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Memorandum

To	Mike DiPietro, NYSDEC	Page 1
CC	Walt Howard – AECOM	
Subject	SSDS IRM Design Memo – Midtown Shopping Center 5-46-054 – Final	
From	Scott Underhill, PE – AECOM	
Date	December 3, 2013	

AECOM has received Contract Work Assignment No. D007626-05 to conduct a Remedial Investigation and Feasibility Study (RI/FS) at the Midtown Shopping Center Site (NYSDEC Site No. 546054), located at 112-114 Main St., South Glens Falls, NY. The purpose of the RI/FS is to define the extent of previously identified soil and groundwater impacts resulting from activities at a now closed dry cleaners business (Aroxy Cleaners) at the Site. As part of the RI/FS, AECOM completed soil vapor intrusion (SVI) sampling within residential and commercial structures immediately adjacent to the Site, in an area where subsurface volatile organic compound (VOC) impacts have been identified. Based on the results of this sampling the NYSDEC decided to implement an interim remedial measure (IRM) in the form of sub-slab depressurization systems (SSDSs) to mitigate chlorinated solvent vapors from entering the structures above the groundwater plume.

A SSDS consists of a fan or blower that draws air from the soil beneath a building through a series of collection pipes and discharges to the atmosphere at a point above the building's roof line. A schematic of a SSDS from the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in New York State (NYSDOH, October 2006) is included in Attachment 1.

There are a total of six residential structures that will have SSDSs installed. These structures are shown on Figure 1. The proposed SSDS for the residential houses adjacent to the Midtown Shopping Center Site will consist of the following components (see Figure 2 for general schematic):

1. Vapor Extraction Point. Each residential structure shall have a minimum of one vapor extraction point located in the basement slab that allows for the removal of soil vapor from the soil/gravel beneath the slab. A minimum of 1 cubic foot of native material shall be removed from the slab penetration. The 4 inch solid, Schedule 40, polyvinyl chloride (PVC) pipe shall be permanently secured to prevent downward movement. The space between the PVC pipe and slab shall be sealed with a urethane caulk or equivalent material.
2. Exhaust Fan. The exhaust fan shall be manufactured by RadonAway or equivalent (See Appendix A for manufactures specifications). The exhaust fan will be used to extract vapors from below the foundation slab. The fan shall be capable of providing a minimum of 0.004 inches of water column at all locations under the basement slab. Verification testing of the final fan installation shall be required to demonstrate the minimum 0.004 inches of water column has been achieved.
3. SSDS Above Grade Piping. The SSDS piping above grade will consist of 4-inch solid Schedule 40 PVC piping. The PVC piping will extend through the basement and be connected to the fan, which will be mounted to the exterior side of the building. The piping

will extend a minimum of 6-inches above the roof line and have a tee or equivalent at the discharge end to prevent rain/snow from entering the line. The discharge point will be a minimum of 10-ft away from any window, door or other opening into conditioned or otherwise occupiable spaces of the structure.

General Installation Requirements

1. The SSDS installation shall be done so as to coordinate with other building components especially those that require maintenance or clearance of any type. All mitigation system components shall be installed to facilitate servicing, maintenance and repair or replacement of other equipment components in or outside the building. Where mounting heights are not detailed or dimensions given, system materials and equipment are to be installed to provide the maximum headroom or side clearance as is possible. NYSDEC must be contacted in cases where a conflict exists between these or other requirements and the drawings or specifications. All systems, materials and equipment shall be installed level, plumb, parallel or perpendicular to other building systems and components unless otherwise specified.
2. The contractor installing the SSDS shall take every possible precaution to avoid any damage to existing utilities located anywhere in the building or those located in or below the slab floor. An instrument capable of detecting a drill bit hitting metal in the slab or other instrument or tool providing the same function shall be used in conjunction with any slab drilling.
3. The contractor shall be responsible for covering or finishing any SSDS piping or electrical conduit that is exposed. The degree of finishing that is required shall be based on a consensus between the owners and NYSDEC. The Contractor installing the SSDS shall seal all penetrations through foundation walls or floors created by the Contractor to install the SSDS with a urethane caulk or equivalent material. Penetrations through side walls shall be carefully cut to match the shape of the pipe unless other finishing is to be done at the discretion of NYSDEC.
4. The contractor installing the SSDS shall ensure that any foreign materials are not left or drawn into the SSDS piping or fan which might at a later period interfere with or in any way impair the SSDS performance.
5. The entire system shall have UL or equivalent ratings for both individual components and the entire system as applicable.
6. The work shall conform to ASTM 2121.

Sub-Slab Depressurization Fan

The fan for the SSDS shall be sized based on results of the vacuum testing. The recommended fan manufacturer is RadonAway or equivalent (see Attachment 2 for a standard specification).

Visual Pressure Indicator U-Tube Manometer

The U-Tube Manometer shall be Carlon CV1085/Carlon JP108 protective box with clear cover or equivalent.

PVC Pipe Installation

All horizontal pipe runs between the fan and the suction holes shall be sloped to ensure that water from rain or condensation drains downward into the ground beneath the slab. All vertical pipe runs shall be installed plumb. In no case shall the piping be installed so as to create a possible water trap in the piping.

Vertical runs shall be secured either above or below the points of penetration through floors, ceilings, and roofs, or at least every 8 ft (2.5 m) on runs that do not penetrate floors, ceilings, or

roofs. System piping shall be fastened to the structure of the building with hangers, strapping, or other supports that shall secure it adequately. System piping shall not be attached to or supported by existing pipes, ducts, conduits, or any kind of equipment. System piping shall not block window and doors or access to installed equipment.

Sump Pit Requirements

Sump pits or other large openings in the slabs or basement walls that allow a significant amount of soil gas leakage into the basement shall be covered and sealed. Sump pit covers shall be made of durable plastic or other nondegradable material and sized to permit air tight sealing. To enable easy removal of the sump pump for servicing, the cover shall be sealed using silicone or other nonpermanent type caulking material or an air-tight gasket and mechanical fastener. Sump lids with viewing ports are recommended to permit inspection of the sump without removing the lid. Penetrations of sump covers to accommodate electrical wiring, water discharge piping or other penetrations shall have air-tight sealing around penetrations, using caulk or grommets.

Fan Installation

The SSDS fan shall be mounted on the side of the building. The fan should be rated for outdoor use. The Contractor shall install the appropriate sealing material for the pipe penetration and the electrical conduit through the wall.

To reduce the risk of vent stack blockage due to heavy snow fall, to reduce the potential for re-entrainment of vapors into the building, and to prevent direct exposure of individuals outside of buildings, the discharge from the vent stack pipes shall meet the following minimum requirements. As outlined in ASTM 2121 discharge from vent stack pipes shall be:

1. Vertical and upward, outside the structure, at least 10 ft (3 m) above the ground level, above the edge of the roof. Whenever practicable, they shall be above the highest roof of the building and above the highest ridge.
2. Ten ft (3 m) or more away from any window, door, or other opening into conditioned or otherwise occupiable spaces of the structure, if the discharge point is not at least 2 ft (0.6 m) above the top of such openings.
3. Ten ft (3 m) or more away from any opening into conditioned or otherwise occupiable spaces of an adjacent building. Chimney flues shall be considered openings into conditioned or otherwise occupiable space.

