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September 27, 2018

New York State Department of Environmental Conservation
Division of Environmental Remediation
Hunters Point Plaza
47-40 21st Street
Long Island City, New York 11101-5401

Attn: Mr. Manfred Magloire

RE: Sub-Slab Depressurization System Construction Completion Report
43-18 56th Street, Woodside, New York
Brownfield Cleanup Program Site Number C241129
LEA Comm. No. 07MD012.010

Dear Mr. Magloire:

On behalf of Black & Decker (U.S.) Inc., enclosed please find one copy of the Sub-Slab Depressurization System (SSD) Construction Completion Report for the above referenced property. The SSD system was constructed in connection with remediation activities for the DeWalt Service Center at 56-15 Queens Boulevard in Woodside, New York.

If you should have any questions concerning the enclosed report, please feel free to contact me at (860) 410-2904.

Sincerely,

LOUREIRO ENGINEERING ASSOCIATES, INC.

Kevin J. Bitjeman, L.E.P.
Senior Project Manager

CC: Kathryn Hinckley, Stanley Black & Decker
Dawn Hettrick, New York State Department of Public Health

SUB-SLAB DEPRESSURIZATION SYSTEM
CONSTRUCTION COMPLETION REPORT

43-18 46th Street
Woodside, New York

September 2018

Prepared for

BLACK & DECKER (U.S.), INC.
1000 Stanley Drive
New Britain, Connecticut 06053

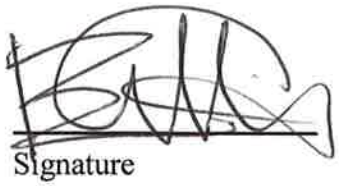
Prepared by

LOUREIRO NY, PC
100 Northwest Drive
Plainville, Connecticut 06062

Comm. No. 07MD012

CERTIFICATION

I Brian A. Cutler certify that I am currently a NYS registered professional engineer, I had primary direct responsibility for the implementation of the subject construction program, and I certify that the Sub-Slab Depressurization System Work Plan was implemented and that all construction activities were completed in substantial conformance with the NYSDEC-approved Sub-Slab Depressurization System Work Plan.

085706	3/25/18	
NYS Professional Engineer #	Date	Signature

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APPENDICES

ACRONYMS

EPA	Environmental Protection Agency
I.D.	Internal Diameter
IRM	Interim Remedial Measure
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PRR	Periodic Review Report
PVC	Polyvinyl Chloride
SMP	Site Management Plan
SSD	Sub-Slab Depressurization
TCE	Trichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
VOCs	Volatile Organic Compounds

UNITS

cfm	Cubic feet per minute
$\mu g/m^3$	Micrograms per cubic meter
w.c.	Water column

1. INTRODUCTION

Loureiro Engineering Associates, Inc. (Loureiro) was retained by Black & Decker (U.S.), Inc. (Black & Decker) to install a sub-slab depressurization (SSD) system at 43-18 56th Street in Woodside, New York (hereinafter referred to as "the Site"). A Site Location Map derived from the 7.5 minute series topographic map for the Brooklyn, New York quadrangle is included as Figure 1-1. The Site is located at latitude 40° 44' 35" north and longitude -73° 54' 34" west. The SSD system was installed in conjunction with remediation and monitoring activities at the DeWalt Service Center property, 56-15 Queens Boulevard, Woodside, New York (Site No. C241129).

Installation of the SSD system was completed at the Site as an Interim Remedial Measure (IRM) to mitigate intrusion hazards associated with chlorinated volatile organic compounds (VOCs) in soil vapor beneath the concrete slab. The SSD system was installed in accordance with the *Generic Work Plan – Sub-Slab Vapor Depressurization System Installation* by Loureiro dated April 6, 2011. A copy of the work plan and the approval letter by the New York State Department of Environmental Conservation (NYSDEC) dated April 7, 2011 is presented as Appendix A. Loureiro delegated design and oversight of the SSD system to Loureiro NY, PC, organized and doing business under the laws of the State of New York. This report summarizes results of the initial soil vapor assessment, pilot testing, design and installation activities, operation and maintenance procedures, and future reporting.

1.1 Site Description

The Site is located northwest of the Queens Boulevard and 56th Street intersection. According to the New York City Department of Finance, Office of the City Register, the Site occupies Block 1325, Lot 88. The Site is located in an area of mixed residential and commercial development and is zoned *R5B* for Residential. The Site is bounded to the west by a residence at 43-15 55th Street, a row of residential units to the north, 56th Street to the east, and to the south by a residence at 43-20 56th Street. An aerial view of the Site and abutting properties is presented as Figure 1-2.

The Site is a 2,428-square foot, rectangular parcel improved by a two story, 2,192-square foot, brick, residential building. The building was constructed on a poured concrete foundation in the 1920s. Interior construction includes sheetrock or plaster walls and ceilings, masonry walls, and hardwood or concrete flooring. The basement has been set up as living space and includes a studio apartment, storage room, utility room, boiler room with a natural gas furnace and hot

water heater, and a set of stairs leading to the first floor. An outdoor patio abuts the eastern wall of the building and is accessible from the first floor by means of an exterior door.

1.2 Soil Vapor and Indoor Air Assessment Summary

Soil vapor and ambient air samples were collected at the Site in March, 2014, January, 2015, and January, 2016. One soil vapor sample (including one duplicate), one indoor air sample, and one background air sample were collected over a 24-hour period during each sampling event. The soil vapor and indoor air samples were collected from the central portion of the basement. The background air sample was collected on the outdoor patio. Sampling was conducted in accordance with a work plan approved by NYSDEC and the New York State Department of Health (NYSDOH).

All samples were submitted to Air Toxics, Ltd of Folsom, California for laboratory analysis for VOCs by EPA Method T0-15. Laboratory analytical results are summarized in Tables 1-1 through 1-3. Several VOCs were detected in the sub-slab soil vapor samples, including trichloroethylene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA) at maximum concentrations of 85 micrograms per cubic meter ($\mu g/m^3$) and 10 $\mu g/m^3$, respectively. TCE was also detected in the March 2014 indoor air sample at a concentration of 0.59 $\mu g/m^3$, but was below laboratory limits in samples of indoor air collected in January 2015 and January 2016. TCA in indoor air samples was below laboratory limits during all three sampling events.

2. DESCRIPTION OF SELECTED REMEDY

This section provides an overview of the IRM completed at the Site in accordance with the *Generic Work Plan – Sub-Slab Vapor Depressurization System Installation* by Loureiro dated April 6, 2011.

2.1 Remedial Action Objectives

The objective of the IRM was to mitigate the potential for vapor intrusion by creating a negative pressure environment immediately below the concrete slab. The selected remedy included the installation of an SSD system, which operates using a "radon type" fan that extracts vapors from beneath the slab and discharges them to the atmosphere through an exterior vent pipe. Additional details regarding the SSD system construction are presented in the Home Owner Information Packet in Appendix B and summarized in the sections below. The SSD system is intended to operate continuously until such time as it can be demonstrated that the VOCs in soil vapor no longer pose a risk of intrusion into the overlying structure.

Indoor air guidelines have been established by NYSDOH for TCE and several other chemicals in air. New York State currently does not have any standards, criteria, or guidance values for concentrations of VOCs in soil vapor. Additionally, there are currently no databases available for background levels of VOCs in soil vapor.

2.2 Description of Interim Remedial Measure

The SSD system includes five suction points (designated S1 through S5) that are constructed of three-inch internal diameter (I.D.) metal pipe (electrical metallic tubing). Each point was installed within a shallow pit after a 4-inch diameter core was advanced through the concrete slab. Suction holes S1 and S3 were installed within the utility room located in the eastern portion of the basement. Suction hole S2 was installed within a storage closest located in the central portion of the basement under the staircase. Suction hole S4, also located in the central portion of the basement, was installed within a closest to the north of the staircase. Suction hole S5 was installed in the western portion of the basement within the boiler room.

Each suction point was connected to a 3-inch I.D. metal pipe equipped with a 3-inch I.D. polyvinyl chloride (PVC) ball valve. All interior pipe fittings are cast iron. Metal piping from each such point was extended through the concrete foundation and connected to a 4-inch I.D. PVC pipe affixed to the exterior wall of the building. This pipe was extended to a "radon-type" fan installed on the building roof. The fan vents through a section of 6-inch I.D. PVC pipe at

approximately 10 feet above the roof line. Specifications for the fan are presented in Appendix B.

3. VAPOR MITIGATION SYSTEM DESIGN AND CONSTRUCTION

This section summarizes the design, installation, and final testing of the SSD system. The SSD system was installed and activated on February 5 and 6, 2018.

3.1 Contractors and Consultants

Mitigation activities at the Site were overseen by Loureiro NY, PC on behalf of Black & Decker. Subcontractors were utilized as necessary to ensure successful completion of the project. A list of subcontractors and their associated tasks is provided below.

