MATRIX
ENVIRONMENTAL TECHNOLOGIES INC.
Remediation, Water Treatment and Environmental Engineering
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August 23, 2023

Mr. Rocco Termini
R&M Leasing LLC
391 Washington Street
Buffalo, NY 14203

Mr. Mark Hanna
Environmental Advantage, Inc.
3636 North Buffalo Street
Orchard Park, NY 14127

Re: SSD System Installation Work Plan
Pierce Arrow Business Center
155 Chandler Street
Buffalo, New York 14203
NYSDEC Site #C915312
METI Project #22-068

Mr. Termini & Mr. Hanna:

This document presents a Work Plan (WP) for the design and installation of a sub-slab depressurization (SSD) system at the Pierce Arrow Business Center (PABC) property located at 155 Chandler Street, Buffalo, New York ("Site"). This Work Plan has been prepared on behalf of R&M Leasing LLC.

If you have any questions or require additional information, please contact Matrix.

Sincerely,
Matrix Environmental Technologies Inc.

Christine M. Curtis, P.E.
Senior Engineer

Sean R. Carter, P.E.
Principal Engineer

SUB-SLAB DEPRESSURIZATION (SSD) SYSTEM INSTALLATION WORK PLAN

Pierce Arrow Business Center
155 Chandler Street
Buffalo, New York 14203
NYSDEC Site #C915312

August 23, 2023

Prepared For:

R&M Leasing LLC

Prepared By:

MATRIX
ENVIRONMENTAL TECHNOLOGIES INC.

CERTIFICATION STATEMENT

I, Christine M. Curtis, P.E., certify that I am currently a NYS Professional Engineer as defined in 6 NYCRR Part 375 and that this Sub-Slab Depressurization (SSD) System Installation Work Plan for the Pierce Arrow Business Center property located at 155 Chandler Street, Buffalo, NY was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in New York.

I hereby certify the following drawing:

Figure 2: SSD System Layout

Christine M. Curtis, P.E. #100560
Matrix Environmental Engineers, PLLC

8/23/2023
Date

SEAL

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ATTACHMENTS

1.0 Introduction

This document presents a Work Plan (WP) for the design and installation of a sub-slab depressurization (SSD) system at the Pierce Arrow Business Center (PABC) property located at 155 Chandler Street, Buffalo, New York ("Site"). The system design is in general adherence with the *Sub-Slab Depressurization System Design Work Plan* (Schenne & Associates, March 2023), with some deviations from the proposed scope based on the results of pilot testing completed subsequent to its approval by NYSDEC in May 2023. This Work Plan supersedes the previous design.

2.0 Nature and Extent of Contamination

To assess the potential for soil vapor intrusion (SVI) at the Site, sub-slab vapor and indoor air samples were collected during an initial assessment completed in September 2017. Based on the results of the investigation, four SSD systems were installed in the southwestern portion of the Site. The systems were installed in 2017 but were not immediately activated as the building was unoccupied during Site development. The systems were activated during Fall 2018. Four annual indoor air monitoring events as well as two additional events at the IA-5 location and four additional events at the IA-6 location were completed from December 2018 through December 2021.

Based on the results of the December 2021 monitoring event, soil vapor intrusion assessments were completed in March, June, and July 2022 in the area of the building currently occupied by Blackbird Cider Works and ODL Orthodontic Lab, located on the building's ground level, as well as a basement storage room. Results of the SVI assessments indicated that mitigation is required in these areas.

3.0 SSD System Design

The design objective of the proposed SSD system is to mitigate potential vapor migration into the affected areas by maintaining a negative pressure of at least 0.002 inches of water column (WC) in the sub-slab, resulting in decreased VOC concentrations in indoor air throughout the area of the building occupied by the Cidery and ODL. The design was developed in accordance with the applicable standards, criteria, and guidance contained in or referenced in NYSDOH's "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" dated October 2006 and its updates.