To facilitate maintenance and future replacement, the fan shall be installed in the vent pipe using removable coupling or flexible connections that can be tightly secured to both the fan and the vent pipe. All fans shall have a galvanized or aluminum roof chimney cap installed on top of the fan. Inlet to exhaust shall include ½" by ½" galvanized critter screen. The manufacturer's specifications and installation instructions for the fans are provided in Attachment B.

System Labeling

The U-tube manometer location shall contain a label explaining their use and be marked with the installation date and final installation U-tube pressure readings. The electrical circuit used to control the SSDS fan shall be labeled as "Sub-Slab Depressurization System". All labels must be readable from 3 feet away. A label shall also be installed at the disconnect switch that says "Sub-Slab Depressurization System, do not alter". A label shall be installed at the main circuit electrical breaker that says "Sub-Slab Depressurization System".

The Contractors name, telephone number, date of installation, and an advisory to retest every two years shall be left at the fan location.

Vacuum Test

The Contractor shall measure the pressure field extension in the sub-slab when the SSDS is activated. The test holes shall be 1/4" drilled through the slab in at least at the corner and center of the basement, depending on where the SSDS extraction point is located, such that measurements can be taken to demonstrate full coverage of the SSDS under the basement slab. The Contractor shall record these pressure readings between the sub-slab and the room on a copy of the SSDS design drawing. The measurements shall be made with a digital micro-manometer capable of reading down to 0.001-inch of water column (1 Pascal). A copy of these final measurements, including the U-tube measurements, shall be maintained by the Contractor and NYSDEC.

OPERATION AND MAINTENANCE

An operation and maintenance (O&M) manual shall be provided to each resident by the contractor and will be included in the Site Management Plan for the site. At a minimum the O&M manual shall require the following items:

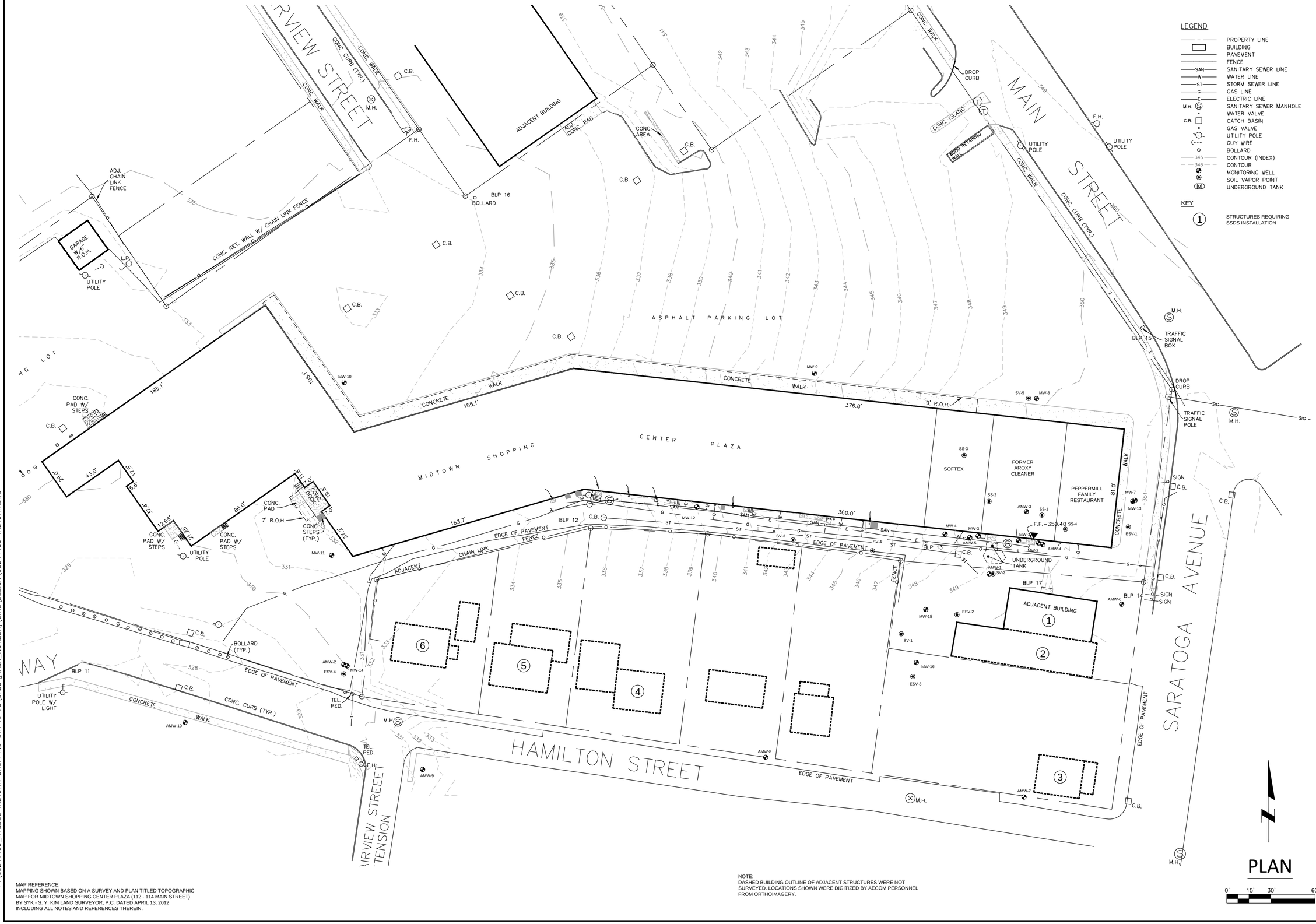
- Installation and warranty information
    - Name and contact information for the contractor including warranty information
    - Name and contact information for the electrician including warranty information
    - Description of the fan and manufacturers information including warranty information
    - Sub-Slab Depressurization Layout and Pressure Test Readings
- Maintenance and Inspection by building owner
    - How to check the manometer to verify that the system is operating properly
    - Periodic (e.g., every 12 months) assessments by the occupant

Periodic assessments by the occupant as specified in the O&M manual may include:

- Inspection of the manometer to see if there is a failure or degradation of the system.
- Inspection of the extraction point to see that it has remained sealed.
- Inspection of the seal surrounding the extraction point, if feasible.
- Inspection of piping and vent stacks for cracks or leaks on interior and exterior of the building.
- Inspection of fan and rubber mounts for leaks.
- Inspection of electrical connection and test of cut off switch by turning the switch on and off.
- Collection of air samples.

The SSDS shall run for a minimum of one year. After one year, the owner may petition the NYSDEC to turn the SSDS off, per NYSDOH guidance. The petition to turn off the SSDS shall include sampling of both the indoor air and sub-slab vapors. Sampling will be performed while the SSDS has been inactive for at least a period of 30 days. Concentrations of the sub-slab vapor and indoor air samples will be reported to the NYSDEC and NYSDOH for evaluation.

