ALPHA
GEOSCIENCE
Geology
Hydrology
Remediation
Water Supply

May 3, 2005

Mr. John Rashak
NYSDEC Region 3
21 South Putt Corners Road
New Paltz, New York 12561-1696

Re: Sub-slab Depressurization System Design
Revonak Dry Cleaners
New Paltz Plaza

Dear Mr. Rashak:

Enclosed is a sub-slab depressurization system design report prepared by Alpine Environmental Services, Inc. for the eastern portion of the New Paltz Plaza in New Paltz, New York. This report was prepared in response to the February 25, 2005 letter from the NYSDEC (also enclosed) that requested additional information on the design and operation of the proposed sub-slab depressurization system.

By copy of this letter, I am forwarding copies of this report to Mr. Michael Rivara (NYSDOH), Mr. Ramanand Pergadia (NYSDEC-Region 3), and Mr. Robert Schick (NYSDEC-Central Office). Please feel free to contact me with any questions you have regarding the proposed sub-slab depressurization system. We request your prompt response and approval of the submitted information to allow construction to proceed so that system operation can begin by June 1, 2005.

Sincerely,
Alpha Geoscience

Thomas M. Johnson
Hydrogeologist

TMJ/bms

cc: M. Rivara (with enclosures)
R. Pergadia (with enclosures)
R. Schick (with enclosures)
P. Kempner (with enclosures)
M. Schnitzer (without enclosures)

Z:\projects\1995\95141-npplaza\Letters\2005\05-02-05 Sub slab design.doc

New York State Department of Environmental Conservation
Region 3
Division of Environmental Remediation
21 South Putt Corners Rd., New Paltz, NY 12561-1696
Telephone: (845) 256-3179 FAX: (845) 255-3414

Denise Sheehan
Acting Commissioner

2/25/05

Thomas M. Johnson, Hydrogeologist
c/o Alpha Geoscience
679 Plank Road
Clifton Park, NY 12065
Subject: New Paltz Plaza site (ID#V000873)

Dear Mr. Johnson:

Per your letter report entitled "Sub-slab Depressurization System Design" for the New Paltz Plaza site dated 1/21/05, I have the following comments:

1. Please submit documentation on the diagnostic testing done to date that supports the design of the Sub-slab Depressurization System (SDS). This documentation is necessary for the evaluation of the SDS design. As part of this documentation, please provide a drawing that includes the locations of all building footings, a north-pointing arrow for geographic reference, and a legend that identifies the location of the suction points (where vacuum could be applied) and the sampling points (where pressure could be measured both before and after a vacuum was applied). This drawing should show the air flow values measured at the suction points and the pressures recorded at the sampling points.

2. Please submit detailed information on the construction of the SDS, such as the material and size of the extraction pipes and the specifications for the fans.

3. Please clarify how the effectiveness of the SDS will be evaluated and how the operation of the SDS will be monitored.

4. Please specify the kind of notification system that will be implemented in the event of SDS failure.

Thank you.

Sincerely,

John J. Rashak

John J. Rashak, Environmental Engineer I

cc: Rosalie Rusinko
Fay Navratil, NYSDOH
Peter Kempner
Kevin Young

Alpine
Environmental Services, Inc.
(518) 453-0146

April 28, 2005

Peter K. Kempner
The Kempner Corporation
257 Mamaroneck Avenue
White Plains, N.Y. 10605

RE: Sub-slab Depressurization System Design
Existing Strip Mall, Route 299, New Paltz, New York

General Design

The following information was gained from the diagnostic testing and assessment.

- Very tight compacted sub-slab soils exist. This requires a high suction series fan.

- There is a series of footings that run north-south through the entire strip mall, as well as several footing divisions running east-west. Each section bound by footings will require at least one suction point. (see drawing for the presumed location of sub slab concrete footings.)

- It is not feasible to depressurize the Cinema. There was no reasonable location to run pipes and equipment without disrupting occupant views of the movie screens and no clear path to place trunk lines (rear to front), as would be required.

The system design involves the installation of eight distinct trunk lines in eight separate tenant spaces (See drawing). Each trunk line will exit through the rear of the respective tenant space, with a fan being mounted above the suspended ceiling (where they exist). The trunk lines will extend forward, above the suspended ceiling in the tenant space, with a series of two to six suction stacks dropping into the tenant space, entering a penetration through the cement floor. The following outlines each of the eight depressurization systems.