The proposed scope of work includes the following:

- Installation of two permanent extraction points (EX-1 and EX-2) and three (3) permanent vapor monitoring points (MPs) in the basement storage area (location of SS-10 and SS-12/IA-12);
- Installation of one permanent extraction point (EX-3) and one (1) permanent vapor monitoring point in the Cidery event area on the ground level (location of IA-10 and SS-11/IA-11 and approximately 20 feet from SS-8/IA-8 on the ground level);
- Installation of permanent vapor monitoring points in the Cidery storage room (location of SS-7/IA-7) and Cidery bar area;

- An additional extraction point (EX-4) will be installed in the office space near the Cidery additional seating area and bar area (ground level) if necessary, based on the vacuum monitoring data and VOC concentrations in indoor air once the SSD system is operating on EX-1 to EX-3;
- Installation of piping from each permanent extraction point to a manifold; and
- Installation of SSD system equipment (blower, instrumentation and carbon treatment) in the basement closed-off area.

3.1 Pilot Testing

METI completed pilot testing on May 16, 2023 in order to determine the radius of influence (ROI) and number of vapor extraction points required in the target treatment area. Pilot test data is summarized in **Appendix A** and locations of proposed vapor monitoring points and vapor extraction points are shown in **Figure 1**.

Pilot test vapor extraction point VP-1 was installed in the basement area at the location of sub-slab sample SS-12. Baseline PID readings were 13.4 ppm in MP-1, 13.8 ppm in MP-2, and 25.6 ppm in MP-3. During testing, zero vacuum influence was noted in vapor monitoring points MP-2 (4 feet to the west) and MP-3A (8 feet to the west); however, vacuum influence was noted in vapor monitoring points installed within approximately 6 inches of these points (MP-2A and MP-3 respectively). The results of the test indicate a radius of influence of 8 to 10 feet in the basement area at applied vacuums ranging from 12 to 45 inches W.C.

Pilot test vapor extraction point VP-2 was installed in the Cidery event area. Observations during installation of VP-2 indicate that the sub-slab material was slag and that the slab consisted of three distinct concrete layers, each approximately 4 inches thick. Vacuum influence above the target 0.002 inches W.C. was observed in monitoring points up to 22 feet away from VP-2 at applied vacuums ranging from 5 to 20 inches W.C. At 20 inches W.C., vacuum influence was observed 31 feet away (MP-17). To avoid damaging the finished floor, no additional points were installed in the adjacent cidery additional seating area. The results of the test indicate a ROI of approximately 30 to 40 feet at applied vacuums ranging from 5 to 20 inches W.C. Vapor monitoring point MP-16 was installed to confirm that vacuum influence could be achieved across potential subsurface obstructions (concrete footer, floor drain) in the event area; data from MP-16 was not used to calculate the ROI.

3.2 SSD System Layout

To achieve the design objectives, three to four permanent vapor extraction points are required: two in the basement storage area (EX-1, EX-2) and one or two on the ground level in the area occupied by the Cidery (EX-3, EX-4). The radius of influence of the extraction points is estimated to be 8 feet in the basement storage area and approximately 30 feet on the ground level. Some variation in the radius of influence is expected depending on proximity to subsurface obstructions, including drainage features. Based on the results of the pilot test at VP-1, the proposed location for EX-1 is further west towards MP-8. Six (6) permanent vapor monitoring points will be installed to monitor the induced vacuum at points throughout the target area. Proposed locations are shown in **Figure 2**.

Vapor extraction points EX-1, EX-2, and EX-3 will be installed, and EX-4 will be installed at later date if needed based on vacuum monitoring data collected once the system is operational and the results of post-SSD system installation indoor air sampling results. Each vapor extraction point will be constructed using four-inch diameter Schedule 40 PVC pipe with screen extending to just below the concrete slab. The annular space will be filled with clean gravel and sealed with bentonite or non-shrinking grout. If any slag is encountered and subsequently removed from beneath the slab during installation of the points, the Department will be notified immediately. The material will be segregated for separate testing and disposal per NYSDEC requirements.

A hammer drill will be used to install vacuum monitoring points at several locations in each area. The monitoring points, which will include a ¾-inch female coupling and threaded cap, will be installed to a depth that extends just below the surface of the concrete slab.

