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March 3, 2008

Tara M. Blum, P.E.
Project Manager
NYSDEC
Region 7
615 Erie Blvd West
Syracuse, NY 13204-2400

Re: Pass & Seymour (P&S) Boyd Ave Site
Solvay, New York
Brownfield Cleanup Program (BCP) Site # C734102
Interim Remedial Measure (IRM)
Sub-Slab Depressurization System (SSDS) Design

Dear Ms. Blum:

This Design Document provides construction details and an implementation approach for a sub-slab depressurization system (SSDS) that will be installed at the P&S BCP site, in accordance with the NYSDEC-approved *Interim Remedial Measure (IRM) Work Plan* [S&W Redevelopment of North America, LLC (SWRNA), March 2007]. As indicated in the IRM Work Plan, the IRM objective is to eliminate, or minimize to the extent practicable, the potential for soil vapor intrusion (SVI) of volatile organic compounds (VOCs) derived from soil and groundwater contamination at the site. The SSDS will be installed to achieve this objective.

GENERAL APPROACH

Soil vapor mitigation by sub-slab depressurization is considered an interim remedy that prevents potential exposure to vapor-phase VOCs by means of engineering controls. As indicated in the New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (October 2006), the soil vapor intrusion (SVI) mitigation measures implemented at this site will stay in operation and undergo appropriate monitoring and maintenance until it is determined by NYSDEC/NYSDOH that contaminated environmental media have been remediated or until mitigation is no longer needed to address SVI-related exposures.

A permanent remedy will also be implemented at the site, in addition to the SSDS, to remediate the contaminated media that are considered potential sources of soil vapor contamination. Whereas the SSDS is designed to prevent exposure to site contamination, the permanent remedy will be aimed at permanently removing/destroying site contamination.

The combined interim and permanent remedies will constitute the overall remedial approach for the site. The permanent remedy will be identified in a *Remedial Work Plan* (RWP), which will be prepared following completion of a Remedial Investigation (RI) currently being conducted under the Brownfield Cleanup Agreement (BCA) between P&S and NYSDEC.

This Design Document presents the SSDS design, construction strategy, operational requirements, and implementation schedule.

COMMUNICATION TEST RESULTS

The SSDS design is based on the results of a communication test conducted at the site on November 6, 2007 by Radon Home Services, Inc. (RHS), a certified radon mitigation contractor. The communication test was the first step of the SSDS implementation approach, as identified in the NYSDEC-approved IRM Work Plan (March 2007).

The objective of the communication test was to determine the negative pressure field that could be achieved below the floor slab by applying a vacuum to a series of test holes drilled through the floor. The test results provide a basis for determining the number and locations of suction holes for the SSDS.

RHS drilled a total of eighteen (18) ¾-inch diameter holes through the floor slab, including nine (9) suction holes (S1 through S9) and 9 test holes (T1 through T9), at locations shown on Figure 1. Sub-slab material was mostly loose, dry aggregate consisting primarily of silt-sized particles. At one location, on the north side of the building (S2), a mixture of clay and cinders was observed below the slab.

Before the vacuum tests began, baseline pressure readings were taken below the slab. In general, the baseline pressures were fairly high, with an average of +0.148 inWC (~ 2.7 Pascals).

A Sears 6.5 hp shop vac was used to generate a vacuum at each suction hole, and pressure was measured at each test hole using an Energy Conservatory Model DG3 micromanometer. Table 1 presents the results of the communication test. Figures 2 though 6 depict the results across the building footprint.

The performance target for the SSDS system identified in the IRM Work Plan is a negative pressure of at least -0.002 inches of water column (inWC) across the building footprint. The communication test indicates that the performance target was surpassed for the majority of the building footprint by applying a modest airflow [~ 75 to 100 cubic feet per minute (cfm)] at four test holes (S3, S5, S7, and S8). Although the relatively low airflow from the communication test did not produce a complete pressure field (see Figure 6), RHS concluded that an adequate vacuum over the entire footprint could be achieved by a properly installed SSDS, with a high pressure fan operating at a higher

capacity. The communication results indicate that full-scale SSDS implementation is feasible.

IMPLEMENTATION APPROACH

The SSDS design will follow guidelines prescribed by the Environmental Protection Agency (USEPA), as presented in Appendix E of the New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (October 2006). The SSDS will be installed by RHS, a certified radon mitigation contractor. A copy of RHS's radon mitigation proficiency certification is provided as Attachment 1.

The IRM Work Plan identified specific system and component requirements for the SSDS. An excerpt of the IRM Work Plan relative to those requirements is included in this design document as Attachment 2.

A. SYSTEM LAYOUT & COMPONENTS. The SSDS will be a high pressure system utilizing three (3) suction points positioned at communication test locations S3, S7, and S8, as indicated on Figure 7. Each SSDS suction point will consist of a 4 inch hole cored through the existing slab. A suction cavity will be cleared around each suction pipe intake by clearing away sub-slab material to improve communication. Each suction riser will be constructed of 3 inch diameter schedule 40 PVC. Design details are presented on Figure 8.

The vertical suction riser at S8, located in the back stairwell, will be routed straight up through the center of the stairwell to the roof line, and elbow through the brick wall at the top of the stairwell to the roof surface. The vertical suction risers at S3 and S7 will each elbow directly to the outside at the first floor ceiling line, then rise vertically along the exterior building wall to the roof surface.

The penetration located at S3, in the existing meeting room, will be enclosed in a chase of 26 gauge metal stud framing with an exterior surface of 5/8 inch fire rated sheetrock, painted white.

All vertical piping will be secured with standard split ring hangers spaced no more than 8 feet apart, where possible.

All vertical risers will join into a horizontal 4 inch schedule 40 PVC trunk line on the roof. This trunk line will then be connected to a Cincinnati Fan, exact model to be determined during field testing. The top of the exhaust stack will be two feet above to roof line.

All floor and wall penetrations will be sealed with a VOC compliant urethane sealant.

A U-tube pressure gage will be mounted on each of the vertical suction pipes to monitor the system's performance. In accordance with standard practices for monitoring radon mitigation systems (ASTM 2121E; EPA/625/R-92/016), the SSDS pressure monitors will provide a visual indication of system performance, will be simple to read and interpret, and be located where they are easily seen. Pressure gage monitoring will be conducted in accordance with procedures identified in a Site Specific Management Plan that will be prepared after the system is installed (see Site Specific Management Plan below).

