# Sub-Slab Depressurization System Operation & Maintenance Manual

Former Alliance BCP Site
12 Pixley Industrial Parkway
Town of Gates, Monroe County, New York
BCP Site # C828101

August 2020, Revised November 2021

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# Certification

I, Dwight A. Harrienger, certify that I am currently a NYS registered professional engineer and that this Sub-Slab Depressurization System Operation & Maintenance Manual was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).


Dwight Harrienger, P.E.

Date: NOV. 5, 2021

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# Abbreviations

| | |
|---|---|
| AA and AAR | Alternatives Analysis, AA Report |
| ACM | Asbestos Containing Material |
| AMSF | Alliance Metal Stamping & Fabrication |
| AOC | Area of Concern |
| BCP | Brownfield Cleanup Program |
| CAMP | Community Air Monitoring Plan |
| CCR | Construction Completion Report |
| CU | Commercial Use |
| CVOC | Chlorinated Volatile Organic Compound |
| DER-10 | NYSDEC Technical Guidance for Site Investigation and Remediation, May 2010 |
| DOT | Department of Transportation |
| ELAP | Environmental Laboratory Approval Program |
| ft bgs | feet below ground surface |
| HASP | Health and Safety Plan |
| HVAC | Heating, Ventilation and Air-Conditioning |
| IRM | Interim Remedial Measure |
| IU | Industrial Use |
| MFP | Maguire Family Properties, Inc. |
| NYSDEC | New York State Department of Environmental Conservation |
| NYSDOH | New York State Department of Health |
| OM&M | Operation, Maintenance & Monitoring |
| OU | Operable Unit |
| PCE or PERC | Perchloroethylene, also tetrachloroethene, tetrachloroethylene |
| PID | Photoionization Detector |
| PMP | Pressure Monitoring Point |
| POGW | Protection of Groundwater |
| PVC | Polyvinyl Chloride |
| RI | Remedial Investigation |
| SCOs | Soil Cleanup Objectives |
| SGVs | Standards and Guidance Values |
| SMP | Site Management Plan |
| SSDS | Sub-Slab Depressurization System |
| SVI | Soil Vapor Intrusion |
| TAL | USEPA's Target Analyte List |
| TCA | Trichloroethane |
| TCE | Trichloroethene, also trichloroethylene |
| TCL | USEPA's Target Compound List |
| TOGS | Technical and Operational Guidance Series |
| TO-15 | USEPA air sample analysis method Toxic Organics - 15 |
| USEPA | United States Environmental Protection Agency |
| UU | Unrestricted Use |
| VOC | Volatile Organic Compound |

# 1.0 INTRODUCTION

This Sub-Slab Depressurization System (SSDS) Operation and Maintenance (O&M) Manual has been developed for the Former Alliance Metal Stamping & Fabrication (AMSF) Facility Site located at 12 Pixley Industrial Parkway in the Town of Gates, Monroe County, New York (the "Site"). The Site is identified by the New York State Department of Environmental Conservation (NYSDEC) as Brownfield Cleanup Program (BCP) Site No. C828101.

The installation of an SSDS in the Site building was performed as an element of a BCP Interim Remedial Measure (IRM) approved by NYSDEC and the New York State Department of Health (NYSDOH) in July 2019. The IRM was implemented to address the presence of contamination by volatile organic compounds (VOCs) in Site soil and groundwater. The SSDS component of the IRM was designed to mitigate the potential for soil vapor intrusion (SVI), a process by which VOCs could migrate in vapor present beneath the floor of the Site building into indoor air inside the Site building.

Operation of the SSDS began in October 2019 and has continued uninterrupted since then. Operation and maintenance of the SSDS will be a component of the final remedy for the Site when a final BCP remedy is approved by NYSDEC. SSDS operation and maintenance will be an element of, and subject to the requirements of, the final Site Management Pan (SMP) [1] for the Site.

This plan may be periodically reviewed and updated. NYSDEC/NYSDOH must approve any revision to this document prior to implementation of the revision.

## 1.1 SITE DESCRIPTION

The Site occupies a 7-acre property on the north side of Pixley Industrial Parkway. A Site Location Map is presented on Figure 1. A Site Plan is presented on Figure 2.

The property is improved with a 120,000-square-foot slab-on-grade building surrounded by paved driveways and parking lots and unpaved lawn areas. The original sections of the Site building were constructed in approximately 1967. Historical records indicate the original Site building may have been operated as a warehouse by the Alcoa Aluminum Corporation. The facility was purchased by the Alliance Tool Corporation, a subsidiary of the Gleason Corporation, in 1973. Alliance operated the Alliance Metal Stamping & Fabrication facility at the Site until July 1994. The Alliance manufacturing operations included stamping, forming, grinding, cleaning, painting, phosphating, and deburring of metal piecework. Alliance decommissioned the manufacturing operation and sold the vacant facility to Maguire Family Properties (MFP) in 1995. Since 1995, MFP has been leasing subdivided spaces in the building to companies operating a variety of light manufacturing operations and commercial activities. The current layout of tenant spaces is depicted on Sub-Slab Depressurization System Coverage Plan (Drawing No. ENV-100) in the Record Drawings package presented in Appendix A.

The Site building was constructed in seven sections beginning with the original manufacturing and office building sections in 1967 and five additions constructed from 1975 through 1988. Three loading docks were added on the

[1] The SMP and other references are listed in Section 7 of this O&M Manual.

north side of the building in the 1990s. The outlines of the various building sections are depicted on Drawing ENV-100 in Appendix A.

## 1.2 SUMMARY OF ENVIRONMENTAL CONDITIONS

**Remedial Investigation Summary**

MFP applied as a Volunteer under New York State's BCP and the Site was admitted into the BCP by NYSDEC in July 2011. A Remedial Investigation (RI) was initiated in March 2012 and completed in December 2015. The findings of the RI concerning the nature and extent of contamination at the Site were as follows:

Soil

Occurrences of soil contamination exceeding NYSDEC's Soil Cleanup Objectives (SCOs) for protection of public health at commercial or industrial use sites were not identified at the Site.

VOC contamination exceeding NYSDEC's SCOs for protection of unrestricted site use (UU SCOs) and protection of groundwater (POGW SCOs) were detected in three areas of the Site:

- Former Degreaser Area - Area of Concern AOC 1
- Former Waste Storage Area B – AOC 5B
- Former Paint Shop Area - AOC 6

As shown on the Site Plan presented on Figure 2, all three areas are within the footprint of the Site building, and the contaminated soil is therefore covered by and contained beneath the building floor slab. In each area, the water table occurs below the top of bedrock. The cap provided by the floor slab, the unsaturated condition of the soil profile and the contaminant concentrations in both soil and groundwater together indicate that the soil contamination in these areas is unlikely to pose health risks to site workers or others from direct contact or ingestion or to be contributing to groundwater contamination at the Site.

Groundwater

Chlorinated VOCs (CVOCs) are present in Site groundwater at concentrations that exceed NYSDEC's groundwater quality standards. The CVOCs are present in the shallow-bedrock zone across the entire Site and are also present in the intermediate- and deep-bedrock zones.

Concentrations of 1,1,1-trichloroethane (1,1,1-TCA), a CVOC commonly used as a solvent in industrial degreasing operations, and the CVOCs which are the daughter products of the degradation of 1,1,1-TCA in the environment (including principally 1,1-dichloroethane and 1,1-dichloroethene) are highest in OU-1, located in the upgradient northwest corner of the Site. 1,1,1-TCA-related contamination above standards extends from OU-1 beneath the building to the eastern, downgradient Site boundary. Contamination by tetrachloroethylene, a CVOC commonly used as a degreasing or dry-cleaning solvent (also known as tetrachloroethene or perchloroethylene and commonly abbreviated as PERC or PCE), and its degradation daughter products (including principally trichloroethene and cis-1,2-dichloroethene) are present at lower concentrations, with the highest levels found in the area of the former degreaser in AOC 1 and with exceedances of standards extending to the eastern Site boundary.

Soil Vapor

The results of the RI indicated the potential for CVOCs present in the subsurface at the Site to migrate by soil vapor intrusion (SVI) from below the floor of the facility building into the air inside the building. Concentrations of TCA, PCE and/or one or more related CVOC daughter products were detected in sub-slab vapor and indoor air sample pairs collected at locations throughout the building. Concentrations in sub-slab vapor at most of the locations sampled, including those locations throughout the high-ceiling sections of the building originally occupied by AMSF manufacturing operations, exceeded SVI evaluation guidance values established by the New York State Department of Health (NYSDOH). NYSDOH guidance recommends taking action to monitor or mitigate the potential for SVI where contaminants are found to be present in soil vapor at levels above the NYSDOH guidance values.

**SSDS Installation**

The SSDS described in this O&M Manual was installed to address the potential for SVI identified by the results of the soil vapor evaluation conducted during the RI. The SSDS covers the entire building with the exception of unheated loading docks, since those loading docks are not routinely occupied by site workers or visitors. After installation of the of the SSDS was completed, commissioning of the system and demonstration of sub-slab depressurization of the building footprint was performed. Full-time operation of the SSDS began in October 2019.

## 1.3 O&M MANUAL OBJECTIVES AND CONTENTS

The primary objectives of this SSDS O&M Manual are to:

- facilitate understanding by the Site owner and building management personnel of the purpose, operation, maintenance and monitoring of the SSDS.
- define system components and operation.
- specify maintenance activities required for continuous and effective operation of the system.
- define monthly monitoring requirements to be completed by the building operator.
- describe annual monitoring and reporting requirements to be completed by a professional Engineer.

The O&M Manual includes the following:

- a basic description of the potential for soil vapor intrusion and how it is mitigated by an SSDS.
- a description of the installed system and its basic operating principles.
- information on how the owner or tenant can check that the system is operating properly.
- information on how and by whom the system will be maintained and monitored.
- a list of appropriate actions for the Owner or a tenant to take if a system warning device (differential pressure gauge) indicates degradation or failure of the operation of the system.
- a description of the proper operating procedures for the system, including manufacturer's operation and maintenance instructions and warrantees.
- contact information if the Owner or a tenant has questions, comments, or concerns about system operation or maintenance.

# 2.0 SSDS DESCRIPTION

## 2.1 BASIC PRINCIPLES

Soil vapor intrusion is the migration of volatile or semi-volatile chemical compounds from contaminated groundwater and soil into overlying buildings. The chemical vapors can migrate into the building interior through openings in the building floor slab or foundation. The potential for SVI increases if the air pressure inside the building is lower than the soil gas pressure beneath the floor, a condition which may occur when, for example, building air is drawn out the interior of the building by operation of the heating, ventilation and air-conditioning (HVAC) systems for the building.

Sub-slab depressurization systems are designed to mitigate the migration of subsurface vapors into the interior of a structure by establishing and maintaining a pressure differential across the building floor slab such that the soil gas pressure below the floor slab is less than the air pressure inside the building. The negative sub-slab pressure relative to the indoor air pressure is established by using vacuum fans to extract vapor from suction points installed through the floor slab. From the suction points the vapor is safely routed in solid piping through the interior of the building to exhaust points above the roof line. The exhaust points are designed in a manner that does not lead to recirculation of the soil gas into indoor air by operation of the HVAC system for the building.

The SSDS for the building located at 12 Pixley Industrial Parkway was designed and constructed in accordance with the applicable standards, criteria and guidance (SCGs) contained or referenced in the following:

- NYSDOH's "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" dated October 2006, with matrices updated May 2017.
- NYSDEC's "DER-10 Technical Guidance for Site Investigation and Remediation".

The goal and objective for implementation of the SSDS at the Site were and remain as follows:

- Goal: Mitigate the potential migration of soil vapor impacted by CVOCs from beneath the building footprint into the interior occupied spaces of the building.
- Objective: Construct, commission and operate the SSDS to achieve and maintain a minimum vacuum pressure differential of 0.002 inches of water column between the sub-slab soil pore and void spaces and the routinely occupied interior spaces of the building.

## 2.2 EQUIPMENT AND MATERIAL DETAILS

The components and operational information for the SSDS are described below. Record drawings for the SSDS are presented in an Appendix A. Representative photographs of and product information sheets for system components are presented in Appendix B.

### 2.2.1 SSDS Suction Points

The SSDS connects a network of 42 suction cavities constructed under the existing floor slab to 21 vacuum fans located on the building roof. The design of the suction point network and the selection of the locations of the 42 suction cavities were determined on the basis of results of sub-slab vacuum communication testing performed in various sections of the building prior to the SSDS construction activities, taking into account the configuration of building footers throughout the building as well as features associated with areas of concern such as the former degreaser location in AOC 1. Refer to Record Drawing ENV-100 in Appendix A for SSDS suction point locations.

To construct suction cavities, a hole was cut through the existing concrete floor and a suction point cavity with a volume of approximately 1 cubic foot was excavated into the underlying soil. Clean, washed #2 gravel was placed in the suction cavity and a 12-inch-long (approximately) section of perforated 4-inch Schedule 40 polyvinyl chloride (PVC) pipe with a bottom end cap was installed to a depth of approximately 12 inches below the bottom of the floor slab. The remaining void space in the excavated cavity was filled with clean, washed #2 gravel to encase the perforated pipe.

### 2.2.2 SSDS Piping

The 4-inch perforated pipe was connected by a stainless-steel sleeve to a solid (not perforated) 4-inch diameter Schedule 40 steel pipe at the top of the suction cavity. The steel pipe was installed through the floor slab either as a vertical riser pipe extending directly above the suction cavity or in welded sections as necessary to form a horizontal pipe run to reach the point at which a vertical steel riser could exit the floor slab at a roof support column. The vertical steel riser pipe transitions to a 4” Schedule 40 PVC riser at a height of 10 feet above the re-established finished floor slab, and a ball valve is installed on the bottom end of the PVC section of each SSDS riser. Typical construction details for SSDS suction points and riser pipes are shown on Drawing ENV-500.

Risers for seven of the suction points (suction points SP-8, -19, -20, -21, -22, -26 and -28) extend vertically to a point just below the building ceiling/roof where they connect to Schedule 80 PVC fan stack riser pipes that penetrate the roof and to which the SSDS fan and Schedule 80 PVC discharge piping for that single suction point are connected. For the remaining 35 suction points, the vertical risers from each point extends up to the roof trusses and structural webbing for the building ceiling system. From there, 6-inch Schedule 40 PVC distribution header laterals connect the 4-inch piping from either two or three individual suction cavities. These 6” distribution headers transition just below the roof to 6” Schedule 80 PVC vertical fan stack riser pipes which connect to 14 SSDS fans and Schedule 80 PVC discharge pipes on the roof. The top end of the discharge stack for each fan is equipped with a rain cap made out of a Schedule 80 PVC tee with ½” by ½” hot dipped galvanized mesh covering both ends of the tee to prevent foreign objects from entering the depressurization piping.

The layout of the lateral SSDS distribution piping network inside the building is shown on Drawing ENV-100. The layout of the 21 SSDS fan and discharge point locations on the building roof is shown on Drawing ENV-101. Typical

roof penetration and exhaust stack riser and fan details are shown on Drawing ENV-500, and typical roof-top exhaust stack support structure details are shown on Drawing ENV-501.

### 2.2.3 SSDS Fans

The roof-mounted fans which depressurize the SSDS suction cavity network for the building are RadonAway in-line vacuum fans including 19 Model RP265 fans and two (2) Model GX5 fans. The two Model GX5 fans are fan numbers 18 and 20. Cut sheet and installation and operating instructions for the RadonAway fans are presented in Appendix B.

### 2.2.4 Operation Monitoring System

The continuous operation of each fan is monitored using a RadonAway Checkpoint IIa low pressure alarm. Each alarm is paired with a Dwyer Instruments Magnehelic 2000-Series differential pressure gauge (manometer) for measuring the vacuum pressure for each SSDS fan at a point just below where the riser for the fan stack penetrates the building roof. The vacuum connection between the manometer and the fan stack riser is made using semi-rigid ¼-in. vinyl tubing run from the monitoring point along ceiling and wall system elements to the monitoring panels. Each low-pressure switch/alarm and manometer pair is installed in a lockable cabinet in one of four monitoring panel groups located along the central hallway that runs between tenant spaces through the interior of the building. Monitoring panel locations are shown on Drawing ENV-100, and monitoring panel details are shown on Drawings ENV-502 and -503.

RadonAway Checkpoint IIa low-pressure alarms have two pilot lights. When the system is operating correctly, a green light (the light on the right side if facing the instrument) is illuminated. The low-pressure switches also have an audible warning alarm. The goal of the low-pressure switches is to monitor the vacuum being produced by the roof-mounted fans. When the fans are creating greater than 0.25 inches of water column pressure differential, the audible/visual alarm will not be activated, and the green pilot light will be illuminated. If the pressure differential in the SSDS fan stack piping drops below 0.25 inches of water column pressure differential, the audible alarm will be activated and the red pilot light will become illuminated.

Installation and operating instructions for the RadonAway alarms and Magnehelic differential pressure gauges are presented in Appendix B.

In addition to the 21 Magnehelic manometers used to monitor the vacuum being produced by each of the SSDS fans, each of the risers for the 35 suction points that are not piped individually (singly) to a fan is equipped with a separate monitoring port fitted with a Dwyer LPG Series low pressure gauge to allow for reading the individual pressures at the two or three suction points with SSDS piping manifolded together and connected to a shared fan. The monitoring ports on the suction point riser pipes are located approximately 8 feet above floor level below the riser ball valve. A monitoring port without a Dwyer low pressure gauge is installed on each of the seven risers for suction points piped singly to an SSDS fan, and these could be used to connect a portable manometer for manual pressure monitoring at that location.

### 2.2.5 Performance Monitoring

The system is designed to exhaust sub-slab vapor at a total rate of no more than 300 cfm per fan. Each fan is sized to operate at approximately 2 inches of water column (+/- 0.5 inches of water column), a level of vacuum designed to generate a pressure extension field capable of depressurizing the sub-slab void spaces beneath the building floor. Twenty-seven (27) permanent Vapor Pin sub-slab pressure monitoring points (PMPs) are installed throughout building to allow for periodic manual monitoring of the sub-slab vacuum. The locations of the PMPs are shown on Drawing ENV-100 in Appendix A, and details on their construction are shown on Drawing ENV-500 in Appendix A. Manufacturer's cut sheet and installation instructions for the Vapor Pin PMPs are presented in Appendix B.

### 2.2.6 Warning Labels

In order to avoid accidental damage to the SSDS that could disturb its function, labels containing the following message were placed on accessible/visible portions of the riser pipes and distribution pipes:

**"THIS IS A COMPONENT OF A SUB-SLAB DEPRESSURIZATION SYSTEM. DO NOT ALTER OR DISCONNECT."**

During the first of the annual monitoring events described in Section 3.3 of this plan, labels with contact information for the building owner will be attached to accessible riser pipes indicating that the owner should be contacted if the system appears to need service or inspection. These labels will be updated as necessary during each subsequent annual event.

# 3.0 OPERATION, MAINTENANCE AND MONITORING

Specific SSDS monitoring tasks need to be completed by the building manager on a monthly basis. In addition, annual monitoring and certification of the system must be performed by a qualified professional.

Under normal operating conditions, regular maintenance of the system is not required unless monitoring results indicate a significant change from normal operating conditions.

System monitoring tasks, non-routine maintenance procedures, and start-up and shut down procedures are described below. SSDS monitoring data will be recorded on the Sub-Slab Depressurization System Monthly Monitoring Log or Annual Monitoring Log; the log forms to be used are presented in Appendix C.

## 3.1 MONTHLY MONITORING, RECORD KEEPING AND COMMUNICATION

The following SSDS monitoring tasks will be completed by the owner or building operator on a monthly basis:

1. Collect vacuum readings from the Magnehelic® manometer gauges (labeled by fan number) located in the monitoring instrument panels described in Section 2.2.4 and shown on Drawing ENV-100 in Appendix A. Record the readings on the Monthly Monitoring Log provided in Appendix C.

2. Note any observed abnormalities, visual or auditory, with respect to normal system operating conditions on the log sheet. If the manometer needle rests all the way to the left on the zero bar and/or the Checkpoint IIa low-pressure switch audible warning alarm is activated and/or the pilot light is red, confirm operation (either visually or audibly) of the corresponding fan at the roof level and notify the owner and Engineer immediately in order to initiate necessary corrective measures. Indicate on the log sheet if the instrument panel pilot lights are green or red to verify that fans are operating correctly. If any of the pilot lights are off, notify the owner and Engineer immediately to initiate necessary corrective measures.

3. Maintain a digital or paper copy of the completed log form in a file dedicated to saving monitoring records for the SSDS. Provide a copy of the completed log sheet to the owner's Engineer.

4. Maintain panelboard labels in the electrical panel box that contains circuit breakers for the SSDS fans.

5. On an occasional basis (at least once annually), toggle each of the circuit breakers for the SSDS fans off and back on to confirm that the low-pressure switches provide the intended audible and visual warnings. If any low-pressure switches do not work correctly, notify the owner and Engineer immediately to initiate corrective measures.

While not directly related to SSDS operation monitoring, monitoring of passive exhaust discharges such as those for gas-fired hot water heaters and gas-fired process heating equipment should be performed by the owner or building operator on a regular basis to confirm that back drafting is not occurring.

## 3.2 NON-ROUTINE MAINTENANCE

Non-routine maintenance may be required to address issues such as unresolvable alarms, repeatedly malfunctioning components, or accidental or weather-related damage to system components. If non-routine maintenance is required, the Engineer must be notified. Contact information for the Engineer is provided below in Section 6 of this plan.

If the routine operation of the SSDS cannot be restored within 2 weeks from when a non-routine maintenance issue was identified, the owner must notify NYSDEC/NYSDOH and provide a schedule for resolving the issue.

A field log or simple report documenting any non-routine maintenance activities performed must be prepared and maintained in the file with the monthly monitoring logs described above in Section 3.1. The documentation should include a description of the issue addressed, the location of the components involved, a description of the maintenance actions completed, a description of the actions taken to confirm that routine system operation was restored, the date or dates when the activities were performed, and the names and affiliations of the personnel involved.

## 3.3 ANNUAL MONITORING & REPORTING

A complete system evaluation will be performed on an annual basis by the Engineer retained by the owner/operator of the building. The following tasks will be completed as part of this evaluation:

1. Compile the monthly monitoring logs prepared by the building owner or operator and records of any non-routine maintenance for the preceding year.

2. Complete the monthly monitoring tasks outlined in section 3.1 above, recording results on the Annual Monitoring Log provided in Appendix C. Inspect the SSDS monitoring panels and confirm that the instrument housings, electrical connections, gauges and alarms are undamaged and in good working order.

