Tony's Cleaners

NASSAU COUNTY, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: 130217

Prepared for:

Nu-Life Realty LLC

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Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date
1	2/17/17	As per 12/12/16, 12/20/16 and 2/7/17 Comments	5/15/17

FEBRUARY 2017

CERTIFICATION STATEMENT

I ANDREW R. LEVENBAUM certify that I am currently a NYS registered professional engineer as 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).

A Site Management Plan has been submitted for the continual and proper operation, maintenance, and monitoring of any engineering controls employed at the site including the property maintenance of any remaining monitoring wells, and that such plan has been approved by DER.

[PE]

February 14, 2017 DATE



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List of Acronyms

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

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

ES EXECUTIVE SUMMARY

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

Site Identification: Site No. **130217.** Tony's Cleaners. 429-441 Merrick Road Lynbrook, NY 11563.

Institutional Controls:	1. Permitted future uses (commercial and industrial) must comply with 6 NYCRR 375-1.8(g)(2)(iii) for commercial uses and 6 NYCRR 375-1.8(g)(2)(iv) for industrial uses.
	2. All ECs must be operated and maintained as specified in this SMP
	3. Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP.
	4. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Nassau Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
	5. All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP
	6. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP
	7. Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP
	8. 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.

Site Identification: Site No. **130217.** Tony's Cleaners. 429-441 Merrick Road Lynbrook, NY 11563.

	9. The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on Figure 2, and any potential impacts that area identified must be monitored or mitigated; and	
	10. Vegetable gardens and farming on the site are prohibited;	
Engineering Controls:	1. Sub-Slab Depressurization /Soil Vapor Extraction System	
	2. Exhaust Ventilator	
Inspections:		Frequency
1. SVES and Exhaust Ventilator		Annually
Monitoring:		
1. SVES		24/7/365 Wireless Telemetry
2. Exhaust Ventilator		24/7/365 Wireless Telemetry
Monitoring wells MW-1 through MW-6		Upon Request for Site Closure
Maintenance:		
1. Pre-filter media replacement		Annually
Reporting:		
1. Periodic Review Report		Annually

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

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the property known as 429-441 Merrick Road located in the Village of Lynbrook, New York (hereinafter referred to as the "Site"). See Figure 1. Pursuant to an Order on Consent and Administrative Settlement, the Site is currently in the New York State (NYS) Superfund Program (Site No. 130217) which is administered by New York State Department of Environmental Conservation (NYSDEC).

Nu-Life Realty LLC entered into an Order on Consent with the NYSDEC on December 6, 2013. A figure showing the site location and boundaries is provided in Figure 2. The boundaries of the site are more fully described in the metes and bounds site description that is part of the Environmental Easement provided in Appendix A.

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

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

It is important to note that:

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

- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and the Order on Consent (Index #A1-0817-13-11; Site #130217) for the site, and thereby subject to applicable penalties.

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

This SMP was prepared by Advanced Cleanup Technologies, Inc. (ACT), on behalf of Nu-life Realty LLC, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 3, 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and ECs required by the Environmental Easement for the site.

1.2 Revisions

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

1.3 Notifications

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

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

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

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

Table 1 below 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 B.

Table 1: Notifications*

Name	**Contact Information**
Walter J. Parish, P.E., NYSDEC Regional Hazardous Waste Remediation Engineer	(631) 444-0240, walter.parish@dec.ny.gov
Jamie Ascher, NYSDEC Project Manager	(631) 444-0246, jamie.ascher@dec.ny.gov
Stephen Lawrence, NYSDOH Project Manager	(518) 402-7860, beei@health.ny.gov
Kelly Lewandowski, P.E., Chief, NYSDEC Site Control Section	(518)402-9553,kelly.lewandowski@dec.ny.gov

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

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The site is located in the Village of Lynbrook, Nassau County, New York and is identified as Section 37 Block 320 and Lots 160, 161 and 162 on the Nassau County Tax Map (see Figure 1). The site is approximately 0.46-acres in area and is bounded by residential properties to the north, Merrick Road followed by commercial properties to the south, Nieman Avenue followed by a church and parochial school to the east, and commercial properties to the west (see Figure 2 – Site Layout Map). The boundaries of the site are more fully described in Appendix A –Environmental Easement. The owner of the site parcels at the time of issuance of this SMP is Nu-Life Realty LLC.

2.2 Physical Setting

2.2.1 Land Use

The Site consists of three adjoining lots totaling approximately 0.46 acres. The existing building is a 1-story row of 9 retail stores, including a dry cleaner (Tony's Cleaners). An asphalt parking lot is located along the south side of the property and a concrete-paved alley is located along the northern property's boundary. The Site is zoned commercial and is currently utilized for commercial uses. Site occupants include Japanese restaurant, Chinese take-out restaurant, pizzeria, dry cleaner, beauty salon, deli, shoe repair, nail salon and Laundromat. The property is constructed on a concrete slab and does not contain a basement. The building is connected to the municipal water and sewer systems.

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 Merrick Road following by commercial properties; the

properties immediately north of the Site include residential properties; the properties immediately east of the Site include Nieman Avenue followed by a church and parochial school properties; and the properties to the west of the Site include commercial properties.

2.2.2 Geology

The Site topography is relatively flat with an approximate elevation of 19.6' above mean sea level. The geology of the Site consists of fine to medium-grained sands with some pebbles, silt and clay to the water table, which was found between 9 and 10 feet below ground surface (bgs). Medium-grained sands were generally found below the water table. Site-specific boring logs are provided in Appendix C.

2.2.3 Hydrogeology

The depth to groundwater varies from 9 to 10 feet bgs. Depth to groundwater measurements were made on June 27, 2012, July 13, 2012, November 4, 2014 and December 28, 2016. Groundwater contour maps for these monitoring events are presented in Figure 3. Groundwater flow beneath the site is in a southwesterly direction.

Groundwater elevation data is provided in Table 2. Groundwater monitoring well construction records are provided in Appendix D.

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. A diagram containing all soil sampling locations is provided as Figure 4. A diagram of all groundwater sampling locations is provided as Figure 5. A diagram of all soil vapor sampling locations is provided as Figure 6. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

The history of the Site is documented in the Phase 1 Environmental Site Assessment by Atlantic Geoscience, Inc. (AGI) dated December 21, 2000. Prior to 1960, the Site had been developed with two small stores and, before that, with a single-family home in 1919. The Site appears to have operated as a strip shopping center from about 1960 to the present. The current owner purchased the property on February 1, 2001 and continues to operate the Site as a strip shopping center. It is unclear when dry cleaning operations commenced. According to a telephone conversation with Joseph Defranco of the Nassau County Department of Health, the county had no records of historical dry cleaning operations at the Site.

A subsurface investigation in February 2012 by Brockerhoff Environmental Services LLC (Brockerhoff) found Tetrachloroethene (PCE) in two soil borings and Trichloroethene (TCE) in one soil boring above UUSCOs in soil samples collected next to the dry cleaning machine and beneath the northern portion of the building. PCE was also found in groundwater samples from all three monitoring wells, while TCE was only found in two wells. Both PCE and TCE were found above water quality standards in MW-2, with PCE also above water quality standards in MW-1. According to the BES investigation, PCE was also found in high concentrations in sediment sample DW-1. However, subsequent sediment samples collected from known storm drain locations were unable to replicate those results.

On July 13, 2012, ACT sampled the three existing monitoring wells at the Site and a fourth newly installed monitoring well in the southwest corner of the Site and hydraulically downgradient from the dry cleaners. The investigation confirmed the presence of PCE and TCE in groundwater above water quality standards in front of the building (MW-2) and PCE in groundwater slightly above water quality standards at the downgradient perimeter of the Site (MW-4).

On August 15, 2012 ACT installed and sampled three soil borings inside the dry cleaner. No VOCs were detected above UUSCOs in any of the soil borings except

Methylene Chloride, which was attributable as a laboratory artifact. Three temporary monitoring wells were also installed and sampled at the borehole locations. PCE and TCE were identified above water quality standards in all of the water samples collected from the interior temporary wells. Three dry wells were also sampled in the northern and southern exterior portions of the Site. No VOCs were detected above regulatory criteria in any of the dry wells.

In April 2013, ACT installed a Soil Vapor Extraction System (SVES) beneath the Site to protect occupants of the building and remediate contaminated soil and groundwater beneath the site. The SVES included off-gas treatment with vapor phase granular-activated carbon adsorbers.

On March 13, 2014, vapor intrusion sampling was performed at the commercial units adjacent to the existing dry cleaner. The results indicated that PCE was present above its indoor air guideline inside the pizzeria and salon, while PCE and TCE were present in sub-slab soil vapor above NYSDOH screening levels only beneath the pizzeria.

On June 3, 2014, additional air samples were collected inside the pizzeria and salon after adjustments to existing ventilation systems. The results indicated significantly improved air quality in both commercial units, although PCE remained slightly above its indoor air guideline in the pizzeria.

An Interim Remedial Measure Work Plan dated May 9, 2014 outlined details for the installation and startup of an expanded SSD system beneath the site. In July 2014, the expanded SSD system was installed and put into operation to overcome boundary effects caused by the building's central footing, along the eastern wall of the dry cleaner. A new exhaust ventilator was also installed inside the dry cleaner to reduce fugitive emissions from dry cleaning operations.

On September 10, 2014, ACT performed a routine groundwater monitoring event, including the measurement of water levels and the collection of groundwater samples

from four cased groundwater monitoring wells (MW-1 through MW-4). The sampling was performed to evaluate groundwater quality after the SVES had been operating for over a year. The results of the groundwater monitoring event showed concentrations of PCE above water quality standards in MW-2 (6.0 ug/l) and MW-4 (33 ug/l) and TCE above water quality standards in MW-4 (5.5 ug/l).

On October 9 and October 10, 2014, ACT installed soil boring SB-5 along the southern property boundary and soil boring SB-6 along the northern property boundary. No VOCs were detected above the laboratory method detections limits in any of the soil samples. A groundwater sample was collected at a depth of 20 feet below the static water table from temporary well TW-5 installed in the borehole of SB-5. PCE was found at 6.2 ug/l, which is slightly above its water quality standard.

On October 10, 2014, ACT conducted soil vapor investigation including the installation and sampling of three soil vapor probes along the rear alley and behind the Laundromat. The results showed trace levels of PCE in soil vapor samples adjacent to the dry cleaner, while PCE was detected above its air guideline in SV-3 along the western property boundary. An auto repair facility is believed to be operating inside the adjacent building to the west.

On November 4, 2014, groundwater samples were collected from the existing and newly-installed cased monitoring wells (MW-1 through MW-6). For the first time, PCE was found below its water quality standard in MW-2 located in front of the dry cleaner. PCE was found above its water quality standard only in MW-4 (63 ug/l) and MW-5 (30 ug/l), both located in the southwest portion of the site and hydraulically downgradient of the dry cleaner. TCE was found above its water quality standard only in MW-4 (17 ug/l).

On January 15, 2015 indoor air samples were collected inside the pizzeria and salon to verify that fugitive dry cleaning emissions had been controlled following installation of the new exhaust ventilator. Surprisingly, the results indicated an increase in PCE and TCE over the June 2014 results. Following interviews with field personnel, it

was learned that the operator of the dry cleaning machine had turned off the new exhaust ventilator during the January 2015 sampling event. The operator agreed to keep the exhaust ventilator running as required by his operating permit and to protect public health. A pressure switch was also installed inside the air duct leading to the exhaust ventilator to measure the presence of airflow in the intake duct, thus insuring that the exhaust ventilator was operating continuously.

On March 5 and 18, 2015, post-installation vapor intrusion sampling was performed at the pizzeria and salon, respectively. The results indicated that air inside the pizzeria and salon met NYSDOH indoor air guidelines. The Site Characterization Report dated June 12, 2015 summarized the findings from tasks performed pursuant to the approved Site Characterization Work Plan and provided an updated summary of environmental conditions at the site.

On February 18, 2016, the NYSDEC Division of Air Resources notified ACT that the use of GAC treatment could be discontinued. Both carbon adsorbers were subsequently taken offline and their contents disposed of as manifested waste.

On December 28, 2016, a groundwater monitoring event was performed that included depth to water measurements and sample collection and analysis from all 6 monitoring wells. The results indicated the absence of groundwater quality exceedances in all monitoring wells.

The Construction Completion Report dated August 2016 summarizes the final engineering design and construction activities associated with implementation of the IRM Work Plan and includes “as-built” drawings of the remedial system.

2.4 Remedial Action Objectives

Based on the results of the Site Characterization, the following Remedial Action Objectives (RAOs) were identified for this site:

Groundwater RAOs

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.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.

Soil RAOs

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

2.5 Remaining Contamination

2.5.1 Soil

A subsurface investigation in February 2012 by Brockerhoff reportedly found PCE above UUSCOs in soil samples collected next to the dry cleaning machine (17 mg/kg @ SS-2) and beneath the northern portion of the building (3.9 mg/kg @ SS-4).

In August 2012 ACT installed and sampled three soil borings inside the front, middle and back portions of the dry cleaner. No VOCs were detected above UUSCOs in any of the soil borings except Methylene Chloride, which could have been a laboratory artifact. A soil sample from 0 to 3 feet in depth at SB-2 behind the dry cleaning machine contained 1.2 mg/kg PCE. A soil sample collected from 9 to 11 feet in depth in the same boring contained 0.52 mg/kg PCE.

The most recent soil investigation was conducted in October 2014 when two soil borings (SB-5 and SB-6) were installed and continuously sampled to the water table at exterior locations at the site. Soil boring SB-5 was installed along the southern property boundary to assess soil quality in front of the building and soil boring SB-6 was installed along the northern property boundary to assess soil quality behind the dry cleaner. The locations of these soil borings are depicted in Figure 4.

Soil samples from depths of 4 to 5 ft and 11 to 12 ft in SB-5 were retained for laboratory analysis. In SB-6, a dry soil sample from the soil-water interface (10-11 ft) was collected for laboratory analysis. All soil samples were submitted to York Analytical Laboratories, Inc. (NYSDOH #10854), a NYSDOH-approved laboratory for analysis in accordance with EPA Method 8260. As indicated in Table 3, no VOCs were detected above the laboratory method detections limits in any of the soil samples.

In summary, no soil samples collected at the site since August 2012 were found to contain any chemicals of concern above SCGs.

2.5.2 Groundwater

In February 2012, Brockerhoff installed and sampled three conventional monitoring wells (MW-1 through MW-3) at the exterior locations indicated in Figure 5. PCE was detected above groundwater quality standards in monitoring wells MW-1 and MW-2, while TCE and cis-1,2-Dichoroethene (Cis-1,2-DCE) were detected above groundwater quality standards in MW-2 only.

On August 15, 2012 ACT installed and sampled three temporary monitoring wells TW-1, TW-2 and TW-3) at the interior locations indicated in Figure 5. PCE and TCE were detected above groundwater quality standards in water samples from all three wells, including PCE @ 180ug/l, 190ug/l and 230ug/l and TCE @ 46ug/l, 51ug/l and 49ug/l, respectively.

On November 4, 2014 groundwater samples were collected from the current six exterior monitoring wells. PCE was detected in all of the monitoring wells ranging from 0.53 µg/L in MW-6 along the northern (upgradient) property boundary to 63 µg/L in MW-4 in the southwest (downgradient) property boundary.

TCE was detected in MW-2, MW-4, and MW-5, with only MW-4 (17 ug/L) above standards. Cis-1,2-Dichloroethene was detected in MW-4 and MW-5, with only MW-4 above standards (44 µg/L). Trace concentrations of 2-Butanone, Acetone, Ethylbenzene, o-Xylene, p-Isopropyltoluene, and trans-1,2-Dichloroethene were sporadically detected beneath the site below water quality standards.

On December 28, 2016, a groundwater monitoring event was performed that included depth to water measurements and sample collection and analysis from all 6 monitoring wells. The results indicated the absence of groundwater quality exceedances in all monitoring wells. A summary of historical groundwater exceedances is provided in Table 4 and Figure 7.

In summary, no groundwater samples exceed SCGs following completion of the remedial action.

2.5.3 Soil Vapor

The most recent soil vapor intrusion study was performed on March 5 and 18, 2015 at the commercial units adjacent to the existing dry cleaner. The pizzeria is located to the east and the beauty salon is located to the west of dry cleaner.

Indoor air samples IA-3 and IA-4 were collected from inside the pizzeria and beauty salon, respectively. Sub-slab soil vapor samples VP-3 and VP-4 were collected from two permanent sub-slab vacuum monitoring points inside the pizzeria and beauty salon, respectively. All four samples were transported to York Analytical Laboratories for VOC analysis in accordance with USEPA Method TO-15.

The analytical results for indoor air and sub-slab soil vapor samples are summarized in Table 5. It can be seen in Table 5 that air quality inside the Pizzeria and Beauty Salon meet NYSDOH indoor air guidelines.

PCE was detected in both sub-slab soil vapor samples below its NYSDOH Matrix 2 soil vapor screening level of 100 $\mu g/m^3$, with concentrations of 49 $\mu g/m^3$ and 63 $\mu g/m^3$ detected in VP-3 and VP-4, respectively. TCE was detected in both sub-slab soil vapor samples slightly above its NYSDOH Matrix 1 soil vapor screening level of 5 $\mu g/m^3$, with concentrations of 5.1 $\mu g/m^3$ and 23 $\mu g/m^3$ in VP-3 and VP-4, respectively.

Table 6 summarizes the results of all samples of soil vapor that exceed the SCGs after completion of the remedial action.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

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

This plan provides:

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

3.2 Institutional Controls

A series of ICs is required by the Construction Completion 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 and industrial 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 2. These ICs are:

- Permitted future uses (commercial and industrial) must comply with 6 NYCRR 375-1.8(g)(2)(iii) for commercial uses and 6 NYCRR 375-1.8(g)(2)(iv) for industrial uses;
- All ECs must be operated and maintained as specified 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;
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Nassau 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.
- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- 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.
- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on Figure 2, and any potential impacts that are identified must be monitored or mitigated; and
- Vegetable gardens and farming on the site are prohibited;

3.3 Engineering Controls

Exposure to remaining contamination at the site is prevented by a Soil Vapor Extraction System (SVES). Procedures for operating and maintaining the SVES are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As-built drawings, signed and sealed by a professional engineer, are included in Appendix F – Operations and Maintenance Manual. Figure 8 shows the location of the ECs for the site.

3.3.1 Soil Vapor Extraction System

In April 2013, ACT installed a soil vapor extraction system (SVES) at the Site in order to protect occupants of the building and remediate contaminated soil and groundwater beneath the ground. In July 2014, the SVES was expanded along the eastern interior wall of the dry cleaner to overcome boundary effects caused by the building's central footing. Figure 9 contains the Process and Instrumentation Diagram for the Remedial System.

The objectives of the SVES system are: 1) to maintain a negative pressure beneath the building foundation in order to prevent VOCs from entering the building's breathing zone, and 2) to remove VOCs from subsurface soil and ground water.

The SVES consists of two vertical 2-inch diameter vacuum wells installed along interior walls in the dry cleaner and screened from the base of the slab to a 1 foot above the water table and two vertical 3-inch diameter vacuum wells installed along the eastern wall of the dry cleaner and screened from 2 feet to 6 feet in depth.

The two vertical 2-inch diameter wells are connected to a single 2-inch diameter manifold pipe leading to a 3 Hp FPZ regenerative blower in the boiler room. After the blower, the air stream is discharged through a 2-inch exhaust pipe located 3 feet above the roof of the building. Each 3-inch diameter well is connected to a riser pipe leading to two dedicated 320-Watt weatherproof Model HS5000 RadonAway vacuum blowers

installed on the roof with their exhausts discharging directly above each blower. Ball valves on each riser pipe adjust vacuum to each of the SVES wells.

The regenerative blower and controls for the two vertical 2-inch diameter wells are located in the boiler room in the northwest corner of the building. The regenerative blower is equipped with a moisture separator, air filter, gauges and switches to control its operation. The suction line is equipped with a vacuum relief valve to avoid excessive vacuum load on the blower.

The regenerative blower is equipped with controls to shut down the blower in the event of an alarm condition. An internal high-pressure switch will shut down the blower if the vacuum at the blower inlet rises above a present vacuum. An internal thermal overload switch will shut the blower down if its temperature rises above a present limit. The moisture separator will shut the blower down when the liquid level within the moisture separator rises above a preset level, triggering an alarm condition.

3.3.2 Exhaust Ventilator

In September 2014, the original exhaust fan inside the dry cleaner was replaced with a new 3,000 cfm Dayton centrifugal belt-drive upblast exhaust ventilator located next to the former exhaust fan, which was then sealed to reduce fugitive emissions from the operating dry cleaner. A new fresh air intake was installed on the front roof to avoid drawing in fumes from nearby restaurant exhausts in the back. The intake was also ducted to the back of the dry cleaner to keep the customer area warm in the winter.

In the event of an alarm condition, the ACT project manager will immediately receive email and text alerts so appropriate service procedures can be implemented and noted in the Periodic Review Report (PRR) prepared for that reporting period.

3.3.3 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 in the Construction Completion Report and Section 6.4 of NYSDEC DER-10.

3.3.3.1 Soil Vapor Extraction System

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

3.3.3.2 Exhaust Ventilator

The exhaust ventilator is a permanent control on the existing dry cleaning operation. The exhaust ventilator will not be discontinued unless prior written approval is granted by the NYSDEC and the NYSDOH to discontinue the SVES.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

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

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

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

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

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

- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site – wide Inspection

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

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

Inspections of all remedial components installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the PRR. 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; and

Reporting requirements are outlined in Section 7.0 of this plan.

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

4.3 Remedial System Monitoring

As long as the SVES is maintaining 0.004 inches of vacuum beneath the dry cleaners and the tenant spaces on either side of the dry cleaners (currently a beauty salon and pizzeria), no additional vapor intrusion sampling is required while the system is operational.

A wireless telemetry system has been installed on the entire SVES, including analog pressure sensors on all four vacuum wells, on pre-filter, influent and effluent ports of the regenerative blower and on the exhaust manifold of the overhead exhaust ventilator. Data from these pressure sensors provide 24/7/365 real-time vacuum at each vacuum well along with comprehensive operating conditions of the SVES. Specifications for the wireless telemetry system are provided in Appendix I. A schedule of monitoring parameters and operating ranges is provided in Table 7, below.

Unscheduled inspections will take place when the *ACT project manager is notified by email and text alerts of an alarm condition other than loss of power to the* SVES*. In that event, the ACT project manager will immediately schedule a site inspection to implement procedures outlined in the Operation and Maintenance Plan (Section 6.0). A written service report for the alarm condition will be included in* the PRR. Modification to these monitoring requirements will require approval from the NYSDEC.

Table 7 – Remedial System Monitoring Requirements and Schedule

Remedial System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
SVES Wells	Vacuum Pressure	5.5”-14” w.c.	24/7/365 Telemetry
Pre-filter	Pressure Drop across filter media	No more than 15” w.c. across filter media	24/7/365 Telemetry
FPZ Blower	Blower Influent Blower Effluent	28-43” w.c. 5”-8” w.c.	24/7/365 Telemetry
RadonAway Blowers	Blower Influent	6”-20” w.c.	24/7/365 Telemetry

A complete list of components to be inspected is provided in the Inspection Checklist, provided in Appendix H - Site Management Forms. 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

Table 8 contains a summary of post-remediation soil, groundwater and vapor intrusion sampling that will be required following a proposal to discontinue engineering controls at the site.

Table 8 – Post Remediation Sampling Requirements and Schedule

Sampling Location	Analytical Parameter	Schedule
Soil Sampling EP-1 -- EP-4	VOCs (EPA Method 8260	2 weeks after shut down of SVES
Groundwater Sampling MW-1 – MW-6	VOCs (EPA Method 8260	2 weeks after shut down of SVES

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

4.4.1 Soil Sampling

Soil sampling will be performed upon proposal to discontinue the engineering controls submitted by the remedial party, to assess the quality of the soil following completion of the remedial action. The network of on-site soil sample locations has been designed based on the following criteria:

- A diagram of post-remedial soil sampling locations is provided in Figure 10.
- Samples will be collected from the 0’ – 2’ and 8’ – 10’ depths at each soil sampling location.
- A summary of sample designations, analytical parameters, detection limits and minimum reporting limits to be achieved by an Environmental Laboratory Approval Program (ELAP) certified laboratory is provided in Table 9, below.

Table 9 – Post-Remedial Soil Sampling Requirements

Sample Number	Analytical Parameters	Detection Limits (ug/kg)	Minimum Reporting Limits (ug/kg)
EP-1	VOCs (EPA Method 8260)	0.20	0.50
EP-2	VOCs (EPA Method 8260)	0.20	0.50
EP-3	VOCs (EPA Method 8260)	0.20	0.50
EP-4	VOCs (EPA Method 8260)	0.20	0.50

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

Modification to the frequency or sampling requirements will require approval from the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC.

4.4.2 Groundwater Sampling

Groundwater sampling will be performed upon proposal to discontinue the system submitted by the remedial party, to assess the quality of the groundwater following completion of the remedial action. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

The network of monitoring wells depicted in Figure 5 has been designed based on the following criteria: location of dry cleaner and its contamination source, local topography and groundwater flow direction measured by BES and ACT. As part of the post-remedial groundwater sampling event, 2 upgradient wells and 4 downgradient wells will be sampled to evaluate the effectiveness of the remedial system. Table 10 summarizes the identification number, purpose, location, depth, diameter and screened

interval of each monitoring well. Monitoring well construction records are included in Appendix D of this document.

The depth to groundwater at the Site varies from 9 to 10 feet below ground surface. Prior to purging, depth to water will be determined using an electronic conductivity meter accurate to the nearest 0.01 feet. Figure 3 depicts groundwater flow in a southwesterly direction on November 4, 2014. This direction is consistent with the direction of groundwater flow determined by BES on February 27, 2012 and by ACT on June 27, 2012 and July 13, 2012.

Table 10 – Monitoring Well Construction Details

Monitoring Well ID	Well Location	Well Diameter (inches)	Elevation (above mean sea level)			
			Casing	Surface	Screen Top	Screen Bottom
MW-1	Downgradient	2	18.28	18.87	10.28	0.28
MW-2	Downgradient	2	19.60	19.99	11.60	1.60
MW-3	Upgradient	2	19.06	19.64	11.06	1.06
MW-4	Downgradient	1	18.82	19.10	10.82	0.82
MW-5	Downgradient	1	18.75	18.95	10.75	0.75
MW-6	Upgradient	1	19.25	19.48	11.25	1.25

Groundwater samples will be collected from the existing monitoring wells into laboratory-issued sampling containers after purging each well utilizing a peristaltic pump with a dedicated polyethylene tubing as per the specifications of the *USEPA "Low Stress Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells," revised January 19th, 2010 (EQASOP-GW001).* Prior to sampling, each monitoring well should be purged of standing water until turbidity below 50 NTU's

is be measured.

The tubing intake should be set approximately 1 to 2 feet above the bottom of each monitor well. In an attempt to minimize turbidity in each well, ground water should be purged for approximately 10 minutes prior to measuring any parameters. After purging, the effluent end of the tubing should be disconnected from the flow-through cell and the ground-water samples should be collected in laboratory prepared sample containers. All samples should be stored on ice in a cooler to maintain a constant temperature until delivery under chain-of-custody procedures to the ELAP certified Laboratory for VOC analysis via EPA Method 8260.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance. The NYSDEC will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent PRR.

Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC.

4.4.3 Soil Vapor Intrusion Sampling

Post remedial monitoring for vapor intrusion will be performed upon proposal to discontinue the SVES submitted by the remedial party and will include collection of an indoor air sample in the tenant spaces located on either side of the dry cleaners and an

outdoor ambient air sample. Sampling should be performed during the heating season. The air samples shall be collected using Summa canisters and analyzed for VOCs via EPA Method TO-15 pursuant to the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (November 2006).

4.4.4 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in Appendix H - 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 J 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 SVES;
- Will be updated periodically to reflect changes in site conditions or the manner in which the SVES is operated and maintained.

Further detail regarding the Operation and Maintenance of the SVES is provided in Appendix F - 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 Remedial System Performance Criteria

Monitoring of the SVES will be performed on a 24 hour, 7 day a week, 365 day a year (7/24/365) basis via a wireless telemetry system discussed in Section 4.3 above. Modification to the monitoring requirements will require approval from the NYSDEC.

Unscheduled inspections will take place when the ACT project manager is notified of an alarm condition other than loss of power in the SVES. Components to be monitored include, but are not limited to, the components included in Table 11 below.

Table 11 – Remedial System Monitoring Requirements and Schedule

Remedial System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
SVES Well	Vacuum Pressure	5.5”-14” w.c.	24/7/265 Telemetry
Pre-filter	Pressure Drop Across Filter	No more than 15” w.c. across filter media	24/7/265 Telemetry
FPZ Regenerative Vacuum Blower	Blower Influent Blower Effluent	28-43” w.c. 5”-8” w.c.	24/7/265 Telemetry
RadonAway Vacuum Blowers	Blower Influent	6”-20” w.c.	24/7/265 Telemetry

A complete list of components to be inspected is provided in the Inspection Checklist, provided in Appendix H - Site Management Forms. 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.

5.3 Operation and Maintenance of Sub-slab Depressurization/Soil Vapor Extraction System

The following sections provide a description of the operations and maintenance of the SVES. Cut-sheets and as-built drawings for the SVES are provided in Appendix F - Operations and Maintenance Manual.

5.3.1 System Start-Up and Testing

The SVES has been started up and is fully operational for optimal performance in its current configuration.

In the event the FPZ regenerative blower shuts down, start the blower using the following start-up procedure:

1. Open all valves on the individual depressurization lines to be operated.
2. Close all sample ports.
3. Press the green START button on a blower starter control box.
4. Fine tune the flow rates from the individual depressurization pipes by adjusting the ball valves on the manifold. Fine tune the total flow by adjusting the pressure relief valve on the blower.

In the event the HS5000 RadonAway vacuum blower of SVES shuts down, the following procedure should be used:

1. Open all valves on the individual extraction lines to be operated. Close all others.
2. Close all sample ports.
3. Turn the power control switch to each electric in-line fan to the "ON" position.
4. Fine tune the flow rates from the individual depressurization wells by adjusting the ball valves on the riser pipes.

To stop operation of the SVES, turn the power off to the regenerative blower by pressing the red STOP button on a blower starter control box and by turning power off to the electric in-line fans.

The system testing described above will be conducted if, in the course of the SVES 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 SVES operates by applying a vacuum to each of the vertical depressurization wells which creates a vacuum beneath the basement slab, thus preventing vapors from entering the building's breathing zone. The amount of vacuum is controlled by a vacuum

relief valve located at the blower and the individual ball valves located on the riser pipes for each depressurization well. The options for operation of each system are as follows:

1. Opening vacuum relief valve - decreases the vacuum on the entire system. Opening the vacuum relief valve increases the exhaust flow rate by adding atmospheric air, but will decrease the concentration of vapors in the exhaust. The flow rate from the individual depressurization pipes will be decreased due to a decrease in vacuum.

2. Closing vacuum relief valve - increases the vacuum on the entire system. Closing the vacuum relief valve decreases the exhaust flow rate, but increases the vacuum on the depressurization pipes.

3. Opening the ball valves on the depressurization pipes - will increase the vacuum and flow rate from each depressurization well.

4. Closing the ball valves on the depressurization pipes - will decrease the vacuum and flow rate from the individual point.

Vacuum Blower

Vacuum blowers require little or no maintenance to perform as designed. The blower is difficult to disassemble and reassemble. Therefore, the manufacturer should be consulted prior to any attempts to repair the blower. Table 13 identifies possible problems, symptoms and potential solutions that may occur while operating the regenerative blower. Once the regenerative blower is either repaired or replaced, the system should be re-started in accordance with Section 5.3.1.

There are no user-serviceable parts located inside the fan unit. Do not attempt to open. In case there is a problem:

1. Check voltage at the fan to insure it corresponds with nameplate.

2. There are no user serviceable parts located inside the fan unit. Do not attempt to open.

3. Before servicing or cleaning the unit, turn the power off to the blower by unplugging the blower from the outlet and turning the switch off. Switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.

4. Once the HS series vacuum blower is either repaired or replaced, the system should be re-started in accordance with Section 5.3.1.

Pre-Filter

Maximum inlet temperature for inlet vacuum pre-filter is 220ºF. Temperatures in excess of this could cause damage to element, media and elastomers. The pre-filter element should be replaced once a year or when the pressure drop reaches 15 to 20-inches water column above the initial pressure drop of the installation.

To change the pre-filter element:

- turn the power off to the blower by pressing the red STOP button on a blower starter control box.
- Release wire-form clips
- Remove element.
- Clean sealing surfaces of housing so that they are free of dirt or any other particulate.
- Place new element evenly on base. Be sure element seats properly on base and there is no dirt or particulate present on sealing surfaces.
- Hemisphere O-ring must rest evenly along canister base O-ring groove.
- Hold canister housing against O-ring or sealing ring on main filter head. Re-fasten wire-form clips.

Table 13 provides a summary and schedule of routine maintenance.

Table 13 – Summary of Routine Maintenance Requirements and Schedule

Remedial System Component	Monitoring Parameter	Operating Range	Replacement Schedule
SVES Pre-filter Replacement	Pressure Drop across filter media	No more than 15" w.c. across filter media	Annually

Checklists or forms will be completed during each routine maintenance event. Checklists/forms will include, but not be limited to the following information:

- Date, current weather condition;
- Name, company, and position of person(s) conducting maintenance activities;
- SVES operational status (arrival and departure) and general condition of exposed system components;
- Regenerative vacuum SVES blower operating parameters including: process air flow rates; ball valve positions (percent open); blower inlet vacuum and discharge pressure;
- Vacuum monitoring point parameters to include: induced (differential) vacuum;
- Maintenance activities conducted;
- 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).

5.3.3 Non-Routine Operation and Maintenance

During each non-routine maintenance event, a form will be completed which will include, but not be limited to, the following information:

- Date, current weather condition;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Warning devices initiated;
- Presence of damage or leak;

- Date of damage or leak repair;
- System effectiveness;
- Other repairs or adjustments made to the system;
- 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).

5.3.4 System Monitoring Devices and Alarms

A wireless telemetry system has been installed on the SVES to monitor subsurface vacuums and system parameters on a continuous 24/7/365 basis. Data from analog vacuum sensors installed in each leg of the SVES and the overhead exhaust ventilator is continuously logged and provides real-time evidence of system operating conditions.

In the event that an alarm condition occurs, the telemetry system is programmed with the ACT Project Manager's contact email address and phone number and will send an email and text alert as soon as an alarm has been detected. Applicable maintenance and repairs will be conducted, as specified in this Operation and Maintenance Plan, and the system will be restarted. Operational problems will be noted in the PRR to be prepared for that reporting period.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

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

The following vulnerability assessment was performed for this site. Based upon this assessment, it was determined that there were no assets/vulnerabilities to be included in the evaluation for future assessments.

- Flood Plain: No portion of the site is located in a flood plain, low-lying or low-groundwater recharge area.
- Site Drainage and Storm Water Management: The site does not contain any areas which may flood during severe rain events due to insufficient groundwater recharge capabilities or inadequate storm water management systems.
- High Wind: The remedial system installed at this site is located inside the building. Therefore, there are no areas of the site or remedial system, which may be susceptible to damage from the wind itself or falling objects, such as trees or utility structures during periods of high wind.
- Electricity: The site and/or remedial system is not susceptibility to power loss and/or dips/surges in voltage during severe weather events.
- Spill/Contaminant Release: There are no chemicals stored at the site or generated by the remedial system that could result in a spill or other contaminant release due to storm-related damage caused by flooding, erosion, high winds, loss of power etc.

6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation outlines NYSDEC's approach to remediating sites in the context of the larger environment. Green Remediation is defined as "the practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprint of cleanup actions."

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

There is no waste generation associated with operating and maintaining the SVES except periodic pre-filter media change for the regenerative blower. There is also no water usage associated with the SVES. The FPZ regenerative blower, Radonaway vacuum blowers and a centrifugal belt-drive upblast exhaust ventilator installed inside the dry cleaner operate continuously on 110 and 220 volt electric service provided by PSEG Long Island.

SVES emissions have steadily decreased since operations commenced in December 2012. On February 18, 2016 the NYSDEC's Division of Air Resources approved termination of activated carbon effluent treatment. Insignificant emissions are anticipated in the foreseeable future.

The SVES and exhaust ventilator are continuously monitored on a 24/7/365 basis by a wireless telemetry system. Analog pressure sensors have been installed on all four vacuum wells to verify that vacuum is being maintained beneath the site. Pressure sensors have also been installed on the pre-filter, influent and effluent ports of the regenerative blower and on the exhaust manifold of the overhead exhaust ventilator to

verify that these systems are functioning properly. Using wireless telemetry, data from pressure sensors provide real-time vacuum readings at each vacuum well and comprehensive system operating conditions; so scheduled site inspections are not required to monitor site conditions.

Unscheduled inspections will take place when the ACT project manager is notified by email and text alerts of an alarm condition other than loss of power to the SVES. In that event, the ACT project manager will immediately schedule a site inspection to implement procedures outlined in the Operation and Maintenance Plan (Section 5.0). A written service report for the alarm condition will be included in the PRR.

Nu-Life Realty LLC participated in NYSDEC Paperless Cleanup Program. Under this program, paper usage to accomplish project milestones was eliminated or minimized through a series of steps, including digital transmission of project documents and communications.

Nu-Life Realty LLC participated in NYSDEC's low-energy project management program. Under this program, whenever possible, meetings were held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion.

6.2.1 Timing of Green Remediation Evaluations

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

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

6.2.2. Remedial Systems

Remedial systems will be operated properly considering the current site conditions to conserve materials and resources to the greatest extent possible. Consideration will be given to operating rates and locations of soil vapor extraction and sub-slab depressurization points.

6.2.3 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site and use of consumables in relation to visiting the Site in order to conduct system checks and/or collect samples and shipping samples to a laboratory for analyses have direct and/or inherent energy costs.

To reduce the cost of energy and resources, ACT has incorporated a wireless telemetry system into the SVES at the site. The telemetry system records and logs the presence of significant vacuum pressures at each of the extraction wells and notifies the project manager via email and text message if a loss of vacuum occurs in any vacuum well.

Site inspections are only required in the rare event that a blower fails and requires service or for post-remedial verification sampling. Thus, energy and resources are consumed only when needed and not to perform routine tasks that can easily be accomplished remotely without associated transportation or consumables costs.

6.2.4 Metrics and Reporting

As discussed in Section 7.0 and as shown in Appendix H – 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. A summary of energy usage for the project broken down between remote monitoring, site inspections, equipment and materials usage will be provided in the PRR.

6.3 Remedial System Optimization

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

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

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

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

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

7.0. REPORTING REQUIREMENTS

7.1 Site Management Reports

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

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the reporting frequency indicated in Table 14 and summarized in the PRR.

Table 14 – Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Periodic Review Report	12 months after NFA followed by every year after the initial PRR

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

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

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

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

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

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

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

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

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

7.2 Periodic Review Report

A PRR will be submitted to the Department beginning sixteen (16) months after the Satisfactory Completion and No Further Action Letter is issued. After submittal of the initial PRR, the next PRR shall be submitted every three years to the Department or at another frequency as may be required by the Department. In the event that the site is subdivided into separate parcels with different ownership, a single PRR will be prepared that addresses the site described in Appendix A -Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the PRR. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC

EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.

- A site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the site-specific RAWP, ROD or Decision Document;
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan; and
  - Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document.
  - The overall performance and effectiveness of the remedy.

- A performance summary for all treatment systems at the site during the calendar year, including information such as:
  - The number of days the system operated for the reporting period;
  - The average, high, and low flows per day;
  - The contaminant mass removed;
  - A description of breakdowns and/or repairs along with an explanation for any significant downtime;
  - A description of the resolution of performance problems;
  - Alarm conditions;
  - Trends in equipment failure;
  - A summary of the performance, effluent and/or effectiveness monitoring; and
  - Comments, conclusions, and recommendations based on data evaluation.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a qualified environmental professional will prepare, and include in the PRR, the following certification as per the requirements of NYSDEC DER-10:

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

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Paul Stewart, of Advanced Cleanup Technologies, Inc., am certifying as Nu-Life Realty LLC's Designated Site Representative for the site."

The signed certification will be included in the PRR.

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

7.3 Corrective Measures Work Plan

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

7.4 Remedial Site Optimization Report

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

implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

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

8.0 REFERENCES

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

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

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

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

Phase I Environmental Site Assessment. 429-441 Merrick Road, Lynbrook NY by Atlantic Geoscience, Inc. AGI Job NO. EA-00-268 (December 21, 2000).

Subsurface Investigation by Brockerhoff Environmental Services LLC (February 2012).

Installation Report. Tony's Cleaners. 429 Merrick Road, Lynbrook, NY by Advanced Cleanup Technologies (April 10, 2013).

Site Characterization Report. Tony's Cleaners. 429-435 Merrick Road, Lynbrook NY by ACT (June 12, 2015)

Construction Completion Report. NYSDEC Site Number 130217 by Advanced Cleanup Technologies (August 2016).