B. PRESSURE FIELD EXTENSION TEST. A pressure field extension (PFE) test will be done following system installation and start up, as indicated in the approved IRM Work Plan, to verify extension of the suction field. Adjustments will be made to the system as necessary, based on the PFE test and pressure gages, to ensure full extension of the suction field (-0.002 inWC) across the building footprint. Additional actions will be taken as needed to meet performance goals if it is determined that -0.002 inWC does not extend across the full footprint. Such actions will be discussed with NYSDEC prior to implementation.

C. POST-MITIGATION AIR TESTING. Post-mitigation indoor air samples will be collected no sooner than 30 days after installation and start up of the SSDS. Three (3) indoor air samples will be taken at the same locations as the previous RI samples, which will include one air sample in the model shop area, one in the test lab area, and one in the main office space area (see Figure 9).

IRM REPORT

Following implementation of the above activities, SWRNA will provide an IRM Report to NYSDEC/NYSDOH that will include the following:

- Description of field activities and observations
- Photographs of work progress and the completed system
- Figures showing the location and layout of the system and its key components
- Analytical data and field test measurements associated with the IRM program, including communication test data, PFE test results, and indoor air analysis.

SITE SPECIFIC MANAGEMENT PLAN

A Site Management Plan (SMP) will be provided for NYSDEC/NYSDOH review within 30 days of SSDS start-up. Following NYSDEC/NYSDOH approval, the SMP will be provided to P&S and maintained on site.

The SMP will describe the SSDS design; operation, monitoring and maintenance requirements; and provide troubleshooting guidance, points of contact for service, and manufacturer's information and specifications.

SCHEDULE

An implementation schedule for the SSDS is provided below, subject to NYSDEC/NYSDOH acceptance of the proposed implementation approach.

Installation of SSDS and start up	April 7 to 18, 2008
Pressure field extension (PFE) test and any necessary system modifications/adjustments	April 21 to 25, 2008
Collect post-mitigation indoor air samples	May 21, 2008 [1]
Submit Site-Specific Management Plan	June 21, 2008 [2]
Submit Initial IRM Report	June 21, 2008 [2]

Notes:

1 Thirty days after system start up and any necessary adjustments/modifications
2 Sixty days after system start up and any necessary adjustments/modifications

SWRNA can begin the implementation of the southern SSDS upon your acceptance of the approach described above. If you have any questions or wish to discuss the approach please call me at (315) 422-4949.

Very truly yours,
S&W REDEVELOPMENT OF NORTH AMERICA, LLC

Daniel P. Ours, C.P.G.
Senior Project Manager

pc: J. Piston, NYSDEC
P. DeCicca, Pass & Seymour
D. Simmons, Hancock & Estabrook
W. McFarland, Stearns & Wheler, LLC

TABLES

Table 1. Sub-Slab Communication Test Data. SSDS Design Document, Pass & Seymour Boyd Ave BCP Site. November 2007

Suction Hole	Baseline Pressure		Test Flow	Test Hole Pressure Readings (Pa)																
I.D.	Pa [1]	in WC [2]	CFM	T1	T2	T3	T4	T5	T6	T7	T8	T9	S1	S2	S3	S4	S5	S6	S7	S8	S9
S1	1.1	0.0044	85.7	-38.7	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	-3.9	-2.4
S2	0.8	0.0032	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
S3	1.5	0.006	81.1	nc	-10.2	-49.2	-38.8	-38.9	-30.4	nc	nc	nc	nc	nc	nc	-2.2	-1.1	-0.5	nc	nc	nc
S4	4.1	0.0164	58.1	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	-0.9	nc	-1.4	nc	nc	nc	nc
S5	2.8	0.0112	100.9	nc	nc	nc	nc	-1.2	-0.3	-1.1	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
S6	2.5	0.01	78.7	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	-1.1	nc	nc	nc	nc
S7	2.6	0.0104	77.6	nc	nc	nc	nc	nc	nc	nc	-2.1	-17.6	nc	nc	nc	nc	nc	nc	nc	nc	nc
S8	0.3	0.0012	82.8	-10.2	-4.7	-9.9	-9.8	-6.9	-5.1	nc	nc	nc	-0.8	nc	nc	nc	nc	nc	nc	nc	-7.4
S9	0.1	0.0004	92.4	-3.8	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc

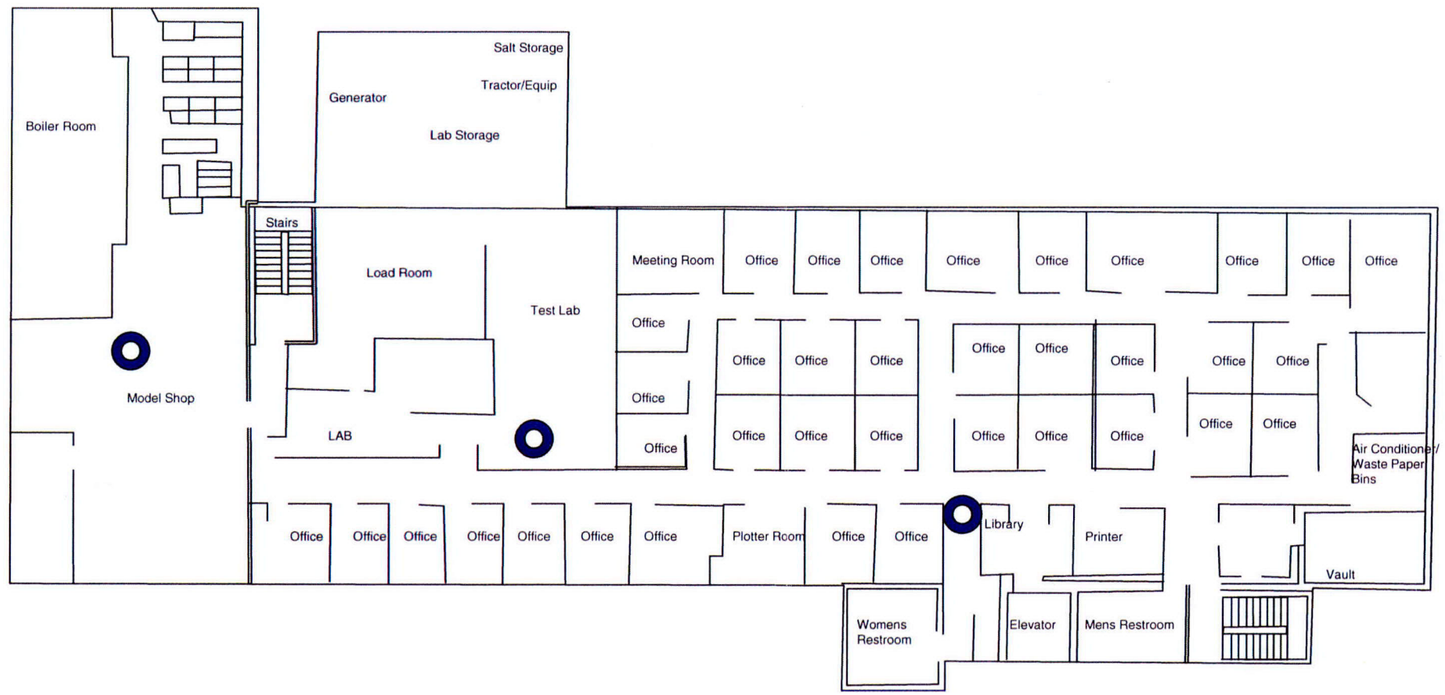
[1] Pa - pressure in Pascals

[2] in WC - pressure in inches of water column (1 Pa = 0.004 in WC)

nc - no communication (i.e. no pressure field) between suction hole and test hole location

Test conducted by Radon Home Services, Inc. on November 6, 2007. Data provided by Radon Home Services, Inc.

FIGURES



Building footprint/floor plan
(Lowest level)

0 16 32 ft

Proposed Post-Mitigation
Air Sample Location

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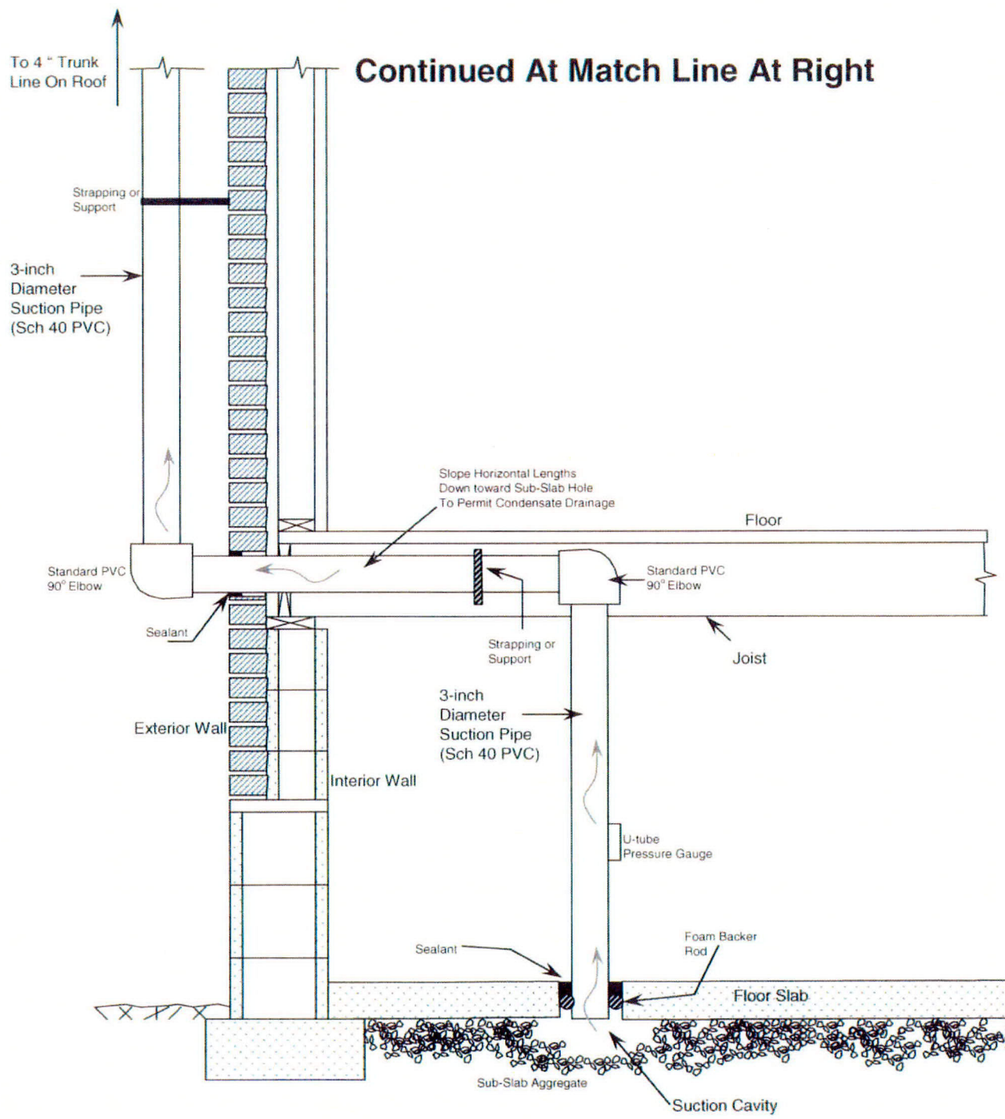
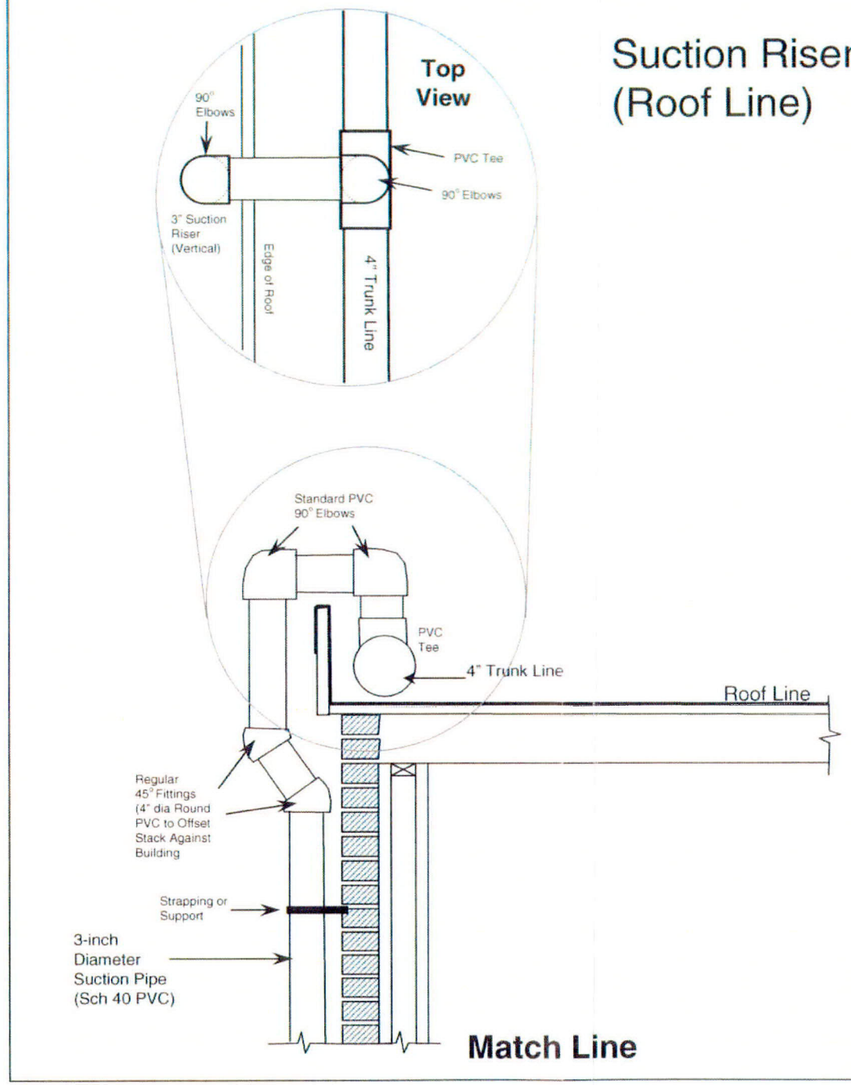
SUB-SLAB DEPRESSURIZATION SYSTEM
(SSDS) DESIGN DOCUMENT
P&S BOYD AVE SITE
35 and 50 BOYD AVENUE
SOLVAY, NEW YORK