FIGURES



MAP REFERENCE:
MAPPING SHOWN BASED ON A SURVEY AND PLAN TITLED TOPOGRAPHIC MAP FOR MIDTOWN SHOPPING CENTER PLAZA (112 - 114 MAIN STREET) BY SYK - S. Y. KIM LAND SURVEYOR, P.C. DATED APRIL 13, 2012 INCLUDING ALL NOTES AND REFERENCES THEREIN.

NOTE:
DASHED BUILDING OUTLINE OF ADJACENT STRUCTURES WERE NOT SURVEYED. LOCATIONS SHOWN WERE DIGITIZED BY AECOM PERSONNEL FROM ORTHOIMAGERY.

DRN BY:	DES BY:	CHK BY:	APP BY:
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REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

1 INCH — VERIFY SCALE IF PLAN SHEET IS REDUCED

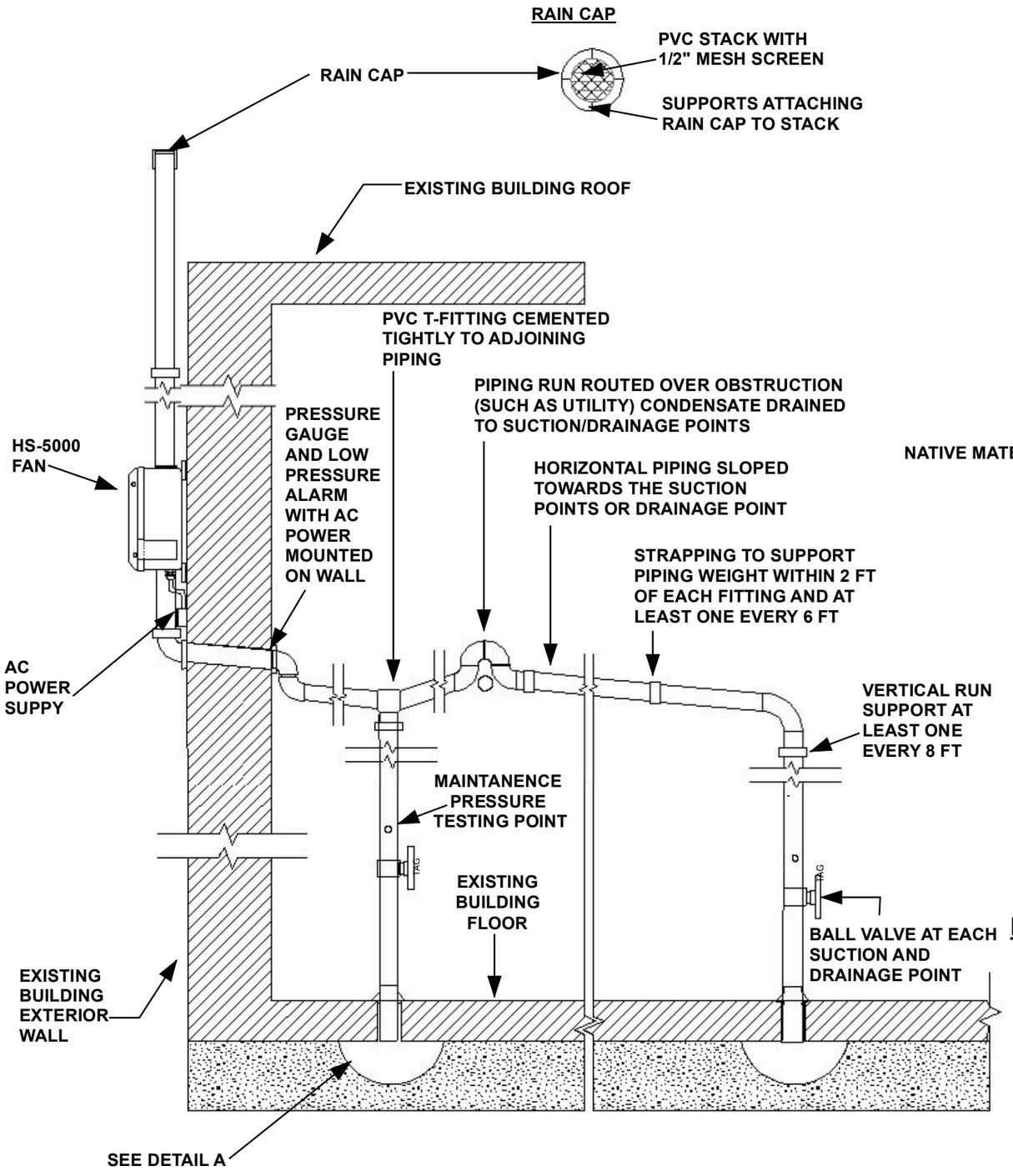
AECOM

NYSDEC PROJECT #
MIDTOWN SHOPPING CENTER
SOUTH GLENS FALLS, NYEW YORK

SSDS INSTALLATION LOCATIONS

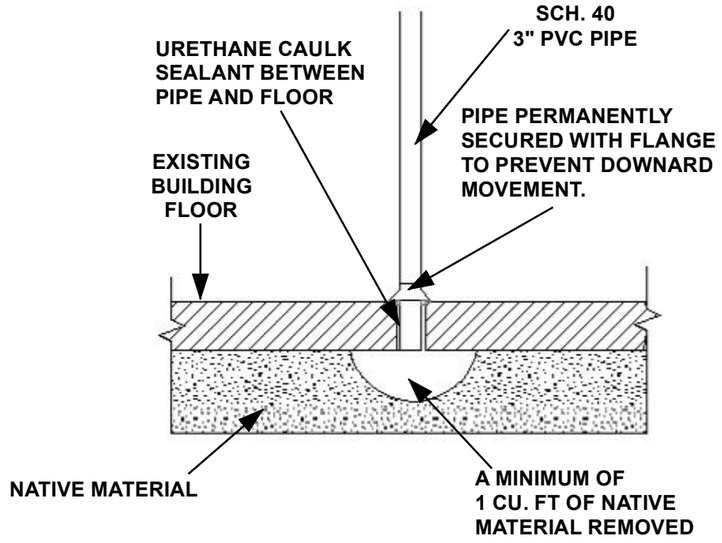
PROJECT START DATE (M / Y)	NOVEMBER 2013
PROJECT NO.	60241403
FILENAME	60241403-MIDTOWN.dwg
SHEET NO.	1
DRAWING NO.	1

Plotted By: MeisterK
Plot File Date Created: Oct/31/2013 12:01 PM
Layout-Sheet Name: SSDS-PLAN_ANSI-D
Filename: P:\60241403_NYSDEC MIDTOWN SHOPPING CTR RI-FS\CADD\[TASK_NUMBER]\CIVIL\DESIGN\60241403-MIDTOWN.DWG



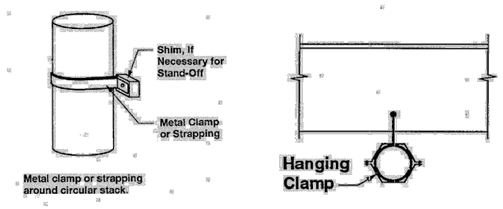
TYPICAL INDIVIDUAL SYSTEM DETAIL

NOT TO SCALE



DETAIL A - SUCTION POINT

NOT TO SCALE



DETAIL B - STRAPPING AND SUPPORTS

NOT TO SCALE
(Reference: USEPA 1993)

SUCTION HOLE INSTALLATION NOTES:
1. The contractor removed a minimum of 1 cubic foot of sub-slab material from below and around each suction hole.

