SITE MANAGEMENT PLAN

BESTWAY CLEANERS
ERIE COUNTY
BUFFALO, NEW YORK

NYSDEC SITE NUMBER 915219

Prepared For:

New York State Department of Environmental Conservation
Division of Environmental Remediation
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JUNE 2022

CERTIFICATION STATEMENT

I Thomas Drachenberg certify that I am currently a NYS registered professional engineer as in defined in 6 NYCRR Part 375 and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Tom Drachenberg P.E.

07/11/22 DATE

Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

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LIST OF ACRONYMS

ACRONYM	Definition	ACRONYM	Definition
CAMP	Community Air Monitoring Plan	ppb	parts per billion
CFR	Code of Federal Regulation	ppt	parts per trillion
CLP	Contract Laboratory Program	PRR	Periodic Review Report
COC	Certificate of Completion	QAPP	Quality Assurance Project Plan
CO_2	carbon dioxide	QEP	Qualified Environmental Professional
DER	Division of Environmental Remediation	RAO	Remedial Action Objective
DUSR	Data Usability Summary Report	RAWP	Remedial Action Work Plan
EC	Engineering Control	RI	Remedial Investigation
ECL	Environmental Conservation Law	ROD	Record of Decision
ERP	Environmental Restoration Program	RP	Remedial Party
EWP	Excavation Work Plan	RSO	Remedial System Optimization
FS	Feasibility Study	SC	Site Characterization
HASP	Health and Safety Plan	SCG	Standards, Criteria and Guidelines
IC	Institutional Control	SCO	Soil Cleanup Objective
NYS	New York State	SMP	Site Management Plan
NYSDEC	New York State Department of Environmental Conservation	SOP	Standard Operating Procedures
		SOW	Statement of Work
NYSDOH	New York State Department of Health	SSD	Sub-slab Depressurization
NYCRR	New York Codes, Rules and Regulations	SSDS	sub-slab depressurization system
O&M	Operation and Maintenance	SVE	Soil Vapor Extraction
OM&M	Operation, Maintenance and Monitoring	SVI	Soil Vapor Intrusion
OSHA	Occupational Safety and Health Administration	TCLP	Toxicity Characteristic Leachate Procedure
Parsons	Parsons Engineering of New York, Inc.	USEPA	United States Environmental Protection Agency
P.E. or PE	Professional Engineer		
PFAS	Per- and Polyfluoroalkyl Substances	VCA	Voluntary Cleanup Agreement
PID	Photoionization Detector	VCP	Voluntary Cleanup Program
PFOA	perfluorooctanoic acid	VOC	Volatile Organic Compounds
PFOS	perfluorooctanesulfonic acid		

EXECUTIVE SUMMARY

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

Site Identification:	Bestway Cleaners 2075 Seneca Street Buffalo, NY NYSDEC Site No 915219

Institutional Controls:	1. The property may be used for commercial use;
	2. All ICs must be operated and maintained as specified in this SMP;
	3. All ICs must be inspected at a frequency and in a manner defined in the SMP;
	4. The remedial party or site owner must complete and submit to the Department periodic certification of institutional controls in accordance with Part 375-1.8 (h)(3);
	5. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the New York State Department of Health (NYSDOH) or the Erie County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;
	6. Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
	7. All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP and an Excavation Work Plan, which details the provisions for the management of future excavations in areas of remaining contamination;
	8. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
	9. Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
	10. Access to the site must be provided to agents, employees, or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement;
	11. Should the owners of properties where soil vapor intrusion sampling was previously declined request to have their properties sampled in the future, the NYSDEC, in consultation with the NYSDOH, shall assess the need for soil vapor intrusion sampling and take appropriate action;

Site Identification:	Bestway Cleaners 2075 Seneca Street Buffalo, NY NYSDEC Site No 915219

	12. All ECs must be inspected at a frequency and in a manner defined in the SMP.	
Engineering Controls:	1. Sub-Slab Depressurization System (SSD)	
Inspections:		Frequency
1. SSD System Components Inspection		Annually
Monitoring:		
1. On-Site Soil Vapor Intrusion Sampling		Prior to and after SSD system installation
2. Off-Site Soil Vapor Intrusion Sampling		As requested by property owners, at the discretion of NYSDEC and NYSDOH
Maintenance:		
1. SSD System		As needed
Reporting:		
1. Annual Inspection Report 2. Periodic Review Report		Annually 15 months after SSD startup at site and then every five years

Further descriptions of the above requirements are provided in detail in the latter sections of this SMP.

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the Bestway Cleaners Site located in Buffalo, 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. 915219, which is administered by New York State Department of Environmental Conservation (NYSDEC or Department). A list of Site contacts is provided in **Appendix A**. Responsibilities of the Site owner and remedial party are defined in **Appendix B**.

A figure showing the site location and boundaries of this site is provided in **Figure 2**. The boundaries of the site will be more fully described in the metes and bounds site description that is part of the Environmental Easement, which is currently in the process of being drafted and will be provided as an addendum to this SMP.

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 Easement, which will be granted to the NYSDEC, and recorded with the Erie County Clerk, will require compliance with this SMP and all ECs and ICs placed on the site.

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

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC).
- Failure to comply with this SMP is also a violation of ECL, Title 6 of the New York Codes, Rules and Regulations (NYCRR) Part 375 and thereby subject to applicable penalties.

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

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

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. The NYSDEC can also make changes to the SMP or request revisions from the remedial party. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shutdown of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the site conditions. In accordance with the Environmental Easement for the site, the NYSDEC project manager will

provide a notice of any approved changes to the SMP and append these notices to the SMP that is retained in its files.

1.3 Notifications

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

1. 60-day advance notice of any proposed changes in site use that are required under the terms of 6 NYCRR Part 375 and/or ECL.
2. 7-day advance notice of any field activity associated with the remedial program.
3. 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan (EWP). If the ground-intrusive activity qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.
4. Notice within 48 hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.
5. Notice within 48 hours of any non-routine maintenance activities.
6. Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
7. Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

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

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

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

Table 1 includes contact information for the above notifications. 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 A.**

Table 1: Notifications*

Name	Contact Information	Required Notification**
Brianna Scharf	518-402-9813 / brianna.scharf@dec.ny.gov	All Notifications
Kelly Lewandowski	(518) 402-9569 / Kelly.lewandowski@dec.ny.gov	Notifications 1 and 8
Eamonn O'Neill	518-402-7860 / beei@health.ny.gov	Notifications 4, 6, and 7

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

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

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The site is located at 2075 Seneca Street in the City of Buffalo, Erie County, New York and is identified as Section 123.81 Block 8 and Lot 13 on the Erie County Tax Map (see **Figure 2**). The site is an approximately 0.2-acre area and is bounded by Seneca Street to the northeast, Yale Place to the northwest, commercial properties to the southeast, and residential properties to the southeast (see **Figure 2**). The boundaries of the site will be more fully described in **Appendix C –Environmental Easement**. The owner(s) of the site parcel(s) at the time of issuance of this SMP is/are:

Bestway Cleaners, Inc.

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

Leo's Pizzeria and R&R Bottle and Can Redemption

2.2 Physical Setting

2.2.1 Land Use

The Site consists of the following: a retail building containing a pizzeria and a recycling facility, with a paved parking area in the front and rear of the building. The Site is zoned N-3E mixed uses and is currently utilized for commercial uses. Site occupants include a pizzeria and recycling facility. There is a paved parking area in the front and rear of the building.

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 residential 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 commercial and residential properties.

2.2.2 Geology

The subsurface can be characterized from the ground surface to depth as follows:

- Fill Material - Fill material consisting primarily of reworked silt and clay with some varying amounts of sand and gravel; brick, coal, wood, concrete, and other debris are also encountered. Fill materials range in thickness from approximately 1.5 to 18 feet.
- Clayey Silt Layer Unit – A clayey silt unit consisting of a brown clay material with silt was found underlying the fill material in some locations. This unit varies in thickness and was not found in all boring locations at the site. Where found, this unit ranged in thickness from 3 to 8 feet.
- Sand and Gravel Unit - A sand unit consisting of fine to medium-grained sand with varying amounts of gravel was found underlying the clayey silt layer in some locations. Where encountered, sand thickness ranges from approximately 3 to 14 feet.

- Silt and Gray Clay unit – This unit underlies large portions of the sand unit; however, the unit is absent in some locations, (e.g. GW-1, GW-2). Where fully penetrated, the silt and clay ranges in thickness from 6 to 14 feet.
- Till unit – The glacial till unit, which consists of a heterogeneous mixture of silt, sand, and gravel, ranging in thickness between 1 and 7 feet, underlies the silt and clay unit.
- Bedrock unit – Although not encountered during drilling, the top of bedrock surface is estimated to be approximately 25 to 30 feet below ground surface (Conestoga-Rovers & Associates (CRA), 2003). Based on state geologic mapping, the bedrock underlying the site is likely part of the Oatka Creek Shale Member of the Middle Devonian Marcellus Formation (Rickard and Fisher, 1970).

A geologic cross section is shown in **Figure 3A** and **3B**. Site specific boring logs are provided in **Appendix D**.

2.2.3 Hydrogeology

Groundwater is generally 6 to 12 feet below the ground surface. According to measurements taken on November 11, 2013, groundwater elevations ranged from 581.73 feet above sea level in GW-9, located west of the Site, to 574.70 feet in GW-113, located southwest of the Site near Cazenovia Creek. Groundwater flows to the west and southwest towards Cazenovia Creek with a gradient of approximately 0.0075 feet/foot. Measurements taken in 2016 showed a similar trend. A groundwater contour map for water levels collected June 4, 2019 is shown in **Figure 4**. Groundwater elevation data is provided in **Table 2**.

Cazenovia Creek is concrete lined in the vicinity of the site. Cazenovia Creek flows northwest toward the Buffalo River and discharges to Lake Erie approximately 3 miles west of the site. Precipitation at the Site that does not infiltrate the soils but is directed to a storm sewer along Yale Place, which discharges to Cazenovia Creek through an outfall.

The hydraulic conductivity within the shallow overburden monitoring zone is reported to range from approximately 3.28 x 10^{-4} cm/sec (0.9 ft/day) to 9.95 x 10^{-3} cm/sec (28.2 ft/day) with a geometric mean of 2.74 X 10^{-3} cm/sec (7.8 ft/day) (CRA, 2003). The screened interval of the shallow overburden monitoring wells mainly straddle the fill unit and the sand unit. Groundwater monitoring well construction logs are provided in **Appendix D**.

Groundwater at the site is not used as a source of drinking water. The Site is located within the Buffalo Water Authority district. As such, the City of Buffalo provides drinking water to the site vicinity via public water supply. The City of Buffalo sources its water from an intake on Lake Erie, just upstream of the Niagara River, which is not impacted by site contamination. There are no known wells used as sources of drinking water within at least one-half mile of the site.

2.3 Investigation and Remedial History

Historical city directories and Sanborn maps indicate that the property was originally developed with a dwelling in 1900, which remained unchanged until 1917. The 1940 Sanborn map indicates that the property was improved with a store/dwelling and the city directory shows that in 1946 a retail/commercial building was developed at the site. In 1950 the site was improved with a residential/retail building and remained unchanged until 1960. According to the city directory, Bestway Dry Cleaners was established in 1965 and operated a dry-cleaning facility at the site until they recently shut down operations. A recycling center is now present in the former Bestway storefront and a pizzeria occupies the other half of the building

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.

- Pizza Hut Off-Site Characterization (O'Brien and Gere (OBG), 2006): The Department became aware of the Bestway Cleaners site after the initial investigation of the nearby Former Pizza Hut site (Site ID No. V00370), which concluded that potential sources of chlorinated solvents were present off-site. One of these potential sources was determined to be Bestway Cleaners. Regulatory and compliance data from an environmental database search indicated spill incidents at Bestway Cleaners associated with the storage of drums of tetrachloroethylene (PCE) and other cleaning materials, the presence of an area of dead grass near a discharge pipe at the rear of the building ,and an apparent air release of trichloroethene. As a result, monitoring wells were installed on the Bestway Cleaners property. The analysis of samples from those wells indicated the presence of PCE, trichloroethylene (TCE), and cis-1,2-dichloroethene (cis-1,2-DCE) in concentrations exceeding Class GA standards and the Bestway property was subsequently listed on the State's Registry of Inactive Hazardous Waste Disposal sites.
- Site Characterization (SC) (Camp, Dresser, & McKee (CDM), 2009): Bestway Cleaners site investigation and site characterization activities prior to this RI included soil borings, surface soil and subsurface soil sampling, soil vapor sampling, monitoring well installations, and groundwater sampling.
    - Volatile Organic Compounds (VOCs) (including PCE) were detected in subsurface soil samples collected during the SC. Concentrations of VOCs do not exceed unrestricted use Soil Cleanup Objectives (SCOs).
    - PCE and/or TCE was detected above the Class GA Water Quality Standard in groundwater samples from six down-gradient monitoring wells. Additionally, cis-1,2-DCE concentrations exceed the Class GA Standard in samples from six wells and vinyl chloride (VC) concentrations exceed the standard in samples from two wells. Four other VOCs were detected above standards in a sample from one monitoring well during the SC.
    - Elevated levels of PCE and TCE were detected in the soil vapor samples collected at the on-site building during the 2008 site characterization investigation. PCE was detected in all ten of the samples collected ranging from 8.48 ug/m^3 to 25,500 ug/m^3. TCE was detected in five of the samples ranging from 13.5 ug/m^3 to 5,970 ug/m^3.
- Remedial Investigation (Parsons, 2016): The 2013-2016 Remedial Investigation (RI) activities were conducted to determine the extent of perchloroethylene (also known as tetrachloroethylene or PCE) and related chlorinated solvents in soil, groundwater, sediment, and soil vapor at and in the vicinity of the Site. RI activities included: utility clearance, geophysical survey, wellhead elevation and location surveys, groundwater elevation survey, soil borings, soil sampling, groundwater monitoring well installation and two rounds of groundwater sampling, storm sewer sampling, and indoor air and sub-slab vapor sampling.
    - During the RI three surface soil samples, nine subsurface soil samples, and one storm sewer sediment samples were collected and analyzed for VOCs. VOCs (including PCE and TCE) were detected in surface and subsurface soils but were not detected in concentrations exceeding unrestricted use SCOs. VOCs were not detected in storm sewer sediment samples.
    - A total of 36 groundwater samples were collected and analyzed. Groundwater concentrations were found to exceed Class GA standards for four chlorinated VOCs: PCE at a maximum level of 120 parts per billion (ppb), TCE at a maximum level of 44 ppb, cis-1,2-dichloroethylene (1,2-DCE) at a maximum level of 280 ppb, VC at a maximum level of 4.2 ppb. Acetone was found in exceedance of Class GA standards in one onsite well. Additionally, two non-chlorinated VOCs were found to exceed Class GA standards: isopropylbenzene at a maximum concentration of 31 ppb, and toluene at a maximum concentration of 12 ppb in groundwater wells located on and downgradient of the Bestway Cleaners site.

- Soil vapor intrusion (SVI) sampling was conducted at Bestway Cleaners, as well as at four properties in the vicinity of the Bestway Cleaners. PCE was detected in each of the RI indoor air and sub-slab vapor samples. The PCE in the groundwater is the likely the source for PCE in sub-slab vapors and indoor air. The apparent PCE distribution is generally from the Bestway site to the southwest of the Site.

- Indoor air and sub-slab vapor samples were collected from within the former cleaners, as well as within the pizzeria that also occupies the building. Results from within Bestway Cleaners found PCE at up to 20,000 micrograms per cubic meter (ug/m^3) beneath the building slab and up to 8,300 ug/m^3 in indoor air. PCE was detected in the pizza shop at concentrations up to 19,000 ug/m^3. Sub-slab soil vapor samples collected from beneath the pizzeria were lower in concentration than the indoor air, indicating that the largest source of indoor air contamination in the pizzeria was from fugitive emissions from the drycleaners. Bestway Cleaner suspended operations to reduce exposures. PCE concentrations in indoor air at the pizzeria decreased substantially, but remained in exceedance of the NYSDOH Air Guidance Value of 30 ug/m^3.
    - From the four sampled off-site properties, PCE in the indoor air ranged from 2.5 ug/m^3 to 4.5 ug/m^3 and PCE in the sub-slab ranged from 33 ug/m3 to 1,500 ug/m^3. Based on these results, it was determined that mitigation measures were needed at one residence to address current and potential indoor air contamination of volatile organic compounds associated with SVI. As a result, the NYSDEC installed a sub-slab depressurization system (SSDS) in 2016 at the impacted residence.
- Supplemental Soil Vapor Assessment Investigation (Groundwater & Environmental Services, Inc. (GES), 2016): In 2016, in order to further evaluate SVI at off-site properties, NYSDOH and NYSDEC collected SVI samples at an additional six residential properties in close proximity to the site. One sub-slab, one indoor air, and one ambient air sample were collected at each property. Sub slab results for TCE ranged from 0.47 ug/m^3 to 9.2 ug/m^3 and PCE ranged from 1.9 ug/m3 to 310 ug/m^3. While there were no indoor air exceedances of PCE or TCE at these properties above the NYSDOH air guidelines of 30 ug/m3 for PCE and 2.0 ug/m^3 for TCE, one property sampled during the 2016 sampling event did require actions to address the potential for soil vapor intrusion and a sub-slab depressurization system was installed. The five other properties sampled in 2016, required no further action.
- 2019 Supplemental Groundwater Investigation (Parsons 2020): As described in the Feasibility Study (FS), three existing wells were selected for sampling of VOCs, SVOCs, pesticides, herbicides, PCBs, metals, cyanide, and emerging contaminants (per- and polyfluoroalkyl substances and 1,4-dioxane). Three VOCs were detected at concentrations greater than Class GA standards of 5 ppb: 1,2-DCE at a maximum concentration of 36 ppb, PCE at a concentration of 91 ppb, and TCE at a maximum concentration of 14 ppb. PCE was detected in two wells with the concentration from one well exceeding the Class GA standard. Cis-1,2-DCE and TCE were also detected in one well in concentrations exceeding Class GA standards. Cadmium was detected at a maximum concentration of 16 ppb, greater than the Class GA standard of 5 ppb. For PFAS, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) were reported at concentrations of up to 5.3 and 12 parts per trillion (ppt), respectively, with PFOS detected slightly above the 10 ppt screening levels for groundwater. 1,4-Dioxane was reported at a concentration of up to 0.15 ppb, below the 1 ppb screening level for groundwater.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Record of Decision dated March 2020 are as follows:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

2.5 Remaining Contamination

2.5.1 Soil

PCE, TCE, and methylene chloride were detected in soil samples collected during previous investigations; however, concentrations of these contaminants do not exceed unrestricted use SCOs. Cyclohexane, isopropylbenzene, and methylcyclohexane, which do not have defined SCOs, were also detected in Site soils. Given that contaminants were not present in exceedance of unrestricted SCOs in soil samples, soil is not considered to be an environmental media of risk to public health or the environment and remaining soil contamination at the site is not of concern as it is covered by a concrete slab (building foundation).

2.5.2 Sediment

One sediment sample was collected from an on-site storm sewer during previous investigations. VOCs were not detected in the sample. Given that contaminants were not present in the sample, sediment is not considered to be an environmental media of risk to public health or the environment.

2.5.3 Groundwater

Table 3 and **Figure 5** summarize the results of all samples of groundwater that exceed the SCGs (2016 and 2019 groundwater sampling results). Because the remedial action does not include groundwater remediation, groundwater contamination remaining at the site is consistent with pre-remediation conditions observed during investigations.

VOC concentrations in groundwater were found to exceed Class GA standards for four chlorinated VOCs: PCE at a maximum level of 120 ppb, TCE at a maximum level of 44 ppb, 1,2-DCE at a maximum level of 280 ppb, and VC at a maximum level of 4.2 ppb. The standard for PCE, TCE, and cis-1,2-DCE is 5 ppb while the standard for VC is 2 ppb. Acetone was also found in exceedance of Class GA standards in one onsite well, with a concentration of 110 ppb and a standard of 50 ppb. Additionally, two other non-chlorinated VOCs were found to exceed Class GA standards: isopropylbenzene at a maximum concentration of 31 ppb, and toluene at a maximum concentration of 12 ppb, with standards of 5 ppb for both of these compounds.

Highest concentrations of VOCs occur directly downgradient (to the southwest) of the site. Attenuation of these compounds is indicated based on decreasing concentrations moving downgradient from the site. Additionally, chlorinated ethene concentrations in 2013 and 2016 were lower than concentrations measured in 2008 supporting the pattern of decreasing concentrations. The presence of 1,2-DCE and VC at significant concentrations also indicates that degradation of PCE and TCE is occurring.

Other contaminants detected in groundwater in concentrations exceeding SCGs include cadmium at a maximum concentration of 16 ppb (compared to the standard of 5 ppb) and PFOS at a maximum concentration of 12 parts per trillion (ppt) (compared to the standard of 10 ppb.

Groundwater at the site is not used as a source of drinking water. There are no known wells used as sources of drinking water within at least one-half mile of the site. The City of Buffalo provides drinking water to the site vicinity from a separate source that is not affected by this contamination.

2.5.4 Soil Vapor

Table 4A, Table 4B and **Figure 6** summarize the results of all samples of soil vapor that exceed the SCGs. Elevated levels of PCE and TCE exist at on-site and off-site buildings. In the 2008 investigation of on-site buildings, PCE was detected in all 10 samples in concentrations ranging from 8.48 ug/m3 to 25,500 ug/m3. TCE was detected in five samples with concentrations ranging from 13.5 ug/m3 to 5,970 ug/m3. Additional sampling during the RI found PCE at up to 20,000 ug/m3 beneath the Bestway Cleaners building slab and up to 8,300 ug/m3 within the Bestway Cleaners indoor air. The adjoining pizzeria had PCE concentrations in indoor air up to 19,000 ug/m3. Following corrective measures at Bestway Cleaners, PCE in indoor air at the pizzeria dropped to 93 ug/m3, which represented a substantial reduction in PCE concentrations, but was still in exceedance of the NYSDOH Air Guidance value of 30 ug/m3. Therefore, a remedial action in the form of an SSD system will need to be in place at the on-site building. Sampling will be conducted prior to system installation and after the system is operational to ensure that the system is effectively decreasing soil vapor concentrations in sub-slab and indoor air.

Sampling at off-site residences in the vicinity of the site also indicate PCE and TCE impacts. PCE in off-site indoor air ranged from non-detect to 4.5 ug/m3 and off-site sub-slab samples from non-detect to 1,500 ug/m3. TCE in the sub-slab ranged from non-detect to 9.2 ug/m3. As a result, SSD systems were installed at two of the 10 residences sampled to address the potential for exposure from soil vapor intrusion.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists at the site, ICs and 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 project manager.

This plan provides:

- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- 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 an Excavation Work Plan (EWP) 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 as determined by the NYSDEC project manager.

3.2 Institutional Controls

A series of ICs is required by the ROD to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and (3) limit the use and development of the site to commercial uses only. Adherence to these ICs on the site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on **Figure 7**. These ICs are:

- The remedial party or site owner must complete and submit to the Department periodic certification of institutional controls in accordance with Part 375-1.8 (h)(3);
- The property may be used for: commercial or industrial use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- All ECs must be installed, operated and maintained as specified in this SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP;
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Erie County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;
- Environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;

- Monitoring to assess the performance and effectiveness of the recommended remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
- Access to the site must be provided to agents, employees, or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement;
- Should the owners of properties where soil vapor intrusion sampling was previously declined, request to have their properties sampled in the future, the NYSDEC, in consultation with the NYSDOH, shall assess the need for soil vapor intrusion sampling and take appropriate action.

3.3 Engineering Controls

3.3.1 Sub-Slab Depressurization (SSD) System

Any on-site building is required to have a sub-slab depressurization (SSD) system, or other acceptable measures, to mitigate the migration of vapors into the building from soil and/or groundwater. This is consistent with the RAO for Public Health Protection of mitigating impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at the site.

Two off-site residential properties (Structures 3 and 4) previously had SSD systems installed during 2014 and 2016 field efforts, based on the results of soil vapor intrusion sampling. Both properties have an SSD system consisting of vapor extraction points installed beneath the basement floor, which is depressurized with a low volume blower. The effluent soil gas is vented through a pipe that extends above the roof.

Similar to the off-site SSD systems, the SSD system to be installed at the on-site building will be consist of PVC piping and an inline low-volume fan such as a FanTech RN4EC Inline EC Radon fan, or equivalent. Two SSD system extraction points will be installed beneath the basement floor. Spacing of extraction points will be determined based on operating constraints of the current building operator, as the building currently contains a bottle redemption center, which likely involves equipment and infrastructure. PVC piping will run from the extraction points, through an interior wall, to an inline low-volume fan, which will be installed at ground level on the piping outside of the building in a convenient location that does not interfere with current building operations. Piping will then route upwards above the roofline, where air will be discharged. A discharge permit is not anticipated to be needed because the extraction system is low volume, and thus is not considered a point source. The system will be powered by a dedicated 15-amp GFI outlet.

Procedures for operating and maintaining the SSD systems (both on- and off-site) are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As-built drawings, signed and sealed by a PE who is licensed and registered in New York State, will be included in the Operation and Maintenance Manual (**Appendix E**) once the system is installed.

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. Unless waived by the NYSDEC, confirmation samples of applicable environmental media are required before terminating any remedial

actions at the site. Confirmation samples require Category B deliverables and a Data Usability Summary Report (DUSR).

The remedial party will also conduct any needed site restoration activities, such as asphalt patching and decommissioning treatment system equipment. In addition, the remedial party will conduct any necessary restoration of vegetation coverage, trees and wetlands, and will comply with NYSDEC and United States Army Corps of Engineers regulations and guidance. Also, the remedial party will ensure that no ongoing erosion is occurring on the site.

3.3.2.1 Sub-Slab Depressurization (SSD) System

The active SSD system to be installed onsite will not be discontinued unless prior written approval is granted by the NYSDEC and the NYSDOH project managers. If 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 project managers.

3.3.3 Excavation Work Plan

Exposure to remaining contamination at the Site is prevented by a SSD System and the concrete slab of the onsite building. The Excavation Work Plan (EWP) template provided in Appendix E outlines the general procedures required to be implemented in the event that any future work that may disturb the subsurface is proposed, the EWP template will be revised by the person(s) proposing the work and submitted to the NYSDEC project manager for approval. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and associated Community Air Monitoring Plan (CAMP) prepared for the Site. The HASP and CAMP will be prepared by the person(s) proposing the work and submitted to the NYSDEC project manager for approval. Any disturbance of the Site's cover system must be overseen by a qualified environmental professional (QEP) as defined in 6 NYCRR Part 375, a Professional Engineer (PE) who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State.

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 recommended remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC project manager.

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

- Sampling and analysis of all appropriate media (e.g., indoor air, soil vapor)
- Assessing compliance with applicable NYSDEC SCGs
- 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;
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site–Wide Inspection

Site-wide inspections will be performed at a minimum of once per year. These periodic inspections must be conducted when the ground surface is visible (i.e. no snow cover). Site-wide inspections will be performed by a QEP as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or duration of the inspections will require approval from the NYSDEC project manager. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed as provided in **Appendix F – Site Management Forms**. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of the recommended 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
- Confirmation that site records are up to date.

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

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;

- 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 project manager must be given by noon of the following day. In addition, an inspection of the site will be conducted within five days of the event to verify the effectiveness of the IC/ECs implemented at the site by a qualified environmental professional, as defined in 6 NYCRR Part 375. Written confirmation must be provided to the NYSDEC project manager within seven 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

Once constructed, monitoring of the on-site SSD system will be performed at the frequency listed below in Table 5. The monitoring of remedial systems must be conducted by a QEP as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager. 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 SSD system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SSD system components to be monitored include, but are not limited to, the components included in **Table 5** below.

Table 5: **Remedial System Monitoring Requirements and Schedule**

Remedial System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Vacuum blower	Vacuum (inches of water column)	0 - 4.35 in w.c.	Annually
General system piping	Integrity of piping	Good working condition, no physical damage, etc.	Annually

If any equipment readings are not within their specified operation range, 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.

4.4 Post-Remediation Media Monitoring and Sampling

Soil vapor intrusion samples shall be collected from the on-site building before and after the SSD system is installed and operating to document that the system satisfies the RAOs. Samples will be collected from sub-slab and indoor air over 8-hour integrated sample periods and will be analyzed for VOCs using EPA Method TO-15.

In addition to planned soil vapor intrusion sampling at the on-site building, sub-slab and indoor air samples will also be collected at off-site properties which previously declined soil vapor intrusion sampling, should property

owners request that sampling be performed. Soil vapor intrusion sampling at these properties will be performed at the discretion of NYSDEC and NYSDOH. Samples will be collected from sub-slab and indoor air over 24-hour integrated sample periods and will be analyzed for VOCs using EPA Method TO-15.

Sampling locations, required analytical parameters and schedule are provided in **Table 6 – Post Remediation Sampling Requirements and Schedule** below.

Table 6: Post Remediation Sampling Requirements and Schedule

Sampling Location	Analytical Parameters	Schedule
	VOCs (EPA Method TO-15)	
On-Site Building	X	Before and after installation of the SSD System in the on-site building
Off-Site Property	X	As-Needed (if requested by property owner at property which previously declined sampling and at the discretion of NYSDEC and NYSDOH)

Detailed sample collection and analytical procedures and protocols are provided in **Appendix G – Field Activities Plan** and **Appendix H – Quality Assurance Project Plan (QAPP)**.

4.4.1 Soil Vapor Intrusion Sampling

Soil vapor intrusion sampling will be performed at the on-site building prior to and after the SSD system is constructed and operating. Soil vapor intrusion sampling will also be performed at off-site properties where property owners previously declined soil vapor intrusion sampling, should the property owner request that sampling be performed in the future. Sampling will be performed at off-site properties at the discretion of the NYSDEC and NYSDOH.

During soil vapor intrusion sampling, sub-slab vapor samples will be collected from temporary soil vapor points installed through the basement floor. Concurrent co-located indoor air samples will also be collected. Prior to sampling, a detailed chemical survey will be performed in the area where samples will be collected and findings will be reported on the NYSDOH Indoor Air Quality (IAQ) Questionnaire and Building Inventory Field Form, provided in **Appendix F**. Sampling points will be installed and samples will be collected using the methods described in **Appendix G – Field Activities Plan**. Samples will be analyzed for VOCs using EPA Method TO-15 in accordance with **Appendix H– Quality Assurance Project Plan**.

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

4.4.2 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in **Appendix F - Site Management Forms**. Other observations will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific Field Activities Plan provided as **Appendix G** of this document.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

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 SSD systems;
- Will be updated periodically to reflect changes in site conditions or the manner in which the SSD systems are operated and maintained.

Further detail regarding the Operation and Maintenance of the SSD system is provided in **Appendix I - Operation and Maintenance Manual**. A copy of this Operation and Maintenance Manual, along with the complete SMP, is to be maintained at the site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of this SMP.

5.2 SSD Performance Criteria

The SSD systems will utilize an in-line low volume FanTech RN4EC Inline EC Radon fan capable of creating 4.3 inches of suction while moving 20 cubic feet per minute (cfm), as well as move 490 cfm when operating at 0.5 inches of suction. Because the extraction system is considered relatively low volume, it is not considered a point source and therefore, discharge permits are not required.

5.3 Operation and Maintenance of SSD System

Complete details regarding operations and maintenance of the SSD System will be provided in the Operations and Maintenance Manual. Components of the Operations and Maintenance Manual will include:

- Cut-sheets and as-built drawings for the SSD system provided will be provided in an Addendum System Start-Up and Testing:
- Routine System Operation and Maintenance: Annual inspections of the system will be performed to ensure that the vacuum blower is operating within range (0.0 to 4.35 inches of water column) and that the general system piping appears to be in good working condition with no physical damage, etc.

Each EC section should have the following sub-headings and associated descriptions, reported individually.

5.3.1 System Start-Up and Testing

The following tests and sampling will be performed in accordance with the NYSDOH Soil Vapor Intrusion Guidance (NYSDOH 2006) to ensure that the SSD system functions effectively:

- Leak Test: Actions will be taken to identify and fix leaks. With the depressurization system operating, smoke tubes will be used to check for leaks through concrete cracks, floor joints, and at extraction points. Any leaks will be re-sealed until smoke is no longer observed flowing through the opening.

