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Environmental Services, Inc.

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November 8, 2011

New York State Department of Environmental Conservation
Division of Environmental Remediation
Attn: Jamie Verrigni
625 Broadway, 11th Floor
Albany, NY 12233-7014

RE: Sub-Slab Depressurization System Installation
Carmel Shop-Rite Center
180 Gleneida Avenue
Carmel, New York
VERTEX Project No. 15836
NYSDEC # D3-0001-97-04

Dear Ms. Verrigni:

Vertex Environmental Services, Inc. (VERTEX) has prepared this correspondence to provide details to the New York State Department of Environmental Conservation (NYSDEC), and through NYSDEC, the New York State Department of Health (NYSDOH), regarding the sub-slab depressurization system (SSDS) installed at the Carmel Shop-Rite Center located at 180 Gleneida Avenue in Carmel, NY (the site) in March 2010.

Extensive subsurface investigations and remediation activities have been conducted at the site to address a historic release of tetrachloroethylene (PCE) to the soil and groundwater at the location of a former dry cleaner's tenant space (currently Sunscape Tan). The SSDS summarized herein was installed to prevent potential residual concentrations of PCE beneath the concrete slab of the tenant spaces adjacent to the former dry cleaner space from impacting indoor air, as described in an October 16, 2006 Work Plan. This correspondence provides a summary of the installed SSDS specifications and includes an operation and maintenance plan for the system.

Previous SSDS

In September 2005, VERTEX completed the installation of the SSDS in the former dry cleaner tenant space as proposed in the approved Work Plan dated December 22, 2004. The SSDS was installed as a subsurface trench system using horizontal 6" diameter perforated pipes. Subsequent performance testing events on October 18, 2005 and January 5, 2006 confirmed that the SSDS created a negative pressure beneath the slab of the former dry cleaner tenant space (now Sunscape Tan). However, the radius of influence of the SSDS appeared to just approach the tenant space occupied by Redendo's Pizza, and did not reach Chinatown Restaurant (see Table 1).

Table 1: Previous SSDS Performance

Summary of SSDS Performance Testing Results			
Testing Date	**Sampling Location**		
	Sunscape Tan	**Redendo's**	**Chinatown**
10/18/2005	-0.7	0	0
1/5/2006	-0.777	-0.007	0
3/23/2006	-0.4	0	0

Note:
1. Sampling results are in inches of water column (inH_2O).

In order to expand the SSDS radius of influence, VERTEX anticipated that it might be necessary to upgrade the system from a radon-type fan to a blower, and/or to install smaller sub-slab depressurization systems in the Rendendo's and Chinatown tenant spaces. On March 9, 2006, after notifying NYSDEC, VERTEX upgraded the SSDS by replacing the existing fan with a 1 ½ horsepower blower. The blower was placed in an exterior concrete enclosed utility room that is attached to the site building. The utility room is not connected to the main site building through the ventilation system, nor is it an occupied space. Subsequent performance testing on March 23, 2006 (see Table 1) indicated that the SSDS radius of influence did not reach beneath the Redendo's or Chinatown tenant spaces.

Based on the above results, it appeared that the subsurface soil conditions (i.e., glacial till) or footings beneath the slab of the strip mall are impeding the flow of air to the SSDS that is centralized beneath Sunscape Tan. As such, VERTEX recommended that individual single penetration radon type SSDS be installed in the four adjacent tenant spaces to the north and south of Sunscape Tan (i.e., Jina's Nail Salon, Redendo's Pizza, Grapevine Wine & Spirits, and Chinatown Restaurant). An SSDS could not be installed in the adjacent tenant space occupied by Grapevine Wine & Spirits due to access constraints inside the store. A work plan for installing these systems, dated October 16, 2006, has been approved by NYSDEC and NYSDOH.

Soil Communication Test

A soil communication test was conducted in each of the four subject tenant spaces at the site on February 25, 2010 by licensed radon subcontractor Connecticut Basement Systems Radon to determine site soil conditions and modify the fan sizes in the SSDS design plans. The test involved measuring the pressure beneath the concrete slab at varying distances from a temporary suction point to determine the extent of the negative pressure field propagation. In general, the soil communication test results showed that soil conditions beneath the slab were moderate to very tight, necessitating the use of more powerful fans than in the original 2006 Work Plan design. Based on the findings of the soil communication test, Connecticut Basement Systems Radon estimated the radius of influence for each proposed suction point at approximately 20 to 25 feet.

