FORMER BRIGHT OUTDOORS
JOHNSON CITY, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: 704023

Prepared for:

New York State Department of Environmental Conservation

Division of Environmental Remediation

625 Broadway

Albany, New York 12233-7013

Prepared by:

D&B Engineers and Architects

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516-364-9890

Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date
1	2/17/2021	New Section: 4.4.5 - Emerging Contaminants	

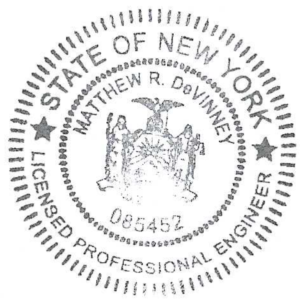
OCTOBER 2020

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.

2-18-21 DATE



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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

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

ES EXECUTIVE SUMMARY

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

Site Identification:	704023 - Former Bright Outdoors, 631 Field Street, Johnson City, NY
Institutional Controls:	1. This Site is listed in the Registry of Inactive Hazardous Waste Sites as Class 4;
	2. The property shall not have any disturbances or excavation of the Property which threatens the integrity of the engineering controls, which will, or is reasonably anticipated to, interfere significantly with any proposed, ongoing, or completed remedial program at the site, or which results or may result in a significantly increase threat of harm or damage at the Site;
	3. The property use is limited to restricted-residential use, which would also permit commercial or industrial uses, provided that the long-term Institutional Controls included in the SMP are employed;
	4. The property may not be used for a higher level of use, such as unrestricted or residential use without additional remediation and amendment of the Environmental Notice, as approved by the NYSDEC.
	5. No person shall disturb, remove, or otherwise interfere with the installation, use, operations, and maintenance of Engineering Controls required for the Remedy, including but not limited to the Engineering Controls described in the SMP, unless in each instance they first obtain a written waiver of such prohibition from the NYSDEC;
	6. All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;
	7. No person shall use 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 NYSDEC. Use of the groundwater without appropriate treatment may result in a significantly increased threat of harm or damage at any Site;
	8. The use of the groundwater underlying the property for potable or process water is prohibited without treatment rendering it safe for intended use as determined by the NYSDOH;
	9. The potential for vapor intrusion must be evaluated for any buildings developed in the area and any potential impacts that are identified must be monitored or mitigated;

Institutional Controls (cont.):	10. The Site owner or remedial party will submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) 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, (2) 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 five years, or an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable; and
	11. It is a violation of 6 NYCRR 375-1.11(b) to use the Property in a manner inconsistent with the Environmental Notice.
Engineering Controls:	1. Sub-Slab Depressurization System
	2. Soil Vapor Extraction System

Inspections:	Frequency
Sub-Slab Depressurization System*	Annually
Soil Vapor Extraction System	Annually
Monitoring:	
Soil Vapor Points SS-101, SS-102, SS-103, SS-104, SS-105, SS-106, SS-107, SS-108, SS-109, SS-110, SS-111 and SS-112.	Annually
Groundwater Monitoring Wells MW-02, MW-03, MW-04, MW-05, MW-06, MW-07, MW-08A	Biennially
Maintenance:	
1. Fan maintenance	As needed
2. Condensate knock out	As needed
Reporting:	
1. Site Management Report	As requested by NYSDEC
2. Periodic Review Report	Every 5 years

*Inspection of the sub-slab depressurization system is managed by a separate state-wide contract and is therefore not covered by this Site Management Plan.

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

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the March 2007 Record of Decision for the Former Bright Outdoors Site located in Johnson City, New York (hereinafter referred to as the "Site"). See **Figure 1**. The Site is currently in the New York State (NYS) Inactive Hazardous Waste Disposal Site Remedial Program Site No. 704023 which is administered by New York State Department of Environmental Conservation (NYSDEC).

The New York State Department of Environmental Conservation (NYSDEC) prepared the Record Decision, dated March 2007, requiring remediation of contaminated media at the Site. A figure showing the site location and boundaries of this site is provided in **Figure 2**. The boundaries of the site are more fully described in the metes and bounds legal description and site survey that are provided as part of the August 23, 2011 Environmental Notice provided in Appendix A.

After completion of the remedial work, some contamination was left at this site, which is hereafter referred to as "remaining contamination." Institutional and Engineering Controls (ICs and ECs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Notice granted to the NYSDEC, and recorded with the Broome County Clerk on August 23, 2011, 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 Notice is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Notice 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 Notice. Failure to properly implement the SMP is a violation of the Environmental Notice, 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 B of this SMP.

This SMP was prepared by D&B Engineers and Architects, 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 Notice 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 Notice for the site, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

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

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

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

- 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan.

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

- Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

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

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

- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

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

Table 1-1: 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
Harry Warner NYSDEC Region 7 HW Engineer	(315) 426-7519 harry.warner@dec.ny.gov
Shaun J. Surani New York State Department of Health Bureau of Environmental Exposure Investigation	Phone: (518) 402-7860 Email: BEEI@health.ny.gov
Stephanie Webb, Region 7 Citizen Participation Specialist; NYS Department of Environmental Conservation	Phone: (315) 426-7441 Email: Stephanie.Webb@dec.ny.gov

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

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The site is located in Johnson City, Broome County, New York, and is identified as Section 143.37 Block 1 and Lot 19 on the Broome County Tax Map. The site is an approximately 1.77-acre area and is bounded by a Wegmans grocery store to the north, NYS Route 17 to the south, a self-storage building to the east, and residential properties along Marie Street to the west (see Figures 1 and 2 – Site Location and Site Features Map, respectively). The boundaries of the site are more fully described in Appendix A –Environmental Notice. The owner(s) of the site parcel(s) at the time of issuance of this SMP is/are:

U-Haul Moving & Storage of Albany

2.2 Physical Setting

2.2.1 Land Use

The Site consists of the following: a building and parking area. The Site is zoned commercial/industrial and is currently utilized as a storage facility. Site occupants include a U-Haul storage and trucking company.

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

2.2.2 Geology

The geology in the area of the Site is identified as unconsolidated sediments overlaying bedrock. The bedrock has been identified to be approximately 100-150 feet thick. Bedrock within the region is identified as siltstone and shale. Pleistocene glacial outwash and lake bottom deposits overlaying the bedrock followed by Holocene fill materials, flood-plain alluvium and post glacial lake deposits (Coon, 1998). The shallowest unconsolidated sediments identified within the area of the Site consists of floodplain alluvium, silt to very fine sand with some organic rich layers. Alluvial fan deposits within the area are identified as gravel, sandy and moderately silty (Coon, 1998). Boring logs completed during monitoring well installation indicate geology below the Site is largely silty, clay and some sands and gravel. Site specific boring logs are provided in Appendix C.

2.2.3 Hydrogeology

The Site is situated over a USEPA designated sole-source aquifer known as the Clinton Street-Ballpark Aquifer. The aquifer is comprised of an upper, unconfined layer and a lower, confined layer, generally separated by a layer of fine-grained lake bottom material (Coon, 1998). Clinton Street-Ballpark Aquifer has been identified as part of a glacial aquifer system within the Susquehanna River valley. The Aquifer is bounded on the north by a bedrock valley wall and a ridge of till and bedrock separating it from the Susquehanna River (Coon, 1998). The hydraulic conductivity of the upper (unconfined) layer of the aquifer is about 130 ft/d, and transmissivity of the lower (confined) layer ranges from 1,000 to 40,000 ft2/d, as estimated from calibration of an aquifer model by Randall (1986). Depth to groundwater across the site during groundwater sampling completed in March 2019 ranged from approximately 5 feet to 9 feet. Groundwater flow direction within the area of the Site is in a southwesterly direction towards the Susquehanna River. A groundwater contour map is shown in **Figure 3**. Groundwater elevation data is provided in **Table 2-1**. Groundwater monitoring well construction logs are provided in Appendix C.

Johnson City's Camden Street Municipal Well Field is located approximately 0.6 miles south-southwest of the Site. The Johnson City Water Department operates up to five municipal supply wells, which provide approximately 2.5 million gallons per day of water to users within the village.

TABLE 2-1
FORMER BRIGHT OUTDOORS SITE
GROUNDWATER ELEVATION DATA

Groundwater Elevation Data						
WELL	LOCATION		GROUND ELEVATION (U.S. Survey Ft.)	RISER ELEVATION (U.S. Survey Ft.)	DATE 3/27/2019	
	Northing	Easting			DTW	Water Elev. (ft)
MW-02*	773422.73	985113.54	828.46	828.20	5.45	822.75
MW-03	773290.37	985083.28	828.12	827.72	8.39	819.33
MW-04*	773293.95	985083.28	827.85	827.41	8.05	819.36
MW-05	773543.4	985289.25	828.50	828.23	7.81	820.42
MW-06	773423.63	985299.71	828.40	828.10	7.77	820.33
MW-07	773633.01	985277.98	829.27	828.89	8.60	820.29
MW-08A*	773501.46	985110.79	828.82	828.40	8.46	819.94

NOTES

Ft.: Feet

DTW: Depth to water

Coordinates: Horizontal coordinates in New York Central Zone State Plane, North American Datum 1983
Elevations in North American Vertical Datum 1988

* Monitoring wells MW-02, MW-04 and MW-08A were excluded from the groundwater contour map.

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 Former Bright Outdoors Site was first occupied in 1966 by Royal Crown Bottling/7-Up Bottling Co./Hanyak Liquidating Corp. from 1966 to 1984 as a soft drink bottling plant.

The property was owned by American Pipe & Plastics, Inc. (APPI), from 1984 to 2001. Bright Outdoors, Inc. (a wholly owned subsidiary of APPI), occupied the Site from 1984 to 1996 and assembled casual outdoor furniture from polyvinyl chloride (PVC) pipe and vinyl-coated polyester upholstery from 1984 to 1990. From 1990 to 1996, Bright Outdoors manufactured consumer sporting goods from PVC pipe. Operations by Bright Outdoors used small quantities of various materials containing numerous chemical solvents. Several of the materials used contained trichloroethane (TCA), 2-butanone, acetone, and toluene, which were detected in samples collected from various environmental media.

From about 1991 to 1993, a portion of the facility was leased from APPI by Royal Equipment, Inc., a separate business that remanufactured heavy equipment (e.g., haul trucks, shovels, and loaders) and supplied new and used mining parts.

Impact Sports Equipment, Inc. (separate business from APPI) leased from APPI and operated at the Site from about 1996-2001. Impact Sports Equipment, Inc. manufactured plastic sporting equipment used in baseball, hockey, volleyball, and other sports.

In 2001, the property was purchased by 631 Field Street, LP. SamScreen, Inc., which manufactured wire screening for use in the mining and aggregate industry, and operated at the Site from 2001 to 2005.

In 1991, VOC contamination was first detected in Johnson City's municipal well field at Camden Street Well Field approximately 0.6 miles southwest of the Former Bright Outdoors Site (Figure 1). Two chlorinated volatile organic compounds (cVOCs)—1,1,1-trichloroethane (1,1,1-TCA) and trichloroethene (TCE) were detected at a concentration above NYSDEC's standard, criteria, and guidance (SCG) value of 5 parts per billion (ppb) in a sample collected from of the Johnson City Water Department's Well No. 3. In July 1991, TCA was detected at concentrations (8 ppb and 12 ppb) above the SCG value in samples collected from Well No. 3. Prior to 1991, TCA had been detected sporadically in various Johnson City Water Department wells at concentrations below the SCG value.

In 1991 a hydrogeologic assessment of the area surrounding the Camden Street Well Field, north of Main Street was performed in order to identify the source of the contamination and collect data required for an emergency remedial action that concluded in the construction of the VOC removal system known as an air stripper. The Contaminant Source Investigation identified TCA in several monitoring wells at concentrations similar to those detected in the municipal wells and concluded that the source area appeared to lie to the north.

A subsequent report in 1992 for the Village of Johnson City included field analysis of water table samples, the installation and sampling of additional monitoring wells, and re-sampling of the original wells. A total of 58 groundwater samples from eight areas were collected from near the mouth of Little Choconut Creek northward. As a result of the investigation, two additional areas of significant TCA contamination were identified: along Main Street at the comer of Oakdale Road and around the north and south sides of the building at this location. At the Main Street location, 11 samples were collected with TCA present in seven samples at concentrations ranging from 1.6 to 5.1 ppb. Along Oakdale Road, 25 locations were sampled with TCA present in all samples at concentrations ranging from less than 0.5 to 68 ppb.

In August 1994 a 4,000-gallon underground storage tank (UST) was identified as the cause of a petroleum spill at the Former Bright Outdoors Site (Spill No. 9407388). The UST was removed, and Spill No. 9407388 was closed on October 31, 1994.

In 1994 and 1995, the United States Geological Survey (USGS) conducted hydrogeologic studies to collect water level and water quality data in order to delineate areas that contribute groundwater to the Camden Street Well Field and to establish the areal extent of VOC contamination in the aquifer. The USGS installed additional wells and sampled numerous existing wells throughout the area. TCA was detected in 13 of 18 points sampled along Field Street at concentrations ranging from 2 ppb to 445 ppb. TCA was detected at concentrations above 100 ppb along a line eastward from Marie Street to the area between the Former Bright Outdoors and Innovation Associates buildings. The USGS study concluded that the area contributing groundwater to the Camden Street Well Field is approximately 1.5 square miles and includes the area of the Former Bright Outdoors site and that the primary source area of TCA contamination in the Camden Street Well Field was an unknown location north of Field Street. Air Force Plant 59, located approximately 1,000 feet northeast of the Camden Street Well Field, was identified as a secondary contributor.

In 1995, the Department and the NYSDOH began to investigate the two adjacent companies located along Field Street: Bright Outdoors (631 Field Street) and Innovation Associates (627 Field Street). Groundwater samples were collected along the northern boundary of both properties and one location near the east side of the Innovation Associates property. Groundwater samples collected from along the northern boundary ranged from non-detect to 52 ppb for TCA, with the highest concentration detected near the loading dock of Innovation Associates. On the east side of Innovation Associates, TCA concentrations ranged from non-detect to 270 ppb. TCE concentrations along the east side of Innovation Associates ranged from non-detect to 170 ppb.

In 1996, the levels of TCA and TCE along the eastern border had dropped significantly to 12 ppb and 10 ppb, respectively.

In 1997, an Immediate Investigation Work Assignment was conducted by the NYSDEC in an attempt to identify other potential sources of groundwater contamination. Sampling was conducted at 23 locations in the surrounding area of the Former Bright Outdoors Site. Sixteen soil samples were collected, but VOCs were not detected. Groundwater samples were collected at depths of 12 to 25 feet below ground surface (bgs), and chlorinated VOCs were detected at several locations with a maximum concentration of 260 ppb of TCA. The highest concentrations of TCA and TCE were present on the south side of Field Street, southwest of Bright Outdoors. However, low levels of both compounds were also detected south and east of Innovation Associates.

In 2000, a Phase 1 Environmental Site Assessment (ESA) was conducted at the subject property. The report concluded that "There were no readily apparent indications of environmental liabilities such as release of petroleum and/or hazardous substances," with exception of the petroleum spill which was previously closed in 1994.

In 2001 and 2002, a Preliminary Site Assessment (PSA) was conducted on behalf of the NYSDEC in order to determine if a site in the Field Street area should be listed as an inactive hazardous waste site. Vertical profile soil borings were drilled, and groundwater samples were collected at various depths both upgradient and downgradient of both the Bright Outdoors and Innovation Associates buildings.

The information collected lead to the listing of the Former Bright Outdoors Site on the Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 in August 2002. A Class 2 site is where the disposal of a consequential quantity of hazardous waste has been confirmed and the presence of such hazardous waste or its components or breakdown products represent a significant threat to the environment or to human health.

A Remedial Investigation (RI) was completed between June 2004 and March 2005 to determine the nature and the extent of the contamination. The 2005 RI identified areas of contamination on the Former Bright Outdoors Site. The detection of TCA in multiple media beneath the floor of the Welding (Plate) room and the presence of TCE in vadose-zone soil beneath the Storage Area indicates that these were areas where release of contaminants had occurred (Figure 2). It should be noted that TCA was detected in the groundwater along the eastern fence line of the Former Bright Outdoors site, which may be emanating from beneath the Former Bright Outdoors building or an additional upgradient, off-site source.

The Record of Decision (ROD) was signed by NYSDEC and accepted by the NYSDOH in 2007 (NYSDEC 2007). Three soil vapor extraction (SVE) treatment systems were installed in April and May 2010 at the warehouse building to collect 1,1,1-TCA and TCE contaminated sub-slab vapors and exhaust them above the roof line. Twelve sub-slab vapor monitoring points and eight groundwater monitoring wells have been installed for site monitoring. The remedial treatment system was commissioned on May 18, 2010.

A Final Engineering Report (FER) for the installation and compliance to the Scope of Work and Technical Specifications was originally submitted to NYSDEC in October 2010 (EEEPC 2010). The FER was revised to conform to DER 10 requirements (NYSDEC 2010) and resubmitted to NYSDEC in June 2012 (EEEPC 2012).

The NYSDEC approved the FER in 2012 which constituted final approval of the NYSDEC's decision to reclassify the Site to a Class 4 in Registry of Inactive Hazardous Waste Disposal Sites. A Site is designated as a Class 4 Site if it has been properly closed but requires continued site management consisting of operation, maintenance and/or monitoring.

In February 2016, the on-site SVE system was shut down following the necessary sampling events. As approved by the NYSDEC, the system was to remain off as the building was identified as vacant. One off-site SSDS system was installed by the NYSDEC at 145 Marie Street. As the off-site SSDS is managed under a separate state-wide contract, specific inspection and maintenance procedures and schedules for this system are not addressed within this SMP.

Groundwater monitoring conducted as part of the Remedial Investigation/Feasibility Study (RI/FS) and subsequent post-remedial action groundwater sampling completed in August 2017 indicated that residual chlorinated VOC contamination remains at the Site at concentrations below applicable NYSDEC SCGs. In addition, soil vapor sampling indicates residual chlorinated VOC contamination remains in soil vapor at the Site.

In March 2019, the Site was occupied and being renovated by U-Haul for use as a moving and storage facility. During this time, it was observed that renovations included installation of storage lockers and the removal and addition of walls.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Record of Decision dated March 23, 2007 are as follows:

To eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to contaminated subsurface soils or contaminated soil vapors that may be released if excavation or other construction is undertaken below the building;
- the release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards; and
- the release of contaminants from beneath the building into indoor air through soil vapor intrusion.

To attain to the extent practicable:

- ambient groundwater quality standards; and
- a minimization of the potential for soil vapor intrusion to occur.

2.5 Remaining Contamination

2.5.1 Groundwater

VOC Results in Groundwater

All concentrations of VOCs detected during the March 2019 sampling event were detected at concentrations below the Class GA Standards with the exception of one well which exhibited a slight exceedance of 1,1,1-TCA (5.2 ug/l in MW-05) as presented in **Table 2-2.** For comparison, previous sampling results for each well are shown in **Table 2-3.** Based upon a review of all available historical data, overall groundwater concentrations have exhibited a decreasing trend since implementation of the remedy in 2010.

1.4-Dioxane Results in Groundwater

1,4-Dioxane was not detected in monitoring wells MW-05 and MW-08A in the September 2017 groundwater sampling event. **Table 2-3** presents the 1,4-Dioxane analytical data for monitoring wells MW-05 and MW-08A.

PFAS Results in Groundwater

PFAS sampling was completed as part of the September 2017 groundwater sampling event. Concentrations of PFAS were not detected in the sample collected from MW-05 exceeding the screening criteria presented in NYSDEC's January 2020 Guidelines for Sampling and Analysis of PFAS Under NYSDEC’s Part 375 Remedial Programs; however, PFOS was detected in MW-08A at 13 ng/L, exceeding the screening criteria. **Table 2-3** presents the PFAS analytical data for monitoring wells MW-05 and MW-08A.

Table 2-2
Former Bright Outdoors Site Groundwater Sample Results
Volatile Organic Compounds

Sample ID Sampling Date Units	MW-02 3/27/2019 ug/l	MW-03 3/27/2019 ug/l	MW-04 3/27/2019 ug/l	MW-05 3/27/2019 ug/l	MW-06 3/27/2019 ug/l	MW-07 3/27/2019 ug/l	MW-08A* 3/27/2019 ug/l	NYSDEC Class GA Standard or Guidance Value ug/l
VOLATILE ORGANIC COMPOUNDS								
1,1,2-Trichloro-1,2,2-trifluoroethane	U	U	U	U	U	U	U	5
1,1,1-Trichloroethane	U	1.0 J	U	**5.2 J**	U	U	0.84 J	5
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	5
1,1,2-Trichloroethane	U	U	U	U	U	U	U	1
1,1-Dichloroethane	U	0.45 J	0.45 J	4.3	3.1	U	U	5
1,1-Dichloroethene	U	U	U	2.9	0.79 J	U	U	5
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	5
1,2-Dibromo-3-Chloropropane	U	U	U	U	U	U	U	0.04
1,2-Dibromoethane	U	U	U	U	U	U	U	0.0006
1,2-Dichlorobenzene	U	U	U	U	U	U	U	3
1,2-Dichloroethane	U	U	U	U	U	U	U	0.6
1,2-Dichloropropane	U	U	U	U	U	U	U	1
1,3-Dichlorobenzene	U	U	U	U	U	U	U	3
1,4-Dichlorobenzene	U	U	U	U	U	U	U	3
2-Hexanone	U	U	U	U	U	U	U	50
Acetone	U	U	U	U	U	U	U	50
Benzene	U	U	U	U	U	U	U	1
Bromodichloromethane	U	U	U	U	U	U	U	50
Bromoform	U	U	U	U	U	U	U	50
Bromomethane	U	U	U	U	U	U	U	5
Carbon Disulfide	U	U	U	U	U	U	U	60
Carbon Tetrachloride	U	U	U	U	U	U	U	5
Chlorobenzene	U	U	U	U	U	U	U	5
Chloroethane	U	U	U	0.40 J	U	U	U	5
Chloroform	U	U	U	U	U	U	U	7
Chloromethane	U	U	U	U	U	U	U	5
Cis-1,2-Dichloroethylene	U	U	U	U	2.8	U	U	5
Cis-1,3-Dichloropropene	U	U	U	U	U	U	U	0.4
Cyclohexane	U	U	U	U	U	U	U	--

See next page for footnotes.

Table 2-2
Former Bright Outdoors Site Groundwater Sample Results
Volatile Organic Compounds

Sample ID / Sampling Date / Units	MW-02 3/27/2019 ug/l	MW-03 3/27/2019 ug/l	MW-04 3/27/2019 ug/l	MW-05 3/27/2019 ug/l	MW-06 3/27/2019 ug/l	MW-07 3/27/2019 ug/l	MW-08A* 3/27/2019 ug/l	NYSDEC Class GA Standard or Guidance Value ug/l
Dibromochloromethane	U	U	U	U	U	U	U	50
Dichlorodifluoromethane	U	U	U	U	U	U	U	5
Ethylbenzene	U	U	U	U	U	U	U	5
Isopropylbenzene	U	U	U	U	U	U	U	5
Methyl Acetate	U	U	U	U	U	U	U	--
Methyl Ethyl Ketone	U	U	U	U	U	U	U	50
Methyl Isobutyl Ketone	U	U	U	U	U	U	U	--
Methylcyclohexane	U	U	U	U	U	U	U	--
Methylene Chloride	U	U	U	U	U	U	U	5
Styrene	U	U	U	U	U	U	U	5
Tert-Butyl Methyl Ether	U	U	U	U	U	U	U	10
Tetrachloroethylene	U	U	U	U	U	U	U	5
Toluene	U	U	U	U	0.78	U	U	5
Trans-1,2-Dichloroethene	U	U	U	U	U	U	U	5
Trans-1,3-Dichloropropene	U	U	U	U	U	U	U	0.4
Trichloroethylene	1.2 J	1.2 J	0.84 J	4.9 J	U	U	0.95 J	5
Trichlorofluoromethane	U	U	U	U	U	U	U	5
Vinyl Chloride	U	U	U	U	U	U	U	2
Xylenes, Total	U	U	U	U	U	U	U	5
Total Volatile Compounds	1.2	2.65	1.29	17.7	7.47	0	1.79	--

Footnotes/Qualifiers:
ug/l: Micrograms per liter
--: No standard
U: Analyzed for but not detected
J: Estimated value
Exceeds Class GA Standard or Guidance Value
*It should be noted that MW-08A was identified as MW-08 in the lab data packages.

D&B Engineers and Architects, P.C.

Compound	1,1,1 Trichloroethane	Trichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	1,4-Dioxane	Perfluorobutanesulfonic acid (PFBS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorononanoic acid (PFNA)
units	µg/L	µg/L	µg/L	µg/L	µg/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
Action Level*	5.0	5.0	5.0	5.0	0.67	NC	NC	NC	Sum of PFOS and PFOA = 70		NC
Well ID / Date											
MW-01											
Feb-16	ell Destroyed										
Jul-15	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-15	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-14	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Mar-14	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-13	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-13	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Mar-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-02											
Apr-16	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Feb-16	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-15	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-15	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-14	4.0	7.1	0.38	ND	NS	NS	NS	NS	NS	NS	NS
Mar-14	2.3	4.0	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-13	3.9	5.3	0.79	ND	NS	NS	NS	NS	NS	NS	NS
Jan-13	3.6	5.5	0.45	ND	NS	NS	NS	NS	NS	NS	NS
Mar-12	3.4	6.3	ND	6.3	NS	NS	NS	NS	NS	NS	NS
MW-03											
Apr-16	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Feb-16	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-15	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-15	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-14	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Mar-14	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-13	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-13	2.5	2.2	0.47	ND	NS	NS	NS	NS	NS	NS	NS
Mar-12	1.9	1.9	ND	1.9	NS	NS	NS	NS	NS	NS	NS

Compound	1,1,1 Trichloroethane	Trichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	1,4-Dioxane	Perfluorobutanesulfonic acid (PFBS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorononanoic acid (PFNA)
units	µg/L	µg/L	µg/L	µg/L	µg/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
Action Level*	5.0	5.0	5.0	5.0	0.67	NC	NC	NC	Sum of PFOS and PFOA = 70		NC
MW-04											
Apr-16	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Feb-16	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-15	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-15	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-14	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Mar-14	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-13	ND	0.74	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-13	2.5	2.8	ND	ND	NS	NS	NS	NS	NS	NS	NS
Mar-12	1.8	3.1	ND	3.1	NS	NS	NS	NS	NS	NS	NS
MW-05											
Aug-17	ND	ND	ND	ND	ND	2.9	5.9	0.82 J	7.3	9.0	ND
Feb-17	4.0	1.5	0.94 J	ND	NS	NS	NS	NS	NS	NS	NS
Apr-16	8.8	3.3	2.2	ND	NS	NS	NS	NS	NS	NS	NS
Feb-16	14	7.4	4.8	0.43	NS	NS	NS	NS	NS	NS	NS
Jul-15	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-15	3.3	1.2	0.48	ND	NS	NS	NS	NS	NS	NS	NS
Jul-14	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Mar-14	1.1	0.48	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-13	19	5.9	4.9	ND	NS	NS	NS	NS	NS	NS	NS
Jan-13	24	11.0	8.2	ND	NS	NS	NS	NS	NS	NS	NS
Mar-12	29	12	5	12	NS	NS	NS	NS	NS	NS	NS
MW-06											
Apr-16	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Feb-16	ND	ND	ND	0.59	NS	NS	NS	NS	NS	NS	NS
Jul-15	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-15	ND	ND	ND	1.2	NS	NS	NS	NS	NS	NS	NS
Jul-14	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Mar-14	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-13	ND	ND	ND	1.1	NS	NS	NS	NS	NS	NS	NS
Jan-13	12	8.9	4.5	0.7	NS	NS	NS	NS	NS	NS	NS
Mar-12	10	7.2	2.2	7.2	NS	NS	NS	NS	NS	NS	NS
MW-07											
Feb-17	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Apr-16	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Feb-16	1.0	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-15	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-15	1.5	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-14	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Mar-14	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-13	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-13	1.3	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Mar-12	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS

Compound	1,1,1 Trichloroethane	Trichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	1,4-Dioxane	Perfluorobutanesulfonic acid (PFBS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorononanoic acid (PFNA)
units	µg/L	µg/L	µg/L	µg/L	µg/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
Action Level*	5.0	5.0	5.0	5.0	0.67	NC	NC	NC	Sum of PFOS and PFOA = 70		NC
MW-08											
Aug-17	0.34 J	2.4	ND	ND	ND	2.50	4.6	ND	4.4	13	ND
Feb-17	1.0	1.5	ND	ND	NS	NS	NS	NS	NS	NS	NS
Apr-16	ND	1.1	ND	ND	NS	NS	NS	NS	NS	NS	NS
Feb-16	0.84	1.2	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-15	0.83	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-15	ND	2.4	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-14	1.1	2.6	ND	ND	NS	NS	NS	NS	NS	NS	NS
Mar-14	ND	2.6	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jul-13	ND	13	ND	ND	NS	NS	NS	NS	NS	NS	NS
Jan-13	2.3	6.2	ND	ND	NS	NS	NS	NS	NS	NS	NS
Mar-12	ND	ND	ND	20	NS	NS	NS	NS	NS	NS	NS

Concentrations marked with "J" are laboratory estimated values

Summary of laboratory groundwater analysis for 1,4-Dioxane and PFCs by Methods EPA 8260C and EPA 537 respectively

Summary of groundwater VOCs by laboratory analysis Method 8260B

ND - Not Detected above the laboratory minimum detection limit

NS - Not Sampled

*Action Levels include:

USEPA Lifetime Health Advisory for the sum of PFOS and PFOA = 70 ng/L

Result exceeds Action Level

EPA screening level in tap water for 1,4-Dioxane is 0.67 µg/L

2.5.2 Soil Vapor

According to the February 2012 FER, sub-slab soil vapor and SVE treatment system stack sampling was performed in August of 2010. The sub-slab soil vapor samples had 1,1,1-TCA concentrations that ranged from 0.55 to 670 micrograms per cubic meter (µg/m3). TCE concentrations in the samples remained relatively low, except for SS-111, which had a concentration of 1,400 µg/m3. Three discharge stack samples were collected along the west side of the warehouse/production area. The analytical results for the samples show that 1,1,1-TCA concentrations ranged from 200 to 420 µg/m3, with the highest concentration in the sample from Stack No. 1 (SSDS-01). TCE concentrations ranged from 5.7 to 6,000 µg/ m3, with the highest concentration in the sample from Stack No. 3 (SSDS-03). Table 2-5 summarizes the results of soil vapor and ambient air samples that were collected after completion of the remedial action.

A sampling event was completed in February 2017. The following conclusions were made following the evaluation of the February 2017 data:

- Ambient-Indoor air samples identified low concentrations of TCE, DCA, and carbon tetrachloride.
  - Carbon tetrachloride has not been recognized by the site management plan as a site-related contaminant of concern (COC) (Aztech, 2017).
- According to decision Matrix A of the New York State Department of Health (NYSDOH), a comparison of the indoor air samples to sub-slab samples for carbon tetrachloride and TCE resulted in a recommendation of mitigation as the action to minimize the current and potential exposures associated with soil vapor intrusion.
- According to decision Matrix B, a comparison of the indoor air samples to the sub-slab samples for PCE and 1,1,1-TCA resulted in a recommendation of no further action.

In March 2019, a round of indoor air sampling was completed at the on-site building. Two indoor air samples and one ambient air sample were collected on March 27, 2019. Additionally, the ambient outdoor sample was collected in an observed upwind direction. All of the samples were collected for laboratory analysis of VOCs via United State Environmental Protection Agency (USEPA) Method TO-15.

Indoor air samples FBO-IA01-MAR19 and FBO-IA02-MAR19 exhibited several contaminants of concern. Several of the VOC's identified within the indoor ambient air samples indicate that the presence of these compounds may be related to residual on-site sources, such as cleaning products, solvents and, petroleum-based compounds. The ambient air sample FBO-AA01-MAR19 also had several contaminants of concern detected which may be due to the presence of cleaning products, solvents and petroleum-based compounds within the vicinity of the sample. Table 2-4 and Figure 4 summarize the results and locations of the indoor air samples that were collected during this sampling event.

The indoor air samples collected in March 2019 indicated carbon tetrachloride concentrations ranging from 0.25 to 0.44 μg/m3. The outdoor air sampled collected upwind from the Site indicated carbon tetrachloride concentrations of 0.42 μg/m3. These samples also indicated both 1,1,1-TCA and TCE concentrations were below the laboratory method detection limits (MDL). The MDL for 1,1,1-TCA was 0.37 μg/m3 and the MDL for TCE was 0.20 μg/m3.

In January 2020, a round of sub-slab soil vapor and SVE stack discharge samples were collected from the on-site building. Seven sub-slab soil vapor samples and three SVE discharge stack samples were collected between January 20 and 21, 2020. All of the samples were collected for laboratory analysis of VOCs via USEPA Method TO-15.

All seven sub-slab soil vapor samples exhibited several contaminants of concern. One sub-slab soil vapor sample (FBO-SS-111) exhibited a trichloroethene (TCE) concentration above the NYSDOH AGVs with a detection of 410 ug/m3, exceeding the AGV of 2 ug/m3. According to decision Matrix A of the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in New York State, and based on the concentration of TCE detected in FBO-SS-111 mitigation is still required to minimize the current and potential exposures associated with soil vapor intrusion. It should be noted that while several contaminants of concern were detected, no exceedances were exhibited in the three SVE stack discharge samples collected. Table 2-6 summarizes the results of the January 2020 sub-slab soil vapor and stack discharge sampling event. Figure 4 depicts the sampling locations of the sub-slab soil vapor and stack discharge samples.

Table 2-4
Former Bright Outdoors
Indoor and Ambient Air Samples
Volatile Organic Compounds (VOCs)

Sample ID / Sampling Date / Units	FBO-IA01-MAR19	FBO-IA02-MAR19	FBO-AA01-MAR19
Sampling Date	03/27/19	03/27/19	03/27/19
Units	ug/m^3	ug/m^3	ug/m^3
1,1,1-Trichloroethane	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.51 J	0.52 J	0.5 J
1,1,2-Trichloroethane	U	U	U
1,1-Dichloroethane	U	U	U
1,1-Dichloroethene	U	U	U
1,2,4-Trichlorobenzene	U	U	U
1,2,4-Trimethylbenzene	2.1	1.1	U
1,2-Dibromoethane (Ethylene Dibromide)	U	U	U
1,2-Dichlorobenzene	U	U	U
1,2-Dichloroethane	U	U	U
1,2-Dichloropropane	U	U	U
1,2-Dichlorotetrafluoroethane	U	U	U
1,3,5-Trimethylbenzene (Mesitylene)	0.52 J	0.35 J	U
1,3-Butadiene	U	U	U
1,3-Dichlorobenzene	U	U	U
1,4-Dichlorobenzene	U	U	U
1,4-Dioxane (P-Dioxane)	U	U	U
2,2,4-Trimethylpentane	U	U	U
2-Chlorotoluene	U	U	U
2-Hexanone	U	U	U
3-Chloropropene	U	U	U
4-Ethyltoluene	0.56 J	0.36 J	U
Acetone	25	25	U
Benzene	0.48 J	0.45 J	0.33 J
Benzyl Chloride	U	U	U
Bromodichloromethane	U	U	U
Bromoethene	U	U	U
Bromoform	U	U	U
Bromomethane	U	U	U
Carbon Disulfide	U	U	U
Carbon Tetrachloride	0.44	0.25	0.42
Chlorobenzene	U	U	U
Chlorodifluoromethane	0.95 J	1 J	1 J
Chloroethane	U	U	U
Chloroform	U	U	U
Chloromethane	1.1	1.2	1.2
Cis-1,2-Dichloroethylene	0.18 J	U	U
Cis-1,3-Dichloropropene	U	U	U
Cyclohexane	U	U	U
Cymene	U	U	U
Dibromochloromethane	U	U	U
Dichlorodifluoromethane	2.9	2.9	2.8
Ethylbenzene	0.86 J	0.6 J	U
Hexachlorobutadiene	U	U	U
Isopropanol	U	U	U
Isopropylbenzene (Cumene)	U	U	U
M,P-Xylenes	4	2.6	U
Methyl Ethyl Ketone (2-Butanone)	2.6	1.3 J	U

See next page for footnotes.