- Backdraft Test: SSD system operation may compete with proper venting of other vented appliances on the property (e.g. furnaces, water heaters, etc.) resulting in the accumulation of exhaust gas in the building. All appliances which could potentially result in back drafting will be tested for back drafting and any observed back drafting will be corrected prior to beginning operation of the SSD system.
- Pressure Test: In order to determine that adequate depressurization is occurring, a pressure field extension test will be performed once the SSD system is installed and ready for operation. This is performed by operating the depressurization system and simultaneously observing the movement of smoke downward into small (3/8-inch) holes drilled throughout the slab. A similar test may be performed using a digital micromanometer or comparable instrument. If adequate depressurization is not occurring, the reason will be identified and corrected.
- Post-Installation Sampling: No sooner than 30 days after depressurization system installation, post-mitigation indoor air sampling will be performed using the same sampling and analytical procedures as pre-remediation indoor air sampling. If the system is installed outside of the heating season or at the end of the heating season, post-mitigation sampling will be postponed until the beginning of the next heating season. If concentrations of VOCs in post-mitigation samples do not decrease significantly from those observed in pre-mitigation samples, the reason will be identified and corrected.

The system testing described above will be conducted if, in the course of the SSD system lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

5.3.2 Routine System Operation and Maintenance

The following routine maintenance activities will be conducted annually:

- Inspection of the vacuum blower to ensure that it is functioning within the operating range (0 to 4.35 inches of water column).
- Visual inspection of system piping to ensure that piping is in good working condition and is free of damage that could prevent the system from functioning as designed.

5.3.3 Non-Routine Operation and Maintenance

Should damage, reduced effectiveness, etc. be observed during routine system inspection or at any other time, repairs/adjustments will be performed to ensure that the system is functioning as designed.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

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

A vulnerability assessment was not prepared and will not be prepared in the future because the components of the remedy are not considered vulnerable to climate change related weather events. Further justification for not performing a vulnerability assessment are as follows:

- The site is not located within a floodplain or area of groundwater recharge;
- The site is paved, and evidence of surface water pooling has not been observed. Surface water is diverted to a storm sewer, which discharges to Cazenovia Creek;
- The remedy does not include any components which altered the site topography, grading, or drainage patterns;
- The remedy does not include any components which would be susceptible to damage from high winds or other severe storm conditions, nor does it include components which would be susceptible to damage from falling objects such as trees or utility structures;
- The SSD system is the only part of the remedy which would be impacted by power loss/dips in voltage during severe weather. The SSD system will be equipped to automatically turn on and resume operations once power is restored if the system were to lose power.
- The remedy does not include any components, nor does the site have any areas which would be susceptible to contaminant release/spills due to storm-related damage.

6.2 Green Remediation Evaluation

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

The following green remediation principals and techniques will be implemented to the extent feasible in site management of the remedy:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Reducing waste, increasing recycling, and increasing reuse of materials which would otherwise be considered waste; and

- Requiring any future on-site building to include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

6.2.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the NYSDEC project manager feels appropriate, e.g. during significant maintenance events or in conjunction with storm recovery activities.

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

6.2.2 Remedial Systems

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

6.2.3 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site, 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.

6.2.4 Metrics and Reporting

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

6.3 Remedial System Optimization

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

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

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

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

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

7.0 REPORTING REQUIREMENTS

7.1 Site Management Reports

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

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

Table 7: Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Inspection Report	Annually
Periodic Review Report	Every 5 years
Soil Vapor Intrusion Sampling Report	As needed, based on requests from property owners for SVI sampling

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

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

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air);
- Copies of all field forms completed (e.g., chain-of-custody documentation);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

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

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

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

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

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

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

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the NYSDEC project manager beginning sixteen months after the SMP is issued. After submittal of the initial PRR, the next PRR shall be submitted every fifth year to the NYSDEC project manager or at another frequency as may be required by the NYSDEC project manager. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in **Appendix C** – Environmental Easement (which will be included at a later date). 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 (if any) will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required for the site.
- Results of the required annual site inspections, fire inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- Identification of any wastes generated during the reporting period, along with waste characterization data, manifests, and disposal documentation.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
  - Data summary tables and graphical representations of contaminants of concern by media (soil vapor) which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These tables and figures will include a presentation of past data as part of an evaluation of contaminant concentration trends.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.
- A site evaluation, which includes the following:

- The compliance of the remedy with the requirements of the site-specific ROD;
- 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;
- The overall performance and effectiveness of the remedy.

- A performance summary for all SSD systems on- and off-site during the calendar year, including information such as:
  - The number of days the system operated for the reporting period;
  - 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; and
  - Comments, conclusions, and recommendations based on data evaluation. Recommendations must address how receptors would be impacted. Recommendations can include:
    - Proposals to address efficiency and costs such as: system changes to decrease maintenance costs and downtime, and system changes to decrease energy use; and
    - Proposals to modify or shut down a treatment system due to remediation completion, system performance or changed conditions. System shutdowns are addressed in Section 6.4 of DER-10.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a QEP as defined in 6 NYCRR Part 375 or Professional Engineer licensed to practice and registered in New York State will prepare, and include in the PRR, a certification in accordance with the requirements of NYSDEC DER-10 (current version) once the ECs are in place.

The signed certification will be included in the PRR.

The PRR will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager. The PRR may also need to be submitted in hard-copy format if requested by the NYSDEC project manager.

7.3 Corrective Measures Work Plan

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

7.4 Remedial Site Optimization Report

If an RSO is to be performed (see Section 6.3), upon completion of an RSO, an RSO report must be submitted to the NYSDEC project manager for approval. 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, Health and Safety Plans(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 project manager and the NYSDOH project manager.

8.0 REFERENCES

A listing of all site-specific reports utilized for preparation of the SMP should be included in this section.

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

Camp Dresser & McKee, 2009. Bestway Dry Cleaners Site (Site No. 9-15-219) 2075 Seneca Street, Buffalo, New York, Final Site Characterization Report – April 2009.

Groundwater & Environmental Services, Inc. Off-Site Soil Vapor Intrusion Investigation Summary, Bestway Cleaners, 2075 Seneca Street, Buffalo, New York 14210, NYSDEC Site #915219. May 3, 2016.

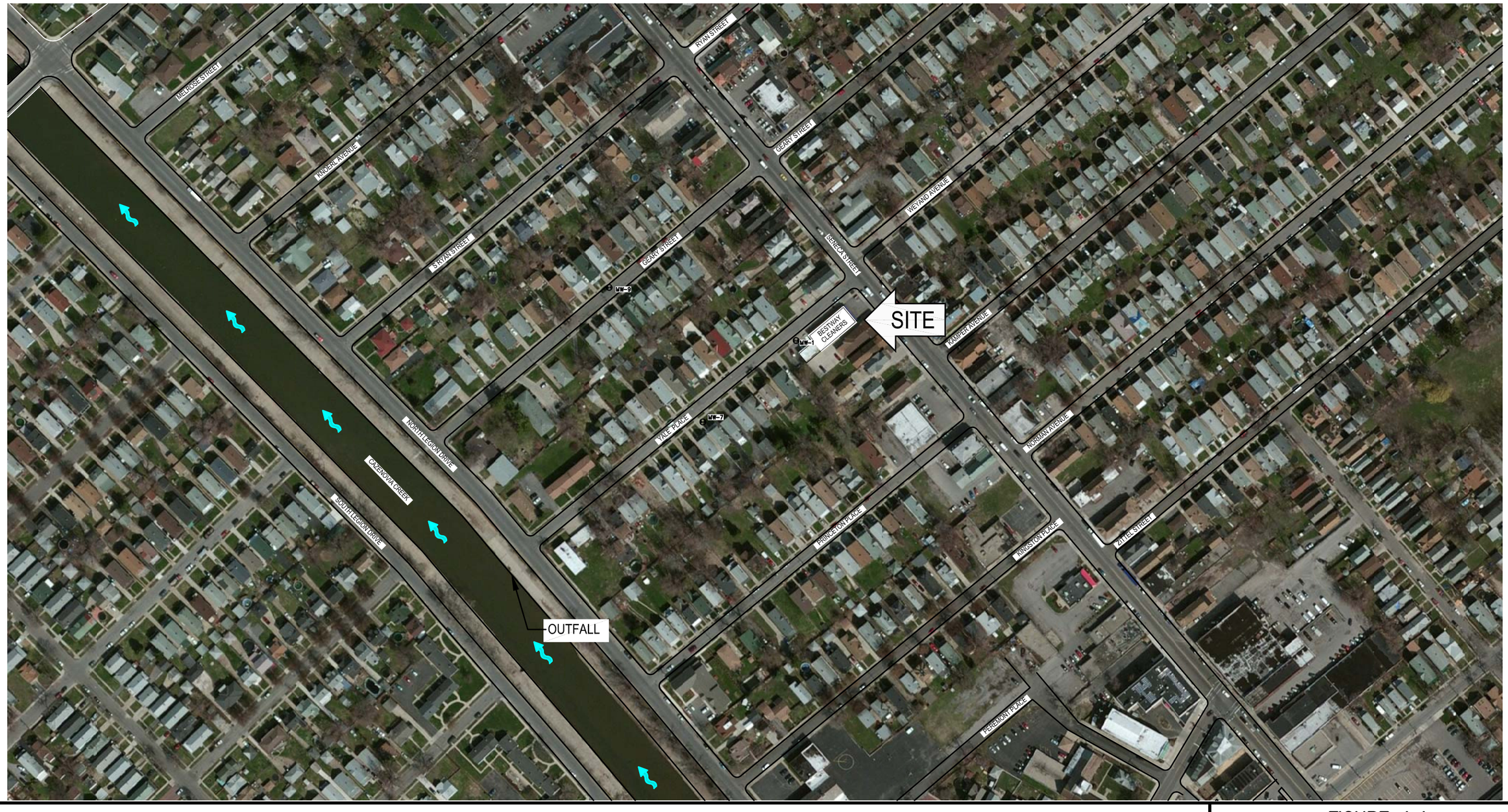
O'Brien Gere, 2006. Pizza Hut Off-Site Site Characterization Report, Buffalo, New York. December 20, 2006.

Parsons, 2016. Remedial Investigation Report, Bestway Cleaners, City of Buffalo, Erie County, New York, Site No. 915219. December 9, 2016

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation". NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

NYSDOH, 2006. Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October, 2006.

FIGURES



LEGEND

CREAK FLOW DIRECTION

200 100 0 200 400

SCALE: 1"=200'

FIGURE 1.1

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

BESTWAY CLEANERS

SITE LOCATION MAP

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, N.Y. 13212, PHONE: 315-451-9560

FILE NAME: P:\NYSDEC PROGRAM\448324 WA #12 - BESTWAY CLEANERS\10.0 TECHNICAL CATEOGORIES\CAD\448324-C-001.DWG
PLOT DATE: 12/21/2016 8:58 AM PLOTTED BY: RUSSO, JILL

KNOERL AVE

S RYAN STREET

GEARY STREET

SENECA STREET

WEYAND AVENUE

KAMPER AVENUE

NORMAN AVENUE

NORTH LEGION DRIVE

SOUTH LEGION DRIVE

CAZENOVIA CREEK

YALE PLACE

PRINCETON PLACE

KINGSTON PLACE

A

A'

B

B'

MW-115

MW-114

MW-113

MW-112

MW-111

MW-10

MW-9R

MW-9

MW-8

MW-7

MW-118

MW-1

GW-1

GW-2

GW-3

GW-4

GW-5

GW-7

GW-8

GW-9

SS-01

SS-02

SS-03

SED-01

B-1

STRUCTURE NO. 1

STRUCTURE NO. 2

STRUCTURE NO. 3

STRUCTURE NO. 4

OUTFALL

BESTWAY CLEANERS

2075 SENECA ST

123.81-9-16

123.81-9-17

123.81-9-18

123.81-9-19

123.81-9-20

123.81-9-21

123.81-9-22

123.81-5-38

123.81-5-37

123.81-5-36

123.81-5-35

123.81-8-13

123.81-8-14

123.81-8-15

123.81-8-16

123.81-8-17

123.81-8-18

123.81-8-19

123.81-8-20

123.81-8-21

123.81-8-22

123.81-8-12

123.81-8-11

N

100 50 0 100 200

SCALE: 1"=100'

LEGEND

MW-112	MONITORING WELL
	SOIL VAPOR SAMPLE LOCATION
SS-01	SOIL SAMPLE LOCATION
SED-01	SEDIMENT SAMPLE LOCATION
A A'	CROSS SECTION LOCATION MARKER
	APPROXIMATE PARCEL BOUNDARY

FIGURE 2

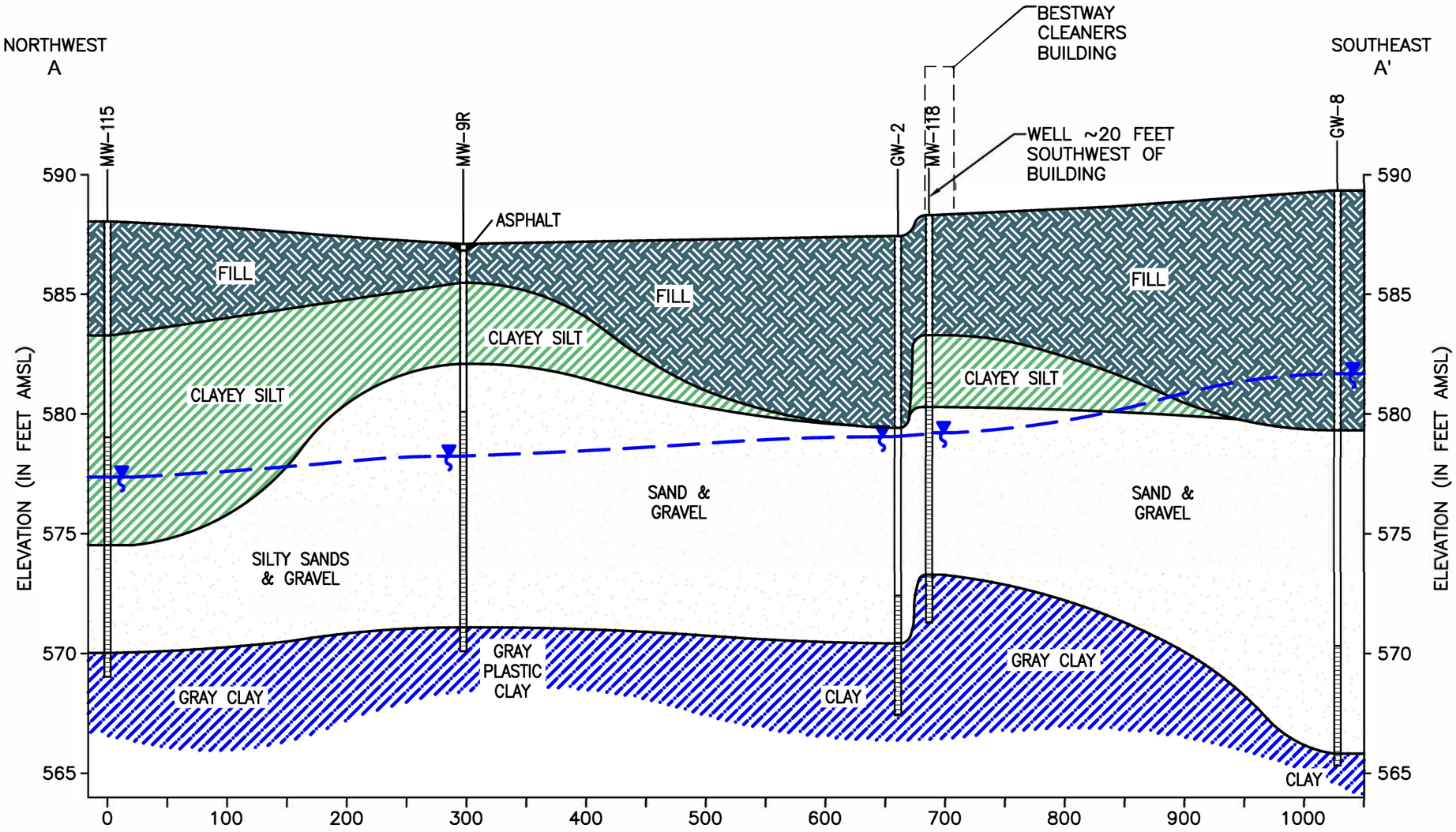
NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

BESTWAY CLEANERS

SITE LAYOUT MAP

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, N.Y. 13212, PHONE: 315-451-9560

FILE NAME: P:\NYSDEC PROGRAM\448324 WA #12 - BESTWAY CLEANERS\10.0 TECHNICAL CATEGORIES\CAD\448324-C-001.DWG
PLOT DATE: 1/5/2022 1:51 PM PLOTTED BY: RUSSO, JILL [US-US]



HORIZONTAL SCALE = 1"=100'
VERTICAL SCALE = 1"=5'

100 50 0 100 200

SCALE: 1"=100'

LEGEND

TOP OF WATER TABLE (11/11/13)

WELL SCREEN

FIGURE 3A

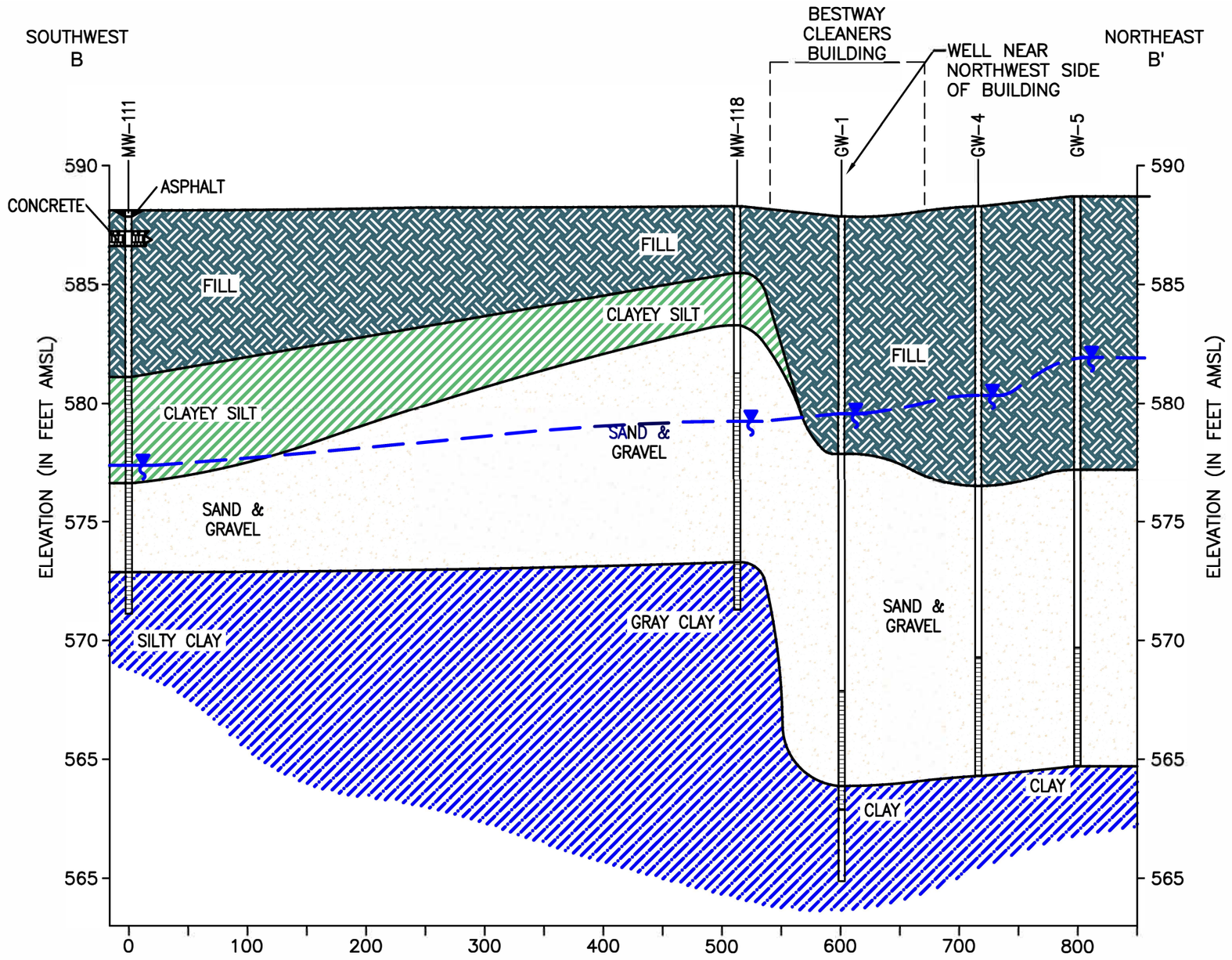
NEW YORK STATE OF OPPORTUNITY Department of Environmental Conservation

BESTWAY CLEANERS

CROSS SECTION A–A'

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, N.Y. 13212, PHONE: 315-451-9560

FILE NAME: P:\NYSDEC PROGRAM\448324 WA #12 – BESTWAY CLEANERS\10.0 TECHNICAL CATEGORIES\CAD\448324-C-001.DWG
PLOT DATE: 12/21/2016 9:00 AM PLOTTED BY: RUSSO, JILL



LEGEND

TOP OF WATER TABLE (11/11/13)

WELL SCREEN

HORIZONTAL SCALE = 1"=100'
VERTICAL SCALE = 1"=5'

100 50 0 100 200

SCALE: 1"=100'

FIGURE 3B

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

BESTWAY CLEANERS

CROSS SECTION B–B'

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, N.Y. 13212, PHONE: 315-451-9560

FILE NAME: P:\NYSDEC PROGRAM\448324 WA #12 – BESTWAY CLEANERS\10.0 TECHNICAL CATEOGORIES\CAD\448324-C-001.DWG
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FIGURE 4

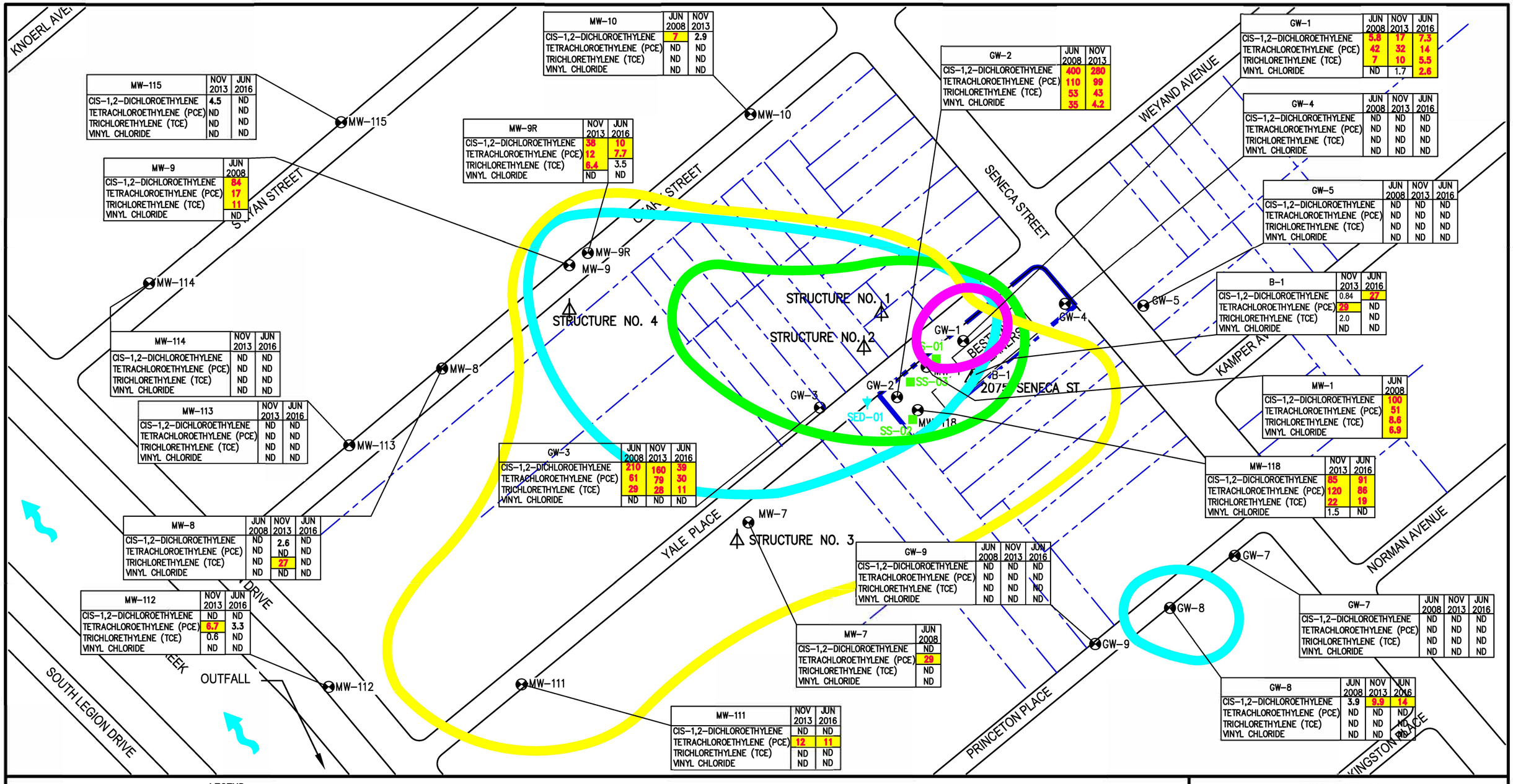
NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

BESTWAY CLEANERS

GROUNDWATER CONTOUR MAP

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, N.Y. 13212, PHONE: 315-451-9560

FILE NAME: P:\NYSDEC PROGRAM\452158 - WA #07 - BESTWAY CLEANERS RA\10.0 TECHNICAL CATEGORIES\CAD\FIGURES\452158-C-001.DWG
PLOT DATE: 2/2/2022 3:14 PM PLOTTED BY: RUSSO, JILL [US-US]



MW-115	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	4.5	ND
TETRACHLOROETHYLENE (PCE)	ND	ND
TRICHLORETHYLENE (TCE)	ND	ND
VINYL CHLORIDE	ND	ND

MW-10	JUN 2008	NOV 2013
CIS-1,2-DICHLOROETHYLENE	7	2.9
TETRACHLOROETHYLENE (PCE)	ND	ND
TRICHLORETHYLENE (TCE)	ND	ND
VINYL CHLORIDE	ND	ND

MW-9R	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	38	10
TETRACHLOROETHYLENE (PCE)	12	7.7
TRICHLORETHYLENE (TCE)	6.4	3.5
VINYL CHLORIDE	ND	ND

MW-9	JUN 2008
CIS-1,2-DICHLOROETHYLENE	84
TETRACHLOROETHYLENE (PCE)	17
TRICHLORETHYLENE (TCE)	11
VINYL CHLORIDE	ND

GW-2	JUN 2008	NOV 2013
CIS-1,2-DICHLOROETHYLENE	400	280
TETRACHLOROETHYLENE (PCE)	110	99
TRICHLORETHYLENE (TCE)	53	43
VINYL CHLORIDE	35	4.2

GW-1	JUN 2008	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	5.8	17	7.3
TETRACHLOROETHYLENE (PCE)	42	32	14
TRICHLORETHYLENE (TCE)	7	10	5.5
VINYL CHLORIDE	ND	1.7	2.6

GW-4	JUN 2008	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	ND	ND	ND
TETRACHLOROETHYLENE (PCE)	ND	ND	ND
TRICHLORETHYLENE (TCE)	ND	ND	ND
VINYL CHLORIDE	ND	ND	ND

GW-5	JUN 2008	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	ND	ND	ND
TETRACHLOROETHYLENE (PCE)	ND	ND	ND
TRICHLORETHYLENE (TCE)	ND	ND	ND
VINYL CHLORIDE	ND	ND	ND

B-1	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	0.84	27
TETRACHLOROETHYLENE (PCE)	29	ND
TRICHLORETHYLENE (TCE)	2.0	ND
VINYL CHLORIDE	ND	ND

MW-114	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	ND	ND
TETRACHLOROETHYLENE (PCE)	ND	ND
TRICHLORETHYLENE (TCE)	ND	ND
VINYL CHLORIDE	ND	ND

MW-113	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	ND	ND
TETRACHLOROETHYLENE (PCE)	ND	ND
TRICHLORETHYLENE (TCE)	ND	ND
VINYL CHLORIDE	ND	ND

GW-3	JUN 2008	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	210	160	39
TETRACHLOROETHYLENE (PCE)	61	79	30
TRICHLORETHYLENE (TCE)	29	28	11
VINYL CHLORIDE	ND	ND	ND

MW-1	JUN 2008
CIS-1,2-DICHLOROETHYLENE	100
TETRACHLOROETHYLENE (PCE)	51
TRICHLORETHYLENE (TCE)	8.6
VINYL CHLORIDE	6.9

MW-118	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	85	91
TETRACHLOROETHYLENE (PCE)	120	86
TRICHLORETHYLENE (TCE)	22	19
VINYL CHLORIDE	1.5	ND

MW-8	JUN 2008	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	ND	2.6	ND
TETRACHLOROETHYLENE (PCE)	ND	ND	ND
TRICHLORETHYLENE (TCE)	ND	27	ND
VINYL CHLORIDE	ND	ND	ND

MW-112	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	ND	ND
TETRACHLOROETHYLENE (PCE)	6.7	3.3
TRICHLORETHYLENE (TCE)	0.6	ND
VINYL CHLORIDE	ND	ND

GW-9	JUN 2008	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	ND	ND	ND
TETRACHLOROETHYLENE (PCE)	ND	ND	ND
TRICHLORETHYLENE (TCE)	ND	ND	ND
VINYL CHLORIDE	ND	ND	ND

MW-7	JUN 2008
CIS-1,2-DICHLOROETHYLENE	ND
TETRACHLOROETHYLENE (PCE)	29
TRICHLORETHYLENE (TCE)	ND
VINYL CHLORIDE	ND

GW-7	JUN 2008	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	ND	ND	ND
TETRACHLOROETHYLENE (PCE)	ND	ND	ND
TRICHLORETHYLENE (TCE)	ND	ND	ND
VINYL CHLORIDE	ND	ND	ND

MW-111	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	ND	ND
TETRACHLOROETHYLENE (PCE)	12	11
TRICHLORETHYLENE (TCE)	ND	ND
VINYL CHLORIDE	ND	ND

GW-8	JUN 2008	NOV 2013	JUN 2016
CIS-1,2-DICHLOROETHYLENE	3.9	9.9	14
TETRACHLOROETHYLENE (PCE)	ND	ND	ND
TRICHLORETHYLENE (TCE)	ND	ND	ND
VINYL CHLORIDE	ND	ND	ND

LEGEND

VOLATILES	JUN 2008	NOV 2013	JUN 2016	UNITS	NYSDEC
CIS-1,2-DICHLOROETHYLENE	210	160	39	ug/L	5
TETRACHLOROETHYLENE (PCE)	61	79	30	ug/L	5
TRICHLORETHYLENE (TCE)	29	28	11	ug/L	5
VINYL CHLORIDE	ND	ND	ND	ug/L	2

NYSDEC CLASS GA STANDARDS/GUIDANCE CRITERIA

100 50 0 100 200

SCALE: 1"=100'

SS-01 SOIL SAMPLE LOCATION

SED-01 SEDIMENT SAMPLE LOCATION

ND NOT DETECTED

79 HIGHLIGHTED CONCENTRATION EXCEEDS NYSDEC CLASS GA AMBIENT WATER QUALITY STANDARD/GUIDANCE CRITERIA

2.6 BOLD NUMBERS – DETECTED CONCENTRATION

CREEK FLOW DIRECTION

NOTE:

1. B-1, MW-9R, MW-10, MW_111, MW-112, MW-113, MW-114, MW-115, AND MW-118 WERE NOT SAMPLED DURING THE JUNE 2008 SAMPLING EVENT BECAUSE THEY WERE NOT INSTALLED YET.
2. GW-2 AND MW-10 WERE NOT SAMPLED DURING JUNE 2016 SAMPLING EVENT, DUE TO DAMAGE.
3. MW-1, MW-7, AND MW-9 WERE TEMPORARY AND INSTALLED DURING THE 2008 SITE CHARACTERIZATION REPORT. WELLS WERE ABANDONED AFTER SAMPLING. LOCATIONS SHOWN ARE APPROXIMATE FOR THESE WELLS.
4. WHERE DUPLICATE SAMPLES WERE COLLECTED, HIGHEST CONCENTRATION SHOWN.