FIGURE 9
POST-MITIGATION INDOOR AIR TESTS

Suction Riser Profile (Exterior Rise)



Suction Riser Profile (Roof Line)



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SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS) DESIGN DOCUMENT
P&S BOYD AVE SITE
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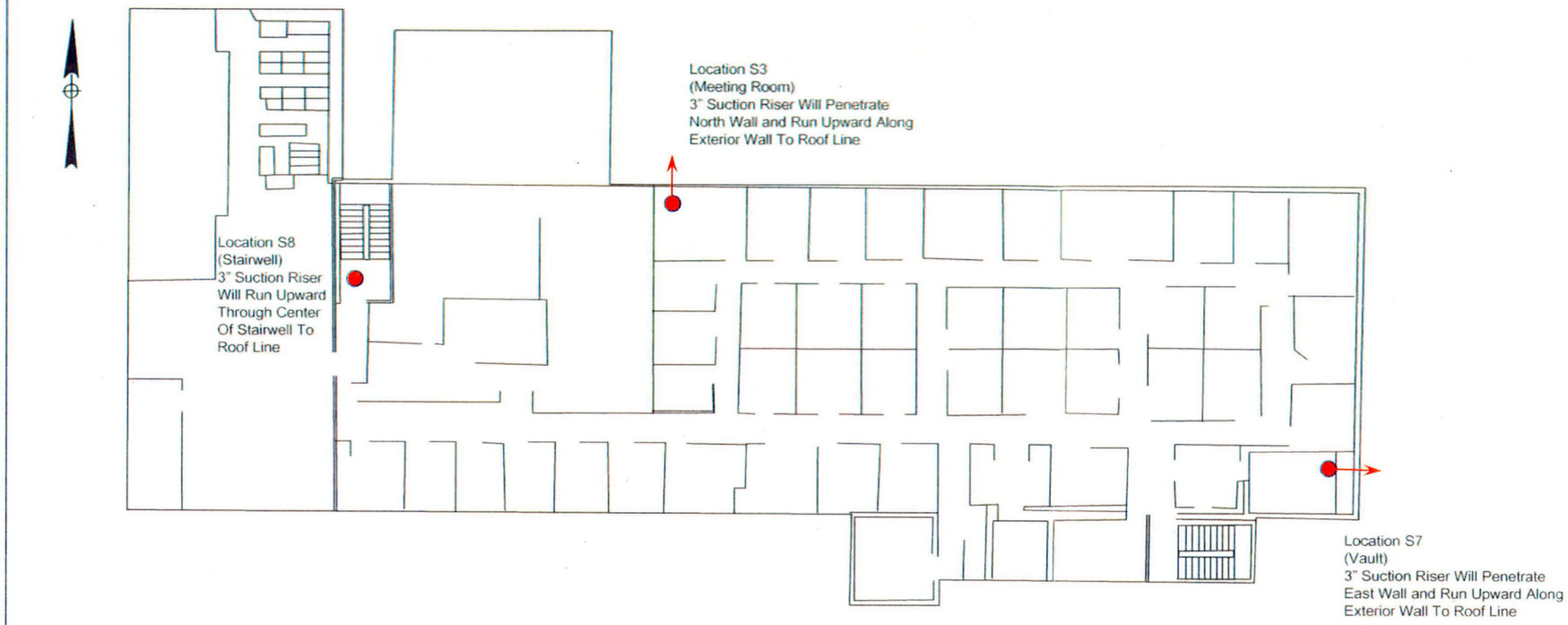
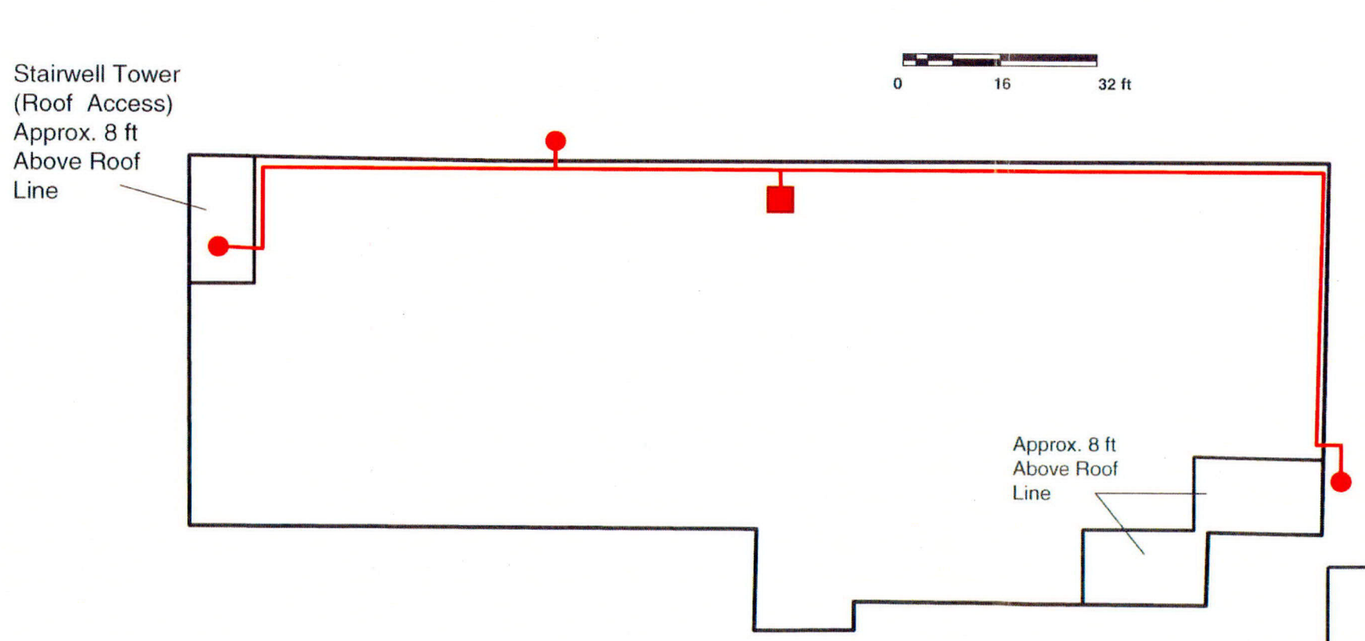
FIGURE 8
SSDS DETAILS – SUCTION RISER AND PENETRATIONS