2. To prevent blockage of air flow into the bottom of suction point pipes and pipe movement to the bottom of the suction pits, the pipes at the suction points were supported and secured to the concrete floor slab with a floor flange.

3. A polyurethane caulk sealant was applied to securely seal the space between the outer diameter of the pipe and the concrete floor.

4. Shut-off valves and flow adjustment valves were installed on each extraction point and discharge point.

VENT PLACEMENT NOTES:
1. All exhaust pipes were installed to a termination point no less than 12" above the roof.

2. All system exhaust termination points were a minimum of 10 feet above grade and away from any intakes or openings into conditioned or other occupiable spaces.

4. All exhaust pipes were fitted with a protective screen.

PVC PIPE INSTALLATION NOTES:
1. All horizontal pipe runs between the fan and the suction holes were sloped to ensure that water from rain or condensation drains downward into the ground beneath the slab.

2. All vertical pipe runs were installed plumb. In no case was the piping installed so as to create a possible water trap in the piping.

3. All horizontal pipe runs have a support with an appropriate device within 2 ft of each fitting and a maximum distance between supports of 6 ft as per BOCA National Plumbing Code and ASTM 2121.

4. Vertical runs were secured either above or below the points of penetration through floors, ceilings, and roofs, or at least every 8 ft (2.5 m) on runs that do not penetrate floors, ceilings, or roofs.

5. System piping was fastened to the structure of the building with hangers, strapping, and clamps that secured it adequately.

6. System piping was not attached to or supported by existing pipes, ducts, conduits, or any kind of equipment. System piping does not block window and doors or access to installed equipment.

7. Horizontal piping inside the office areas were concealed above drop ceilings

Prepared by: AECOM

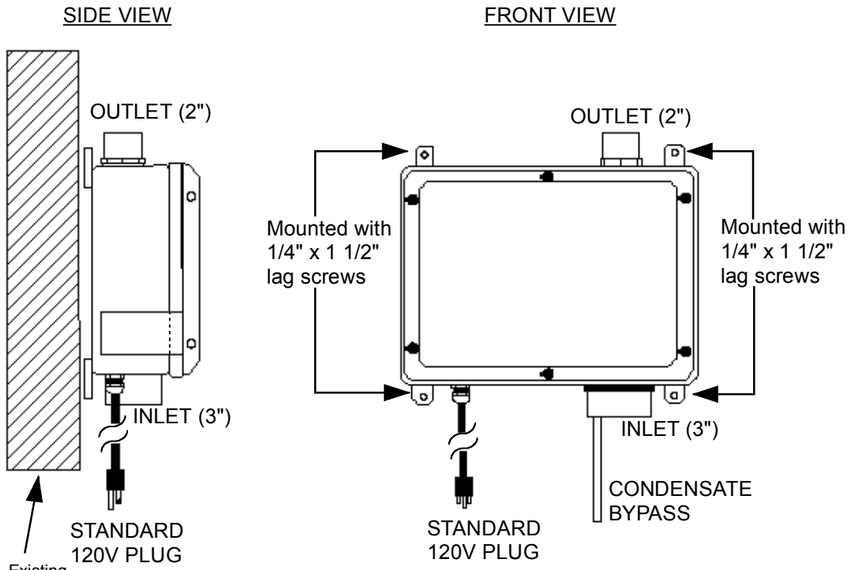
Prepared for: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Midtown Shopping Mall
South Glend Falls, New York
NYSDEC Project #

Date: NOVEMBER 2013

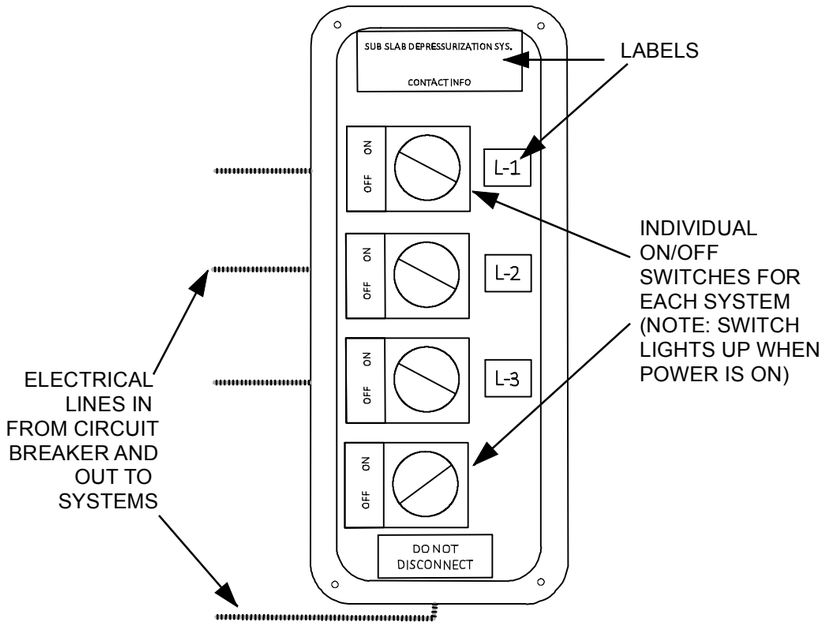
SSDS DETAILS

Figure No. : 2



TYPICAL HS SERIES FAN INSTALLATION

NOT TO SCALE



SHUT OFF PANEL NEXT TO CIRCUIT BREAKER

HS SERIES FAN INFORMATION

(Reference: RadonAway Instruction Manual)

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):
HS3000, HS5000 --- 2.0" PVC Pipe
HS2000 --- Main feeder line of 3.0" or greater PVC Pipe
Branch lines (if 3 or more) may be 2.0" PVC Pipe
Outlet ducting: 2.0" PVC
Storage temperature range: 32 - 100 degrees F.
Thermally protected
Locked rotor protection
Internal Condensate Bypass

Fan Wiring Notes:
1. All wiring was performed in accordance with the National Fire Protection Association's (NFPA) "National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes and manufacturer's specifications.

2. Wiring was not located in or chased through the mitigation installation ducting or any other heating or cooling ductwork. All electrical work was performed by a licensed electrician

3. The sub-slab depressurization unit fans are powered by two dedicated circuits that are not used for any other building components.

4. The standard plug acts as a disconnect switch within 3 ft of each fan. The plug is in an outdoor rated electrical box with a switch cover. Additional disconnect switches are located inside the building next to the circuit breaker boxes.

5. The contractor used outdoor rated flexible conduit from each switch box to the fan.

SUCTION HOLE INSTALLATION NOTES:
1. The contractor removed a minimum of 1 cubic foot of sub-slab material from below and around each suction hole.

2. To prevent blockage of air flow into the bottom of suction point pipes and pipe movement to the bottom of the suction pits, the pipes at the suction points were supported and secured to the concrete floor slab with a floor flange.

3. A polyurethane caulk sealant was applied to securely seal the space between the outer diameter of the pipe and the concrete floor.