FIGURE 5

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

BESTWAY CLEANERS

COMPOUND PLUMES MAP JUNE 2016

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, N.Y. 13212, PHONE: 315-451-9560

FILE NAME: P:\NYSDEC PROGRAM\D007623 CONTRACT ARCHIVE WA'S\448324 WA #12 – BESTWAY CLEANERS\10.0 TECHNICAL CATEGORIES\CAD\448324-C-001.DWG
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KNOERL AVE

S RYAN STREET

GEARY STREET

SENECA STREET

WEYAND AVENUE

KAMPER AVENUE

NORMAN AVENUE

NORTH LEGION DRIVE

SOUTH LEGION DRIVE

CAZENOVIA CREEK

YALE PLACE

PRINCETON PLACE

KINGSTON PLACE

OUTFALL

MW-115

MW-114

MW-113

MW-112

MW-111

MW-10

MW-9R

MW-9

MW-8

MW-7

MW-1

MW-118

GW-1

GW-2

GW-3

GW-4

GW-5

GW-7

GW-8

GW-9

SS-01

SS-02

SS-03

SED-01

B-1

BESTWAY CLEANERS

2075 SENECA ST

STRUCTURE NO. 1

STRUCTURE NO. 2

STRUCTURE NO. 3

STRUCTURE NO. 4

STRUCTURE NO. 5

STRUCTURE NO. 6

STRUCTURE NO. 7

STRUCTURE NO. 8

STRUCTURE NO. 9

STRUCTURE NO. 10

	IA	SS	AA
PCE	1.9	ND	0.85

	IA	SS	AA
PCE	4.5	8.3	NA

	IA	SS	AA
PCE	2.5	750	0.68

	IA	SS	AA
PCE	1.3	33	0.67

	IA	SS	AA
PCE	23	0.26	ND

	IA	SS	AA
PCE	8,300	20,000	ND
	3,600	980	NA

	IA	SS	AA
PCE	310	ND	ND

	IA	SS	AA
PCE	58	ND	ND

	IA	SS	AA
PCE	21	ND	ND

	IA	SS	AA
PCE	3.2	1500	NA

	IA	SS	AA
PCE	230	1.1	ND

100 50 0 100 200

SCALE: 1"=100'

LEGEND

- MW-112 — MONITORING WELL
- SOIL VAPOR SAMPLE LOCATION
- SS-01 — SOIL SAMPLE LOCATION
- SED-01 — SEDIMENT SAMPLE LOCATION

	IA	SS	AA	
PCE	3.2	1500	NA	– SAMPLE 2

– SAMPLE 1

IA = INSIDE AIR SAMPLE $\mu g/M^3$

SS = SUB-SLAB SAMPLE $\mu g/M^3$

AA = AMBIENT AIR SAMPLE $\mu g/M^3$

NA = NOT ANALYZED

ND = NOT DETECTED

FIGURE 6

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

BESTWAY CLEANERS

2013 AND 2016 SOIL VAPOR RESULTS (TETRACHLORAETHYLENE/PCE)

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, N.Y. 13212, PHONE: 315-451-9560

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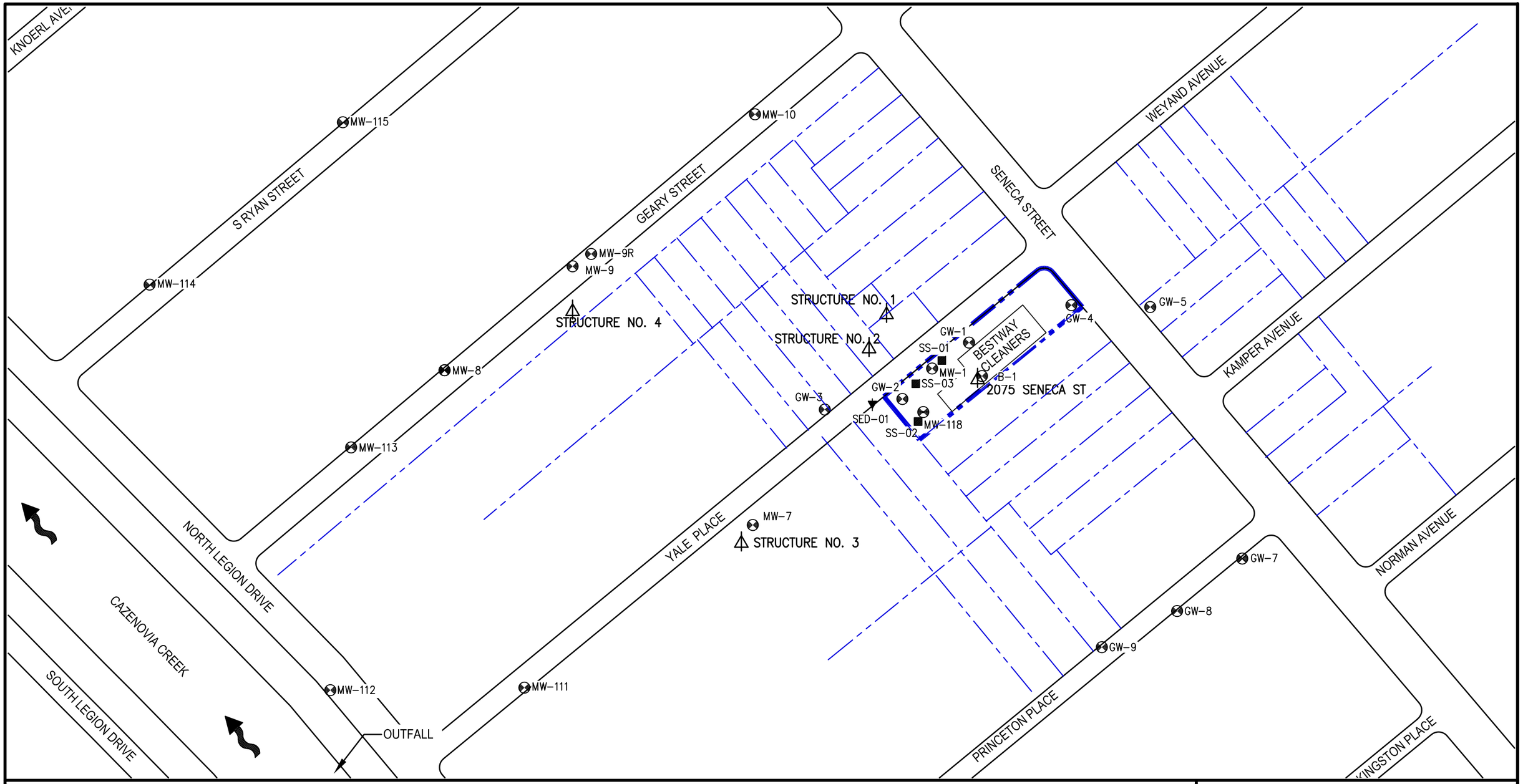

FIGURE 7

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

BESTWAY CLEANERS

INSTITUTIONAL CONTROL BOUNDARIES

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, N.Y. 13212, PHONE: 315-451-9560

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PLOT DATE: 1/6/2022 11:55 AM PLOTTED BY: RUSSO, JILL [US-US]

TABLES

NYSDEC
Bestway Cleaners Site - Buffalo, NY
Table 2
Monitoring Well Water Levels
6/12/19

Well	X (ft SP)	Y (ft SP)	X (World)	Y (world)	Elevation TOC	Screened Interval	Depth to Water 6/12/2019	Time	Groundwater Elevation 6/12/2019
GW-1	1087429	1040413	-78.8103214	42.8552771	587.58	20-25	8.69	13:50	578.89
GW-2	1087358	1040353	-78.8105839	42.8551127	587.11	15-20	8.46	13:58	578.65
GW-3	1087276	1040342	-78.8108897	42.8550817	587.03	10-15	8.65	14:10	578.38
GW-4	1087537	1040453	-78.8099183	42.8553865	587.95	19-24	7.64	13:40	580.31
GW-5	1087620	1040451	-78.809607	42.8553815	588.32	19-24	6.95	13:10	581.37
GW-7	1087718	1040185	-78.8092416	42.8546523	588.73	19-24	7.82	13:00	580.91
GW-8	1087649	1040129	-78.8094978	42.8544994	589.32	19-24	7.58	13:05	581.74
GW-9	1087569	1040091	-78.809794	42.854394	589.35	14-19	7.64	13:10	581.71
MW-8	1086874	1040384	-78.8123901	42.8551927	586.57	10-15	9.71	12:20	576.86
MW-9	1087029	1040507	-78.811813	42.855531	586.91	7-17	8.87	12:25	578.04
MW-10	1087202	1040655	-78.8111684	42.8559379	587.79	10-15	DNL		
MW-111	1086958	1040048	-78.8120718	42.8542719	587.62	7-17	10.84	14:25	576.78
MW-112	1086753	1040045	-78.8128372	42.8542631	585.94	7-17	9.66	12:45	576.28
MW-113	1086775	1040302	-78.8127577	42.8549679	586.31	9-19	11.21	12:10	575.1
MW-114	1086562	1040474	-78.8135546	42.8554389	587.12	7-17	10.97	12:05	576.15
MW-115	1086766	1040646	-78.8127941	42.8559116	587.96	9-19	10.49	11:55	577.47
MW-118	1087380	1040340	-78.8105013	42.8550751	587.92	7-17	6.25	14:00	581.67

TABLE 3
Remaing Groundwater Sample Exceedances
Bestway Cleaners, Buffalo, NY

NYSDEC-Bestway Cleaners Validated GW Analytical Data SDG - 480-161559		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	GW-5 GW-5_2019-10-24 480-161559-1 TALBUFF 4801615591 WATER 10/24/2019 15:00 12/18/2019	MW-113 MW-113_2019-10-24 480-161559-2 TALBUFF 4801615591 WATER 10/24/2019 12:00 12/18/2019	Duplicate of MW-113_2019-10-24 MW-113 MW-113DUP_2019-10-24 480-161559-7 TALBUFF 4801615591 WATER 10/24/2019 12:10 12/18/2019	MW-118 MW-118_2019-10-24 480-161559-3 TALBUFF 4801615591 WATER 10/24/2019 10:15 12/18/2019
CAS NO.	COMPOUND	UNITS:				
	VOLATILES					
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	1 U	1 U	1 U	36
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	1 U	0.38 J	1 U	91
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	1 U	1 U	1 U	14
	SEMIVOLATILES					
123-91-1	1,4-DIOXANE (P-DIOXANE)	ug/l	0.15 J	0.2 U	0.19 U	0.19 U
	PESTICIDES					
	None detected					
	HERBICIDES					
	None detected					
	PCBS					
	None detected					
	INORGANICS					
7429-90-5	ALUMINUM	mg/l	1.1	0.2 U	0.2 U	0.086 J
7440-38-2	ARSENIC	mg/l	0.008 J	0.015 U	0.015 U	0.015 U
7440-39-3	BARIUM	mg/l	0.21	0.12	0.11	0.065
7440-43-9	CADMIUM	mg/l	0.016	0.002 U	0.002 U	0.002 U
7440-70-2	CALCIUM	mg/l	57.5	167	167	78.8
7440-47-3	CHROMIUM, TOTAL	mg/l	0.0022 J	0.004 U	0.004 U	0.004 U
7440-48-4	COBALT	mg/l	0.0028 J	0.004 U	0.004 U	0.004 U
7440-50-8	COPPER	mg/l	0.0028 J	0.0021 J	0.0022 J	0.01 U
57-12-5	CYANIDE	mg/l	0.017	0.01 U	0.01 U	0.01 U
7439-89-6	IRON	mg/l	5.6	0.088	0.071	0.13
7439-92-1	LEAD	mg/l	0.0053 J	0.01 U	0.01 U	0.01 U
7439-95-4	MAGNESIUM	mg/l	9.7	20.1	19.9	12.7
7439-96-5	MANGANESE	mg/l	2.8	0.36	0.36	0.67
7440-02-0	NICKEL	mg/l	0.0053 J	0.0025 J	0.0026 J	0.0021 J
7440-09-7	POTASSIUM	mg/l	3.4	7.8	7.8	5.8
7440-23-5	SODIUM	mg/l	67.9	173	173	62.8
7440-62-2	VANADIUM	mg/l	0.0022 J	0.005 U	0.005 U	0.005 U
7440-66-6	ZINC	mg/l	0.033	0.003 J	0.0037 J	0.0031 J
	PFAS/PFOS					
375-73-5	PERFLUOROBUTANESULFONIC ACID	ng/l	3.6	2.6	2.5	3.3
375-22-4	PERFLUOROBUTYRIC ACID (PFBA)	ng/l	4.5	4.4	4.2	6.3
335-76-2	PERFLUORODECANOIC ACID (PFDA)	ng/l	0.72 J	1.7 U	1.7 U	1.7 U
307-55-1	PERFLUORODODECANOIC ACID (PFDoA)	ng/l	0.68 J	1.7 U	1.7 U	1.7 U
375-85-9	Perfluoroheptanoic Acid (PFHpA)	ng/l	1.8 U	1.7 U	1.7 U	1.4 J
355-46-4	PERFLUOROHEXANESULFONIC ACID	ng/l	0.78 J	1.1 J	1.1 J	1.4 J
307-24-4	PERFLUOROHEXANOIC ACID (PFHxA)	ng/l	4.3	1.7 U	1.7 U	2.6
375-95-1	PERFLUORONONANOIC ACID	ng/l	0.28 J	1.7 U	1.7 U	0.3 J
1763-23-1	PERFLUOROOCTANE SULFONIC ACID	ng/l	1.6 J	1.7 U	1.4 J	12 J
335-67-1	Perfluorooctanoic acid (PFOA)	ng/l	0.74 J	0.94 J	0.95 J	5.3
2706-90-3	PERFLUOROPENTANOIC ACID (PFPeA)	ng/l	6	1.7 U	1.7 U	3.8

Table 4A
Remaining Soil Vapor Exceedances from 2013-2014 Heating Season
Bestway Cleaners
Buffalo, NY

			2075 Seneca Street				
NYSDEC-Bestway Cleaners 2013 Site Investigation Validated Air Analytical Data		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	2408A-IA1 2408A-IA1-032014 140-1106-1 TALKNX 14011061 AIR 3/20/2014 15:59 5/27/2014	2408A-IA2 2408A-IA2-032014 140-1106-3 TALKNX 14011061 AIR 3/20/2014 15:59 5/27/2014	2408A-SS1 2408A-SS1-032014 140-1106-5 TALKNX 14011061 AIR 3/20/2014 15:59 5/27/2014	2408A-SS2 2408A-SS2-032014 140-1106-2 TALKNX 14011061 AIR 3/20/2014 15:59 5/27/2014	AA AA-032014 140-1106-4 TALKNX 14011061 AIR 3/20/2014 16:09 5/27/2014
CAS NO.	COMPOUND	UNITS:					
	VOLATILES						
71-55-6	1,1,1-TRICHLOROETHANE	ug/m3	53 U	22 U	89 U	11 U	0.44 U
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	74 U	31 U	130 U	15 U	0.61 U
95-63-6	1,2,4-TRIMETHYLBENZENE	ug/m3	48 U	20 U	80 U	**18**	0.39 U
108-67-8	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	ug/m3	48 U	20 U	80 U	9.8 U	0.39 U
71-43-2	BENZENE	ug/m3	31 U	13 U	52 U	6.4 U	**0.61**
56-23-5	CARBON TETRACHLORIDE	ug/m3	30 U	13 U	51 U	6.3 U	**0.47**
74-87-3	CHLOROMETHANE	ug/m3	50 U	21 U	84 U	10 U	**1.1**
110-82-7	CYCLOHEXANE	ug/m3	83 U	35 U	140 U	**37**	0.69 U
75-71-8	DICHLORODIFLUOROMETHANE	ug/m3	48 U	20 U	81 U	9.9 U	**2.3**
64-17-5	ETHANOL	ug/m3	180 U	76 U	310 U	38 U	**7.4**
100-41-4	ETHYLBENZENE	ug/m3	42 U	18 U	71 U	8.7 U	0.35 U
179601-23-1	M,P-XYLENES	ug/m3	42 U	18 U	71 U	**25**	**0.43**
78-93-3	METHYL ETHYL KETONE (2-BUTANONE)	ug/m3	110 U	48 U	190 U	24 U	0.94 U
108-10-1	METHYL ISOBUTYL KETONE	ug/m3	99 U	41 U	170 U	20 U	0.82 U
75-09-2	METHYLENE CHLORIDE	ug/m3	84 U	35 U	140 U	17 U	0.69 U
110-54-3	N-HEXANE	ug/m3	85 U	36 U	140 U	**31**	0.7 U
95-47-6	O-XYLENE (1,2-DIMETHYLBENZENE)	ug/m3	42 U	18 U	71 U	8.7 U	0.35 U
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/m3	**8300**	**3600**	**20000**	**980**	0.54 U
108-88-3	TOLUENE	ug/m3	55 U	23 U	92 U	11 U	**0.85**
75-69-4	TRICHLOROFLUOROMETHANE	ug/m3	54 U	23 U	92 U	11 U	**1.2**

Notes:
U - compound not detected. Detection limit posted.
J - estimated concentration below the contract requred detection limit.
Detected concentrations shown in bold font.

Table 4A
Remaining Soil Vapor Exceedances from 2013-2014 Heating Season
Bestway Cleaners
Buffalo, NY

			Structure No. 4				Structure No. 3	
					Dup of 354Y-SS			
NYSDEC-Bestway Cleaners		Location ID:	354Y-IA	354Y-SS	354Y-SS	AA	360E-IA	360E-SS
2013 Site Investigation		Sample ID:	354Y-IA-031714	354Y-SS-031714	SSD-031714	AA-031714	360E-IA-031714	360E-SS-031714
Validated Air Analytical Data		Lab Sample Id:	140-1082-1	140-1082-2	140-1082-3	140-1082-4	140-1082-5	140-1082-6
		Source:	TALKNX	TALKNX	TALKNX	TALKNX	TALKNX	TALKNX
		SDG:	14010821	14010821	14010821	14010821	14010821	14010821
		Matrix:	AIR	AIR	AIR	AIR	AIR	AIR
		Sampled:	3/18/2014 13:00	3/18/2014 13:00	3/18/2014 0:00	3/18/2014 12:59	3/18/2014 11:00	3/18/2014 11:00
		Validated:	5/27/2014	5/27/2014	5/27/2014	5/27/2014	5/27/2014	5/27/2014
CAS NO.	COMPOUND	UNITS:						
	VOLATILES							
71-55-6	1,1,1-TRICHLOROETHANE	ug/m3	0.44 U	4.4 U	4.4 U	0.44 U	0.44 U	22 U
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	**0.64**	6.1 U	6.1 U	0.61 U	0.61 U	31 U
95-63-6	1,2,4-TRIMETHYLBENZENE	ug/m3	**0.91**	3.9 U	3.9 U	**0.52**	**0.55**	20 U
108-67-8	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	ug/m3	0.39 U	3.9 U	3.9 U	0.39 U	0.39 U	20 U
71-43-2	BENZENE	ug/m3	**1.1**	2.6 U	2.6 U	**0.84**	**0.73**	13 U
56-23-5	CARBON TETRACHLORIDE	ug/m3	**0.48**	2.5 U	2.5 U	**0.37**	**0.4**	13 U
74-87-3	CHLOROMETHANE	ug/m3	**1.4**	4.1 U	4.1 U	**1.3**	**1.2**	21 U
110-82-7	CYCLOHEXANE	ug/m3	0.69 U	6.9 U	6.9 U	0.69 U	0.69 U	34 U
75-71-8	DICHLORODIFLUOROMETHANE	ug/m3	**0.54**	4 U	4 U	**0.51**	**0.55**	20 U
64-17-5	ETHANOL	ug/m3	**150**	15 U	15 U	**12**	**36**	75 U
100-41-4	ETHYLBENZENE	ug/m3	**0.38**	3.5 U	3.5 U	0.35 U	0.35 U	17 U
179601-23-1	M,P-XYLENES	ug/m3	**1.2**	3.5 U	3.5 U	**0.81**	**0.74**	17 U
78-93-3	METHYL ETHYL KETONE (2-BUTANONE)	ug/m3	**1**	9.4 U	9.4 U	0.94 U	**4.1**	47 U
108-10-1	METHYL ISOBUTYL KETONE	ug/m3	0.82 U	8.2 U	**8.8**	0.82 U	**1.5**	41 U
75-09-2	METHYLENE CHLORIDE	ug/m3	0.69 U	6.9 U	6.9 U	0.69 U	0.69 U	35 U
110-54-3	N-HEXANE	ug/m3	**0.88**	7 U	7 U	0.7 U	**0.7**	35 U
95-47-6	O-XYLENE (1,2-DIMETHYLBENZENE)	ug/m3	**0.45**	3.5 U	3.5 U	0.35 U	0.35 U	17 U
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/m3	**2.5**	**710**	**750**	**0.68**	**3.2**	**1500**
108-88-3	TOLUENE	ug/m3	**7.3**	4.5 U	4.5 U	**1.3**	**2.2**	23 U
75-69-4	TRICHLOROFLUOROMETHANE	ug/m3	**1.1**	4.5 U	4.5 U	**1**	**1.2**	22 U

Notes:
U - compound not detected. Detection limit posted.
J - estimated concentration below the contract requred detection limit.
Detected concentrations shown in bold font.

Table 4A
Remaining Soil Vapor Exceedances from 2013-2014 Heating Season
Bestway Cleaners
Buffalo, NY

			Structure No. 2			Structure No. 1		
							Dup of 387E-IA	
NYSDEC-Bestway Cleaners		Location ID:	383E-IA	383E-SS	AA	387E-IA	387E-IA	387E-SS
2013 Site Investigation		Sample ID:	383E-IA-031814	383E-SS-031814	AA-031814	387E-IA-031714	IAD-031714	387E-SS-031714
Validated Air Analytical Data		Lab Sample Id:	140-1089-4	140-1089-5	140-1089-6	140-1089-1	140-1089-3	140-1089-2
		Source:	TALKNX	TALKNX	TALKNX	TALKNX	TALKNX	TALKNX
		SDG:	14010891	14010891	14010891	14010891	14010891	14010891
		Matrix:	AIR	AIR	AIR	AIR	AIR	AIR
		Sampled:	3/19/2014 14:53	3/19/2014 14:53	3/19/2014 14:53	3/18/2014 14:52	3/18/2014 0:00	3/18/2014 14:52
		Validated:	5/27/2014	5/27/2014	5/27/2014	5/27/2014	5/27/2014	5/27/2014
CAS NO.	COMPOUND	UNITS:						
	VOLATILES							
71-55-6	1,1,1-TRICHLOROETHANE	ug/m3	0.44 U	**2.1**	0.44 U	0.44 U	0.44 U	**8.5**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U
95-63-6	1,2,4-TRIMETHYLBENZENE	ug/m3	**3.5**	**0.81**	**0.66**	**0.49**	**0.77**	**0.76**
108-67-8	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	ug/m3	**0.75**	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
71-43-2	BENZENE	ug/m3	**2.6**	0.26 U	**1.1**	**0.66**	**0.79**	0.26 U
56-23-5	CARBON TETRACHLORIDE	ug/m3	**0.5**	0.25 U	**0.54**	**0.43**	**0.52**	0.25 U
74-87-3	CHLOROMETHANE	ug/m3	**1.1**	0.41 U	**0.86**	**1**	**0.94**	**0.69**
110-82-7	CYCLOHEXANE	ug/m3	0.69 U	0.69 U	0.69 U	0.69 U	0.69 U	0.69 U
75-71-8	DICHLORODIFLUOROMETHANE	ug/m3	**2**	**1.7**	**2.2**	**2**	**2.2**	**1.7**
64-17-5	ETHANOL	ug/m3	**25**	**1.6**	**16**	**110**	**120**	**3.2**
100-41-4	ETHYLBENZENE	ug/m3	**2.2**	0.35 U	**0.37**	0.35 U	0.35 U	0.35 U
179601-23-1	M,P-XYLENES	ug/m3	**9.4**	**0.62**	**1.4**	**0.94**	**1.5**	**1.2**
78-93-3	METHYL ETHYL KETONE (2-BUTANONE)	ug/m3	0.94 U	0.94 U	0.94 U	0.94 U	0.94 U	0.94 U
108-10-1	METHYL ISOBUTYL KETONE	ug/m3	0.82 UJ	0.82 UJ	0.82 UJ	**3.1** J-	**1.8** J-	0.82 UJ
75-09-2	METHYLENE CHLORIDE	ug/m3	0.69 U	0.69 U	0.69 U	**2.7**	**3.2**	0.69 U
110-54-3	N-HEXANE	ug/m3	**4.4** J-	0.7 UJ	0.79 J-	0.7 UJ	0.7 UJ	0.7 UJ
95-47-6	O-XYLENE (1,2-DIMETHYLBENZENE)	ug/m3	**3**	0.35 U	**0.53**	**0.35**	**0.46**	**0.38**
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/m3	**1.3**	**33**	**0.67**	**3.7**	**4.5**	**8.3**
108-88-3	TOLUENE	ug/m3	**10**	**0.81**	**2.2**	**1.7**	**1.9**	**0.93**
75-69-4	TRICHLOROFLUOROMETHANE	ug/m3	**1.4**	**1.3**	**1.5**	**1.3**	**1.5**	**1.1**

Notes:
U - compound not detected. Detection limit posted.
J - estimated concentration below the contract requred detection limit.
Detected concentrations shown in bold font.

Table 4A
Remaining Soil Vapor Exceedances from 2013-2014 Heating Season
Bestway Cleaners
Buffalo, NY

NYSDEC-Bestway Cleaners 2013 Site Investigation Validated Air Analytical Data		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	FIELDQC TB-031714 140-1106-7 TALKNX 14011061 AIR 3/17/2014 0:00 5/27/2014	FIELDQC TB-032014 140-1106-6 TALKNX 14011061 AIR 3/20/2014 0:00 5/27/2014
CAS NO.	COMPOUND	UNITS:		
	VOLATILES			
71-55-6	1,1,1-TRICHLOROETHANE	ug/m3	0.44 U	0.44 U
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	0.61 U	0.61 U
95-63-6	1,2,4-TRIMETHYLBENZENE	ug/m3	0.39 U	0.39 U
108-67-8	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	ug/m3	0.39 U	0.39 U
71-43-2	BENZENE	ug/m3	0.26 U	0.26 U
56-23-5	CARBON TETRACHLORIDE	ug/m3	0.25 U	0.25 U
74-87-3	CHLOROMETHANE	ug/m3	0.41 U	0.41 U
110-82-7	CYCLOHEXANE	ug/m3	0.69 U	0.69 U
75-71-8	DICHLORODIFLUOROMETHANE	ug/m3	0.4 U	0.4 U
64-17-5	ETHANOL	ug/m3	1.5 U	1.5 U
100-41-4	ETHYLBENZENE	ug/m3	0.35 U	0.35 U
179601-23-1	M,P-XYLENES	ug/m3	0.35 U	0.35 U
78-93-3	METHYL ETHYL KETONE (2-BUTANONE)	ug/m3	0.94 U	0.94 U
108-10-1	METHYL ISOBUTYL KETONE	ug/m3	0.82 U	0.82 U
75-09-2	METHYLENE CHLORIDE	ug/m3	0.69 U	0.69 U
110-54-3	N-HEXANE	ug/m3	0.7 U	0.7 U
95-47-6	O-XYLENE (1,2-DIMETHYLBENZENE)	ug/m3	0.35 U	0.35 U
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/m3	0.54 U	0.71
108-88-3	TOLUENE	ug/m3	0.45 U	0.45 U
75-69-4	TRICHLOROFLUOROMETHANE	ug/m3	0.45 U	0.45 U

Notes:
U - compound not detected. Detection limit posted.
J - estimated concentration below the contract requred detection limit.
Detected concentrations shown in bold font.

Table 4B - Air Analytical
Summary Method TO-15
February-March, 2016
Bestway Cleaners
2075 Seneca Street
Buffalo, New York
NYSDEC Site #915219

Sample ID		H001SS	H001ID	H001OD	H002SS	H002ID	H002OD	H002IDD	H003SS	H003ID	H003CR
Sample Location		Basement	Basement	Backyard	Basement	Basement	Backyard	Basement	Basement	Basement	Basement
Sample Type		Sub Slab	Indoor	Outdoor	Sub Slab	Indoor	Outdoor	Indoor (DUP)	Sub Slab	Indoor	Indoor
Sample Pickup Date		2/10/2016	2/10/2016	2/10/2016	2/10/2016	2/10/2016	2/10/2016	2/10/2016	2/10/2016	2/10/2016	2/10/2016
CAS #	COMPOUND (µg/m^3)										
71-55-6	1,1,1-Trichloroethane	4.6	ND	ND	0.47	ND	ND	ND	2.4	ND	ND
79-34-5	1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
79-00-5	1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
76-13-1	1,1,2-Trichlorotrifluoroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
75-34-3	1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
75-35-4	1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
120-82-1	1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	3.5	ND	ND
95-63-6	1,2,4-Trimethylbenzene	ND	0.86	ND	2.3	ND	ND	ND	ND	ND	ND
106-93-4	1,2-Dibromoethane (EDB)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
95-50-1	1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
107-06-2	1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
78-87-5	1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
108-67-8	1,3,5-Trimethylbenzene	ND	ND	ND	0.7	ND	ND	ND	0.80	ND	ND
541-73-1	1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
106-46-7	1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
123-91-1	1,4-Dioxane	ND	ND	ND	ND	ND	ND	3.6	ND	ND	ND
540-84-1	2,2,4-Trimethylpentane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
78-93-3	2-Butanone (MEK)	ND	1.2	ND	20	1.3	ND	1.0	3.5	1.4	0.97
108-10-1	4-Methyl-2-pentanone (MIBK)	4.4	4.0	ND	7.7	ND	4.4	1.2	11	2.3	ND
71-43-2	Benzene	ND	0.47	0.40	4.9	0.64	0.88	0.68	0.57	0.70	0.47
100-44-7	Benzyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
75-27-4	Bromodichloromethane	ND	ND	ND	0.75	ND	ND	ND	ND	ND	ND
75-25-2	Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
74-83-9	Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
56-23-5	Carbon tetrachloride	ND	0.46	0.40	0.37	0.49	0.38	0.51	ND	0.50	0.39
108-90-7	Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.96	ND	ND
75-00-3	Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
67-66-3	Chloroform	ND	ND	ND	4.1	ND	ND	ND	2.9	ND	ND
74-87-3	Chloromethane	ND	0.84	0.86	0.69	1.0	0.98	0.87	ND	1.1	0.95
156-59-2	cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10061-01-5	cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
110-82-7	Cyclohexane	ND	ND	ND	26	ND	ND	ND	0.97	ND	ND
124-48-1	Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
75-71-8	Dichlorodifluoromethane	2.2	2.2	2.1	1.9	2.2	2.4	2.3	2	2.3	2.3
64-17-5	Ethanol	ND	64	ND	5.8	490 D	6.2	300D	9.4	520 D	60
100-41-4	Ethylbenzene	ND	ND	ND	2.5	ND	ND	ND	2.2	1	ND
87-68-3	Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
110-54-3	n-Hexane	ND	ND	ND	29	ND	ND	ND	0.91	ND	ND
1634-04-4	Methyl tert-butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
75-09-2	Methylene chloride	ND	0.75	ND	ND	ND	0.72	0.92	ND	1.3	ND
136777-61-2	m-Xylene & p-Xylene	4.6	0.57	ND	8.6	0.71	0.47	0.87	7.2	4	0.4
95-47-6	o-Xylene	1.8	ND	ND	2.8	ND	ND	ND	2.7	0.89	ND
100-42-5	Styrene	ND	ND	ND	0.96	ND	ND	ND	3	ND	ND
75-65-0	tert-Butyl alcohol	ND	ND	ND	2.4	ND	ND	ND	ND	ND	ND
127-18-4	Tetrachloroethene	310	ND	ND	200 D	1.1	ND	1.4	2.3	ND	ND
108-88-3	Toluene	17	1.0	ND	41	1.2	0.77	1.3	20	1.3	0.5
156-60-5	trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	6.0	ND
10061-02-6	trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
79-01-6	Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	1.4	ND
75-69-4	Trichlorofluoromethane	ND	1.3	1.2	1.3	1.4	1.3	1.5	1.2	1.5	1.4
75-01-4	Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = not detected at or above laboratory Reporting Limit.
µg/m^3 = micrograms per cubic meter
D = Results are from dilution and re-analysis. Initial detected value was outside calibration range.