TABLES

(Those not included within text)

TABLE 2

GROUNDWATER ELEVATION MEASUREMENTS

Table 2

Groundwater Elevation Measurements, November 4, 2014
429 Merrick Road
Lynbrook, NY

NYSDEC Site No. 130217
ACT Project No.: 7045-LBNY

Well ID	Top Of Casing Elevation (feet measured by using NAVD 88)	Depth to Water from Top of Casing (feet)	Water Table Elevation (feet measured by using NAVD 88)
MW-1	18.87	10.3	8.57
MW-2	19.99	10.58	9.41
MW-3	19.64	10.98	8.66
MW-4	19.1	10.85	8.25
MW-5	18.95	10.73	8.22
MW-6	19.49	11.23	8.26

TABLE 3

VOLATILE ORGANIC COMPOUNDS IN SOIL

Table 1

Volatile Organic Compounds in Soil (ug/kg)
EPA Method 8260
429 Merrick Road
Lynbrook, NY 11563

ACT Project No.: 7045-LBNY

Sample ID	Standard			SS-1 (10-16')	SS-2 (10-16')	SS-3 (10-16')	SS-4 (10-16')	SB-1 (2-3')	SB-1 (9-10')	SB-2 (0-3')	SB-2 (9-11')	SB-3 (0-3')	SB-3 (9-11')	SB-5 (4-5')	SB-5 (11-12')	SB-6 (10-11')
Sample Date	UUSCO [1]	RRSCO [2]	CSCO [3]	2/9/12	2/9/12	2/9/12	2/9/12	8/15/12	8/15/12	8/15/12	8/15/12	8/15/12	8/15/12	10/9/14	10/9/14	10/10/14
1,1,1,2-Tetrachloroethane	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,1,1-Trichloroethane	680	100,000	500,000	0.13U	6.2U	0.13U	6.5UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,1,2,2-Tetrachloroethane	NS	NS	NS	0.093U	16U	0.09U	17UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,1,2-Trichloro-1,2,2-trifluoroethane	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,1,2-Trichloroethane	NS	NS	NS	0.15U	19U	0.14U	20UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,1-Dichloroethane	270	26,000	240,000	0.11U	13U	0.11U	14UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,1-Dichloroethene	330	100,000	500,000	0.20U	8.8U	0.19U	9.3UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,1-Dichloropropene	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
1,2,3-Trichlorobenzene	NS	NS	NS	0.17U	51U	0.16U	54UH*	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
1,2,3-Trichloropropane	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
1,2,4,5-Tetramethylbenzene	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
1,2,4-Trichlorobenzene	NS	NS	NS	0.20U	34U	0.19U	36UH*	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,2,4-Trimethylbenzene	3,600	52,000	190,000	0.16U	13U	0.15U	13UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,2-Dibromo-3-chloropropane	NS	NS	NS	0.46U	40U	0.44U	42UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,2-Dibromoethane	NS	NS	NS	0.16U	27U	0.15U	29UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,2-Dichlorobenzene	1,100	100,000	500,000	0.10U	20U	0.10U	22UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,2-Dichloroethane	20	3,100	30,000	0.19U	19U	0.18U	20UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,2-Dichloropropane	NS	NS	NS	0.16U	8.6U	0.15U	9UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,3,5-Trimethylbenzene	8,400	52,000	190,000	0.12U	15U	0.12U	16UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,3-Dichlorobenzene	2,400	49,000	280,000	0.17U	13U	0.16U	14UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,3-dichloropropane	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
1,4-Dichlorobenzene	1,800	13,000	130,000	0.11U	23U	0.11U	24UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
1,4-Dioxane	100	13,000	130,000	13U	3,600U*	13U	3,800UH*	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<49	<52	<54
2,2-Dichloropropane	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
2-Butanone	120	100,000	500,000	0.65U	230U	0.63U	240UH	<5.3	<5.6	<5.5	<480	<5.2	<5.3	<2.5	<2.6	<2.7
2-Chloroethyl vinyl ether	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
2-Chlorotoluene	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
2-Hexanone	NS	NS	NS	0.13U	50U	0.13U	52UH	<5.3	<5.6	<5.5	<480	<5.2	<5.3	<2.5	<2.6	<2.7
2-Propanol	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
4-Chlorotoluene	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
4-Isopropyltoluene	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
4-Methyl-2-pentanone	NS	NS	NS	0.21U	98U	0.20U	100UH	<5.3	<5.6	<5.5	<480	<5.2	<5.3	<2.5	<2.6	<2.7
Acetone	50	100,000	500,000	1.8U	270U	1.7U	280UH	<5.3	<5.6	<5.5	<480	<5.2	<5.3	<4.9	<5.2	<5.4
Acrolein	NS	NS	NS	NT	NT	NT	NT	<11	<11	<11	<950	<10	<11	<4.9	<5.2	<5.4
Acrylonitrile	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Benzene	60	4,800	44,000	0.16U	8.2U	0.15U	8.7UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Bromobenzene	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
Bromochloromethane	NS	NS	NS	0.11U	27U	0.11U	29UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
Bromodichloromethane	NS	NS	NS	0.33U	12U	0.32U	13UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Bromoform	NS	NS	NS	0.18U	19U	0.17U	20UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Bromomethane	NS	NS	NS	0.45U	18U	0.43U	19UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Carbon disulfide	NS	NS	NS	0.16U	12U	0.15U	13UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Carbon tetrachloride	760	2,400	22,000	0.16U	5.7U	0.15U	6UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Chlorobenzene	1,100	100,000	500,000	0.19U	11U	0.18U	12UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Chlorodifluoromethane	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
Chloroethane	NS	NS	NS	0.34U	17U	0.33U	18UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Chloroform	370	49,000	350,000	0.25U	7.8U	0.24U	8.2UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Chloromethane	NS	NS	NS	0.17U	9.6U	0.16U	10UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
cis-1,2-Dichloroethene	250	100,000	500,000	1.5	380	17	49JH	<2.1	<2.2	**0.85**	<190	<2.1	<2.1	<2.5	<2.6	<2.7
cis-1,3-Dichloropropene	NS	NS	NS	0.15U	18U	0.14U	19UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Cyclohexane	NS	NS	NS	0.13U	16U	0.13U	17UH	NT	NT	NT	NT	NT	NT	NT	NT	NT
Dibromochloromethane	NS	NS	NS	0.10U	20U	0.10U	21UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Dibromomethane	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Dichlorodifluoromethane	NS	NS	NS	0.23U	21U	0.22U	23UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Diisopropyl ether	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
Ethanol	NS	NS	NS	NT	NT	NT	NT	<5.3	<5.6	<5.5	<480	<5.2	<5.3	NT	NT	NT
Ethyl acetate	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
Ethylbenzene	1,000	41,000	390,000	0.36J	9.5U	0.17U	10UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Freon-114 (Freon TF)	NS	NS	NS	0.11U	8.2U	0.11U	8.6UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
Hexachlorobutadiene	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Isopropyl acetate	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
Isopropylbenzene	NS	NS	NS	0.11U	7.6U	0.11U	8UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
m,p-Xylene (p- & m- Xylenes)	NS	NS	NS	1.3J	24U	0.59U	26UH	<4.3	<4.5	<4.4	<380	<4.1	<4.2	<4.9	<5.2	<5.4
Methyl Acetate	NS	NS	NS	0.33U	33U	0.32U	35UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Methyl tert-butyl ether (MTBE)	930	100,000	500,000	0.11U	14U	0.11U	14UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Methylcyclohexane	NS	NS	NS	0.10U	13U	0.10U	14UH*	NT	NT	NT	NT	NT	NT	NT	NT	NT
Methylene chloride	50	100,000	500,000	0.16U	18U	0.71JB	19UH	**7.7**	**8.1**	**7.9**	**740**	**8**	**8**	<4.9	<5.2	<5.4
n-Amyl acetate	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
Naphthalene	NS	NS	NS	0.24U	29U	0.23U	31UH*	<2.1	<2.2	0.37	<190	<2.1	<2.1	NT	NT	NT
n-Butyl acetate	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
n-Butylbenzene	12,000	100,000	500,000	0.083U	14U	0.08U	15UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
n-Propyl acetate	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
n-Propylbenzene	3,900	100,000	500,000	0.16U	9.4U	0.15U	10UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
o-Xylene	NS	NS	NS	0.80U	13U	0.19U	14UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
p-Diethylbenzene	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
p-Ethyltoluene	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
p-Isopropyltoluene	NS	NS	NS	0.15U	13U	0.14U	14UH	NT	NT	NT	NT	NT	NT	<2.5	<2.6	<2.7
sec-Butylbenzene	11,000	100,000	500,000	0.13U	18U	0.13U	19UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Styrene	NS	NS	NS	0.29U	12U	0.28U	12UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
t-Butyl alcohol	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
tert-Butylbenzene	5,900	100,000	500,000	0.12U	12U	0.12U	12UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Tetrachloroethene	1,300	19,000	150,000	94	**17,000**	440	**3,900H**	**19**	**1.9**	**1,200**	**520**	**6.8**	**1.2**	<2.5	<2.6	<2.7
Toluene	700	100,000	500,000	0.15U	30J	0.14U	16UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
trans-1,2-Dichloroethene	190	100,000	500,000	0.13U	13U	0.23J	14UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
trans-1,3-Dichloropropene	NS	NS	NS	0.10U	24U	0.10U	25UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Trichloroethene	470	21,000	200,000	2.5	**690**	28	330H	<2.1	<2.2	**2.4**	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Trichlorofluoromethane	NS	NS	NS	0.17U	15U	0.16U	15UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Vinyl acetate	NS	NS	NS	NT	NT	NT	NT	<2.1	<2.2	<2.2	<190	<2.1	<2.1	NT	NT	NT
Vinyl chloride	20	900	13,000	0.35U	14U	0.34U	15UH	<2.1	<2.2	<2.2	<190	<2.1	<2.1	<2.5	<2.6	<2.7
Xylenes (total)	260	100,000	500,000	2.1J	36U	0.67U	38UH	NT	NT	NT	NT	NT	NT	<7.4	<7.8	<8.1

Notes:
[1] Unrestricted Use Soil Cleanup Objectives, Table 375-6.8(a), 6 NYCRR 375, NYSDEC 2006
[2] Restricted Residential Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
[3] Commercial Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
NS: There are no standards (SCOs) for these constituents.
*: Recovery or RPD exceeds control limits
B: Compound was found in the blank and sample.
H: Sample was prepared or analyzed beyond the specified holding time.
E: Result exceeded calibration range. (Estimated value)
J: Result is less than the Reporting Limit (RL) but greater than or equal to the Method Detection Limit (MDL) and the concentration is an approximate value.
U: Indicates the analyte was analyzed for but not dectected.
NT=this indicates the analyte was not a target for this sample
Bolded values signify detection above method detection limit
Highlighted values signify detection above guidance value

TABLE 4

HISTORICAL GROUNDWATER EXCEEDANCES

Table 4

Historical Ground Water Data (ug/L)
(2012 - 2016)

Tonys Cleaners Site
429 Merrick Road, Lynbrook, NY
NYSDEC Site No. 130217

	PCE	TCE	CIS-1,2-DCE
MW-1			
2/27/2012	12	2.3	0.28
7/13/2012	4	0.71	ND
9/10/2014	2.8	ND	ND
11/4/2014	1	ND	ND
12/28/2016	0.38	ND	
MW-2			
2/27/2012	160	37	20
7/13/2012	130	16	ND
9/10/2014	6	0.58	ND
11/4/2014	3.8	0.41	ND
12/28/2016	0.53	ND	ND
MW-3			
2/27/2012	ND	ND	ND
7/13/2012	0.98	ND	ND
9/10/2014	1	ND	ND
11/4/2014	1.5	ND	ND
12/28/2016	0.69	ND	ND
MW-4			
2/27/2012	NS	NS	NS
7/13/2012	7.5	1.2	ND
9/10/2014	33	5.5	2.9
11/4/2014	63	17	44
12/28/2016	ND	ND	ND
MW-5			
2/27/2012	NS	NS	NS
7/13/2012	NS	NS	NS
9/10/2014	NS	NS	NS
11/4/2014	30	3.8	1.4
12/28/2016	0.27	ND	ND
MW-6			
2/27/2012	NS	NS	NS
7/13/2012	NS	NS	NS
9/10/2014	NS	NS	NS
11/4/2014	0.53	ND	ND
12/28/2016	ND	ND	ND

NS = Not Sampled
ND = Not Detected above laboratory Detection Limits
Shaded = Detected above SCG of 5 ug/l

TABLE 5

VOLATILE ORGANIC COMPOUNDS IN INDOOR AIR AND SOIL VAPOR

Table 5a

Indoor Air Quality Data (ug/m^3)
429 Merrick Road
Lynbrook, NY

Chemical	NYSDOH Air Guideline[1]	Pizzeria				Emma's Beauty Salon			
		3/13/14	6/3/14	1/23/15	3/5/15	3/13/14	6/3/14	1/23/15	3/18/15
PCE	30	331	47	170	8.5	106	14	120	ND
TCE	2	3.33	ND	1.7	0.38	0.75	ND	1.8	ND
cis-1,2-DCE	NG	<0.79	ND	ND	ND	<0.79	ND	ND	ND

[1] Table 3.1, Final Guidance for Evaluating Soil Vapor Intrusion in New York State, October 2006
ND = Not Detected
NG = No Guideline
Shaded value signifies exceedance of air guideline

Table 5b

Sub-Slab Soil Vapor Quality Data (ug/m^3)
429 Merrick Road
Lynbrook, NY

Chemical	Pizzeria (VP-3)				Emma's Beauty Salon (VP-4)			
	3/13/14	6/3/14	1/23/15	3/5/15	3/13/14	6/3/14	1/23/15	3/18/15
PCE	471	NA	NA	49	92.7	NA	NA	63
TCE	8.44	NA	NA	5.1	0.7	NA	NA	23
cis-1,2-DCE	2.34	NA	NA	2.2	<0.79	NA	NA	15

[2] Matrix 1 and Matrix 2, Final Guidance for Evaluating Soil Vapor Intrusion in New York State, October 2006
NS = No Screening Level
NA = Not Analyzed
Shaded value signifies exceedance of screening level

TABLE 6

REMAINING SOIL VAPOR EXCEEDANCES

Table 6

Remaining Soil Vapor Exceedances (ug/m^3)
EPA Method TO-15
429 Merrick Road
Lynbrook, NY

NYSDEC Site No. 130217
ACT Project No.: 7045-LBNY

Sample ID Sample Date	Soil Vapor Guideline[2]	VP-3 3/5/15	VP-4 3/18/15
1,1,1-Trichloroethane	100 [3]	<2.8	<2.4
1,1,2,2-Tetrachloroethane	0.42	<3.5	<3.0
1,1,2-Trichloro-1,2,2-trifluoroethane	300,000	<3.9	<3.3
1,1,2-Trichloroethane	1.5	<2.8	<2.4
1,1-Dichloroethane	5,000	<2.0	<1.8
1,1-Dichloroethene	2,000	<2.0	<1.7
1,2,4-Trichlorobenzene	2,000	<3.7	<3.2
1,2,4-Trimethylbenzene	60	**7.7**	**8.9**
1,2-Dibromoethane	0.11	<3.9	<3.3
1,2-Dichlorobenzene	2,000	<3.0	<2.6
1,2-Dichloroethane	0.94	<2.0	<1.8
1,2-Dichloroethene (cis)	350	**2.2**	**15**
1,2-Dichloroethene (trans)	700	<2.0	<1.7
1,2-Dichloropropane	40	<2.3	<2.0
1,2-Dichlorotetrafluoroethane	NA	<3.5	<3.0
1,3,5-Trimethylbenzene	60	<2.5	**2.1**
1,3-Butadiene	0.09	<2.2	<1.9
1,3-Dichlorobenzene	1,100	<3.0	<2.6
1,3-Dichloropropene (cis)	6.1	<2.3	<2.0
1,3-Dichloropropene (trans)	6.1	<2.3	<2.0
Hexachlorobutadiene	1.1	<5.4	<4.6
1,4-Dichlorobenzene	8,000	<3.0	<2.6
1,4-Dioxane	NA	<1.8	<1.6
2-Butanone	10,000	**32**	**11**
2-Hexanone	NA	**19**	<3.5
Acetone	3,500	**310**	**95**
Benzene	3.1	**6.6**	**2.8**
Bromodichloromethane	1.4	<3.1	<2.7
Bromoform	22	<5.2	<4.5
Bromomethane	NA	<2.0	<1.7
Carbon disulfide	7,000	**8.2**	<1.3
Carbon tetrachloride	5 [3]	<0.79	<0.68
Chlorobenzene	600	<2.3	<2.0
Chloroethane	100,000	<1.3	<1.1
Chloroform	1.1	<2.5	<2.1
Chloromethane	24	**2.1**	<0.89
Cyclohexane	NA	<1.7	<1.5
Dibromochloromethane	NA	<4.0	<3.5
Dichlorodifluoromethane	2,000	**2.7**	**2.8**
Ethyl acetate	32,000	<3.6	<3.1
Ethylbenzene	22	**4.8**	**6.6**
Isopropanol	NA	**7.4**	**7.4**
Methyl Methacrylate	7,000	<2.1	<1.8
Methyl tert-butyl ether	30,000	<1.8	<1.6
Methylene chloride	52	<3.5	<3.0
n-Heptane	NA	**9.3**	**2.3**
n-Hexane	2,000	**4.8**	<1.5
Propylene	NA	<0.87	<0.74
Styrene	10,000	<2.1	<1.8
Tetrachloroethene	30 [3]	**49**	**63**
Tetrahydrofuran	NA	**1.8**	<1.3
Toluene	4,000	**16**	**30**
Trichloroethene	2 [4]	**5.1**	**23**
Trichlorofluoromethane	7,000	<2.8	<2.4
Vinyl acetate	2,000	<1.8	<1.5
Vinyl chloride	2.8	<0.32	<0.28
Xylenes (m&p)	70,000	**19**	**32**
p-Ethyltoluene	NA	**7.4**	**8.9**
Xylenes (o)	70,000	**6.6**	**7.7**

[1] Table 3.1, NYSDOH "Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (October 2006)

[2] Draft Subsurface Vapor Intrusion Guidance, USEPA (November, 2002)

[3] Matrix 1, NYSDOH "Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (October 2006)

[4] Matrix 2, NYSDOH "Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (October 2006)

Bolded values signify detection above method detection limit
Highlighted values signify detection above guidance value
NA = Not Available

TABLE 12

BLOWER TROUBLESHOOTING GUIDE

Table 12

Troubleshooting Guidance Table

Troubleshooting

		POSSIBLE CAUSE	OUT OF WARRANTY REMEDY ***
IMPELLER DOES NOT TURN	Humming Sound	1. * One phase of power line not connected	1. Connect
		2. * One phase of stator winding open	2. Rewind or buy new motor
		3. Bearings defective	3. Change bearings
		4. Impeller jammed by foreign material	4. Clean and add filter
		5. Impeller jammed against housing or cover	5. Adjust
		6. ** Capacitor open	6. Change capacitor
	No Sound	1. * Two phases of power line not connected	1. Connect
		2. * Two pheses of stator winding open	2. Rewind or buy new motor
IMPELLER TURNS	Blown Fuse	1. Insufficient fuse capacity	1. Use time delay fuse of proper rating
		2. Short circuit	2. Repair
	Motor Overheated Or Protector Trips	1. High or low voltage	1. Check input voltage
		2. * Operating in single phase condition	2. Check connections
		3. Bearings defective	3. Check bearings
		4. Impeller rubbing against housing or cover	4. Adjust
		5. Impeller or air passage clogged by foreign material	5. Clean and add filter
		6. Unit operating beyond performance range	6. Reduce system pressure/vacuum
		7. Capacitor shorted	7. Change capacitor
		8. * One phase of stator winding short circuited	8. Rewind or buy new motor
	Abnormal Sound	1. Impeller rubbing against housing or cover	1. Adjust
		2. Impeller or air passages clogged by foreign material	2. Clean and add filter
		3. Bearings defective	3. Change bearings
	Performance Below Standard	1. Leak in piping	1. Tighten
		2. Piping and air passages clogged	2. Clean
		3. Impeller rotation reversed	3. Check wiring
		4. Leak in blower	4. Tighten cover, flange
		5. Low voltage	5. Check input voltage

3 phase units

* 1 phase units

** Disassembly and repair of new blowers or motors will void the Retron warranty. Factory should be contacted prior to any attempt to field repair an in-warranty unit.

FIGURES

FIGURE 1

TAX MAP FOR 429-441 MERRICK ROAD, LYNBROOK, NY

COPYRIGHT 1998 NASSAU COUNTY

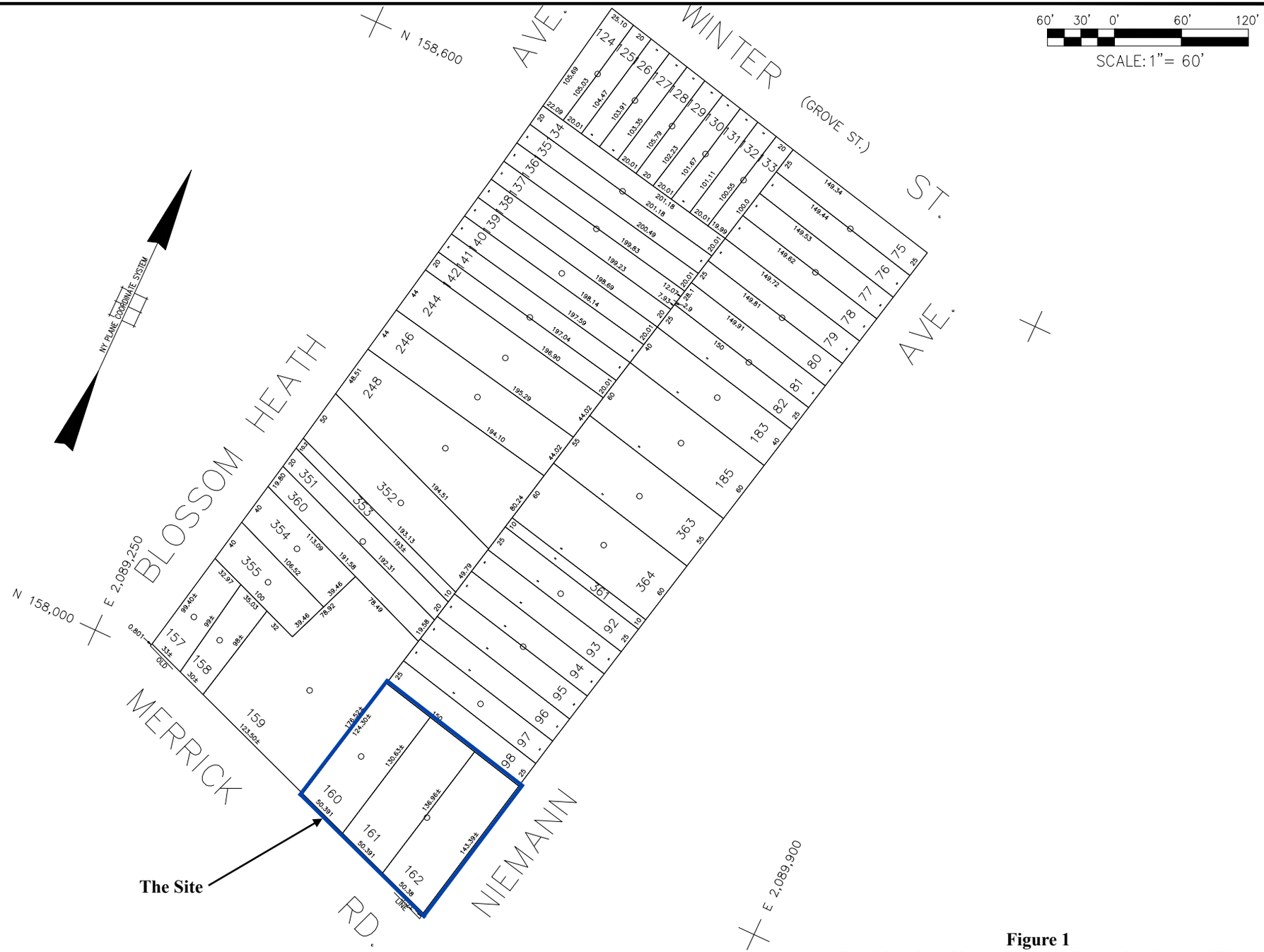


Figure 1
Tax Map for 429-441 Merrick Road, Lynbrook, NY

LEGEND

COUNTY LINE	
TOWN LINE	
VILLAGE LINE	
SCHOOL DISTRICT LINE	
PROPERTY LINE	
SPECIAL DISTRICT LINE	
BLOCK LIMIT	
LOCATOR POINT	
TAX MAP PARCEL NO.	246
CALCULATED ACREAGE	754(C)
DEED ACREAGE	176A
SCALED DIMENSION	327(S)
DEED DIMENSION	185.69

REFERENCE MAPS
MAP NO.

SPECIAL DISTRICTS

	DIST
POLICE	
WATER	
LIGHTING	
LIBRARY	
FIRE	
FIRE PROTECTION	
SANITARY	
REFUSE & GARBAGE	
REFUSE DISPOSAL	
SEWAGE COLLECTION	
Sewage Collection District #2-ELM	J
PUBLIC PARKING	
SEWER	
Nassau County Sewage Disposal District #2	202
PARK	
IMPROVEMENT	
SIDEWALK	
DRAINAGE	
FIRE HYDRANT RENTAL	
GARBAGE	
ESCALATOR	
WATER POLLUTION CONTROL	
Town, County, College, Police HQ	1

MUNICIPALITIES

TOWN OF:
HEMPSTEAD
NORTH HEMPSTEAD
OYSTER BAY
CITY OF:
GLEN COVE
LONG BEACH
VILLAGE OF:

SCHOOL DISTRICT
Lynbrook 20

CODE	SPECIAL DISTRICT	WITHIN
286	1 202 J	

Nassau County Department of Assessment
Charles O'Shea, Chairman
Land & Tax Map

Map Last Revised: August 27 2002

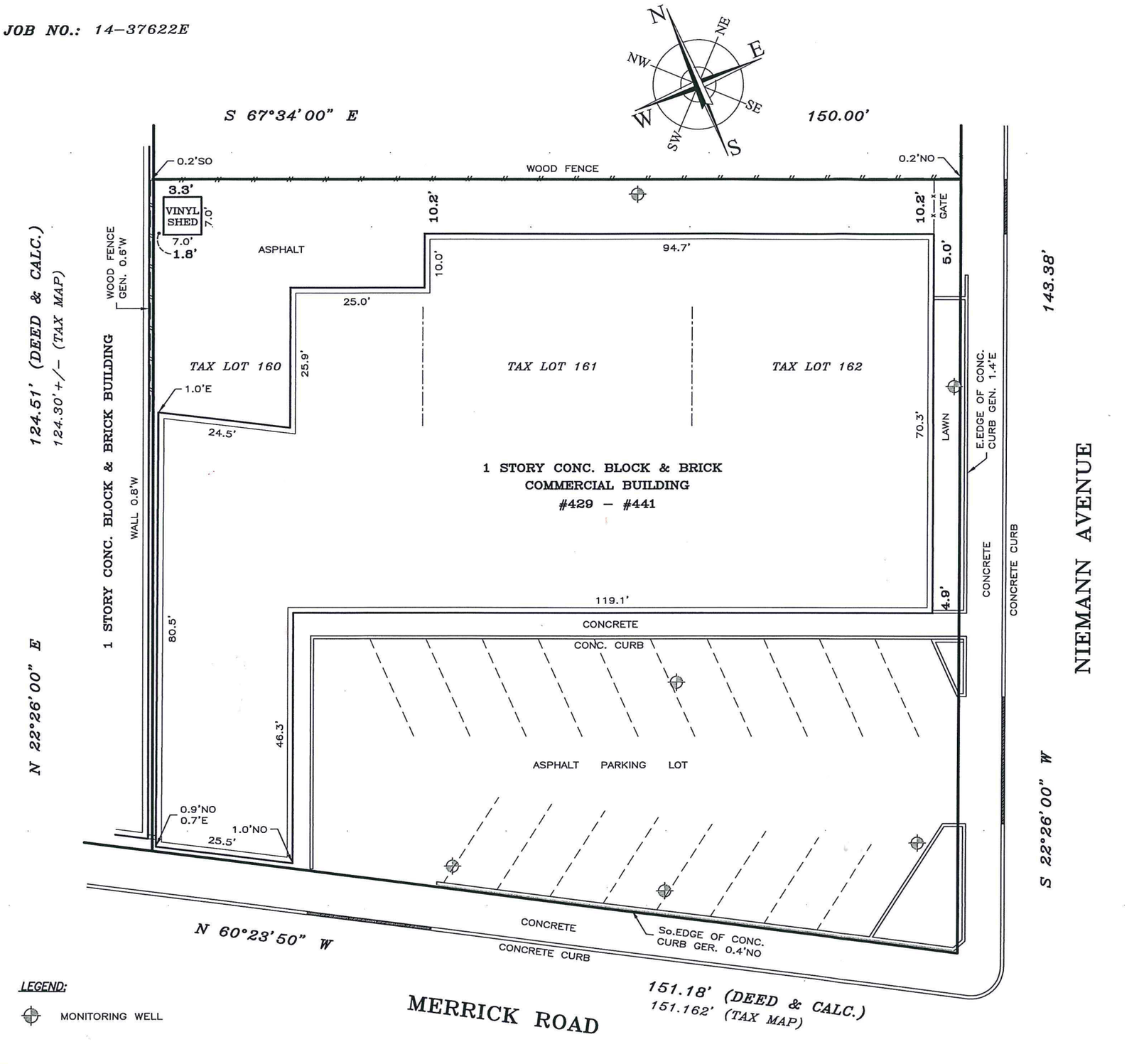
SEC. 37
BLK. 320

SHEET 1 OF 1

FIGURE 2

SITE LOCATION, BOUNDARIES AND TAX PARCELS

JOB NO.: 14-37622E



LEGEND:

MONITORING WELL

MAP of SURVEY

LOT 1–6
"MAP OF VALUABLE BUILDING SITES AT HIGHLAND PARK"
FILED ON 05/25/1905, AS MAP #260, CASE #1953

LOCATED AT:

INCORPORATED VILLAGE OF LYNBROOK,
TOWN OF HEMPSTEAD,
COUNTY OF NASSAU, STATE OF NEW YORK

TAX DESIGNATION:

SECTION: 37, BLOCK: 320, LOTS: 160–162

SURVEYED ON: *OCTOBER 08, 2015*

DRAWN BY: M.V. CHECKED BY: A.T.

STATE OF NEW YORK
ALEXANDER TSUKERMAN
No. 050189
LICENSED LAND SURVEYOR

ALEXANDER TSUKERMAN N.Y.S. L.S. № 050189

20 0 20 40 60

Scale 1" = 20'

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LEONARD J. STRANDBERG AND ASSOCIATES,
CONSULTING ENGINEERS AND LAND SURVEYORS, P.C.
32 SMITH STREET, FREEPORT, NY 11520
516-378-2064 ° 212-213-4090 ° FAX 516-378-6649

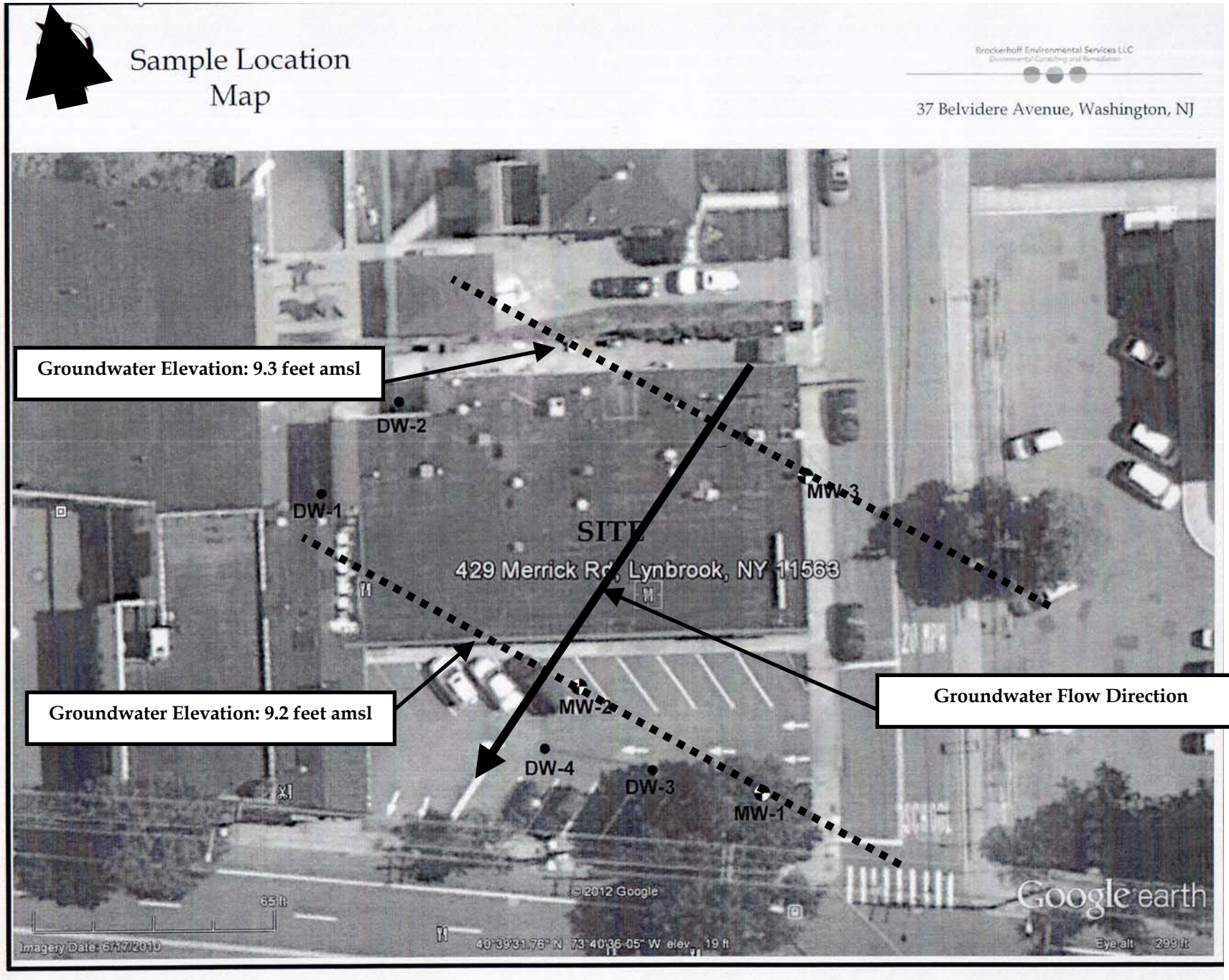
FIGURE 3

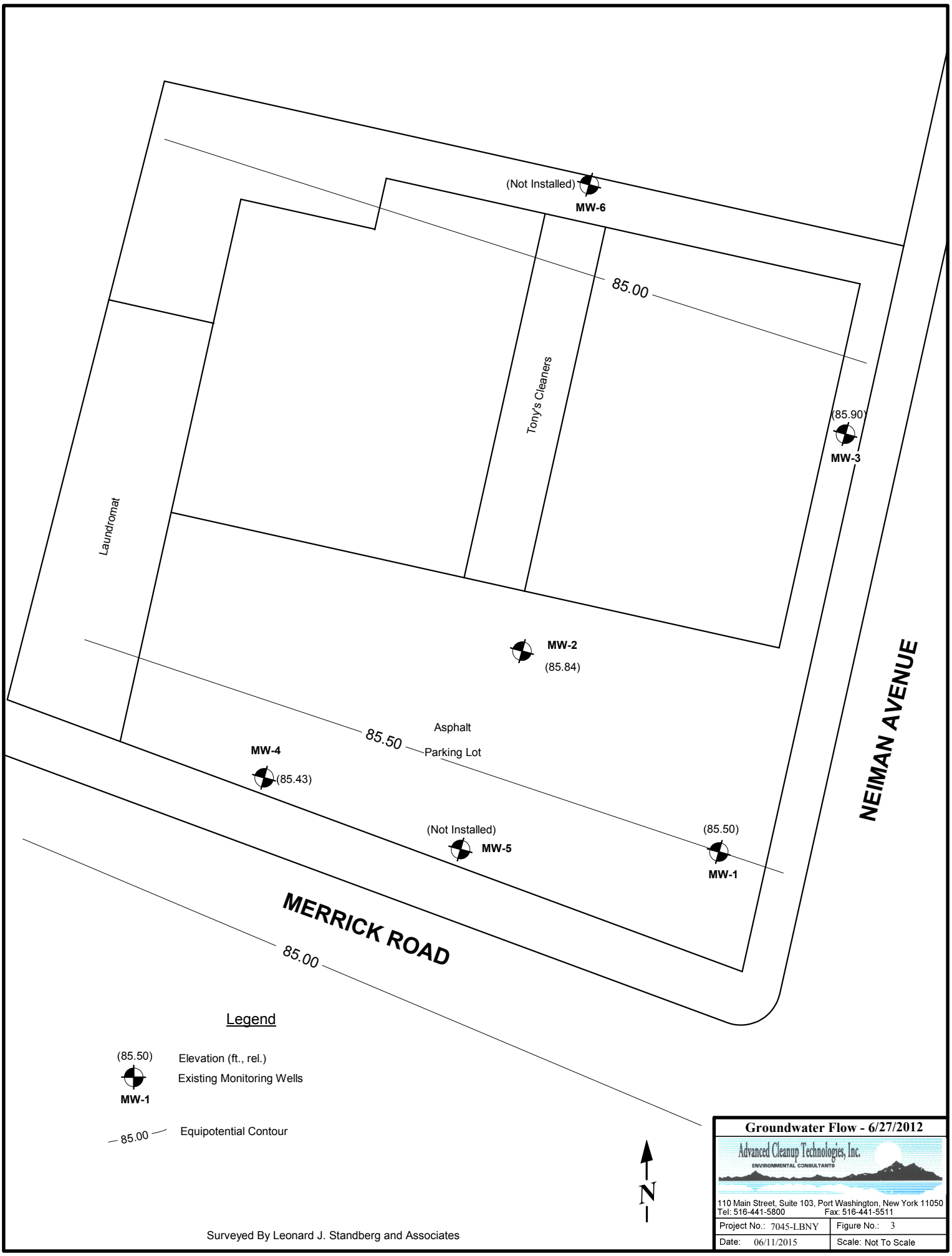
GROUNDWATER CONTOUR MAPS

Sample Location Map

Brockerhoff Environmental Services LLC
Environmental Consulting and Remediation

37 Belvidere Avenue, Washington, NJ

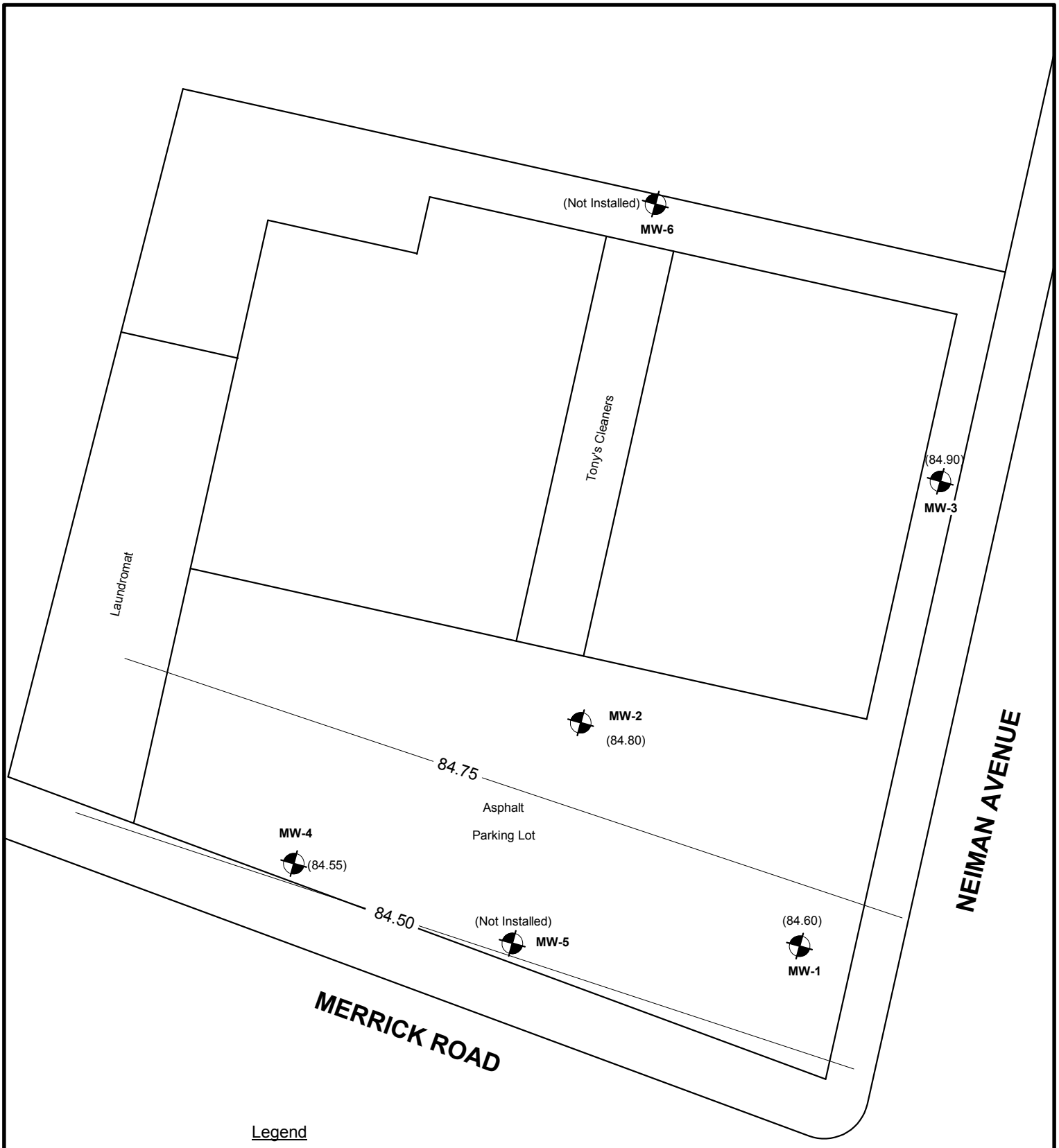




Groundwater Flow - 6/27/2012

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.: 7045-LBNY	Figure No.: 3
Date: 06/11/2015	Scale: Not To Scale



Legend

(84.60) Elevation (ft., rel.)

MW-1 Existing Monitoring Wells

84.50 Equipotential Contour

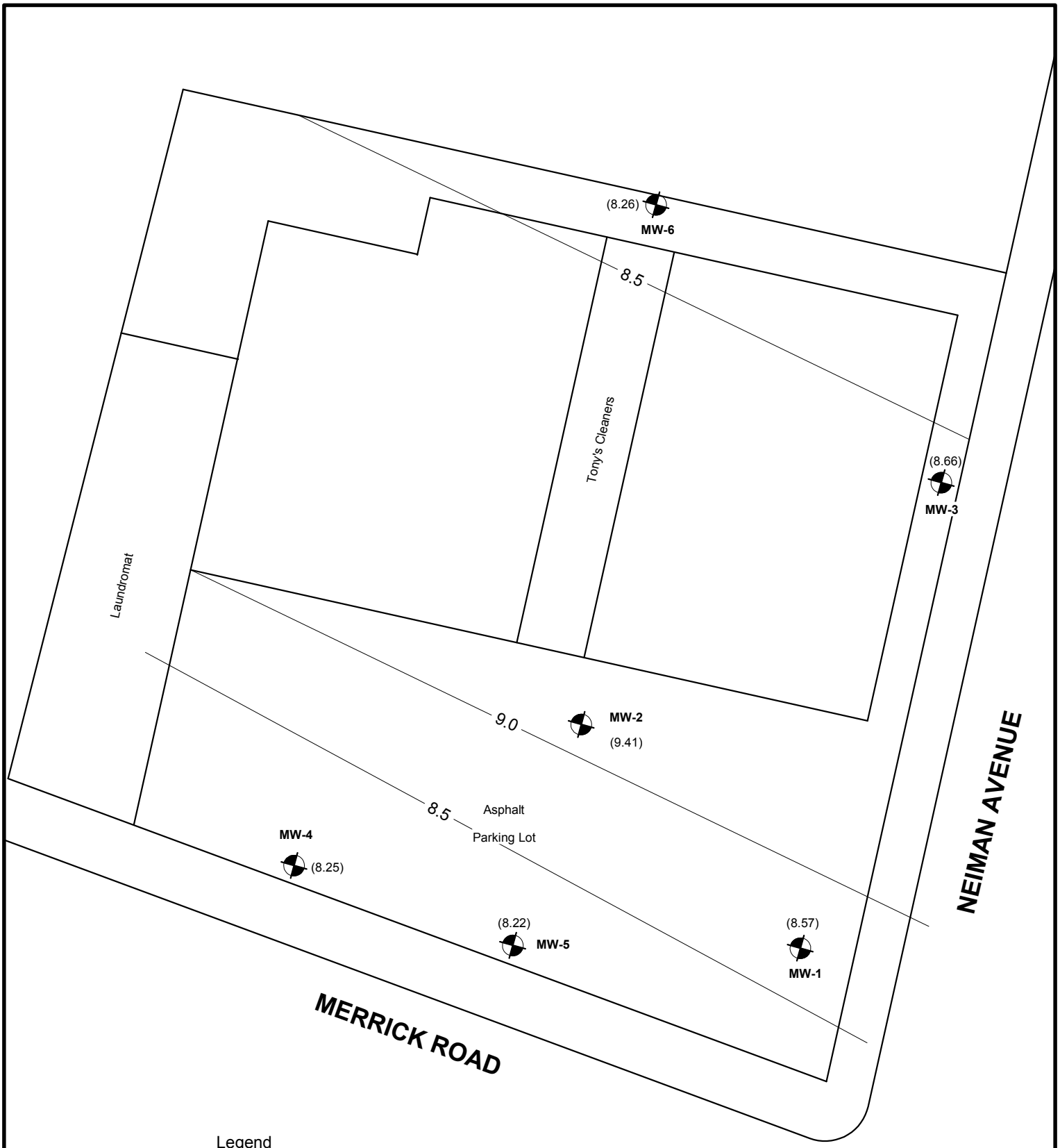
N

Surveyed By Leonard J. Standberg and Associates

Groundwater Flow - 7/13/2012

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.: 7045-LBNY	Figure No.: 3
Date: 06/11/2015	Scale: Not To Scale



Legend

(8.57) MW-1 — Elevation (ft., rel.) / Existing Monitoring Wells

8.0 — Equipotential Contour

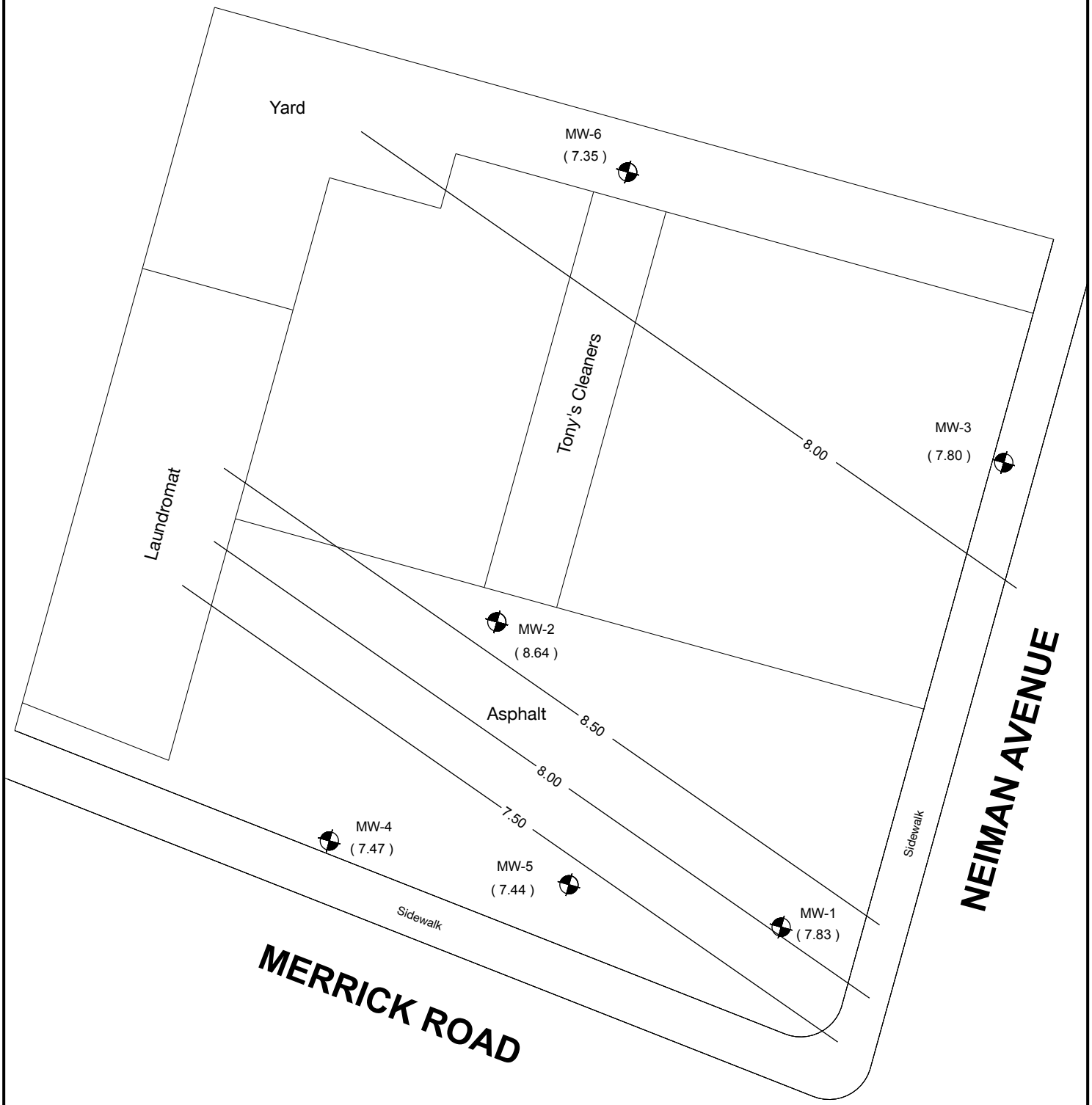
N

Surveyed By Leonard J. Standberg and Associates

Groundwater Flow - 11/4/2014

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.: 7045-LBNY	Figure No.: 3
Date: 06/11/2015	Scale: Not To Scale



Legend

MW-1 (7.83) — Monitoring Well; Elevation (ft., rel.)

