



SUB-SLAB DEPRESSURIZATION SYSTEM INSTALLATION REPORT

**Bright Cleaners Tenant Space
Franklin Centre
7249 South 76th Avenue
Franklin, Milwaukee County, Wisconsin**

November 6, 2018

Apex Project No. PECO_2017-101

Prepared for:

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EXECUTIVE SUMMARY

Franklin Station LLC (Client) retained Apex Companies, LLC (Apex) to install a Sub-Slab Depressurization System (SSDS) at the dry cleaner tenant space at 7249 South 76th Street (Site). This tenant space is located within Franklin Centre, a retail strip mall located at 7199-7255 South 76th Street in Franklin, Milwaukee County, Wisconsin (the Parent Tract). The general vicinity of the Parent Tract is shown in **Figure 1**.

Prior to acquiring the Parent Tract, Client retained Apex to conduct a Phase I Environmental Site Assessment (ESA) at the Franklin Centre. The Phase I ESA identified one recognized environmental condition (REC), use of dry-cleaning solvents in a tenant space currently occupied by Bright Cleaners. The findings of the Phase I ESA were presented in Apex's report dated September 2016.

The Client subsequently retained Apex to conduct a Site Investigation at the dry cleaner tenant space. The scope of work for the subsurface investigation was described in Apex's report dated August 31, 2016. To assess the potential for vapor intrusion into buildings at the Site, Apex conducted several rounds of sub-slab soil-gas sampling/analysis. The soil-gas analysis detected tetrachloroethylene (PCE) at a concentration in excess of sub-slab Vapor Action Levels (VALs) below the concrete floor in the tenant space.

Apex created a remedial action options and design report dated January 24, 2018. As part of the plan, Apex proposed the installation of a SSDS. Per the mitigation and monitoring plan, a SSDS was installed to vent PCE vapors below the floor slab in the vicinity of the soil-gas exceedances. The SSDS was installed to address the potential indoor vapor intrusion and reduce subsurface solvent mass.

1.0 INTRODUCTION

Bright Station LLC retained Apex to install a sub-slab depressurization system for the dry cleaner tenant space at 7249 South 76th Street.

Historical records show two dry cleaning businesses have operated dry cleaning plants at the Site: Sun Cleaners in 1995 and Bright Cleaners from 1999 to present. Analysis of soil and soil-gas samples detected VOCs at concentration in excess of Soil Residual Contaminant Levels (RCLs) and sub-slab Vapor Action Levels (VALs) cited in Wisconsin regulations. It was Apex's opinion that to address the soil-gas exposure pathway for building occupants, mitigation was required. A SSDS was selected for mitigation of soil-gas to indoor air. The SSDS is intended to prevent potential vapors from entering from beneath the building once the SSDS is installed and operational. Additionally, Apex believes that the SSDS will reduce subsurface solvent mass beneath the store after several months of operation.

1.1 Site Description

The Site is a dry cleaner tenant space located at 7249 South 76th Street. The Site is within the Client's Franklin Centre, a retail strip mall located within Franklin Centre, a retail strip mall located at 7199-7255 South 76th Street in Franklin, Milwaukee County, Wisconsin

The Parent Tract occupies approximately 14.6-acres of land developed with a 120,000-square foot (SF) multi-tenant shopping center, asphalt-paved parking and landscaped areas. Franklin Centre is bounded to the north by an outparcel bank, restaurant, and a multi-tenant commercial retail building followed by W Rawson Avenue; to the east by two outparcel banks and a restaurant followed by S 76th Street; to the south by undeveloped properties and condominium properties followed by Terrace Drive; and to the west by undeveloped properties followed by W Loomis Road/Wisconsin 36. The Site configuration and the adjoining properties are shown in the Site Plan provided as **Figure 2**. Photographs of the Site are included in **Appendix A**.

2.0 PREVIOUS SOIL GAS SAMPLING/ANALYSIS

Apex collected 6 soil-gas samples immediately below the concrete floor slab in and adjacent to the dry cleaner tenant space at the locations shown in Figure 1. The soil-gas samples were analyzed for VOCs by EPA Method TO-15.

The results of the soil-gas analysis were compared to sub-slab Vapor Action Levels (VALs) for a commercial property use based on the USEPA VISLC (Version 3.5.1, May 2016) with an excess lifetime cancer risk of 1×10^{-5} in accordance with WAC 716.