Lowest Level Plan

- 3-inch Diameter PVC Vertical Suction Riser



Roof Level Plan

- High Pressure Cincinnati Fan (Model To Be Determined)
- 3" diameter Vertical PVC Riser
- 4" diameter Horizontal PVC Trunk Line
- Roof Line

Based on proposal provided by Radon Home Services, Inc. (February 4, 2008))

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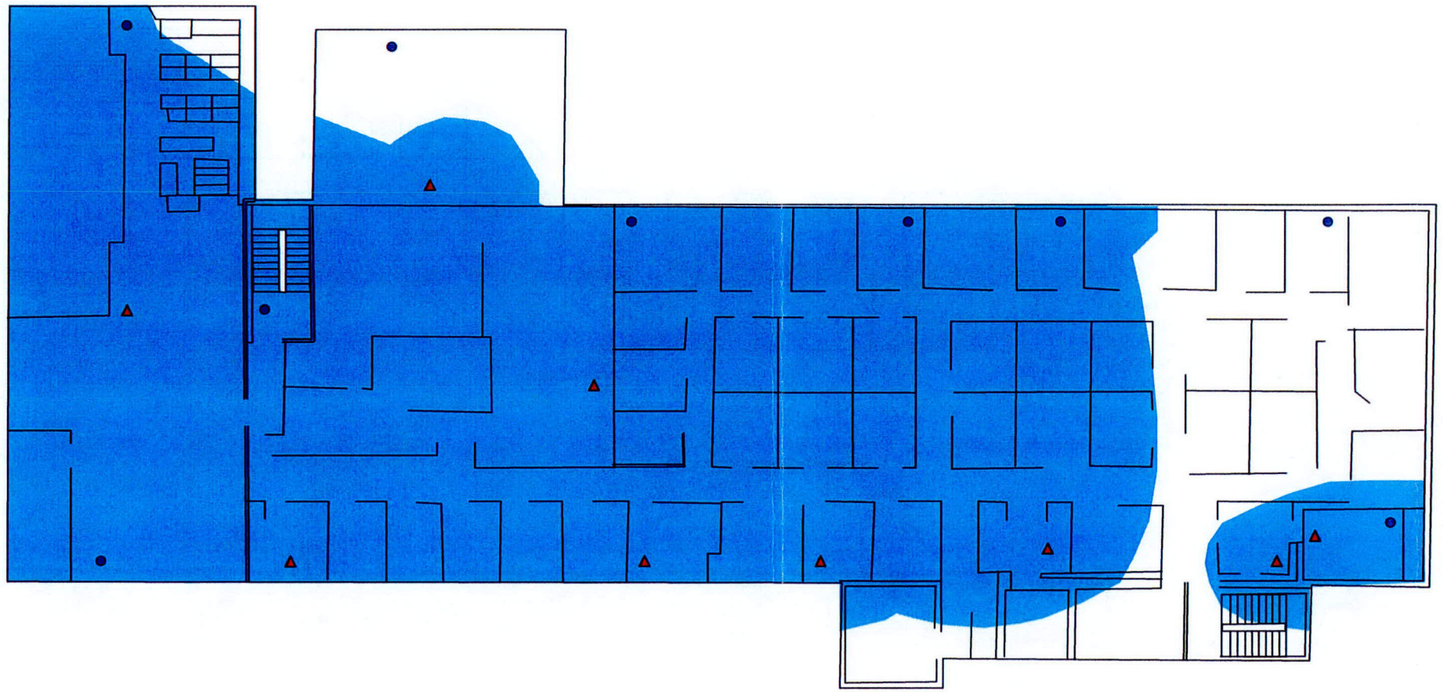
FIGURE 7
SSDS LAYOUT – SUCTION RISERS, TRUNK LINE AND FAN ORIENTATION