8.00 — Equipotential Contour

N

Ground Water Flow - 12/28/2016

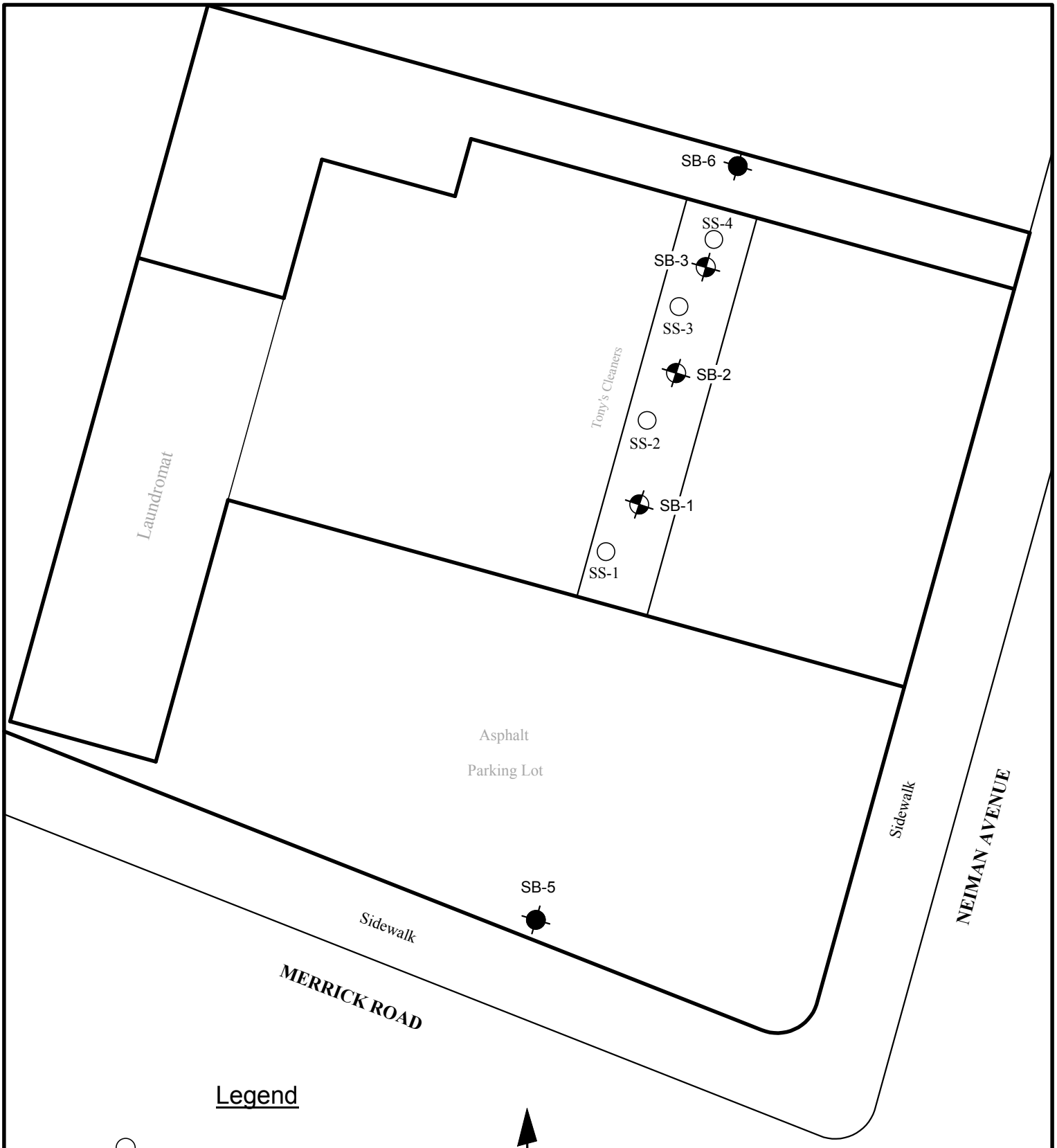
Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.: 7045-LBNY	Figure No.: 2
Date: 01/11/2017	Scale: Not To Scale

Surveyed By Leonard J. Standberg and Associates

FIGURE 4

SOIL SAMPLE LOCATIONS



Legend

SS-1 — Soil Boring, Brockerhoff 2012

SB-1 — Soil Boring, ACT 2012

SB-5 — Soil Boring, ACT 2014

N

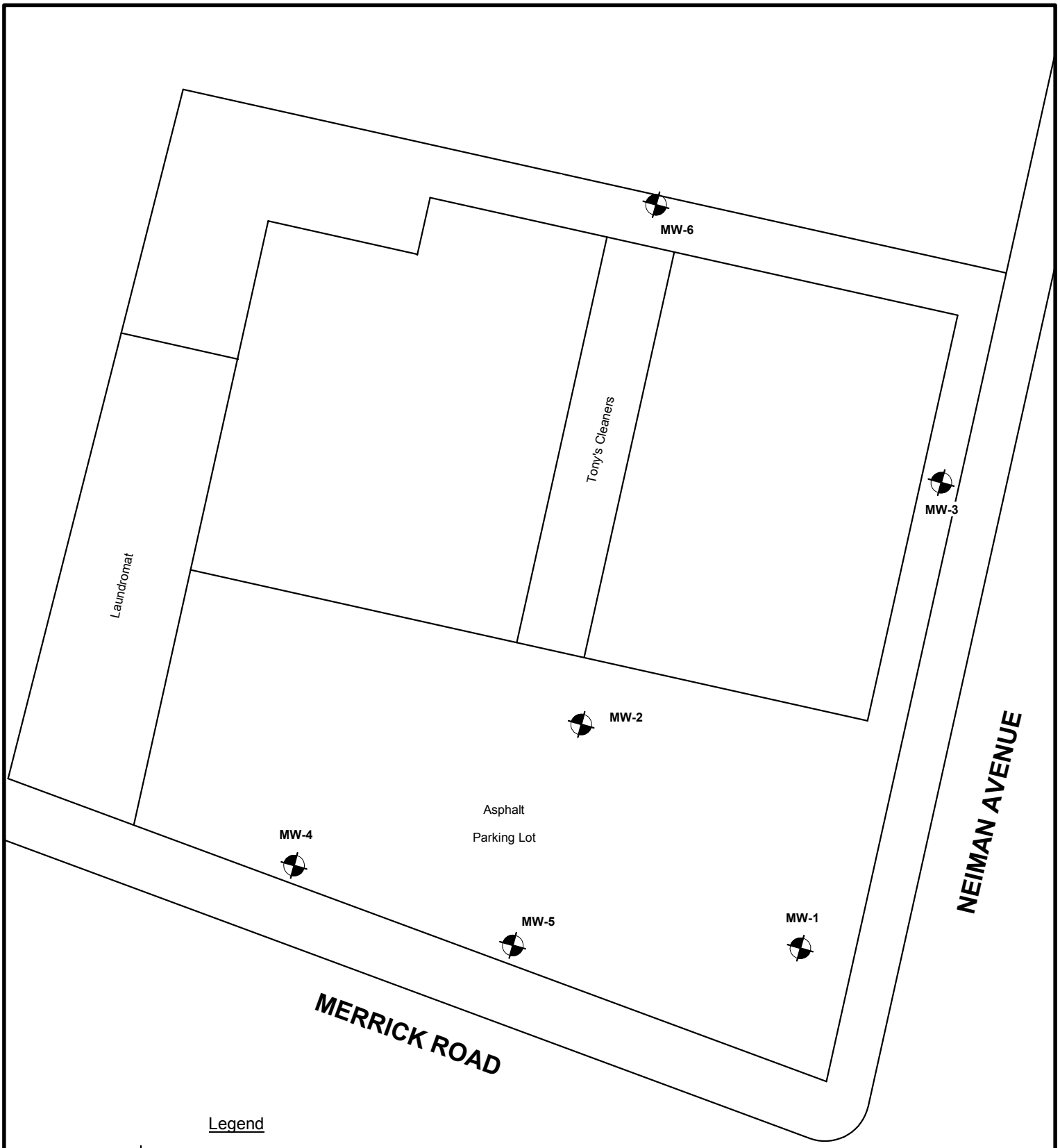
Soil Sampling

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
960 S. Broadway, Suite 100, Hicksville, New York 11801
Tel: 516-933-0655 Fax: 516-933-0659

Project No.: 7045-LBNY	Figure No.: 1
Date: 08/02/2016	Scale: Not To Scale

FIGURE 5

GORUNDWATER MONITORING LOCATIONS



Ground Water Sampling Locations

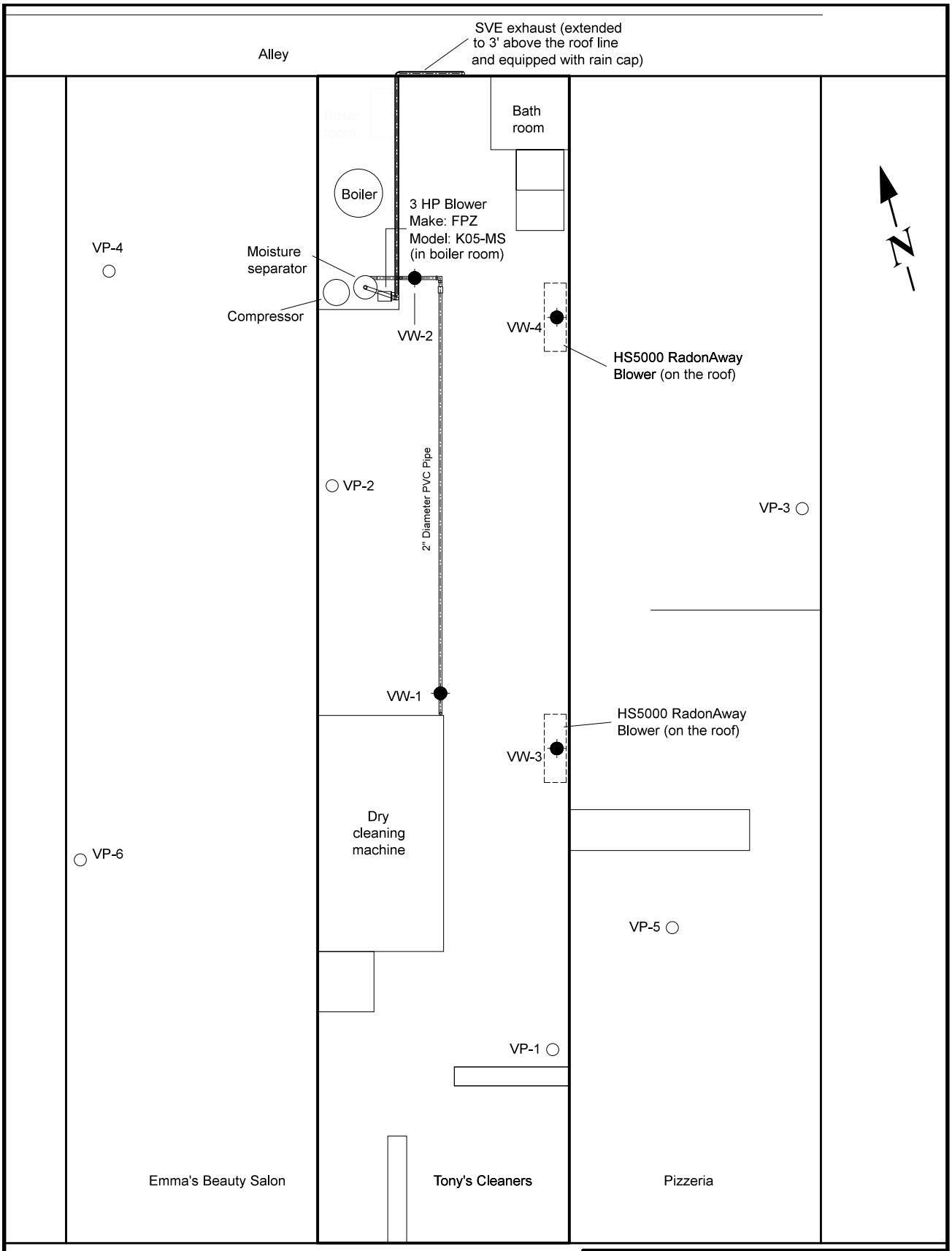
Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS

110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.: 7045-LBNY	Figure No.: 2
Date: 06/11/2015	Scale: Not To Scale

FIGURE 6

SOIL VAPOR INTRUSION SAMPLE LOCATIONS



LEGEND

VW — Vacuum Well

VP — Vacuum Point (typical of 6)

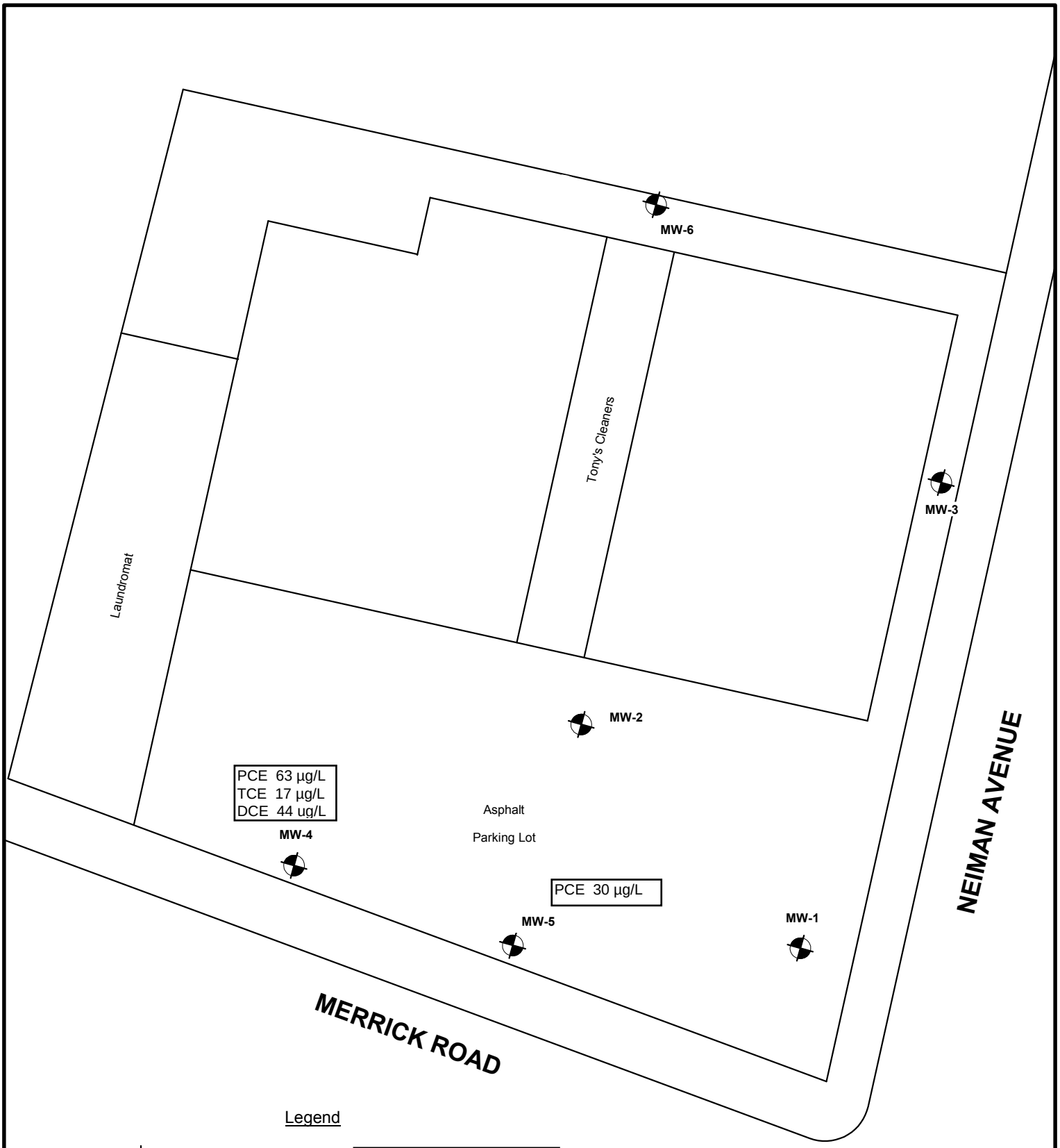
SSD/SVE SYSTEM LAYOUT

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
110 Main St., Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.:7045-LBNY	Figure No.: 3
Date: 02/22/2016	Scale: 1" = 5.81'

FIGURE 7

HISTORICAL GROUNDWATER QUALITY EXCEEDANCES



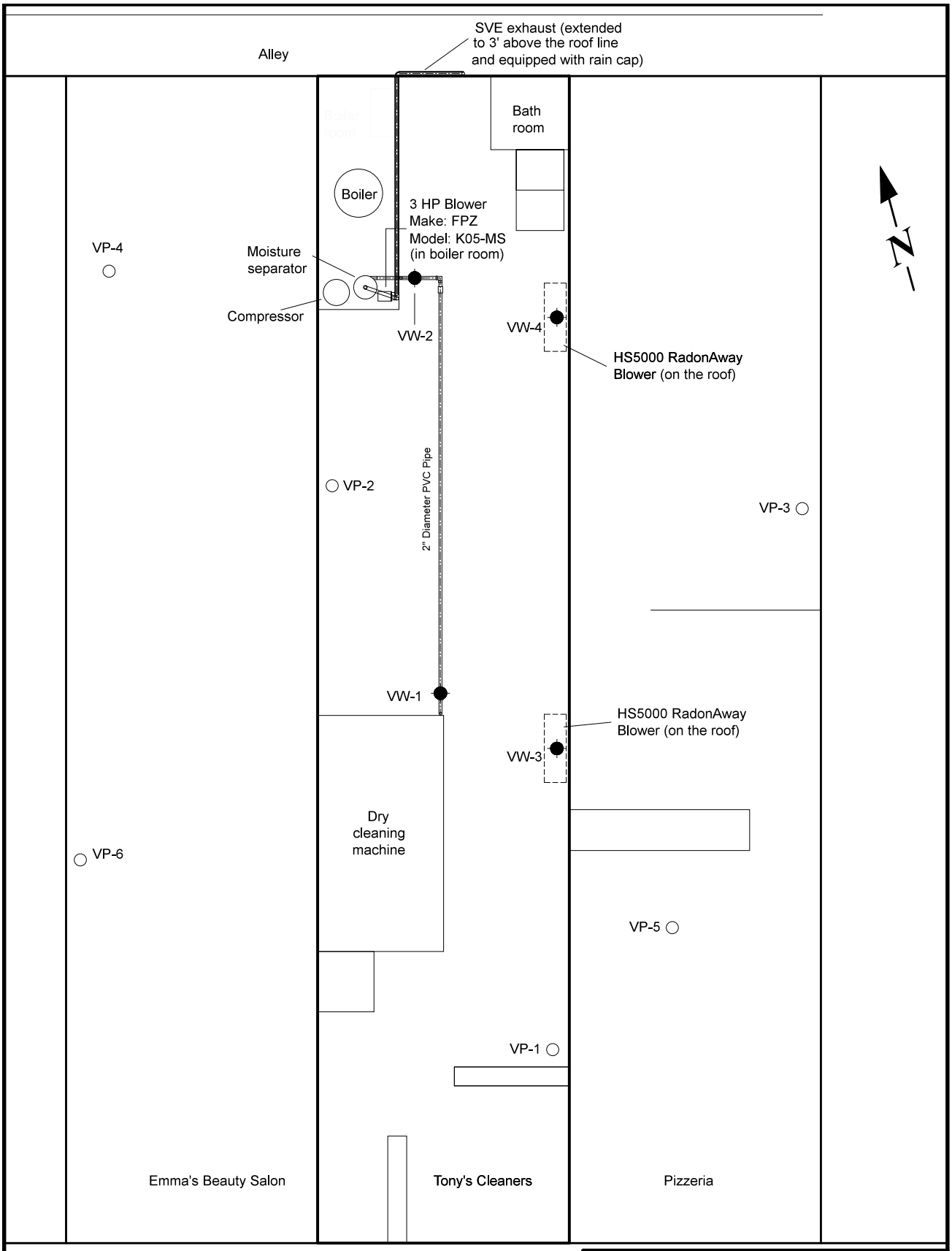
Remaining Groundwater Quality Exceedances

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.: 7045-LBNY	Figure No.: 7
Date: 06/11/2015	Scale: Not To Scale

FIGURE 8

LOCATIONS OF ENGINEERING CONTROLS FOR THE SITE



LEGEND

VW — Vacuum Well

VP — Vacuum Point (typical of 6)

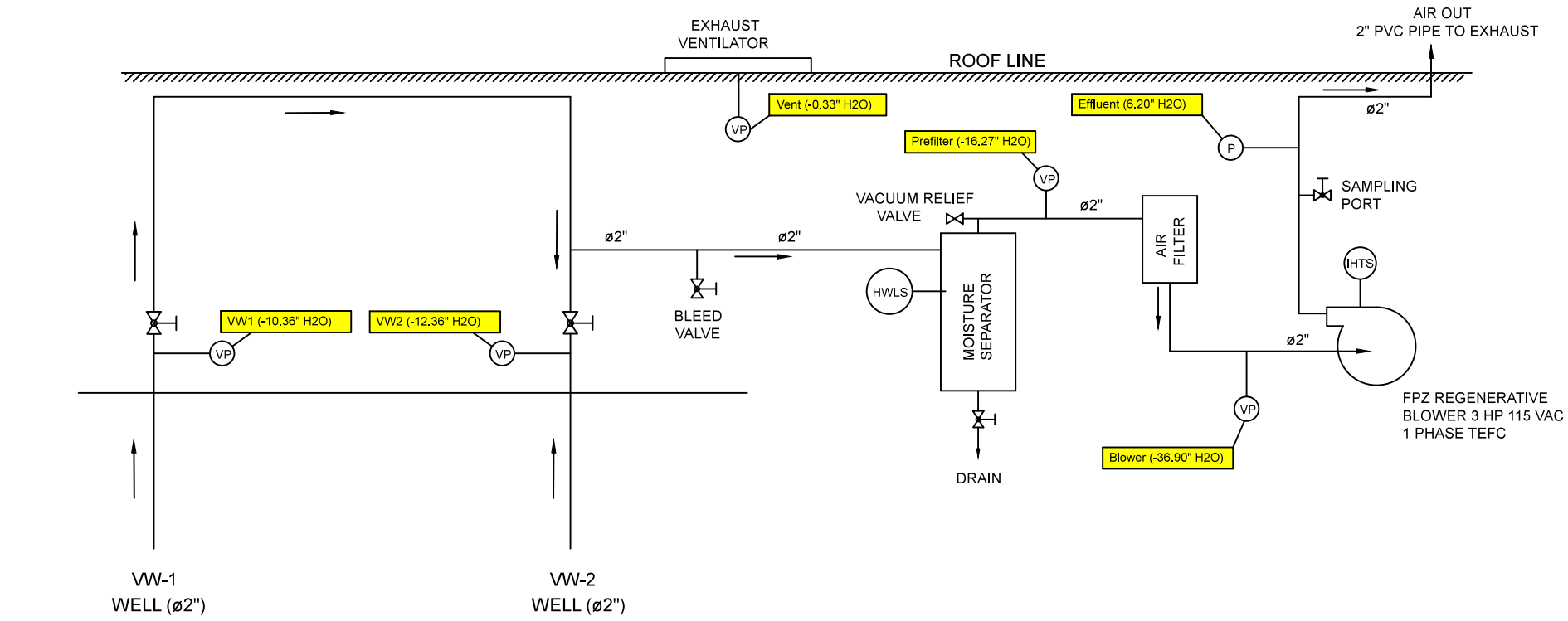
SSD/SVE SYSTEM LAYOUT

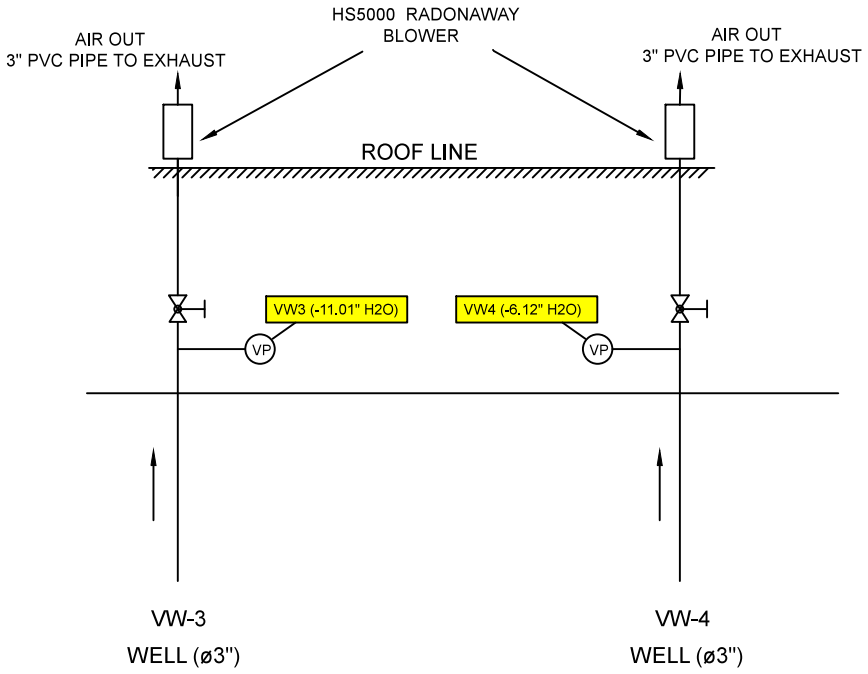
Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
110 Main St., Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.:7045-LBNY	Figure No.: 3
Date: 02/22/2016	Scale: 1" = 5.81'

FIGURE 9

PROCESS AND INSTRUMENTATION DIAGRAM





LEGEND

VP	Vacuum Pressure Sensor
P	Pressure Sensor
IHTS	Internal High Temperature Switch
HWLS	High Water Level Switch
	Gate Valve
VW1 (-10.36" H2O)	Real Time Data viewed through proprietary software

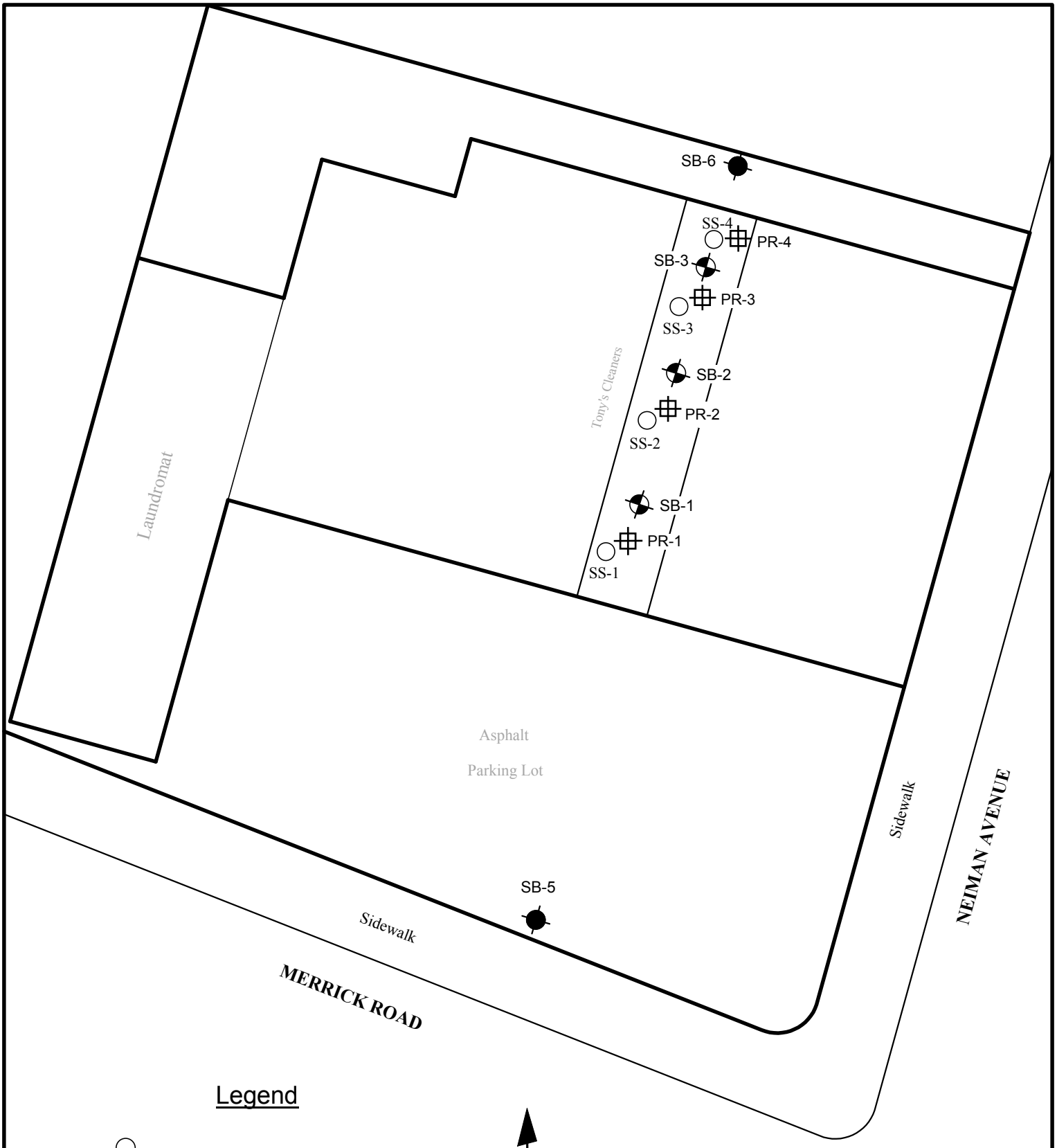
Process and Instrumentation Diagram

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No: 7045-LBNY	Figure No: 9
Date: 09/01/16	Scale: Not To Scale

FIGURE 10

POST-REMEDIAL SOIL SAMPLE LOCATIONS



Legend

SS-1 — Soil Boring, Brockerhoff 2012

SB-1 — Soil Boring, ACT 2012

SB-5 — Soil Boring, ACT 2014

PR-1 — Post-Remedial Soil Sample

N

Post-Remedial Soil Sample Locations

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
960 S. Broadway, Suite 100, Hicksville, New York 11801
Tel: 516-933-0655 Fax: 516-933-0659

Project No.: 7045-LBNY	Figure No.: 10
Date: 08/02/2016	Scale: Not To Scale

APPENDICES

APPENDIX A

ENVIRONMENTAL EASEMENT

April 12, 2016

Lilia Factor, Esq.
Campolo, Middleton & McCormick, LLP
4175 Veterans Memorial Highway- Suite 400
Ronkonkoma, NY 11779

Title No.:	REC-18071-16
Reference:	Nu-Life Realty LLC
Premises:	429-441 Merrick Road, Lynbrook, NY
County:	Nassau

Dear Ms. Factor:

With respect to the above referenced matter, please be advised that the following document(s) were recorded in the above county clerk's office:

- Environmental Easement from Nu-Life Realty LLC to The People of the State of New York on April 11, 2016 in Liber 13346 Page 662

The above instrument(s) have been electronically recorded. Pursuant to your request, the document(s) containing original signatures are attached.

Please contact me should you have any questions or if I can be of further assistance.

Sincerely,

Michelle Sandillo

Michelle Sandillo
Recording Department

**** Electronically Filed Document ****

Instrument Number: 2016-35119

Recorded As: EX-D06 - DEED AGREEM

Recorded On: April 11, 2016

Recorded At: 03:35:26 pm

Receipt Number: 206906

Number of Pages: 10

Processed By: 001 KAV

Book-VI/Pg: Bk-D VI-13346 Pg-662

Total Rec Fee(s): $395.00

** Examined and Charged as Follows **

06 - DEED AGREEMENT	$ 90.00	EX-Blocks - Deeds - $300	$ 300.00	EX-TP-584 Affidavit Fee	$ 5.00

	Tax Amount	Consid Amt	RS#/CS#		
Tax-Transfer HEMPSTEAD	$ 0	$ 0	RE 17801	Basic	$ 0.00
				Local NY CITY	$ 0.00
				Additional MTA	$ 0.00
				Spec ASST	$ 0.00
				Spec ADDL SONYMA	$ 0.00
				Transfer	$ 0.00
Tax Charge:	$ 0				

Property Information:

Section	Block	Lot	Unit	Town Name
37	320	160		HEMPSTEAD
37	320	161		HEMPSTEAD
37	320	162		HEMPSTEAD

**********THIS PAGE IS PART OF THE INSTRUMENT **********

Any provision herein which restricts the Sale, Rental or use of the described REAL PROPERTY because of color or race is invalid and unenforceable under federal law.

NASSAU COUNTY STATE OF NEW YORK

Maureen O'Connell

County Clerk Maureen O'Connell

ORIGINAL DOCUMENT(S)
WITH
ORIGINAL SIGNATURE(S)

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

THIS INDENTURE made this 29th day of December , 2015, between Owner(s), Nu-Life Realty, LLC, having an office at 1300 Harbor Rd., Hewlett, New York 11557 (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

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

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

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

WHEREAS, Grantor, is the owner of real property located at the address of 429-441 Merrick Road in the Village of Lynbrook, Town of Hempstead, County of Nassau and State of New York, known and designated on the tax map of the County of Nassau as tax map parcel numbers: Section 37 Block 320 Lots 160, 161, 162, being the same as that property conveyed to Grantor by deed dated February 1, 2001 and recorded in the Nassau County Clerk's Office at Liber and Page 11380/156. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.460 +/- acres, and is hereinafter more fully described in the Land Title Survey dated October 8, 2015 prepared by Alexander Tsukerman, NYSLS, which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is

extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Order on Consent Index Number: A1-0817-13-11, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

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

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

A. (1) The Controlled Property may be used for:

Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

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

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

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

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

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

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

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

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the 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 this Environmental Easement.

B. The Controlled Property shall not be used for Residential or Restricted Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i) and (ii), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

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

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

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

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

Law.

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

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

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

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

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

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against

the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

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

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

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

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: 130217
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

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

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

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the

recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

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

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

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

Remainder of Page Intentionally Left Blank

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

Nu-Life Realty LLC:

By: _____

Print Name: HOWARD M ZUCKERMAN

Title: V. Pres Date: 12/15/15

Grantor's Acknowledgment

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

On the 15th day of December, in the year 2015, before me, the undersigned, personally appeared Howard M Zuckerman, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

CARLA R MORALES
Notary Public - State of New York
NO. 01MO6090164
Qualified in Nassau County
My Commission Expires May 24, 2019

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

By: _____
Robert W. Schick, Director
Division of Environmental Remediation

Grantee's Acknowledgment

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

On the 29th day of December, in the year 2015, before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 2018

SCHEDULE "A" PROPERTY DESCRIPTION

All that certain plot, piece or parcel of land, with the buildings and improvements thereon erected situate, lying and being in the Incorporated Village of Lynbrook, Town of Hempstead, County of Nassau and State of New York, being parts of Lots Nos. 1 thru 6 on a certain map entitled, "Map of Valuable Building Sites at Highland Park; situated at Lynbrook, in the Town of Hempstead, Nassau County, New York, owned by Fowler and Neimann, surveyed March 13, 1903, by D.S. Denton, East Rockaway, L.I." and filed in the Office of the Clerk of the County of Nassau on May 25, 1905 as Map No. 260, Case no. 1953, which said parts of Lots when taken together are more particularly bounded and described as follows:

BEGINNING AT the corner formed by the intersection of the northerly side of Merrick Road, (new line) and the westerly side of Nieman Avenue;

RUNNING THENCE North 60 degrees 23 minutes 50 seconds West 151.18 along the northerly side of Merrick Road (new line);

THENCE North 22 degrees 26 minutes 00 seconds East, 124.51 feet;

THENCE South 67 degrees 34 minutes 00 seconds East, 150.00 feet to the westerly side of Nieman Avenue;

THENCE South 22 degrees 26 minutes 00 seconds West, along the westerly side of Nieman Avenue 143.38 feet to the point or place of BEGINNING.

TP-584 (4/13)

New York State Department of Taxation and Finance

Combined Real Estate Transfer Tax Return, Credit Line Mortgage Certificate, and Certification of Exemption from the Payment of Estimated Personal Income Tax

Recording office time stamp

See Form TP-584-I, Instructions for Form TP-584, *before completing this form. Print or type.*

Schedule A — Information relating to conveyance

Grantor/Transferor	Name *(if individual, last, first, middle initial)* (☐ *check if more than one grantor)*			Social security number
☐ Individual ☐ Corporation ☐ Partnership ☐ Estate/Trust ☐ Single member LLC ☒ Other	Nu-Life Realty LLC			
	Mailing address			Social security number
	1300 Harbor Road			
	City	State	ZIP code	Federal EIN
	Hewlett	NY	11557	11-3582440
	Single member's name if grantor is a single member LLC *(see instructions)*			Single member EIN or SSN

Grantee/Transferee	Name *(if individual, last, first, middle initial)* (☐ *check if more than one grantee)*			Social security number
☐ Individual ☐ Corporation ☐ Partnership ☐ Estate/Trust ☐ Single member LLC ☒ Other	New York State Department of Environmental Conservation			
	Mailing address			Social security number
	625 Broadway			
	City	State	ZIP code	Federal EIN
	Albany	NY	12233	14-6013200
	Single member's name if grantee is a single member LLC *(see instructions)*			Single member EIN or SSN

Location and description of property conveyed

Tax map designation – Section, block & lot *(include dots and dashes)*	SWIS code (six digits)	Street address	City, town, or village	County
37-320 Lots 160, 161,162	282025	429-441 Merrick Road	Lynbrook	Nassau

Type of property conveyed *(check applicable box)*

1 ☐ One- to three-family house
2 ☐ Residential cooperative
3 ☐ Residential condominium
4 ☐ Vacant land
5 ☒ Commercial/Industrial
6 ☐ Apartment building
7 ☐ Office building
8 ☐ Other _____

Date of conveyance: 12 (month) / 29 (day) / 2015 (year)

Percentage of real property conveyed which is residential real property 100 % *(see instructions)*

Condition of conveyance *(check all that apply)*

a. ☐ Conveyance of fee interest
b. ☐ Acquisition of a controlling interest (state percentage acquired _____ %)
c. ☐ Transfer of a controlling interest (state percentage transferred _____ %)
d. ☐ Conveyance to cooperative housing corporation
e. ☐ Conveyance pursuant to or in lieu of foreclosure or enforcement of security interest *(attach Form TP-584.1, Schedule E)*
f. ☐ Conveyance which consists of a mere change of identity or form of ownership or organization *(attach Form TP-584.1, Schedule F)*
g. ☐ Conveyance for which credit for tax previously paid will be claimed *(attach Form TP-584.1, Schedule G)*
h. ☐ Conveyance of cooperative apartment(s)
i. ☐ Syndication
j. ☐ Conveyance of air rights or development rights
k. ☐ Contract assignment
l. ☐ Option assignment or surrender
m. ☐ Leasehold assignment or surrender
n. ☐ Leasehold grant
o. ☒ Conveyance of an easement
p. ☒ Conveyance for which exemption from transfer tax claimed *(complete Schedule B, Part III)*
q. ☐ Conveyance of property partly within and partly outside the state
r. ☐ Conveyance pursuant to divorce or separation
s. ☒ Other *(describe)* Environmental Easemt

For recording officer's use	Amount received	Date received	Transaction number
	Schedule B., Part I $ Schedule B., Part II $		

Schedule B — Real estate transfer tax return (Tax Law, Article 31)

Part I – Computation of tax due

1	Enter amount of consideration for the conveyance *(if you are claiming a total exemption from tax, check the exemption claimed box, enter consideration and proceed to Part III)* ☐ **Exemption claimed**	1.	0 00
2	Continuing lien deduction *(see instructions if property is taken subject to mortgage or lien)*	2.	0 00
3	Taxable consideration *(subtract line 2 from line 1)*	3.	0 00
4	Tax: $2 for each $500, or fractional part thereof, of consideration on line 3	4.	
5	Amount of credit claimed for tax previously paid *(see instructions and attach Form TP-584.1,* Schedule G)	5.	
6	Total tax due* *(subtract line 5 from line 4)*	6.	0 00

Part II – Computation of additional tax due on the conveyance of residential real property for $1 million or more

1	Enter amount of consideration for conveyance *(from* Part I, *line 1)*	1.	
2	Taxable consideration *(multiply line 1 by the percentage of the premises which is residential real property, as shown in* Schedule A)	2.	
3	Total additional transfer tax due* *(multiply line 2 by 1% (.01))*	3.	

Part III – Explanation of exemption claimed on Part I, line 1 *(check any boxes that apply)*

The conveyance of real property is exempt from the real estate transfer tax for the following reason:

a. Conveyance is to the United Nations, the United States of America, the state of New York, or any of their instrumentalities, agencies, or political subdivisions (or any public corporation, including a public corporation created pursuant to agreement or compact with another state or Canada) ..... a ☒

b. Conveyance is to secure a debt or other obligation ..... b ☐

c. Conveyance is without additional consideration to confirm, correct, modify, or supplement a prior conveyance ..... c ☐

d. Conveyance of real property is without consideration and not in connection with a sale, including conveyances conveying realty as bona fide gifts ..... d ☐

e. Conveyance is given in connection with a tax sale ..... e ☐

f. Conveyance is a mere change of identity or form of ownership or organization where there is no change in beneficial ownership. (This exemption cannot be claimed for a conveyance to a cooperative housing corporation of real property comprising the cooperative dwelling or dwellings.) Attach Form TP-584.1, Schedule F ..... f ☐

g. Conveyance consists of deed of partition ..... g ☐

h. Conveyance is given pursuant to the federal Bankruptcy Act ..... h ☐

i. Conveyance consists of the execution of a contract to sell real property, without the use or occupancy of such property, or the granting of an option to purchase real property, without the use or occupancy of such property ..... i ☐

j. Conveyance of an option or contract to purchase real property with the use or occupancy of such property where the consideration is less than $200,000 and such property was used solely by the grantor as the grantor's personal residence and consists of a one-, two-, or three-family house, an individual residential condominium unit, or the sale of stock in a cooperative housing corporation in connection with the grant or transfer of a proprietary leasehold covering an individual residential cooperative apartment ..... j ☐

k. Conveyance is not a conveyance within the meaning of Tax Law, Article 31, section 1401(e) *(attach documents supporting such claim)* ..... k ☐

*The total tax (from Part I, line 6 and Part II, line 3 above) is due within 15 days from the date conveyance. Please make check(s) payable to the county clerk where the recording is to take place. If the recording is to take place in the New York City boroughs of Manhattan, Bronx, Brooklyn, or Queens, make check(s) payable to the ***NYC Department of Finance.*** If a recording is not required, send this return and your check(s) made payable to the ***NYS Department of Taxation and Finance,*** directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-5045.

Schedule C — Credit Line Mortgage Certificate (Tax Law, Article 11)

Complete the following only if the interest being transferred is a fee simple interest.
I (we) certify that: *(check the appropriate box)*

1. ☐ The real property being sold or transferred is not subject to an outstanding credit line mortgage.

2. ☐ The real property being sold or transferred is subject to an outstanding credit line mortgage. However, an exemption from the tax is claimed for the following reason:
   - ☐ The transfer of real property is a transfer of a fee simple interest to a person or persons who held a fee simple interest in the real property (whether as a joint tenant, a tenant in common or otherwise) immediately before the transfer.
   - ☐ The transfer of real property is (A) to a person or persons related by blood, marriage or adoption to the original obligor or to one or more of the original obligors or (B) to a person or entity where 50% or more of the beneficial interest in such real property after the transfer is held by the transferor or such related person or persons (as in the case of a transfer to a trustee for the benefit of a minor or the transfer to a trust for the benefit of the transferor).
   - ☐ The transfer of real property is a transfer to a trustee in bankruptcy, a receiver, assignee, or other officer of a court.
   - ☐ The maximum principal amount secured by the credit line mortgage is $3,000,000 or more, and the real property being sold or transferred is **not** principally improved nor will it be improved by a one- to six-family owner-occupied residence or dwelling.

     Please note: for purposes of determining whether the maximum principal amount secured is $3,000,000 or more as described above, the amounts secured by two or more credit line mortgages may be aggregated under certain circumstances. See TSB-M-96(6)-R for more information regarding these aggregation requirements.
   - ☐ Other *(attach detailed explanation)*.

3. ☐ The real property being transferred is presently subject to an outstanding credit line mortgage. However, no tax is due for the following reason:
   - ☐ A certificate of discharge of the credit line mortgage is being offered at the time of recording the deed.
   - ☐ A check has been drawn payable for transmission to the credit line mortgagee or his agent for the balance due, and a satisfaction of such mortgage will be recorded as soon as it is available.

4. ☐ The real property being transferred is subject to an outstanding credit line mortgage recorded in _____ (insert liber and page or reel or other identification of the mortgage). The maximum principal amount of debt or obligation secured by the mortgage is _____. No exemption from tax is claimed and the tax of _____ is being paid herewith. *(Make check payable to county clerk where deed will be recorded or, if the recording is to take place in New York City but not in Richmond County, make check payable to the **NYC Department of Finance.**)*

Signature (both the grantor(s) and grantee(s) must sign)

The undersigned certify that the above information contained in schedules A, B, and C, including any return, certification, schedule, or attachment, is to the best of his/her knowledge, true and complete, and authorize the person(s) submitting such form on their behalf to receive a copy for purposes of recording the deed or other instrument effecting the conveyance.

Grantor signature	Title	Grantee signature	Title
[signature]	Member	[signature] Andrew Ghyselinck NYSDEC	Attorney
Grantor signature	Title	Grantee signature	Title

Reminder: Did you complete all of the required information in Schedules A, B, and C? Are you required to complete Schedule D? If you checked *e*, *f*, or *g* in Schedule A, did you complete Form TP-584.1? Have you attached your check(s) made payable to the county clerk where recording will take place or, if the recording is in the New York City boroughs of Manhattan, Bronx, Brooklyn, or Queens, to the ***NYC Department of Finance***? If no recording is required, send your check(s), made payable to the ***Department of Taxation and Finance***, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-5045.

Schedule D - Certification of exemption from the payment of estimated personal income tax (Tax Law, Article 22, section 663)

Complete the following only if a fee simple interest or a cooperative unit is being transferred by an individual or estate or trust.

If the property is being conveyed by a referee pursuant to a foreclosure proceeding, proceed to Part II, and check the second box under *Exemptions for nonresident transferor(s)/seller(s)* and sign at bottom.

Part I - New York State residents

If you are a New York State resident transferor(s)/seller(s) listed in Schedule A of Form TP-584 (or an attachment to Form TP-584), you must sign the certification below. If one or more transferors/sellers of the real property or cooperative unit is a resident of New York State, **each** resident transferor/seller must sign in the space provided. If more space is needed, please photocopy this Schedule D and submit as many schedules as necessary to accommodate all resident transferors/sellers.

Certification of resident transferor(s)/seller(s)

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor(s)/seller(s) as signed below was a resident of New York State, and therefore is not required to pay estimated personal income tax under Tax Law, section 663(a) upon the sale or transfer of this real property or cooperative unit.

Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

Note: A resident of New York State may still be required to pay estimated tax under Tax Law, section 685(c), but not as a condition of recording a deed.

Part II - Nonresidents of New York State

If you are a nonresident of New York State listed as a transferor/seller in Schedule A of Form TP-584 (or an attachment to Form TP-584) but are not required to pay estimated personal income tax because one of the exemptions below applies under Tax Law, section 663(c), check the box of the appropriate exemption below. If any one of the exemptions below applies to the transferor(s)/seller(s), that transferor(s)/seller(s) is not required to pay estimated personal income tax to New York State under Tax Law, section 663. **Each** nonresident transferor/seller who qualifies under one of the exemptions below must sign in the space provided. If more space is needed, please photocopy this Schedule D and submit as many schedules as necessary to accommodate all nonresident transferors/sellers.

If none of these exemption statements apply, you must complete Form IT-2663, *Nonresident Real Property Estimated Income Tax Payment Form*, or Form IT-2664, *Nonresident Cooperative Unit Estimated Income Tax Payment Form.* For more information, see *Payment of estimated personal income tax,* on page 1 of Form TP-584-I.

Exemption for nonresident transferor(s)/seller(s)

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor(s)/seller(s) (grantor) of this real property or cooperative unit was a nonresident of New York State, but is not required to pay estimated personal income tax under Tax Law, section 663 due to one of the following exemptions:

☐ The real property or cooperative unit being sold or transferred qualifies in total as the transferor's/seller's principal residence (within the meaning of Internal Revenue Code, section 121) from _____ (Date) to _____ (Date) *(see instructions)*.

☐ The transferor/seller is a mortgagor conveying the mortgaged property to a mortgagee in foreclosure, or in lieu of foreclosure with no additional consideration.

☐ The transferor or transferee is an agency or authority of the United States of America, an agency or authority of the state of New York, the Federal National Mortgage Association, the Federal Home Loan Mortgage Corporation, the Government National Mortgage Association, or a private mortgage insurance company.

Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

APPENDIX B

LIST OF SITE CONTACT INFORMATION

Appendix B
List of Site Contact Information

NYSDEC Officials:

Mr. Walter J. Parish, P.E.
Regional Hazardous Waste Remediation Engineer
NYSDEC Region 1 Division of Environmental Remediation
SUNY – Stony Brook
50 Circle Road
Stony Brook, NY 11790-3409

Mr. Jamie Ascher, P.G.
Project Manager
NYSDEC Region 1 Division of Environmental Remediation
SUNY – Stony Brook
50 Circle Road
Stony Brook, NY 11790-3409

Ms. Kelly Lewandowski, P.E.
Chief, Site Control Section
NYSDEC Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, NY 12233-7011

NYSDOH Officials:

Mr. Stephen Lawrence
Project Manager
NYSDOH
547 River Street
Troy, New York 12180-2216

Nassau County Officials:

Mr. Edward P. Mangano
Nassau County Executive
1550 Franklin Avenue
Mineola, NY 11501

Ms. Maureen O'Connell
Nassau County Clerk
240 Old Country Road
Mineola, NY 11501

Mr. Joseph DeFranco, Chief
Office of Soil and Groundwater Remediation
Nassau County Department of Health

Bureau of Environmental Protection
106 Charles Lindbergh Blvd.
Uniondale, NY 11553

Town of Hempstead Officials:

Ms. Kate Murray, Supervisor
Hempstead Town Hall
One Washington Street
Hempstead, New York 11550

Nasrin G. Ahmad, Town Clerk
Hempstead Town Hall
One Washington Street, First Floor
Hempstead, New York 11550

Village of Lynbrook Officials:

William J. Hendrick, Mayor
The Inc. Village of Lynbrook
Post Office Box 7021
Lynbrook, NY 11563-7021

Brian Stanton, Building Department Superintendent
The Inc. Village of Lynbrook
Post Office Box 7021
Lynbrook, NY 11563-7021

Public Water Supply:

Mr. John Sparacio, Chairman
West Hempstead Water District
575 Birch Street
West Hempstead, NY 11552

Document repository:

Lynbrook Village Library
56 Elder Street
Lynbrook, NY 11563

Nearby school or day care facility:

Our Lady of Peace School
21 Fowler Avenue
Lynbrook, NY 11563

APPENDIX C

SOIL BORING LOGS

Brockerhoff Environmental Services LLC

37 Belvidere Avenue, Washington, NJ 07882

MONITORING WELL LOG

BORING #: **MW-1**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**NuLife Realty LLC**	DRILLING CO.:	**Hawk Drilling, Inc.**
SITE LOCATION:	**429-441 Merrick Rd., Lynbrook, NY**	DRILLER:	**Ricky**
JOB NO.:	**N/A**	RIG TYPE:	**HSA**
LOGGED BY:	**JMB/JLJ**	METHOD OF DRILLING:	**HSA**
WELL PERMIT #:		SAMPLING METHODS:	**2' split spoon**
DATES DRILLED:	**2/9/12**	HAMMER WT./DROP:	**N/A**

▽ Water level during drilling ▼ Water level in completed well

DEPTH (ft)	SOIL SYMBOLS	SOIL DESCRIPTION	RECOVERY (ft)	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0–18		Asphalt and subbase; tan Cmf Sand; dark brown Cmf Sand; light brown Cmf Sand	2; 2		0; 0; 0; 0; 0	Flushmount completion; Concrete; 2" Sch. 40 PVC Blank; Bentonite seal; #1 Sand pack; 2" Sch. 40 PVC 10-slot Screen; End Cap	

NOTES: No obvious odors or signs of staining observed throughout.

Brockerhoff Environmental Services LLC

37 Belvidere Avenue, Washington, NJ 07882

MONITORING WELL LOG

BORING #: **MW-2**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**NuLife Realty LLC**	DRILLING CO.:	**Hawk Drilling, Inc.**
SITE LOCATION:	**429-441 Merrick Rd., Lynbrook, NY**	DRILLER:	**Ricky**
JOB NO.:	**N/A**	RIG TYPE:	**HSA**
LOGGED BY:	**JMB/JLJ**	METHOD OF DRILLING:	**HSA**
WELL PERMIT #:		SAMPLING METHODS:	**2' split spoon**
DATES DRILLED:	**2/9/12**	HAMMER WT./DROP:	**N/A**

Water level during drilling ▽ Water level in completed well ▼

DEPTH (ft)	SOIL SYMBOLS	SOIL DESCRIPTION	RECOVERY (ft)	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0–18		Asphalt and subbase; tan Cmf Sand; dark brown Cmf Sand; light brown Cmf Sand	6–7: 2 7–8: 2		0 0 0 0 0	Flushmount completion; Concrete; 2" Sch. 40 PVC Blank; Bentonite seal; #1 Sand pack; 2" Sch. 40 PVC 10-slot Screen; End Cap	

NOTES: No obvious odors or signs of staining observed throughout.

Brockerhoff Environmental Services LLC

37 Belvidere Avenue, Washington, NJ 07882

MONITORING WELL LOG

BORING #: **MW-3**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**NuLife Realty LLC**	DRILLING CO.:	**Hawk Drilling, Inc.**
SITE LOCATION:	**429-441 Merrick Rd., Lynbrook, NY**	DRILLER:	**Ricky**
JOB NO.:	**N/A**	RIG TYPE:	**HSA**
LOGGED BY:	**JMB/JLJ**	METHOD OF DRILLING:	**HSA**
WELL PERMIT #:		SAMPLING METHODS:	**2' split spoon**
DATES DRILLED:	**2/10/12**	HAMMER WT./DROP:	**N/A**

Water level during drilling Water level in completed well

DEPTH (ft)	SOIL SYMBOLS	SOIL DESCRIPTION	RECOVERY (ft)	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0–18		Asphalt and subbase; tan Cmf Sand; dark brown Cmf Sand; light brown Cmf Sand	2; 2		0; 0; 0; 0; 0	Flushmount completion; Concrete; 2" Sch. 40 PVC Blank; Bentonite seal; #1 Sand pack; 2" Sch. 40 PVC 10-slot Screen; End Cap	

NOTES: No obvious odors or signs of staining observed throughout.

SOIL BORING LOG

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS

960 S. Broadway Hicksville New York

Project No.:	7045-LBNY	**SOIL BORING No.:**	SB-5
Location:	429 Merrick Road, Liberty Plaza		10 AM
Drilling Method:	Direct Push driling technology	**DATE:**	10/9/14
Drilling Rig:	AMS 9600 Power Probe	**WEATHER:**	Sunny 70's
Geologist:	SW/TY		
Depth to Groundwater:	11.5'ft (measured) 12.4'ft (via liners)	**Completed depth:**	15'ft

Depth (ft. bgs)	Depth (ft)	Recovery (ft)	PID (ppm)	USCS Symbol	Description	Environmental Description
	0-5	3.5'ft recovery	—		0.0-0.5'ft - asphalt/concrete top hole fill.	
1			X		0.5-2.5'ft - light brown to medium brown, fine to medium grained sands. conform (clay) semi compacting. damp, but not wet.	
			16			
2			+30	0		
			19		2.5'-3.2'ft - light browns, light medium browns. Fine grained sands. conform (moderate clay) semi compact w/ silts. scattered pebbles. DRY	
3			10.5			
			13.8			
4			26.1		3.2-5.0'ft - light brown to light yellow brown, tans, medium sands. Orange tint. rustic. qtz sands - non conform / non compact (DRY)	sample #1 PID 4.5'ft
			40.3	* (sample)		
5			17.4			
	5-10	3.1'ft recovery			0.0-0.8- top hole fill from (0-5'ft) asphalt dust within (damp, not wet)	
6			29.4			
			8.8		0.8'ft - 2.2'ft - light brown to light yellow brown, medium sands. tans, rustic oranges (3.2-5.0'ft sample) - qtz - non conform/ no compact DRY	
7			22.7			
			5.1			
8			14.0		2.2'-3.0'ft - orange brown to light orange rusty/dusky browns. fine to medium qtz sands - semi conform, non compact. DRY	
			13.5			
9			8.1		3.0-4.5'ft - light yellow to pale yellow sands black sand stringers (zebra stripes) non conform/non compact (DRY)	
			11.1			
10			12.7			

4.5'-5.0'ft - light brown to dusky orange medium grained qtz sands. no pebbles at all. non conform/non compact (DRY)

FIELD
SOIL BORING LOG

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS

ect, Port ew York

Project No.: 7045-LBNY

LOCATION: Liberty Plaza, Lynbrook NY

BORING NUMBER: SB-5

DATE:

Depth (ft. bgs)	Depth (ft)	Recovery (ft)	PID (ppm)	USCS Symbol	Description	Environmental Description
11	10-15	4.5'Ft recovery	11.1		10.0 - 11.5'Ft - samples (0-5 + 5-10') typ fill asphalt dust + composite of hp hole samples	(Sample #2 11.5-12.4) ↓ 12.4' Ft water boundary interface
12			9.4			
			5.2			
			16		11.5'Ft - 12.4'Ft - light browns, medium browns, tans + some yellow qtz sands. fine to medium grained. conform (very damp) - compact (med saturation) water interface	
13			12.7			
			10.4			
14			19.4		12.4' - 15.0'Ft - (SATURATED) tan to light yellow dusky brown. resembles wet beach sand saturated w/ water. compact/conform (wet)	
15						
16	15-20				END OF BORING samples: 4-5'Ft (PID) 11-12'Ft (saturation interface) * PID readings inconsistent (?) no odors!! *	
17						
18						
19						
20						
21	20-25					
22						
23						
24						
25						

FIELD
SOIL BORING LOG

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS

960 S. Broadway
Hicksville NY

JOB No.: 7045-LBNY
BORING NUMBER: SB-6
LOCATION: Liberty Plaza, Lynbrook NY
Tony Cleaner (back alley)
DATE: 10/16/14
WEATHER: Sunny 60's
Drilling Method: Direct Push driling technology- PORTABLE
16'

Depth (ft. bgs)	Depth (ft)	Recovery (ft)	PID (ppm)	USCS Symbol	Description	Environmental Description
1	0-4	3.2	0		0-8" Concrete 8"-3' Orange-brown silt V. fine sand, slightly moist	No Odor
2			0			
3			0		3'-4' Orange-brown V. fine sand, dry	
4			0			
5	4-8	3.4	0		4'-16' Orange-brown-tan V. fine - fine sand Dry Few small pebbles	No Odor
6			0			
7			0			
8			0			
9	8-12	4.0	24		Wet at ~ 11'	
10			16			
11			57		Sample @ 10-11' 12:00	
12			22			
			333			
			3000			
			↓			
			3000			

FIELD
SOIL BORING LOG

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS

960 S. Broadway
Hicksville NY

JOB No.: 7045-LBNY

LOCATION: _____

Drilling Method: Direct Push driling technology-

BORING NUMBER: SB-6

DATE: 10/10/14

WEATHER: _____

Depth (ft. bgs)	Depth (ft)	Recovery (ft)	PID (ppm)	USCS Symbol	Description	Environmental Description
12					Same wet Stuck shoe - had to bang sample into a bag Composite PID = 114	
13						
14	12-16	4.0	114			
15						
16						
17						
18	16-20					
19						
20						

APPENDIX D

MONITORING WELL CONSTRUCTION RECORDS

Brockerhoff Environmental Services LLC

37 Belvidere Avenue, Washington, NJ 07882

MONITORING WELL LOG

BORING #: **MW-1**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**NuLife Realty LLC**	DRILLING CO.:	**Hawk Drilling, Inc.**
SITE LOCATION:	**429-441 Merrick Rd., Lynbrook, NY**	DRILLER:	**Ricky**
JOB NO.:	**N/A**	RIG TYPE:	**HSA**
LOGGED BY:	**JMB/JLJ**	METHOD OF DRILLING:	**HSA**
WELL PERMIT #:		SAMPLING METHODS:	**2' split spoon**
DATES DRILLED:	**2/9/12**	HAMMER WT./DROP:	**N/A**

▽ Water level during drilling ▼ Water level in completed well

DEPTH (ft)	SOIL SYMBOLS	SOIL DESCRIPTION	RECOVERY (ft)	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0–18		Asphalt and subbase; tan Cmf Sand; dark brown Cmf Sand; light brown Cmf Sand	2; 2		0; 0; 0; 0; 0	Flushmount completion; Concrete; 2" Sch. 40 PVC Blank; Bentonite seal; #1 Sand pack; 2" Sch. 40 PVC 10-slot Screen; End Cap	

NOTES: No obvious odors or signs of staining observed throughout.

Brockerhoff Environmental Services LLC

37 Belvidere Avenue, Washington, NJ 07882

MONITORING WELL LOG

BORING #: **MW-2**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**NuLife Realty LLC**	DRILLING CO.:	**Hawk Drilling, Inc.**
SITE LOCATION:	**429-441 Merrick Rd., Lynbrook, NY**	DRILLER:	**Ricky**
JOB NO.:	**N/A**	RIG TYPE:	**HSA**
LOGGED BY:	**JMB/JLJ**	METHOD OF DRILLING:	**HSA**
WELL PERMIT #:		SAMPLING METHODS:	**2' split spoon**
DATES DRILLED:	**2/9/12**	HAMMER WT./DROP:	**N/A**

Water level during drilling ▽ Water level in completed well ▼

DEPTH (ft)	SOIL SYMBOLS	SOIL DESCRIPTION	RECOVERY (ft)	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0–18		Asphalt and subbase; tan Cmf Sand; dark brown Cmf Sand; light brown Cmf Sand	6–7: 2 7–8: 2		0 0 0 0 0	Flushmount completion; Concrete; 2" Sch. 40 PVC Blank; Bentonite seal; #1 Sand pack; 2" Sch. 40 PVC 10-slot Screen; End Cap	

NOTES: No obvious odors or signs of staining observed throughout.

Brockerhoff Environmental Services LLC

37 Belvidere Avenue, Washington, NJ 07882

MONITORING WELL LOG

BORING #: **MW-3**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**NuLife Realty LLC**	DRILLING CO.:	**Hawk Drilling, Inc.**
SITE LOCATION:	**429-441 Merrick Rd., Lynbrook, NY**	DRILLER:	**Ricky**
JOB NO.:	**N/A**	RIG TYPE:	**HSA**
LOGGED BY:	**JMB/JLJ**	METHOD OF DRILLING:	**HSA**
WELL PERMIT #:		SAMPLING METHODS:	**2' split spoon**
DATES DRILLED:	**2/10/12**	HAMMER WT./DROP:	**N/A**

Water level during drilling Water level in completed well

DEPTH (ft)	SOIL SYMBOLS	SOIL DESCRIPTION	RECOVERY (ft)	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0–18		Asphalt and subbase; tan Cmf Sand; dark brown Cmf Sand; light brown Cmf Sand	2; 2		0; 0; 0; 0; 0	Flushmount completion; Concrete; 2" Sch. 40 PVC Blank; Bentonite seal; #1 Sand pack; 2" Sch. 40 PVC 10-slot Screen; End Cap	

NOTES: No obvious odors or signs of staining observed throughout.

WELL CONSTRUCTION LOG

SITE 7045-LRNY JOB NO. _____ WELL NO. MW-4

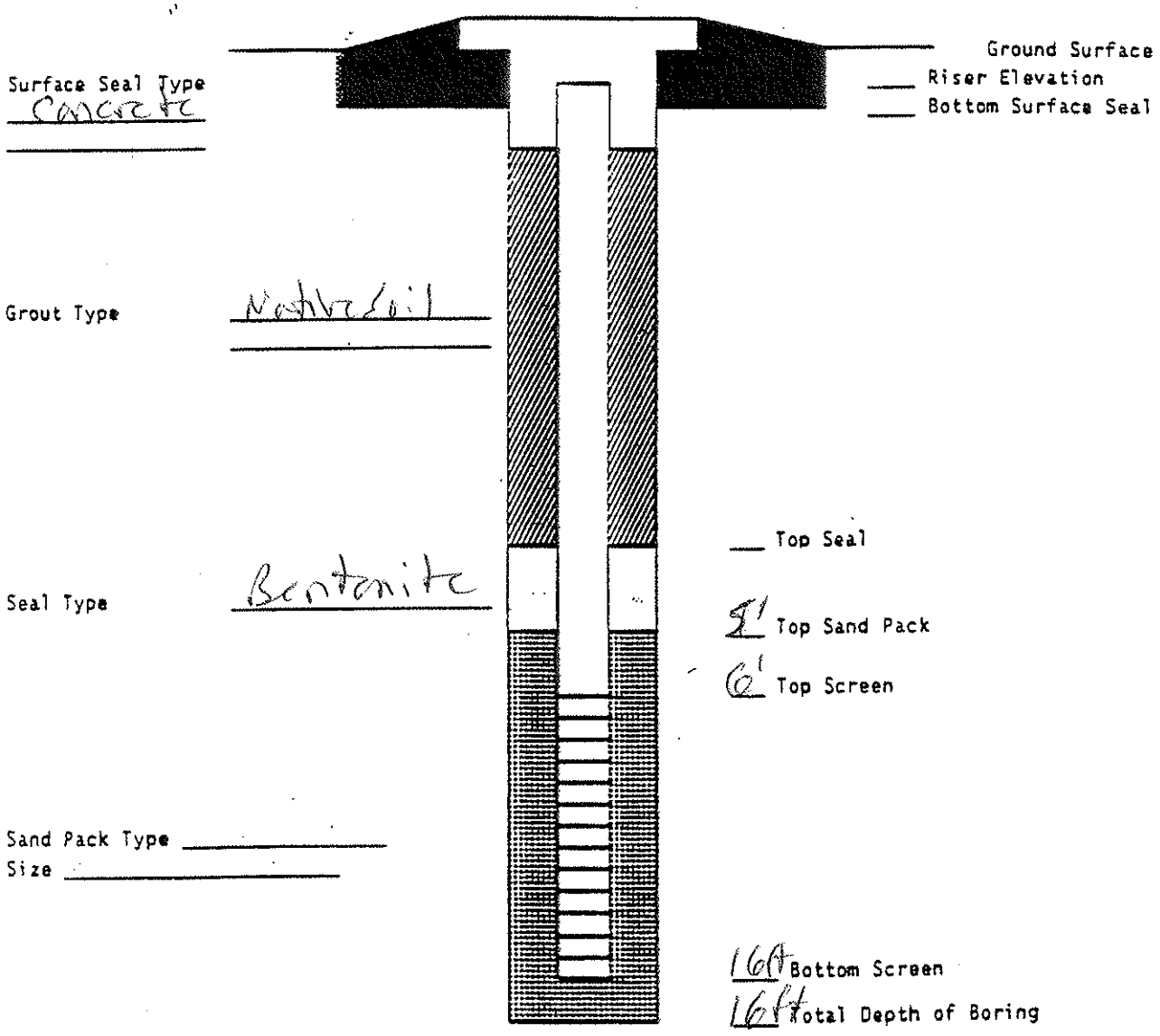
TOTAL DEPTH 16ft SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) DTW-9.17' DATE INSTALLED 6/27/12

RISER DIA 1" MATERIAL PVC LENGTH 6ft

SCREEN DIA 1" MATERIAL PVC LENGTH 10ft SLOT SIZE 0.02"

SCHEMATIC



WELL CONSTRUCTION LOG

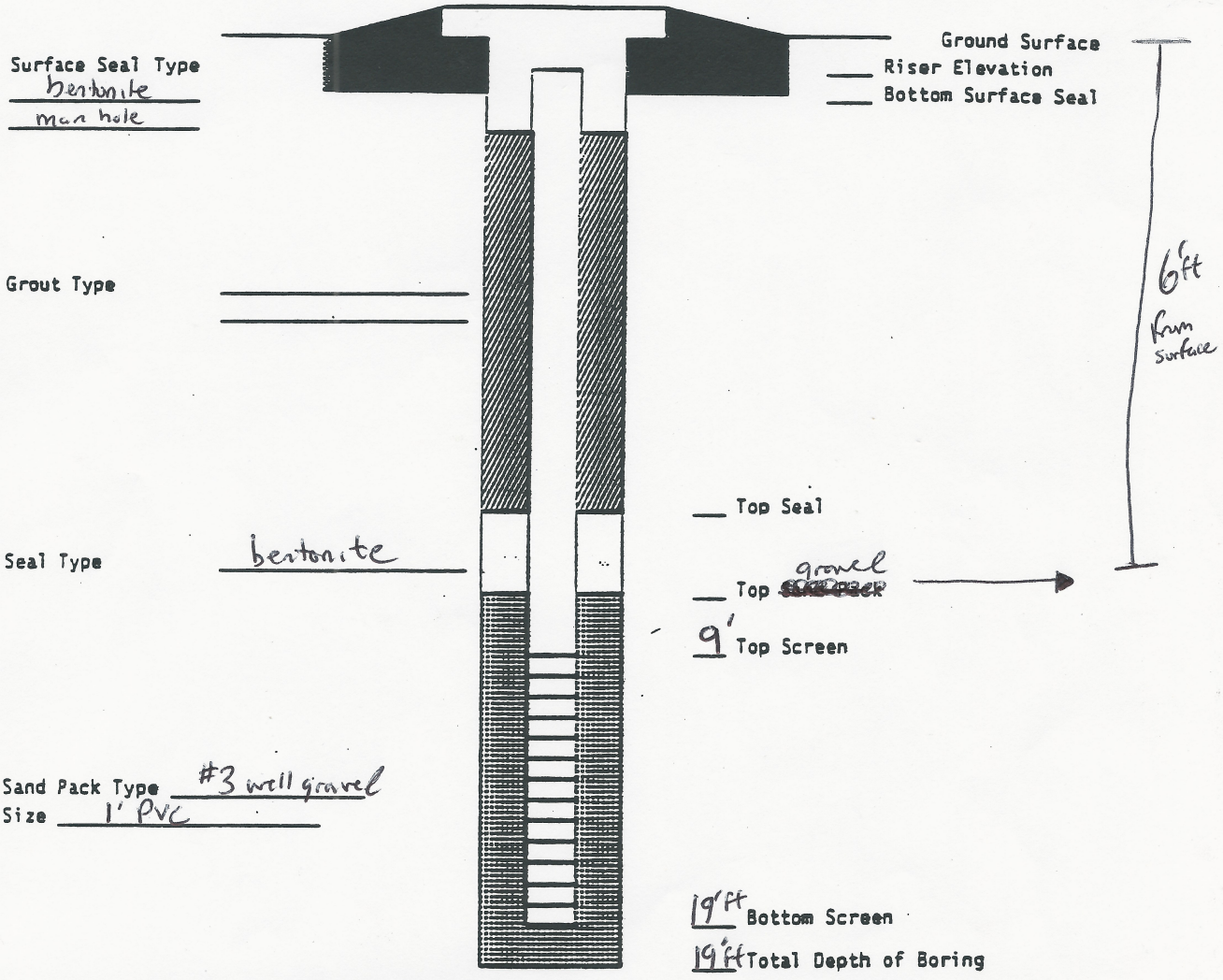
SITE 7045-LBNY JOB NO. _____ WELL NO. MW-5

* TOTAL DEPTH 19'ft SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) _____ DATE INSTALLED _____

* RISER DIA ___ MATERIAL PVC LENGTH 9'ft
* SCREEN DIA ___ MATERIAL PVC LENGTH 10'ft SLOT SIZE 1' PVC

SCHEMATIC



WELL CONSTRUCTION LOG

SITE 7045-LBNY JOB NO. _____ WELL NO. MW-6

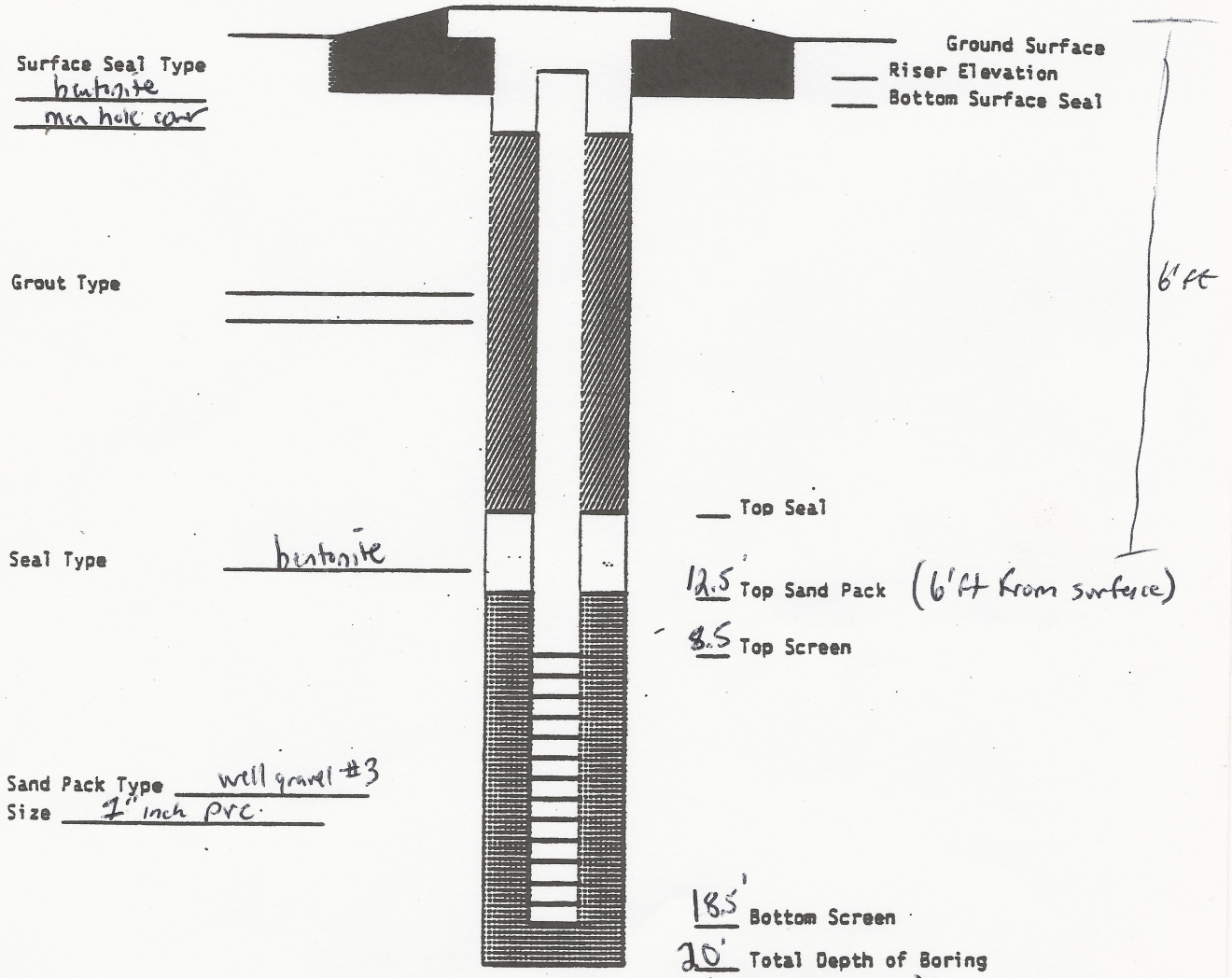
TOTAL DEPTH 18.5' SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) _____ DATE INSTALLED 10/10/14

RISER DIA ___ MATERIAL PVC LENGTH 8.5 ft

SCREEN DIA ___ MATERIAL PVC LENGTH 10' SLOT SIZE _____

SCHEMATIC



APPENDIX E

EXCAVATION WORK PLAN

EXCAVATION WORK PLAN (EWP)

The site has been remediated for commercial and industrial uses only. Any future intrusive work that will encounter or disturb the remaining contamination will be performed in compliance with this Excavation Work Plan (EWP. 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 Community Air Monitoring Plan (CAMP) prepared for the site. Based on future changes to State and federal health and safety requirements, and specific methods employed by future contractors, the HASP and CAMP will be updated and re-submitted with the notification provided in Section A-1 of the EWP. Any intrusive construction work will be performed in compliance with the EWP, HASP and CAMP, and will be included in the periodic inspection and certification reports submitted under the Site Management Reporting.

E-1 NOTIFICATION

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

Table 1: Notifications*

Name	Contact Information
Walter J. Parish, P.E., NYSDEC Regional Hazardous Waste Remediation Engineer	(631) 444-0240, walter.parish@dec.ny.gov
Jamie Ascher, NYSDEC Project Manager	(631) 444-0246, jamie.ascher@dec.ny.gov
Steven Lawrence, NYSDOH Project Manager	(518) 402-7860, beei@health.ny.gov

Kelly Lewandowski, P.E., Chief, NYSDEC Site Control Section	(518)402-9553,kelly.lewandowski@dec.ny.gov

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

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;
- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix I of the QAPP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

E-2 SOIL SCREENING METHODS

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

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

E-3 SOIL STAGING METHODS

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

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

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

E-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material. The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

All excavated soils shall be sampled and analyzed in accordance with Table 5.4(e)10 in DER-10. Based on this characterization, soil containing contaminant levels which exceed the lower value of either the commercial use soil cleanup objectives (SCOs) or the protection of groundwater SCOs will be disposed of off-site at a permitted disposal facility selected with DEC concurrence. Disposal manifests, for any soil disposed of off-site, should be included in the PRR

prepared for the site. Soil which meets the SCOs can be used as backfill and be returned into the excavations from which they were generated.

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

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

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

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

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

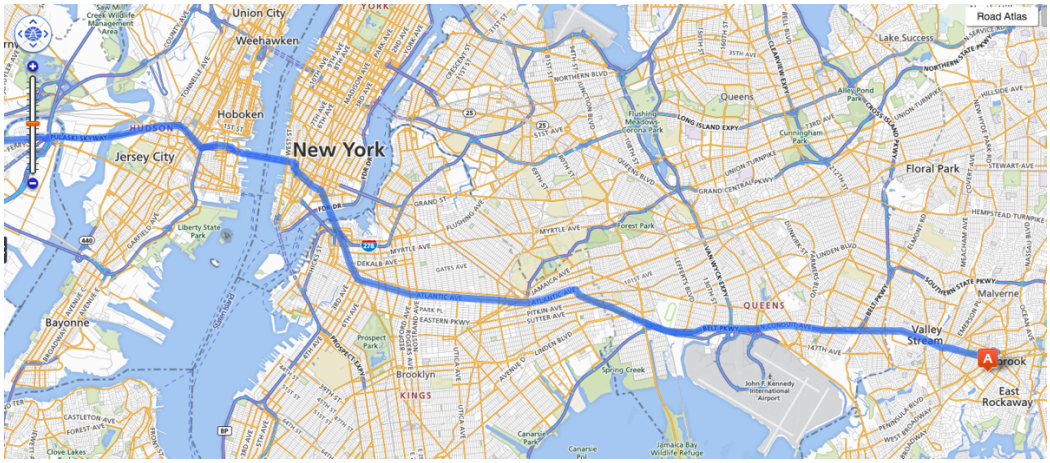
E-5 MATERIALS TRANSPORT OFF-SITE

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.

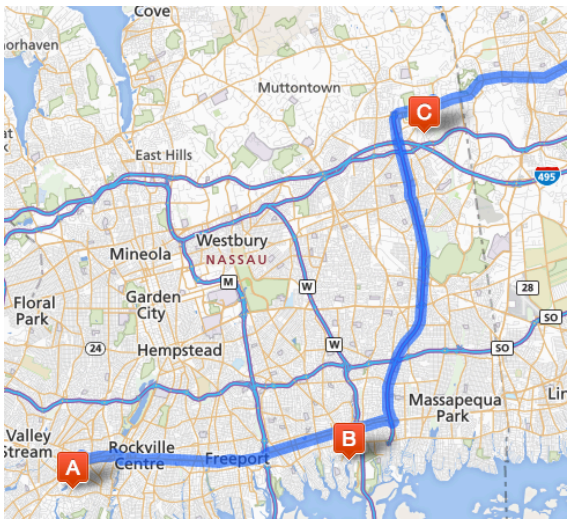
Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes are as follows:

To New Jersey: head east on Merrick Rd., turn right onto Peninsula Blvd., turn right (west) onto NY-27/Sunrise Hwy, merge onto North Conduit Ave., North Conduit Ave. becomes Conduit Blvd., Conduit Blvd. becomes Atlantic Ave., turn slight right onto Flatbush Ave., Flatbush Ave. becomes Manhattan Bridge, turn left onto Canal St., turn right onto ramp, turn slight left onto I-78 W (crossing into New Jersey), follow to your New Jersey destination.



To Eastern Long Island: head east on Merrick Rd., turn right onto Peninsula Blvd., turn left (east) onto NY-27/Sunrise Hwy, take a ramp onto NY-135/Seaford-Oyster Bay Expressway North, take exit 13E onto I-495/ Long Island Expressway, follow to your destination.



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

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

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

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

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 in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of material from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a

formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

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

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

E-7 MATERIALS REUSE ON-SITE

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

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

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 in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

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

E-9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the RAWP, decision document, or Record of Decision]. The existing cover system is comprised of a minimum of 4 inches of concrete slab on grade foundation flooring, front and rear sidewalks and asphalt paved parking lot. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP.

E-10 BACKFILL FROM OFF-SITE SOURCES

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

Soil brought to the site for use as cover or backfill must comply with 6 NYCRR 375-6.7(d) and DER-10 Section 5.4(e). The soil will be placed over a demarcation layer (preferably a geotextile fabric) to identify it from native soil. In areas where the soil is exposed, the upper 6 inches shall be of sufficient quality to maintain a vegetation layer.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to 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 identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

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

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.

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

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

E-13 COMMUNITY AIR MONITORING PLAN

The CAMP addresses community concerns of possible off-site airborne migration of suspected contaminants that may be encountered on-site during field activities. Continuous air monitoring will be performed for VOCs during all ground intrusive activities such as soil and ground water sampling. All ambient air readings will be recorded and made available for NYSDEC and NYSDOH personnel to review.

E-13.1 Non-Intrusive Activities

Periodic air monitoring will be performed for volatile organic compounds (VOCs) at the perimeter of the work area once every two hours during field activities. If total organic vapor levels exceed 5 ppm above background, work activities will be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings will be recorded and made available for NYSDEC and NYSDOH personnel to review.

Particulates will not be monitored due to the absence of any field activities likely to generate dust. However, dust suppression techniques utilizing the application of a water mist from a portable spray tank will be employed in the event dust is generated.

E-13.1.1 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- the organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.
- more frequent intervals of monitoring, as directed by the Safety Officer, are conducted.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

E-13.1.2 Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities will be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts relating to the above source are unsuccessful and if the following levels persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect;

- if organic vapor levels are approached 5 ppm above background.

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

E-13.1.3 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

- All emergency Response Contacts as listed in the Health and Safety Plan of the Work Plan will be notified.
- The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.
- Frequent air monitoring will be conducted at 30 minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

E-13.2 Intrusive Activities

Real-time air monitoring, for volatile compounds and particulate levels at the perimeter of the work area will be accomplished as follows:

- Volatile organic compounds must be monitored at the downwind perimeter of the work area on a continuous basis. If total organic vapor levels exceed 5 ppm above background, work activities will be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings will be recorded and available for State NYSDEC and NYSDOH personnel to review.
- Particulates should be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations. If the downwind particulate level is 150 ug/m^3 greater than the upwind particulate level, then dust suppression techniques will be employed. All readings will be recorded and available for State NYSDEC and NYSDOH personnel to review.

E-13.2.1 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume.

If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- the organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

E-13.2.2 Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities will be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts related to the above the emission source are unsuccessful and if the following levels persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect.:

- if organic vapor levels are approached 5 ppm above background.

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

E-13.2.3 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

- All emergency Response Contacts as listed in the Health and Safety Plan of the Work Plan will be notified
- The local police authorities will immediately be contacted by the Safety Officer and advised o the situation.
- Frequent air monitoring will be conducted at 30 minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

If a sensitive receptor, such as a school, day care or residential area is adjacent to the site, a fixed monitoring station should be located at that site perimeter, regardless of wind direction, and discussed in the text.

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

E-14 ODOR CONTROL PLAN

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

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

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

E-15 DUST CONTROL PLAN

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

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- 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 for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

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

APPENDIX F

OPERATIONS AND MAINTENANCE MANUAL

Advanced Cleanup Technologies, Inc.

ENVIRONMENTAL CONSULTANTS

OPERATIONS AND MAINTENANCE MANUAL

Tony's Cleaners
429 Merrick Road
Lynbrook, New York 11563

April 10, 2013

ACT File #: 7045-LBNY

Prepared for:

Mr. Howard Zuckerman
Nu-Life Realty
429 Merrick Road
Lynbrook, New York 11563

Prepared by:

Advanced Cleanup Technologies, Inc.
960 South Broadway, Suite #100
Hicksville, New York 11801

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2	Process and Instrumentation Diagram
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2	Volatile Organic Compounds in Ground Water
3	Volatile Organic Compounds in Exhaust
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A	Manufacturer Equipment Specifications
B	Monitoring and Sampling Schedule
C	Monitoring Field Sheets
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E	Laboratory Reports

1.0 INTRODUCTION AND STATEMENT OF PURPOSES

1.1 Introduction

The property located at 429 Merrick Road, Lynbrook, New York (the Site) is currently occupied by Tony's Cleaners where dry cleaning operations take place. Past activities have resulted in the presence of volatile organic compounds (VOCs) to underlying soil and ground water. The most prevalent VOCs identified in the soil beneath the Site are Tetrachlorothene (PCE), Trichloroethene (TCE) and cis-1,2 Dichloroethene.

Advanced Cleanup Technologies, Inc. (ACT) was given the work assignment to install a Soil Vapor Extraction system (SVES) beneath the Site to protect occupants of the building and remediate contaminated soil and ground water beneath the ground. Operation of the SVES will also control the migration of contaminated ground water by depressing the water table beneath the Site.

1.2 Statement of Purposes

This document provides operational guidance to keep the SVES operating efficiently and insure timely site closure. The tasks include continually monitoring air flow, vacuum and temperature through a wireless telemetry system and performing annual inspections including changes to pre-filter media.

The objectives of the SVES are: 1) to maintain a negative pressure beneath the building foundation in order to prevent VOCs from entering the building's breathing zone; 2) to remove VOCs from subsurface soil and ground water and to restore the ground water to drinking water quality or to the best quality reasonably attainable using the best available technology, and 3) to prevent any further migration of ground water containing VOCs beyond the Site.

1.3 Previous Environmental Investigations

A previous environmental investigation was performed by Brockerhoff Environmental Services LLC in February 2012. During the investigation, seven soil borings were installed, screened and sampled from beneath the Site, four of them within the dry cleaning building. Additionally, three monitoring wells were installed, screened and sampled throughout the Site, and the four on-Site dry wells were surveyed and sampled.

No VOCs were identified above soil cleanup objectives in any of the soil borings except for PCE and Trichloroethene TCE at SS-2 next to the dry cleaning machine and PCE at SS-4 inside the northern portion of the building. Additionally, PCE was found in MW-1 and MW-2 and TCE in MW-2 above water quality standards. According to that investigation, PCE was also found in high concentrations in a sediment sample, DW-1. However, the location where that sample was collected could not be replicated during subsequent sampling events. The results of that investigation are included in Appendix D.

On July 13, 2012 ACT screened and sampled the three on-Site monitoring wells and installed, screened and sampled a fourth monitoring well in the southwest corner of the Site which is hydraulically downgradient of the dry cleaning establishment. The investigation confirmed that PCE and TCE was present above water quality standards in front of the building (MW-2) and PCE was found only slightly above water quality standards at the downgradient perimeter of the Site (MW-4).

On August 15, 2012 ACT installed and sampled three additional soil borings inside the dry cleaning building. Three temporary monitoring wells were also installed and sampled at the bore hole locations. Finally, three dry wells (DW-1, DW-3 and DW-4) were sampled in the northern and southern exterior portions of the Site. No VOCs were detected above regulatory criteria in any of the soil borings except for Methylene Chloride in the deep sample from SB-2. Methylene Chloride was also found in the laboratory's method blank and is probably a laboratory artifact.

PCE and TCE were identified significantly above water quality standards in the ground water samples from TW-1, TW-2 and TW-3. No VOCs were detected above regulatory criteria in any of the dry well sediment samples. Laboratory analytical results can be seen in Appendix E.

2.0 SOIL VAPOR EXTRACTION SYSTEM

2.1 Description of System

Figure 1 shows the piping layout for the SVES. The SVES consists of two vertical 2 inch diameter vapor extraction wells installed to within 1 foot of the water table and two horizontal 4 inch diameter depressurization wells. The vertical SVES wells are connected to a single 2 inch diameter manifold pipe which is leads into the boiler room and powered by a 3 Hp FPZ regenerative blower. The horizontal SVES wells are connected to 3 inch diameter riser pipes and dedicated roof-mounted Radonaway HS5000 vacuum blowers.

The regenerative blower and controls are located in the boiler room in the northwest corner of the building. After exiting the respective blowers, the air streams are discharged through exhaust pipes located above the roof. The 3 HP FPZ regenerative blower is equipped with a moisture separator, air filter, gauges and switches to control its operations. The suction lines are equipped with vacuum relief valves to avoid excessive vacuum loads on the blower. Figure 2 contains the Process and Instrumentation Diagram for the Remedial System.

2.2 Equipment and Controls

The regenerative blower is equipped with a vacuum relief valve, in-line filter and moisture separator with a high level liquid level switch. The suction side of the blower is equipped with a filter to remove particulates and a moisture separator to remove excessive moisture. The vacuum relief valve is used to adjust the vacuum placed upon the manifold to the SVES piping. Ball valves on each riser pipe adjust vacuum to each of the SVES wells.

The blower is equipped with control switches to shut down the blower in the event of an alarm condition. The moisture separator will shut the blower down when the liquid level within the moisture separator rises to a preset level, triggering an alarm condition. A high pressure switch will shut down the blower if the vacuum at the blower inlet rises past the alarm set point. An internal thermal overload switch will shut the blower down if there is an overload on the blower.

In the event of an alarm, a control panel on the wall inside the boiler room will indicate specific operating and alarm conditions by illumination of a light or position of a switch. A Netbiter wireless telemetry system programmed with a contact phone number and will send an email and text alert after the alarm has been detected.

2.3 Operation and Maintenance

2.3.1 Start-up Procedure

To start the SVES system, the following procedure should be used:

1. Open all valves on the individual extraction lines to be operated. Close all others.
2. Close all sample ports.
3. Close drain valve on moisture separator.
4. Turn the power control switch, located on the control panel, to the "ON" position.
5. Reset alarms by pressing the "Alarm Reset" button on the control panel.
6. Start the blower using the disconnect switch located on the control panel.
7. Fine tune the flow rates from the individual extraction pipes by adjusting the ball valves on the manifold. Fine tune the total flow by adjusting the pressure relief valve on the blower.
8. Check and record all the pressure gauge and the temperature gauge associated with each system and compare with normal operating ranges.

To stop operation of the SVES, turn the power off to the individual blower by using the disconnect switch on the control panel or the main switch outside the control panel.

2.3.2 Routine Operating Procedures

The SVES operates by placing a vacuum on the extraction pipes. As the air passes through the soil the contamination volatilizes and is drawn from the soil through the extraction piping and into the blowers. The amount of vacuum is controlled by the vacuum relief valve located on the blower package and the flow control valve associated with each extraction pipe on the manifold. The options for operation of each system are as follows:

1. Opening vacuum relief valve - decreases the vacuum on the entire system. Opening the vacuum relief valve increases the exhaust flow rate by adding atmospheric air, but will decrease the concentration of vapors in the exhaust. The flow rate from the individual extraction pipes will be decreased due to a decrease in vacuum.

2. Closing vacuum relief valve - increases the vacuum on the entire system. Closing the vacuum relief valve decreases the exhaust flow rate, but increases the concentration of vapors in the exhaust by placing a higher vacuum on the extraction pipes and it will also increase the extraction rate.

3. Opening the flow control valves on the extraction pipes - will increase the vacuum and flow rate from the individual point.

4. Closing the flow control valves on the extraction pipes - will decrease the vacuum and flow rate from the individual point.

2.3.3 Maintenance

2.3.3.1 Extraction Blowers

The extraction blowers require little or no maintenance to perform as designed. Maintenance activities should involve keeping the filter clean and the moisture separator empty. The blower is difficult to disassemble and reassemble; therefore, prior to any attempts to repair the blower, the manufacturer should be consulted.

2.3.3.2 Moisture Separator

The moisture separator should remain free of liquid at all times. Both extraction pipes are located within 1 foot of the water table. However, no liquid was observed in the moisture separator during startup and the water table is not expected to rise close enough to the bases of the well screens to permit water to enter the treatment system.

2.3.4 Troubleshooting

2.3.4.1 Regenerative Blower

Table 3 identifies possible problems, symptoms and potential solutions that may occur while operating the regenerative blower. Once the regenerative blower is either repaired or replaced, the system should be re-started and monitored in accordance with Section 2.3.1.

2.3.4.2 Moisture Separator

The moisture separator should stay dry during normal remedial system operations. In the event water enters the moisture separator, the high level switch will shut down the regenerative blower and send an alarm through the Netbiter. Liquid in the moisture separator will be transferred into a drum and stored onsite until offsite transport and disposal can be arranged through a licensed waste hauler.

3.0 SYSTEM MONITORING

The operation of the SVES will be monitored by instrumentation such as a flow meter, level sensor and pressure gauge. Signals from each instrument are transmitted from where they are installed in the process line to the control panel located on the inside wall of the treatment room.

Operational data, such as water levels, air pressure, and equipment failures will be continually recorded by wireless telemetry. Based on the results, system modifications may be made as frequently as once a month.

3.1 Inspections

The remediation systems will be inspected and sampled according to the schedule shown in Appendix C. Any failures, faults or unusual observations will be investigated fully. Any equipment that is found to be out of adjustment or in disrepair will be repaired or serviced. Manufacturer's information for the major pieces of equipment is provided in the manual included in Appendix A.

3.2 Observations

The inspection items that will be observed and recorded during screening, sampling and monitoring events are included on the Data Sheets located in Appendix D. A general list of observations is listed below.

- Weather Conditions

  The weather will be monitored for parameters including current weather conditions (sunny, raining, etc.), air temperature, wind direction, wind speed, relative humidity and barometric pressure.

- Equipment Operations and System Operating Parameters

  The operating configuration of the regenerative blower, moisture separator and carbon units will be recorded. Operations that will be recorded include the flow and pressure at each recording location.

  The air flow rate and vacuum downstream of the regenerative blower will also be recorded.

  The pressures at the regenerative blower outlets (pre-carbon) and between carbon locations will also be recorded.

  The temperature of the effluent air stream after each blower will be recorded.

  Photoionization detector (PID) readings will be made from air samples collected at the pre-, mid- and post-carbon sample ports.

- Vapor Monitoring Points

  The vacuum in each vapor monitoring point located in the basement will be recorded.

3.3 Air Quality

Ambient concentrations of VOCs will be measured inside the boiler room using a PID equipped with a 10.2 eV bulb.

3.4 Waste Disposal

Some waste material will be generated during the operation of the remedial systems. Liquid wastes from the moisture separator may also be generated. The removal and disposal of waste shall be completed following guidelines defined by OSHA, NYSDEC, New York State Department of Transportation (NYSDOT) and the USEPA. A disposal or regeneration facility and waste transporter shall be contacted and scheduled for the removal of the waste. The collection and generation of waste should be noted on the Data Sheets provided in Appendix D.

3.5 Reporting Documentation

All data collected during field activities shall be recorded into a spreadsheet program following each day's activities. Keeping data up to date will allow the operator to monitor system performance by comparing new data with past operating data. Data that will be continuously updated during O&M activities includes:

- summary of system operation;
- airflow data and calculations;
- summary of temperatures;
- laboratory data for all sample ports sampled;
- PID data for all sample ports sampled;
- summary of pressure and vacuum gauge readings;
- summary of O&M activities; and,
- summary of system alarms.

