Sub-Slab Depressurization System
Construction Completion Report
Elks Plaza, LLC
157-189 West Merrick Road
Freeport, NY
NYSDEC Site No.: 130193

September 2012

Prepared for:

Elks Plaza, LLC
c/o Galaxy Management, Inc.
28 Campbell Drive
Dix Hills, NY 11746-7902

Prepared by:

CA RICH CONSULTANTS, INC.
17 Dupont Street
Plainview, NY 11803-1614

e-mail: eweinstock@carichinc.com

September 20, 2012

NYSDEC
Division of Hazardous Waste Remediation
625 Broadway
Albany, New York 12207-2942

Attention: Melissa Sweet, Project Manager

Re: **Sub-Slab Depressurization System**
Construction Completion Report
Elks Plaza, LLC
157-189 West Merrick Road
Freeport, NY
NYSDEC Site No.: 130193

Dear Ms. Sweet:

CA RICH Consultants, Inc. (CA RICH) is pleased to present this Sub-Slab Depressurization System, Construction Completion Report for Elks Plaza, LLC at 157-189 West Merrick Road Freeport, NY. A Site Plan with Property Boundaries is included as Figure 1.

Introduction

The property has been the subject of a series of investigations that have included testing and analysis of the groundwater, soil, soil vapor and indoor air at the property. The results of these investigations are summarized in the following documents (Refs. 1 and 2).

- Site Characterization Report, Elks Plaza LLC — March 2010
- Supplemental Soil Vapor Investigation, Elks Plaza LLC — June 2010

Based on the results of those investigations elevated levels of perchloroethene (PCE) were identified below the units 179 and 181. Unit 181 was the former location of a dry cleaning tenant. The focus of this work was to perform a pilot test within units 179, 181 and 181A, the space currently occupied by a Laundromat. This work was performed in accordance with our Revised Pilot Test Work Plan and Work Plan Addendum #1 (Refs. 3 and 4). An initial test boring was performed to delineate the vertical extent of PCE below a former dry cleaning machine that existed in unit 181. The results of the test boring and the pilot test were, in turn, used to design a venting system to address the sub-slab soil vapor issues identified in the earlier investigations. A summary or the pilot test and a design for the SSD system were included in references 5 & 6.

- Pilot Test Report and Interim Remedial Measures Work Plan — January 2012
- Revised Pilot Test Report and Interim Remedial Measures Work Plan Addendum #1 — March 2012

Remedial Action Objectives

The Remedial Action Objective (RAO) for this IRM was to develop a SSD system that is protective of public health and the environment. This was achieved by exerting a vacuum below the slab of the Laundromat that will prevent any remnant subsurface PCE vapors from the operation of the former dry cleaner from entering the existing structure. Initially, the exhaust of the SSD system will be treated using vapor-phase carbon canisters. As the operation of the system continues and the levels of PCE and its degradation products in the raw soil vapor before carbon treatment decrease below NYSDEC and NYSDOH emission guidance, the system will be operated without carbon treatment.

Description of Remedy

The remedy included in this IRM includes a SSD system. The system consists of the four vents installed for the pilot test which were converted into permanent sub-slab depressurization vents. Four-inch diameter sheet metal ducts were extended and connected above the existing Laundromat. These were, in turn, connected to a six-inch diameter riser. Initially, the four-inch diameter ducts transitioned to four-inch diameter PVC pipe which was extend along the roof to the stair well at unit 175. The four-inch pipe was extended down through the roof and into the stair well. It was connected to a moisture knock drum and then to a Fuji Model VFC40 1 HP regenerative blower. The extracted soil vapor is then passed through two 55-gallon vapor phase carbon units. The treated vapor is then connected to a four-inch pipe that extends through the roof of the stair well for a height of six feet above the roof. The blower was connected to the electric panel of the shopping center.

A magnehelic-type vacuum gauge equipped with a red LED low-vacuum indicator light was installed on the vertical riser closest to the office of the Laundromat. The LED light is connected to the power supply of the shopping center. The tenant will be instructed to call CA RICH for service if the red indicator light is illuminated.

The Annual Cavity Impact (Cc) will be recalculated after each round of quarterly monitoring round and compared to the AGC standard. Once the untreated soil vapor is less than the AGC standard, we will petition the NYSDEC to turn off the Fuji Blower and replace it with a Fantech fan model HP220. The four-inch diameter PVC pipe will be removed and the Fantech fan will be connected directly to the six-inch riser set above the roof.

Summary of Construction Activities

1) Installation of the Sub-Slab Venting System

The sub-slab venting system design was focused to address the shallow soils below the Laundromat floor. As shown on Figure 2, the vents extend approximately one foot below the bottom of the concrete slab floor. The locations of the four vents are displayed on Figure 3.

A core drill was used to penetrate the concrete floor. A hole was then advanced using a hand auger until the final depth required for the vent was achieved. Four-inch diameter perforated PVC pipe was then lowered into the ground and surrounded with pea gravel. A concrete seal was placed at the top of the vent.

2) Installation of Duct Work

Between May 18, 2012 and May 25, 2012, spiral welded sheet metal duct risers were connected to the vents installed in the floor and extend up to the roof. The riser ducts were then connected to a manifold above the roof. A six-inch riser was placed in the center of the manifold and capped for future use. A four-inch PVC pipe was connected to the sheet metal duct manifold and extended to the stairwell at unit 175.

3) Installation of Moisture Knock-Out Drum, Blower and Carbon Drums

On June 7, 2012, a moisture knock-out drum, a Fuji Model VFC40 1 HP regenerative blower and two General Carbon 55-gallon carbon drums were installed stair well at unit 175. The moisture knock-out drum was connected to the four-inch diameter PVC pipe on the roof using four-inch diameter sheet metal ducts. The moisture knock-out drum was then connected to the blower, which was, in turn connected to the carbon drums. The carbon drums were then connected to a four-inch diameter sheet metal vent that extends above the roof. A schematic of the system is included on Figure 4.

4) Venting System Start Up

After the system was installed, a start up test was performed on June 21, 2012. Holes were drilled into the floors of units 177, 177A, 179A and 183A. Using a barbed fitting sealed into the floor, the vacuum at each of these units was measured using a digital manometer. The vacuum in the sheet metal riser and at the inlet to the blower was also recorded. The results of the start up test are presented below and on Figure 5. The measurements confirm that adequate vacuum was established at all of the points measured and confirm the design criteria included in the IRM Work Plan.

Location	Measured Vacuum
Inlet of Blower	- 4.0
SSD Vent Riser	-2.04
Unit 177	-0.018
Unit 177A	-0.136
Unit179A	-0.031
Unit183A	-0.067

5) Description of Problems Encountered During Construction

During a pre-start up trail run, it was noticed that several of the sheet metal ducts (which are under vacuum) had minor leaks. These were sealed and checked. The leaks did not reoccur.