- WPB Enterprises, Inc., Riegelsville, Pennsylvania
    - Completed pilot testing, design, and installation of the SSD system under the supervision of Loureiro NY, PC. WPB Enterprises was assisted with permitting and installation by Obar Systems, Inc. of Newfoundland, New Jersey. Both WBP Enterprises and Obar are certified National Radon Proficiency Program Residential Mitigation Providers. Copies of program certifications are provided in Appendix C.
- Delta Geophysics, Catasauqua, Pennsylvania
    - Conducted underground utility clearances using ground-penetrating radar and other techniques.

3.2 Sub-Slab Depressurization System Pilot Testing and Design

Pilot testing of the SSD system was conducted by WPB Enterprises, Inc. on August 9, 2016 using two vacuum points (designated as V1 and V2) installed beneath the concrete slab. Vacuum point V1 was installed within the utility room in the eastern portion of the basement. Vacuum point V2 was installed in the western portion of the basement within the boiler room. No evidence of a crushed stone or gravel aggregate was encountered beneath the concrete slab. Subsurface materials encountered at the slab penetration points consisted of rounded boulders and sand.

Five diagnostic test hole (designated T1 through T5) were installed in the locations shown on Figure 3-1 for measurement of sub-vacuum during pilot testing. Each test hole consisted of a 3/8-inch vapor probe installed directly below the concrete slab. An air-tight seal was created between the vapor probe and slab using silicone caulk.

Each pilot test was conducted using a shop vacuum to extract air from beneath the concrete slab. Vacuum measurements were recorded at selected test points using a digital micro-monometer capable of measuring vacuum to -0.0025 inches of water column (w.c.).

Vacuum Point V1

Testing of vacuum point V1 was conducted at a vacuum of 9-inches of w.c. and a maximum flow rate of 75 cubic feet per minute (cfm). Vacuum measurements recorded during pilot testing of vacuum point V1 are presented in the table below.

Test Hole Designation	Distance from V1 (feet)	Vacuum Measurements (inches of w.c.)		
		75 cfm	20 cfm	0 cfm
T1	4	-13.0	-2.0	+0.1
T2	5	-14.2	-2.1	+0.2
T3	27	-0.9	-0.1	+0.0
T4	34	-0.6	+0.1	-0.3

Field measurements recorded during the pilot testing of V1 indicated the presence of a vacuum at -0.6 to -14.2 inches of water column at an air extraction rate of 75 cfm. All vacuum readings were all above the goal of -0.004 inches of w.c. established in the *Generic Work Plan – Sub-Slab Vapor Depressurization System Installation* by Loureiro dated April 6, 2011.

Vacuum Point V2

Testing of vacuum point V2 was conducted at a vacuum of 9-inches of w.c. and a maximum flow rate of 88 CFM. Vacuum measurements recorded during pilot testing of vacuum point V2 are presented in the table below.

Test Hole Designation	Distance from V2 in feet	Vacuum Measurements (inches of w.c.)		
		88 cfm	22 cfm	0 cfm
T1	30	-0.2	-0.0	+0.1
T2	29	-0.2	-0.0	+0.0
T3	12	-5.8	-1.2	+0.0
T5	8	-48.2	-8.9	-0.3

Field measurements recorded during the pilot testing of V2 indicated the presence of a vacuum at -0.2 to -48.2 inches of w.c. at an air extraction rate of 88 cfm. The vacuum readings were all above the goal of -0.004 inches of w.c.

Based on the results of pilot testing, a final design was developed by WPB Enterprises, Inc. that included five permanent extraction points. A model GBR 89 fan was selected to achieve the required air flow.

3.3 Site Preparation

A pre-construction inspection of the basement floor was conducted to identify holes, cracks, expansion joints, or other penetration points in the slab. A sump was observed near the southern wall of the utility room. The sump walls were sealed with cement. No holes, cracks, or expansion joints were observed within the basement floor.

3.4 Construction Activities

Construction of the SSD system was started on February 5, 2018 and completed on February 6, 2018 by WPB Enterprises, Inc. and Obar Systems, Inc. under the supervision of Loureiro NY, PC. An as-built drawing of the SSD system was generated by Loureiro NY, PC during construction activities and is presented as Figure 3-2. Photographs of the SSD system construction are presented in Appendix D.

Four-inch diameter cores were advanced through the concrete slab for suction holes S1 through S5. Soil beneath the slab was removed to a depth of one foot below the base of the slab to create a shallow "suction pit". The open end of a 3-inch I.D. metal pipe was then inserted into each suction pit to a depth of one inch below the slab. The space between the pipe and surrounding concrete slab was then filled with silicone caulk and non-shrink cement. Each section of 3-inch I.D. metal pipe was extended vertically from the extraction point to a 3-inch I.D. PVC ball valve, elbowed at a 90-degree angle, and connected to a horizontal lateral consisting of 3-inch I.D. metal pipe.

Piping from suction holes S3, S4, and S5 were joined at the northern wall of the basement using 3" I.D. metal pipe and cast iron fittings. Suction holes S1 and S2 were joined in a similar manner at the southern wall of the basement. The two piping laterals were then extended to a single connection point in the southeast corner of the utility room.

A Magnehelic style vacuum meter was installed on the horizontal section of piping between suction points S1 and S3. The meter measures differential pressure with a column of water and

its primary function is to allow the home owner or tenant to visually confirm that the SSD system is operating.

The two horizontal vacuum laterals (S1/S2 and S3/S4/S5) were extended overhead to the utility room and connected to a section of 4" I.D. metal piping using cast iron fittings. This piping was installed within a cored penetration hole in the basement wall, elbowed upward, and fastened to the exterior of the building. The penetration hole was sealed after installation of the piping using urethane caulk and non-shrink cement.

Exterior piping for the SSD system was connected to a GBR 89 fan installed on the eastern portion of the roof. Electrical conduit was routed from the fan to the existing circuit breaker box located in the utility room by a licensed electrician. The fan and all electrical components are rated for outdoor use.

The fan exhaust port was connected to a six-inch I.D. PVC pipe that extends above the roof line. No air intakes, vents, or adjacent buildings are located within 10 feet of the exhaust point. A moisture by-pass was installed within the downspout to direct condensation away from the fan motor and prevent water damage. The fan was secured to the suction line and exhaust by means of flexible adaptors for ease of future maintenance or replacement.

3.5 Labeling of System Components

Labeling of system components was conducted in accordance with the *Generic Work Plan – Sub-Slab Vapor Depressurization System Installation*. Labels stating "Vapor Intrusion Mitigation System Do Not Alter" were placed on piping associated with each vacuum point. Each label contains a phone number to call if any issues arise. The electrical circuit used to control the depressurization fan was labeled as "VIM fan".

4. POST-INSTALLATION TESTING

This section summarizes the testing performed at start-up to ensure that the SSD system was functioning properly and in accordance with design objectives. Post-installation testing was conducted after construction was completed on February 6, 2018.

4.1 Leak Inspection

With the SSD system operating, smoke tubes were used to confirm the absence of vacuum loss through fittings or surface seals. No leaks in the piping system or surface seals were observed. In addition, no preferential air flow toward the suction holes or piping was observed following the release of smoke at various locations within the basement.

4.2 Meter Testing

The vacuum meter was tested by deactivating and restarting the SSD system and observing the change in measurements. The SSD system is functioning properly if the meter is reading above 0 inches of w.c., indicating the presence of a vacuum. A vacuum pressure of -1.0 inches of w.c. was recorded with the SSD system operating.

4.3 Final Sub-Slab Vacuum Measurements

Two diagnostic test holes (designated T1 and T2) were installed in the locations shown on Figure 3-2 for measurement of vacuum beneath the concrete slab under operating conditions. Vacuum measurements were recorded using a digital micro-manometer after the SSD system was activated on February 6, 2018. Vacuum measurements are presented in the table below.

Test Hole Designation	Distance from Suction Hole S1 (feet)	Distance from Suction Hole S2 (feet)	Distance from Suction Hole S3 (feet)	Distance from Suction Hole S4 (feet)	Distance from Suction Hole S5 (feet)	Vacuum (inches of w.c.)
T1	30	14	28	8	12.5	-0.37
T2	12	32.5	8	28	38	-0.27

Vacuum readings greater than the -0.004 inches of w.c. goal established in the *Generic Work Plan – Sub-Slab Vapor Depressurization System Installation* were recorded at both test holes.

5. OPERATION, MAINTENANCE, AND MONITORING

Routine maintenance and monitoring will be conducted within 12 months of the SSD system activation date. Maintenance and monitoring will occur approximately every 12 months thereafter in accordance with the NYSDEC approved *Site Management Plan* (SMP) for the DeWalt Service Center dated December 2015. Maintenance and monitoring protocols for offsite SSD systems installed in conjunction with the DeWalt Service Center remediation project were developed in accordance with the NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006 and include the following:

- Visual inspection of the SSD system, including the fan, piping, manometer, and labeling;
- Identification and repair of any leaks; and
- Inspection of the exhaust to verify that no new air intakes have been located nearby.