1. Former Hair Studio (Vacant)
Trunk line exhaust will exit in the rear of the shop, to the north.
two suction points in the center of the store, adjacent to interior partitions. No finish paint or box will be applied; it is assumed that this pipe will be concealed during fit up for a future tenant. This sub slab area is sufficiently less than the all the other areas. A smaller fan, Radonaway GP-501, will be used for this area.

2. Former Hobby Shop (Vacant)
Trunk line exhaust will exit in the rear of the shop, to the east.
6 suction points, 3 along the north wall and 3 along the south wall of the store, adjacent to interior partitions. No finish paint or box will be applied; it is assumed that this pipe will be concealed during fit up for a future tenant.

3. Laundromat (Active)
Trunk line exhaust will exit in the rear of the shop, to the east.
3 suction points, along the south, interior partition. Finish paint will be applied to the suction stacks. Exposed PVC pipe(s) are currently present in the space.

4. Dry Cleaner (Active)
Trunk line exhaust will exit in the rear of the shop, to the east.
3 suction points, 2 along the south, interior partition, and the third in the center adjacent to the service desk. No finish will be applied. Exposed pipe and equipment are currently present throughout the space.

5. Advance Auto Parts (Active)
Trunk line exhaust will exit in the rear of the shop, to the east.
4-5 suction points, near the north, interior partition, adjacent to shelving unit ends. Finish paint will be applied to the suction stacks.

6. PDQ Print Shop (Active)
Trunk line exhaust will exit in the rear of the shop, to the east.
3 suction points, along the north, interior partition. Finish paint will be applied to the two eastern suction stacks and the third stack (located in the self service vestibule) will be framed into a corner box, dry walled and taped, and painted.

7. Jewelers (Active)
Trunk line exhaust will exit in the rear of the shop, to the east.
3 suction points, along the south, interior partition. Finish paint will be applied to the one eastern suction stack (in the back room) and the

remaining two stacks (located in the retail space) will be framed in, dry walled and taped, and painted.

8. Bagel Shop (Active)
Trunk line exhaust will exit in the rear of the shop, to the east.
3 suction points, all along the north, interior partition, with one in the counter area behind the drink coolers. Finish paint will be applied to the suction stacks.

Construction Materials and Requirements

All suction lines will be constructed of PVC piping and PVC pipe fittings. A minimum of Schedule 20 will be used in areas not exposed to weather. All pipe exposed to the weather will be Schedule 40. All connections will be cemented, with the exception of the fan connection, which will be secured with flexible PVC, screw tightened couplings. Suction points will be sealed into the cement floor slab with a floor flange, sealed air tight, with polyurethane caulk.

Horizontal pipe runs (Trunk lines) will pitch to the first inline suction hole at the following slope:

	Minimum Rise Per Foot		
Pipe Dia.	@ 25cfm	@ 50 cfm	@ 100 cfm
4 "	1/32"	3/32"	3/8"
3 "	1/8"	3/8"	1 ½ "

- Vertical piping to individual suction points will be constructed of minimally, 2 inch PVC piping.
- Each trunk line will be fitted with damper(s) for system balancing.
- Exhaust will be in the rear of the structure, a minimum of 10 feet above grade, away from any intakes or openings.
- A hanger will secure horizontal pipe runs at least every six feet.
- Each trunk line will be fitted with a Magnehelic Manometer (pressure sensor). This device will maintain a real time analog pressure reading on the system. Periodic monitoring of the system pressure will be incorporated into the building maintenance. Any significant change in the pressure will be cause for service on the system.

- A pressure sensor with status indicator light and system alarm will be installed on each system. Alarm will sound if pressure in the system drops below the alarm set point.

Installation Diagnostics and Balancing:

Installation Diagnostics are performed during and after the installation of the each suction point individually, as well as following the completion of each system. Test fans are connected to the pipes that rise through the floor. The static pressures of the fans are checked under actual sub slab operating conditions. The model of fan to be used will be verified/modified based on the data collected.

Once the appropriate fan has been selected, the system will be balanced utilizing dampers to control the Pressure Field Extension (PFE). PFE will be verified by drilling numerous, 3/8" test holes, distributed throughout the floor slab. A micro manometer will be used to verify negative pressure extension and adjust dampers for a consistent PFE distribution. Test holes will be sealed with polyurethane caulk when complete. Test locations and results will be documented.