4. Shut-off valves and flow adjustment valves were installed on each extraction point and discharge point.

VENT PLACEMENT NOTES:
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Prepared by: AECOM

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Midtown Shopping Mall
South Glend Falls, New York
NYSDEC Project #

Date: NOVEMBER 2013

SSDS DETAILS

Figure No. : 3

ATTACHMENT 1

NYSDOH SSDS Schematic

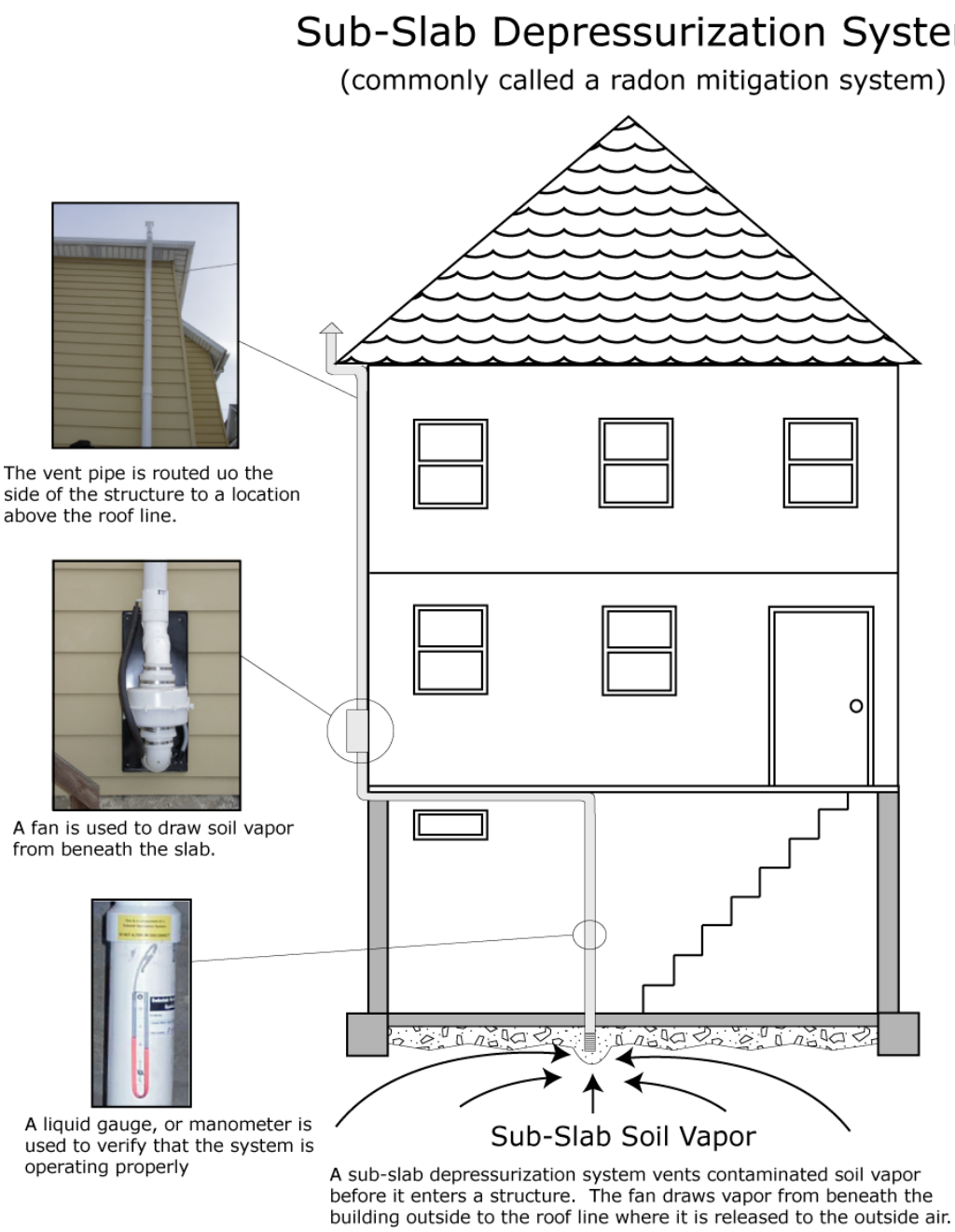


FIGURE 1

Example of an illustration showing how a SSD system works.

Source:
Final NYSDOH CEH BEEI Soil Vapor Intrusion Guidance (Oct. 2006)

ATTACHMENT 2

RadonAway Cut Sheets

RadonAway™
The world's leading radon fan manufacturer

GP Series

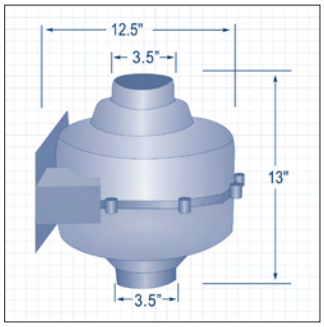
Radon Mitigation Fan

All RadonAway™ fans are specifically designed for radon mitigation. GP Series Fans offer a wide range of performance options that make them ideal for most sub-slab radon mitigation systems.

Features

- Quiet operation
- Water-hardened motor
- Seams sealed under negative pressure (to inhibit radon leakage)
- Mounts on duct pipe or with integral flange
- 3″ diameter ducts for use with 3″ or 4″ pipe
- Electrical box for hard wire or plug in
- ETL Listed - for indoor or outdoor use
- 4 interchangeable GP models

MODEL	P/N	FAN DUCT DIAMETER	WATTS	MAX. PRESSURE"WC	TYPICAL CFM vs. STATIC PRESSURE WC						
					1.0"	1.5"	2.0"	2.5"	3.0"	3.5"	4.0"
GP201	23007-1	3"	40-60	2.0	82	58	5	-	-	-	-
GP301	23006-1	3"	55-90	2.6	92	77	45	10	-	-	-
GP401	23009-1	3"	60-110	3.4	93	82	60	40	15	-	-
GP501	23005-1	3"	70-140	4.2	95	87	80	70	57	30	10



Made in USA with US and imported parts

ETL Listed

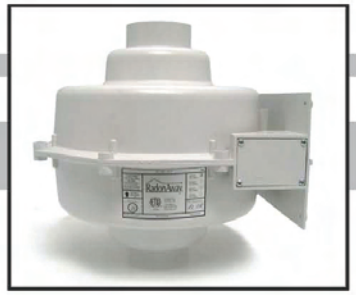
All RadonAway inline radon fans are covered by our 5-year, hassle-free warranty

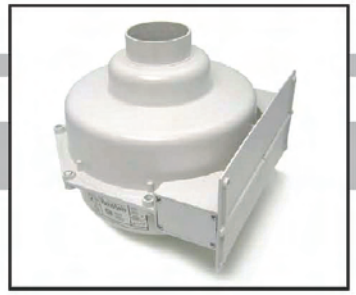
For Further Information Contact

9/12
P/N 02002

RadonAway™

The World's Leading Radon Fan Manufaturer





GP/XP/XR Series Installation Instructions

Please Read And Save These Instructions

DO NOT CONNECT POWER SUPPLY UNTIL FAN IS COMPLETELY INSTALLED. MAKE SURE ELECTRICAL SERVICE TO FAN IS LOCKED IN "OFF" POSITION. DISCONNECT POWER BEFORE SERVICING FAN.