Based on data provided by Radon Home Services, Inc. (November 6, 2007)

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FIGURE 6
COMMUNICATION TEST
COMBINED PRESSURE FIELD AT S-3, S-5, S-7 AND S-8

< -0.002 in WC (< -0.5 Pa)

-0.01 to -0.05 in WC (-2.5 to -12.5 Pa)

< -0.05 in WC (< -12.5 Pa)

Based on data provided by Radon Home Services, Inc. (November 6, 2007)

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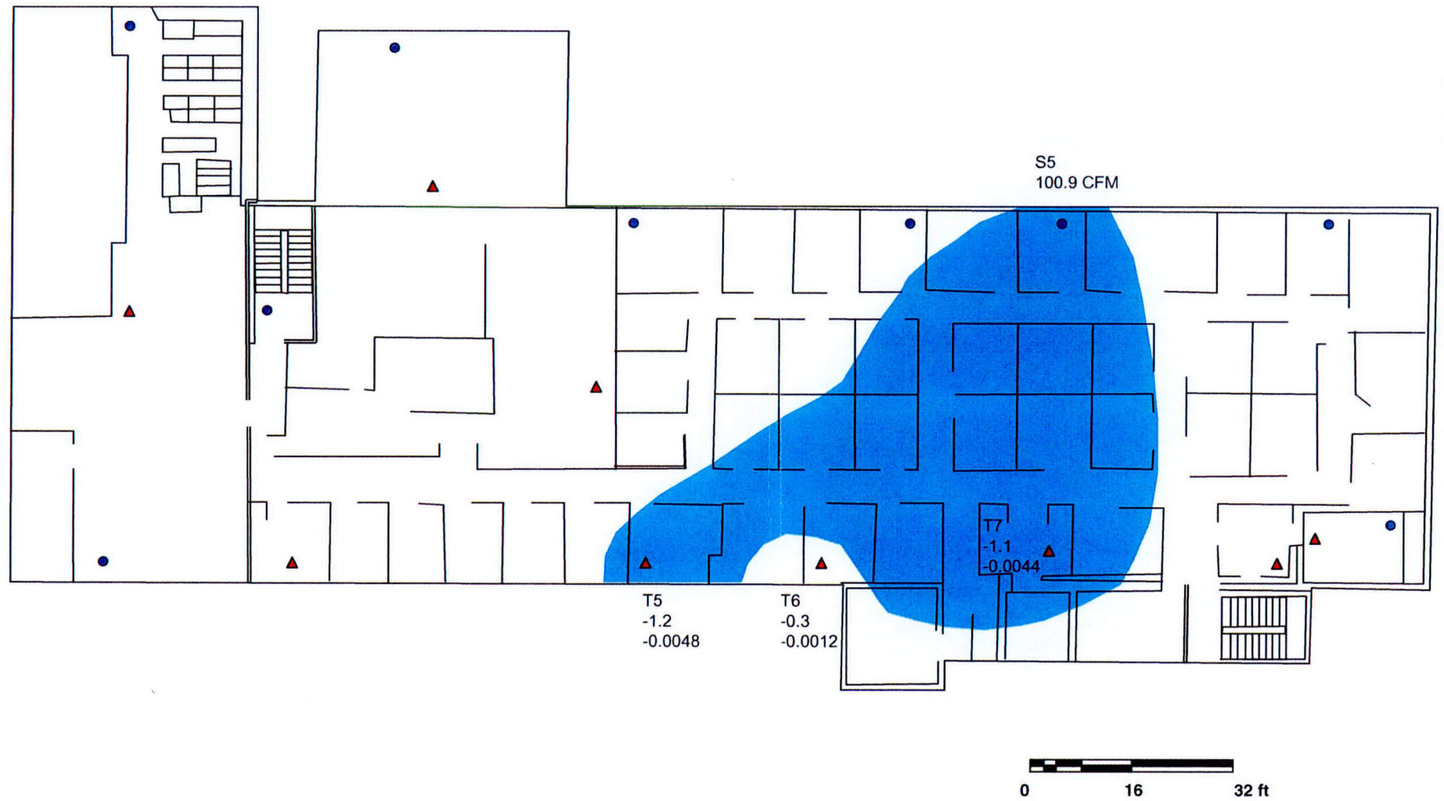
FIGURE 5
COMMUNICATION TEST
SUCTION PT S-7 PRESSURE FIELD



Based on data provided by Radon Home Services, Inc. (November 6, 2007)