Table 2-4
Former Bright Outdoors
Indoor and Ambient Air Samples
Volatile Organic Compounds (VOCs)

Sample ID / Sampling Date / Units	FBO-IA01-MAR19	FBO-IA02-MAR19	FBO-AA01-MAR19
Sampling Date	03/27/19	03/27/19	03/27/19
Units	ug/m^3	ug/m^3	ug/m^3
VOCs continued			
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	U	U	U
Methyl Methacrylate	U	U	U
Methylene Chloride	0.98 J	1 J	1 J
Naphthalene	U	U	U
n-Butane	3.4	7.3	1.1 J
N-Butylbenzene	U	U	U
N-Heptane	U	U	U
N-Hexane	U	U	U
N-Propylbenzene	U	U	U
O-Xylene (1,2-Dimethylbenzene)	0.86 J	0.57 J	U
Sec-Butylbenzene	U	U	U
Styrene	U	U	U
T-Butylbenzene	U	U	U
Tert-Butyl Alcohol	U	U	U
Tert-Butyl Methyl Ether	U	U	U
Tetrachloroethylene(PCE)	U	U	U
Tetrahydrofuran	U	U	U
Toluene	4.3	3.1	U
Trans-1,2-Dichloroethene	U	U	U
Trans-1,3-Dichloropropene	U	U	U
Trichloroethylene (TCE)	U	U	U
Trichlorofluoromethane	1.5	1.6	1.5
Vinyl Chloride	U	U	U
Xylenes, Total	4.9	3.2	U

Qualifiers:

U: Analyzed but not detected

J: Estimated value

Notes:

ug/m^3: Micrograms per cubic meter

Table 2-5
Summary of Soil Vapor and Ambient Air
Labratory Analysis (ug/m3)

Well ID / DATE	Compound		
	Tetrachloroethene	1,1,1 Trichloroethane	Trichloroethene
SS 101			
*Feb-17	ND	350	2.3
*Apr-16	ND	83	1.3
Feb-16	24	2.1	0.55
Jul-15	ND	5.8	ND
Jan-15	3.7	2.3	0.45
Jul-14	3.1	19	6.5
Mar-14	1.9	2.1	0.70
Jul-13	1.5	23	5.6
Jan-13	ND	150	5.4
SS 102			
*Feb-17	ND	770	ND
*Apr-16	ND	300	ND
Feb-16	26	5.2	ND
Jul-15	ND	7.7	ND
Jan-15	ND	4.5	ND
Jul-14	1.9	ND	2.4
Mar-14	2.0	4.6	ND
Jul-13	ND	260	ND
Jan-13	ND	48	ND
SS 103			
*Feb-17	ND	370	ND
*Apr-16	ND	170	ND
Feb-16	19	ND	ND
Jan-15	ND	15	ND
Jul-14	1.6	0.64	2.6
Mar-14	2.1	ND	ND
Jul-13	ND	ND	0.85
Jan-13	ND	2.0	ND
SS 104			
*Feb-17	ND	190	2.7
*Apr-16	0.61	170	2.2
Feb-16	110	46	1.7
Jan-15	ND	50	1.4
Jul-14	2.8	130	15
Mar-14	2.7	48	2.8
Jul-13	ND	350	47
Jan-13	ND	150	5.2

Table 2-5
Summary of Soil Vapor and Ambient Air
Labratory Analysis (ug/m3)

Well ID / DATE	**Compound**		
	Tetrachloroethene	1,1,1 Trichloroethane	Trichloroethene
SS 105			
*Feb-17	ND	980	ND
*Apr-16	3.8	310	0.74
Feb-16	22	12	ND
Jan-15	2.3	18	ND
Mar-14	3.2	11	ND
Jul-13	21	100	1.9
Jan-13	4.1	38	0.42
SS 106			
Jul-14	5.2	43	3.9
SS 107			
*Feb-17	ND	71	ND
*Apr-16	ND	98	ND
Feb-16	43	74	ND
Jan-15	1.1	280	ND
Jul-14	ND	380	4.1
Mar-14	2.5	51	ND
Jul-13	4.6	570	0.42
Jan-13	NS	NS	NS
SS 108			
*Feb-17	ND	14	ND
*Apr-16	ND	16	0.37
Feb-16	29	12	0.25
Jan-15	ND	20	0.43
Jul-14	ND	43	4.6
Mar-14	6.6	45	0.92
Jul-13	NS	NS	NS
Jan-13	2.6	15	1.6
SS 109			
Mar-14	Carpet installed over port		
Jul-13	ND	56	2.2
Jan-13	NS	NS	NS
SS 111			
*Feb-17	ND	ND	1,700
*Apr-16	ND	ND	1300
Feb-16	27	5.4	340
Jan-15	ND	ND	110
Jul-14	2.0	2.8	180
Mar-14	2.0	0.87	76
Jul-13	ND	7.8	290
Jan-13	ND	ND	220

Table 2-5
Summary of Soil Vapor and Ambient Air
Labratory Analysis (ug/m3)

Well ID / DATE	Compound		
	Tetrachloroethene	1,1,1 Trichloroethane	Trichloroethene
SS 112			
*Feb-17	ND	17	ND
*Apr-16	ND	11	ND
Feb-16	26	0.51	ND
Jan-15	ND	0.70	ND
Jul-14	7.1	3.2	3.4
Mar-14	1.1	ND	ND
Jul-13	1.0	4.7	2.0
Jan-13	ND	7.9	ND
North Stack #1			
Feb-16	13	8.7	0.23
Jan-15	0.62	6.6	ND
Jul-14	3.0	100	5.0
Mar-14	1.8	7.4	ND
Jul-13	ND	220	3.3
Jan-13	ND	270	0.76
Center Stack #2			
Feb-16	14	6.6	ND
Jan-15	0.91	4.0	ND
Jul-14	3.5	56	5.1
Mar-14	1.1	5.5	ND
Jul-13	ND	100	1.8
Jan-13	ND	23	ND
Southern Stack #3			
Feb-16	16	3.8	57
Jan-15	0.96	6	95
Jul-14	5.5	46	650
Mar-14	50	19	2.0
Jul-13	NS	NS	NS
Jan-13	ND	21	400
Indoor Air 201			
*Feb-17	ND	ND	ND
*Apr-16	ND	ND	ND
Feb-16	33	ND	0.42
Jan-15	0.98	ND	ND
Jul-14	ND	ND	0.48
Mar-14	ND	ND	0.30
Jul-13	1.1	ND	0.77
Jan-13	ND	ND	ND

Table 2-5
Summary of Soil Vapor and Ambient Air
Labratory Analysis (ug/m3)

Well ID / DATE	**Compound**		
	Tetrachloroethene	1,1,1 Trichloroethane	Trichloroethene
Indoor Air 202			
*Feb-17	ND	ND	ND
*Apr-16	ND	ND	0.57
Feb-16	25	ND	ND
Jan-15	ND	ND	ND
Jul-14	ND	ND	0.48
Mar-14	0.95	ND	ND
Jul-13	ND	ND	0.84
Jan-13	ND	ND	ND
Indoor Air 203			
*Feb-17	ND	ND	ND
*Apr-16	ND	ND	0.25
Feb-16	19	ND	ND

Notes:
ND - Not Detected above the laboratory minimum detection limit
NS - Not Sampled
Analysis by TO-15
*sampling with SVE system off

Table 2-5 - Summary of Sub Slab Vapor vs. Indoor and Outdoor Vapor Concentrations (ug/m3)

Summary of Sub Slab Vapor vs. Indoor and Outdoor Vapor Concentration (ug/m3) - February, 2017																	
	OA 310	IA 201	IA 201.1	IA 201.2	IA 202	IA 203	IA 204	SS 101	SS 102	SS 103	SS 104	SS 105	SS 107	*DUP	SS 108	SS 111	SS 112
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	350	770	370	190	980	71	84	14	ND	17
1,1,2-Trichlorotrifluoroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.85	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.7	0.45	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	0.56	0.59	1.3	1.0	1.1	1.3	ND	ND	ND	ND	ND	ND	0.42	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	1.3	1.3	0.93	1.1	2.6	ND	ND	ND	ND	ND	ND	1.6	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	1.7	82	4.6	ND	ND	0.90	3.0	ND	ND	ND	ND	ND	1.6	ND	1.2	ND	ND
Benzene	0.64	1.1	1.3	1.4	1.90	2.0	2.2	ND	ND	ND	ND	ND	0.42	0.44	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.36	0.47	0.52	0.50	0.51	0.48	0.52	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	1.0	0.82	0.91	0.99	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	3.9	4.4	4.3	2.5	2.4	0.48	ND	ND	ND	1.6	ND	1.4	2.3	0.94	ND	1.8
Ethanol	6	6.4	7.4	11	6.8	6.6	12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	0.35	0.38	0.93	0.59	0.57	0.78	ND	ND	ND	0.36	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	1.0	0.72	2.1	0.90	0.91	0.78	ND	ND	ND	1.0	ND	ND	ND	0.88	ND	ND
m-Xylene & p-Xylene	1.1	1.3	1.4	3.3	2.1	2.1	2.7	ND	ND	ND	1.3	ND	0.61	0.69	0.59	ND	ND
n-Hexane	ND	ND	ND	ND	0.84	0.87	0.80	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	0.39	0.49	0.57	1.3	0.86	0.79	1.1	ND	ND	ND	0.47	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-Butyl alcohol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	1.6	1.7	1.8	5.1	2.7	2.5	3.1	ND	ND	ND	1.3	ND	0.88	0.80	1.1	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	0.22	2.3	ND	ND	2.7	ND	ND	ND	ND	1700	ND
Trichlorofluoromethane	ND	1.4	1.4	1.5	1.5	1.5	0.65	14.0	ND	ND	2.7	ND	0.94	1.7	2.6	ND	0.94

Notes:

ND = Not detected above the laboratory minimum detection limit

*DUP: Duplicate of SS 107

Table 2-6
Former Bright Outdoors
Summary of Soil Vapor Analytical Results
Volatile Organic Compounds

Sample ID Sampling Date Units	FBO-SS-102 01/20/20 ug/m3	FBO-SS-104 01/20/20 ug/m3	FBO-SS-107 01/20/20 ug/m3	FBO-SS-108 01/20/20 ug/m3	FBO-SS-111 01/20/20 ug/m3	NYSDOH Air Guideline Value ug/m3
1,1,1-Trichloroethane (TCA)	3.5	36	160	46	6.5	--
1,1,2,2-Tetrachloroethane	U	U	U	U	U	--
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.46 J	0.51 J	0.52 J	0.56 J	U	--
1,1,2-Trichloroethane	U	U	U	U	U	--
1,1-Dichloroethane	U	U	U	0.24 J	U	--
1,1-Dichloroethene	U	U	U	U	U	--
1,2,4-Trichlorobenzene	U	U	U	U	U	--
1,2,4-Trimethylbenzene	U	0.38 J	U	U	U	--
1,2-Dibromoethane (Ethylene Dibromide)	U	U	U	U	U	--
1,2-Dichlorobenzene	U	U	U	U	U	--
1,2-Dichloroethane	U	U	U	U	U	--
1,2-Dichloropropane	U	U	U	U	U	--
1,2-Dichlorotetrafluoroethane	U	U	U	U	U	--
1,3,5-Trimethylbenzene (Mesitylene)	U	U	U	U	U	--
1,3-Butadiene	0.21 J	0.33 J	U	U	U	--
1,3-Dichlorobenzene	U	U	U	U	U	--
1,4-Dichlorobenzene	U	U	U	U	U	--
1,4-Dioxane (P-Dioxane)	U	U	U	U	U	--
2-Hexanone	U	U	U	U	U	--
4-Ethyltoluene	U	U	U	U	U	--
Acetone	13	12 J	21	2.8 J	13 J	--
Benzene	0.86	1.1	0.24 J	U	U	--
Benzyl Chloride	U	U	U	U	U	--
Bromodichloromethane	U	U	U	U	U	--
Bromoform	U	U	U	U	U	--
Bromomethane	U	U	U	U	U	--
Carbon Disulfide	U	U	0.29 J	0.40 J	U	--
Carbon Tetrachloride	0.39 J	0.42 J	0.44 J	U	U	--
Chlorobenzene	U	U	U	U	U	--
Chloroethane	U	U	0.29 J	U	U	--
Chloroform	U	U	U	U	1.6 J	--
Chloromethane	0.92 J	0.72 J	0.94 J	0.23 J	U	--
Cis-1,2-Dichloroethylene	U	U	U	U	U	--
Cis-1,3-Dichloropropene	U	U	U	U	U	--
Cyclohexane	U	U	U	U	U	--

See next page for qualifiers and notes.

Table 2-6
Former Bright Outdoors
Summary of Soil Vapor Analytical Results
Volatile Organic Compounds

Sample ID / Sampling Date / Units	FBO-SS-102 01/20/20 ug/m3	FBO-SS-104 01/20/20 ug/m3	FBO-SS-107 01/20/20 ug/m3	FBO-SS-108 01/20/20 ug/m3	FBO-SS-111 01/20/20 ug/m3	NYSDOH Air Guideline Value ug/m3
Dibromochloromethane	U	U	U	U	U	--
Dichlorodifluoromethane	2.5	2.5	4.6	1.8 J	3.7 J	--
Ethanol	--	--	--	--	--	--
Ethyl Acetate	--	--	--	--	--	--
Ethylbenzene	U	0.41 J	U	U	U	--
Hexachlorobutadiene	U	U	U	U	U	--
Isopropanol	U	2.0 J	2.6 J	U	5.7 J	--
m,p-Xylene	0.76 J	1.2 J	U	U	U	--
Methyl Ethyl Ketone (2-Butanone)	0.48 J	0.37 J	1.2 J	0.53 J	2.2 J	--
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	U	U	U	U	U	--
Methylene Chloride	U	U	2.1	U	U	60
Naphthalene	U	U	U	U	U	--
N-Heptane	U	0.31 J	0.36 J	U	U	--
N-Hexane	U	U	6.1	U	U	--
O-Xylene (1,2-Dimethylbenzene)	0.21 J	0.35 J	U	U	U	--
Propylene	--	--	--	--	--	--
Styrene	U	U	U	U	U	--
Tert-Butyl Methyl Ether	U	U	U	U	U	--
Tetrachloroethylene (PCE)	U	0.32 J	0.35 J	U	U	30
Tetrahydrofuran	U	U	0.38 J	U	U	--
Toluene	1.4	2.2	0.57 J	U	U	--
Trans-1,2-Dichloroethene	U	U	U	U	U	--
Trans-1,3-Dichloropropene	U	U	U	U	U	--
Trichloroethylene (TCE)	U	0.29 J	U	0.40 J	**410**	2
Trichlorofluoromethane	1.3	1.3	1.6	4.3	1.4 J	--
Vinyl Acetate	--	--	--	--	--	--
Vinyl Chloride	U	U	U	U	U	--

Qualifiers:
U: Analyzed but not detected
J: Estimated value

Notes:
ug/m3: Micrograms per cubic meter
-- : Not calculated or no guideline value
Exceeds the maximum concentration of NYSDOH Air Guideline Value

D&B ENGINEERS AND ARCHITECTS, P.C.

Table 2-6
Former Bright Outdoors
Summary of Soil Vapor Analytical Results
Volatile Organic Compounds

Sample ID Sampling Date Units	FBO-SS-112 01/20/20 ug/m3	FBO-SSDS01 01/20/20 ug/m3	FBO-SSDS02 01/20/20 ug/m3	FBO-SSDS03 01/20/20 ug/m3	NYSDOH Air Guideline Value ug/m3
1,1,1-Trichloroethane (TCA)	1.2	21	19	U	--
1,1,2,2-Tetrachloroethane	U	U	U	U	--
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.52 J	0.48 J	0.49 J	0.49 J	--
1,1,2-Trichloroethane	U	U	U	U	--
1,1-Dichloroethane	U	0.31 J	0.49 J	U	--
1,1-Dichloroethene	U	U	U	U	--
1,2,4-Trichlorobenzene	U	U	U	U	--
1,2,4-Trimethylbenzene	U	U	U	0.36 J	--
1,2-Dibromoethane (Ethylene Dibromide)	U	U	U	U	--
1,2-Dichlorobenzene	U	U	U	U	--
1,2-Dichloroethane	U	U	U	0.21 J	--
1,2-Dichloropropane	U	U	U	U	--
1,2-Dichlorotetrafluoroethane	U	U	U	U	--
1,3,5-Trimethylbenzene (Mesitylene)	U	U	U	U	--
1,3-Butadiene	U	U	U	U	--
1,3-Dichlorobenzene	U	U	U	U	--
1,4-Dichlorobenzene	U	U	U	U	--
1,4-Dioxane (P-Dioxane)	U	U	U	U	--
2-Hexanone	U	U	U	U	--
4-Ethyltoluene	U	U	U	U	--
Acetone	U	4.4 J	9.9 J	11 J	--
Benzene	U	0.33 J	0.32 J	0.66	--
Benzyl Chloride	U	U	U	U	--
Bromodichloromethane	U	U	U	U	--
Bromoform	U	U	U	U	--
Bromomethane	U	U	U	U	--
Carbon Disulfide	U	U	6.3	0.42 J	--
Carbon Tetrachloride	0.39 J	0.39 J	0.40 J	0.60 J	--
Chlorobenzene	U	U	U	U	--
Chloroethane	U	U	U	U	--
Chloroform	U	0.20 J	U	U	--
Chloromethane	0.24 J	0.36 J	0.30 J	0.88 J	--
Cis-1,2-Dichloroethylene	U	U	U	U	--
Cis-1,3-Dichloropropene	U	U	U	U	--
Cyclohexane	U	U	U	U	--

See next page for qualfiers and notes.

Table 2-6
Former Bright Outdoors
Summary of Soil Vapor Analytical Results
Volatile Organic Compounds

Sample ID Sampling Date Units	FBO-SS-112 01/20/20 ug/m3	FBO-SSDS01 01/20/20 ug/m3	FBO-SSDS02 01/20/20 ug/m3	FBO-SSDS03 01/20/20 ug/m3	NYSDOH Air Guideline Value ug/m3
Dibromochloromethane	U	U	U	U	--
Dichlorodifluoromethane	2.6	2.3 J	3.9	2.0 J	--
Ethanol	--	--	--	--	--
Ethyl Acetate	--	--	--	--	--
Ethylbenzene	U	U	U	0.48 J	--
Hexachlorobutadiene	U	U	U	U	--
Isopropanol	U	U	1.5 J	1.9 J	--
m,p-Xylene	U	U	U	1.5 J	--
Methyl Ethyl Ketone (2-Butanone)	U	U	2.0	2.2	--
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	U	U	U	U	--
Methylene Chloride	U	U	U	U	60
Naphthalene	U	U	U	U	--
N-Heptane	U	U	U	U	--
N-Hexane	U	U	U	U	--
O-Xylene (1,2-Dimethylbenzene)	U	U	U	0.42 J	--
Propylene	--	--	--	--	--
Styrene	U	U	U	U	--
Tert-Butyl Methyl Ether	U	U	U	U	--
Tetrachloroethylene (PCE)	U	U	0.29 J	U	30
Tetrahydrofuran	U	U	U	0.94 J	--
Toluene	U	0.40 J	0.47 J	1.2	--
Trans-1,2-Dichloroethene	U	U	U	U	--
Trans-1,3-Dichloropropene	U	U	U	U	--
Trichloroethylene (TCE)	U	U	U	0.23 J	2
Trichlorofluoromethane	1.3	1.3	1.7	1.1	--
Vinyl Acetate	--	--	--	--	--
Vinyl Chloride	U	U	U	U	--

Qualifiers:
U: Analyzed but not detected
J: Estimated value

Notes:
ug/m3: Micrograms per cubic meter
-- : Not calculated or no guideline value
Exceeds the maximum concentration of NYSDOH Air Guideline Value

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

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

This plan provides:

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

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

3.2 Institutional Controls

The ICs are placed on the entire area bound by the property line of the Former Bright Outdoors Site which is illustrated in Figure 2. The Former Bright Outdoors 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 IC for the Site in the form of an Environmental Notice (EN) was granted to the NYSDEC. The EN was filed with the Broome County Clerk's office and places the following restrictions on the Site:

- The property shall not have any disturbances or excavation of the Property which threatens the integrity of the engineering controls, which will, or is reasonably anticipated to, interfere significantly with any proposed, ongoing, or completed remedial program at the site, or which results or may result in a significantly increase threat of harm or damage at the Site;
- The property use is limited to restricted-residential use, which would also permit commercial or industrial uses, provided that the long-term Institutional Controls included in the SMP are employed;
- The property may not be used for a higher level of use, such as unrestricted or residential use without additional remediation and amendment of the Environmental Notice, as approved by the NYSDEC;
- No person shall disturb, remove, or otherwise interfere with the installation, use, operations, and maintenance of Engineering Controls required for the Remedy, including but not limited to the Engineering Controls described in the SMP, unless in each instance they first obtain a written waiver of such prohibition from the NYSDEC;
- All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;
- No person shall use 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 NYSDEC. Use of the groundwater without appropriate treatment may result in a significantly increased threat of harm or damage at any Site;
- The use of the groundwater underlying the property for potable or process water is prohibited without treatment rendering it safe for intended use as determined by the NYSDOH;
- The potential for vapor intrusion must be evaluated for any buildings developed in the area and any potential impacts that are identified must be monitored or mitigated;
- The Site owner or remedial party will submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) 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, (2) 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 five years, or an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable; and

- It is a violation of 6 NYCRR 375-1.11(b) to use the Property in a manner inconsistent with the Environmental Notice.

3.3 Engineering Controls

3.3.1 Sub-Slab Depressurization Systems and Soil Vapor Extraction Systems

Three SVE systems are constructed on-site, located at the northern, central and southern portions of the on-site structure. Each SVE system consists of polyvinyl chloride (PVC) piping, slide gate valves, manometers, RadonAway RP 265 fans with an insulated condensate bypass mounted on the exterior of the building, a PVC pipe stack, and a vent cap. Selected areas of the concrete floor were removed to facilitate the installation of subsurface piping for the SVE treatment systems.

The approximately 60-foot-long central trench drain that ran through the middle of the warehouse building was also removed. The floor drain discharge pipe at the north end of the central trench drain was plugged and capped as part of the remedial action.

In order to provide depressurization of the warehouse slab, OP-TECH Environmental Services, Inc. (OP-TECH), the standby remedial contractor, sealed the joints between the new and existing concrete flooring, as well as existing cracks in the warehouse slab floor and wall joints.

During the pre-design investigation, six sub-slab monitoring points were installed in the warehouse. As required by the SOW, two additional sub-slab monitoring points were installed in the warehouse for depressurization monitoring.

Procedures for operating and maintaining the SVE systems are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As built drawings, signed and sealed by a professional engineer, are included in Appendix G – Sub-slab Depressurization System Shop Drawings. **Figure 2** shows the location of the ECs for the site.

3.3.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered 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

3.3.2.1 - Soil Vapor Extraction (SVE) Systems

Three SVE treatment systems have been installed that remove soil vapors from below the concrete floor of the warehouse building and vent them above the roofline. The systems are designed to mitigate exposure to contaminated indoor air resulting from the soil vapor.

The SVE systems will not be discontinued unless prior written approval is granted by the NYSDEC. In the event that monitoring data indicates that the SVE systems may no longer be required, a proposal to discontinue the systems will be submitted by the remedial party. Conditions that may warrant discontinuing the SVE systems include contaminant concentrations in groundwater, soil and/or soil vapor that: (1) reach levels that are consistently below ambient water quality standards or the site SCGs, as appropriate; (2) have become asymptotic to a low level over an extended period of time, as accepted by the NYSDEC; or (3) the NYSDEC has determined that the SVE systems have reached the limit of their effectiveness. This assessment will be based in part on post-remediation contaminant levels in groundwater collected from monitoring wells located throughout the site as well as sub-slab and indoor air sampling. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC.

3.3.2.2 - Sub-Slab Depressurization (SSD) System

One off-site sub-slab depressurization system was installed by NYSDEC at 145 Marie Street to mitigate exposures to volatile contaminants via the vapor intrusion pathway. Continued operation of this system is an element of the overall remedial strategy at the site. Because inspection and maintenance of this vapor mitigation system are being managed under a separate state-wide contract, specific inspection and maintenance procedures and schedules for this system are not addressed herein. This Site Management Plan, in conjunction with the state-wide contract, is considered an institutional control with respect to vapor intrusion.

The active SSD system will not be discontinued unless prior written approval is granted by the NYSDEC and the NYSDOH. In the event that monitoring data indicates that the SSD system may no longer be required, a proposal to discontinue the SSD system will be submitted by the remedial party to the NYSDEC and NYSDOH.

3.3.2.3 - Monitoring Wells

Groundwater monitoring activities to will continue, as determined by the NYSDEC with consultation with NYSDOH, 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 for may no longer be required, a proposal to discontinue the system will be submitted by the remedial party. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC. 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. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of site management for the site are included in the Quality Assurance Project Plan provided in Appendix H.

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. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed as provided in Appendix I – 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 Notice;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date.

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC must be given by noon of the following day. In addition, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the site by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be provided to the NYSDEC within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

4.3 Treatment System Monitoring and Sampling

4.3.1 Remedial System Monitoring

Monitoring of the SVE systems will be performed on a routine basis, as identified in **Table 4-1** Remedial System Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SVE systems has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SVE systems components to be monitored include, but are not limited to, the components included in **Table 4-1** below.

Table 4-1 – Remedial System Monitoring Requirements and Schedule

Remedial System Component	Monitoring Parameter	Monitoring Schedule
SVE System 1-Northern RadonAway Fan (SVE-1)	Manometer Reading inches of water (In. H2O)	Annually
SVE System 2-Central RadonAway Fan (SVE-2)	Manometer Reading inches of water (In. H2O)	Annually
SVE System 3-Southern RadonAway Fan (SVE-3)	Manometer Reading inches of water (In. H2O)	Annually

A complete list of components to be inspected is provided in the Inspection Checklist, provided in Appendix I - Site Management Forms. If the monometer readings do not indicate a minimum suction pressure of at least 0.004 inches of water column, any equipment is observed to be malfunctioning or the system is not performing within specifications; maintenance and repair, as per the Operation and Maintenance Plan, is required immediately.

4.3.2 Remedial System Sampling

Samples shall be collected from the three SVE systems stack discharge locations on an annual basis. Sampling locations, required analytical parameters and schedule are provided in **Table 4-2** – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 4-2 – Remedial System Sampling Requirements and Schedule

Sampling Location	Analytical Parameters				Schedule
	VOCs (EPA Method 624)	TAL Metals (EPA Method 6010B)	pH (EPA Method 9040)	VOC (EPA Method TO-15)	
SVE Stack Discharges – SVE-01, SD-02, SD-03				X	Annually

Three SVE stack discharge samples are collected as part of the remedial system sampling. one from each of the three SVE discharge stacks located on the outside of the building. The stacks are located along the west side of the former warehouse and production area and are constructed with 6-inch diameter PVC pipe.

Prior to collecting the sample each sample port is purged via a Gilian GilAir pump to remove any residual dust and debris and to ensure the sample is not diluted due to the negative pressure on the sub-slab of the building. Each stack discharge sample is collected utilizing dedicated Teflon-line polyethylene tubing. The samples are collected utilizing a 6-liter batch certified SUMMA canister fitted with a laboratory calibrated low-flow regulator set to collect the sample over a 12-hour collection period. The samples shall be analyzed for VOCs via U.S. Environmental Protection Agency method TO-15 and other contaminants at an ELAP-certified laboratory in accordance with the analytical procedures listed above.

It should be noted that due to the configuration of the sampling ports in the SSD system exhaust stacks, a negative pressure is exerted upon the orifice of the sample port and, subsequently, the dedicated sample tubing. As such, detailed sample collection and analytical procedures and protocols are provided in Appendix J – Field Activities Plan and Appendix H – Quality Assurance Project Plan.

4.4 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from the seven groundwater monitoring wells and nine sub-slab vapor points on a routine basis. Sampling locations, required analytical parameters and schedule are provided in **Table 4-3** – Post Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 4-3 – Post Remediation Sampling Requirements and Schedule

Sampling Location	Analytical Parameters				Schedule
	VOCs (EPA Method 624)	TAL Metals (EPA Method 6010B)	pH (EPA Method 9040)	VOC (EPA Method TO-15)	
Monitoring wells MW-02, MW-03, MW-04, MW-05, MW-06, MW-07, MW-08A	X				Biennially
Soil Vapor points SS101 through SS105, SS107, SS108, SS111, and SS112				X	Annually

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

4.4.1 Groundwater Sampling

Groundwater monitoring will be performed every 8 quarters to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

On-site groundwater monitoring wells are sampled utilizing a low-flow peristaltic pump with low-density polyethylene tubing and a stainless-steel check valve. Water quality readings are recorded with a Horiba U-52 during groundwater purging and prior to sampling. Low flow sampling allows for purging of each groundwater monitoring well to allow for stabilized representative samples of the groundwater and contaminants.

The network of monitoring wells has been installed to monitor on-site and downgradient groundwater conditions at the site. The network of on-site wells has been designed based on the following criteria:

The network of seven groundwater monitoring wells have been installed to allow for accurate monitoring of the groundwater plume and to determine the extent of the contamination. Within the system of wells, the well screens range from between 12 ft. bgs and 49 ft. bgs. The water table is encountered in all wells between 5.45 ft. and 8.60 ft. Groundwater flow direction is to the southwest. Monitoring well construction details are provided in **Table 4-4** and monitoring well construction logs are included in Appendix C of this document.

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

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

Table 4-4 summarizes the identification number, as well as the purpose, location, depths, diameter and screened intervals of the wells. As part of the groundwater monitoring, on-site wells are sampled to evaluate the effectiveness of the remedial system.

Table 4-4 – Monitoring Well Construction Details

Monitoring Well ID	Well Location	Coordinates (longitude/ latitude)	Well Diameter (inches)	Elevation (above mean sea level)			
				Casing	Surface	Screen Top	Screen Bottom
MW-02	On-site	-075.9754696° N, 42.1212499° W	2	828.20	828.46	771.46	781.46
MW-03	Downgradient	-075.9755846 °N, 42.1208872° W	2	827.72	828.12	773.12	783.12
MW-04	Downgradient	-075.9755845° N, 42.1208971° W	2	827.41	827.85	768.85	778.85
MW-05	On-site	-075.9748188° N, 42.1215776° W	2	828.23	828.50	772.5	782.5
MW-06	On-site	-075.9747834° N, 42.1212487° W	2	828.10	828.40	790.9	800.9
MW-07	On-site	-075.9748580° N, 42.1218237° W	2	828.89	829.27	797.27	807.27
MW-08A	On-site	-075.9754777° N, 42.1214660° W	2	828.40	828.82	795.82	805.82

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

4.4.2 Soil Vapor Sampling

Soil vapor sampling will be performed annually to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

The network of on-site soil vapor sample locations has been designed based on the following criteria:

A total of nine sub-slab soil vapor samples will be collected during each visit at locations SS101 through SS105, SS107, SS108, SS111, and SS112. Sub-slab vapor sampling points consist of stainless-steel tubing that penetrates the facility floor. The tubing is cemented in place and terminates with a threaded connector that is flush with the floor surface. The sampling frequency may only be modified with the approval of the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC.

Deliverables for the soil vapor sampling program are specified in Section 7.0 – Reporting Requirements.

4.4.3 Soil Vapor Intrusion Sampling

Soil vapor intrusion sampling will be performed annually and will consist of at least two indoor air samples collected within the vicinity of where a sub-slab soil vapor sample is collected and one outdoor air sample collected upwind from the building.

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

Deliverables for the soil vapor intrusion sampling program are specified in Section 7.0 – Reporting Requirements.

4.4.4 Monitoring and Sampling Protocol

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

4.4.5 Emerging Contaminants

Current and future private/commercial properties located within a 1/2-mile of the Site can request through the NYSDEC and NYSDOH for their private groundwater wells to be sampled for per- and polyfluoroalkyl substances (PFAS). The sampling will include collection of one or more water samples at a tap or faucet located in the kitchen or from an outdoor spigot. The sampling will be performed by a qualified environmental contractor contracted with the DEC. Eligible property owners can request sampling for their private wells by contacting the NYSDEC Project Manager listed on Table 1-1 of this SMP.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

This Operation and Maintenance Plan provides a brief description of the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the site. This Operation and Maintenance Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the site to operate and maintain the SVE and Radon Fan systems;
- Will be updated periodically to reflect changes in site conditions or the manner in which the SVE and Radon Fan systems are operated and maintained.

A copy of the Shop Drawings, along with the complete SMP, is to be maintained at the site. These Shop Drawings are not to be used as a stand-alone document, but as a component document of this SMP.

5.2 Remedial System (or Other Engineering Control) Performance Criteria

In accordance with New York State Department of Health guidance (NYSDOH 2006), the successful operation of the SVE treatment systems requires a minimum suction pressure of one Pascal, or 0.004 inches of water column, to be achieved at the individual sub-slab vapor monitoring points.

5.3 Operation and Maintenance of Soil Vapor Extraction Systems

The following sections provide a description of the operations and maintenance of three SVE Systems. Cut-sheets and as-built drawings for all three SVE systems are provided in Appendix G - Shop Drawings.

5.3.1 System Start-up and Testing

This section should include a description of, as appropriate:

- Pre-start-up inspection:
  - integrity of all electrical circuits is reviewed by examining the main circuit breaker panel. If any circuit breaker is found to be tripped, the cause is investigated and fixed before the subject breaker switch is reset.
  - The control panel outputs are reviewed for any alarm conditions. An illuminated red light signifies an alarm condition.
  - Prior to the start or restart of the systems, all switches on the control panel should be in the “OFF” position.
  - A visual check of each entire system is performed to check for any apparent damage to piping, electrical wiring and/or equipment.
  - Prior to baseline testing of the SVE system the system components are checked and evaluated. The SVE system components are evaluated including the following:
    - All pressure and vacuum gauges should be reading “zero” when the systems are “OFF”. If not, the defective gauge should be replaced, after confirming that there is no pressure (or vacuum) in the measured line/vessel.

Prior to baseline testing of the SVE system the system components are checked and evaluated. The SVE system components evaluated including the following:

- Exterior RadonAway fan,
- Interior knife valve for calibrating pressure
- One 6-inch-diameter PVC vent piping, which extends from the fan to above the roof line of the building and below the fan, into the warehouse and beneath the concrete slab of the warehouse floor.
- The fans were installed with insulated by-pass freeze protection and condensate drains.
- The ends of the sub-slab piping consist of 2-foot-long slotted PVC pipe segments and are located along the east-west axis of the warehouse building.
  - Baseline Testing Methods and Measurements:

Baseline testing of the SVE system is completed following a final check and evaluation of all system components. The SVE system was successfully started up and tested for sub-slab pressure control on May 18, 2010; all units were operating normally at the time of this postconstruction monitoring event. However, full-time system operation and commissioning did not occur until July 22, 2010, following the performance of baseline sampling.

In accordance with New York State Department of Health guidance (NYSDOH 2006), the successful operation of the SVE treatment systems requires a minimum suction pressure of one Pascal, or 0.004 inches of water column, to be achieved at the individual sub-slab vapor monitoring points. On May 18, 2010, the three SVE treatment systems were started, and the differential pressure beneath the slab was then measured at seven soil vapor monitoring points to assess the ability of the system to depressurize the area beneath the slab. The differential pressure was measured with a manometer. Manometer results are included in Appendix K – Op-Tech's Final Close-Out Report. The vacuum levels at vapor monitoring points SS-101 and SS-102 were below the required level. Visual observation and smoke testing of the affected concrete floor area revealed an unsealed expansion joint between the perimeter of the floor and the exterior wall. This allowed air to enter below the slab, resulting in lower pressure readings during the commissioning tests. The contractor sealed the exposed expansion joints to the extent practicable. Vapor monitoring point SS-102 was then resampled and the pressure was above the required differential pressure level. However, the leaks near vapor monitoring point SS-101 could not be sealed. This point was located in the northeast corner of the facility. The expansion joint was sealed around the facility except in this area. This area includes offices that have wood framing, paneling and insulation. The sill plate was located over the expansion joint, which did not allow sealing of the perimeter expansion joint. While the differential pressure was below the required 0.004 inches of water column vacuum, the test result was acceptable to NYSDEC. NYSDEC has requested that the sub-slab soil vapor point be monitored and evaluated during future sampling events.