System airflow and pressures shall be checked in each of the trunk lines following installation to verify each system is operating within the fan manufacturers operating requirements. If the manufacturers operating requirements are not being met, additional suction points will be added until the requirements are met.

References

Radon Mitigation Standards, US Environmental Protection Agency 402-R-93-078 April 1994

DESIGN, EFFECTIVENESS, AND RELIABILITY OF SUB-SLAB DEPRESSURIZATION SYSTEMS FOR MITIGATION OF CHLORINATED SOLVENT VAPOR INTRUSION, presented at the US EPA Seminar on Indoor Air Vapor Intrusion, December 4, 2002 [Folkes].

Guidance for Evaluating Soil Vapor Intrusion in the State of New York, New York State Department of Health, February 2005

If you have any questions concerning this design or need additional information, please do not hesitate to contact me (518) 453-0146.

Sincerely,
ALPINE ENVIRONMENTAL SERVICES, INC.

Mark W. Schnitzer, PE
Environmental Engineer

Incl: Drawing
Sub Slab Diagnostic Test Data
Dynavac HS Series Fan Installation Instructions

Alpine Environmental Services, Inc.

Sub-Slab Diagnostic Test Data
New Paltz Plaza
Route 299, New Paltz, New York
June 4 and June 7, 2004

SUCTION APPLIED TO:	S-1		S-2		S-3		S-4	
Sub Slab Pressure ("WC)	**HP-220 Fan**	**2.5 HP Vac.**	**HP-220 Fan**	**2.5 HP Vac.**	**HP-220 Fan**	**2.5 HP Vac.**	**HP-220 Fan**	**2.5 HP Vac.**
Test Point (T-1)	-0.280	-0.127	NT	NT	NT	NT	NT	NT
Test Point (T-2)	0.000	-0.085	NT	NT	NT	NT	NT	NT
Test Point (T-3)	NT	NT	0.000	-0.013	NT	NT	NT	NT
Test Point (T-4)	NT	NT	-0.020	-1.680	NT	NT	NT	NT
Test Point (T-5)	NT	NT	0.000	-0.028	NT	NT	NT	NT
Test Point (T-6)	NT	NT	NT	NT	-0.031	-1.520	NT	NT
Test Point (T-7)	NT	NT	NT	NT	0.000	-0.007	NT	NT
Test Point (T-8)	NT	NT	NT	NT	-0.001	-0.001	NT	NT
Test Point (T-9)	NT	NT	NT	NT	-1.073	-2.371	NT	NT
Test Point (T-10)	NT	NT	NT	NT	-0.012	-0.049	NT	NT
Test Point (T-11)	NT	NT	NT	NT	-0.083	-1.060	NT	NT
Test Point (T-12)	NT	NT	NT	NT	-0.007	-0.031	NT	NT
Test Point (T-13)	NT	NT	NT	NT	NT	NT	-0.255	-1.951
Test Point (T-14)	NT	NT	NT	NT	-0.002	-0.008	NT	NT
Test Point (T-15)	NT	NT	NT	NT	NT	NT	-0.004	-0.009
Test Point (T-16)	NT	NT	NT	NT	NT	NT	-0.010	-0.096
Fan Airflow (cfm)	N/A	98	N/A	121	N/A	43	N/A	98

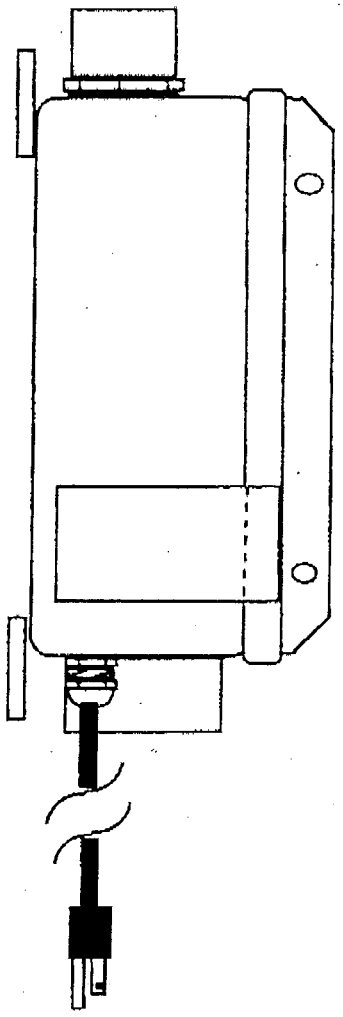
NT – "Not Tested"; Outside of Footprint Defined by Footing
N/A – "Not Applicable"; Reading Not Collected. Alternate Higher Pressure Fan to Be Used
Test Point Pressure Measured with an Infiltec Digital Micro-manometer
Air Flow Measured with a TSI Hot Wire Veloci-Calc