The soil-gas analysis detected PCE in two samples (samples SV-1 and SV-2) at concentrations in excess of commercial VALs per WAC 716. **Figure 3** shows the sample locations where the soil-gas exceeds the VALs.

The soil-gas analysis did not detect any additional VOCs at concentrations in excess of commercial VALs per WAC 716. It is Apex's opinion that the VOCs detected in soil-gas and groundwater have been delineated, and that additional investigation is not warranted. However, to eliminate the soil-gas exposure pathway for building occupants, mitigation is required.

3.0 INSTALLATION OF SUB-SLAB DEPRESSURIZATION SYSTEM

Apex designed a SSDS intended to vent the soil-vapor below the floor slab in the vicinity of soil-gas exceedances. The design included a post-installation communication tests to determine the radius of influence for the SSDS. The areas for soil-gas venting (depressurization) are shown in **Figure 3**. The SSDS installation, and the results of post-installation communication tests are described below. Photographs showing the SSDS installation are included in **Appendix A**.

3.1 Installation of Sub-Slab Depressurization System

Apex retained RadoVent Illinois, LLC to install the SSDS on September 17, 2018. The SSDS installed consisted of the following:

1. A total of three 4" suction points were installed at the locations shown in **Figure 3**. 5" holes were cored through the slab on grade to reach the sub grade materials under the building, and about 4 gallons of material were removed from each core location.
2. A 3-inch diameter PVC pipe extends from each suction point to the intake side of the AMG Maverick in-line fan installed on the outside of the southern wall of the dry cleaner tenant space. The fan extracts vapors from the three suction pits. The fan is capable of achieving a static vacuum of at least 0.25 inches water column (wc) at the suction point. Specifications for the AMG Maverick fans are included in **Appendix B**. Photographs showing the vent pipes and in-line fan are included in **Appendix A**.

Vacuum measurements show a differential pressure reading of at least -0.003 inches wc below the slab at the farthest edges of the area served by the suction pit. Further, visible downward flow of air at test holes was observed at a 15-foot radius from the suction pit using the flame or a butane lighter.

3. A manometer was installed on the outer surface of each vent pipe to allow maintenance staff to routinely monitor on-going system operation via a visual check on the gauge. A photograph of a micrometer is also included in **Appendix A**. Manometer measurements and the volume of vented airflow recorded on October 4, 2018 are summarized in **Table 1**.
4. The pipes exhausts outside the building at approximately 10-12' feet above grade level. The vent stack continues up the back of the building to stick up 2'-3' feet above the roof.

Materials and installation techniques followed guidelines put forth in ASTM E2121: Standard Practice for Installing Radon Mitigation systems in Existing Low-Rise Residential Buildings. Radon systems are nearly identical in design to SSDS systems and this ASTM Standard was applicable to residential and commercial properties.

3.2 Post-Installation Communication Test

Following the SSDS installation, a sub-slab communication tests were performed to confirm that the extraction system was performing as intended. A micro manometer was used to measure pressure gradients and to determine how easily air can move from one point to another beneath the floor slab. During the tests, small holes were cored in strategic locations through the slab. Pressure differentials during the communication tests were used to determine the most efficient configuration for the active venting system. Photographs showing use of the micro manometer is included in **Appendix A**. As mentioned above, visible downward flow of air at test holes was observed at a 15-foot radius from the suction pits using the flame or a butane lighter. Based upon the results of the butane flame test, the radius of the vacuum near each extraction point exceeds 15 feet. The radius of the vacuum for each extraction point is shown in **Figure 3**.

4.0 SUMMARY AND CONCLUSIONS

Franklin Station LLC (Client) retained Apex Companies, LLC to install a SSDS at the dry cleaner tenant space at 7249 South 76th Street (Site). This tenant space is located within Franklin Centre, a retail strip mall located at 7199-7255 South 76th Street in Franklin, Milwaukee County, Wisconsin.

Prior to acquiring the Parent Tract, Client retained Apex to conduct a Phase I Environmental Site Assessment (ESA) at the Franklin Centre. The Phase I ESA identified one recognized environmental condition (REC), use of dry-cleaning solvents in a tenant space currently occupied by Bright Cleaners. The findings of the Phase I ESA were presented in Apex's report dated September 2016.

To address the soil-gas exposure pathway for building occupants, mitigation was required. A SSDS was selected for mitigation of soil-gas to indoor air. The SSDS is intended to prevent potential vapors from entering from beneath the building once the SSDS is installed and operational. Additionally, Apex believes that the SSDS will reduce subsurface solvent mass beneath the store after several months of operation.