The system testing described above will be conducted if, in the course of the SVE systems lifetimes, the systems go down or significant changes are made to the systems and the systems must be restarted.

5.3.2 Routine System Operation and Maintenance

Routine tasks to be performed to the SVE system during O&M visits are as follows:

SVE systems shall be periodically inspected to determine and document their physical condition and to identify the necessary maintenance required to ensure that each monitoring point remains operational. Inspection forms are included in Appendix I - Site Management Forms. Repairs or equipment replacement should be completed within 10 days after inspection.

Some minor problems that may be encountered during inspection and typical solutions include the following:

- Missing or deteriorated mitigation system labels– re-label as necessary;
- Fan bearing issues or broken fans – replace as necessary;
- Cracked sub-slab or compromised floor seal – re-seal with approved sealant;
- Compromised conduit and pipe supports – replace as necessary; and
- Leaking or cracked piping or joints – seal or replace with air-tight couplings.

5.3.3 Non-Routine Operation and Maintenance

Non-routine operation and maintenance on-site consists of tasks which involve out of-scope maintenance and upkeep of the SVE System components. Non-routine maintenance activities are commonly conducted in response to shutdown conditions or as a result of decreased equipment performance. Non-routine shutdown conditions are due to temperature fluctuations, low vacuum at the SVE blower, high-temperature at the system, and high moisture levels in the knock-out drum.

All non-routine maintenance events must be documented in Site management forms. Examples of Site Management Forms are provided in Appendix I. In addition, all non-routine maintenance events shall be detailed in each respective Site Management Report, as well as the

PRR for that respective reporting period. Following the completion of any non-routine maintenance event, the start-up procedures as documented in Section 5.3.1 above, shall be completed to confirm normal system operation. **Table 4-1** provides summary and schedule of routine maintenance.

5.3.4 System Monitoring Devices and Alarms

- SVE Systems - system monitoring device and alarm notification for SVE vacuum blower failure; system monitoring device for low, high, and high-high water level in moisture separator; and an alarm notification for high-high moisture separator level.

The SVE system has a warning devices to indicate that the system is not operating properly. In the event that warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SVE system will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that 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.

The site is located in an area of minimal flooding; however, flooding may occur during instances of severe weather. If flooding does occur in the future, it is not expected to affect the monitoring well network as currently installed. The site and will be inspected annually and after any significant weather event to evaluate the condition of the site.

Any disruption or failure of the electric supply to the Site will cause a shut-down of the system.

6.2 Green Remediation Evaluation

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

Waste Generation

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

- Personal protective equipment associated with SVE and groundwater sampling, such as disposable gloves, etc.
- Packaging material and ice used to pack and preserve samples to be submitted for laboratory analysis.
- Light bulbs for building lighting.
- Paper and office supplies associated with SVE Site logs, monitoring logs and report preparation.
- Repair and replacement of equipment associated with the SVE.

Electric Usage

The SVE currently obtains 100% of its electricity from the local electric utility. Minor electricity usage can be attributed to the system controls.

Fossil Fuel Usage

The SVE 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 associated with the overall operation of the SVE. Indirect fossil fuel use results from completion of the following Site related activities:

- Transportation to and from the Site for monitoring, sampling and system alarm responses.
- Off-site transportation and shipment of samples collected for laboratory analysis.
- Disposal of waste generated at the Site.

Water Usage

The 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 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.

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 in order to conduct system checks 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 have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

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 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 I. These forms are subject to NYSDEC revision.

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

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

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

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

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

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

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

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

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

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

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

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted every five years to the Department or at another frequency as may be required by the Department. In the event that the Site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the Site described in Appendix A – Environmental Notice. 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.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends.

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

- A site evaluation, which includes the following:

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

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

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

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

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

  - The overall performance and effectiveness of the remedy.

- A 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;

  - 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 notice;*
- *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."

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

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

- *The institutional control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental notice.*
- *The information presented in this report is accurate and complete.*

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

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

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

7.3 Corrective Measures Work Plan

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

7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.3), upon completion of an RSO, an RSO report must be submitted to the Department for approval. A general outline for the RSO report is provided in Appendix 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

NYSDEC, 2006. *6 NYCRR Part 375, Environmental Remediation Programs, Subparts 375-1 to 375-4 & 375-6.* (December 14, 2006).

NYSDEC, 2006. *6 NYCRR Part 375, Environmental Remediation Programs, Subparts 375-1 to 375-4 & 375-6.* (December 14, 2006).

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Aztech Technologies, Inc. (2013). *Semi-Annual Media Sampling Report, Former Bright Outdoors.* (March 19, 2013).

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Aztech Technologies, Inc. (2016). *Semi-Annual Media Sampling Report, Former Bright Outdoors.* (April 14, 2016).

Aztech Technologies, Inc. (2017). *Semi-Annual Media Sampling Report, Former Bright Outdoors.* (March 9, 2017).

Aztech Technologies, Inc. (2017). *Semi-Annual Media Sampling Report, Former Bright Outdoors.* (September 29, 2017).

FIGURES

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

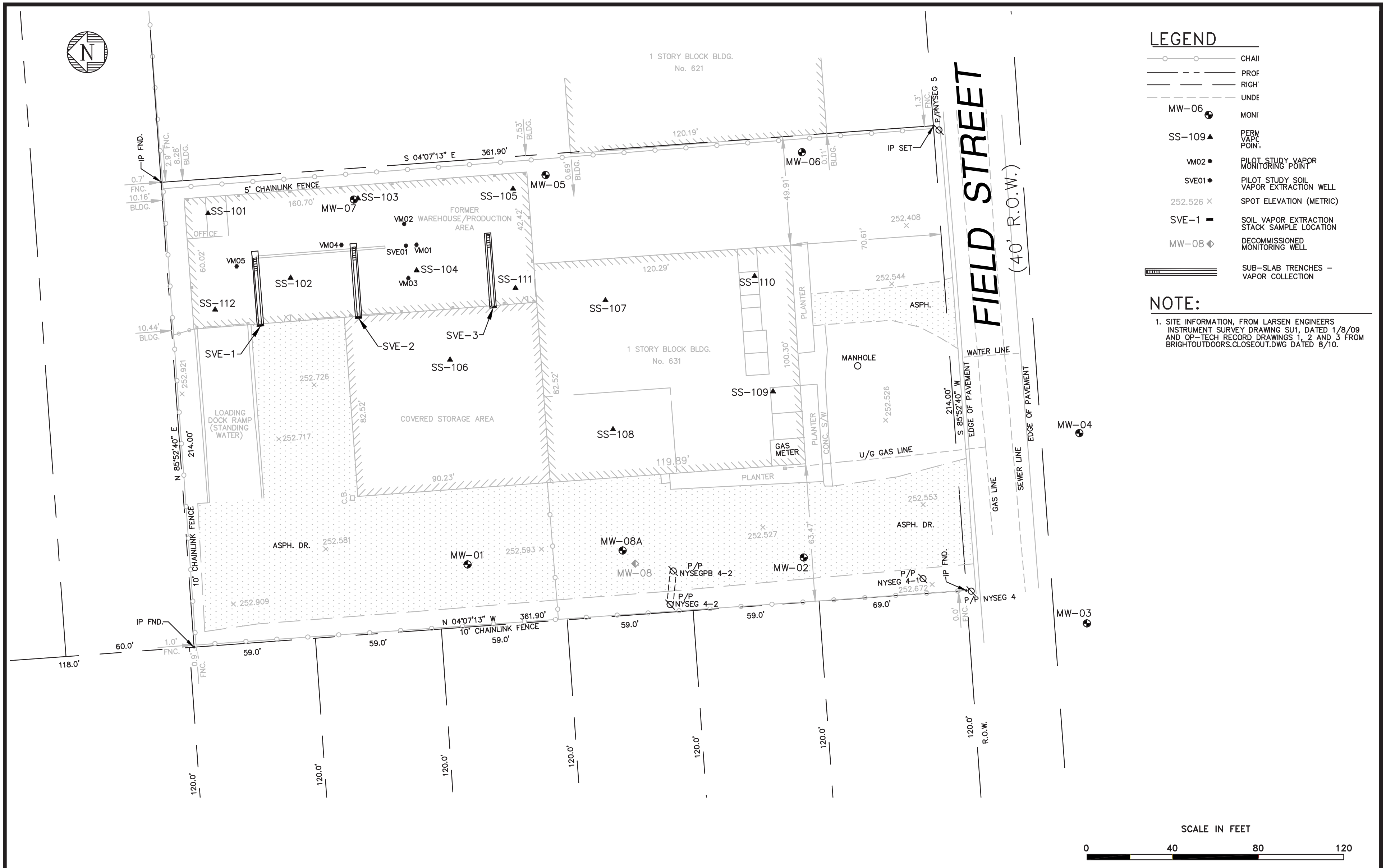
D&B ENGINEERS AND ARCHITECTS, P.C.

FORMER BRIGHT OUTDOORS SITE

SITE LOCATION

FIGURE 1

Figure 1 - Site Location Map.indd (12/13/19 - 2:50 PM)



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

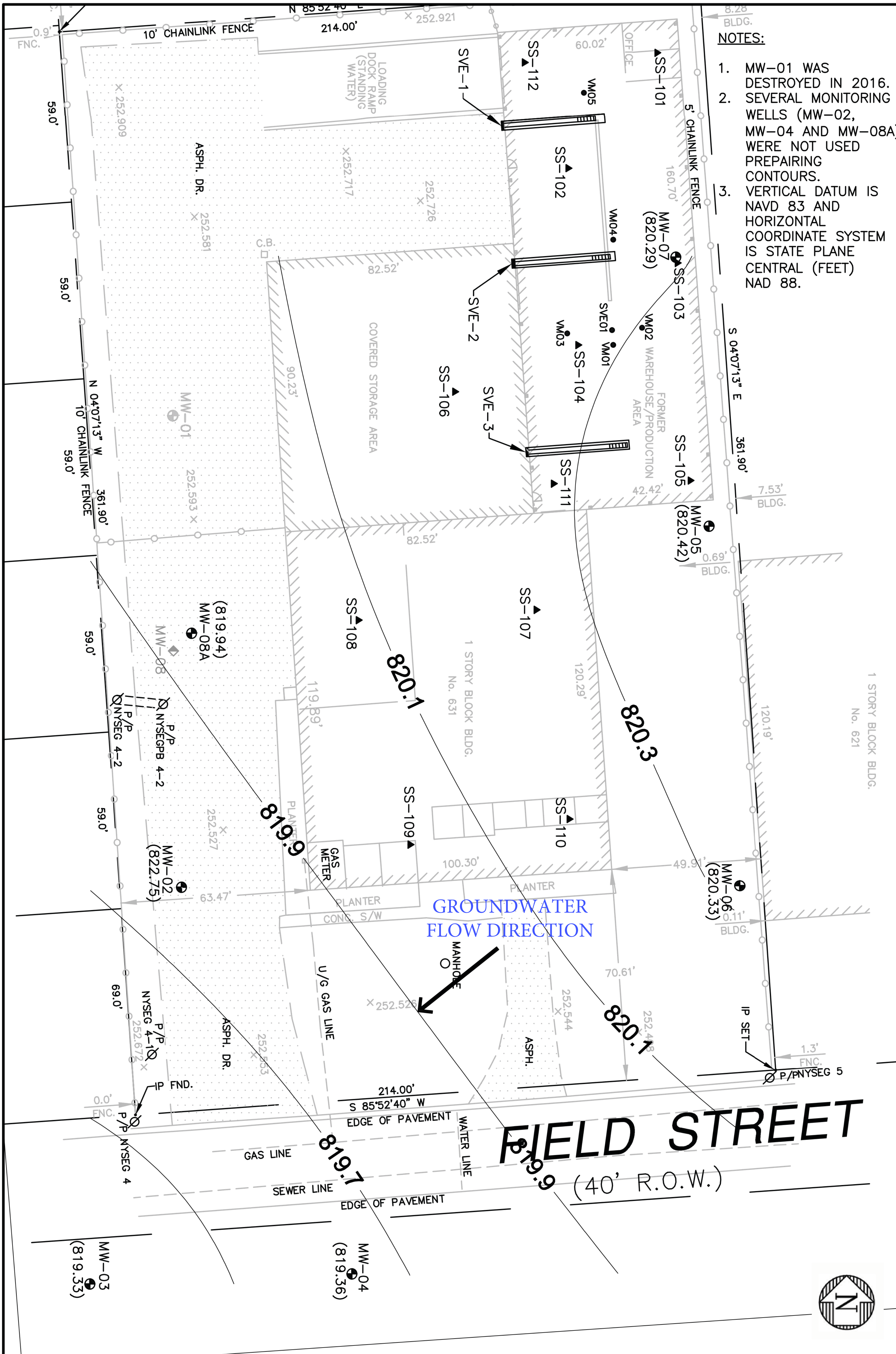
FORMER BRIGHT OUTDOORS SITE

SITE FEATURES MAP

FIGURE 2

D&B ENGINEERS AND ARCHITECTS, P.C.

Figure 2 - Site Features Map.indd (12/13/19 - 2:25 PM)



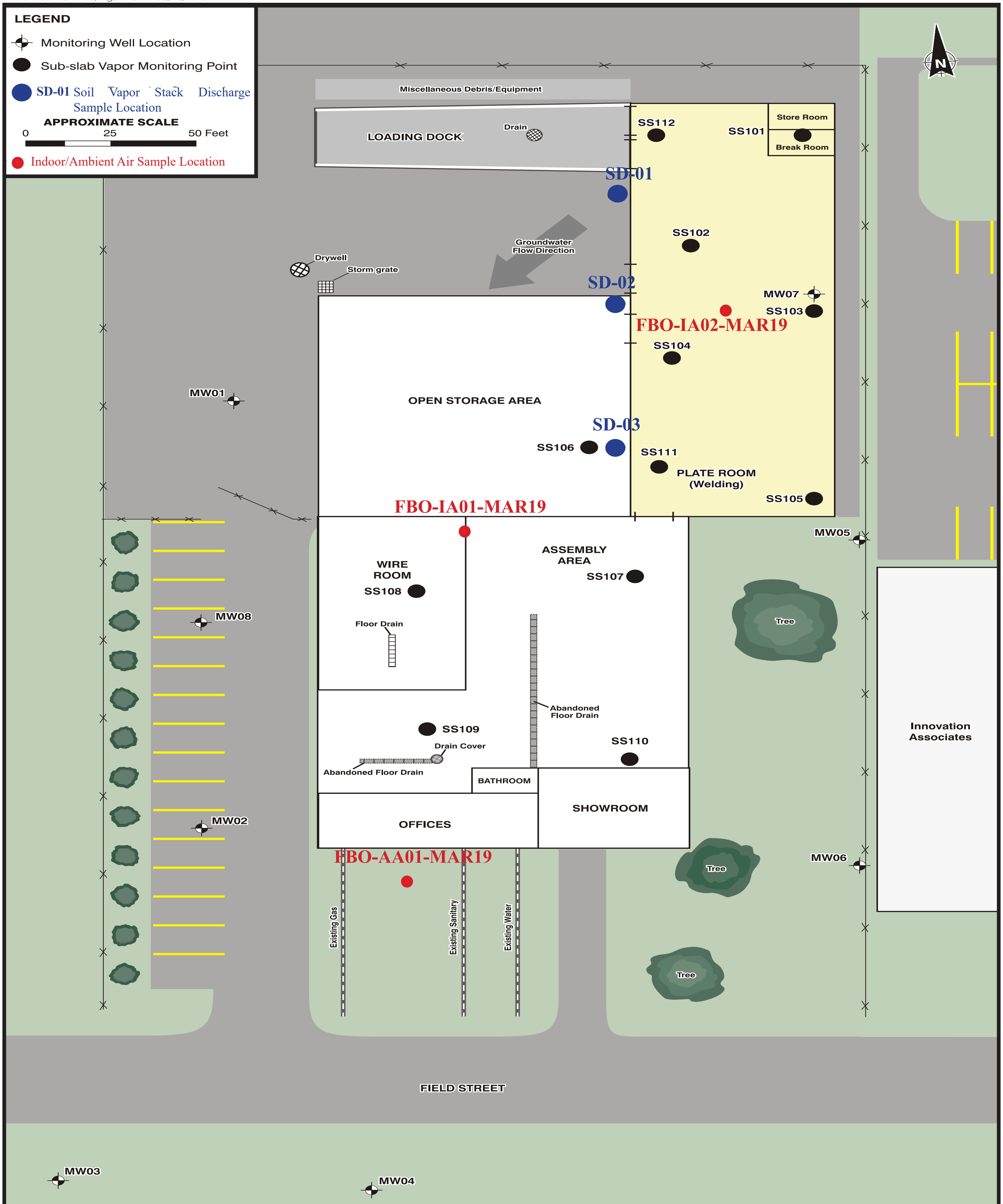
F:\3150-45X\dwg\3150-45X-C-SP01-04-30-20.dwg, Layout1, 4/30/2020 2:43:11 PM, kalesius

D&B ENGINEERS AND ARCHITECTS, P.C.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
FORMER BRIGHT OUTDOORS
JOHNSON CITY, NEW YORK

GROUND WATER CONTOUR MAP

FIGURE 3



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

D&B ENGINEERS AND ARCHITECTS, P.C.

FORMER BRIGHT OUTDOORS SITE

SOIL VAPOR SAMPLE LOCATIONS MAP

FIGURE 4

APPENDIX A - ENVIRONMENTAL NOTICE

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau E, 12th Floor
625 Broadway, Albany, New York 12233-7017
Phone: (518) 402-9814 • **Fax:** (518) 402-9819
Website: www.dec.ny.gov

Joe Martens
Commissioner

M E M O R A N D U M

TO: File

FROM: Benjamin Rung, Project Manager
Remedial Section B, Remedial Bureau E

SUBJECT: Environmental Notice – Former Bright Outdoors
631 Field St., Johnson City, Broome County
Site No. 704023

DATE: August 26, 2011

On Thursday August 25, 2011, I personally delivered an Environmental Notice, made upon the former Bright Outdoors site (No. 704023) located at 631 Field St. in Johnson City and signed by Dale Desnoyer on August 23, 2001, to the Broome County Clerk's office located at 44 Hawley St in Binghamton. The Environmental Notice was recorded under *Deed Miscellaneous* on Page No. 0485 of Book No. 02353 and will be cross referenced to Page 0275 of the *Book of Deeds* No. 01953.

Benjamin Rung, PE
Project Manager
Remedial Section B, Remedial Bureau E
Division of Environmental Remediation

INTERNATIONAL YEAR OF FORESTS · 2011

RICHARD R BLYTHE

BROOME COUNTY CLERK
44 Hawley Street, 3rd Floor
Binghamton, NY 13902-1766
(607) 778-2255

Public

Rcpt # 639544 08/25/11 10:20AM

Description	Fee
DOC# 201100029321 Deed Misc. B/P D 02353 0485 1 NEW YORK STATE DEPARTMENT OF ENVIRONM 2 631 FIELD STREET LP	$0.00
No Fee	$0.00
Total Amount Due	$0.00
Total Paid	

KEEP FOR REFERENCE
THANK YOU
WWW.GOBCCLERK.COM

ENVIRONMENTAL NOTICE

THIS ENVIRONMENTAL NOTICE is made the 2nd day of August 2011, by the New York State Department of Environmental Conservation (Department), having an office for the transaction of business at 625 Broadway, Albany, New York 12233

WHEREAS, a parcel of real property located at 631 Field Street in Johnson City, Town of Union, Broome County, which is part of lands conveyed by American Pipe & Plastics, Inc. to 631 Field Street, L.P. by deed dated January 31, 2001 and recorded in Broome County Clerk's Office on February 1, 2001 in Book 1953 of Deeds at Page 275 and which is identified by tax parcel numbers 143.037-1-019 (the "Property"); and being more particularly described in Appendix "A," attached to this notice and made a part hereof, and hereinafter referred to as "the Property," is the subject of a remedial program which was conducted by the Department as part of the New York State Superfund Program: and

WHEREAS, the Department approved a cleanup to address contamination disposed at the Property and such cleanup was conditioned upon certain limitations.

NOW, THEREFORE, the Department provides notice that:

FIRST, the Property subject to this Environmental Notice is as shown on a map attached to this Notice 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 there shall be no disturbance or excavation of the Property which threatens the integrity of the engineering controls, which will, or is reasonably anticipated to, interfere significantly with any proposed, ongoing, or completed remedial program at the site, or which results or may result in a significantly increased threat of harm or damage at the site. A violation of this provision is a violation of 6 NYCRR 375-1.11(b)(2).

THIRD, no person shall disturb, remove, or otherwise interfere with the installation, use, operation, and maintenance of engineering controls required for the remedy or with performance of the Department approved Site Management Plan unless in each instance they first obtain a written waiver of such prohibition from the Department or Relevant Agency.

FOURTH, the remedy was designed to be protective for the following use: restricted-residential use. Therefore, any use for purposes other than for restricted-residential use without the express written waiver of such prohibition by the Relevant Agency may result in a significantly increased threat of harm or damage at any site.

FIFTH, no person shall use 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. Use of the groundwater without appropriate treatment may result in a significantly increased threat of harm or damage at any site.

SIXTH, upon change of use, re-occupancy of the site building, or new construction on the site, the site remedy requires evaluation of the potential for soil vapor intrusion and the possibility of adverse impacts on indoor air, and compliance with New York State Department of Health Guidance for Evaluating Soil Vapor Intrusion to address current or potential human exposures.

SEVENTH, it is a violation of 6 NYCRR 375-1.11(b) to use the Property in a manner inconsistent with this environmental notice.

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

By: ____________________

Dale A. Desnoyers, Director
Division of Remediation

STATE OF NEW YORK) ss:
COUNTY OF ALBANY)

On the 23rd day of August in the year 2011, before me, the undersigned, personally appeared Dale Desnoyers, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his 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

APPENDIX – A
Legal Description

ALL THAT TRACT OR PARCEL OF LAND, situate in the Village of Johnson City, Town of Union, County of Broome and State of New York, bounded and described as follows: Beginning at an iron in the north line of Field Street, said point being 120 feet easterly from the east line of Marie Street; thence northerly parallel to the easterly line of said Marie Street and 120 feet distant therefrom, along the back lines of several parcels a distance of 361.9 feet to an iron; thence easterly at an interior angle of 89 degrees 53 minutes a distance of 214 feet to an iron; thence southerly at an interior angle of 90 degrees 07 minutes, a distance of 361.9 feet to an iron in the north line of said Field Street; thence westerly at an interior angle of 89 degrees 53 minutes along said north line of Field Street a distance of 214.0 feet to the point of beginning, the last course forming an interior angle of 90 degrees 07 minutes with the first course; containing 1.778 acres of land, more or less.

TOGETHER WITH the right of ingress and egress over a strip of land designated as a proposed extension of Field Street, extending from the east line of Marie Street to the east line of the premises herein conveyed, more particularly described as follows: Beginning in the easterly line of Marie Street at the point where the northerly line of Field Street (formerly Oak Street) would intersect the said easterly line of Marie Street, said streets being as shown on a map of "Subdivision of Oaklawn", recorded in Broome County Clerk's Office Book of Maps No. 3 at Page 139, thence in an easterly direction on a line forming a right angle with the said easterly line of Marie Street and being an easterly extension of Field Street, a distance of 334 feet to an iron; thence in a southerly direction at an interior angle of 90 degrees, a distance of 40 feet to a point; thence in a westerly direction in a straight line parallel with the first above mentioned line, a distance of 334 feet to a point in the east line of Marie Street; thence in a northerly direction along the east line of Marie Street, a distance of 40 feet to the point or place of beginning.

SUBJECT to an easement granted by The Royal Crown Bottling Co. of the Southern Tier, Inc. to New York State Electric & Gas Corp. dated January 17, 1966 and recorded on March 2, 1966 in the Broome County Clerk's Office in Book 1102 of Deeds at Page 39.

Being the same premises conveyed to the grantor herein by Hanyak Liquidating Corp. by Warranty Deed dated August 1, 1984 and recorded the same day in the Broome County Clerk's Office in Liber 1412 of Deeds at Page 430.

APPENDIX – B

Site Survey

N W E S

1" = 30'

MONITORING WELL LOCATION & ELEVATION HORIZONTAL VALUES ARE NAD 83 CENTRAL ZONE (METRIC) VERTICAL VALUES ARE NAVD 88 (METRIC)				
SAMPLE	NORTH	EAST	ELEVATION	DESCRIPTION
MW-01	235787.612	300262.233	252.574	COVER (FLUSH)
			252.516	PVC RISER
MW-02	235739.720	300263.208	252.479	COVER (FLUSH)
			252.432	PVC RISER
MW-03	235699.376	300253.984	252.384	COVER (FLUSH)
			252.287	PVC RISER
MW-04	235700.468	300280.636	252.331	COVER (FLUSH)
			252.187	PVC RISER
MW-05	235776.499	300316.784	252.518	COVER (FLUSH)
			252.443	PVC RISER
MW-06	235739.994	300319.952	252.506	COVER (FLUSH)
			252.404	PVC RISER
MW-07	235803.812	300313.328	252.763	COVER (FLUSH)
			252.645	PVC RISER
MW-08	235763.718	300252.370	252.626	COVER (FLUSH)
			252.498	PVC RISER
EXTRACTION POINT			252.758	RIM

MONITORING WELL LOCATION & ELEVATION HORIZONTAL VALUES ARE NAD 83 CENTRAL ZONE (U.S. SURVEY FEET) VERTICAL VALUES ARE NAVD 88 (U.S. SURVEY FEET)				
SAMPLE	NORTH	EAST	ELEVATION	DESCRIPTION
MW-01	773579.86	985110.32	828.65	COVER (FLUSH)
			828.46	PVC RISER
MW-02	773422.73	985113.54	828.34	COVER (FLUSH)
			828.19	PVC RISER
MW-03	773290.37	985083.28	828.03	COVER (FLUSH)
			827.71	PVC RISER
MW-04	773293.95	985170.72	827.86	COVER (FLUSH)
			827.38	PVC RISER
MW-05	773543.40	985289.25	828.47	COVER (FLUSH)
			828.22	PVC RISER
MW-06	773423.63	985299.71	828.44	COVER (FLUSH)
			828.10	PVC RISER
MW-07	773633.01	985277.98	829.27	COVER (FLUSH)
			828.89	PVC RISER
MW-08	773501.46	985110.79	828.82	COVER (FLUSH)
			828.40	PVC RISER
EXTRACTION POINT			829.29	RIM

LEGEND

- MW-06 ⊕ MONITORING WELL & No.
- ×252.526 SPOT ELEVATION (METRIC)
- CHAINLINK FENCE
- PROPERTY LINE
- RIGHT OF WAY
- UNDERGROUND UTILITY

REFERENCES:

COPIES OF THE DEEDS LISTED BELOW WERE OBTAINED FROM THE BROOME COUNTY CLERKS OFFICE AND USED IN THE PREPARATION OF THIS MAP

DEEDS	LIBER	PAGE
	1953	275
	1698	175
	2100	409
	2054	407
	2174	459
	2178	147
	2114	598
	1040	779
	1183	1079
	1961	155

SURVEY NOTES:

HORIZONTAL INFORMATION SHOWN HEREON IS REFERENCED TO THE NAD'83 NEW YORK CENTRAL ZONE.
VERTICAL INFORMATION SHOWN HEREON IS REFERENCED TO THE NAVD'88.

LARSEN ENGINEERS HEREBY CERTIFY:
THAT THIS MAP WAS PREPARED JANUARY 6, 2009 FROM NOTES OF AN INSTRUMENT SURVEY COMPLETED UNDER MY DIRECTION ON DECEMBER 24, 2008 AND IN CONJUNCTION WITH THE NOTES AND REFERENCES LISTED HEREON.

Date

Robert Scott Bonneman L.S. No. 050007

Plot Date: Jan 08, 2009

SHEET NO. 1 OF 1

DRAWING NO. SU 1

NO.	REVISIONS	BY	DATE

PROJECT ENGINEER: R.S.B.
DRAFTED BY: R.S.B.
CHECKED BY: R.J.P.
SCALE: 1" = 30'
DATE: DECEMBER, 2008

LARSEN ENGINEERS

PROJECT: FORMER BRIGHT OUTDOORS SITE
NYSDEC SITE No. 7-04-023
TOWN OF UNION, COUNTY OF BROOME, STATE OF NEW YORK

TITLE: INSTRUMENT SURVEY
631 FIELD STREET
VILLAGE OF JOHNSON CITY

PROJECT NO. 28-8-6087

APPENDIX B - 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
Kelly Lewandowski NYSDEC Site Control	(518) 402-9553 kelly.lewandowski@dec.ny.gov
Harry Warner NYSDEC Region 7 HW Engineer	(315) 426-7519 harry.warner@dec.ny.gov
Shaun J. Surani New York State Department of Health Bureau of Environmental Exposure Investigation	Phone: (518) 402-7860 Email: BEEI@health.ny.gov
Stephanie Webb, Region 7 Citizen Participation Specialist; NYS Department of Environmental Conservation	Phone: (315) 426-7441 Email: Stephanie.Webb@dec.ny.gov

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

APPENDIX C – FIELD LOGS

DRILLING LOG OF WELL NO. MW01

Project/Location: Former Bright Outdoors / Johnson City, NY
Boring Location: East of Former Bright Outdoors Facility
Northing/Easting: 773572.6282 / 985117.443
Date Started - Finished: 6/25/2004 - 6/25/2004
Drilling Company: North Star Drilling
Driller/Geologist: Steve Laramee / Brian Cervi

Total Depth of Hole (feet BGS): 47
Ground Elevation (feet AMSL): 828.68
Groundwater Depth After Drilling / Date: 9.93 feet BGS ∇ / 6/29/04
Top of Inner Casing (feet AMSL): 828.46

ELEVATION	DEPTH	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	RQD (%)	PENETRATION TIMES	BLOW COUNT	RECOVERY (feet)	OVA (ppm) SAMPLE / HOLE	COMMENTS
gs elevation 828.68		Flush Mount	ground surface (gs)						
	0.4	Portland Cement	BLACKTOP.						Well Construction
	1.2		SILTY CLAY: Gray/mottled brown silty clay, few sand, slightly moist.		0807	18 5 3 5	1.2	0	Bentonite Seal: 33 - 35 ft BGS Sand Pack: 35 - 47 ft BGS Screen: 37 - 47 ft BGS
825			SILTY CLAY: Brown/mottled gray silty clay, few sand, slightly moist, becoming moist at 6 ft bgs.		0809	3 4 6 6	1.7	0	
					0817	6 4 5 4 6	1.2	0	
	8.0				0820	5 8 7 8	1.2	0	
820	8.5		SILTY CLAY: Brown silty clay, few sand, very moist.		0831	4 3 2 3	1.8	0	Soil sample (FBO-MW01-S1) at 9-10 ft BGS. Wet at 9.5 ft BGS.
	8.8		SAND: Brown sand with little silt and few clay.						
	9.5		SILTY CLAY: Brown silty clay, little sand, wet.		0837	1 2 4 7	1.3	0	
	10.0		NO RECOVERY						
815	11.3		SAND/SILT: Brown sand/silt with some clay, few gravel, wet.						
	15.0								
	15.3		SAND/SILT: Brown medium to fine-grained sand/silt with few gravel, wet.		0843	1 1 2 2	0.3	0	
810	20.0								
	20.6		SILTY CLAY: Brown/gray silty clay with few sand, wet.		0852	1 1 3 1	1.8	0	
805	21.5		SAND/SILT: Brown medium to fine-grained sand/silt with little gravel, wet.						
	25.0								

DRILLING LOG OF WELL NO. MW01

Project/Location: Former Bright Outdoors / Johnson City, NY

Total Depth of Hole (feet BGS): 47

ELEVATION	DEPTH	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	RQD (%)	PENETRATION TIMES	BLOW COUNT	RECOVERY (feet)	OVA (ppm) SAMPLE / HOLE	COMMENTS
	26.0		SAND/SILT: Brown fine-grained sand/silt with little sand/gravel, wet.		0900	4 2 4 2	1	0	
800	30.0–31.0		SAND/SILT: Brown sand/silt with little gravel, few clay, wet.		0909	6 5 2 1	1	0	
795	33–35	Bentonite Seal							
	35.0–35.5	U.S. Silica No. 0	SAND: Brown sand with little silt, trace gravel, wet.		0917	2 2 2 2	0.5	0	
790	37–47	2" PVC No. 10 Slot Screen							
	40.0–41.0		GRAVEL: Brown gravel with little sand, few silt/clay, wet.		0924	6 12 12 11	1.3	0	Soil sample (FBO-MW01-S2) at 40-42 ft BGS.
785	45.0–46.8		SAND/SILT: Brown sand/silt with few gravel, wet.		0935	11 8 7 11	1.8	0	
780	47–52	Natural Backfill							
	50.0–51.8		SAND/SILT: Brown sand/silt with few gravel, wet.		0951	6 6 5 7	1.9	0	
775									
770	60								

DRILLING LOG OF WELL NO. MW02

Project/Location: Former Bright Outdoors / Johnson City, NY
Boring Location: East of Former Bright Outdoors Facility
Northing/Easting: 773415.5671 / 985120.8372
Date Started - Finished: 6/18/2004 - 6/18/2004
Drilling Company: North Star Drilling
Driller/Geologist: Steve Laramee / Brian Cervi

Total Depth of Hole (feet BGS): 45
Ground Elevation (feet AMSL): 828.46
Groundwater Depth After Drilling / Date: 9.87 feet BGS ∇ / 6/29/04
Top of Inner Casing (feet AMSL): 828.2

gs elevation 828.46

Portland Cement

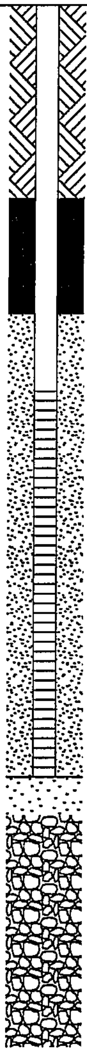
Flush Mount

ELEVATION	DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	PENETRATION TIMES	BLOW COUNT	RECOVERY (feet)	OVA (ppm) SAMPLE / HOLE	COMMENTS
		ground surface (gs)						
	0.2	BLACKTOP.		0722	8 3 1 1	0.3	0	Well Construction Bentonite Seal: 30 - 33 ft BGS Sand Pack: 33 - 46 ft BGS Screen: 35 - 45 ft BGS
	3.2	SILTY CLAY: Gray silty clay with few sand, few to trace gravel, moist to very moist.		0734	1 1 2 3	1.2	0.5	
825	4.0	NO RECOVERY						
	5.0	SILTY CLAY: Brown/gray silty clay with little sand, moist to very moist.		0740	1 1 1 1	1	0	
	6.0	NO RECOVERY						
		SILTY CLAY: Brown silty clay with few to little sand, trace to few gravel in some horizons, very moist and becoming wet at about 9.5 ft BGS.		0743	2 4 3 3	1.6	0	
820	10.4			0750	H 1 1 1	1	0	Soil sample (FBO-MW02-S1) at 9-10 ft BGS. Wet at 9.5 ft BGS.
	10.8	SAND/GRAVEL: Brown sand/gravel with few silt/clay.		0757	1 2 3 2	1.7	0	
	11.7	SILTY CLAY: Brown silty clay with little sand, wet.						
815	15.0							
	15.5	SILTY CLAY: Brown silty clay with little sand, wet.		0807	1 1 3 4	0.4	0	
810	20.0							
	20.7	SILTY CLAY: Brown/gray silty clay with little gravel, few sand, wet.		0815	3 5 7 6	0.7	0	
805	25.0							

DRILLING LOG OF WELL NO. MW02

Project/Location: Former Bright Outdoors / Johnson City, NY

Total Depth of Hole (feet BGS): 45



Elevation	Depth	Graphic Log	Soil/Rock Description	RQD (%)	Penetration Times	Blow Count	Recovery (feet)	OVA (ppm) Sample / Hole	Comments
	25–26.4		GRAVEL: Brown gravel with some sand, few silt/clay, wet. (26.4)		0823	7 7 5 7	1.4	0	Geotechnical soil sample (FBO-MW02-GT) at 25-27 ft BGS.
800	30.0–30.4	Bentonite Seal	SILTY CLAY: Brown silty clay with little gravel, few sand, wet.		0833	2 2 1 2	0.4	0	
795	35.0–36.3	U.S. Silica No. 0; 2" PVC No. 10 Slot Screen	SAND/SILT: Brown sand/silt with little gravel, trace clay, wet.		0845	3 2 10 17	1.3	0	
790	40.0–40.8		SAND/SILT: Brown sand/silt with little gravel, trace clay, wet.		0858	2 3 7 6	0.8	0	
785	45.0–46.7	Natural Backfill	SAND/SILT: Brown medium to fine-grained sand/silt, few gravel, trace clay, wet.		0918	6 11 15 14	1.7	0	Soil sample (FBO-MW02-S2) at 45-47 ft BGS.
780	50.0–50.3		SAND/SILT: Brown medium to fine-grained sand/silt, trace gravel, wet.			6 10 12 9	1.2	0	
	50.3–51.2		SILTY CLAY: Brown/red silty clay with few sand, few gravel, wet.						