Current SSDS Installation

Between March 23 and 26, 2010, licensed radon subcontractor Connecticut Basement Systems Radon installed a new SSDS at the site in order to generate the appropriate radius of influence required by the NYSDEC and NYSDOH. In total, four SSDS systems were installed in three

tenant spaces, as summarized in Table 2. In addition, a more powerful fan was attached to the existing trench SSDS along the north wall of the former dry cleaner tenant space.

Table 2: SSDS Installation Summary

Tenant Space	Number of Suction Points	Radon-Away Fan Type
Redendo's Pizza	3	HP-5000
Jina's Nail Salon	3	HP-5000
Sunscape Tan	Trench (existing)	RP-265
Chinatown Restaurant (2 systems)	3	HP-5000
	3	HP-5000

Each suction point was drilled as a 3" diameter hole into the concrete slab. Suction point locations, are shown on Figure 2, were installed to be in accordance with the 2006 Work Plan, where possible. However, obstructions in the tenant spaces including kitchen equipment, permanent fixtures, utilities, and interior walls necessitated the movement of several points to the nearest accessible area.

Once the suction point was drilled, an approximately 1 foot deep, 1 foot diameter cylindrical space was cleared beneath the concrete slab at each location. These smaller suction point spaces were determined to be more conducive to maintaining negative pressure beneath the slab than the sump extraction points described in the 2006 Work Plan. As such, the sump design was not utilized in the final installation.

For the four newly installed SSDS systems, the suction points were connected to 3" PVC riser pipe that extended vertically to the ceiling at each location and joined to a single horizontal 3" PVC pipe above the ceiling that connected the points to the fan. The spaces surrounding the suction point piping at the concrete slab were filled with foam and caulked to maintain a pressure seal.

In the case of the existing trench SSDS at Sunscape Tan, the existing exhaust system was removed and replaced with a vertical 6" PVC riser pipe leading to a newly installed RP-265 fan.

Each fan was installed on the exterior rear wall of the building, with the exhaust pipe extending a minimum of 12 inches above the height of the roof and at least 20 feet from the nearest air intake. The HP-5000 fans were also equipped with mufflers to mitigate noise.

Each riser pipe was fitted with a sticker warning that it is associated with an active SSDS. Due to the magnitude of the suction (greater than -8 inH_2O in most locations), liquid manometers were only installed at the two westernmost suction points at Redendo's Pizza. Larger sizes of liquid manometers are not available.

An as-built sketch of the system is included as Figure 2.

Post-Mitigation Sampling

Following system installation, VERTEX field verified that a pressure differential exists below the slab of the site building using a Series 475 Mark III Digital Manometer. The results are summarized in Table 3. Sampling locations are shown on Figure 3.

The October 16, 2006 Work Plan stated that post-mitigation sampling would be performed using existing sampling points in Redendo's Pizza, Sunscape Tans, and the Chinatown Restaurant. However, due to sampling point age and access constraints, the use of these existing sampling points was not possible. Therefore, VERTEX installed several new temporary sampling locations, as shown on Figure 3.

Table 3: Current SSDS Performance

Tenant Space	Sampling Location (Figure 3)	Sub-Slab Pressure (inH_2O)
Redendo's Pizza	P-1	-0.033
	P-2	-0.002
	P-3	-0.003
	P-4	-0.035
Jina's Nail Salon	P-5	-0.178
	P-6	-0.135
	P-7	-0.215
Sunscape Tans	P-8	-0.425
Chinatown Restaurant	P-9	-0.109
	P-10	-0.133
	P-11	-0.486

As shown in Table 3, the SSDS has established a negative pressure field beneath each of the subject tenant spaces. Access to the Grapevine Wine and Spirits was not possible for post-mitigation sampling. However, as can be referenced in Figure 3, three SSDS points were installed along the wall at Chinatown Restaurant and a trench SSDS system was installed in Sunscape Tan with three points terminating at the adjoining wall with the Grapevine Wine and Spirits tenant space. Prior to installation, sub-slab communication testing indicated that the radius of influence below the slab was measured to be a minimum of 20 to 25 foot radius from each suction point. The width of the Grapevine Wine and Spirits tenant space is approximately 28 feet. Therefore, based on the radius of influence of 20 to 25 feet and that the strongest sub-slab negative pressure readings were found within adjoining tenant spaces Chinatown Restaurant and Sunscape tan, it is expected that the SSDSs located at the adjacent tenant space walls are creating a negative pressure beneath Grapevine Wine and Spirits as well.

Due to the verification of successful system operation, the need for indoor air or soil gas testing is not anticipated.

Site Management Plan

VERTEX has developed a Site Management Plan (SMP) that includes operation and maintenance (O&M) activities for the SSDSs. All routine and non-routine O&M activities will be documented and reported to the NYSDEC.

