroform	49	0.37	0.37
Ethylbenzene	41	1	1
Hexachlorobenzene	1.2	3.2	1.2
Methyl ethyl ketone	100	0.12	0.12
Methyl tert-butyl ether	100	0.93	0.93
Methylene chloride	100	0.05	0.05
n-Propylbenzene	100	3.9	3.9
sec-Butylbenzene	100	11	11
tert-Butylbenzene	100	5.9	5.9
Tetrachloroethene	19	1.3	1.3
Toluene	100	0.7	0.7
Trichloroethene	21	0.47	0.47
1,2,4-Trimethylbenzene	52	3.6	3.6
1,3,5- Trimethylbenzene	52	8.4	8.4
Vinyl chloride	0.9	0.02	0.02
Xylene (mixed)	100	1.6	1.6

F-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.

F-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. The NYSDEC project manager will be promptly notified of the discovery.

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, and PFAS), 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 project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

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.

F-13 COMMUNITY AIR MONITORING PLAN

Community air monitoring will be conducted for any ground intrusive activities in accordance with NYSDOH Generic Community Air Monitoring Plan (Appendix 1A of DER-10). All work plans for any intrusive activities must include a site-specific community air monitoring plan (CAMP), to address community health and safety which identifies measures and/or actions to ensure that the public living and working near the site as well as employees or visitors to any facility located on the site are protected from exposure to site contaminants during intrusive activities. Air monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) will be accomplished at the upwind and at least two downwind perimeter locations to document real time levels of contaminants which might be moving off-site.

<u>Major Vapor Emission</u>

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

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 Health and Safety Officer (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 photoionization 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 Field Operations Manager (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.

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 provided as Exhibit 6 of the Generic Health and Safety Plan in Appendix F of this SMP:

- 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.

F-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.

F-15 DUST CONTROL PLAN

Particulate monitoring must be conducted according to the site specific CAMP requirements provided in Section F-13. If particulate levels at the site exceed the thresholds listed in the CAMP guidance or if airborne dust is observed on the site or leaving the site, the dust suppression techniques listed below will be employed. The remedial party will also take measures listed below to prevent dust production on the site.

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.

F-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 G

RESPONSIBILITY OFOWNER AND REMEDIAL PARTY

Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for the Sweden-3 Chapman site (the "Site"), number 828040A, are divided between the site owner(s) and a Remedial Party, as defined below. The owner(s) are currently listed as:

George III and Nancy Luce
6000 Redman Road
Brockport, New York 14420

Harold Polle and Barbara Hinchey
1338 Beadle Road
Brockport, New York 14420

Solely for the purposes of this document and based upon the facts related to this Site and the remedial program being carried out, the term Remedial Party ("RP") refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is:

NYSDEC
625 Broadway
Albany, New York 12233

Nothing on this page shall supersede the provisions of the Environmental Easement, Deed Restriction, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the site.

Site Owner's Responsibilities:

1) The owner shall follow the provisions of the SMP as they relate to future construction and excavation at the site.

2) In accordance with a periodic time frame determined by the NYSDEC, the owner shall periodically certify, in writing, that all Institutional Controls set forth in the Environmental Easement or Deed Restriction remain in place and continue to be complied with. The owner shall provide a written certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the site's Periodic Review Report (PRR) certification to the NYSDEC.

3) In the event the site is delisted, the owner remains bound by the Environmental Easement or Deed Restriction and shall submit, upon request by the NYSDEC, a written certification that the Environmental Easement or Deed Restriction is still in place and has been complied with.

4) The owner shall grant access to the site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

5) The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. If damage to the remedial components or vandalism is evident, the owner shall notify the site's RP and the NYSDEC in accordance with the timeframes indicated in Section 1-3 - Notifications of this SMP.

6) If some action or inaction by the owner adversely impacts the site, the owner must notify the site's RP and the NYSDEC in accordance with the time frame indicated in Section 1.3 - Notifications and coordinate the performance of necessary corrective actions with the RP.

7) The owner must notify the RP and the NYSDEC of any change in ownership of the site property (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the site property. 6 NYCRR Part contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 1.3 of the SMP. A change of use includes, but is not limited to, any activity that may increase direct human or environmental exposure (e.g., day care, school or park). A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) The RP remains ultimately responsible for maintaining the engineering controls.

9) In accordance with the tenant notification law, within 15 days of receipt, the owner must supply a copy of any vapor intrusion data, that is produced with respect to structures and that exceeds NYSDOH or OSHA guidelines on the site, whether produced by the NYSDEC, RP, or owner, to the tenants on the property. The owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

Remedial Party Responsibilities

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site.

2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.

3) Before accessing the site property to undertake a specific activity, the RP shall provide the owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.

4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the owner(s).

5) The RP shall notify the NYSDEC and the owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html .

6) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under Section 1.3 - Notifications of the SMP.

7) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.

8) Any change in use, change in ownership, change in site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the NYSDEC project manager to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

APPENDIX H

HEALTH AND SAFETY PLAN

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 Engineers and Architects

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

♦PW5246\DD04191101.DOC

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.

Bruce D. Groves.

(Bruce Groves, CIH)
ABIH No. Cert # 2224

HEALTH AND SAFETY PLAN

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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 Permissible 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 bergdorfii) 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 repellant; 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 ≤ 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/m^3 above BKGD	Implement dust suppression techniques to reduce dust levels
Respirable dust >150 ug/m^3	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 then 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 (l) 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 complete by each person working on the subject work-site. Upon completion, this form is to be given to the HSO.

JOB NUMBER: 3150-45U

CLIENT/PROJECT: NYSDEC / Sweden-3 Chapman Site 3150 – 45U

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

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

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 (PRCS) 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 PRCS for testing, maintenance, inspection, or repair activities.

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:

- 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

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 %)

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 by 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.

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).

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

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)

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,

- 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 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.

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

- 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

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.

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.

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

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. <u>The HSC or his/hers designee will maintain a master list of all lockout padlocks and keys.</u>

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.

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.

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.

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 in 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.

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:	Sweden-3 Chapman Site 3150 – 45U
Address:	1338 Beadle Road; Brockport, New York
Telephone:	N/A
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:	Strong West Emergency Room,
Address:	156 West Avenue; Brockport, NY 14420

EXHIBIT 11 (continued)

SITE-SPECIFIC INFORMATION

Emergency
Telephone: (315) 824-1100/911

Directions: **See attach a route to hospital**

Emergency Telephones

Agent/Facility	Telephone	Emergency No.
EMS - Ambulance		911
Police Department		911
Fire Department		911
Hospital	(585) 758-1010	
Poison Control Center	1-800-222-1222	211

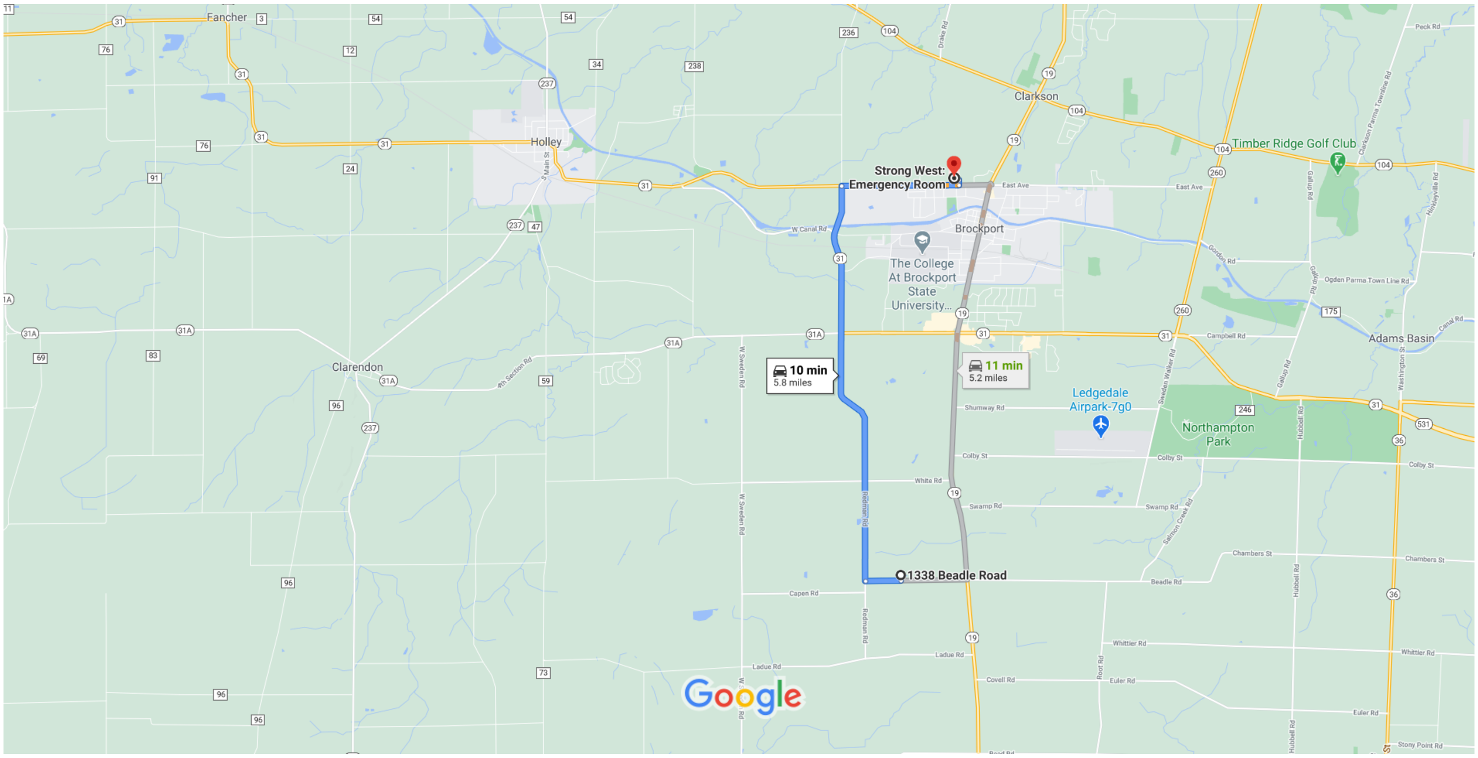
Additional site related information (may include special hazards, site control, waste storage and disposal, PPE, decon area location, special engineering controls, etc.).

Secure limits of work area and install traffic control/pedestrian protection devices per the Technical Scope of Work, work permits, and applicable federal, state and local laws, rules and regulations.

Google Maps

1338 Beadle Rd, Brockport, NY 14420 to Strong West: Emergency Room

Drive 5.8 miles, 10 min



Map data ©2021 1 mi

1338 Beadle Rd

Brockport, NY 14420

1. Head west on Beadle Rd toward Redman Rd

   0.4 mi

2. Turn right onto Redman Rd

   4.2 mi

3. Turn right onto West Ave

   1.2 mi

4. Turn left

   282 ft

5. Turn left

   Destination will be on the left

   305 ft

Strong West: Emergency Room

156 West Ave, Brockport, NY 14420

APPENDIX I

QUALITY ASSURANCE PROJECT PLAN

New York State Department of Environmental Conservation

Generic Quality Assurance Project Plan

Prepared for:

New York State Department of Environmental Conservation

Standby Engineering Contract

April 2011

Prepared by:

D&B Engineers and Architects

GENERIC QUALITY ASSURANCE
PROJECT PLAN

Prepared for:

NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

Prepared by:

D&B/TRC JOINT VENTURE
WOODBURY, NEW YORK

APRIL 2011

GENERIC QUALITY ASSURANCE
PROJECT PLAN

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1.0 INTRODUCTION

The purpose of this Generic 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 Dvirka and Bartilucci Consulting Engineers (D&B)/TRC Engineers, Inc. (TRC) Joint Venture 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:

- Background soil sampling;
- Surface soil sampling;
- Exploratory test pits and subsurface soil sampling;
- Soil borings and subsurface soil sampling;
- Soil vapor survey;
- 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 air sampling;
- Indoor air sampling;
- Vapor Intrusion Sampling;
- Wipe 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;
- Lead field analysis utilizing an x-ray fluorescence (XRF) analyzer; and,
- Investigative-derived waste characterization and handling.

If any of the collection procedures, sample analysis or sample matrices are modified for a specific site investigation, detailed information regarding the changes and rationale for the change will be provided in a Site-Specific QAPP.