6) Descriptions of Design Changes

No design changes were required

7) Quantities and Concentrations of Contaminants Removed

There were no contaminants removed as part of the implementation of the SSD system.

8) Description of Waste Streams, Quantity of Material Disposed and Disposal Facilities

The SSD system is anticipated to generate waste PCE as it is captured in the 55-gallon carbon drums. These drums will be monitored and disposed of as the operation of the system continues. Carbon change outs will be documented in the quarterly monitoring reports.

PCE-laden water may be captured in the moisture knock out drum. If water does collect in the drum, it will be sampled and tested. The results will be submitted to the NCDPW and we will request permission to discharged this water to the municipal sewer.

9) Operations, Maintenance and Monitoring for the Venting System

The site will be visited weekly for the first month, monthly for the first three months and then quarterly thereafter. During each visit, the moisture knockout drum will be drained and a PID will be used to check the VOCs before the carbon units, between the two carbon units and after the carbon units. SUMMA canisters will be used to collect samples of the untreated and treated soil vapor for laboratory analysis on a quarterly basis. These results will be submitted to the NYSDEC in quarterly letter reports. The blower and fan do not require any periodic maintenance. Literature for the Fuji blower and Fantech fan are included as Appendix A.

Certification

I, Stephen Osmundsen, certify that I am currently a NYS registered professional engineer as defined in 6NYCRR Part 375 and that this Sub-Slab Depressurization System Construction Completion Report was prepared in accordance with all applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the state of New York.

Seal

If you have any questions regarding this plan, please do not hesitate to call our office.

Respectfully,

CA RICH CONSULTANTS, INC.

Stephen J. Osmundsen, P.E.
Senior Engineer

Eric A. Weinstock
Vice President

Attachments

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Lois Reisman
apjmanagement@optonline.net

Suzanne Avena
savena@garfunkelwild.com

References

1. Preferred Environmental Services March 2010, Site Characterization Report, Elks Plaza LLC - Site # 130193, 157 -189 West Merrick Road, Freeport, NY.

2. Preferred Environmental Services June 2010, Supplemental Soil Vapor Investigation, Elks Plaza LLC - Site # 130193, 157 -189 West Merrick Road, Freeport, NY.

3. CA RICH, April 2011, Revised Pilot Test Work Plan, Elks Plaza, LLC, 157-189 West Merrick Road, Freeport, NY.

4. CA RICH, May 2011, Revised Pilot Test Work Plan Addendum Number 1, Elks Plaza, LLC, 157-189 West Merrick Road, Freeport, NY.

5. CA RICH, January 2012, Pilot Test Report and Interim Remedial Measures Work Plan,Elks Plaza, LLC, 157-189 West Merrick Road, Freeport, NY

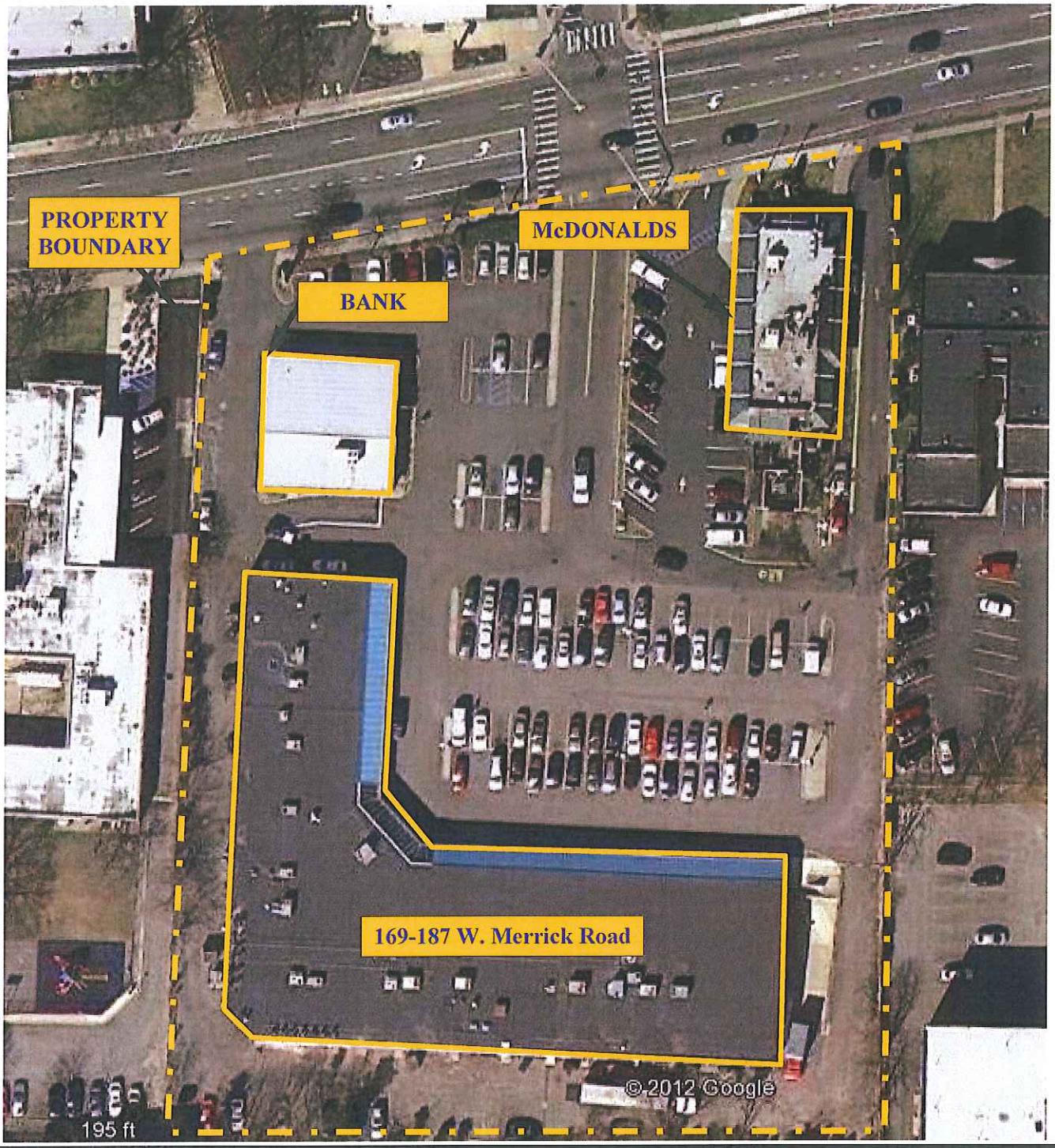
6. CA RICH, March 2012, Revised Pilot Test Report and Interim Remedial Measures Work Plan Addendum #1, Elks Plaza, LLC, 157-189 West Merrick Road, Freeport, NY