Any additional data that may provide insight into the operation of the remedial systems will also be compiled.

4.0 SITE MONITORING AND REPORTING

4.1 Monitoring

Annual system monitoring will be performed. Due to improvements in water quality in the ground water monitoring wells at the Site, a long-term water quality monitoring program will not be performed.

4.2 Reporting

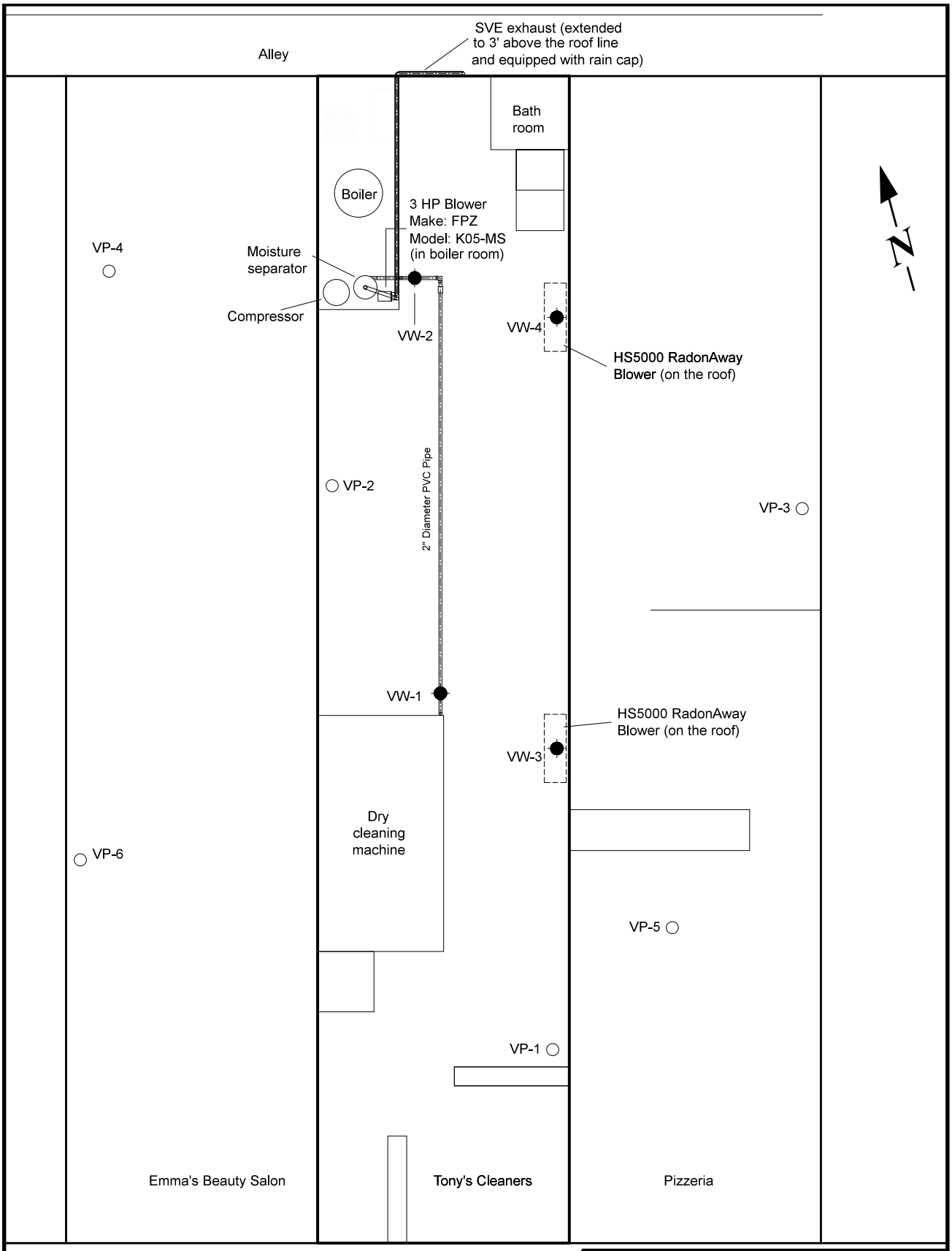
ACT will prepare a status report on an annual basis. The report will include a summary of remedial system operations, maintenance and monitoring data accumulated from the site over the preceding year. Included as attachments to the report will be analytical laboratory reports, Field Sheets, Calculation Sheets (if necessary) and descriptions of the following:

- system downtime/reason;
- operational issues; and,
- maintenance log.

At a minimum, with respect to the preceding year, these progress reports shall:

1. describe the actions which have been taken during that quarter,
2. include all sampling reports, test results and all other data,
3. describe work planned for the next year with schedules relating such work to the overall project schedule for the completion of remedial activities,
4. describe problems encountered or anticipated, actual or anticipated delays, and solutions developed and implemented to address actual or anticipated problems or delays.

FIGURES



LEGEND

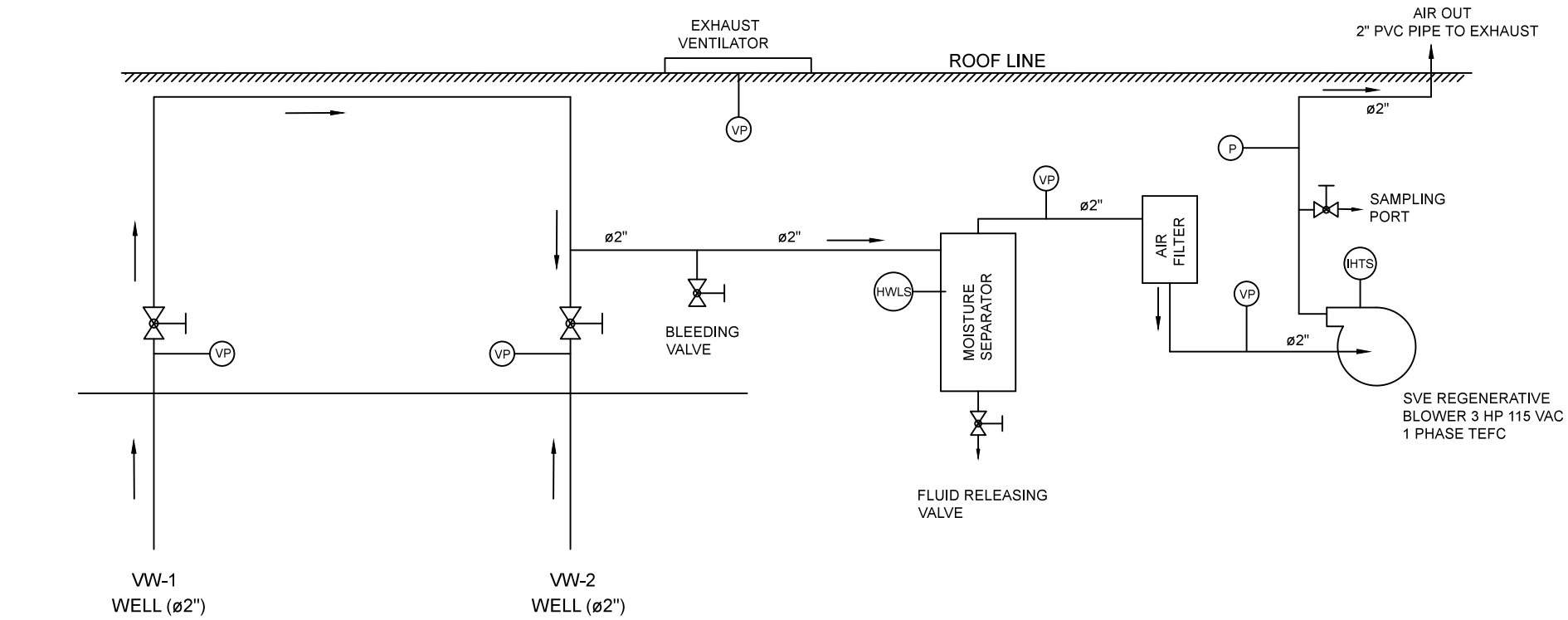
VW — Vacuum Well

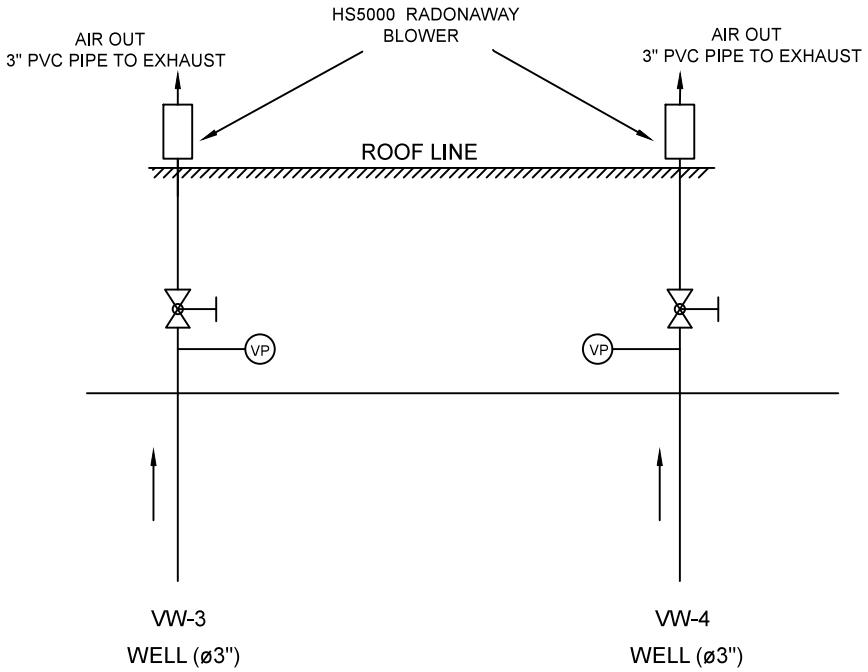
VP — Vacuum Point (typical of 6)

SSD/SVE SYSTEM LAYOUT

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
110 Main St., Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.:7045-LBNY	Figure No.: 3
Date: 02/22/2016	Scale: 1" = 5.81'





LEGEND

VP	Vacuum Pressure Sensor
P	Pressure Sensor
IHTS	Internal High Temperature Switch
HWLS	High Water Level Switch

Process and Instrumentation Diagram

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No: 7045-LBNY	Figure No: 9
Date: 09/01/16	Scale: Not To Scale

TABLES

Table 3

Troubleshooting Guidance Table

Troubleshooting

		POSSIBLE CAUSE	OUT OF WARRANTY REMEDY ***
IMPELLER DOES NOT TURN	Humming Sound	1. * One phase of power line not connected	1. Connect
		2. * One phase of stator winding open	2. Rewind or buy new motor
		3. Bearings defective	3. Change bearings
		4. Impeller jammed by foreign material	4. Clean and add filter
		5. Impeller jammed against housing or cover	5. Adjust
		6. ** Capacitor open	6. Change capacitor
	No Sound	1. * Two phases of power line not connected	1. Connect
		2. * Two pheses of stator winding open	2. Rewind or buy new motor
IMPELLER TURNS	Blown Fuse	1. Insufficient fuse capacity	1. Use time delay fuse of proper rating
		2. Short circuit	2. Repair
	Motor Overheated Or Protector Trips	1. High or low voltage	1. Check input voltage
		2. * Operating in single phase condition	2. Check connections
		3. Bearings defective	3. Check bearings
		4. Impeller rubbing against housing or cover	4. Adjust
		5. Impeller or air passage clogged by foreign material	5. Clean and add filter
		6. Unit operating beyond performance range	6. Reduce system pressure/vacuum
		7. Capacitor shorted	7. Change capacitor
		8. * One phase of stator winding short circuited	8. Rewind or buy new motor
	Abnormal Sound	1. Impeller rubbing against housing or cover	1. Adjust
		2. Impeller or air passages clogged by foreign material	2. Clean and add filter
		3. Bearings defective	3. Change bearings
	Performance Below Standard	1. Leak in piping	1. Tighten
		2. Piping and air passages clogged	2. Clean
		3. Impeller rotation reversed	3. Check wiring
		4. Leak in blower	4. Tighten cover, flange
		5. Low voltage	5. Check input voltage

3 phase units

* 1 phase units

** Disassembly and repair of new blowers or motors will void the Retron warranty. Factory should be contacted prior to any attempt to field repair an in-warranty unit.

APPENDIX A

MANUFACTURER EQUIPMENT SPECIFICATIONS

FPZ, Inc
150 N. Progress Drive
Saukville, WI 53080 - **U.S.A.**
Tel. (262) 268-0180
Fax (262) 268-0415
E-mail usa@fpz.com

REGENERATIVE BLOWERS - **VACUUM**

SCL K03 / K04 / K05 / K06

MS SERIES

TECHNICAL CHARACTERISTICS

- Aluminium alloy construction
- Smooth operation
- High efficiency impeller
- Maintenance free
- Mountable in any position
- Recognized TEFC - **cURus** motor

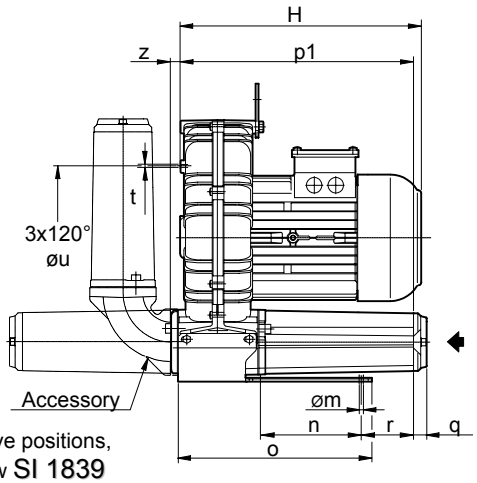
OPTIONS

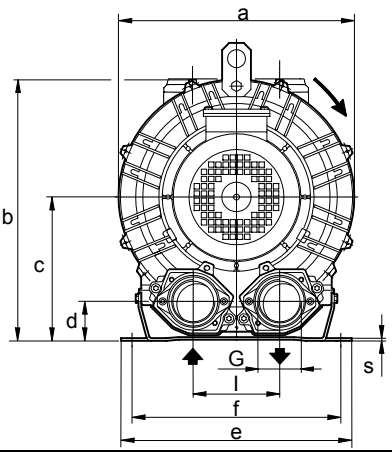
- Special voltages (IEC 38)
- Surface treatments

ACCESSORIES

- Inlet and/or inline filters
- Additional inlet/outlet silencers
- Safety valves
- Flow converting device
- Optional connectors

Dimensions in inches.
Dimension for reference only.





Possible alternative positions, please refer to drw SI 1839

Model	a	b	c	d	e	f	G	l	m	n	o	p1	q	r	s	t	u	z
K03-MS	**9.49**	**10.55**	**5.79**	**1.69**	**9.06**	**8.07**	**1" ¼ NPT**	**3.39**	**0.39**	**3.27**	**5.59**	**8.07**	**0.71**	**2.95**	**0.16**	**M6**	**5.51**	**0.47**
K04-MS	**11.22**	**12.40**	**6.77**	**1.93**	**10.04**	**8.86**	**1"1/2 NPT**	**4.02**	**0.47**	**3.74**	**6.73**	**8.74**	**0.71**	**2.76**	**0.16**	**M6**	**6.89**	**0.71**
K05-MS	**12.87**	**14.37**	**7.87**	**2.13**	**12.60**	**10.24**	**2" NPT**	**4.72**	**0.59**	**4.53**	**10.43**	**12.60**	**0.71**	**3.86**	**0.16**	**M8**	**7.87**	**0.75**
K06-MS	**14.80**	**15.47**	**8.07**	**2.13**	**12.80**	**11.42**	**2" NPT**	**4.92**	**0.59**	**5.51**	**10.71**	**13.15**	**0.71**	**3.35**	**0.16**	**M8**	**9.45**	**0.75**

Model	Maximum flow cfm		Installed power Hp		Maximum differential pressure Δp (In Hg)		Noise level Lp dB (A) (1)		Overall dimensions H	Weight
	60 Hz 3500 rpm	*50 Hz 2900 rpm*	60 Hz 3500 rpm	*50 Hz 2900 rpm*	60 Hz 3500 rpm	*50 Hz 2900 rpm*	60 Hz 3500 rpm	*50 Hz 2900 rpm*	**Inches**	**Lbs**
K03-MS	**52**	***43***	**3/4**	***3/4***	**4.7**	***3.7***	**61.0**	***59.0***	**10.43**	**24.30**
			1	***1***	**5.9**	***4.9***	**61.3**	***59.3***	**11.97**	**26.50**
K04-MS	**98**	***81***	**1 ½**	***1 ½***	**4.3**	***5.9***	**63.8**	***61.8***	**11.65**	**36.40**
			2	***2***	**6.3**	***6.6***	**64.0**	***62.0***	**13.78**	**43.00**
			3	**-**	**7.4**	**-**	**64.2**	**-**	**13.78**	**49.60**
K05-MS	**156**	***129***	**2**	***2***	**3.8**	***5.1***	**69.5**	***67.5***	**13.20**	**51.80**
			3	***3***	**6.6**	***7.1***	**69.8**	***67.8***	**13.20**	**58.40**
			4	**-**	**8.1**	**-**	**70.1**	**-**	**14.40**	**67.20**
K06-MS	**216**	***179***	**3**	***3***	**3.7**	***4.8***	**72.0**	***70.0***	**13.54**	**68.70**
			4	***4***	**5.5**	***7.0***	**72.3**	***70.3***	**14.17**	**71.65**
			5 ½	***5 ½***	**8.1**	***8.1***	**72.6**	***70.6***	**14.17**	**77.60**
			6 1/5 (2)	**-**	**9.6**	**-**	**72.9**	**-**	**14.45**	**77.60**

(1) Noise measured at 1 m distance with inlet and outlet ports piped, in accordance to ISO 3744.
(2) No cURus motor

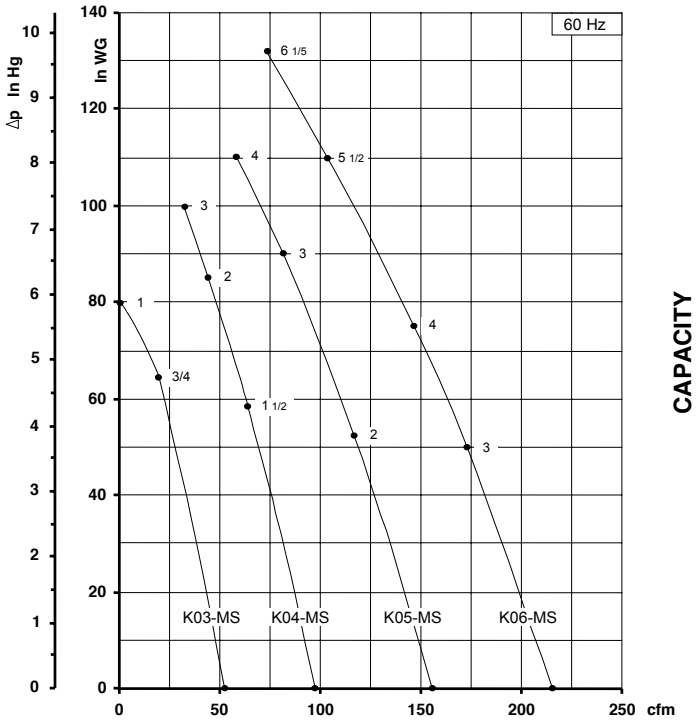
- For proper use, the blower should be equipped with inlet filter and safety valve; other accessories available on request.
- Ambient temperature from +5° to +104°F.
- Specifications subject to change without notice.

REGENERATIVE BLOWERS - **VACUUM**

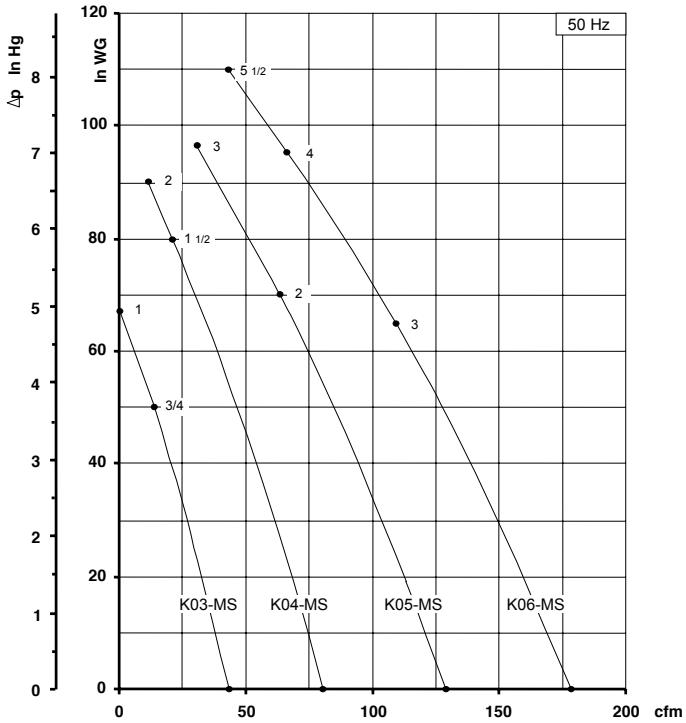
SCL K03 / K04 / K05 / K06

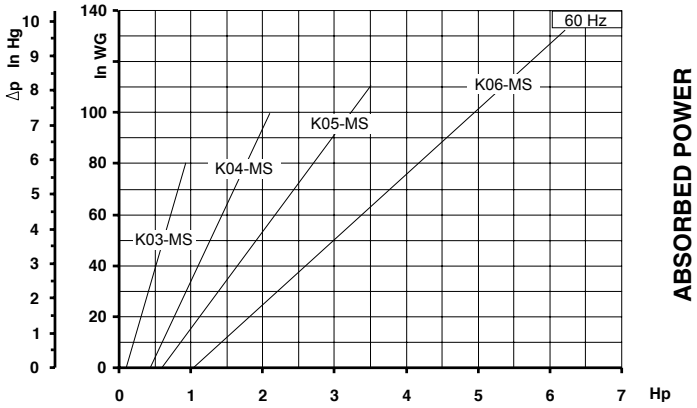
MS SERIES

SN 1879-8 2/2

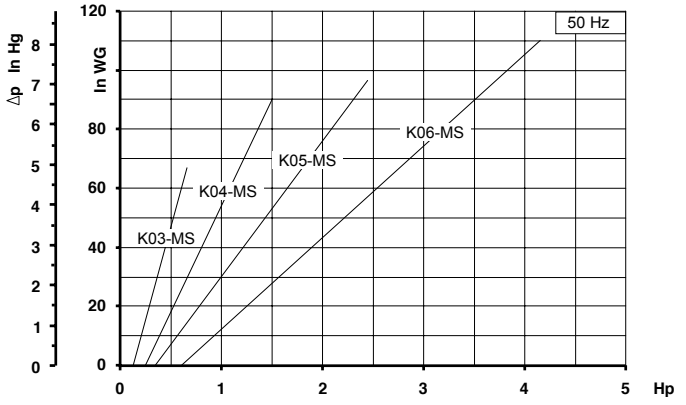


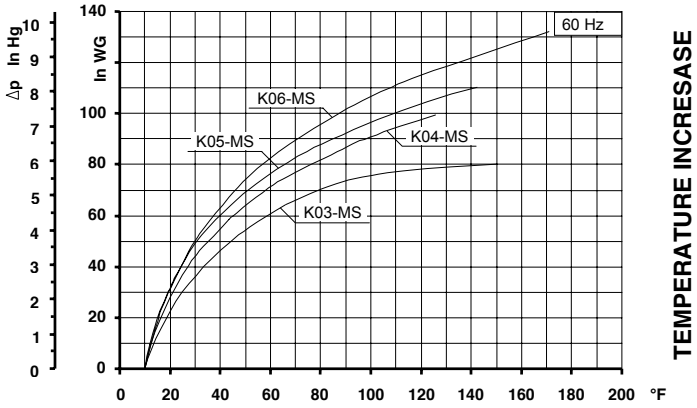
CAPACITY



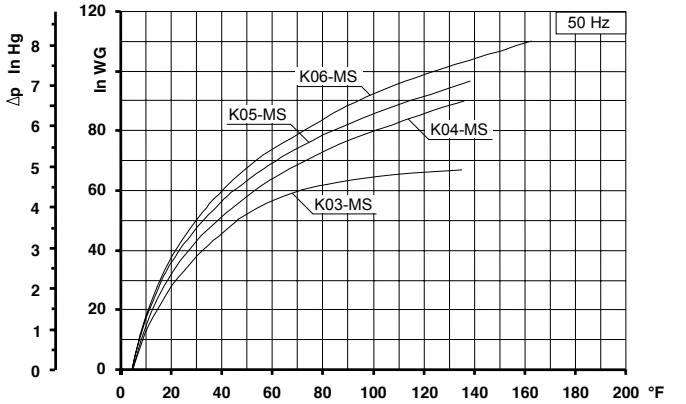


ABSORBED POWER

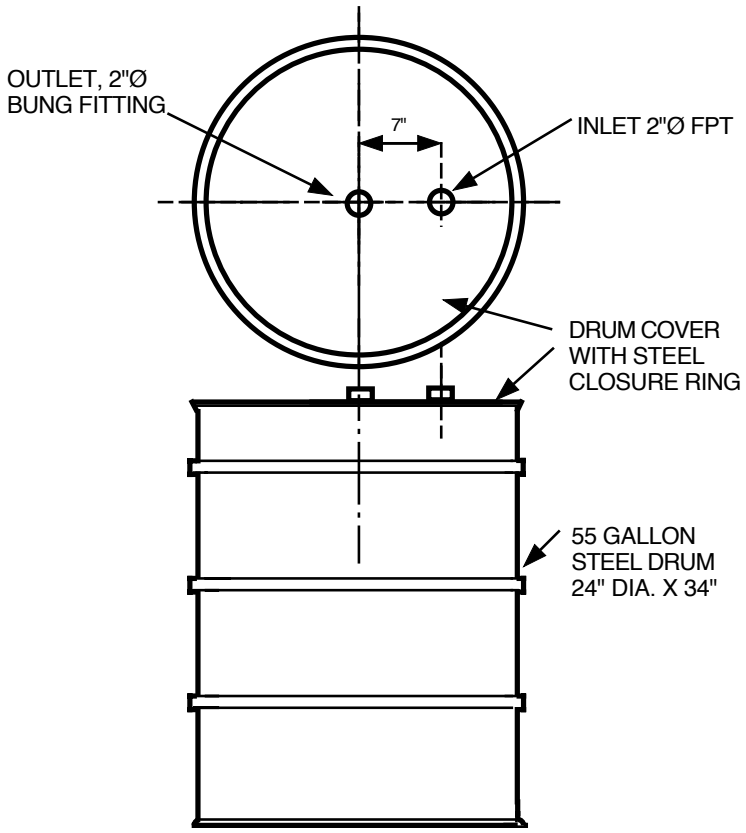




TEMPERATURE INCRESASE



Curves refer to air at 68° F temperature, measured at inlet port and 29.92 In Hg atmospheric backpressure (abs).
Values for flow, power consumption and temperature rise: +/-10% tolerance.
Data subject to change without notice.



SPECIFICATION

Model:	GSE
Design Flow:	100 CFM
Design Features:	
Pressure Drop:	2.75 inch w.c. at 100 CFM
Max Operating Pressure:	10 psi
Carbon:	175 lbs. of vapor phase carbon, 4 x 8 mesh
Canister:	24" dia. x 34" steel drum, PVC internal piping. DOT rated. Acceptable for transport of hazardous waste.
Connections:	Inlet - 2" Ø FPT Outlet - 2" Ø Bung fitting Inlet and Outlet located in cover.
Shipping Weight (lbs.):	215
Availability:	From Stock

CARBTROL ®
CORPORATION

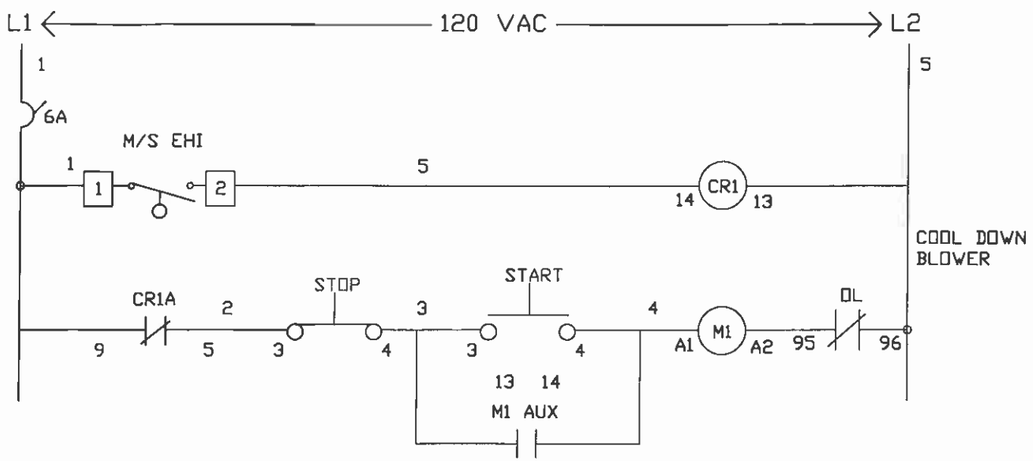
955 CONNECTICUT AVENUE
BRIDGEPORT, CT 06607
(203) 337-4340

SCALE ----		BY WH
DATE 8-15-95		REV 3-24-99

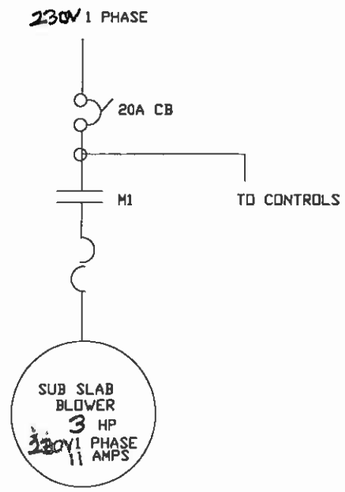
GSE
AIR PHASE CANISTER

ARRANGEMENT	**S**	DWG **2621/3**

LADDER LOGIC DIAGRAM

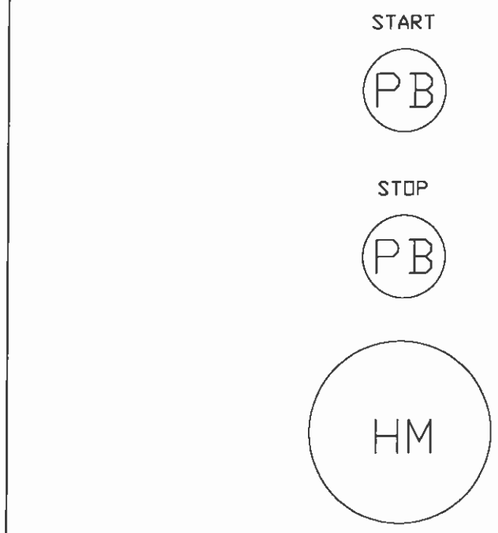


ONE LINE DIAGRAM

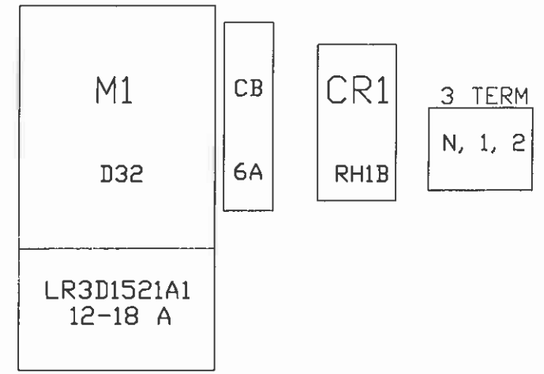


PANEL EXTERIOR

DIMENSIONS: 12" X 10" X 6" (FIBERGLASS)



PANEL INTERIOR



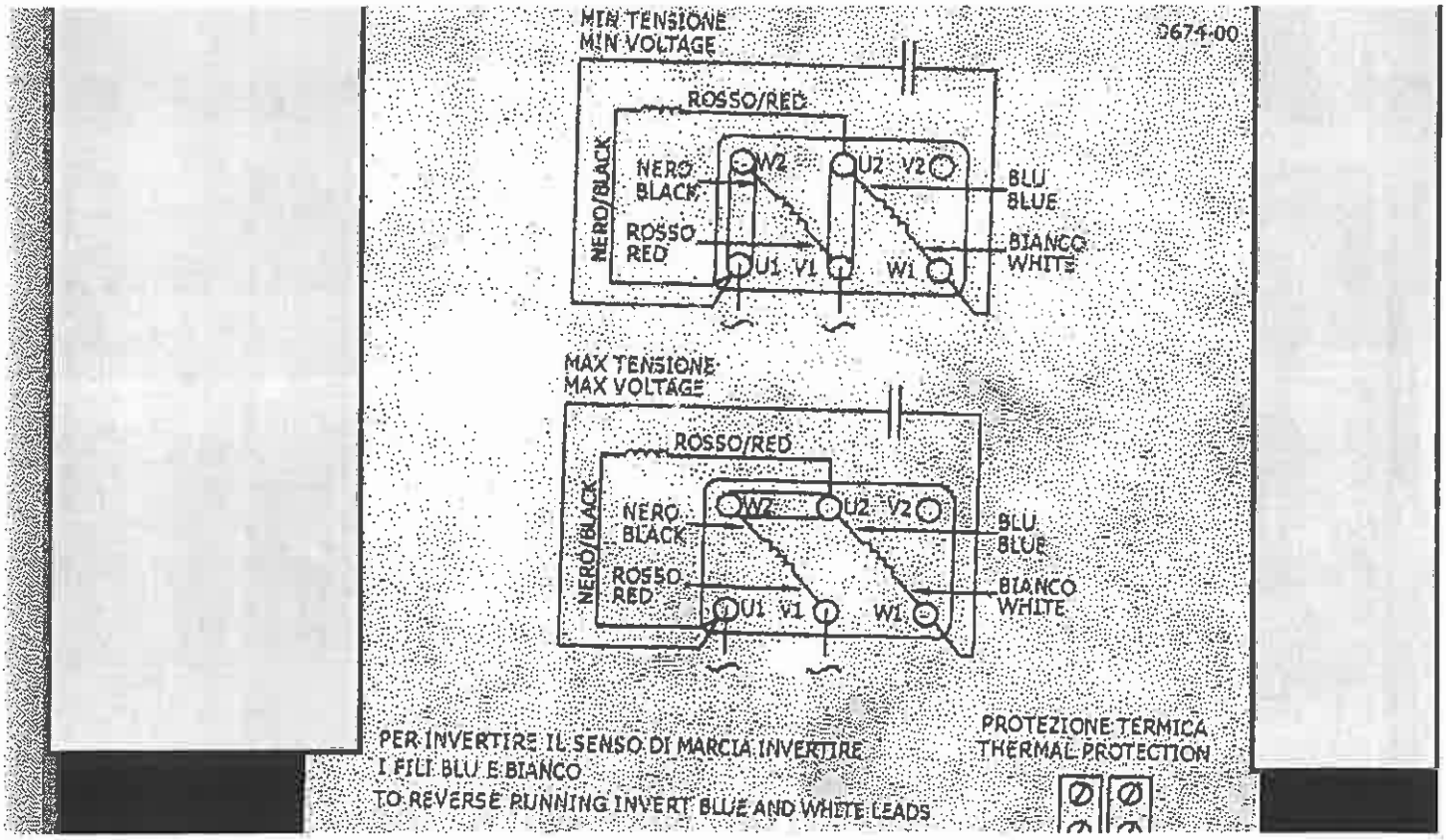
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NES™ NATIONAL ENVIRONMENTAL SYSTEMS
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DRWN BY: RJD	DATE: 6/21/11	TITLE: CONTROL PANEL EXTERIOR INTERIOR LAYOUT/LADDER	
CHK BY	DATE	Advanced Cleanup Technologies, Port Washington, NY	JOB NO. 11-152
APPR BY	DATE	SCALE: N/A · SIZE: B · DWG NO. E1 PNL IXL	SHEET: E-1 · REV: A

REV	DESCRIPTION	DATE	APPR
A	AS BUILT	8/31/11	EMB


MIN TENSIONE
MIN VOLTAGE
0674-00
ROSSO/RED
NERO/BLACK
NERO
BLACK
ROSSO
RED
W2
U2
V2
U1
V1
W1
BLU
BLUE
BIANCO
WHITE
MAX TENSIONE
MAX VOLTAGE
ROSSO/RED
NERO/BLACK
NERO
BLACK
ROSSO
RED
W2
U2
V2
U1
V1
W1
BLU
BLUE
BIANCO
WHITE
PER INVERTIRE IL SENSO DI MARCIA INVERTIRE
I FILI BLU E BIANCO
TO REVERSE RUNNING INVERT BLUE AND WHITE LEADS
PROTEZIONE TERMICA
THERMAL PROTECTION

Installation and Maintenance

Liquid Level Switches

English • Español

Madison Company
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Branford, CT 06405
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www.madisonco.com

CERTIFIED
ISO 9001:2000

ECN #08-493 • Effective Date 04/09 • MF-002, Rev. J

General Information

1. Switches should be installed rigidly so the float or floats are free to move as the liquid level changes.
2. Switches should be mounted in a tank area free of severe turbulence or protected from such turbulence by appropriate and adequate slosh shields.
3. Vertical switch stems should be vertical for best results, but satisfactory operation is possible in most liquids with the stem at up to a 30° angle from vertical.
4. Side mount switch stems must be mounted with the arrow vertically either up or down depending on switch operation.
5. Care should be taken that switches are always operated within electrical ratings.
6. Orientation for standard Vertical switches can be changed from normally open to normally closed dry or vice versa by removing the float and reversing it in the stem, except with the M3326.

Wire Table for Reed Switch		
Model	GA	Color
MT3920-1, -2, -3	22	Brown
MT5600-1, -2, -3, -4	22	Black
MT8000-1, -2	22	White

Note: Temperature lead wires normally smaller gauge size

Información General

1. Los interruptores deben de ser instalados rígidamente de manera que el flotador o los flotadores tengan libertad de movimiento cuando cambie el nivel de líquido.
2. Los interruptores deben de ser montados en un área del tanque que esté libre de turbulencia severa o protegidos de tal turbulencia con protectores de chapoteo apropiados.
3. Los vástagos de interruptor vertical deben de estar verticales para obtener óptimos resultados, pero es posible lograr una operación satisfactoria en la mayoría de los líquidos si el vástago está a un ángulo de hasta 30º de la línea vertical.
4. Los vástagos de interruptor de montaje lateral deben ser montados con la flecha en posición vertical, ya sea hacia arriba o hacia abajo, dependiendo de la operación del interruptor.
5. Hay que tener cuidado para que los interruptores siempre sean operados a los niveles eléctricos correspondientes.
6. Se puede cambiar la orientación para interruptores verticales estándar de normalmente cerrada a normalmente abierta seca o viceversa, retirando el flotador y colocándolo en el sentido opuesto en el vástago, excepto con el M3326.

Maintenance

Maintenance should consist of inspection to see that the float is free to move and not coated with any substance, which would change its weight or volume significantly. If this occurs, the float should be cleaned. This is easily accomplished without disturbing the installation. In addition, the stem may be wiped down to remove any build-up.

The only repair possible in the field is replacement of either the float or stem. Dents or nicks on the float are usually of no consequence to operation.

Mantenimiento

El mantenimiento debe consistir en una inspección para verificar que el flotador tenga libertad de movimiento y que no esté cubierto de ninguna sustancia que podría cambiar significativamente su peso o volumen. Si esto ocurre, deberá limpiar el flotador. Esto se logra fácilmente sin afectar la instalación. Además, el vástago puede limpiarse hacia abajo para quitar cualquier acumulación.

La única reparación de campo posible es el reemplazo del flotador o del vástago. Las abolladuras o melladuras en el flotador normalmente no tienen consecuencias para su operación.

Cautions

1. The pressure, temperature and electrical limitations shown for the specified level switches must not be exceeded.
2. The pressures and temperatures must take into consideration possible surges in the temperature and pressure of the system.
3. The liquids used must be compatible with the materials of construction. Specifications of materials will be given upon request.
4. Life expectancy of the switch varies with applications. Contact the factory if life cycle testing is required.
5. Ambient temperature changes can affect switch set points, since specific gravities of liquids vary with temperature. Consult factory for assistance.
6. Level switches have been designed to be shock and vibration resistant. For maximum life, both shock and vibration should be minimized. Consult factory for assistance.
7. Excessive contaminants in fluid may inhibit float operation, and occasional wipe down may be necessary.
8. Level switches must not be field repaired
9. Physical damage to product may render product unserviceable.
10. Installation in a vessel made from magnetic materials may affect operation.

Precauciones

1. Los límites de presión, temperatura y electricidad mostrados para los interruptores de nivel especificados no deben ser excedidos.
2. Las presiones y temperaturas deben tomar en consideración posibles fluctuaciones en la temperatura y la presión del sistema.
3. Los líquidos usados tienen que ser compatibles con los materiales de construcción. Las especificaciones de los materiales se brindarán a pedido.
4. La vida útil del interruptor varía según la aplicación. Comuníquese con la fábrica si se requieren pruebas cíclicas de la vida útil.
5. Los cambios en la temperatura ambiente pueden afectar los puntos fijos del interruptor, dado a que el peso específico de los líquidos varía con la temperatura. Consulte con la fábrica si requiere asistencia.
6. Los interruptores de nivel han sido diseñados para ser resistentes a golpes y vibraciones. Para una máxima vida útil, se debe minimizar la cantidad de golpes y vibraciones. Consulte con la fábrica si requiere asistencia.
7. El exceso de contaminantes en el líquido puede inhibir la operación del flotador, y puede ser necesaria una limpieza ocasional.
8. Los interruptores de nivel no deben ser reparados en el lugar de la instalación.
9. Los daños físicos al producto pueden dejarlo inservible.
10. La instalación en un recipiente hecho de materiales magnéticos puede afectar la operación.

Installation

Operation is stated in the tank dry position.

Vertical Switches:

NC Operation: SS Floats: Witness mark (round circle) down. Plastic Floats: Magnets up.

NO Operation: SS Floats: Witness mark (round circle) up. Plastic Floats: Magnets down.

**Note M3326, M3326-NO are not reversible. The M3326 is Normally Closed. The M3326-NO is Normally Open*

Side Mounted Switches:

NC Operation: Arrow mounted vertically pointed down.

NO Operation: Arrow mounted vertically pointed up.

Instalación

El funcionamiento se define en la posición de tanque seco.

Interruptores Verticales:

Normalmente Cerrado: Flotadores de acero inoxidable (SS): Marca testigo (círculo) hacia abajo. Flotadores de plástico Imanes hacia arriba.

Normalmente Abierto: Flotadores de acero inoxidable (SS): Marca testigo (círculo) hacia arriba. Flotadores de plástico: Imanes hacia abajo.

**Nota: Los modelos M3326 y M3326-NO no son reversibles. El M3326 es [illegible] cerrado. El M3326-NO es normalmente abierto*

Interruptores de Montaje Lateral:

Normalmente Cerrado. Flecha montada vertical señalando hacia abajo.

Normalmente Flecha montada vertical señalando hacia

Typical Current and Voltage Ratings

** Note: The ratings at right are for resistive loads only. For inductive loads, maximum switch life will be achieved if appropriate arc suppression is used.*

** Nota. Las clasificaciones de la derecha son sólo para cargas resistivas. Para cargas inductivas, se logrará una vida útil máxima si se usa la supresión de arco apropiada*

Watts	Voltage	Current Amps
15	240 AC	-
	120 AC	0.12
	100 DC	0.10
	24 DC	0.30
30	240 AC	0.14
	120 AC	0.28
	120 DC	0.07
	24 DC	0.28
60	240 AC	0.40
	120 AC	0.50
	120 DC	0.20
	24 DC	0.50
100	240 AC	0.40
	120 AC	1.00
	120 DC	0.40
	24 DC	1.00

Approvals
(See details for part number specific approvals on reverse.)

1. UL
2. UL Haz Loc
3. Ulc
5. CSA Haz Loc
6. CE
7. NSF

Aprobaciones
(Vea detalles de aprobaciones para numero de partes especificas al reverso.)