Elevation scale: 800, 795, 790, 785, 780, 775, 770. Depth scale: 26–60.

DRILLING LOG OF WELL NO. MW03

Project/Location: Former Bright Outdoors / Johnson City, NY
Boring Location: SE of Former Bright Outdoors Facility
Northing/Easting: 773283.0554 / 985090.4006
Date Started - Finished: 6/16/2004 - 6/16/2004
Drilling Company: North Star Drilling
Driller/Geologist: Steve Laramee / Brian Cervi

Total Depth of Hole (feet BGS): 49
Ground Elevation (feet AMSL): 828.12
Groundwater Depth After Drilling / Date: 10.11 feet BGS / 6/30/04
Top of Inner Casing (feet AMSL): 827.72

gs elevation 828.12 — ground surface (gs) — Flush Mount — Portland Cement

Depth (ft)	Soil/Rock Description	RQD (%)	Penetration Times	Blow Count	Recovery (feet)	OVA (ppm) Sample / Hole	Comments
0.4	TOPSOIL: Brown organic topsoil, few gravel, moist.		1116	3 14 18 6	1.6	0	Well Construction Bentonite Seal: 35 - 37 ft BGS Sand Pack: 37 - 50 ft BGS Screen: 39 - 49 ft BGS
1.3 / 1.6	SAND/SILT: Brown/tan medium to fine-grained sand/silt with little gravel, dry.		1119	4 4 6 6	1.5	0	
2.0	SILTY CLAY: Brown silty clay with few gravel and few sand, dry.		1124	2 3 4 5	1.6	0	
	NO RECOVERY		1127	4 3 4 6	1.9	0	
	SILTY CLAY: Brown silty clay with few to little sand, moist grading to wet. Wet at about 11.5 ft BGS.		1136	1 1 2 3	1.6	0	
11.6			1141	1 2 1 2	1.6	0	Soil sample (FBO-MW03-S1 and FBO-MW03-S1/D) at 11-12 ft BGS. Wet at 11.5 ft BGS.
15.0 / 15.7	SAND/SILT: Brown medium to fine-grained sand/silt, little gravel, few clay, wet.		1150	2 2 2 2	0.6	0	
20.0 / 21.2	SILTY CLAY: Brown silty clay with little sand, trace gravel, wet.		1159	5 5 7 6	1.4	0	
21.4	SAND/SILT: Brown medium to fine-grained sand/silt with little gravel, few clay, wet.						
25.0							

Elevation scale: 825, 820, 815, 810, 805. Depth scale: 1–25.

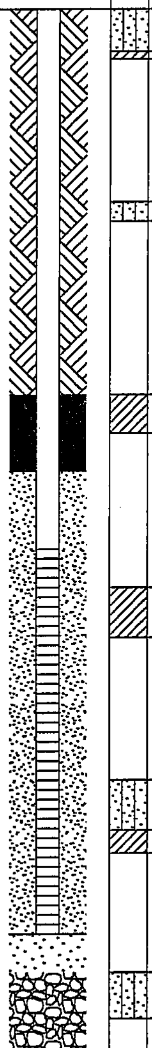
DRILLING LOG OF WELL NO. MW03

Project/Location: Former Bright Outdoors / Johnson City, NY

Total Depth of Hole (feet BGS): 49

Elevation scale: 800 at 28 ft; 795 at 33 ft; 790 at 38 ft; 785 at 43 ft; 780 at 48 ft; 775 at 53 ft; 770 at 58 ft. Depth scale: 26–60 ft.

Graphic log labels: Bentonite Seal (35–37 ft); U.S. Silica No. 0 (from 37 ft); 2" PVC No. 10 Slot Screen (from 39 ft); Natural Backfill (50–52 ft).



Depth (ft)	SOIL/ROCK DESCRIPTION	RQD (%)	PENETRATION TIMES	BLOW COUNT	RECOVERY (feet)	OVA (ppm) SAMPLE / HOLE	COMMENTS
26.1	SAND/SILT: Brown medium to fine-grained sand/silt with few gravel, wet.		1304	1 3 1 1 1	1.3	0	
26.3	SILTY CLAY: Brown silty clay with few sand, few gravel, wet.						
30.0							
30.5	SAND/SILT: Brown medium to fine-grained sand/silt with little gravel, few clay, wet.		1320	2 1 1 4	0.5	0	
35.0							
36.0	SILTY CLAY: Dark gray silty clay with few sand, wet.		1332	1 2 2 3	1.0	0	Soil sample (FBO-MW03-S2) at 36-37 ft BGS.
40.0							
41.3	SILTY CLAY: Dark gray silty clay with some sand, wet.		1349	2 2 4 4	1.3	0	
45.0							
46.3	SAND/SILT: Brown/gray medium to fine-grained sand/silt with few gravel and few clay.		1402	8 7 6 7	1.9	0	
46.9	SILTY CLAY: Gray/brown silty clay, some gravel, little sand, wet.						
50.0							
51.2	SAND/SILT: Gray/brown medium to fine-grained sand/silt with little gravel, few clay, wet.		1417	6 9 8 7	1.2	0	

DRILLING LOG OF WELL NO. MW04

Project/Location: Former Bright Outdoors / Johnson City, NY

Boring Location: South of Former Bright Outdoors Facility

Northing/Easting: 773286.5913 / 985177.8913

Date Started - Finished: 6/14/2004 - 6/15/2004

Drilling Company: North Star Drilling

Driller/Geologist: Steve Laramee / Brian Cervi

Total Depth of Hole (feet BGS): 46

Ground Elevation (feet AMSL): 827.85

Groundwater Depth After Drilling / Date: 10.23 feet BGS / 6/30/04

Top of Inner Casing (feet AMSL): 827.41

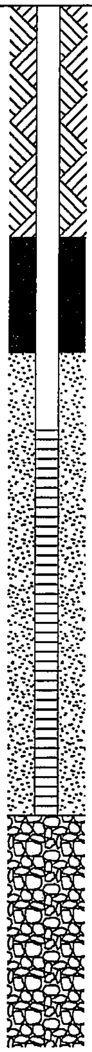
gs elevation 827.85

Graphic log: Flush Mount; Portland Cement

DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	PENETRATION TIMES	BLOW COUNT	RECOVERY (feet)	OVA (ppm) SAMPLE / HOLE	COMMENTS
	ground surface (gs)						
0.3	TOPSOIL: Brown sandy topsoil, few organics, few gravel, dry.		1415	3 9 8 5	1.6	0	Well Construction Bentonite Seal: 31 - 34 ft BGS Sand Pack: 34 - 46 ft BGS Screen: 36 - 46 ft BGS
0.9	SILTY CLAY: Tan/gray silty clay with little gravel, trace sand.		1418	4 6 5 7	1.3	2.2	
	SILTY CLAY: Gray/brown silty clay with trace to few sand, grading from slightly moist to very moist.		1425	1 2 4 3	1.2	1	
			1429	5 5 6 7	0.3	0.5	
			1437	1 2 2 2	1.9	0	
11.1			1443	1 1 1 1	1.6	0	Soil sample (FBO-MW04-S1) at 11-12 ft BGS. Wet at 11.5 ft BGS.
11.8	SAND: Brown medium to fine sand, some clay, few silt, wet at 11.5 ft BGS.						
15.0							
15.8	SILTY CLAY: Brown/gray silty clay, trace sand, wet.		1457	2 3 3 4	1	0	
16.0	GRAVEL: Black/brown rock/gravel, few sand, wet.						
20.0							
20.4	SILTY CLAY: Brown silty clay, few gravel, trace sand, wet.		1554	5 11 12 11	0.4	0	
25.0							

Project/Location: Former Bright Outdoors / Johnson City, NY

Total Depth of Hole (feet BGS): 46



Depth	Soil/Rock Description	RQD (%)	Penetration Times	Blow Count	Recovery (feet)	OVA (ppm) Sample / Hole	Comments
25.3	SILTY CLAY: Brown (with some gray) silty clay, little sand, trace gravel, wet.		1640	1 1 3 3	0.2	0	
30.0–31.0	SAND/SILT: Brown medium to fine-grained sand/silt with little gravel, few clay, wet.		0752	10 7 6 5	1	0	
35.0–36.0	SAND/SILT: Brown medium to fine-grained sand/silt with few gravel, trace clay, wet.		0807	10 6 3 3	1	0	
40.0–41.2	GRAVEL: Brown gravel with little medium to fine-grained sand/silt, few clay, wet.		0826	7 11 14 11	1.2	0	
45.0–47.0	SAND: Brown coarse to fine-grained sand, few silt, trace gravel, wet.		0851	4 12 12 9	2	0	Soil sample (FBO-MW04-S2) at 45-46 ft BGS.
50.0–52.0	SAND: Brown coarse to fine sand, few silt, few gravel, wet.		0915	10 8 11 17	2	0	

Elevation scale: 800 (28 ft), 795 (33 ft), 790 (38 ft), 785 (43 ft), 780 (48 ft), 775 (53 ft), 770 (58 ft). Depth scale: 26–60 ft.

DRILLING LOG OF WELL NO. MW05

Project/Location: Former Bright Outdoors / Johnson City, NY

Boring Location: Southeast of Former Bright Outdoors Facility

Northing/Easting: 773536.0945 / 985296.4992

Date Started - Finished: 6/22/2004 - 6/22/2004

Drilling Company: North Star Drilling

Driller/Geologist: Steve Laramee / Brian Cervi

Total Depth of Hole (feet BGS): 30

Ground Elevation (feet AMSL): 828.5

Groundwater Depth After Drilling / Date: 8.83 feet BGS ▽ / 6/29/04

Top of Inner Casing (feet AMSL): 828.23

gs elevation 828.5

ground surface (gs)

Graphic log: Flush Mount; Portland Cement (0–16 ft); Bentonite Seal (16–18 ft); U.S. Silica No. 0 (18–25 ft); 2" PVC No. 10 Slot Screen (20–25 ft)

Depth (ft)	Soil/Rock Description	RQD (%)	Penetration Times	Blow Count	Recovery (feet)	OVA (ppm) Sample / Hole	Comments
0.3	TOPSOIL: Brown organic topsoil with some clay, trace sand, dry.		0737	2 3 3 4	1.2	0	Well Construction Bentonite Seal: 16 - 18 ft BGS Sand Pack: 18 - 32 ft BGS Screen: 20 - 30 ft BGS
	SILTY CLAY: Brown silty clay with few sand, moist grading to wet, wet at approximately 9.5 ft BGS.		0739	2 3 5 5	1.3	0	
			0745	2 3 3 4	1.8	0	
			0753	3 5 5 6	1.6	0	
			0756	1 8 7 5	0.8	0	Soil sample (FBO-MW05-S1) at 9-10 ft BGS. Wet at 9.5 ft BGS.
10.0 / 10.3	GRAVEL: Brown gravel with some silty clay, few sand, wet.		0801	3 4 4 5	0.2	0	
15.0 / 15.4	SILTY SAND: Brown silty sand with little clay and few gravel, wet.		0810	3 5 2 3	0.4	0	
20.0 / 20.4	SILTY SAND: Brown silty sand with little gravel, few clay, wet.		0818	H 1 1 3	0.4	0	
25.0							

Elevation scale: 825, 820, 815, 810, 805

DRILLING LOG OF WELL NO. MW05

Project/Location: Former Bright Outdoors / Johnson City, NY

Total Depth of Hole (feet BGS): 30

Natural Backfill

Depth (ft)	SOIL/ROCK DESCRIPTION	RQD (%)	PENETRATION TIMES	BLOW COUNT	RECOVERY (feet)	OVA (ppm)	SAMPLE / HOLE	COMMENTS
25.3	SILTY SAND: Brown silty sand with trace gravel, wet.		0829	3 4 5 5	0.8	0		Soil sample (FBO-MW05-S2) at 25-27 ft BGS.
25.6	SILTY CLAY: Brown silty clay with little sand, wet.							
25.9–30.0	SILTY SAND: Brown silty sand with few gravel, wet.							
30.0–31.0	SILTY CLAY: Gray silty clay, trace sand, wet.		0840	H 1 1 3	1	0		
35.0–36.5	SILTY CLAY: Gray/brown silty clay, trace sand, very plastic, wet.		0858	H 1 2 3	1.5	0		Soil sample (FBO-MW05-S3) at 35-36 ft BGS.
40.0–41.5	SILTY CLAY: Gray/brown silty clay with few sand, very plastic, wet.		0912	1 1 3 4	1.3	0		
45.0–46.7	SILTY CLAY: Gray/brown silty clay with trace sand, plastic, wet.		0927	1 3 4 7	1.7	0		
50.0–51.5	SILTY CLAY: Gray/brown silty clay with few sand, wet.		0945	H 3 4 6	1.4	0		

DRILLING LOG OF WELL NO. MW06

Project/Location: Former Bright Outdoors / Johnson City, NY
Boring Location: Southeast of Former Bright Outdoors Facility
Northing/Easting: 773416.4188 / 985306.7252
Date Started - Finished: 6/23/2004 - 6/24/2004
Drilling Company: North Star Drilling
Driller/Geologist: Steve Laramee / Brian Cervi

Total Depth of Hole (feet BGS): 27.5
Ground Elevation (feet AMSL): 828.4
Groundwater Depth After Drilling / Date: 9.05 feet BGS ∇ / 6/29/04
Top of Inner Casing (feet AMSL): 828.1

gs elevation 828.4

ground surface (gs)

Graphic log: Flush Mount; Portland Cement (0–13.5 ft); Bentonite Seal (13.5–15.5 ft); U.S. Silica No. 0; 2" PVC No. 10 Slot Screen; water level ∇ at approx. 9 ft.

Elevation scale: 825, 820, 815, 810, 805. Depth scale: 1–25.

Depth (ft)	Soil/Rock Description	RQD (%)	Penetration Times	Blow Count	Recovery (feet)	OVA (ppm) Sample / Hole	Comments
0.2	TOPSOIL: Brown organic topsoil with few sand and few gravel, slightly moist.		1420	1 2 2 3	1.5	0	Well Construction Bentonite Seal: 13.5 - 15.5 ft BGS Sand Pack: 15.5 - 29 ft BGS Screen: 17.5 - 27.5 ft BGS
	SILTY CLAY: Brown silty clay with few to little sand, trace organics 0.2-1.5 ft BGS, moist to slightly moist.		1422	2 3 5 5	1.5	0	
6.0			1429	1 2 3 4	1.6	0	
	SILTY CLAY: Brown/mottled gray silty clay with few to little sand, moist grading to wet, wet at 10 ft BGS.		1432	4 4 5 5	1.8	0	
10.0			1440	2 3 5 5	1	0	Soil sample (FBO-MW06-S1) at 9.5-10.5 ft BGS.
10.5	SILTY CLAY: Brown silty clay, wet.		1444	5 6 6 7	0.5	0	Wet at 10 ft BGS.
15.0							
16.5	SILTY SAND: Brown silty sand with little clay, few gravel, wet.		1451	4 2 3 4	1.5	0	
20.0							
20.7	SILT/SAND: Brown silt/sand with few clay, few gravel, wet.		1457	4 6 3 3	0.7	0	
25.0							

Project/Location: Former Bright Outdoors / Johnson City, NY

Total Depth of Hole (feet BGS): 27.5

Graphic log: Natural Backfill

Depth (ft)	SOIL/ROCK DESCRIPTION	RQD (%)	PENETRATION TIMES	BLOW COUNT	RECOVERY (feet)	OVA (ppm) SAMPLE / HOLE	COMMENTS
25.4 – 26.6	SAND: Brown sand with little silt, trace gravel, wet.		1504	2 1 2 3	1.6	0	Soil sample (FBO-MW06-S2) at 25-27 ft BGS.
26.6	SILT/CLAY: Brown silt/clay with few sand, plastic, wet.						
30.0 – 31.8	SILTY CLAY: Brown/gray silty clay, few sand, plastic, wet.		1515	H 2 3 1	1.8	0	
35.0 – 36.9	SILTY CLAY: Gray/brown silty clay with trace sand, plastic, wet.		1523	1 2 3 4	1.9	0	
40.0 – 41.7	SILTY CLAY: Gray/brown silty clay with trace sand, plastic, wet.		1531	H 2 2 4	1.7	0	
45.0 – 46.8	SILTY CLAY: Gray silty clay with few sand, slightly plastic, wet.		1541	3 4 4 6	1.8	0	
50.0 – 51.7	SILTY CLAY: Gray silty clay with few sand, slightly plastic, wet.		1554	3 4 6 7	1.7	0	

Elevation scale: 800 (at 28.5 ft), 795, 790, 785, 780, 775, 770

Depth scale: 26–60

DRILLING LOG OF BORING NO. BH07

Project/Location: Former Bright Outdoors / Johnson City, NY
Boring Location (Northing/Easting): 773639.221 / 985136.1933
Date Started/Finished: 6/17/2004 - 6/17/2004
Drilling Company: North Star Drilling
Driller/Geologist: Steve Laramee / Brian Cervi

Total Depth of Hole (feet BGS): 50
Ground Elevation (feet above MSL): 828.15
Groundwater Depth After Drilling/Date: -- ft BGS/
Groundwater Depth During Drilling: 9.5 ft BGS ▽

ELEVATION	DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
gs elevation 828.15		*ground surface (gs)*						
	0.6	GRAVEL: Brown/red gravel with little medium to fine-grained sand/silt, dry.		0812	10 6 8 6	1.4	31	
825		SILTY CLAY: Brown silty clay with few sand, gray mottling from 2 to 3 ft BGS, slightly moist grading to wet, wet starting at 9.5 to 10 ft BGS.		0814	5 4 5 6	1	20	Soil sample (FBO-BH07-S1) at 1.5-2.5 ft BGS.
				0840	2 3 4 3	1.4	8	
820				0843	3 4 4 3	1.5	8	
	10.3	▽		1000	1 1 2 2	1.7	0	Soil sample (FBO-BH07-S2) at 9-10 ft BGS. Wet at 9.5 to 10 ft BGS.
	11.2	SAND/SILT: Brown medium to fine-grained sand/silt, little clay, few gravel, wet.		1008	1 4 10 7	1.2	0	
815	15.0							
	16.0	SAND/SILT: Brown fine-grained sand/silt with little sand/gravel, trace clay, wet.		1018	2 3 2 3	1	0	Groundwater sample (FBO-BH07-GW) at 15-17 ft BGS.
810	20.0							
	21.5	SAND/SILT: Brown medium to fine-grained sand/silt with little gravel, trace clay, wet.		1046	5 4 3 2	1.3	0	
805	25.0							

DRILLING LOG OF BORING NO. BH07

Project/Location: Former Bright Outdoors / Johnson City, NY   Total Depth of Hole (feet BGS): 50

ELEVATION	DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
	25.5	SAND/SILT: Brown medium to fine-grained sand/silt with few coarse sand/gravel, trace clay, wet.		1058	1 1 1 2	1.3	0	
	26.5	SILTY CLAY: Brown silty clay, little sand, trace gravel.						
	30.0	SAND/SILT: Brown/gray medium to fine-grained sand/silt with little clay, wet.		1111	1 3 5 6	1.6	0	
	31.6							
	35.0							
	35.7	SAND: Brown/gray sand with little gravel, few clay, wet.		1122	9 12 12 12	0.7	0	
	40.0							
	40.3	SAND: Brown coarse to fine-grained sand with little gravel, trace clay, wet.		1140	6 10 14 11	0.3	0	
	45.0							
	45.2	SAND: Brown sand with little gravel, trace silt, wet, rock in shoe.		1243	7 8 8 7	0.1	0	
	50.0	GRAVEL: Brown gravel with little sand, few silt, wet.		1256	12 15 16 14	1	0	
	51.0							

Elevation scale: 800 (at 28 ft), 795 (33), 790 (38), 785 (43), 780 (48), 775 (53), 770 (58). Depth scale 26–60.

DRILLING LOG OF BORING NO. BH08

Project/Location: Former Bright Outdoors / Johnson City, NY
Boring Location (Northing/Easting): 773490.0962 / 985115.1118
Date Started/Finished: 6/23/2004 - 6/23/2004
Drilling Company: North Star Drilling
Driller/Geologist: Steve Laramee / Brian Cervi

Total Depth of Hole (feet BGS): 50
Ground Elevation (feet above MSL): 828.9
Groundwater Depth After Drilling/Date: -- ft BGS/
Groundwater Depth During Drilling: 10 ft BGS ∇

ELEVATION	DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/ PID (ppm) SAMPLE / HOLE	COMMENTS
gs elevation 828.9		ground surface (gs)						
	0.7	BLACKTOP: Blacktop with some gravel, dry.		0909	21 6 3 3	1.4	0	
	1.4	SILTY CLAY: Brown silty clay with few and, trace gravel, slightly moist.						
	2.0	NO RECOVERY		0911	3 4 6 5	1.3	0	
825		SILTY CLAY: Mottled brown/gray silty clay with few sand, slightly moist grading to very moist.		0917	2 5 5 5	1.5	0	
				0921	4 5 3 5	1.3	0	
820	9.2			0933	1 2 2 3	1.7	0	
	10.0 ∇	SAND: Brown sand with some clay/silt, trace gravel, wet.		0938	3 3 2 3	1.7	0	Soil sample (FBO-BH08-S1) at 9.5-10.5 ft BGS. Wet at 10 ft BGS.
	11.7	SAND and CLAY: Intermixed sand and clay layers; sand layers are about one-inch thick and are medium to fine-grained sand/silt, wet; clay layers are two to three-inches thick and are silty clay with few sand, wet.						
815	15.0							
	15.3	SILTY CLAY: Brown silty clay with little sand, few gravel, wet.		0945	H 1 2 4	0.3	0	Groundwater sample (FBO-BH08-GW) at 15-17 ft BGS.
810	20.0							
	20.2	SAND/SILT: Brown medium to fine-grained sand/silt with few clay, trace gravel, wet.		1001	1 1 3 3	0.2	0	
805	25.0							

DRILLING LOG OF BORING NO. BH08

Project/Location: Former Bright Outdoors / Johnson City, NY

Total Depth of Hole (feet BGS): 50

ELEVATION	DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
	25.5	SAND: Brown sand with trace clay and trace gravel, wet.		1007	1 2 2 2	0.5	0	
800	30.0–31.5	SAND: Brown sand with little gravel, few silt, wet.		1017	2 5 7 10	1.3	0	Soil sample (FBO-BH08-S2 and FBO-BH08-S2/D [duplicate]) at 30-32 ft BGS.
795	35.0–36.5	SAND: Brown sand with few silt, wet.		1031	12 14 14 14	1.9	0	
	36.5–36.8	SILTY CLAY: Brown silty clay with little sand, wet.						
790	40.0–41.6	SAND: Brown sand with little silt, trace gravel, wet.		1057	5 5 7 7	1.8	0	
	41.6–41.8	SILTY CLAY: Brown silty clay with few sand, wet.						
785	45.0–46.8	SAND/SILT: Brown sand/silt with few clay, wet.		1109	3 3 3 6	1.9	0	
780	50.0–51.7	SILTY CLAY: Gray silty clay with few sand, few gravel, wet.		1122	3 1 3 5	1.6	0	
775								
770								

DRILLING LOG OF BORING NO. BH09

Project/Location: Former Bright Outdoors / Johnson City, NY
Boring Location (Northing/Easting): 773351.7798 / 985127.8534
Date Started/Finished: 6/21/2004 - 6/21/2004
Drilling Company: North Star Drilling
Driller/Geologist: Steve Laramee / Brian Cervi

Total Depth of Hole (feet BGS): 50
Ground Elevation (feet above MSL): 828.37
Groundwater Depth After Drilling/Date: -- ft BGS/
Groundwater Depth During Drilling: 10.5 ft BGS ∇

ELEVATION	DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
gs elevation 828.37		ground surface (gs)						
	0.2	BLACKTOP		1125	9 2 3 2	0.5	0	
	1.0–2.0	SILTY CLAY: Brown silty clay, few sand, slightly moist.						
825	2.0	NO RECOVERY		1127	2 2 4 4	1.4	0	
		SILTY CLAY: Brown/gray silty clay, trace to few sand, trace gravel, moist.		1134	1 3 4 5	1	0	
	6.7–6.9	GRAVEL: Brown/black gravel with some sand/silt, few clay, moist.		1138	4 4 4 5	1.9	0	
820		SILTY CLAY: Brown silty clay, few to little sand, very moist grading to wet, wet at 10.5 ft BGS.		1148	2 2 3 3	1.8	0	
	10.5 ∇			1154	1 1 2 1	1.9	0	Soil sample (FBO-BH09-S1) at 10-11 ft BGS. Wet at 10.5 ft BGS.
	12.0							
815	15.0–15.5	SILTY CLAY: Brown/gray silty clay with little sand, few gravel, wet.		1201	1 2 2 2	0.5	0	Groundwater sample (FBO-BH09-GW) at 15-17 ft BGS.
810	20.0–20.5	SILTY CLAY: Brown silty clay with few sand, few gravel, wet.		1255	H H 1 1	0.5	0	
805	25.0							

DRILLING LOG OF BORING NO. BH09

Project/Location: Former Bright Outdoors / Johnson City, NY

Total Depth of Hole (feet BGS): 50

ELEVATION	DEPTH	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
	26	26.3	SILTY CLAY: Brown silty clay with little sand/gravel, wet.		1306	5 9 10 7	1.3	0	
800	27–29								
	30	30.0 / 31.5	SILTY CLAY: Brown silty clay with some gravel, little sand, wet.		1319	6 8 8 20	1.5	0	Geotechnical soil sample (FBO-BH09-GT) at 30-32 ft BGS.
795	32–34								
	35	35.0 / 36.5	SAND: Brown sand with some gravel, few clay/silt, wet.		1334	9 7 8 12	1.3	0	
790	37–39								
	40	40.0 / 41.7	SAND: Brown sand with some gravel, few silt/clay, wet.		1349	15 11 15 19	1.8	0	Soil sample (FBO-BH09-S2) at 41-42 ft BGS.
785	42–44								
	45	45.0 / 46.7	SAND: Brown sand with few gravel, few silt, wet.		1408	5 6 7 11	1.8	0	
780	47–49								
	50	50.0 / 51.7	SAND: Brown sand with few gravel, few silt, wet.		1430	8 11 7 15	1.8	0	
775	52–57								
770	58–60								

DRILLING LOG OF BORING NO. BH10

Project/Location: Former Bright Outdoors / Johnson City, NY

Boring Location (Northing/Easting): 773356.3077 / 985186.504

Date Started/Finished: 6/28/2004 - 6/28/2004

Drilling Company: North Star Drilling

Driller/Geologist: Steve Laramee / Brian Cervi

Total Depth of Hole (feet BGS): 50

Ground Elevation (feet above MSL): 828.39

Groundwater Depth After Drilling/Date: -- ft BGS/

Groundwater Depth During Drilling: 10 ft BGS ▽

ELEVATION	DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
gs elevation 828.39		ground surface (gs)						
	0.4	TOPSOIL: Brown topsoil with some organics, few sand, dry.		1059	3 3 4 4	1.3	0	
825		SILTY CLAY: Brown silty clay with few sand, trace organics ar 0.4-1.5 ft BGS, gray mottling at 2-3.5 and 6-7.5 ft BGS, trace gravel at 4-5.5 ft BGS, slightly moist grading to wet, wet at approximately 10 ft BGS.		1101	3 4 6 5	1.5	0	
				1109	2 3 3 4	1.5	0	
				1111	5 4 4 5	1.3	0	
820				1122	3 3 4 4	0	0	
	10 ▽			1127	1 1 3 6	1	0	Soil sample (FBO-BH10-S1) at 10-11 ft BGS. Wet at 10 ft BGS.
	12.0							
815	15.0							
	15.4	SAND/SILT: Brown sand/silt with few gravel, trace clay, wet.		1136	2 2 3 2	0.4	0	Groundwater sample (FBO-BH10-GW) at 15-17 ft BGS.
810	20.0							
	20.7	SAND/SILT: Brown sand/silt with few gravel, wet.		1225	H 2 4 6	0.7	0	
805	25.0							

DRILLING LOG OF BORING NO. BH10

Project/Location: Former Bright Outdoors / Johnson City, NY   Total Depth of Hole (feet BGS): 50

ELEVATION	DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
	26.2	SAND/SILT: Brown sand/silt with little gravel, trace clay, wet.		1231	5 8 9 9	1.2	0	
800	30.0–31.5	SAND: Brown sand with few gravel, few silt, trace clay, wet.		1257	4 8 10 10	1.5	0	
795	35.0–36.0	SAND/SILT: Brown sand/silt with few gravel, wet.		1306	7 5 7 7	1.8	0	Soil sample (FBO-BH10-S2) at 35-36 ft BGS.
	36.0–36.7	SILTY CLAY: Brown/gray silty clay with few sand, wet.						
790	40.0–41.5	SILTY CLAY: Gray silty clay with few sand, plastic, wet.		1321	2 3 4 3	1.3	0	
785	45.0–45.8	SILTY CLAY: Gray/brown silty clay with few sand, plastic, wet.		1334	H 2 2 3	0.8	0	
780	50.0–50.7	SILTY CLAY: Gray silty clay with little sand, slightly plastic, wet.		1348	H H 1 1	0.7	0	
775								
770	60							

DRILLING LOG OF BORING NO. BH11

Project/Location: Former Bright Outdoors / Johnson City, NY

Boring Location (Northing/Easting): 773291.3087 / 985261.8445

Date Started/Finished: 6/15/2004 - 6/16/2004

Drilling Company: North Star Drilling

Driller/Geologist: Steve Laramee / Brian Cervi

Total Depth of Hole (feet BGS): 50

Ground Elevation (feet above MSL): 828.31

Groundwater Depth After Drilling/Date: -- ft BGS/

Groundwater Depth During Drilling: 12 ft BGS ∇

ELEVATION	DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
gs elevation 828.31		ground surface (gs)						
	0-1.0	GRAVEL FILL: Tan/gray gravel fill with some coarse to fine-grained sand, dry.		1507	11 16 9 4	1.5	0	
825	1.0-12.8	SILTY CLAY: Gray/brown mottled silty clay with trace to little sand, trace to few gravel at 1-3.5 ft BGS, gray at 1-3.5 ft BGS, slightly moist grading to wet, wet at approximately 12 ft BGS.		1510	3 3 4 4	1.5	0	
				1518	2 3 5 7	1.3	0	
820				1522	2 3 4 4	1	0	
				1532	2 3 4 4	1.7	0	
				1552	1 2 3 3	1.6	0	
815	12 ∇			1557	3 1 2 5	0.8	0	Soil sample (FBO-BH11-S1) at 11.5-12.5 ft BGS. Wet at 12 ft BGS.
	17.0-18.0	SILTY CLAY: Brown/gray silty clay, few sand, trace gravel, wet.		1612	2 2 2 5	1	0	Groundwater sample (FBO-BH11-GW) at 17-19 ft BGS.
810	20.0-20.7	SILTY CLAY: Brown silty clay, few sand, few gravel, wet.		1638	6 8 8 5	1.2	0	
805	20.7-21.2	GRAVEL: Brown/gray gravel with little sand and silt, few clay, wet.						
	25.0							

DRILLING LOG OF BORING NO. BH11

Project/Location: Former Bright Outdoors / Johnson City, NY   Total Depth of Hole (feet BGS): 50

DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
25.8	SILTY CLAY: Brown/gray silty clay with some sand, few gravel, wet.		1646	1 4 6 4	1.2	0	
26.2	GRAVEL: Brown gravel with little sand/silt, trace clay, wet.						
30.0							
30.8	SAND: Brown coarse to fine-grained sand, trace gravel, wet.		1655	3 4 7 6	1.5	0	
31.3	SILTY CLAY: Brown silty clay with little sand, few gravel, wet.						
31.7	GRAVEL: Brown gravel, few sand.						
35.0	SAND: Brown coarse to fine-grained sand, few gravel, few silt, wet.		0758	4 6 2 4	1.9	0	Soil sample (FBO-BH11-S2) at 36-37 ft BGS.
36.6							
36.9	SILTY CLAY: Brown silty clay with few sand, trace gravel, wet.						
40.0	SILTY CLAY: Brown/tan silty clay, trace sand, wet.		0820	2 2 3 3	1.3	0	
41.5							
45.0	SILTY CLAY: Brown/gray silty clay with few sand, wet.		0835	3 4 4 5	1.9	0	
46.9							
50.0	SILTY CLAY: Brown/gray silty clay with few sand, wet.		0850	2 4 4 6	1.8	0	Geotechnical soil sample (FBO-BH11-GT) at 50-52 ft BGS.
51.8							

ELEVATION	DEPTH
	26
	27
800	28
	29
	30
	31
	32
795	33
	34
	35
	36
	37
790	38
	39
	40
	41
	42
785	43
	44
	45
	46
	47
780	48
	49
	50
	51
	52
775	53
	54
	55
	56
	57
770	58
	59
	60

DRILLING LOG OF BORING NO. BH12

Project/Location: Former Bright Outdoors / Johnson City, NY
Boring Location (Northing/Easting): 773462.5787 / 985303.3586
Date Started/Finished: 6/22/2004 - 6/22/2004
Drilling Company: North Star Drilling
Driller/Geologist: Steve Laramee / Brian Cervi

Total Depth of Hole (feet BGS): 50
Ground Elevation (feet above MSL): 828.47
Groundwater Depth After Drilling/Date: -- ft BGS/
Groundwater Depth During Drilling: 9.5 ft BGS ∇

gs elevation 828.47 — ground surface (gs)

ELEVATION	DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
	0.3	TOPSOIL: Brown organic topsoil with little clay, few sand, slightly moist.		1400	2 3 3 3	1.3	0	
	3.5	SILTY CLAY: Brown silty clay with few to some sand, trace organics from 0.3 to 1.5 ft BGS, slightly moist to moist.		1403	2 4 4 5	1.5	0	
825	4.0	NO RECOVERY						
	8.0	SILTY CLAY: Brown/gray silty clay with some grading to little sand, moist to very moist.		1410	2 3 4 4	1.8	0	
				1414	4 7 5 5	1.8	0	
820	10.0	SILTY CLAY: Brown silty clay with little sand, few gravel, very moist to wet.		1423	1 2 5 2	1	0	Soil sample (FBO-BH12-S1) at 9-10 ft BGS.
	10.3	SILTY SAND: Brown silty sand with some gravel, few clay, wet.		1429	2 2 3 3	0.2	0	Wet at approximately 9 ft BGS.
815	15.0							
	15.5	SAND: Brown sand with some gravel, few silt, wet.		1437	3 2 5 7	0.5	0	Groundwater sample (FBO-BH12-GW) at 15-17 ft BGS.
810	20.0							
	21.2	SILTY CLAY: Brown grading into gray silty clay, few sand, plastic, wet.		1458	H 2 2 3	1.2	0	
805	25.0							

DRILLING LOG OF BORING NO. BH12

Project/Location: Former Bright Outdoors / Johnson City, NY

Total Depth of Hole (feet BGS): 50

ELEVATION	DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
	25–26.8	SILTY CLAY: Gray silty clay with few sand, plastic, wet.		1505	H 2 3 3	1.8	0	Geotechnical soil sample (FBO-BH12-GT) at 25-27 ft BGS.
800	30.0–31.8	SILTY CLAY: Gray/brown silty clay with few sand, plastic, wet.		1515	3 6 5 6	1.8	0	
795	35.0–36.5	SILTY CLAY: Gray/brown silty clay with few sand, plastic, wet.		1528	H 2 2 2	1.3	0	
790	40.0–40.7	SILTY CLAY: Gray silty clay with little sand, plastic, wet.		1544	H H 1 3	0.7	0	
785	45.0–46.2	SILTY CLAY: Gray/brown silty clay with few sand, plastic, wet.		1600	H H 3 3	1.2	0	
780	50.0–51.5	SILTY CLAY: Gray silty clay with few sand, plastic, wet.		1616	H H 3 4	1.2	0	
775, 770	52–60							