Each inspection will be performed using the *Sub-Slab Depressurization System Operation, Maintenance and Monitoring Checklist* in Appendix E.

Preventative maintenance, repairs, and adjustments will be made as necessary to ensure that the system continues to operate effectively. The home owner information packet in Appendix B includes instructions for recognizing and reporting maintenance issues. Repair or replacement of any SSD system components will be coordinated by Loureiro NY, PC with WPB Enterprises, Inc. All future maintenance activities will be reported to NYSDEC annually, as described in Section 6.0.

6. REPORTING

Inspection, maintenance, repairs, or operational adjustments to the SSD system will be documented in the annual *Periodic Review Report* (PRR) for the DeWalt Service Center. The PRR will include a photographic log documenting any repairs or modifications that have been completed since the prior reporting period. Inspection and maintenance records generated during each Site visit will also be included.

TABLES

TABLE 1-1
SUMMARY OF VOCs DETECTED IN SOIL VAPOR AND AMBIENT AIR
March 24, 2014
43-18 56th Street, Woodside, New York

Constituent	Location ID	Sub-Slab Soil Vapor Sample (VP-4318-56)	Sub-Slab Soil Vapor Sample - Duplicate (VP-4318-56)	Indoor Air Sample (IA-4318-56)	Outdoor Air Sample (OA-4318-56)
	Sample ID	**1297839**	**1297840**	**1297838**	**1297841**
	Sample Date	3/24/2014	3/24/2014	3/24/2014	3/24/2014
	Laboratory	Eufin-Air Toxis	Eufin-Air Toxis	Eufin-Air Toxis	Eufin-Air Toxis
	Laboratory ID	1403542-02A	1403542-03A	1403542-01A	1403542-04A
1,1,1-Trichloroethane (TCA)	ug/m^3	6.0	5.7	<0.47	<0.42
1,2,4-Trimethylbenzene	ug/m^3	1.4	1.9	1.4	<0.75
1,4-Dichlorobenzene	ug/m^3	8.3	7.0	<0.52	<0.46
2-Butanone (MEK)	ug/m^3	8.8	8.4	<2.6	<2.2
Benzene	ug/m^3	0.92	0.93	0.6	0.76
Carbon Tetrachloride	ug/m^3	1.3	1.3	<0.22	<0.19
Chloroform	ug/m^3	3.0	2.7	<0.85	<0.75
cis-1,2-Dichloroethylene	ug/m^3	1.7	1.8	<0.69	<0.61
Cyclohexane	ug/m^3	<0.64	0.86	<0.60	<0.53
Dichlorodifluoromethane	ug/m^3	2.4	2.5	2.2	2.1
Ethanol	ug/m^3	12.0	13.0	34.0	5.1
Methylene Chloride	ug/m^3	4.4	5.3	4.0	<1.1
n-Hexane	ug/m^3	0.99	0.96	<061	<0.54
o-Xylene	ug/m^3	<0.81	0.98	<0.76	<0.66
Tetrachloroethylene (PCE)	ug/m^3	4.7	4.7	<0.59	<0.52
Toluene	ug/m^3	6.4	7.1	1.90	1.3
Trichloroethylene (TCE)	ug/m^3	65.0	64.0	0.23	<0.16
Trichlorofluoromethane	ug/m^3	3.4	3.2	1.2	1.0
Xylenes,m- & p-	ug/m^3	1.6	2.6	1.4	<0.66

Notes:

μg/m^3 - micrograms per cubic meter of air

VOCs - Volatile organic compounds

TABLE 1-2
SUMMARY OF VOCs DETECTED IN SOIL VAPOR AND AMBIENT AIR
January 15, 2015
43-18 56th Street, Woodside, New York

Constituent	Location ID	Sub-Slab Soil Vapor Sample (VP2-4318-56)	Sub-Slab Soil Vapor Sample (VP2-4318-56)	Outdoor Air Sample (OA2-4318-56)	Indoor Air - Basement (IA2-4318-56)
	Sample ID	**1342455**	**1342456**	**1342458**	**1342457**
	Sample Date	1/15/2015	1/15/2015	1/15/2015	1/15/2015
	Laboratory	Eurfin - Air Toxic	Eurfin - Air Toxic	Eurfin - Air Toxic	Eurfin - Air Toxic
	Lab. Number	1501237-01A	1501237-02A	1501237-04A	1501237-03A
Benzene	µg/m^3	1.7	1.1	0.97	1.5
Chloroform	µg/m^3	4	1.8	<0.65	<0.80
Dichlorodifluoromethane	µg/m^3	2.5	2.5	2.2	2.5
Ethanol	µg/m^3	66	180 E	8.4	310 E
Methylene Chloride	µg/m^3	2.9	10	<0.93	12
Tetrachloroethylene (PCE)	µg/m^3	4.5	1.8	<0.45	2
Toluene	µg/m^3	27	11	3.1	15
Trichlorofluoromethane	µg/m^3	9.3	4.5	1.2	1.4
n-Hexane	µg/m^3	2.4	1.4	0.65	1.3
Carbon Tetrachloride	µg/m^3	3.9	1.7	0.47	0.58
Xylenes,m- & p-	µg/m^3	31	12	2.6	24
1,1,1-Trichloroethane (TCA)	µg/m^3	10	4	<0.36	<0.44
2-Butanone (MEK)	µg/m^3	6.2	4.7	<2.0	<2.4
Trichloroethylene (TCE)	µg/m^3	85	20	<0.14	0.59
1,2,4-Trimethylbenzene	µg/m^3	17	6.2	1.7	21
1,3,5-Trimethylbenzene	µg/m^3	4	1.5	<0.66	4.7
1,4-Dichlorobenzene	µg/m^3	5.2	3	0.94	6.3
cis-1,2-Dichloroethylene	µg/m^3	2	0.65	<0.53	<0.65
Cyclohexane	µg/m^3	1.2	0.54	<0.46	<0.56
Ethylbenzene	µg/m^3	7.6	3.1	0.68	5.3
o-Xylene	µg/m^3	10	3.7	0.98	7.9
Styrene	µg/m^3	3.3	1.3	<0.57	2.5

Notes:

E - concentration exceeds the calibration range of the instrument

µg/m^3 - micrograms per cubic meter of air

TABLE 1-3
SUMMARY OF VOCs DETECTED IN SOIL VAPOR AND AMBIANT AIR
January 06, 2016
43-18 56th Street, Woodside, New York