3. Obtain vacuum readings using a portable micromanometer from the 27 sub-slab pressure monitoring points (refer to Drawing ENV-100 in Appendix A for the locations of the sub-slab pressure monitoring points). Ensure that the micromanometer has been calibrated by the manufacturer within one (1) year of its use. If any of the sub-slab pressure monitoring points are damaged or protective covers are missing, take measures for corrective action.

4. Use visual observations and listen for audible evidence of air leaks to inspect the finished floor slab for new cracks or penetrations that represent either apparent potential pathways for vapor intrusion or potential compromises to sub-slab depressurization. Perform smoke testing as necessary to assess the leakage potential of suspect locations.

5. If the roof is accessible and safe to be on (e.g., not snow/ice covered), inspect the fans and exhaust stacks on the roof and note any abnormal conditions such as hot fan housings, vibrations, or unusual noise. Make note of any condensation occurring on the SSDS exhaust piping. Visually inspect the ½" by ½" hot dipped galvanized mesh on the exhaust stacks to verify there are no obstructions to exhaust flow.

6. Conduct annual indoor air sampling during the heating season as specified in the Site Management Plan.

The results of the annual evaluation shall be presented in an annual Operation, Maintenance and Monitoring (OM&M) report. The OM&M report will be signed by a professional engineer or environmental professional. The OM&M report will be submitted for approval to the NYSDEC and NYSDOH on behalf of the owner. The first annual report will be due 18 months after approval of this OM&M Plan.

## 3.4 SYSTEM STARTUP AND SHUTDOWN PROCEDURES

### 3.4.1 SSDS Startup

The SSDS has been in operation at the Site since 2019. Should circumstances call for a need for a restart of some or all the system components, the following steps will be needed to turn the fans on and resume normal operation:

1. After the fans are inspected to assure that the discharges are clear and that no -one is in contact with wiring, confirm that the appropriate breakers in the electrical panel boxes are ON with the help of a person qualified to open the electrical panels on-site.

2. Confirm the fan motor starter switches are in the ON position. These are affixed to the exhaust stack support structures located on the roof.

3. Confirm proper operation by performing the appropriate monitoring steps outlined in sections 3.1 and 0.

### 3.4.2 SSDS Shutdown

To temporarily turn system components off:

1. Put the SSDS fan motor starter switches affixed to the exhaust stack supports in the OFF position.

2. Place the appropriate circuit breakers in the OFF position with the help of a person qualified to open the electrical panels on-site.

# 4.0 SYSTEM OPTIMIZATION AND MODIFICATION

## 4.1 OPTIMIZATION

Changes to subsurface conditions or other factors may affect the performance of the SSDS such that its operational settings may need to be adjusted or optimized or equipment or components may need to be replaced or added. If during annual monitoring or system restart a vacuum (differential pressure) greater than or equal to 0.002 inches of water column is not detected at all permanent sub-slab pressure monitoring points shown (the PMPs shown on Drawing ENV-100 in Appendix A), the SSDS may need to be adjusted or optimized. Should such a situation arise, contact the owner and the Engineer immediately.

System optimization should be accomplished by using the PMP readings to identify areas of the building which have inadequate differential pressures as well as adjacent areas where an excess of vacuum is indicated. To perform the optimization:

- At those locations where a number of suction points lead to one fan, and excess sub-slab vacuum (pressure differences of significantly more than 0.002 inches) is indicated, incrementally throttle the ball valves down on risers for those individual suction points in that area to attempt to balance the influence of the fan operations more evenly across the affected area. Recheck all PMPs in that section of the building to determine if sufficient vacuum is now present at each PMP location. Several adjustments and readjustments of ball valves on more than one riser may be needed to accomplish the rebalancing.
- If throttling back the suction point riser valves does not yield acceptable vacuum throughout the area of the building addressed by that fan, it's possible that system optimization could be accomplished by selecting and installing a fan of a different size (different performance characteristics) to replace the fan in question and/or fans for other nearby suction points. The Engineer will need to be involved in determining and implementing the appropriate action.

If effectiveness of the SSDS cannot be restored within 2 weeks from when the issue requiring optimization was identified, the owner must notify NYSDEC/NYSDOH and provide a schedule for resolving the issue.

## 4.2 MODIFICATION

If building maintenance, remodeling or renovation activities require consideration of relocating SSDS fans and discharge points on the roof, minimum clearances to air intakes will need to be maintained. Where interior construction requires consideration of relocating suction points or re-routing of interior SSDS piping, the impacts to SSDS operation and performance must be evaluated by the Engineer. As with modifications to the SSDS itself, planned changes to or modifications of the HVAC system for the building should be evaluated by the Engineer for possible impacts to the performance of the SSDS.

Contact the Engineer at least 75 days in advance of the proposed construction if changes to the SSDS or HVAC system are required. Contact information for the Engineer is provided below in Section 6 of this plan. NYSDEC/NYSDOH should also be notified two weeks in advance of any planned modification to the SSDS.

# 5.0 SYSTEM DECOMMISSIONING

It is anticipated that the SSDS will need to be operated for an extended period of time. The active SSDS will not be discontinued unless prior written approval is granted by the DEC and the DOH project managers. If monitoring data indicates that the SSD system may no longer be required, a proposal to discontinue the SSDS will be submitted by the remedial party to the DEC and DOH.

Decommissioning of the system may include:

- Removal of the SSDS fans and monitoring instrument panels and proper decommissioning of associated electrical connections by a qualified electrician.
- Grouting of the sub-slab piping and permanent sub-slab pressure monitoring points.
- Capping (or removal if required by owner) of the risers and piping network.

# 6.0 ENGINEER OF RECORD CONTACT INFORMATION

The contact information for the NYS-licensed Professional Engineer of Record for the design of this SSDS is presented below, in the event the Owner and/or Tenants have questions or concerns regarding the SSDS operation, performance, monitoring or maintenance.

**Dwight Harrienger, P.E. LEED BD + C**
Senior Associate

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# 7.0 REFERENCES

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Stantec Consulting Services Inc., December 2015. Remedial Investigation Report, Brownfield Cleanup Program Site #C828101, Former Alliance Metal Stamping & Fabrication Facility, 12 Pixley Industrial Parkway, Town of Gates, Monroe County, New York.

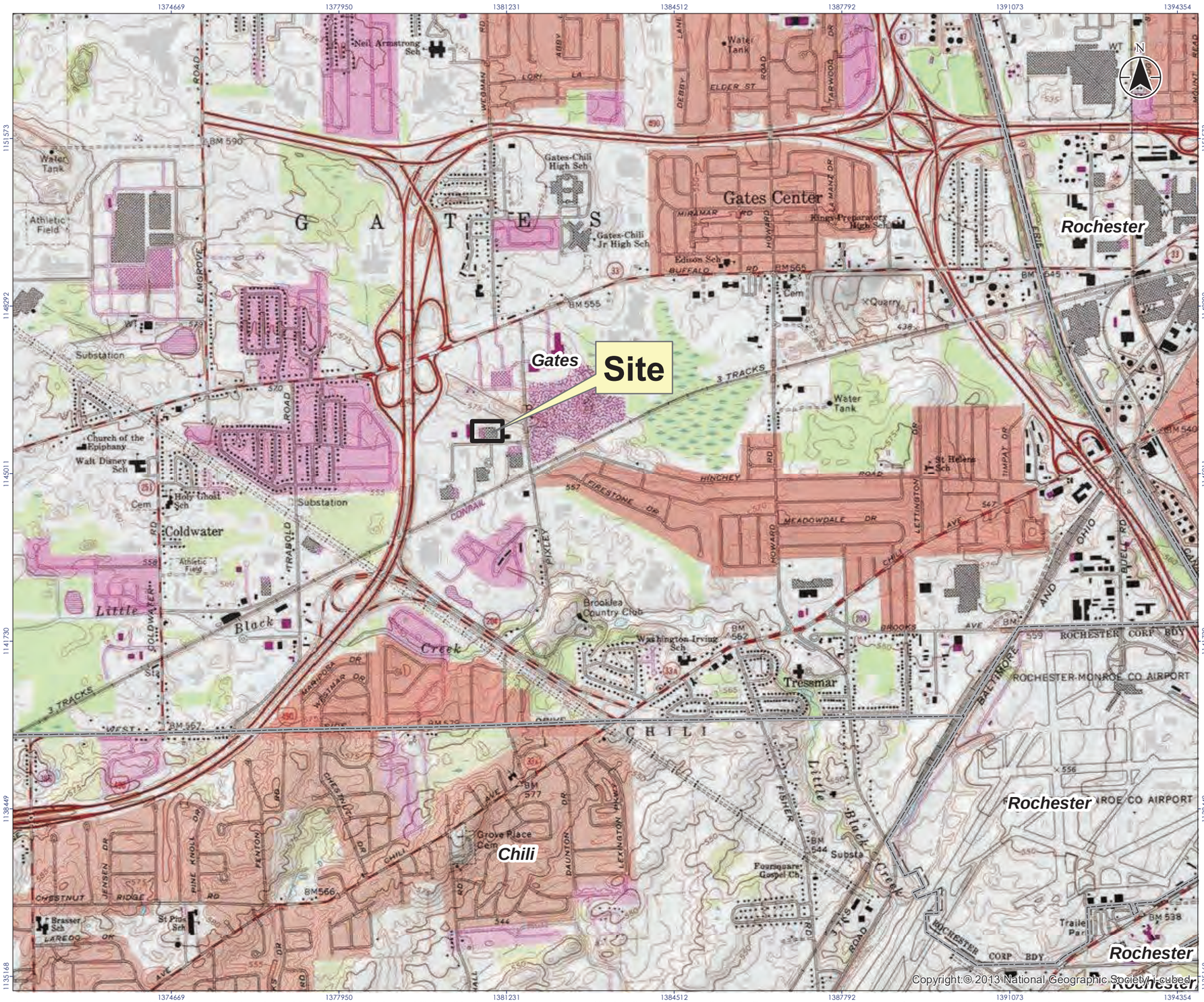
Stantec Consulting Services Inc., Revised June 2016. Interim Remedial Measure Site Management Plan, Brownfield Cleanup Program Site #C828101, Former Alliance Metal Stamping & Fabrication Facility, 12 Pixley Industrial Parkway, Town of Gates, Monroe County, New York.

Stantec Consulting Services Inc., June 2019. IRM Work Plan, Brownfield Cleanup Program Site #C828101, Former Alliance Metal Stamping & Fabrication Facility, 12 Pixley Industrial Parkway, Town of Gates, Monroe County, New York.

Stantec Consulting Services Inc., August, 2020. Health & Safety Plan, Site Management Activities, Former Alliance Metal Stamping & Fabrication Facility, 12 Pixley Industrial Parkway, Town of Gates, Monroe County, New York, NYSDEC Site Number C828101. (The HASP is presented in Appendix E of the SMP referenced below.)

Stantec Consulting Services Inc., September 2021. Interim Remedial Measures / Alternatives Analysis Report, Brownfield Cleanup Program Site #C828101, Former Alliance Metal Stamping & Fabrication Facility, 12 Pixley Industrial Parkway, Town of Gates, Monroe County, New York.

Stantec Consulting Services Inc., October 2021. Site Management Plan, Former Alliance Metal Stamping & Fabrication Facility, 12 Pixley Industrial Parkway, Town of Gates, Monroe County, New York, NYSDEC Site Number C828101.

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Notes

1. Coordinate System: NAD 1983 StatePlane New York West FIPS 3103 Feet
2. USGS Map Source :This map presents land cover imagery for the world and detailed topographic maps for the United States. The map includes the National Park Service (NPS) Natural Earth physical map at 1.24km per pixel for the world at small scales, i-cubed eTOPO 1:250,000-scale maps for the contiguous United States at medium scales, and National Geographic TOPO! 1:100,000 and 1:24,000-scale maps (1:250,000 and 1:63,000 in Alaska) for the United States at large scales. The TOPO! maps are seamless, scanned images of United States Geological Survey (USGS) paper topographic maps. For more information on this map, including terms of use, visit online at http://goto.arcgisonline.com/maps/USA_Topo_Maps


Project Location:
12 Pixley Industrial Parkway
Town of Gates, NY

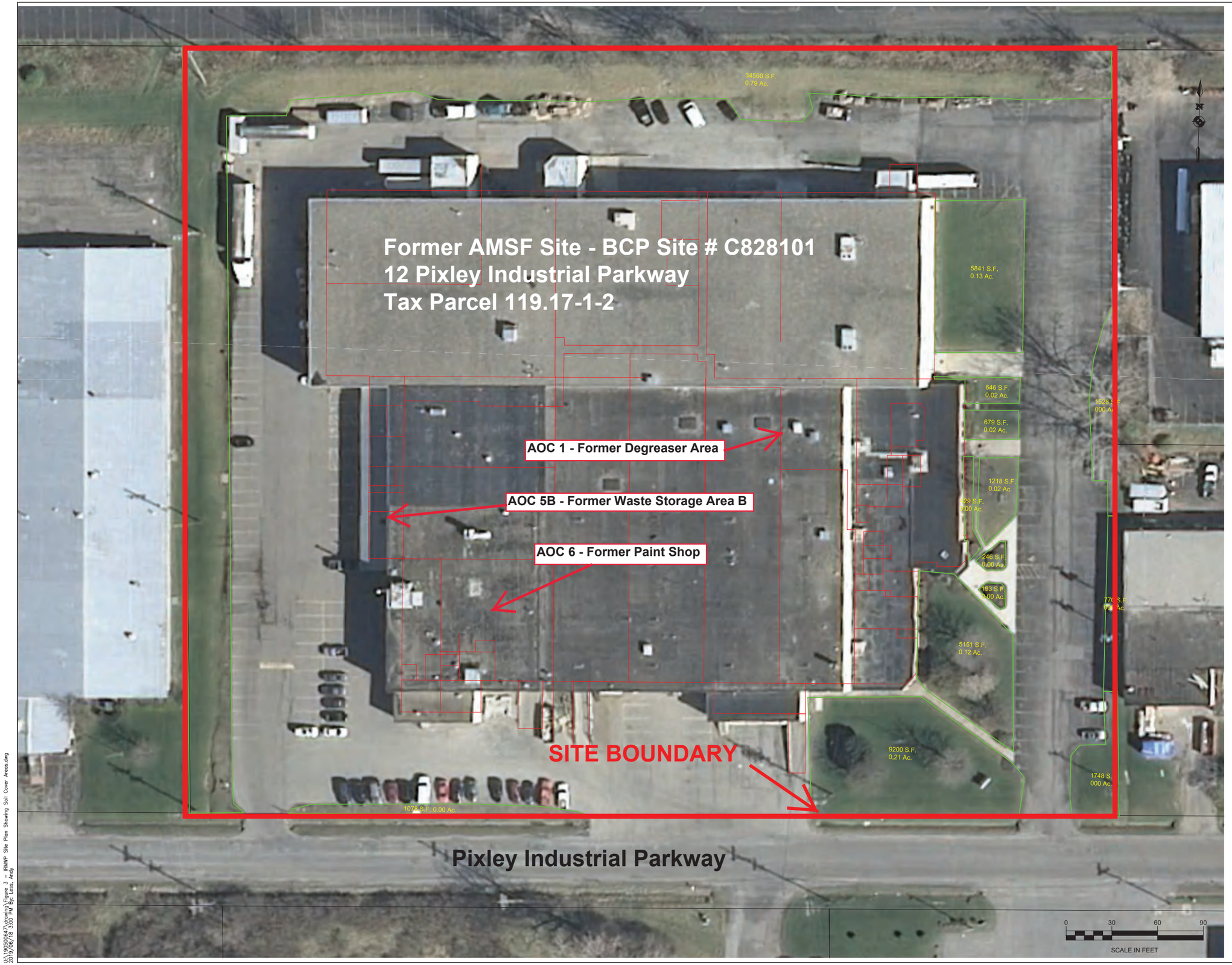
Prepared by AL on 2017-07-17
Technical Review by TW on 2017-07-17
Independent Review by MPS on 2017-07-17

190500647

Client/Project
Former Alliance Metal Stamping and Fabrication Facility
Brownfield Cleanup Program Site #C828101

Figure No.
1

Title
Site Location Map




U:\190500647\drawing\Figure 3 - IRMWP Site Plan Showing Soil Cover Areas.dwg
2019/06/18 3:00 PM By: Lees, Andy

ORIGINAL SHEET – ANSI D

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Legend

AREAS OF SOIL COVER
SF – SQUARE FEET
AC. – ACRES

Notes

| Revision | By | Appd. | YY.MM.DD |
|---|---|---|---|
| | | | |
| RI Report | TW | MPS | 2014.10 |
| Issued | By | Appd. | YY.MM.DD |
| File Name: | APL | TW | TW | 2014.10 |
| | Dwn. | Chkd. | Dsgn. | YY.MM.DD |

Permit-Seal

Client/Project

FORMER ALLIANCE METAL STAMPING & FABRICATION FACILTY
BROWNFIELD CLEANUP PROGRAM SITE # C828101

12 PIXLEY INDUSTRIAL PARKWAY, GATES, NY

Title

**SITE LAYOUT MAP**

| Project No. | Scale | |
|---|---|---|
| 190500647 | AS SHOWN | |
| Drawing No. | Sheet | Revision |
| FIG. 2 | of | |

# Appendix A RECORD DRAWINGS

- ENV-000 – General Notes and Table of Contents
- ENV-100 – Sub-Slab Depressurization System Coverage Plan
- ENV-101 – Sub-Slab Depressurization System Discharge and Exhaust Locations
- ENV-500 – Sub-Slab Depressurization System Interior Details
- ENV-501 – Sub-Slab Depressurization System Exterior Details
- ENV-502– Sub-Slab Depressurization System Monitoring Panel Details (Sheet 1 of 2)
- ENV-503 – Sub-Slab Depressurization System Monitoring Panel Details (Sheet 2 of 2)

GENERAL NOTES

1. THERE HAS NOT BEEN A FORMAL SURVEY/INVENTORY OF SUB-SLAB UTILITIES/PIPING/CONDUIT. CONTRACTOR'S SCOPE AND BUDGET SHALL INCLUDE NECESSARY PROVISIONS TO PERFORM UTILITY LOCATING PRIOR TO ANY PENETRATIONS OF THE CONCRETE SLAB. ANY CONDUIT/PIPE/UTILITY REPAIR WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
2. THE CONFIGURATION OF THE BUILDING'S FOOTERS FOR INTERIOR OR EXTERIOR COLUMNS HAS NOT BEEN INVESTIGATED. PROPOSED SUCTION CAVITY CONSTRUCTIONS ARE PROVIDED FOR SEVERAL FOOTER CONFIGURATIONS. CONTRACTOR TO CONFIRM THE CONSTRUCTION OF EACH SUCTION CAVITY WITH THE ENGINEER BASED ON FIELD INVESTIGATION PERFORMED BY THE CONTRACTOR.
3. ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE CODES AND REGULATIONS, AS WELL AS THE INTERIM REMEDIAL WORK PLAN APPROVED BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) AND NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH).
4. ALL WORK SHALL BE DONE IN PROPER SEQUENTIAL PHASES. ALL STAGES OF WORK RELATED TO THE SUB-SLAB DEPRESSURIZATION SYSTEM SHALL BE INSPECTED AND APPROVED BY THE ENGINEER. CHANGES TO DRAWINGS AND SPECIFICATIONS RELATED TO THE SUB-SLAB DEPRESSURIZATION SYSTEM SHALL BE APPROVED BY THE ENGINEER BEFORE BEING IMPLEMENTED. NO SUB-SLAB DEPRESSURIZATION SYSTEM PIPING SHALL BE COVERED BEFORE INSPECTION AND APPROVAL IS GIVEN BY THE ENGINEER.
5. ALL SSDS COMPONENT LOCATIONS ON DRAWINGS ARE APPROXIMATE AND THEIR LOCATIONS MUST BE CONFIRMED IN THE FIELD PRIOR TO ANY WORK ON THE SSDS INSTALLATION.
6. FOR EACH COMMON PVC PIPE HEADER LEADING TO AN EXHAUST FAN, SUPPLY AND INSTALL ONE BRASS NIPPLE THREADED WITH TEFLON TAPE THAT CONNECTS ¼" I.D. POLYETHYLENE (PE) TUBING TO BE USED FOR PRESSURE MONITORING OF THE EXHAUST FANS. THE PE TUBING CONNECTS TO A DWYER MAGNEHELIC MANOMETER (WITH A MINIMUM OPERATING TEMPERATURE RANGE OF -20ºF TO 130ºF) AND LOW-PRESSURE SWITCH MOUNTED INSIDE MANOMETER/WARNING LIGHT BOXES. SEE ELECTRICAL DRAWINGS FOR LOCATIONS OF MONITORING PANELS. REFER TO THE CONTRACT DRAWING FOR FURTHER DETAILS.
7. LOW-PRESSURE SWITCHES SHALL BE RADONAWAY CHECKPOINT IIA MITIGATION SYSTEM ALARM, WITH AUDIBLE ALARM, GREEN AND RED LED LIGHTS, FACTORY PRESET TO ACTIVATE AT 0.25 INCHES OF WATER COLUMN.
8. EACH VERTICAL SUCTION CAVITY RISER SHALL HAVE A BALL VALVE INSTALLED. REFER TO THE CONTRACT DRAWINGS FOR MOUNTING HEIGHT ABOVE FINISHED FLOOR. BALL VALVES SHALL BE INSTALLED IN THE CLOSED POSITION IF THE END OF THE PIPE DOES NOT TERMINATE TO THE EXTERIOR OF THE BUILDING TO MINIMIZE THE POTENTIAL FOR CREATING A NEW VAPOR INTRUSION PATHWAY.
9. ALL POLYVINYL CHLORIDE (PVC) PIPING SHALL BE SOLID WALL, PRESSURE RATED PIPING, MEETING THE REQUIREMENTS OF ASTM D 2241, ASTM D 1785 OR ASTM F 480. ALL PVC PIPING IS SUBJECT TO FINAL APPROVAL BY THE ENGINEER.
10. CLEAN, WASHED GRAVEL FOR SUCTION CAVITIES, SHALL BE SUPPLIED AND MAINTAINED FREE OF CONTAMINANTS, SAND, SILT, CLAY OR OTHER FINE MATERIALS OR DEBRIS. PROPOSED MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER.
11. ANY SLAB PENETRATION THAT WILL NOT IMMEDIATELY BE SEALED TO BE VAPOR TIGHT SHALL BE COVERED AT MINIMUM WITH A RIGID PLASTIC COVER THAT IS URETHANE CAULKED TO THE FLOOR.
12. CONTRACTOR TO PROVIDE NOTICE OF ANY PLANNED SUB-SLAB PENETRATION WORK A MINIMUM OF 48 HOURS IN ADVANCE TO THE ENGINEER TO ALLOW THE ENGINEER TO COORDINATE ANY NECESSARY MONITORING EQUIPMENT.
13. CONTRACTOR SHALL HAVE NEW ACTIVATED CARBON FILTERS ON-SITE IN THE EVENT THAT EXHAUST TUBING FOR USE DURING DRILLING OF SUCTION CAVITIES IS UNABLE TO REACH AN EXTERIOR DISCHARGE POINT.
14. SEAL ALL PENETRATIONS THROUGH THE CONCRETE SLAB IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND MANUFACTURER'S SPECIFICATIONS. CONCRETE MIX USED SHALL HAVE A COMPRESSIVE STRENGTH OF 5,000 PSI AFTER 28 DAYS.
15. ALL PIPING SHALL MAINTAIN A MINIMUM OF 1% SLOPE DRAINING TOWARDS SUCTION CAVITIES (REFER TO THE CONTRACT DRAWINGS) TO ENSURE THAT CONDENSATE FLOWS DOWN THE RISERS TO THE SUBSURFACE.
16. ALL PVC CONSTRUCTION SHALL BE AIRTIGHT AND GLUED WITH APPROPRIATE ADHESIVES.
17. ROOF PENETRATIONS AND SEALS SHALL BE PERFORMED BY THE ROOFING CONTRACTOR WHO INSTALLED THE ROOF TO NOT VOID THE ROOF WARRANTY. CONTRACTOR TO MARK LOCATIONS OF PLANNED ROOF PENETRATIONS AND COORDINATE TIMING OF THOSE PENETRATIONS WITH THE ROOFING CONTRACTOR WHO WILL BE ENGAGED BY THE OWNER.