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

Parameter	Sample Matrix	CRDL*	Estimated Accuracy	Accuracy Protocol**	Estimated Precision	Precision Protocol**
Volatile Organics	Liquid Solid	10 10	0.87 - 1.18 ug/l	Vol. IV, Part XIX, Method 8260, Table 7	0.11 - 0.84 ug/l	Vol. IV, Part XIX, Method 8260, Table 7
Base Neutrals	Liquid Solid	10-50 330-1600	0.29 - 1.23 ug/l	Vol. IV, Part XIX, Method 8270, Table 7	0.13 - 1.05 ug/l	Vol. IV, Part XIX, Method 8270, Table 7
Acid Extractables	Liquid Solid	10-50 330-1600	0.29 - 1.23 ug/l	Vol. IV, Part XIX, Method 8270, Table 7	0.13 - 1.055 ug/l	Vol. IV, Part XIX, Method 8270, Table 7
Pesticides/PCBs	Liquid Solid	0.5-1.0 8.0-160	0.66 - 0.97 ug/l	Vol. IV, Part XIX, Method 8081/8082, Table 4	0.15 - 0.47 ug/l	Vol. IV, Part XIX, Method 8081/8082, Table 4
Metals	Liquid Solid	0.2-5000 0.2-5000	--	Vol. III, Part XIV, Method 200.7*** Table 4	--	Vol. III, Part XIV, Method 200.7*** Table 4
Cyanide	Liquid Solid	10 10	85% - 102% of recovery	Vol. III, Part XV, Method 335.2, Subpart 10	±0.005 - +0.094 mg/l	Vol. III, Part XV, Method 335.2, Subpart 10

*Contract Required Detection Limits - units are ug/l for liquid samples, ug/kg for solid samples.
** Reference: NYSDEC 7/05 ASP.
***If trace ICP is not used, then SW-846 Methods for:

Metal	Method
Selenium	7740
Lead	7421
Thallium	7841
Mercury	7470
Arsenic	7060

Table 2-1 (continued)

DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION, ACCURACY, AND COMPLETENESS

Matrix/Parameter	Precision (%)	Accuracy (%)
Soil/Sediment		
VOCs[(a)]	See Table 2-1a	See Table 2-1a
Extractables[(a)]	See Table 2-1b	See Table 2-1b
Pesticides/PCBs	See Table 2-1c	See Table 2-1c
Metals[(b)(c)]	± 25	75-125
Water		
VOCs[(a)]	See Table 2-1a	See Table 2-1a
Extractables[(a)]	See Table 2-1b	See Table 2-1b
Pesticides/PCBs	See Table 2-1c	See Table 2-1c
Metals[(b)(c)]	± 25%	75-125

NOTES:

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

(b) Accuracy will be determined as percent recovery of matrix spikes when appropriate or the percent recovery of a QC sample if spiking is inappropriate. Precision will be determined as relative percent difference of matrix spike duplicate samples, or duplicate samples if spiking is inappropriate.

(c) Precision will be determined as the average percent difference for replicate samples. Accuracy will be determined as the percent recovery of matrix spike samples or laboratory control samples, as appropriate.

Source: 2005 NYSDEC ASP

Table 2-1a

DATA QUALITY REQUIREMENTS
ACCURACY REQUIREMENTS FOR VOCs

	Spike Recovery Limits (%)	
	Water	Low/Medium Soil
Surrogate Compound		
Toluene-d8	88-110	84-138
4-Bromofluorobenzene	86-115	59-113
1,2-Dichloroethane-d4	76-114	70-121
Matrix Spike Compound		
1,1-Dichloroethene	61-145	59-172
Trichloroethane	71-120	62-137
Chlorobenzene	75-130	60-133
Toluene	76-125	59-139
Benzene	76-127	66-142

Source: NYSDEC ASP

Table 2-1b

DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION AND ACCURACY
OF EXTRACTABLE COMPOUNDS
BASED UPON RECOVERY OF SURROGATE AND
MATRIX SPIKE COMPOUNDS*

Surrogate Compounds	Matrix	Precision	Accuracy %
d5-Nitrobenzene	Water	≤ 20	35-114
	Solid	≤ 25	23-120
2-Fluorobiphenyl	Water	≤ 20	43-116
	Solid	≤ 25	30-115
d14-Terphenyl	Water	≤ 20	33-141
	Solid	≤ 25	18-137
d5-Phenol	Water	≤ 20	10-110
	Solid	≤ 25	24-113
2-Fluorophenol	Water	≤ 20	21-110
	Solid	≤ 25	25-121
2,4,6-Tribromophenol	Water	≤ 20	10-123
	Solid	≤ 25	19-122
2-Chlorophenol-d4 (Advisory)	Water	≤ 20	33-110
	Solid	≤ 25	20-130
1,2-Dichlorobenzene-d4 (Advisory)	Water	≤ 20	16-110
	Solid	≤ 25	20-130

Table 2-1b (continued)

DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION AND ACCURACY
OF EXTRACTABLE COMPOUNDS
BASED UPON RECOVERY OF SURROGATE AND
MATRIX SPIKE COMPOUNDS*

	Matrix	Precision	Accuracy %
Matrix Spike Compounds			
1,2,4-Trichlorobenzene	Water	≤ 20	39-98
	Solid	≤ 25	38-107
Acenaphthene	Water	≤ 20	46-118
	Solid	≤ 25	31-137
2,4-Dinitrotoluene	Water	≤ 20	24-96
	Solid	≤ 25	28-89
Pyrene	Water	≤ 20	26-127
	Solid	≤ 25	35-142
N-Nitroso-Di-n-Propylamine	Water	≤ 20	41-116
	Solid	≤ 25	41-126
1,4-Dichlorobenzene	Water	≤ 20	36-97
	Solid	≤ 25	28-104
Pentachlorophenol	Water	≤ 20	9-103
	Solid	≤ 25	17-109
Phenol	Water	≤ 20	12-110
	Solid	≤ 25	26-90
2-Chlorophenol	Water	≤ 20	27-123
	Solid	≤ 25	25-102

Table 2-1b (continued)

DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION AND ACCURACY
OF EXTRACTABLE COMPOUNDS
BASED UPON RECOVERY OF SURROGATE AND
MATRIX SPIKE COMPOUNDS*

	Matrix	Precision	Accuracy %
Matrix Spike Compounds (continued)			
4-Chloro-3-methylphenol	Water	≤ 20	23-97
	Solid	≤ 25	26-103
4-Nitrophenol	Water	≤ 20	10-80
	Solid	≤ 25	11-114

* Accuracy will be determined as percent recovery of these compounds. Precision will be estimated as the relative standard deviation of the percent recoveries per matrix.

Source: NYSDEC ASP

Table 2-1c

ADVISORY RECOVERY LIMITS
SURROGATE AND MATRIX SPIKE COMPOUNDS
FOR PESTICIDES/PCBs*

	Advisory Recovery Limits (%)	
	Water	Soil/Sediment
Surrogate Compound		
Decachlorobiphenyl	60-150	60-150
Tetrachloro-m-xylene	60-150	60-150
Matrix Spike Compound		
Lindane	56-123	46-127
Heptachlor	40-131	35-130
Aldrin	40-120	34-132
Dieldrin	52-126	31-134
Endrin	56-121	42-139
4,4'-DDT	38-127	23-134

*Samples do not have to be reanalyzed if these recovery limits are not met.

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.
Surface and Subsurface Soil, Sediment and Sludge	NYSDEC 6 NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives, effective December 14, 2006.
	AND
	NYSDEC Commissioner Policy CP-51 on Soil Cleanup Guidance, effective December 3, 2010.
Air	NYSDEC DAR-1, Guidelines for the Control of Toxic Ambient Air Contaminants, dated November 1997* and Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York dated October 2006.

* Including Complete and HAP Listings, AGCs, SGCs and Air Quality Standards for the DAR-1 Software Program.

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 Plan, 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:

- Soil Vapor - Samples will be collected from decontaminated stainless steel or dedicated tubing soil probes after the soil vapor has reached equilibrium. Samples will be collected using a certified clean Summa canister with dedicated regulator and polyethylene tubing. See Section 6.3, Soil Vapor Collection Procedures.

- Surface Soil - Samples will be collected at a depth of 0-6 inches using a dedicated polystyrene scoop or sterile wooden tongue depressor.

- Concrete Chip – Samples will be collected at a depth of 0-2 inches using a decontaminated chisel.

- Subsurface Soil (Test Pit) - Samples will be collected from the center of the decontaminated bucket of the backhoe using a dedicated scoop or sterile wooden tongue depressor.

- Subsurface Soil (Monitoring Well/Soil Boring) - Samples will be collected using a decontaminated steel split spoon sampler during monitoring well or soil boring construction.

- Subsurface Soil (Probe) - Samples will be collected using a decontaminated screen point sampler and dedicated acetate tube liner.

- Sediment/Sludge (Dry Well/Drainage System) - Samples will be collected from the center of the dry well, wastewater disposal/sanitary system, or catch basin and storm drain (if possible) after the drainage/storm water sample is obtained in order not to introduce sediment into the water column. Samples will be collected utilizing a decontaminated long handle scoop (if possible) or from a soil probe or split spoon sampler.

- Wastewater/Drainage Water - Samples will be collected from the center of the wastewater disposal/sanitary system (if possible) and at a depth of 6 inches below the surface of standing water (if possible) using a dedicated disposable bailer or decontaminated long handle scoop.

- Storm Water - Samples will be collected from the center of the drainage system or storm drain (if possible) at a depth of 6 inches below the surface of standing water (if possible) using a dedicated polyethylene bailer or decontaminated polyethylene scoop.

- Groundwater (Probe) - Samples will be collected immediately upon installation of the probe using dedicated tubing equipped with a bottom check valve.

- Groundwater (Hydropunch) - Samples will be collected immediately upon installation of the hydropunch screen using a dedicated small diameter bailer or hydropunch sampler.

- Groundwater (Monitoring Well) - 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.

- Water Supply - Samples will be collected from the water supply wells, from an accessible point prior to any treatment systems (if possible) and will be collected directly into the sample container.

- Air (Ambient/Indoor)- Samples will be collected using a certified clean Summa canister equipped with a dedicated flow regulator.

- Asbestos – Bulk samples of building materials that are characterized during field inspection as suspect asbestos-containing materials (ACMs) will be collected utilizing decontaminated stainless steel tools (i.e., chisel, wire snips, scissors, hatchet, crack hammer, sledge hammer, etc.) from sampling points that are pre-moistened with a light mist of amended water and placed into zipper-sealed plastic bags.

- Paint Chip – Paint chip samples will be collected utilizing a decontaminated chisel /scraper from a sampling point that has been pre-measured utilizing the appropriate template and placed into a zipper-sealed plastic bag or clean sample container.

- Wipes – Wipe samples will be collected from selected surfaces utilizing an appropriate wipe (gauze, ghost wipe etc.) moistened with the media designated solvent (i.e. hexane). The samples will be collected from a location which has been pre-measured using a template and the wipe placed in a clean sample container.

- Equipment Calibration - Field equipment used for air monitoring will be calibrated daily before use according to the manufacturer's procedures.

- Equipment Decontamination – Non-dedicated sampling equipment will be decontaminated prior to use at each location according to the procedures described in Section 7.0 of this QAPP Plan.

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.

- Soil Vapor - Soil vapor samples will be collected during soil vapor surveys or subslab sampling programs to locate/confirm the source and extent of contamination on-site.
- Surface Soil - Surface soil samples will be collected on-site to determine the nature and extent of on-site surface soil contamination.
- Subsurface Soil - Subsurface soil samples will be collected during construction of monitoring wells and borings, test pits or at direct-push probe locations to determine the nature and extent of on-site subsurface soil contamination.
- Sediment/Sludge - Sediment and sludge samples will be collected from dry wells, storm drainage systems and/or wastewater disposal/sanitary systems located on-site to determine if collection/disposal systems are a source of contamination.
- Wastewater/Drainage Water - Waste water and drainage water samples will be collected from dry wells and/or wastewater disposal/sanitary systems located on-site to determine if these wells/systems are a source of contamination.
- Storm Water - Storm water samples will be collected from catch basins and storm drains located on-site to determine if the storm water system has been contaminated or is a source of contamination.
- 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.
- Water Supply - Water supply samples will be collected from private water supply systems to determine if these systems are impacted by on-site (or off-site) contamination.
- Air - Ambient air samples will be collected on-site, particularly in structures, to determine potential exposure to vapor emissions as a result of on-site waste disposal or contaminated soil and/or groundwater underlying the site.
- Asbestos – Bulk suspect ACM samples of building materials will be collected from the interior and exterior of site buildings and structures to determine the locations, quantities, friability and condition of any ACM present.

- Paint Chip – Paint chip samples will be collected from the interior and exterior of site buildings and structures to determine if lead based paint is present.

- Wipes – Wipe samples will be collected from the interior and exterior surfaces of site buildings and structures to evaluate surface contamination and/or the effectiveness of decontamination activities.

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 Analyte List (TAL) and 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 or soil) 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 soil, sediment, or surface water samples collected during site characterization (SC) or remedial investigation (RI) 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)
- TCL SVOCs plus 20 TICs;
- TCL Pesticides and Herbicides;
- TCL PCBs;
- Target Analyte List (TAL) metals;
- Cyanide;
- 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 Spill Guidance Manual; and,
- For investigations of non-petroleum releases, sample analysis will use methods appropriate for the stored or discharged material.