Wiring

Madison Part Number: _____

Número de Parte Madison : _____

Switch Location (from bottom of fitting)	Colors	Watt Rating	Switch Type	Dry Position

Liquid Level Switch Details by Part Number

Part Number	Materials (stem, float)	Max. Temp.	Mounting	Max. Pressure (PSIG)	Elec. Rating (Watts)	Approvals (see reverse for key)	Notes (see below for key)
Standard Full Size Vertical							
M4182-AL	Alum, Polypro.	105°C	1/2 NPT	150	70		
M4182-SS	316 SS	200°C	1/2 NPT	300	70		
M5600	316 SS	200°C	1/4 NPT	200	60	2, 5, 6, 7	
M5400	Brass, 316 SS	200°C	1/4 NPT	200	60	1, 4, 6	
M5917	316 SS	250°C	1/4 NPT	200	60	1, 4, 6, 7	*
M8800	Polypro	105°C	1/4 NPT	100	60	1, 4, 6, 7	*
M8600	316 SS, Polypro	105°C	1/4 NPT	100	60	1, 4, 6, 7	
M8400	Brass, Polypro	105°C	1/4 NPT	100	60	1, 4, 6	
M7800	PBT, Buna-N	105°C	1/4 NPT	150	60	1, 4, 6	1
M4300	Brass, Buna-N	105°C	1/4 NPT	150	60	1, 4, 6	
M4600	316 SS, Buna-N	105°C	1/4 NPT	150	60	1, 4, 6	
M9800	Kynar	105°C	1/4 NPT	15	60	1, 6, 7	
M5600-PR	316 SS	200°C	1/4 NPT	500	100	6, 7	
M8060-PR	CPVC, Polypro.	105°C	1/4 NPT	100	100	6	
M8800-PR	Polypro.	105°C	1/4 NPT	100	100	6, 7	
M7800-PR	PBT, Buna-N	105°C	1/4 NPT	150	100	6	1
MSB5600	316 SS	110°C	Bracket	85	60	8	
MSB7800	PBT, Buna-N	105°C	Bracket	150	60		1
MSB8800	Polypro	105°C	Bracket	100	60		
Standard Miniature Vertical							
M5000	316 SS	200°C	1/8 NPT	300	30	1, 4, 6, 7	
M5040	Brass, 316 SS	200°C	1/8 NPT	300	30	1, 4, 6	
M8000	Polypro	105°C	1/8 NPT	100	30	1, 4, 6, 7	*, **
M8020	316 SS, Polypro.	105°C	1/8 NPT	100	30	1, 4, 6, 7	**
M8040	Brass, Polypro.	105°C	1/8 NPT	100	30	1, 4, 6	**
M7000	PBT, Buna-N	105°C	1/8 NPT	150	30	1, 4, 6	*, **, 1
M4500	Brass, Buna-N	105°C	1/8 NPT	150	30	1, 4, 6	**
M4400	316 SS, Buna-N	105°C	1/8 NPT	150	30	1, 4, 6	**
M4008	Polypro., Buna-N	105°C	1/8 NPT	150	30	1, 4, 6	**
M9000	Kynar	105°C	1/8 NPT	15	30	1, 6, 7	*, **
M3326	Polypro.	105°C	3/8-16 BH	50	15	1, 6	2
M3326-NO	Polypro.	105°C	3/8-16 BH	50	15	1, 6	2
Standard Horizontal							
M3827-XX	316 SS	200°C	NPT or Bulkhead	200	30		
M4249	316 SS	250°C	5/8-11 BH	300	60	6	
M5900	316 SS	200°C	1 x 1/2 NPT	300	30	2, 4, 6, 7	
M5910	316 SS	200°C	1/2 x 1/4 NPT	300	30	2, 4, 6, 7	
M5920	316 SS	200°C	1/2 x 1/2 NPT	300	30	2, 4, 6, 7	
M5970	316SS	200°C	1/2 BH	100	30	1, 6	
M7790	PBT	150°C	5/8-11 BH	100	30	1, 4, 6	1
M7740	PBT	150°C	3/4-16 x 7/8-14	100	30	1, 4, 6	1
M7700	PBT	150°C	1/2 x 1/2 NPT	100	30	1, 4, 6	1
M7725	PBT	150°C	1/2 NPT	100	30	1, 4, 6	1
M7750	PBT	150°C	1/2 NPT	100	30	1, 4, 6	1
M8700	Polypro.	105°C	1/2 x 1/2 NPT	100	30	1, 4, 6, 7	*
M8710	Polypro.	105°C	1/2 x 1/4 NPT	100	30		
M8725	Polypro.	105°C	1/2 NPT	100	30	1, 4, 6, 7	
M8740	Polypro.	105°C	3/4-16 x 7/8-14	100	30	1, 4, 6, 7	
M8750	Polypro.	105°C	1/2 NPT	100	30	1, 4, 6, 7	
M8790	Polypro.	105°C	5/8-11 BH	100	30	1, 4, 6, 7	
M5010	316 SS	200°C	3/8-24 BH	300	30	1, 4, 6, 7	*
M4010	Brass, Buna-N	105°C	3/8-24 BH	100	30		*
M9700	Kynar	105°C	1/2 x 1/2 NPT	100	30	1, 4, 6, 7	*
M9750	Kynar	105°C	1/2 NPT	100	30	1, 4, 6, 7	
M9740	Kynar	105°C	3/4-16 x 7/8-14	100	30	1, 4, 6, 7	
Configured (Multi-Level)							
M5602-XXXX	316 SS	200°C	X	200	60	2, 5, 6, 7	
M5402-XXXX	Brass, 316 SS	200°C	X	200	60	1, 4, 6	
M4302-XXXX	Brass, Buna-N	105°C	X	150	60	1, 4, 6	
M4602-XXXX	316 SS, Buna-N	105°C	X	150	60	1, 4, 6	
M8802-XXXX	Polypro.	105°C	X	100	60	1, 4, 6, 7	
M8602-XXXX	316 SS, Polypro.	105°C	X	100	60	1, 4, 6, 7	
M8402-XXXX	Brass, Polypro.	105°C	X	100	60	1, 4, 6	
M9802-XXXX	Kynar	105°C	X	15	60	1, 6	
M5002-XXXX	316 SS	200°C	X	300	30	1, 4, 6, 7	
M5042-XXXX	Brass, 316 SS	200°C	X	300	30	1, 4, 6	
M4502-XXXX	Brass, Buna-N	105°C	X	150	30	1, 4, 6	
M4402-XXXX	316 SS, Buna-N	105°C	X	150	30	1, 4, 6	
M8002-XXXX	316 SS, Polypro.	105°C	X	100	30	1, 4, 6, 7	
M8042-XXXX	Brass, Polypro.	105°C	X	100	30	1, 4, 6	
M8080-XXXX	Polypro.	105°C	X	100	30	1, 4, 6, 7	
M5605	316 SS	200°C	1/2 NPT	200	60		3
M8085	Polypro.	105°C	1/4 NPT	100	30		3

Detalles de Interruptor de Nivel Líquido por Número de Parte

Número de Parte	Materiales (vástago, flotador)	Temp. Máx.	Montaje	Presión Máx. (PSIG)	Clasificación Eléct. (Vatios)	Aprobaciones (ver clave en el reverso)	Notas (ver clave está abajo)
Vertical Estándar Tamaño Total							
M4182-AL	Alum, Polipro	105°C	1/2 NPT	150	70		
M4182-SS	316 SS	200°C	1/2 NPT	300	70		
M5600	316 SS	200°C	1/4 NPT	200	60	2, 5, 6, 7	
M5400	Bronce, 316 SS	200°C	1/4 NPT	200	60	1, 4, 6	
M5917	316 SS	250°C	1/4 NPT	200	60	1, 4, 6, 7	*
M8800	Polipro.	105°C	1/4 NPT	100	60	1, 4, 6, 7	*
M8600	316 SS, Polipro.	105°C	1/4 NPT	100	60	1, 4, 6, 7	
M8400	Bronce, Polipro.	105°C	1/4 NPT	100	60	1, 4, 6	
M7800	PBT, Buna-N	105°C	1/4 NPT	150	60	1, 4, 6	1
M4300	Bronce, Buna-N	105°C	1/4 NPT	150	60	1, 4, 6	
M4600	316 SS, Buna-N	105°C	1/4 NPT	150	60	1, 4, 6	
M9800	Kynar	105°C	1/4 NPT	15	60	1, 6, 7	
M5600-PR	316 SS	200°C	1/4 NPT	500	100	6, 7	
M8060-PR	CPVC, Polipro.	105°C	1/4 NPT	100	100	6	
M8800-PR	Polipro.	105°C	1/4 NPT	100	100	6, 7	
M7800-PR	PBT, Buna-N	105°C	1/4 NPT	150	100	6	1
MSB5600	316 SS	110°C	Bracket	85	60	8	
MSB7800	PBT, Buna-N	105°C	Bracket	150	60		1
MSB8800	Polipro.	105°C	Bracket	100	60		
Vertical Estándar Miniatura							
M5000	316 SS	200°C	1/8 NPT	300	30	1, 4, 6, 7	
M5040	Bronce, 316 SS	200°C	1/8 NPT	300	30	1, 4, 6	
M8000	Polipro.	105°C	1/8 NPT	100	30	1, 4, 6, 7	*, **
M8020	316 SS, Polipro.	105°C	1/8 NPT	100	30	1, 4, 6, 7	**
M8040	Bronce, Polipro.	105°C	1/8 NPT	100	30	1, 4, 6	**
M7000	PBT, Buna-N	105°C	1/8 NPT	150	30	1, 4, 6	*, **, 1
M4500	Bronce, Buna-N	105°C	1/8 NPT	150	30	1, 4, 6	**
M4400	316 SS, Buna-N	105°C	1/8 NPT	150	30	1, 4, 6	**
M4008	Polipro., Buna-N	105°C	1/8 NPT	150	30	1, 4, 6	**
M9000	Kynar	105°C	1/8 NPT	15	30	1, 6, 7	*, **
M3326	Polipro.	105°C	3/8-16 BH	50	15	1, 6	2
M3326-NO	Polipro.	105°C	3/8-16 BH	50	15	1, 6	2
Horizontal Estándar							
M3827-XX	316 SS	200°C	NPT or Bulkhead	200	30		
M4249	316 SS	250°C	5/8-11 BH	300	60	6	
M5900	316 SS	200°C	1 x 1/2 NPT	300	30	2, 4, 6, 7	
M5910	316 SS	200°C	1/2 x 1/4 NPT	300	30	2, 4, 6, 7	
M5920	316 SS	200°C	1/2 x 1/2 NPT	300	30	2, 4, 6, 7	
M5970	316 SS	200°C	1/2" BH	100	30	1, 6	
M7790	PBT	150°C	5/8-11 BH	100	30	1, 4, 6	1
M7740	PBT	150°C	3/4-16 x 7/8-14	100	30	1, 4, 6	1
M7700	PBT	150°C	1/2 x 1/2 NPT	100	30	1, 4, 6	1
M7725	PBT	150°C	1/2 NPT	100	30	1, 4, 6	1
M7750	PBT	150°C	1/2 NPT	100	30	1, 4, 6	1
M8700	Polipro.	105°C	1/2 x 1/2 NPT	100	30	1, 4, 6, 7	*
M8710	Polipro.	105°C	1/2 x 1/4 NPT	100	30		
M8725	Polipro.	105°C	1/2 NPT	100	30	1, 4, 6, 7	
M8740	Polipro.	105°C	3/4-16 x 7/8-14	100	30	1, 4, 6, 7	
M8750	Polipro.	105°C	1/2 NPT	100	30	1, 4, 6, 7	
M8790	Polipro.	105°C	5/8-11 BH	100	30	1, 4, 6, 7	
M5010	316 SS	200°C	3/8-24 BH	300	30	1, 4, 6, 7	*
M4010	Bronce, Buna-N	105°C	3/8-24 BH	100	30		*
M9700	Kynar	105°C	1/2 x 1/2 NPT	100	30	1, 4, 6, 7	*
M9750	Kynar	105°C	1/2 NPT	100	30	1, 4, 6, 7	
M9740	Kynar	105°C	3/4-16 x 7/8-14	100	30	1, 4, 6, 7	
Configurado (Multinivel)							
M5602-XXXX	316 SS	200°C	X	200	60	2, 5, 6, 7	
M5402-XXXX	Bronce, 316 SS	200°C	X	200	60	1, 4, 6	
M4302-XXXX	Bronce, Buna-N	105°C	X	150	60	1, 4, 6	
M4602-XXXX	316 SS, Buna-N	105°C	X	150	60	1, 4, 6	
M8802-XXXX	Polipro.	105°C	X	100	60	1, 4, 6, 7	
M8602-XXXX	316 SS, Polipro.	105°C	X	100	60	1, 4, 6, 7	
M8402-XXXX	Bronce, Polipro.	105°C	X	100	60	1, 4, 6	
M9802-XXXX	Kynar	105°C	X	15	60	1, 6	
M5002-XXXX	316 SS	200°C	X	300	30	1, 4, 6, 7	
M5042-XXXX	Bronce, 316 SS	200°C	X	300	30	1, 4, 6	
M4502-XXXX	Bronce, Buna-N	105°C	X	150	30	1, 4, 6	
M4402-XXXX	316 SS, Buna-N	105°C	X	150	30	1, 4, 6	
M8002-XXXX	316 SS, Polipro.	105°C	X	100	30	1, 4, 6, 7	
M8042-XXXX	Bronce, Polipro.	105°C	X	100	30	1, 4, 6	
M8080-XXXX	Polipro	105°C	X	100	30	1, 4, 6, 7	
M5605	316 SS	200°C	1/2 NPT	200	60		3
M8085	Polipro.	105°C	1/4 NPT	100	30		3

Notes:
* Also applies to models with slosh shields
** Also applies to Ultra Low Level (ULL) float models
1 PBT is not for use in water above 65°C (150°F).
2. The M3326 is Normally Closed. The M3326-NO is Normally Open.
3

Model No.	Switch Location (from bottom of fitting)	Colors	Watt Rating	Switch Type	Dry Position
M5605	1.25"	Red	60	SPST	NC
	5.75"	Black	60	SPST	NC
M8085	0.75"	Red	60	SPST	NC
	5.75"	Black	60	SPST	NC

Temperature Switches

Madison Model No.	Materials (stem,float)	Mounting	Max Pressure (PSIG)	Electrical Rating (Watts)	Temp. Type
MT3920-1	Polypro.	3/8-16 BH	50	15	J
MT3920-2	Polypro.	3/8-16 BH	50	15	K
MT3920-3	Polypro.	3/8-16 BH	50	15	RTD
MT5600	316 SS	1/4 NPT	200	60	J
MT5600-1	316 SS	1/4 NPT	200	60	K
MT5600-2	316 SS	1/4 NPT	200	60	RTD
MT5600-3	316 SS	1/4 NPT	200	60	J
MT5600-4	316 SS	1/4 NPT	200	60	K
MT5600-5	316 SS	1/4 NPT	200	60	Bimetal Switch
MT8000	Polypro.	1/8 NPT	100	30	J
MT8000-1	Polypro.	1/8 NPT	100	30	K
MT8000-2	Polypro	1/8 NPT	100	30	RTD
MT8000-4	Polypro	1/8 NPT	100	30	Bimetal Switch

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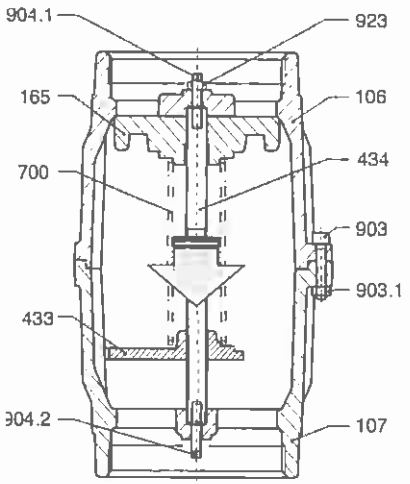
VALVOLA DI SICUREZZA VRL
SAFETY VALVE VRL
SOUPAPE DE SECURITE VRL
SICHERHEITSVENTIL VRL
VALVULA DE SEGURIDAD VRL

ISTRUZIONI D'USO
USE INSTRUCTIONS
INSTRUCTIONS D'UTILISATION
ANWENDUNGSHINWEISE
INSTRUCCIONES PARA EL USO

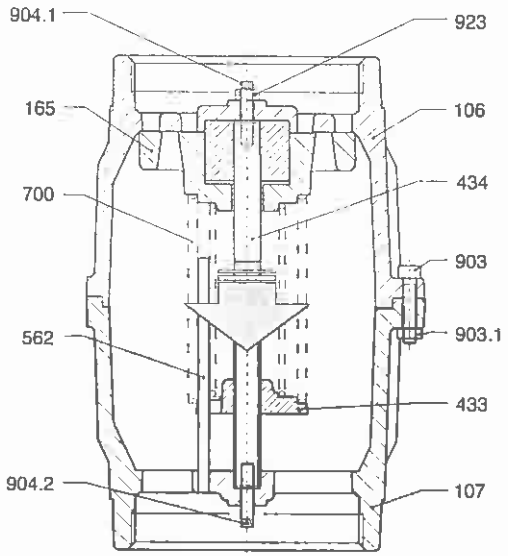
ATTENZIONE! LA VALVOLA E' FORNITA NON TARATA
CAUTION! THE VALVE IS SUPPLIED NOT CALIBRATED
ATTENTION ! LA SOUPAPE EST FOURNIE NON TAREE
ACHTUNG ! DAS VENTIL IST WERKSEITIG NICHT GEEICHT
ATENCION ! LA VALVULA NO ESTA GRADUADA



LEGGERE ATTENTAMENTE TUTTE LE ISTRUZIONI E CONSERVARLE
PLEASE READ CAREFULLY ALL INSTRUCTIONS AND KEEP THEM FOR FUTURE REFERENCE
LIRE ATTENTIVEMENT TOUTES LES INSTRUCTIONS ET LES CONSERVER
ALLE ANLEITUNGEN SIND SORGFÄLTIG ZU LESEN UND AUFZUBEWAHREN!
LEER ATENTAMENTE LAS INSTRUCCIONES Y CONSERVARLAS



VRL6
Fig. 1a



VRL8 - VRL9
Fig 1b

ITEM	Denominazione - *Description* - Désignation - *Description* - Descripciòn
06	Corpo - *Housing* - Corps supérieur - *Gehäuse* - Cuerpo
07	Coperchio - *Cover* - Couvercle - *Abdeckung* - Cubierta
65	Otturatore - *Shutter* - Obturateur - *Verschluss* - Obturador
33	Piattello guida molla - *Spring guide disc* - Guide ressort - *Federführungsscheibe* - Disco guìa muelle
34	Asta - *Shutter guide* - Tige - *Schließführung* - Vastago
62	Spina cilindrica - Dowel pin -Goupille cylindrique - *Führungsstift* - Pin
00	Molla - *Spring* - Ressort - *Feder* - Muelle
03	Vite - *Screw* - Vis - *Schraube* - Tornillo
03.1	Dado - *Nut* - Ecrou - *Schraubenmutter* - Tuerca
04.1	Grano superiore - *Upper grub screw* - Tige de réglage supérieure – *Obere Einstellschraube* - Espàrrago superior
04.2	Grano inferiore - *Lower grub screw* - Tige de réglage inférieure - *Untere Einstellschraube* - Espàrrago inferior
23	Dado di fermo - *Nut* - Ecrou de blocage -*Schraubenmutter* - Contratuerca

I CONDIZIONI D'UTILIZZO

- LE VALVOLE VRL SONO ADATTE AL CONVOGLIAMENTO DI ARIA E GAS NON ESPLOSIVI, I INFIAMMABILI, NON AGGRESSIVI, IN ATMOSFERA NON ESPLOSIVA. LA TEMPERATURA DEL FLU CONVOGLIATO È AMMESSA NEL CAMPO DI -15 A +160 °C.
- VALVOLE PROGETTATE E FABBRICATE PER LA LIMITAZIONE NEL CAMPO DELLE BASSE PRESSI / DEPRESSIONI, PER UN UTILIZZO SPECIFICO SU SOFFIANTI, ASPIRATORI E COMPRESSORI A BA PRESSIONI;
- NON SOPPORTANO PRESSIONI INTERNE ELEVATE, COMUNQUE NON SUPERIORI A 2.8 bar A;
- SONO SOGGETTE A PICCOLE PERDITE DEL FLUIDO CONVOGLIATO;
- CORPI SOLIDI ANCHE DI PICCOLE DIMENSIONI E SPORCIZIA POSSONO PROVOCARE GRAVI DA VANNO QUINDI SEPARATI DAL FLUSSO MEDIANTE ADEGUATI FILTRI IN ASPIRAZIONE.

GB *CONDITIONS OF USE*

- *THE VRL VALVES ARE DESIGNED FOR THE HANDLING OF AIR OR NON-EXPLOSIVE, N HAZARDOUS AND NON-FLAMMABLE GASES IN NON-EXPLOSIVE ENVIRONMENTS. THE GAS IN TEMPERATURE MUST BE IN THE RANGE OF -15 TO +160 °C.*
- *RELIEF VALVES ARE DESIGNED AND MANUFACTURED TO LIMIT THE OPERATING PRESSUR LOW PRESSURE/VACUUM APPLICATIONS. THEY ARE FOR USE SPECIFICALLY ON LOW PRESS BLOWERS AND VACUUM PUMPS ONLY;*
- *THE VALVE CANNOT WITHSTAND HIGH INTERNAL PRESSURE, DESIGN MAXIMUM OF 2.8 bar A;*
- *THERE IS SMALL LOSS OF THE AIR/GAS BEING HANDLED;*
- *SOLID PARTICULES, HOWEVER SMALL, INCLUDING DIRT CAN CAUSE SERIOUS DAMA THEREFORE IT IS ESSENTIAL THAT SUCH SUBSTANCES SHOULD BE REMOVED FROM THE GAS SUITABLE FILTERS UPSTREAM OF THE INLET.*

F CONDITIONS D'UTILISATION

- LES SOUPAPES VRL SONT ADAPTÉS À L'ACHEMINEMENT D'AIR ET DE GAZ NON EXPLOS ININFLAMMABLES, NON AGRESSIFS, DANS UNE ATMOSPHÈRE NON EXPLOSIVE. LA TEMPÉRAT DU FLUIDE ACHEMINÉ EST ADMISE DANS UN ÉVENTAIL DE -15 À +160 °C.
- CES SOUPAPES ONT ETÉ DÉVELOPPÉES ET CONSTRUITES AFIN DE LIMITER LES VALE MAXIMALES VIDE/PRESSION ET LEUR UTILISATION EST SPÉCIFIQUEMENT RESERVÉE ASPIRATEURS ET COMPRESSEURS BASSES PRESSION;
- NE SUPPORTENT PAS DES PRESSIONS INTERNES ÉLEVÉES, C'EST-À-DIRE DES PRESSI SUPÉRIEURES À 2.8 bar A;
- SONT SUJETTES À DE PETITES PERTES DU FLUIDE ACHEMINÉ;
- DES CORPS SOLIDES MÊME DE PETITES DIMENSIONS ET LÉGÈREMENT SALES PEUV PROVOQUER DE GRAVES DOMMAGES, ILS SONT PAR CONSÉQUENT SÉPARÉS DU FLUX PAR FILTRES ADÉQUANTS EN ASPIRATION.

D *EINSATZBEDINGUNGEN*

- *DIE VENTILE DER SERIE VRL SIND FÜR DEN DAUERBETRIEB IN NICHT-EXPLOSIVER UMGEB ZUM ANSAUGEN UND VERDICHTEN VON LUFT ODER NICHT-EXPLOSIVEN, NICHT-BRENNBAREN NICHT-AGGRESSIVEN GASEN GEEIGNET. DIE ZULÄSSIGE ANSAUGTEMPERATUREN LI ZWISCHEN -15 BIS +160 °C.*
- *DIE SPEZIELL FÜR DEN NIEDERDRUCK- BZW. NIEDERVAKUUMBEREICH ENTWICKELTEN VEN SIND FÜR DIE SPEZIFISCHE ANWENDUNG IN VAKUUMPUMPEN UND KOMPRESSOREN GEEIGNET*
- *DIE GEHÄUSE WIDERSTEHEN KEINEN HOHEN INNENDRÜCKEN. UNTER KEINEN UMSTÄNDEN D DER MAX. BETRIEBSDRUCK VON 2.8 bar A ÜBERSCHRITTEN WERDEN;*
- *DIE VENTILE SIND NICHT VOLLSTÄNDIG GASDICHT;*
- *FREMDKÖRPER, AUCH GERINGER GRÖßE, UND VERUNREINIGUNGER KÖNNEN SCHWERE SCHÄ VERURSACHEN. SIE MÜSSEN DAHER AUS DEM FÖRDERMEDIUM MIT GEEIGNETEN ANSAUGFILT ENTFERNT WERDEN.*

E CONDICONES DE USO

- LAS VALVULAS VRL SON ADAPTAS PARA EL MOVIMIENO DE AIRE O GASES NO EXPLOSIVOS PELIGROSOS Y NO INFLAMABLES Y PARA SERVICIO EN AMBIENTES NO EXPLOSIVOS. TEMPERATURA DE ENTRADA DEL GAS DEBE ESTAR ENTRE LOS –15 Y +160 °C.
- VALVULAS PROYECTADAS Y FABRICADAS PARA LA LIMITACION EN EL SECTOR DE LAS BA PRESIONES / VACIOS, PARA UN UTILIZO SOBRE ASPIRADORES, COMPRESORES A BA PRESIONES.
- LA VALVULA NO PUEDE CONTENER PRESIONES INTERNAS ALTAS, NO MAYORES QUE 2.8 bar A;
- HAY UNA PECHEÑA PERDIDA DE FLUIDO MANEJADO;
- LAS PARTICULAS SOLIDAS, AUNQUE PEQUEÑAS, INCLUIDO EL POLVO, PUEDEN CAUSAR SEI DAÑOS. POR LO TANTO ES ESENCIAL QUE DICHAS SUSTANCIAS SEAN ELIMINADAS DEL MEDIANTE FILTROS APROPIADOS ANTES DE LA ENTRADA.

DIAGRAMMA DI SELEZIONE - *SELECTION DIAGRAM*
SCHÉMA DE SÉLECTION – AUSWAHLDIAGRAMM
DIAGRAMA DE SELECCION

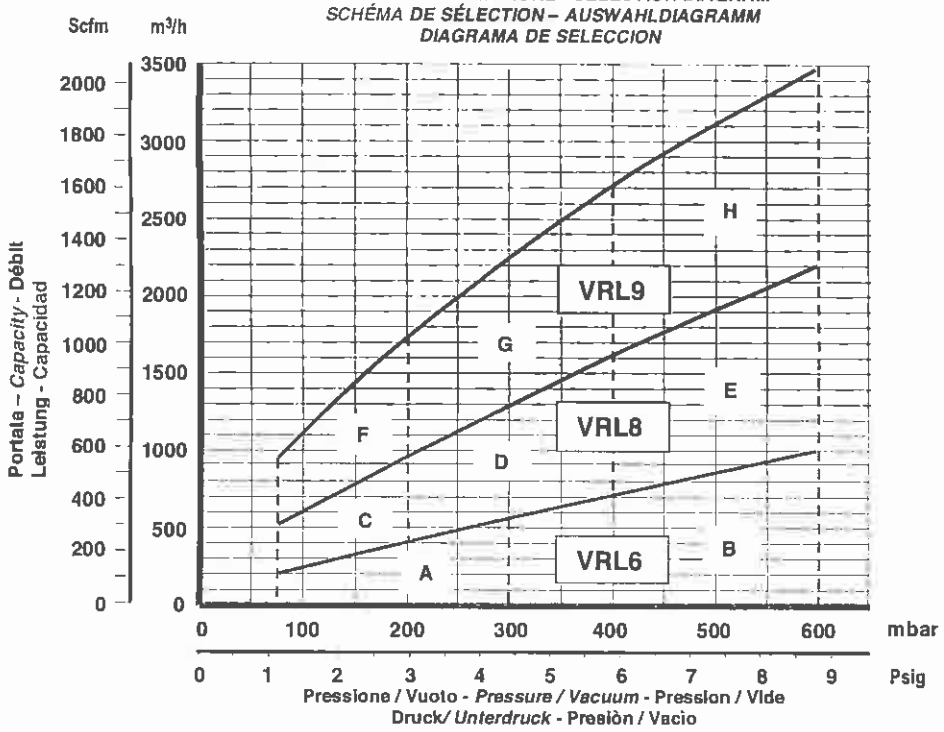


TABELLA DI SELEZIONE MOLLA - *SPRING SELECTION CHART* - TABLEAU DE SÉLECTION RESSORT
***UEBERSICHTSTABELLE FEDERN* - TABLA DE SELECCION MUELLE**

RANGE	MOLLA *SPRING* RESSORT *FEDER* MUELLE N°	Pressione / Vuoto *Pressure / Vacuum* Pression / Vide *Druck / Underdruck* Presiòn / Vacio MIN [mbar]	[psig]	Pressione / Vuoto *Pressure / Vacuum* Pression / Vide *Druck / Underdruck* Presiòn / Vacio MAX [mbar]	[psig]	Colore di identificazione *Colour of identification* Couleur d' identification *Farbidentifizierung* Color de identificaciòn
VRL6						
A	I	75	1.102	300	4.408	-
B	II	300	4.408	600	8,820	VERDE - *GREEN* - VERT - *GRÜN* - VERDE
VRL8						
C	I	75	1.102	200	2.940	-
D	II	200	2.940	400	5.880	VERDE – *GREEN* VERT - *GRÜN* - VERDE
E	I + II	400	5.880	600	8,820	-
VRL9						
F	I	75	1.102	200	2.940	VERDE - *GREEN* - VERT - *GRÜN* - VERDE
G	II	200	2.940	400	5.880	-
H	I + II	400	5.880	600	8,820	-

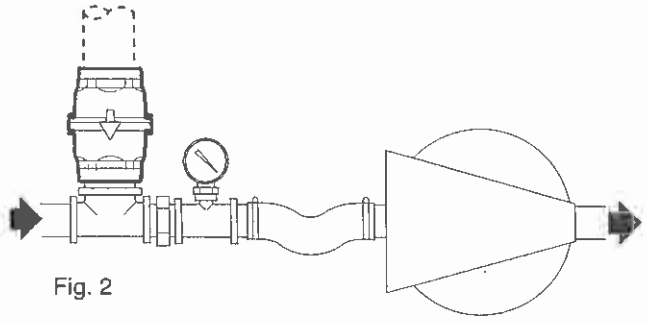


Fig. 2

SCHEMA DI INSTALLAZIONE – VALVOLA LIMITATRICE DI VUOTO
INSTALLATION SKETCH – VACUUM RELIEF VALVE
INSTALLATIONSSCHEMA – VAKUUMVENTIL
SCHÉMA DE INSTALLATION – SOUPAPE CASSE VIDE
ESQUEMA DE INSTALATIÒN – VALVULA LIMITADORA DE VACIO

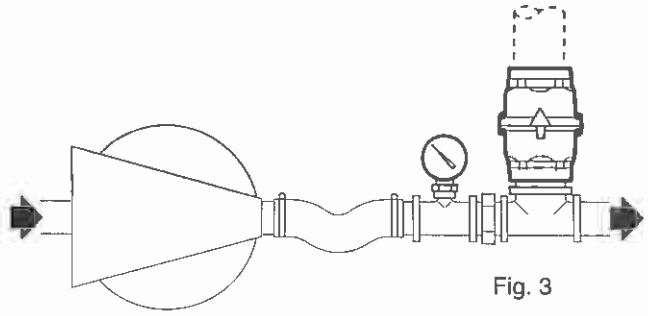


Fig. 3

SCHEMA DI INSTALLAZIONE – VALVOLA LIMITATRICE DI PRESSIONE
INSTALLATION SKETCH – PRESSURE RELIEF VALVE
INSTALLATIONSSCHEMA – DRUCKVENTIL
SCHÉMA DE INSTALLATION – SOUPAPE DE SÉCURITÉ
ESQUEMA DE INSTALATIÒN – VALVULA LIMITADORA DE PRESION

1. SCELTA DELLA MOLLA

a valvola è fornita con 2 differenti molle, ciascuna delle quali adatta a lavorare in uno specifico campo di uoto / pressione, nel caso delle valvole VRL8 e VRL9 è previsto anche l'uso delle molle combinate.
Riferendo al DIAGRAMMA DI SELEZIONE, verificare che la valvola sia della dimensione adeguata e, in unzione della zona nella quale si posiziona il punto di funzionamento (zona A, B,...H), scegliere la molla combinazione di molle come indicato nella TABELLA DI SELEZIONE MOLLA.
a valvola è fornita con la molla n° 1 installata; se la molla fosse da sostituire o qualora fosse necessario iggiungere una supplementare (VRL8 / VRL9) procedere come da punto 2, altrimenti tarare la valvola ome da punto 3.

2. SOSTITUZIONE DELLA MOLLA (O AGGIUNTA PER VRL8 / VRL9)

Rimuovere i due tappi di protezione alle estremità della valvola.
Assicurarsi che il dado di fermo 923 sia bloccato sul corpo 106.
Rimuovere le viti 903 dai dadi 903.1.
Sfilare il coperchio 107 dal corpo 106.
Svitare il piattello guida molla 433 e sfilarlo completamente dall'asta 434.
Sfilare la molla 700 solo in caso di sostituzione.
Posizionare la molla scelta nell'apposita sede dell'otturatore 165.
Comprimere la/e molla/e ed avvitare per almeno venti giri di filetto il piattello guida 433 sull'asta 434.
Verificare che entrambe le estremità della/e molla/e siano posizionate correttamente nelle sedi guida.
Posizionare il coperchio 107 nel corpo 106 inserendo:
- per VRL6: la guida di scorrimento nell'asola presente nel piattello guida molla 433.
- per VRL8 e VRL9: la spina cilindrica 562 nell'asola presente nel piattello guida molla 433.

Avvitare le viti 903 ai dadi 903.1.

3. TARATURA DELLA VALVOLA

A) Regolazione al valore di vuoto consentito

Rimuovere i due tappi di protezione alle estremità della valvola, se presenti.
Montare la valvola in derivazione sulla condotta di aspirazione e predisporre una presa di pressione il più vicino possibile alla bocca dell'aspiratore (Fig. 2).
Allentare il dado di fermo 923.
Scaricare la/e molla/e della valvola svitando, con la chiave a brugola data in dotazione, il grano superiore 904.1.
Avviare l'aspiratore e chiudere l'aspirazione, a monte della valvola, fino ad ottenere le condizioni più gravose di esercizio (normalmente condotta completamente chiusa).
Avvitare il grano superiore 904.1 fino al raggiungimento del vuoto massimo consentito.
Serrare il dado di fermo 923 mantenendo fermo il grano superiore 904.1.
Aprire la condotta di aspirazione.

Verificare le perdite di carico dovute a condotte e/o filtri installati a monte della valvola.

B) Regolazione al valore di pressione consentita

- Rimuovere i due tappi di protezione alle estremità della valvola, se presenti.
- Svitare il dado di fermo 923 e toglierlo dal grano superiore 904.1.

Avvitare senza serrare il dado di fermo 923 sul grano inferiore 904.2.
Montare la valvola in derivazione sulla condotta di mandata e predisporre una presa di pressione il più vicino possibile alla bocca del compressore (Fig. 3).
Scaricare la/e molla/e della valvola avvitando il grano inferiore 904.2 con la chiave a brugola data in dotazione.
Avviare il compressore e chiudere la mandata, a valle della valvola, fino ad ottenere le condizioni più gravose di esercizio (normalmente condotta completamente chiusa).
Svitare il grano inferiore 904.2 fino al raggiungimento della pressione massima consentita.
Serrare il dado di fermo 923 mantenendo fermo il grano inferiore 904.2.
Aprire la condotta di mandata.

Verificare le perdite di carico dovute a condotte installate a valle della valvola.

1. CHOICE OF SPRING

The valve is supplied with 2 different springs; each spring is to be used within a specific pressure-vac operating range. For the VRL8 and VRL9 there is the possibility to use both springs working in parallel. Referring to the SELECTION DIAGRAM, check that the valve is correctly sized and depending where operating point (area A, B,...H) is located, choose one or two springs according to SPRING SELECT CHART.
The valve is supplied with spring # 1 installed. If spring needs to be replaced or a supplementary spri needed to be added (for VRL8 / VRL9), proceed to point # 2 otherwise, adjust valve as per point #3.

2. INSTRUCTIONS FOR SPRING REPLACEMENT (OR MOUNTING ADITIONAL SPRING FOR VRL8 / VRL9)

- Remove the two plastic caps on valve.
- **Ensure stop-nut 923 is locked on the upper housing 106.**
- Unscrew screw 903 from nut 903.1.
- Remove cover 107 from housing 106.
- Unscrew spring guide disc 433 taking it out from shutter guide 434.
- Remove spring 700 (only in case of replacement).
- Install the appropriate spring into shutter 165.
- Compress spring and screw spring guide disc 433 on shutter guide 434 for at least 20 full th terms.
- Check that both ends of the spring are properly positioned within their seats.
- Install the cover 107 on the housing 106 inserting:
  - for VRL6: the sliding guide on the slot in spring guide disc 433.
  - for VRL8 and VRL9: dowel pin 562 on the slot in spring guide disc 433.
- Tighten screw 903 on nut 903.1.

3. VALVE SETTING

A) Setting-up at allowed vacuum level

- Remove the two plastic caps on valve, if any.
- Position valve on the suction by-pass and connect a vacuum gage as close as possible to exhauster inlet (Fig. 2).
- Unscrew nut 923.
- Relieve spring tension by backing off upper grub screw 904.1 with the fit key.
- Turn on exhauster. Induce highest attainable vacuum by throttling air intake upstream relief v (normally reducing throttle to fully-closed).
- Adjust upper grub screw 904.1 until maximum allowable vacuum level is reached.
- Tighten nut 923 keeping blocked upper grub screw 904.1
- Open suction line.

Double-check vacuum gauge to ensure no additional losses are induced by pipes or fi installed upstream relief valve.

B) Setting-up at allowed pressure level

- Remove the two plastic caps on valve, if any.
- Remove nut 923 from upper grub screw 904.1 and place it on to the lower grub screw 904.2. Do tighten.
- Position valve on the discharge by-pass and connect a pressure gage as close as possible to blower outlet (Fig. 3).
- Relieve spring tension by backing on lower grub screw 904.2 with the fit key.
- Turn on blower. Induce highest attainable pressure by throttling air discharge downstream of the v (normally reducing throttle to fully-closed).
- Unscrew lower grub screw 904.2 until maximum allowable pressure level is reached.
- Tighten nut 923 keeping blocked lower grub screw 904.2.
- Open discharge line.

Double-check pressure gauge to ensure no additional losses are induced by pipes or filters installed downstream the valve

1. CHOIX DU RESSORT

F

a soupape est fournie avec 2 ressorts différents, chacun conçu pour travailler dans une gamme spécifique le vide ou pression ; dans le cas des soupapes VRL 8 et VRL 9, l'utilisation des ressorts en combinaison ist également prévue.
En se référant au diagramme de sélection, vérifier que la soupape soit de dimension adaptée et en fonction lu point de travail demandé (point A, B...H) choisir le ressort ou la combinaison comme indiqué dans le ABLEAU DE SELECTION RESSORT.
.a soupape est fournie avec le ressort n° 1 monté; si le ressort est à changer ou s'il faut en rajouter un VRL8 / VRL9) , procéder comme indiqué au point 2, sinon tarer la soupape comme indiqué au point 3.

2. REMPLACEMENT DU RESSORT (OU ADJONCTION POUR VRL8 / VRL9)

Retirer les capsules de protection aux extrémités de la soupape.
S'assurer que l'écrou 923 soit bloqué sur le corps supérieur 106.
- Dévisser la vis 903 de l'écrou 903.1.

Dévisser le couvercle 107 du corps 106.
Dévisser le guide ressort 433 et l'enlever complètement de la tige 434.
Enlever le ressort 700 seulement en cas de changement.
Positionner le ressort choisi sur l'embase appropriée de l'obturateur 165.
Comprimer le/les ressort et visser sur au moins 20 tours de filetage le guie ressort 433 sur la tige 434.
Vérifier que chaque extrémité du/des ressort soient positionnées correctement sur l'embase des guides.
Positionner le couvercle 107 dans le corps 106 en insérant :
- pour VRL6 : la rail de guidage dans l'un des trous du guide ressort 433.
- pour VRL8 et VRL9: la goupille cylindrique 562 dans l'un des trous du guide ressort 433.

Visser la vis 903 à l'écrou 903.1.

3. TARAGE DE LA SOUPAPE

A) Réglage à la valeur du vide souhaité

Si présentes, retirer les capsules de protection aux extrémités de la soupape.
Monter la soupape en dérivation sur le conduit d'aspiration et créer une prise de pression le plus prés possible de l'orifice de la soufflante (Fig. 2).
Dèvisser l'écrou 923.
A l'aide de la clé fournie, détendre le ressort de la soupape en dévissant la tige supérieure 904.1.
Mettre la soufflante en route et obstruer l'aspiration en amont de la soupape jusqu'à obtenir les conditions de travail les plus mauvaises (conduit complètement obstrué).
- Visser la tige supérieure 904.1 jusqu'à atteindre le vide maxi souhaité.
- Serrer l'écrou 923 en mintenant la tige supérieure 904.1 bloquée.
- Déboucher le conduit d'aspiration.

Vérifier les pertes de charge dues à des conduits et/ou filtres installés en amont de la soupape.

B) Réglage à la pression souhaité

- Si présentes, retirer les capsules de protection aux extrémités de la soupape.
- Dévisser l'écrou 923 et l'enlever de la tige supérieure 904.1.
- Visser sans serrer l'écrou 923 sur la tige inférieure 904.2.
- Monter la soupape en dérivation sur le conduit de refoulement et créer une prise de pression le plus près possible de l'orifice de la soufflante (Fig. 3).
- A l'aide de la clé fournie, détendre le ressort de la soupape en vissant la tige inférieure 904.2.
- Mettre la soufflante en route et obstruer le refoulement, en aval de la soupape, jusqu'à obtenir les conditions de travail les plus mauvaises (conduit complètement obstrué).
- Dévisser la tige inférieure 904.2 jusqu'à atteindre la pression maximale souhaitée.
- Serrer l'écrou 923 en mintenant la tige inférieure 904.2 bloquée.
- Déboucher le conduit de refoulement.

Vérifier les pertes de charge dues à des conduits installés en aval de la soupape.

1. WAHL DER FEDER

D

Das Ventil wird mit zwei unterschiedlichen Federn geliefert. Jede Feder ist auf einen speziellen Druc Vakuum -Leistungsbereich ausgerichtet. Bei den Ventilen VRL8 und VRL9 besteht die Möglichkeit, be Federn parallel einzusetzen.
Überzeugen Sie sich anhand des Auswahldiagramms, dass das Ventil die richtige Größe hat und wählen abhängig vom Arbeitspunkt (A, B, ... H) eine der beiden Federn anhand der Übersichtstabelle Federn.
Das Ventil wird standardmäßig mit Feder Nr. 1 installiert geliefert. Wenn die Feder ausgewechselt oder e zusätzliche Feder montiert werden muß (bei VRL8 und VRL9), gehen Sie bitte entsprechend Punkt 2 Anderenfalls stellen Sie das Ventil gemäß der Beschreibung unter Punkt 3 ein.

2. AUSTAUSCH DER FEDER

- Entfernen Sie die zwei Plastikkappen auf dem Ventil (falls vorhanden).
- **Versichern Sie sich, dass die Schraubenmutter 923 fest am oberen Gehäuse 106 verschraubt i**
- Lösen Sie die Schraube 903 aus der Mutter 903.1.
- Nehmen Sie die Abdeckung 107 vom Gehäuse 106.
- Schrauben Sie die Federführungsscheibe 433 ab und nehmen Sie sie von der Schließführung 434.
- Entnehmen Sie die Feder 700 (nur bei Auslausch).
- Setzen Sie die gewünschte Feder in den Verschluss 165 ein.
- Drücken Sie die Feder und die Federführungsscheibe 433 auf der Schließführung 434 durch wenigst 20 Schraubdrehungen zusammen.
- Prüfen Sie, ob beide Federenden genau in den Anschlüssen sitzen.
- Setzen Sie die Abdeckung 107 auf das Gehäuse 106 führen Sie:
  - für VRL6: den Gleitführung in den Schlitz der Federführungsscheibe 433 ein.
  - für VRL8 und VRL9: den Führungsstift 562 in den Schlitz der Federführungsscheibe 433 ein.
- Drehen Sie die Schraube 903 in der Mutter 903.1 fest.

3. VENTILEINSTELLUNG

A) Einstellung des zugelassenen und gewünschten Unterdruckwertes

- Entfernen Sie die beiden Plastikkappen auf dem Ventil (falls vorhanden).
- Befestigen Sie das Ventil an der Druckumleitung und schliessen Sie einen Druckmesser so dicht möglich am Gebläseeingang (Fig. 2) an.
- Lösen Sie die Schraube 923.
- Reduzieren Sie den Federdruck indem Sie die obere Einstellschraube 904.1 mit dem Einstellschlü lösen.
- Stellen Sie das Gebläse an und erzeugen Sie größtmögliches Vakkum durch Drosselung der Z (normalerweise Drosselung bis zur vollen Schließung).
- Stellen Sie die obere Einstellschraube 904.1 so ein, bis der maximal zulässige Unterdruch erreicht ist
- Schrauben Sie die Mutter 923 fest während Sie die obere Einstellschraube 904.1 festhalten.
- Öffnen Sie den lufttansaugkanal.

*Überprüfen **Sie die Druckwerte** sorgfältig, **um sicherzustellen, dass keine Unterdruckverluste** **dem** Ventil **durch Leitungen oder** Filter **entstehen.***

B) Einstellung des zugelassenen und gewünschten Druckwertes

- Entfernen Sie die beiden Plastikkappen auf dem Ventil (falls vorhanden).
- Drehen Sie die Mutter 923 von der oberen Einstellschraube 904.1 und drehen Sie sie auf die un Einstellschraube 904.2. Nicht fest anziehen.
- Befestigen Sie das Ventil an der Auslassleitung und schliessen Sie es so dicht wie möglich Gebläseausgang (Fig. 3) an.
- Reduzieren Sie den Federdruck indem Sie die untere Einstellschraube 904.2 mit dem Einstellschlü lösen.
- Stellen Sie das Gebläse an und erzeugen Sie größtmögliches Druck durch Drosselung der Al (normalerweise Drosselung bis zur vollen Schließung).
- Stellen Sie die unter Einstellschraube 904.2 so ein, bis der maximal zulässige Druch erreicht ist.
- Schrauben Sie die Mutter 923 fest während Sie die untere Einstellschraube 904.2 festhalten.
- Öffnen Sie den lufttansaugkanal.

***Überprüfen Sie die Druckwerte sorgfältig, um sicherzustellen, dass keine Druckverluste hinter d** Ventil **durch Leitungen oder Filter** entstehen.*

1. SELECCION DEL MUELLE

La válvula es suministrada con 2 muelles diferentes. Cada uno de ellos adecuado a un rango especifico de trabajo bien en presion bien en vacio, en el caso de las válvulas VRL8 / VRL9 se podrán usar los muelles combinados.
Observando el diagrama de selección, hay que controlar che la válvula sea la adecuada y en función de la zona de los valores operativos de presion/vacio (zona A,B,...H) seleccionar el muelle o la combinación de muelles como indicado en la TABLA DE SELECCION MUELLE.
La válvula es suministrada con el muelle n° I instalado. Si el muelle debe de ser sustituido o adicionado uno suplementar seguir el procedimiento del punto n°2. Para graduar el muelle seguir el procedimiento del punto n°3.

2. SUSTITUCION DEL MUELLE (O ADICION PARA VRL8 / VRL9)

- Quitar las dos tapas de plastico de la vàlvula.
- **Comprobar che la contratuerca ref.923 esta atada al cuerpo ref.106.**
- Desenroscar los tornillos ref.903 de las tuercas 903.1.
- Quitar la cubierta 107 del cuerpo 106.
- Desenroscar el disco guia ref.433 sacandolo de vastago ref.434.
- Sacar el muelle rel.700 (solo en caso de sustitución).
- Instalar el muelle adecuado en la base del obturador ref.165.
- Comprimir el/los muelle/s y enroscar veinte vueltas como minimo el disco guia ref.433 en el vastago ref.434.
- Comprobar que las extremidades de el/los muelle/s esten bien posicionadas.
- Poner la cubierta ref.107 en el cuerpo rel.106 introduciendo
  - para VRL6: la guìa de desplazamiento en el orificio del disco guìa rel.433.
  - para VRL8 y VRL9: la guìa ref.562 en el orificio del disco guìa ref.433.
- Atornillar los tornillos rel.903 en las tuercas rel 903.1.

3. GRADUACION DE LA VALVULA

A) Ajuste para la regulaciòn de vacio

- Quitar las dos tapas de plastico de la valvula.
- Colocar la vàlvula en by-pass en la aspiraciòn y conectar tan cerca como sea posible un vacuometro en la entrada del aspirador (ver Fig. 2).
- Desenroscar la contratuerca rel.923.
- Rebajar la tension del muelle desenroscando, con la llave allen, el esparrago superior ref.904.1
- Poner en marcha el aspirador y cerrar la boca de aspiraciòn, para obtener las condiciones extremas de funcionamiento (generalmente boca completamente cerrada).
- Ajustar atornillando el esparrago superior ref.904.1 hasta alcanzar el nivel de vacio deseado.
- Enroscar la contratuerca ref.923 hasta bloquearla con el cuerpo ref.106, sin mover el esparrago superior ref.904.1.
- Abrir la tuberìa de aspiraciòn.

El vacuometro no mide las perdidas adicionales debidas a tuberias o filtros instalados a continuación de la vàlvula.