GENERAL NOTES (CONT,)

18. CLEARLY LABEL ALL COMPONENTS OF THE SUB-SLAB DEPRESSURIZATION SYSTEM ABOVE THE FLOOR SLAB AT 20-FOOT INTERVALS WITH THE FOLLOWING MESSAGE: "THIS IS A COMPONENT OF A SUB-SLAB DEPRESSURIZATION SYSTEM. DO NOT ALTER OR DISCONNECT." ALSO LABEL EACH VERTICAL SUCTION CAVITY RISER AT AN ELEVATION OF 4 FEET ABOVE FINISHED FLOOR.
19. USE SCHEDULE 80 PVC PIPE AND FITTINGS FOR ALL SSDS COMPONENTS LOCATED ON THE EXTERIOR OF THE BUILDING.
20. PROVIDE AND INSTALL RADONAWAY OR FANTECH IN-LINE FANS AS PER MANUFACTURER'S SPECIFICATIONS AND AS SHOWN ON THE CONTRACT DRAWINGS. INSTALL FANS WITH AIRTIGHT AND EASILY REMOVABLE COUPLINGS FOR EASE OF REPAIR, REPLACEMENT OR UPGRADE.
21. CLEARLY LABEL ALL EXHAUST FANS WITH THE PROPER ID (I.E. FAN #1, FAN #2, FAN #3, AND FAN #4).
22. RESERVED
23. RESERVED
24. ALL SUB-SLAB DEPRESSURIZATION SYSTEM ROOFTOP EXHAUST STACKS TERMINATIONS SHALL BE LOCATED A MINIMUM OF 25 HORIZONTAL FEET FROM AIR INTAKES OR BUILDING OPENINGS AND 10 HORIZONTAL FEET FROM ROOF EDGES.
25. INSTALL SCHEDULE 80 PVC RAIN CAP WITH GALVANIZED MESH TO PREVENT FOREIGN OBJECTS FROM ENTERING THE EXHAUST STACK.
26. CONTRACTOR SHALL CONTAINERIZE ALL CONSTRUCTION WATER GENERATED OR ENCOUNTERED (I.E. GROUNDWATER, WET CORING) IN 55-GALLON DOT APPROVED DRUMS. DRUMS SHALL BE STORED ON-SITE IN A LOCATION APPROVED BY THE ENGINEER AND THE OWNER.
27. CONTRACTOR SHALL CONTAINERIZE ALL CONCRETE CUTTINGS, SOIL CUTTINGS AND AGGREGATE CUTTINGS IN 55-GALLON DOT APPROVED DRUMS. DRUMS SHALL BE STORED ON-SITE IN A LOCATION APPROVED BY THE ENGINEER AND THE OWNER.
28. A REPRESENTATIVE OF THE ENGIINEER MUST BE ON-SITE AT ALL TIMES WHILE THE CONTRACTOR IS PERFORMING WORK.
29. CONTRACTOR TO FOLLOW APPROVED DUST CONTROL MEASURES.

HAZARDOUS MATERIALS

30. RESERVED
31. THE ENGINEER RESERVES THE RIGHT TO STOP WORK IF MATERIALS ARE ENCOUNTERED THAT HAVE THE POTENTIAL TO BE HAZARDOUS AND ARE DETERMINED TO REQUIRE FURTHER ANALYTICAL TESTING.
32. THE CONTRACTOR SHALL HAVE ALL WORKERS ON-SITE WITH 40-HOUR OSHA HAZWOPER TRAINING.
33. A HAZARDOUS MATERIALS SURVEY OF THE BUILDING MATERIALS (E.G. ASBESTOS, PCB CAULKS, LEAD BASED PAINTS), HAS NOT BEEN PERFORMED. THE POTENTIAL EXISTS FOR THESE HAZARDS TO BE ON-SITE. THE CONTRACTOR IS RESPONSIBLE FOR CONDUCTING THE WORK UNDER THEIR OWN HEALTH AND SAFETY PLAN PER OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REQUIREMENTS AND PER THE SITE-SPECIFIC SAFETY REQUIREMENTS.

ELECTRIC, GENERAL

34. ALL FAN BREAKERS SHOULD BE LABELED AS "SSDS FAN NO. __" ON THE PANELBOARD SCHEDULE.

TABLE OF CONTENTS

1) RECORD DRAWINGS



NOTES FOR RECORD DRAWING:

TO PREPARE THE RECORD DRAWING VERSION OF THIS SHEET, THE FOLLOWING CHANGES WERE MADE TO THE CONSTRUCTION DRAWING VERSION OF ENV-000:

1. SHEET NOS. ENV-504 AND ENV-505 WERE REMOVED FROM THE TABLE OF CONTENTS. THE SSDS MONITORING PANEL DETAILS PRESENTED ON THOSE TWO SHEETS WERE CONSOLIDATED ON TO ENV-502 AND ENV-503 FOR THE RECORD DRAWING SET.
2. INTERIM REMEDIAL MEASURE WORK PLAN DOCUMENTS WERE REMOVED FROM THE TABLE OF CONTENTS BECAUSE THOSE DOCUMENTS WERE NOT INCLUDED IN THE RECORD DRAWING SET.


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|---|---|---|---|
| RECORD DRAWING FOR CCR | TW | DH | 2020.08 |
| ISSUED FOR AGENCY REVIEW | MB/AK | DH | 2019.03 |
| Issued | By | Appd. | YY.MM.DD |
| File Name: | APL Dwn. | DH Chkd. | MB/AK Dsgn. | 2019.03 YY.MM.DD |

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Client/Project

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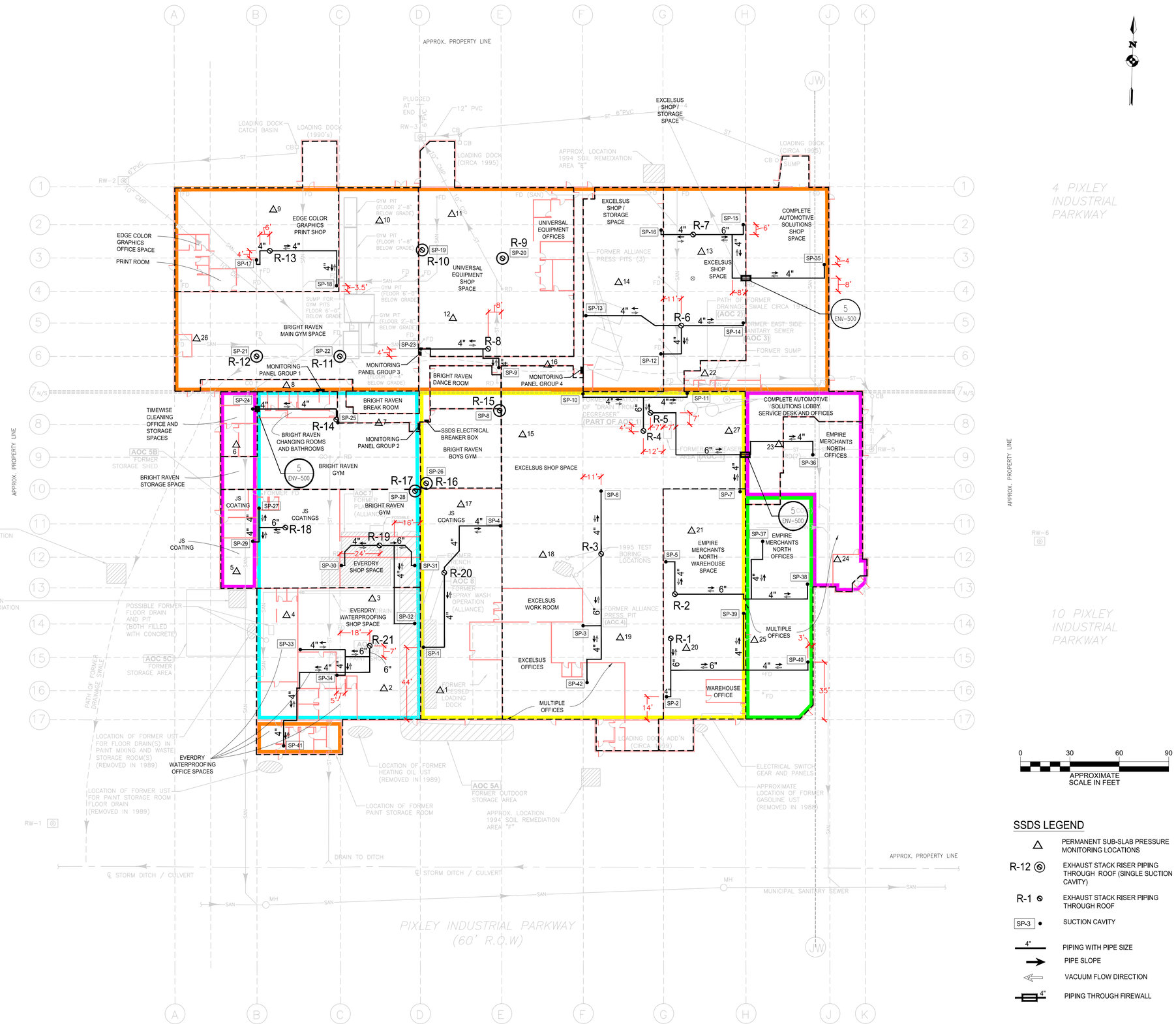
BROWNFIELD CLEANUP PROGRAM SITE # C828101
12 PIXLEY INDUSTRIAL PARKWAY, GATES, NY

SSDS RECORD DRAWINGS

Title

GENERAL NOTES AND TABLE OF CONTENTS

| Project No. | Scale | |
|---|---|---|
| 190500647 | NONE | |
| Drawing No. | Sheet | Revision |
| ENV-000 | 1 of 7 | 1 |




## SSDS LEGEND

- △ PERMANENT SUB-SLAB PRESSURE MONITORING LOCATIONS
- R-12 ◎ EXHAUST STACK RISER PIPING THROUGH ROOF (SINGLE SUCTION CAVITY)
- R-1 ◎ EXHAUST STACK RISER PIPING THROUGH ROOF
- SP-3 • SUCTION CAVITY
- 4" PIPING WITH PIPE SIZE
- → PIPE SLOPE
- VACUUM FLOW DIRECTION
- 4" PIPING THROUGH FIREWALL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TENANT SPACE OUTLINE (AS OF JULY 2020)

INTERIOR WALL (GENERALLY LESS THAN FULL HEIGHT IF SHOWN WITHOUT OVER-PRINTED DASHED LINE). NOT ALL INTERIOR WALLS ARE SHOWN.

FD FLOOR DRAIN
RD ROOF DRAIN PIPE UP
CB CATCH BASIN
SAN SANITARY SEWER
ST STORM SEWER
RW RECHARGE WELL
CO CLEAN OUT
MH MANHOLE

FOUNDATION WALL / GRADE BEAM/ FOOTER OUTLINES

- ORIGINAL MFG BUILDING
- ORIGINAL ADMIN BUILDING
- WEST ADDITION (1975)
- NORTH ADDITION (1979) AND PAINT STORAGE ADDITION (1979)
- OFFICE ADDITION (1988) AND STORAGE SHED ADDITION (1988)

Notes

1. The building floor plan shown on this drawing was drawn based on the floor plan shown on the following drawing: "Series: Tenant Layout, Floor: First, Title: Floor Plan, No.: TP-1", prepared by Miller Anderson Architects, Rochester, NY, date May 1999, issued 5-24-99.

2. Locations of floor drains, roof drains, catch basins and recharge wells were taken from various historic site plans (see separate *Summary of Available Building Plans* prepared by Stantec dated 4/19/12) and then field checked by Stantec personnel on 3/20/12 to confirm that they were present. Additional floor drains, roof drains, catch basins and recharge wells not shown on historic plans or drawings but noted during the field check are also shown. All locations are approximate. Interior tenant walls my have been revised.

3. Locations shown for underground sanitary sewer ('SAN') and storm sewer ('ST') lines and foundation features were taken from various historic site plans (see separate *Summary of Available Building Plans* prepared by Stantec dated 4/19/12). These features have not been field verified.

| Revision | By | Appd. | YY.MM.DD |
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| RECORD DRAWING FOR CCR | TW | DH | 2020.08 |
| ISSUED FOR AGENCY REVIEW | MB/AK | DH | 2019.03 |

| Issued | By | Appd. | YY.MM.DD |
|---|---|---|---|
| File Name: | APL | DH | 2019.03 |
| | Dwn. | Chkd. | Dsgn. |

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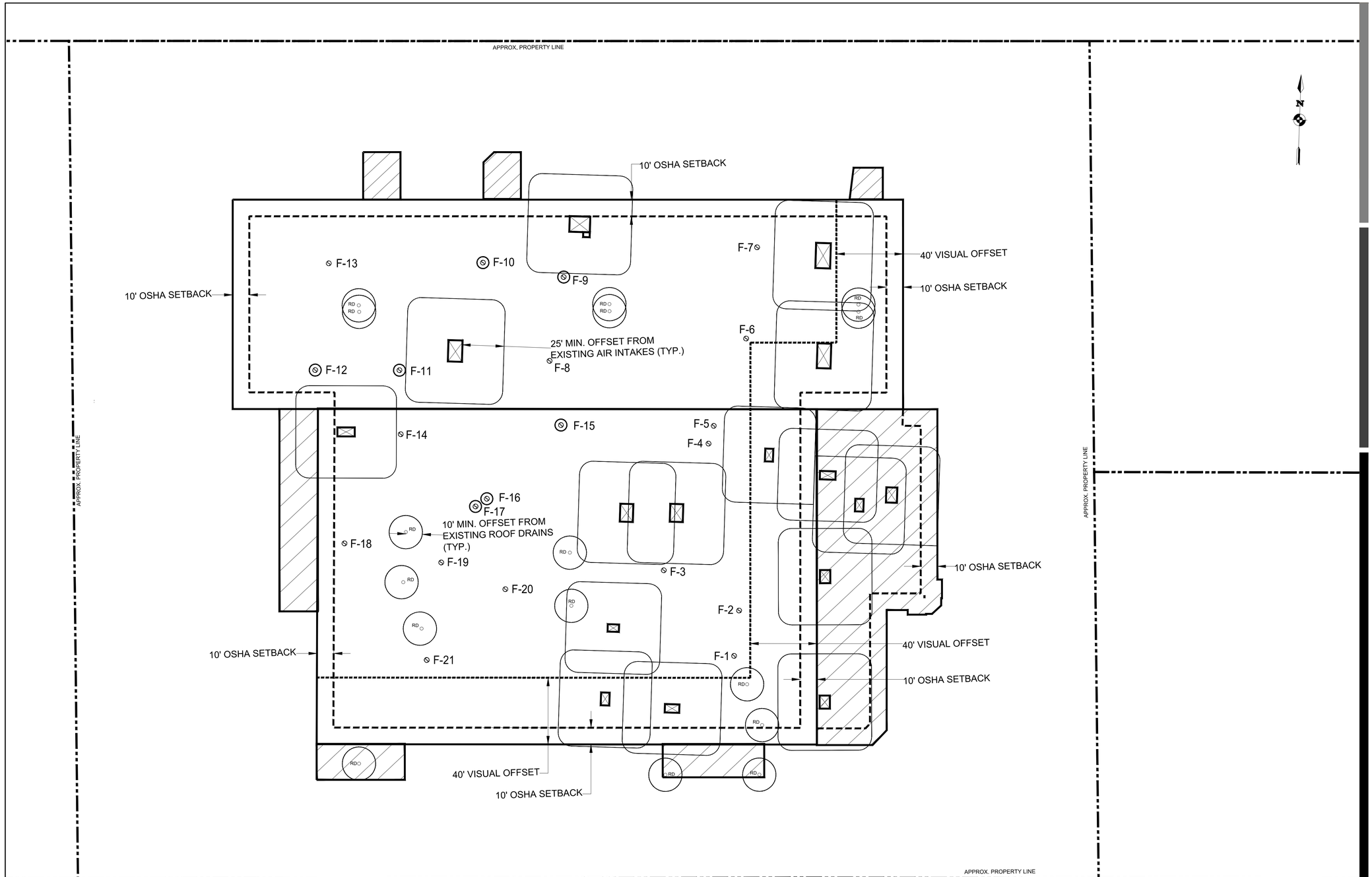
12 PIXLEY INDUSTRIAL PARKWAY, GATES, NY

SSDS RECORD DRAWINGS

Title

SUB-SLAB DEPRESSURIZATION SYSTEM COVERAGE PLAN

| Project No. | Scale | |
|---|---|---|
| 190500647 | As Shown | |
| Drawing No. | Sheet | Revision |
| ENV-100 | 2 of 7 | 1 |

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2020/08/07 1:42 PM By: Less, Andy


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- AIR INTAKE STRUCTURE
- LOWER ELEVATION ROOF
- AIR INTAKE BUFFER (AREA WITHIN 25 FEET OF OF AIR INTAKE EQUIPMENT)
- 40 FOOT VISUAL OFFSET
- OSHA FALL PROTECTION BOUNDARY (10 FOOT OFFSET FROM BUILDING EDGE)
- F-1 FAN/RISER DISCHARGE LOCATION WITH DESIGNATION FROM MULTIPLE SUCTION CAVITY POINTS
- F-11 FAN/RISER DISCHARGE LOCATION WITH DESIGNATION FROM SINGLE SUCTION CAVITY POINT
- RD EXISTING ROOF DRAIN WITH 10 FOOT OFFSET

Notes

1. The building floor plan shown on this drawing was drawn based on the floor plan shown on the following drawing: "Series: Tenant Layout, Floor: First, Title: Floor Plan, No.: TP-1", prepared by Miller Anderson Architects, Rochester, NY, date May 1999, issued 5-24-99.

2. Locations of floor drains, roof drains, catch basins and recharge wells were taken from various historic site plans (see separate *Summary of Available Building Plans* prepared by Stantec dated 4/19/12) and then field checked by Stantec personnel on 3/20/12 to confirm that they were present. Additional floor drains, roof drains, catch basins and recharge wells not shown on historic plans or drawings but noted during the field check are also shown. All locations are approximate.