Figures

Tables

Appendices

FIGURES



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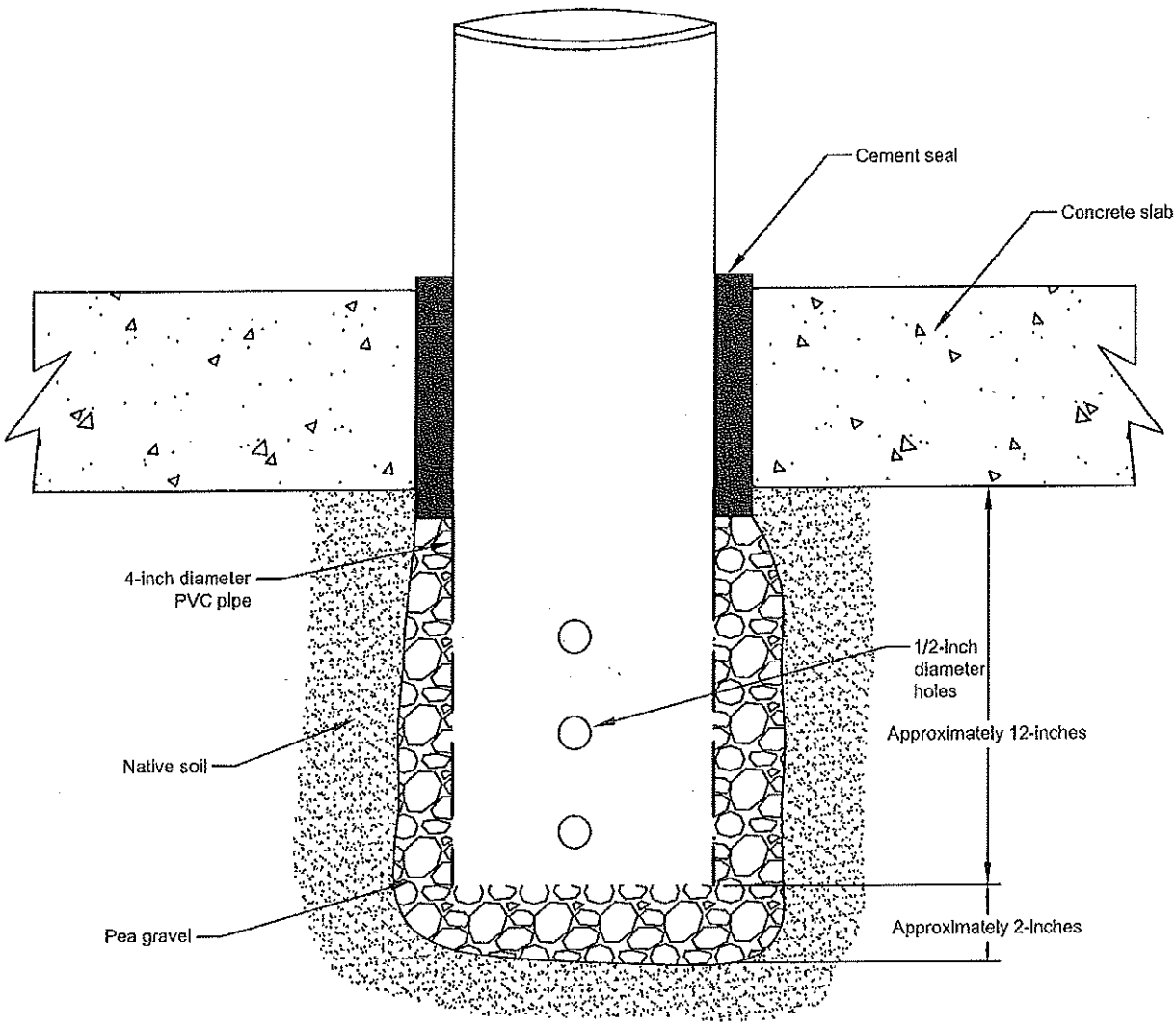
Adapted from Google Earth 2012

CA RICH CONSULTANTS, INC.
17 Dupont Street,
Plainview, NY 11803

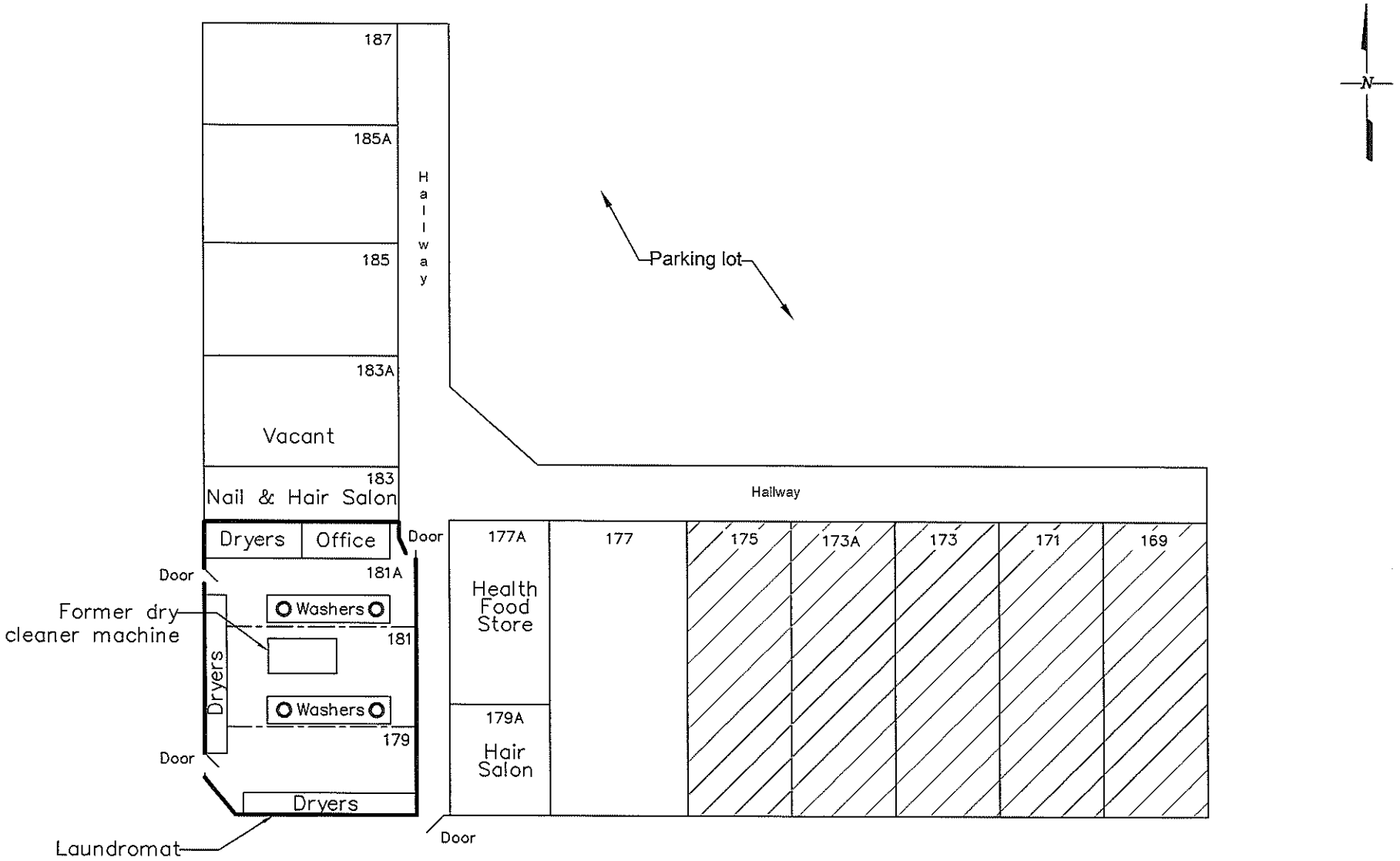
TITLE: **SITE PLAN WITH PROPERTY BOUNDARIES**	DATE: **6/8/2012**
	SCALE: **Not to scale**
FIGURE: **1**	**Elks Plaza, LLC** **157-189 W. Merrick Road** **Freeport, New York**
DRAWING:	DRAWN BY: **JTC**
	APPR. BY: **EAW**