Table 4B - Air Analytical
Summary Method TO-15
February-March, 2016
Bestway Cleaners
2075 Seneca Street
Buffalo, New York
NYSDEC Site #915219

Sample ID		H003OD	H004SS	H004ID	H004OD	H004SSD	H005SS	H005ID	H005OD	H006SS	H006ID	H006OD
Sample Location		Backyard	Basement	Basement	Backyard	Basement	Basement	Basement	Backyard	Storage Area	Storage Area	Backyard
Sample Type		Outdoor	Sub Slab	Indoor	Outdoor	Sub Slab (DUP)	Sub Slab	Indoor	Outdoor	Sub Slab	Indoor	Outdoor
Sample Pickup Date		2/10/2016	2/18/2016	2/18/2016	2/18/2016	2/18/2016	3/30/2016	3/30/2016	3/30/2016	3/30/2016	3/30/2016	3/30/2016
CAS #	COMPOUND (µg/m^3)											
71-55-6	1,1,1-Trichloroethane	ND	9.2	ND	ND	9.6	ND	ND	ND	ND	ND	ND
79-34-5	1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
79-00-5	1,1,2-Trichloroethane	ND	ND	ND	ND	0.81	ND	ND	ND	ND	ND	ND
76-13-1	1,1,2-Trichlorotrifluoroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
75-34-3	1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
75-35-4	1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
120-82-1	1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
95-63-6	1,2,4-Trimethylbenzene	ND	1.6	0.63	0.55	1.5	2.3	ND	ND	3.4	5.1	ND
106-93-4	1,2-Dibromoethane (EDB)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
95-50-1	1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
107-06-2	1,2-Dichloroethane	ND	ND	ND	ND	1.5	ND	ND	ND	ND	ND	ND
78-87-5	1,2-Dichloropropane	ND	ND	ND	ND	0.88	ND	ND	ND	ND	ND	ND
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
108-67-8	1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
541-73-1	1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
106-46-7	1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
123-91-1	1,4-Dioxane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
540-84-1	2,2,4-Trimethylpentane	ND	ND	ND	ND	ND	ND	ND	ND	ND	32	ND
78-93-3	2-Butanone (MEK)	ND	1.1	5.2	ND	1.3	8.8	15	ND	ND	ND	ND
108-10-1	4-Methyl-2-pentanone (MIBK)	3.1	3.0	1.4	ND	2.8	30	12	48	19	39	3.9
71-43-2	Benzene	0.45	0.34	ND	1.1	0.34	1.7	0.70	0.46	8.5	11	0.58
100-44-7	Benzyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
75-27-4	Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
75-25-2	Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
74-83-9	Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
56-23-5	Carbon tetrachloride	0.45	0.33	0.46	0.41	2.2	ND	0.52	0.42	ND	ND	0.41
108-90-7	Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	2.4	ND	ND
75-00-3	Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
67-66-3	Chloroform	ND	0.42	ND	ND	1.5	ND	ND	ND	ND	ND	ND
74-87-3	Chloromethane	0.94	ND	0.84	0.92	ND	ND	1.3	1.3	ND	4.3	1.6
156-59-2	cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10061-01-5	cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
110-82-7	Cyclohexane	ND	1.5	ND	ND	1.7	ND	ND	ND	19	ND	ND
124-48-1	Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
75-71-8	Dichlorodifluoromethane	2.3	1.7	2.2	2.3	1.8	2.7	2.6	2.4	2.6	2.6	2.6
64-17-5	Ethanol	ND	5.6	57	11	ND	ND	100	7.7	36	150	12
100-41-4	Ethylbenzene	ND	0.65	0.62	0.48	0.64	3.6	0.39	ND	5.5	10	ND
87-68-3	Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
110-54-3	n-Hexane	ND	ND	2.8	1.1	ND	3.6	ND	ND	33	18	ND
1634-04-4	Methyl tert-butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
75-09-2	Methylene chloride	0.73	0.91	6.3	ND	0.73	ND	0.93	0.8	ND	ND	0.93
136777-61-2	m-Xylene & p-Xylene	ND	2.6	2.1	1.7	2.6	12	1.1	0.5	20	37	0.73
95-47-6	o-Xylene	ND	0.92	0.75	0.61	0.89	3.9	0.38	ND	6.3	11	ND
100-42-5	Styrene	ND	0.59	ND	ND	0.58	ND	ND	ND	ND	ND	ND
75-65-0	tert-Butyl alcohol	ND	ND	ND	ND	ND	ND	2.1	ND	ND	ND	ND
127-18-4	Tetrachloroethene	ND	1.9	ND	0.85	6.4	58	ND	ND	21	ND	ND
108-88-3	Toluene	0.45	10	4.9	2.5	11	190	2.5	1.4	170	78	6.0
156-60-5	trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10061-02-6	trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
79-01-6	Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
75-69-4	Trichlorofluoromethane	1.3	0.97	1.5	1.3	1	ND	1.2	1.2	ND	ND	1.2
75-01-4	Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = not detected at or above laboratory Reporting Limit.
µg/m^3 = micrograms per cubic meter
D = Results are from dilution and re-analysis. Initial detected value was outside calibration range.

APPENDIX A

LIST OF SITE CONTACTS

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

Name	Phone/Email Address
Property Owner - Chuck Orlando	Cvo978@hotmail.com 2075 Seneca Street, Buffalo, NY 14210
Remedial Party Project Manager Sara Weishaupt - Parsons	315-552-9681 Sara.Weishaupt@Parsons.com
Project Engineer Michael Broschart - Parsons	315-552-9725 Michael.Broschart@Parsons.com
Brianna Scharf – NYSDEC DER	518-402-9813 Brianna.scharf@dec.ny.gov
Eamonn O'Neill - NYSDOH	518-402-7860 beei@health.ny.gov

APPENDIX B

RESPONSIBILITIES OF OWNER AND REMEDIAL PARTY

Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for the Bestway Cleaners site (the "site"), number 915219, are divided between the site owner(s) and a Remedial Party, as defined below. The owner(s) is/are currently listed as:

Bestway Cleaners, Inc., Chuck Orlando (2075 Seneca Street, Buffalo, NY 14210) (the "owner").

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

NYSDEC, Division of Environmental Remediation (DER), Brianna Scharf, 625 Broadway, 12th Floor, Albany, NY 12233

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 an Environmental Easement remain in place and continue to be complied with. The owner shall provide a written certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the site's Periodic Review Report (PRR) certification to the NYSDEC.
3) In the event the site is delisted, the owner remains bound by the Environmental Easement and shall submit, upon request by the NYSDEC, a written certification that the Environmental Easement is still in place and has been complied with.
4) The owner shall grant access to the site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.
5) The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. If damage to the remedial components or vandalism is evident, the owner shall notify the site's RP and the NYSDEC in accordance with the timeframes indicated in Section 1.3 - Notifications.

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

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

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

9) Until such time as the NYSDEC deems the vapor mitigation system unnecessary, the owner shall operate the system, pay for the utilities for the system's operation, and report any maintenance issues to the RP and the NYSDEC.

10) 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 (Occupational Safety and Health Administration) 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.

APPENDIX C

ENVIRONMENTAL EASEMENT

The Environmental Easement is being drafted and will be included in the site management plan as an addendum.

APPENDIX D

MONITORING WELL BORING AND CONSTRUCTION LOGS

Contractor: GeoLogic
Driller: Scott
Oversight: Bill Simons
Rig Type: Drill Rig

PARSONS
DRILLING RECORD

PROJECT NAME: NYSDEC Bestway Cleaners
PROJECT Location: Buffalo, NY

BORING/ WELL NO. MW-9R
Location Description: Geary Street

GROUNDWATER OBSERVATIONS			
Apparent Borehole DTW:		10	ft bls
Measured Water Level:		NA	ft bls
Total Depth of Boring:		19	ft bls
Additional Comments:			

Date/Time Start: November 7, 2013
Date/Time Finish: November 7, 2013

Location Plan

Sample Type	SPT	Recovery	PID	USCS Symbol	Depth (ft bls)	FIELD IDENTIFICATION OF MATERIAL
HC					0	0-0.5ft-Asphalt
HC					1	0-.5-1.75ft-Sandy gravel subbase
HC					2	1.75-2.5ft-Moist, brown, SILT and SAND, trace gravel, ash and cinders, fill
HC					3	2.5-5ft- Brown, moist, CLAY and SILT
HC					4	
SS	1-2-2-3	12"	0	SP	5	Moist, gray-brown, fine to medium grain SAND and GRAVEL. Till.
					6	
SS	3-6-4-3	12"	0	SP	7	Moist, gray-brown, fine to medium grain SAND and GRAVEL. Till.
					8	
SS	2-3-2-2	6"	0	SP	9	Moist, gray-brown, fine to medium grain SAND and GRAVEL. Till.
					10	
SS	4-5-4-4	12"	0	SP	11	Wet, gray-brown, fine to medium grain SAND and GRAVEL. Till.
					12	
SS	3-2-5-2	6"	0	SP	13	Wet, gray-brown, fine to medium grain SAND and GRAVEL. Till.
					14	
SS	3-2-1-2	6"	0	SP/CL	15	0-12"-Wet, gray-brown, fine to medium grain SAND and GRAVEL. Till. 12-24" - Wet, gray, CLAY, plastic
					16	
SS	3-2-3-3	18"	0		17	NA
					18	
					19	End of Boring
					20	

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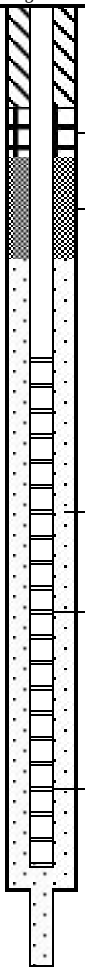

COMMENTS

SAMPLING METHOD
HC = Hand Cleared (post hole)
SS= Split Spoon
MC=Macrocore

COMMENTS:

PARSONS

DRILLING RECORD

BORING/ WELL NO. MW-111 Page 1 of 1

Contractor: GeoLogic
Driller: Scott
Oversight: Bill Simons
Rig Type: Drill Rig

PROJECT NAME: NYSDEC Bestway Cleaners
PROJECT Location: Buffalo, NY

Location Description: Yale Place

GROUNDWATER OBSERVATIONS			
Apparent Borehole DTW:		10	ft bls
Measured Water Level:		NA	ft bls
Total Depth of Boring:		17	ft bls
Additional Comments:			

Date/Time Start: November 6, 2013
Date/Time Finish: November 6, 2013

Location Plan

Sample Type	SPT	Recovery	PID	USCS Symbol	Depth (ft bls)	FIELD IDENTIFICATION OF MATERIAL
HC					0	0-01 ft-Asphalt
HC					1	1-1.5 ft-Concrete
HC					2	1.5-5 ft-Dry, gray-brown, CLAY and SAND, trace concrete, cobbles, cinders and coal. Fill
HC					3	
HC					4	
SS	2-4-3-2	12"	0	CL	5	Dry, gray-brown, CLAY and SAND, trace concrete, cobbles, cinders and coal. Fill
					6	
SS	1-1-1-1	12"	0	CL	7	Dry, gray-brown, CLAY and SAND, trace concrete, cobbles, cinders and coal. Fill
					8	
SS	1-1-1-WH	18"	0	SM	9	0-6"-Dry, gray-brown, CLAY and SAND, trace concrete, cobbles, cinders and coal. Fill.
					10	6-24"-Moist, soft, brown, mottled orange-gray, SILT and CLAY
SS	WH-WH-WH-3	12"	0	SM	11	0-8"-Moist, soft, brown, mottled orange-gray, SILT and CLAY 8-24"-Wet, gray-brown, fine to medium SAND and SILT
					12	
SS	6-7-11-10	12"	0	GM	13	Wet, brown-gray, GRAVEL and SAND. Till
					14	
SS			0	CL	15	Wet, gray, CLAY and some silt, plastic.
					16	
					17	End of Boring
					18	
					19	
					20	

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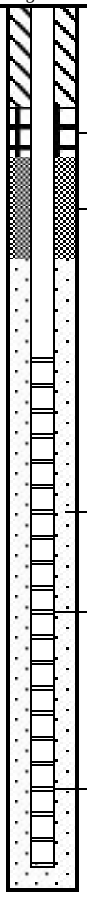

COMMENTS

SAMPLING METHOD

HC = Hand Cleared (post hole)
SS= Split Spoon
MC=Macrocore

COMMENTS:

PARSONS

DRILLING RECORD

BORING/ WELL NO. MW-112 Page 1 of 1

Contractor GeoLogic
Driller: Scott
Oversight: Bill Simons
Rig Type: Drill Rig

PROJECT NAME: NYSDEC Bestway Cleaners
PROJECT Location: Buffalo, NY

Location Description: North Legion Drive

GROUNDWATER OBSERVATIONS			
Apparent Borehole DTW:		9	ft bls
Measured Water Level:		NA	ft bls
Total Depth of Boring:		17	ft bls
Additional Comments:			

Date/Time Start: November 6, 2013
Date/Time Finish: November 6, 2013

Location Plan

Sample Type	SPT	Recovery	PID	USCS Symbol	Depth (ft bls)	FIELD IDENTIFICATION OF MATERIAL
HC					0	0-0.5ft-Asphalt
					1	0.5-1.25ft-Concrete
					2	1.25-5ft-Dry, brown-gray, CLAY and SILT, some sand, trace gravel, fill debris
					3	
					4	
SS	1-2-2-4	12"	0	CL	5	Moist, gray-brown, CLAY and SILT, trace sand, plastic
					6	
SS	4-3-2-2	18"	0	SM	7	0-6"-Moist, gray-brown, CLAY and SILT, trace sand, plastic 6-18"-Moist, dark brown-gray, SAND and SILT, some gravel, organic debris
					8	
SS	1-1-1-1	6"	0	CL	9	Moist, gray-brown, CLAY and SILT, plastic
					10	
SS	WH-3-3-2	12"	0	GM	11	0-6"-Moist, gray-brown, CLAY and SILT, plastic 6-24"-Wet, gray-brown, GRAVEL and CLAY, some silt, trace wood debris
					12	
SS	4-7-3-2	18"	0	GM	13	0-3"-Wet, gray-brown, GRAVEL and CLAY, some silt, trace wood debris 3-24"-Wet, brown-gray, CLAY and SILT, plastic
					14	
SS	1-1-1-1	24"	0	CL	15	Wet, brown-gray, CLAY and SILT, plastic
					16	
					17	End of Boring
					18	
					19	
					20	

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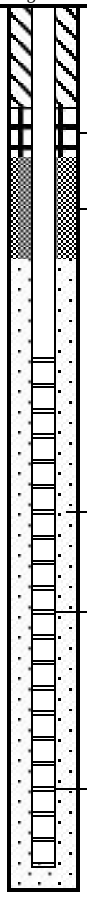

COMMENTS

SAMPLING METHOD

HC = Hand Cleared (post hole)
SS= Split Spoon
MC=Macrocore

COMMENTS:

PARSONS

DRILLING RECORD

BORING/ WELL NO. MW-113 Page 1 of 1

Contractor GeoLogic
Driller: Scott
Oversight: Bill Simons
Rig Type: Drill Rig

PROJECT NAME: NYSDEC Bestway Cleaners
PROJECT Location: Buffalo, NY

Location Description: Geary Street

GROUNDWATER OBSERVATIONS			
Apparent Borehole DTW:		11	ft bls
Measured Water Level:		NA	ft bls
Total Depth of Boring:		19	ft bls
Additional Comments:			

Date/Time Start: November 5, 2013
Date/Time Finish: November 5, 2013

Location Plan

Sample Type	SPT	Recovery	PID	USCS Symbol	Depth (ft bls)	FIELD IDENTIFICATION OF MATERIAL
HC					0	0-1.5 ft- Dry, dark brown, CLAY and SAND, some silt, fill debris
HC					1	0.5-5 ft-Moist, gray-brown, SILT and CLAY, some sand and gravel
HC					2	
HC					3	
HC					4	
SS	WH-WH-2-2	12"	0	CL	5	Moist, brown with gray mottling, CLAY and SILT, some sand, trace gravel
					6	
SS	2-3-2-3	12"	0	CL	7	Moist, brown with gray mottling, CLAY and SILT, some sand, trace gravel
					8	
SS	3-3-7-8	6"	0	CL	9	Moist, brown with gray mottling, CLAY and SILT, some sand, trace gravel
					10	
SS	4-6-7-8	6"	0	CL	11	Wet, brown with gray mottling, CLAY and SILT, some sand, trace gravel
					12	
SS	4-3-3-3	12"	0	SW	13	Wet, gray-brown, SAND and gravel, till
					14	
SS	1-1-1-1	12"	0	CL	15	Wet, brown-gray, CLAY, plastic
					16	
SS	1-2-3-3	24"	0	CL	17	Wet, brown-gray, CLAY, plastic, 1.5" fine to medium sand lens at 9".
					18	
					19	End of Boring
					20	

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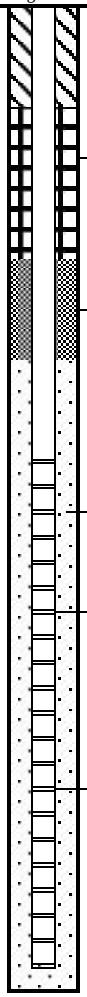

COMMENTS

SAMPLING METHOD

HC = Hand Cleared (post hole)
SS= Split Spoon
MC=Macrocore

COMMENTS:

PARSONS

DRILLING RECORD

BORING/ WELL NO. MW-114 Page 1 of 1

Contractor: GeoLogic
Driller: Scott
Oversight: Bill Simons
Rig Type: Drill Rig

PROJECT NAME: NYSDEC Bestway Cleaners
PROJECT Location: Buffalo, NY

Location Description: South Ryan Street

GROUNDWATER OBSERVATIONS			
Apparent Borehole DTW:		10.75	ft bls
Measured Water Level:		NA	ft bls
Total Depth of Boring:		17	ft bls
Additional Comments:			

Date/Time Start: November 11, 2013
Date/Time Finish: November 11, 2013

Location Plan

Sample Type	SPT	Recovery	PID	USCS Symbol	Depth (ft bls)	FIELD IDENTIFICATION OF MATERIAL
HC					0	0-5ft-Moist, gray-brown, SAND and CLAY, some concrete, brick, sinders, slag deb
HC					1	
HC					2	
HC					3	
HC					4	
SS	2-2-2-1	0	0	SM	5	No Recovery
					6	
SS	1-2-3-4	6"	0	SM	7	Moist, gray-brown, SAND and CLAY, some concrete, brick, sinders, slag debris.Fil
					8	
SS	2-2-1-2	6"	0	SM	9	Moist, gray-brown, SAND and SILT
					10	
SS	4-3-3-4	18"	0	SM	11	0-18"Wet, gray-brown, SAND and SILT 18-24"-Wet, gray, SAND, some gravel. Till
					12	
SS	6-6-4-5	12"	0	SW	13	Wet, gray, SAND, some gravel. Till
					14	
SS	8-4-2-2	6"	0	SW/CL	15	0-12"-Wet, gray, SAND, some gravel. Till 12-24"-Wet, gray, CLAY, plastic
					16	
					17	End of Boring
					18	
					19	
					20	

SCHEMATIC

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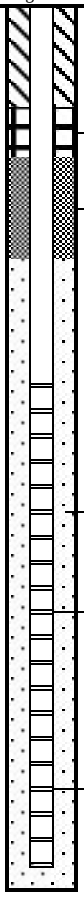


COMMENTS

SAMPLING METHOD

HC = Hand Cleared (post hole)
SS= Split Spoon
MC=Macrocore

COMMENTS:

Contractor: GeoLogic
Driller: Scott
Oversight: Bill Simons
Rig Type: Drill Rig

PARSONS
DRILLING RECORD

PROJECT NAME: NYSDEC Bestway Cleaners
PROJECT Location: Buffalo, NY

BORING/ WELL NO. MW-115
Location Description: South Ryan Street

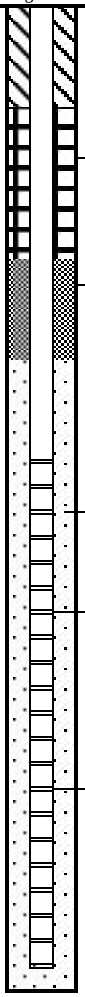
GROUNDWATER OBSERVATIONS			
Apparent Borehole DTW:		11	ft bls
Measured Water Level:		NA	ft bls
Total Depth of Boring:		19	ft bls
Additional Comments:			

Date/Time Start: November 8, 2013
Date/Time Finish: November 8, 2013

Location Plan

Sample Type	SPT	Recovery	PID	USCS Symbol	Depth (ft bls)	FIELD IDENTIFICATION OF MATERIAL
HC					0	0-5ft-Dry, black grading to dark gray, Sand and Gravel, some silt, trace concrete ceramic chips, ash and cinders. Fill
					1	
					2	
					3	
					4	
SS	WH-1-2-3	18"	0	SM	5	Moist, brown, SILT and CLAY
					6	
SS	4-4-3-4	18"	0	SM	7	Moist, brown, SILT and CLAY
					8	
SS	WH-1-2-2	18"	0	SM	9	Moist, brown, SILT and CLAY
					10	
SS	2-2-3-4	24"	0	SM	11	Moist, brown, mottled from 12-24", SILT and CLAY
					12	
SS	5-6-4-6	18"	0	SM	13	0-6"-Moist, brown, SILT and CLAY 6-24"-Wet, gray-brown, firm, SAND and SILT, some gravel. Till
					14	
SS	2-3-4-3	0	0		15	No Recovery
					16	
SS	2-3-2-1	18"	0	SM/CL	17	0-12"-Wet, gray-brown, firm, SAND and SILT, some gravel. Till. 12-24"- Wet, gray, Clay, plastic
					18	
					19	End of Boring
					20	

SCHEMATIC
Drawing Not to Scale



COMMENTS

SAMPLING METHOD
HC = Hand Cleared (post hole)
SS= Split Spoon
MC=Macrocore

COMMENTS:

PARSONS
DRILLING RECORD

BORING/ WELL NO. MW-118 Page 1 of 1

Contractor: GeoLogic
Driller: Scott
Oversight: Bill Simons
Rig Type: Drill Rig

PROJECT NAME: NYSDEC Bestway Cleaners
PROJECT Location: Buffalo, NY

Location Description: Yale Place southwest of site building.

GROUNDWATER OBSERVATIONS			
Apparent Borehole DTW:		10	ft bls
Measured Water Level:		NA	ft bls
Total Depth of Boring:		17	ft bls
Additional Comments:			

Date/Time Start: November 4, 2013
Date/Time Finish: November 4, 2013

Location Plan

Sample Type	SPT	Recovery	PID	USCS Symbol	Depth (ft bls)	FIELD IDENTIFICATION OF MATERIAL
HC					0	0-1 ft-Asphalt
					1	1-5 ft- Moist, brown-gray, CLAY and SILT, some sand, trace gravel, roots
					2	
					3	
					4	
SS	WH-WH-WH-2	18"	0	SM	5	Moist, brown-gray with gray mottling, SILT and CLAY, slightly plastic
					6	
SS	4-6-7-5	12"	0.1	SM	7	0-12"-Moist, brown-gray with gray mottling, SILT and CLAY, slightly plastic
					8	12-24"-Moist, gray-brown, SILT, trace sand and gravel grading to all sand and gravel, dark organic streaks. Till
SS	4-6-6-7	12"	0.5	SM	9	Moist, gray-brown, SILT, trace sand and gravel, grading to all sand and gravel, dark organic streaks. Till
					10	
SS	4-3-2-2	12"	0.8	SM	11	Moist, gray-brown, SILT, trace sand and gravel, grading to all sand and gravel, dark organic streaks. Till
					12	
SS	2-4-4-5	6"	0.2	SM	13	Moist, gray-brown, SILT, trace sand and gravel, grading to all sand and gravel, dark organic streaks. Till
					14	
SS	1-1-1-2	24"	0.1	CL	15	Wet, gray, CLAY, plastic
					16	
					17	End of Boring
					18	
					19	
					20	

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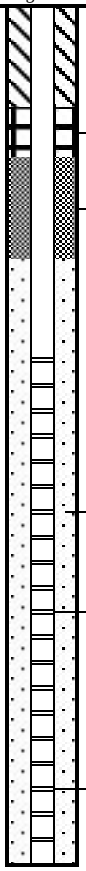

COMMENTS

SAMPLING METHOD
HC = Hand Cleared (post hole)
SS= Split Spoon
MC=Macrocore

COMMENTS:

Contractor GeoLogic
Driller: Steve Larame
Oversight: Dan Chamberland
Rig Type: Portable direct push

PARSONS
DRILLING RECORD

PROJECT NAME: NYSDEC Bestway Cleaners
PROJECT Location: Buffalo, NY

BORING/ WELL NO. B-1 Page 1 of 1
Location Description: Bestway Building

GROUNDWATER OBSERVATIONS			
Apparent Borehole DTW:		~7	ft bls
Measured Water Level:		NA	ft bls
Total Depth of Boring:		17	ft bls
Additional Comments:			

Date/Time Start: October 19. 2015
Date/Time Finish: October 19. 2015

Location Plan

Sample Type	SPT	Recovery	PID	USCS Symbol	Depth (ft bls)	FIELD IDENTIFICATION OF MATERIAL
HC					0	
HC					1	
HC			0.2		2	0-3.5 ft: Med to coarse sand with some fine gravel and little silt. Brown, dry, loose.
HC					3	
HC			0.3		4	3.5-5 ft: Fine to coarse sand with some Fine to med gravel. Trace silt. Light brown, dry, loose.
SS					5	5-7 ft: Fine to med sand with some fine gravel. Little silt. Brown to dark brown, dry med loose
			0.5		6	
SS			0.3		7	7-8.5 ft: Fine to med sand with some fine gravel. Little silt. Dark brown, Moist, med loose. 8.5-9 ft: Silt with little fine to med sand and little fine gravel. Dark brown, Moist, med soft.
			1.4		8	
SS					9	9-11 ft: Fine sand and silt with trace Fine gravel. Dark brown, wet, med soft. Light petroleum odor.
			24		10	
SS					11	11-13 ft: Fine sand with silt and trace fine gravel. Coarse sand band 12.1 to 12.3 ft. Dark brown, med soft, wet.
			31		12	
SS					13	13-15 ft: Fine sand with silt and trace fine gravel. Trace clay . wet, med stiff, grayish brown. Strong petroleum odor and a sheen along the macro core liner.
			267		14	
SS					15	15-17 ft: Fine sand and silt grading to Clayey silt. Wet, Med stiff, Grayish brown. Strong petroleum odor, sheen along macro core liner.
			113		16	
SS					17	17-19 ft: Clayey silt grading to Clay. Gray brown, Med stiff, wet.
			67		18	
			3.5		19	19-20 ft: Clay. Gray-brown, Med stiff, wet
					20	

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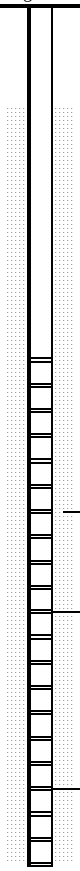

COMMENTS

SAMPLING METHOD
HC = Hand Cleared (post hole)
SS= Split Spoon
MC=Macrocore

COMMENTS:
Temporary well installed purged of three volumes and sampled.

APPENDIX E

EXCAVATION WORK PLAN TEMPLATE

APPENDIX E – EXCAVATION WORK PLAN (EWP) TEMPLATE

E-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination or breach or alter the site's cover system, the site owner or their representative will notify the New York State Department of Environmental Conservation (NYSDEC) contacts listed in the table below. Table 1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix A of the Site Management Plan (SMP).

Table 1: Notifications*

Brianna Scharf NYSDEC Project Manager	(518) 402-5987 Brianna.scharf@dec.ny.gov
Michael Cruden, PE NYSDEC Remediation Bureau E Director	(518) 402-9825 Michael.cruden@dec.ny.gov
Eamonn O'Neill NYSDOH Project Manager	(518) 402-7860 beei@health.ny.gov

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

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements, or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, any modifications of truck routes, and any work that may impact an engineering control.
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling.
- A schedule for the work, detailing the start and completion of all intrusive work.
- A summary of the applicable components of this Excavation Work Plan (EWP).
- A statement that the work will be performed in compliance with this EWP, 29 CFR 1910.120 and 29 CFR 1926 Subpart P.
- A copy of the contractor's health and safety plan (HASP), in electronic format.
- Identification of disposal facilities for potential waste streams.

- Identification of sources of any anticipated backfill, along with the required request to import form and all supporting documentation including, but not limited to, chemical testing results.

The NYSDEC project manager will review the notification and may impose additional requirements for the excavation that are not listed in this EWP.

E-2 SOIL/SEDIMENT SCREENING METHODS

Visual, olfactory, and instrument-based (e.g., photoionization detector) soil screening will be performed during all excavations into known or potentially contaminated material (remaining contamination) or a breach of the cover system. A qualified environmental professional (QEP) as defined in 6 NYCRR Part 375, a Professional Engineer (PE) who is licensed and registered in New York state, or a qualified person who directly reports to a PE who is licensed and registered in New York state will perform the screening. Soil/sediment 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.

Soils/sediments 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 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 E-6 and E-7 of this EWP, respectively.

E-3 SOIL/SEDIMENT STAGING METHODS

Soil/sediment 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.

E-4 MATERIALS EXCAVATION AND LOAD-OUT

A QEP as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York state, or a qualified person who directly reports to a PE who is licensed and registered in New York state will oversee all invasive work and the excavation and load-out of all excavated material.

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

The presence of utilities and easements on the site will be investigated by the QEP. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site. A site utility stakeout will be completed for all utilities prior to any ground intrusive activities at the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate federal, state, local, and New York State Department of Transportation (NYSDOT) requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site, as appropriate. The QEP 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/sediment tracking.

The QEP will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials. Material accumulated from the street cleaning and egress cleaning activities will be disposed off-site at a permitted landfill facility in accordance with all applicable federal, state, and local regulations.

E-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.
Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.
Truck transport routes are as follows: [describe route and provide map]. All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and considers: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.
Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.
Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.
Queuing of trucks will be performed on-site to minimize off-site disturbance. Off-site queuing will be prohibited.

E-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 off-site in a permitted facility in accordance with all federal, state, and local regulations. If disposal of material from this site is proposed for unregulated off-site disposal (i.e., clean soil/sediment removed for development purposes), a formal request with an associated plan will be made to the NYSDEC project manager. Unregulated off-site management of materials from this site will not occur without formal NYSDEC project manager approval.
Off-site disposal locations for excavated soils/sediments will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, (e.g., hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, construction and debris [C&D] debris recovery facility) Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include, but will not be limited to waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.
Non-hazardous historic fill and contaminated soils/sediments taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted Soil Cleanup Objections (SCOs) is prohibited from being taken to a New York State C&D debris recovery facility (6 NYCRR Subpart 360-15 registered or permitted facility).

E-7 MATERIALS REUSE ON-SITE

The QEP as defined in 6 NYCRR part 375 will ensure that procedures defined for materials reuse in the SMP are followed and that unacceptable material (i.e., contaminated) does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil/sediment, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.
Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the site use criteria presented in NYSDEC DER-10 Appendix 5 – Allowable Constituent Levels for Imported Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances [October 2020 or date of current version, whichever is later] guidance values. Approvals for modifications to the analytical parameters must be obtained from the NYSDEC project manager prior to the sampling event.
Soil/fill material for reuse on-site will be segregated and staged as described in Sections E-2 and E-3 of this EWP. The anticipated size and location of stockpiles will be provided in the 15-day notification to the NYSDEC project manager. Stockpile locations will be based on the location of site excavation activities and proximity to nearby site features. Material reuse on-site will comply with requirements of NYSDEC DER-10

Section 5.4(e)4. Any modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC project manager.

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

E-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 off-site at a permitted facility 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 State Pollutant Discharge Elimination System (SPDES) permit.

E-9 COVER SYSTEM RESTORATION

After the completion of sediment removal and any other invasive activities the cover system will be restored in a manner that complies with the Statement of Basis. The existing cover system is comprised of a minimum of 12 inches of clean sand (grain size less than ¾ inches) overlain by a minimum of 12 inches of fine gravel (grain size ½-inch to 4 inches). If the type of cover system changes from that which exists prior to the excavation 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 (PRR) and in an updated SMP.

E-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the QEP, as defined in 6 NYCRR Part 375, and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of five business days for review.

Material from industrial sites, spill sites, 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) and DER-10 Appendix 5 for ecological use. Soils that meet 'general' fill requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the site without prior approval by NYSDEC project manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1, 4-dioxane. 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.

E-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 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.

E-12 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. The NYSDEC project manager will be promptly notified of the discovery.
Sampling will be performed on product, sediment, and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (Target Analyte List [TAL] metals, Target Compound List [TCL] volatiles and semi-volatiles [including 1,4-dioxane], TCL pesticides and polychlorinated biphenyls (PCBs), and per- and polyfluoroalkyl substances [PFAS]), unless the site history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.
Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone within two hours 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.

E-13 COMMUNITY AIR MONITORING PLAN

This section should provide all details of the Community Air Monitoring Plan. Guidance can be obtained in Appendix 1A of DER-10, Generic Community Air Monitoring Plan. At a minimum, this section must include:

- Details of the perimeter air monitoring program.
- Action levels to be used.
- Air monitoring methods.
- Analytes measured and instrumentation to be used.