3. Locations of air intakes are approximate and based on publicly available aerial imagery. Contractor to field verify SSDS discharge locations are a minimum of 25 horizontal feet away from any air intakes.

| Revision | By | Appd. | YY.MM.DD |
|---|---|---|---|
| RECORD DRAWING FOR CCR | TW | DH | 2020.08 |
| ISSUED FOR AGENCY REVIEW | MB/AK | DH | 2019.03 |

Issued

| | By | Appd. | YY.MM.DD |
|---|---|---|---|
| File Name: | APL Dwn. | DH Chkd. | MB/AK Dsgn. 2019.03 YY.MM.DD |

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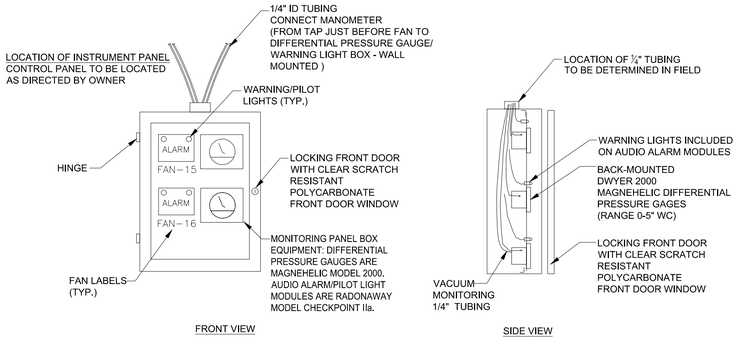
BROWNFIELD CLEANUP PROGRAM SITE # C828101
12 PIXLEY INDUSTRIAL PARKWAY, GATES, NY

SSDS RECORD DRAWINGS

Title

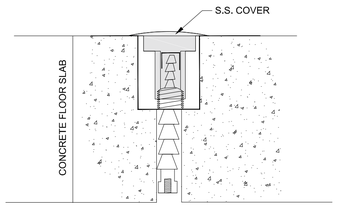
SUB-SLAB DEPRESSURIZATION SYSTEM DISCHARGE AND EXHAUST LOCATIONS ROOF PLAN

| Project No. | Scale | |
|---|---|---|
| 190500647 | As Shown | |
| Drawing No. | Sheet | Revision |
| ENV-101 | 3 of 7 | 1 |

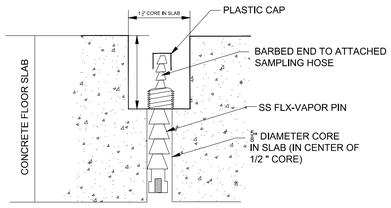



NOTE :
1) ¼" TUBING NOT TO BE RUN THROUGH DUCT WORK
2) APPROVED MANUFACTURERS : ATTABOX OR APPROVED EQUAL

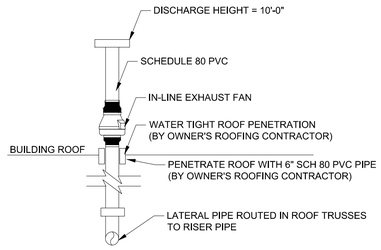
1 ENV-500 TYPICAL WALL-MOUNTED INSTRUMENT PANEL INSTALLATION DETAIL
NO SCALE



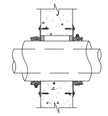

2 ENV-500 SUB-SLAB VACUUM MONITORING PIN COVER DETAIL
NOT TO SCALE



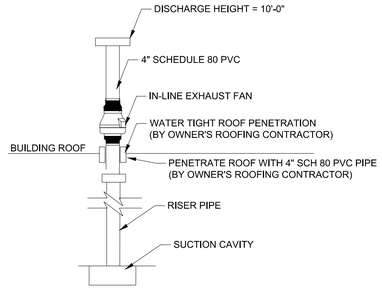

3 ENV-500 SUB-SLAB VACUUM MONITORING PIN
NOT TO SCALE



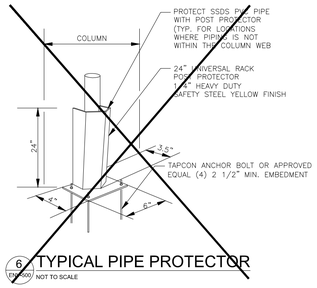

4A ENV-500 TYPICAL VERTICAL RISER SECTION FOR MULTIPLE SUCTION CAVITIES
NOT TO SCALE




5 ENV-500 TYPICAL WALL PENETRATION FIRE STOP
NOT TO SCALE

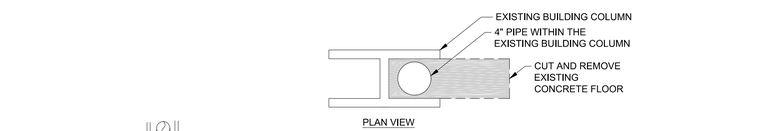


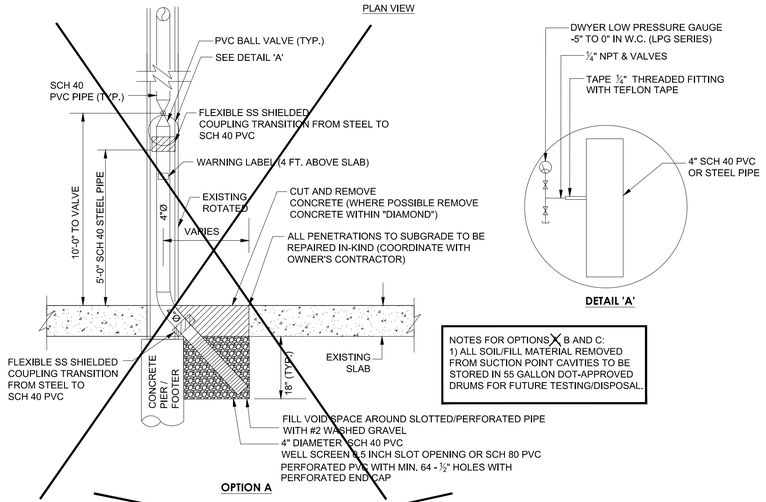

4B ENV-500 TYPICAL VERTICAL RISER SECTION FOR SINGLE SUCTION CAVITY
NOT TO SCALE




6 ENV-500 TYPICAL PIPE PROTECTOR
NOT TO SCALE

(PIPE PROTECTORS NOT NEEDED, STEEL PIPING USED BELOW A HEIGHT OF 8' AT UNPROTECTED LOCATIONS)



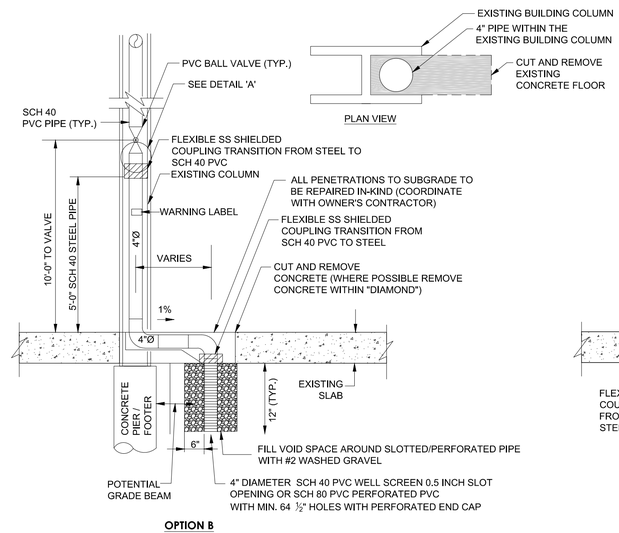




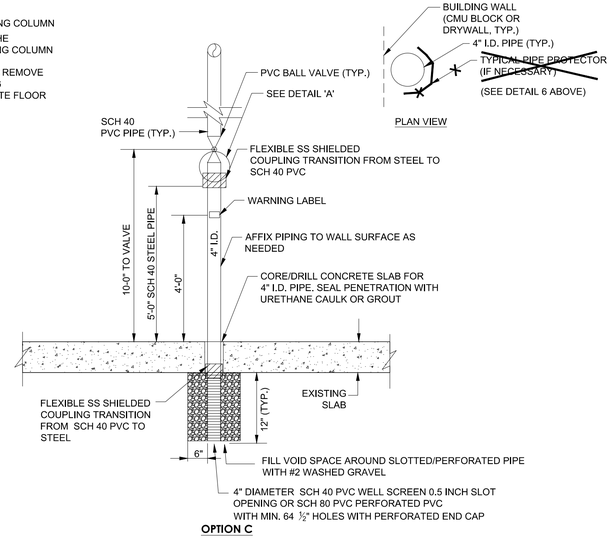
NOTES FOR OPTIONS A, B AND C:
1) ALL SOIL/FILL MATERIAL REMOVED FROM SUCTION POINT CAVITIES TO BE STORED IN 55 GALLON DOT-APPROVED DRUMS FOR FUTURE TESTING/DISPOSAL.

7 ENV-500 TYPICAL COLUMN MOUNTED SUCTION POINT INSTALLATION SECTION
NOT TO SCALE

(NOT TYPICAL OF COLUMN FOOTER LOCATIONS AT SITE)




8 ENV-500 TYPICAL COLUMN MOUNTED VERTICAL SUCTION POINT INSTALLATION SECTION
NOT TO SCALE




9 ENV-500 TYPICAL VERTICAL SUCTION POINT INSTALLATION SECTION (NOT ON A COLUMN)
NOT TO SCALE

Stantec
61 Commercial Street
Rochester , NY
14614
Tel. 585-475-1440
Fax. 585-272-1814
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Legend

Notes

| Revision | By | Appd. | YY.MM.DD |
|---|---|---|---|
| RECORD DRAWING FOR CCR | TW | DH | 2020.08 |
| ISSUED FOR AGENCY REVIEW | MB | DH | 2019.02.22 |
| Issued | By | Appd. | YY.MM.DD |
| File Name: | APL Dwn. | DH Chkd. | MB Dsgn. | 2019.02.22 YY.MM.DD |

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Client/Project

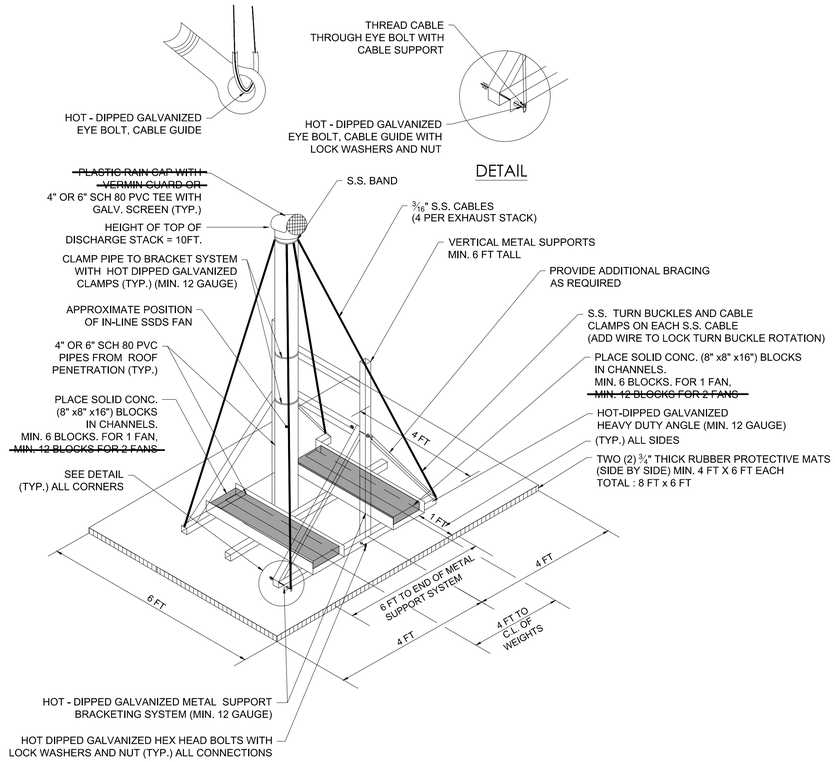
FORMER ALLIANCE METAL STAMPING & FABRICATION FACILTY
BROWNFIELD CLEANUP PROGRAM SITE # C828101
12 PIXLEY INDUSTRIAL PARKWAY, GATES, NY

SSDS RECORD DRAWINGS

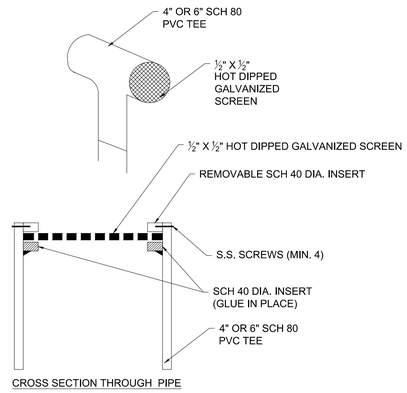
Title

SUB-SLAB DEPRESSURIZATION SYSTEM INTERIOR DETAILS

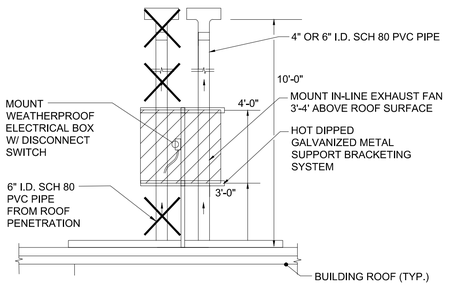
| Project No. | Scale | |
|---|---|---|
| 190500647 | AS SHOWN | |
| Drawing No. | Sheet | Revision |
| ENV-500 | 4 of 7 | 1 |




1 ENV-501 SSDS ROOF EXHAUST STACK SUPPORT SYSTEM (TYP.)
NO SCALE




2 ENV-501 RAIN CAP SCREEN DETAIL
NO SCALE




3 ENV-501 SSDS DOUBLE STACK ROOF EXHAUST STACK
NO SCALE

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Notes

| Revision | By | Appd. | YY.MM.DD |
|---|---|---|---|
| RECORD DRAWING FOR CCR | TW | DH | 2020.08 |
| ISSUED FOR AGENCY REVIEW | MB/AK | DH | 2019.03 |
| Issued | By | Appd. | YY.MM.DD |
| File Name: | APL Dwn. | DH Chkd. | MB/AK Dsgn. | 2019.03 YY.MM.DD |

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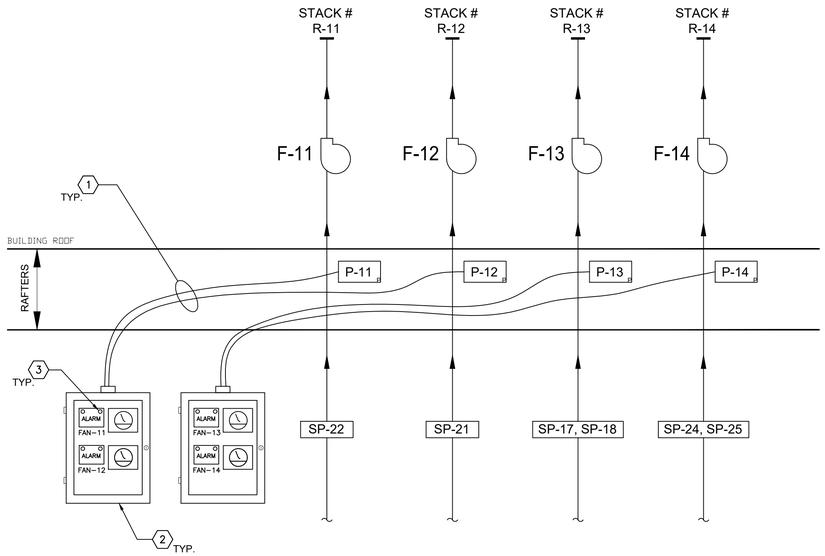
SSDS RECORD DRAWINGS

Title

SUB-SLAB DEPRESSURIZATION SYSTEM EXTERIOR DETAILS

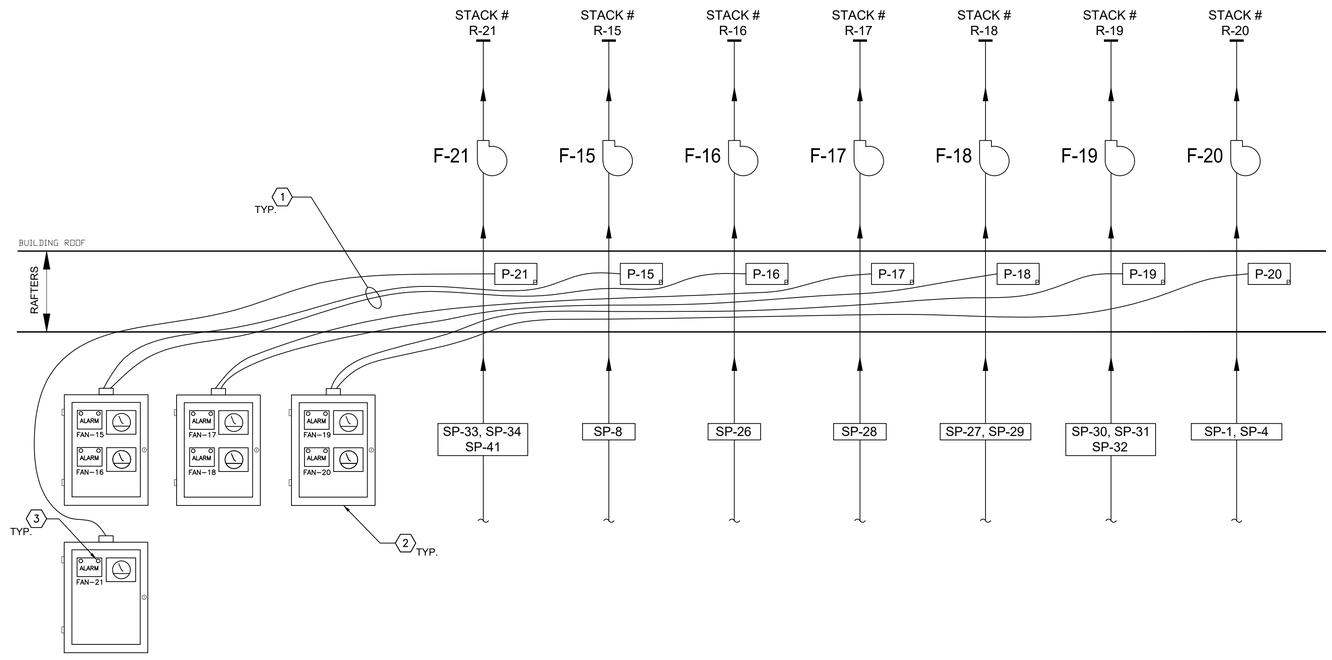
| Project No. | Scale | |
|---|---|---|
| 190500647 | AS SHOWN | |
| Drawing No. | Sheet | Revision |
| ENV-501 | 5 of 7 | 1 |




## MONITORING PANEL GROUP 1

NO SCALE

LOCATION: HALLWAY BETWEEN COLUMNS B-7 AND C-7




## MONITORING PANEL GROUP 2

NO SCALE

LOCATION: HALLWAY ALCOVE AT COLUMN D-8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F-5 IN-LINE EXHAUST FAN

P-01 POINT OF MEASUREMENT FOR THE DIFFERENTIAL PRESSURE GAUGE (MOUNTED INSIDE DIFFERENTIAL PRESSURE GAUGE/WARNING LIGHT BOX)

SP-22 SUB-SLABSUCTION CAVITY

AIR FLOW

Notes

1. ALL EXHAUST FANS ARE RADONAWAY MODEL RP265 EXCEPT FANS F-18 AND F-20 WHICH ARE RADONAWAY MODEL GX5.
2. MONITORING PANEL BOX EQUIPMENT: DIFFERENTIAL PRESSURE GAUGES ARE MAGNEHELIC MODEL 2000. AUDIO ALARM/PILOT LIGHT MODULES ARE RADONAWAY MODEL CHECKPOINT IIa.
3. ¼" TUBING IS EATON SYNFLEX 1219FR.
4. REFER TO ENV-100 FOR PLAN SHOWING LOCATIONS OF MONITORING PANEL GROUPS 1 TO 4, EXHAUST STACKS R-1 TO R-21, AND SUCTION CAVITIES SP-1 TO SP-42.

KEYED NOTES:

1. 1/4" ID TUBING
2. TYPICAL WALL-MOUNTED INSTRUMENT PANEL INSTALLATION DETAIL
3. VACUUM PILOT LIGHT WITH AUDIO ALARM (MOUNTED INSIDE DIFFERENTIAL PRESSURE GAUGE/WARNING LIGHT BOX)

| Revision | By | Appd. | YY.MM.DD |
|---|---|---|---|
| RECORD DRAWING FOR CCR | TW | DH | 2020.08 |
| ISSUED FOR AGENCY REVIEW | MB/AK | DH | 2019.03 |

Issued

| | By | Appd. | YY.MM.DD |
|---|---|---|---|
| File Name: | APL Dwn. | DH Chkd. | MB/AK Dsgn. 2019.03 YY.MM.DD |

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ROBERT ALAN HARRINGER
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LICENSED PROFESSIONAL ENGINEER

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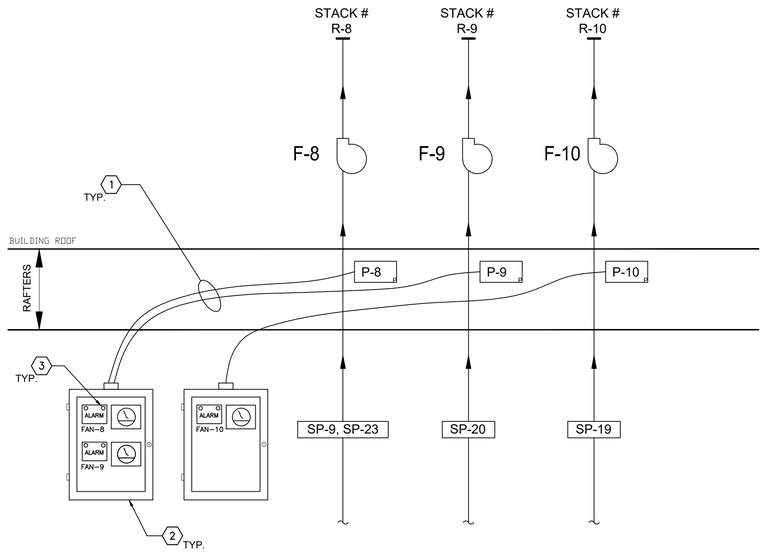
12 PIXLEY INDUSTRIAL PARKWAY, GATES, NY

SSDS RECORD DRAWINGS

Title

SUB-SLAB DEPRESSURIZATION SYSTEM MONITORING PANEL DETAILS (SHEET 1 OF 2)

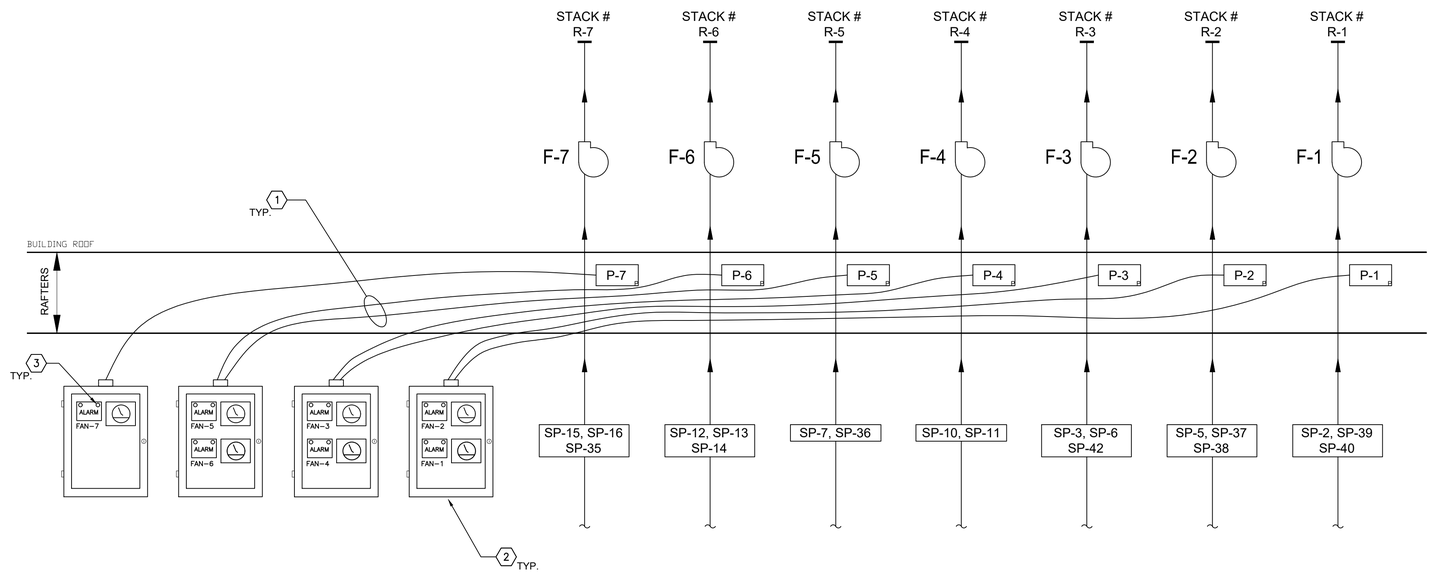
| Project No. | Scale | |
|---|---|---|
| 190500647 | AS SHOWN | |
| Drawing No. | Sheet | Revision |
| ENV-502 | 6 of 7 | 1 |




## MONITORING PANEL GROUP 3

NO SCALE

LOCATION: HALLWAY ALCOVE AT COLUMN D-6




## MONITORING PANEL GROUP 4

NO SCALE

LOCATION: HALLWAY ALCOVE BETWEEN COLUMNS F-6 AND F-7

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F-5 IN-LINE EXHAUST FAN

P-01 POINT OF MEASUREMENT FOR THE DIFFERENTIAL PRESSURE GAUGE (MOUNTED INSIDE DIFFERENTIAL PRESSURE GAUGE/WARNING LIGHT BOX)

SP-22 SUB-SLABSUCTION CAVITY

AIR FLOW

Notes

1. ALL EXHAUST FANS ARE RADONAWAY MODEL RP265 EXCEPT FANS F-18 AND F-20 WHICH ARE RADONAWAY MODEL GX5.
2. MONITORING PANEL BOX EQUIPMENT: DIFFERENTIAL PRESSURE GAUGES ARE MAGNEHELIC MODEL 2000. AUDIO ALARM/PILOT LIGHT MODULES ARE RADONAWAY MODEL CHECKPOINT IIa.
3. ¼" TUBING IS EATON SYNFLEX 1219FR.
4. REFER TO ENV-100 FOR PLAN SHOWING LOCATIONS OF MONITORING PANEL GROUPS 1 TO 4, EXHAUST STACKS R-1 TO R-21, AND SUCTION CAVITIES SP-1 TO SP-42.