CA RICH CONSULTANTS, INC.

Environmental Specialists Since 1982
17 Dupont Street, Plainview, New York 11803

TITLE: Typical Soil Vapor Vent		DATE: 9/22/2011
		SCALE: N.T.S.
FIGURE: 2	Elks Plaza, LLC 157-189 W. Merrick Road Freeport, New York	DRAWN BY: J.T.C.
DRAWING NO: 2011-M4		APPR. BY: E.A.W.



LEGEND

O Sub slab vent

Units have basement, basement unit is # 165

0 20 40 60

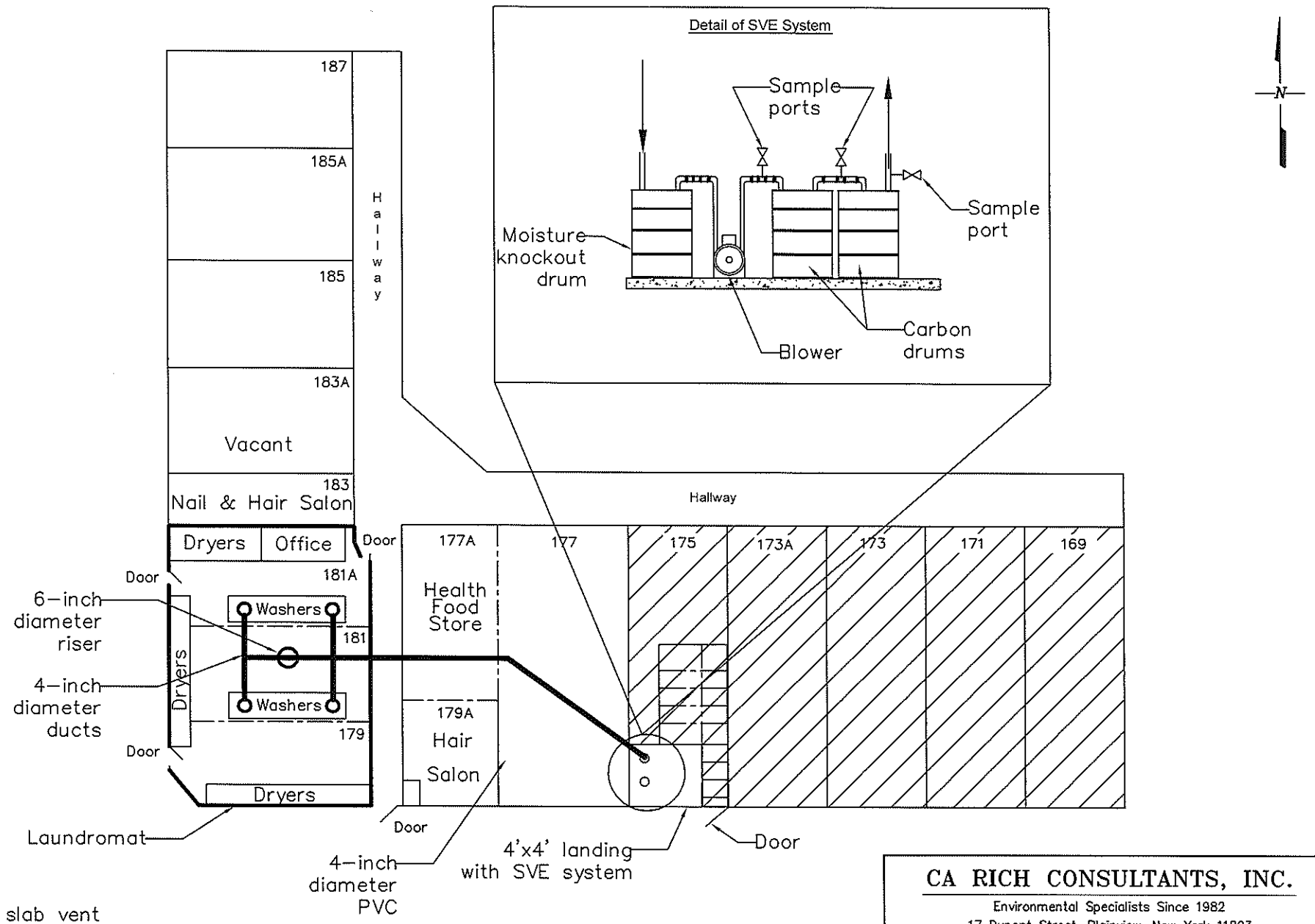
Graphic Scale in Feet

CA RICH CONSULTANTS, INC.

Environmental Specialists Since 1982

17 Dupont Street, Plainview, New York 11803

TITLE: Layout of Sub Slab Vents		DATE: 8/13/2012
		SCALE: 1"=40'
FIGURE: 3	Elks Plaza, LLC 157–189 W. Merrick Road Freeport, New York	DRAWN BY: J.T.C.
DRAWING NO: 2012–6		APPR. BY: E.A.W.