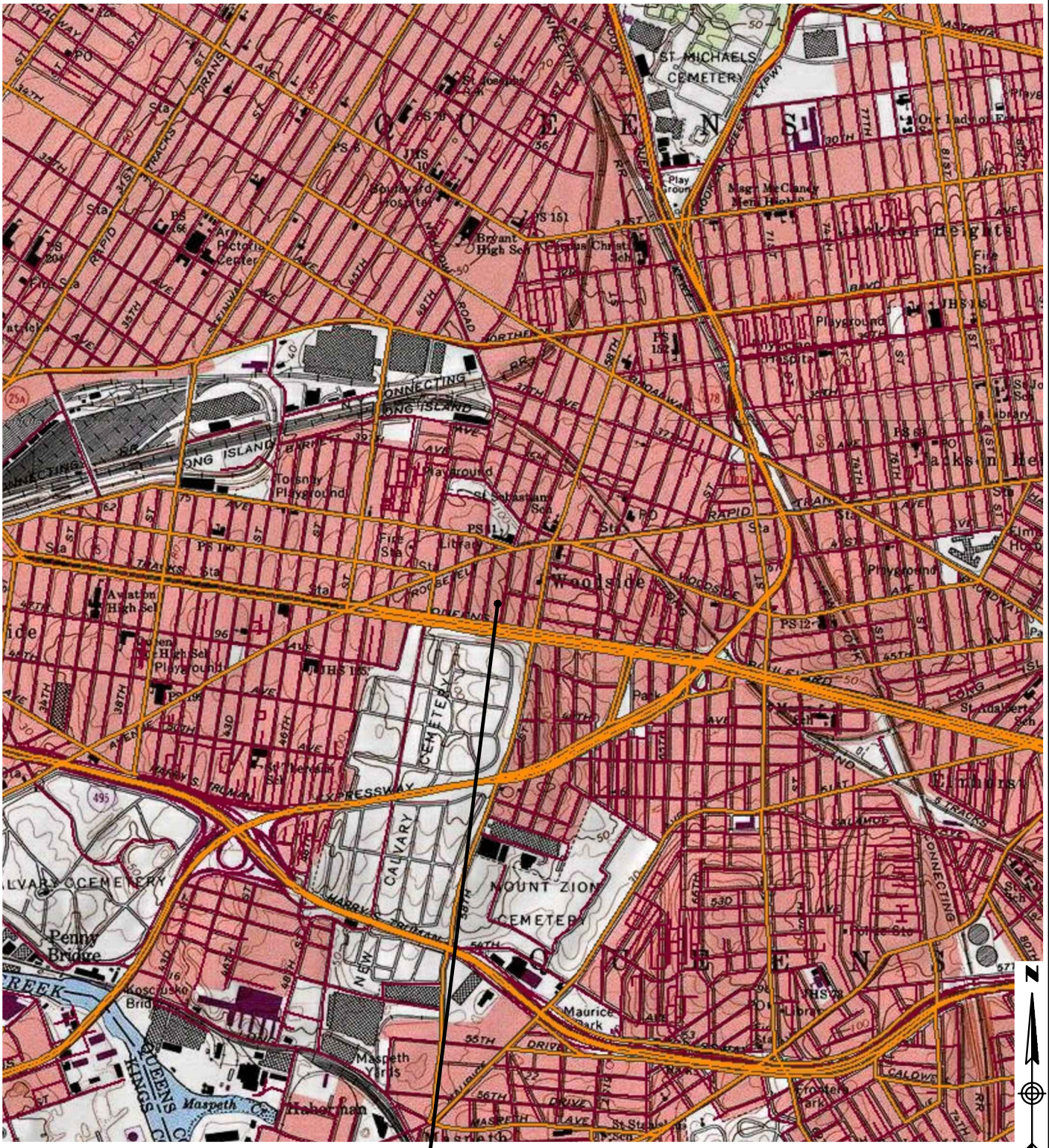
Constituent	Location ID	Sub-Slab Soil Vapor Sample (VP-4318-56)	Outdoor Air Sample (OA3-4318-56)	Indoor Air - Basement (IA3-4318-56)
	Sample ID	**1352438**	**1352440**	**1352439**
	Sample Date	1/6/2016	1/6/2016	1/6/2016
	Laboratory	Eurofins-Air Toxics	Eurofins-Air Toxics	Eurofins-Air Toxics
	Lab. Number	1601129-01A	1601129-03A	1601129-02A
Benzene	µg/m³	1	2.1	2.1
Chloroform	µg/m³	2.6	<0.63	2.6
Dichlorodifluoromethane	µg/m³	2.2	2.1	2.2
Ethanol	µg/m³	22	25	180E
Methylene Chloride	µg/m³	52	1.5	22
Tetrachloroethylene (PCE)	µg/m³	6.4	0.84	1.8
Toluene	µg/m³	71	6.7	23
Trichlorofluoromethane	µg/m³	2.3	1.3	1.3
n-Hexane	µg/m³	1.5	1.8	59
Carbon Tetrachloride	µg/m³	1.1	0.32	0.43
Xylenes,m- & p-	µg/m³	7.3	2.6	5.7
1,1,1-Trichloroethane (TCA)	µg/m³	2.6	<0.35	<0.36
2-Butanone (MEK)	µg/m³	6.1	1.9	3.2
Trichloroethylene (TCE)	µg/m³	55	<0.14	4.5
1,2,4-Trimethylbenzene	µg/m³	3.7	0.78	1.4
1,3,5-Trimethylbenzene	µg/m³	1.3	<0.63	<0.65
1,4-Dichlorobenzene	µg/m³	14	<0.39	22
cis-1,2-Dichloroethylene	µg/m³	2.3	<0.51	<0.52
Cyclohexane	µg/m³	0.71	0.63	4.7
Ethylbenzene	µg/m³	1.6	0.79	2.9
o-Xylene	µg/m³	2.4	0.97	1.9
Styrene	µg/m³	<0.68	<0.55	1.4

Notes:

E - concentration exceeded the calibration range of the instrument

µg/m^3 - micrograms per cubic meter of air

FIGURES



MAP REFERENCE :
PORTION OF 7.5 MINUTE SERIES MAP FOR THE BROOKLYN, NY QUADRANGLE. TAKEN FROM TOPO!® CD VERSION 4.2.6 . © 2006 NGHT, INC.© 2006 TELE ATLAS NORTH AMERICA, INC.

Loureiro
Engineering • Construction • EH&S • Energy
Waste • Facility Services • Laboratory

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An Employee Owned Company • www.Loureiro.com

SITE LOCATION MAP

INTERIM REMEDIAL MEASURE CONSTRUCTION COMPLETION REPORT
43-18 56TH STREET, WOODSIDE, NEW YORK
PREPARED FOR:
STANLEY BLACK & DECKER
1000 STANLEY DRIVE, NEW BRITAIN, CONNECTICUT 06053

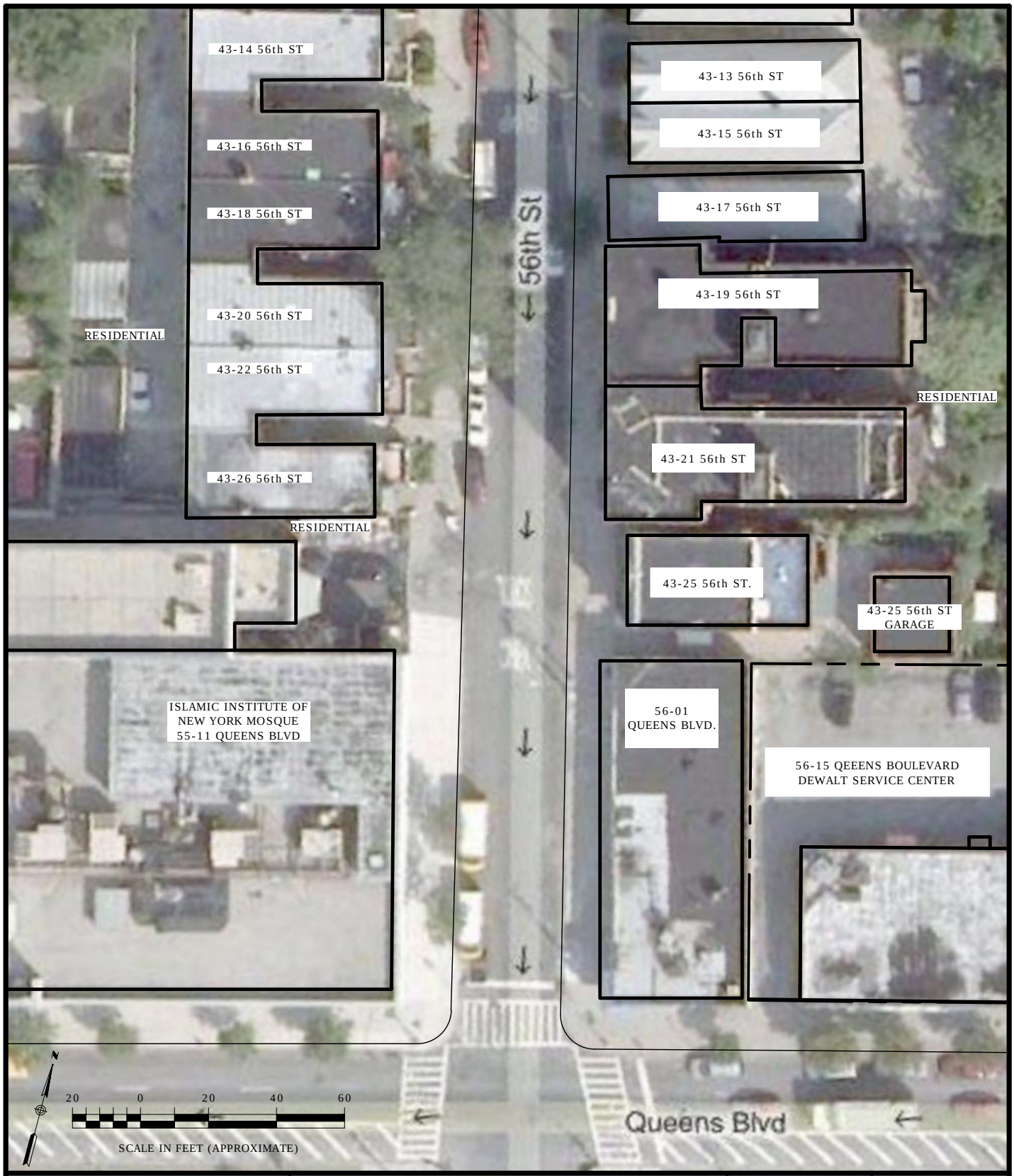
SCALE
1" = 2000'

COMM. NO.
07MD012.010

DATE
02/09/2018

FIGURE
1-1

V:\NY\NEW YORK CITY\WOODSIDE\56TH STREET - 43-18\PLANS & DRAWINGS\07MD012 CCR USGS.DWG Tab: F1-1 Saved: 2/9/2018 11:04 AM Plotted: 2/9/2018 11:04 AM