1. **WARNING!** Do not use fan in hazardous environments where fan electrical system could provide ignition to combustible of flammable materials.
2. **WARNING!** Do not use fan to pump explosive or corrosive gases.
3. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.
4. **WARNING!** Normal operation of this device may affect the combustion airflow needed for safe operation of fuel burning equipment. Check for possible backdraft conditions on all combustion devices after installation.
5. **NOTICE!** There are no user serviceable parts located inside the fan unit. **Do NOT attempt to open.** Return unit to the factory for service.
6. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician.
7. **WARNING!** Do not leave fan unit installed on system piping without electrical power for more than 48 hours. Fan failure could result from this non-operational storage.
8. **WARNING - TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:**
   a) Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
   b) Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel

RadonAway
3 Saber Way | Ward Hill, MA 01835
www.radonaway.com

INSTALLATION INSTRUCTION IN014 Rev I

XP/XR Series		GP Series	
XP101	p/n 23008-1	GP201	p/n 23007-1
XP151	p/n 23010-1	GP301	p/n 23006-1
XP201	p/n 23011-1	GP401	p/n 23009-1
XR261	p/n 23019-1	GP501	p/n 23005-1

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The GP/XP/XR Series Radon Fans are intended for use by trained, professional Radon mitigators. The purpose of this instruction is to provide additional guidance for the most effective use of a fan. 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 GP/XP/XR Series Fans are 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 fan should be stored in an area where the temperature is never less than 32 degrees F. or more than 100 degrees F.

1.3 ACOUSTICS

The GP/XP/XR Series Fan, when installed properly, operates with little or no noticeable noise to the building occupants. The velocity of the outgoing air should be considered in the overall system design. In some cases the "rushing" sound of the outlet air may be disturbing. In these instances, the use of a RadonAway Exhaust Muffler is recommended.

1.4 GROUND WATER

In the event that a temporary high water table results in water at or above slab level, water may be drawn into the riser pipes thus blocking air flow to the GP/XP/XR Series Fan. The lack of cooling air may result in the fan 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 fan be turned off until the water recedes allowing for return to normal operation.

1.5 SLAB COVERAGE

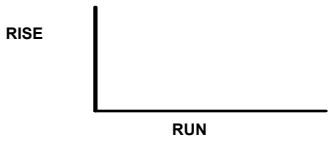
The GP/XP/XR Series Fan can provide coverage up to 2000+ sq. ft. per slab penetration. This will primarily depend on the sub-slab material in any particular installation. In general, the tighter the material, the smaller the area covered per penetration. Appropriate selection of the GP/XP/XR Series Fan best suited for the sub-slab material can improve the slab coverage. The GP & XP Series have a wide range of models to choose from to cover a wide range of subslab material. The higher static suction fans are generally used for tighter subslab materials. The XR Series is specifically designed for high flow applications such as stone/gravel and drain tile. Additional suction points can be added as required. It is recommended that a small pit (5 to 10 gallons in size) be created below the slab at each suction hole.

1.6 CONDENSATION & DRAINAGE

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 GP/XP/XR Series Fan **MUST** be mounted vertically plumb and level, with the outlet pointing up for proper drainage through the fan. Avoid mounting the fan in any orientation that will allow water to accumulate inside the fan housing. The GP/XP/XR Series Fans are **NOT** suitable for underground burial.

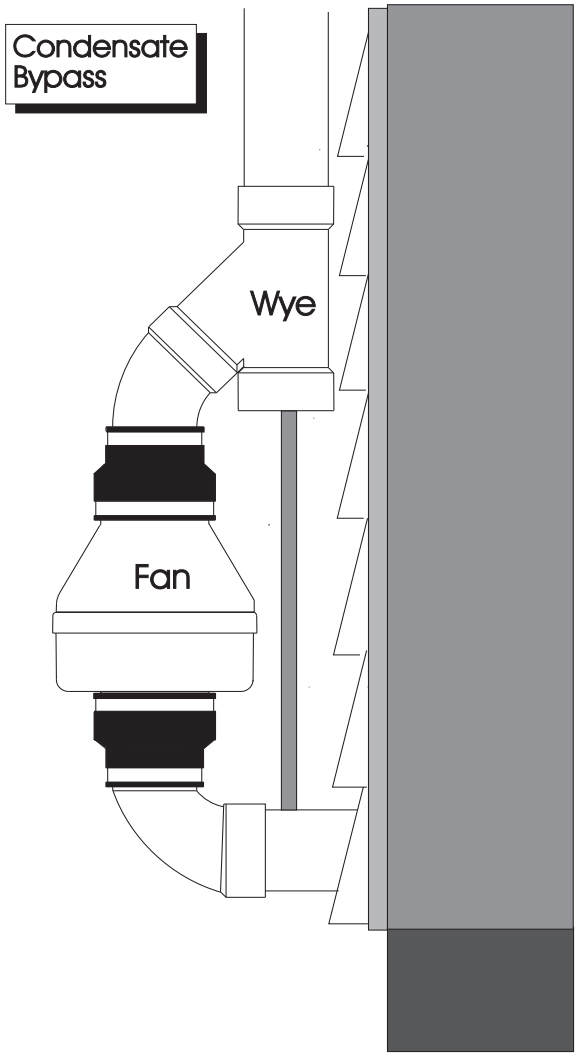
For GP/XP/XR Series Fan piping, the following table provides the minimum recommended pipe diameter and pitch under several system conditions.

Pipe Dia.	Minimum Rise per Foot of Run* @25 CFM	@50 CFM	@100 CFM
4″	1/8″	1/4″	3/8″
3"	1/4"	3/8"	1 1/2"



*Typical GP/XP/XR Series Fan operational flow rate is 25 - 90 CFM. (For more precision, determine flow rate by using the chart in the addendum.)

Under some circumstances in an outdoor installation a condensate bypass should be installed in the outlet ducting as shown. This may be particularly true in cold climate installations which require long lengths of outlet ducting or where the outlet ducting is likely to produce large amounts of condensation because of high soil moisture or outlet duct material. Schedule 20 piping and other thin-walled plastic ducting and Aluminum downspout will normally produce much more condensation than Schedule 40 piping.



The bypass is constructed with a 45 degree Wye fitting at the bottom of the outlet stack. The bottom of the Wye is capped and fitted with a tube that connects to the inlet piping or other drain. The condensation produced in the outlet stack is collected in the Wye fitting and drained through the bypass tube. The bypass tubing may be insulated to prevent freezing.

1.7 "SYSTEM ON" INDICATOR

A properly designed system should incorporate a "System On" Indicator for affirmation of system operation. A manometer, such as a U-Tube, or a vacuum alarm is recommended for this purpose.