DRILLING LOG OF BORING NO. BH13

Project/Location: Former Bright Outdoors / Johnson City, NY

Total Depth of Hole (feet BGS): 50

Boring Location (Northing/Easting): 773363.8664 / 985307.859

Ground Elevation (feet above MSL): 827.99

Groundwater Depth After Drilling/Date: -- ft BGS/

Date Started/Finished: 6/24/2004 - 6/24/2004

Groundwater Depth During Drilling: 10 ft BGS

Drilling Company: North Star Drilling

Driller/Geologist: Steve Laramee / Brian Cervi

ELEVATION	DEPTH	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
gs elevation 827.99		ground surface (gs)						
	0.5	TOPSOIL: Brown organic topsoil with few sand, trace gravel, slightly moist.		1035	2 2 2 3		0	
	1.2	SILTY CLAY: Brown silty clay with few sand, trace organics, slightly moist.						
825	2.0	NO RECOVERY		1037	2 4 6 5		0	
		SILTY CLAY: Brown/gray silty clay with few grading to little sand, few gravel at 10-11 ft BGS, slightly moist grading to wet, wet at 10 ft BGS.		1045	3 4 4 4		0	
820				1048	5 6 5 7		0	
				1054	1 2 3 5		0	
815	11.0			1059	1 4 5 5		0	Soil sample (FBO-BH13-S1) at 9.5-10.5 ft BGS. Wet at approximately 10 ft BGS.
	15.0							
	15.7	SILTY CLAY: Brown silty clay with few sand, wet.		1107	1 2 4 5		0	Groundwater sample (FBO-BH13-GW) at 15-17 ft BGS.
810	16.0	SAND: Brown sand with little gravel, few clay/silt, wet.						
	20.0							
	21.0	SILTY CLAY: Brown silty clay with little sand, trace gravel, wet.		1125	3 3 3 2		0	
805	21.5	SAND: Brown sand with few silt, wet.						
	25.0							

DRILLING LOG OF BORING NO. BH13

Project/Location: Former Bright Outdoors / Johnson City, NY   Total Depth of Hole (feet BGS): 50

ELEVATION	DEPTH	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	RQD (%)	Penetration Times	BLOW COUNT	RECOVERY (feet)	FID/PID (ppm) SAMPLE / HOLE	COMMENTS
	26		SAND/SILT: Brown sand/silt with few gravel, wet.		1131	3 4 4 7		0	
	26.9								
	27								
800	28								
	29								
	30.0		SAND/SILT: Brown/red sand/silt with few gravel, wet.		1143	4 5 8 9		0	
	31								
	31.8								
	32								
795	33								
	34								
	35.0		SAND/SILT: Brown sand/silt with trace gravel, wet.		1240	2 2 3 4		0	Soil sample (FBO-BH13-S2) at 36-37 ft BGS.
	36								
	36.8								
	37								
790	38								
	39								
	40.0		SILTY CLAY: Gray silty clay, few sand, plastic, wet.		1300	1 2 2 5		0	
	41								
	41.5								
	42								
785	43								
	44								
	45.0		SILTY CLAY: Gray silty clay with few sand, slightly plastic, wet.		1313	H 2 2 3		0	
	46								
	46.5								
	47								
780	48								
	49								
	50.0		SILTY CLAY: Gray silty clay with few sand, slightly plastic, wet.		1325	1 2 3 3		0	
	51								
	51.5								
	52								
775	53								
	54								
	55								
	56								
	57								
770	58								
	59								
	60								

Borehole Record for MW-07

- Drilling Log
- Narrative Lithologic Description
- Well Development Record
- Well Development -- Parameter Measurements
- Investigation - Derived Waste Inventory Sheet

DRILLING LOG FOR MW-07

Project Name FORMER BRIGHT OUTDOORS

Site Location JOHNSON CITY, NY

Date Started/Finished 12/3/08

Drilling Company AZTECH TECHNOLOGY

Driller's Name MARTY HARRINGTON

Geologist's Name MEGAN FRONCKOWIAK

Geologist's Signature M Fronckowiak

Rig Type (s) MOBILE B3500

Drilling Method (s) HSA & MACROCORE

Bit Size (s) 9" Auger Size (s) 4 1/4" ID

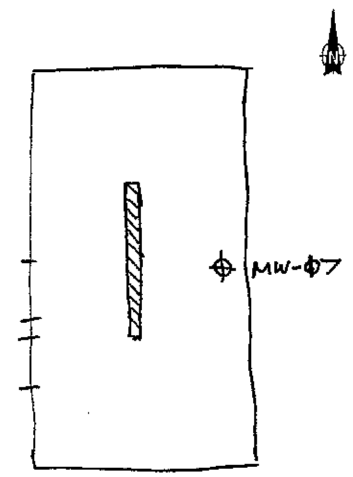
Auger/Split Spoon Refusal N/A

Total Depth of Borehole Is 22'

Total Depth of Corehole Is N/A

Water Level (TOIC)		
Date	Time	Level(Feet)
12/3/08	08:40	10.5' (open hole)

Well Location Sketch



NTS

Depth(Feet)	Sample Number	Blows on Sampler	Soil Components Rock Profile CL SL S GR	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	PID ~~HNu/OVA~~ (ppm)	Comments
0–5 (1, 2, 3, 4, 5)			SL	08:05	1	1'	-	-	0	Collect MW-07-Z1 soil sample from 1' @ 08:10
5–10 (6, 7, 8, 9, 10)			SL/S	08:15	2	3.3'	-	-	0	
10–15 (11, 12, 13, 14, 15)			S	08:25	3	4'	-	-	0	

MW-07

SCREENED WELL

Stick-up ______ ft

Top of Grout 0 ft

Top of Seal at 2 ft

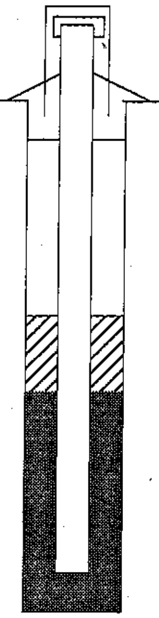
Top of Sand Pack 10 ft

Top of Screen at 12 ft

Bottom of Screen at 22 ft

Bottom of Hole at 22 ft

Bottom of Sandpack at 22



Lock Number ______

Inner Casing Material PVC

Inner Casing Inside Diameter 2 inches

GROUND SURFACE

Quantity of Material Used:
Bentonite Pellets ______

Cement ______

Borehole Diameter 9 inches

Cement/ Bentonite ______

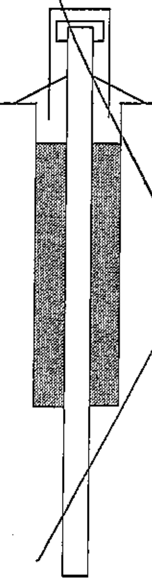
Grout ______

Screen Slot Size 0.010"

Screen Type ______
☒ PVC ______
☐ Stainless Steel ______

Pack Type/Size:
☒ Sand #0 U.S. Silica
☐ Gravel ______
☐ Natural ______

OPEN-HOLE WELL



Stick-up ______ ft

Inner Casing Material ______

Inner Casing Inside Diameter ______ inches

Outer Casing Diameter ______ inches

Borehole Diameter ______ ft

Bedrock ______ ft

Bottom of Rock Socket/ Outer Casing ______ ft

Bottom of Inner Casing ______ ft

Corehole Diameter ______

Bottom of Corehole ______ ft

NOTE: See pages 136 and 137 for well construction diagrams

Depth-ft.	NARRATIVE LITHOLOGIC DESCRIPTION	Moisture Content: Dry	Moist	Wet
1	0-0.5' concrete	○	⊗	○
2	0.5-0.8' gravel subbase	○	⊗	○
3	0.8-1.7' mottled little gray to light brown silt	○	⊗	○
4		○	⊗	○
5		○	⊗	○
6	5-5.7' silt with little clay, brown to med. brown throughout	○	⊗	○
7	5.7-6.8' sandy silt w/ trace clay, sand fine-coarse	○	⊗	○
8	6.8-7.4' sandy silt, wet	○	○	⊗
9	7.4-8.3' very fine sand	○	⊗	○
10		○	⊗	○
11	10-15' very fine to fine sand, med. brown to brown	○	○	⊗
12		○	○	⊗
13		○	○	⊗
14		○	○	⊗
15		○	○	⊗

Depth(feet)	Sample Number	Blows on Sampler	Soil Components CL SL S GR	Rock Profile	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	PID ~~HNu/OVA~~ (ppm)	Comments
			S		08:40	4	.6'	-	-	0	little recovery gravel stuck in shoe
16											
17											
18											
19											
20						5	0				no recovery likely due to gravel
21											
22											
23											
24											
25			end of hole								
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45											

MW-07

Depth(feet).	NARRATIVE LITHOLOGIC DESCRIPTION	Moisture Content: Dry	Moist	Wet
16	15-15.6' wet, sandy gravel			X
17				X
18				X
19				X
20				X
21	20-25' no recovery			
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				

WELL DEVELOPMENT RECORD

SITE FORMER BRIGHT OUTDOORS DATE 12/4/08

LOCATION JOHNSON CITY, NY WELL NO. MW-07

MEASUREMENT OF WATER LEVEL AND WELL VOLUME

- Prior to sampling, the static water level and total depth of the well will be measured with a calibrated weighted line. Care will be taken to decontaminate equipment between each use to avoid cross contamination of wells.
- The number of linear feet of static water (difference between static water level and total depth of well) will be calculated.
- The static volume will be calculated using the formula:

$$V = Tr^2 (0.163)$$

Where:
V = Static volume of well in gallons;
T = Depth of water in the well, measured in feet;
r = Inside radius of well casing in inches;
and 0.163 = A constant conversion factor which compensates for r^2h factor for the conversion of the casing radius from inches to feet, the conversion of cubic feet to gallons, and (pi).
1 well volume (v) = 1.9 gallons.

Volume of Water in Casing or Hole

Diameter of Casing or Hole (in)	Gallons per Foot of Depth	Cubic Feet per Foot of Depth	Liter per Meter of Depth	Cubic Meters per Meter of Depth
1	0.041	0.0055	0.509	0.509×10^{-3}
11/2	0.092	0.0123	1.142	1.142×10^{-3}
2	0.163	0.0218	2.024	2.024×10^{-3}
21/2	0.255	0.0341	3.167	3.167×10^{-3}
3	0.367	0.0491	4.558	4.558×10^{-3}
31/2	0.500	0.0668	6.209	6.209×10^{-3}
4	0.653	0.0873	8.110	8.110×10^{-3}
41/2	0.826	0.1104	10.260	10.260×10^{-3}
5	1.020	0.1364	12.670	12.670×10^{-3}
51/2	1.234	0.1650	15.330	15.330×10^{-3}
6	1.469	0.1963	18.240	18.240×10^{-3}
7	2.000	0.2673	24.840	24.840×10^{-3}
8	2.611	0.3491	32.430	32.430×10^{-3}
9	3.305	0.4418	41.040	41.040×10^{-3}
10	4.080	0.5454	50.670	50.670×10^{-3}
11	4.937	0.6600	61.310	61.310×10^{-3}
12	5.875	0.7854	72.960	72.960×10^{-3}
14	8.000	1.0690	99.350	99.350×10^{-3}
16	10.440	1.3960	129.650	129.650×10^{-3}
18	13.220	1.7670	164.180	164.180×10^{-3}
20	16.320	2.1820	202.680	202.680×10^{-3}
22	19.750	2.6400	245.280	245.280×10^{-3}
24	23.500	3.1420	291.850	291.850×10^{-3}
26	27.580	3.6870	342.520	342.520×10^{-3}
28	32.000	4.2760	397.410	397.410×10^{-3}
30	36.720	4.9090	456.020	456.020×10^{-3}
32	41.780	5.5850	518.870	518.870×10^{-3}
34	47.160	6.3050	585.680	585.680×10^{-3}
36	52.880	7.0690	656.720	656.720×10^{-3}

1 Gallon = 3.785 liters
1 Meter = 3.281 feet
1 Gallon water weighs 8.33 lbs. = 3.779 kilograms
1 Liter water weighs 1 kilogram = 2.205 pounds
1 Gallon per foot of depth = 12.419 liters per foot of depth
1 Gallon per meter of depth = 12.419×10^{-3} cubic meters per meter of depth

INITIAL DEVELOPMENT WATER

WATER LEVEL (TOIC) 9.92'
WELL DEPTH (TD) 21.93' firm bottom
COLOR brown
ODOR none
CLARITY poor

FINAL DEVELOPMENT WATER

WATER LEVEL (TOIC) 10.02' @1242
WELL DEPTH (TD) 21.93'
COLOR clear
ODOR none
CLARITY good

DESCRIPTION OF DEVELOPMENT TECHNIQUE surge and purge with 12V pump.

WELL DEVELOPMENT - PARAMETER MEASUREMENTS

MW-Ø7

TIME	TOTAL VOL. WITHDRAWN		pH	COND. (µmhos/cm)	TEMP. (°C/°F)	TURB. (NTU)	COMMENTS
	GALS.	BORE VOL.					
1130	0	0	6.74	1510	12.0	>1000	flow rate = .77 gpm
1137	5	2.5	6.61	1586	12.9	>1000	water level dropping slowly
1144	10	5	6.59	1441	13.1	>1000	
1149	15	7.5	6.54	1567	13.2	>1000	clarity is improving
1155	20	10	6.55	1582	13.3	>1000	
1202	25	12.5	6.56	1536	13.5	>1000	
1207	30	15	6.54	1549	13.4	>1000	continuing to clear and more
1213	35	17.5	6.58	1482	13.2	153	quickly
1219	40	20	6.53	1472	13.3	15.1	increased flow rate to max.
1228	50	25	6.51	1592	13.1	387	development complete

DEVELOPED BY: Megan Frondkowiak/Rick Watt

DATE 12/4/08

Borehole Record for MW-08

- Drilling Log
- Narrative Lithologic Description
- Well Development Record
- Well Development -- Parameter Measurements
- Investigation - Derived Waste Inventory Sheet

DRILLING LOG FOR MW-08

Project Name: Former Bright Outdoors

Site Location: Johnson City, NY

Date Started/Finished: 12/2/2008

Drilling Company: Aztech Technology

Driller's Name: Marty Harrington

Geologist's Name: Rick Watt

Geologist's Signature: R Watt

Rig Type (s): Mobile B3500

Drilling Method (s): HSA + Macrocore

Bit Size (s): 9" Auger Size (s): 4 1/4" ID

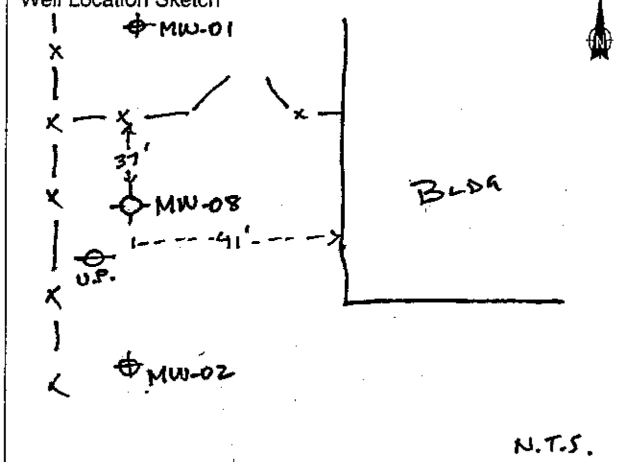
Auger/Split Spoon Refusal: N/A

Total Depth of Borehole Is: 23

Total Depth of Corehole Is: –

Water Level (TOIC)		
Date	Time	Level(Feet)
12/2/08	11:00	10.5' (open hole)

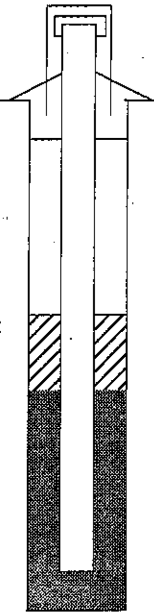
Well Location Sketch



Depth(Feet)	Sample Number	Blows on Sampler	Soil Components Rock Profile CL SL S GR	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	PID ~~HNu/OVA~~ (ppm)	Comments
1			NSM	10:15	1	3.8'	–	–	0	
2										
3										
4										
5										
6			NSM	10:30	2	4.5'	–	–	0	
7										
8										
9										
10										
11			S/GR	10:35	3	2.6'	–	–	0	
12										
13										
14										
15										

MW-08 pg 2 of 4

SCREENED WELL



Stick-up -0.45 ft

Top of Grout 0 ft

Top of Seal at 2 ft

Top of Sand Pack 10 ft

Top of Screen at 13 ft

Bottom of Screen at 23 ft

Bottom of Hole at 23. ft

Bottom of Sandpack at 23

Lock Number

Inner Casing Material PVC

Inner Casing Inside Diameter 2 inches

GROUND SURFACE

Quantity of Material Used:

Bentonite Pellets

Cement

Borehole Diameter 9 inches

Cement/ Bentonite

Grout

Screen Slot Size 0.010"

Screen Type

☒ PVC 2" ID

☐ Stainless Steel

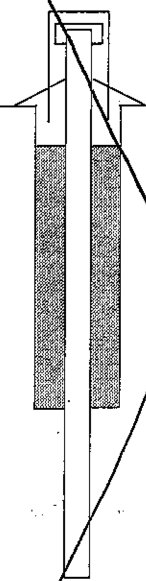
Pack Type/Size:

☒ Sand #0 U.S. Silica

☐ Gravel

☐ Natural

OPEN-HOLE WELL



Stick-up ft

Inner Casing Material

Inner Casing Inside Diameter inches

Outer Casing Diameter inches

Borehole Diameter ft

Bedrock ft

Bottom of Rock Socket/ Outer Casing ft

Bottom of Inner Casing ft

Corehole Diameter

Bottom of Corehole ft

NOTE: See pages 136 and 137 for well construction diagrams

Depth-ft.	NARRATIVE LITHOLOGIC DESCRIPTION	Moisture Content: Dry	Moist	Wet
1	0 - 0.5' Asphalt, gravel sub-base	X	X	
2	0.5 - 5.0' ~~Mod~~ Mottled light gray / yellow-brown silt with	X	X	
3	little clay and trace very fine sand, dry to moist.	X	X	
4		X	X	
5		X	X	
6	5 - 10' Same as above but less mottling more light brown;	X	X	
7	softer and moister below 8'. Sand content increases	X	X	
8	at base of core.	X	X	
9			X	
10			X	
11	10 - 10.2 Same as above		X	
12	10.2 - 12 Brown, fine-grained sand, wet.			X
13	12 - 12.5' Brown gravel with little sand			X
14				X
15				X

MW-08

Depth(feet)	Sample Number	Blows on Sampler	Soil Components CL SL S GR	Rock Profile	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	PID ~~HNu/OVA~~ (ppm)	Comments
16			S/GR	-	10:50	4	4.5'	-	-	0	
17											
18											
19											
20											
21			GR	-	11:00	5	4.5'	-	-	0	
22											
23											
24											
25			END OF HOLE								
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45											

MW-08

Depth(feet).	NARRATIVE LITHOLOGIC DESCRIPTION	Moisture Content: Dry	Moist	Wet
16	15-16.7' Brown fine to medium-grained sand.			X
17	Grades @ ~16.7' to fine then coarse gravel,			X
18	very wet.			X
19				X
20				X
21	20-25' Brown gravel, medium to coarse, angular			X
22	to rounded, very wet.			X
23				X
24				X
25				X
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				

WELL DEVELOPMENT RECORD

SITE: Former Bright Outdoors
DATE: 12/4/2008
LOCATION: Johnson City, NY
WELL NO. MW-08

MEASUREMENT OF WATER LEVEL AND WELL VOLUME

- Prior to sampling, the static water level and total depth of the well will be measured with a calibrated weighted line. Care will be taken to decontaminate equipment between each use to avoid cross contamination of wells.
- The number of linear feet of static water (difference between static water level and total depth of well) will be calculated.
- The static volume will be calculated using the formula:

$$V = Tr^2(0.163)$$

Where:
V = Static volume of well in gallons;
T = Depth of water in the well, measured in feet;
r = Inside radius of well casing in inches;
and 0.163 = A constant conversion factor which compensates for r^2h factor for the conversion of the casing radius from inches to feet, the conversion of cubic feet to gallons, and (pi).
1 well volume (v) = 2 gallons.

Volume of Water in Casing or Hole

Diameter of Casing or Hole (in)	Gallons per Foot of Depth	Cubic Feet per Foot of Depth	Liter per Meter of Depth	Cubic Meters per Meter of Depth
1	0.041	0.0055	0.509	0.509×10^{-3}
11/2	0.092	0.0123	1.142	1.142×10^{-3}
2	0.163	0.0218	2.024	2.024×10^{-3}
21/2	0.255	0.0341	3.167	3.167×10^{-3}
3	0.367	0.0491	4.558	4.558×10^{-3}
31/2	0.500	0.0668	6.209	6.209×10^{-3}
4	0.653	0.0873	8.110	8.110×10^{-3}
41/2	0.826	0.1104	10.260	10.260×10^{-3}
5	1.020	0.1364	12.670	12.670×10^{-3}
51/2	1.234	0.1650	15.330	15.330×10^{-3}
6	1.469	0.1963	18.240	18.240×10^{-3}
7	2.000	0.2673	24.840	24.840×10^{-3}
8	2.611	0.3491	32.430	32.430×10^{-3}
9	3.305	0.4418	41.040	41.040×10^{-3}
10	4.080	0.5454	50.670	50.670×10^{-3}
11	4.937	0.6600	61.310	61.310×10^{-3}
12	5.875	0.7854	72.960	72.960×10^{-3}
14	8.000	1.0690	99.350	99.350×10^{-3}
16	10.440	1.3960	129.650	129.650×10^{-3}
18	13.220	1.7670	164.180	164.180×10^{-3}
20	16.320	2.1820	202.680	202.680×10^{-3}
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1 Gallon = 3.785 liters
1 Meter = 3.281 feet
1 Gallon water weighs 8.33 lbs. = 3.779 kilograms
1 Liter water weighs 1 kilogram = 2.205 pounds
1 Gallon per foot of depth = 12.419 liters per foot of depth
1 Gallon per meter of depth = 12.419×10^{-3} cubic meters per meter of depth

INITIAL DEVELOPMENT WATER

WATER LEVEL (TOIC) 10.05'
WELL DEPTH (TD) 22.72'
COLOR Brown
ODOR no
CLARITY Poor
* bottom is soft (sediment)

FINAL DEVELOPMENT WATER

WATER LEVEL (TOIC) 10.2' and rising @1030
WELL DEPTH (TD) 22.72'
COLOR clear
ODOR no
CLARITY good

DESCRIPTION OF DEVELOPMENT TECHNIQUE Surge w/ bailer then pump w/ 12-V submersible, surging periodically w/ pump.

WELL DEVELOPMENT - PARAMETER MEASUREMENTS

MW-08

TIME	TOTAL VOL. WITHDRAWN		pH	COND. (μmhos/cm)	TEMP. (°C/~~°F~~)	TURB. (NTU)	COMMENTS
	GALS.	BORE VOL.					
0822	0	0	7.28	840	12.5	>1000	Pump full (~1 gpm), well dried
0841	5	2.5	6.67	1162	12.6	>1000 MF	out after 4 gal.
0858	8	4	6.65	1233	13.2	>1000	Reduce flow to 0.25 gpm. &
0921	15	7.5	6.77	1334	13.1	633	WL maintained @ ~17' bgs.
0930	17	8.5	6.61	1312	13.6	70.6	let sit undisturbed for 5 mins
							*after surging turb. >1000 again
0941	20	10	6.58	1315	13.5	47	
1017	30	15	6.66	1356	13.1	34.4	development complete

DEVELOPED BY: RWatt, M.Fronckowiak

DATE 12/4/08

APPENDIX D – EXCAVATION WORK PLAN (EWP)

D-1 NOTIFICATION

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

Table D-1: Notifications*

Name	Contact Information
Robert Strang, 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
Harry Warner NYSDEC Region 7 HW Engineer	(315) 426-7519 harry.warner@dec.ny.gov
Shaun J. Surani New York State Department of Health Bureau of Environmental Exposure Investigation	Phone: (518) 402-7860 Email: BEEI@health.ny.gov
Stephanie Webb, Region 7 Citizen Participation Specialist; NYS Department of Environmental Conservation	Phone: (315) 426-7441 Email: 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 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 F of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

D-2 SOIL SCREENING METHODS

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

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

D-3 SOIL STAGING METHODS

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

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

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

D-4 MATERIALS EXCAVATION AND LOAD-OUT

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

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

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

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

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

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

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

D-5 MATERIALS TRANSPORT OFF-SITE

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

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

All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. The most appropriate route shall take into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport; (g) community input [where necessary].

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

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

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

D-6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 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. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

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

Non-hazardous historic fill and contaminated soils taken off-site will be 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.

D-7 MATERIALS REUSE ON-SITE

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

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

H-8 FLUIDS MANAGEMENT

All liquids to be removed from the site including, but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC. Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

D-9 COVER SYSTEM RESTORATION

Currently the site does not have a cover system. In the future, if one is installed after the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the ROD. A demarcation layer, consisting of orange snow fencing material, white geotextile or equivalent material, etc. will be installed to provide a visual reference to the top of the 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.

D-10 BACKFILL FROM OFF-SITE SOURCES

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

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

All imported soils will meet the backfill and cover soil quality standards established in 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 D-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. 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 H-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	47	47	47
Cadmium	4.3	7.5	7.5
Chromium, hexavalent [h]	19	19	19
Chromium, trivalent [h]	180	NS	1,500
Copper	270	1,720	270
Total Cyanide [h]	27	40	27
Lead	400	450	450
Manganese	2,000	2,000	2,000
Total Mercury	0.73	0.73	0.73
Nickel	130	130	130
Selenium	4	4	4
Silver	8.3	8.3	8.3
Zinc	2,480	2,480	2,480
PCBs/Pesticides			
2,4,5-TP Acid (Silvex)	3.8	3.8	3.8
4,4'-DDE	8.9	17	17
4,4'-DDT	7.9	136	47
4,4'- DDD	13	14	14
Aldrin	0.097	0.19	0.19
alpha-BHC	0.02	0.02	0.02
beta-BHC	0.09	0.09	0.09
Chlordane (alpha)	2.9	2.9	2.9
delta-BHC	0.25	0.25	0.25
Dibenzofuran	59	210	210
Dieldrin	0.1	0.1	0.1
Endosulfan I	24	102	102
Endosulfan II	24	102	102
Endosulfan sulfate	24	1,000	200
Endrin	0.06	0.06	0.06

Contaminant	Restricted Residential Use	Protection of Groundwater Use	Site Specific Soil Quality Standards
Heptachlor	0.38	0.38	0.38
Lindane	0.1	0.1	0.1
Polychlorinated biphenyls	1	3.2	1
Semivolatiles			
Acenaphthene	98	98	98
Acenapthylene	100	107	107
Anthracene	100	1,000	500
Benz(a)anthracene	1	1	1
Benzo(a)pyrene	1	22	1
Benzo(b)fluoranthene	1	1.7	1.7
Benzo(g,h,i)perylene	100	1,000	500
Benzo(k)fluoranthene	1.7	1.7	1.7
Chrysene	1	1	1
Dibenz(a,h)anthracene	0.33	1,000	0.56
Fluoranthene	100	1,000	500
Fluorene	100	386	386
Indeno(1,2,3-cd)pyrene	0.5	8.2	5.6
m-Cresol	0.33	0.33	0.33
Naphthalene	12	12	12
o-Cresol	0.33	0.33	0.33
p-Cresol	0.33	0.33	0.33
Pentachlorophenol	0.8	0.8	0.8
Phenanthrene	100	1,000	500
Phenol	0.33	0.33	0.33
Pyrene	100	1,000	500
Volatiles			
1,1,1-Trichloroethane	0.68	0.68	0.68
1,1-Dichloroethane	0.27	0.27	0.27
1,1-Dichloroethene	0.33	0.33	0.33
1,2-Dichlorobenzene	1.1	1.1	1.1
1,2-Dichloroethane	0.02	0.02	0.02
cis-1,2-Dichloroethene	0.25	0.25	0.25
trans-1,2-Dichloroethene	0.19	0.19	0.19
1,3-Dichlorobenzene	2.4	2.4	2.4
1,4-Dichlorobenzene	1.8	1.8	1.8
1,4-Dioxane	0.1	0.1	0.1
Acetone	0.05	0.05	0.05
Benzene	0.06	0.06	0.06
Butylbenzene	12	12	12
Carbon tetrachloride	0.76	0.76	0.76
Chlorobenzene	1.1	1.1	1.1
Chloroform	0.37	0.37	0.37
Ethylbenzene	1	1	1
Hexachlorobenzene	1.2	3.2	3.2
Methyl ethyl ketone	0.12	0.12	0.12

Contaminant	Restricted Residential Use	Protection of Groundwater Use	Site Specific Soil Quality Standards
Methyl tert-butyl ether	0.93	0.93	0.93
Methylene chloride	0.05	0.05	0.05
n-Propylbenzene	3.9	3.9	3.9
sec-Butylbenzene	11	11	11
tert-Butylbenzene	5.9	5.9	5.9
Tetrachloroethene	1.3	1.3	1.3
Toluene	0.7	0.7	0.7
Trichloroethene	0.47	0.47	0.47
1,2,4-Trimethylbenzene	3.6	3.6	3.6
1,3,5- Trimethylbenzene	8.4	8.4	8.4
Vinyl chloride	0.02	0.02	0.02
Xylene (mixed)	1.6	1.6	1.6

D-11 STORMWATER POLLUTION PREVENTION

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

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

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

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

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

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

D-12 EXCAVATION CONTINGENCY PLAN

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

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

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

D-13 COMMUNITY AIR MONITORING PLAN

Air monitoring for volatile organic compounds (VOCs) 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 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. 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 B 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.

D-14 ODOR CONTROL PLAN

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

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

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

D-15 DUST CONTROL PLAN

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

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

D-16 OTHER NUISANCES

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

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

APPENDIX E - RESPONSIBILITIES of OWNER and REMEDIAL PARTY

Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for the Former Bright Outdoors site (the "site"), number 704023 site owner(s), as defined below. The owner(s) is/are currently listed as:

U-Haul Moving & Storage of Albany (the "owner").

Nothing on this page shall supersede the provisions of an Environmental Easement, 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 a(n) March 22, 2007 Easement and Declaration of Restrictive Covenants remain in place and continue to be complied with.

3) In the event the site is delisted, the owner remains bound by the March 22, 2007 Easement and Declaration of Restrictive Covenants and shall submit, upon request by the NYSDEC, a written certification that the March 22, 2007 Easement and Declaration of Restrictive Covenants is still in place and has been complied with.

4) The owner shall grant access to the site to 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. In the event that damage to the remedial components or vandalism is evident, the owner shall notify the NYSDEC.

6) In the event some action or inaction by the owner adversely impacts the site, the owner must notify the NYSDEC.

7) The owner must notify 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 2.4 of the SMP. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) 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.

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

APPENDIX F – 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

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: 3150-45X

CLIENT/PROJECT: NYSDEC / Former Bright Outdoors 3150 - 45X

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

<u>Adjacent area</u> – 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.

<u>Competent Person</u> – 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.

<u>Excavation</u> – 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.

<u>Protective system</u> – Shoring, Shielding, Sloping or equivalent.

<u>Trench</u> – 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.

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.

EXHIBIT 5 (continued)

CARE AND CLEANING OF RESPIRATORS

Cleaning and Disinfection

Collect respirators at a central location. Brief employees required to wear respirators on the respirator program and assure them that they will always receive a clean and sanitized respirator. Such assurances will boost morale. Clean and disinfect respirators as follows:

- Remove all cartridges, canisters, and filters, plus gaskets or seals not affixed to their seats.
- Remove elastic headbands.
- Remove exhalation cover.
- Remove speaking diaphragm.
- Remove inhalation valves.
- Wash facepiece and breathing tube in cleaner/sanitizer powder mixed with warm water, preferably at 120 to 140°F. Wash components separately from the facemask, as necessary. Remove heavy soil from surfaces with a hand brush.
- Remove all parts from the wash water and rinse twice in clean, warm water.
- Air dry parts in a designated clean area.
- Wipe facepieces, valves, and seats with a damp lint-free cloth to remove any remaining soap or other foreign material.

Note: Most respirator manufacturers market their own cleaners/sanitizers as dry mixtures of a bactericidal agent and a mild detergent. One-ounce packets for individual use and bulk packages for quantity use are usually available.

EXHIBIT 5 (continued)

CARE AND CLEANING OF RESPIRATORS

Repairs

Only a trained person with proper tools and replacement parts should work on respirators. No one should ever attempt to replace components or to make adjustments or repairs beyond the manufacturers' recommendations. It may be necessary to send high pressure side components of SCBA's to an authorized facility for repairs.

Make repairs as follows:

- Disassemble and hand clean the pressure-demand and exhalation valve assembly (SCBA's only). Exercise care to avoid damage to the rubber diaphragm.
- Replace all faulty or questionable parts or assemblies. Use parts only specifically designed for the particular respirator.
- Reassemble the entire respirator and visually inspect the completed assembly.
- Insert new filters, cartridges, or canisters, as required. Make sure that gaskets or seals are in place and tightly sealed.

Storage

Follow manufacturers' storage instructions, which are always furnished with new respirators or affixed to the lid of the carrying case. In addition, these general instructions may be helpful:

- After respirators have been inspected, cleaned, and repaired, store them so to protect against dust, excessive moisture, damaging chemicals, extreme temperatures, and direct sunlight.

EXHIBIT 5 (continued)

CARE AND CLEANING OF RESPIRATORS

Storage (continued)

- Do not store respirators in clothes lockers, bench drawers, or tool boxes. Place them in wall compartments at work stations or in a work area designated for emergency equipment. Store them in the original carton or carrying case.
- Draw clean respirators from storage for each use. Each unit can be sealed in a plastic bag, placed in a separate box, and tagged for immediate use.

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.

EXHIBIT 7 (continued)

HEAT/COLD STRESS GUIDELINES

Lose layers of work clothes rather than bulky garments will allow the wearer to adapt to changing conditions. Use of rubber overboots will prevent leather workboots from getting wet and are excellent for stationary work to stop cold penetration.

Signs to Look For:

FROSTNIP, the first stage of frostbite occurs when a body part comes in direct contact to a cold object or cold air. This condition is not serious and can be remedied by warming of the region. The real problem is that a numbing effect can occur and keep the worker from realizing that he is going into the next stage SUPERFICIAL FROSTBITE.

The skin and under layers become effected. If not treated this can become a FREEZING condition in which the deeper structures of the body become effected.

CONDITION	SKIN SURFACE	TISSUE UNDER SKIN	SKIN COLOR
frostnip	soft	soft	red-white
frostbite	hard	soft	white/waxy
freezing	hard	hard	white/gray

HYPOTHERMIA occurs when the body is unable to maintain its proper temperature of 98.6 degrees. It is important for the worker to realize that this can occur in temperatures of 50 degrees and below. Submersion of a body part in cold water will also cause hypothermia very quickly. Some early signs are:

1. Shivering
2. Numbness in extremities
3. Drowsiness

EXHIBIT 7 (continued)

HEAT/COLD STRESS GUIDELINES

4. Slow breathing and pulse rates
5. Failing eyesight
6. Loss of coordination, inability to do easy tasks
7. Freezing of body parts

Proper treatment begins by activation of emergency medical service procedure. Hypothermia required prompt qualified medical treatment. Initial site action would revolve around getting the affected worker out of the weather and begin the warming process. The most important thing to realize is that Hypothermia is a MEDICAL EMERGENCY.

Workers exposed to cool temperatures for extended period of time can experience lesions in the form of red swollen areas that seem hot and itchy. These chronic lingering lesions are known as CHILBLAINS. Although not an emergency, the Chilblains indicate that the worker 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.