Loureiro
Engineering • Construction • EH&S • Energy
Waste • Facility Services • Laboratory
Loureiro Engineering Associates, Inc.
100 Northwest Drive • Plainville, Connecticut 06062
Phone: 860-747-6181 • Fax: 860-747-8822
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AERIAL VIEW OF SITE AND ABUTTING PROPERTIES

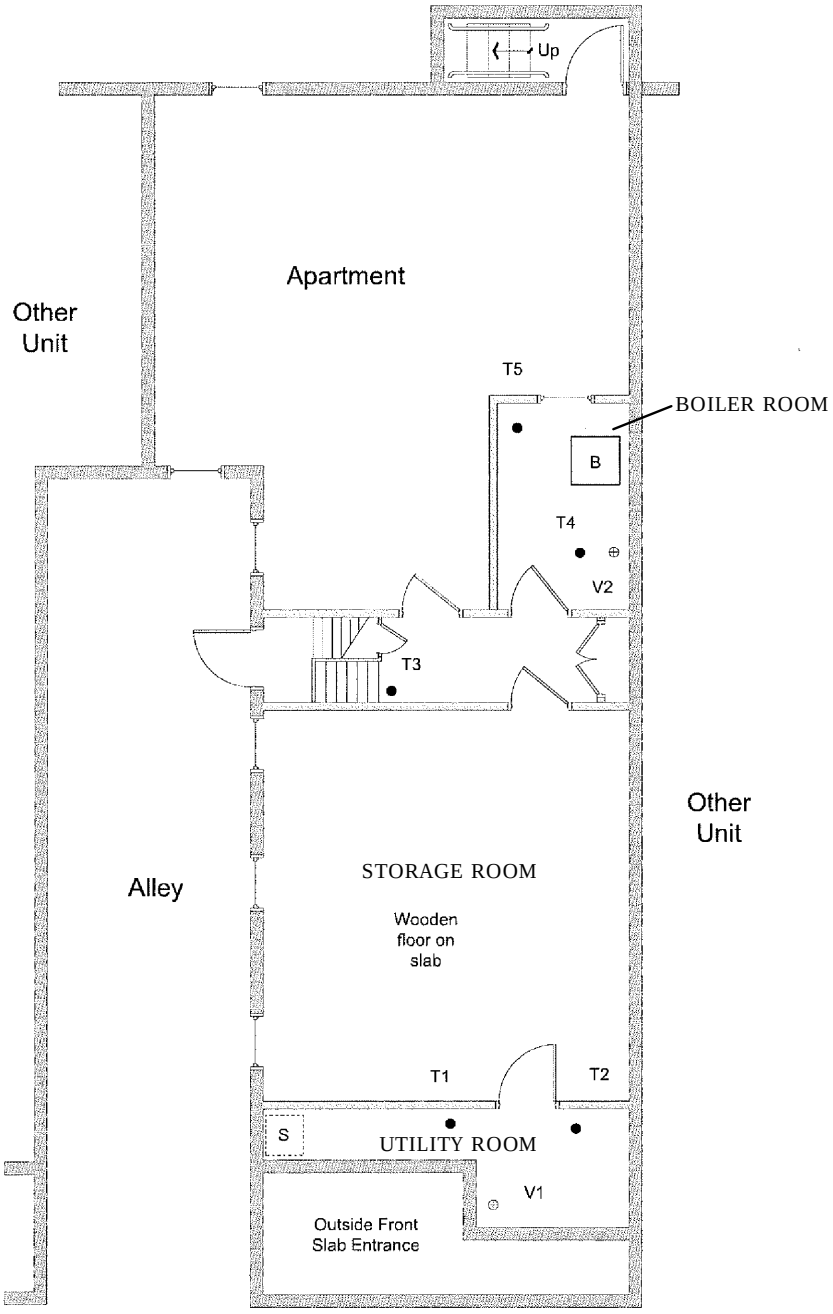
INTERIM REMEDIAL MEASURE CONSTRUCTION COMPLETION REPORT
43-18 56TH STREET, WOODSIDE, NEW YORK
PREPARED FOR:
STANLEY BLACK & DECKER
1000 STANLEY DRIVE, NEW BRITAIN, CONNECTICUT 06053

SCALE
1" = 40'

COMM. NO.
07MD012.010

DATE
02/09/2018

FIGURE
1-2



LEGEND

⊕V2 VACUUM POINT

●T1 DIAGNOSTIC TEST HOLE

N

5 0 5 10 15

APPROXIMATE SCALE IN FEET

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SUB-SLAB DEPRESSURIZATION SYSTEM
AUGUST 2017 DIAGNOSTIC TEST
FLOOR PLAN

43-18 56TH STREET, WOODSIDE, NEW YORK

PREPARED FOR:

STANLEY BLACK & DECKER

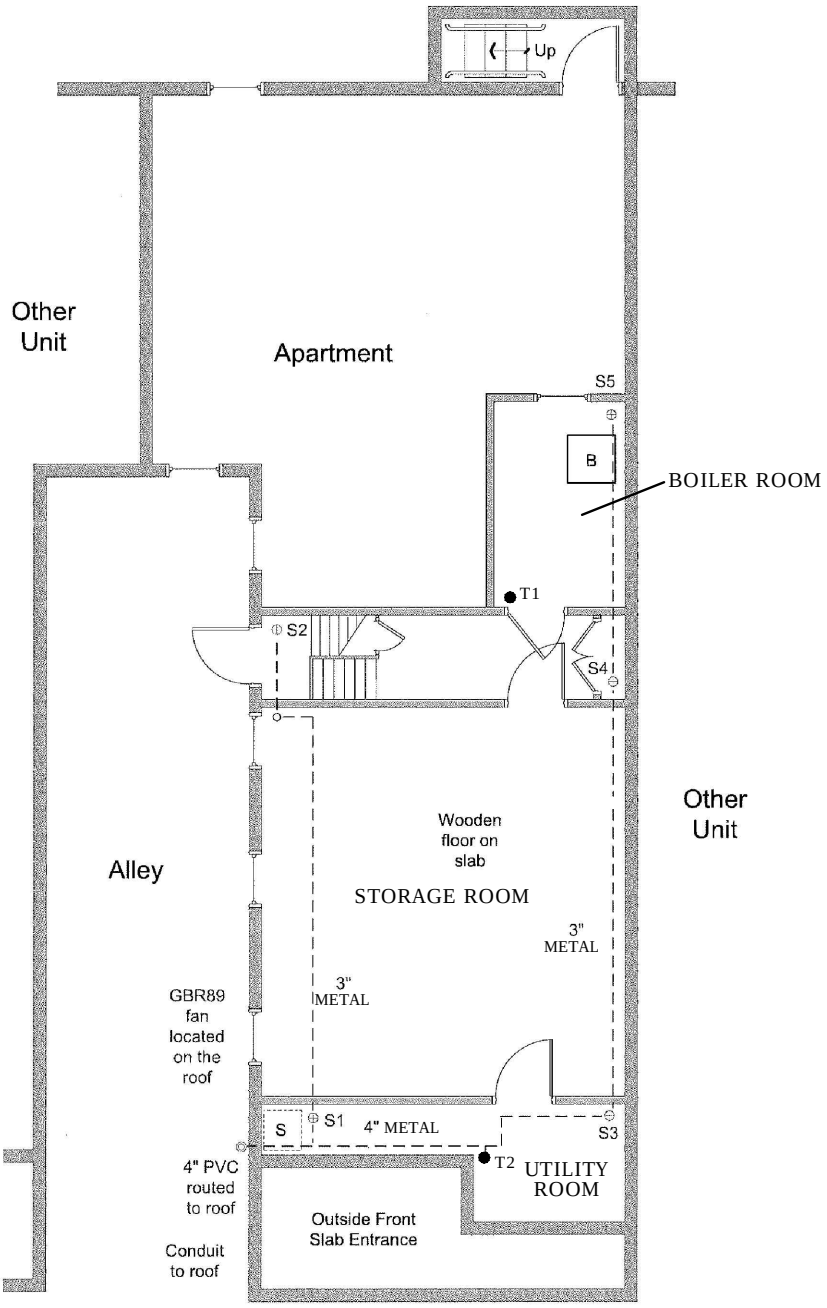
1000 STANLEY DRIVE, NEW BRITAIN, CONNECTICUT 06053

SCALE: 1" = 10'

COMM. NO.: 07MD012.008

DATE: 03/14/2018

FIGURE 3-1



LEGEND

● T1	DIAGNOSTIC TEST HOLE
⊕ S1	SUCTION POINT
- - - - - - - - -	OVERHEAD METAL PIPING

N

5 0 5 10 15

APPROXIMATE SCALE IN FEET

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SUB-SLAB DEPRESSURIZATION SYSTEM
AS-BUILT
PLAN VIEW

43-18 56TH STREET, WOODSIDE, NEW YORK

PREPARED FOR:

STANLEY BLACK & DECKER

1000 STANLEY DRIVE, NEW BRITAIN, CONNECTICUT 06053

SCALE: 1" = 10'

COMM. NO.: 07MD012.008

DATE: 03/14/2018

FIGURE 3-2

APPENDIX A

Sub-Slab Depressurization System Work Plan and
NYSDEC Approval Letter

Loureiro Engineering Associates, Inc.