When sampling soil vapor, sub-slab vapor, crawl space air, indoor air or outdoor air, all samples will be analyzed by a NYSDOH ELAP approved laboratory in accordance with USEPA approved analytical methods utilizing the most current version of NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (Issued October 2006)

When sampling biota tissue, analysis of lipid content is required for all organochlorine compounds using USEPA Method 3540C Soxhlet extraction with a 1:1 hexane/acetone ratio or other approved method. The percent lipids will be quantified by the laboratory from the same aliquot as that used to quantify organochlorine concentrations.

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 Rinsate 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:

Table 4-1

SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time	Analytical Method
On-site/ Off-site	Grab	Ambient Air	Volatile Organics	Certified Clean Summa Canister	None	7 days	EPA/600/4-89/017 Method T015
On-site/ Off-site	Grab	Soil Vapor	Volatile Organics	Certified Clean Summa Canister	None	7 days	EPA/600/4-89/017 Method T015

*Holding time based upon VTSR (Verified Time of Sample Receipt).

Table 4-1 (continued)

SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Water Supply Wells, Monitoring Wells, and Probe and Hydropunch Locations	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 8260B
	Grab	Groundwater	Base Neutral and Acid Extractable Organics	Glass, amber/ 1L/2 ICHEM 300 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	7/05 NYSDEC ASP, Method 8270C
	Grab	Groundwater	Pesticides/PCBs	Glass, amber/ 1L/2 ICHEM 300 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	7/05 NYSDEC ASP, Method 8081A/8082
	Grab	Groundwater	Metals	Plastic/1L/1 ICHEM 300 series or equivalent	HNO_3 to pH <2 Cool to 4°C	26 days after VTSR for Hg analysis, 6 months after VTSR for analysis of others	7/05 NYSDEC ASP, Method 6010/7470A**
	Grab	Groundwater	Cyanide	Plastic/1L/1 ICHEM 300 series or equivalent	NaOH to pH >12 Cool to 4°C	12 days after VTSR for analysis	7/05 NYSDEC ASP, Method 9010B

VTSR - Verified Time of Sample Receipt at the laboratory

*Holding times based on the NYSDEC 7/05 ASP

**If Trace ICP is not used then SW-846 Methods for:

Metal	Method
Selenium	7740
Lead	7421
Thallium	7841
Mercury	7470
Arsenic	7060

Table 4-1 (continued)

SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Dry Wells, Storm Drainage Systems, and Wastewater Disposal/Sanitary Systems	Grab	Sediment/Sludge	Volatile Organics	Glass, clear/ 40 mL/2 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for analysis	7/05 NYSDEC ASP, Method 8260B
	Grab	Sediment/Sludge	Base Neutral and Acid Extractable Organics	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	7/05 NYSDEC ASP, Method 8270C
	Grab	Sediment/Sludge	Pesticides/PCBs	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	7/05 NYSDEC ASP, Method 8081A/8082
	Grab	Sediment/Sludge	Metals	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	26 days after VTSR for Hg analysis, 6 months after VTSR for analysis of others	7/05 NYSDEC ASP, Method 6010/7471A**
	Grab	Sediment/Sludge	Cyanide	Glass, amber/ ICHEM 200 series or equivalent	Cool to 4°C	12 days after VTSR for analysis	7/05 NYSDEC ASP, Method 9010B

VTSR - Verified Time of Sample Receipt at the laboratory

*Holding times based on the NYSDEC 7/05 ASP

**If Trace ICP is not used then SW-846 Methods for:

Metal	Method
Selenium	7740
Lead	7421
Thallium	7841
Mercury	7470
Arsenic	7060

Table 4-1 (continued)

SUMMARY OF MONITORING PARAMETERS

Sample Location	**Sample Type**	**Sample Matrix**	**Sample Fraction**	**Container Type/Size/No.**	**Sample Preservation**	**Maximum Holding Time***	**Analytical Method**
On-site Off-site Soil	Grab	Surface Soil	Volatile Organics	Glass, clear/ 40 mL/2 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for analysis	7/05 NYSDEC ASP, Method 8260B
	Grab	Surface Soil	Base Neutral and Acid Extractable Organics	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	7/05 NYSDEC ASP, Method 8270C
	Grab	Surface Soil	Pesticides/PCBs	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	7/05 NYSDEC ASP, Method 8081A/8082
	Grab	Surface Soil	Metals	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	26 days after VTSR for Hg analysis, 6 months after VTSR for analysis of others	7/05 NYSDEC ASP, Method 6010B/7471A**
	Grab	Surface Soil	Cyanide	Glass, amber/ ICHEM 200 series or equivalent	Cool to 4°C	12 days after VTSR for analysis	7/05 NYSDEC ASP, Method 9010B

VTSR - Verified Time of Sample Receipt at the laboratory

*Holding times based on the NYSDEC 7/05 ASP

**If Trace ICP is not used then SW-846 Methods for:

Metal	Method
Selenium	7740
Lead	7421
Thallium	7841
Mercury	7470
Arsenic	7060

Table 4-1 (continued)

SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Monitoring Wells Soil Borings, and Probe and Hydropunch Locations	Grab	Subsurface Soil	Volatile Organics	Glass, clear/ 40 mL/2 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for analysis	7/05 NYSDEC ASP, Method 8260B
	Grab	Subsurface Soil	Base Neutral and Acid Extractable Organics	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	7/05 NYSDEC ASP, Method 8270C
	Grab	Subsurface Soil	Pesticides/PCBs	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	7/05 NYSDEC ASP, Method 8081A/8082
	Grab	Subsurface Soil	Metals	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	26 days after VTSR for Hg analysis, 6 months after VTSR for analysis of others	7/05 NYSDEC ASP, Method 6010B/7471A**
	Grab	Subsurface Soil	Cyanide	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	12 days after VTSR for analysis	7/05 NYSDEC ASP, Method 9010B

VTSR - Verified Time of Sample Receipt at the laboratory

*Holding times based on the NYSDEC 7/05 ASP

**If Trace ICP is not used then SW-846 Methods for:

Metal	Method
Selenium	7740
Lead	7421
Thallium	7841
Mercury	7470
Arsenic	7060

Table 4-1 (continued)

SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Site	Trip Blank	Water	Volatile Organics	Glass, clear/ 40 mL/2 ICHEM 300 series or equivalent	Cool to 4°C	5 days after VTSR for analysis	7/05 NYSDEC ASP, Method 8260B
Site	Asbestos	Bulk Building Materials	Asbestos fibers	Resealable plastic zipper bags	None	None	NYSDOH Method 198.1 (friable materials) NYSDOH Method 198.6 (non-friable materials) NYSDOH Method 198.4 (non-friable confirmation)
Site	Lead Paint	Paint Chips	Lead	Resealable plastic zipper bags	None	6 months	USEPA SW-846 Method 3050B/6010B
Site	Lead	Wipe	Lead	Ghost Wipe/Gauze 4 oz/1 ICHEM 200 series or equivalent	None	6 months	USEPA SW-846 Method 3050B/6010B
Site	PCB	Wipe	PCB	Ghost Wipe/Gauze 4 oz/1 ICHEM 200 series or equivalent	None	6 months	USEPA SW-846 Method 8082B

VTSR - Verified Time of Sample Receipt at the laboratory

- 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.

4.6 Method Blanks/Holding Blanks

A method blank is an aliquot of laboratory water or soil 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. These may include but are not limited to: groundwater, wastewater, storm/drainage water, sediment/sludge, subsurface soil, surface soil, soil vapor and ambient air, concrete chips and/or cores, wipes. Sample locations will consist of monitoring wells, water supply wells, dry wells, wastewater disposal/sanitary systems, direct push probe locations, hydropunch locations, storm water drainage systems, soil borings, surface soils, test pits, soil vapor points and ambient air. Actual locations will be determined on a site-specific basis.

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.

When taking soil samples, an attempt will be made to maintain sample integrity by preserving its physical form and chemical composition to as great an extent as possible. An appropriate sampling device (i.e., decontaminated or dedicated equipment) will be utilized to transfer the sample into the sample container. The sample will reflect and contain a good representation of the matrix from which it was collected. The sample will be transferred into the sample container as quickly as possible, with no mixing, to ensure that the volatile fraction is not lost.

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

Environmental Media	Sample Location	Sample Point	Sample Depth	Equipment	Rationale	Sample Analysis
Soil Vapor	On-site or Off-site	Soil vapor survey point	3 feet below soil surface	Decontaminated or disposable soil vapor rods/ tubing, dedicated regulator and certified clean Summa canister	To determine subsurface contamination	TCL volatile parameters EPA 600/4-89/017 Method T015
Surface Soil	On-site or Off-site	Throughout site	0-6 inches below soil surface	Disposable polyethylene scoop and/or sterile wooden tongue depressor	To determine surface soil contamination	TCL +30 and TAL parameters + CN 2005 NYSDEC ASP
Subsurface Soil	On-site or Off-site	Test pit	Dependent on visual charac-teristics and total organic vapor field screening	Decontaminated backhoe bucket, disposable polyethylene scoop and sterile wooden tongue depressor	To determine subsurface soil contamination	TCL +30 and TAL parameters + CN 2005 NYSDEC ASP
Sediment/Sludge	On-site or Off-site	Dry well/catch basin/wastewater/ sanitary system/storm drain	0-6 inches below sediment surface	Decontaminated polyethylene scoop or split spoon sampler	To determine sediment contamination	TCL +30 and TAL parameters + CN 2005 NYSDEC ASP
Wastewater	On-site or Off-site	Wastewater/ Sanitary System	6 inches below water surface	Decontaminated long handle polyethylene scoop or polyethylene bailer	To determine drainage wastewater contamination	TCL +30 and TAL parameters + CN 2005 NYSDEC ASP
Drainage/Storm Water	On-site or Off-site	Dry well/catch basin/ storm drain	6 inches below water surface	Decontaminated long handle polyethylene scoop or polyethylene bailer	To determine storm water contamination	TCL +30 and TAL parameters + CN 2005 NYSDEC ASP

Table 5-1 (continued)

SUMMARY OF SAMPLING PROGRAM

Environmental Media	Sample Location	Sample Point	Sample Depth	Equipment	Rationale	Sample Analysis
Subsurface Soil	On-site or Off-site	Monitoring well borehole/soil boring	Dependent on visual charac-teristics and total organic vapor field screening	Auger, decontaminated split spoon and sterile wooden tongue depressor and decontaminated stainless steel tools	To determine subsurface soil contamination	TCL +30 and TAL parameters + CN 2005 NYSDEC ASP
Subsurface Soil	On-site or Off-site	Probe location	Dependent on visual charac-teristics and total organic vapor field screening	Decontaminated probe and polyethylene tube liner	To determine subsurface soil contamination	TCL +30 and TAL parameters + CN 2005 NYSDEC ASP
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	Hydropunch location	At surface of water in screen	Disposable polyethylene - small diameter bailer	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 +30 and TAL parameters + CN 2005 NYSDEC ASP
Water Supply	On-site or Off-site	Prior to treatment system, if possible, or from faucet	NA	Sample container directly after running water for 5 minutes	To determine water supply contamination	TCL +30 and TAL parameters + CN 2005 NYSDEC ASP
Air	On-site or Off-site	Ambient Air	Breathing Zone	Certified clean Summa canister and dedicated regulator	To determine air contamination and worker exposure	TCL VOC EPA 600/4-89/017 T015

Table 5-1 (continued)

SUMMARY OF SAMPLING PROGRAM

Environmental Media	Sample Location	Sample Point	Sample Depth	Equipment	Rationale	Sample Analysis
Air	On-site	Drilling and sample locations	In the breathing zone and at point of sample collection	Photoionization and/or flame ionization detector	To screen for air contamination	Total organic vapors
Building Materials	On-site	Building interior and exterior	Sampling of multi-layered building systems as determined by NYSDOL-licensed asbestos inspector	Decontaminated stainless steel tools	To determine asbestos fiber count	Asbestos Standard Methods
Painted Building Components	On-site	Building interior	Sampling of multi-layered painted Surfaces	Decontaminated stainless	To determine lead content in paint	Lead 2005 NYSDEC ASP
Building surfaces	On-site Lead/PCBs	Floors/walls	Surface	Pre-moistened wipe, template	To verify decontamination activities	Lead/PCB 2005 NYSDEC ASP

NA - Not applicable.