EXHIBIT 9 (continued)

EMERGENCY INFORMATION

- Inhalation - if a person inhales a large amount of organic vapor, the person will be removed from the work area to fresh air and artificial respiration will be administered if breathing has ceased. The affected person will be transported to the hospital by ambulance or emergency vehicle if overexposure to lungs has occurred.
- Personal Injuries - in case of severe injury, the victim will receive emergency first aid at the site, as appropriate, and will be transported by ambulance or emergency vehicle to the hospital. An accident form must be completed for any accident or occupational exposure and forwarded to the Project Manager.

3. Evacuating the Site

- Contact the HSO On-Site
- Contact the FOM
- Follow the directions below:
  - Upwind withdrawal - withdraw to a safe upwind location if:
    - Air quality concentration contain excessive concentrations of volatile organics, combustible gases, or oxygen percentage above or below safe levels for the level of protection being worn. The field team will withdraw to a safe upwind location determined by the HSO.
    - A minor accident occurs. The victim will undergo decontamination procedures and be transported to a safe upwind location. Field operations will resume after first aid and/or decontamination procedures have been administered to the affected individual.
    - Protective clothing and/or respirator malfunctions.
  - Withdrawal from site - evacuate the site if:
    - Explosive levels of combustible gases, toxic gases, or volatile organics are recorded.
    - A major accident or injury occurs.
    - Fire and/or explosion occurs.
    - Shock-sensitive, unstable, or explosive materials are discovered.
    - High levels of radioactive materials are discovered.

- Evacuation of nearby facilities - a continuous release of toxic, flammable, or explosive vapors from the site could affect people off-site. Air quality should be monitored downwind to assess the situation. The FOM, or on-site designee, is responsible for determining if circumstances exist for any level of off-site contamination warranting concern for people off-site. he should always assume worst case conditions until proven otherwise. If conditions are marginal, evacuation should be conducted until acceptable conditions resume. Key personnel identified in the HASP should be contacted when evacuation of nearby facilities becomes necessary.

EXHIBIT 9 (continued)

EMERGENCY INFORMATION

TABLE I

EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communications. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

Where radio communication is not available, the following air-horn and/or hand signals will be used:

EMERGENCY AIR-HORN SIGNALS

HELP!	Three short blasts	. . .
EVACUATION!	Three long blasts	___ ___ ___
ALL CLEAR!	Alternating long and short blasts	___ . ___ .

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN'T BREATH	Hand gripping throat
LEAVE AREA IMMEDIATELY, NO DEBATE!	Grip partner's wrist or place both hands around waist
NEED ASSISTANCE	Hands on top of head
OKAY! - I'M ALRIGHT! - I UNDERSTAND!	Thumbs up
NO! - NEGATIVE!	Thumbs down

EXHIBIT 9 (continued)

EMERGENCY INFORMATION

TABLE II

LOCATION OF EMERGENCY EQUIPMENT

EQUIPMENT	TYPE	LOCATION(S)
Fire Extinguisher Dry Chemical	20A-80B:C	
First Aid Kit		
Eye Wash	Portable	
Emergency Sprayer	Portable	
Communication	Air Horns Each work area.	
Map	Hospital Route	

EXHIBIT 10

POSTING 1 - USE OF PERSONAL PROTECTIVE EQUIPMENT

WHO This posting applies to all site workers, supervisors, and visitors, *without exception.*

WHEN Prior to entering the Contaminant Reduction Zone (CRZ) or Exclusion Zone (EZ) provisions of this posting will be followed.

WHAT This posting outlines the initial forms of PPE required to be worn while working in the CRZ and EZ. Particular types or forms of PPE may be altered based on the authority of the HSO. Specific guidelines are provided in Section 7.0 of this HASP. Disposable PPE will not be worn more than one work shift of workday. In some instances disposable PPE may have to be replaced more than once during a workday. The HSO will determine the frequency of replacing disposable PPE. Reusable PPE will be properly decontaminated, cleaned, sterilized (if appropriate), and stored. Doubts regarding what to wear will be directed to the HSO for resolution.

WHY The levels of protection specified in the SSHP were chosen to protect individuals from potentially harmful exposures to chemicals or physical hazards. No changes to PPE specifications are authorized without the permission of the HSO.

EXHIBIT 10 (continued)

POSTING 2 - PERSONAL HYGIENE

WHO This posting applies to all site workers, supervisors, and visitors, but is intended primarily for site workers.

WHEN Before beginning work, during scheduled breaks, and at the end of a workday.

WHAT This posting summarizes the policy on personal hygiene that applies to all site personnel. Personal hygiene includes those activities such as washing hands, showering, shaving, etc., that are conducive to keeping one's body clean and mind refreshed. For the individual's sake, and his/her coworkers, each worker will be responsible for maintaining a high level of personal hygiene. This is especially critical prior to breaks where food, beverages, or smoking will occur. If proper personal hygiene is not followed, potential ingestion, absorption, or inhalation of toxic materials may occur. Particular attention must be paid to close shaving whenever respirators are worn. Facial hair and long hair will interfere with respirator fit and will allow excessive contaminant penetration.

WHY To avoid accidental ingestion, absorption, or inhalation of hazardous materials. To maintain an elevated state of awareness, thus reducing potential mental errors and accidents.

EXHIBIT 10 (continued)

POSTING 3 - PROVISIONS FOR SMOKING, EATING, CHEWING, AND DRINKING

WHO This posting applies to all site workers, supervisors, and visitors, *without exception.*

WHEN At all times personnel are on-site. This regulation will specifically apply during breaks and rest periods.

WHAT Site personnel are forbidden to smoke, eat, chew, or drink in the Exclusion Zone or Contaminant Reduction Zone. Only those areas specified as break areas or common areas in the Support Zone may be used for smoking, eating, chewing, or drinking. The rest/break facility and office trailers in the Support Zone may be used. Individuals found to be repeatedly disregarding these provisions will be released.

The only exception to this posting involves access to electrolytic fluids in the Contaminant Reduction Zone when the HSO has determined heat stress warrants regular replenishing of lost body fluids.

WHY To protect personnel from accidental exposures to hazardous materials, smoking, eating, chewing, and drinking is prohibited everywhere except designated break areas. To avoid potential fires and explosions, smoking is prohibited everywhere except designated break areas and office trailers.

EXHIBIT 11

SITE-SPECIFIC INFORMATION

The following site-specific information will be filled out by project personnel for each site and will be posted on-site:

Site Name:	Former Bright Outdoors 3150 - 45X
Address:	Vestal, 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:	UHS Wilson Medical Center,
Address:	33-57 Harrison St, Johnson City, NY

EXHIBIT 11 (continued)

SITE-SPECIFIC INFORMATION

Emergency
Telephone: (607) 763-6311

Directions: Head west on Field St toward Marie St
Turn left onto Oakdale Rd
Turn left onto NY-17C E/Main St
Turn right onto Harrison St

See attach a route to hospital

Emergency Telephones

Agent/Facility	Telephone	Emergency No.
EMS - Ambulance		911
Police Department		911
Fire Department		911
Hospital	(607) 763-6311	
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.

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:	Former Bright Outdoors 3150 - 45X
Address:	Vestal, New York
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Entry Objectives:	

	Name	Phone
Site Organizational Structure:		
Project Director:		
Project Manager:		
HSO:		
FOM/Alternate HSO:		
Field team staff:		
Subcontractors:		

Medical Assistance	
Physician:	
Hospital:	UHS Wilson Medical Center,
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EXHIBIT 11 (continued)

SITE-SPECIFIC INFORMATION

Emergency
Telephone: (607) 763-6311

Directions: Head west on Field St toward Marie St
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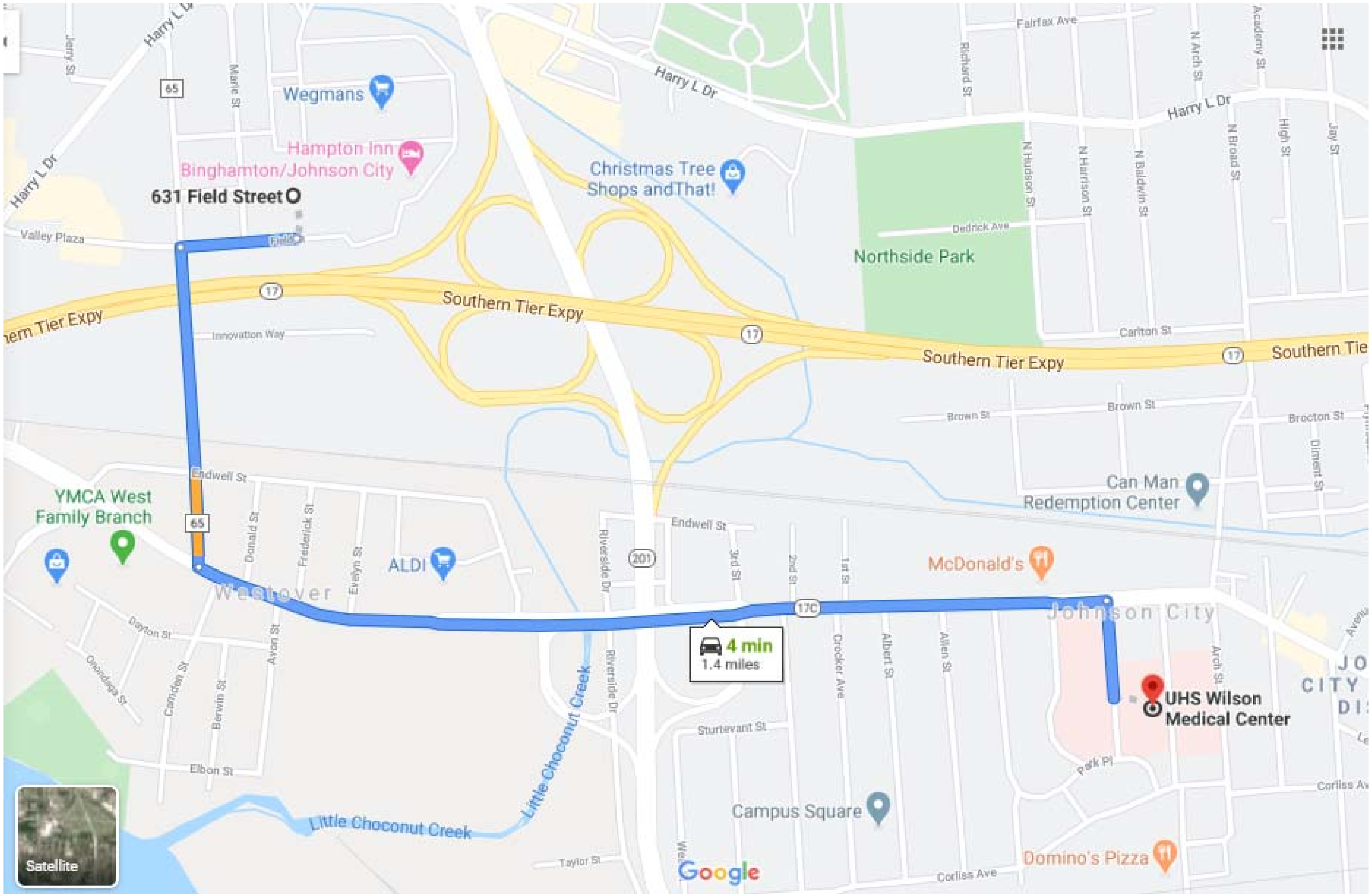
Agent/Facility	Telephone	Emergency No.
EMS - Ambulance		911
Police Department		911
Fire Department		911
Hospital	(607) 763-6311	
Poison Control Center	1-800-222-1222	211

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

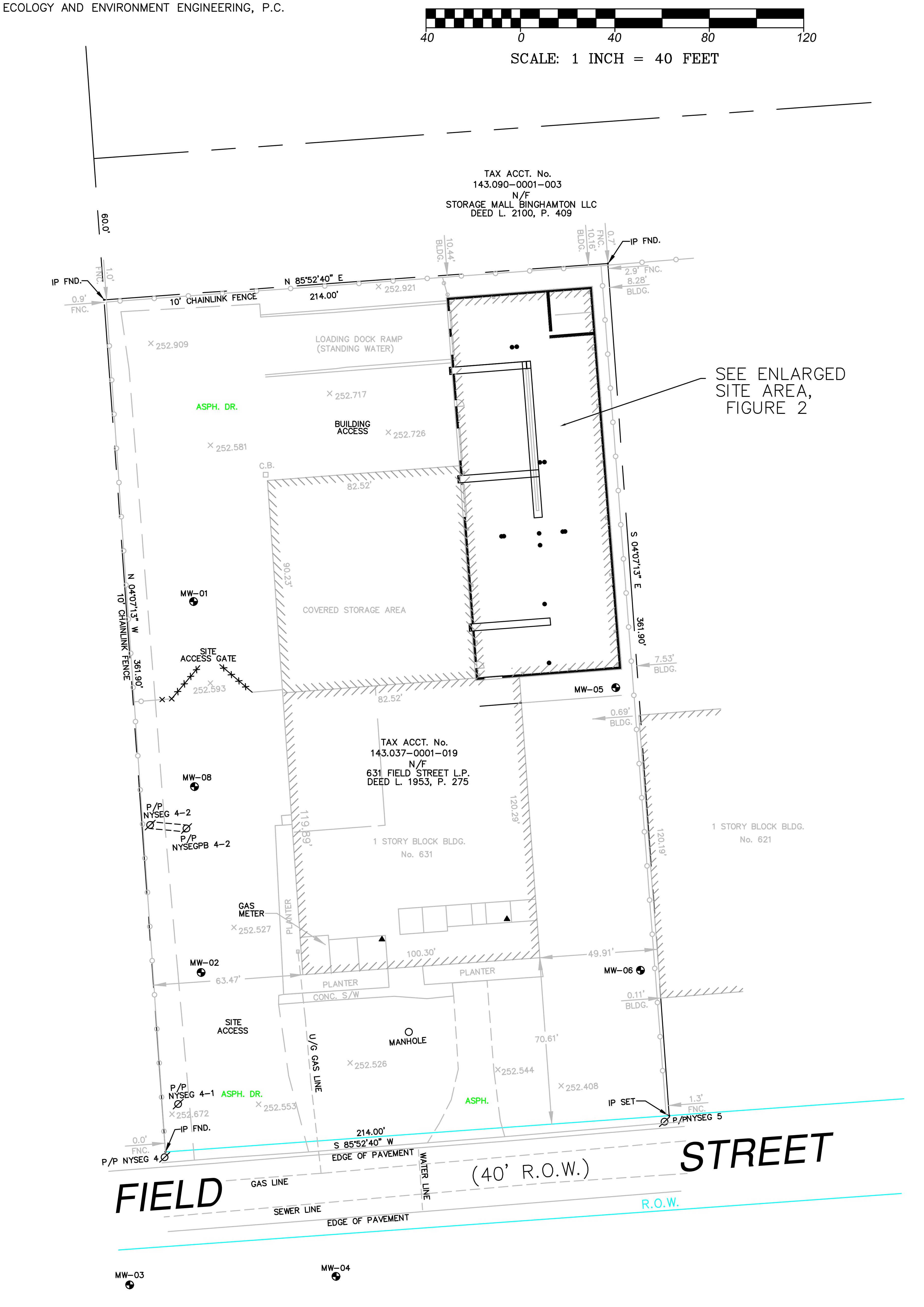
Secure limits of work area and install traffic control/pedestrian protection devices per the Technical Scope of Work, work permits, and applicable federal, state and local laws, rules and regulations.

631 Field Street, Johnson City, NY to 33-57 Harrison St, Johnson City, NY



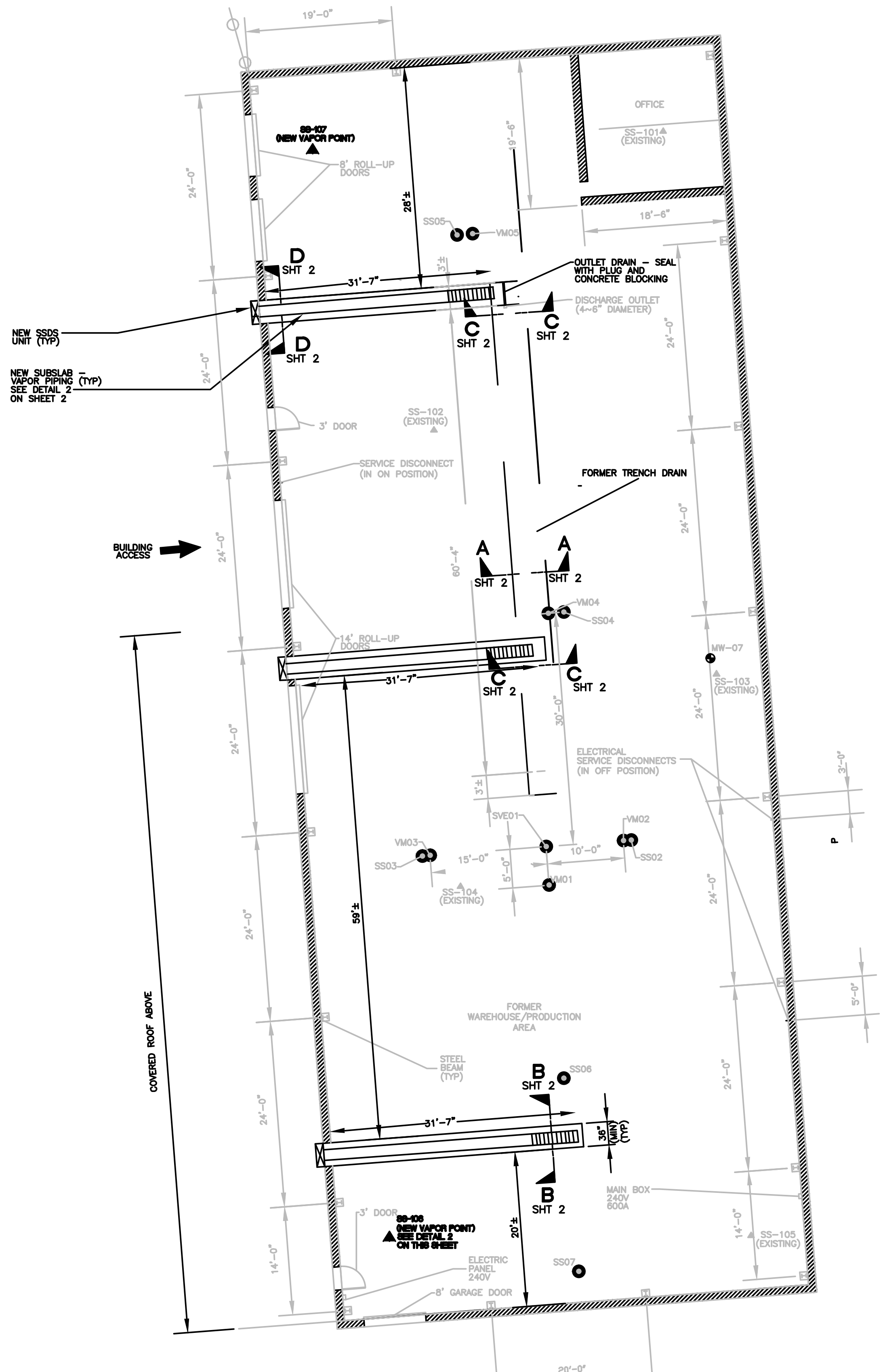
APPENDIX G – SHOP DRAWINGS

MAP DERIVED FROM
ECOLOGY AND ENVIRONMENT ENGINEERING, P.C.



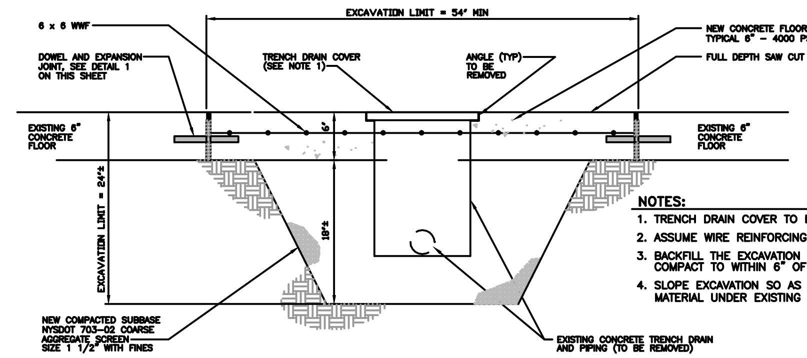
OP-TECH
Response ● Service ● Experience

Site: FORMER BRIGHT OUTDOORS SITE SUBSLAB DEPRESSURIZATION SYSTEMS AND MISCELLANEOUS CONSTRUCTION	**Job No:** WD700836	**Date:** APR. 2010
Client: NEW YORK STATE DEC	**Figure 1: SITE PLAN**	



ENLARGED SITE WORK AREA

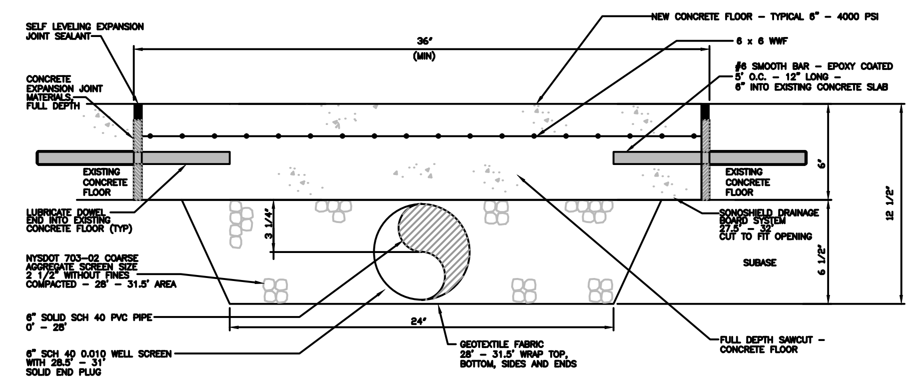
SCALE: 1 INCH = 20 FEET



NOTES:
1. TRENCH DRAIN COVER TO BE TURNED OVER TO THE PROPERTY OWNER.
2. ASSUME WIRE REINFORCING IS IN THE CONCRETE FLOOR TO BE SAW CUT.
3. BACKFILL THE EXCAVATION WITH CLEAN CRUSHED #2 STONE AND COMPACT TO WITHIN 6" OF THE FLOOR SURFACE.
4. SLOPE EXCAVATION SO AS NOT TO UNDERMINE SUB BASE MATERIAL UNDER EXISTING CONCRETE FLOOR.

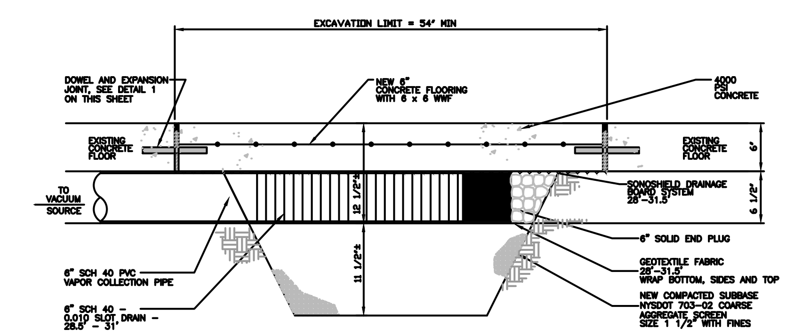
EXISTING TRENCH DRAIN REMOVAL SECTION A-A

SCALE: 1/2" = 1'-0"



BELOW FLOOR HORIZONTAL VAPOR COLLECTION AT SUBSLAB VAPOR PIPING SECTION B-B

SCALE: 1" = 1'-0"

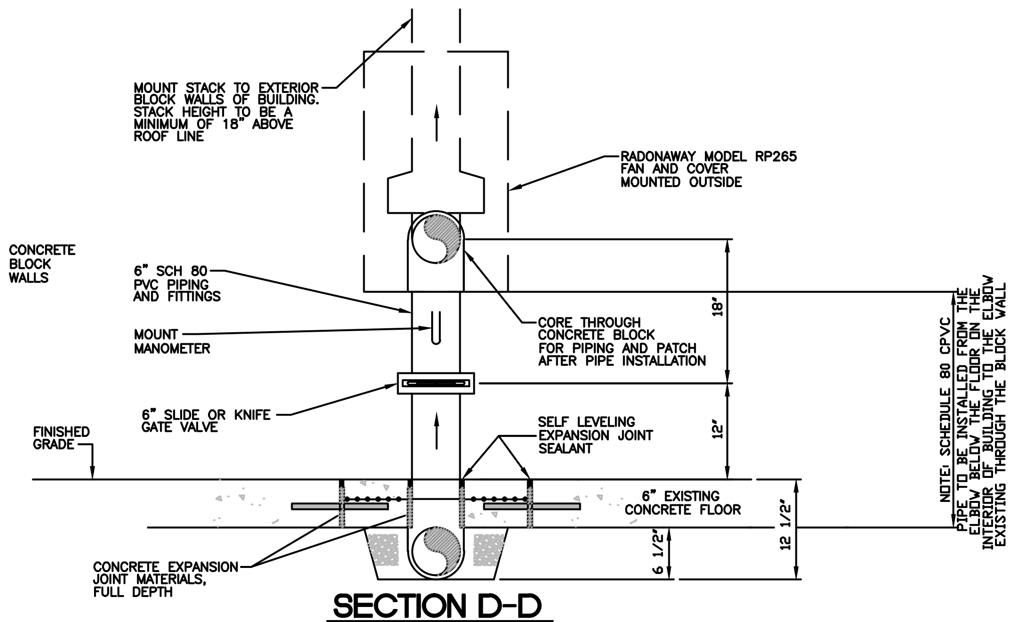


HORIZONTAL VAPOR PIPE TRENCH DRAIN CROSSING SECTION C-C

SCALE: 1/2" = 1'-0"

FIGURE DERIVED FROM CONSTRUCTION DRAWINGS PREPARED BY ECOLOGY AND ENVIRONMENT, P.C NOVEMBER 2009.
PLAN UPDATED BY OP-TECH IN AUGUST 2010 TO SHOW CONSTRUCTION CONDITIONS

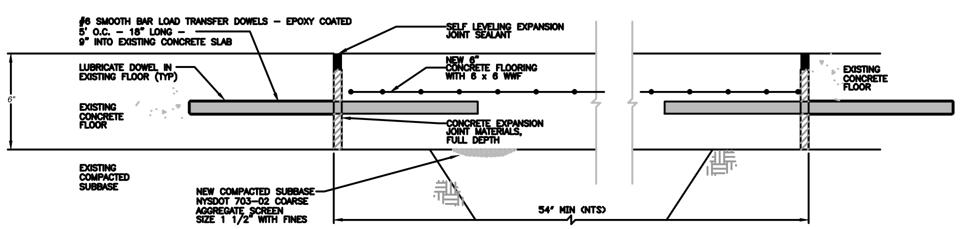
OP-TECH Response ● Service ● Experience		
Site: FORMER BRIGHT OUTDOORS SITE SUBSLAB DEPRESSURIZATION SYSTEMS AND MISCELLANEOUS CONSTRUCTION	Job No: WD700836	Date: Aug. 2010
Client: New York State DEC	Figure 2: ENLARGED SITE WORK AREA AND SECTIONS	



SECTION D-D

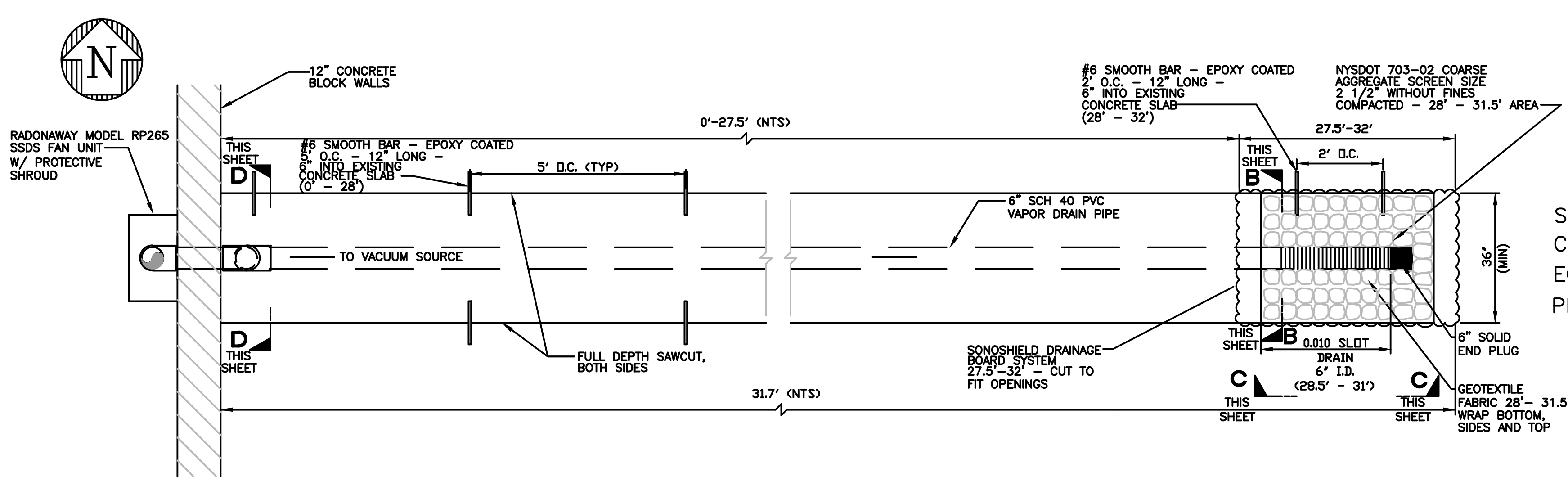
SCALE: 1/2" = 1'-0"

TYPICAL FOR ALL THREE VAPOR EXTRACTION PIPING INSTALLATIONS.



DOWEL AND EXPANSION JOINT AT TRENCH DRAIN EXCAVATION DETAIL 1

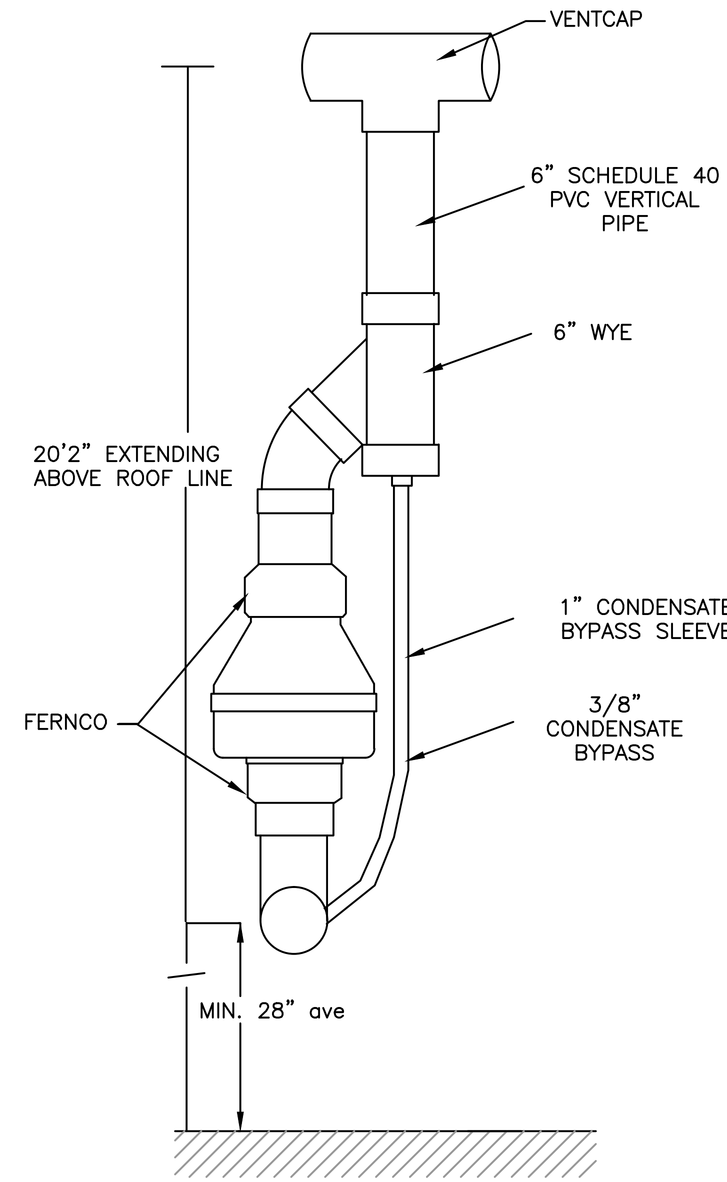
SCALE: 1" = 1'-0"



SUBSLAB - VAPOR PIPING DETAIL 2 - TYPICAL • ALL 3 LOCATIONS

SCALE: 1/4" = 1'-0"

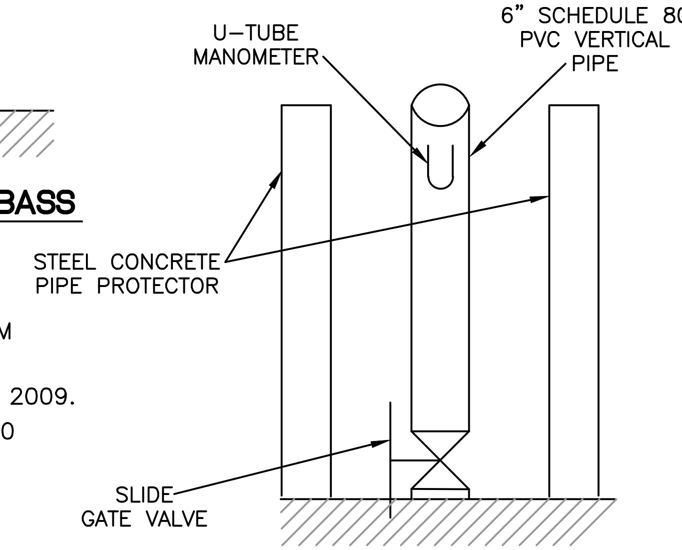
NOTES:
1. SSDS VERTICAL VENT STACKS EXTEND 18" ABOVE ROOF LINE.
2. LOCATION OF ELECTRICAL SOURCE TO BE DETERMINED.
3. ELECTRICAL SOURCE REQUIREMENTS FOR THE SSDS UNITS ARE SINGLE PHASE – 120 VOLTS.