VIA ELECTRONIC MAIL

April 6, 2011

New York State Department of Environmental Conservation
47-40 21st Street
Long Island City, New York 11101

Attn: Ms. Dana Kaplan, Environmental Engineer 1

RE: Generic Work Plan - Sub-Slab Depressurization System Installation
DeWalt Service Center Site - Woodside, New York
LEA Comm. No. 07MD0.12

Dear Ms. Kaplan:

This generic work plan is submitted to provide you with information regarding the proposed plan to install active sub-slab depressurization (SSD) systems at properties surrounding the DeWalt Service Center Site located at 56-15 Queens Boulevard in Woodside, New York. The information provided in this work plan includes the procedures that will be followed to install, operate, maintain, and monitor the SSD systems. The systems are proposed to be installed to mitigate current or potential exposures related to soil vapor intrusion.

SYSTEM INSTALLATION

Pre-Installation Activities

Pre-installation activities will include obtaining all necessary permits from the New York City Department of Buildings. These activities will also include contacting Dignet of New York City and Long Island to have underground utilities located. In addition, the base level floor of each building will be scanned for subsurface utilities and anomalies by a utility locating contractor using ground-penetrating radar (GPR) and electromagnetic inductance (EMI) tools, as part of the pre-installation activities.

Installation

Loureiro Engineering Associates, Inc. (LEA) will subcontract US Radon Management, Inc. of North Scituate, Rhode Island and/or WPB Enterprises, Inc. of Riegelsville, Pennsylvania to install the SSD systems. Both of these contractors are Residential Mitigation Providers certified by the National Environmental Health Association (NEHA) – National Radon Proficiency Program. Accordingly, each system will be installed by a contractor who has met the certification requirements of Subdivision C, Table 1.5, Line 6 of DER-10: Technical Guidance

for Site Investigation and Remediation published by the New York State Department of Environmental Conservation (NYDEC) Division of Remediation (NYSDEC, May 2010). Copies of the contractor NEHA certifications are attached to this work plan.

Each SSD system will be installed within the base level of the building to maintain a minimum negative pressure of 0.004 inches (in.) of water column (w.c.) beneath the slab. The SSD system will be installed in accordance with the *Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings* published by American Society for Testing and Materials (ASTM E-2121-09) and *Radon Reduction Techniques for Existing Detached Houses: Technical Guidance (Third Edition) for Active Soil Depressurization Systems* published by the Environmental Protection Agency (EPA) (EPA 625/R-93-011, October 1993).

Sealing

Any penetrations made during the installation process will be sealed with environmentally safe, non-shrink, elastomeric joint sealants, compatible urethane caulks, cements, grouts, mortars, and/or expanding foams. In addition, any other potential subsurface vapor entry openings that are found in the basement slab measuring approximately 0.06 inches or greater, including any open expansion joints in the floor, will be sealed with urethane caulk. Dranjer drain seals and/or air-tight gaskets will also be used, if necessary, to improve the effectiveness of depressurization and ventilation systems, limit the flow of subsurface vapors into the building, and prevent air leaks.

System Labeling

A U-tube manometer will be installed on the piping of each SSD system to allow the homeowner or tenant to visually confirm that the system is operating. The manometer will be labeled. The label will include an explanation identifying the manometer's function, an installation date, and the final installation U-tube pressure readings. The electrical circuit used to control the fan(s) will be labeled as, "Vapor Removal Fan". The fan disconnect switch will be labeled as, "Vapor System – Do Not Alter." Contact information will be noted on the manometer that identifies the name and telephone number of the appropriate party to contact if the SSD system shuts down or requires maintenance.

POST-INSTALLATION TESTING

Several measures will be taken to ensure the each SSD system is functioning properly once the installation is complete. The post-installation testing measures will include the following tests:

- With the SSD system operating, smoke tubes will be used to check for leaks through concrete cracks, floor joints, and at the suction holes. Any leaks that are identified will be resealed until smoke is no longer observed flowing through the opening.

- The building will be tested for positive pressure conditions by measuring the pressure differential between the sub-slab and indoor air using field instruments.

- The building will be tested for backdrafting of natural draft combustion appliances such as furnaces, clothes dryers, and water heaters. Backdrafting conditions will be corrected before the SSD system is placed in operation.

- A pressure field extension test will be conducted to verify that a minimum negative pressure of 0.004 in. of w.c. is being maintained beneath the slab. If adequate depressurization is not occurring, then the cause of the problem will be identified, the SSD system will be corrected, and, the system will be re-tested until adequate depressurization is obtained.

- The U-tube manometer will be tested to ensure that it is functioning properly.

Any additional post-installation testing, including the collection of indoor air and sub-slab vapor samples for laboratory analyses, will be performed if necessary, following further evaluation and in consultation with NYSDEC and the New York State Department of Health (NYSDOH), and/or as directed by NYSDEC or NYSDOH. All post-installation testing activities will be documented and presented in a report to be submitted to NYSDEC and NYSDOH.

OPERATION, MAINTENANCE AND MONITORING

Routine maintenance and monitoring will commence within 12 months after the SSD systems become operational, and will occur every 12 months thereafter, until NYSDEC and NYSDOH state that there is no longer any need to operate the systems. The operation, maintenance, and monitoring (OM&M) protocols to be followed have been developed in accordance with the *Guidance for Evaluation Soil Vapor Intrusion in the State of New York* (NYSDOH, 2006), and include the following:

- a visual inspection of the complete system, including the fan, piping, manometer, and labeling on the SSD system.

- identification and repair of leaks; and

- inspection of the exhaust to verify no air intakes have been located nearby.

As appropriate, preventative maintenance, repairs, and/or adjustments will be made to each system to ensure its continued effectiveness at mitigating current or potential exposures related to soil vapor intrusion. In the event that the building owner(s) or tenant(s) reports that the system has become damaged or is not operating properly, the SSD system will be inspected to identify the cause of the problem. The system will be adjusted to correct the problem and will be

re-started. In addition, the SSD system will be inspected following any notifications that the building has undergone renovations that have the potential to alter the effectiveness of the SSD system.

In addition to the routine OM&M activities described herein, the building's owner(s) and tenant(s) will be given an information packet that explains the SSD system operation, maintenance, and monitoring. Therefore, at any time during the system's operation, the building owner(s) or tenant(s) may check to verify that the system is operating properly.

All routine and non-routine OM&M activities will be documented and presented in an annual certification report to be submitted to NYSDEC and NYSDOH.

Each SSD system will remain in place until NYSDEC and NYSDOH determine that it is no longer needed to address current or potential exposures related to soil vapor intrusion.

At this time it is requested that NYSDEC approve this generic work plan.

Should you have any questions regarding the information contained in this work plan, please feel free to contact me at (860) 410.2976.

Sincerely,

LOUREIRO ENGINEERING ASSOCIATES, INC.

David N. Scotti, P.G.
Project Manager

Attachments

cc: Ms. Linda Biagioni, Black & Decker (U.S.) Inc.
Mr. Christopher Doroski, New York State Department of Health

National Environmental Health Association
National Radon Proficiency Program

Norman E. Johnson

Residential Mitigation Provider

ID Number: 103412 RMT Expiration: 2/28/2013

To confirm validity of this certification call (800) 269-4174. Verification of adherence to state and local regulations is advised. See reverse for specific certification designations.

National Environmental Health Association
National Radon Proficiency Program

William P. Brodhead

Residential Mitigation Provider

ID Number: 100044 RMT Expiration: 2/29/2012

To confirm validity of this certification call (800) 269-4174. Verification of adherence to state and local regulations is advised. See reverse for specific certification designations.

National Environmental Health Association
National Radon Proficiency Program

William Brodhead

Residential Measurement Provider

ID Number: 106100 RT Expiration: 11/30/2012

To confirm validity of this certification call (800) 269-4174. Verification of adherence to state and local regulations is advised. See reverse for specific certification designations.

New York State Department of Environmental Conservation
Division of Environmental Remediation
Region 2 Office
47-40 21st Street, Long Island City, NY 11101-5407
Phone: (718) 482-4955 • **Fax:** (718) 482-6358
Website: www.dec.ny.gov

Joe Martens
Acting Commissioner

April 7, 2011

David N. Scotti, P.G.
Loureiro Engineering Associates, Inc.
100 Northwest Drive
Plainville, CT 06062

Re: DeWalt Service Center, Woodside, NY
Site 241129
Work Plan for Installation of Sub-Slab Depressurization Systems in off-site properties

Dear Mr. Scotti:

The New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) have reviewed the Generic Work Plan – Sub-Slab Depressurization System Installation (Work Plan) dated April 6, 2011 for the above-referenced site, prepared by Loureiro Engineering Associates, Inc. on behalf of Black & Decker (Owner). The Work Plan proposes the installation of sub-slab depressurization (SSD) systems in off-site properties near the DeWalt Service Center Site where NYSDEC and NYSDOH have determined that concentrations of chlorinated volatile organic compounds in sub-slab soil vapor warrant mitigation.