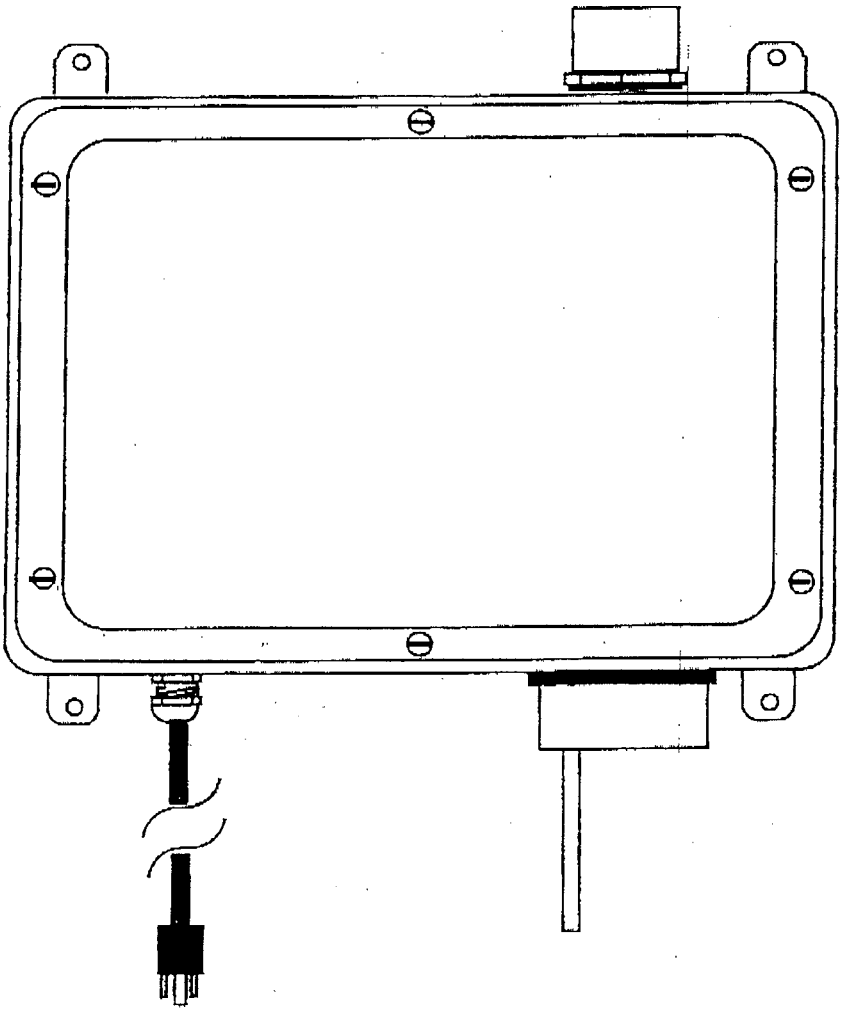
Best sub-slab pressure field extension obtained with 2.5 HP vacuum. Fan selected for design is the HS-5000, which best matches the characteristics of the 2.5 HP vacuum. Based on actual installation sub-slab pressure readings, HS-2000 or HS-3000 may be substituted.

1146 Central Avenue • Albany, New York 12205 • Phone:(518) 453-0146 • Fax:(518) 453-0175

HS SERIES INSTALLATION INSTRUCTIONS

BY RadonAway™





RadonAway™
Your Full Service Radon Specialists

INSTALLATION INSTRUCTIONS (Rev D)
for DynaVac High Suction Series
HS2000 p/n 23004-1
HS3000 p/n 23004-2
HS5000 p/n 23004-3

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

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

1.2 ENVIRONMENTALS

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

1.3 ACOUSTICS

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

The velocity of the outgoing air must also be considered in the overall system design. With small diameter piping, the "rushing" sound of the outlet air can be disturbing. The system design should incorporate a means to slow and quiet the outlet air. The use of the RadonAway Exhaust Muffler, p/n 24001, is strongly recommended.