RadoVent was subcontracted in October 2018 to complete the installation of the SSDS System. The SSDS reduces potential indoor vapor intrusion from beneath the building both in the short and long-term.

The SSDS was installed to vent PCE vapors from below the floor slab in the vicinity of soil-gas exceedances. Following four months of SSDS operation, an additional round of soil-gas samples will be collected for analysis. The objective of this additional round of sampling will be to assess whether the SSDS has reduced the target analytes near previous soil-gas samples SV-1 and SV-2 to concentrations below VALs.

Table

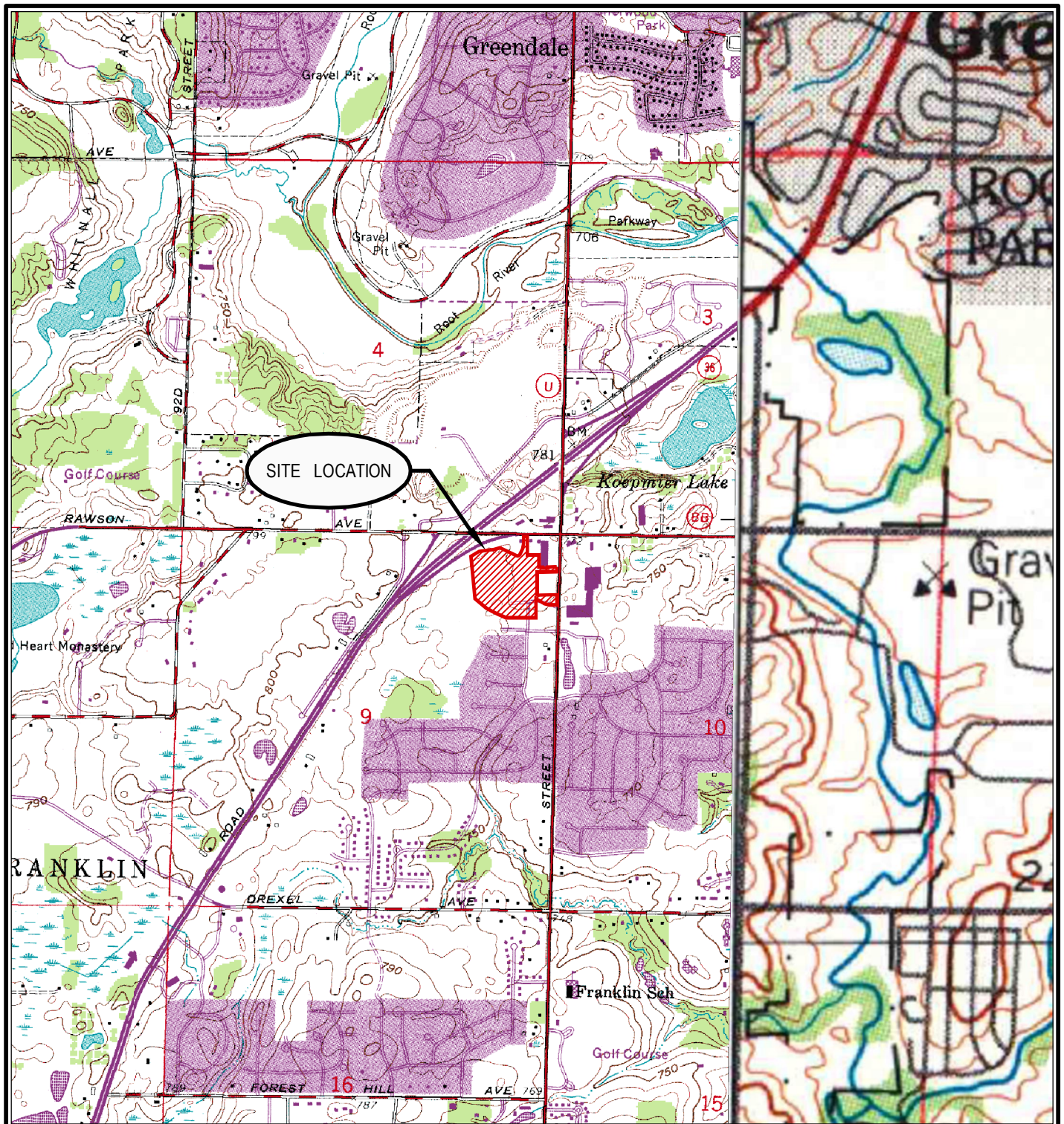
Table 1

**Summary of Manometer Measurements
Bright Dry Cleaner, Franklin Wisconsin**

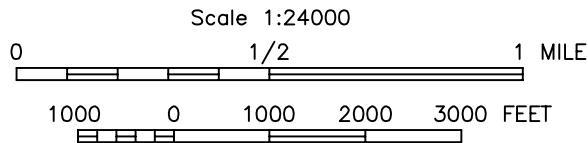
Suction Point Location	Date	Pressure (Inches H₂O)	Volume Vented (CFM)
SP-1	October 4, 2018	.55	131
SP-2	October 4, 2018	.25	178
SP-3	October 4, 2018	.20	195

CFM = cubic feet per minute

Figures



QUADRANGLE LOCATION



(SOURCE OF MAP IS USGS 7.5 MINUTE QUADRANGLE MAP, HALES CORNERS (1994), WISCONSIN)