KEYED NOTES:

1. 1/4" ID TUBING
2. TYPICAL WALL-MOUNTED INSTRUMENT PANEL INSTALLATION DETAIL
3. VACUUM PILOT LIGHT WITH AUDIO ALARM (MOUNTED INSIDE DIFFERENTIAL PRESSURE GAUGE/WARNING LIGHT BOX)

| Revision | By | Appd. | YY.MM.DD |
|---|---|---|---|
| RECORD DRAWING FOR CCR | TW | DH | 2020.08 |
| ISSUED FOR AGENCY REVIEW | MB/AK | DH | 2019.03 |

Issued

| | By | Appd. | YY.MM.DD |
|---|---|---|---|
| File Name: | APL | DH | MB/AK | 2019.03 |
| | Dwn. | Chkd. | Dsgn. | YY.MM.DD |

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12 PIXLEY INDUSTRIAL PARKWAY, GATES, NY

SSDS RECORD DRAWINGS

Title

SUB-SLAB DEPRESSURIZATION SYSTEM
MONITORING PANEL DETAILS (SHEET 2 OF 2)

| Project No. | Scale | |
|---|---|---|
| 190500647 | AS SHOWN | |
| Drawing No. | Sheet | Revision |
| ENV-503 | 7 of 7 | 1 |

# Appendix B PHOTOGRAPHS OF AND PRODUCT INFORMATION FOR SSDS COMPONENTS

- Photographic Log
- Product Sheets, Specifications, and Installation, Operating and Maintenance Instructions

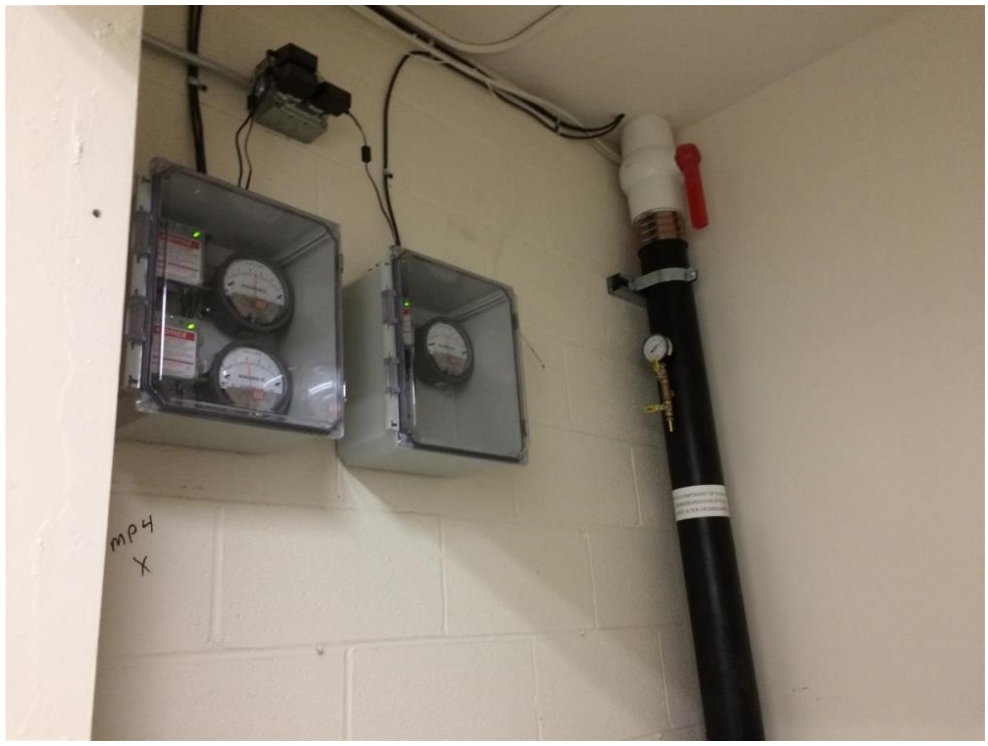
Stantec

# Photographic Log

| | | | |
|---|---|---|---|
| **Client:** | **Maguire Family Properties** | **Project:** | **Sub-Slab Depressurization System** |
| **Site Name:** | **Former Alliance BCP Site** | **Site Location:** | **12 Pixley Industrial Parkway, Gates, New York** |

| | |
|---|---|
| **Photograph ID:** 1<br>**Photo Location:** Backfilled suction cavity<br>**Direction:**<br>**Survey Date:** 8/29/2019<br>**Comments:** |  |
| **Photograph ID:** 2<br>**Photo Location:** Suction point SP-35 riser prior to installation of overhead piping<br>**Direction:**<br>**Survey Date:** 8/26/2019<br>**Comments:** |  |

| | | | |
|---|---|---|---|
| **Client:** | **Maguire Family Properties** | **Project:** | **Sub-Slab Depressurization System** |
| **Site Name:** | **Former Alliance BCP Site** | **Site Location:** | **12 Pixley Industrial Parkway, Gates, New York** |

| | |
|---|---|
| **Photograph ID:** 3 |  |
| **Photo Location:** SSDS overhead piping leading to fan stack riser R-21 in EverDry Shop | |
| **Direction:** | |
| **Survey Date:** 10/18/2019 | |
| **Comments:** | |
| **Photograph ID:** 4 |  |
| **Photo Location:** Monitoring panel group 3 and riser for Suction point SP-23 | |
| **Direction:** | |
| **Survey Date:** 10/29/2019 | |
| **Comments:** | |

| | | | |
|---|---|---|---|
| **Client:** | **Maguire Family Properties** | **Project:** | **Sub-Slab Depressurization System** |
| **Site Name:** | **Former Alliance BCP Site** | **Site Location:** | **12 Pixley Industrial Parkway, Gates, New York** |

| | |
|---|---|
| **Photograph ID:** 5 |   |
| **Photo Location:** Monitoring panel close-up for SSDS fans 1 and 2 | |
| **Direction:** | |
| **Survey Date:** 10/29/2019 | |
| **Comments:** | |
| **Photograph ID:** 6 |  |
| **Photo Location:** Suction point riser gauge close-up | |
| **Direction:** | |
| **Survey Date:** 10/22/2019 | |
| **Comments:** | |

| | | | |
|---|---|---|---|
| **Client:** | **Maguire Family Properties** | **Project:** | **Sub-Slab Depressurization System** |
| **Site Name:** | **Former Alliance BCP Site** | **Site Location:** | **12 Pixley Industrial Parkway, Gates, New York** |

| | |
|---|---|
| **Photograph ID:** 7 |   |
| **Photo Location:** Panel box for SSDS electrical system breaker switches | |
| **Direction:** | |
| **Survey Date:** 11/1/2019 | |
| **Comments:** | |
| **Photograph ID:** 8 |  |
| **Photo Location:** View of SSDS discharge stacks on building roof | |
| **Direction:** | |
| **Survey Date:** 10/15/2019 | |
| **Comments:** | |

| | | | |
|---|---|---|---|
| **Client:** | **Maguire Family Properties** | **Project:** | **Sub-Slab Depressurization System** |
| **Site Name:** | **Former Alliance BCP Site** | **Site Location:** | **12 Pixley Industrial Parkway, Gates, New York** |

| | |
|---|---|
| **Photograph ID:** 9<br>**Photo Location:** Discharge stack and support structure prior to installation of support cables and discharge vent screen<br>**Direction:**<br>**Survey Date:** 10/15/2019<br>**Comments:** |  |
| **Photograph ID:** 10<br>**Photo Location:** Close-up of on/off for switch for SSDS fan on rooftop support structure<br>**Direction:**<br>**Survey Date:** 11/1/2019<br>**Comments:** |  |

| | | | |
|---|---|---|---|
| **Client:** | **Maguire Family Properties** | **Project:** | **Sub-Slab Depressurization System** |
| **Site Name:** | **Former Alliance BCP Site** | **Site Location:** | **12 Pixley Industrial Parkway, Gates, New York** |

| | |
|---|---|
| **Photograph ID:** 11 |  |
| **Photo Location:** Close-up of SSDS fan model RP265 | |
| **Direction:** | |
| **Survey Date:** 10/25/2019 | |
| **Comments:** | |
| **Photograph ID:** 12 |  |
| **Photo Location:** Close-up of SSDS fan model GX5 | |
| **Direction:** | |
| **Survey Date:** 10/25/2019 | |
| **Comments:** | |

RadonAway®

The world's leading radon fan manufacturer.

# 2019 / 2020 Radon Professional's Pull-Out Fan Guide

# Fan Selection Specifications and Guidelines

## With Fan Replacement Guide

This handy 4-page guide is intended to make it easier for you to have RadonAway® fan specifications and our fan replacement chart at your fingertips where you need them, when you need them – on a job site, in your truck, at your desk, or anywhere else you might want to quickly check for fan specs or replacements.

As always, we are committed to providing you with not only the highest quality radon mitigation products but also information to help you provide expert, effective professional radon services.

*To remove this guide, firmly hold this 4-page section, then fold back the rest of the catalog and gently pull the guide from the staples.*

## RP Pro Series

Use RP fans for quiet operation, energy efficiency and high air flow in porous sub-slab or sub-membrane materials consisting of about 4 inches of clean, size 4-6 gravel.

## XP/XR Pro Series

Use XP/XR fans for compact size, lower pressure and average flow in very porous sub-slab/membrane materials consisting of 4 inches of clean, size 4-6 gravel.

## LV175

The LV175 Low Voltage Radon Fan includes a power pack and cord for connecting to up to 120v AC power. No additional electrical work is required.

## GX5

Coming soon, the GX5 is powerful, capable of operating at 5". It will get the job done when conditions call for power, reliability and quiet operation.

| MODEL | P/N | FAN DUCT DIAMETER | RRNC 2.0 RADON FAN TYPE | WATTS | RECOM. MAX OP. PRESSURE "WC* Alt.>1,000ft. see NOTE | MAX. PRESSURE"WC | |
|---|---|---|---|---|---|---|---|
| **RP140** | 28460 | 4" | RF1 | 15-21 | 0.7 | 0.8 | |
| **RP145** | 28461 | 4" | RF1, RF2 | 41-72 | 1.7 | 2.1 | |
| **RP260** | 28462 | 6" | - | 47-65 | 1.3 | 1.4 | |
| **RP265** | 28463 | 6" | - | 95-139 | 2.3 | 2.4 | |
| **RP380** | 28464 | 8" | - | 96-138 | 2.0 | 2.3 | |
| **XP151** | 28469 | 4" | RF1, RF2 | 53-70 | 1.4 | 1.5 | |
| **XP201** | 28470 | 4" | RF1 | 38-74 | 1.6 | 1.7 | |
| **XR261** | 23019-1 | 6" | - | 67-117 | 1.6 | 1.7 | |
| **LV175** | 28537 | 4" | RF1, RF2 | 35-75 | 1.9 | 2.0 | |
| **GX5** | 28536 | 4" | RF1, RF2 | 77-133 | 5.0 | 5.3 | |
| **GP201** | 28465 | 3" | - | 31-67 | 1.8 | 2.1 | |
| **GP301** | 28466 | 3" | - | 56-100 | 2.3 | 2.5 | |
| **GP401** | 28467 | 3" | - | 62-128 | 3.0 | 3.2 | |
| **GP501** | 28468 | 3" | - | 68-146 | 3.8 | 4.1 | |
| **SF180** | 28317 | 3" or 4" | - | 53-71 | 1.7 | 2.1 | |
| **GP500** | 23003-1 | 3" | - | 85-153 | 3.8 | 4.0 | |

| | MODEL | P/N | FAN DUCT DIAMETER | WATTS | RECOM. MAX OP. PRESSURE "WC* | MAX. PRESSURE "WC | TYPICAL CFM vs. STATIC PRESSURE WC | | | | | | FAN WEIGHT | SHIPPING WEIGHT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 0" | 10" | 15" | 20" | 25" | 35" | | |
| With Cord | HS2000 | 23004-1 | 3"in / 2"out | 153-314 | 14 | 16 | 62 | 40 | 23 | - | - | - | 17 | 20 |
| | HS3000 | 23004-2 | 3"in / 2"out | 120-250 | 21 | 24 | 39 | 30 | 25 | 19 | - | - | 18 | 21 |
| | HS5000 | 23004-3 | 3"in / 2"out | 349-381 | 35 | 41 | 43 | 35 | 32 | 28 | 24 | 18 | 18 | 21 |
| With Switch Box | HS2000E | 23004-4 | 3"in / 2"out | 153-314 | 14 | 16 | 62 | 40 | 23 | - | - | - | 17 | 20 |
| | HS3000E | 23004-5 | 3"in / 2"out | 120-250 | 21 | 24 | 39 | 30 | 25 | 19 | - | - | 18 | 21 |
| | HS5000E | 23004-6 | 3"in / 2"out | 349-381 | 35 | 41 | 43 | 35 | 32 | 28 | 24 | 18 | 18 | 21 |

## GP Pro Series

Use GP fans for versatility and a broad performance range in moderate to tight sub-slab/sub-membrane conditions. Ideal choice when multiple suction points are necessary.

## SF180

Use the SF180 for its low-profile design and moderate to good air flow in porous sub-slab or sub-membrane conditions ranging from about 4 inches of 4-6 gravel to very loose soil.

## GP500 Series

Use the GP500 in situations that require a high-performance box fan as an alternative to inline tube fans. It can provide coverage up to 1000 square feet per slab penetration.

## HS Series

Use HS fans in sand, clay or tight soil conditions when you need up to 25 times the suction of inline radon fans.

| | TYPICAL CFM vs. STATIC PRESSURE WC | | | | | | | | | FAN WEIGHT (lbs) | SHIPPING WEIGHT (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0" | .5" | 1.0" | 1.5" | 2.0" | 2.5" | 3.0" | 3.5" | 4.0" | | |
| | 135 | 70 | - | - | - | - | - | - | - | 3.9 | 5 |
| | 166 | 126 | 82 | 41 | 3 | - | - | - | - | 5.5 | 7 |
| | 251 | 157 | 70 | - | - | - | - | - | - | 5.6 | 8 |
| | 375 | 282 | 204 | 140 | 70 | - | - | - | - | 6.5 | 9 |
| | 531 | 415 | 268 | 139 | 41 | - | - | - | - | 9.1 | 12 |
| | 167 | 127 | 77 | - | - | - | - | - | - | 4.9 | 6 |
| | 126 | 98 | 66 | 26 | - | - | - | - | - | 5 | 6 |
| | 217 | 149 | 87 | 27 | - | - | - | - | - | 5.7 | 8 |
| | 187 | 162 | 132 | 97 | 12 | - | - | - | - | | |
| | 174 | 161 | 150 | 136 | 121 | 105 | 87 | 69 | 50 | | |
| | - | - | 54 | 42 | - | - | - | - | - | 9.1 | 11 |
| | - | - | 64 | 54 | 41 | - | - | - | - | 9.8 | 12 |
| | - | - | - | 61 | 52 | 44 | 22 | - | - | 10 | 12 |
| | - | - | - | - | 66 | 58 | 50 | 27 | - | 10 | 12 |
| | 149 | 127 | 96 | 61 | - | - | - | - | - | 12.8 | 15 |
| | - | - | - | - | 51 | 45 | 35 | 18 | - | 18 | 20 |

# RRNC 2.0 ANSI/AARST Standard

### Reducing Radon in New Construction of 1 & 2 Family Dwellings and Townhouses

This chart displays the designated radon fan types recommended in the new standard.

*Radon Fan Types RF1 & RF2 minimum flow and pressure ratings are manufacturer specifications.

| PIPE SIZE Nominal (I.D.) | TOTAL FOUNDATION AREA | | |
|---|---|---|---|
| | < 1600 sq. feet<br>< 149 sq. meters | 1600 to 2500 sq. feet<br>149 to 232 sq. meters | > 2500 sq. feet<br>> 232 sq. meters |
| (3 inch) [7.6 cm] | Use Radon Fan Type: **RF1**<br>RF1 Minimum rating:*<br>50 cfm @ 0.5" WC<br>[85m³/hr @ 125 Pa] | Use Radon Fan Type: **RF2**<br>RF2 Minimum rating:*<br>75 cfm @ 1.0" WC<br>[127m³/hr @ 250 Pa] | Radon fan to be sized by a certified/licensed radon mitigator. |
| (4 inch) [10 cm] | Use Radon Fan Type: **RF1**<br>RF1 Minimum rating:*<br>50 cfm @ 0.5" WC<br>[85m³/hr @ 125 Pa] | Use Radon Fan Type: **RF1**<br>RF1 Minimum rating:*<br>50 cfm @ 0.5" WC<br>[85m³/hr @ 125 Pa] | Radon fan to be sized by a certified/licensed radon mitigator. |

***NOTE: This chart is based on airflow through the ducting of the fan. Every time you reduce the duct size, there is a 20% degradation of airflow. Airflow drops 4% every 1000 feet alt. You can calculate adjusted recommended maximum operating pressure based on the following formula:**

$$\left(\text{Recommended Fan Operating Pressure}\right) - \left(\textit{Recommended} \text{ Fan Operating Pressure} \times \frac{\text{Altitude}}{1{,}000\text{ ft}} \times 4\%\right) = \textit{Actual} \text{ Maximum Fan Operating Pressure } \textit{(Adjusted for altitude)}$$

**EXAMPLE:**
*GP501 Fan Operating in Denver, CO at Elevation of 5280 ft*

$$\left(3.8\text{" } \textit{Recommended WC}\right) - \left(3.8\text{" } \times \frac{5{,}280\text{ ft}}{1{,}000\text{ ft}} \times 4\%\right) = 3.0\text{" } \textit{Actual} \text{ WC}$$

***Using Denver, CO as an example, RP145 actual WC reduces to 1.3, and RP265 reduces to 1.7 at 5,280 ft.***

# Need a replacement for other brands?
## We've got you covered.

**The RadonAway® replacement fans listed below provide superior performance and durability. In many cases, they use the same flexible pipe couplings and require little or no change to the system piping.This guide is intended to help you select a replacement fan for most brands. Included are many of the older fans with their current replacements.**

**Don't see the fan you need to replace? Give us a call and we will gladly help you find the best replacement fan for your requirements. 1-(800) 767-3703**

| ORIGINALLY INSTALLED FAN | | RadonAway® REPLACEMENT FAN |
|---|---|---|
| Fantech | R100, F100, FR100, HP2133, Rn1 | **RP140 or LV175** |
| | R150, F150, FR150, Rn3 | **XR261 or RP260** |
| | R160, F160, FR160 | **RP260 or RP265** |
| | R175, F175, FR175 | **RP265** |
| | HP190, HP2190, Rn2 | **RP145 or LV175** |
| | HP190SL, Rn2SL | **SF180** |
| | HP220 | **RP265** |
| AMG/FESTA | Maverick | **RP145, XP151, XP201, or LV175** |
| | Hawk | **RP260 or XR261** |
| | Prowler | **GP301** |
| | Legend | **RP265** |
| | Eagle | **GP401 or GX5** |
| | Goliath | **RP260, GP501**, or GX5** |
| | Force | **RP260, GP501**, or GX5** |
| Kanalflakt/ FanAmerica | T1 Turbo 5 (Fiberglass) | **XP201*, XP151*, or LV175** |
| | T2 Turbo 6 (Fiberglass) | **XR261 or RP260** |
| | K4 (Metal Kanalflakt) | **RP140* or LV175** |
| | K4XL (Metal Kanalflakt) | **XP201*, XP151*, or LV175** |
| | K6 (Metal Kanalflakt) | **XR261 or RP260** |
| Rosenberg | R100 | **RP140* or LV175** |
| | R150 | **XR261 or RP260** |

*** Slightly different duct diameter requires different flexible couplings. ** Depends on site needs: Airflow vs. static pressure**

# RP PRO SERIES BY RADONAWAY®

# RP FANS


RP145


RP265

## SPECIFICATIONS

| MODEL | FAN DUCT DIAMETER | WATTS | RECOM. MAX. OP. PRESSURE "WC | TYPICAL CFM vs. STATIC PRESSURE WC | | | | | RRNC 2.0 Radon Fan Type[1] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0" | 0.5" | 1.0" | 1.5" | 2.0" | |
| RP140* | 4" | 15-21 | 0.7 | 135 | 70 | - | - | - | RF1 |
| RP145 | 4" | 41-72 | 1.7 | 166 | 126 | 82 | 41 | 3 | RF1, RF2 |
| RP260 | 6" | 47-65 | 1.3 | 251 | 157 | 90 | - | - | - |
| RP265 | 6" | 95-139 | 2.3 | 375 | 282 | 204 | 140 | 70 | - |
| RP380 | 8" | 96-138 | 2.0 | 531 | 415 | 268 | 139 | 41 | - |

1 Suitable as designated by the Reducing Radon in New Construction Standard, RRNC 2.0. See chart p. 87.

See p. 22 for fan dimensions.

HVI CERTIFIED

* Most Efficient 2019 RadonAway RP140

MADE IN USA Made in the USA with U.S. and imported parts.