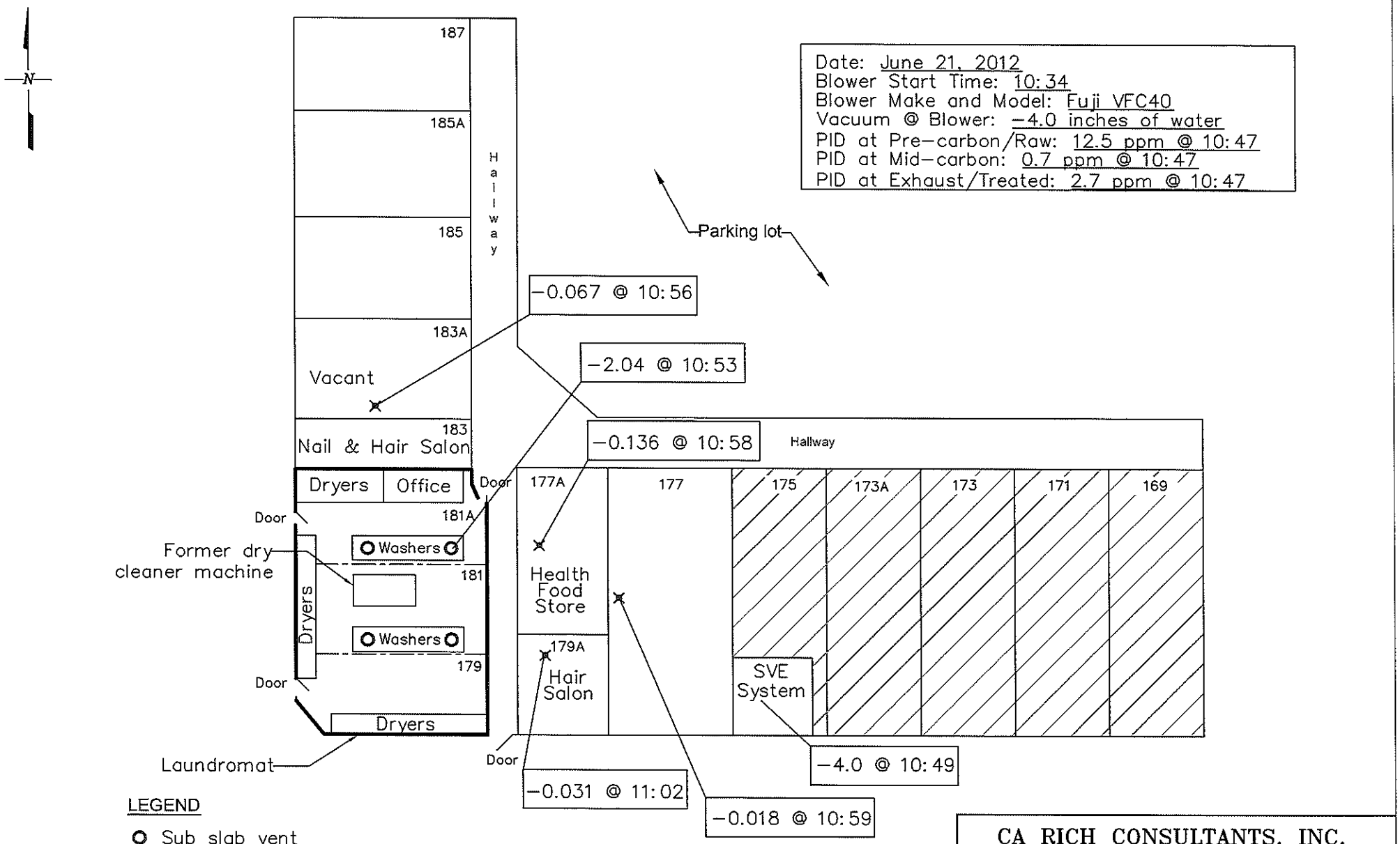
CA RICH CONSULTANTS, INC.

Environmental Specialists Since 1982

17 Dupont Street, Plainview, New York 11803

TITLE: Venting System Layout	DATE: 8/13/2012
	SCALE: 1"=40'
FIGURE: 4	DRAWN BY: J.T.C.
DRAWING NO: 2012-1A	APPR. BY: S.J.O.

Elks Plaza, LLC
157-189 W. Merrick Road
Freeport, New York



CA RICH CONSULTANTS, INC.

Environmental Specialists Since 1982

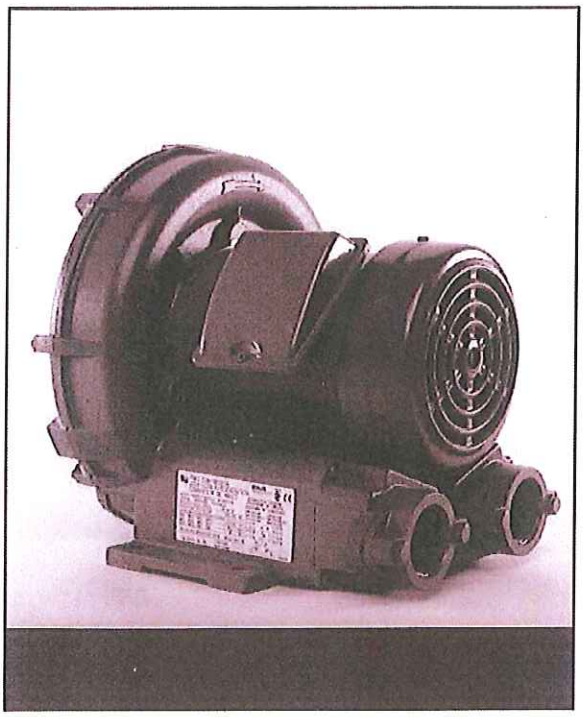
17 Dupont Street, Plainview, New York 11803

TITLE: Results of Startup Test	DATE: 8/13/2012
	SCALE: 1"=40'
FIGURE: 5	DRAWN BY: J.T.C./T.R.B.
DRAWING NO: 2012−2A	APPR. BY: E.A.W.

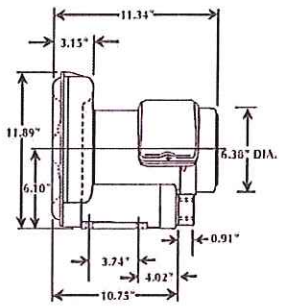
Elks Plaza, LLC
157−189 W. Merrick Road
Freeport, New York

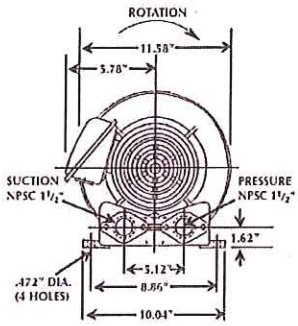
APPENDIX A

VFC40 RING COMPRESSOR



The VFC40 is a single-stage ring compressor with a maximum pressure of 54.5 in. H_2O, a maximum vacuum of 50 in. H_2O, and a maximum capacity of 98 SCFM. It comes complete with a direct-drive, 1 horsepower, TEFC motor capable of operating on a wide range of voltages, and on 50 or 60 Hz. A pilot-duty thermal protector is standard equipment on all 3-phase and 1-phase models. All versions have NEMA class B insulation, are UL recognized, CSA certified, and CE. 575V units are CSA certified only.