The following text should be included somewhere in this section:
A figure showing the location of air sampling stations based on generally prevailing wind conditions is shown in Figure [x]. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.
Exceedances of action levels listed in the Community Air Monitoring Plan (CAMP) will be reported to NYSDEC and New York State Department of Health (NYSDOH) Project Managers.

E-14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors on- and off-site. Specific odor control methods to be used on a routine basis will include [define elements]. 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/sediment stockpiles; and (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils/sediments. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils/sediments 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.

E-15 DUST CONTROL PLAN

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

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

- Dust suppression will be achieved using 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.

E-16 OTHER NUISANCES

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

APPENDIX F

SITE MANAGEMENT FORMS

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 I-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 G

FIELD ACTIVITIES PLAN

DRAFT
BESTWAY CLEANERS

FIELD ACTIVITIES PLAN (FAP)

Prepared For:

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

625 Broadway, 12th floor
Albany, NY 12233-7012

Prepared By:

PARSONS

301 Plainfield Road, Suite 330
Syracuse, New York 13212

FEBRUARY 2022

TABLE OF CONTENTS

LIST OF ATTACHMENTS

LIST OF ACRONYMS

Acronym	Definition
ASTM	American Society for Testing and Materials
ELAP	Environmental Laboratory Approval Program
FAP	Field Activity Plan
IAQ	indoor air quality
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
HASP	Health and Safety Plan
PID	photoionization detector
PSHEP	Parsons Safety, Health, and Environment Plan
QAPP	Quality Assurance Project Plan
USCS	Unified Soil Classification System
VOC	volatile organic compound

1.0 PROJECT DESCRIPTION

Parsons has developed this Field Activities Plan (FAP) to be used during implementation of field activities associated with the Bestway Cleaners Site (New York State Department of Environmental Conservation (NYSDEC) Site Number 915219).

The objective of this FAP is to outline methods and procedures that will allow consistency in investigatory field activities across a potentially broad range of specific project goals and objectives.

The methods and procedures described in this FAP have been prepared in accordance with the most recent and applicable NYSDEC and New York State Department of Health (NYSDOH) regulatory guidance and requirements.

Health and safety considerations and emergency procedures associated with this project is documented in the site-specific Parsons Safety, Health, and Environment Plan (PSHEP).

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2.0 ANTICIPATED FIELD ACTIVITIES

Field activities will include sampling and monitoring of environmental media including soil and air for the purpose of installing the remedial system and evaluating the effectiveness of the remedial action.

2.1 Soil Borings

Soil borings will be advanced to facilitate installation of soil vapor extraction points for the Sub-Slab Depressurization (SSD) System.

Depending on drilling conditions, soil borings may be advanced using direct-push or conventional hollow stem auger drilling methods.

2.1.1 Direct-Push Method

This drilling method is typically used to collect shallow overburden soils and create boreholes for temporary monitoring well installations or soil vapor sampling points. This method is advantageous in that it typically allows for the advancement of numerous borings in a relatively short period of time. The disadvantage of this method is that it is typically limited to shallow overburden soils (less than 50 feet below grade) which exhibit relatively low densities. When used, the following procedures will be followed by field personnel:

- Soil samples will be collected continuously from the ground surface to the bottom of the borings using 4-foot long, MacroCore™ samplers.
- Soil samples retrieved from the borehole will be described for: 1) percent recovery; 2) soil type; 3) color; 4) moisture content; 5) texture; 6) grain size and shape; 7) consistency; 8) evidence of staining or other chemically-related impacts; and 9) any other relevant observations. In addition, soil will be screened with a photoionization detector (PID) to allow evaluation of the bulk volatile organic concentration of each soil sample. Should compound-specific monitoring be required to meet project objectives or by the Health and Safety Plan (HASP), then this monitoring will be conducted using appropriate monitoring devices/meter (*i.e.* Drager® tubes, mercury vapor analyzer, 4-gas meter, etc.).
- Soils will be described in accordance with the Unified Soil Classification System (USCS). This descriptive information will be recorded on a soil boring log form. An example of the typical soil boring log form is provided in **Attachment A**.
- Samples for headspace screening will be collected. A representative portion of each soil sample will be placed in a re-sealable plastic (e.g., Ziploc®) bag filled approximately half full. The bag will be labeled with the boring number and interval sampled. After allowing the bagged soil to warm, the tip of the sample probe attached to the PID will be inserted into the bag to measure the headspace for organic vapors.
- Drilling equipment will be decontaminated between each boring.

2.1.2 Conventional Drill Rig Methods

Typical drilling methods used to collect shallow and deeper overburden soils and create boreholes for permanent monitoring well installations include:

- Hollow stem augers;
- Drive and wash or spin and wash flush joint casing;
- Fluid rotary methods (using potable water only);
- Roto-sonic; and
- Air rotary.

These drilling methods typically allow for the advancement of borings through most soil types including denser soils (e.g., glacial till), and when coupled with split spoon sampling conducted in accordance with American Society for Testing and Materials (ASTM) Method D1586, can provide geotechnical information. Soil samples will be collected continuously from the ground surface to the bottom of the borings. When hollow stem auger drilling is used, samples will be collected using 2-inch diameter split-barrel samplers in accordance with ASTM Method D1586.

- Soil samples retrieved from the borehole will be described for: 1) percent recovery; 2) soil type; 3) color; 4) moisture content; 5) density; 6) texture; 7) grain size and shape; 8) consistency; 9) evidence of staining or other chemically-related impacts; and 10) any other relevant observations. In addition, soil will be screened with a PID to allow evaluation of the bulk volatile organic concentration of each soil sample. Soils will be described in accordance with the USCS. This descriptive information will be recorded on a soil boring log form. An example of the typical soil boring log form is provided in **Attachment A**.
- Headspace screening samples will be collected. A representative portion of each soil sample will be placed in a re-sealable plastic (e.g., Ziploc®) bag filled approximately half full. The bag will be labeled with the boring number and interval sampled. After allowing the bagged soil to warm, the tip of the sample probe attached to the PID will be inserted into the bag to measure the headspace for organic vapors. No analytical samples will be submitted from the bag contents.
- Drilling equipment will be decontaminated between each boring.

2.2 Vapor Intrusion Sampling

Three (3) 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 air sample. Procedures for obtaining these air samples are described in this section. During 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 **Attachment B**.

2.2.1 Equipment and Supplies

- Hand drill with concrete bit;
- Teflon® tubing;
- Beeswax or permagum®;
- Vacuum pump or syringe;
- Sampling form;
- Inventory form;
- Camera;
- Caulk (if needed to seal hole following sample collection).

2.2.2 Sub-Slab Samples

2.2.2.1 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 two 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®.

2.2.2.2 Sub-Slab Vapor Sample Collection

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

- Purge the tubing using a vacuum pump or gas-tight syringe (~60 cc). Calculate the volume of air (volume = $\pi r^2 h$) in the tubing and purge one to three tubing volumes prior to sample collection at a rate no greater than 0.2 liter per minute (lpm).
- 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 a digital 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 digital vacuum gauge and connect the pre-calibrated flow controller to the canister.
    - Purging the tubing using a vacuum pump or gas-tight syringe (~60 cc). Calculate the volume of air (volume = $\pi r^2 h$) in the tubing and purge one to three tubing volumes prior to sample collection at a rate no greater than 0.2 lpm.
    - 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.
    - 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 a digital 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 **Attachment C**.

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 digital vacuum gauge from the canister and replace the protective brass plug.
- Seal (with caulk) 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 Environmental Laboratory Approval Program (ELAP)-certified laboratory. Detection limits for the analyzed compound list will be defined by the NYSDEC and NYSDOH prior to sample submittal and outlined in the Work Assignment Scoping Documents. For specific parameters identified by NYSDOH, where the selected parameters may have a higher detection limit (e.g., acetone), the higher detection limits will be designated by NYSDOH.
- 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.

2.2.3 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 volatile organic compounds (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. If potential indoor air sources are present, the sources should be removed and the sampling should be postponed for a period of time.

As part of the indoor air sampling it should be established establish whether the building has a positive or negative pressure with respect to outdoors. Smoke pens may be used to help with this assessment. This may be done immediately before and immediately after indoor air sampling, but not during sampling.

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. 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 a digital 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 digital 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 a digital 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 **Attachment D**.

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 digital 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 the analyzed compound list will be defined by the NYSDEC and NYSDOH prior to sample submittal and outlined in the Work Assignment Scoping Documents. For specific parameters identified by NYSDOH, where the selected parameters may have a higher detection limit (e.g., acetone), the higher detection limits will be designated by NYSDOH.
- 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.

2.2.4 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 a digital 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 digital 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 a digital 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 **Attachment E**.

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 digital 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 the analyzed compound list will be defined by the NYSDEC and NYSDOH prior to sample submittal and outlined in the Work Assignment Scoping Documents. For specific parameters identified by NYSDOH, where the selected parameters may have a higher detection limit (e.g., acetone), the higher detection limits will be designated by NYSDOH.
- 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.

2.3 Management Of Investigation-Derived Waste

Field activities will generate soil that will require proper management. Management of these materials will comply with DER-10.

2.3.1 Soils Generated From On-Site Activities

Drill cuttings and other soils generated on-site will be presumed to be contaminated in accordance with DER-10. Soils will be containerized and characterized for disposal. If the soil is considered characteristic hazardous waste, or a solid waste, it must be managed and disposed at a properly permitted treatment, storage or disposal facility.

2.3.2 IDW Container Management and Waste Characterization

IDW which requires further characterization and off-site disposal will be placed in New York State Department of Transportation-approved 55-gallon 17-H type drums (or other containers, such as covered roll-offs) and affixed with appropriate labeling. Liquid waste drums will be placed within secondary containment.

If the waste requires characterization, representative samples will be obtained of each waste type upon completion of waste generation and submitted to an analytical laboratory for analysis of the disposal facilities requirements. The IDW will be classified as hazardous or non-hazardous based on characterization results and will be disposed of in accordance with applicable federal, state, and local regulations.

ATTACHMENT A TEST BORING LOG/DRILLING RECORD

Contractor:	**PARSONS** **DRILLING RECORD**	**BORING/ WELL NO.** Page of
Driller:		**Location Description:**
Oversight:	**PROJECT NAME:**	
Rig Type:	**PROJECT Location:**	

GROUNDWATER OBSERVATIONS			
Apparent Borehole DTW:			ft bls
Measured Water Level:			ft (TOC)
Total Depth of Well:			ft bls
Additional Comments:			

Date/Time Start:
Date/Time Finish:

Location Plan

Sample Type	SPT	% Recovery	PID (ppm)	USCS Symbol	Depth (ft bls)	FIELD IDENTIFICATION OF MATERIAL	SCHEMATIC Drawing Not to Scale	COMMENTS

SAMPLING METHOD

HC = Hand Cleared (post hole)

SS= Split Spoon

COMMENTS:

ATTACHMENT B INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY

NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No._____

Purpose of Investigation_____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ___)

Interviewed: Y / N

Last Name: _____First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential	School	Commercial/Multi-use
Industrial	Church	Other: _____

If the property is residential, type? (Circle appropriate response)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other:_____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____

Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors_____ Building age_____

Is the building insulated? Y / N How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

_____

_____

_____

Airflow near source

_____

_____

_____

Outdoor air infiltration

_____

_____

_____

Infiltration into air ducts

_____

_____

_____

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

a. Above grade construction:	wood frame	concrete	stone	brick
b. Basement type:	full	crawlspace	slab	other _____
c. Basement floor:	concrete	dirt	stone	other _____
d. Basement floor:	uncovered	covered	covered with _____	
e. Concrete floor:	unsealed	sealed	sealed with _____	
f. Foundation walls:	poured	block	stone	other _____
g. Foundation walls:	unsealed	sealed	sealed with _____	
h. The basement is:	wet	damp	dry	moldy
i. The basement is:	finished	unfinished	partially finished	
j. Sump present?	Y / N			
k. Water in sump?	Y / N / not applicable			

Basement/Lowest level depth below grade: _____(feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

_____

_____

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation	Heat pump	Hot water baseboard	
Space Heaters	Stream radiation	Radiant floor	
Electric baseboard	Wood stove	Outdoor wood boiler	Other _____

The primary type of fuel used is:

Natural Gas	Fuel Oil	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: _____

Boiler/furnace located in:	Basement	Outdoors	Main Floor	Other_____
Air conditioning:	Central Air	Window units	Open Windows	None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

_____

_____

_____

_____

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level	**General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)**
Basement	_____
1st Floor	_____
2nd Floor	_____
3rd Floor	_____
4th Floor	_____

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage? Y / N

b. Does the garage have a separate heating unit? Y / N / NA

c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) Y / N / NA Please specify_____

d. Has the building ever had a fire? Y / N When?_____

e. Is a kerosene or unvented gas space heater present? Y / N Where? _____

f. Is there a workshop or hobby/craft area? Y / N Where & Type? _____

g. Is there smoking in the building? Y / N How frequently? _____

h. Have cleaning products been used recently? Y / N When & Type? _____

i. Have cosmetic products been used recently? Y / N When & Type? _____

j. Has painting/staining been done in the last 6 months? Y / N Where & When? _____

k. Is there new carpet, drapes or other textiles? Y / N Where & When? _____

l. Have air fresheners been used recently? Y / N When & Type? _____

m. Is there a kitchen exhaust fan? Y / N If yes, where vented?_____

n. Is there a bathroom exhaust fan? Y / N If yes, where vented?_____

o. Is there a clothes dryer? Y / N If yes, is it vented outside? Y / N

p. Has there been a pesticide application? Y / N When & Type?_____

Are there odors in the building? Y / N
If yes, please describe: _____

Do any of the building occupants use solvents at work? Y / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist

If yes, what types of solvents are used? _____

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly) No
Yes, use dry-cleaning infrequently (monthly or less) Unknown
Yes, work at a dry-cleaning service

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____
Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply:	Public Water	Drilled Well	Driven Well	Dug Well	Other: _____
Sewage Disposal:	Public Sewer	Septic Tank	Leach Field	Dry Well	Other: _____

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended: _____

b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel

c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N

11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:

First Floor:

12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.

13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo** Y / N

* Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)**
** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

ATTACHMENT C SUB-SLAB VAPOR (CANISTER) SAMPLE COLLECTION FIELD FORM

Sub-slab Vapor (Canister) Sample Collection Field Form

Project # _____ Consultant _____

Project Name _____ Collector _____

Sample ID _____

Vacuum gauge "zero" ("Hg) _____

Start Date/Time _____ Start Pressure ("Hg) _____

End Date/Time _____ End Pressure ("Hg) _____

Canister ID _____ End pressure > "zero"? _____

Flow controller ID _____ Sampling duration (intended) _____

Associated indoor air sample ID _____ Associated ambient air sample ID _____

Tubing type used _____ Length of tubing _____ cm Tubing volume _____ cc

Volume purged _____ cc @ _____ min 1 to 3 volumes purged @ < 200cc/min? _____

Weather Conditions at Start of Sampling:

Air temperature (^{o}F) _____ Rainfall _____ Wind direction _____

Barometric pressure _____ Wind speed (mph) _____

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

_____

_____

Indoor air temp (^{o}F) _____ Indoor relative humidity (%) _____

Building Survey and Chemical Inventory Form Completed? _____ Photograph IDs _____

Floor Plan showing sample location, HVAC equipment, indoor air sources, preferential pathways

Comments: _____

_____

_____

_____

_____

ATTACHMENT D INDOOR AIR (CANISTER) SAMPLE COLLECTION FIELD FORM

Indoor Air (Canister) Sample Collection Field Form

Project # _____ Consultant _____

Project Name _____ Collector _____

Sample ID _____

Vacuum gauge "zero" ("Hg) _____

Start Date/Time _____ Start Pressure ("Hg) _____

End Date/Time _____ End Pressure ("Hg) _____

Canister ID _____ End pressure > "zero"? _____

Flow controller ID _____ Sampling duration (intended) _____

Associated ambient air sample ID _____ Associated sub-slab vapor sample ID _____

Tubing type used _____ Length of tubing _____ cm Tubing volume _____ cc

Volume purged _____ cc @ _____ min 1 to 3 volumes purged @ < 200cc/min? _____

Weather Conditions at Start of Sampling:

Air temperature (^{o}F) _____ Rainfall _____ Wind direction _____

Barometric pressure _____ Relative humidity _____ Wind speed (mph) _____

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

Indoor air temp (^{o}F) _____ Indoor relative humidity (%) _____

Building Survey and Chemical Inventory Form Completed? _____ Photograph IDs _____

Floor Plan showing sample location, HVAC equipment, indoor air sources, preferential pathways

Comments: _____

ATTACHMENT E AMBIENT AIR (CANISTER) SAMPLE COLLECTION FIELD FORM

Ambient Air (Canister) Sample Collection Field Form

Project # _____ Consultant _____

Project Name _____ Collector _____

Sample ID _____

Vacuum gauge "zero" ("Hg) _____

Start Date/Time _____ Start Pressure ("Hg) _____

End Date/Time _____ End Pressure ("Hg) _____

Canister ID _____ End pressure > "zero"? _____

Flow controller ID _____ Sampling duration (intended) _____

Tubing type used _____ Length of tubing _____ cm Tubing volume _____ cc

Volume purged _____ cc @ _____ min 1 to 3 volumes purged @ < 200cc/min? _____

Weather Conditions at Start of Sampling:

Air temperature (^{o}F) _____ Rainfall _____ Wind direction _____

Barometric pressure _____ Relative humidity _____ Wind speed (mph) _____

Substantial changes in weather conditions during sampling or over the past 24 to 48 hrs:

Site Plan showing sample location, building(s) being sampled, building HVAC inlet, outdoor air sources, wind direction

Comments: _____

APPENDIX H

QUALITY ASSURANCE PROJECT PLAN

DRAFT
BESTWAY CLEANERS

QUALITY ASSURANCE PROJECT PLAN (QAPP)

NYSDEC SITE NUMBER 915219

Prepared For:

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

625 Broadway, 12th floor
Albany, NY 12233-7012

Prepared By:

PARSONS

301 Plainfield Road, Suite 330
Syracuse, New York 13212

FEBRUARY 2022

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LIST OF ACRONYMS

Acronym	Definition
ASTM	American Society for Testing and Materials
BFB	4-Bromofluorobenzene
ºC	Degrees Celsius
CAR	Corrective Action Request
CCB	continuing calibration blanks
CCS	contract compliance screening
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COC	Chain-of-Custody
CVOC	chlorinated volatile organic compound
DER	Division of Environmental Remediation
DFTPP	decafluorotriphenylphosphine
DL	detection limit
DOT	Department of Transportation
DQO	Data Quality Objective
DUSR	Data Usability Summary Report
EDD	Electronic Data Deliverable
EIMS	Environmental Information Management System
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectroscopy
ICB	initial calibration blanks
ICP	inductively coupled plasma
ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
LCS	Laboratory Control Sample
LIMS	Laboratory Information Management System
LPM	Laboratory Project Manager
MD	Matrix Duplicate
MDL	method detection limit
µg/L	microgram per liter

mg/kg	milligram per kilogram
mL	milliliter
MS	matrix spike
MSA	Method of Standard Additions
MSB	matrix spike blank
MS/MSD	matrix spike/matrix spike duplicate
MSD	matrix spike duplicate
NCM	Nonconformance Memo
NIST	National Institute of Standards and Technology
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity
PCB	polychlorinated biphenyl
PE	performance evaluation
PFAS	polyfluoroalkyl substances
PID	photoionization detector
PM	Project Manager
PPE	personal protective clothing
PRRL	Project Required Quantitation Limit
PQL	project quantitation limit
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAM	Quality Assurance Manual
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
%R	percent recovery
RL	Reporting Limit
RPD	Relative Percent Difference
RRF	relative response factors
SDG	Sample Delivery Group
SOP	Standard Operating Procedure
SOW	statement of work

SVOC	semivolatile organic compound
TCL	Target Compound List
TIC	tentatively identified compounds
TOGS	Technical and Operational Guidance Series
trans-1,2-DCE	trans-1,2-dichloroethene
USEPA	Unites States Environmental Protection Agency
VC	vinyl chloride
VOC	Volatile Organic Compound

1.0 PROJECT DESCRIPTION

This Quality Assurance Project Plan (QAPP) has been prepared to support activities and specifies the quality assurance/quality control (QA/QC) procedures for field and laboratory sampling and measurements for Site Management activities at the Bestway Cleaners site (New York State Department of Environmental Conservation (NYSDEC) Site Number 915219). The specific objectives of the QAPP are:

- Foster data quality that is sufficient to meet the investigation objectives and to support the decision-making process
- Provide a standard for control and review of measurement data to confirm that the data are scientifically sound, representative, comparable, defensible, and of known quality.

This QAPP has been prepared in accordance with Unites States Environmental Protection Agency (USEPA) guidance (USEPA, 2000, 2001, 2002) and NYSDEC guidance (NYSDEC, 2019).

2.0 DATA QUALITY OBJECTIVES AND DATA QUALITY CRITERIA

2.1 Introduction

Data Quality Objectives (DQOs) are based on the premise that different data uses require different levels of data quality. The term *data quality* refers to a degree of uncertainty with respect to Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity (PARCCS) data quality indicators. Specific objectives are established to develop sampling protocols and identify applicable documentation, sample handling procedures, and measurement system procedures. These DQOs are established by onsite conditions, objectives of the project, and knowledge of available measurement systems. A wide range of data quality is achieved through the use of various analytical methods. The following data quality levels are widely accepted as descriptions of the different kinds of data that can be generated for various purposes:

- **Level I, Field screening or analysis using portable instruments (e.g., photoionization detector [PID]):** Results are often not compound-specific, but results are available in real time. Depending on the analysis being performed and the instrumentation used, the results may be considered qualitative, semi-quantitative, or quantitative.
- **Level II, Field analysis using more sophisticated portable analytical instruments (e.g., on-site mobile laboratory):** There is a wide range in the quality of data that can be generated depending on the use of suitable calibration standards, reference materials, and sample preparation equipment. Results are available in real-time or typically within hours of sample collection.
- **Level III, All analyses performed in an off-site analytical laboratory using methods other than USEPA-approved analytical methods**: These data generally do not include the level of formal documentation required under Level IV and are not subject to formal data validation. These data are typically used for engineering studies (e.g., treatability testing), site investigations and remedial design.
- **Level IV, Data generated using USEPA methods and enhanced by a rigorous QA program, supporting documentation, and data validation procedures:** These data are typically used for engineering studies (e.g., treatability testing), risk assessment, site investigations, and remedial design, and may be suitable for litigation/enforcement activities. Results are both qualitative and quantitative.

Work assignment data quality level requirements for sample analyses may be as follows:

- Level I data quality will be obtained for field screening data collected with portable instruments such as pH meters, temperature probes, and PIDs which will be used for health and safety and field operational monitoring. In addition, these instruments or field test kits may be used to produce data for determining where to collect a sample to assess impacts and for field screening of samples to be designated for laboratory confirmation analyses.
- A Level II data quality assurance program will be executed by the field team for obtaining data.
- A Level III data quality assurance program will be executed by the laboratory for chemical analyses not required to be Level IV, such as pH.
- A Level IV data quality assurance program will be executed, in general, by the laboratory for chemical analyses necessary to meet the work assignment objectives.

2.2 PARCCS Parameters (Data Quality Indicators)

2.2.1 Precision

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value (USEPA, 1987). Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), absolute difference (D), range (maximum value minus minimum value), relative range, and relative percent difference (RPD) are common.

The objectives for precision for each chemical are based on the capabilities of the approved EPA analytical method with respect to laboratory performance. For this project, field-sampling precision will be determined by analyzing coded (blind) duplicate samples for the same parameters, and then, during data validation, calculating the %RPD for duplicate sample results. Field duplicate precision criteria for the air samples will be 50%RPD. The laboratory will determine analytical precision by calculating the %RPD or %D, as applicable to the analytical method being used.

The laboratory will determine analytical precision by calculating the RPD for the results of the analysis of the laboratory duplicates and matrix spike duplicates. The formula for calculating %RPD is as follows:

$$\%RPD = \frac{|V1 - V2|}{(V1 + V2)/2} \times 100$$

where:

RPD	=	Relative percent difference
V1, V2	=	Values to be compared
|V1 - V2|	=	Absolute value of the difference between the two values
(V1 + V2)/2	=	Average of the two values

For data evaluation purposes, in instances where both sample concentrations are less than five times (<5x) the RL, duplicate precision will be evaluated using the calculated %D result. In this instance, the applicable precision criterion will be two times the RL (2xRL). If a value is not detected, the %RPD criterion will be considered to be not applicable and the %RPD will not be calculated (i.e. precision will not be quantitatively determined). The data quality objectives for analytical precision, calculated as the RPD between duplicate analyses, are defined in the for each analytical method in **Table 2.1**.

2.2.2 Accuracy

Accuracy is a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern (Taylor, 1987) or the difference between a measured value and the true or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material and is expressed as the percent of the known quantity that is recovered or measured. The recovery of a given analyte depends on the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes that are less than the quantitation limits are less accurate because they are more affected by such factors as instrument "noise." Higher concentrations will not be as affected by instrument noise or other variables and, thus, will be more accurate.

The objectives for accuracy for each chemical are based on the capabilities of the approved USEPA analytical method with respect to laboratory performance. Analytical accuracy is typically assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), the percent recoveries of matrix spike compounds added to selected samples, and the percent recoveries of spike compounds added to laboratory control samples (LCS). An LCS will be analyzed to provide additional information on analytical accuracy. Additionally, initial and continuing calibrations must be performed and accomplished within the established method control limits to define the instrument accuracy before analytical accuracy can be determined for any sample set.

Accuracy is normally measured as the percent recovery (%R) of a known amount of analyte, called a *spike*, added to a sample (matrix spike or laboratory control). The accuracy on a per sample basis will be measured using surrogates for the organics analyses. The %R is calculated as follows:

Matrix Spike Recovery:

$$\% \text{ Recovery} = \frac{SSR - SR}{SA} \times 100$$

where:

%R	=	Percent recovery
SSR	=	Spike sample result: concentration of analyte obtained by analyzing the sample with the spike added
SR	=	Sample result: the background value; *i.e.,* the concentration of the analyte obtained by analyzing the sample
SA	=	Spiked analyte: concentration of the analyte spike added to the sample

Surrogate Recovery: $\% \text{ Recovery} = \frac{\text{Concentration (or amount) found}}{\text{Concentration (or amount) spiked}} \times 100$

LCS Recovery: $\% \text{ Recovery} = \frac{\text{Concentration (or amount) found}}{\text{Concentration (or amount) spiked}} \times 100$

The acceptance limits for accuracy for each parameter are presented in the in **Table 2.1.**

2.2.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point or an environmental condition. Representativeness is a qualitative parameter and is most concerned with the proper design of the sampling program (USEPA, 1987). Samples must be representative of the environmental media being sampled. An important factor in the selection of sample locations and sampling procedures will be obtaining representative samples.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree technically possible, that the data derived represents the in-place quality of the material sampled. Care will be exercised to see that chemical compounds are not introduced to the sample from sample containers, handling, and analysis. Laboratory method/prep blanks will be analyzed to monitor for potential sample contamination from laboratory procedures.

The assessment of representativeness also must consider the degree of heterogeneity in the material from which the samples are collected. Sampling heterogeneity will be evaluated during data validation through the analysis of coded (blind) field duplicate samples. The analytical laboratory will also follow acceptable procedures to assure the samples are adequately homogenized prior to taking aliquots for analysis such that the reported results are representative of the sample received. Chain-of-custody (COC) procedures will be followed to document the possession of sample containers from the time of container preparation through sample collection and receipt back at the laboratory. Field QC samples will be collected and analyzed to provide information to evaluate sample representativeness. Details of field QC sample collection (field duplicates) and COC procedures are presented in Section 3.2 and Section 7.1.

2.2.4 Completeness

Completeness is defined as the percentage of measurements that meet the project's data quality objectives (USEPA, 1987). Completeness is calculated for each method (or analyte) and sample matrix for an assigned group of samples. Completeness for a data set represents the results usable for data interpretation and decision making. The completeness objective for the analytical and field data is 95%. Completeness is defined as follows for all sample measurements:

$$\%C = \frac{V}{T} \times 100$$

where:

%C = Percent completeness
V = Number of measurements judged valid (not rejected during data validation)
T = Total number of measurements

Completeness, which is expressed as a percentage, is calculated by subtracting the number of rejected and unreported results from the total planned results and dividing by the total number of results. Results rejected because of out-of-control analytical conditions, severe matrix effects, broken or spilled samples, or samples that could not be analyzed for any other reason, negatively affect influence completeness and are subtracted from the total number of results to calculate completeness.

2.2.5 Comparability

Comparability expresses the degree of confidence with which one data set can be compared to another (USEPA, 1987). The comparability of all data collected for this project will be managed by:

- Using identified standard methods (including laboratory SOPs) for both sampling and analysis phases of this project
- Requiring traceability of all analytical standards and/or source materials to the USEPA or National Institute of Standards and Technology (NIST)
- Requiring that calibrations be verified with an independently prepared standard from a source other than that used for calibration (if applicable)
- Using standard reporting units and reporting formats including the reporting of QC data
- Performing data validation on the analytical results, including the use of data qualifiers in all cases where appropriate
- Evaluating the sample collection information and analytical QC sample results
- Requiring that the significance of all validation qualifiers be assessed any time an analytical result is used for any purpose.

By taking these steps during the investigation, future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

2.2.6 Sensitivity and Quantitation Limits

When selecting an analytical method during the DQO process, the achievable detection limit (DL) and method reporting limit (RL) must be evaluated to verify that the method will meet the project quantitation limits necessary to support project decision making requirements. This process ensures that the analytical method sensitivity has been considered and that the methods used can produce data that satisfy users' needs while making the most effective use of resources. The concentration of any one target compound that can be detected and/or quantified is a measure of sensitivity for that compound. Sensitivity is instrument, compound, method, and matrix specific and achieving the required project quantitation limit (PQL) and/or method detection limit (MDL) objectives depends on instrument sensitivity and potential matrix effects. With regard to instrument sensitivity, it is important to monitor the instrument performance to ensure consistent instrument performance at the low end of the calibration range. Instrument sensitivity will be monitored through the analysis of method/prep blanks, calibration check samples, and low standard evaluations.

Laboratories generally establish limits that are reported with the analytical results; these results may be called reporting limits, detection limits, quantitation limits, or other terms. These laboratory-specific limits, apply undiluted analyses and must be less than or equal to the project RLs. The RL, also known as the PQL, represents the concentration of an analyte that can be routinely measured in the sampled matrix within stated limits and with confidence in both identification and quantitation. Throughout various documents RL and PQL may be interchanged, but they effectively have the same meaning. The RLs are established based on specific knowledge about the analyte, sample matrix, project specific requirements, and regulatory requirements. The RL is typically established by the laboratory at the level of the lowest calibration standard and is generally in the range of two to ten times the MDL.

The MDL is defined as "the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results" (40 Code of Federal Regulations (CFR) 136 Appendix B). MDLs are experimentally determined and verified for each target analyte of the methods in the sampling program. The laboratory will determine MDLs for each analyte and matrix type prior to analysis of project samples. In addition, when multiple instruments are employed for the analysis of the same method, each individual instrument will maintain a current MDL study. MDLs are statistically calculated in accordance with the Title 40, Code of Federal Regulations Part 136 (40 CFR 136) as promulgated in September 2017. If risk-based project objectives are developed, then where practicable, MDLs must be lower than the risk-based criteria determined for the project.

Laboratory RLs and MDLs for all analyses will meet at a minimum the standards criteria specified in the NYSDOH May 2017 Soil Vapor/Indoor Air Matrix. The project standards criteria are presented in **Table 2.2.**

Analytical results below the MDL will be flagged with a *U* at the RL to indicate the data are non-detect. However, the laboratory will flag analytes detected at a level less than the RL but greater than the MDL (or the laboratory's determined minimum reportable concentration) with a *J* to denote an estimated concentration.

For samples that do not meet the RLs or MDLs, (taking into consideration elevated detection limits due to aliquots used for the designated analysis), the laboratory must make available compelling documentation (e.g., screening data) and a justifiable explanation for its inability to meet the specified limits using the project protocols. It must also provide an appropriate, justifiable explanation of the issues and resolution in the analytical report/data package (dilution factor, interference, etc.). Excessive, unnecessary dilutions on any sample for a project are unacceptable. The laboratory will analyze all samples initially undiluted unless a preliminary analytical screen is performed and is indicative of instrument damage or compromise may occur if the sample is not analyzed initially at dilution. In this instance, the sample will be analyzed at the lowest possible dilution factor. If multiple extractions/ analyses are performed (such as undiluted and diluted analyses), resulting in several data sets for the same sample, the laboratory will report all data and results from each of the multiple analyses in the data package.