1.4 GROUND WATER

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

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

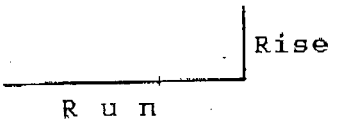
1.5 CONDENSATION & DRAINAGE

(***WARNING***: Failure to provide adequate drainage for condensation can result in system failure and damage the DynaVac).

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

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

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



*Typical operational flow rates:

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

(For more precision, determine actual depressurization in the inlet pipe using a Magnehelic or other pressure differential device and determine flow rate by using chart in addendum.)

All exhaust piping should be 2" PVC.

1.6 "SYSTEM ON" INDICATOR

A properly designed system should incorporate a "System On" Indicator for affirmation of system operation. A Magnehelic pressure gauge is recommended for this purpose. The indicator should be mounted at least 5 feet above the slab penetration to minimize the risk of filling the gauge with water in installations with occasional high water tables.

1.7 SLAB COVERAGE

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

1.8 ELECTRICAL WIRING

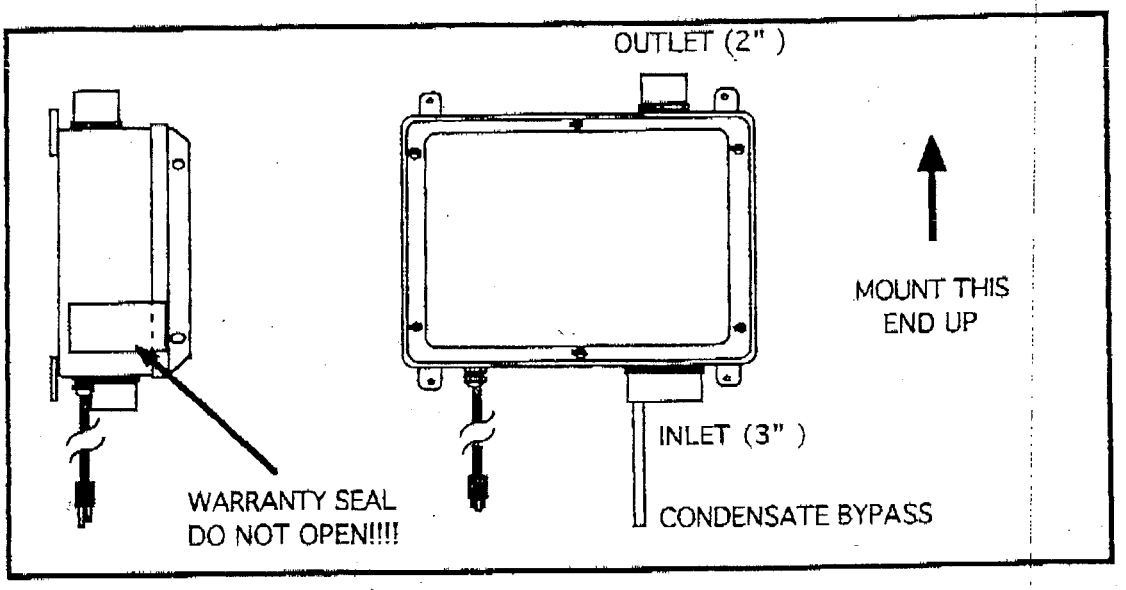
The DynaVac plugs into a standard 120V outlet. All wiring must be performed in accordance with the National Electrical Code and state and local building codes.

1.8a ELECTRICAL BOX (optional)

The optional Electrical Box (p/n 20003) provides a weathertight box with switch for outdoor hardwire connection. All wiring must be performed in accordance with the National Electrical Code and state and local building codes. All electrical work should be performed by a qualified electrician. Outdoor installations require the use of a U.L. listed watertight conduit.

1.9 SPEED CONTROLS

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



2.0 INSTALLATION

2.1 MOUNTING

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

2.2 DUCTING CONNECTIONS

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

2.3 VENT MUFFLER INSTALLATION

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

2.5 OPERATION CHECKS

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

____ Insure the DynaVac and all ducting is secure and vibration-free.

____ Verify system vacuum pressure with Magnehelic. Insure vacuum pressure is less than the maximum recommended as shown below:

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

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

____ Verify Radon levels by testing to EPA protocol.

3.0 IMPORTANT INSTRUCTIONS TO INSTALLER

3.1 Inspect DynaVac for shipping damage within 15 days of receipt. Notify carrier of any damages immediately. RadonAway is not responsible for damages incurred during shipping.