SPECIFICATIONS

	Model No.	Hz	Voltage	Amps (Max. Rated)	Amps (Locked Rotor)	Max. Pressure	Max. Vacuum	Max. Airflow	Min. Airflow	Max. Temp Rise (ΔT)	Weight
			Low Voltage/High Voltage			in. H_2O	in. H_2O	SCFM	SCFM	°F(°C)	lbs.(kg)
1 Phase	VFC400P-5T	60	115/230	8.6/4.3	24/12	54.5	50	98	3.5	119(65)	51(23)
		50	110/220	6.0/3.0	22/11	40	37	84	3.5	101(55)	
3 Phase	VFC400A-7W	60	200-240/400-480	3.3-2.8/1.7-1.4	15-16.5/7.4-8.2	54.5	50	98	3.5	119(65)	47.5(21.5)
		50	190-230/380-460	2.2-2.4/1.1-1.2	16.5-18.5/8.3-9.2	40	37	84	3.5	101(55)	
	VFC400A-5W	60	575	1.3	7.2	54.5	50	98	3.5	119(65)	47.5(21.5)

ACCESSORIES

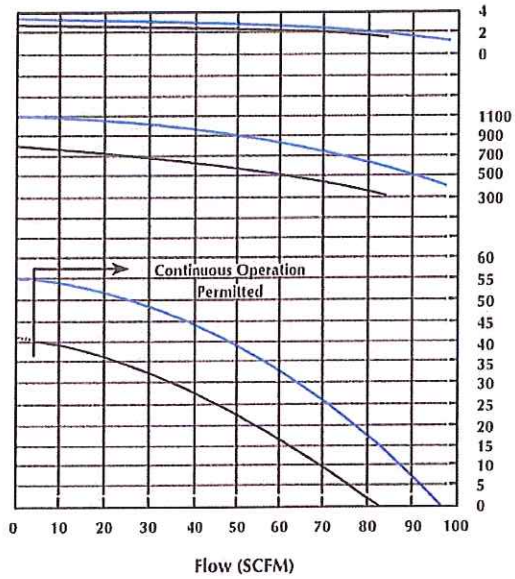
Description	Vacuum Relief Valve	Pressure Relief Valve	Inlet Filter	Inlet Filter Cover	Inlet Filter/Receiver	Exhaust Silencer/Muffler
Model No.	VV4	PV4	F-45	C-45	R30P1.5	VFY-024A

NOTE: Maximum allowable time at deadhead is 120 seconds.