ETL Listed

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

## PRICING

| MODEL | P/N | UNIT PRICE | | |
|---|---|---|---|---|
| | | 1-3 | 4-7 | 8+ |
| RP140 | 28460 | | | |
| RP145 | 28461 | | | |
| RP260 | 28462 | | | |
| RP265 | 28463 | | | |
| RP380 | 28464 | | | |

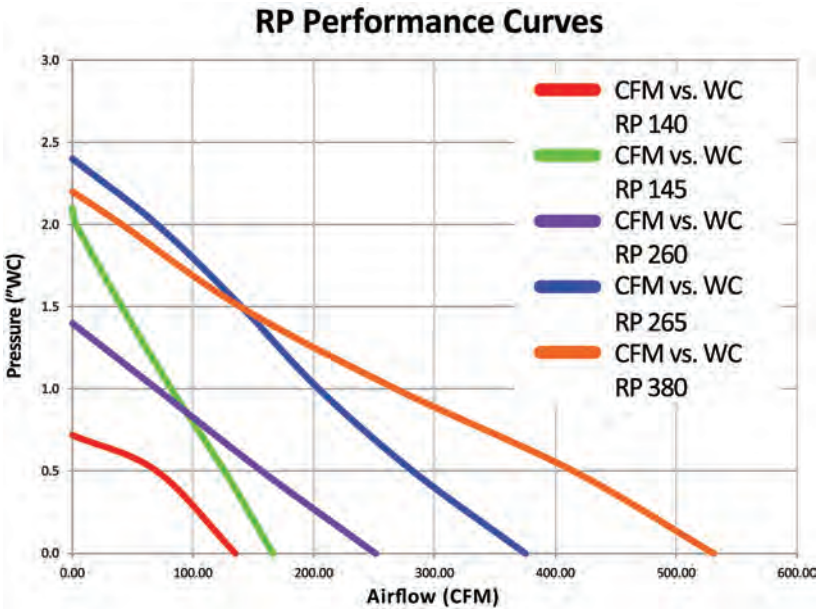
Quantity discounts determined by number of RadonAway® fans (any model) per order.

**In 2018 we enhanced the performance of the RP265.**
The motor was re-engineered to provide better performance curves for air flow and pressure while maintaining quiet operation.

## FEATURES

- **Stay-White™ Housing**
- Energy efficient
- Ultra-quiet operation
- Meets all electrical code requirements
- Water-hardened motorized impeller
- Sealed seams to inhibit radon leakage (RP140 & RP145 double snap sealed)
- RP140 Energy Star® Most Efficient 2019
- ETL Listed—for indoor or outdoor use
- Thermally protected motor
- Rated for commercial and residential use

**The RP145 is the most popular fan in the industry!**
The RP145 radon fan provides high air flow and is one of the most energy-efficient radon mitigation fans in the industry.




## INSTALLATION ACCESSORIES

| ITEM | SIZE | COLOR | FOR USE WITH | P/N | QTY / CASE | UNIT PRICE | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | <CASE | CASE* | 3+ CASES* |
| Flexible Couplings | 3 x 4 | black<br>white | RP140, RP145 | 79011<br>79038 | 40 | | | |
| | 4 x 4 | black<br>white | RP140, RP145 | 79012<br>79040 | 40 | | | |
| | 4 x 6 | black<br>white | RP260, RP265 | 79013<br>79039 | 20<br>30 | | | |

NOTE: Coupling sizes are for selection only, actual sizes may vary fractionally. See Flexible Coupling Sizing Chart on p. 25 or at radonaway.com/couplings
*Price applies to case quantities only.

| ITEM | COLOR | P/N | QTY / CASE | UNIT PRICE | | |
|---|---|---|---|---|---|---|
| | | | | < CASE | CASE | 2+ CASES* |
| 4.5" Easy Read U-tube Manometer | Blue | 50017 | 50 | | | |
| | Red | 50018 | 50 | | | |

*Must be purchased in case quantity. For more package details see p. 26.

***Easy Read U-tube package includes:***
Hangable bag with homeowner brochure and all system labels to help you to comply with RRNC 2.0 "Model Code" Standard (see p. 87) and provide important system information.

| ITEM | P/N | PRICE |
|---|---|---|
| 6' Power Cord Kit[1, 3] | 27005 | |
| 6' Power Cord Kit[2] | 27009 | |
| 8' Power Cord Kit[1,3,4] | 27004 | |
| Fan Mounting Bracket | 25007 | |
| RP380 Mounting Bracket | 25033-1 | |
| Transition Fitting[5] | 13245 | |

[1]18 ga 3-prong plug and bushing
[2]16 ga 3-prong plug and bushing
[3]Not in IN
[4]See p. 53 for details and case pricing
[5]Not for use in Canada

Flexible Couplings
79011

Transition Fitting
13245

Fan Mounting Bracket
25007

Flexible Couplings
79039

6' Power Cord Kit
27005


Zoom

# RP265 Radon Fan Pro Series

**SKU:** 28463

Be the first to review this product

We have just enhanced the performance of our popular RadonAway RP265 Pro Series radon fan (see below for details). The RP265 Pro Series fan installs white and stays white. It has a 6" duct and is chosen most often by radon professionals when there is a need for quiet efficiency coupled with more power and higher air flow. Made in the USA with U.S. and imported parts.

**NOTE: New RP265 performance curves are shown below.**

NOTICE

## Log In to Purchase

RadonAway is a B2B business only. You must be an approved RadonAway customer to purchase products through this website. If you are an existing RadonAway customer and need a website login, click here. If you are a professional and would like to become a RadonAway customer, click here.

Add to Wishlist Add to Compare

Share

Details | Additional Info | Reviews | Conditions of Sale

## RP265 Radon Fan Features:

Stay-White™ housing
Five-year limited warranty
Quiet and attractive (Installs white, stays white)

Product Categories

- Radon Fans +
- HRVs / ERVs +
- Radon System Components +
- Mitigation Tools & Diagnostic Aids +
- Sealing Products +
- Crawlspace Moisture and Radon Control +
- Sump Pumps & Accessories +
- Pipe Accessories +
- Radon System Accessories +
- Radon in Water Removal Systems +
- Radon Testing +
- Spruce Inline Ventilation +
- Canada Fulfillment +
- Air Purifiers
- New Products New
- Best Sellers

1-2 day shipping in most of US Read more...

Five year manufacturer's warranty on RadonAway fans

Free technical support for our customers

Contact Us

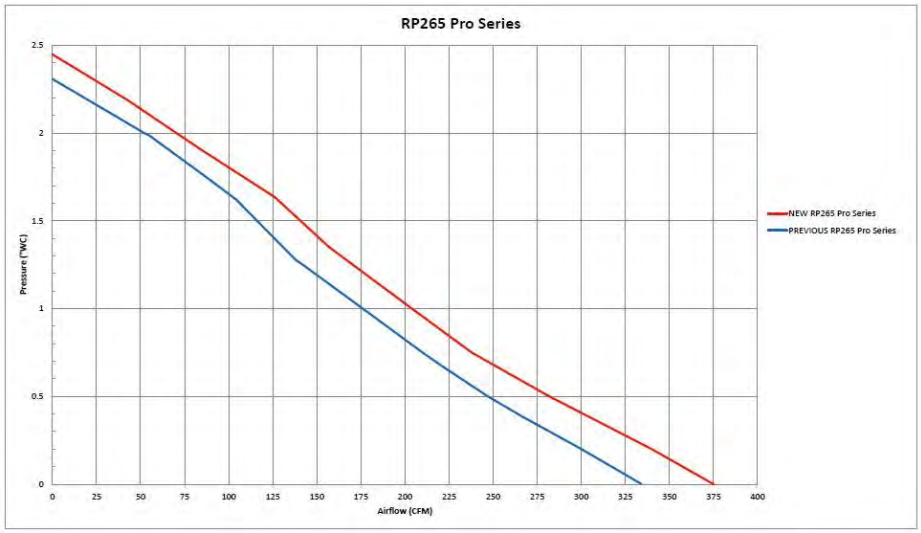
Thermally protected
Water-hardened motorized impeller
Seams sealed to inhibit radon leakage
ETL Listed - for indoor or outdoor use
Meets all electrical code requirements
Rated for commercial and residential use




## Additional Radon Fan Information:

Downloadable Fan Specifications/Sales Sheet (PDF format)
Downloadable Fan Installation Instructions (PDF format)
Calculate your estimated annual electrical cost.
Also available through our Canadian distribution location.

## RP265 New Performance Curves



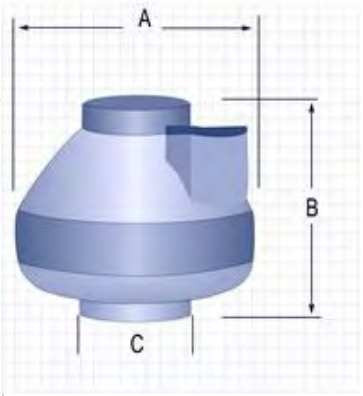

| Model | P/N | Energy Star® Rated | Fan Duct Diameter | Watts | Recommended Max Operating Pressure "WC | Typical CFM vs. Static Pressure WC 0" | .5" | 1.0" | 1.5" | 2.0" | RRNC Type1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RP140 Pro Series | 28460 | Yes | 4" | 15-21 | 0.7 | 135 | 70 | - | - | - | RF1 |
| RP145 Pro Series | 28461 | - | 4" | 41-72 | 1.7 | 166 | 126 | 82 | 41 | 3 | RF1, RF2 |
| RP260 Pro Series | 28462 | - | 6" | 47-65 | 1.3 | 251 | 157 | 70 | - | - | - |
| RP265 Pro Series | 28463 | - | 6" | 95-139 | 2.3 | 375 | 282 | 204 | 140 | 70 | - |

| Model | P/N | Energy Star® Rated | Fan Duct Diameter | Watts | Recommended Max Operating Pressure "WC | Typical CFM vs. Static Pressure WC 0" | .5" | 1.0" | 1.5" | 2.0" | RRNC Type1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RP380 Pro Series | 28208 | - | 8" | 96-138 | 2.0 | 531 | 415 | 268 | 139 | 41 | - |

*1 Suitable as designated by the new Reducing Radon in New Construction Standard, RRNC 2.0. Click here for details.*

**Dimensions**

| Model | A | B | C |
|---|---|---|---|
| RP140 Pro | 9.7" | 8.5" | 4.5" |
| RP145 Pro | 9.7" | 8.5" | 4.5" |
| RP260 Pro | 11.75" | 8.6" | 6" |
| RP265 Pro | 11.75" | 8.6" | 6" |
| RP380 Pro | 13.41" | 10.53" | 8" |




## Related

RadonAway® Easy Read Manometer - BLUE
Add to Wishlist

RadonAway® Transition Fitting
Add to Wishlist

6" x 6" Black Coupling (Single)
Add to Wishlist

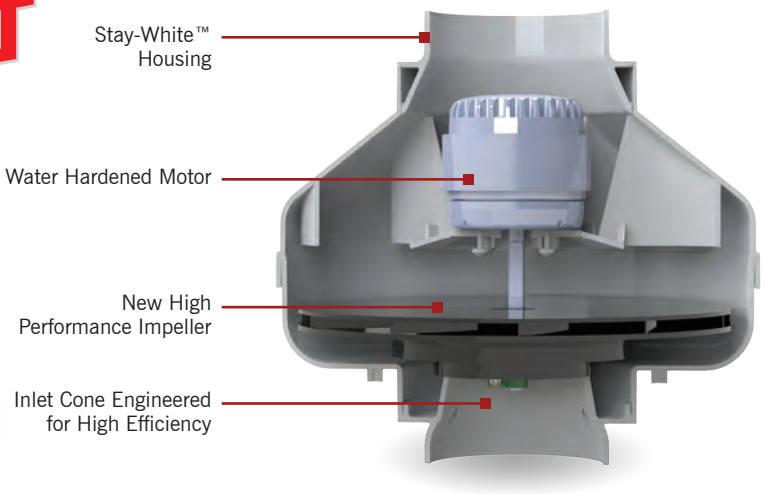
4" x 4.5" Black Coupling (Single)
Add to Wishlist

# GX5 PRO SERIES BY RADONAWAY®

# GX5 FAN

COMING SOON


GX5




## SPECIFICATIONS

| MODEL | FAN DUCT DIAMETER | WATTS | RECOM. MAX. OP. PRESSURE "WC | TYPICAL CFM vs. STATIC PRESSURE WC | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0" | 1.0" | 2.0" | 3.0" | 4.0" | 5.0" |
| GX5 | 4" | 77-133 | 5.0 | 174 | 150 | 121 | 87 | 50 | 8 |

See p. 22 for fan dimensions.

HVI CERTIFIED

MADE IN USA Made in the USA with U.S. and imported parts.

ETL Listed Intertek

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

## PRICING

| MODEL | P/N | UNIT PRICE | | |
|---|---|---|---|---|
| | | 1-3 | 4-7 | 8+ |
| GX5 | 28536 | | | |

Quantity discounts determined by number of RadonAway® fans (any model) per order.

## TECH TIP 6.5" MANOMETER

Designed and manufactured in RadonAway's Massachusetts production facility, the new 6.5" Easy Read U-tube Manometer is made specifically for the GX5's higher vaccuum pressure. However, since the gauge shows from 0" - 6.5" WC, it can also be used with other RadonAway radon fans.

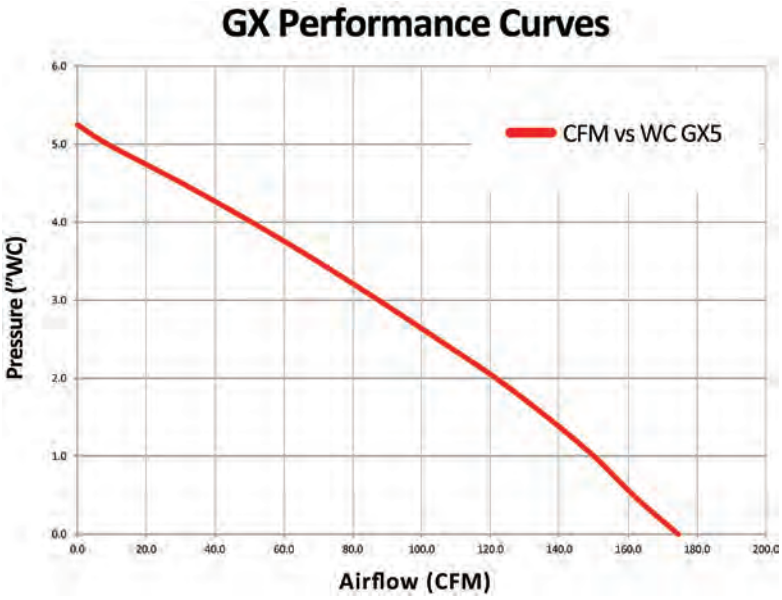
For more informaiton on the 6.5" Manometer, see p. 27.

## FEATURES

- **Stay-White™ Housing**
- Quiet Operation
- Water-Hardened Thermally-Protected Motor
- 4" Duct for Use with 3" or 4" Pipe
- Sealed Seams to Inhibit Radon Leakage
- Electrical Box for Hard Wire or Plug In
- For Indoor or Outdoor Use
- Rated for Commercial or Residential Use
- New Revolutionary Impeller
- Modern "RP Style" Housing

**Experience the POWER of the GX5!**

Capable of operating at 5" of vacuum, our revolutionary GX5's power will blow you away.




## INSTALLATION ACCESSORIES

| ITEM | SIZE | COLOR | P/N | QTY / CASE | UNIT PRICE | | |
|---|---|---|---|---|---|---|---|
| | | | | | <CASE | CASE* | 3+ CASES* |
| Flexible Couplings | 3 x 4 | black<br>white | 79011<br>79038 | 40 | | | |
| | 4 x 4 | black<br>white | 79012<br>79040 | 40 | | | |
| | 4 x 6 | black<br>white | 79013<br>79039 | 20<br>30 | | | |

NOTE: Coupling sizes are for selection only, actual sizes may vary fractionally. See Flexible Coupling Sizing Chart on p. 25 or at radonaway.com/couplings
*Price applies to case quantities only.

| ITEM | COLOR | P/N | QTY / CASE | UNIT PRICE | | |
|---|---|---|---|---|---|---|
| | | | | < CASE | CASE | 2+ CASES* |
| 6.5" U-tube Manometer | Blue | 50036 | 50 | | | |

*Must be purchased in case quantity. For more package details see p. 27.

***6.5" U-tube package includes:***
Hangable bag with homeowner brochure and all system labels to help you to comply with RRNC 2.0 "Model Code" Standard (see p. 87) and provide important system information.

| ITEM | P/N | PRICE |
|---|---|---|
| 6' Power Cord Kit[1, 3] | 27005 | |
| 6' Power Cord Kit[2] | 27009 | |
| 8' Power Cord Kit[1,3,4] | 27004 | |
| Fan Mounting Bracket | 25007 | |
| RP380 Mounting Bracket | 25033-1 | |
| Transition Fitting[5] | 13245 | |

[1]18 ga 3-prong plug and bushing
[2]16 ga 3-prong plug and bushing
[3]Not in IN
[4]See p. 53 for details and case pricing
[5]Not for use in Canada

Flexible Couplings
79011

Transition Fitting
13245

Fan Mounting Bracket
25007

Flexible Couplings
79039

6' Power Cord Kit
27005

RadonAway®

The world's leading radon fan manufacturer

# RP, GP, XP Pro Series Installation Instructions

**Fan Installation & Operating Instructions**
**RP, GP, XP Pro Series Fans**
***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!** For General Ventilating Use Only. Do Not Use to Exhaust Hazardous, Corrosive or Explosive Materials, Gases or Vapors. See Vapor Intrusion Application Note #AN001 for important information on VI Applications. RadonAway.com/vapor-intrusion

2. **NOTE:** Fan is suitable for use with solid state speed controls; however, use of speed controls is not generally recommended.

2. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.

3. **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.

4. **NOTICE!** There are no user serviceable parts located inside the fan unit.
**Do NOT attempt to open.** Return unit to the factory. (See Warranty, p. 8, for details.)

5. **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.

6. **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. (See p. 8.)

   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.

   c) Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire rated construction.

   d) Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment to prevent backdrafting. Follow the heating equipment manufacturers' guidelines and safety standards such as those published by any National Fire Protection Association, and the American Society for Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), and the local code authorities.

   e) When cutting or drilling into a wall or ceiling, do not damage electrical wiring and other hidden utilities.

   f) Ducted fans must always be vented to outdoors.

   g) If this unit is to be installed over a tub or shower, it must be marked as appropriate for the application and be connected to a GFCI (Ground Fault Circuit Interrupter) protected branch circuit.



**Fan Installation & Operating Instructions**

| RP Pro Series | GP Pro Series | XP Pro Series |
|---|---|---|
| RP140 \| P/N 28460 | GP201 \| P/N 28465 | XP151 \| P/N 28469 |
| RP145 \| P/N 28461 | GP301 \| P/N 28466 | XP201 \| P/N 28470 |
| RP260 \| P/N 28462 | GP401 \| P/N 28467 | |
| RP265 \| P/N 28463 | GP501 \| P/N 28468 | |
| RP380 \| P/N 28464 | | |

# 1.0 SYSTEM DESIGN CONSIDERATIONS

## 1.1 INTRODUCTION

The RP, GP and XP Pro Series Radon Fans are intended for use by trained, professional, certified/licensed radon mitigators. The purpose of these instructions is to provide additional guidance for the most effective use of RP, GP and XP Series Fans. These instructions should be considered supplemental to EPA/radon industry standard practices, state and local building codes and regulations. In the event of a conflict, those codes, practices and regulations take precedence over these instructions.

## 1.2 FAN SEALING

The RP, GP and XP Pro Series Fans are factory sealed; no additional caulk or other materials are required to inhibit air leakage.

## 1.3 ENVIRONMENTALS

The RP, GP and XP Pro 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.

## 1.4 ACOUSTICS

The RP, GP and XP Pro Series Fans, when installed properly, operate 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.

(To ensure quiet operation of inline and remote fans, each fan shall be installed using sound attenuation techniques appropriate for the installation. For bathroom and general ventilation applications, at least 8 feet of insulated flexible duct shall be installed between the exhaust or supply grille(s) and the fan(s). RP, GP and XP Pro Series Fans are not suitable for kitchen range hood remote ventilation applications.)

## 1.5 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 RP, GP and XP Pro 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. Should this condition arise, it is recommended that the fan be turned off until the water recedes, allowing for return to normal operation.

## 1.6 SLAB COVERAGE

The RP, GP and XP Pro Series Fans 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 RP, GP and XP Pro Series Fan best suited for the sub-slab material can improve the slab coverage. The RP, GP and XP Pro Series have a wide range of models to choose from to cover a wide range of sub-slab materials. The RP140 and 145 are best suited for general purpose use. The RP 260 can be used where additional airflow is required, and the RP265 and RP 380 are best suited for large slab, high airflow applications. 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.

## 1.7 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 RP, GP and XP Pro 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 RP, GP and XP Pro Series Fans are NOT suitable for underground burial.

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

| Pipe Diameter | Minimum Rise per Ft of Run* | | |
|---|---|---|---|
| | @25 CFM | @50 CFM | @100 CFM |
| 4” | 1/8” | 1/4” | 3/8” |
| 3” | 1/4” | 3/8” | 1 1/2” |

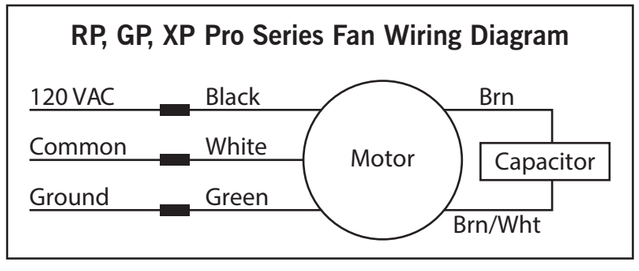

See p. 7 for detailed specifications.

## 1.8 SYSTEM MONITOR & LABEL

A System Monitor, such as a manometer (P/N 50017) or audible alarm (P/N 28001-2, 28001-4 or 28421), is required to notify the occupants of a fan system malfunction. A System Label (provided with Manometer P/N 50017) with instructions for contacting the installing contractor for service and identifying the necessity for regular radon tests to be conducted by the building occupants must be conspicuously placed in a location where the occupants frequent and can see the label.

## 1.9 ELECTRICAL WIRING

The RP, GP and XP Pro Series Fans operate on standard 120V, 60Hz AC. All wiring must be performed in accordance with National Fire Protection (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 UL 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.




## 1.10 SPEED CONTROLS

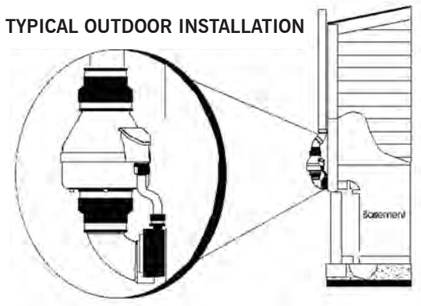
The RP, GP and XP Pro Series Fans are rated for use with electronic speed controls; however, speed controls are generally not recommended. If used, the recommended speed control is Pass & Seymour Solid State Speed Control (Cat. No. 94601-1).