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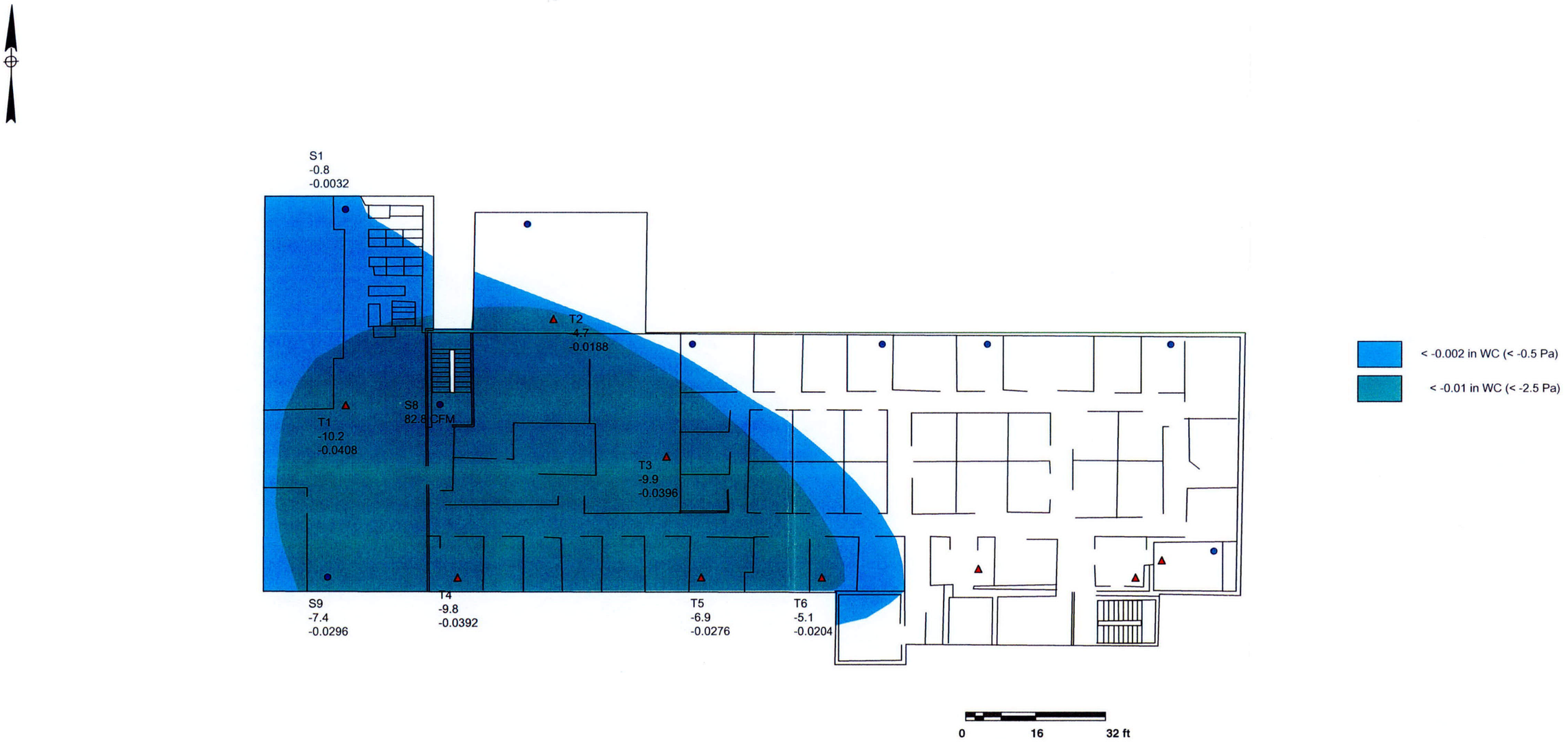
FIGURE 4
COMMUNICATION TEST
SUCTION PT S-5 PRESSURE FIELD



Based on data provided by Radon Home Services, Inc. (November 6, 2007)

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(SSDS) DESIGN DOCUMENT
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35 and 50 BOYD AVENUE
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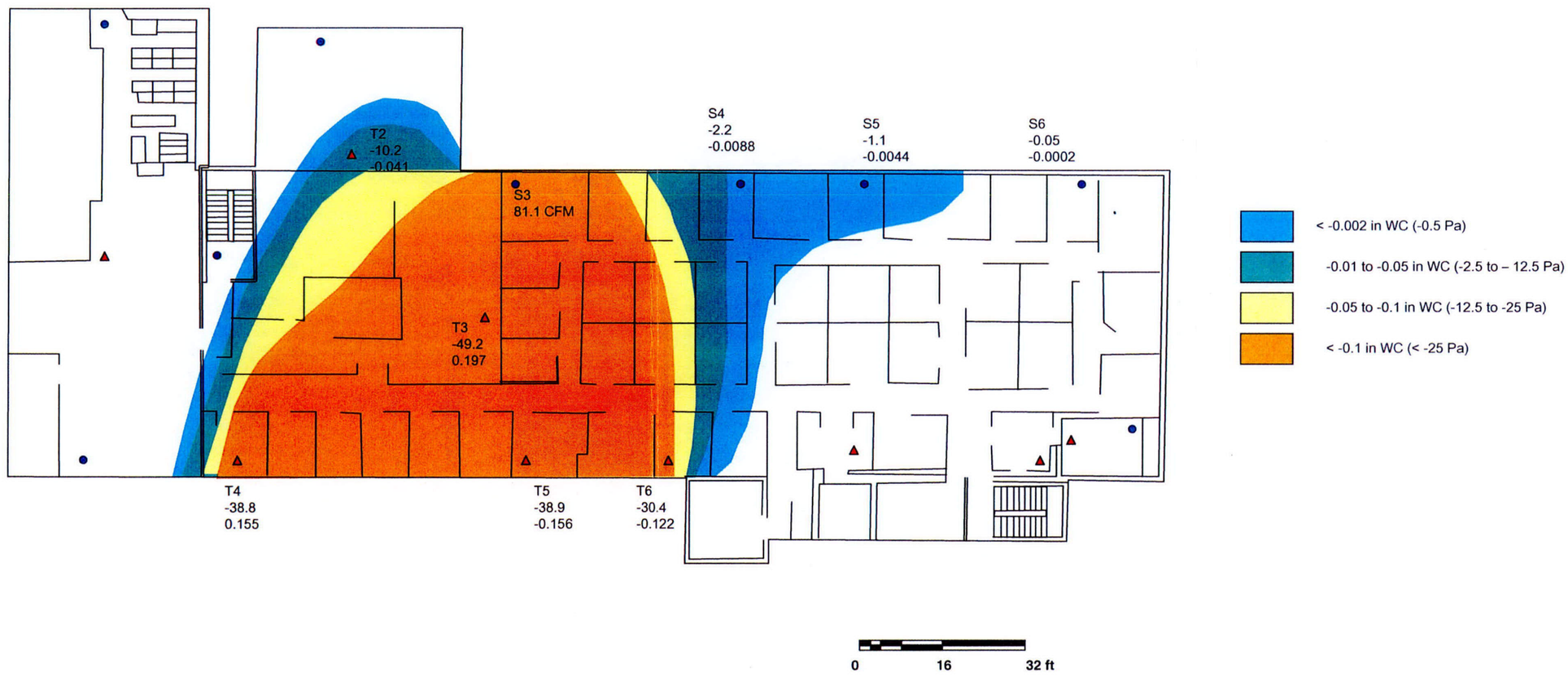
FIGURE 3
COMMUNICATION TEST
SUCTION PT S-8 PRESSURE FIELD



Based on data provided by Radon Home Services, Inc. (November 6, 2007)

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FIGURE 2
COMMUNICATION TEST
SUCTION PT S-3 PRESSURE FIELD

Building footprint/floor plan (Lowest level)

Communication Test Locations

- Suction Hole
- Test Hole

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(SSDS) DESIGN DOCUMENT
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FIGURE 1
COMMUNICATION TEST
SUCTION AND TEST HOLE LOCATIONS

ATTACHMENTS

Attachment 1

National Environmental Health Association Radon Proficiency Certification

NEHA Certification

National Environmental Health Association
National Radon Proficiency Program

Richard A. Kornbluth

Residential Mitigation Provider

ID Number: 100038 RMT Expiration: 7/31/2008

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.