If you have any questions or comments regarding this correspondence, please do not hesitate to contact the undersigned at (781) 952-6000.

Sincerely,

VERTEX Environmental Services, Inc.

Jessica L. Fox, PE
Senior Project Manager

Jaron J. Frieden, CEA
Vice President

Encl: Figures

cc: Thomas Myers, Urstadt Biddle Properties, Inc.
Daniel Logue, Urstadt Biddle Properties, Inc.
Fay Navratil, NYSDOH
Charlotte Bethoney, NYSDOH

USGS Topographic Map, 1991
Lake Carmel, New York Quadrangle
Contour Interval: 10 feet

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SITE LOCUS MAP
Carmel Shop Rite Center
180 Gleneida Avenue
Carmel, New York

SCALE: AS SHOWN

July 5, 2006

VERTEX Proj. No. 4148

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ENVIRONMENTAL SERVICES
FIGURE NO. 1

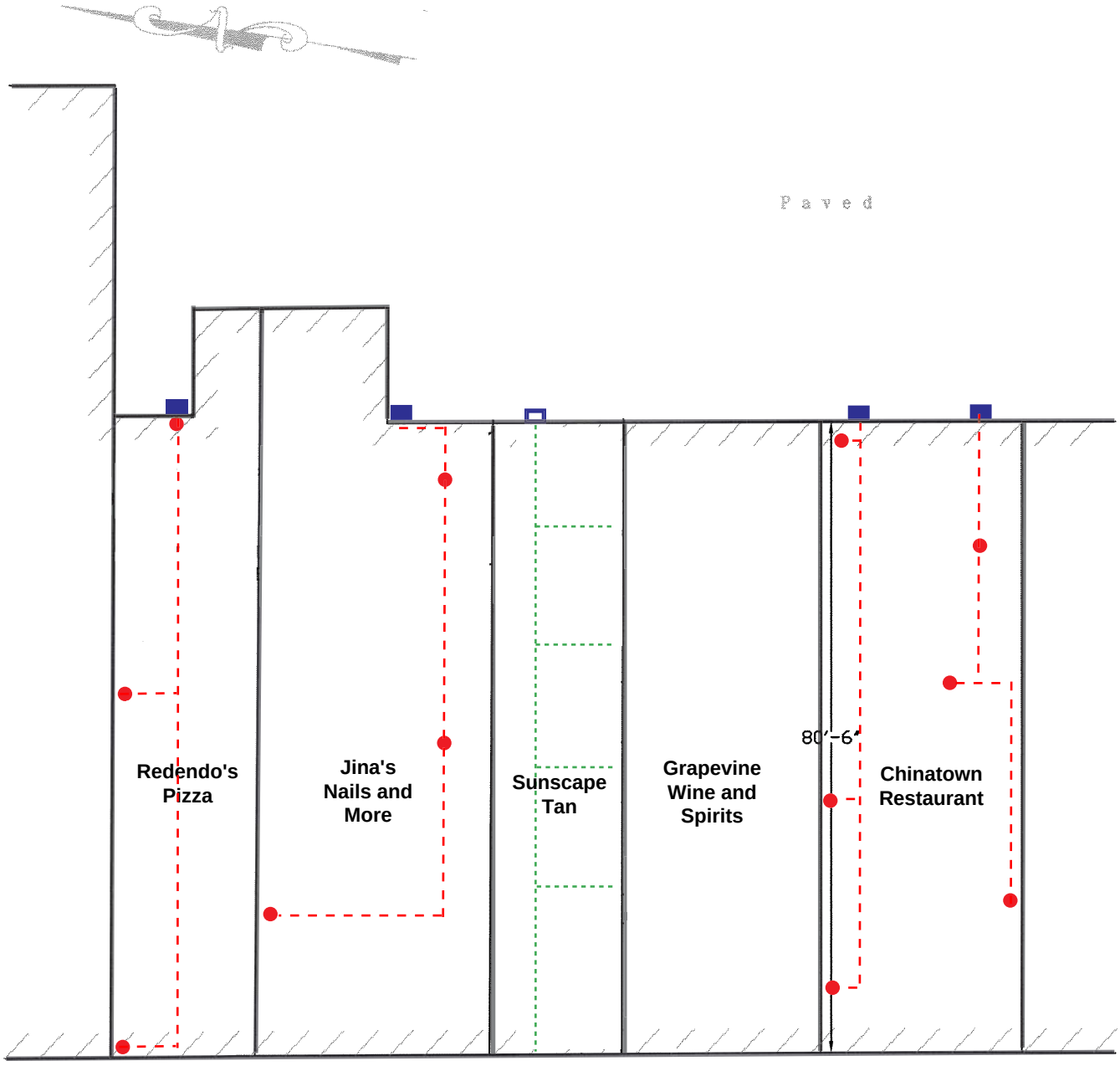

Figure 2: SSDS As-Built Sketch

Carmel Shop-Rite Center
180 Gleneida Avenue
Carmel, NY

SCALE : Not to Scale

DATE: March 9, 2010

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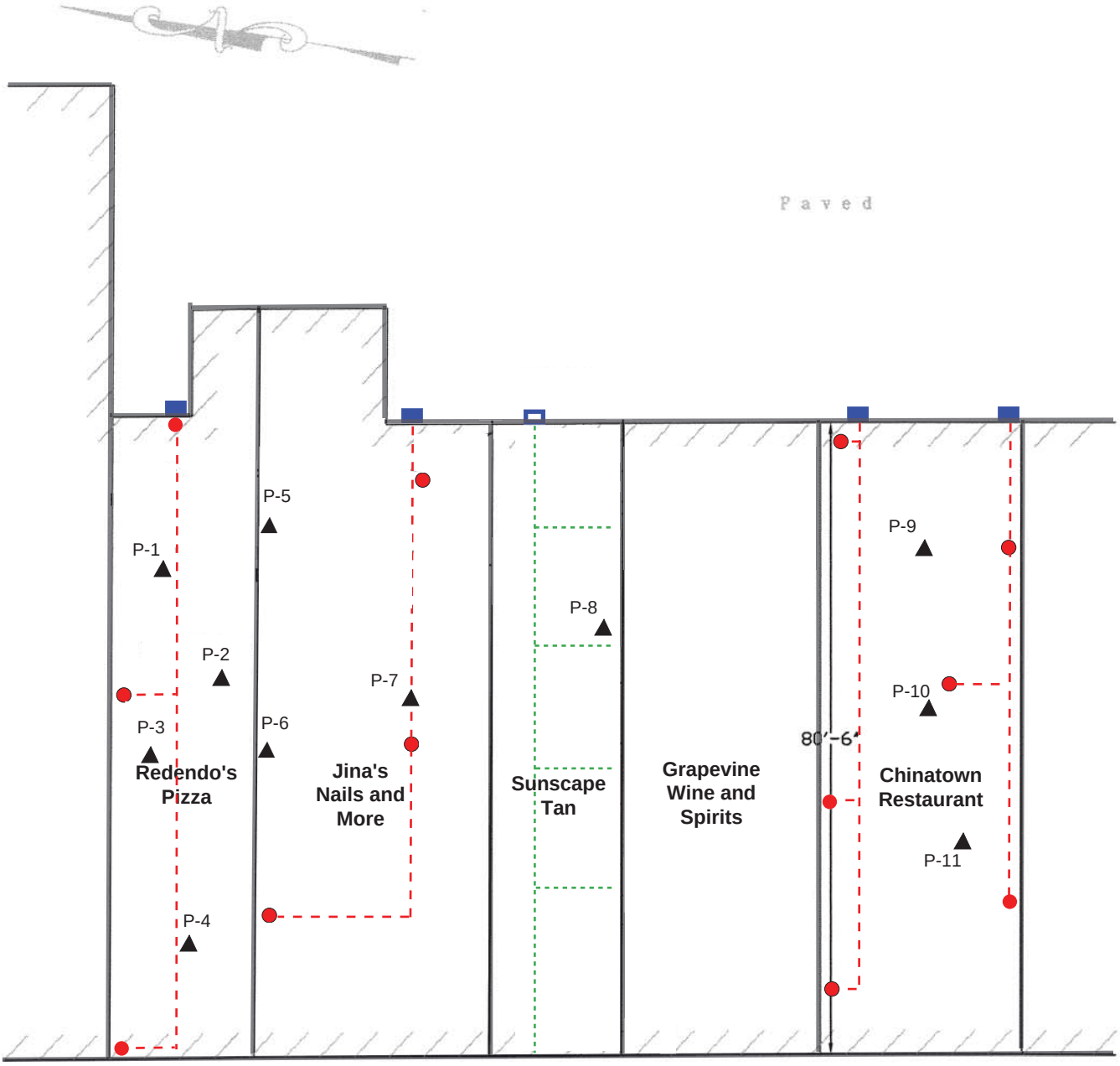

Figure 3: Post-Mitigation Sampling Points

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SCALE : Not to Scale

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