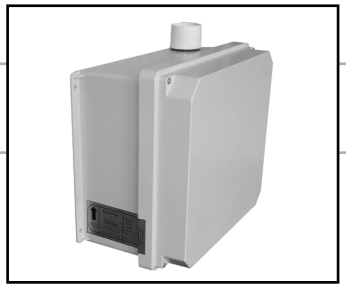
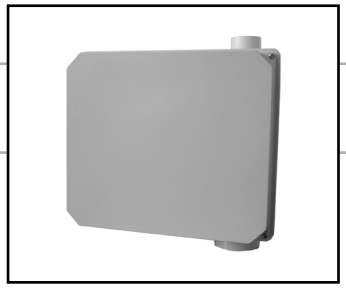
B) Ajuste para regulaciòn de presiòn

- Quitar las dos tapas de plastico de la valvula.
- Desenroscar la contratuerca ref.923 del esparrago superior ref.904.1 y enroscarla sin apretar en el esparrago inferior ref.904.2
- Colocar la vàlvula en el by-pass en la impulsion y conectar tan cerca como sea posible un manometro en la boca de salida del compresor (ver Fig. 3).
- Rebajar la tension del muelle atornillando, con la llave allen, el esparrago inferior ref.904.2
- Poner en marcha el compresor y cerrar la boca de impulsion, para obtener las condiciones màs etremas de funcionamiento (generalmente boca completamente cerrada).
- Ajustar desatornillando el esparrago inferior ref.904.2 hasta alcanzar el nivel de presiòn deseado.
- Enroscar la contratuerca ref.923 hasta bloquearla con el cuerpo ref.107, sin mover el esparrago inferior 904.2.
- Abrir la tuberìa de impulsion.

El manometro no mide las pèrdidas adicionales debidas a tuberias o filtros instalados a continuaclone de la vàlvula.

RadonAway™

The World's Leading
Radon Fan Manufaturer

HS Series

Installation & Operating Instructions

RadonAway
3 Saber Way | Ward Hill, MA 01835
www.radonaway.com

P/N IN007-REV J 9/13

RadonAway Ward Hill, MA.

HS Series Fan Installation & Operating Instructions

Please Read and Save These Instructions.

DO NOT CONNECT POWER SUPPLY UNTIL FAN IS COMPLETELY INSTALLED. MAKE SURE ELECTRICAL SERVICE TO FAN IS LOCKED IN "OFF" POSITION. DISCONNECT POWER BEFORE SERVICING FAN.

1. **WARNING!** Do not use fan in hazardous environments where fan electrical system could provide ignition to combustible or flammable materials.
2. **WARNING!** Do not use fan to pump explosive or corrosive gases.
   See Vapor Intrusion Application Note #AN001 for important information on VI applications. RadonAway.com/vapor-intrusion
3. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.
4. **WARNING!** Normal operation of this device may affect the combustion airflow needed for safe operation of fuel burning equipment. Check for possible backdraft conditions on all combustion devices after installation.
5. **NOTICE!** There are no user serviceable parts located inside the fan unit.
   Do NOT attempt to open. Return unit to the factory for service.
6. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician.
7. **WARNING!** In the event that the fan is immersed in water, return unit to factory for service before operating.
8. **WARNING!** Do not twist or torque fan inlet or outlet piping as Leakage may result.
9. **WARNING!** Do not leave fan unit installed on system piping without electrical power for more than 48 hours. Fan failure could result from this non-operational storage.
10. **WARNING!** TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:

    a) Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.

    b) Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The HS Series Fan is intended for use by trained, certified/licensed, professional Radon mitigators. The purpose of this instruction is to provide additional guidance for the most effective use of the HS Series Fan. This instruction should be considered as a supplement to EPA/Radon Industry standard practices, state and local building codes and state regulations. In the event of a conflict, those codes, practices and regulations take precedence over this instruction.

1.2 ENVIRONMENTALS

The HS Series Fan is designed to perform year-round in all but the harshest climates without additional concern for temperature or weather. For installations in an area of severe cold weather, please contact RadonAway for assistance. When not in operation, the HS Series Fan should be stored in an area where the temperature is never less than 32 degrees F. or more than 100 degrees F. The HS Series Fan is thermally protected such that it will shut off when the internal temperature is above 104 degrees F. Thus if the HS Series Fan is idle in an area where the ambient temperature exceeds this shut off, it will not restart until the internal temperature falls below 104 degrees F.

1.3 ACOUSTICS

The HS Series Fan, when installed properly, operates with little or no noticeable noise to the building occupants. There are, however, some considerations to be taken into account in the system design and installation. When installing the HS Series Fan above sleeping areas, select a location for mounting which is as far away as possible from those areas. Avoid mounting near doors, fold-down stairs or other uninsulated structures which may transmit sound. Insure a solid mounting for the HS Series Fan to avoid structure-borne vibration or noise.

The velocity of the outgoing air must also be considered in the overall system design. With small diameter piping, the "rushing" sound of the outlet air can be disturbing. The system design should incorporate a means to slow and quiet the outlet air. The use of the RadonAway Exhaust Muffler, p/n 24002, is strongly recommended.

1.4 GROUND WATER

Under no circumstances should water be allowed to be drawn into the inlet of the HS Series Fan as this may result in damage to the unit. The HS Series Fan should be mounted at least 5 feet above the slab penetration to minimize the risk of filling the HS Series Fan with water in installations with occasional high water tables.

In the event that a temporary high water table results in water at or above slab level, water will be drawn into the riser pipes thus blocking air flow to the HS Series Fan. The lack of cooling air will result in the HS Series Fan cycling on and off as the internal temperature rises above the thermal cutoff and falls upon shutoff. Should this condition arise, it is recommended that the HS Series Fan be disconnected until the water recedes allowing for return to normal operation.

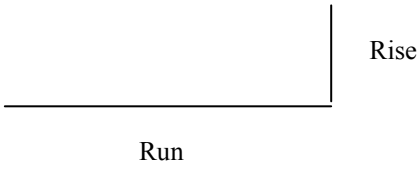
1.5 CONDENSATION & DRAINAGE

(WARNING!: Failure to provide adequate drainage for condensation can result in system failure and damage the HS Series Fan).

Condensation is formed in the piping of a mitigation system when the air in the piping is chilled below its dew point. This can occur at points where the system piping goes through unheated space such as an attic, garage or outside. The system design must provide a means for water to drain back to a slab hole to remove the condensation.

The use of small diameter piping in a system increases the speed at which the air moves. The speed of the air can pull water uphill and at sufficient velocity it can actually move water vertically up the side walls of the pipe. This has the potential of creating a problem in the negative pressure (inlet) side piping. For HS Series Fan inlet piping, the following table provides the minimum recommended pipe diameters as well as minimum pitch under several system conditions. Use this chart to size piping for a system.

Pipe Diam.	Minimum Rise per Foot of Run*		
	@ 25 CFM	@ 50 CFM	@ 100 CFM
4"	1/32 "	3/32 "	3/8 "
3"	1/8 "	3/8 "	1 1/2 "



*Typical operational flow rates:

HS3000, or HS5000	20 - 40 CFM
HS2000	50 - 90 CFM

All exhaust piping should be 2" PVC.

1.6 SYSTEM MONITOR AND LABEL

A properly designed system should incorporate a "System On" Indicator for affirmation of system operation. A Magnehelic pressure gauge is recommended for this purpose. The indicator should be mounted at least 5 feet above the slab penetration to minimize the risk of filling the gauge with water in installations with occasional high water tables. A System Label (P/N 15022) with instructions for contacting the installing contractor for service and also identifying the necessity for regular radon tests to be conducted by the building occupants, must be conspicuously placed where the occupants frequent and can see the label.

1.7 SLAB COVERAGE

The HS Series Fan can provide coverage of well over 1000 sq. ft. per slab penetration. This will, of course, depend on the sub-slab aggregate in any particular installation and the diagnostic results. In general, sand and gravel are much looser aggregates than dirt and clay. Additional suction points can be added as required. It is recommended that a small pit (2 to 10 gallons in size) be created below the slab at each suction hole.

1.8 ELECTRICAL WIRING

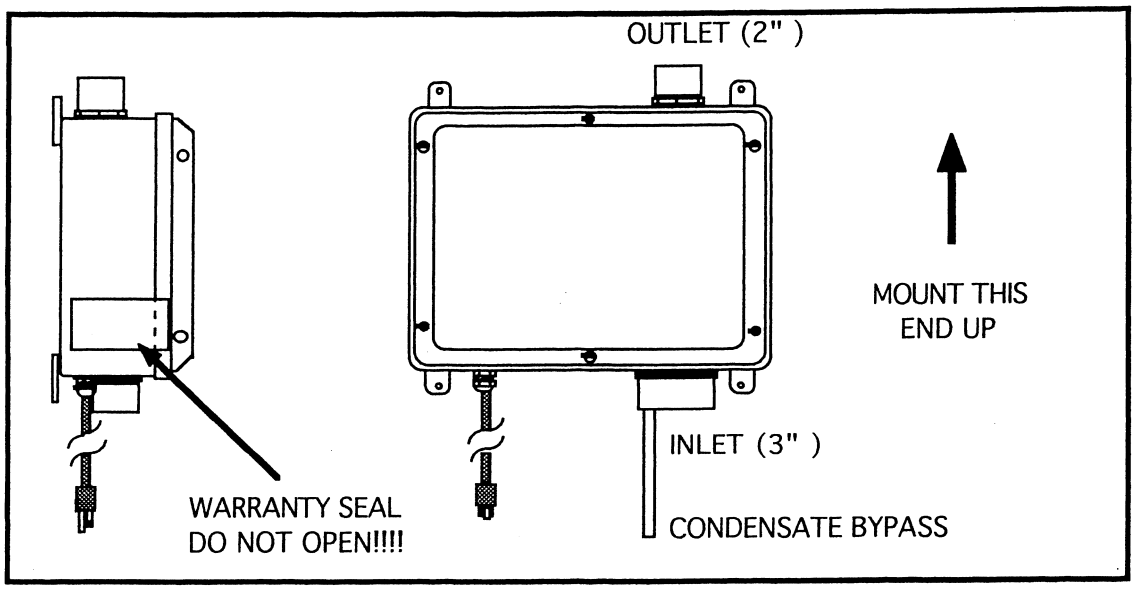
The HS Series Fan plugs into a standard 120V outlet. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a U.L. listed watertight conduit. Ensure that all exterior electrical boxes are outdoor rated and properly caulked to prevent water penetration into the box. A means, such as a weep hole, is recommended to drain the box.

1.8a ELECTRICAL BOX (optional)

The optional Electrical Box (p/n 20003) provides a weather tight box with switch for outdoor hardwire connection. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a U.L. listed watertight conduit. Ensure that all exterior electrical boxes are outdoor rated and properly caulked to prevent water penetration into the box. A means, such as a weep hole, is recommended to drain the box.

1.9 SPEED CONTROLS

Electronic speed controls can **NOT** be used on HS Series units.



2.0 INSTALLATION

2.1 MOUNTING

Mount the HS Series Fan to the wall studs, or similar structure, in the selected location with (4) 1/4" x 1 1/2" lag screws (not provided). Insure the HS Series Fan is both plumb and level.

2.2 DUCTING CONNECTIONS

Make final ducting connection to HS Series Fan with flexible couplings. Insure all connections are tight. Do not twist or torque inlet and outlet piping on HS Series Fan or leaks may result.

2.3 VENT MUFFLER INSTALLATION

Install the muffler assembly in the selected location in the outlet ducting. Solvent weld all connections. The muffler is normally installed above the roofline at the end of the vent pipe.

2.5 OPERATION CHECKS & ANNUAL SYSTEM MAINTENANCE

____ Make final operation checks by verifying all connections are tight and leak-free.

____ Insure the HS Series Fan and all ducting is secure and vibration-free.

____ Verify system vacuum pressure with Magnehelic. Insure vacuum pressure is within normal operating range and less than the maximum recommended as shown below:

HS2000	14" WC
HS3000	21" WC
HS5000	40" WC

(Above are based on sea-level operation, at higher altitudes reduce above by about 4% per 1000 Feet.) If these are exceeded, increase number of suction points.

____ Verify Radon levels by testing to EPA protocol.

PRODUCT SPECIFICATIONS

Model	Maximum Static Suction	Typical CFM vs Static Suction WC (Recommended Operating Range)						Power* Watts @ 115 VAC
		0"	10"	15"	20"	25"	35"	
HS2000	18"	110	72	40	-	-	-	150-270
HS3000	27"	40	33	30	23	18	-	105-195
HS5000	50"	53	47	42	38	34	24	180-320

*Power consumption varies with actual load conditions

Inlet: 3.0" PVC

Outlet: 2.0" PVC

Mounting: Brackets for vertical mount

Weight: Approximately 18 lbs.

Size: Approximately 15"W x 13"H x 8"D

Minimum recommended inlet ducting (greater diameter may always be used):

HS3000, HS5000 --- 2.0" PVC Pipe

HS2000 --- Main feeder line of 3.0" or greater PVC Pipe

Branch lines (if 3 or more) may be 2.0" PVC Pipe

Outlet ducting: 2.0" PVC

Storage temperature range: 32 - 100 degrees F.

Thermally protected

Locked rotor protection

Internal Condensate Bypass

IMPORTANT INSTRUCTIONS TO INSTALLER

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

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

Install the HS Series Fan in accordance with all EPA standard practices, and state and local building codes and state regulations.

Provide a copy of this instruction or comparable radon system and testing information to the building occupants after completing system installation.

WARRANTY

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

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

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

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

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

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

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

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

Record the following information for your records:

Serial No._____

Purchase Date_____

Please read and save these instructions. *Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.*

Dayton® Centrifugal Belt-Drive Upblast Exhaust Ventilators

Description

Dayton ventilators are designed for continuous operation to exhaust contaminated air, fumes, odors and grease-laden vapors from range hoods and commercial cooking appliances in addition to ventilating industrial or institutional applications. Ventilators can handle temperatures up to 300°F. Weather resistant ventilators feature spun aluminum curb, galvanized metal motor base and supports. Ventilators (excluding 6KWJ9, and 6KWK0 thru 6KWK3) are UL/cUL Listed, Standard 705 and UL/cUL Listed Subject 762 (YZHW) and comply with the NFPA 96 Standard for Ventilation Control and Fire Protection Commercial Cooking Operations. Motors are mounted out of the discharge stream in a positively cooled chamber fed by outside air drawn in through a breather tube.

High Pressure units are designed for applications that have a high resistance to exhaust contaminated air in industrial and commercial applications, directly away from the roof surface. Typically used for long and/or high resistance duct work with average volume and high pressure.

When used with explosion proof motor, ventilators 6KWJ9 and 6KWK0 thru 6KWK3 may be used to exhaust potential flammable particles or fumes. Ventilators feature spark-resistant aluminum wheel and rub ring for hazardous locations.

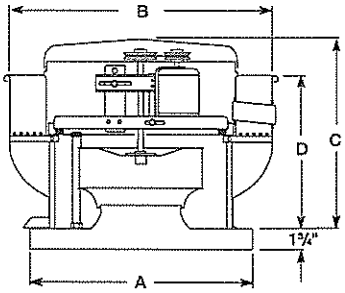


Figure 1 — Dimensions

c UL us LISTED E53236 MH12596

Dayton Electric Mfg. Co. certifies that the ventilators shown herein are licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

Optional Accessories

General or UL 705	
Description	**Model No.**
NEMA 1 Dis. Switch:	
1H400 (2 pole, 2 HP max)	
1H401 (3 pole, 7½ HP max)	
Damper:	4HX64-4HX70
12" Fixed Roof Curb:	
	2RB75-2RB77, 2RB79-2RB82
12" Adj. Roof Curb:	2ZV82-2ZV85
Roof Curb Adapter:	
	3AZK1-3AZK9, 3AZL1-3AZL3
Birdscreen:	4YY78-4YY83

Kitchen or UL 762	
Description	**Model No.**
NEMA 4 Dis. Switch:	
1H408 (2 pole, 2 HP max)	
1H409 (3 pole, 7½ HP max)	
Grease Collector Box:	1RL34, 4HX78
Hinge Kit:	4HX79, 4YY84-4YY86
Clean-Out Port Kit:	3ATV9
18-24" Ventilated Fixed Roof Curb:	
	4HX54-4HX60
18-24" Ventilated Adj. Roof Curb:	
	4HX61-4HX63

⚠ WARNING ***Do not use a damper in any kitchen exhaust application.***

Dimensions and Specifications (See Figure 1)

Model Without Drive Package	Model With Drive Package, Assembled	Wheel Dia.	Shaft Dia.	A	B	C	D	Recommended Roof Opening	Recommended Damper Size
4YY13	1MBE6	11"	3/4"	19"	24⅞"	25⅛"	17⅜"	14½ x 14½"	12 x 12"
4YY14, 2RB65, 6KWJ9	1MBE7	11¼	3/4	22	24⅞	25⅛	17⅜	17½ x 17½	15 x 15
5DVL4	—	12½	3/4	22	24⅞	25⅛	17⅜	17½ x 17½	15 x 15
4YY15, 6KWK0	1MBE8	13¼	3/4	22	24⅞	25⅛	17⅜	17½ x 17½	15 x 15
4YY16A, 2RB66, 6KWK1	5PV06H, 3ATT8A, 3ATT9A, 3ATU1A	14¾	3/4	26	28⅞	26⅜	19⅜	21½ x 21½	19 x 19
4YY17, 1MBF1, 6KWK2	1MBE9, 3ATU2, 3ATU3	16½	3/4	26	28⅞	26⅜	19⅜	21½ x 21½	19 x 19
4YY18, 6KWK3	5PV07G, 3ATU4, 3ATU5, 3ATU6	18½	3/4	30	35⅜	34¾	21	25½ x 25½	23 x 23
4YY19, 1MBF2	5PV08G, 3ATU7, 3ATU8	21¼	3/4	30	35⅜	34¾	21	25½ x 25½	23 x 23
4YY20	3GY73G, 3ATU9, 3ATV1	24½	1	34	42¾	39½	25½	29½ x 29½	27 x 27
4YY21	3GY74G, 3ATV2	30½	1	42	50	40	29¼	37½ x 37½	35 x 35
4YY22	—	36	1¼	46	58⅝	44⅝	29⁹⁄₁₆	41½ x 41½	39 x 39

Dayton® Centrifugal Belt-Drive Upblast Exhaust Ventilators

ENGLISH

Without Drive Package Performance

Model	Wheel Dia.	Fan RPM	HP	Max BHP	Sones @ .250" SP @ 5 Ft.	CFM Air Delivery @ Static Pressure Shown .000"	.125"	.250"	.375"	.500"	.750"	1.00"	1.25"	1.50"	1.75"
4YY13	11"	1140	1/6	0.06	8.3	780	656	502	294	—	—	—	—	—	—
		1725	1/4	0.20	13.0	1180	1094	1017	929	824	586	—	—	—	—
4YY14, 6KWJ9‡	11¼	1660	1/4	0.26	12.0	1413	1365	1313	1251	1189	1056	861	—	—	—
		1820	1/3	0.35	13.4	1549	1505	1459	1406	1350	1234	1106	900	—	—
5DVL4	12½	1410	1/4	0.26	12.2	1665	1595	1528	1463	1398	1224	968	—	—	—
		1545	1/3	0.34	14.0	1824	1760	1699	1639	1580	1441	1262	990	—	—
		1725	1/2	0.48	16.7	2037	1979	1923	1869	1816	1710	1571	1406	1176	—
4YY15, 6KWK0‡	13¼	1305	1/4	0.26	13.9	1790	1709	1629	1547	1458	1201	—	—	—	—
		1435	1/3	0.35	15.1	1968	1895	1822	1749	1671	1479	1198	—	—	—
		1645	1/2	0.52	17.4	2256	2192	2128	2065	2001	1864	1684	1455	—	—
4YY16A, 6KWK1‡	14¾	1105	1/4	0.26	10.6	2001	1906	1793	1667	1515	998	—	—	—	—
		1210	1/3	0.34	11.7	2192	2106	2006	1896	1773	1443	—	—	—	—
		1390	1/2	0.52	14.2	2518	2445	2362	2271	2174	1949	1643	—	—	—
		1595	3/4	0.79	18.5	2889	2826	2757	2683	2602	2430	2225	1968	1568	—
		1725	1	1.00	22	3125	3066	3005	2936	2865	2711	2539	2339	2085	1704
4YY17, 6KWK2‡	16½	875	1/4	0.26	10.1	2515	2362	2177	1974	1744	—	—	—	—	—
		965	1/3	0.35	11.5	2774	2637	2477	2300	2109	1584	—	—	—	—
		1110	1/2	0.54	14.2	3191	3072	2941	2796	2641	2297	1770	—	—	—
		1265	3/4	0.79	17.7	3636	3532	3426	3301	3172	2894	2583	2163	—	—
		1390	1	1.05	21	3996	3901	3806	3698	3584	3340	3078	2785	2394	—
4YY18, 6KWK3‡	18½	745	1/4	0.26	8.1	2815	2617	2448	2143	1763	—	—	—	—	—
		820	1/3	0.34	10.0	3098	2916	2759	2525	2257	—	—	—	—	—
→		940	1/2	0.52	13.1	3551	3389	3243	3115	2879	2363	—	—	—	—
		1075	3/4	0.78	15.8	4061	3919	3786	3666	3554	3141	2652	—	—	—
		1185	1	1.04	17.1	4477	4348	4224	4108	4005	3703	3336	2841	—	—
		1360	1½	1.58	22	5138	5026	4913	4811	4710	4532	4232	3912	3537	3023
		1495	2	2.10	27	5648	5546	5443	5345	5254	5082	4921	4598	4313	3983
4YY19	21¼	605	1/4	0.26	6.7	3403	3054	2675	2144	—	—	—	—	—	—
		665	1/3	0.35	8.1	3740	3422	3096	2699	2073	—	—	—	—	—
		760	1/2	0.52	10.9	4275	3994	3718	3413	3048	—	—	—	—	—
		875	3/4	0.79	15.2	4922	4676	4439	4192	3922	3240	—	—	—	—
		960	1	1.04	17.7	5400	5176	4958	4742	4508	3985	3169	—	—	—
		1100	1½	1.57	23	6187	5992	5798	5610	5421	5006	4529	3861	—	—
		1210	2	2.10	23	6806	6628	6451	6279	6108	5748	5350	4892	4289	3365
4YY20	24½	465	1/4	0.26	6.3	4216	3768	3188	2162	—	—	—	—	—	—
		510	1/3	0.34	7.3	4623	4243	3717	3134	—	—	—	—	—	—
		585	1/2	0.52	9.5	5303	4961	4540	4093	3565	—	—	—	—	—
		670	3/4	0.79	12.8	6074	5763	5461	5052	4659	3524	—	—	—	—
		735	1	1.04	15.5	6663	6370	6133	5764	5409	4618	—	—	—	—
		845	1½	1.57	18.6	7660	7400	7184	6947	6615	6002	5282	—	—	—
		930	2	2.10	23	8431	8194	7985	7798	7536	6953	6375	5706	4324	—
		1050	3	3.00	31	9519	9309	9107	8941	8775	8267	7766	7253	6672	6005

(‡) Ventilator for use with explosion proof motor in hazardous locations. Performance certified is for installation type A: Free inlet, Free outlet. Power rating (BHP) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per AMCA Standard 301. Values shown are for installation type A: Free inlet hemispherical sone levels.

APPENDIX G

QUALITY ASSURANCE PROJECT PLAN



QUALITY ASSURANCE PROJECT PLAN

Tony's Cleaners
429 Merrick Road
Lynbrook, New York 11563
Section 37, Block 320, Lots 160, 161 and 162

ACT File #: 7045-LBNY

Prepared for:

Nu-Life Realty LLC
P.O. Box 302
Roslyn, NY 11576

Prepared by:

Advanced Cleanup Technologies
110 Main Street, Suite 103
Port Washington, NY 11050

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1.0 INTRODUCTION

Advanced Cleanup Technologies, Inc. (ACT) has prepared this Quality Assurance Project Plan (QAPP) for site activities to be undertaken at the property located at 429-441 Merrick Road, in Lynbrook, New York (the site). This QAPP has been prepared to define the quality assurance (QA) and quality control (QC) measures to be implemented, to verify the integrity of the work to be performed at the site, and that the data collected will be of the appropriate type and quality needed for the intended use. Specifically, this QAPP addresses the following:

- Project Objectives, including Quality Assurance Objectives for Data
- Overview of Field Sampling Program and Procedures
- Sample Packaging and Shipping
- Sample Documentation
- Sample Analytical Program
- Quality Assurance/Quality Control Procedures

2.0 PROJECT ORGANIZATION AND PERSONNEL RESPONSIBILITIES

The investigative efforts defined in the SMP will be coordinated by Environmental Contractor on behalf of the NYSDEC. The NYSDEC is the lead regulatory agency overseeing the investigation site. An organization structure has been developed to identify the roles and responsibilities of the various parties involved with the project, as discussed below.

The **NYSDEC Project Manager** will be responsible for reviewing and approving work plans and amendments, coordinating approval of requested modifications, and providing guidance on regulatory requirements.

The **Environmental Contractor Project Director** will provide technical expertise for review of the project plans, reports and ongoing field activities. The program manager will be responsible for the coordination of the overall project with the NYSDEC. The Project Director will act as the project's Quality Assurance Manager.

The **Environmental Contractor Project Manager** will be responsible for the day to day project management, task leadership, and project engineering support and for the planning and implementation of SMP activities. The Project Manager will be responsible for ensuring that the requirements of the SMP are implemented. The project manager will also act as the site Health and Safety Manager (HSM).

The **Environmental Contractor Field Team Leader** will be responsible for sample collection, oversight of subcontractor personnel, and coordination of daily field activities. The Field Team Leader will act as the Site Health and Safety Officer ensuring implementation of the Site Health and Safety Plan.

A NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory will be contracted to perform required analyses and reporting, including Analytical Services Protocol (ASP) Category B Deliverables, which will allow for data validation.

Subcontractors will perform remedial construction, surveying, drilling, and/or sampling at the direction of the Field Team Leader in accordance with this SMP.

3.0 QUALITY ASSURANCE PROJECT OBJECTIVES

The objective of SMP activities for the site is to obtain sufficient data at a known quality level to assess the effectiveness of the remedy selected in eliminating, reducing, or controlling risks to human health and the environment.

3.1 Data Quality Categories

Data quality objectives (DQO) are qualitative and quantitative statements that specify the quality of the data required to support decisions during remedial and monitoring activities. DQOs composed of written expectations for precision, accuracy, representativeness, completeness and comparability of a data set (see Section 3.2). The DQO process provides a logical basis for linking the QA/QC procedures to the intended use of the data, primarily

through the decision maker's acceptable limits on decision error. One descriptive data categories - definitive data - will be used for the site.

Definitive data is generated using specific analytical methods and guidelines and have satisfied known QA/QC requirements. Analytical data provided by an off-site laboratory shall be definitive data, and are deemed critical to project objectives. QA/QC elements of definitive data include determination and documentation of calibrations, detection limits, method blanks, and matrix spike recoveries.

3.2 QA/QC Characteristics

The overall QA/QC objective for SMP activities is to develop and implement procedures that will provide data of known and documented quality. QA/QC characteristics for data include precision, accuracy, representativeness, completeness, and comparability (PARCC). Data quality objectives for each of these parameters are determined based on the level of data required. Descriptions of these characteristics are provided below:

Precision is the measurement of agreement in repeated tests of the same or identical samples, under prescribed conditions. Analytical precision can be expressed in terms of Standard Deviation (SD), Relative Standard Deviation (RSD) and/or Relative Percent Difference (RPD). The precision of analytical environmental samples has two components - laboratory precision and sampling precision. Laboratory precision is determined by replicate measurements of laboratory duplicates and by analysis of reference materials. The precision of the field sampling effort is determined by the analysis of field duplicate samples. Field duplicate analysis will be performed at a rate of five percent (i.e., one duplicate collected for every 20 samples). Acceptance criteria for duplicates analyzed by an off-site laboratory shall be an RPD of 25 percent.

Accuracy is the degree of agreement of a measured sample result or average of results with an accepted reference or true value. It is the quantitative measurement of the bias of a system, and is expressed in terms of percent recovery (%R). Measurements of accuracy for the laboratory include surrogate spike, laboratory control spike, matrix spike and matrix spike

duplicate samples. The laboratory must meet or exceed control limit objectives and the applicable methodologies.

Representativeness is the degree to which the results of the analyses accurately and precisely represent a characteristic of a population, a process condition, or an environmental condition. In this case, representativeness is the degree to which the data reflect the contaminants present and their concentration magnitudes in the sampled site areas. Representativeness of data will be ensured through the implementation of approved sampling procedures. Results from environmental field duplicate sample analyses can be used to assess representativeness, in addition to precision.

Completeness is defined as the percentage of samples that meet or exceed all the criteria objective levels for accuracy, precision and detection limits within a defined time period or event. It is the measure of the number of data "points" which are judged to be valid, usable results. The objective for completeness for this project is 100 percent, and will be calculated by dividing the number of usable data results (i.e., all results not considered to be "rejected" and all samples able to be analyzed) by the number of possible data results (i.e., the total number of field samples collected), and then multiplying by 100 percent.

Comparability is the degree of confidence with which results from two or more data sets, or two or more laboratories, may be compared. To achieve comparability, standard environmental methodologies will be employed in the field and in the laboratory. See Section 6.0 for analysis methods and detection limits for this SMP activities.

4.0 SITE MONITORING ACTIVITIES

Monitoring activities to be performed at the site will be conducted in accordance with established technical guidelines, methods, policies and Standard Operating Procedures (SOPs). The subsections below present an overview of the sampling program procedures; a more detailed discussion of the monitoring activities is presented in the SMP.

4.1 Soil Sampling

Soil sampling will be performed upon proposal to discontinue the system submitted by the remedial party, to assess the quality of the soil following completion of the remedial actions.

Soil samples will be collected continuously from grade to the water table surface. Soil recovered from each macro core sampler will be visually characterized for color, texture, and moisture content and screened with a photoionization detector (PID). The presence of visible staining and elevated PID readings will be noted. In the absence of visual or olfactory evidence of contamination or elevated PID readings, a soil sample will be collected for laboratory analysis from the soil/water table interface.

4.2 Soil Vapor Sampling

Soil vapor samples should be collected utilizing a dedicated Teflon tubing and 6-Liter stainless steel Summa Canister. The Teflon tubing should be connected to a dedicated barb connector attached to a soil vapor sampling port located on a pressure side of regenerative blower of SSD/SVE system. A 6-Liter stainless steel Summa canister without a flow regulator should be connected to the other end of Teflon tubing. Once the canister is in place, the canister intake valve should be opened and sampling should be collected until the canister is full.

Sub-slab soil vapor sample should be collected also utilizing a dedicated Teflon tubing and 6-Liter stainless steel Summa Canister. The Teflon tubing should be connected to a dedicated barb connector attached to a permanent vapor sub-slab point. A 6-Liter stainless steel Summa canister with a flow regulator set to a flow rate of approximately 0.025 liters per minute should be connected to the other end of Teflon tubing. Once the canister is in place, the flow regulator should be opened and sampling should continue for approximately 4 hours until the canister will be full. Soil vapor samples should be transmitted under chain of custody to ELAP-certified laboratory.

All samples should be analyzed for VOCs in accordance with USEPA Method TO-15.

5.0 SAMPLE CUSTODY AND DOCUMENTATION

Each day that samples are collected, a chain-of-custody/request for analysis form will be completed and submitted to the laboratory with samples to be analyzed. A copy of the chain-of-custody will be retained by the Project Manager. The chain-of-custody will include the project name, sampler's signature, sample IDs, date and time of sample collection, and analysis requested.

Samples will be packaged and shipped in a manner that maintains sample preservation requirements during transport (i.e., ice to keep samples cool until receipt at the laboratory), ensures that sample holding times can be achieved by the laboratory, and prevents samples from being tampered with.

If a commercial carrier ships samples, a bill of lading (waybill) will be used as documentation of sample custody. Receipts for bills of lading and other documentation of shipment shall be maintained as part of the permanent custody documentation. Commercial carriers are not required to sign the chain-of-custody as long as it is enclosed in the shipping container and evidence tape (custody seal) remains in place on the shipping container.

Identification and documentation of samples are important in maintaining data quality. Strict custody procedures are necessary to ensure the integrity of the environmental samples. Sections below address sample identification, packaging, shipping, and documentation.

5.1 Sample Identification System

The method of identification of a sample depends on the type of measurement or analysis performed. When field screening measurements (e.g., vacuum pressure, flow rate) are made, data are recorded directly in logbooks. Identifying information such as project name, sample location and depth, date and time, name of sampler, field observations, remarks, etc. shall be recorded.

Each sample collected for off-site laboratory analysis during the field investigation should be specifically designated for unique identification. Samples should be identified using a letter code to indicate sample collection methodology. A letter code (see below) will follow, along with the name and/or number that identifies the specific location where the sample was collected. Field equipment blanks will be denoted by the letter code "FB" and trip blanks with "TB". Sample collection date and time should be recorded in the field logbook, chain of custody as well as the sample label.

Letter code prefixes for SMP activities are as follows:

SB	Delineation Soil Sample
FB	Field Blank Sample
TB	Trip Blank Sample

At a minimum, all location and identification information for the samples shall be recorded in the field sampling logbook, and on the appropriate chain of custody record form for shipment.

5.2 Sample Custody and Packaging

Sample custody shall be strictly maintained and carefully documented each time sample material is collected, transported, received, prepared, and analyzed. Custody procedures are necessary to ensure the integrity of the samples, and samples collected during monitoring activities must be traceable from the time the samples are collected until they are disposed of and/or stored, and their derived data are used in the subsequent monitoring report. Sample custody is defined as (1) being in the sampler's possession; (2) being in the sampler's view, after being in the sampler's possession; (3) being locked in a secured container, after being in the sampler's possession; and (4) being placed in a designated secure area.

5.2.1 Field Custody and Packaging Procedures

Field custody procedures shall be implemented for each sample collected. The field sampler shall be responsible for the care and custody of the samples until they are properly transferred or dispatched. To maintain the integrity of the samples, the samples are to be stored

in a designated, secure area and/or be custody sealed in the appropriate containers prior to shipment.

Each environmental sample will be properly identified and individually labeled. Labels will be filled out in indelible ink with at least the following information: sample identification (see Section 5.1), type and matrix of sample, date and time of sample acquisition, name of sampler, analysis required, and preservation (as necessary). The sample label will be securely attached to the sample container.

A laboratory supplied completed chain of custody form will be included with all samples.

5.2.2 Laboratory Custody Procedures

The following generally summarizes laboratory custody procedures; more detailed operations are presented in the laboratory's SOPs.

- A designated sample custodian will accept custody of the shipped samples and will verify that the information on the sample labels matches that on the chain of custody record(s).
- The laboratory custodian will use the sample label number or assign a unique laboratory number to each sample label and will assure that all samples are transferred to the proper analyst or stored in the appropriate secure area; and,
- Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted or returned to the custodian or sample storage area. Internal chain of custody records shall be maintained by the laboratory.

The laboratory shall communicate with ACT personnel by telephone, email or facsimile, as necessary, throughout the process of sample scheduling, shipment, analysis and data reporting, to ensure that samples are properly processed. If a problem occurs during sample shipment or receipt (e.g., a sample container arrives broken or with insufficient sample

volume, a sample was not preserved correctly, a sample was not listed on the chain of custody, etc.), the laboratory shall immediately notify the appropriate person for resolution.

Samples received by the laboratory will be retained until analyses and QA checks are completed. When sample analyses and necessary QA checks have been completed, the unused portion of the sample and the sample container must be disposed of properly by the laboratory. All identifying tags, data sheets, and laboratory records shall be retained as part of the permanent documentation.

6.0 ANALYTICAL REQUIREMENTS

Analytical services will be provided by a NYSDOH ELAP approved laboratory. The laboratory will follow NYSDEC Analytical Sampling Protocol (ASP) and provide data in results only format, with the exception of the final round of sampling in which data will be reported with Category B deliverables (ASP-B). Analyses not available using ASP-B will be provided in results only format.

6.1 Verification Soil Samples

Delineation soil samples will be collected as described in the SMP. Each delineation soil sample will be analyzed for Target Analyte List (TAL) metals by USEPA Method 6010/7473. Soil samples will be collected in a Terracore sampling kit (or equivalent). Glassware will be supplied pre-cleaned and pre-preserved by the analytical laboratory. The hold time for TAL metals is six months and for mercury analysis the hold time is 28 days.

7.0 DECONTAMINATION PROCEDURES

In order to minimize the potential for cross-contamination, non-dedicated drilling and sampling equipment shall be properly decontaminated prior to and between sampling/drilling locations.

Decontamination of sampling equipment will be kept to a minimum in the field, and wherever possible, dedicated disposable sampling equipment will be used. Decontamination fluids will be stored in US Department of Transportation (DOT)-approved 55-gallon drums or in an on-site storage tank (liquids only) until proper disposal.

Personnel directly involved in equipment decontamination will wear protective clothing in accordance with the project Health and Safety Plan (HASP).

7.1 General Procedures

Drilling equipment will be decontaminated in a designated area. Sampling equipment and probes will be decontaminated in an area covered with plastic sheeting near the sampling location. Waste material generated during decontamination activities will be containerized, stored and disposed of. Decontamination of sampling equipment shall be kept to a minimum, and wherever possible, dedicated sampling equipment shall be used. Personnel directly involved in equipment decontamination shall wear appropriate protective equipment.

7.2 Drilling Equipment

Drilling equipment shall be decontaminated by steam cleaning prior to performance of the first boring/excavation and between all subsequent borings/excavations. This shall include hand tools, casing, augers, drill rods, temporary well material and other related tools and equipment. Water used during drilling and/or steam cleaning operations shall be from a potable source.

7.3 Sampling Equipment

Sampling equipment (i.e., trowels, knives, split-spoons, bowls, hand augers, etc.) will be decontaminated prior to each use as follows:

- Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
- Generous tap water rinse
- Distilled water rinse

8.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE REQUIREMENTS

This section will discuss the type and quantities of QA/QC samples to be utilized during implementation of the field program.

8.1 Field Quality Control Samples

The subsections below present general information and guidance on field QC samples, including definition and frequency of QC blanks. Field QC samples will be labeled and shipped according to the procedures outlined in Section 5.1.

8.1.1 Field Blanks

A field blank will be collected to evaluate the potential for contamination of environmental samples from inadequate decontamination of field equipment. Field blanks shall be collected by pouring laboratory supplied distilled/deionized (DI) water over and/or through decontaminated non-disposable equipment or disposable equipment, and collecting the rinsate. Field blanks will be collected at a frequency of one per decontamination event per type of sampling equipment, not to exceed one per day per sample matrix. Preservation and analysis of field blanks will be identical to that of the associated environmental samples.

8.1.2 Trip Blanks

A trip blank serves to detect possible cross-contamination of samples resulting from handling, storage and shipment procedures. Blanks are stored by the laboratory under the same conditions as the environmental samples. A trip blank will accompany each cooler containing samples submitted for VOC analysis (if any), and will be preserved identically to the associated environmental samples. Due to the lack of VOC impact identified at the site, it is not anticipated that trip blanks will be necessary during the final soil sampling.

8.1.3 Temperature Blanks

A temperature blank will be sent with each cooler of samples to be analyzed for VOCs to verify that the cooler temperature has been maintained at 4ºC. One non-preserved VOA vial shall be filled with either potable or DI water, and labeled with "NYSDEC cooler temperature indicator" and the date. If supplied, the laboratory's temperature blank will be used in place of the VOA vial. The laboratory shall record the temperature of the blank water on the chain of custody immediately upon cooler arrival.

8.1.4 Field Environmental Duplicate Samples

Duplicate environmental samples will be analyzed by the off-site laboratories to evaluate the reproducibility of the sampling procedures. Duplicate samples will be collected at a rate of five percent of the total samples for each specific matrix for each type of analysis (i.e., one duplicate for up to every 20 samples). The duplicate samples will be collected from the same location and at the same time as the original environmental sample; however, the duplicated samples will be "coded" in such a manner that the laboratory will not be able to determine of which original field sample they are duplicated (i.e., "blind" duplicates). For example, the duplicate sample of location EP001 may be "coded" as location EP051, as long as there are not more than fifty endpoint samples being collected (i.e., the coded sample name should not be assigned a legitimate sample location identification). An explanation of the duplicate "coding" must be written in the field logbook. Preservation and analysis of duplicate samples will be identical to those for the environmental samples. Precision of field data will be evaluated based on the calculation of Relative Percent Difference (RPD), with acceptance criteria of 25 percent for the off-site laboratory samples. Blind duplicate samples will be collected in the same manner as the environmental samples.

8.2 Laboratory Quality Control Samples

General information and guidance on laboratory QC samples are presented in the subsections below. A summary of QC procedures, frequencies, criteria, and corrective actions for the samples, as determined by the applicable method guidelines.

8.2.1 Method Blanks/Preparation Blanks

A method blank (for organics) or a preparation blank (for inorganics) will be analyzed with every batch of samples to ensure that contamination has not occurred during the analytical process. Method blanks consist of a portion of analyte-free solid that is processed through the entire sample procedure the same as an environmental sample.

8.2.2 Laboratory Control Samples

A laboratory control sample (LCS) consists of an analyte- solid phase sample that is spiked with target analytes at a known concentration. The LCS shall be analyzed for every batch of samples (i.e., 1 per 20) to assess the ability of the analytical procedure to generate a correct result without matrix effects/interferences affecting the analysis. The percent recoveries for the LCS compounds will be compared to QC limits stated in the appropriate methods.

8.2.3 Surrogate Compounds

Surrogates (also known as System Monitoring Compounds) are compounds of known concentrations added to every organic analysis sample for analytical chromatography methods at the beginning of the sample preparation to monitor their recovery. Surrogate recoveries will be used to assess potential matrix interferences and to monitor any potential effects of sample preparation and analysis on final analyte concentrations. The recovery values will be compared to values established in the applicable methodologies to determine the validity of the data.

8.2.4 Internal Standards

Internal standards are used to provide instrument correction for variation in instrument performance and injection volumes. Internal standards also establish relative response factors for the analytes.

9.0 INSTRUMENT CALIBRATION AND PREVENTIVE MAINTENANCE

9.1 Calibration

Equipment will be inspected and approved by the Field Team Leader before being used. Equipment will generally be calibrated in the field to factory specifications. Monitoring equipment will be calibrated following manufacturers recommended schedules. Daily field response checks and calibrations will be performed as necessary following manufacturers standard operating procedures. Equipment calibrations will be documented in a designated field logbook.

The Field Team Leader or his designee will be responsible for ensuring that instrumentation is of the proper range, type and accuracy for the measurement/test being performed, and that all of the equipment are calibrated at their required frequencies, according to their specific calibration protocols/procedures.

All field measurement instruments must be calibrated according to the manufacturer's instructions prior to the commencement of the day's activities. Exceptions to this requirement shall be permitted only for instruments that have fixed calibrations pre-set by the equipment manufacturer. Calibration information shall be documented on in a designated field logbook. Information to be recorded includes the date, the operator, and the calibration standards (concentration, manufacturer, etc.). All project personnel using measuring equipment or instruments in the field shall be trained in the calibration and usage of the equipment and are personally responsible for ensuring that the equipment has been properly calibrated prior to its use.

In addition, all field instruments must undergo response verification checks at the end of the day's activities and at any other time that the user suspects or detects anomalies in the data being generated. The checks consist of exposing the instrument to a known source of analyte (e.g., the calibration solution), and verifying a response. If an unacceptable instrument response is obtained during the check the data shall be labeled suspect, the problem documented in the site logbook, and appropriate corrective action taken.

Any equipment found to be out of calibration shall be recalibrated. When instrumentation is found to be out of calibration or damaged, an evaluation shall be made to ascertain the validity of previous test results since the last calibration check. If it is necessary to ensure the acceptability of suspect items, the originally required tests shall be repeated (if possible), using properly calibrated equipment. Any instrument consistently found to be out of calibration shall be repaired or replaced.

9.2 Preventive Maintenance

Field equipment shall be maintained at its proper functional status in accordance to manufacturer manual specifications. A check of the equipment shall be performed before field activities begin, and any potential spare parts (e.g., batteries, connectors, etc.) and maintenance tools will be brought on site, to minimize equipment downtime during the field activities. Visual checks of the equipment will be conducted on a daily basis. Routine preventive maintenance shall be performed to assure proper operation of the equipment. Any maintenance performed on field equipment will be documented in the designated field logbook, and shall be undertaken by personnel who have the appropriate skills and/or training in the type of maintenance required.

10.0 DATA REDUCTION, VALIDATION AND REPORTING

Standard methods and references will be used as guidelines for data handling, reduction, validation, and reporting. All data for the project will be compiled and summarized with an independent verification at each step in the process to prevent transcription/typographical errors. Any computerized entry of data will also undergo verification review.

10.1 Data Reduction

10.1.1 Field Data Reduction

Field instrumentation data will be reported by site personnel in field logbooks associated with the monitoring event. At the end of each monitoring event, the field screening data results shall be summarized in tabulated form, as warranted.

10.1.2 Laboratory Data Reduction

All data generated by the off-site laboratory will be reported in a specified format containing all required elements to perform data validation. Analytical results shall be presented on standard NYSDEC Analytical Sampling Protocol (ASP) forms or equivalents and provide data in results only (ASP-A) format and include the dates the samples were received and analyzed, and the actual methodology used, with the exception of the final round of sampling in which data will be reported with Category B (ASP-B) deliverables.

Laboratory QA/QC information required by the method protocols will be compiled, including the application of data QA/QC qualifiers as appropriate. In addition, laboratory worksheets, laboratory notebooks, chains-of-custody, instrument logs, standards records, calibration records, and maintenance records, as applicable, will be provided in the laboratory data packages to determine the validity of data.

10.1.3 Project Data Reduction

Following receipt of the laboratory analytical results by Environmental Contractor, the data results will be compiled and presented in an appropriate tabular form. Where appropriate, the impacts of QA/QC qualifiers resulting from laboratory or external validation reviews will be assessed in terms of data usability.

10.2 Data Usability and Validation

The main purpose of the data is for use in defining the extent of contamination at the site, to aid in evaluation of potential human health and ecological exposure assessments, and to support remedial action decisions. Based upon this, data use usability and validation will be performed as described below. Complete data packages will be archived in the project files, and if deemed necessary additional validation can be performed using procedures in the following sections. It is anticipated that data validation will be performed on data collected during the final round of sampling, only.

10.2.1 Data Usability and Validation Requirements

Data usability and validation are performed on analytical data sets, primarily to confirm that sampling and chain-of-custody documentation are complete, sample IDs can be tied to specific sampling locations, samples were analyzed within the required holding times, and analyses are reported in conformance to NYSDEC ASP data deliverable requirements as applicable to the method utilized.

All data should be provided to NYSDEC in draft form prior to being validated by a third party data validator. The data validation report should be included in the PRR.

10.2.2 Data Usability and Validation Methods

If deemed necessary by NYSDEC, a data usability evaluation for the data collected during the SMP and a data usability summary report (DUSR) will be prepared. The DUSR will be prepared in accordance with USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, February 1994 (EPA 540/R-94/013).

11.0 CORRECTIVE ACTION

Review and implementation of systems and procedures may result in recommendations for corrective action. Any deviations from the specified procedures within approved SMP due to unexpected site-specific conditions shall warrant corrective action. All errors, deficiencies, or other problems shall be brought to the immediate attention of the Environmental Contractor PM, who in turn shall contact the Quality Assurance/Data Quality Manager or his designee (if applicable).