3.3 Blower Selection and System Installation

A network of vacuum pipes will be installed to convey the vapor outside of the building. The riser pipes from the vapor extraction points will be supported on the interior building walls with pipe supports placed near valves, elbows, fittings, and points. All piping will be level or sloped toward the vapor extraction points to prevent condensate accumulation in pipe runs.

Equipment will be in the basement closed-off area, which is approximately 5-6 feet lower than the ground level. The system will vent to the courtyard area south of the basement closed-off area; therefore, vapor treatment will be required to address nuisance odors.

Sub-slab vapor from the extraction points will be routed into a wall mounted header located inside the basement closed-off area near the exterior location of the blower enclosure. Therefore, only one four-inch diameter PVC pipe will penetrate the wall. Each extraction well line will be equipped with a permanent magnehelic gauge to monitor vacuum and ball valve for controlling air flow. The blower will also be equipped with a vacuum gauge.

3.4 Extraction Equipment and Vapor Treatment

A 1.5 HP GAST regenerative Regenair blower (R4P115; 100 SCFM at 20 inches WC) is required to maintain a pressure differential of 0.002 inches WC in the sub-slab. Once the extraction points are installed, the system will be operated with the blower used for the pilot test and operating data collected (air flow rate, vacuum etc.) to verify the blower size for continuous operation. This step is proposed due to the difference in ROI observed between the basement and ground level during the pilot test as well as the need for air treatment. Effluent air from the blower will be treated using a 55-gallon vapor phase carbon drum to control nuisance odors in accordance with 6 NYCRR Part 212. The need for carbon treatment will be reevaluated after the first year of system operation.

The system effluent will discharge to the atmosphere via a 4-inch diameter discharge stack. The discharge point will be located approximately 4-5 feet above the roofline of the building and at least 10 feet away from any opening that is less than 2 feet below the exhaust point, 12 inches above the roof of any adjacent building, and 10 feet from any adjacent buildings, HVAC intakes, or supply registers.

4.0 Post-Installation Testing

Subsequent to the installation of the SSD system, sub-slab pressure will be monitored to verify that a negative pressure of at least 0.002 inches is achieved in the vapor monitoring points throughout the treatment area. Smoke tubes will be used to check for leaks through cracks or floor joints. Observable leaks will be sealed with MasterSeal SL1 or NP1 caulk.

SSD system installation and post-installation testing will be summarized in an SSD System Installation and Testing Report. The report will include descriptions and as-built drawings of SSD system and components and a summary of testing results. A Mitigation System Installation Record will also be submitted to NYSDEC.

5.0 Maintenance and Monitoring

System checks will be completed weekly for the first month of system operation, monthly for the following two months, and on a quarterly basis thereafter for the first year of system operation. After one year, the need for future system checks will be reevaluated and the frequency of inspections may be reduced to an annual basis. Routine monitoring will include the identification and repair of any leaks, operational status checks of the blower, documentation of manifold settings and vacuum at each vapor extraction point, and documentation of vacuum at each monitoring point. At least once per year, all piping under pressure (an estimated 2 feet of piping before it penetrates the south wall of the basement closed-off area) will be checked for integrity. Non-routine maintenance, including carbon changeouts, will be completed as necessary.

Pre-carbon and post-carbon air samples will be collected on a monthly basis for the initial three months of system operation and on a quarterly basis thereafter for the first year of system operation. All samples will be submitted for laboratory analysis of VOCs via EPA Method TO-15. Pre-carbon and post-carbon photoionization detector (PID) readings will also be collected during regular system checks.

6.0 Schedule

Installation of the vapor extraction points and vapor monitoring points followed by operation with the pilot test blower and final selection of the extraction equipment will be scheduled pending approval of this Work Plan.