3.2 There are no user servicable parts inside the DynaVac. Do not attempt to open. Return unit to the factory for service.

3.3 Install the DynaVac in accordance with all EPA standard practices, and state and local building codes and state regulations.

3.4 In the event the DynaVac is immersed in water, return unit to factory for service before operating.

3.5 Do not twist or torque inlet and outlet piping on the DynaVac. Leakage can result.

4.0 WARRANTY INFORMATION

Subject to applicable consumer protection legislation, RadonAway, Inc. warrants that the DynaVac will be free from defective materials and workmanship for a period of (1) year from the date of purchase. Warranty is contingent on installation in accordance with the instructions provided. This warranty does not apply where repairs or alterations have been made or attempted by others; or the unit has been abused or misused. Warranty does not include damage in shipment unless the damage is due to the negligence of RadonAway, Inc. To make a claim under these limited warranties, you must return the defective item to RadonAway, Inc. with a copy of the purchase receipt. All other warranties, expressed or written, are not valid. RadonAway, Inc. is not responsible for installation or removal cost associated with this warranty.

5.0 OPTIONAL THREE YEAR EXTENDED WARRANTY

Under this option all warranty terms and conditions are extended to (3) years from date of purchase. Purchase receipt provides proof of purchase of this option and Serial Number of DynaVac covered.

Record the following for your records:

Serial No._____

Receipt Date_____

ADDENDUM

PRODUCT SPECIFICATIONS

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

*Power consumption varies with actual load conditions

Inlet: 3.0" PVC

Outlet: 2.0" PVC

Mounting: Brackets for vertical mount

Weight: Approximately 18 lbs.

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

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

Main line of 3.0" or greater PVC Pipe
Any branch lines may be 2.0" or greater PVC Pipe

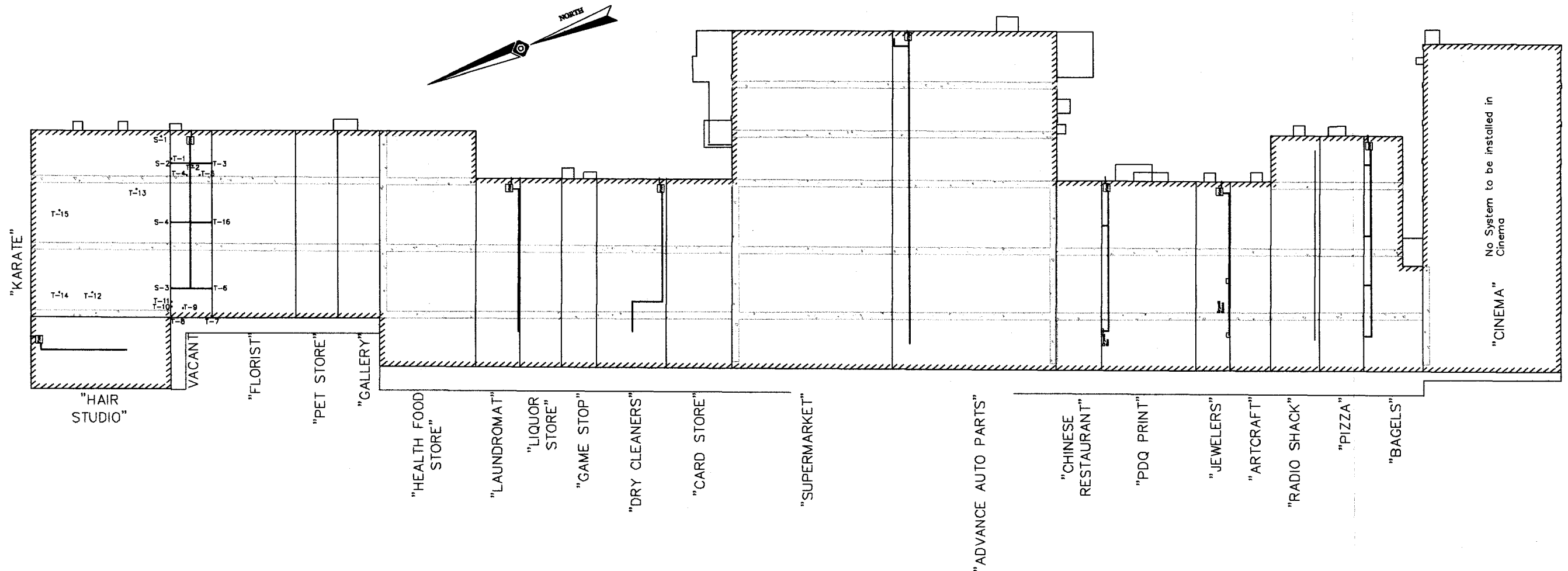
Outlet ducting: 2.0" PVC

Storage temperature range: 32 - 100 degrees F.