There will be several steps taken after the transfer of the soil or 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 paper work (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:
  - Soil Boring "SB"
  - Monitoring Well "MW"
  - Water Supply "WS"
  - Dry Well "DW"
  - Surface Soil "SS"
  - Hydropunch "H"
  - Probe "P"
  - Test Pit "TP"
  - Wetland "WET"
- Sample Matrix (as listed in NYSDEC EQuIS reference values):
  - AE – Vapor Extraction Well Effluent
  - AI – Indoor Ambient Air
  - AO – Outdoor ambient Air
  - AQ - Air Quality Control Matrix

- AS – Soil Vapor
- CA – Bottom Ash
- CF – Fly Ash Cinder
- DC – Drill Cuttings
- GE – Gaseous Effluent (Stack Gas)
- GL – Headspace of Liquid sample
- LD – Drilling Fluid
- LE – Liquid Emulsion
- LF – Floating/Free Product LNAPL
- LS - DNAPL
- SE - Sediment
- SF – Filter Sandpack
- SL – Sludge
- SN – Miscellaneous Solid Materials
- SO – Soil
- SS – Surface Soil
- SW – Swab or Wipe
- TA – Animal Tissue
- TP –Plant Tissue
- TQ – Tissue Quality Control Matrix
- U – Unknown
- WC – Drilling Water (for well construction)
- WD – Well Development Water
- WE – Estuary – Brackish Surface Water
- WG – Groundwater
- WH – Rinsate
- WI – Interstitial Water
- WL – Leachate
- WO – Ocean Water – Saline Surface Water
- WP – Drinking Water
- WQ - Water Quality Control Matrix
- WS – Surface Water
- WW – Waste Water
- WZ – Special Water Quality Control Matrix

- 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:

Site | Sample Location | QA/QC

HW-SB-SS-1-(5) - MS

Sample Matrix | Sample Number | Sample Depth

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 Soil Vapor

Sample protocols for the collection of soil vapor samples will consist of the following minimum procedures:

1. Be certain that the sample location is noted on Location Sketch (see Section 8.1).
2. Concrete coring may be required prior to advancing the vapor probes. Water will be applied to the coring to prevent dust generation.
3. Drive the decontaminated stainless steel probe with removable inner rod into the ground to the desired depth.
4. Seal the space between the probe rods and ground surface from the ambient air with plastic sheeting and bentonite, bees' wax or modeling clay.
5. The adequacy of the seal must be tested before and after sampling. Place a 5-gallon bucket over the probe rods and seal with plastic sheeting and bentonite, bees' wax or modeling clay. Fill interior of bucket with tracer gas (helium). Monitor probe with a helium gas detector. Readings of less than 10% are sufficient to verify a tight seal.
6. Connect regulator to Summa canister and verify canister vacuum (reading should be -20 to -33 inches Hg).
7. Connect new tubing to the probe and certified clean Summa canister. Open canister/regulator and keep open until pressure gauge reads <5 inches Hg. Samples should be collected at a rate of 0.2 L per minute for a period of 30 minutes.
8. Close valve on canister, disconnect tubing and remove regulator.
9. Record initial and final pressure on Chain of Custody.
10. Extract probe from the ground and decontaminate according to the procedures in Section 6.0.

5.4 Soil (Surface)

Sampling protocols for the collection of surface soil samples will consist of the following minimum procedures:

1. Be certain that the sample location is noted on Location Sketch (see Section 8.1).

2. If a dedicated sampling device is not used, be certain that the sampling equipment has been decontaminated utilizing the procedures outlined in Section 6.0.

3. Remove laboratory precleaned sample container from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 8.0).

4. .At the sample location, clear surface debris (e.g., vegetation, rocks, twigs, etc.). Collect sample 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.Collect an adequate amount of soil using a decontaminated or disposable scoop, and/or sterile wooden tongue depressor. Transfer the sample directly into the sample container.

5. Return the sample container to the cooler.

6. If reusable, decontaminate the sampling equipment according to the procedures described in Section 6.0.

7. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

5.5 Sediment

Sediment samples may be collected from a variety of structures and physical features, including but not limited to, the following:

- Surface water bodies such as rivers, natural or man-made streams, lakes, ponds, or wetlands;
- Swales, gullies, culverts, and troughs;
- Catch basins;
- Dry Wells;
- Storm drains;
- Floor drains or associated collection systems;

- Plumbing and piping;
- Trenches;
- Gutters and roof leader discharge points;
- Sumps;
- Storm sewer and spill containment collection systems;
- Boiler and compressor discharges;
- Surface impoundments; and,
- Discharge and waste disposal systems (i.e., above-ground treatment systems, and underground wastewater treatment systems such as tanks, septic tanks, separators, neutralization pits, septic leach fields, cesspools, seepage pits, and dry wells).

Sampling protocols for the collection of sediment samples will consist of the following minimum procedures:

1. Be certain that any nondisposable sampling equipment (e.g., long handle polyethylene scoop, stainless steel tools) has been decontaminated utilizing the procedures outlined in Section 6.0.

2. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form.

3. Insert scoop slowly at 0-6 inches into the sediment and remove sample. Sample sediment only after surface water samples have been taken to avoid introduction of sediment into the water.

4. If depth to sediment is greater than the reach of a long handled scoop, the sample may need to be collected utilizing the soil probe or split spoon sampler (see Sections 5.8 and 5.9, respectively).

5. With a sterile wooden tongue depressor, decontaminated stainless steel tool or disposable polyethylene scoop, transfer the sample into the open sample container taking care not to spill sample on the outside of the container or overfill container and replace cover on the sample container.

6. Return sample container to sample cooler.

7. If necessary, decontaminate the sampling equipment according to the procedures outlined in Section 6.0.

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).

5.6 Drainage Water/Wastewater/Storm Water

Drainage water, wastewater and storm water samples may be collected from a variety of structures and physical features, including but not limited to, the following:

- Swales, gullies, culverts, and troughs;
- Dry Wells;
- Catch basins;
- Storm drains;
- Floor drains or associated collection systems;
- Plumbing and piping;
- Trenches;
- Gutters and roof leader discharge points;
- Sumps;
- Storm sewer and spill containment collection systems;
- Boiler and compressor discharges;
- Surface impoundments; and,
- Discharge and waste disposal systems (i.e., above-ground treatment systems, and underground wastewater treatment systems such as tanks, septic tanks, separators, neutralization pits, septic leach fields, cesspools, seepage pits, and dry wells).

Sampling protocols for the collection of drainage water/wastewater/storm water samples will consist of the following minimum procedures:

1. Be certain sample location is noted on Location Sketch (see Section 8.1).

2. Be certain that all nondisposable sampling equipment (e.g., long handled polyethylene scoop, stainless steel tool) has been decontaminated utilizing the procedures outlined in Section 6.0.

3. Remove laboratory precleaned sample bottles from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form.

4. Lower the scoop or disposable bailer slowly into the water making sure that the sample is taken just below the surface of the water (or at the water/air interface if there is a sheen present) and raise the sample out of the water. Sample water before sediment to avoid introduction of sediment into the water.

5. Gently pour the sample into the sample container, taking care not to spill the sample on the outside of the container or overfill, and replace cover on the sample container. For volatile organic samples, make sure that there are no air bubbles in the sample vial after it has been capped. This is accomplished 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 the bubbles appear, reopen the vial, remove septum and add more sample (or resample). Replace septum, recap and check for bubbles. Continue until vial is bubble-free.

6. Return sample container to sample cooler. If sample is obtained directly with a sample container, dry the exterior of the container before placing into cooler.

7. If reusable, decontaminate the sampling equipment according to the procedures outlined in Section 6.0.

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).

5.7 Soil (Test Pit)

Test pit excavation will be conducted using a backhoe or excavator. Sampling protocols for the collection of subsurface soil samples from test pit excavations will consist of the following minimum procedures:

1. Be certain that the sample location is noted on Location Sketch (see Section 8.1).

2. Be certain that the sampling equipment, including the backhoe/excavator bucket, is decontaminated utilizing the procedures outlined in Section 6.0.

3. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form.

4. Set aside top 2 feet of soil.

5. Lower the bucket into the test pit and remove soil/waste material.

6. Immediately upon retrieval of the soil/waste material, obtain an organic vapor measurement with a PID or FID.

7. Depending upon the organic vapor measurement, odors and visual characteristics,obtain a soil sample from the backhoe bucket with a disposable or decontaminated scoop and/or sterile wooden tongue depressor, place into the open sample containers and replace the container covers.

8. Fill out Test Pit Log Form, including a description of soil/waste with location, depth and material sampled.

9. Return the sample container to the cooler.

10. Backfill test pit using the top 2 feet of soil that was set aside as the top layer.

11. If reusable, decontaminate the sampling equipment according to the procedures described in Section 6.0.

12. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

5.8 Soil (Probe)

Sampling protocols for the collection of subsurface soil samples from hydraulic direct-push sampling probes will consist of the following minimum procedures:

1. Be certain that the sample location is noted on Location Sketch (see Section 8.1).

2. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form.

3. Drive the probe to the desired sampling depth.

4. Retrieve the soil probe and immediately after opening it, obtain an organic vapor measurement with a FID or PID.

5. Remove a sample aliquot from the soil probe using a disposable scoop, decontaminated stainless steel tool or sterile tongue depressor, place into the open sample container and replace the container cover. If the NYSDEC requests that VOC's be collected utilizing the Encore sampling method than the VOC fraction will be collected immediately from the probe using the Encore sampling method in accordance with USEPA Method 5035. The remaining soil fraction will be homogenized prior to collecting the samples for the remaining parameters. Remove a sample aliquot from the soil probe using a disposable scoop or sterile wooden tongue depressor, place into the open sample container and replace the container cover. Sample container shall be filled in the following order after the collection of the soil fraction for VOC analysis; SVOCs, pesticides/PCBs, metals and cyanide.

6. Return the sample container to the cooler.

7. If reusable, decontaminate the sampling equipment according to the procedures described in Section 6.0.

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).

5.9 Soil (Borehole, Split Spoon)

Sampling protocols for the collection of subsurface soil samples from split spoons in soil borings will consist of the following minimum procedures:

1. Be certain that the sample location is noted on Location Sketch (see Section 8.1).

2. Be certain that the sampling equipment (split spoon) has been decontaminated utilizing the procedures outlined in Section 6.0.

3. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 8.0).

4. Drill into the soil to the desired depth and drive the split spoon sampler.

5. Retrieve the split spoon and immediately after opening the split spoon, obtain an organic vapor measurement with a PID or FID and fill out Boring Log Form (see Section 8.0).

6. Remove a sample aliquot from the soil probe using a disposable scoop, decontaminated stainless steel tool or sterile tongue depressor, place into the open sample container and replace the container cover. If the NYSDEC requests that VOC's be collected utilizing the Encore sampling method than the VOC fraction will

be collected immediately from the probe using the Encore sampling method in accordance with USEPA Method 5035. The remaining soil fraction will be homogenized prior to collecting the samples for the remaining parameters. Remove a sample aliquot from the soil probe using a disposable scoop or sterile wooden tongue depressor, place into the open sample container and replace the container cover. Sample container shall be filled in the following order after the collection of the soil fraction for VOC analysis; SVOCs, pesticides/PCBs, metals and cyanide.

7. Return the sample container to the cooler.

8. If reusable, decontaminate the sampling equipment according to the procedures described in Section 6.0.

9. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

5.10 Soil (Immunoassay Colorimetric Field Quantification of Analytes)

On-site field screening analysis, when deemed appropriate, will utilize methanol extraction of soils, and immunoassay colorimetric quantification of selected analytes to provide real-time screening results. The selected analytes may include, but are 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 kits produce a field analytical system capable of detecting very low levels of BTEX/Naphthalene, PAHs, and PCBs. Specific sample detection limits are provided with instructions supplied by Strategic Diagnostics, Inc. that are specific for each analysis. Site-specific sampling locations will be provided in the Site-Specific Work Plan.

The standard protocols for conducting on-site field screening utilizing RaPID Assay field test kits should strictly adhere to manufacturer’s specification/instructions.

5.11 Groundwater (Probe)

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

1. Be certain sample location is noted on Location Sketch (see Section 8.1).
2. 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.
3. Obtain a sample by using dedicated polyethylene tubing equipped with a bottom check valve.
4. Gently pour the sample into the sample container taking care not to spill on the outside of the container or overfill container and replace cover on the sample container. Samples for volatile organic analyses will have no air space in the sample vial prior to sealing. This is accomplished 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.
5. After sample collection, obtain field measurements including pH, conductivity, temperature and turbidity.
6. If a sample is to be collected for metals analysis, the turbidity must be less than 50 NTUs. If the turbidity cannot be reduced to less than 50 NTUs, the sample will be filtered in the field or by the laboratory. Both filtered (soluble metals) and unfiltered (total metals) samples will be analyzed.
7. Return sample containers to sample cooler.
8. Place all disposable personal protective equipment and disposal sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

5.12 Groundwater (Hydropunch)

Sampling protocols for the collection of groundwater samples from hydropunch equipment will consist of the following minimum procedures:

1. Be certain sample location is noted on Location Sketch (see Section 8.1).

2. Using hydropunch equipment drive/punch screen to desired depth.

3. Remove inner sleeve and lower down decontaminated hydropunch bailer or remove filled hydropunch sampler from borehole.

4. Remove the laboratory precleaned sample container from the sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody form.