FAN AND CONDENSATE BYBASS

NOT TO SCALE

SECTION AND DETAILS AT LEFT DERIVED FROM CONSTRUCTION DRAWINGS PREPARED BY ECOLOGY AND ENVIRONMENT, P.C NOVEMBER 2009. PLAN UPDATED BY OP-TECH IN AUGUST 2010



INTERIOR VERTICAL PIPING

NOT TO SCALE

OP-TECH
Response ● Service ● Experience

Site: FORMER BRIGHT OUTDOORS SITE SUBSLAB DEPRESSURIZATION SYSTEMS AND MISCELLANEOUS CONSTRUCTION	Job No: WD700836	Date: APR. 2010
	Figure 3: SECTIONS	
Client: New York State DEC		

APPENDIX H – 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 characteristics 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 characteristics 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

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			

dbTRC
A Joint Venture

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

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:________________

A Joint Venture	**Project No.:** **Project Name:**	**Test Pit No.:** **Sheet of** **By**:
Contractor: **Operator:** **Equipment:**	**Geologist:** **Test Pit Method:** **Date Started:** **Date Completed:**	**Test Pit Completion Depth:** **Ground Surface Elevation:** **Test Pit Dimension(s):**

Weather Conditions:

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

NOTES:

Date: ___________________

SAMPLE INFORMATION RECORD

Site: ________________________ **Sample Crew:** ________________________

Sample Location/Well No. ________________________

Field Sample I.D. Number ________________________ **Time** ________________________

Weather ________________________ **Temperature** ________________________

Sample Type:

Groundwater ________________________ **Sediment** ________________________

Surface Water/Stream ________________________ **Air** ________________________

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

Well Information (fill out for groundwater samples)

Depth to Water ________________________ **Measurement Method** ________________________

Depth of Well ________________________ **Measurement Method** ________________________

Volume Removed ________________________ **Removal Method** ________________________

Field Test Results

Color ________________ **pH** ________________ **Odor** ________________

Temperature (ºF) ____________ **Specific Conductance (umhos/cm)** ________________________

Other (OVA, Methane Meter, etc. ________________________

Constituents Sampled

________________ ________________ ________________ ________________

________________ ________________ ________________ ________________

Remarks:

____

____

____

Well Casing Volumes

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

A Joint Venture

Date:

AIR MONITORING FORM

Project Name: ______________________________

Project Number: ______________________________ Instrument: ______________

Recorded by: ______________________________ Calibration Date: ______________

Weather Conditions: ______________________________

Time	Location	Wind Speed and Direction	Reading	Observations

Recording Procedures/Remarks: ______________________________

Date: ____________________

LOCATION SKETCH

Project ____ Sample Crew ______________________________

Sample(s) Locations(s) ____

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

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

N

A Joint Venture

Date: ____________________

DAILY FIELD ACTIVITY REPORT

Report Number: ____________________ Project Number: ______________________

Field Log Book Page Number: ____

Project: ____

Address: ____

Weather: (AM) ______________________________ Rainfall: (AM) ______________ Inches

(PM) ______________________________ (PM) ______________ Inches

Temperature: (AM) _______ ºF Wind Speed: (AM) ______ MPH Wind Direction: (AM) ______

(PM) _______ ºF (PM) ______ MPH (PM) ______

Site Condition: ____

Personnel On Site:	Name	Affiliation	Arrival Time	Departure Time

Subcontractor Work Commencement: (AM) __________________ (PM) __________________

Subcontractor Work Completion: (AM) __________________ (PM) __________________

A Joint Venture

Date: ___________________

DAILY FIELD ACTIVITY REPORT

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

A Joint Venture

Date: ___________________

DAILY FIELD ACTIVITY REPORT

General work performed today by D&B Engineers:

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

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

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

Prepared by: ______________________ Reviewed by: ______________________

dbTRC A Joint Venture

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]: ____________________

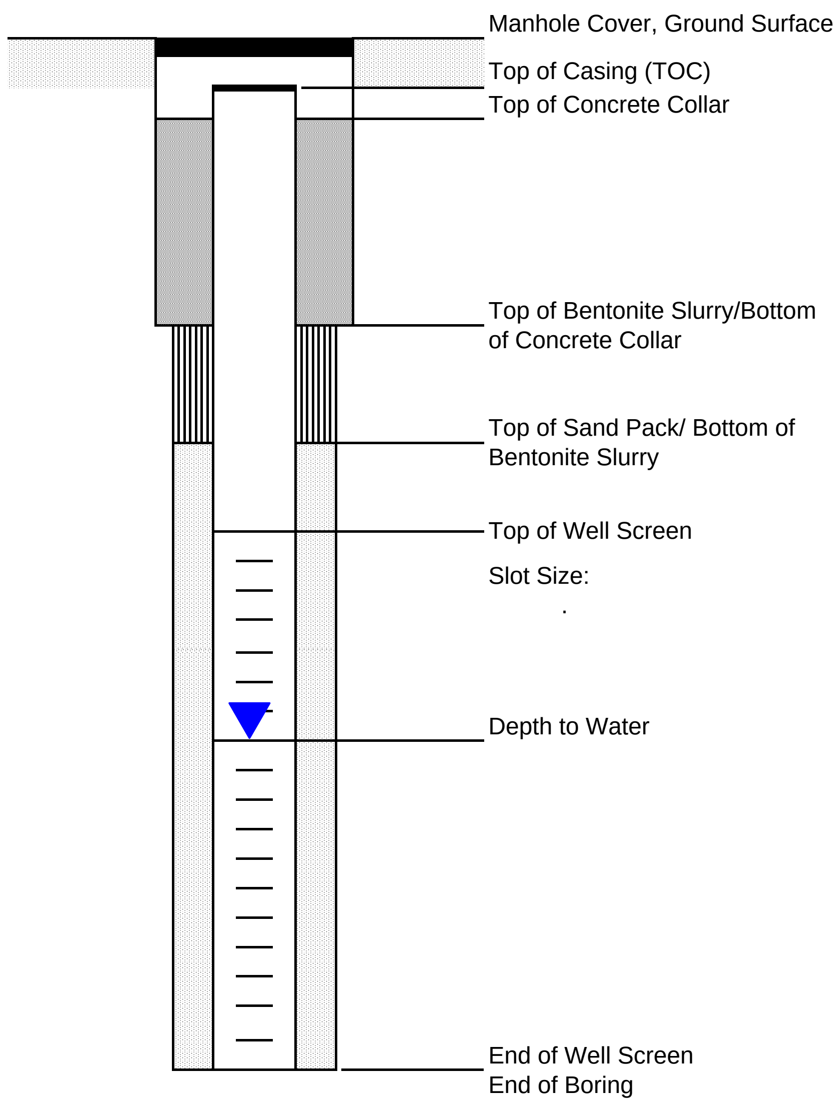
ELEVATION[1]: ____________________

DATUM: ____________________ DEPTH TO PRODUCT[2]: ____________________

CASING MATERIAL: ____________________ SCREEN MATERIAL: ____________________

FILTER PACK TYPE: ____________________ SEAL TYPE: ____________________

Depth from Ground Surface (feet) | Elevation[1]



Not to Scale

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

NOT TO SCALE

A Joint Venture

Date: __________

DAILY EQUIPMENT CALIBRATION LOG

Project Name: ______________________________

Project Number: ______________________________ Calibrated by: ______________________________

Instrument Name and Model Number	Calibration Method	Time	Readings and Observations

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	# 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:

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:

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

<u>Pesticide Notes</u>

[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 I – 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.

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- Describe the current site operations/use. If necessary, attach additional sheets.

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- Describe visual integrity/condition engineering control. If necessary, attach additional sheets.

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II. <u>Protectiveness Evaluation</u>

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.

____

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____

B. Evaluation of Institutional and Engineering Controls

<u>1. Zoning or Land Use Changes</u> (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 ____

<u>2. Inspections</u> (Complete below)

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

Yes____No_____

Date(s) of Disturbance: ___________________________________

Duration of Disturbance: Years ____ Months ____ Days ____

Date the NYSDEC was notified: ________________________

Date Work Plan Approved: __________________

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

____

____

____

Name of Contact Person Relative to the Disturbance:

____

Title: ____

Street Address: ____

City: ____________ State: _______ Zip Code: ____________

Telephone Number: _____________________________________

Email Address: ____

3. Changes to Laws and Regulations **(Complete below)**

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

Yes ____No ____

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

Yes____No_____

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

____

____

____

Date: ____________________

DAILY FIELD ACTIVITY REPORT

Report Number: ____________________ Project Number: ______________________

Field Log Book Page Number: ____

Project: ____

Address: ____

Weather: (AM) ______________________ Rainfall: (AM) ____________ Inches

(PM) ______________________ (PM) ____________ Inches

Temperature: (AM) _______ ºF Wind Speed: (AM) _______ MPH Wind Direction: (AM) _______

(PM) _______ ºF (PM) _______ MPH (PM) _______

Site Condition: ____

Personnel On Site:	Name	Affiliation	Arrival Time	Departure Time

Subcontractor Work Commencement: (AM) ______________ (PM) ______________

Subcontractor Work Completion: (AM) ______________ (PM) ______________

Date: ___________________

DAILY FIELD ACTIVITY REPORT

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

dbTRC
A Joint Venture

Date: ___________________

DAILY FIELD ACTIVITY REPORT

General work performed today by D&B Engineers:

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

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

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

Prepared by: ______________________ Reviewed by: ______________________

A Joint Venture

Date: __________

DAILY EQUIPMENT CALIBRATION LOG

Project Name: ______________________________

Project Number: ______________________________ Calibrated by: ______________________

Instrument Name and Model Number	Calibration Method	Time	Readings and Observations

A Joint Venture

Date: ___________________

SAMPLE INFORMATION RECORD

Site: ______________________ **Sample Crew:** ______________________

Sample Location/Well No. ______________________

Field Sample I.D. Number ______________________ **Time** ______________________

Weather ______________________ **Temperature** ______________________

Sample Type:

Groundwater ______________________ **Sediment** ______________________

Surface Water/Stream ______________________ **Air** ______________________

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

Well Information (fill out for groundwater samples)

Depth to Water ______________________ **Measurement Method** ______________________

Depth of Well ______________________ **Measurement Method** ______________________

Volume Removed ______________________ **Removal Method** ______________________

Field Test Results

Color ______________ **pH** ______________ **Odor** ______________

Temperature (ºF) ______________ **Specific Conductance (umhos/cm)** ______________________

Other (OVA, Methane Meter, etc. ______________________

Constituents Sampled

______________ ______________ ______________ ______________

______________ ______________ ______________ ______________

Remarks:

____

____

____

Well Casing Volumes

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

A Joint Venture

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

Air/Vapor Sample Data Collection Forms

Former Bright Outdoors Site

SVE Stack Discharge Emission Sampling Data Collection Form

Site Name: Former Bright Outdoors	**Project No.:**

Sample Location Information

Location ID/Description:

Address:	**City:**	**State:**

Sampler Names (Print):

Building Inspection & Inventory Performed? ☐ Yes ☐ No

Organic Vapor Meter Used: ☐ PID ☐ FID Model:

		Northern Stack Air	Center Stack Air	Southern Stack Air				
Sample ID								
Manometer Reading								
Canister No.								
Regulator No.								
Duration (hours)								
Start	**Date**							
	Time							
	Pressure							
End	**Date**							
	Time							
	Pressure							
Quality Control								
OVM (ppb)								
Analysis Method								

Laboratory:	**Date Shipped to Lab:**

Associated Trip Blank Sample ID:

Comments:

Key:
FID = flame-ionization detector
OVM = organic vapor meter
PID = photo-ionization detector
ppb = parts per billion
Pressure measured in inches of mercury, gauge (in Hg)

Permanent Soil Vapor Monitoring Point Sampling Data Collection Form

Site Name: Former Bright Outdoors	Project No.:

Sample Location Information

Project Task:

Sampler Names (Print):

Organic Vapor Meter Used: ☐ PID ☐ FID Model:

Sample ID								
Micro-manometer Reading								
Canister No.								
Regulator No.								
Duration (hours)								
Start	**Date**							
	Time							
	Pressure							
End	**Date**							
	Time							
	Pressure							
Quality Control								
OVM (ppb)								
Analysis Method								

Laboratory:	Date Shipped to Lab:

Associated Trip Blank Sample ID:

Comments:

Key:
FID = flame-ionization detector
OVM = organic vapor meter
PID = photo-ionization detector
ppb = parts per billion
Pressure measured in inches of mercury, gauge (in Hg)

SVE System Inspection Form

Former Bright Outdoors Site

System Inspection Field Form
Soil Vapor Mitigation Systems
Former Bright Outdoors Site
Johnson City, Broome County, New York
NYSDEC Site #7-04-023

SVE SYSTEMS INSPECTION FORM

Post Commissioning, Routine or Non-Routine Inspections (circle one)

Date of Inspection: ____

Date of Previous Inspection: ________________________________

Address: ___________________________________ Tracking Number: ___________

Equipment Documentation

As Found		Manometer Reading (in. H_20)			As Left		Manometer Reading (in. H_20)	
SVE System	Fan Model	Prior	Current		SVE System	Fan Model	Prior	Current
1-Northern					1-Northern			
2-Central					2-Central			
3-Southern					3-Southern			

Fan Check	As Found Yes	As Found No	As Left Yes	As Left No
Are all fans 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 each fan 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: ____________________

APPENDIX J – 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 Sampling Equipment Decontamination

Suggested Materials

- Potable water

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

<u>Procedures</u>

- 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 <u>Decontamination Fluids</u>

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

3.3.2 Drill Cuttings

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

3.3.3 Development and Purge Water

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

3.3.4 Personal Protective Equipment

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

3.3.5 Dedicated Sampling Equipment

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

4.0 FIELD INVESTIGATION TECHNIQUES

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

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

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

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

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

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

4.2 Records Review Search

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

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

4.3 Building Interiors

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

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

- Suspect asbestos-containing material (ACM), suspect lead-based paint (LBP), and/or suspect lead-based coatings (LBC) are observed in the building, and if damaged or disturbed, have the potential to impact the environment inside, beneath, and outside the building; and

- PCB-containing building materials (i.e. window caulking and light ballasts), with concentrations greater than 10,000 parts per million (ppm), are observed in the building, and if damaged or disturbed, have the potential to impact the environment inside, beneath, and outside the building.

4.3.1 Physical Structures and Features Inside Buildings

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

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

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

4.3.2 Suspect Asbestos-Containing Material

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

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

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

The lead survey will be conducted by either the physical collection of paint chip samples for laboratory analysis or field analysis utilizing an x-ray fluorescence (XRF) analyzer. Paint chip sampling is slightly destructive to building materials, while the XRF sampling activities are non-destructive to building materials. Whether paint chip or XRF sampling methodologies are employed, the Assessor will collect samples or a representative group of selected paints on various substrates throughout the building. During the lead survey, accessible portions of the building will be visually assessed to identify coated building components. The coated components will be grouped by the same color, texture, and substrate material. The Assessor will be selective in the screening process of various coated building components such as wood, metal, concrete, plaster, and gypsum wall board, amongst others, to provide a representative profile of potential LBP and LBC substrates. In addition, since LBP and LBC were used up to the time lead was banned in 1978, older painted surfaces and coatings and multi-layered painted surfaces will be targeted for screening over individual layers of newer paint.

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

4.4 Soil Vapor Sampling

4.4.1 Equipment and Supplies

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

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

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

4.4.2 Soil Vapor Probe Installation

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

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

4.4.3 Collection of Soil Vapor Samples

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

- Record weather information (i.e., temperature, barometric pressure, rainfall, wind speed, and wind direction) at the beginning of the sampling event.

- Record substantial changes to these conditions that may have occurred over the past 24 to 48 hours and that do occur during the course of sampling. The information may be measured with on-site equipment or obtained from a reliable source of local measurements (e.g., a local airport).

- Sampling personnel must avoid activities immediately before and during the sampling that may contaminate the sample (e.g., using markers, adhesive tapes, fueling vehicles, etc.).

- Identify sampling locations on a plot plan that also identifies buildings, other landmarks, and potential sources of VOC contamination to both the surface and outdoor air. Record the depth of the probe screen below grade.

- If necessary, connect additional Teflon® tubing to the tubing extending from the soil vapor probe to allow for connection to sample collection equipment.

- Calculate the volume of air in the probe, tubing (volume = πr^2h), including any additional tubing added in the step above and the annular space between the probe and the native material if sand or glass beads were used.

- Connect a vacuum pump or gas-tight syringe (~60 cubic centimeters [cc]) to the sample tubing. At a flow rate of no more than 0.2 liter per minute (l/min), purge air from the tubing until one to three of the above-calculated air volumes are removed. Screen the purge air with a calibrated PID capable of detecting down to a ppb concentration.

- During purging, evaluate the potential for ambient air to be introduced in the soil vapor sample through the annulus of the soil vapor probe or tubing connections using a tracer gas such as helium. The procedures for the tracer gas evaluation are described below (Section 4.4.4). Note that the bentonite used in the probe installation should have sufficient time to seal before the samples are collected (typically a minimum of 24 hours). The tracer gas evaluation will verify if the seal is sufficient.

- Use an evacuated Summa® passivated (or equivalent) stainless-steel canister to collect the soil vapor sample. The canister will be provided by the laboratory, along with a flow controller equipped with an in-line particulate filter and a vacuum gauge. The flow controller will be pre-calibrated by the laboratory for the desired flow rate or duration of sample collection. The sampling flow rate should always be less than 0.2 l/min. The canisters will be "batch certified clean" by the laboratory.

- Remove the protective brass plug from the canister. Connect the pre-calibrated flow controller to the canister.

- Record the identification numbers for the canister and flow controller. Record the initial canister pressure on the vacuum gauge (check equipment-specific instructions for taking this measurement). A canister with a significantly different pressure than originally recorded by the testing laboratory should not be used for sampling. Record these numbers and values on the Chain of Custody form for each sample and on the field sampling form (Appendix A).

- Connect the tubing from the soil vapor probe to the flow controller.

- Completely open the valve on the canister. Record the time that the valve was opened (beginning of sampling) and the canister pressure on the vacuum gauge.

- Photograph the canister (with the sample ID visible, note: any sample ID tags should be generated prior to sample date and used only for photo) and the area surrounding the canister.

- Monitor the vacuum pressure in the canister routinely during sampling.

- Stop sample collection when the canister still has a minimum amount of vacuum remaining. Check with the laboratory supplying the canister and flow controller for the ideal final vacuum pressure. Typically, the minimum vacuum is between 2 and 5 inches of mercury (in. Hg), but not zero. If there is no vacuum remaining, the sample may be rejected and have to be collected again in a new canister.

- Complete the Soil Vapor (Canister) Sample Collection Field Form. An example of the Soil Vapor (Canister) Sample Collection Field Form is provided in Appendix A.

- Remove the flow controller from the canister and replace the protective brass plug.

- Attach labels/tags (sample name, time/date of sampling, etc.) to the canister as directed by the laboratory.

- Air samples will be analyzed by an ELAP-certified laboratory. The detection limit for soil vapor analytical results will be 1 ug/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 <u>Equipment and Supplies</u>

- 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 = πr^2h) in the tubing and purge one to three tubing volumes prior to sample collection at a rate no greater than 0.2 l/min. Screen the purge air with a calibrated PID capable of detecting down to a ppb concentration.

- During purging, evaluate the potential for ambient air to be introduced in the soil vapor sample through the annulus of the soil vapor probe or tubing connections using a tracer gas such as helium. The procedures for the tracer gas evaluation are described in Section 4.4.4. The tracer gas evaluation will verify if the seal is sufficient.

- Use an evacuated Summa® passivated (or equivalent) canister to collect the sub-slab vapor sample. The canister will be provided by the laboratory, along with a flow controller equipped with an in-line particulate filter and a vacuum gauge. The flow controller will be pre-calibrated by the laboratory for the desired flow rate or duration of sample collection. The canisters will be batch certified as clean by the laboratory.

- Record the identification numbers for the canister and flow controller. Remove the protective brass plug from canister. Record the initial canister pressure using the laboratory supplied vacuum gauge (check equipment-specific instructions for taking this measurement). A canister with a significantly different pressure than originally recorded by the testing laboratory should not be used for sampling. Record these numbers and values on the Chain of Custody form and field sampling form (**Appendix A**) for each sample.

- Close the valve, remove the vacuum gauge and connect the pre-calibrated flow controller to the canister.

  - Connect the tubing from the sub-slab vapor sampling probe to the flow controller.
  - Open the valve on the canister. Record the date and time that the valve is opened (beginning of sampling) and the canister pressure on the vacuum gauge provided with the canister by the laboratory.
  - Photograph the canister and the area surrounding the canister.

- Close the valve on the vacuum pressure in the canister after the scheduled duration of sample collection. Record the date and time that the valve was closed (completion of sampling).

- Remove the flow controller from the canister. Record the final canister pressure using the laboratory supplied vacuum gauge (check equipment-specific instructions for taking this measurement).

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

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

- After closing the valve, remove the vacuum gauge from the canister and replace the protective brass plug.
- Seal (with hydraulic cement) all holes made through the slab and remove debris, materials and or waste that may be produced during the sampling activities.
- Attach labels/tags (sample name, time/date of sampling, etc.) to the canister as directed by the laboratory.
- Air samples will be analyzed by an ELAP-certified laboratory. The detection limit for soil vapor analytical results will be 1 ug/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 Indoor Air Samples

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

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

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

- Use an evacuated Summa® passivated (or equivalent) stainless-steel canister to collect the indoor air sample. The canister will be provided by the laboratory, along with a flow controller equipped with an in-line particulate filter and a vacuum gauge. The flow controller will be pre-calibrated by the laboratory for the desired flow rate or duration of sample collection. The canisters will be individually certified as clean by the laboratory.

- Place the canister at the sampling location. Sample location will be collocated with sub-slab soil vapor samples and in consultation with the NYSDEC and NYSDOH. If the sample should be collected from breathing height (e.g., 3 to 5 feet above ground), then mount the canister on a stable platform such that the sample inlet will be at the proper height.

- Record the identification numbers for the canister and flow controller. Remove the protective brass plug from canister. Record the initial canister pressure using the laboratory supplied vacuum gauge (check equipment-specific instructions for taking this measurement). A canister with a significantly different pressure than originally recorded by the testing laboratory should not be used for sampling. Record these numbers and values on the Chain of Custody form for each sample.

- Close the valve, remove the vacuum gauge and connect the pre-calibrated flow controller to the canister.

- Open the valve on the vacuum pressure in the canister. Record the date and time that the valve was opened (beginning of sampling) and the canister pressure on the vacuum gauge provided with the canister by the laboratory.

- Photograph the canister and the area surrounding the canister.

- Close the valve on the vacuum pressure in the canister after the scheduled duration of sample collection. Record the date and time that the valve was closed (completion of sampling).

- Remove the flow controller from the canister. Record the final canister pressure using the laboratory supplied vacuum gauge (check equipment-specific instructions for taking this measurement).

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

  <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.

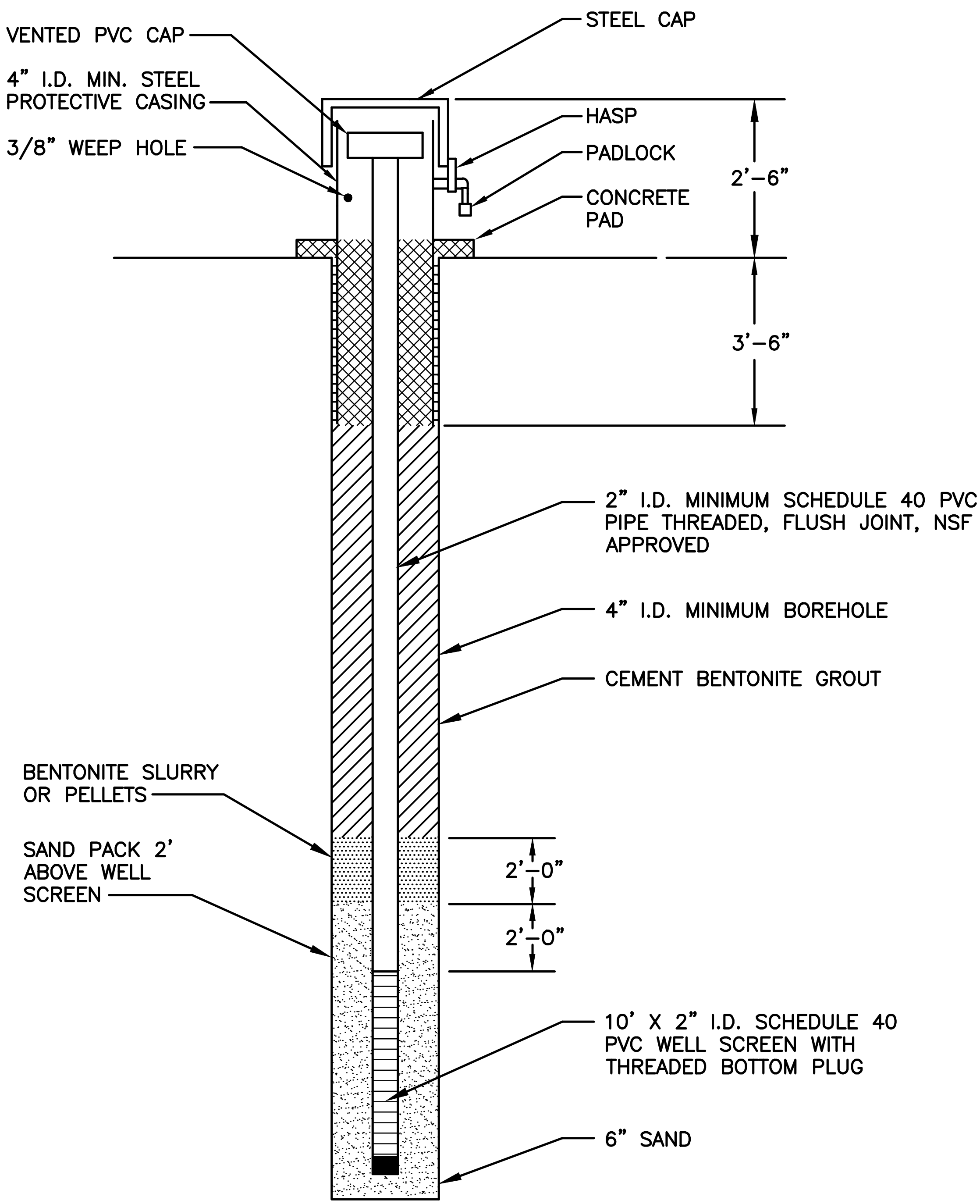
In order to properly define the movement of contaminants both vertically and horizontally, it is essential to collect depth-discreet water level data. Monitoring wells completed at the water table will provide a portion of the data needed to determine the vertical direction of groundwater movement. Water 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.

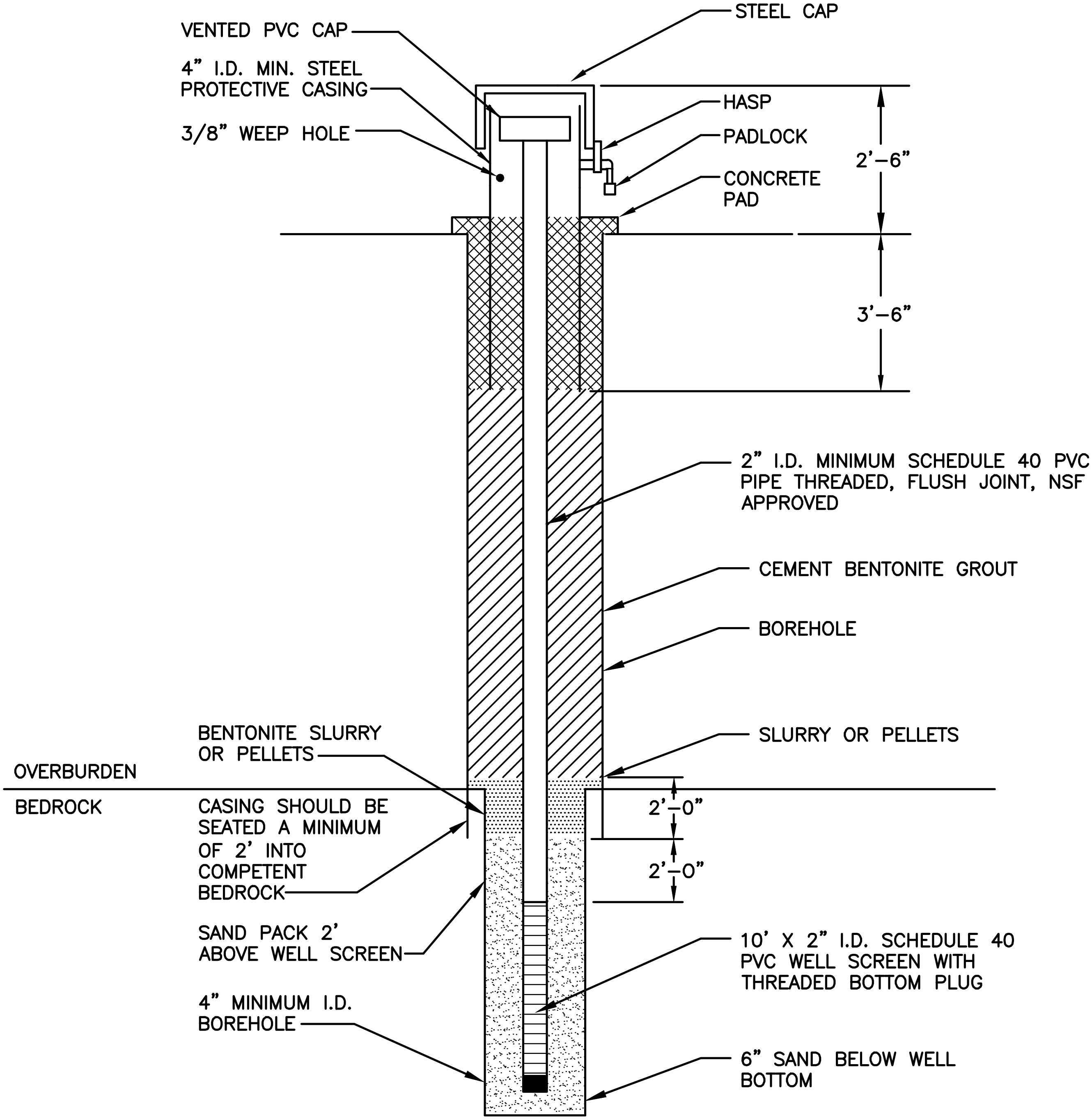
Monitoring well boreholes constructed in bedrock will be advanced using a cutting tool with a minimum inside diameter of 4 inches. In situations where rock is cored at a smaller diameter, the hole must be reamed to 4 inches before monitoring well installation. Only potable water will be allowed in the 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

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

  - 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: ______________________________

WELL CONSTRUCTION LOG

WELL:

SHEET OF

PROJECT NAME: ____________________ WELL NUMBER: ____________________

ADDRESS: ____________________ DRILLING METHOD: ____________________

INSTALLATION DATE: ____________________ DRILLER: ____________________

DEVELOPMENT DATE: ____________________ GAUGING DATE: ____________________

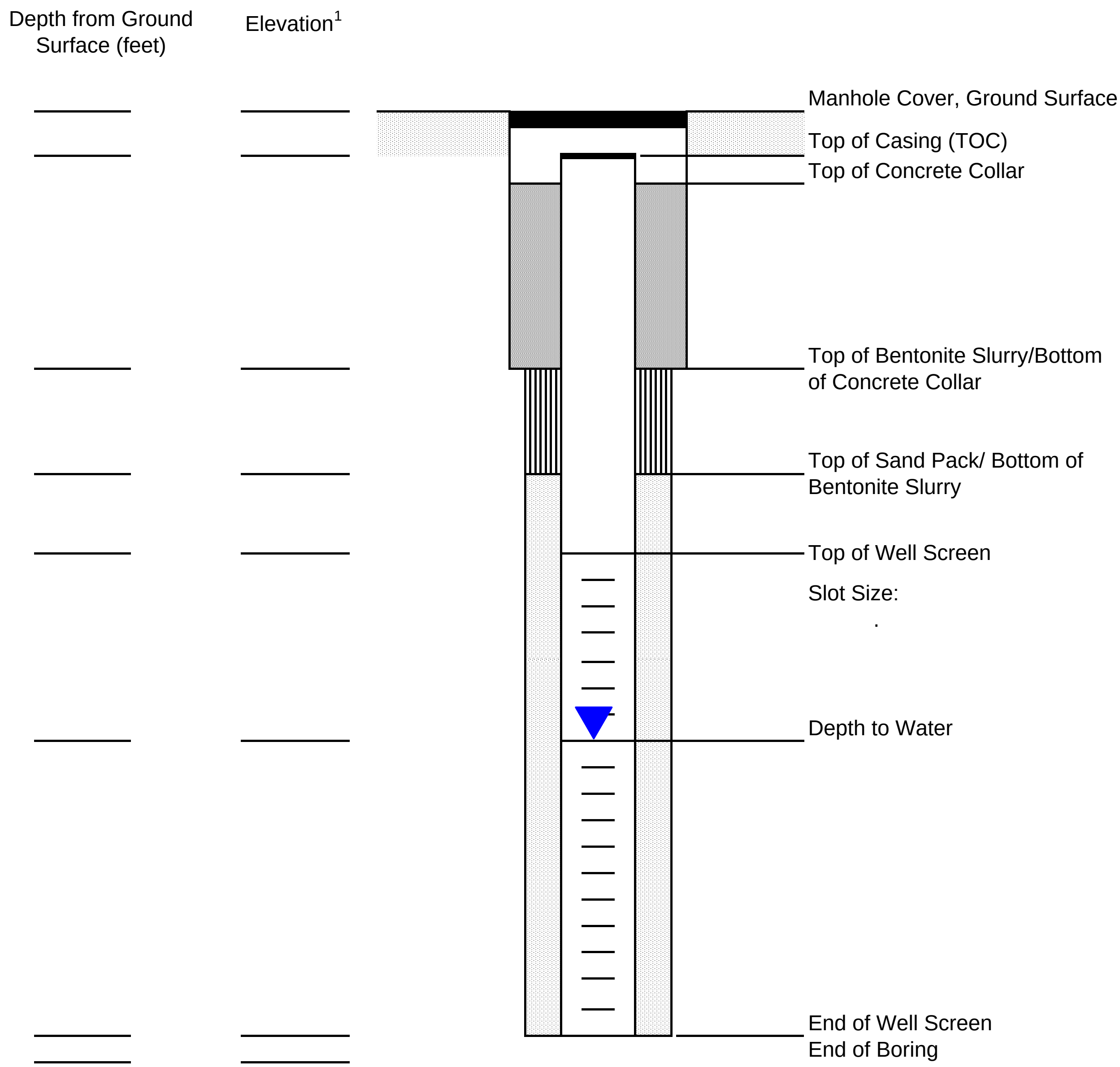
HEIGHT OF STICK-UP: ____________________ DEPTH TO WATER[2]: ____________________

ELEVATION[1]: ____________________

DATUM: ____________________ DEPTH TO PRODUCT[2]: ____________________

CASING MATERIAL: ____________________ SCREEN MATERIAL: ____________________

FILTER PACK TYPE: ____________________ SEAL TYPE: ____________________



Not to Scale

Notes:

[1]Feet above datum

[2]Feet below top of casing

NOT TO SCALE

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

A Joint Venture

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

Containers:

Analyses:

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	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic										

☐ E-mail to ______________________________

EDD Format______________________________

____

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C __________

Relinquished by:	Received by:	Date:	Time:

APPENDIX K – OP-TECH FINAL CLOSEOUT REPORT

PROJECT CLOSEOUT
SUB-SLAB DEPRESSURIZATION SYSTEM
FORMER BRIGHT OUTDOORS
JOHNSON CITY, NEW YORK
SITE # 7-04-023

Prepared for:
NYS Department of Environmental Conservation
Remedial Bureau E, 12th Floor
625 Broadway
Albany, New York 12306

Prepared by:
OP-TECH Environmental Services, Inc
150 Elmgrove Park
Rochester, New York

JULY 2010

ATTACHEMENT – 1

Compaction Results

CME Associates, Inc.

701B Chemung Street
Horseheads, New York 14845
(607) 739-4033
(607) 739-4085 Fax

www.cmeassociates.com

IN-PLACE FIELD DENSITY TEST REPORT

PROJECT: 631 Field Street, Johnson City, NY **DATE:** May 6, 2010
CLIENT: OP-TECH Environmental Services **REPORT NO.:** 29102S-01-0510
TEST METHOD: ASTM D6938-08A **REPRESENTATIVE:** M. Hamilton
MATERIAL TYPE/SOURCE: Type 2 subbase/Crusher Run, Hanson Jamesville Quarry
WEATHER: Sunny **TEMPERATURE:** 60's °F **PAGE:** 1 of 2

REMARKS:

This representative was on site to conduct in-place field density tests.

The test results show that the required percentage of compaction was **not** achieved at all of the locations and elevations tested using Dry Density data supplied by the client.