3.0 DATA ACQUISITION

3.1 Sampling Methods

The NYSDEC Bestway Cleaners QAPP includes best practices and field decontamination methods will be used to mitigate cross contamination. Additionally, this QAPP describes management, handling, and tracking procedures for investigation-derived waste, including solid and liquid materials, and personal protective equipment (PPE).

The special precautions described here will be taken to confirm that each sample collected is representative of the conditions at that location and that the sampling and handling procedures neither alter nor contaminate the sample. If failure in the sampling or measurement system occurs, the procedures specified in Section 9.3 of this QAPP will be followed to identify who is responsible for implementing the appropriate corrective action. This section presents sample container preparation procedures, sample preservation procedures, and sample holding times.

For this program, the laboratory will purchase and distribute certified clean sample containers (e.g., Summa canisters). Vendors are required to provide documentation of analysis for each lot of containers, and the documentation will be kept on file at the laboratory. Alternatively, the laboratory must perform testing to certify that the sample containers are not contaminated and are certified clean.

Laboratory-supplied sample kits (coolers containing field COC forms, custody seals, sample containers, and packing material) will be prepared by the laboratory's Sample Management Staff and shipped to the Field Team Leader. The type of containers, preservation techniques, and holding times for specific analyses are presented in **Table 3.1**.

3.2 Sample Handling And Custody

This section presents sample handling and custody procedures for both the field and laboratory. Implementation of proper handling and custody procedures for samples generated in the field is the responsibility of field personnel. Both laboratory and field personnel involved in the COC and transfer of samples will be trained as to the purpose and procedures prior to implementation. For transfer of samples within the laboratory, an internal COC will be required.

3.2.1 Sample Handling

Each container will be provided with a sample label that will be filled out at the time of collection. The sampler will print label information, specified below, on each label either before or immediately after collecting the sample with an indelible writing instrument. The label will be protected from water and solvents with clear label packing tape.

The following information, at a minimum, is required on each sample label (note: the location ID and the sample ID as described in the Data Management section below inherently identify some of this information, see below):

- Client
- Project name
- Sampling location
- Sample number
- Date and time of sample collection

- Parameters to be analyzed
- Preservative(s) added, if any
- Initials of the sampler.

Following sample collection, excess soil, water, etc., will be wiped from the outside of the sample containers with a paper towel and the lids will be checked to verify they are tightly closed. Documentation of equipment and methods used in the field for treating the samples will be maintained in the field logs, and a COC will be initiated to document transfer of the samples from the field team to the laboratory. In preparation for shipment to the analytical laboratory, the shipment cooler will be packaged as follows:

Vapor intrusion samples are typically shipped to the lab in the same box the lab sent them in. The return shipment should include all samples properly labeled consistent with sample identification used on the COC. The return shipment should include any flow regulators, duplicate sample tees, an extra summa canisters not used for sampling. Complete a copy of the COC (see Section 3.2.2) and place the COC in a sealable bag. Field personnel retain a copy of the COC; another copy is transmitted to the data management personnel, QAO, and the PM specified in the Work Assignment Scoping Documents.

3.2.2 Field Sample Custody

The primary objective of sample custody procedures is to create an accurate written record that can be used to trace the possession and handling of samples from the moment of their collection through analysis until their final disposition. A sample (or sample container) will be considered under custody if:

- In a person's possession
- Maintained in view after possession is accepted and documented
- Locked and tagged with custody seals placed on the sample cooler so that no one can tamper with it after having been in physical custody
- In a secured area that is restricted to authorized personnel.

The sample custody flowchart is shown in **Figure 3.1**. An example Chain-of-Custody form is shown in **Figure 3.2.**

A COC record will accompany the samples from the time the samples leave the original sampler's possession through the sample shipments' receipt at the laboratory. Triplicate copies of the COC record must be completed for each sample set collected. See chart for data requirements.

DATA REQUIRED ON CHAIN-OF-CUSTODY
Project name and client Signatures of samplers Sample number, date and time of collection, and grab or composite sample designation Signatures of individuals involved in sample transfer If applicable, the air bill or other shipping number
ADDITIONAL ITEMS THAT SHOULD BE INCLUDED
Sample matrix Number of sample containers Analyses to be performed, Preservative(s) Name of the analytical laboratory to which the samples are sent Method of sample shipment Project number.

If samples are split and sent to different laboratories, a copy of the COC record is sent with each sample.

The REMARKS space on the COC form is used to indicate if the sample is a matrix spike/matrix spike duplicate (MS/MSD), or any other sample information for the laboratory. Since they are not specific to any one-sample point, blanks are indicated on separate rows. Immediately prior to sealing the sample cooler, the sampler will sign the COC form and write the date and time on the first RELINQUISHED BY space. The sampler will also write the method of shipment, the shipping cooler identification number, and the shipper air bill number on the top of the COC form. Mistakes will be crossed out with a single line in ink and initialed by the author.

Sampling personnel will retain one copy of the COC form, and the other two copies are put into a sealable plastic bag and taped inside the lid of the shipping cooler. The cooler lid is closed, custody seals provided by the laboratory are affixed to the latch and across the back and front lids of the cooler, and the person relinquishing the samples signs his or her name across the seal. The seal is taped, and the cooler is wrapped tightly with clear packing tape. Field personnel then relinquish the cooler to personnel responsible for shipment, typically an overnight carrier.

The COC seal must be broken to open the sample cooler. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Field Team Leader for direction on whether to proceed with the analyses.

Sampling personnel record the information placed on the COC record in the field logs. They also include in the log a detailed description of the exact locations from which the samples were collected, any pertinent conditions under which the samples were obtained, and the lot number of the containers used.

3.2.3 Laboratory Sample Management

The laboratory has a designated Sample Management Staff responsible for receiving samples in the laboratory, opening the coolers, checking the sample integrity and custody seals, logging samples into the laboratory information management system (LIMS), and controlling the handling and storage of samples while in the laboratory. The laboratory is a secure facility and only authorized laboratory personnel are allowed to handle active samples. The laboratory maintains an SOP for sample management.

3.2.4 Sample Receipt and Logging

Upon receipt at the laboratory, sample-receiving personnel inspect the samples for integrity of the custody seal, check the shipment against the COC form, and note any discrepancies. Specifically, the sample-receiving personnel note any damaged or missing sample containers. At this time, the field COC record is completed and signed by the Sample Management Staff.

Using the temperature blank in each cooler, the temperature of each incoming sample cooler is measured and recorded during the sample receipt and log-in procedures before samples are placed in laboratory cold storage. Similarly, the laboratory documents that its cold storage facilities are being maintained through daily (at a minimum) documented temperature measurements using a thermometer.

Upon receipt, Sample Management Staff measure and record on the preservation documentation sheet the pH of acid- or base-preserved aqueous samples. Any problems observed during sample receipt must be communicated to the Field Team Leader and/or the QAO verbally and either by fax transmission or email within 24 hr (preferably 3 hr beginning with the normal business day or immediately following for problems noted during second shifts or weekends) after discovery and before samples are released to the laboratory for analysis. Problems may include but are not limited to broken bottles, errors or ambiguities in paper work, insufficient sample volume or weight, inappropriate pH, and elevated temperature.

When the shipment is inspected and the COC record agree, the sample receiving personnel enter the sample and analysis information into the LIMS and assign each sample a unique laboratory number. This number is affixed to each sample bottle.

3.2.5 Sample Storage Security

While in the laboratory, the samples and aliquots that require cold storage will be stored and will be maintained in a secured refrigerator unless they are being used for preparation and/or analysis. All of the refrigerators in the laboratory used for storage of samples have restricted access and are numbered. In addition, dedicated refrigerators are designated for extracts and analytical standards. The sample storage areas are in the laboratory, and access is limited to laboratory personnel. Specific requirements for sample storage are described below:

- Samples will be removed from the shipping container and stored in their original containers unless damaged.
- Damaged samples will be disposed in an appropriate manner, and the disposal will be documented or repacked as necessary and appropriate.
- Samples and extracts will be stored in a secure area designed to comply with the storage method(s) defined in the contract.
- The storage area will be kept secure at all times. The sample custodian or designated personnel will monitor access to the storage area.
- Standards or reagents will not be stored with samples or sample extracts.

The following SOPs for laboratory sample security will be implemented to confirm that the laboratory satisfies sample COC requirements:

- Samples will be stored in a secure area.
- Access to the laboratory will be through a monitored area. Other outside access doors to the laboratory will be kept locked.
- Visitors must sign a visitor's log and will be escorted while in the laboratory.
- Refrigerators, freezers, and other sample storage areas will be securely maintained.

Samples for VOC determinations will be stored in a secure area separate from other samples, sample extracts, reagents, and standards.

3.2.6 Retention and Disposal of Samples

The laboratory must retain all excess samples within their original sample bottles for a minimum of 30 days in cold storage (below 4°C) following submission of the validated data to NYSDEC. At that time, the laboratory must contact the Field Team Leader for authorization for responsible disposal or further storage instructions. At the point at which the laboratory is provided authorization to dispose of the samples, the laboratory will be responsible, and will assume all liability for proper characterization and disposal of samples and bottleware in accordance with all local, state, and federal regulations.

4.0 DATA MANAGEMENT

4.1 Introduction

The electronic data management systems for each work assignment will be implemented to process the information effectively without loss or alteration. As of April 1, 2011, the New York State Division of Environmental Remediation (DER) has implemented an Environmental Information Management System (EIMS). The EIMS uses the database software application EQuIS™ from EarthSoft® Inc. In an effort to improve the management of environmental data and reduce paper quantities, all laboratory analytical data minus instrument raw data must be submitted in the DEC-approved Electronic Data Deliverable (EDD).

Data providers must download and install the EQuIS Data Processor (EDP) to check their properly formatted EDD as well as the NYSDEC DER Format file. The EDP performs a series of formatting checks on the EDD and identifies any errors in the data file prior to submission. All EDDs are to be error free when submitted. It is important that the most recent version of the EDP and NYSDEC format file are employed since the valid values used by EIMS are periodically updated for the EDP.

4.2 Field Data Management

The Field Team Leader will manage data generated in the field. This person or their designee will be responsible for recording and documenting sampling activities in the field logs, on sampling records (as appropriate), and on COC forms (when samples are collected) as described in Section 3.2.2. The records may be photocopied and stored in the project file along with the original.

A sample nomenclature system was developed with the data management team. Each sample name will be unique to include a location ID and field sample ID. The Database Manager will add data to EIMS through the input module of the system.

The Database Manager will add data to EIMS through the input module of the system.

DATA INPUT TO EIMS MAY INCLUDE:
– Sample planning information (e.g., sample depth) – Chain-of-custody data – Sediment coring logs – Geotechnical data – Location and geographic data – Field measurements – Meteorological data – Waste characterization data – Groundwater levels – Radiodating data – Laboratory analytical data

4.3 Laboratory Data Management

Laboratory data management involves several important stages that include data transformation, review, verification, and validation, as well as data storage, retrieval, and security. The laboratory will implement a data

management system to manage the data from its generation in the laboratory to its final reporting and storage. The data management system will include, but not be limited to, the use of standard record-keeping practices, standard document control systems, and the electronic data management system.

The laboratory data reduction, verification, validation, and reporting procedures and project data management activities, data/information exchange procedures ensure that complete documentation is maintained, transcription and reporting errors are minimized, and data are properly review.

Specific laboratory data management requirements and procedures are discussed in Sections 6.0 and 9.0 of this QAPP.

5.0 DOCUMENTS AND RECORDS

5.1 Introduction

Records will be maintained to document accurately the data generation process during investigation in the field, sample analysis in the lab, and during data validation. Project documentation will be maintained in general accordance with guidelines in the National Enforcement Investigation Center Policies and Procedures (USEPA, 1986). A project file will be maintained that will contain appropriate project documentation; see components in chart. Some of this documentation may be retained electronically in lieu of paper copies. **Table 5.1** summarizes the types of project documents and records.

MINIMUM COMPONENTS OF PROJECT FILE
- Project plans and specifications - Field logs and data records - Photographs, maps, and drawings - Sample identification documents - Chain-of-custody records - Data review notes - Report notes and calculations - Progress and technical reports and - Correspondence and other pertinent information - Full analytical data deliverables package provided by the lab, including QC documentation and electronic data deliverable

5.2 Field Records

Field personnel are responsible for documenting sample handling activities, observations, and data in field sampling records including field logs, COC records, photographs, and pre-design investigation records. The Field Team Leader is responsible for maintaining these documents. Each record is described below.

5.2.1 Field Log

A Field Log will be used to document work assignment activities. The field log will have consecutively numbered pages, and documentation will be recorded using waterproof ink. Incomplete lines, pages, and changes in the log will be lined out with a single line, dated, and initialed. More detailed procedures for documenting investigation activities (such as field sampling records and boring log forms) and type of information to include in the field log may be developed.

MINIMUM REQUIREMENT FOR INFORMATION IN FIELD LOG
- Responsible person's name - Date and time of activity - Equipment and methods used for field preparation of samples - Field measurements of samples (*e.g.*, pH, temperature) - Information coordinating sample handling activities with appropriate field activities and chain-of-custody documentation *Daily calibration activities:* Calibrator's name Instrument name and model Date and time of calibration Standards used and their source Temperature (if appropriate) Results of calibration Corrective actions taken (if any)

5.2.2 Electronic Field Data Management

The field sampling program will have an electronic data management component. The system will be designed to specify the necessary samples taken at any given location and to provide the ability to be updated and amended in the field. This will provide a management system that efficiently tracks the needs of the sampling scope. As the samples are taken, log entries are put in the database, and sample labels are printed. At any given time, a COC record can be printed as well.

5.2.3 Chain-of-Custody Record

The COC record establishes the documentation necessary to trace sample possession from the date and time of sample collection, through sample shipment, to the date and time of arrival at the laboratory designated to perform analysis. The ability to trace the history of a sample is essential to show that the sample collected was, indeed, the sample analyzed and that the sample was not subjected to biasing influences. Evidence of sample traceability and integrity is provided by COC procedures. These procedures are necessary to support the validity of the data and will accompany each shipping container.

A copy of the COC record will be detached and kept with the field log or placed in the project file; the original record will accompany the shipment.

5.3 Laboratory Records

Laboratories providing analytical support for this project must maintain records to ensure that all aspects of the analytical processes are adequately documented to ensure legal defensibility of the data.

When a mistake is made, the wrong entry is crossed out with a single line, initialed, and dated by the person making the entry, and the correct information recorded. Obliteration of an incorrect entry or writing over it is not allowed, nor is the use of correction tape or fluid on any laboratory records.

Overwriting or disposal of any electronic media prior to a 5-yr expiration period is strictly prohibited. All electronic and hardcopy data must be stored in an easily accessible climate-controlled environment. The laboratory will exercise "best practices" in terms of frequent, redundant electronic backup procedures on proper long-term storage media to assure that all electronic data representing sample analyses will be maintained for the 5-yr storage period. Electronic data must be stored in a secure, limited-access area with redundant copies stored in fireproof vaults and/ or stored off-site of the laboratory facilities.

Sample preparation in the laboratory must be fully documented and include sample preparation conditions (such as digestion temperatures). In addition, documentation must allow complete traceability to all prepared or purchased reagents, acids and solvents, and reference solutions. All spike solutions and calibration standards must be used prior to labeled expiration dates and stored in accordance with manufacturers recommended conditions. Complete and unequivocal documentation must exist to enable traceability of all prepared spike solutions, calibration standards, and prepared reagents back to the reference materials utilized. Organic extracts must be stored in the same type of vials (amber or clear) as the associated standards at the appropriate storage temperatures.

The unit conventions set forth in the figures for reported data will be consistent with standard laboratory procedures. Reporting units used are those commonly used for the analyses performed.

Laboratory records used to document analytical activities in the laboratory will include reagent and titrant preparation records, standard preparation logs, sample preparation logs, bench data sheets, instrument run logs, and strip chart recordings/chromatograms/computer output. Additional records will include calibration records, maintenance records, nonconformance memos, and Corrective Action Request (CAR) forms.

LAB RECORDS SHOULD CONVEY:
- What was done - When it was done - Who did it and - What was found

REQUIREMENTS FOR LAB RECORDKEEPING
- Data entries must be made in indelible water-resistant ink - Date of each entry and observer must be clear - Observer uses his or her full name or initials - Initial and signature log is maintained so the recorder of every entry can be identified - Information must be recorded in notebook or on other records when the observations are made - Recording information on loose pieces of paper not allowed

5.3.1 Operational Calibration Records

Operational calibration records will document the calibration of instruments and equipment that are corrected on an operational basis. Such calibration generally consists of determining instrumental response against compounds of known composition and concentration or the preparation of a standard response curve of the same compound at different concentrations. Records of these calibrations are maintained in the following documents:

- Standard preparation information, to trace the standards to the original source solution of neat compound, is maintained in LIMS or laboratory standard preparation logs.

- Instrument logbook provides an ongoing record of the calibration for a specific instrument. The logbook should be indexed in the laboratory operations records and should be maintained at the instrument by the chemist. The chemist must sign and date all entries, and the QM or his designee must review them.
- For NYSDEC Category B data packages, copies of the raw calibration data will be kept with the analytical sample data so the results can readily be processed and verified as one complete data package. If samples from several projects are processed together, the calibration data is copied and included with each group of data. The laboratory will maintain all calibration, analysis, and corrective action documentation (both hard copy and electronic data) for a minimum of 7 years. The documentation maintained must be sufficient to show all factors used to derive the final (reported) value for each sample. Documentation must include all calculation factors such as dilution factor and sample aliquot size. The individual who performs hand calculations must sign and date them. This documentation must be stored with the raw data. Calculations performed by the data system will be documented and stored as electronic and hard copy data. The instrument printouts will be kept on file, and the electronic data will be stored by the laboratory for a minimum of 7 years.

5.3.2 Maintenance Records

Maintenance records will be used to document maintenance activities, service procedures, and schedules. They must be traceable to each analytical instrument, tool, or gauge. The individual responsible for the instrument must review, maintain, and file these records. These records may be audited by the QAO to verify compliance. Logs must be established to record and control maintenance and service procedures and schedules.

5.3.3 Nonconformance Memos

Nonconformance Memos (NCM) may be either a hard copy record or an electronic database record. In either case, review and release of the record must be documented by the initiator, the analytical group leader where appropriate, the laboratory project manager (LPM), and the laboratory QA manager. All internal laboratory nonconformance documentation will be communicated to the Field Team Leader by the LPM verbally and summarized in the report narrative. The NCM will be used to document equipment that fails calibration and will identify any corrective actions taken.

5.3.4 Corrective Action Request (CAR) Forms

The laboratory must use CAR forms to document any incidents requiring corrective action. The CAR form will be issued to the personnel responsible for the affected item or activity. A copy will also be submitted to the LPM. The individual to whom the CAR is addressed will return the requested response promptly to the QA personnel and will affix his or her signature and date to the corrective action block after stating the cause of the conditions and corrective action to be taken. QA personnel will maintain a log for status of CAR forms to confirm the adequacy of the intended corrective action and to verify its implementation. CARs will be retained in the project record file.

5.3.5 Analytical Data Reports

Analytical data will be reported as an EDD and as an analytical data package. The analytical laboratories are required to submit all data, preliminary and final, in formatted EDDs in accordance with NYSDEC's requirements. The laboratory must meet 100% compliance with these requirements. The Parsons Database Manager will submit written requests dictating the requirements and appropriate files to be supplied by the laboratory. The

specifications of the EDD are presented in Section 5. EDDs are required for this project for all data collected regardless of whether the data will be validated or not.

Analytical data reports will be provided by the laboratory within 28 calendar days following receipt of a complete Sample Delivery Group (SDG) and will include the specifications identified in Attachment 1. An SDG is considered to include all samples received for the same project or site, to a maximum of twenty investigative samples not to exceed 5 consecutive days of sampling. The data package provided by the laboratory will be Level IV data in the NYSDEC ASP Category B format for all data requiring validation, unless an alternative requirement is specified in a laboratory statement of work (SOW) and will contain all information to support the data validation in accordance with the USEPA Region II SOPs as described in Section 8. Additionally, the completed copies of the COC records, accompanying each sample from the time of initial bottle preparation to completion of analysis, must be attached to the analytical reports.

5.4 Data Validation And Audit Records

Data validation personnel are responsible for documenting validation procedures and results in the form of a data usability summary report (DUSR). The QAO will be responsible for maintaining this report and the QAO will be responsible for its distribution. Additionally, audit reports will be prepared and distributed by the QAO. A brief description of each record is described below.

5.4.1 Data Usability Summary Reports

The DUSR will be prepared as required by NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, Appendix 2B, May, 2010. The DUSR will summarize the impacts of using data that do not achieve overall data quality objectives or that do not meet PARCC and sensitivity criteria identified in Section 2.2. Additionally, the report will be used to identify, assess and present issues associated with the overall data.

5.4.2 Audit Reports

Among other QA audit reports, which may be generated during the conduct of activities, a final audit report for this project may be prepared by the QAO. The report will include:

- Periodic assessment of measurement data accuracy, precision, and completeness
- Results of performance audits and/or system audits
- Significant QA problems and recommended solutions for future projects

Status of solutions to any problems previously identified.

6.0 ANALYTICAL PROCEDURES

6.1 Introduction

To meet program specific regulatory requirements for chemicals of concern, all methods will be followed as stated, with some specific requirements noted below. Chemical analyses for organic parameters will be conducted in accordance with the QAPP, laboratory's SOPs (maintained "on-file" at the laboratory), and with referenced analytical methods. Where requirements conflict, the technical and QA/QC requirements in this QAPP.

6.2 Standard Operating Procedures

Standard Operating Procedures (SOPs) are a written step-by-step description of laboratory operating procedures exclusive of analytical methods. Laboratories providing analytical support for this project will be required to document all procedures in SOPs. The SOPs must address the following areas:

- Storage containers and sample preservatives
- Sample receipt and logging
- Sample custody
- Sample handling procedures
- Sample transportation
- Glassware cleaning
- Laboratory security
- QC procedures and criteria
- Equipment calibration and maintenance
- Documentation
- Safety
- Data handling procedures
- Document control
- Personnel training and documentation
- Sample and extract storage
- Preventing sample contamination
- Traceability of standards
- Data reduction and validation
- Maintaining instrument records and logbooks
- Nonconformance
- Corrective actions
- Records management

7.0 QUALITY CONTROL

A QC program is a systematic process that controls the validity of analytical results by measuring the accuracy and precision of method and matrix, developing expected control limits, using these to detect anomalous events, and requiring corrective action techniques to prevent or minimize the recurrence of these events. QC measurements for analytical protocols are designed to evaluate laboratory performance, and measurement biases resulting from the sample matrix and field performance.

- **Field performance:** QC samples are used to evaluate the effectiveness of the sampling program to obtain representative samples, eliminating any cross contamination. These samples will include field duplicates.
- **Sample performance:** Factors associated with sample preparation and analysis influence accuracy and precision. Such factors are monitored by the use of internal QC samples. QC field samples are analyzed to evaluate measurement bias due to the sample matrix based on evaluation of matrix spike (MS) and matrix spike duplicate (MSD) samples. If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.
- **Laboratory method performance:** All QC criteria for method performance should be met for all target analytes for data to be reported. These criteria generally apply to instrument detector assessment, calibration, method blanks, SUMMA canister cleaning certifications, and LCS. Variances will be documented and noted in the case narrative of the report.

7.1 Field Quality Control Samples

QC samples will be collected in the field as part of the sampling program to allow evaluation of data quality. Field QA/QC samples will consist of the collection and analysis of field duplicates at a frequency of 1:20 samples. Standard sample identifiers will identify field QA/QC samples and they may provide no indication of their nature as QA/QC samples.

A summary of the type and collection frequency of field QC samples to be collected respective to the sampling programs specified in this QAPP, is included in **Table 7.1.** A description of each QC sample is included below.

7.1.1 Field Duplicates

Coded (blind) field duplicates will be used to assess the precision of field sampling procedures. Precision of a sample is calculated by quantifying the RPD between two sample measurements (Section 2.2.2.1). If the RPD of field duplicate results is greater than the precision criterion, environmental results for the field duplicate pair will be qualified as estimated. The Field Leader responsible for sample collection and processing should be notified to identify the source of variability (if possible), and corrective action should be taken (Section 9.3).

Coded (blind) field duplicates will be collected to evaluate the representativeness and effectiveness of homogenization and proper mixing for soil and aqueous samples and to assess sampling errors for vapor intrusion samples. The field duplicate will be analyzed for all of the parameters for which the associated samples are being analyzed. The samples will be labeled in such a manner that the laboratory will not be able to identify the sample as a duplicate sample. This will eliminate bias that could arise by laboratory personnel.

7.2 Laboratory Quality Control Samples

QC data from the laboratory are necessary to determine precision and accuracy of the analyses and to demonstrate the absence of interferences and contamination of glassware and reagents. The laboratory will analyze QC samples routinely as part of the laboratory QC procedures. Laboratory QC results will consist of analysis of LCS, method/preparation blanks, and surrogate spikes. Laboratory QC will be analyzed at the frequency specified in Table 7.2. QC samples will be prepared and analyzed utilizing the same preparation and analysis procedures as the field samples. These laboratory QC sample analyses will be run independently of the field QC samples. Results of these analyses will be reported with the sample data and kept in the project QC data file.

QC samples will be prepared and analyzed utilizing the same preparation and analysis procedures as the field samples. Re-preparation and/or reanalysis of the laboratory QC samples due to a failing recovery and/or precision failure without the re-preparation and reanalysis of the associated samples is prohibited. In all events, QC failures, holding time exceedances, or any other non-standard occurrence must be communicated immediately to the QAO and prior to reporting and then, with approval to report the data, summarized in the case narrative. If the criteria are not met, appropriate corrective action must be taken as specified in Section 9.1 and Section 10.

7.2.1 Laboratory Control Samples

Laboratory Control Samples (LCS) are designed to check the accuracy of the analytical procedure by measuring a known concentration of an analyte of interest. An LCS will be analyzed for each analytical batch requested for sample preparation and analysis. LCSs must be prepared at a frequency of one per batch for all analytical methods. If high LCS recoveries are observed and the associated samples are reported as “not detected” for the requested target analytes, no action is necessary other than to note the issue in the case narrative of the final analytical report.

7.2.2 Method and Preparation Blanks

Laboratory blank samples (also referred to as method or preparation blanks) are designed to detect contamination resulting from the laboratory environment or sample preparation procedure. Method blanks verify that method interferences caused by contaminants in solvents, reagents, glassware, or in other sample processing hardware, are known. Method blanks will be analyzed for each analytical batch using similar preparation techniques (separatory funnel and liquid/liquid extraction) to assess possible contamination and evaluate which corrective measures may be taken, if necessary.

Method blanks associated with field samples must undergo all of the processes performed on investigative samples, including but not limited to pre-filtration and sample cleanups. Where all the field samples in a batch do not require an additional cleanup procedure, an additional blank may be prepared to check the performance of the additional cleanup and will be associated with the field samples getting the specific additional cleanup. Where this is done, both blanks will be reported, and the procedure described in the case narrative. Method blanks must be prepared at a frequency of one per analytical batch.

7.2.3 Surrogate Spike Analyses

Surrogate spikes (applicable to organic analysis only) are used to determine the efficiency of analyte recovery in sample preparation and analysis. Calculated percent recovery of the spikes is used to measure the accuracy of the analytical method. A surrogate spike is prepared by adding a known amount of a compound similar in type to the analytes of interest. Surrogate compounds will be added to all samples analyzed by USEPA Methods, including method blanks, project environmental samples, and duplicate samples in accordance with the method.

7.3 Instrument/Equipment Testing, Inspection, And Maintenance

7.3.1 Field Equipment

Equipment failure will be minimized by routinely inspecting all field equipment to ensure that it is operational and by performing preventative maintenance procedures. Field sampling equipment will be inspected prior to sample collection activities, and repairs will be made prior to decontamination and reuse of the sampling equipment. Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure, based on the manufacturer's instructions or recommendations. Maintenance will be performed in accordance with the schedule specified by the manufacturer to minimize the downtime of the measurement system. Qualified personnel must perform maintenance work.

MINIMUM ROUTINE PREVENTIVE MAINTENANCE
Removal of foreign debris from exposed surfaces
Storage in a cool dry place protected from the elements
Daily inspections
Verification of instrument calibrations

A list of critical spare parts will be developed prior to the initiation of fieldwork. Field personnel will have ready access to critical spare parts to minimize downtime while fieldwork is in progress. A service contract for rapid instrument repair or backup instruments may be substituted for the spare part inventory.

Non-routine maintenance procedures require field equipment to be inspected prior to initiation of fieldwork to determine whether or not it is operational. If it is not operational, it will be serviced or replaced. Batteries will be fully charged or fresh, as applicable.

7.3.2 Laboratory Instrumentation

Periodic preventive maintenance is required for all sensitive equipment. Instrument manuals will be kept on file for reference if equipment needs repair. The troubleshooting section of factory manuals may be used in assisting personnel in performing maintenance tasks.

Major instruments in the laboratory are covered by annual service contracts with manufacturers or other qualified personnel (internal or external). Under these agreements, trained service personnel make regular preventive maintenance visits. Maintenance is documented and maintained in permanent records by the individual responsible for each instrument.

The laboratory manager is responsible for preparation, documentation, and implementation of the program. The laboratory QA manger reviews implementation to verify compliance during scheduled internal audits.

Written procedures will establish the schedule for servicing critical items to minimize the downtime of the measurement system. The laboratory will adhere to the maintenance schedule and arrange any necessary and prompt service. Qualified personnel will perform required service.

7.4 Instrument/Equipment Calibration And Frequency

Instruments (field and laboratory) used to perform chemical measurements will be properly calibrated prior to use to obtain valid and usable results. The requirement to properly calibrate instruments prior to use applies equally to field instruments as it does to fixed laboratory instruments to generate appropriate data to meet DQOs.

7.4.1 Field Instruments

All field analytical equipment will be calibrated immediately prior to each day's use. The calibration procedures of field instruments (such as PID, pH, temperature), will conform to manufacturer's standard instructions to ensure that the equipment functions within the allowable tolerances established by the manufacturer and required by the project. Personnel performing instrument calibrations must be trained in its proper operation and calibration. Records of all instrument calibration will be maintained by the Field Team Leader in the field log (Section 5.2) and will be subject to audit by the QAO or authorized personnel. The Field Team Leader will maintain copies of all the instrument manuals on the site.

7.4.2 Laboratory Instruments

A formal calibration program will control instruments and equipment used in the laboratory. The program will verify that equipment is of the proper type, range, accuracy, and precision to provide data compatible with specified requirements. Instruments and equipment that measure a quantity or whose performance is expected at a stated level will be subject to calibration. Laboratory personnel or external calibration agencies or equipment manufacturers will calibrate the instruments using reference standards. Upon request, the laboratory will provide all data and information to demonstrate that the analytical system was properly calibrated at the time of analysis including calibration method, frequency, source of standards, concentration of standards, response factors, linear range, check standards, and all control limits. This data will be documented in a calibration record (Section 5.3.1). Calibration records will be prepared and maintained for each piece of equipment subject to calibration.

This section provides an overview of the practices used by the laboratory to implement a calibration program. Detailed calibration procedures, calibration frequencies, and acceptance criteria are specified in the laboratory's analytical method SOPs. The requirements for the calibration of instruments and equipment depend on the type and expected performance of individual instruments and equipment. Therefore, the laboratory will use the guidelines provided here to develop a calibration program.

Two types of calibration are described in this section: periodic calibration and operational calibration. The results of the calibration activities will be documented in the analytical data package and the calibration records (Section 5.3.1).

- **Periodic calibration:** Performed at prescribed intervals for equipment, such as balances and thermometers. In general, equipment which can be calibrated periodically is a distinct, singular purpose unit and is relatively stable in performance.
- **Operational calibration:** routinely performed as part of an analytical procedure or test method, such as the development of a standard curve for use with an atomic absorption spectrophotometer. Operational calibration is generally performed for instrument systems.

Equipment that cannot be calibrated or becomes inoperable will be removed from service. Such equipment must be repaired and satisfactorily recalibrated before reuse. For equipment that fails calibration, analysis cannot proceed until appropriate corrective action is taken, and the analyst achieves an acceptable calibration. This type of failure will be documented in an Nonconformance Memo (NCM) (Section 9).