5. Obtain a volatile organic sample by using a hydropunch bailer or from hydropunch sampler. Gently pour the sample into the sample container taking care not to spill on the outside of the container or overfill container and replace cover on the sample container. Samples for volatile organic analyses will have no air space in the sample vial prior to sealing. This is accomplished 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.

6. Obtain a sample and analyze for field parameters (pH, conductivity, temperature and turbidity).

7. Turbidity must be less than 50 NTUs prior to collection of a sample for metals analysis. If the turbidity of the sample is greater than 50 NTUs, the sample will be filtered in the field or by the laboratory. Both filtered (dissolved metals) and unfiltered (total metals) samples will be analyzed.

8. Collect remaining samples. Gently pour the sample into the sample container, taking care not to spill water on the outside of the container or overfill the container. Replace cover on the sample container.

9. Return sample container to sample cooler.

10. Punch down to next depth and repeat items 3 through 9.

11. Decontaminate hydropunch equipment as described in Section 6.0.

12. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

5.13 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).

5.14 Private Water Supply

Sampling protocols for the collection of groundwater samples from private potable water supply wells will consist of the following minimum procedures:

1. Fill out Water Supply Information Record (see Section 8.0).
2. Remove the laboratory precleaned sample container from the sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody form.
3. If there is a treatment system, identify a location to sample that is ahead of any in-line water treatment unit, if possible. If samples are to be collected from a faucet, disassemble any screens and/or purification system that may be on the faucet, if possible. Note these conditions on the Sample Information Record Form.
4. Allow the cold water to run for approximately five minutes to adequately flush the line before sampling.
5. Collect the cold water directly in the sample container, taking care not to spill on the outside of the container or overfill container, and replace cover on the sample container. Samples for volatile organic analyses will have no air space in the sample vial prior to sealing. This is accomplished 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.
6. Return sample to sample cooler.
7. Reattach water line that may have been disconnected ahead of treatment devise and reassemble screens and/or treatment systems that may have been removed.

5.15 Ambient Air (Summa Canister)

Sampling protocols for the collection of air samples in summa canisters will consist of the following minimum procedures:

1. Be certain sample location is noted on Location Sketch (see Section 8.1).

2. Verify vacuum of Summa canister and connect dedicated regulator. Regulator should be set at a flow rate of <0.2L/min.

3. Label canister and fill out Sample Information Record and Chain of Custody Form.

4. Set canister in breathing zone, approximately 3-4 feet above ground surface.

5. Open valve on canister and monitor the canister vacuum rate at half-hour intervals during the duration of sampling.

6. Close valve on canister and disconnect the regulator.

7. Place canister in shipping containers.

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).

5.16 Methane Gas Survey

Protocols for conducting methane gas surveys will consist of the following minimum procedures:

1. Be certain that the sample location is noted on Location Sketch.

2. Drive the decontaminated stainless steel probe with removable inner rod into the ground to the desired depth.

3. Remove inner rod and immediately replace with a stainless steel cap equipped with a sampling port.

4. Connect new silicon tubing to the probe and the methane gas meter. Turn on meter.

5. Record initial, highest and steady-state methane readings.

6. Shut off meter and disconnect tubing.

7. Extract probe from the ground and decontaminate according to the procedures described in Section 6.0.

5.17 Radiological Survey

Protocols for conducting radiological surveys will consist of the following minimum procedures:

1. Lay out transect lines/grid in area to be surveyed using site-specific spacing. Record location on Location Sketch.
2. Turn on calibrated radiation meter (Geiger counter) and evaluate meter operation using test source.
3. Record radiation reading at background location.
4. Slowly walk along transect/grid lines with radiation meter in front, moving meter probe from side to side during traverses. Note radiation readings along traverses, including both areas higher and lower than the background reading. Readings significantly below background levels may indicate that the background location does not represent background conditions.
5. Mark any areas of elevated radiation readings in field notebook or on Location Sketch, utilizing transect/grid point designations or other reference points, and/or mark on ground utilizing marker flags, marker stakes or paint. DO NOT PROCEED PAST ANY LOCATION WITH A RADIATION READING EXCEEDING TWO TIMES BACKGROUND LEVELS UNLESS A QUALIFIED HEALTH PHYSICIST ADVISES OTHERWISE. If possible, delineate the areas of elevated radiation readings by approaching these areas from multiple directions.
6. If warranted, consult with a qualified health physicist regarding confirmation of radiation results, source determination and sample collection.

5.18 Asbestos Survey

An asbestos survey may be completed in order to determine the presence, extents and condition of ACM that may be present within buildings. The asbestos survey will be performed 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 USEPA and NYSDOL Industrial Code Rule 56 (ICR-56). Asbestos bulk sampling protocols will be performed in accordance with ICR-56 protocols for multi-layered building systems and materials and utilizing the following sampling methodologies:

- Prior to collecting samples of suspect ACMs, the Inspector shall ensure that the required personal protective equipment (PPE; such as respirator, gloves, etc.), lagging materials or an approved encapsulant is at hand and ready for use in repairing surfaces disturbed during the collection process;

- The Inspector will collect a bulk sample consisting of a few grams of the suspect ACM in a resealable, zipper plastic bag for laboratory submittal;

- If the material being sampled is friable in nature (i.e., pipe lag insulation, spray-on fireproofing, plaster/spackling finishes, etc.), the immediate area surrounding the point of sample collection will be sprayed with a light mist of amended water. Non-friable materials rendered friable during the sample collection process will also be sprayed with a light mist of amended water;

- Where possible, sample collection will be performed adjacent to a point of existing damage in an attempt to avoid or minimize any unnecessary contact or disturbance;

- Sampling locations will be repaired by filling the hole where the bulk sample was collected with patching materials listed by the manufacturer as non-asbestos, such as lagging cloth, silicone, putty, construction tape, or acrylic adhesive;

- To avoid possible sample cross-contamination, the Inspector will ensure that tools (i.e., knife, chisel, etc.) used to collect the sample are properly cleaned using a damp rag following the collection of each individual sample; and,

- In the event additional fragments or pieces of the suspect ACM being sampled break off during sample collection, the associated debris will be collected using a damp rag or HEPA-equipped vacuum. Unless otherwise proven through subsequent analysis, residual suspect ACM debris will be double-bagged in NYSDOL-approved 6 mil polyethylene asbestos disposal bags as investigative derived waste.

Many suspect ACMs are located in concealed areas such as wall cavities, below ground level, and other hidden spaces. The Inspector will conduct a destructive investigation, as necessary, to gain access to these hidden spaces and to inspect them for suspect ACMs. The following guidelines constitute reasonable criteria for locating concealed materials:

- Identify the different building systems which may involve concealed suspect ACM such as heating/cooling systems, water lines, steam lines, roof drainage lines, miscellaneous piping lines, underlying roof materials, foundation waterproofing materials, etc.;

- Expose hidden areas and inspect each system in at least three locations for each area of construction;

- Focus the inspection on likely areas of occurrence of suspect ACMs (i.e., where insulated pipe enters walls or ceilings, behind heating units, etc.);

- Collection of bulk samples of suspect ACMs will undergo multi-layered sample analysis of individual suspect ACM layers in accordance with ICR-56;

- The Inspector will examine additional areas if results of the initial inspection are inconsistent;

- The Inspector will clearly list all concealed areas that have not been inspected, and explain why they were not inspected. Examples of reasons for not inspecting concealed areas may include, but are not limited to:

  - Records showing recent access to such spaces and sample results;

  - Safety restrictions (i.e., confined spaces) or safety hazards (i.e., unsafe breathing atmosphere, active hot surfaces, etc.); and,

  - Restrictions imposed by the property owner.

- For those asbestos surveys that include inaccessible concealed spaces, a qualified licensed asbestos professional will be available during the project to address the potential of unidentified suspect materials becoming disturbed during the course of the asbestos survey.

Upon completion of the bulk sample collection, the samples will be properly labeled and shipped under Chain of Custody to the laboratory for analysis. The samples will be analyzed by Polarized Light Microscopy (PLM) utilizing NYSDOH ELAP Method 198.1 for friable suspect materials, and Non-Friable Organically Bound (NOB) PLM utilizing NYSDOH ELAP Method 198.6 for non-friable suspect materials. Confirmation analysis of NOB materials will be performed, where necessary, utilizing Transmission Electron Microscopy (TEM) via NYSDOH ELAP Method 198.4. TEM is required by NYSDOH to prove that a NOB material is non-ACM, when the material is initially determined to be non-ACM by PLM and the sample has an acid insoluble inorganic phase of greater than 1.0 percent.

5.19 Lead-Based Paint and Lead-Based Coatings

A lead survey to determine the presence, extents and condition of lead-based paint (LBP) and lead based coatings (LBC) that may be present within buildings may be completed. A

USEPA certified lead risk assessor (Assessor) will conduct lead surveys of on-site buildings. The lead survey will 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. Whether paint chip or XRF sampling methodologies are employed, the Assessor will collect samples of a representative group of selected paints on various substrates and building components throughout the building. During the lead survey, all accessible portions of the building will be visually assessed to identify all 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.

When paint chip sample collection is employed, one sample will be collected of each suspect LBP and LBC from each substrate type for laboratory analysis. During sample collection, all layers of the coating present will be collected with the substrate material excluded. Following collection of each paint chip sample, the Assessor will note the location from where each sample was collected on a sample location plan. When XRF field analysis is selected as the method of lead analysis, a Niton® SL3t XRF (or equivalent), equipped with a 50kV x-ray tube will be utilized as the on-site XRF field analysis and will be used in accordance with the manufacturer specifications and the following additional procedures:

- In order to measure concentrations of lead in a material, the desired sample is positioned in front of the XRF probe window;
- Field measurements can be obtained 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 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;

- XRF sample analysis is then initiated by exposing the sample to primary radiation from the sample source. The measurement time of each sample is user-selectable. Shorter sample measurement times (i.e., up to 30 seconds) are generally used for initial screening and hot spot delineation, and longer measurement times (i.e., up to 300 seconds) are typically used to meet higher precision and accuracy requirements;

- Field personnel operating the XRF analyzer will pay close attention to lead data patterns on various substrates. When the presence of LBP and LBC is confirmed on similar colored substrates on a building component (i.e., white paint metal window sash) at 2 to 3 sample locations, no additional XRF sampling will be necessary on that substrate and component type. In order to provide a statistical basis for the absence of LBP and LBC on similar colored substrates on a building component, field personnel will analyze up to 5 sample locations on each substrate and component type; and,

- Analytical data will be downloaded from the XRF analyzer to a computer hard-drive at the end of each sampling day and tabulated in an Excel document.

Once paint chip or XRF analysis is completed, any paint, coating, sediment, or soil surface with a lead concentration greater than or equal to 1.0 mg/cm^2 utilizing an XRF, or greater than or equal to 0.5 percent or 5,000 parts per million (ppm) [a.k.a. milligrams per kilogram (mg/kg)] will be classified as a lead contaminated material.

5.20 Fish and Wildlife Sampling

An investigation of the nature and extent of ecological impacts to biota (i.e., plant, invertebrate and/or fish) will be conducted via field sampling of biota tissue and laboratory analysis of COECs. The following procedures and sampling protocols will be used to collect biota samples:

- Plant Tissue Sampling- Plant tissue samples will be collected in the following manner:
  - Samples of native plants will be collected from subsample locations selected during a field reconnaissance in consultation with NYSDEC;

- Each composite tissue sample will consist of approximately 50 grams of tissue gathered from several subsample locations;

- It is not expected that the same plant species will be collected from each subsample location. The type of plant will be identified and recorded at each subsample location;

- Field personnel will use a dedicated pair of disposable nitrile gloves prior to initiating sampling at each location;

- Field personnel will use clean dedicated stainless steel scissors, pruners or garden snips to cut off a representative portion of a selected plant at each subsample location;

- The plant subsamples will be placed on a new sheet of clean aluminum until approximately 50 grams of plant material is gathered;

- The aluminum foil will be closed by folding the foil over the plant material, placed in an iced cooler, and transported under chain-of-custody documentation to a qualified laboratory for analysis of the target list of COECs .