Thermally protected

Locked rotor protection

Internal Condensate Bypass



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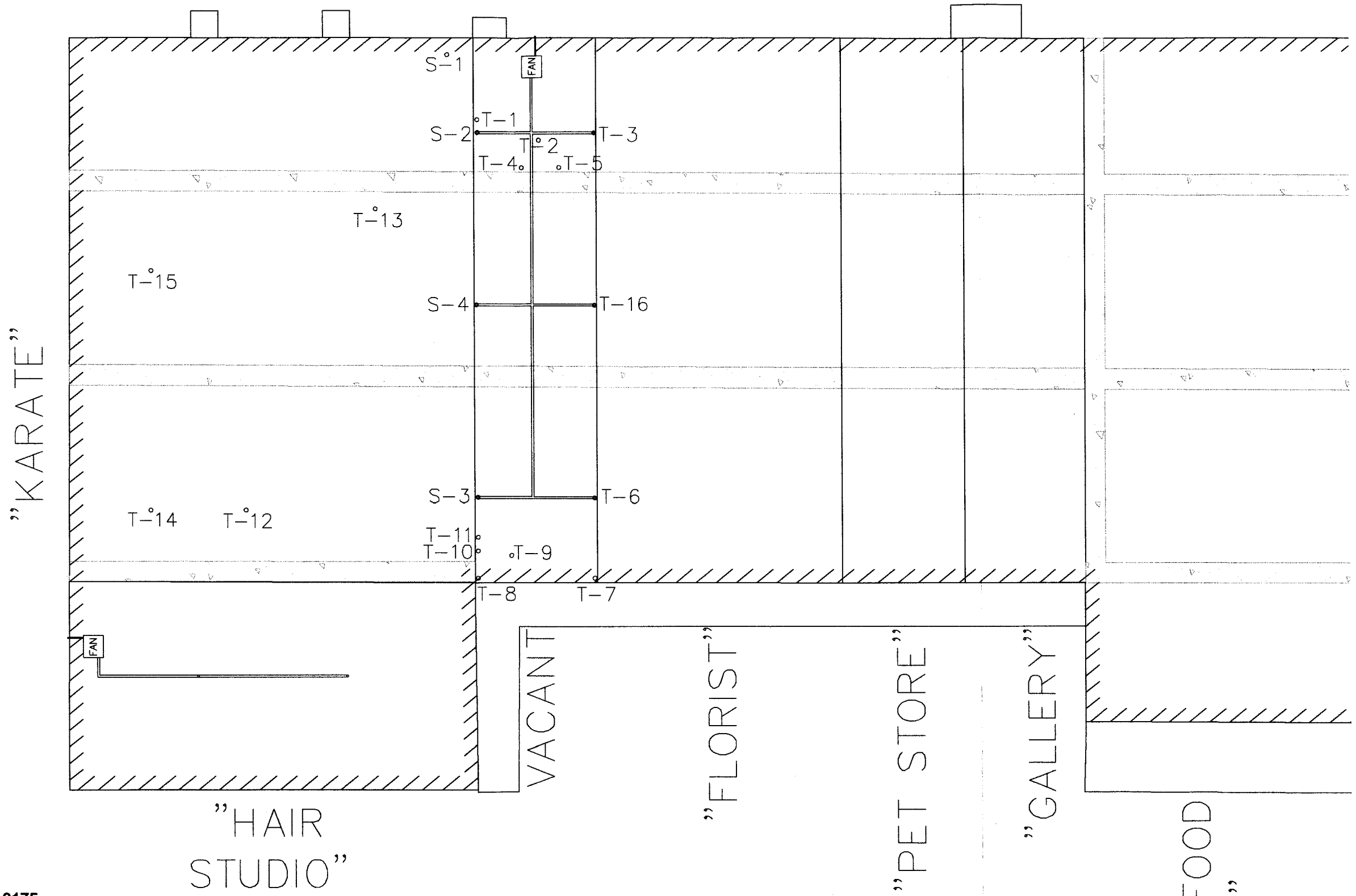
Presumed Location of Sub-slab Footings