FIGURES

LEGEND

- BASEMENT AREA BELOW MEZZANINE
- BASEMENT CLOSED-OFF AREA
- TARGET TREATMENT AREA
- PILOT TEST VAPOR EXTRACTION POINT
- PILOT TEST VAPOR MONITORING POINT

S / E / W / N

MEN'S RESTROOM
WOMEN'S RESTROOM
TILE
ENTRY
CON
CLOSET
OFFICE
CIDERY BAR AREA
TASTING ROOM
WD-1
BAR
BELOW
CLOSET
UP
DN
MP-8
MP-7
MP-1
VP-1
MP-2A
MP-2
MP-3A
MP-3
MP-4
MP-5
MP-6
STORAGE
ELECTRICAL
CORRIDOR
CIDERY ADDITIONAL SEATING AREA
CIDERY EVENT AREA
MP-15
MP-16
MP-14
MP-13
MP-12
VP-2
MP-11
MP-10
MP-9
MP-17
ELEVATOR LOBBY
ELEVATOR
MACHINE ROOM

NINE ABOVE
30 years dedicated to a CLEANER ENVIRONMENT 1991-2021

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DESIGNED BY: C. CURTIS

REVIEWED BY: S. CARTER

DRAWN BY: C. CURTIS

REVISION	
BY	DATE

SCALE IN FEET: 1" = 8'
0 8

PROJECT NAME / LOCATION:

155 CHANDLER STREET
BUFFALO, NEW YORK

NYSDEC SITE NUMBER: C915312

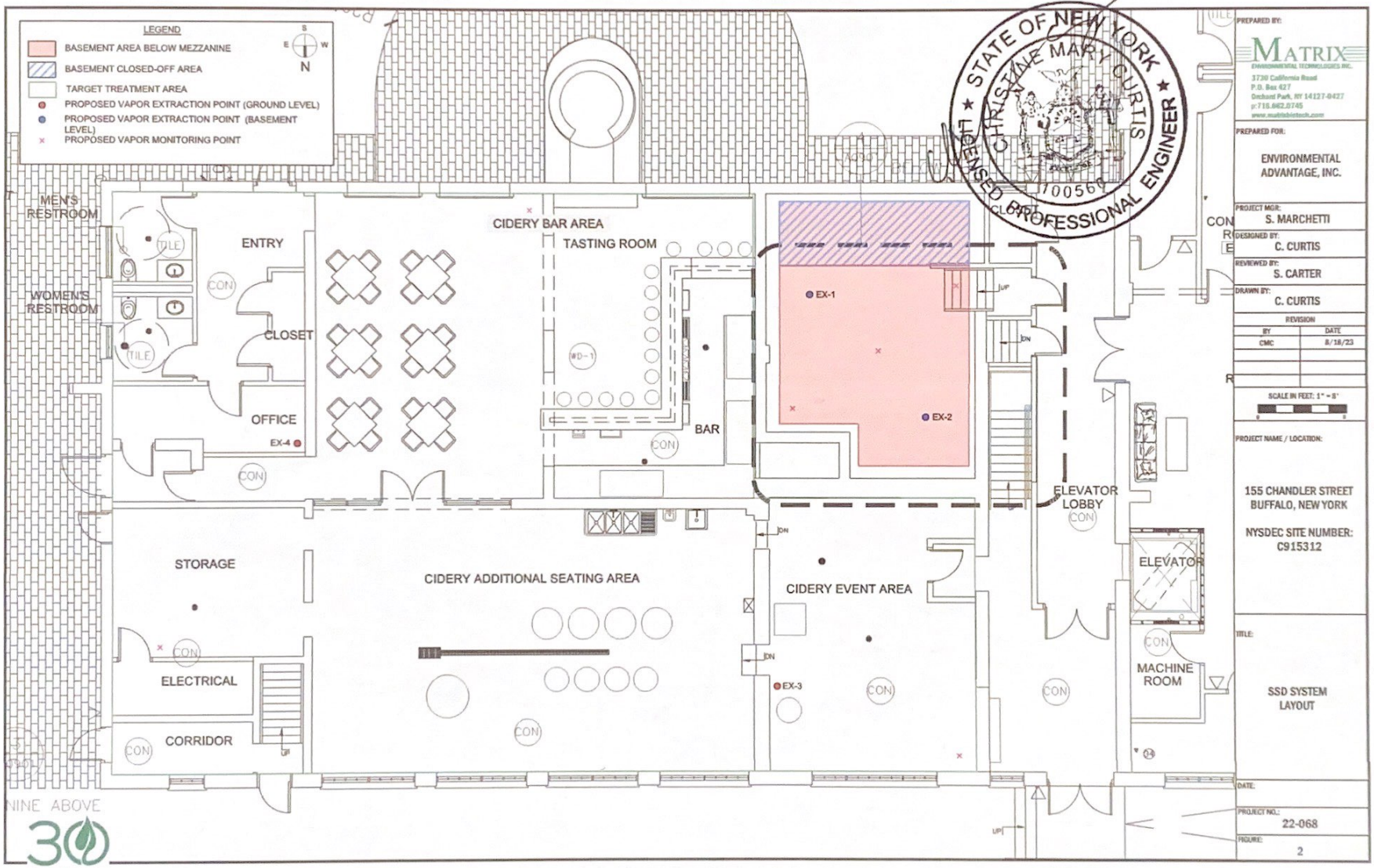
TITLE:

SOIL VAPOR INTRUSION PILOT TESTING LOCATIONS

DATE: MAY 16, 2023

PROJECT NO.: 22-068

FIGURE: 1



NINE ABOVE
30 years dedicated to a CLEANER ENVIRONMENT
1991-2021

APPENDIX A

Pilot Test Data Summary

Table 1

Soil Vapor Intrusion Pilot Test Data Summary - VP-1 (Basement Level)

155-157 Chandler Street, Buffalo, New York

May 16, 2023

Vacuum at Blower (" H_2O)	Blower Exhaust Reading (ppm)	Monitoring Point									
		MP-1	MP-2	MP-2A	MP-3	MP-3A	MP-4	MP-5	MP-6	MP-7	MP-8
		Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)
Extraction Point VP-1 Distance from VP-1 (ft.) →		*2*	*4*	*4*	*8*	*8*	*3*	*6*	*9*	*4*	*8*
6	0	0.354	0.000	0.000							
12	9.2	0.644	0.000	0.074	0.000		0.495	0.146	0.311	0.019	0.006
20	8.6	0.837	0.000	0.123	0.000	0.000	0.771	0.511	0.026	0.280	0.000
30	5.0	1.117	0.000	0.213	0.006	0.000	1.251	0.395	0.004	0.355	0.000
45		1.182	0.000	0.275	0.008	0.000	1.499	0.062	0.023	0.270	0.000
End of test											

NOTE: Vacuum reading in MP-6 during test at 12" H2O is considered an anomaly.

Table 2

Soil Vapor Intrusion Pilot Test Data Summary - VP-2 (Ground Level)

155-157 Chandler Street, Buffalo, New York

May 16, 2023

Vacuum at Blower (" H_2O)	Blower Exhaust Reading (ppm)	Monitoring Point								
		MP-9	MP-10	MP-11	MP-12	MP-13	MP-14	MP-15	MP-16	MP-17
		Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)	Vacuum (" H_2O)
Extraction Point VP-2 Distance from VP-2 (ft.) →		*5*	*10*	*14*	*4*	*10*	*15*	*20*	*22*	*31*
5	0.0	0.574	0.241	0.180	0.382	0.120	0.088	0.073	0.046	0.000
10	0.0	0.900	0.381	0.275	0.643	0.206	0.156	0.124	0.081	0.000
20	0.0	1.354	0.574	0.405	1.009	0.311	0.227	0.183	0.125	0.000
20	0.0	1.331	0.570	0.402	1.000	0.302	0.228	0.182	0.122	0.012
End of test										