* Invertebrate and Vertebrate Sampling- Invertebrate and vertebrate tissue sampling and analysis may be conducted on benthic invertebrates (i.e., polychaete worms, bivalve; aquatic insects; gastropods; benthic arthropods including crayfish, crab, and others; etc.), mid-water planktonic invertebrates (i.e., copepods; amphipods, larvae, etc.) and mid-water planktonic vertebrates (i.e., fish, frogs, etc.). All types of invertebrates will be collected whole in the following manner:

  - When sampling benthic invertebrate tissue samples, hand-held dragging mesh nets or similar will be used to stir up the sediment allowing any benthic invertebrates to float downstream into the net and hoist them to the surface;

  - When sampling mid-water planktonic invertebrates and vertebrates, trawling mesh nets or similar will be used to surround the organisms and hoist them to the surface;

  - The type of invertebrate or vertebrate will be identified and recorded at each sample location;

  - Preparation of benthic invertebrates will consist of removing the invertebrates from the surrounding sediment by placing them in a pre-cleaned stainless steel bowl filled with a sufficient volume of distilled or deionized water to cover the sample. The benthic invertebrates will be removed from the sediment in the bowl using clean stainless steel tweezers and placed in a clean sample jar and inside an iced cooler. Shells of bivalves will be removed, retaining only the mussel and mantel tissues in the sample jar;

- All remaining benthic invertebrates, and mid-water planktonic invertebrates and vertebrates will be retained whole in clean sample jars by handling with nitrile gloves and stainless steel tools;

- Collected invertebrate or vertebrate organisms will be shipped to the qualified laboratory under chain-of-custody documentation, where the organisms will be homogenized whole. Each homogenized tissue sample will be analyzed for the target list of COECs.

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 nondisposable 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.

Also, following the general cleaning procedures described above, all downhole/drilling items, such as split spoon samplers, Shelby tubes, rock corers, or any other item of equipment which will come in direct contact with a sample during drilling, will be decontaminated by steam cleaning.

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 (HNO_3) (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 $4^{\circ}C \pm 2^{\circ}C$ 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' completing Boring, Well and Test Pit Construction Logs; maintaining a daily Field Log Book; preparing Daily Field Activity Reports; completing Field Change Forms; and filling out a Daily Air Monitoring Form. 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), water levels, drilling logs, and organic vapor and dust readings
- 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 performingroutine/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 soil borings, contaminated waste, soil and water may be generated from drill cuttings, drilling fluids, 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 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 remain on the ground of the day, as stipulated in the Site specific work plan. The soil may also be disposed on site within the borehole that 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.

11.3 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 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.

11.4 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.

11.5 Dedicated Sampling Equipment

In general, all dedicated soil sampling equipment (Macrocore sampler liners and catchers), groundwater sampling equipment (dedicated disposable polyethylene bailer and dedicated polypropylene line) and soiled disposable sampling equipment (i.e., bailers, tongue depressors, scoops, etc.) will be 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. These include: florisil column cleanup, silica gel column cleanup, acid-base partition, steam distillation and sulfuric acid cleanup for PCB analysis.

High levels of matrix interference may be present in waste, soil and sediment samples. This interference may prevent the achievement of ASP detection limits if no target compounds are found. In order to avoid unnecessary dilutions, the optional cleanup methods noted in the 2005 NYSDEC ASP will be required to be performed by the laboratory as necessary.

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

D&B ENGINEERS AND ARCHITECTS, P.C.

DATE:	
REPORT NO.	
PAGE NO.	
PROJECT NO.	

DAILY FIELD ACTIVITY REPORT

PROJECT ____________________

LOCATION ____________________

ATTACHMENTS ____________________

WEATHER	TIME	TEMP.	PRECIP.	WIND (MPH)	WIND (DIR)

SITE CONDITIONS:

WORK GOAL FOR DAY:

PERSONNEL ON SITE:

NAME	AFFILIATION	ARRIVAL TIME	DEPART TIME

EQUIPMENT ON SITE:

TYPE	MODEL	TYPE	MODEL

HEALTH & SAFETY:

PPE REQUIRED: ☐ ☐ ☐ ☐ HASP?

SITE SAFETY OFFICER:

H & S NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.		DATE:
		REPORT NO.
		PAGE NO.
		PROJECT NO.

DAILY FIELD ACTIVITY REPORT

DESCRIPTION OF WORK PERFORMED AND OBSERVED

D&B ENGINEERS AND ARCHITECTS, P.C.		**DATE:**
		REPORT NO.
		PAGE NO.
		PROJECT NO.

DAILY FIELD ACTIVITY REPORT

PREPARED BY (OBSERVER)	**REVIEWED BY**
PRINT NAME:	PRINT NAME:
SIGNATURE:	SIGNATURE:

☐ **ADDITIONAL SHEETS USED**

☐ emailed draft / final to NYSDEC – date:	☐ hardcopy to NYSDEC – date:

FIELD OBSERVATION LOG
GROUNDWATER SAMPLING RECORD

SITE ______________________ DATE ______________________

WELL ID: __________ Time On-site: __________ Time Off-site: __________
SAMPLERS: __________

Depth of well (feet from top of casing/riser)...................... __________
Initial static water level (feet from top of casing/riser)........ __________

Depth to ____/____of screen
(top / bottom)

Purging Method

Airlift ____
Bailer ____
Peri Pump (dedicated tubing) ____
Centrifugal ____
Pos. Displ. ____
Disposable Bladder Pump (Low Flow) ____

Well Volume Calculation:

1 in casing ________ft. of water x 0.04 = ________ gallons
2 in. casing: ________ft. of water x 0.16 = ________ gallons
3 in. casing: ________ft. of water x 0.37 = ________ gallons
4 in. casing: ________ft. of water x 0.65 = ________ gallons
5 in. casing: ________ft. of water x 1.02 = ________ gallons
6 in. casing: ________ft. of water x 1.47 = ________ gallons

volume of water removed:
________ gal. >3 volumes: yes ____ no ____ purged dry? yes ____ no ____

Field Tests

Time	Purge Rate (ml/min)	Depth to Water (ft)	pH [+/-0.1 units]	Temp (c°) [3%]	Spec. Cond. (ms/cm) [3%]	Turbidity (NTUs) [10% >5 NTU]	DO (mg/l) [10% >0.5mg/l]	ORP (mv) [+/- 10]

Purge Volume: Purging Time:
Purge Rate (gph):

Sampling

Time of Sample Collection: __________

Method:
____ Stainless steel bailer
____ Teflon bailer
____ Pos. Disp. Pump
____ Disposable bailer
X Dedicated pump and tubing

Analyses:
____ USEPA Method 8260C TCL VOCs
____
____
____
____

Observations

Well Observations: __________
Weather/Temperature: __________
Sample description: __________
Free Product? yes ____ no ____ describe __________
Sheen? yes ____ no ____ describe __________
Odor? yes ____ no ____ describe __________

D&B ENGINEERS AND ARCHITECTS, P.C.

SITE NAME: ______________________ SITE ID.: ________

INSPECTOR: ________

MONITORING WELL FIELD INSPECTION LOG

DATE/TIME: ________

WEll ID.: ________

	YES	NO
WELL VISIBLE? (If not, provide directions below)		

WELL COORDINATES? NYTM X_____________ NYTM Y____________________

PDOP Reading from Trimble Pathfinder:_______ Satelites:________

GPS Method (circle) Trimble And/Or Magellan

	YES	NO
WELL I.D. VISIBLE?		
WELL LOCATION MATCH SITE MAP? (if not, sketch actual location on back).....................		

WELL I.D. AS IT APPEARS ON PROTECTIVE CASING OR WELL: ....

	YES	NO
SURFACE SEAL PRESENT?		
SURFACE SEAL COMPETENT? (If cracked, heaved etc., describe below)		
PROTECTIVE CASING IN GOOD CONDITION? (If damaged, describe below)		

HEADSPACE READING (ppm) AND INSTRUMENT USED.. ________

TYPE OF PROTECTIVE CASING AND HEIGHT OF STICKUP IN FEET (If applicable) ________

PROTECTIVE CASING MATERIAL TYPE: .... ________

MEASURE PROTECTIVE CASING INSIDE DIAMETER (Inches): .... ________

	YES	NO
LOCK PRESENT?		
LOCK FUNCTIONAL?		
DID YOU REPLACE THE LOCK?		
IS THERE EVIDENCE THAT THE WELL IS DOUBLE CASED? (If yes,describe below)		
WELL MEASURING POINT VISIBLE?		

MEASURE WELL DEPTH FROM MEASURING POINT (Feet): .... ________

MEASURE DEPTH TO WATER FROM MEASURING POINT (Feet): .... ________

MEASURE WELL DIAMETER (Inches): .... ________

WELL CASING MATERIAL: .... ________

PHYSICAL CONDITION OF VISIBLE WELL CASING: .... ________

ATTACH ID MARKER (if well ID is confirmed) and IDENTIFY MARKER TYPE .... ________

PROXIMITY TO UNDERGROUND OR OVERHEAD UTILITIES.. ________

DESCRIBE ACCESS TO WELL: (Include accessibility to truck mounted rig, natural obstructions, overhead power lines, proximity to permanent structures, etc.); ADD SKETCH OF LOCATION ON BACK, IF NECESSARY.

DESCRIBE WELL SETTING (For example, located in a field, in a playground, on pavement, in a garden, etc.) AND ASSESS THE TYPE OF RESTORATION REQUIRED.

IDENTIFY ANY NEARBY POTENTIAL SOURCES OF CONTAMINATION, IF PRESENT (e.g. Gas station, salt pile, etc.):

REMARKS:

Sketch

System Inspection Field Form

Sub-Slab Depressurization System Inspection Form

Site: ____

Post Commissioning, Routine or Non-Routine Inspections (circle one)

Date of Inspection: ____

Date of Previous Inspection: ________________________________

Equipment Documentation

As Found		Manometer Reading (in. $H_2$0)		As Left		Manometer Reading (in. $H_2$0)	
SVE System	Fan Model	Prior	Current	SVE System	Fan Model	Prior	Current

	As Found Yes	As Found No	As Left Yes	As Left No
Fan Check				
Are all fan(s) in operation?				
Is there a differential pressure shown in U-Tube manometer?				
If yes, provide readings above.				
Is each fan mounted securely?				
Are coupling connections secure?				
Is excessive noise heard when fan is running?				
Does fan(s) induce suction when running?				
Is switch is locked in the ON position?				
Does smoke enter joints?				
If yes: Was joint re-sealed?				
Does smoke enter re-sealed joint?				
Piping Check				
Is glue evident at joints?				
Are system suction points sealed?				
Is piping system properly supported?				
Are valves and manometers installed at proper locations?				
Is excessive noise heard in piping joints?				
Were piping modifications and 10% of old joints smoke tested?				
Does smoke enter joints?				
If yes: Was joint re-sealed?				
Does smoke enter re-sealed joint?				
Slab Check				
Have new floor cracks appeared since the last inspection?				
Was each identified slab crack, repair, or modification smoke tested?				

Does smoke enter?

If yes: Was area re-sealed with approved sealant*?

Does smoke enter re-sealed area?

Electrical Check

Are electrical wires and connections secure?

Is each junction box closed?

Are conduit properly supported?

Are switch boxes locked?

Does each fan start when the switch is ON position?

Does each fan stop when the switch is in OFF position?

Are mitigation system labels applied?

Are the correct labels applied in the proper locations?

Have the following items changed since the last visit?

	No	**Yes**	**If yes, explain…**
Building Footprint	______	______	______________________________
Ownership	______	______	______________________________

If any of these items have changed, a redesign may be required.
Contact the maintenance supervisor for field review.

Deviations/Comments

____

____

____

____

____

____

____

____

____

____

____

____

Performed by: ______________________ Date: ______________

Soil Vapor Intrusion - Structure Sampling Building Questionnaire **Structure ID :** _______________

Site No. : ______________________ **Site Name** : ____

Date: ______________________ **Time:** ____

Structure Address : ____

Preparer's Name & Affiliation : ____

Residential ? ☐ **Yes** ☐ **No** **Owner Occupied ?** ☐ **Yes** ☐ **No** **Owner Interviewed ?** ☐ **Yes** ☐ **No**

Commercial ? ☐ **Yes** ☐ **No** **Industrial ?** ☐ **Yes** ☐ **No** **Mixed Uses ?** ☐ **Yes** ☐ **No**

Identify all non-residential use(s) : ____

Owner Name : ____ **Owner Phone** : ( ) __________ - ___________

Secondary Owner Phone : ( ) __________ - ___________

Owner Address (if different) : ____

Occupant Name : ______________________________________ **Occupant Phone** : ( ) __________ - __________

Secondary Occupant Phone : ( ) __________ - ___________

Number & Age of All Persons Residing at this Location : ____

Additional Owner/Occupant Information : ____

Describe Structure (style, number floors, size) : ____

____

Approximate **Year Built** : ______________________ Is the building **Insulated**? ☐ Yes ☐ No

Lowest level : ☐ Slab-on-grade ☐ Basement ☐ Crawlspace

Describe Lowest Level (finishing, use, time spent in space) : ____

____

Floor Type: ☐ Concrete Slab ☐ Dirt ☐ Mixed : ____

Floor Condition : ☐ Good (few or no cracks) ☐ Average (some cracks) ☐ Poor (broken concrete or dirt)

Sumps/Drains? ☐ Yes ☐ No Describe : ____

Identify other floor penetrations & details : ____

____

Wall Construction : ☐ Concrete Block ☐ Poured Concrete ☐ Laid-Up Stone

Identify any wall penetrations : ____

____

Identify water, moisture, or seepage: location & severity (sump, cracks, stains, etc) : ____________________________