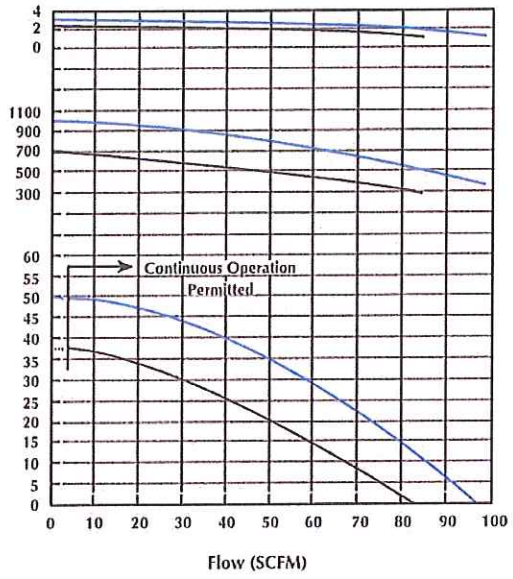
VFC40 PERFORMANCE DATA

KEY
60 Hz
50 Hz

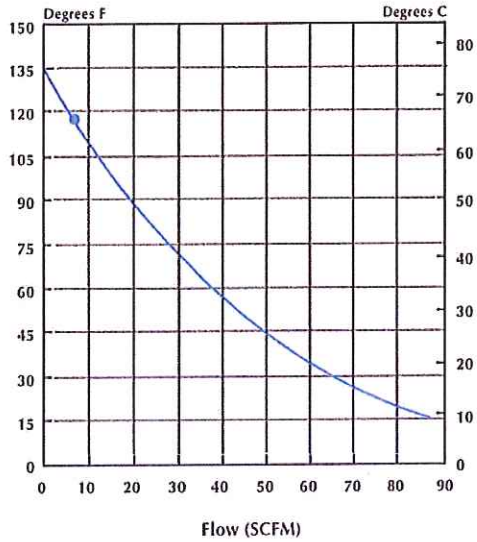
PRESSURE



VACUUM

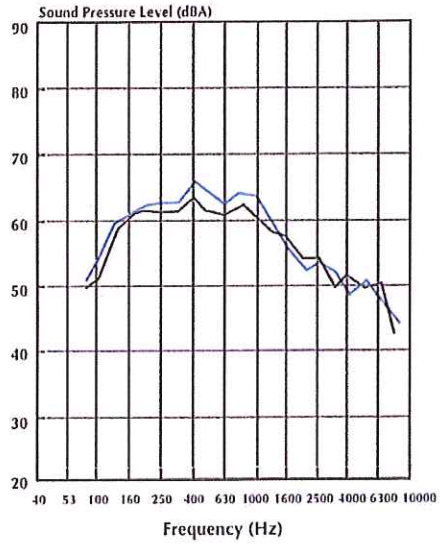


TEMPERATURE RISE



Max. Air Temperature is Value Marked • plus 40 Degrees C Ambient Temperature

SOUND LEVEL

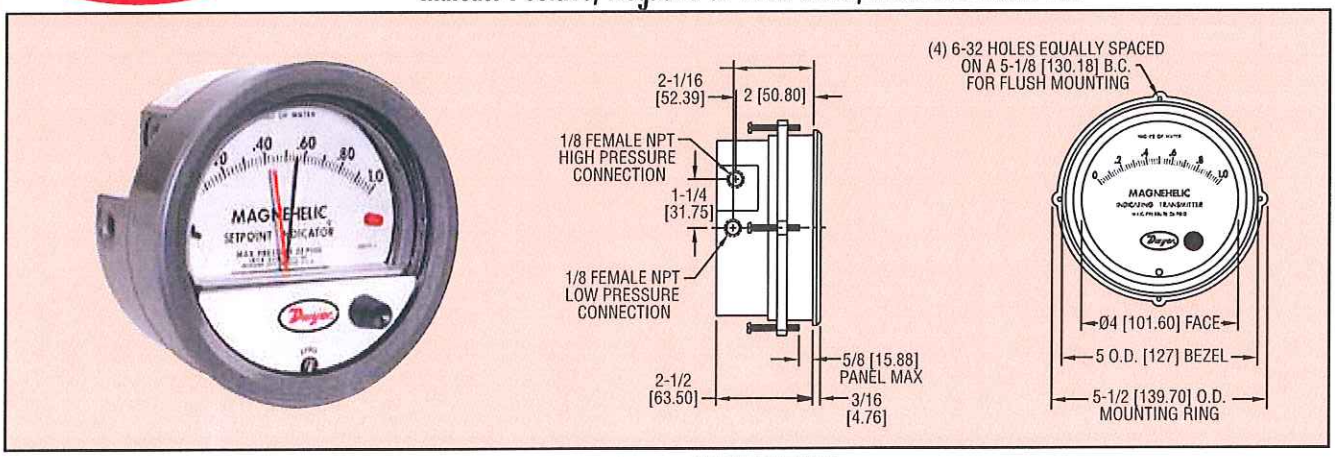


*Measured at distance of 1.0 meter

Series 2000-SP

Magnehelic® Differential Pressure Gages

Indicate Positive, Negative or Differential, Accurate within 2%



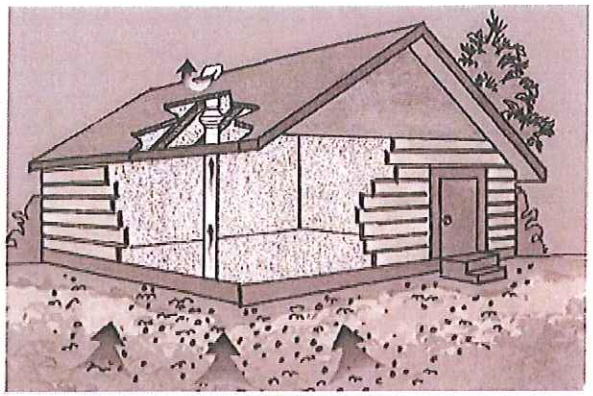
Bright red LED on right of scale shows when setpoint is reached. Field adjustable from gage face, unit operates on 12-24 VDC. Requires MP or HP style cover and bezel.

For Set Point Indicator Option, Add suffix **-SP** to end of gage model number
Ex: 2001-SP

SPECIFICATIONS

Service: Air and non-combustible, compatible gases. (Natural gas option available.)
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.
Accuracy: ±2% of full scale (±3% on - 0, -100 Pa, -125 Pa, 10MM and ±4% on - 00, -60 Pa, -6MM ranges), throughout range at 70°F (21.1°C).
Pressure Limits: 35 psig (2.41 bar), HP option: 80 psig (5.52 bar).
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only.
Temperature Limits: 20 to 140°F (-6.67 to 60°C).
Size: 4" (101.6 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8" female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
Standard Accessories: Two 1/8" NPT plugs for duplicate pressure taps, two 1/8" pipe thread to rubber tubing adapter and three flush mounting adapters with screws. (Mounting and snap ring retainer substituted for 3 adapters in MP & HP gage accessories.)

Fantech



HP Series Fans are Specially Designed with Higher Pressure Capabilities for Radon Mitigation Applications

MOST RADON MITIGATORS WHO PREVIOUSLY USED THE FANTECH FR SERIES FANS HAVE SWITCHED TO THE NEW HP SERIES.

PERFORMANCE DATA

Fan Model	Volts	Wattage Range	Max. Amps	CFM vs. Static Pressure in Inches W.C.								Max. Ps
				0"	0.5"	0.75"	1.0"	1.25"	1.5"	1.75"	2.0"	
HP2133	115	14 - 20	0.17	134	68	19	-	-	-	-	-	0.84
HP2190	115	60 - 85	0.78	163	126	104	81	58	35	15	-	1.93
HP175	115	44 - 65	0.57	151	112	91	70	40	12	-	-	1.66
HP190	115	60 - 85	0.78	157	123	106	89	67	45	18	1	2.01
HP220	115	85 - 152	1.30	344	260	226	193	166	137	102	58	2.46

HVI MEMBER℠

PERFORMANCE CURVES

Fantech provides you with independently tested performance specifications.

The performance curves shown in this brochure are representative of the actual test results recorded at Texas Engineering Experiment Station/Energy Systems Lab, a recognized testing authority for HVI. Testing was done in accordance with AMCA Standard 210-85 and HVI 916 Test Procedures. Performance graphs show air flow vs. static pressure.

Use of HP Series fans in low resistance applications such as bathroom venting will result in elevated sound levels. We suggest FR Series or other Fantech fans for such applications.

HP FEATURES INCLUDE

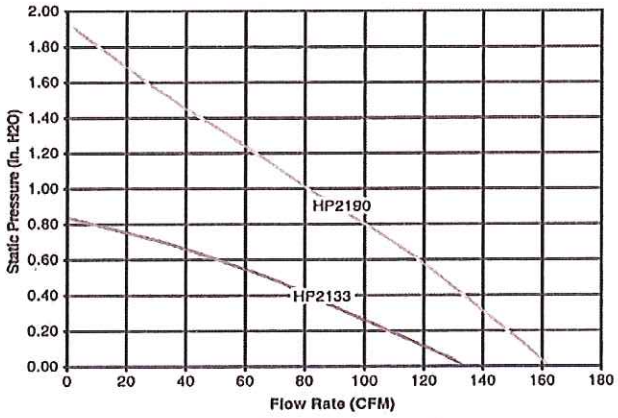
- Improved UV resistant housings approved for commercial applications.
- UL Approved for Wet Locations (Outdoors)
- Sealed housings and wiring boxes to prevent Radon leakage or water penetration
- Energy efficient permanent split capacitor motors
- External wiring box
- Full Five Year Factory Warranty

c UL us

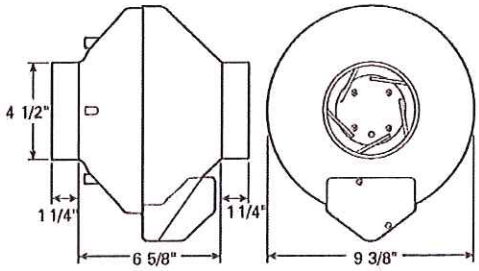
NOTE:

Installations that will result in condensate forming in the outlet ducting should have a condensate bypass installed to route the condensate outside of the fan housing. Conditions that are likely to produce condensate include but are not limited to: outdoor installations in cold climates, long lengths of outlet ducting, high moisture content in soil and thin wall or aluminum outlet ducting. Failure to install a proper condensate bypass may void any warranty claims.

HP2133 & HP2190 RADON MITIGATION FANS



Tested with 4" ID duct and standard couplings.

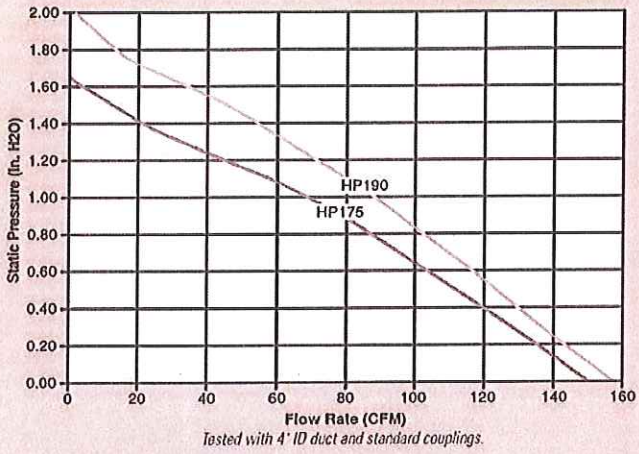


HP2133 – For applications where lower pressure and flow are needed. Record low power consumption of 14-20 watts! Often used where there is good sub slab communication and lower Radon levels.