7.4.3 Calibration System

The calibration system includes calibration procedures, equipment identification, calibration frequency, calibration reference standards, calibration failure, and calibration records. These elements are described next.

7.4.3.1 Calibration Procedures

Written procedures will be used by the laboratory for all instruments and equipment subject to calibration. Whenever possible, recognized procedures, such as those published by ASTM or USEPA, will be adopted. If established procedures are not available, a procedure will be developed considering the type of equipment, stability characteristics of the equipment, required accuracy, and the effect of operational error on the quantities measured. Calibration procedure established by the laboratory must, at a minimum, meet the calibration requirements of the method on which the SOP is based.

MINIMUM CALIBRATION PROCEDURES
Equipment to be calibrated
Reference standards used for calibration
Calibration technique and sequential actions
Acceptable performance tolerances
Frequency of calibration
Calibration documentation format

7.4.3.2 Equipment Identification

Equipment that is subject to calibration is identified by a unique number assigned by the laboratory. Calibration records reference the specific instrument identification.

7.4.3.3 Calibration Frequency

Instruments and equipment will be calibrated at prescribed intervals and/or as part of the operational use of the equipment. Calibration frequency will be based on the type of equipment, inherent stability, manufacturer's recommendations, values provided in recognized standards, intended data use, specified analytical methods, effect of error upon the measurement process, and prior experience.

7.4.3.4 Calibration Reference Standards

Two types of reference standards will be used by the laboratory for calibration:

- **Physical standards**, such as weights for calibrating balances and certified thermometers for calibrating working thermometers, refrigerators and ovens, are generally used for periodic calibration. Physical reference standards that have known relationships to nationally recognized standards (such as NIST) or accepted values of natural physical constants will be used whenever possible. If national standards do not exist, the basis for the reference will be documented. Physical reference standards will be used only for calibration and will be stored separately from equipment used in analyses. In general, physical standards will be recalibrated annually by a certified external agency, and documentation will be maintained. Balances will be calibrated against class "S" weights by an outside source annually. Physical standards such as the laboratory's class "S" weights will be recertified annually.
- **Chemical standards,** such as vendor certified stock solutions and neat compounds, will generally be used for operational calibration. The laboratory, to provide traceability for all standards used for calibration and QC samples, will document standard preparation activities.

7.4.4 Operational Calibration

Operational calibration will generally be performed as part of the analytical procedure and will refer to those operations in which instrument response (in its broadest interpretation) is related to analyte concentration. Formulas used for calibration are listed in Table 7.3.

7.4.4.1 Preparation of a Calibration Curve

Preparation of a standard calibration curve will be accomplished by analyzing calibration standards that are prepared by adding the analyte(s) of interest to the solvent that is introduced into the instrument. The concentrations of the calibration standards will be chosen to cover the working range of the instrument or method. All sample measurements will be made within this working range. Average response factors will be used or a calibration curve will be prepared by plotting or regressing the instrument responses versus the analyte concentrations. Where appropriate a best-fit curve may be used for nonlinear curves and the concentrations of the analyzed samples will be back-calculated from the calibration curve.

7.4.4.2 Periodic Calibration

Periodic calibrations are performed for equipment (such as balances and thermometers), that is required in the analytical method, but that is not routinely calibrated as part of the analytical procedure. Table 7.4 lists the periodic calibration requirements used by the laboratories.

7.5 Inspection/Acceptance Of Supplies And Consumables

In the laboratory, personnel qualifying reagents and standards must be trained to perform the associated instrumental analysis, including instrument calibration, calculations, and data interpretation. Laboratory personnel must document the purchase, receipt, handling, storage, and tracking of supplies and consumables used during analysis. For example, analytical standards, source materials, and reference materials used for instrumental calibration/tunes/checks must be certified and traceable to the USEPA or NIST through reference numbers documented directly in each analytical sequence. Calibration for all requested analyses must be verified by an independent second source reference. Adhering to these procedures precludes the use of expired supplies and consumables or supplies and consumables that do not meet standard acceptance criteria.

Records must be maintained on reagent and standard preparation in the LIMS reagent system or laboratory standard preparation logs. The records should indicate traceability of the standards to their original source solution or neat compound, the name of the material, concentration, the method and date of preparation, the expiration date, storage conditions, and the preparer's initials. Each prepared reagent or standard should be labeled with a unique identifier that links the solution to the preparation documentation that specifies an expiration and/or re-evaluation date for the solution.

8.0 DATA VALIDATION AND USABILITY ELEMENTS

8.1 Data Review, Verification, And Validation

The data collected during this project will undergo a systematic review for compliance with the DQOs and performance objectives as stated in Section 2. In particular, field, laboratory, and data management activities will be reviewed to confirm compliance with the method QC criteria for performance and accuracy and to show that data were collected in a manner that is appropriate for accomplishing the project objectives. These data will be evaluated as to their usability during data verification. In particular, data outside QC criteria, but not rejected, will be reviewed for possible high and low bias. All data will be validated following verification and reduction.

Qualified data validation personnel will assess and verify data; they will review the data against QC criteria, DQOs (Sections 2 and 8.2.2), analytical method, USEPA Region 2 SOPs for data review, and NYSDEC guidelines (NYSDEC, 2020) to identify outliers or errors and to flag suspect values. Field and laboratory activities that should be reviewed include, at a minimum, sample collection, handling, and processing techniques; field documentation records; verification of proper analytical methods; analytical results of QC samples; and calibration records for laboratory instruments and field equipment. A review of such elements is necessary to demonstrate whether the DQOs outlined in Section 2 were met. Samples that deviate from the experimental design and affect the project objectives must be reported to the QAO and data validation personnel.

Departures from standard procedures in this QAPP, or the laboratory SOPs, may lead to exclusion of that data from the project database or validation process, based on discussions with and approval of the NYSDEC. However, routine field audits involving thorough reviews of sample collection procedures and sample documentation should preclude such deviations from occurring. Additionally, routine laboratory audits will be used to document proper sample receipt, storage, and analysis; instrument calibration; use of the proper analytical methods; and use of QC samples specified in Section 7 to assist in appropriately qualifying the data.

The laboratory's analytical report for each sample delivery group (SDG) will be assembled by collecting and incorporating all the data for each analysis associated with the reported samples; the analytical narratives; and other report-related information such as copies of COC forms, communication records, and nonconformance forms. The information included in the analytical data report is summarized in Attachment 1.

Before the laboratory submits data, the laboratory's data review process will include a full first level "technical" review by the laboratory's analyst during sample analysis and data generation. The review must include a check of all QC data for errors in transcription, calculations, and dilution factors and for compliance with QC requirements. Failure to meet method performance QC criteria may result in the reanalysis of the sample or analytical batch. After the initial review is completed, the data will be collected from summary sheets, workbooks, or computer files and assembled into a data package.

The laboratory's first review will be followed by a second-level technical review of the data package. The second level review may be performed by a peer trained in the procedures being reviewed or by the appropriate analytical group supervisor. The reviewer will check the data packages for completeness and compliancy with the project requirements and will certify that the report meets the DQOs for PARCCS specifications. The report narrative will be generated at this stage of the data review. Any problems discovered during the review and the corrective actions necessary to resolve them will be communicated to the responsible individual, who will discuss the findings with the laboratory QA manager for resolution.

The first and second review will be conducted throughout sample analysis and data generation to validate data integrity during collection and reporting of analytical data. Data review checklists will be used to document the performance and review of the QC and analytical data.

Before the laboratory's final release to the client, the data will undergo a final review by the laboratory's QA officer or his/her designee. This third level review is to confirm that the report is complete and meets project requirements for performance and documentation. The laboratory's QA officer must review reports involving non-conforming data issues. A summary of all non-conformances will be included in the case narrative. The report will then be released to the client for data validation, and a copy will be archived by the laboratory for a period of 7 yrs.

The laboratory analytical data will be validated using project-specific data validation procedures to confirm that data meet the applicable data quality objectives. Depending on the type of data and the intended data uses, the data validation process for a given SDG (or a specific percentage of sample analyses) or analytical method may be performed following a Level IV protocol (full validation), or a Level III protocol (sample plus QC summary data only, no raw data review). The project-specific Level III data validation protocol will provide a level of review resulting in the generation of a DUSR, as defined by NYSDEC DER-10 requirements. Level III validation will be performed on all DQO Level III and all DQO Level IV data. Ten percent (10%) of the DQO Level IV Data for each analytical method will undergo a Level IV validation. Certain geotechnical and field screening data may be evaluated in a manner suitable for the intended data uses.

A data validation report will be issued and reviewed by the QAO before finalization. The data validation report will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of PARCCS criteria for each analytical method. The validation criteria are objective and are not sample dependent, except for consideration of sample matrix effects. The criteria specify performance requirements that should be under the control of the field-sampling contractor or analytical laboratory. This QAPP will be the primary reference for evaluating the data.

After data validation, the data will be evaluated for consistency with site conditions and developed conceptual models. Data validation personnel will prepare a project DUSR that summarizes the implications of the use of any data out of criteria. In addition, the data usability report will include the percentage of sample completeness for critical and non-critical samples and a discussion of any issues in representativeness of the data that may develop as a result of validation. The data usability report will address overall data quality and achievement of PARCCS criteria and assess issues associated with the overall data and data quality for all validated Level III and Level IV data.

8.2 Verification And Validation Methods

8.2.1 Laboratory

The laboratory will verify and assess analytical data against the stated requirements on the COC record, the sample handling procedures (Section 3), and the QC parameters. The laboratory data reviewers will also check that transcriptions of raw or final data and calculations were performed correctly and are verified.

Following data verification, analytical data generated by the laboratory will be reduced and managed based on the procedures specified in this QAPP and analytical methodologies. Data reduction includes all processes that change either the values or numbers of data items. The data reduction processes used in the laboratory includes establishment of calibration curves, calculation of sample concentrations from instrument responses, and computation of QC parameters. **Table 8.1** lists the formulas used to calculate sample concentrations.

The reduction of instrument responses to sample concentrations takes different forms for different types of methods. For most analyses, the sample concentrations are calculated from the measured instrument responses using a calibration curve. The sample concentrations can be back-calculated from a regression equation fitted to calibration data. For gravimetric and titrimetric analyses, the calculations are performed

according to equations given in the method. For chromatographic analyses, the unknown concentrations are determined using either calibration factors (external standard procedure) or relative response factors (internal standard procedure). GC analyses are generally quantitated using the external standard technique; GC/MS analyses are quantitated using the internal standard technique. These calculations are generally performed by the associated computerized data systems.

Validated analytical data will be loaded into a database and reported in tabular format. Database fields will include the field sample identification, laboratory sample identification, blinded sample number, analytical results, detection limits, and validation qualifiers. The usability of the data will be evaluated by the QAO or designee.

8.2.2 Analytical Data Validation

The data review process is performed in two phases:

1. **Initial phase, contract compliance screening (CCS)**: Review of sample data deliverables for completeness. Completeness is evaluated by ensuring that all required data deliverables are received in a legible format with all required information. The CCS process also includes a review of the COC forms, case narratives, and RLs. Sample resubmission requests, documentation of nonconformances with respect to data deliverable completeness, and corrective actions often are initiated during the CCS review. The results of the CCS process are incorporated into the data validation process.
2. **Second phase, data validation:** A project-specific data validation procedure based on a "Level III" or the "Level IV" validation protocol will be performed on the analytical results from the fixed-base laboratory or laboratories, with the exception of the bench-scale testing data. The Level III validation protocol, which be applied to Level III data packages and Level IV data packages not receiving "full" Level IV validation includes a review of summary information to determine adherence to analytical holding times; results from analysis of field duplicates, method blanks, surrogate spikes, LCSs, and sample temperatures during shipping and storage. Data qualifiers are applied to analytical results during the data validation process based on adherence to method protocols and laboratory-specific QA/QC limits. The Level IV validation protocol incorporates the Level III validation protocol and adds calculation checks from the raw data of reported and summarized sample data and QC results.

The laboratory will send the required analytical data package deliverables, consisting of hardcopy versions and the EDD, following completion of the laboratory's validation process. Data validation will be performed in accordance with the USEPA Region 2 Data Validation SOPs for organic data review (USEPA, 2016). In addition, Parsons will refer to this QAPP to verify that DQOs were met. If problems are identified during data validation, the QAO and the laboratory QA manager will be alerted, and corrective actions will be requested. The LPM and data validation chemists will maintain close contact with the QAO to ensure all nonconformance issues are acted upon prior to data manipulation and assessment routines.

Data validation will be conducted using the USEPA guidelines (USEPA, 2020) as supplementary guidelines. Where USEPA guidelines and SW-846 disagree, this QAPP and data validation professional judgment will prevail.

Organic Analytical Methods
Sample preservation and holding times
Instrument tuning
Instrument calibrations
Blank results
System monitoring compounds or surrogate recovery compounds (as applicable)
Internal standard recovery results
SUMMA canister cleaning
LCS results
Target compound identification
Chromatogram quality
Duplicate results
Compound quantitation and reported RLs
System performance and
Results verification

Trained and experienced data validation chemists will perform the data validation work. The QAO will review the data validation report before it is finalized. The data validation report will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of PARCCS criteria for each analytical method. A detailed assessment of each SDG will follow. Based on the results of data validation, the validated analytical results reported will be assigned a usability flag (see chart below).

USABILITY FLAGS FOR VALIDATED RESULTS	
U	Not detected at given value
UJ	Analyte not detected; associated quantitation limit is an approximate (estimated) values.
J	Estimated value
J+	Estimated biased high
J-	Estimated biased low
N	Presumptive evidence at the value given
NJ	Analysis indicates presence of analyte tentatively identified; the associated numerical value is its approximate concentration
R	Result not useable and
No flag	Result accepted without qualification

8.3 Reconciliation With User Requirements

Following data validation by qualified personnel, the data will be evaluated by the QAO and the PM as to consistency with site conditions and developed conceptual models to determine whether field and analytical data meet the requirements for decision making. Specifically, the results of the measurements will be compared to the DQOs (Section 2).

The DQOs will be considered complete and satisfied if the data are identified as usable and if no major data gaps are identified. For example, the objective for data collected under the characterization program is to further refine the limits of dredging and/or capping. If the collected data sufficiently characterizes these limits in a manner that is acceptable for remedial action, then the DQO is satisfied. In cases where data may be considered not usable (for example, rejected during data validation), resampling may be required at a specific location. If resampling is not possible, the data will be identified and noted in the project database to make data users aware of its limitations.

9.0 ASSESSMENT AND OVERSIGHT

9.1 Assessments And Response Actions

Performance and system audits of both field and laboratory activities may be performed. Any such audits will be performed at a frequency to be determined to ensure that sampling and analysis activities are completed in accordance with the procedures specified in field sampling SOPs and the contents of this QAPP itself.

Quality assurance audits will be carried out under the direction of the QAO on field activities, including sampling and field measurements. They will be implemented to verify that established procedures are being followed and to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s).

The QAO will plan, schedule, and approve system and performance audits based on procedures customized to the project requirements. If required, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. Quality auditing personnel will not have responsibility for field or laboratory project work.

9.2 Project-Specific Audits

Project-specific audits include system and performance audits of sampling and analysis procedures, and of associated recordkeeping and data management procedures. Project-specific audits will be performed on a discretionary basis at a frequency determined by the PM.

9.2.1 System Audits

The QAO may perform system audits. Such audits will encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory QC procedures and associated documentation may be system-audited including the field log, field sampling records, laboratory analytical records, sample handling, processing, and packaging in compliance with the established procedures, maintenance of QA procedures, and COC procedures. These audits may be carried out during execution of the project to confirm that sampling crews employ consistent procedures. However, if conditions adverse to quality are detected additional audits may occur.

Findings from the audit will be summarized and provided to the PM and/or designated personnel so that necessary corrective action can be monitored from initiation to closure.

9.2.2 Performance Audits

The laboratory may be required to conduct an analysis of performance evaluation (PE) samples or provide proof that PE samples were submitted by an approved USEPA or NYSDEC performance testing provider within the past 12 months. If necessary, proof that applicable PE samples have been analyzed at the laboratory within the past 12 months will be included in the laboratory procurement package.

9.2.3 Formal Audits

Formal audits are any system or performance audit that the QAO documents and implements. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklist to verify objectively that QA requirements have been developed, documented, and instituted in accordance with contractual and project criteria. At the discretion of the PM, the QAO or designated personnel may conduct formal audits on project and subcontractor work during the course of the project.

Auditors who have performed the site audit after gathering and evaluating all data will write audit reports. Items, activities, and documents determined by lead auditors to be in noncompliance must be identified at exit interviews conducted with the involved management. Noncompliance will be logged and documented through audit findings. These findings will be attached to and become part of the integral audit report. These audit-finding forms are directed to management to resolve satisfactorily the noncompliance in a specified and timely manner.

The QAO has overall responsibility to see that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports will be submitted to the PM after completion of the audit. Serious deficiencies will be reported to the PM on an expedited basis. Audit checklists, audit reports, audit findings, and acceptable resolutions will be approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

9.2.4 Laboratory Audits

Internal laboratory audits will be performed routinely to review and evaluate the adequacy and effectiveness of the laboratory's performance and QA program, to ascertain if the QAPP is being completely and uniformly implemented, to identify nonconformances, and to verify that identified deficiencies are corrected. The laboratory QA manager is responsible for such audits and will perform them according to a schedule planned to coincide with appropriate activities on the project schedule and sampling plans. Such scheduled audits may be supplemented by additional audits for one or more of the following reasons:

- When significant changes are made in the QAPP
- When necessary to verify that corrective action has been taken on a nonconformance reported in a previous audit
- When requested by the laboratory's PM or QA manager.

9.2.4.1 Laboratory Performance Audits

Performance audits are independent sample checks made by a supervisor or auditor to arrive at a quantitative measure of the quality of the data produced by one section or the entire measurement process. Performance audits are conducted by introducing control samples, in addition to those used routinely, into the data production process. These control samples include PE samples of known concentrations. The results of performance audits will be evaluated against acceptance criteria. The results will be summarized and maintained by the laboratory QA manager and distributed to the supervisors who must investigate and respond to any results that are outside control limits.

9.2.4.2 Laboratory Internal Audits

The laboratory QA manager conducts routine internal audits of each laboratory section for completeness, accuracy, and adherence to SOPs. The laboratory audit team will verify that the laboratory's measurement systems are operated within specified acceptable control criteria and that a system is in place to confirm that out-of-control conditions are efficiently identified and corrected.

9.2.4.3 Laboratory Data Audits

The laboratory will maintain raw instrument data for sample analyses on magnetic tape media or optical media in a secured fireproof safe. During routine audits, the audit team will verify the processing of the raw data file by reviewing randomly selected electronic data files and comparing the results with the hardcopy report. Tapes will be archived for a period of 7 yr. Tapes will be also available for audit by the QAO upon request.

9.2.4.4 Laboratory Audit Procedures

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. The auditor will prepare and submit an audit report to the designated responsible individual of the audited group, the PM, and the QAO. Minor administrative findings that can be resolved to the satisfaction of the auditor during an audit need not be cited as items requiring corrective action. Findings that are not resolved during the course of the audit and findings affecting the overall quality of the project will be included in the audit report.

The designated responsible individual of the audited group will prepare and submit to the QAO a reply to the audit. This reply will include, at a minimum, a plan for implementing the corrective action to be taken on nonconformances indicated in the audit report, the date by which such corrective action will be completed, and actions taken to prevent reoccurrence. If the corrective action has been completed, supporting documentation should be attached to the reply. The auditor will ascertain (by re-audit or other means) if appropriate and timely corrective action has been implemented.

Records of audits will be maintained in the project files. Audit files will include, as a minimum, the audit report, the reply to the audit, and any supporting documents. It is the responsibility of the designated responsible individual of the audited group to conform to the established procedures, particularly as to development and implementation of such corrective action.

9.2.4.5 Laboratory Documentation

To confirm that the previously defined scope of the individual audits is accomplished and that the audits follow established procedures, a checklist will be completed during each audit. The checklist will detail the activities to be executed and ensure that the auditing plan is accurate. Audit checklists will be prepared in advance and will be available for review.

AUDIT CHECKLIST (AT MINIMUM)
Date and type of audit
Name and title of auditor
Description of group, task, or facility being audited
Names of lead technical personnel present at audit
Checklist of audit items according to scope of audit
Deficiencies or non-conformances

Following each system, performance, and data audit, the QAO or his designee will prepare a report to document the findings of the specific audit. The report will be submitted to the designated individual of the audited group to ensure that objectives of the QA program are met.

MINIMUM CONTENT OF AUDIT REPORT
Description and date of audit
Name of auditor
Copies of completed, signed, and dated audit form and/or checklist
Summary of findings including any nonconformance or deficiencies
Date of report and appropriate signatures
Description of corrective actions

The QAO will maintain a copy of the signed and dated report for each audit. If necessary, a second copy will be placed in project files.

9.3 Corrective Actions

Corrective action procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected. Corrective action enables significant conditions adverse to quality to be noted promptly at the site, laboratory, or subcontractor location. Additionally, it allows for the cause of the condition to be identified and corrective action to be taken to rectify the problem and to minimize the effect on the data set. Further, corrective action is intended to minimize the possibility of repetition.

Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, PM, FTL, and involved subcontractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action. Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The designated responsible individual of the audited group will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

Events that trigger corrective actions
When predetermined acceptance standards are not attained
When a deviation from SOP is required or observed
When procedure or data compiled are determined to be deficient
When equipment or instrumentation is found to be faulty
When samples and analytical test results are not clearly traceable
When QA requirements have been violated
When designated approvals have been circumvented
As a result of system and performance audits
As a result of a management assessment
As a result of laboratory/field comparison studies
As required by analytical method

All project personnel have the responsibility, as part of normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Specifically, the laboratory must designate the assigned individual to act as the primary laboratory contact responsible for timely identification and resolution of any and all issues including contract and administrative issues. Any phone calls initiated by personnel or designated representatives to the laboratory with respect to corrective actions must be returned in a timely manner on a normal business day if the designate individual (or alternate) is not available at the initiation of the phone call.

Project management and related staff, including field investigation teams, remedial design planning personnel, and laboratory groups will monitor on-going work performance as part of daily responsibilities. Work may be audited at the site, the laboratories, or subcontractor locations. Activities or documents ascertained to be noncompliant with QA requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the QAO, PM, or designated personnel.

Personnel assigned to QA functions will have the responsibility to issue and control CAR forms (**Figure 9.1**). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered.

Similar to the CAR, the laboratory will record and report nonconformances internally using the laboratory's non-conformance documentation tracking system in the form of an NCM. Each NCM is traceable so that it can be cross-referenced with its resolution to the associated project records. The laboratory QA manager summarizes critical nonconformances, such as reissued reports and client complaints, in a monthly report to the laboratory management staff. Management of the NCM is described in Section 5.3. Corrective action procedures applicable to QC requirements that do not meet the criteria of this QAPP are described in the following sections. Consistent, frequent contacts between laboratory personnel, the QAO, or designated personnel are required.

TYPICAL CONTENT OF NCM FORMS
Problem description and root cause
Corrective action
Client notification summary
QA verification
Approval history action

10.0 REPORTS TO MANAGEMENT

10.1 QA Reports

Management personnel receive QA reports appropriate to their level of responsibility. The PM receives copies of all QA documentation. QC documentation is retained within the department that generated the product or service except where this documentation is a deliverable for a specific contract. QC documentation is also submitted to the project QAO for review and approval. Previous sections detailed the QA activities and the reports, which they generate. Among other QA audit reports that may be generated during the conduct of activities, a final audit report for this project will be prepared by the QAO. The report will include:

- Periodic assessment of measurement data accuracy, precision, and completeness
- Results of performance audits and/or system audits
- Significant QA problems and recommended solutions for future projects
- Status of solutions to any problems previously identified.

Additionally, any incidents requiring corrective action will be fully documented.

11.0 REFERENCES

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TABLES

TABLE 2.1 QUALITY CONTROL LIMITS – AIR SAMPLES

Laboratory Accuracy and Precision							
Analytical Parameters	**Analytical Method**	**Matrix Spike (MS) Compounds**	**MS/MSD (a) % Recovery**	**MS/MSD RPD (b)**	**LCS (c) % Recovery**	**Surrogate Compounds**	**Surrogate % Recovery**
VOCs	TO-15	NA	NA	NA	70-130	4-Bromofluorobenzene	60-140

(a) Matrix Spike/Matrix Spike Duplicate
(b) Relative Percent Difference
(c) Laboratory Control Sample
NA – Not applicable

Tablw 2.2
Bestway Cleaners QAPP
Standards Criteria

CAS Number	Analytical Method[1]	Parameter	NYSDEC Standard Criteria[2]	QAPP Quantitation Limit[3]	Units
71-55-6	TO-15	1,1,1-TRICHLOROETHANE	NS	TBD	ug/m3
79-34-5	TO-15	1,1,2,2-TETRACHLOROETHANE	NS	TBD	ug/m3
76-13-1	TO-15	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NS	TBD	ug/m3
79-00-5	TO-15	1,1,2-TRICHLOROETHANE	NS	TBD	ug/m3
75-34-3	TO-15	1,1-DICHLOROETHANE	NS	TBD	ug/m3
75-35-4	TO-15	1,1-DICHLOROETHENE	NS	TBD	ug/m3
120-82-1	TO-15	1,2,4-TRICHLOROBENZENE	NS	TBD	ug/m3
95-63-6	TO-15	1,2,4-TRIMETHYLBENZENE	NS	TBD	ug/m3
106-93-4	TO-15	1,2-DIBROMOETHANE	NS	TBD	ug/m3
95-50-1	TO-15	1,2-DICHLOROBENZENE	NS	TBD	ug/m3
107-06-2	TO-15	1,2-DICHLOROETHANE	NS	TBD	ug/m3
76-14-2	TO-15	1,2-DICHLOROTETRAFLUOROETHANE	NS	TBD	ug/m3
78-87-5	TO-15	1,2-DICHLOROPROPANE	NS	TBD	ug/m3
108-67-8	TO-15	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	NS	TBD	ug/m3
541-73-1	TO-15	1,3-DICHLOROBENZENE	NS	TBD	ug/m3
106-46-7	TO-15	1,4-DICHLOROBENZENE	NS	TBD	ug/m3
123-91-1	TO-15	1,4-DIOXANE (P-DIOXANE)	NS	TBD	ug/m3
540-84-1	TO-15	2,2,4-TRIMETHYLPENTANE	NS	TBD	ug/m3
71-43-2	TO-15	BENZENE	NS	TBD	ug/m3
100-44-7	TO-15	BENZYL CHLORIDE	NS	TBD	ug/m3
75-27-4	TO-15	BROMODICHLOROMETHANE	NS	TBD	ug/m3
75-25-2	TO-15	BROMOFORM	NS	TBD	ug/m3
74-83-9	TO-15	BROMOMETHANE	NS	TBD	ug/m3
56-23-5	TO-15	CARBON TETRACHLORIDE	NS	TBD	ug/m3
108-90-7	TO-15	CHLOROBENZENE	NS	TBD	ug/m3
75-00-3	TO-15	CHLOROETHANE	NS	TBD	ug/m3
67-66-3	TO-15	CHLOROFORM	NS	TBD	ug/m3
74-87-3	TO-15	CHLOROMETHANE	NS	TBD	ug/m3
156-59-2	TO-15	CIS-1,2-DICHLOROETHYLENE	NS	TBD	ug/m3
10061-01-5	TO-15	CIS-1,3-DICHLOROPROPENE	NS	TBD	ug/m3
110-82-7	TO-15	CYCLOHEXANE	NS	TBD	ug/m3
124-48-1	TO-15	DIBROMOCHLOROMETHANE	NS	TBD	ug/m3
75-71-8	TO-15	DICHLORODIFLUOROMETHANE	NS	TBD	ug/m3
64-17-5	TO-15	ETHANOL	NS	TBD	ug/m3
100-41-4	TO-15	ETHYLBENZENE	NS	TBD	ug/m3
87-68-3	TO-15	HEXACHLOROBUTADIENE	NS	TBD	ug/m3
179601-23-1	TO-15	M,P-XYLENES	NS	TBD	ug/m3
78-93-3	TO-15	METHYL ETHYL KETONE (2-BUTANONE)	NS	TBD	ug/m3
108-10-1	TO-15	METHYL ISOBUTYL KETONE	NS	TBD	ug/m3
75-09-2	TO-15	METHYLENE CHLORIDE	60	TBD	ug/m3
110-54-3	TO-15	N-HEXANE	NS	TBD	ug/m3
95-47-6	TO-15	O-XYLENE (1,2-DIMETHYLBENZENE)	NS	TBD	ug/m3
100-42-5	TO-15	STYRENE	NS	TBD	ug/m3
75-65-0	TO-15	TERT-BUTYL ALCOHOL	NS	TBD	ug/m3
1634-04-4	TO-15	TERT-BUTYL METHYL ETHER	NS	TBD	ug/m3
127-18-4	TO-15	TETRACHLOROETHYLENE(PCE)	30	TBD	ug/m3
108-88-3	TO-15	TOLUENE	NS	TBD	ug/m3
156-60-5	TO-15	TRANS-1,2-DICHLOROETHENE	NS	TBD	ug/m3
10061-02-6	TO-15	TRANS-1,3-DICHLOROPROPENE	NS	TBD	ug/m3
79-01-6	TO-15	TRICHLOROETHYLENE (TCE)	2	TBD	ug/m3
75-69-4	TO-15	TRICHLOROFLUOROMETHANE	NS	TBD	ug/m3
75-01-4	TO-15	VINYL CHLORIDE	NS	TBD	ug/m3

Notes:
(1) Analytical method from *EPA Air Method, Toxic Organics - 15 (TO-15) Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS),* USEPA 1999.
(2) Criteria from *Guidance for Evaluating Soil Vapor Intrusion in New York State* , NYSDOH 2006 and Soil Vapor Intrusion Updates page on NYSDOH website (https://health.ny.gov/environmental/indoors/vapor_intrusion/update.htm)
(3) Quantitation limits will be populated with lab-supplied values once analytical laboratory is selected
NS - No Standard
TBD - To be determined.

TABLE 3.1 SAMPLE CONTAINERIZATION, PRESERVATION, AND HOLDING TIMES

Analysis	Bottle Type	Preservation [a]	Holding Time [b]
VOCs	SUMMA Canister	NA	NA

[a]All samples to be preserved in ice during collection and transport.

[b]Days from sample collection.

NA – Not applicable

TABLE 5.1 SUMMARY OF FIELD, LABORATORY, AND DATA MANAGEMENT RECORDS

REPORT	PERSON RESPONSIBLE FOR		STORAGE
	MAINTENANCE	DISTRIBUTION	
PROJECT FILES AND FIELD SAMPLING RECORDS			
Field Log	Field Team Leader	Project Manager	Job File at Primary Contractor's Location
Photographs	Field Team Leader	Project Manager	Job File at Primary Contractor's Location
Chain-of-Custody	Field Team Leader	Project Manager	Job File at Primary Contractor's Location
Field Sampling Records	Field Team Leader	Project Manager	Job File at Primary Contractor's Location
LABORATORY RECORDS			
Reagent and Titrant Preparation Records	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Standards Preparation Logs	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Sample Preparation Logs	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Bench Data Sheets	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Instrument Run Logs	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Strip Chart Recordings/ Chromatograms/Computer Output	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Analytical Data Reports	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Log-in Sheets	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Maintenance Records	Quality Assurance Manager	Laboratory Project Manager	Instrument Maintenance Logbook at Laboratory
Periodic Calibration Records	Quality Assurance Manager	Laboratory Project Manager	QA Files at Laboratory
Operational Calibration Records	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Nonconformance Memos	Quality Assurance Manager	Laboratory Project Manager	Maintained in Database File at Laboratory
Corrective Action Request Forms	Quality Assurance Manager	Laboratory Project Manager	Client Correspondence Records at Laboratory
DATA VALIDATION AND AUDIT RECORDS			
Data Validation Reports	Quality Assurance Officer	Quality Assurance Officer	Job File at Primary Contractor's Location
Audit Reports	Quality Assurance Officer	Quality Assurance Officer	Job File at Primary Contractor's Location

TABLE 7.1 SUMMARY OF FIELD QC SAMPLE TYPES AND COLLECTION FREQUENCY

Field QC Sample Type	Sample Type	Collection Frequency
Field Duplicates	Air	1:20 Samples

Field QA/QC samples will be identified by using standard sample identifiers that will provide no indication of their nature as QA/QC samples.