Ventilation System

T-12 Test Locations



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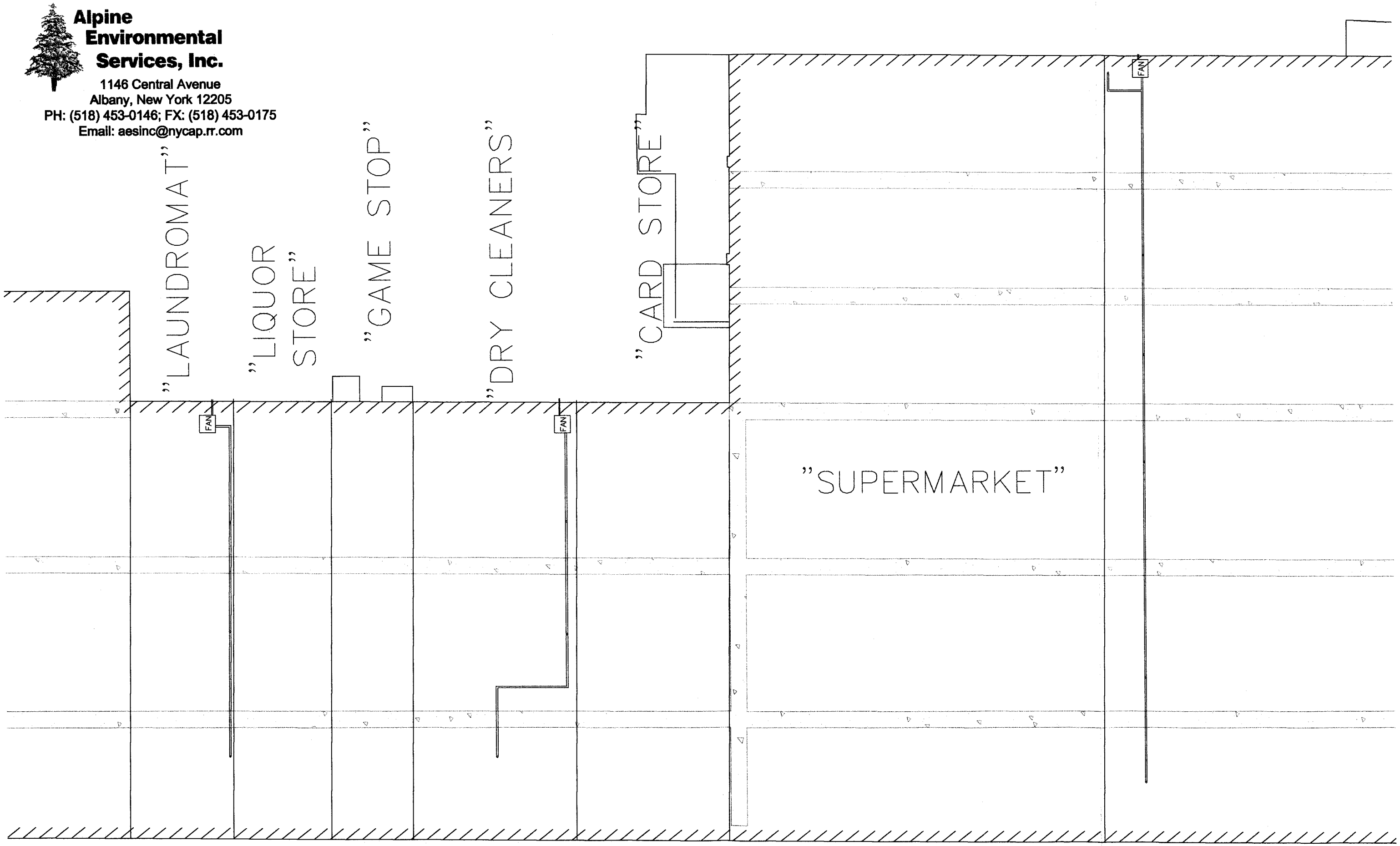

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"ADVANCE AUTO PARTS"

"CHINESE RESTAURANT"

"PDQ PRINT"

"JEWELERS"

"ARTCRAFT"

"RADIO SHACK"

"PIZZA"

"BAGELS"

"CINEMA"

FAN

Drywall Box

Drywall Boxes