CHECK BY	JB
DRAWN BY	OS
DATE	11-1-18
SCALE	AS SHOWN
CAD NO.	PECO_2017.101C
PRJ NO.	PECO_2017.101

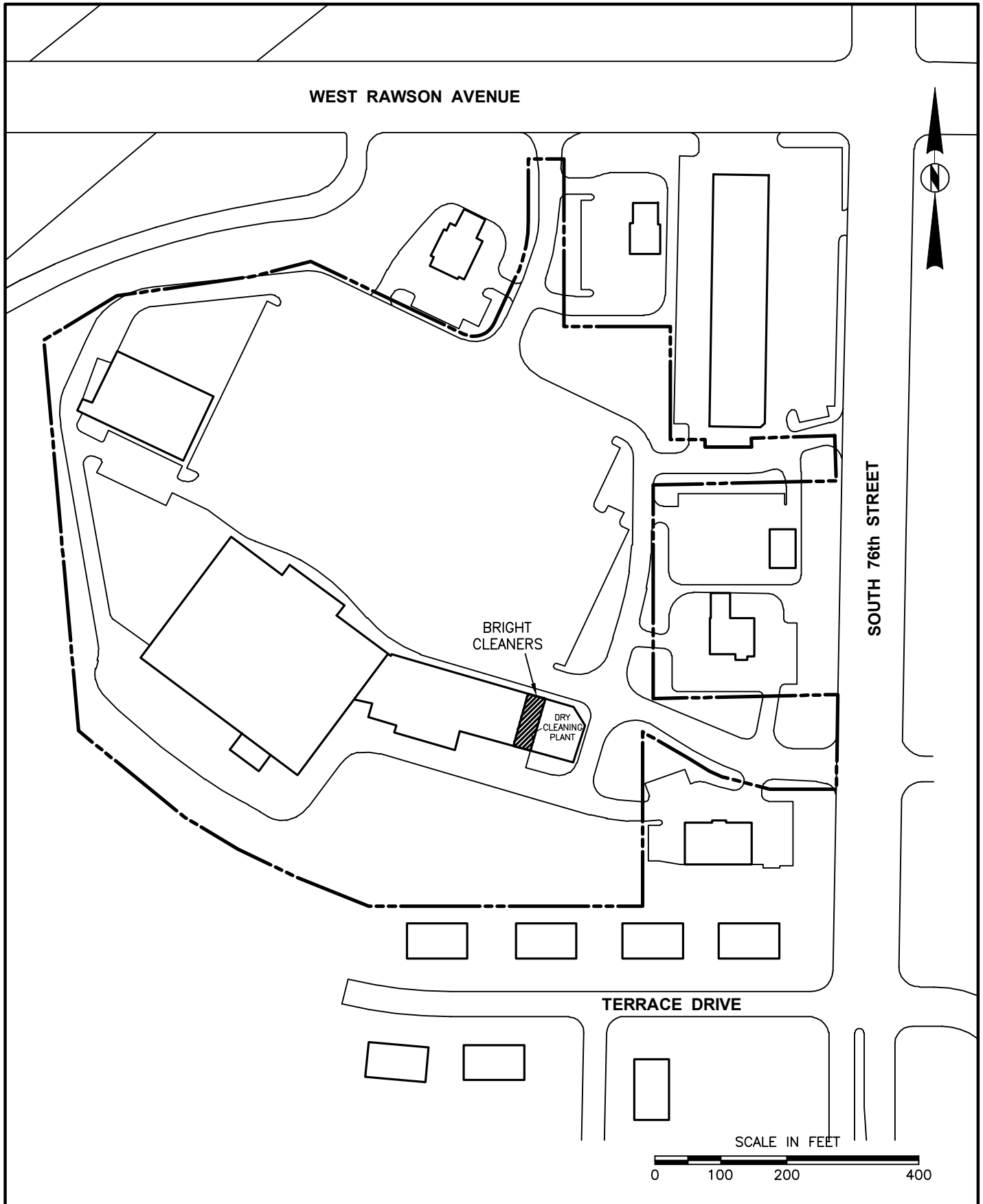
SITE LOCATION MAP

BRIGHT CLEANERS – FRANKLIN
7249 SOUTH 76th STREET
FRANKLIN, WISCONSIN



FIGURE

1

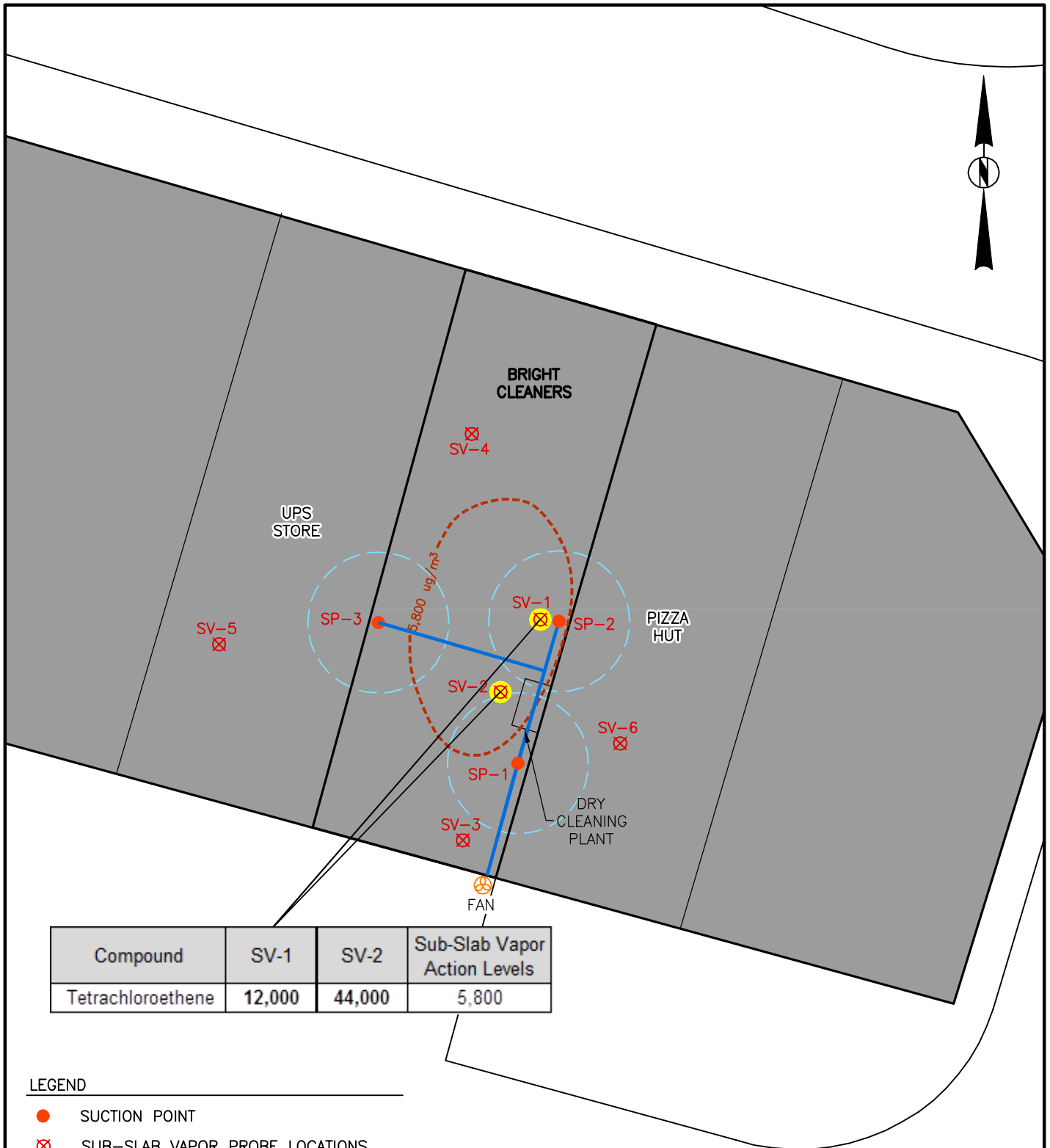


CHECK BY	JB
DRAWN BY	OS
DATE	11-1-18
SCALE	AS SHOWN
CAD NO.	PECO_2017.101B
PRJ NO.	PECO_2017.101

SITE PLAN
 BRIGHT CLEANERS – FRANKLIN
 7249 SOUTH 76th STREET
 FRANKLIN, WISCONSIN



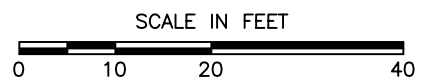
FIGURE
2



Compound	SV-1	SV-2	Sub-Slab Vapor Action Levels
Tetrachloroethene	12,000	44,000	5,800

LEGEND

- SUCTION POINT
- ⊗ SUB-SLAB VAPOR PROBE LOCATIONS
- TETRACHLOROETHENE (PCE) EXCEEDS SUB-SLAB VAPOR ACTION LEVELS (VAL)
CONCENTRATIONS IN MICROGRAMS PER CUBIC METER ($\mu\text{g}/\text{m}^3$)
CONCENTRATIONS EXCEEDING THE VAL ARE SHOWN IN BOLD
- ESTIMATED AREA OF EXCEEDANCE OF SUB-SLAB VACs



CHECK BY	RG
DRAWN BY	OS
DATE	10-11-18
SCALE	AS SHOWN
CAD NO.	PECO_2017.100A