TABLE 7.2 LABORATORY QUALITY CONTROL SAMPLE FREQUENCY

QC Sample	Frequency
Method/prep Blanks	1 per analytical batch of 1-20 samples, per preparation event
Laboratory Control Sample	1 per analytical batch of 1-20 samples, per preparation event
Surrogates	Spiked into all field and QC samples (Organic Analyses)

TABLE 7.3 OPERATIONAL CALIBRATION FORMULAS

Application	Formula	Symbols
Linear calibration curves	$C = (R - a_0)/a_1$	C = analytical concentration R = instrument response a_0 = intercept of regression curve (instrument response when concentration is zero) a_1 = slope of regression curve (change in response per change in concentration)
Calibration factors [1]	$CF = A_x / C$	C = concentration microgram per liter (µg/L) CF = calibration factor Ax = peak size of target compound in sample extract
Response factors [2]	$RRF = C_{is} A_x / C_x A_{is}$	C = concentration (µg/L) RF = internal standard response factor Cis = concentration of the internal standard (µg/L) Ax = area of the characteristic ion for the target compound Ais = area of the characteristic ion for the internal standard

1. Used for quantitation by the external standard technique
2. Used for quantitation by the internal standard technique

Note: For organic analysis, the laboratory will make efforts to use the best curve technique for each analyte. This practice is described in detail in the laboratory calibration criteria documents for GC analysis. This may require the use of a quadratic curve for some compounds.

TABLE 7.4 PERIODIC CALIBRATION REQUIREMENTS

Instrument	Calibration Frequency		Corrective Actions
Analytical Balances	Daily: Annually	Sensitivity (with a Class S-verified weight) Calibrated by outside vendor against certified Class S weights	Adjust sensitivity Service balance
Thermometers	Annually	Calibrated against certified NIST thermometers	Tag and remove from service
Automatic Pipettors	Quarterly:	Gravimetric check	Service or replacement

TABLE 8.1 SAMPLE CONCENTRATION CALCULATION FORMULAS

Application	Formula	Symbols
Linear regression calibration curves	$C = (R - a_0)/a_1$	C = analytical concentration R = instrument response a_0 = intercept of regression curve (instrument response when concentration is zero) a_1 = slope of regression curve (change in response per change in concentration)
Calibration factors [1]	$C = A_x V_f / CF V_i$	C = concentration (µg/L) CF = calibration factor A_x = peak size of target compound in sample extract V_f = final volume of extracted sample (mL) V_i = initial volume of sample extracted (mL)
Response factors [2]	$C = C_{is} A_x V_f / RF A_{is} V_I$	C = concentration (µg/L) RF = internal standard response factor C_{is} = concentration of the internal standard (µg/L) A_x = area of the characteristic ion for the target compound V_f = final volume of extracted sample (mL) A_{is} = area of the characteristic ion for the internal standard V_i = initial volume of sample extracted (mL)
Residues [3]	R = (W – T)/V x 1,000,000	R^6 = residue concentration (mg/L) W = weight of dried residue + container (g) T = tare weight of container (g) V = volume of sample used (mL)
Solid samples [4]	K = C V D / W (%S/100)	K = dry-weight concentration milligram per kilogram (mg/kg) C = analytical concentration (mg/L) V = final volume (mL) of processed sample solution D = dilution factor W = wet weight (g) of as-received sample taken for analysis %S = percent solids of as-received sample

1. Used for quantitation by the external standard technique
2. Used for quantitation by the internal standard technique
3. Used for total, filterable, nonfilterable, and volatile residues as well as gravimetric oil and grease
4. Used to calculate the dry-weight concentration of a solid sample from the analytical concentration of the processed sample.
5. Conversion factor to convert g/mL to mg/L:

$$\frac{mg}{L} = \frac{g}{mL} \times \frac{10^3 mL}{L} \times \frac{10^3 mg}{g}$$

FIGURES

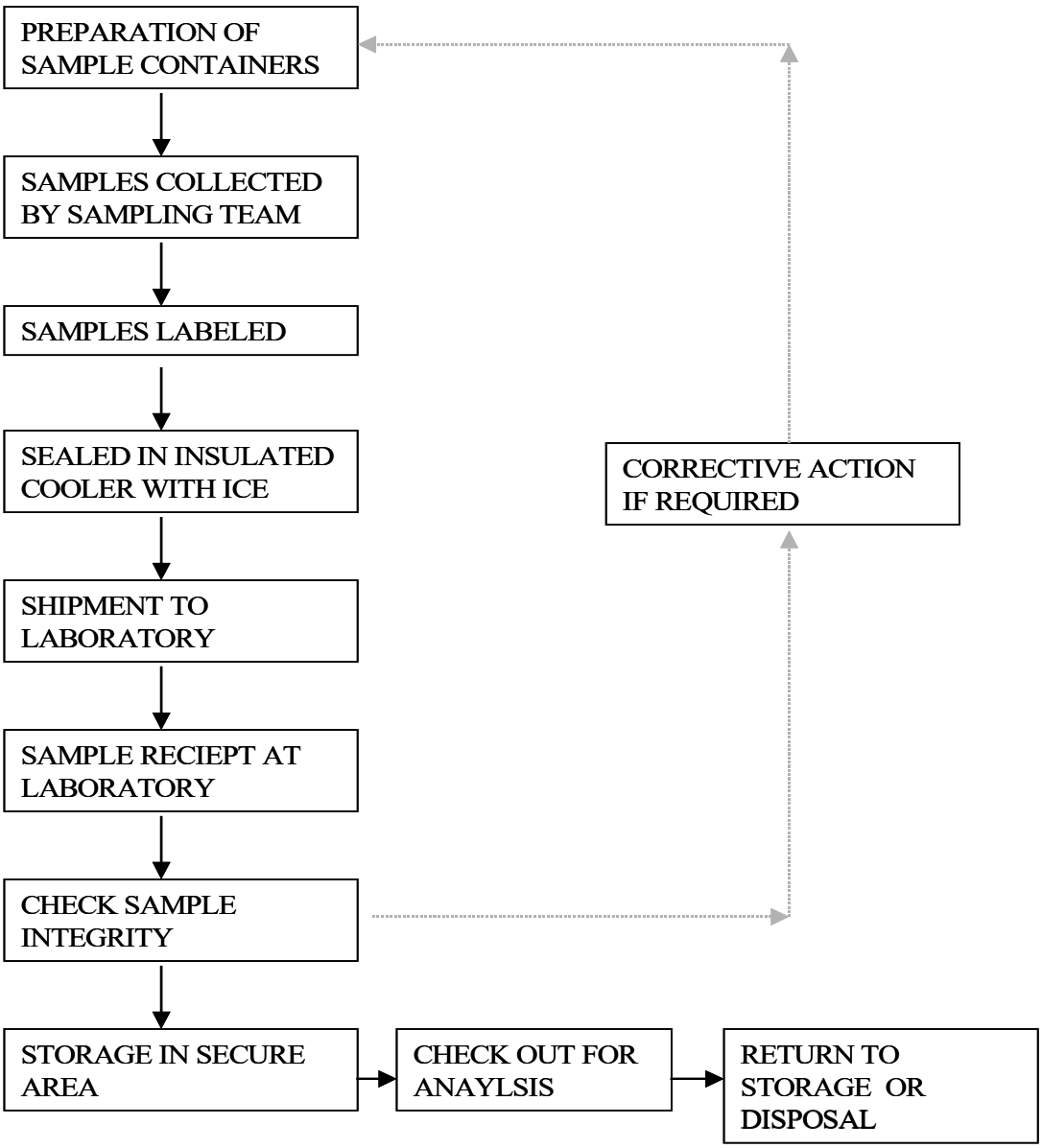

FIGURE 3.1 SAMPLE CUSTODY FLOW CHART

Submitted to:

Chain Of Custody / Analysis Request

AESI Ref:
COC #:
Lab Use Only
Lab Proj #
Lab ID

Privileged & Confidential
EDD To:
Site Name:
Location of Site:

Client Contact: (name, co., address)
Sampler:
P O #
Analysis Turnaround Time:
Standard - Y
2 weeks -
1 week -
Next Day -
Hardcopy Report To:
Invoice To:

Preservative: 0 | 0 | 2

Job No.
Column Study Sediment

Sample Identification

	Location ID	Start Depth (ft)	End Depth (ft)	Field Sample ID	Sample Date	Sample Time	Sample Type	Sample Matrix	Sample Purpose	# of Cont.	Grab/Composite	Field Filtered Sample ?	Units
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													

Special Instructions:

Notes:

Relinquished by	Company		Received by	Company		Condition	Custody Seals Intact
	Date/Time			Date/Time		Cooler Temp.	
Relinquished by	Company		Received by	Company		Condition	Custody Seals Intact
	Date/Time			Date/Time		Cooler Temp.	

Preservatives: 0 = None; [1 = HCL]; [2 = HNO3]; [3 = H2SO4]; [4 = NaOH]; [5 = Zn. Acetate]; [6 = MeOH]; [7 = NaHSO4]; 8 = Other (specify):

FIGURE 3.2 EXAMPLE CHAIN-OF-CUSTODY

CORRECTIVE ACTION REQUEST

Number _____ **Date:** _____

TO: _____

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (a) to resolve the noted conditions and (b) to prevent it from recurring. Your written response is to be returned to the Project quality assurance manager by _____.

Condition:

Reference Documents:

_____ _____ _____ ____ ____ _____

Originator Date Approval Date Approval Date

Response

Cause of Condition:

Corrective Action

(A) Resolution:

(B) Prevention

(B2) Affected Documents

Signature_____ Date_____

CA Follow-up

Corrective Action verified by:_____ Date _____

FIGURE 9.1 CORRECTIVE ACTION REQUEST FORM

ATTACHMENT 1 SUMMARY OF ANALYTICAL DATA PACKAGE (DQO LEVEL IV)

1.0 INTRODUCTION

In order for data to be used for decision-making purposes it is essential that it be of known and documented quality. Verification and validation of data requires that appropriate quality assurance and quality control (QA/QC) procedures be followed, and that adequate documentation be included for all data generated both in the laboratory and in the field.

The QA/QC documentation provided by any laboratory, in conjunction with sample results, allows for evaluation of the following indicators of data quality:

- Integrity and stability of samples;
- Instrument performance during sample analysis;
- Possibility of sample contamination;
- Identification and quantitation of analytes;
- Analytical precision; and
- Analytical accuracy.

General laboratory documentation requirements discussed in this document are formatted into two sections, organic and inorganic analyses. These specifications are intended to establish general, analytical documentation requirements that laboratories should meet when generating data for this project.

2.0 GENERAL DOCUMENTATION REQUIREMENTS

2.1 DATA PACKAGE FORMAT

Each data package for Level IV data submitted will consist of five sections:

- Case narrative;
- Chain-of-custody documentation
- Summary of results for environmental samples;
- Summary of QA/QC results; and
- Raw data.

Level II data packages will not contain the raw data.

Data packages will be consistent with, and will supply the data and documentation required for NYSDEC ASP-defined deliverables (i.e. Category B and Category A). Summaries of data and results may be presented in a Contract Laboratory Program (CLP) type format or an equivalent format that supplies the required information as stated below. All laboratory data qualifiers shall be defined in the deliverable.

In cases where the laboratory has varied from established methodologies, they will be required to provide the Standard Operating Procedures (SOPs) for those methods and added as variances to this QAPP. Inclusion of these SOPs will aid in final review of the data by data reviewers and users.

2.2 CASE NARRATIVE

The case narrative will be written on laboratory letterhead and the release of data will be authorized by the laboratory manager or their designee. The Case Narrative will consist of the following information:

- Client's sample identification and the corresponding laboratory identification;
- Parameters analyzed for each sample and the methodology used. EPA method numbers should be cited when applicable;
- Whether the holding times were met or exceeded;
- Detailed description of all analytical and/or sample receipt problems encountered;
- Discussion of reasons for any QA/QC sample result exceedances; and
- Observations regarding any occurrences which may adversely impact sample integrity or data quality.

2.3 CHAIN-OF-CUSTODY

Legible copies of all COC forms for each sample shall be submitted in the data package. Copies of any internal laboratory tracking documents should also be included. It is anticipated that COC forms and/or internal laboratory tracking documents will include the following information:

- Date and time of sampling and shipping;
- Sampler and shipper names and signatures;
- Type of sample (grab or composite);
- Analyses requested;
- Project, site, and sampling station names;
- Date and time of sample receipt;
- Laboratory sample receiver name and signature;
- Observed sample condition at time of receipt;
- Sample and/or cooler temperatures at time of receipt;
- Air bill numbers;
- Custody seal; and
- Sample numbers.

3.0 ORGANIC ANALYSES DOCUMENTATION REQUIREMENTS

These requirements are applicable to organic methods (e.g., VOCs, SVOCs, PFAS).

3.1 SUMMARY OF ENVIRONMENTAL SAMPLE RESULTS

The following information is to be included in the summary of sample results for each environmental sample.

- Client's sample identifications and corresponding laboratory identifications;
- Sample collection dates;
- Dates and times of sample extraction and/or analysis;
- Weights or volumes of sample used for extraction and/or analysis;

- Identification of instruments used for analysis;
- Gas Chromatography (GC) column and detector specifications;
- Dilution or concentration factor for the sample;
- Percent Difference between columns, if applicable;
- Percent Moisture or Percent Solids for soil samples;
- Method Detection Limits (MDLs) or sample Reporting Limits (RLs);
- Analytical results and associated units;
- Discussion of any manual integrations; and
- Definitions for any laboratory data qualifiers used.

3.2 SUMMARY OF QA/QC SAMPLE RESULTS (AS APPLICABLE)

The following QA/QC sample results shall be presented on QC summary forms. They shall also include the date and time of analysis. Additional summary forms may be required for some methods. Therefore, when reporting data, laboratories should defer to specific method requirements.

All summary forms should, at a minimum, include in the header:

- Form Title;
- Project Identifier (e.g., Batch QC ID, Site Name, Case Number, Sample Delivery Group);
- Laboratory Name; and
- Sample Matrix.

3.2.1 Instrument Calibration (for each instrument used)

- **GC/MS Tuning**. Report mass listings, ion abundance criteria, and percent relative abundances. List the instrument identification (ID) and the date and time of analysis. Ensure that all ion abundances have been appropriately normalized.
- **Initial Calibration**. Report analyte concentrations of initial calibration standards and the date and time of analysis. List the instrument identification (ID), response factors (RF), relative response factors (RRF), or calibration factors (CF), percent relative standard deviation (%RSD), and retention time (RT) for each analyte. The initial calibration (IC) report must also include a sample identifier (ID), associated injection volume or quantity of sample analyzed, the acceptance criteria, such as minimum RF values, and associated maximum %RSD values.
- **Continuing Calibration**. Report the concentration of the calibration standard used for the continuing calibration and for the mid-level standard, and the date and time of analysis. List the ID, RF, RRF, CF, percent difference (%D), and RT for each analyte.
- **Quantitation Limit** or Project Required Reporting Limit (PRRL) Verification (if applicable). Report results for standards that are used to verify instrument sensitivity. Report the source for the verification standards. Report the concentration for the true value, the concentration found, the percent recovery, and control limits for each analyte analyzed. The date and time of analysis must also be reported.

3.2.2 Method Blank Analysis

List environmental samples and QC analyses associated with each method blank. Report concentrations of any analytes found in method blanks above the instrument detection limit.

3.2.3 Surrogate Standard Recovery

Report the name and concentration of each surrogate compound added. List percent recoveries of all surrogates in the samples, method blanks, matrix spike/matrix spike duplicates and other QC analyses. Also include acceptance ranges that the laboratory used for the analysis.

3.2.4 Internal Standard Summary

Report internal standard area counts of the associated calibration standard and retention times, include upper and lower acceptance limits. List internal standard area counts and retention times for all samples, method blanks, matrix spike/matrix spike duplicates and other QC analyses. Include the ID and the date and time of analysis.

3.2.5 Compound Confirmation

Report retention times of each compound on both columns as well as retention time windows of the associated standard. In addition, report determined concentrations from each column and percent differences between results. List the ID and the date and time of analysis. A summary should be generated for each sample, including dilutions and reanalyses, blanks, MSs, and MSDs.

3.2.6 Peak Resolution Summary

For primary and secondary columns report retention times of any target compounds and/or surrogates that coelute in the standards (ie. the Performance Evaluation Mixture for Contract Laboratory Program pesticides). Calculate and report the percent resolution between each pair of compounds which coelute. Include the ID, column ID, and the date and time of analysis.

3.2.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

Report the name and concentration of each spiking compound. Samples are to be spiked with specified compounds of potential concern. List sample results, spiked sample results, duplicate spiked sample results, percent recovery (%R) and the relative percent difference (RPD) between the MS and MSD (if applicable). Acceptance criteria that the laboratory used for the analysis must also be presented.

3.2.8 Laboratory Duplicate Analysis

When performed, report the RPD between duplicate analyses, along with the associated acceptance criteria.

3.2.9 Laboratory QC Check Sample Analysis

Also known as the Laboratory Control Sample (LCS) or Matrix Spike Blank (MSB). Report the name and concentration of each spiking compound. List the QC check sample and duplicate (if applicable) results, %R, and RPD, if performed in duplicate. The acceptance criteria that the laboratory used for the analysis must also be presented.

3.2.10 Other QC Criteria

- **Retention time windows determination**. Report the retention time window for each analyte, for both primary and confirmation analyses.
- **Compound identification**. Report retention times and concentrations of each analyte detected in samples.
- **MDL determination**. List most recent method detection limits, with dates determined maintained in laboratory file. MDL summary forms may be submitted at start of project and not included in individual data packages.
- **Additional method suggested QC parameters, if required**.
- **Any Performance Evaluation (PE) samples** (if identified) associated with the environmental samples.

3.3 RAW DATA

Legible copies of the raw data shall be organized systematically, each page shall be numbered, and a table of contents must be included with each package. Raw data for compound identification and quantitation must be sufficient to verify each result.

3.3.1 Gas Chromatographic (GC) Analyses

This section shall include legible copies of raw data for the following:

- Environmental samples arranged in sequential order by laboratory sample number, include dilutions and reanalyses;
- Instrument calibrations; and
- QC analyses (i.e., method blanks, LCS, etc.).

Raw data for both primary and confirmation analyses are to be included. Raw data for each analysis shall include the following:

- Appropriately scaled chromatograms (label all analyte peaks, internal standards and surrogate standards with chemical names). All chromatograms shall be scaled such that individual peaks can be readily resolved from any neighboring peaks;
- Appropriately scaled before and after manual integrations;
- Area print-outs or quantitation reports;
- Instrument analysis logs for each instrument used;
- Sample extraction and cleanup logs;
- Standards preparation logs and manufacturer certificates of analyses for standards, if applicable, sufficient to document traceability of all standards (including surrogates, internal standards, and spike solutions) maintained in "job file" in laboratory, unless otherwise requested;
- Percent Moisture or Percent Solids for soil samples; and
- GC/MS confirmation, as applicable.

Note: Additional raw data may be required for some methods. Therefore, when reporting data, laboratories should defer to specific method requirements.

3.3.2 Gas Chromatographic / Mass Spectrometric (GC/MS) Analyses

This section shall include legible copies of raw data for the following:

- Environmental samples arranged in sequential order by laboratory sample number, include dilutions and reanalyses;

- Mass spectrometer tuning and mass calibration 4-Bromofluorobenzene, decafluorotriphenylphosphine (BFB, DFTPP);
- Initial and continuing instrument calibrations; and
- QC analyses (i.e., method blanks, LCS, etc.).

Raw data for each analysis shall include the following:

- Appropriately scaled chromatograms (label all analyte peaks, internal standards and surrogate standards with chemical names). All chromatograms shall be scaled such that individual peaks can be readily resolved from any neighboring peaks;
- Appropriately scaled before and after manual integrations;
- Ion scans and enhanced spectra of target analytes and tentatively identified compounds (TICs), with the associated best-match spectra;
- Area print-outs and quantitation reports;
- Instrument analysis logs for each instrument used;
- Sample extraction and cleanup logs;
- Standards preparation logs and manufacturer certificates of analyses for standards, if applicable, sufficient to document traceability of all standards (including surrogates, internal standards, and spike solutions) maintained in "job file" in laboratory, unless otherwise requested; and
- Moisture Content (Percent Moisture) for sediment samples.

Note: Additional raw data may be required for some methods. Therefore, when reporting data, laboratories should defer to specific method requirements.

4.0 INORGANIC ANALYSES DOCUMENTATION REQUIREMENTS

4.1 SUMMARY OF ENVIRONMENTAL SAMPLE RESULTS

The following information is to be included in the summary of sample results for each environmental sample:

- Client's sample identifications and corresponding laboratory identifications;
- Sample collection dates;
- Dates and times of sample digestion and/or analysis;
- Weights or volumes of sample used for digestion and/or analysis;
- Identification of instruments and analytical techniques used for analysis;
- Instrument specifications;
- Dilution or concentration factor for the sample;
- Percent Moisture or Percent Solids for soil samples;
- Detection Limits: MDLs, RLs;
- Analytical results and associated units; and
- Definitions for any laboratory data qualifiers used.

4.2 SUMMARY OF QA/QC RESULTS

The following QA/QC sample results shall be presented on QC summary forms. They shall also include the date and time of analysis. Additional summary forms may be required for some methods. Therefore, when reporting data, laboratories should defer to specific method requirements.

All summary forms shall, at a minimum, include in the header:

- Form Title;
- Project Identifier (e.g., Batch QC ID, Site Name, Case Number, Sample Delivery Group);
- Laboratory Name; and
- Sample Matrix.

4.2.1 Instrument Calibration Verification (if applicable)

The order for reporting of calibration verifications for each analyte must follow the chronological order in which the standards were analyzed.

- **Initial Calibration Verification.** Report the source for the calibration verification standards. Report the concentration for the true value, the concentration found, the percent recovery, and control limits for each element analyzed. The date and time of analysis must also be reported.
- **Continuing Calibration Verification**. Report the source for calibration verification standards. Report the concentration for the true value, the concentration found, the percent recovery, and control limits for each element analyzed. The date and time of analysis must also be reported.
- **Quantitation Limit** or PRRL Verification (if applicable). Report results for standards that are used to verify instrument sensitivity. Report the source for the verification standards. Report the concentration for the true value, the concentration found, the percent recovery, and control limits for each element analyzed. The date and time of analysis must also be reported.

4.2.2 Blank Analysis

Report analyte concentrations above the instrument detection limits found in the initial calibration blanks (ICBs), continuing calibration blanks (CCBs), and in method/ preparation blanks. The date and time of analysis must also be reported. The order for reporting ICB and CCB results for each analyte must follow the chronological order in which the blanks were analyzed.

4.2.3 Matrix Spike (MS) Analysis

Report concentrations of the unspiked sample result, the spiked sample result and the concentration of the spiking solution added to the pre-digestion spike for each analyte. Calculate and report the %R and list control limits. If performed in duplicate, provide the %R for the MSD and the RPD.

4.2.4 Post Digestion Spike Analysis (if applicable)

In addition to matrix spikes, post-digestion spikes are often required by the method. Report concentrations of the unspiked sample results, spiked sample results, and the concentration of the spiking solution added. Calculate and report the %R and list control limits.

4.2.5 Laboratory Duplicate Analysis

Report concentrations of original and duplicate sample results. Calculate and report the RPD and list control limits.

4.2.6 Laboratory Control Sample

Identify the source for the LCS. Report the found concentration of the laboratory control sample and the true concentration for all analytes. Calculate and report the %R and list control limits.

4.2.7 Other QC Criteria (if applicable)

- **Method of Standard Additions (MSA)**. This summary must be included if MSA analyses are performed. Report absorbance values with corresponding concentration values. Report the final analyte concentration and list the associated correlation coefficient and control limits.
- **ICP-AES Serial Dilution**. Report initial and serial dilution results, associated %D, and control limits.
- **ICP-AES Linear Dynamic Ranges.** For each instrument and wavelength used, report the date on which linear ranges were established, the integration time, and the upper limit concentration.
- **MDL Determination**. List most recent method detection limits as determined using the September 2017 promulgation of the 40CFR136, with dates determined maintained in laboratory file. MDL summary forms may be submitted at start of project and not included in individual data packages.
- **Any Performance Evaluation (PE) Samples** (if identified) associated with the environmental samples.

4.3 RAW DATA

Legible copies of the raw data shall be organized systematically, each page shall be numbered, and a table of contents must be included with each package. Data should be organized sequentially by method and analysis date. Raw data for compound identification and quantitation must be sufficient to verify each result.

4.3.1 Atomic Absorption (AA) and Atomic Emission (AE) Spectrometric Analyses

This section shall include legible copies of raw data for the following:

- Environmental sample results, include dilutions and reanalyses;
- Instrument calibrations; and
- QC analyses (i.e., method blanks, LCS, etc.).
- Measurement print-outs for all instruments used or copies of logbook pages for analyses that do not provide instrument print-outs;
- Absorbance units, emission intensities, or other measurements for all analyses;
- Sample preparation and digestion logs that include reagents used, standards referenced to standards preparation logs, volumes of reagents, digestion times, etc.;
- Instrument analysis logs for each instrument used or summary of sample analyses;
- Standards preparation logs and manufacturer certificates of analyses for standards, if applicable, sufficient to document traceability of all standards (including spike solutions) maintained in “job file” in laboratory, unless otherwise requested;
- Wavelengths used for the analyses; and
- Percent Moisture or Percent Solids for soil samples.

Note: Additional raw data may be required for some methods. Therefore, when reporting data, laboratories

should defer to specific method requirements.

4.3.2 Titrimetric and Colorimetric Analyses

This section shall include legible copies of raw data for the following:

- Environmental sample results, include dilutions and reanalyses;
- Calibrations; and
- QC analyses (i.e., method blanks, LCS, etc.).

Raw data for each analysis shall include the following:

- Copies of logbook pages for analyses that do not provide instrument print-outs and calculations used to derive reported sample concentrations;
- Titrant volumes, titration end-points, absorbance units, or other measurements for all analyses;
- Sample preparation and digestion logs that include reagents used, standards referenced to standards preparation logs, volumes of reagents, digestion times, sample volumes, solution normalities, etc.;
- Standards preparation logs and manufacturer certificates of analyses for standards, if applicable, sufficient to document traceability of all standards (including spike solutions) maintained in "job file" in laboratory, unless otherwise requested; and
- Wavelengths used for the analyses.
- Note: Additional raw data may be required for some methods. Therefore, when reporting data, laboratories should defer to specific method requirements.

4.3.3 Gravimetric Analyses

This section shall include legible copies of raw data for the following:

- Environmental sample results, include dilutions and reanalyses;
- Calibrations; and
- QC analyses (i.e., method blanks, LCS, etc.).

Raw data for each analysis shall include the following:

- Copies of logbook pages for analyses that do not provide instrument print-outs and calculations used to derive reported sample concentrations;
- Weights, sample volumes, or other measurements for all analyses;
- Sample preparation and digestion logs that include reagents used, standards referenced to standards preparation logs, volumes of reagents, drying times, drying temperatures, etc.; and
- Standards preparation logs and manufacturer certificates of analyses for standards, if applicable, sufficient to document traceability of all standards maintained in "job file" in laboratory, unless otherwise requested.

Note: Additional raw data may be required for some methods. Therefore, when reporting data, laboratories should defer to specific method requirements.

SUMMARY OF REQUIRED LABORATORY DELIVERABLES FOR LEVEL IV DQO DATA PACKAGE (REQUIREMENTS WILL VARY BY METHOD)

Method Requirements	Laboratory Deliverables
Requirements for all methods:	
Parsons project identification number	Case narrative
Discussion of unusual circumstances or problems	Case narrative
Analytical method description and reference citation	Case narrative
Field sample identification	Signed chain-of-custody forms and sample results form
Laboratory assigned sample number	Signed chain-of-custody forms and sample results form
Sample matrix description	Signed chain-of-custody forms and sample results form
Date of sample collection	Signed chain-of-custody forms and sample results form
Date of sample receipt at laboratory	Signed chain-of-custody forms
Analytical method description and reference citation	Signed chain-of-custody forms and case narrative
Sample analysis results	USEPA Contract Laboratory Program (CLP) form or equivalent sample analysis results summary form (e.g., ASP Form I-VOA)
Dates of sample preparation and analysis (including first run and any subsequent runs)	Specific deliverable depends on type of analysis
Laboratory analytical QC batch info and sample analysis associations	Specific deliverable depends on type of analysis
Instrument analysis sequence log	Specific deliverable depends on type of analysis
Analytical holding times compliance	USEPA CLP form or equivalent holding time summary form
Method detection limit (MDL) determination	USEPA CLP form or equivalent MDL summary form
Method reporting limits (RLs) achieved	Specific deliverable depends on type of analysis (see below)
Dilution or concentration factors	Specific deliverable depends on type of analysis
Discussion of unusual circumstances or problems	Case narrative
Laboratory Control Sample (LCS) results	USEPA CLP form or equivalent LCS results summary form
“Raw” analytical data sufficient to recreate and check analysis results for all calibrations, QC sample results, and sample results	Sequentially numbered pages with tabulated index

REQUIRED LABORATORY DELIVERABLES (Continued)

Method Requirements	Laboratory Deliverables
Matrix spike / matrix spike duplicate	USEPA CLP form or equivalent MS/MSD summary form (e.g., NYSDEC ASP Form III-SV
Method blank analysis	USEPA CLP form or equivalent method blank summary form (e.g., NYSDEC ASP Form IV-SV)
GC/MS instrument performance check. Tuning and mass calibration (abundance) using BFB for method SW8260C and DFTPP for method SW8270CD	USEPA CLP form or equivalent instrument tuning/performance check summary form
Internal Standard Area Counts and Retention Time, as applicable	USEPA CLP form or equivalent internal standard summary form (e.g., NYSDEC ASP Form VIII-SV)
GC/MS initial calibration data	USEPA CLP form or equivalent initial calibration summary form (e.g., NYSDEC ASP Form VI-SV)
GC/MS continuing calibration data.	USEPA CLP form or equivalent continuing calibration summary form (e.g., NYSDEC ASP Form VII-SV)
GC/MS calibration verification (initial and continuing)/2nd source calibration verification (ICV/CCV)	USEPA CLP form or equivalent calibration verification summary form
GC continuing calibration data for volatile and semivolatile analyses. If calibration factors are used, calibration factors and their percent differences from the initial calibration must be reported. Retention time windows and analyte retention times must be included in this form	USEPA CLP form or equivalent calibration verification summary form
GC/MS internal standard area and retention time summary data	USEPA CLP form or equivalent internal standard summary form
GC second column confirmation, as applicable. To be done for all compounds that are detected above method detection limits	Chromatograms of all confirmations of all samples and the standard laboratory form for all positive results
Surrogate Compound percent recovery summary	USEPA form or equipment percent recovery summary form (e.g., NYSDEC ASP Form II-SV)
"Raw" analytical data sufficient to recreate and check analysis results for all calibrations, QC sample results, and sample results	Sequentially numbered pages with tabulated index
Requirements for inorganic analytical methods:	
Initial and Continuing Calibration Verification	USEPA CLP form or equivalent calibration verification summary form(s) (e.g., NYSDEC ASP Form II-IN)

REQUIRED LABORATORY DELIVERABLES (Continued)

Method Requirements	Laboratory Deliverables
ICP Interference Check Sample (ICS), as applicable	USEPA CLP form or equivalent ICS standard summary form (e.g., NYSDEC ASP Form IV-IN)
ICP Interelement Correction Factors, as applicable	USEPA CLP form or equivalent internal standard summary form (e.g., NYSDEC ASP Form XII-IN
Instrument Detection Limit (IDL) or MDL determination	USEPA CLP form or equivalent IDL or MDL summary form(s)
Post-digestion spike, as applicable	USEPA CLP form or equivalent post-digestion spike summary form(s) (e.g., NYSDEC ASP Form V-IN)
ICP linear range	USEPA CLP form or equivalent linear range summary form(s) (e.g., NYSDEC ASP Form XII-IN)
ICP serial dilution, as applicable	USEPA CLP form or equivalent serial dilution summary form(s) (e.g., NYSDEC ASP Form IX-IN)
Method of standard addition (MSA), as applicable	USEPA CLP form or equivalent MSA summary form(s)
Laboratory duplicate results, as applicable	USEPA CLP form or equivalent duplicate analysis summary form(s) (e.g., NYSDEC ASP Form VI-IN)
Requirements for other methods:	
Preparation and analysis logs	No format
Sample results	No format
MS/MSD results	No format
Lab duplicate sample results	No format
Laboratory control sample	Control limits
Method blank results	No format
Initial calibration results	No format
Continuing calibration check (calibration verification)	No format. Report percent relative standard deviation or percent difference from initial calibration

APPENDIX I

OPERATION AND MAINTENANCE (O&M) MANUAL FOR SSD SYSTEM

The O&M Manual will be included in the site management plan as an addendum after the installation of the SSD System has been completed.