The Work Plan is deemed to be appropriate and is hereby approved for SSD system installation at such properties. Prior to proceeding with installation at any off-site property, please submit a notification letter and access agreement to be sent to the owner and/or occupant of that property. Loureiro Engineering Associates, Inc. and its subcontractors should make reasonable efforts to accommodate requests from property owners and/or occupants regarding the aesthetic appearance of system components (i.e., by concealing pipe work and other equipment).

Please be advised that the Owner and its contractors are solely responsible for safe execution of all invasive and other work performed under the Work Plan. In particular, the Owner and its contractors are responsible for the structural integrity of excavations, and protection of the structural integrity of buildings, utilities, and other structures both onsite and offsite that may be adversely affected by those excavations. The Owner and its contractors must obtain any local, state or federal permits or approvals that may be required to perform work under the Work Plan. Furthermore, the Owner and its contractors are solely responsible for the identification of utilities that might be affected by work under the Work Plan and implementation of all required,

appropriate, or necessary health and safety measures during performance of work under the approved Work Plan.

Should you have any questions about this, please contact me at 718-482-7541.

Sincerely,

Dana Kaplan
Environmental Engineer

cc: Jane H. O'Connell – NYSDEC
Chris Doroski – NYSDOH
Linda Biagioni – Black & Decker (U.S.) Inc.

APPENDIX B

Sub-Slab Depressurization System
Home Owner Information Packet

SUB-SLAB DEPRESSURIZATION SYSTEM

HOMEOWNER INFORMATION PACKET

Prepared for:

Owner(s) and Occupant(s) of Property Located at 43-18 56th Street
Woodside, New York 11377

Prepared by:

LOUREIRO ENGINEERING ASSOCIATES, INC.
100 Northwest Drive
Plainville, Connecticut 06062

An Employee Owned Company

SYSTEM DESCRIPTION

A sub-slab depressurization (SSD) system, much like a radon mitigation system, essentially prevents vapors beneath a slab from entering a building. A SSD system uses a fan-powered vent and piping to draw vapors from the soil beneath the building slab. A low amount of vacuum is applied below the foundation of the building and the vapors are vented to the exterior, as shown in the illustration provided below as Figure 1. The system uses minimal electricity and should not noticeably affect heating and cooling efficiency.

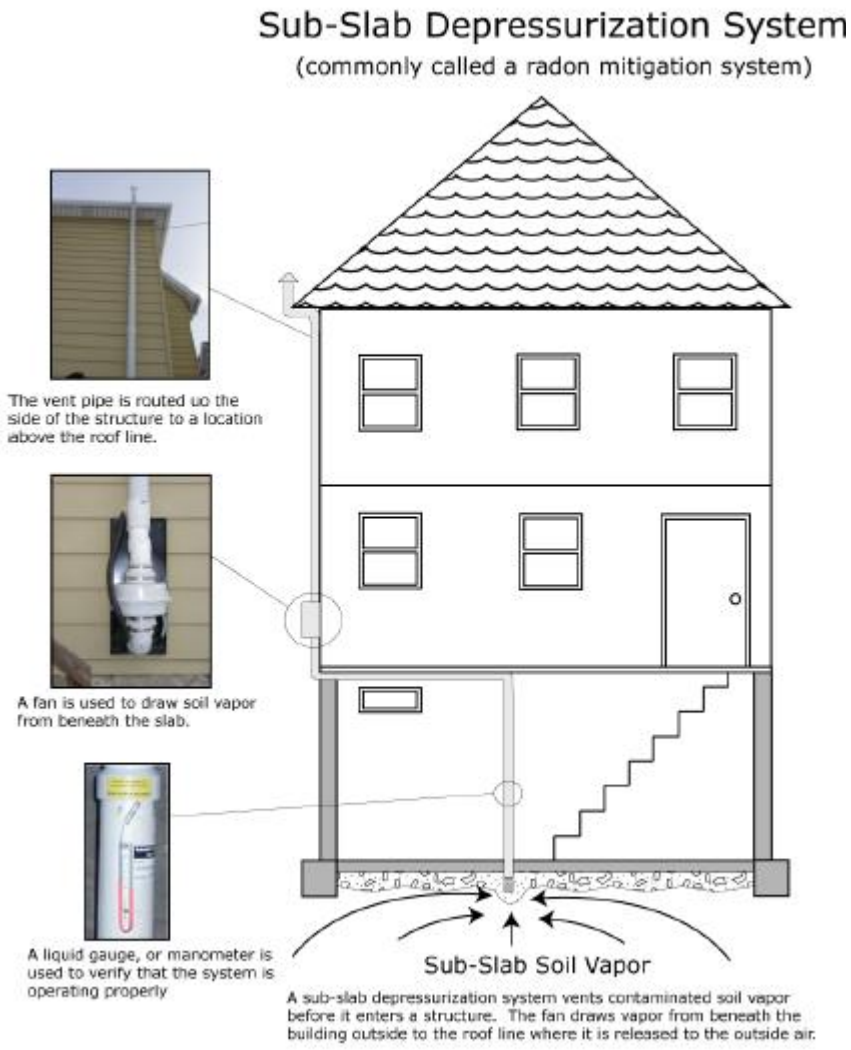

Figure 1. Illustration showing how a typical SSD system works[1]

[1] Taken from Figure 5.2 of the New York State Department of Health Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006).

The SSD system installed at 43-18 56th Street in Woodside, New York includes five suction holes or vacuum points (identified as S1 through S5) that are constructed of three-inch diameter metal pipe. As shown below in Figure 2, suction holes were installed at various locations within the basement. These points are connected by three-inch diameter metal pipe, which is plumbed through the southern foundation wall. This pipe is connected to a 4-inch polyvinyl chloride (PVC) pipe that is connected to a GBR 89 "radon-type" fan installed on the roof of the building. The fan vents through a section of six-inch diameter PVC pipe that terminates approximately 10 feet above the roof line.

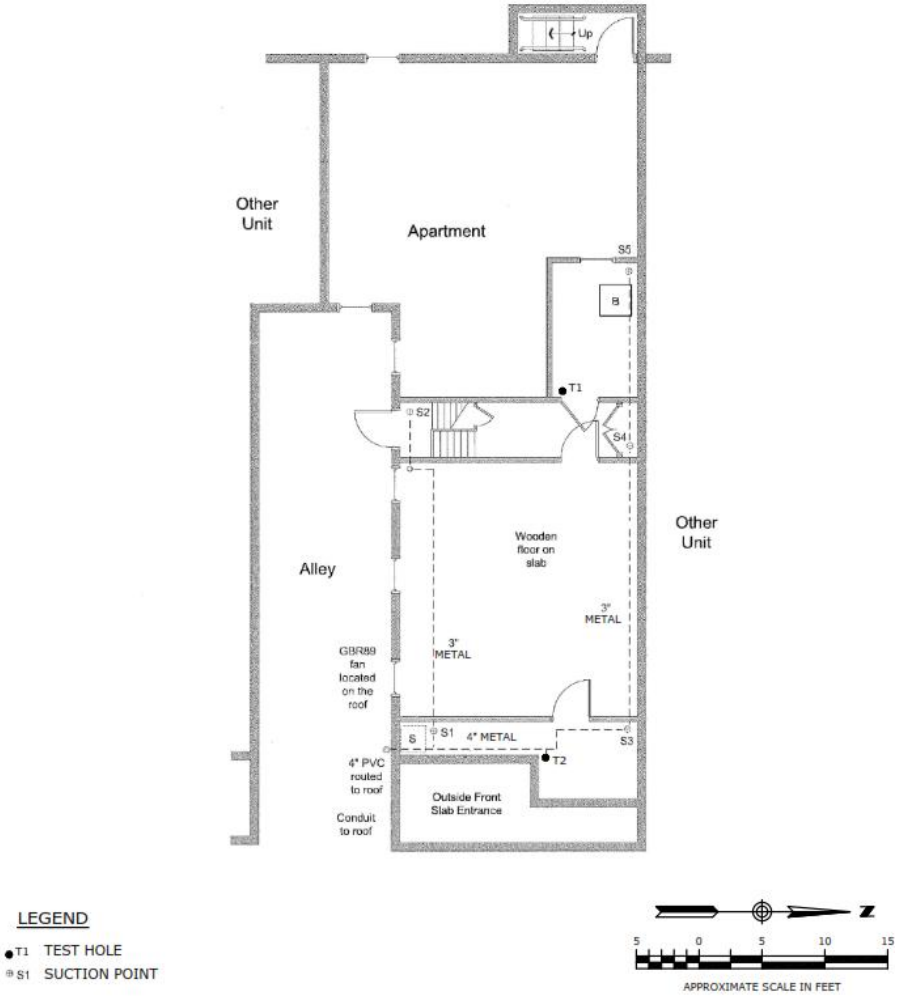

Figure 2. Sub-slab depressurization system plan

SYSTEM OPERATION

The SSD system should operate continuously. The SSD system is equipped with a Magnehelic style vacuum meter that has been installed in the basement. This meter is an instrument that measures pressure with a column of water. The SSD system is functioning properly if the meter is reading greater than 0 inches of water column, as illustrated below in Figure 3.