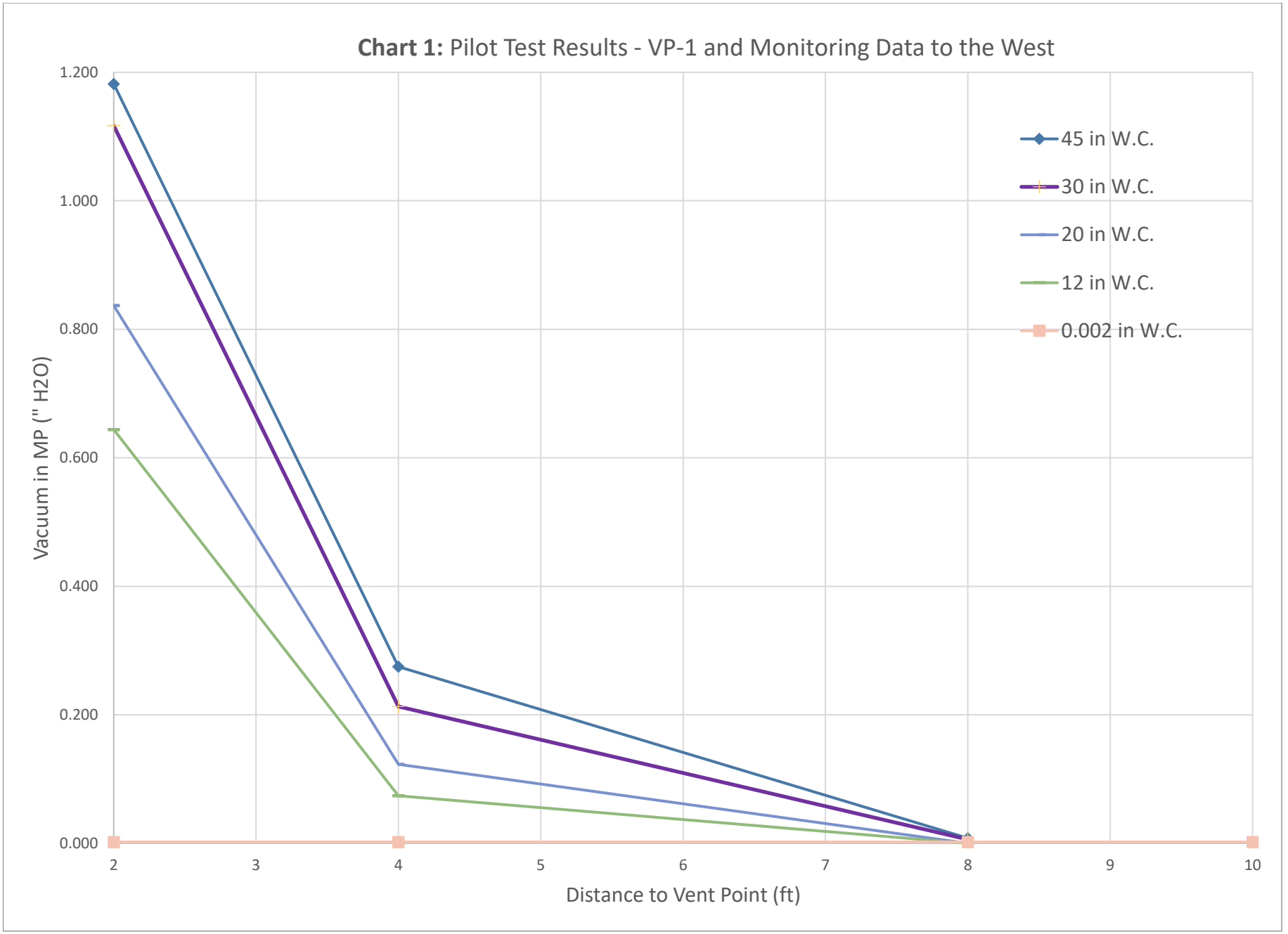


Chart 1: Pilot Test Results - VP-1 and Monitoring Data to the West
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Vacuum in MP (" H2O)
2
3
4
5
6
7
8
9
10
Distance to Vent Point (ft)
45 in W.C.
30 in W.C.
20 in W.C.
12 in W.C.
0.002 in W.C.