1.8 ELECTRICAL WIRING

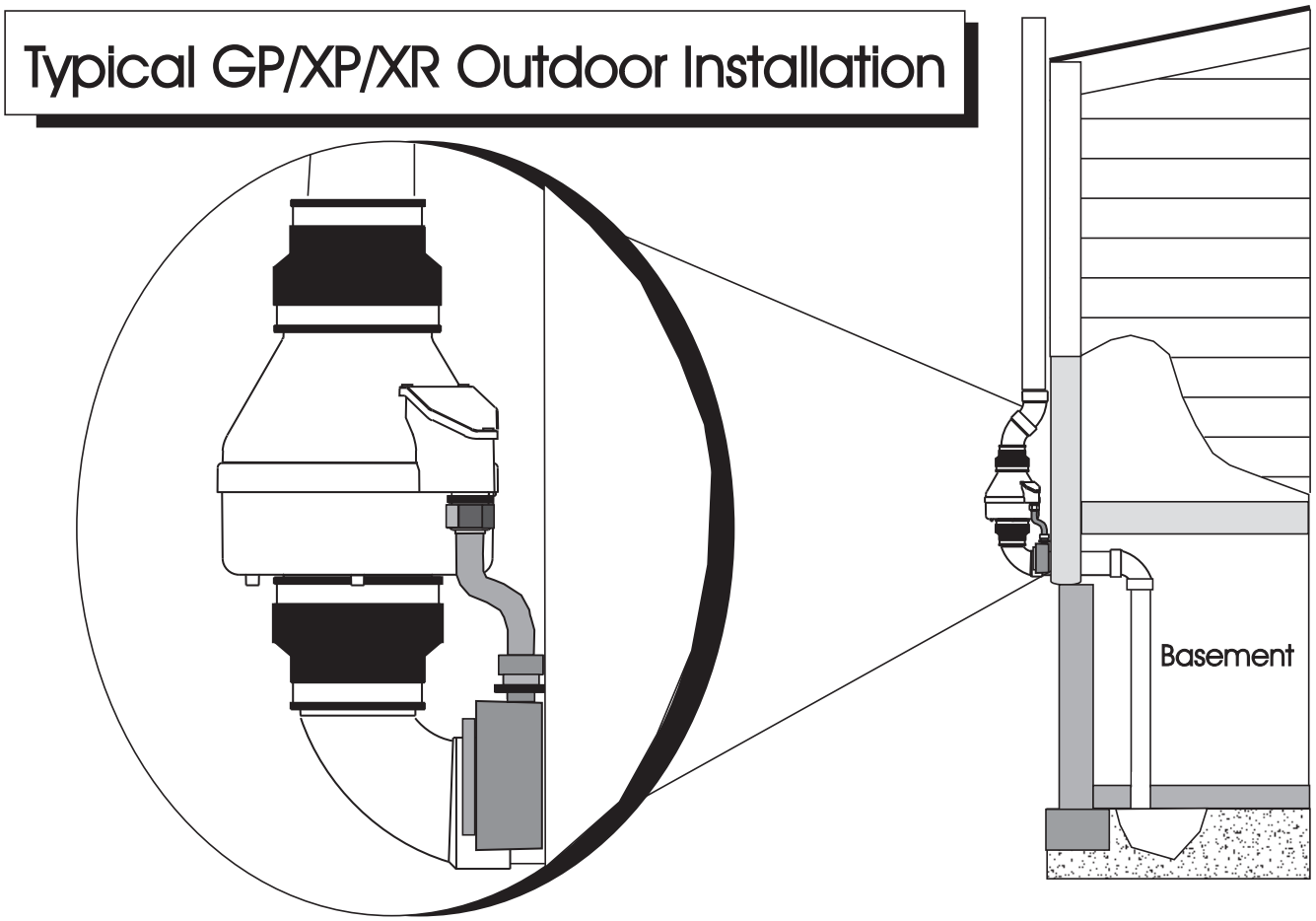
The GP/XP/XR Series Fans operate on standard 120V 60 Hz. AC. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a U.L. listed watertight conduit. Ensure that all exterior electrical boxes are outdoor rated and properly sealed to prevent water penetration into the box. A means, such as a weep hole, is recommended to drain the box.

1.9 SPEED CONTROLS

The GP/XP/XR Series Fans are rated for use with electronic speed controls, however, they are generally not recommended. If used, the speed control recommended is Pass & Seymour Solid State Speed Control Cat. No. 94601-I.

2.0 INSTALLATION

The GP/XP/XR Series Fan can be mounted indoors or outdoors. (It is suggested that EPA recommendations be followed in choosing the fan location.) The GP/XP/XR Series Fan may be mounted directly on the system piping or fastened to a supporting structure by means of optional mounting bracket.



2.1 MOUNTING

Mount the GP/XP/XR Series Fan vertically with outlet up. Insure the unit is plumb and level. When mounting directly on the system piping assure that the fan does not contact any building surface to avoid vibration noise.

2.2 MOUNTING BRACKET (optional)

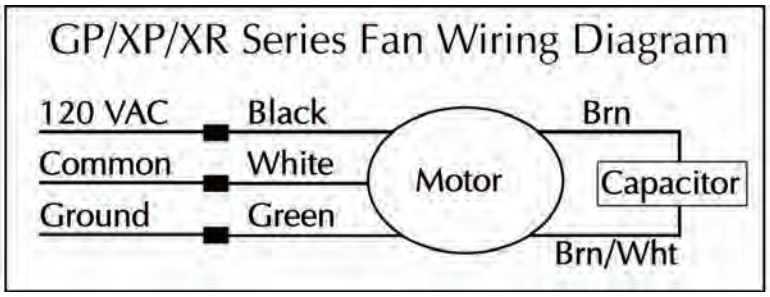
The GP/XP/XR Series Fan may be optionally secured with the integral mounting bracket on the GP Series fan or with RadonAway P/N 25007-2 mounting bracket for an XP/XR Series Fan. Foam or rubber grommets may also be used between the bracket and mounting surface for vibration isolation.

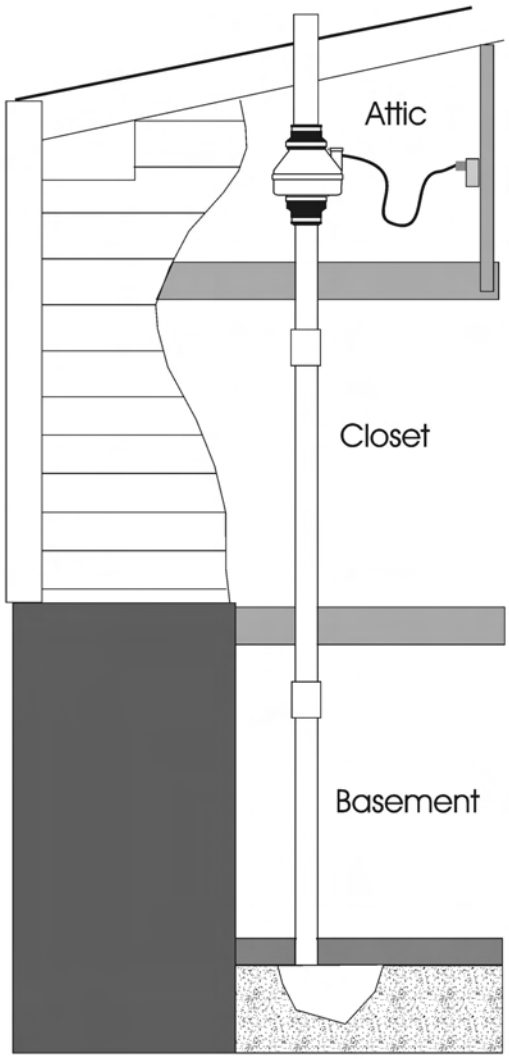
2.3 SYSTEM PIPING

Complete piping run, using flexible couplings as means of disconnect for servicing the unit and vibration isolation.