# 2.0 INSTALLATION

The RP, GP and XP Pro Series Fans can be mounted indoors or outdoors. (It is suggested that EPA and radon mitigation standards recommendations be followed in choosing the fan location.) The GP fans have an integrated mounting bracket; RP and XP Pro Series Fans may be mounted directly on the system piping or fastened to a supporting structure by means of an optional mounting bracket.
The ducting from the fan to the outside of the building has a strong effect on noise and fan energy use. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated airflow.

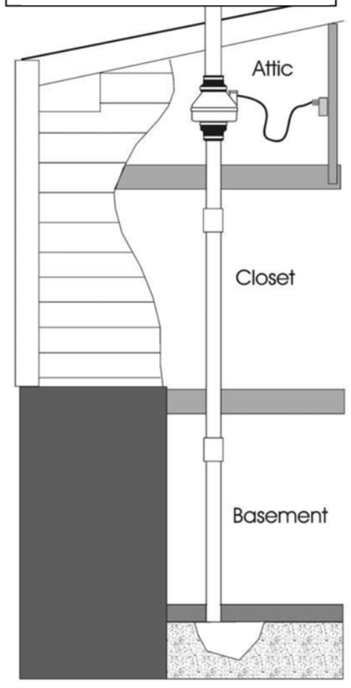
**TYPICAL OUTDOOR INSTALLATION**




## 2.1 MOUNTING

Mount the RP, GP and XP Pro 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.

**TYPICAL INDOOR INSTALLATION**




## 2.2 MOUNTING BRACKET (optional)

The RP and XP Pro Series Fans may be optionally secured with the RadonAway P/N 25007 mounting bracket. 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 a means of disconnect for servicing the unit and for vibration isolation. As the fan is typically outside of the building thermal boundary and is venting to the outside, installation of insulation around the fan is not required.

## 2.4 ELECTRICAL CONNECTION

Connect wiring with wire nuts provided, observing proper connections (See Section 1.9). Note that the fan is not intended for connection to rigid metal conduit.

## 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 & ANNUAL SYSTEM MAINTENANCE

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

_____ **Ensure** the RP, GP and XP Pro Series Fan and all ducting are **secure and vibration-free**.

_____ **Verify system vacuum pressure** with manometer. **Insure** vacuum pressure is within normal operating range and **less than** the 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 and applicable testing standards.

**THE FOLLOWING CHARTS SHOW THE PERFORMANCE OF THE RP, GP and XP PRO SERIES FANS**

## RP Pro Series Product Specifications

| Typical CFM Vs. Static Pressure "WC | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Model** | **0"** | **.25"** | **.5"** | **.75"** | **1.0"** | **1.25"** | **1.5"** | **1.75"** | **2.0"** |
| RP140 | 135 | 103 | 70 | 14 | - | - | - | - | |
| RP145 | 166 | 146 | 126 | 104 | 82 | 61 | 41 | 21 | 3 |
| RP260 | 251 | 209 | 157 | 117 | 70 | 26 | - | - | - |
| RP265 | 375 | 330 | 282 | 238 | 204 | 170 | 140 | 108 | 70 |
| RP380 | 531 | 490 | 415 | 340 | 268 | 200 | 139 | 84 | 41 |

| Model | Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum | Maximum Recommended Operation Pressure* (Sea Level Operation)** |
|---|---|---|
| RP140 | 15 - 21 watts | 0.7" WC |
| RP145 | 41 - 72 watts | 1.7" WC |
| RP260 | 47-65 watts | 1.3" WC |
| RP265 | 95 - 139 watts | 2.3" WC |
| RP380 | 96 - 138 watts | 2.0" WC |

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

| Model | Size | Weight | Inlet/Outlet | L.2 |
|---|---|---|---|---|
| RP140 | 8.5"H x 9.7" Dia. | 5.5 lbs | 4.5"OD (4.0" PVC Sched 40 size compatible) | 25 |
| RP145 | 8.5"H x 9.7" Dia. | 5.5 lbs | 4,5" OD | 15 |
| RP260 | 8.6"H x 11.75" Dia. | 5.5 lbs | 6.0" OD | 48 |
| RP265 | 8.6"H x 11.75" Dia. | 6.5 lbs | 6.0" OD | 30 |
| RP380 | 10.53"H x 13.41" Dia. | 11.5 lbs | 8.0" OD | 57 |

L.2 = Estimated Equivalent Length of Rigid Metal Ducting resulting in .2" WC pressure loss for Duct Size listed. Longer Equivalent Lengths can be accommodated at Flows Lower than that at .2" WC pressure loss (see CFM Vs Static Pressure "WC Table).

## XP Pro Series Product Specifications

| Typical CFM Vs. Static Pressure "WC | | | | | | |
|---|---|---|---|---|---|---|
| | **0"** | **.5"** | **1.0"** | **1.5"** | **1.75"** | **2.0"** |
| XP151 | 167 | 127 | 77 | - | - | - |
| XP201 | 126 | 98 | 66 | 26 | - | - |

| Model | Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum | Maximum Recommended Operation Pressure* (Sea Level Operation)** |
|---|---|---|
| XP151 | 53-70 watts | 1.4" WC |
| XP201 | 38-74 watts | 1.6" WC |

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

| Model | Size | Weight | Inlet/Outlet |
|---|---|---|---|
| XP151 | 9.5"H x 8.5" Dia. | 6 lbs | 4.5"OD (4.0" PVC Sched 40 size compatible) |
| XP201 | 9.5"H x 8.5" Dia. | 6 lbs | 4.5" OD |



## GP Pro Series Product Specifications

| Typical CFM Vs. Static Pressure "WC | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1.0"** | **1.5"** | **2.0"** | **2.5"** | **3.0"** | **3.5"** | **4.0"** |
| GP201 | 54 | 42 | 11 | - | - | - | - |
| GP301 | 64 | 54 | 41 | 4 | - | - | - |
| GP401 | - | 61 | 52 | 44 | 22 | - | - |
| GP501 | - | - | 66 | 58 | 50 | 27 | 4 |

| Model | Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum | Maximum Recommended Operation Pressure* (Sea Level Operation)** |
|---|---|---|
| GP201 | 31-65 watts | 1.8" WC |
| GP301 | 56-100 watts | 2.3" WC |
| GP401 | 62-128 watts | 3.0" WC |
| GP501 | 68 - 146 watts | 3.8" WC |

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

| Model | Size | Weight | Inlet/Outlet |
|---|---|---|---|
| GP201 | 13"H x 12.5" Dia. | 12 lbs | 3.5"OD (3.0" PVC Sched 40 size compatible) |
| GP301 | 13"H x 12.5" Dia. | 12 lbs | 3.5" OD |
| GP401 | 13"H x 12.5" Dia. | 12 lbs | 3.5" OD |
| GP501 | 13"H x 12.5" Dia. | 12 lbs | 3.5" OD |

## RP, XP and GP Pro Series Additional Specifications

| Model | Recommended Duct | PVC Pipe Mounting | Thermal Cutout | Insulation Class |
|---|---|---|---|---|
| RP140 | 3" or 4" Schedule 20/40 PVC | Mount on the duct pipe or with optional mounting bracket. For Ventilation: 4", 6" or 8" Rigid or Flexible Ducting. | 130°C/266°F | Class B Insulation |
| RP145 | | | 130°C/266°F | Class F Insulation |
| RP260 | | | 150°C/302°F | |
| RP265 | | | 150°C/302°F | |
| RP380 | 6" Schedule 20/40 PVC Pipe | | 150°C/302°F | |
| XP151 | 3" or 4" Schedule 20/40 PVC | Fan may be mounted on the duct pipe or with integral flanges. | 120°C/248°F | Class B Insulation |
| XP201 | | | | |
| GP201 | 3" or 4" Schedule 20/40 PVC | Fan may be mounted on the duct pipe or with integral flanges. | 120°C/248°F | Class B Insulation |
| GP301 | | | | |
| GP401 | | | | |
| GP501 | | | | |

**Continuous Duty**
**3000 RPM**
**Thermally Protected**
**RP, GP Residential and Commercial**
**XP Residential Only**
**Rated for Indoor or Outdoor Use**

Most Efficient 2019 ENERGY STAR www.energystar.gov
RP140 Only

LISTED Electric Fan

Intertek 77728

Conforms to UL STD. 507
Certified to CAN/CSA STD. C22.2 No.113

# IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the RadonAway® RP, GP and XP Pro 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 the housing.** Return unit to factory. (See Warranty below).

Install the RP, GP and XP Pro Series Fan in accordance with all EPA, ANSI/AARST standard practices, and state and local building codes and regulations.

**Provide a copy of this instruction or comparable radon system and testing information to the building occupants after completing system installation.**

## Warranty

RadonAway® warrants that the RP, GP (excluding GP500) and XP Pro Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of 12 months from the date of purchase or 18 months from the date of manufacture, whichever is sooner (the "Warranty Term").

RadonAway® will replace any fan which fails due to defects in materials or workmanship during the Warranty Term. 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®.

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.

**5-YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.**

RadonAway® will extend the Warranty Term of the fan to 60 months (5 years) from date of purchase or 66 months from date of manufacture, whichever is sooner, provided that the fan is installed by a professional radon mitigation contractor. Proof of purchase and/or proof of professional installation may be required for service under this warranty. No extended warranty is offered outside the Continental United States and Canada beyond the standard 12 months from the date of purchase or18 months from the date of manufacture, whichever is sooner.

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

**LIMITATION OF WARRANTY**

**EXCEPT AS STATED ABOVE, THE RP, GP (excluding GP500) and XP PRO SERIES FANS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULARPURPOSE.**

**IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.**

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 costs, including insurance, to and from factory.

RadonAway® 3 Saber Way
Ward Hill, MA 01835 USA TEL (978) 521-3703
FAX (978) 521-3964
Email to: Returns@RadonAway.com

Record the following information for your records:

Serial Number: _____ Purchase Date: _____

**INSTALLATION & OPERATING INSTRUCTIONS**
**Instruction P/N IN015 Rev E**
**FOR *CHECKPOINT IIa*™ P/N 28001-2 & 28001-3**
**RADON SYSTEM ALARM**

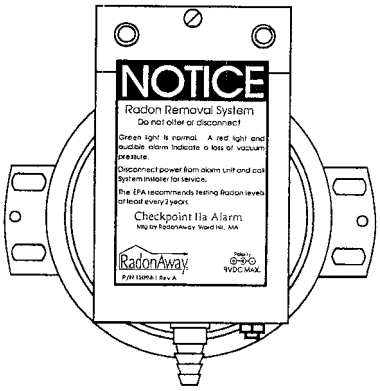
**INSTALLATION INSTRUCTIONS**
(WALL MOUNTING)

Select a suitable wall location near a vertical section of the suction pipe. The unit should be mounted about four or five feet above the floor and as close to the suction pipe as possible. Keep in mind that with the plug-in transformer provided, the unit must also be within six feet of a 120V receptacle. **NOTE: The Checkpoint IIa is calibrated for vertical mounting, horizontal mounting will affect switchpoint calibration.**

Drill two ¼" holes 4" apart horizontally where the unit is to be mounted.

Install the two ¼" wall anchors provided.

Hang the CHECKPOINT IIa from the two mouting holes located on the mounting bracket. Tighten the mounting screws so the unit fits snugly and securely against the wall.




Drill a 5/16" hole into the side of the vent pipe about 6" higher than the top of the unit.

Insert the vinyl tubing provided about 1" inside the suction pipe.

Cut a suitable length of vinyl tubing and attach it to the pressure switch connector on the CHECKPOINT IIa.

**CALIBRATION AND OPERATION.**

The CHECKPOINT IIa units are calibrated and sealed at the factory to alarm when the vacuum pressure falls below the factory setting and should not normally require field calibration. Factory Settings are:
**28001-2 -.25" WC Vacuum**
**28001-3 -.10" WC Vacuum**

**To Verify Operation:**

With the exhaust fan off or the pressure tubing disconnected and the CHECKPOINT IIa plugged in, both the red indicator light and the audible alarm should be on.

Turn the fan system on or connect the pressure tubing to the fan piping. The red light and the audible alarm should go off. The green light should come on.

Now turn the fan off. The red light and audible alarm should come on in about two or three seconds and the green light should go out.

**WARRANTY INFORMATION**

Subject to applicable consumer protection legislation, RadonAway warrants that the CHECKPOINT IIa will be free from defective material 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. All other warranties, expressed or written, are not valid. To make a claim under these limited warranties, you must return the defective item to RadonAway with a copy of the purchase receipt. RadonAway is not responsible for installation or removal cost associated with this warranty. In no case is RadonAway liable beyond the repair or replacement of the defective product FOB RadonAway.

**THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THERE IS NO WARRANTY OF MERCHANTIBILITY. ALL OTHER WARRANTIES, EXPRESSED OR WRITTEN, ARE NOT VALID.**

For service under these warranties, 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 costs to and from factory.

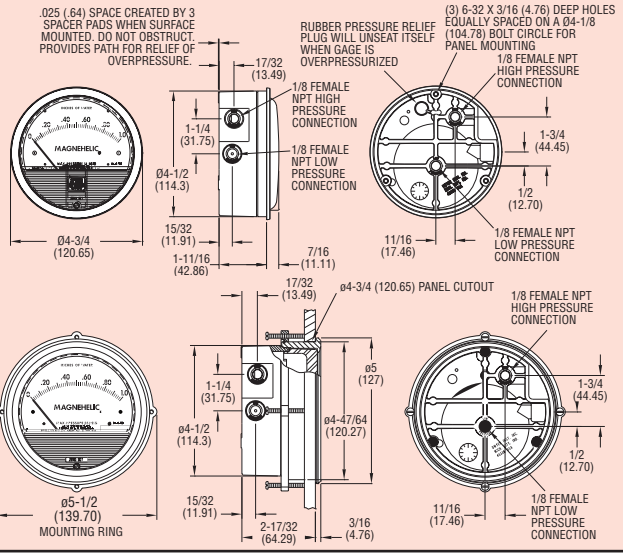
Manufactured by:
RadonAway
Ward Hill, MA
(978)-521-3703

Series 2000

# Magnehelic® Differential Pressure Gages

## Indicate Positive, Negative or Differential, Accurate within 2%

RoHS


**Select the Dwyer® Magnehelic® gage** for high accuracy – guaranteed within 2% of full-scale – and for the wide choice of 81 models available to suit your needs precisely. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates low air or non-corrosive gas pressures – either positive, negative (vacuum) or differential. The design resists shock, vibration and over-pressures. No manometer fluid to evaporate, freeze or cause toxic or leveling problems. It's inexpensive, too.

The Magnehelic® gage is the industry standard to measure fan and blower pressures, filter resistance, air velocity, furnace draft, pressure drop across orifice plates, liquid levels with bubbler systems and pressures in fluid amplifier or fluidic systems. It also checks gas-air ratio controls and automatic valves, and monitors blood and respiratory pressures in medical care equipment.

### Mounting

A single case size is used for most models of Magnehelic® gages. They can be flush or surface mounted with standard hardware supplied. Although calibrated for vertical position, many ranges above 1″ may be used at any angle by simply re-zeroing. However, for maximum accuracy, they must be calibrated in the same position in which they are used. These characteristics make Magnehelic® gages ideal for both stationary and portable applications. A 4-9/16″ hole is required for flush panel mounting. Complete mounting and connection fittings, plus instructions, are furnished with each instrument. See pages 6 and 7 for more information on mounting accessories.

**Flush, Surface or Pipe Mounted**

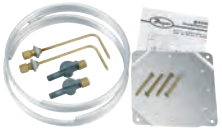
**Enclosure Mounted**

### SPECIFICATIONS

**Service:** Air and non-combustible, compatible gases (natural gas option available).
**Note:** May be used with hydrogen. Order a Buna-N diaphragm. Pressures must be less than 35 psi.
**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 FS (±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:** -20 in Hg to 15 psig† (-0.677 to 1.034 bar); MP option: 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. See Overpressure Protection Note on next page.
**Temperature Limits:** 20 to 140°F*
(-6.67 to 60°C). -20°F (-28°C) with low temperature option.
**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 three adapters in MP & HP gage accessories.)
**Agency Approval:** RoHS. **Note:** -SP models not RoHS approved.
†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options at lower left.

### ACCESSORIES

**Model A-432 Portable Kit**
Combine carrying case with any Magnehelic® gage of standard range, except high pressure connection. Includes 9 ft (2.7 m) of 3/16″ ID rubber tubing, standhang bracket and terminal tube with holder . . . . . **$48.00**



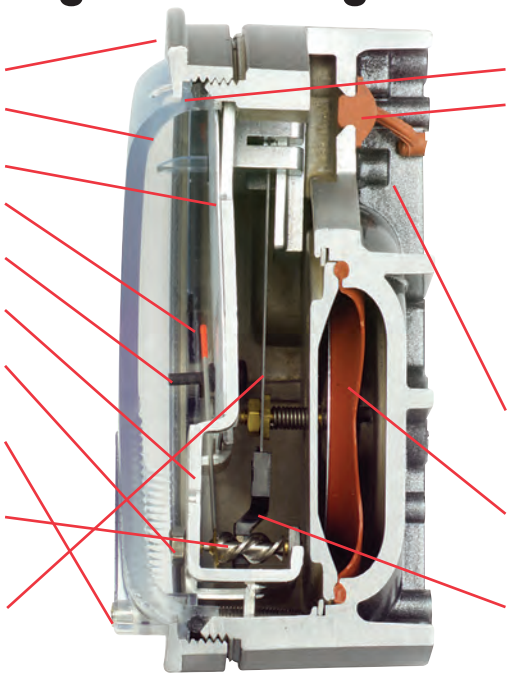
**Model A-605 Air Filter Gage Accessory Kit**
Adapts any standard Magnehelic® gage for use as an air filter gage. Includes aluminum surface mounting bracket with screws, two 5 ft (1.5 m) lengths of 1/4″ aluminum tubing two static pressure tips and two molded plastic vent valves, integral compression fittings on both tips and valves . . . . . **35.00**

**A-605B Air Filter Gage Accessory Kit,** Air filter kit with two plastic open/close valves, two 4″ steel static tips, plastic tubing and mounting flange . . . . . **26.00**

**A-605C Air Filter Gage Accessory Kit,** Air filter kit with two plastic open/close valves, two plastic static tips, plastic tubing and mounting flange . . . . . **21.00**

Series 2000

# Magnehelic® Gage Models & Ranges



**Bezel** provides flange for flush mounting in panel.

**Clear plastic face** is highly resistant to breakage. Provides undistorted viewing of pointer and scale.

**Precision litho-printed scale** is accurate and easy to read.

**Red tipped pointer** of heat treated aluminum tubing is easy to see. It is rigidly mounted on the helix shaft.

**Pointer stops** of molded rubber prevent pointer over-travel without damage.

**"Wishbone" assembly** provides mounting for helix, helix bearings and pointer shaft.

**Jeweled bearings** are shock-resistant mounted; provide virtually friction-free motion for helix. Motion damped with high viscosity silicone fluid.

**Zero adjustment screw** is conveniently located in the plastic cover, and is accessible without removing cover. O-ring seal provides pressure tightness.

**Helix** is precision made from an alloy of high magnetic permeability. Mounted in jeweled bearings, it turns freely, following the magnetic field to move the pointer across the scale.

**Calibrated range** spring is flat spring steel. Small amplitude of motion assures consistency and long life. It reacts to pressure on diaphragm. Live length adjustable for calibration.

**O-ring seal** for cover assures pressure integrity of case.

**OVERPRESSURE PROTECTION**
**Blowout plug** is comprised of a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (1.7 bar). To provide a free path for pressure relief, there are four spacer pads which maintain 0.023″ clearance when gage is surface mounted. Do not obstruct the gap created by these pads. The blowout plug is not used on models above 180″ of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm. The blowout plug should not be used as a system overpressure control. High supply pressures may still cause the gage to fail due to over pressurization, resulting in property damage or serious injury. Good engineering practices should be utilized to prevent your system from exceeding the ratings or any component.

**Die cast aluminum case** is precision made and iridite-dipped to withstand 168 hour salt spray corrosion test. Exterior finished in baked dark gray hammerloid. One case size is used for all standard pressure options, and for both surface and flush mounting.

**Silicone rubber diaphragm** with integrally molded O-ring is supported by front and rear plates. It is locked and sealed in position with a sealing plate and retaining ring. Diaphragm motion is restricted to prevent damage due to overpressures.