Procedures have been established to ensure that conditions adverse to data quality are promptly investigated, evaluated and corrected. These procedures for review and implementation of a change are as follows:

- Define the problem.
- Investigate the cause of the problem.
- Develop a corrective action to eliminate the problem, in consultation with the personnel who defined the problem and who will implement the change.
- Complete the required form describing the change and its rationale (see below for form requirements).
- Obtain all required written approvals.
- Implement the corrective action.
- Verify that the change has eliminated the problem.

During the project, all changes to the SI monitoring program will be documented in field logs/sheets and the Environmental Contractor PM will be advised.

If any problems occur with the laboratory or analyses, the laboratory must immediately notify Environmental Contractor PM, who will consult with other Environmental Contractor project staff. All approved corrective actions shall be controlled and documented.

All corrective action documentation shall include an explanation of the problem and a proposed solution which will be maintained in the project file or associated logs. Each report must be approved by the necessary personnel (e.g., the PM) before implementation of the change occurs. The Environmental Contractor PM shall be responsible for controlling, tracking, implementing and distributing identified changes.

APPENDIX H

SITE MANAGEMENT FORMS

DATE:_____

MONITORING FIELD SHEET
General Site Conditions

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS

429 Merrick Road
Lynbrook, New York
ACT Project No.: 7045-LBNY

GENERAL WEATHER: _____

_____

TEMPERATURE (°F): _____

RELATIVE HUMIDITY (%): _____

DEW POINT (°F): _____

BAR0METRIC PRESSURE (in. Hg): _____

ACT personel on site: _____

Air Sample Location	Wind	Wind Speed	PID Concentration (ppm)
Calibration	N/A	N/A	
Background	N/A	N/A	
Upwind			
Treatment room			
Downwind			

Notes

DATE:_____

MONITORING FIELD SHEET
General Site Conditions

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS

429 Merrick Road
Lynbrook, New York
ACT Project No.: 7045-LBNY

Sample Location	Pressure (+/-) ("H_2O)	Flow (ft^3/min)	Temp. (°F)	PID (ppm)	Sample Collected (yes/no)
VW-1			N/A		
VW-2			N/A		
VW-3			N/A		
VW-4			N/A		
VP-1		N/A	N/A		
VP-2		N/A	N/A		
VP-3 (Pizzeria)		N/A	N/A		
VP-4 (Beauty Salon)		N/A	N/A		
SVE BLOWER					
Temperature	N/A	N/A	N/A	N/A	N/A
Flow Rate	N/A		N/A	N/A	N/A
Pre-filter		N/A	N/A	N/A	N/A
Post-filter		N/A	N/A	N/A	N/A
Carbon influent		N/A	N/A		
Carbon mid		N/A	N/A		
Carbon effluent		N/A	N/A		

Notes

ADVANCED CLEANUP TECHNOLOGIES, INC.
DAILY FIELD ACTIVITY REPORT

Report Number:_____ Project Number:_____ Date:_____

Project/Address:_____

Weather: (AM)_____ Temperature: (AM)_____ Wind Direction: (AM)_____
(PM)_____ (PM)_____ (PM)_____

Site Condition:_____

Subcontractor Work: Crew:_____
Equipment:_____

_____

_____

On Site:_____ Off Site:_____

Work Accomplished:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Comments:_____

_____

_____

Site Supervisor_____ _____
Name Initial

SAMPLE INFORMATION RECORD

SITE _____ SAMPLE CREW _____

SAMPLE LOCATION/WELLNO. _____

FIELD SAMPLE I.D. NUMBER _____ DATE _____

TIME _____ WEATHER _____ TEMPERATURE _____

SAMPLE TYPE:

GROUNDWATER _____ SEDIMENT _____

SURFACE WATER _____ AIR _____

SOIL _____ OTHER (Describe, e.g., septage,leachate)

_____

WELL INFORMATION (fill out for groundwater samples):

DEPTH TO WATER _____ MEASUREMENT METHOD _____

DEPTH OF WELL _____ MEASUREMENT METHOD _____

VOLUME REMOVED _____ REMOVAL METHOD _____

FIELD TEST RESULTS:

COLOR _____ pH _____ ODOR _____

TEMPERATURE (°F) _____ SPECIFIC CONDUCTANCE (umhos/cm) _____

TURBIDITY _____

PID/FID READING _____ VISUAL DESCRIPTION _____

_____

CONSTITUENTS TO BE ANALYZED:

_____ _____ _____ _____

_____ _____ _____ _____

REMARKS: _____

_____

_____

_____

WELL CASING VOLUMES

GAL/FT				
	1-1/4" = 0.077	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.10	2-1/2" = 0.24	3-1/2" = 0.50	6" = 1.46

IIR-0794.PM4

Receipt for Samples

Project Name: _____ Field Log Book Reference Number: _____

Project Address: _____ Sampled By: _____

Project Number: _____ Split With: _____

SAMPLE NUMBERS	DATE	TIME	C O M P	G R A B	SPLIT SAMPLES	LOG BOOK PAGE NO.	TAG NUMBERS	SAMPLE LOCATION	NO. OF CONTAINERS	REMARKS

Transferred by (Signature)		Received by (Signature)		Telephone
Date	Time	Title	Date	Time

RFS

DAILY EQUIPMENT CALIBRATION LOG

Project Name: _____

Project Number: _____ Calibrated By: _____

Date	Instrument Name and Model Number	Calibration Method	Time	Readings and Observations

APPENDIX I

WIRELESS TELEMETRY SPECIFICATIONS

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title	template	columns	order
Electron datasheet	datasheet.hbs	two	4

Electron Datasheet (v002)



Functional description

Overview

The Electron is a tiny development kit for creating cellular-connected electronics projects and products. It comes with a SIM card (Nano 4FF) and an affordable data plan for low-bandwidth things. Plus it's available for more than 100 countries worldwide!

It also comes with Particle's development tools and cloud platform for managing and interacting with your new connected hardware.

Features

- U-blox SARA-U260/U270 (3G) and G350 (2G) cellular module
- STM32F205 120MHz ARM Cortex M3 microcontroller
- 1MB flash, 128KB RAM
- BQ24195 power management unit and battery charger
- MAX17043 fuel gauge
- RGB status LED
- 30 mixed-signal GPIO and advanced peripherals
- Open source design
- Real-time operation system (RTOS)
- FCC, CE and IC certified

Interfaces

Block diagram



Power

The Electron can be powered via the VIN (3.9V-12VDC) pin, the USB Micro B connector or a LiPo battery.

USB

Most USB ports can supply only a maximum of 500mA, but the u-Blox GSM module on the Electron alone can consume a peak of 800mA to 1800mA of current during transmission. In order to compensate of this deficit, one must connect the LiPo battery at all times when powering from a traditional USB port. The Electron will intelligently source power from the USB most of the time and keep the battery charged. During peak current requirements, the additional power will be sourced from the battery. This reduces the charge-discharge cycle load on the battery, thus improving its longevity.

VIN

The input voltage range on VIN pin is 3.9VDC to 12VDC. When powering from the VIN pin alone, make sure that the power supply is rated at 10W (for example 5VDC at 2Amp). If the power source is unable to meet this requirement, you'll need connect the LiPo battery as well.

LiPo Battery

When powered from a LiPo battery alone, the power management IC switches off the internal regulator and supplies power to the system directly from the battery. This reduces the conduction losses and maximizes battery run time. The battery provided with the Electron is a Lithium-Ion Polymer battery rated at 3.7VDC 2000mAh. You can substitute this battery with another 3.7V LiPo with higher current rating. Remember to never exceed this voltage rating and alway pay attention to the polarity of the connector.

Typical current consumption is around 180mA and upto 1.8A transients at 5VDC. In deep sleep mode, the quiescent current is 130uA (powered from the battery alone).

Li+

This pin is internally tied to the positive terminal of the LiPo battery connector. It is intentionally left unpopulated. Please note that an incorrect usage of this pin can render the Electron unusable.

Li+ pin serves two purposes. You can use this pin to connect a LiPo battery directly without having to use a JST connector or it can be used to connect an external DC power source (and this is where one needs to take extra precautions). When powering it from an external regulated DC source, the recommended input voltage range on this pin is between 3.6V to 4.4VDC. Make sure that the supply can handle currents of at least 3Amp.

This is the most efficient way of powering the Electron since the PMIC by-passes the regulator and supplies power to the Electron via an internal FET leading to lower quiescent current.

VUSB

This pin is internally connected to USB supply rail and will output 5V when the Electron is plugged into an USB port. It is intentionally left unpopulated. This pin will *NOT* output any voltage when the Electron is powered via VIN and/or the LiPo battery.

3V3 Pin

This pin is the output of the on-board 3.3V switching regulator that powers the microcontroller and the peripherals. This pin can be used as a 3.3V power source with a max load of 800mA. Unlike the Photon or the Core, this pin *CANNOT* be used as an input to power the Electron.

FCC approved antennas

Antenna Type	Manufacturer	MFG. Part #	Gain
PCB antenna	Taoglas	PC104.07.0165C	1dBi ~ 2.39dBi

Peripherals and GPIO

Peripheral Type	Qty	Input(I) / Output(O)	FT[1] / 3V3[2]
Digital	30	I/O	FT/3V3
Analog (ADC)	12	I	3V3
Analog (DAC)	2	O	3V3
UART	3	I/O	3V3
SPI	2	I/O	3V3
I2S	1	I/O	3V3
I2C	1	I/O	FT
CAN	2	I/O	FT
USB	1	I/O	3V3
PWM	13[3]	O	3V3

Notes: [1] FT = 5.0V tolerant pins. All pins except A3 and DAC are 5V tolerant (when not in analog mode). If used as a 5V input the pull-up/pull-down resistor must be disabled.

[2] 3V3 = 3.3V max pins.

[3] PWM is available on D0, D1, D2, D3, B0, B1, B2, B3, A4, A5, WKP, RX, TX with a caveat: PWM timer peripheral is duplicated on two pins (A5/D2) and (A4/D3) for 11 total independent PWM outputs. For example: PWM may be used on A5 while D2 is used as a GPIO, or D2 as a PWM while A5 is used as an analog input. However A5 and D2 cannot be used as independently controlled PWM outputs at the same time.

JTAG AND SWD

Pin D3 through D7 are JTAG interface pins. These can be used to reprogram your Electron bootloader or user firmware image with standard JTAG tools such as the ST-Link v2, J-Link, R-Link, OLIMEX ARM-USB-TINI-H, and also the FTDI-based Particle JTAG Programmer. If you are short on available pins, you may also use SWD mode which requires less connections.

| Electron Pin | JTAG | SWD | STM32 Pin | Default Internal[1] | | :-:|:-:|:-:|:-:|:-:| | D7 | JTAG_TMS | SWD/SWDIO| PA13 | ~40k pull-up | | D6 | JTAG_TCK | CLK/SWCLK| PA14 | ~40k pull-down | | D5 | JTAG_TDI | |PA15 | ~40k pull-up | | D4 | JTAG_TDO | |PB3 | Floating | | D3 | JTAG_TRST | |PB4 | ~40k pull-up | | 3V3 | Power | || | | GND | Ground| || | | RST | Reset | || ||

Notes: [1] Default state after reset for a short period of time before these pins are restored to GPIO (if JTAG debugging is not required, i.e. `USE_SWD_JTAG=y` is not specified on the command line.)

Memory Map

STM32F205RGY6 Flash Layout Overview

- Bootloader (16 KB)
- DCD1 (16 KB), stores keys, mfg info, system flags, etc..
- DCD2 (16 KB), swap area for DCD1
- EEPROM emulation bank 1 (16 KB)
- EEPROM emulation bank 2 (64 KB) [only 16k used]
- System firmware (512 KB) [256 KB comms + 256 KB hal/platform/services]
- Factory backup, OTA backup and user application (384 KB) [3 x 128 KB]

DCD Layout

The DCD area of flash memory has been mapped to a separate DFU media device so that we can incrementally update the application data. This allows one item (say, server public key) to be updated without erasing the other items.

DCD layout as of v0.4.9 found here in firmware

Region	Offset	Size
system flags	0	32
version	32	2
device private key	34	1216
device public key	1250	384
ip config	1634	128
claim code	1762	63
claimed	1825	1
device id	1852	6
version string	1858	32
dns resolve	1890	128
reserved1	2018	64
server public key	2082	768
padding	2850	2
flash modules	2852	100
product store	2952	24
cloud transport	2977	1
alt device public key	2978	128
alt device private key	3106	192
alt server public key	3298	192
alt server address	3490	128
reserved2	3618	1280

Note: Writing 0xFF to offset 3106 (DEFAULT key used on Electron) will cause the device to re-generate a new private UDP/ECC key on the next boot. TCP keys are currently unsupported on the Electron but would be located at offset 34. You should not need to use this feature unless your keys are corrupted.

```
// Regenerate Alternate Keys (Default)
echo -e "\xFF" > fillbyte && dfu-util -d 2b04:d00a -a 1 -s 3106 -D fillbyte
// Regenerate TCP Keys (Unsupported)
echo -e "\xFF" > fillbyte && dfu-util -d 2b04:d00a -a 1 -s 34 -D fillbyte
```

Memory Map (Common)

Region	Start Address	End Address	Size
Bootloader	0x8000000	0x8004000	16 KB

DCD1	0x8004000	0x8008000	16 KB
DCD2	0x8008000	0x800C000	16 KB
EEPROM1	0x800C000	0x8010000	16 KB
EEPROM2	0x8010000	0x8020000	64 KB

Memory Map (Modular Firmware - default)

Region	Start Address	End Address	Size
System Part 1	0x8020000	0x8040000	128 KB
System Part 2	0x8040000	0x8060000	128 KB
Application	0x8080000	0x80A0000	128 KB
Factory Reset/Extended Application	0x80A0000	0x80C0000	128 KB
OTA Backup	0x80C0000	0x80E0000	128 KB
Decompress region	0x80E0000	0x8100000	128 KB

Memory Map (Monolithic Firmware - optional)

Region	Start Address	End Address	Size
Firmware	0x8020000	0x8080000	384 KB
Factory Reset	0x8080000	0x80E0000	384 KB
Unused (factory reset modular)	0x80E0000	0x8100000	128 KB

Pin and button definition

Pin markings:



Pin description

Pin	Description
VIN	This pin can be used as an input or output. As an input, supply 5VDC to 12VDC to power the Electron. When the Electron is powered via the USB port, this pin will output a voltage of approximately 4.8VDC due to a reverse polarity protection series schottky diode between VUSB and VIN. When used as an output, the max load on VIN is 1Amp.
RST	Active-low reset input. On-board circuitry contains a 10k ohm pull-up resistor between RST and 3V3, and 0.1uF capacitor between RST and GND.
VBAT	Supply to the internal RTC, backup registers and SRAM when 3V3 is not present (1.65 to 3.6VDC). The Pin is internally connected to 3V3 supply via a 0 ohm resistor. If you wish to power is via an external supply, you'll need to remove this resistor. Instructions to remove this resistor can be found here
3V3	This pin is the output of the on-board regulator. When powering the Electron via VIN or the USB port, this pin will output a voltage of 3.3VDC. The max load on 3V3 is 800mA. It should not be used as an input to power the Electron.

WKP	Active-high wakeup pin, wakes the module from sleep/standby modes. When not used as a WAKEUP, this pin can also be used as a digital GPIO, ADC input or PWM.
DAC	12-bit Digital-to-Analog (D/A) output (0-4095), and also a digital GPIO. DAC is used as DAC or DAC1 in software, and A3 is a second DAC output used as DAC2 in software.
RX	Primarily used as UART RX, but can also be used as a digital GPIO or PWM.
TX	Primarily used as UART TX, but can also be used as a digital GPIO or PWM.
D0-D1	Digital only GPIO
A0-A1	12-bit Analog-to-Digital (A/D) inputs (0-4095), and also digital GPIOs. A6 and A7 are code convenience mappings, which means pins are not actually labeled as such but you may use code like `analogRead(A7)`. A6 maps to the DAC pin and A7 maps to the WKP pin.
B0-B5	B0 and B1 are digital only while B2, B3, B4, B5 are 12-bit A/D inputs as well as digital GPIOs
C0-C5	Digital only GPIO
VUSB	This pin is internally connected to USB supply and will output 5V when the Electron is plugged into an USB port. It is intentionally left unpopulated.
Li+	This pin is internally connected to the positive terminal of the LiPo battery. It is intentionally left unpopulated.

LED Status

Charge status LED

State	Description
ON	Charging in progress
OFF	Charging complete
Blink at 1Hz	Fault condition[1]
Rapid blinking	Battery disconnected[2]

Notes:

[1] A fault condition can occur due to several reasons, for example, battery over/under voltage, temperature fault or safety timer fault. You can find the root cause by reading the fault register of the power management IC in firmware.

[2] You can stop this behavior by either plugging in the LiPo battery or by disabling the charging using the appropriate firmware command.

System RGB LED

For a detailed explanation of different color codes of the RGB system LED, please take a look here.

Pinout diagram



You can download a high resolution pinout diagram in a PDF version here.

Technical Specifications

Absolute maximum ratings [1]

Parameter	Symbol	Min	Typ	Max	Unit
Supply Input Voltage	V_{IN-MAX}			+17	V
Supply Output Current	$I_{IN-MAX-L}$			1	A
Battery Input Voltage	V_{LiPO}			+6	V
Supply Output Current	$I_{3V3-MAX-L}$			800	mA
Storage Temperature	T_{stg}	-30		+75	°C
ESD Susceptibility HBM (Human Body Mode)	V_{ESD}			2	kV

[1] Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Recommended operating conditions

Parameter	Symbol	Min	Typ	Max	Unit
Supply Input Voltage	V_{IN}	+3.88[1]		+12	V
Supply Output Voltage	V_{IN}		+4.8		V
Supply Output Voltage	V_{3V3}		+3.3		V
LiPo Battery Voltage	V_{LiPo}	+3.6		+4.4	V
Supply Input Voltage	V_{VBAT}	+1.65		+3.6	V
Supply Input Current (VBAT)	I_{VBAT}			19	uA
Operating Current (Cellular ON)	$I_{IN\ avg}$		180	250	mA
Peak Current (Cellular ON)	$I_{IN\ pk}$	800[2]		1800[3]	mA
Operating Current (Cellular OFF)	$I_{IN\ avg}$		2	15	mA
Sleep Current (4.2V LiPo)	I_{Qs}		0.8	2	mA
Deep Sleep Current (4.2V LiPo)	I_{Qds}		110	130	uA
Operating Temperature	T_{op}	-20		+60	°C
Humidity Range Non condensing, relative humidity				95	%

Notes:

[1] The minimum input voltage is software defined with a user selectable range of 3.88V to 5.08V in 80mV increments. Out of the box, the minimum input voltage is set to 4.36V in order for the LiPo battery to be able to properly charge.

[2] 3G operation

[3] 2G operation

Radio specifications

The Electron is available in three different versions: A 2G version based on u-blox G350 cellular module, and two 3G versions based on U260 and U270 modules. The difference between the 3G versions is their operating frequency band which differs based on the country. All of these cellular modules are GSM only and do not support CDMA networks.

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P1 datasheet	datasheet.hbs	two	5

P1 Datasheet (v006)



```
void setup() {
    Particle.publish("my-event","The internet just got smarter!");
}
```

Functional description

Overview

The P1 is Particle's tiny Wi-Fi module that contains both the Broadcom Wi-Fi chip and a reprogrammable STM32F205RGY6 32-bit ARM Cortex-M3 microcontroller. The P1 comes preloaded with Particle firmware libraries, just like our dev kits, and it's designed to simplify your transition from prototype to production. The P1 is the PØ's big brother; it's a bit bigger and a tad more expensive, but it includes some extra flash and an antenna and u.FL connector on board. Every P1 includes free cloud service.

Features

- Particle P1 Wi-Fi module
  - Broadcom BCM43362 Wi-Fi chip
  - 802.11b/g/n Wi-Fi
  - STM32F205RGY6 120Mhz ARM Cortex M3
  - 1MB flash, 128KB RAM
  - 1MB external SPI flash
  - Integrated PCB antenna
  - Integrated u.FL connector for external antenna
  - Integrated RF switch
- 25 Mixed-signal GPIO and advanced peripherals
- Open source design
- Real-time operating system (FreeRTOS)
- Soft AP setup

- FCC, CE and IC certified

Interfaces

Block Diagram



Power

Power to the P1 is supplied via 3 different inputs: VBAT_WL (pin 2 & 3), VDDIO_3V3_WL (pin 5), VDD_3V3 (pin 26 & 27). Optionally +3.3V may be supplied to VBAT_MICRO (pin 38) for data retention in low power sleep modes. Each of these inputs also requires a 0.1uF and 10uF ceramic decoupling capacitor, located as close as possible to the pin (see Fig 1). The voltage should be regulated between 3.0VDC and 3.6VDC.

Typical average current consumption is 80mA with 5V @ input of the recommended SMPS power supply with Wi-Fi on. Deep sleep quiescent current is typically 80uA (Please refer to Recommended Operating Conditions for more info). When powering the P1 make sure the power supply can handle 600mA continuous. If a lesser power supply is provided, peak currents drawn from the P1 when transmitting and receiving will result in voltage sag at the input which may cause a system brown out or intermittent operation. Likewise, the power source should be sufficient enough to source 1A of current to be on the safe side.



Fig. 1 Recommended power connections with decoupling capacitors.

RF The RF section of the P1 includes an on-board PCB trace antenna and a u.FL connector which allows the user to connect an external antenna. These two antenna outputs are selectable via a user API, made possible by an integrated RF switch. The default selected antenna will be the PCB antenna. The area surrounding the PCB antenna on the carrier PCB should be free of ground planes and signal traces for maximum Wi-Fi performance. --- ### FCC Approved Antennas | Antenna Type | Manufacturer | MFG. Part # | Gain | |-|-|-|-| | Dipole antenna | LumenRadio | 104-1001 | 2.15dBi | | PCB Antenna | Included | - | - | --- ### Peripherals and GPIO The P1 module has ton of capability in a super small footprint, with analog, digital and communication interfaces. **Note:** P1 pin names will be preserved as they are named in the USI datasheet, however for the scope of this datasheet we will also refer to them as their Photon and code equivalents, i.e. D7 instead of MICRO_JTAG_TMS and A2 instead of MICRO_GPIO_13. This will help to simplify descriptions, while providing a quick reference for code that can be written for the P1 such as `int value = analogRead(A2);` | Peripheral Type | Qty | Input(I) / Output(O) | FT[1] / 3V3[2] | | :-:|:-:|:-:|:-: | | Digital | 24 | I/O | FT/3V3 | | Analog (ADC) | 13 | I | 3V3 | | Analog (DAC) | 2 | O | 3V3 | | SPI | 2 | I/O | 3V3 | | I2S | 1 | I/O | 3V3 | | I2C | 1 | I/O | FT | | CAN | 1 | I/O | FT | | USB | 1 | I/O | 3V3 | | PWM | 11[3] | O | 3V3 | **Notes:** [1] FT = 5.0V tolerant pins. All pins except A3 and DAC are 5V tolerant (when not in analog mode). If used as a 5V input the pull-up/pull-down resistor must be disabled. [2] 3V3 = 3.3V max pins. [3] PWM is available on D0, D1, D2, D3, A4, A5, WKP, RX, TX, P1S0, P1S1 with a caveat: PWM timer peripheral is duplicated on two pins (A5/D2) and (A4/D3) for 7 total independent PWM outputs. For example: PWM may be used on A5 while D2 is used as a GPIO, or D2 as a PWM while A5 is used as an analog input. However A5 and D2 cannot be used as independently controlled PWM outputs at the same time. ### RGB LED, SETUP and RESET button When using the P1 module, it is very important to remember that your device must have an RGB LED to show the user the connectivity status. Also required is a SETUP and RESET button to enter various [Device Modes](/guide/getting-started/modes). By default the RGB LED outputs are configured for a Common Anode type of LED. These components should be wired according to the [P1 Reference Design - User I/O](#schematic-user-i-o). RGB pins may be accessed in code as: RGBR, RGBG and RGBB. ### JTAG and SWD Pin D3 through D7 are JTAG interface pins. These can be used to reprogram your P1 bootloader or user firmware image with standard JTAG tools such as the ST-Link v2, J-Link, R-Link, OLIMEX ARM-USB-TINI-H, and also the FTDI-based Particle JTAG Programmer. If you are short on available pins, you may also use SWD mode which requires less connections. | Photon Pin | JTAG | SWD | STM32F205RGY6 Pin | P1 Pin # | P1 Pin Name | Default Internal[1] | | :-:|:-:|:-:|:-:|:-:|:-:|:-:|:-:|:- | | D7 | JTAG_TMS | SWD/SWDIO | PA13 | 54 | MICRO_JTAG_TMS | ~40k pull-up | | D6 | JTAG_TCK | CLK/SWCLK | PA14 | 55 | MICRO_JTAG_TCK | ~40k pull-down | | D5 | JTAG_TDI | | PA15 | 53 | MICRO_JTAG_TDI | ~40k pull-up | | D4 | JTAG_TDO | | PB3 | 54 | MICRO_JTAG_TDO | Floating | | D3 | JTAG_TRST | | PB4 | 51 | MICRO_JTAG_TRSTN | ~40k pull-up | | 3V3 | Power | Power | | | | | GND | Ground | Ground | | | | | RST | Reset |

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7 contributors

815 lines (538 sloc) 37.7 KB Raw Blame History

title	template	columns	order
Particle shields and kits	datasheet.hbs	two	2

Shields and accessories

Shield Shield

Sometimes life can be a little difficult in the land of electronics when two systems talk a different voltage language. How do you make them talk to each other without making one of them *burn out*? The Shield Shield is the answer. This shield performs all the necessary voltage translation and provides an Arduino-compatible footprint to make it easier for you to plug in your existing Arduino shields or talk to other 5V hardware.



Shield Shield - Operation

We use Texas Instruments TXB0108PWR to do the voltage translation in between the Particle's device's 3.3V to a 5V logic. Unlike other IO pins, the analog pins are rated at only a max of 3.3V and **NOT** 5.0V. Please remember NOT to exceed this voltage at anytime. The shield has an on-board voltage regulator and can be powered from 7V to 15V DC source. You could also power it via the USB plug on the Particle device alone but the current would be limited to 500mA.

Shield Shield Schematic - TXB0108PWR



The new version of the Shield Shield (v3.x.x) uses dedicated mosfet based voltage translation on the I2C lines. We also decided to add a prototyping area in empty space in the middle of the shield.

Shield Shield Schematic - MOSFET I2C

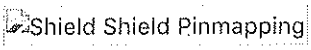




Note: One drawback of using the TXB0108PWR as a voltage translator is that it is only capable of driving loads at short distances. Long length wires will introduce excessive capacitive loading and cause the auto direction detection

to fail. To overcome this drawback, the shield shield also has an optional on-board 74ABT125 buffer that is capable of driving heavier loads in *one* direction. A user can jumper wire to whichever IO pin they would like to be translated to 5V.

Shield Shield - Pin Mapping



Shield	Photon	Peripherals
0	RX	Serial1 RX,PWM
1	TX	Serial1 TX,PWM
2	A2	SPI1_SS
3	WKP	PWM,ADC
4	D6	
5	D0	SDA,PWM
6	D1	SCL,PWM,CAN_TX
7	D7	
8	A5	SPI1_MOSI,PWM
9	A4	SPI1_MISO,PWM
10	D5	SPI3_SS
11	D2	SPI3_MOSI,PWM,CAN_RX
12	D3	SPI3_MISO,PWM
13	D4	SPI3_SCK
A0	A0	ADC**
A1	A1	ADC**
A2	DAC1	DAC,ADC**
A3	DAC2	SPI1_SCL,DAC,ADC**
A4	D0	SDA,PWM*
A5	D1	SCL,PWM*,CAN_TX

* Note: These pins can also function as 3.3V PWM outputs or 3.3V Servo outputs.
** Note: ADC inputs are 3.3V max.

IMPORTANT: The Shield Shield does not map the Particle device's pins to like-numbered pins on the Arduino. In other words, D0 on the Particle device is not the same as D0 on the Arduino. Please review the pin mapping table to the right and plan accordingly.

Shield Shield - Specifications (v3.x.x)

- Operating voltage: 7 to 15V DC
- Current consumption: standalone 7mA at 9V DC
- Voltage translator with auto direction detect: TXB0108PWR
- Dedicated MOSFET based voltage translator on I2C lines
- Separate unidirectional quad buffer for driving heavy loads: 74ACT125
- Diode protection on ADC pins

- Dimensions: 3.4" x 2.1"
- Weight: 28 gms

Drill Template >



Relay Shield

The Relay Shield allows you to take over the world, one electric appliance at a time. Want to control a lamp, fan, coffee machine, aquarium pumps or garden sprinklers? Then this is a solution for you!

The shield comes with four relays that are rated at a max of 220V @10Amp allowing you to control any electric appliance rated at under 2000 Watts. You are not just limited to an appliance though; any gadget that requires high voltage and/or a lot of current can be controlled with this shield.



We have even provided a small prototyping area around the shield for you to add more components or connectors. A temperature sensor to go along with your brewer, maybe?

IMPORTANT: This shield provides regulated power (5V) to the seated Particle device and relays. However, it does not support power to the devices controlled by the relays.

Relay Shield - Library

If you're already logged into Build.particle.io then you can jump directly to the library to get going quickly and easily with the RelayShield library, which wraps all the features in easy-to-use functions.

Examples include: 1. **Blink a Relay** - How to turn a relay on and off 2. **Blink all the Relays** - An extension on the simplest case 3. **Internet Relays** - Creating Particle.function()s so that you can turn relays on and off over the Internet

Relay Shield - Operation

The schematic for the relay shield is simple and self explanatory. The shield has four relays that are controlled by pins D3, D4, D5 and D6 on the Particle device. Each relay is triggered via a NPN transistor that takes a control signal from the Particle device and switches the relay coil ON and OFF, which in turn makes or breaks the electrical contact on the output. There is also a fly-back diode connected across the coil to help protect the transistor from high voltage transients caused during switching.

NOTE: On the under side of the relay shield (top center), you will see 4 solder pads that are by default bridged via traces. You can scratch off the trace to disconnect the control pin from the preassigned ones (D3 to D6) and wire up based on your project requirement.

Relay Shield Schematic - Control



The relays are SPDT (Single Pole Double Throw) type, which means they have three terminals at the output: COMMON (COMM), Normally Open (NO) and Normally Closed (NC). We can either connect the load in between the COMM and NO or COMM and NC terminals. When connected in between COMM and NO, the output remains open/disconnected when the relay is turned OFF and closes/connects when the relay is turned ON. In the later case, the output remains closed/connected when the relay is OFF and opens/disconnects when the relay is ON.

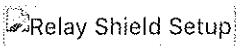
Relay Shield Schematic - Power Supply



The Relay Shield uses a high efficiency RT8259 switch mode voltage regulator that provides a constant 5V to the Particle device and the relays. The regulator is rated at 1.2A max output current which is ample enough to power the Particle device, the four relays and still have left over for other things you may decided to connect later. You can power the shield via the 5.5mm barrel jack or through the screw terminal. There is a reverse polarity protection diode in place so that you don't fry the electronics by plugging in the wires in reverse!

Here is an example setup to control a light bulb. The relay acts like a switch which is normally open and when pin D3 on the Particle device is turned HIGH, it activates Relay 1 thereby closing the circuit on the light bulb and turning it ON. Ta dah!

Relay Shield - Sample Setup



Relay Shield - Sample Code

```
int RELAY1 = D3;
int RELAY2 = D4;
int RELAY3 = D5;
int RELAY4 = D6;

void setup()
{
   //Initilize the relay control pins as output
   pinMode(RELAY1, OUTPUT);
   pinMode(RELAY2, OUTPUT);
   pinMode(RELAY3, OUTPUT);
   pinMode(RELAY4, OUTPUT);
   // Initialize all relays to an OFF state
   digitalWrite(RELAY1, LOW);
   digitalWrite(RELAY2, LOW);
   digitalWrite(RELAY3, LOW);
   digitalWrite(RELAY4, LOW);

   //register the Particle function
   Particle.function("relay", relayControl);
}

void loop()
{
   // This loops for ever
}

// command format r1,HIGH
int relayControl(String command)
{
  int relayState = 0;
  // parse the relay number
  int relayNumber = command.charAt(1) - '0';
  // do a sanity check
  if (relayNumber < 1 || relayNumber > 4) return -1;

  // find out the state of the relay
  if (command.substring(3,7) == "HIGH") relayState = 1;
  else if (command.substring(3,6) == "LOW") relayState = 0;
  else return -1;

  // write to the appropriate relay
  digitalWrite(relayNumber+2, relayState);
  return 1;
}
```

An example API request to this function would look something like this:

```
POST /v1/devices/{DEVICE_ID}/relay

# EXAMPLE REQUEST
curl https://api.particle.io/v1/devices/0123456789abcdef/relay \
  -d access_token=123412341234 -d params=r1,HIGH
```

Relay Shield - Specifications (v3.x.x)

- Operating voltage: 7 to 20V DC
- Current consumption: 150mA min to 290mA max (at 9V DC)
- Relay Max Voltage: 220V AC
- Relay Max Current: 10Amp at 125V AC
- Relay Part Number: JS1-5V-F Data Sheet
- Dimensions: 6.0" x 1.7"
- Weight: 80 gms

Drill Template >



Programmer Shield

Do you want to gain complete control over your Particle device right down to its every bit of memory space? or watch as your code gets executed and debug it? Then this shield should be able to pacify that control freak inside of you.



This is a FT2232H based JTAG programmer shield that is compatible with OpenOCD and Broadcom's WICED IDE. The FT2232 chip is setup to provide an USB-JTAG and USB-UART interface simultaneously. The FT2232 can be also reconfigured by the user by reprogramming the on-board config EEPROM. The unused pins are clearly marked and broken out into easy to access header holes.

The USB-UART interface is connected to the TX and RX of a Particle device and communicates via Serial1



For more instructions on setting up OpenOCD and using the Programmer Shield, please read through the README at the landing page of the Programmer Shield repository on GitHub, linked below:

https://github.com/spark/shields/tree/master/photon-shields/programmer-shield

Programmer Shield - Specifications

- Operating supply: USB
- Current consumption:
- Dimensions: 1.55" x 3.3"
- Weight: 18 gms
- Compatibility: OpenOCD and WICED IDE

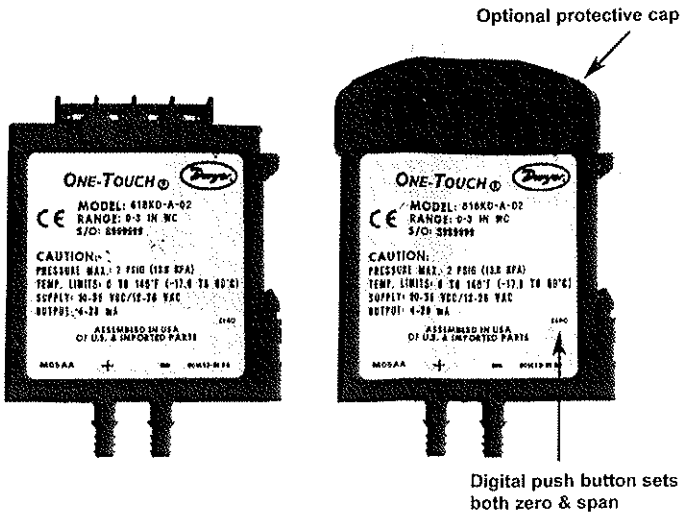
Drill Template >

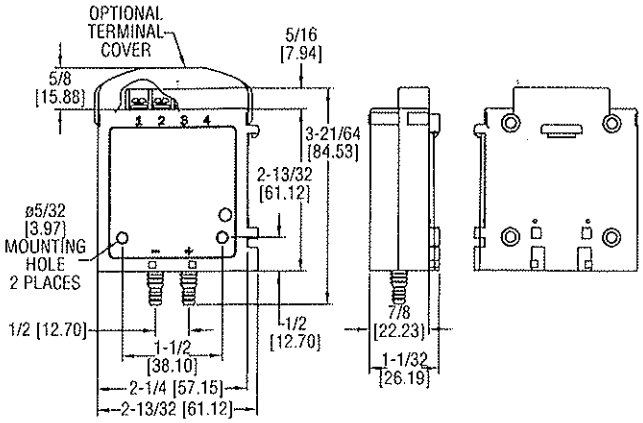


Power Shield

Series 616KD One-Touch® Differential Pressure Transmitter

Specifications – Installation and Operating Instructions





The Series 616KD One-Touch® Differential Pressure Transmitter senses the pressure of air and compatible gases and sends a standard 4 to 20 mA or optional voltage output signal. A wide range of models are available factory calibrated to specific ranges. A single push button properly adjusts both zero and span. New enclosure enables the 616KD-A/B to be mounted on a 35 mm DIN rail either via its side or back DIN rail clips.

INSTALLATION

1. Location
Select a clean, dry mounting location free from excess vibration where the temperature will remain between 20 and 122°F (-6.7 and 50°C). The tubing supplying pressure to the instrument can be practically any length required, but long lengths will increase response time slightly.

2. Position
A vertical position, with pressure connections pointing down, is recommended. That is the position in which all standard models are calibrated at the factory. Consult factory for other position orientations.

3. Pressure Connections
Two integral barbed tubing connections are provided. They are dual-sized to fit both 1/8 and 3/16" (3.12 and 4.76 mm) I.D. tubing. Be sure the pressure rating of the tubing exceeds that of the operating ranges.

4. Electrical Connections:

⚠ CAUTION Do not exceed specified supply voltage ratings. Permanent damage not covered by warranty will result. This unit is not designed for 120 or 240 volts AC line operation.

Electrical connections are made to the terminal block located on the top of the transmitter. Terminals are marked 1, 2, 3 and 4 as shown below. Determine which of the following circuit drawings applies to your application and wire accordingly. Shielded cable is recommended. Ground the shield at the power supply end only.

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Accuracy: 616KD-A: ±0.25% FS; 616KD-B: ±1% FS; 616KD-C: ±2% FS.
Stability: ±1% FS/year.
Temperature Limits: 0 to 140°F (-17.8 to 60°C).
Compensated Temperature Range: 20 to 122°F (-6.67 to 50°C).
Pressure Limits: 2 psig (ranges 5 in w.c. or lower); 5 psig (ranges 10 to 40 in w.c.).
Thermal Effect: 616KD-A: ±0.02% FS/°F; 616KD-B: ±0.04% FS/°F; 616KD-C: ±0.06 FS/°F, includes zero and span.
Power Requirements: 4 to 20 mA output: 10 to 35 VDC (2 wire) or 12 to 26 VAC (4 wire); 5V output: 10 to 35 VDC (3 wire) or 12 to 26 VAC (4 wire); 10V output: 13 to 35 VDC (3 wire) or 12 to 26 VAC (4 wire).
Output Signal: 4 to 20 mA or option with field selectable 0 to 10, 0 to 5, 2 to 10, 1 to 5 volts.
Zero and Span Adjustments: Push button.
Loop Resistance: 4 to 20 mA output (DC): 0 to 1250 Ω max. Rmax = 50(VpsDC - 10) Ω; 4 to 20 mA output (AC): 0 to 1200 Ω max. Rmax = 50(1.4 VpsAC -12) Ω; Voltage output: 5K Ω minimum.
Current Consumption: 24 mA max.
Warm Up Time: 20 minutes.
Electrical Connections: Screw-type terminal block.
Process Connections: Barbed, dual size to fit 1/8" & 3/16" (3 mm & 5 mm) ID rubber or vinyl tubing.
Enclosure Rating: NEMA1 (IP20).
Mounting Orientation: Vertical with pressure connections pointing down.
Weight: 1.8 oz (51 g).
Agency Approvals: CE.

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Fax: 219/872-9057 e-mail: info@dwyermail.com

4.1: 4 to 20 mA OUTPUT CONNECTIONS

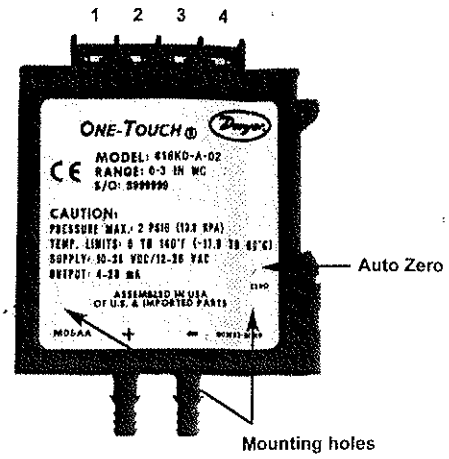


Figure 1

4.2: VOLTAGE OUTPUT CONNECTIONS

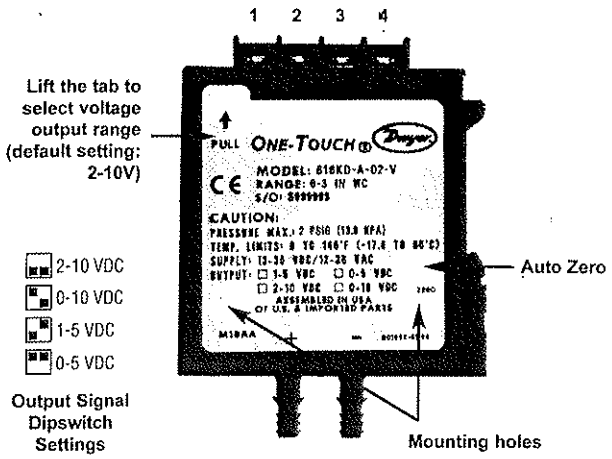
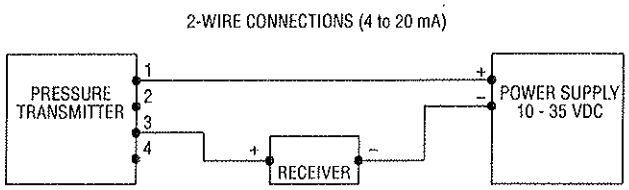
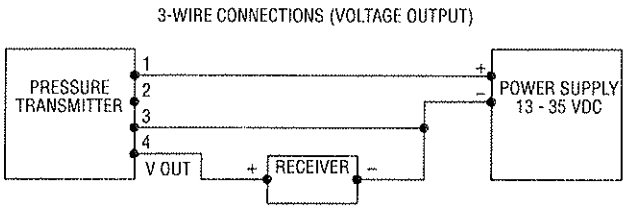
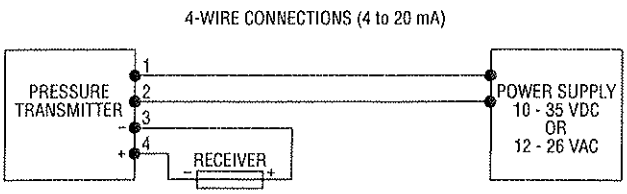


Figure 3







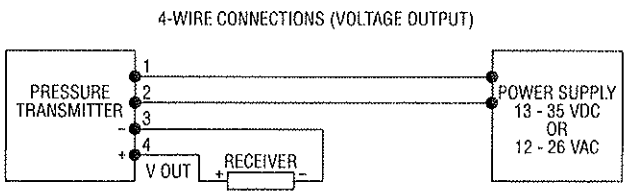


Figure 2

Figure 4

ZERO ADJUSTMENT
A single push button is provided to zero the transmitter. Allow transmitter to warm up for 20 minutes. The zero calibration can be set by applying zero pressure to both the pressure ports and pressing the zero button for 2 seconds. Span is factory calibrated to the range specified on the label. There is no user span adjustment necessary.

CHANGING OUTPUT SIGNAL
To change output signal see dipswitch settings in Figure 3 -- OUTPUT SIGNAL DIPSWITCH SETTINGS.

MAINTENANCE/REPAIR
Upon final installation of the Series 616KD no routine maintenance is required. The Series 616KD is not field serviceable and should be returned if repair is needed. Field repair should not be attempted and may void warranty.

WARRANTY/RETURN
Refer to "Terms and Conditions of Sales" in our catalog and on our website. Contact customer service to receive a Return Goods Authorization number before shipping the product back for repair. Be sure to include a brief description of the problem plus any additional application notes.

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APPENDIX J

FIELD ACTIVITIES FORM

FIELD AUDIT FORM

Site: _____ Date: _____

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

_____ Project: _____

_____

1. Is safety equipment in use (hardhats, respirators, gloves etc.): YES NO

2. Is a decontamination station, equipment and supplies on site and in working order:

Methanol	YES	NO
Alconox	YES	NO
D.I. Water	YES	NO
Scrub Brushes	YES	NO
Steam Cleaner	YES	NO

Comments: _____

_____

_____

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

Comments: _____

_____

_____

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

Comments: _____

_____

_____

FIELD AUDIT FORM
(continued)

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

   Comments: _____

   _____

   _____

6. Are field forms filled out properly, legibly and timely:

Field Log Book	YES	NO
Chain of Custody	YES	NO
Equipment Calibration Log	YES	NO
Daily Field Activity Report	YES	NO
Location Sketch	YES	NO
Sample Information Record	YES	NO
Equipment Usage Form	YES	NO
Boring Logs	YES	NO

   Comments: _____

   _____

   _____

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

   Comments: _____

   _____

   _____

FIELD AUDIT FORM
(continued)

8. Are there adequate sample containers, including deionized water for QA/QC:

Field Blanks	YES	NO
Trip Blanks	YES	NO

Comments: _____

_____

_____

9. Is the equipment decontaminated in accordance with project requirements:

Sampling equipment	YES	NO
Construction equipment	YES	NO

Comments: _____

_____

_____

10. Is field measurement equipment calibrated:

Daily	YES	NO
Properly	YES	NO

Comments: _____

_____

_____

11. Are samples collected and labeled properly: YES NO

Comments: _____

_____

_____

FIELD AUDIT FORM
(continued)

12. Are samples stored at 4°C: YES NO

Comments: _____

_____

_____

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

Comments: _____

_____

_____

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

Comments: _____

_____

_____

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

Comments: _____

_____

_____

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

Comments: _____

_____

_____

FIELD AUDIT FORM
(continued)

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

Comments: _____

_____

_____

18. Are quality control samples taken:

Trip Blanks	YES	NO
Field Blanks	YES	NO

Comments: _____

_____

_____

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

Comments: _____

_____

_____

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

Comments: _____

_____

_____

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

_____ _____

Dated Signed

FIELD AUDIT FORM
(continued)

General Comments: _____

_____

_____

_____

APPENDIX K

REMEDIAL SYSTEM OPTIMIZATION TABLE OF CONTENTS

APPENDIX K

RSO TABLE OF CONTENTS

1. Introduction
2. Reason for performing a Remedial System Optimization (RSO) Study
3. Status of Property Ownership, Management and Occupancy
4. Current Status of Remedial System
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6. Estimated Time Frame for Completion of Remedial Activities
7. Causes for Remedial System Cost Overrides
8. Changes in Site Conditions
9. Changes in Remaining Contamination
10. Summary of Revised Site Conceptual Model
11. Summary of Past Performance
12. Summary of Current Cleanup Practices
13. Summary of Progress towards Site's Cleanup Goals
14. Availability of Alternative Remedial Technologies
15. Recommendations to enhance Remedial System's ability to reach RAOs