PRJ NO.	PECO_2017.101

SITE DETAIL SHOWING SOIL VAPOR SAMPLE LOCATIONS
WHERE PCE EXCEEDS THE VAL

BRIGHT CLEANERS – FRANKLIN CENTRE
7249 SOUTH 76th STREET
FRANKLIN, WISCONSIN



FIGURE

3

APPENDIX A

PHOTO LOG



**PHOTO LOG FOR BRIGHT CLEANERS
7249 SOUTH 76TH AVE, FRANKLIN, WISCONSIN**

Photo No. 1 showing one of the three 4" suction points inside the building.



Photo No. 2 showing a suction point and correlated PVC piping..



Photo No.3 showing a suction point and correlated PVC piping.



**PHOTO LOG FOR BRIGHT CLEANERS
7249 SOUTH 76TH AVE, FRANKLIN, WISCONSIN**

Photo No. 4 showing the sub-slab depressurization system.



Photo No. 5 showing the sub-slab depressurization system.



Photo No. 6 showing the mounted fan on the exterior of the building.



**PHOTO LOG FOR BRIGHT CLEANERS
7249 SOUTH 76TH AVE, FRANKLIN, WISCONSIN**

Photo No. 7
documenting a
communication test
on the system.



Photo No. 8
showing the
manometer
installed on suction
point.

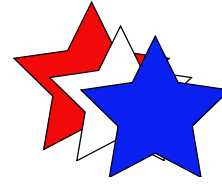


Photo No. 9
showing the
manometer
installed on
suction point.



Appendix B

FESTA RADON TECHNOLOGIES Co.



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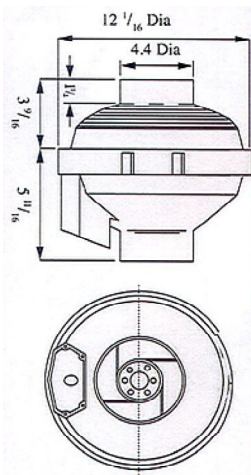
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AMG Maverick



Performance shown is for installation type D - Ducted inlet, Ducted outlet.

Speed (rpm) shown is nominal. Performance is based on actual speed of test. Performance ratings do not include the effects of appurtenances in the air stream. The performance figures shown have been corrected to standard air density.

*We have brackets, too!

Model	Volts	Watts	Max. Amps	CFM at STATIC PRESSURE in. w.g.							
				0"	0.5"	0.75"	1.0"	1.25"	1.5"	1.75"	1.88"
AMG Maverick	150V 60Hz	85	0.75	220	136	111	82	51	21	7	0
Weight: 8 lbs. 3 oz. Fan Speed: 2200 rpm											

Tag your pictures of our products on social media using #Festafans and we will repost your picture!

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