____

Heating Fuel : ☐ Oil ☐ Gas ☐ Wood ☐ Electric ☐ Other : ___________________________

Heating System : ☐ Forced Air ☐ Hot Water ☐ Other : ____

Hot Water System : ☐ Combustion ☐ Electric ☐ Boilermate ☐ Other: ___________________________

Clothes Dryer : ☐ Electric ☐ Gas Where is dryer **vented** to? ______________________

If combustion occurs, describe where air is drawn from (cold air return, basement, external air, etc.) : __________________

____

Fans & Vents (identify where fans/vents pull air from and where they vent/exhaust to) : ________________________________

____

Describe factors that may affect indoor air quality (chemical use/storage, unvented heaters, smoking, workshop):

Attached garage ? ☐ Yes ☐ No Air fresheners ? ☐ Yes ☐ No

New carpet or furniture ? ☐ Yes ☐ No What/Where ? ______________________________

Recent **painting** or **staining** ? ☐ Yes ☐ No Where ? : ______________________________

Any **solvent** or **chemical-like** odors ? ☐ Yes ☐ No Describe : ______________________________

Last time **Dry Cleaned** fabrics brought in ? __________________ What / Where ? ______________________________

Do any building occupants use solvents at work ? ☐ Yes ☐ No Describe : ______________________

Any testing for Radon ? ☐ Yes ☐ No Results : ______________________________

Radon System/Soil Vapor Intrusion Mitigation System present ? ☐ Yes ☐ No If yes, describe below

---

Lowest Building Level Layout Sketch

- Identify and label the locations of all sub-slab, indoor air, and outdoor air samples on the layout sketch.
- Measure the distance of all sample locations from identifiable features, and include on the layout sketch.
- Identify room use (bedroom, living room, den, kitchen, etc.) on the layout sketch.
- Identify the locations of the following features on the layout sketch, using the appropriate symbols:

B or **F**	Boiler or Furnace	o	Other floor or wall penetrations (label appropriately)
HW	Hot Water Heater	**xxxxxxx**	Perimeter Drains (draw inside or outside outer walls as appropriate)
FP	Fireplaces	**######**	Areas of broken-up concrete
WS	Wood Stoves	● SS-1	Location & label of sub-slab vapor samples
W/D	Washer / Dryer	● IA-1	Location & label of indoor air samples
S	Sumps	● OA-1	Location & label of outdoor air samples
@	Floor Drains	● PFET-1	Location and label of any pressure field test holes.

Structure Sampling - Product Inventory

Homeowner Name & Address: ______________________________ **Date:** __________

Samplers & Company: ______________________________ **Structure ID:** __________

Site Number & Name: ______________________________ **Phone Number:** __________

Make & Model of PID: ______________________________ **Date of PID Calibration:** __________

Identify any Changes from Original Building Questionnaire : ______________________________

Product Name/Description	Quantity	Chemical Ingredients	PID Reading	Location

VAPOR SAMPLING DATA SHEET
SUB-SLAB AND INDOOR AIR

General Information

Site Name / Address: ____

Sampling Location / Address: ____
(if other than site address)

Contact Name: ________________________________ **Phone:** _____________________________

Laboratory & Analytical Method: __________________ **Method of Delivery:** __________
(Courier, UPS, delivered by sampler, etc.)

Sampling Team Members: ____

Met with resident/business on (date) ____________ to provide information on VOC inventory and sampling cross-contamination concerns. If not, explain why:____
____
____

Indoor Air Samples

Sample ID #: ___________________ **Canister ID #:**__________________ **Regulator ID #**__________________

Start: Date: ___________________ **Time:** __________ **Initial canister vacuum:** ________ **mm Hg**

End: Date: ___________________ **Time:** __________ **Final canister vacuum:** _________ **mm Hg**

Regulator Calibrated for: 8 hr _____ **24 hr** _____ **grab (no regulator)**______

Canister/ Regulator Leak Checked: Yes ______ **No**______

Sub-Slab Samples

Sample ID #: _________________ **Canister ID #:**________________ **Regulator ID #**________________

Size of canister: __________ **Thickness of sub-slab (inches)** _________ **Port install time:** __________

Sampling Start: Date: ________________ **Time:** __________ **Initial canister vacuum:** ________ **mm Hg**

Sampling End: Date: ________________ **Time:** __________ **Final canister vacuum:** _________ **mm Hg**

Regulator Calibrated for: 8 hr _____ **24 hr** _____ **grab (no regulator)** ______

Canister/ Regulator Leak Checked: Yes No **Sub-Slab Port Leak Checked: Yes No**

Type of sub-slab port: Swagelok __________ **Vapor Pin:** __________

Sub-Slab Port Installed by: _________________________ **Sub-Slab Port Sealed: Yes No**

PID Reading: VOC ppb___________ **% 02**_____________ **PID ID#:** __________________

NOTES: (sampler/canister problems, other significant sampling details, or FSOP deviations)

Note: If a diagram of the sample location(s) is sketched on the back of this data sheet, check here ☐

Revised: 05.2018

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:____________________
____
____
____

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:

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: YES NO

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

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORM S-I

SAMPLE IDENTIFICATION AND ANALYTICAL REQUIREMENT SUMMARY

NYSDEC Sample ID/Code	Laboratory Sample ID/Code	Analytical Requirements					
		VOA GC/MS (Method #)	BNA GC/MS (Method #)	VOA GC (Method #)	Pest PCBs (Method #)	Metals (Method #)	Other (Method #)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORM S-IIa

SAMPLE PREPARATION AND ANALYSIS SUMMARY
SEMIVOLATILE (BNA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORM S-IIb

SAMPLE PREPARATION AND ANALYSIS SUMMARY
VOLATILE (VOA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORM S-IIc

SAMPLE PREPARATION AND ANALYSIS SUMMARY PESTICIDE/PCB ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORM S-III

SAMPLE PREPARATION AND ANALYSIS SUMMARY
MISCELLANEOUS ORGANIC
ANALYSES

Laboratory Sample ID	Matrix	Analytical Protocol	Extraction Method	Auxiliary Cleanup	Dil/Conc Factor

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORM S-IV

SAMPLE PREPARATION AND ANALYSIS SUMMARY
INORGANIC ANALYSES

Laboratory Sample ID	Matrix	Metals Requested	Date Rec'd at Lab	Date Digested	Date Analyzed

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-chlorothyl) 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-Chloroisoproply) 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 J

SITE MANAGEMENT FORMS

INSTITUTIONAL AND ENGINEERING 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 Institutional and Engineering 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 Institutional and Engineering 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.

____

____

____

D&B ENGINEERS AND ARCHITECTS, P.C.

DATE:	
REPORT NO.	
PAGE NO.	
PROJECT NO.	

DAILY FIELD ACTIVITY REPORT

PROJECT ______________________________

LOCATION ______________________________

ATTACHMENTS ______________________________

WEATHER	TIME	TEMP.	PRECIP.	WIND (MPH)	WIND (DIR)

SITE CONDITIONS:

WORK GOAL FOR DAY:

PERSONNEL ON SITE:

NAME	AFFILIATION	ARRIVAL TIME	DEPART TIME

EQUIPMENT ON SITE:

TYPE	MODEL	TYPE	MODEL

HEALTH & SAFETY:

PPE REQUIRED: ☐ ☐ ☐ ☐ **HASP?**

SITE SAFETY OFFICER:

H & S NOTES:

D&B ENGINEERS AND ARCHITECTS, P.C.		DATE:
		REPORT NO.
		PAGE NO.
		PROJECT NO.

DAILY FIELD ACTIVITY REPORT

DESCRIPTION OF WORK PERFORMED AND OBSERVED

D&B ENGINEERS AND ARCHITECTS, P.C.		**DATE:**
		REPORT NO.
		PAGE NO.
		PROJECT NO.

DAILY FIELD ACTIVITY REPORT

PREPARED BY (OBSERVER)	**REVIEWED BY**
PRINT NAME:	PRINT NAME:
SIGNATURE:	SIGNATURE:
☐ **ADDITIONAL SHEETS USED**	
☐ emailed draft / final to NYSDEC – date:	☐ hardcopy to NYSDEC – date:

Date: __________

DAILY EQUIPMENT CALIBRATION LOG

Project Name: ______________________________

Project Number: ______________________________ Calibrated by: ______________________________

Instrument Name and Model Number	Calibration Method	Time	Readings and Observations

FIELD OBSERVATION LOG
GROUNDWATER SAMPLING RECORD

SITE ______________________ DATE ______________________

WELL ID: ______________ Time On-site: Time Off-site:
SAMPLERS: ______________________ ______________ ______________

Depth of well (feet from top of casing/riser)...................... ______________ Depth to ____/____of screen
Initial static water level (feet from top of casing/riser)........ ______________ (top / bottom)

Purging Method
Airlift ____ Centrifugal ____
Bailer ____ Pos. Displ. ____
Peri Pump (dedicated tubing) ____ Disposable Bladder Pump (Low Flow) ____

Well Volume Calculation:
1 in casing ________ft. of water x 0.04 = ________ gallons
2 in. casing: ________ft. of water x 0.16 = ________ gallons
3 in. casing: ________ft. of water x 0.37 = ________ gallons
4 in. casing: ________ft. of water x 0.65 = ________ gallons
5 in. casing: ________ft. of water x 1.02 = ________ gallons
6 in. casing: ________ft. of water x 1.47 = ________ gallons

volume of water removed:
________ gal. >3 volumes: yes ____ no ____ purged dry? yes ____ no ____

Field Tests

Time	Purge Rate (ml/min)	Depth to Water (ft)	pH [+/-0.1 units]	Temp (c°) [3%]	Spec. Cond. (ms/cm) [3%]	Turbidity (NTUs) [10% >5 NTU]	DO (mg/l) [10% >0.5mg/l]	ORP (mv) [+/- 10]

Purge Volume: Purging Time:
Purge Rate (gph):

Sampling
Time of Sample Collection: ______________

Method:
____ Stainless steel bailer
____ Teflon bailer
____ Pos. Disp. Pump
____ Disposable bailer
X Dedicated pump and tubing

Analyses:
____ USEPA Method 8260C TCL VOCs
____
____
____
____

Observations
Well Observations: ______________________
Weather/Temperature: ______________________
Sample description: ______________________
Free Product? yes ____ no ____ describe ______________
Sheen? yes ____ no ____ describe ______________
Odor? yes ____ no ____ describe ______________

D&B Engineers and Architects, P.C.

SITE NAME: ______________________________ SITE ID.: ________

INSPECTOR: ________

MONITORING WELL FIELD INSPECTION LOG

DATE/TIME: ________

WEll ID.: ________

	YES	NO
WELL VISIBLE? (If not, provide directions below)		

WELL COORDINATES? NYTM X_____________ NYTM Y____________________

PDOP Reading from Trimble Pathfinder:_______ Satelites:________

GPS Method (circle) Trimble And/Or Magellan

	YES	NO
WELL I.D. VISIBLE?		
WELL LOCATION MATCH SITE MAP? (if not, sketch actual location on back)		

WELL I.D. AS IT APPEARS ON PROTECTIVE CASING OR WELL: ....

	YES	NO
SURFACE SEAL PRESENT?		
SURFACE SEAL COMPETENT? (If cracked, heaved etc., describe below)		
PROTECTIVE CASING IN GOOD CONDITION? (If damaged, describe below)		

HEADSPACE READING (ppm) AND INSTRUMENT USED.. ________

TYPE OF PROTECTIVE CASING AND HEIGHT OF STICKUP IN FEET (If applicable) ________

PROTECTIVE CASING MATERIAL TYPE: .... ________

MEASURE PROTECTIVE CASING INSIDE DIAMETER (Inches): .... ________

	YES	NO
LOCK PRESENT?		
LOCK FUNCTIONAL?		
DID YOU REPLACE THE LOCK?		
IS THERE EVIDENCE THAT THE WELL IS DOUBLE CASED? (If yes,describe below)		
WELL MEASURING POINT VISIBLE?		

MEASURE WELL DEPTH FROM MEASURING POINT (Feet): .... ________

MEASURE DEPTH TO WATER FROM MEASURING POINT (Feet): .... ________

MEASURE WELL DIAMETER (Inches): .... ________

WELL CASING MATERIAL: .... ________

PHYSICAL CONDITION OF VISIBLE WELL CASING: .... ________

ATTACH ID MARKER (if well ID is confirmed) and IDENTIFY MARKER TYPE .... ________

PROXIMITY TO UNDERGROUND OR OVERHEAD UTILITIES... ________

DESCRIBE ACCESS TO WELL: (Include accessibility to truck mounted rig, natural obstructions, overhead power lines, proximity to permanent structures, etc.); ADD SKETCH OF LOCATION ON BACK, IF NECESSARY.

DESCRIBE WELL SETTING (For example, located in a field, in a playground, on pavement, in a garden, etc.) AND ASSESS THE TYPE OF RESTORATION REQUIRED.