2.4 ELECTRICAL CONNECTION

Connect wiring with wire nuts provided, observing proper connections (See Section 1.8):





2.5 VENT MUFFLER (optional)

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

2.6 OPERATION CHECKS

_____ **Verify** all connections are tight and **leak-free**.

_____ **Insure** the GP/XP/XR Series Fan and all ducting is secure and vibration-free.

_____ **Verify** system vacuum pressure with manometer. **Insure** vacuum pressure is **less than** maximum recommended operating pressure
(*Based on sea-level operation, at higher altitudes reduce by about 4% per 1000 Feet.)*
(Further reduce Maximum Operating Pressure by 10% for High Temperature environments)
See Product Specifications. If this is exceeded, increase the number of suction points.

_____ **Verify Radon levels by testing to EPA protocol.**

XP/XR SERIES PRODUCT SPECIFICATIONS

The following chart shows fan performance for the XP & XR Series Fan:

Typical CFM Vs Static Suction "WC	0"	.25"	.5"	.75"	1.0"	1.25"	1.5"	1.75"	2.0"
XP101	125	118	90	56	5	-	-	-	-
XP151	180	162	140	117	78	46	10	-	-
XP201	150	130	110	93	74	57	38	20	-
XR261	250	215	185	150	115	80	50	20	-

Maximum Recommended Operating Pressure*		
XP101	0.9" W.C.	(Sea Level Operation)**
XP151	1.3" W.C.	(Sea Level Operation)**
XP201	1.7" W.C.	(Sea Level Operation)**
XR261	1.6" W.C.	(Sea Level Operation)**

**Reduce by 10% for High Temperature Operation*
***Reduce by 4% per 1000 feet of altitude*

Power Consumption @ 120 VAC	
XP101	40 - 49 watts
XP151	45 - 60 watts
XP201	45 - 66 watts
XR261	65 - 105 watts

XP Series Inlet/Outlet: 4.5" OD (4.0" PVC Sched 40 size compatible)
XR Series Inlet/Outlet: 5.875" OD
Mounting: Mount on the duct pipe or with optional mounting bracket.
Recommended ducting: 3" or 4" Schedule 20/40 PVC Pipe
Storage temperature range: 32 - 100 degrees F.
Normal operating temperature range: -20 - 120 degrees F.
Maximum inlet air temperature: 80 degrees F.
Size: 9.5H" x 8.5" Dia.
Weight: 6 lbs. (XR261 - 7 lbs)

Continuous Duty
Thermally Protected
Class B Insulation
3000 RPM
Rated for Indoor or Outdoor Use

LISTED Electric Fan ETL® 77728 Tested to UL Std. 507

GP SERIES PRODUCT SPECIFICATIONS

The following chart shows fan performance for the GP Series Fan:

Typical CFM Vs Static Suction "WC	1.0"	1.5"	2.0"	2.5"	3.0"	3.5"	4.0"
GP501	95	87	80	70	57	30	5
GP401	93	82	60	38	12	-	-
GP301	92	77	45	10	-	-	-
GP201	82	58	5	-	-	-	-

Maximum Recommended Operating Pressure*		
GP501	3.8" W.C.	(Sea Level Operation)**
GP401	3.0" W.C.	(Sea Level Operation)**
GP301	2.4" W.C.	(Sea Level Operation)**
GP201	1.8" W.C.	(Sea Level Operation)**

**Reduce by 10% for High Temperature Operation*

***Reduce by 4% per 1000 feet of altitude*

Power Consumption @ 120 VAC	
GP501	70 - 140 watts
GP401	60 - 110 watts
GP301	55 - 90 watts
GP201	40 - 60 watts

Inlet/Outlet: 3.5" OD (3.0" PVC Sched 40 size compatible)

Mounting: Fan may be mounted on the duct pipe or with integral flanges.

Weight: 12 lbs.

Size: 13H" x 12.5" x 12.5"

Recommended ducting: 3″ or 4" Schedule 20/40 PVC Pipe

Storage temperature range: 32 - 100 degrees F.

Normal operating temperature range: -20 - 120 degrees F.

Maximum inlet air temperature: 80 degrees F.

Continuous Duty

Class B Insulation

3000 RPM

Thermally Protected

Rated for Indoor or Outdoor Use

LISTED Electric Fan ETL® 77728 Tested to UL Std. 507

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the GPx01/XP/XR Series Fan for shipping damage within 15 days of receipt. Notify RadonAway of any damages immediately. Radonaway is not responsible for damages incurred during shipping. However, for your benefit, Radonaway does insure shipments.

There are no user serviceable parts inside the fan. **Do not attempt to open.** Return unit to factory for service.

Install the GPx01/XP/XR Series Fan in accordance with all EPA standard practices, and state and local building codes and state regulations.

WARRANTY

Subject to any applicable consumer protection legislation, RadonAway warrants that the GPx01/XP/XR Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of 90 days from the date of purchase (the "Warranty Term").

RadonAway will replace any Fan which fails due to defects in materials or workmanship. The Fan must be returned (at Owner's cost) to the RadonAway factory. Any Fan returned to the factory will be discarded unless the Owner provides specific instructions along with the Fan when it is returned regardless of whether or not the Fan is actually replaced under this warranty. Proof of purchase must be supplied upon request for service under this Warranty.

This Warranty is contingent on installation of the Fan in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not cover damage in shipment unless the damage is due to the negligence of RadonAway.

5 YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.

RadonAway will extend the Warranty Term of the fan to 5 years from date of manufacture if the Fan is installed in a professionally designed and professionally installed radon system or installed as a replacement fan in a professionally designed and professionally installed radon system. Proof of purchase and/or proof of professional installation may be required for service under this warranty. Outside the Continental United States and Canada the extended Warranty Term is limited to one (1) year from the date of manufacture.

RadonAway is not responsible for installation, removal or delivery costs associated with this Warranty.

E□CEPT AS STATED A□O□E, THE GP□□1□□P□□R SERIES FANS ARE PRO□IDED WITHOUT WARRANTY OF ANY KIND, EITHER E□PRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTA□ILITY AND FITNESS FOR A PARTICULAR PURPOSE□

IN NO E□ENT SHALL RADONAWAY □E LIA□LE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSE□UENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF □RADONAWAY□S AGGREGATE LIA□ILITY HEREUNDER SHALL NOT IN ANY E□ENT E□CEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT□ THE SOLE AND E□CLUSI□E REMEDY UNDER THIS WARRANTY SHALL □E THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE E□TENT THE SAME DOES NOT MEET WITH RADONAWAY□S WARRANTY AS PRO□IDED A□O□E□

For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping cost to and from factory.

RadonAway
3 Saber Way
Ward Hill, MA 01835
TEL. (978) 521-3703
FAX (978) 521-3964

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Serial No._____
Purchase Date_____