Attachment 2

IRM Work Plan Excerpt – SSDS System Requirements

SECTION 2 - DESIGN REQUIREMENTS

The following describes the basic design concepts that will be incorporated into the SSD system, as prescribed by USEPA and NYSDOH. The final design of the SSD system will be based on findings of a sub-slab communication test and building inspection completed as the first step of the implementation process (see Section 3 – *Implementation Approach*). A final design document will be provided and submitted to the NYSDEC following the completion of the communication test, for approval prior to system installation.

2.1 - GENERAL REQUIREMENTS

The SSD system will be designed and installed by Radon Home Services, Inc., a USEPA-certified radon mitigation contractor that the New York State Department of Health has accepted as qualified to install SSD systems.

Following installation of the SSD system, a documentation report will be prepared that establishes the SSD system was installed in accordance with the NYSDEC-approved design. An Operations, Monitoring, and Maintenance (OM&M) Plan (see Section 3) will be prepared and provided to the building owner and tenants, to facilitate understanding of the system's design and operation.

2.2 - SYSTEM REQUIREMENTS

The principal design and installation requirements of the SSD system are identified below, and incorporate many design aspects of systems to mitigate radon exposure.

- Sealing. The operating principle of the SSD will be to create negative pressure (i.e. a vacuum) below the building floor slab relative to inside the building, which will prevent vapors below the slab from entering the building. To improve system performance, visible cracks, holes, and gaps in the floor will be filled with compatible caulks, non-shrink mortar, grouts, or expanding foam to create a seal that will prevent short-circuiting of air. Materials used as sealants will not contain any VOCs.

- Operation. The system vent fan will run on electrical power, and designed in such a manner to avoid excess energy usage. The system shall be designed to avoid the creation of other health, safety, or environmental hazards to building occupants (e.g. backdrafting of natural draft combustion appliances), and shall also avoid compromising moisture and temperature controls and other comfort features, and to minimize noise.

- Vent Fan. The vent fan and discharge piping shall not be located within or below an occupied area of the building to avoid entry of subsurface vapors in the event of a fan leak.

- Exhaust. The vent pipe's exhaust shall be a minimum of 12 inches above the roof line of the building, and at least 10 feet above ground level. It shall be at least 10 feet (laterally) away from any openings in the building (i.e. doors, windows) that are less than 2 feet (vertically) below the exhaust point.

- Labeling. The SSD system shall be clearly labeled to identify its purpose, and a telephone number will be identified to call if there are any questions.

- Monitor. A pressure monitor shall be installed on the system to alert building occupants if the system stops working properly. The monitor may be a liquid gauge (a manometer), sound alarm, or needle display gauge. The monitor shall be placed in a visible location, and building manager will be made aware of it, how it works, and how it is read, and what to do if it indicates a problem.

2.3 - COMPONENT REQUIREMENTS

Figure 4 is a conceptual design schematic that identifies the main system components, which are discussed below.

2.3.1 Piping Requirements

- Piping will be schedule 40 PVC. All joints and connections shall be permanently sealed with adhesives as specified by the manufacturer of the pipe. Joints and connections shall be made air tight.

- External piping runs shall be insulated to avoid freezing and condensation.

- Vent pipes shall be fastened to the structure of the building with hangers, straps, or other supports that will secure the piping. Existing plumbing pipes, ducts, or mechanical equipment shall not be used to support SSD system pipe.

- Supports for vent pipes shall be installed at least every six (6) feet on horizontal runs. Vertical runs shall be secured either above or below the points of penetration through floors, ceilings, and roofs, or at least every 8 feet on runs that do not penetrate floors, ceilings or roofs.

- To prevent blockage of air flow into the bottom of the vent pipe (i.e. at the extraction point), the pipe shall be supported or secured in a permanent manner that prevents downward settlement into soil beneath the sub-slab aggregate material.

- Vent pipes shall be installed in a configuration that allows condensation and/or rainwater to drain downward into the ground beneath the slab.

- Vent pipes shall not block access to any areas requiring maintenance or inspection. Pipes shall not be installed in front of or interfere with any light sources, opening, door, window, or equipment access required by code.

2.3.2 Vent Fan Requirements

- The vent fan(s) shall be designed or otherwise sealed to reduce the potential for leakage of vapors from the vent fan housing.

- The vent fan(s) shall be installed in a configuration that avoids condensation buildup in the fan housing. Whenever possible, the fan should be installed in vertical runs on the vent pipe.

- Vent fan(s) mounted on the exterior of the building shall be rated for outdoor use.

- Vent fan(s) shall be installed in the vent pipe using removable couplings or flexible connections that can be tightly secured to both the fan and the vent pipe.

- The fan intake shall be screened to prevent intake of debris that could damage the fan. Screens shall be removable to enable cleaning and replacement.

2.3.3 Electrical

- Wiring of the vent fan shall conform to local regulations. The wiring may not be located in or chased through the installation ducting or any other heating or cooling ductwork.

- The fan(s) for this project will be mounted on the exterior side of the building. The use of an exterior fan prohibits the use of plugged cords to supply power to the fan. (If a plugged cord is used to supply power to the fan, it may not penetrate a wall or be concealed in a wall).

- High–flow vent fans typically rate at between 112 to 245 Watts. If the rated electricity requirements of the system fan exceeds 50 percent of the circuit capacity into which it will be connected, or if the total connected load on the circuit (including the vent fan) exceeds 80 percent of the circuit's rated capacity, a separate, dedicated circuit shall be installed to power the fan.

- An electrical disconnect switch or circuit breaker shall be installed to permit deactivation of the fan for maintenance or repair.