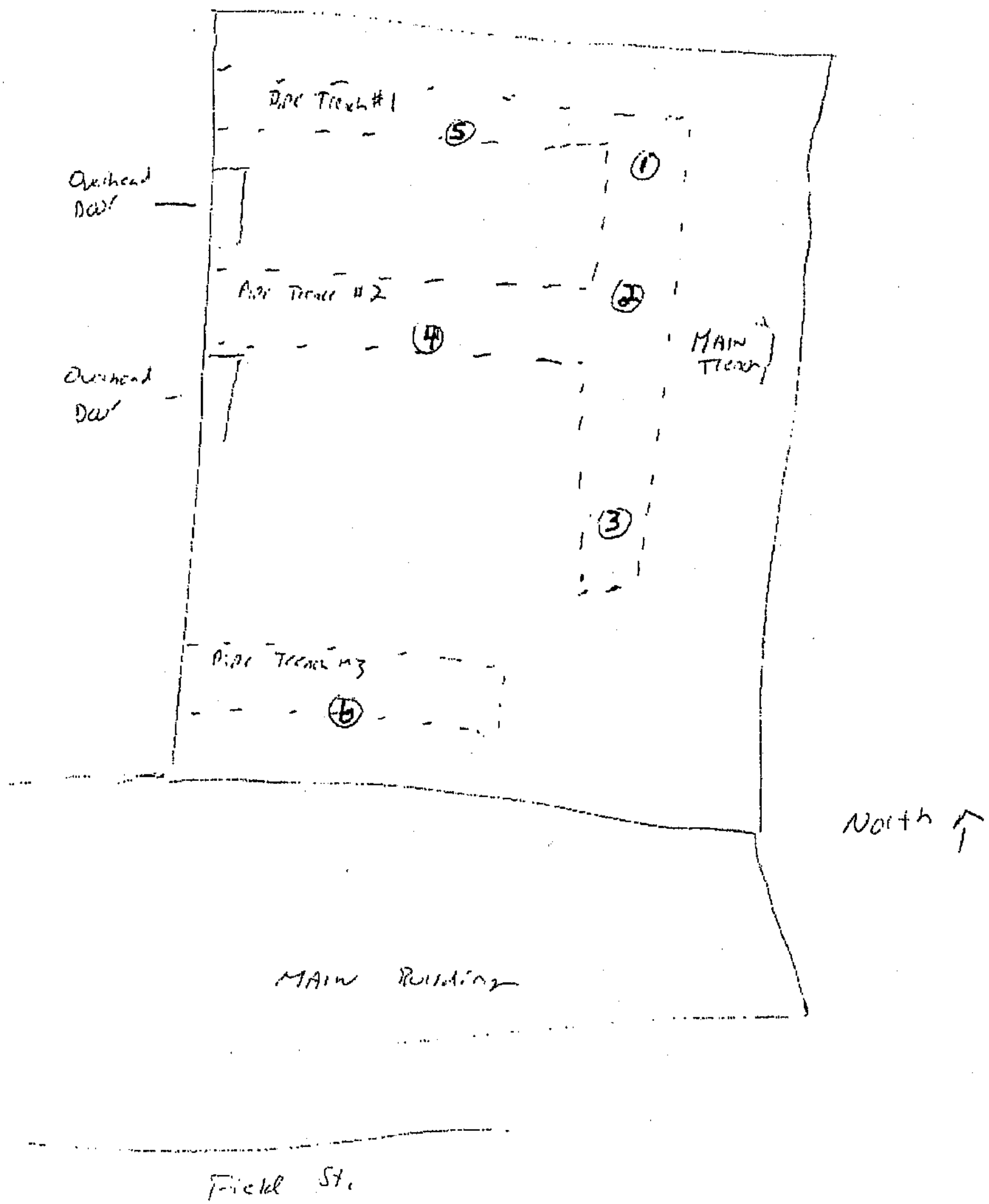
Mike with OP-TECH was informed of today's test results.

RESULTS:

Final Subgrade Elevation = 100.0

Test #	Test Location	Test Elevation	Moisture Content (%)	OMC (%)	Field Dry Density (pcf)	100% Dry Density (pcf)	Compaction Achieved (%)	Compaction Required (%)
1	Main trench, north end	100.0	2.8	6.2	139.1	143.4	97.0	95.0
2	Main trench, center	100.0	3.0	6.2	140.7	143.4	98.1	95.0
3	Main trench, south end	100.0	3.8	6.2	143.4	143.4	100.0	95.0
4	Pipe trench #2	100.0	6.2	7.0	131.6	138.0	99.4	95.0
5	Pipe trench #1	100.0	5.5	7.0	131.0	138.0	**94.9**	95.0
6	Pipe trench #3	100.0	5.0	7.0	131.4	138.0	95.2	95.0

CME Associates, Inc.



ATTACHEMENT – 2

Concrete Break Testing

CME Associates, Inc.

701B Chemung Street
Horseheads, New York 14845
(607) 739-4033
(607) 739-4085 (Fax)
www.cmeassociates.com

CONCRETE INSPECTOR FIELD & LABORATORY TEST REPORT

Client: OP-TECH Environmental Services
Report No.: 29102C-01-0510
Project & Location: 631 Field Street, Johnson City, NY
Set I.D.: 30973 Set 1 of 1

FIELD DATA & TEST RESULTS

The fresh concrete was tested in accordance with ASTM C-143, C-173 or C-231, C-1064 and (optional) C-138.

Date Sampled:	May 7, 2010	**Time Sampled:**	9:45 am	**No. of Cylinders Cast:**	4
Sampled By:	M. Hamilton	**Sampled From*:**	TD	**Slump (nearest ¼ in):**	3 ½
Truck No.:	10			**Air Content (%):**	5.0
Ticket No.	49279			**Unit Weight (pcf):**	-
Quantity of Load:	5.5	cubic yards		**Concrete Temperature:**	70 °F
Water added at Site:	10.0	gallons		**Ambient Temperature:**	60 °F
Contractor:	OP-TECH			**Weather Conditions:**	Sunny
Supplier:	Porter's Concrete	**Mix No.:**	4000	**Admixture Added at Site:**	-
				Required Strength at 28 Days (psi):	4000

Location of Placement: Trench fill-ins slab on grade

Where Cylinders are Stored on Site: Inside building

LAB TEST RESULTS

The concrete test specimens were made in accordance with ASTM C-3 and tested in accordance with ASTM C-39.

Test Date	Test Age (days)	Test Specimen Dia. (in)	Test Specimen Area (in^2)	Maximum Load (lbf)	Specimen Compressive Strength (psi)	Cylinders represent this exact location in concrete pour	Defects in specimen or cap or type of fracture if not conical
5/14	7	6.00	28.27	86500	3060		
6/04	28						
6/04	28						
H							

Additional Comments: Mike with OP-TECH was informed of the field test results.

*PP = Point of Placement; TD = Truck Chute Discharge

The tests were performed in compliance with the specifications given above unless noted below:

☐ The concrete was not sampled in accordance with ASTM C-172,

☑ The Aggregate Correction Factor was not subtracted from the air meter gauge reading.

The cylinders were initially cured 3 day(s) in the field. For the remaining days, the test specimens were cured in a moist room or water storage tank complying with ASTM C-511.

CME Laboratories are in conformance with ASTM C-1077 and participate in Proficiency Testing Programs administered by CCRL and AASHTO as required for all testing laboratories testing fresh concrete produced according to ASTM C-94, *"Ready-Mixed Concrete"*.

AASHTO R18

ATTACHEMENT – 3

Concrete Disposal

Bert Adams Disposal, Inc.
Box 549
Chenango Bridge, NY 13745
(607) 648-4863

INVOICE#	04X00232
INV DATE	04/30/10
ACCOUNT#	300326
DUE DATE	05/25/10

OP-TEC
1 ADLER DR
JOB #
E SYRACUSE, NY 13057

MAY 12 2010

AMOUNT YOU ARE PAYING ____________
Phone# ________

PLEASE DETACH AND RETURN THIS STUB WITH YOUR PAYMENT

SERVICE ADDRESS: 631 FIELD ST (JC, NY)

DATE	DESCRIPTION						AMOUNT
	LOCATION: 631 FIELD ST					PRIOR BALANCE	.00
04/09/10			DELIVER 2-20YDS				
04/22/10	04X00232	1	20Y ROLLOFF	HAULING FEE	04/22/10		300.00
				LANDFILL FEE (T)		9.26 tons	416.70
04/22/10			D/RET 20YD CONCRETE				
04/27/10	04X00232	1	20Y ROLLOFF	HAULING FEE	04/27/10		300.00
				LANDFILL FEE (T)		16.93 tons	761.85
04/27/10			D/REMOVE 20YD STONE/CONCRETE				

PO#SBHM0002 JRC

PAST DUE CHARGES DUE UPON RECEIPT-CURRENT CHARGES DUE 5/25/10.WE NOW OFFER ONSITE SHREDDING AND ELECTRONICS RECYCLING.

Tax 142.29

INV# 04X00232 ACCT# 300326	CURRENT	30 DAY	60 DAY	90 DAY	DATE 04/30/10 PAGE 1 OF 1
	1,920.84				

TERMS: NET 15 DAYS. 2% SERVICE CHARGE ON UNPAID BALANCE AFTER 30 DAYS. (24% ANNUM)
**IF YOUR ACCOUNT IS TURNED OVER FOR COLLECTION DUE TO UNPAID BALANCES, YOU ARE RESPONSIBLE FOR COLLECTION COST. ROLL OFFS ARE CHARGED $5 PER DAY AFTER 7 DAYS ON SITE.

PLEASE PAY THIS AMOUNT 1,920.84

Bert Adams Disposal, Inc.
Box 549
Chenango Bridge, NY 13745
(607) 648-4863

INVOICE# 05X00444
INV DATE 05/31/10
ACCOUNT# 300326
DUE DATE 06/25/10

OP-TECH
1 ADLER DR
JOB # WD700836
E SYRACUSE, NY 13057

AMOUNT YOU ARE PAYING ____________
Phone# ________

PLEASE DETACH AND RETURN THIS STUB WITH YOUR PAYMENT

SERVICE ADDRESS: 631 FIELD ST (JC, NY)

DATE	DESCRIPTION						AMOUNT
	LOCATION: 631 FIELD ST					PRIOR BALANCE	1,920.84
05/18/10	05X00444	1	20Y ROLLOFF	HAULING FEE	05/18/10		300.00
				LANDFILL FEE (T)		10.04 tons	301.20
05/18/10			D/REMOVE 20YD CONT SOIL				
05/31/10	05X00444	1	FINANCE CHARGE	FINANCE CHARGE	04/30/10		38.42

RECEIVED
JUN - 5 2010
By________

PAST DUE CHARGES DUE UPON RECEIPT-CURRENT CHARGES DUE 6/25/10.WE NOW OFFER ONSITE SHREDDING AND ELECTRONICS RECYCLING.

PLEASE SEND PAST DUE AMOUNT IMMEDIATELY!

Tax 48.10

INV# 05X00444 ACCT# 300326	CURRENT	30 DAY	60 DAY	90 DAY	DATE 05/31/10 PAGE 1 OF 1
	687.72	1,920.84			

TERMS: NET 15 DAYS. 2% SERVICE CHARGE ON UNPAID BALANCE AFTER 30 DAYS. (24% ANNUM)
**IF YOUR ACCOUNT IS TURNED OVER FOR COLLECTION DUE TO UNPAID BALANCES, YOU ARE

PLEASE PAY THIS AMOUNT 2,608.56

1

ATTACHEMENT – 4

Soil Disposal

Bert Adams Disposal, Inc.
Box 549
Chenango Bridge, NY 13745
(607) 648-4863

INVOICE# 05X00444
INV DATE 05/31/10
ACCOUNT# 300326
DUE DATE 06/25/10

WD700836

OP-TECH
1 ADLER DR
JOB # WD700836
E SYRACUSE, NY 13057

AMOUNT YOU ARE PAYING ______
Phone# ______

PLEASE DETACH AND RETURN THIS STUB WITH YOUR PAYMENT

SERVICE ADDRESS: 631 FIELD ST (JC, NY)

DATE	DESCRIPTION						AMOUNT
	LOCATION: 631 FIELD ST					PRIOR BALANCE	1,920.84
05/18/10	05X00444	1	20Y ROLLOFF	HAULING FEE	05/18/10		300.00
				LANDFILL FEE (T)		10.04 tons	301.20
05/18/10			D/REMOVE 20YD CONT SOIL				
05/31/10	05X00444	1	FINANCE CHARGE	FINANCE CHARGE	04/30/10		38.42

RECEIVED
JUN - 5 2010
By______

approved
6/8/10

PAST DUE CHARGES DUE UPON RECEIPT-CURRENT CHARGES DUE 6/25/10.WE NOW OFFER ONSITE SHREDDING AND ELECTRONICS RECYCLING.

PLEASE SEND PAST DUE AMOUNT IMMEDIATELY! Tax 48.10

INV# 05X00444 ACCT# 300326	CURRENT	30 DAY	60 DAY	90 DAY	DATE 05/31/10 PAGE 1 OF 1
	687.72	1,920.84			

TERMS: NET 15 DAYS. 2% SERVICE CHARGE ON UNPAID BALANCE AFTER 30 DAYS. (24% ANNUM) PLEASE PAY

BERT ADAMS DISPOSAL, INC.
P.O. BOX 549 CHENANGO BRIDGE, NY 13745
607-648-4863/FAX 607-648-2455

Waste Shipment Record

Manifest #:

GENERATOR INFORMATION

Generator Name: [redacted] ENT OPTC
Address: [redacted] TAL
Contact Name: [redacted]
Phone Number: [redacted]

Job #:
Location: ~~1180 OLD VESTAL RD~~
Address: ~~VESTAL~~ 631 Field St Johnson City

Description of Waste:

		Description
Friable		
Non-Friable		
Both	% Friable	
	% Non-Friable	
Grit & Bar Screen		
Stabalized Sludge		
Contaminated Soil		
Auto Fluff		
Other	✓	
Description:		

Containers Quantity	Type	Volume in Cubic Yards

Vehicle License No./State: 11G76P.B
Disposal Facility Permit Number
Truck: 16-18 #343
Rolloff: 16-60

TRANSPORTER #1

Transporter Name: BERT ADAMS DISPOSAL, INC.
Address: P.O. BOX 549
City, State, Zip: CHENANGO BRIGE, NY 13745
Phone #: 607-648-4863
DEC/EPA Permit #: 7A-355
Name of Driver (print): Matt Boser

I hereby warrant that the above named and described material was from the owner on the date of receipt referenced below.

Matt Boser
Signature of Driver — Date of Receipt

I hereby warrant that the above named and described material was delivered without incident or contamination on the date of delivery referenced below.

Matt Boser
Signature of Driver — Date of Receipt

DESTINATION (Disposal Facility)

Disposal Facility's Name: BROOME COUNTY LANDFILL
Address: 286 KNAPP RD
City, State, Zip: BINGHAMTON, NY 13905
Phone #: 607-763-4460
6NYCRR 360 Permit #:
Name of Authorized Agent (Print):

I hereby warrant that the above named and described material was accepted from the transporter on the date of receipt referenced below.

Authorized Agent — Date of Receipt

RECEIVED APR 28 2010 BROOME COUNTY NANTICOKE LANDFILL

The material delivered by the transporter has been rejected for disposal at this disposal site.

Signature of Disposal Facilities Authorized Agent — Date of Receipt

Landfill Ticket Number:

Division of Solid Waste Management
Broome County Landfill
Barbara J. Fiala, Broome County Executive • Daniel A. Schofield, Deputy Commissioner

286 Knapp Road • Binghamton, New York 13905
(607) 763-4450 • Fax (607) 763-4280 • Website: www.gobroomecounty.com

May 13, 2010

Dana Wells
Bert Adams Disposal
PO Box 449
Chenango Bridge, NY 13745

RE: CONTAMINATED SOIL (CS)
PARADIGM ENVIRONMENTAL SERVICES
LAB REPORT # 10-1713

Dear Mr. Wells:

This approval letter is authorization to haul contaminated soil to the Broome County Landfill. This approval is based on the above mentioned lab report. Further, we need to have a copy of your current Part 364 Industrial Waste Transporter permit to haul this material to the landfill. The contaminated soil originates from the following location: BRIGHT OUTDOORS, 631 FIELD STREET, JOHNSON CITY, NY.

You need to bring this letter with you to the Landfill to be allowed to dump the contaminated soil. Also a waste manifest or bill of lading must accompany each load. The charge for bringing the contaminated soil into the Landfill will be at the current tip fee of $27.00 per ton.

Should you have any questions, please contact me at (607) 778-2932.

Sincerely,

Laurie Haskell
(klh)

Laurie Haskell
Solid Waste Specialist

LH:cpc
cc: Robert Denz, Director, Environmental Health
Lois Dilworth, Nanticoke Landfill CAC Chairman
Scott Ellis, Town of Nanticoke
Richard Hand, Broome County Landfill Supervisor
Vinny Snyder, Op-Tech Environmental

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No.	Manifest Document No.	2. Page 1 of

3. Generator's Name and Mailing Address

4. Generator's Phone ( )

5. Transporter 1 Company Name	6. US EPA ID Number	A. State Transporter's ID	
		B. Transporter 1 Phone	
7. Transporter 2 Company Name	8. US EPA ID Number	C. State Transporter's ID	
		D. Transporter 2 Phone	
9. Designated Facility Name and Site Address	10. US EPA ID Number	E. State Facility's ID	
		F. Facility's Phone	

11. WASTE DESCRIPTION	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a.				
b.				
c.				
d.				

G. Additional Descriptions for Materials Listed Above

H. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

GENERATOR

16. **GENERATOR'S CERTIFICATION:** I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name	Signature	Date Month	Day	Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month	Day	Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month	Day	Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator; Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name	Signature	Date Month	Day	Year

NON-HAZARDOUS WASTE

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Analytical Report Cover Page

Op Tech Environmental

For Lab Project # 10-1713
Issued May 10, 2010
This report contains a total of 8 pages

The reported results relate only to the samples as they have been received by the laboratory.

Any noncompliant QC parameters having impact on the data are flagged or documented on the final report.

All soil/sludge samples have been reported on a dry weight basis, unless qualified "reported as received". Other solids are reported as received.

Each page of this document is part of a multipage report. This document may not be reproduced except in its entirety, without the prior consent of Paradigm Environmental Services, Inc.

The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of frequently used data flags and their meaning:

"ND" = analyzed for but not detected.
"E" = Result has been estimated, calibration limit exceeded.
"D" = Duplicate results outside QC limits. May indicate a non-homogenous matrix.
"M" = Matrix spike recoveries outside QC limits. Matrix bias indicated.
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 (585) 647 - 2530 FAX (585) 647 - 3311

Flashpoint by Pensky-Martin Analysis Report

Client: OP-TECH

Client Job Site:	Bright Outdoors 631 Field St., Johnson City	**Lab Project Number:**	10-1713
Client Job Number:	WD700836		
		Date Sampled:	04/27/2010
		Date Received:	04/29/2010
Sample Type:	Soil	**Date Analyzed:**	05/05/2010

Lab Sample Number	Field Number	Field Location	Result (°C)
6153	N/A	Excavated Soil	> 70

ELAP Number 10958

Method: SW846 1010

Comments: °C = degrees Centigrade

Signature:

Bruce Hoogesteger: Technical Director

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue, Rochester, NY 14608 (585) 647-2530 FAX (585) 647-3311

Client:	OP-TECH	**Lab Project No.:**	10-1713
		Lab Sample No.:	6153
Client Job Site:	Bright Outdoors		
Client Job No.:	WD700836	**Sample Type:**	TCLP Extract
Field Location:	Excavated Soil	**Date Sampled:**	04/27/2010
Field ID No.:	N/A	**Date Received:**	04/29/2010

Laboratory Report for TCLP Metals Analysis

Parameter	Date Analyzed	Analytical Method	Result (mg/L)	Regulatory Limit (mg/L)
TCLP Metal Series				
Arsenic	05/03/2010	EPA 6010	<0.100	5.0
Barium	05/03/2010	EPA 6010	0.612	100.0
Cadmium	05/03/2010	EPA 6010	<0.025	1.0
Chromium	05/03/2010	EPA 6010	<0.050	5.0
Lead	05/03/2010	EPA 6010	<0.100	5.0
Mercury	04/30/2010	EPA 7470	<0.0020	0.2
Selenium	05/03/2010	EPA 6010	<0.100	1.0
Silver	05/03/2010	EPA 6010	<0.050	5.0

ELAP ID No.: 10958

Comments:

Approved By: ____________________
Bruce Hoogesteger, Technical Director

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue Rochester, New York 14608 (585) 647-2530 FAX (585) 647-3311

Client:	OP-TECH	**Lab Project No:**	10-1713
		Lab Sample No:	6153
Client Job Site:	Bright Outdoors	**Sample Type:**	TCLP Extract
Client Job No:	WD700836	**Date Sampled:**	4/27/2010
		Date Received:	4/29/2010
Field Location:	Excavated Soil	**Date Analyzed:**	5/6/2010

Herbicide Analysis Report for TCLP Extract

Parameter	Result (mg/L)	Regulatory Limit (mg/L)
2,4,5-TP (Silvex)	ND<0.05	1.0
2,4-D	ND<0.50	10.0

Analytical Method: SW1311/8151 ELAP ID: 10709

Comments: ND denotes Non Detect.

Approved By Technical Director: ______________________
Bruce Hoogesteger

This report is part of a multipage document and should only be evaluated in its entirety. The Chain of Custody provides additional sample information, including compliance with the sample condition requirements upon receipt.

PARADIGM
ENVIRONMENTAL SERVICES, INC. 179 Lake Avenue Rochester, New York 14608 (585) 647 - 2530 FAX (585) 647 - 3311

Pesticide Analysis Report for TCLP Extract

Client: OP-Tech

Client Job Site:	Bright Outdoors 631 Field St, Johnson City, NY	**Lab Project Number:**	10-1713
		Lab Sample Number:	6153
Client Job Number:	W0700836		
Field Location:	Excavated Soil	**Date Sampled:**	04/27/2010
Field ID Number:	N/A	**Date Received:**	04/29/2010
Sample Type:	TCLP Extract	**Date Analyzed:**	05/07/2010

Pesticide Identification	Results in ug / L	Regulatory Limits in ug / L
gamma-BHC	ND< 1.00	400
Chlordane	ND< 1.00	30.0
Endrin	ND< 1.00	20.0
Heptachlor	ND< 1.00	8.00
Heptachlor Epoxide	ND< 1.00	8.00
Methoxychlor	ND< 1.00	10000
Toxaphene	ND< 50.0	500

ELAP Number 10958

Method: EPA 8081

Comments: ND denotes Non Detect
ug / L = microgram per Liter

Signature:

Bruce Hoogesteger: Technical Director

This report is part of a multipage document and should only be evaluated in its entirety. Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt.

101713P2.XLS

PARADIGM
ENVIRONMENTAL SERVICES, INC. 179 Lake Avenue Rochester, New York 14608 (585) 647 - 2530 FAX (585) 647 - 3311

Semi-Volatile Analysis Report for TCLP Extract

Client: OP-TECH

Client Job Site:	Bright Outdoors 631 Field St, Johnson City	**Lab Project Number:**	10-1713
		Lab Sample Number:	6163
Client Job Number:	WD700836		
Field Location:	Excavated Soil	**Date Sampled:**	04/27/2010
Field ID Number:	N/A	**Date Received:**	04/29/2010
Sample Type:	TCLP Extract	**Date Analyzed:**	05/02/2010

Base / Neutrals	Results in ug / L	Regulatory Limits in ug / L
1,4-Dichlorobenzene	ND< 40.0	7,500
2,4-Dinitrotoluene	ND< 40.0	130
Hexachlorobenzene	ND< 40.0	130
Hexachlorobutadiene	ND< 40.0	500
Hexachloroethane	ND< 40.0	3000
Nitrobenzene	ND< 40.0	2000
Pyridine	ND< 40.0	5000

Acids	Results in ug / L	Regulatory Limits in ug / L
Cresols (as m,p,o-Cresol)	ND< 80.0	200,000
Pentachlorophenol	ND< 100	100,000
2,4,5-Trichlorophenol	ND< 100	400,000
2,4,6-Trichlorophenol	ND< 40.0	2000

ELAP Number 10958 Method: EPA 8270C Data File: S50936.D

Comments: ND denotes Non Detect
ug / L = microgram per Liter

Signature:

Bruce Hoogesteger: Technical Director

PARADIGM
ENVIRONMENTAL SERVICES, INC. 179 Lake Avenue Rochester, New York 14608 (585) 647 - 2530 FAX (585) 647 - 3311

Volatile Analysis Report for TCLP Extract

Client: OP-TECH

Client Job Site:	Bright Outdoors 631 Field ST, Johnson City	**Lab Project Number:**	10-1713
		Lab Sample Number:	6153
Client Job Number:	WD700836		
Field Location:	Excavated Soil	**Date Sampled:**	04/27/2010
Field ID Number:	N/A	**Date Received:**	04/29/2010
Sample Type:	TCLP Extract	**Date Analyzed:**	04/30/2010

Compounds	Results in ug / L	Regulatory Limits in ug / L
Benzene	ND< 20.0	500
2-Butanone	ND< 100	200,000
Carbon Tetrachloride	ND< 20.0	500
Chlorobenzene	ND< 20.0	100,000
Chloroform	ND< 20.0	6,000
1,2-Dichloroethane	ND< 20.0	500
1,1-Dichloroethene	ND< 20.0	700
Tetrachloroethene	ND< 20.0	700
Trichloroethene	31.3	500
Vinyl chloride	ND< 20.0	200

ELAP Number 10958 Method: EPA 8260B Data File: V74942.D

Comments: ND denotes Non Detect
ug / L = microgram per Liter

Signature:
Bruce Hoogesteger: Technical Director

This report is part of a multipage document and should only be evaluated in its entirely. Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt.

101713V1.XLS

PARADIGM

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

CHAIN OF CUSTODY

REPORT TO:	INVOICE TO:	
COMPANY: OP-TECH	COMPANY: Same	LAB PROJECT #: 10-1713 / CLIENT PROJECT #: WD7008336
ADDRESS: 370 Rte. 34	ADDRESS: 1 Adler Drive	TURNAROUND TIME: (WORKING DAYS)
CITY: Waverly STATE: NY ZIP: 14892	CITY: East Syracuse STATE: NY ZIP: 13057	1 ☐ 2 ☐ 3 ☐ STD ☒ 5 OTHER ☐
PHONE: 607-565-8891 FAX: 607-565-8893	PHONE: FAX:	
ATTN: Mike Harders / Gisele Fields	ATTN: Accts. Payable	
COMMENTS: email: Hardersm@op-tech.us + fieldsg@op-tech.us		Quotation #

PROJECT NAME/SITE NAME: Bright Outdoors 631 Field St. Johnson City, NY

REQUESTED ANALYSIS

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER OF CONTAINERS	Full TCLP	Plus Pest Herb	Flash	REMARKS	PARADIGM LAB SAMPLE NUMBER
1	4-27-10	4:00pm	X		Excavated Soil 4-27-10	Solid	2	X	X	X		6153
2	~~4-27-10~~	~~4:00PM~~	~~X~~			ed f 4/29						
3												
4												
5												
6												
7												
8												
9												
10												

LAB USE ONLY BELOW THIS LINE

Sample Condition: Per NELAC/ELAP 210/241/242/243/244

Receipt Parameter	Comments	NELAC Compliance
Container Type:		Y ☒ N ☐
Preservation:	NA	Y ☐ N ☐
Holding Time:		Y ☒ N ☐
Temperature:	9°C iced	Y ☐ N ☒

	Date/Time
Sampled By: Mike Harders	4-27-10 4:00 pm
Relinquished By: Gisele Fields	4-28-10 4:30pm
Received By: [signature]	4/29/10 1412
Received @ Lab By: Emily Youmen	4/29/10 1545

Total Cost:

P.I.F.

Division of Solid Waste Management
Broome County Landfill
Barbara J. Fiala, Broome County Executive • Daniel A. Schofield, Deputy Commissioner

286 Knapp Road • Binghamton, New York 13905
(607) 763-4450 • Fax (607) 763-4280 • Website: www.gobroomecounty.com

May 13, 2010

Dana Wells
Bert Adams Disposal
PO Box 449
Chenango Bridge, NY 13745

RE: CONTAMINATED SOIL (CS)
PARADIGM ENVIRONMENTAL SERVICES
LAB REPORT # 10-1713

Dear Mr. Wells:

This approval letter is authorization to haul contaminated soil to the Broome County Landfill. This approval is based on the above mentioned lab report. Further, we need to have a copy of your current Part 364 Industrial Waste Transporter permit to haul this material to the landfill. The contaminated soil originates from the following location: BRIGHT OUTDOORS, 631 FIELD STREET, JOHNSON CITY, NY.

You need to bring this letter with you to the Landfill to be allowed to dump the contaminated soil. Also a waste manifest or bill of lading must accompany each load. The charge for bringing the contaminated soil into the Landfill will be at the current tip fee of $27.00 per ton.

Should you have any questions, please contact me at (607) 778-2932.

Sincerely,

Laurie Haskell
(KLH)

Laurie Haskell
Solid Waste Specialist

LH:cpc

cc: Robert Denz, Director, Environmental Health
Lois Dilworth, Nanticoke Landfill CAC Chairman
Scott Ellis, Town of Nanticoke
Richard Hand, Broome County Landfill Supervisor
Vinny Snyder, Op-Tech Environmental

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Facility DEC ID 7-0399-00027

PERMIT

Under the Environmental Conservation Law (ECL)

Permittee and Facility Information

Permit Issued To:
BROOME COUNTY
GOVERNMENT PLZ BOX 1766
BINGHAMTON, NY 13902
(607) 778-2109

Facility:
BROOME COUNTY LANDFILL
286 KNAPP RD
BINGHAMTON, NY 13905

Facility Application Contact:
LAURIE HASKELL
BROOME CO DIV OF SOLID WASTE MANAGEMENT
44 HAWLEY ST - PO BOX 1766
BINGHAMTON, NY 13902-1766
(607) 778-2250

Facility Permit Contact:
PATRICK J BRENNAN
BROOME CO DIV OF SOLID WASTE MGMT
44 HAWLEY ST PO BOX 1766
BINGHAMTON, NY 13902
(607) 778-3947

Facility Location: In MULTIPLE TOWNS in BROOME COUNTY
Facility Principal Reference Point: NYTM-E: 419.329 NYTM-N: 4676.965
Latitude: 42°14'26.6" Longitude: 76°58'40.0"

Authorized Activity: Proposed modifications to the Broome County Landfill permit include design changes to the access to Section IV of the landfill which was the subject of a Supplemental Environmental Impact Statement (SEIS) that was finalized in December 2007. The access design was originally an at-grade entrance into Section IV. The SEIS evaluated alternatives including an overpass/underpass on Dunham Hill Road, a driveway off Dunham Hill Road with a queuing area for trucks, a scale house, inbound and outbound scales, customer convenience area for refuse disposal, a recycling drop-off area and an area for development of supplemental processing within the current property boundary. The result of the SEIS is an at-grade entrance with a realignment of Knapp Road and changes to the line-of-sight on Dunham Hill Road at the point of the entrance. Other changes to the permit include consolidating the separately issued Household Hazardous Waste Permit in its entirety into the landfill permit. In addition, the permittee proposes to eliminate an outdated monitoring requirement.

Permit Authorizations

Solid Waste Management - Under Article 27, Title 7
Permit ID 7-0399-00027/00002

Modification # 0	Effective Date: 1/23/2002	Expiration Date: 3/22/2011
Modification # 0	Effective Date: 3/31/2003	Expiration Date: 3/22/2011
Modification # 0	Effective Date: 5/17/2004	Expiration Date: 3/22/2011
Modification # 1	Effective Date: 10/7/2009	Expiration Date: 3/22/2011

Permit Authorizations

Solid Waste Management - Under Article 27, Title 7

Permit ID 7-0399-00027/00002

Modification # 0	Effective Date: 1/23/2002	Expiration Date: 3/22/2011
Modification # 0	Effective Date: 3/31/2003	Expiration Date: 3/22/2011
Modification # 0	Effective Date: 5/17/2004	Expiration Date: 3/22/2011
Modification # 1	Effective Date: 10/7/2009	Expiration Date: 3/22/2011

NYSDEC Approval

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.

Permit Administrator: MICHAEL K BARYLSKI, Deputy Regional Permit Administrator
Address: NYSDEC REGION 7 CORTLAND SUB-OFFICE
1285 FISHER AVE
CORTLAND, NY 13045 -1090

Authorized Signature: Michael K. Barylski Date 10/07/09

Distribution List

LAURIE HASKELL
PATRICK J BRENNAN
THOMAS E ANNAL
JAMES E GRUPPE
JAIME P EANG
Gus Ribiero

Permit Components

SOLID WASTE MANAGEMENT PERMIT CONDITIONS

GENERAL CONDITIONS, APPLY TO ALL AUTHORIZED PERMITS

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

ATTACHEMENT – 5

Radon Away Fan RP-265 Warranty

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the GPx01/XP/XR Series Fan for shipping damage within 15 days of receipt. Notify RadonAway of any damages immediately. Radonaway is not responsible for damages incurred during shipping. However, for your benefit, Radonaway does insure shipments.

There are no user serviceable parts inside the fan. Do not attempt to open. Return unit to factory for service.

Install the GPx01/XP/XR Series Fan in accordance with all EPA standard practices, and state and local building codes and state regulations.

WARRANTY

Subject to any applicable consumer protection legislation, RadonAway warrants that the GPX01/XP/XR/RP Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of 90 days from the date of purchase (the "Warranty Term").

RadonAway will replace any Fan which fails due to defects in materials or workmanship. The Fan must be returned (at Owner's cost) to the RadonAway factory. Any Fan returned to the factory will be discarded unless the Owner provides specific instructions along with the Fan when it is returned regardless of whether or not the Fan is actually replaced under this warranty. Proof of purchase must be supplied upon request for service under this Warranty.

This Warranty is contingent on installation of the Fan in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not cover damage in shipment unless the damage is due to the negligence of RadonAway.

5 YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.

RadonAway will extend the Warranty Term of the fan to 5 years from date of manufacture if the Fan is installed in a professionally designed and professionally installed radon system or installed as a replacement fan in a professionally designed and professionally installed radon system. Proof of purchase and/or proof of professional installation may be required for service under this warranty. Outside the Continental United States and Canada the extended Warranty Term is limited to one (1) year from the date of manufacture.

RadonAway is not responsible for installation, removal or delivery costs associated with this Warranty.

EXCEPT AS STATED ABOVE, THE GPx01/XP/XR/RP SERIES FANS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.

For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping cost to and from factory.

RadonAway
3 Saber Way
Ward Hill, MA 01835
TEL. (978) 521-3703
FAX (978) 521-3964

Record the following information for your records:

Serial No.______________________________
Purchase Date__________________________

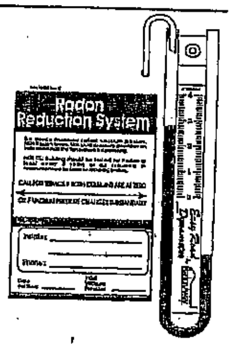
RadonAway™

Dynameter™ Vacuum Gauge P/N 50006-1

INSTALLATION INSTRUCTIONS:

1. Select location on the vertical suction pipe where the vacuum gauge is to be mounted. Pipe surface should be clean and dry.
2. Remove end caps from both tube ends. Hold gauge upright to prevent loss of gauge fluid.
   Warning: Do not ingest gauge fluid.
   Caution: Gauge fluid will stain if spilt.
3. Remove protective backing from the foam tape on the back of the unit and firmly press into place on piping.
4. Allow fluid to settle in gauge for several minutes and then zero the gauge by sliding the tube until the tops of both columns align with the zero mark on the pressure scale.
   The gauge may be fixed in this position using the mounting screw provided.
5. Drill a 3/16" hole in piping 2 inches below the top of the gauge.

   Positioning the hole below the top of the gauge will prevent condensation from potentially collecting in the u-tube gauge.



6. Insert vinyl tubing into either opening in gauge tube and push firmly.
7. Install end of the tubing into drilled hole.
   Apply caulking for airtight connection.
8. Fill out label using an indelible marker.
9. Remove backing and position label next to vacuum gauge ensuring the arrow is lined up with the gauge zero.

WARRANTY

Subject to any applicable consumer protection legislation, RadonAway warrants that the Dynameter Vacuum Gauge(the "Gauge) will be free from defects in materials and workmanship for a period of five (5) years from the date of manufacture (the "Warranty Term"). Outside the Continental United States and Canada the Warranty Term is one (1) year from the date of manufacture.

RadonAway will replace any Gauge which fails due to defects in materials or workmanship. The Gauge must be returned (at owner's cost) to the RadonAway factory. Proof of purchase must be supplied upon request for service under this Warranty.

This Warranty is contingent on installation of the Gauge in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not include damage in shipment unless the damage is due to the negligence of RadonAway.

RadonAway is not responsible for installation, removal or delivery costs associated with this Warranty.

EXCEPT AS STATED ABOVE, THE GAUGE IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE GAUGE OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.

For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping cost to and from factory.

RadonAway 3 Saber Way Ward Hill, MA 01835 TEL (978) 521-3703 FAX (978) 521-3964

Record the following information for your records:

Purchase Date________________________

Rev. 0405 A

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

REMEDIAL SYSTEM OPTIMIZATION TABLE OF CONTENTS

REMEDIAL SYSTEM OPTIMIZATION FOR FORMER BRIGHT OUTDOORS SITE

TABLE OF CONTENTS