IDENTIFY ANY NEARBY POTENTIAL SOURCES OF CONTAMINATION, IF PRESENT (e.g. Gas station, salt pile, etc.):

REMARKS:

Sketch

APPENDIX K

FIELD ACTIVITIES 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

db TRC
A 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 (GPS™) 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 GPS™ 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 <u>Sampling Equipment Decontamination</u>

<u>Suggested Materials</u>

- 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 = $\pi r^2 h$), 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/m^3 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 Permagum®
- 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 Permagum®.

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 = $\pi r^2 h$) 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**.

<u>Note</u>: 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/m^3 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 <u>Indoor Air Samples</u>

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**.

  <u>Note</u>: 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/m^3 for indoor air. All other compounds should achieve a 1 ug/m^3 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.

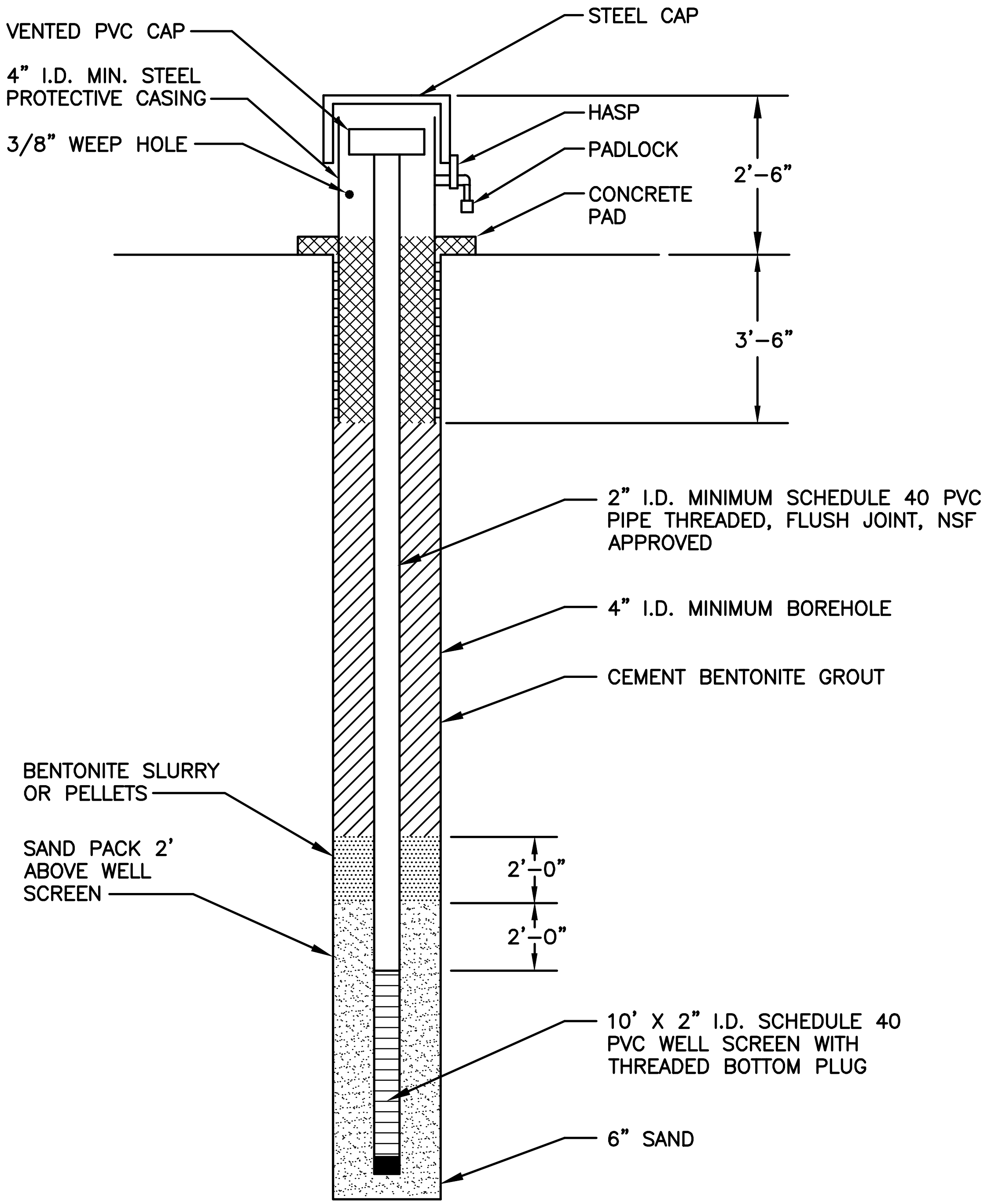
In order to properly define the movement of contaminants both vertically and horizontally, it is essential to collect depth-discreet water level data. Monitoring wells completed at the water table will provide a portion of the data needed to determine the vertical direction of groundwater movement. Water 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.

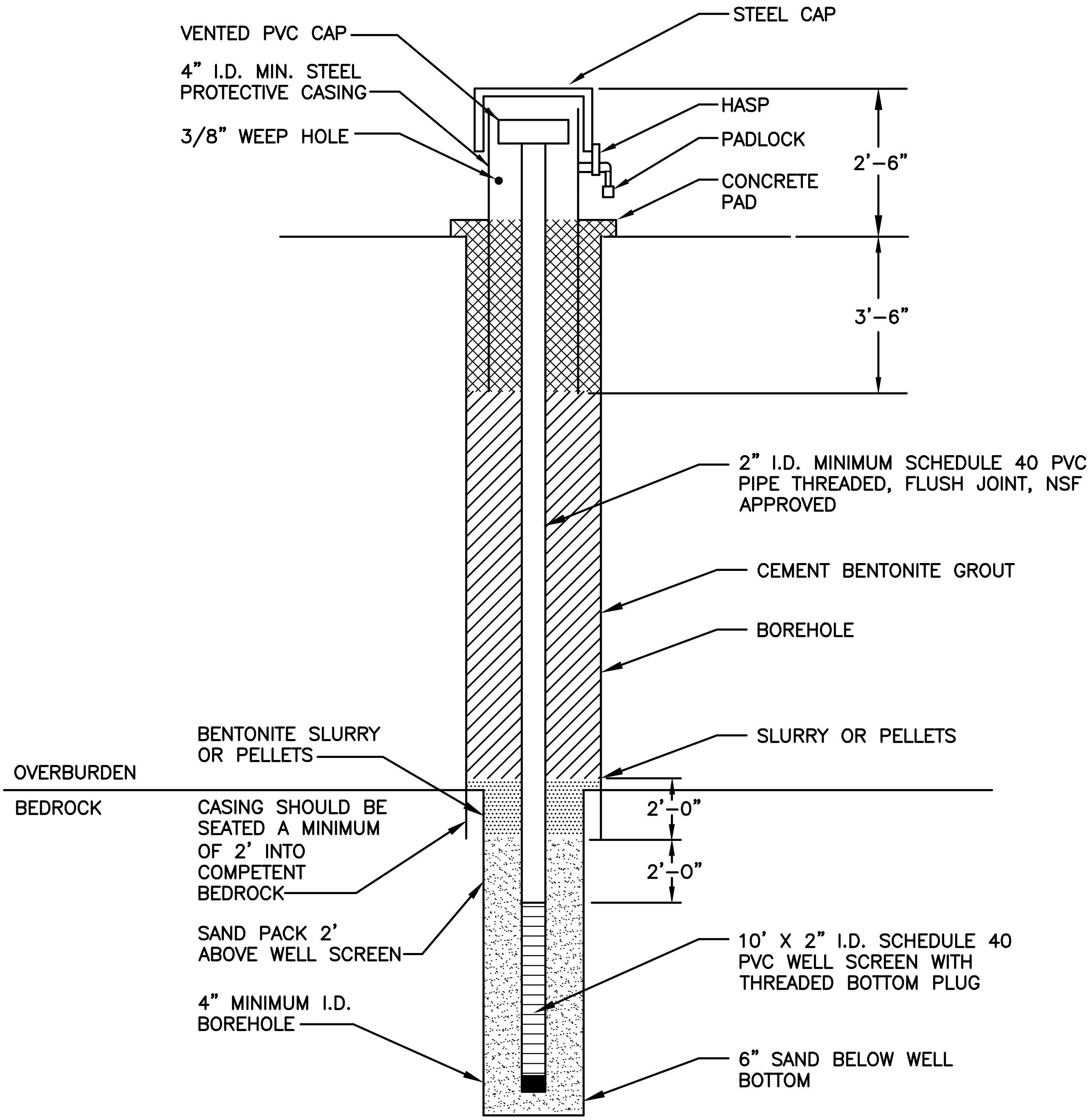
Monitoring well boreholes constructed in bedrock will be advanced using a cutting tool with a minimum inside diameter of 4 inches. In situations where rock is cored at a smaller diameter, the hole must be reamed to 4 inches before monitoring well installation. Only potable water will be allowed in the 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

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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 LNAP 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:

    o 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;

    o 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

  - o 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

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: ____

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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]: ____________________

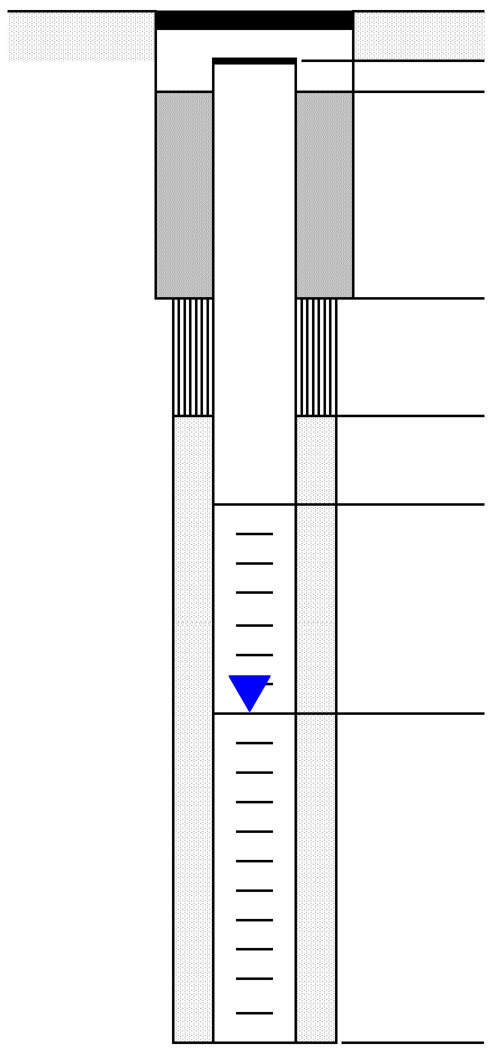
ELEVATION[1]: ____________________

DATUM: ____________________ DEPTH TO PRODUCT[2]: ____________________

CASING MATERIAL: ____________________ SCREEN MATERIAL: ____________________

FILTER PACK TYPE: ____________________ SEAL TYPE: ____________________

Depth from Ground Surface (feet)	Elevation[1]	
________	________	Manhole Cover, Ground Surface
________	________	Top of Casing (TOC)
		Top of Concrete Collar
________	________	Top of Bentonite Slurry/Bottom of Concrete Collar
________	________	Top of Sand Pack/ Bottom of Bentonite Slurry
________	________	Top of Well Screen
		Slot Size:
________	________	Depth to Water
________	________	End of Well Screen
________	________	End of Boring



Not to Scale

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

NOT TO SCALE

dbTRC A Joint Venture

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

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Purging and Sampling Log

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:
						Site Name:
PERMIT NUMBER						Site Location:
NA						Job Number:

(1) Use a previously determined total depth. Confirm the total depth of wel 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 (ºC)	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: Sample Finish Time:
Weather Conditions:										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 abov

MITKEM LABORATORIES

A DIVISION OF SPECTRUM ANALYTICAL, INC. Featuring HANIBAL TECHNOLOGY

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: ______________________

Project Mgr.: ______________________

Invoice To: ______________________

P.O. No.: ____________ RQN: ____________

Project No.: ______________________

Site Name: ______________________

Location: ______________________ State: ________

Sampler(s): ______________________

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9=______________ 10=______________ 11= ______________

List preservative code below:

Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1=____________ X2=____________ X3=____________

G=Grab C=Composite

QA/QC Reporting Level

- ☐ Level I ☐ Level II
- ☐ Level III ☐ Level IV
- ☐ Other ____________

State specific reporting standards: ____________

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		Analyses:								

☐ E-mail to ______________________

EDD Format______________________

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C __________

Relinquished by:	Received by:	Date:	Time:

175 Metro Center Boulevard • Warwick, RI 02886-1755 • 401-732-3400 • Fax 401-732-3499 • www.mitkem.com

APPENDIX L

GREEN REMEDIATION METRICS

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**

APPENDIX M

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REMEDIAL SYSTEM OPTIMIZATION FOR AMERICAN CLEANERS SITE

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