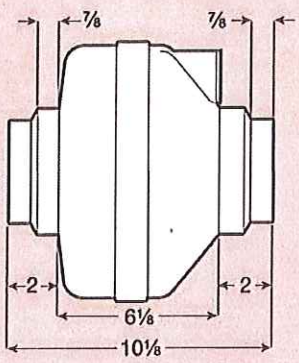
HP2190 – Performance like the HP190 but in a smaller housing. Performance suitable for the majority of installations.

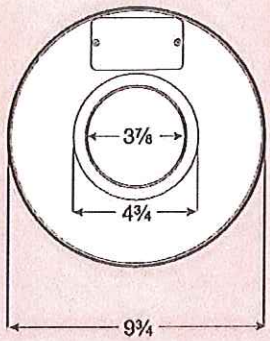
Fans are attached to PVC pipe using flexible couplings.
For 4" PVC pipe use Indiana Seals #156-44, Pipeconx FCX 56-44 or equivalent.
For 3" PVC pipe use Indiana Seals #156-43, Pipeconx FCX 56-43 or equivalent.

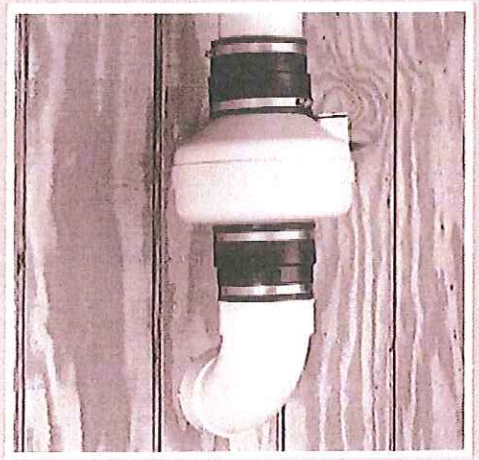
HP175 & HP190 RADON MITIGATION FANS



Tested with 4" ID duct and standard couplings.





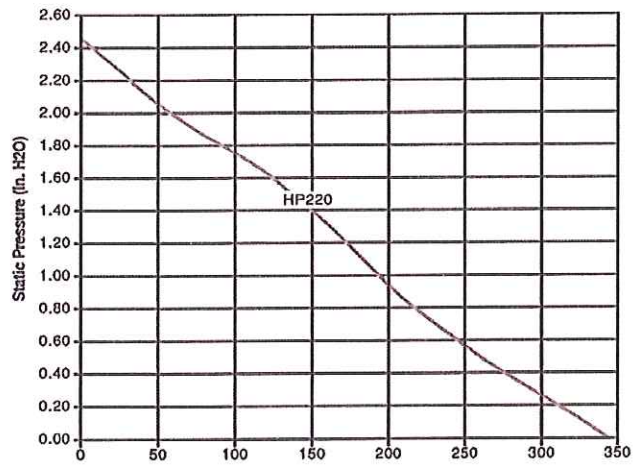


HP175 – The economical choice where slightly less air flow is needed. Often used where there is good sub slab communication and lower Radon levels.

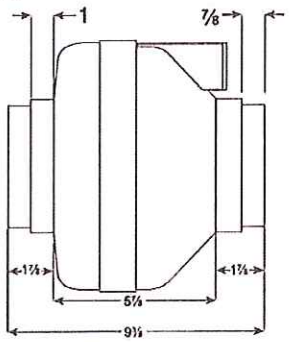
HP190 – The standard for Radon Mitigation. Ideally tailored performance curve for a vast majority of your mitigations.

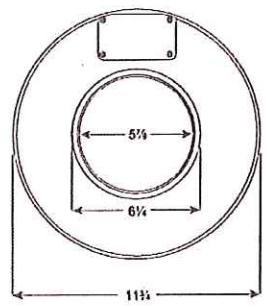
Fans are attached to PVC pipe using flexible couplings.
For 4" PVC pipe use Indiana Seals #151-44, Pipeconx FCX 51-44 or equivalent.
For 3" PVC pipe use Indiana Seals #156-43, Pipeconx FCX 56-43 or equivalent.

HP220 RADON MITIGATION FAN



Tested with 6" ID duct and standard couplings.

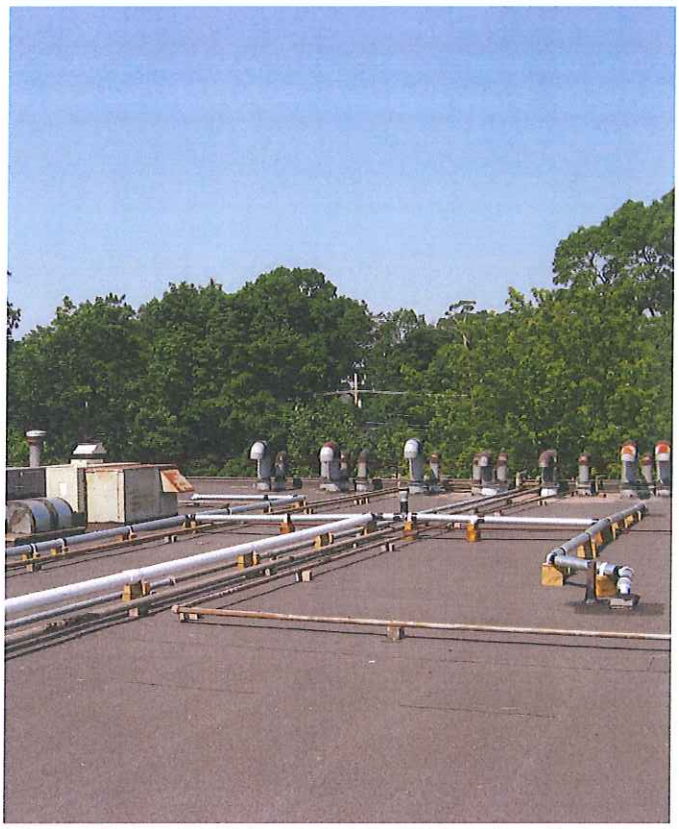




HP 220 – Excellent choice for systems with elevated radon levels, poor communication, multiple suction points and large subslab footprint. Replaces FR 175.

Fans are attached to PVC pipe using flexible couplings.
For 4" PVC pipe use Indiana Seals #156-64, Pipeconx FCX 56-64 or equivalent.
For 3" PVC pipe use Indiana Seals #156-63, Pipeconx FCX 56-63 or equivalent.

APPENDIX B



Duct work on roof

SSD blower and drums

Exhaust stack

Roof penetration

Vacuum gauge with indicator light