**Samarium Cobalt magnet** mounted at one end of range spring rotates helix without mechanical linkages.

| Model | Range Inches of Water | Price |
|---|---|---|
| 2000-00N†•• | .05-0-.2 | $77.45 |
| 2000-00†•• | 0-.25 | 73.00 |
| 2000-0†• | 0-.50 | 63.50 |
| 2001 | 0-1.0 | 63.50 |
| 2002 | 0-2.0 | 63.50 |
| 2003 | 0-3.0 | 63.50 |
| 2004 | 0-4.0 | 63.50 |
| 2005 | 0-5.0 | 63.50 |
| 2006 | 0-6.0 | 63.50 |
| 2008 | 0-8.0 | 63.50 |
| 2010 | 0-10 | 63.50 |
| 2012 | 0-12 | 63.50 |
| 2015 | 0-15 | 63.50 |
| 2020 | 0-20 | 63.50 |
| 2025 | 0-25 | 63.50 |
| 2030 | 0-30 | 63.50 |
| 2040 | 0-40 | 63.50 |
| 2050 | 0-50 | 63.50 |
| 2060 | 0-60 | 63.50 |
| 2080 | 0-80 | 63.50 |
| 2100 | 0-100 | 63.50 |
| 2120 | 0-120 | 63.50 |
| 2150 | 0-150 | 63.50 |
| 2160 | 0-160 | 88.50 |
| 2180* | 0-180 | 190.00 |
| 2250* | 0-250 | 190.00 |
| **Zero Center Ranges** | | |
| 2300-00†•• | 0.125-0-0.125 | $74.00 |
| 2300-0†• | .25-0-.25 | 74.00 |
| 2301 | .5-0-.5 | 74.00 |
| 2302 | 1-0-1 | 74.00 |
| 2304 | 2-0-2 | 74.00 |
| 2310 | 5-0-5 | 74.00 |
| 2320 | 10-0-10 | 74.00 |
| 2330 | 15-0-15 | 74.00 |

| Model | Range PSI | Price |
|---|---|---|
| 2201 | 0-1 | $67.95 |
| 2202 | 0-2 | 67.95 |
| 2203 | 0-3 | 67.95 |
| 2204 | 0-4 | 67.95 |
| 2205 | 0-5 | 67.95 |
| 2210* | 0-10 | 169.45 |
| 2215* | 0-15 | 169.45 |
| 2220* | 0-20 | 169.45 |
| 2230** | 0-30 | 242.00 |

| Model | Range, CM of Water | Price |
|---|---|---|
| 2000-15CM | 0-15 | $63.50 |
| 2000-20CM | 0-20 | 63.50 |
| 2000-25CM | 0-25 | 63.50 |
| 2000-50CM | 0-50 | 63.50 |
| 2000-80CM | 0-80 | 63.50 |
| 2000-100CM | 0-100 | 63.50 |
| 2000-150CM | 0-150 | 67.95 |
| 2000-200CM | 0-200 | 67.95 |
| 2000-250CM | 0-250 | 67.95 |
| 2000-300CM | 0-300 | 67.95 |
| **Zero Center Ranges** | | |
| 2300-4CM | 2-0-2 | $78.45 |
| 2300-10CM | 5-0-5 | 78.45 |
| 2300-30CM | 15-0-15 | 78.45 |

†These ranges calibrated for vertical scale position.
• Accuracy +/-3%
• • Accuracy +/-4%
*MP option standard
**HP option standard

| Model | Range MM of Water | Price |
|---|---|---|
| 2000-6MM†•• | 0-6 | $73.00 |
| 2000-10MM†• | 0-10 | 63.50 |
| 2000-15MM | 0-15 | 63.50 |
| 2000-25MM | 0-25 | 63.50 |
| 2000-30MM | 0-30 | 63.50 |
| 2000-50MM | 0-50 | 63.50 |
| 2000-80MM | 0-80 | 63.50 |
| 2000-100MM | 0-100 | 63.50 |
| 2000-125MM | 0-125 | 63.50 |
| 2000-150MM | 0-150 | 63.50 |
| 2000-200MM | 0-200 | 63.50 |
| 2000-250MM | 0-250 | 63.50 |
| 2000-300MM | 0-300 | 63.50 |
| **Zero Center Ranges** | | |
| 2300-6MM†•• | 3-0-3 | $99.00 |
| 2300-10MM†• | 5-0-5 | 74.00 |
| 2300-20MM†• | 10-0-10 | 74.00 |

| Model | Range, Pa | Price |
|---|---|---|
| 2000-60NPA†•• | 10-0-50 | $77.45 |
| 2000-60PA†•• | 0-60 | 73.00 |
| 2000-100PA†• | 0-100 | 63.50 |
| 2000-125PA†• | 0-125 | 63.50 |
| 2000-250PA | 0-250 | 63.50 |
| 2000-300PA | 0-300 | 63.50 |
| 2000-500PA | 0-500 | 63.50 |
| 2000-750PA | 0-750 | 63.50 |
| 2000-1000PA | 0-1000 | 63.50 |
| **Zero Center Ranges** | | |
| Model | Range, Pa | Price |
| 2300-60PA†•• | 30-0-30 | $74.00 |
| 2300-100PA†• | 50-0-50 | 74.00 |
| 2300-120PA | 60-0-60 | 74.00 |
| 2300-200PA | 100-0-100 | 74.00 |
| 2300-250PA | 125-0-125 | 74.00 |
| 2300-300PA | 150-0-150 | 74.00 |
| 2300-500PA | 250-0-250 | 74.00 |
| 2300-1000PA | 500-0-500 | 74.00 |

| Model | Range, kPa | Price |
|---|---|---|
| 2000-0.5KPA | 0-0.5 | $63.50 |
| 2000-1KPA | 0-1 | 63.50 |
| 2000-1.5KPA | 0-1.5 | 63.50 |
| 2000-2KPA | 0-2 | 63.50 |
| 2000-2.5KPA | 0-2.5 | 63.50 |
| 2000-3KPA | 0-3 | 63.50 |
| 2000-4KPA | 0-4 | 63.50 |
| 2000-5KPA | 0-5 | 63.50 |
| 2000-8KPA | 0-8 | 63.50 |
| 2000-10KPA | 0-10 | 63.50 |
| 2000-15KPA | 0-15 | 63.50 |
| 2000-20KPA | 0-20 | 63.50 |
| 2000-25KPA | 0-25 | 63.50 |
| 2000-30KPA | 0-30 | 63.50 |
| **Zero Center Ranges** | | |
| 2300-1KPA | .5-0-.5 | $74.00 |
| 2300-2KPA | 1-0-1 | 74.00 |
| 2300-2.5KPA | 1.25-0-1.25 | 74.00 |
| 2300-3KPA | 1.5-0-1.5 | 74.00 |

**Dual Scale Air Velocity Units**
For use with pitot tube

| Model | Range in W.C./ Velocity F.P.M. | Price |
|---|---|---|
| 2000-00AV†•• | 0-.25/ 300-2000 | $98.00 |
| 2000-0AV†• | 0-.50/ 500-2800 | 88.50 |
| 2001AV | 0-1.0/ 500-4000 | 67.95 |
| 2002AV | 0-2.0/ 1000-5600 | 67.95 |
| 2005AV | 0-5.0/ 2000-8800 | 67.95 |
| 2010AV | 0-10/ 2000-12500 | 67.95 |

**Dual Scale English/Metric Models**

| Model | Range, in w.c. | Range, Pa or kPa | Price |
|---|---|---|---|
| 2000-00D†•• | 0-.25 | 0-62 Pa | $73.00 |
| 2000-0D†• | 0-0.5 | 0-125 Pa | 67.95 |
| 2001D | 0-1.0 | 0-250 Pa | 67.95 |
| 2002D | 0-2.0 | 0-500 Pa | 67.95 |
| 2003D | 0-3.0 | 0-750 Pa | 67.95 |
| 2004D | 0-4.0 | 0-1.0 kPa | 67.95 |
| 2005D | 0-5.0 | 0-1.25 kPa | 67.95 |
| 2006D | 0-6.0 | 0-1.5 kPa | 67.95 |
| 2008D | 0-8.0 | 0-2.0 kPa | 67.95 |
| 2010D | 0-10 | 0-2.5 kPa | 67.95 |
| 2015D | 0-15 | 0-3.7 kPa | 67.95 |
| 2020D | 0-20 | 0-5 kPa | 88.50 |
| 2025D | 0-25 | 0-6.2 kPa | 88.50 |
| 2050D | 0-50 | 0-12.4 kPa | 88.50 |
| 2060D | 0-60 | 0-15 kPa | 88.50 |

**VELOCITY AND VOLUMETRIC FLOW UNITS**
Scales are available on the Magnehelic® that read in velocity units (FPM, m/s) or volumetric flow units (SCFM, $m^3/s$, $m^3/h$). Stocked velocity units with dual range scales in inches w.c. and feet per minute are shown above. For other ranges contact the factory.
When ordering volumetric flow scales please specify the maximum flow rate and its corresponding pressure. Example: 0.5 in w.c. = 16,000 CFM.

**ACCESSORIES**
**A-321,** Safety Relief Valve . . . . . **34.00**
**A-448,** 3-piece magnet kit for mounting Magnehelic® gage directly to magnetic surface . . . . . **10.75**
**A-135,** Rubber gasket for panel mounting . . . . . **1.50**

**A-310A 3-Way Vent Valves** . . . . . **$16.50**
In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage.

# Standard Operating Procedure Installation and Extraction of the FLX-VP VAPOR PIN®

Updated October 4, 2016

## Scope:

This standard operating procedure describes the installation, use, and extraction of the FLX-VP for sub-slab soil-gas sampling.

## Purpose:

The purpose of this procedure is to assure good quality control in field operations and uniformity between field personnel in the use of the FLX-VP for the collection of sub-slab soil-gas samples or pressure readings.

## Equipment Needed:

- Assembled FLX-VP [FLX-VP barb fitting with O-ring, FLX-VP base, and silicone sleeve (Figure 1)]; Because of sharp edges, gloves are recommended for sleeve installation;
- Hammer drill;
- 5/8-inch (16mm) diameter hammer bit (hole must be 5/8-inch (16mm) diameter to ensure seal. It is recommended that you use the drill guide). (Hilti™ TE-YX 5/8" x 22" (400 mm) #00206514 or equivalent);
- 1½-inch (38mm) diameter hammer bit (Hilti™ TE-YX 1½" x 23" #00293032 or equivalent) for flush mount applications;
- ¾-inch (19mm) diameter bottle brush;
- Wet/Dry vacuum with HEPA filter (optional);
- VAPOR PIN® installation/extraction tool;
- Dead blow hammer;
- VAPOR PIN® flush mount cover, if desired;
- VAPOR PIN® drilling guide, if desired;
- VAPOR PIN® protective cap; and
- VOC-free hole patching material (hydraulic cement) and putty knife or trowel for repairing the hole following the extraction of the FLX-VP.

Figure 1. Assembled FLX-VP

## Installation Procedure:

1) Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.
2) Set up wet/dry vacuum to collect drill cuttings.

3) If a flush mount installation is required, drill a 1½-inch (38mm) diameter hole at least 1¾-inches (45mm) into the slab. Use of a VAPOR PIN® drilling guide is recommended.

4) Drill a 5/8-inch (16mm) diameter hole through the slab and approximately 1-inch (25mm) into the underlying soil to form a void. Hole **must** be 5/8-inch (16mm) in diameter to ensure seal. It is recommended that you use the drill guide.

5) Remove the drill bit, brush the hole with the bottle brush, and remove the loose cuttings with the vacuum.

6) Place the lower end of the assembled FLX-VP into the drilled hole. Place the small hole located in the handle of the installation/extraction tool over the barb fitting, and tap the FLX-VP into place using a dead blow hammer (Figure 2). Make sure the installation/extraction tool is aligned parallel to the FLX-VP to avoid damaging the barb fitting.

**Figure 2.** Installing the FLX-VP

During installation, the silicone sleeve will form a slight bulge between the slab and the FLX-VP shoulder. Place the protective cap on FLX-VP to prevent vapor loss prior to sampling (Figure 3).

**Figure 3.** Installed FLX-VP

7) For flush mount installations, cover the FLX-VP with a flush mount cover, using either the plastic cover or the optional stainless-steel Secure Cover (Figure 4).

**Figure 4.** Secure Cover Installed

8) Allow 20 minutes or more (consult applicable guidance for your situation)

for the sub-slab soil-gas conditions to re-equilibrate prior to sampling.

9) Remove protective cap and connect sample tubing to the barb fitting of the FLX-VP. This connection can be made using a short piece of Tygon™ tubing to join the FLX-VP with the Nylaflow tubing (Figure 5). Put the Nylaflow tubing as close to the FLX-VP as possible to minimize contact between soil gas and Tygon™ tubing.

   If you wish to directly connect to FLX-VP accessory (e.g. Swagelok fitting, TO-17 tube, or quick connect) unscrew the barb fitting and replace with accessory (Figures 6 and 7).

**Figure 5.** FLX-VP sample connection

**Figure 6.** FLX-VP with Swagelok® connection

**Figure 7.** FLX-VP with TO-17 Sorbent tube connection

10) Conduct leak tests in accordance with applicable guidance. If the method of leak testing is not specified, an alternative can be the use of a water dam and vacuum pump, as described in SOP Leak Testing the FLX-VP via Mechanical Means (Figure 8). For flush-mount installations, distilled water can be poured directly into the 1 1/2 inch (38mm) hole.

**Figure 8.** Water dam used for leak detection

11) Collect sub-slab soil gas sample or pressure reading. When finished, replace the barb fitting and protective cap and flush mount cover until the next event. If the sampling is complete, extract the FLX-VP.

Extraction Procedure:

1) Remove the protective cap, and thread the installation/extraction tool onto the barrel of the FLX-VP (Figure 9). Continue turning the tool clockwise to pull the FLX-VP from the hole into the installation/extraction tool.

2) Fill the void with hydraulic cement and smooth with a trowel or putty knife.

**Figure 9.** Removing the FLX-VP

3) Prior to reuse, remove the silicone sleeve and protective cap and discard. Decontaminate the FLX-VP in a hot water and Alconox® wash, then heat in an oven to a temperature of 265° F (130° C) for 15 to 30 minutes. For both steps, STAINLESS – ½ hour, BRASS 8 minutes

The FLX-VP is designed to be used repeatedly, however, accessories, replacement parts and supplies will be required periodically. These parts are available on-line at VaporPin.CoxColvin.com

# Standard Operating Procedure Use of the VAPOR PIN® Drilling Guide and Secure Cover

Updated October 4, 2016

## Scope:

This standard operating procedure (SOP) describes the methodology to use the VAPOR PIN® Drilling Guide and Secure Cover to install and secure a VAPOR PIN® in a flush mount configuration.

## Purpose:

The purpose of this SOP is to detail the methodology for installing a VAPOR PIN® and Secure Cover in a flush mount configuration. The flush mount configuration reduces the risk of damage to the VAPOR PIN® by foot and vehicular traffic, keeps dust and debris from falling into the flush mount hole, and reduces the opportunity for tampering. This SOP is an optional process performed in conjunction with the SOP entitled "Installation and Extraction of the VAPOR PIN®". However, portions of this SOP should be performed prior to installing the VAPOR PIN®.

## Equipment Needed:

- VAPOR PIN® Secure Cover (Figure 1);
- VAPOR PIN® Drilling Guide (Figure 2);
- Hammer drill;
- 1½-inch diameter hammer bit (Hilti™ TE-YX 1½" x 23" #00293032 or equivalent);
- 5/8-inch diameter hammer bit (Hilti™ TE-YX 5/8" x 22" #00226514 or equivalent);
- assembled VAPOR PIN®;
- #14 spanner wrench;
- Wet/Dry vacuum with HEPA filter (optional); and
- personal protective equipment (PPE).

**Figure 1.** VAPOR PIN® Secure Cover

**Figure 2.** VAPOR PIN® Drilling Guide

## Installation Procedure:

1) Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.

2) Set up wet/dry vacuum to collect drill cuttings.

3) While wearing PPE, drill a 1½-inch diameter hole into the concrete slab to a depth of approximately 1 3/4 inches. Pre-marking the desired depth on the drill

bit with tape will assist in this process.

4) Remove cuttings from the hole and place the Drilling Guide in the hole with the conical end down (Figure 3). The hole is sufficiently deep if the flange of the Drilling Guide lies flush with the surface of the slab. Deepen the hole as necessary, but avoid drilling more than 2 inches into the slab, as the threads on the Secure Cover may not engage properly with the threads on the VAPOR PIN®.

**Figure 3.** Testing Depth with the Drilling Guide

5) When the 1½-inch diameter hole is drilled to the proper depth, replace the drill bit with a 5/8-inch diameter bit, insert the bit through the Drilling Guide (Figure 4), and drill through the slab. The Drilling Guide will help to center the hole for the VAPOR PIN®, and keep the hole perpendicular to the slab.

6) Remove the bit and drilling guide, clean the hole, and install the VAPOR PIN® in accordance with the SOP "Installation and Extraction of the VAPOR PIN®.

**Figure 4.** Using the Drilling Guide

7) Screw the Secure Cover onto the VAPOR PIN® and tighten using a #14 spanner wrench by rotating it clockwise (Figure 5). Rotate the cover counter clockwise to remove it for subsequent access.

**Figure 5.** Tightening the Secured Cover

Limitations:

On slabs less than 3 inches thick, it may be difficult to obtain a good seal in a flush mount configuration with the VAPOR PIN.®

# Standard Operating Procedure Installation and Extraction of the Vapor Pin®

Updated March 16, 2018

## Scope:

This standard operating procedure describes the installation and extraction of the VAPOR PIN® for use in sub-slab soil-gas sampling.

## Purpose:

The purpose of this procedure is to assure good quality control in field operations and uniformity between field personnel in the use of the VAPOR PIN® for the collection of sub-slab soil-gas samples or pressure readings.

## Equipment Needed:

- Assembled VAPOR PIN® [VAPOR PIN® and silicone sleeve(Figure 1)]; Because of sharp edges, gloves are recommended for sleeve installation;
- Hammer drill;
- 5/8-inch (16mm) diameter hammer bit (hole **must** be 5/8-inch (16mm) diameter to ensure seal. It is recommended that you use the drill guide). (Hilti™ TE-YX 5/8" x 22" (400 mm) #00206514 or equivalent);
- 1½-inch (38mm) diameter hammer bit (Hilti™ TE-YX 1½" x 23" #00293032 or equivalent) for flush mount applications;
- ¾-inch (19mm) diameter bottle brush;
- Wet/Dry vacuum with HEPA filter (optional);
- VAPOR PIN® installation/extraction tool;
- Dead blow hammer;
- VAPOR PIN® flush mount cover, if desired;
- VAPOR PIN® drilling guide, if desired;
- VAPOR PIN® protective cap; and
- VOC-free hole patching material (hydraulic cement) and putty knife or trowel for repairing the hole following the extraction of the VAPOR PIN®.

**Figure 1.** Assembled VAPOR PIN®

## Installation Procedure:

1) Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.

2) Set up wet/dry vacuum to collect drill cuttings.

3) If a flush mount installation is required, drill a 1½-inch (38mm) diameter hole at least 1¾-inches (45mm) into the slab. Use of a VAPOR PIN® drilling guide is recommended.

4) Drill a 5/8-inch (16mm) diameter hole through the slab and approximately 1-inch (25mm) into the underlying soil to form a void. Hole **must** be 5/8-inch (16mm) in diameter to ensure seal. It is recommended that you use the drill guide.

5) Remove the drill bit, brush the hole with the bottle brush, and remove the loose cuttings with the vacuum.

6) Place the lower end of VAPOR PIN® assembly into the drilled hole. Place the small hole located in the handle of the installation/extraction tool over the vapor pin to protect the barb fitting, and tap the vapor pin into place using a dead blow hammer (Figure 2). Make sure the installation/extraction tool is aligned parallel to the vapor pin to avoid damaging the barb fitting.

**Figure 2.** Installing the VAPOR PIN®

During installation, the silicone sleeve will form a slight bulge between the slab and the VAPOR PIN® shoulder. Place the protective cap on VAPOR PIN® to prevent vapor loss prior to sampling (Figure 3).

**Figure 3.** Installed VAPOR PIN®

7) For flush mount installations, cover the vapor pin with a flush mount cover, using either the plastic cover or the optional stainless-steel Secure Cover (Figure 4).

**Figure 4.** Secure Cover Installed

8) Allow 20 minutes or more (consult applicable guidance for your situation) for the sub-slab soil-gas conditions to re-equilibrate prior to sampling.

9) Remove protective cap and connect sample tubing to the barb fitting of the VAPOR PIN®. This connection can be made using a short piece of Tygon™ tubing to join the VAPOR PIN® with the

Nylaflow tubing (Figure 5). Put the Nylaflow tubing as close to the VAPOR PIN® as possible to minimize contact between soil gas and Tygon™ tubing.

**Figure 5.** VAPOR PIN® sample connection

10) Conduct leak tests in accordance with applicable guidance. If the method of leak testing is not specified, an alternative can be the use of a water dam and vacuum pump, as described in SOP Leak Testing the VAPOR PIN® via Mechanical Means (Figure 6). For flush-mount installations, distilled water can be poured directly into the 1 1/2 inch (38mm) hole.

**Figure 6.** Water dam used for leak detection

11) Collect sub-slab soil gas sample or pressure reading. When finished, replace the protective cap and flush mount cover until the next event. If the sampling is complete, extract the VAPOR PIN®.

Extraction Procedure:

1) Remove the protective cap, and thread the installation/extraction tool onto the barrel of the VAPOR PIN® (Figure 7). Turn the tool clockwise continuously, don't stop turning, the VAPOR PIN® will feed into the bottom of the installation/extraction tool and will extract from the hole like a wine cork, DO NOT PULL.

2) Fill the void with hydraulic cement and smooth with a trowel or putty knife.

**Figure 7.** Removing the VAPOR PIN®

- Prior to reuse, remove the silicone sleeve and protective cap and discard. Decontaminate the VAPOR PIN® in a hot water and Alconox® wash, then heat in an oven to a temperature of 265° F (130° C) for 15 to 30 minutes. For both steps, **STAINLESS – ½ hour, BRASS 8 minutes**

3) Replacement parts and supplies are available online.

# Appendix C MONITORING LOG FORMS

- Monthly Monitoring Log
- Annual Monitoring Log

**Former AMSF Site (BCP Site #C828101)** **MONTHLY INSPECTION FORM**

**12 Pixley Industrial Parkway, Gates, New York**

***SSDS Pressure Monitoring Form***

| Fan | Monitoring Panel Group | Approximate Time | Differential Pressure (inches of water column) |
|---|---|---|---|
| 1 | 4 | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | 3 | | |
| 9 | | | |
| 10 | | | |
| 11 | 1 | | |
| 12 | | | |
| 13 | | | |
| 14 | | | |
| 15 | 2 | | |
| 16 | | | |
| 17 | | | |
| 18 | | | |
| 19 | | | |
| 20 | | | |
| 21 | | | |

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|---|
| Date: |
| Weather conditions: |
| Is an air supply/heating system on: |
| Name and Position: |
| Company: |

## SSDS Inspection Form

Date _____
Name _____
Company _____
Position _____

| Done? | Task | Notes |
|---|---|---|
| **SSDS Inspection** | | |
| | Visual inspection of the equipment and piping | |
| | Identification and subsequent repair of any leaks | |
| | Inspection of exhaust points to verify that no air intakes have been located nearby | |
| | Audible operational status check of vent fans | |
| | Documentation of manifold settings and vacuum at each fan and extraction point | |
| | Documentation of sub-slab pressure at each permanent sub-slab pressure monitoring point | |
| | Suction point riser valve adjustments as required to balance parallel branches of system | |
| | Maintenance activities conducted | |
| | Any modifications to the system | |
| **Cover System (Concrete Floor Slab) Inspection** | | |
| | Visual inspection of the hard surface cover for evidence of deep cracks, potholes, cuts, depressions, and deterioration of joint seals and penetration seals | |
| | Identification of any areas where there is evidence of excessive settlement relative to the surrounding areas | |
| | Note any audible indications of leaks in the cover system, and/or note results of any smoke tests performed to check for leaks | |

## SSDS Pressure Monitoring Form

| PMP | Date | Approximate Time | Differential Pressure (inches of water column) | Manometer Zeroed? |
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| Fan | SSDS Zone | Date | Approximate Time | Differential Pressure (inches of water column) | Manometer Zeroed? |
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| Suction Point (Riser) | SSDS Zone | Date | Approximate Time | Differential Pressure (inches of water column) | Manometer Zeroed? |
|---|---|---|---|---|---|
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Weather conditions: _____

Is an air supply/heating system on: _____

Name and Position: _____

Company: _____

Notes:

1) All sub-slab pressure readings are shown as differential pressure readings between the indoor air and the sub-slab void space. Values shown as negative values indicate that sub-slab pressure is lower than indoor air pressure.