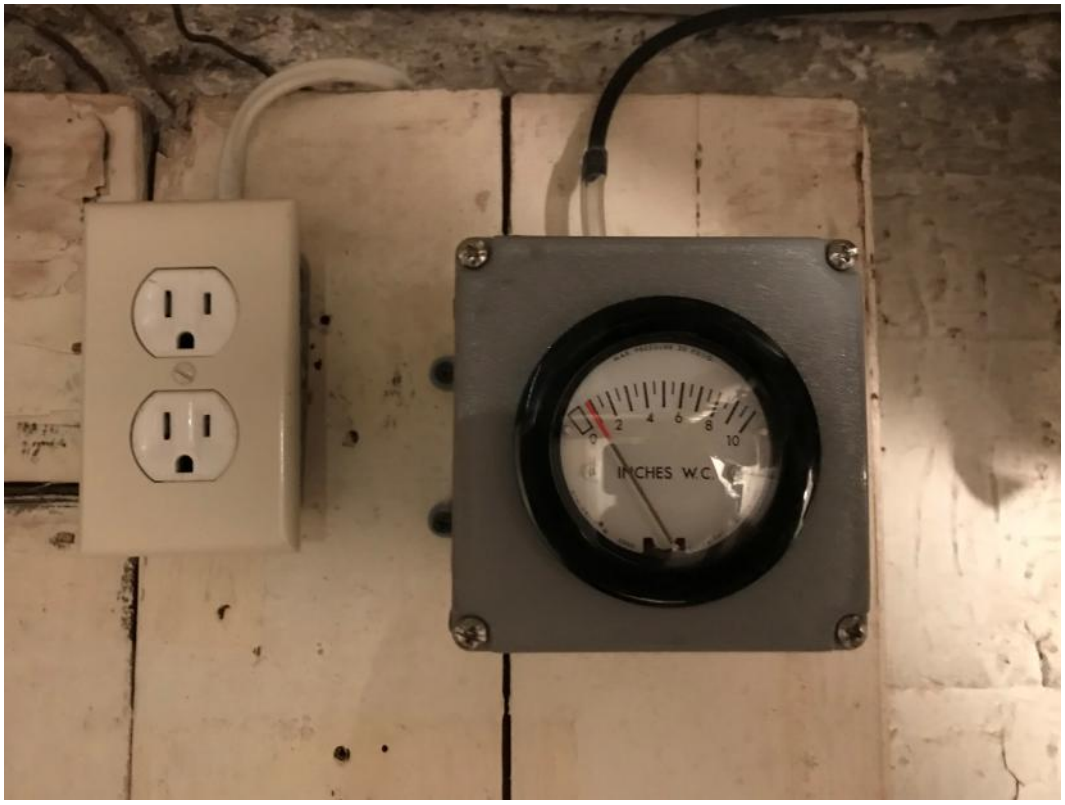

Figure 3. Properly functioning vacuum meter

If the meter reads "zero", then the system is not operating properly, and you will need to contact the following representative of Loureiro Engineering Associates, Inc. (Loureiro):

Mr. Kevin J. Bitjeman, L.E.P
Senior Project Manager
Loureiro Engineering Associates, Inc.
100 Northwest Drive
Plainville, Connecticut 06062
Telephone: (860) 410-2904 or 860-747-6181
Email address: kjbitjeman@loureiro.com

SYSTEM MAINTENANCE AND MONITORING

The system will be maintained and monitored by Loureiro of Plainville, Connecticut. Routine maintenance and monitoring will begin within 12 months following the installation of the SSD system. Maintenance and monitoring will occur every 12 months thereafter, until the New York State Department of Environmental Conservation and New York State Department of Health provide written permission to deactivate and dismantle the SSD system.

During routine maintenance and monitoring, the following activities will be conducted:

- A visual inspection of the SSD system, including the fan, piping, manometer, and labeling;
- Identification and repair of leaks; and
- Inspection of the exhaust to verify that no new air intakes have been located nearby.

As appropriate, preventative maintenance, repairs, and/or adjustments will be made to the system to ensure its continued effectiveness at mitigating current or potential exposures related to soil vapor intrusion.

In the event that the homeowner or occupant reports that the mitigation system has become damaged or is not operating properly, the SSD system will be inspected to identify the cause of the problem. The SSD system will be adjusted to correct the problem and the system will be re-started.

The homeowner or occupant must notify Loureiro if the building has undergone any renovations or if the heating, ventilating, and air conditioning system has been modified. Loureiro will then conduct an inspection to ensure that such building modifications have not altered the effectiveness of the SSD system.

SYSTEM DOCUMENTATION

A copy of the fan manufacturer's specifications and warranty are included as part of this Homeowner Information Packet.

CONTACT INFORMATION

1. Mr. Kevin J. Bitjeman, L.E.P
   Senior Project Manager
   Loureiro Engineering Associates, Inc.
   100 Northwest Drive
   Plainville, Connecticut 06062
   Telephone: (860) 410-2904 or (860) 747-6181
   Email address: kjbitjeman@loureiro.com

2. Ms. Dawn Hettrick P.E.
Public Health Engineer
New York State Department of Health
Bureau of Environmental Exposure Investigation
Telephone: (518) 402-7860
Email Address: deh02@health.state.ny.us

-or-

New York State Department of Health
Center for Environmental Health
Bureau of Environmental Exposure Investigation
Toll-free Information Line: (1-800) 458-1158, ext. 27850

3. Manfred Maglorie,
Environmental Engineer, Division of Environmental Remediation
New York State Department of Environmental Conservation
Telephone: (718) 482-7541
Email Address: manfred.magloire@dec.ny.gov

APPENDIX C

Residential Mitigation Provider Certifications

Commonwealth of Pennsylvania

Department of Environmental Protection

Bureau of Radiation Protection

Radon Division

Radon Certification

Identification Number

0584

WPB Enterprises, Inc.

Radon Mitigation, Firm

This firm's DEP-listed mitigation employees may perform radon mitigation activities in Pennsylvania under the responsible charge of this firm's certified mitigation individual.

Issued: September 16, 2017

Expires: September 16, 2019

Control Number: 07937

Tom Wolf, Governor

Patrick McDonnell, Secretary

If this firm loses its certified individual, this certification automatically lapses and is void. This firm's owner shall notify the Department in writing within 5 days if it loses its certified individual.

Commonwealth of Pennsylvania

Department of Environmental Protection

Bureau of Radiation Protection

Radon Division

Radon Certification

Identification Number

0736

Bill Brodhead

Radon Mitigation, Individual

This certification authorizes the certified individual above to perform radon mitigation activities

Issued: September 16, 2017

Expires: September 16, 2019

Control Number 07936

Tom Wolf, Governor

Patrick McDonnell, Secretary

APPENDIX D

Sub-Slab Depressurization System
Construction Photographs

Photographic Log
43-18 56th Street, Woodside, New York

Photograph #1 – Suction point S1

Photograph #2 – Suction point S2

Photographic Log
43-18 56th Street, Woodside, New York

Photograph #3 – Suction point S3

Photograph #4 – Suction point S4

Photographic Log
43-18 56th Street, Woodside, New York

Photograph #5 – Suction point S5 PVC ball valve

Photograph #6 – Suction point S5 floor seal

Photographic Log
43-18 56th Street, Woodside, New York

Photograph #7 – GBR89 fan

Photograph #8 –GBR89 mounted on roof

Photographic Log
43-18 56th Street, Woodside, New York

Photograph #9 – System meter reading 1" of water column

Photograph #10 – System labeling

APPENDIX E

Sub-Slab Depressurization System Operation,
Maintenance & Monitoring Checklist

Sub-Slab Depressurization System Operation, Maintenance & Monitoring Checklist

Woodside, New York

Date of inspection _____

Property Address _____

Property Contact Name _____

VISUAL INSPECTION

	GOOD	FAIR	POOR	Comments
Manometer				
Floor Seals				
PVC Joints and Piping				
SSD Labeling				
Fan				
Air Exhaust				

	Yes	No	Comments
Air Intake Near Exhaust Pipe			
Leaks			

PHOTOGRAPHS

	Yes	No	Comments
Manometer			
PVC Joints			
Floor Seals			
Fans			
Other			

Property Owner Problems, Question or Concerns

Summary of Repairs / Comments

Field Personnel _____ **Signature** _____