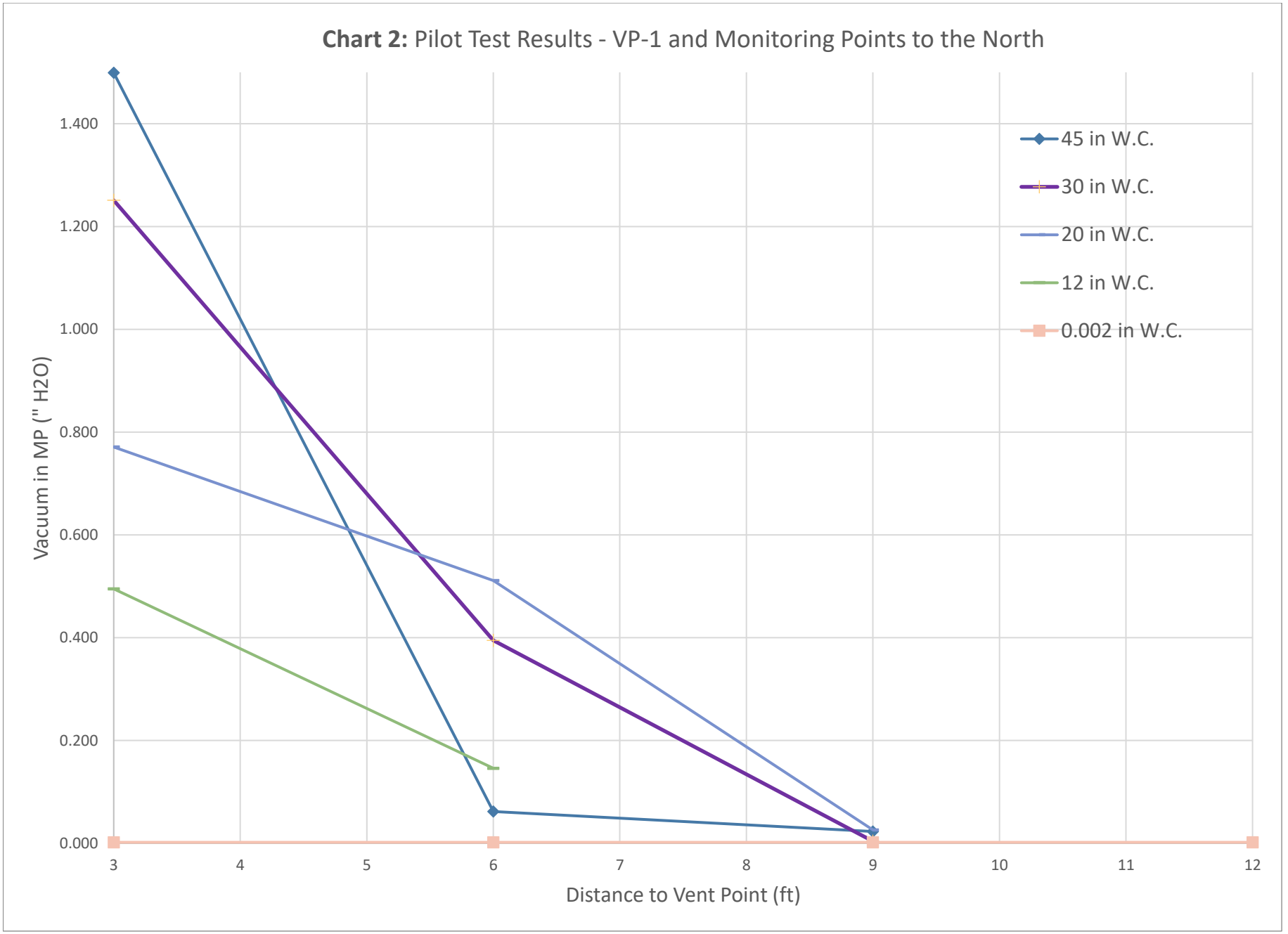


Chart 2: Pilot Test Results - VP-1 and Monitoring Points to the North
Vacuum in MP (" H2O)
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
3
4
5
6
7
8
9
10
11
12
Distance to Vent Point (ft)
45 in W.C.
30 in W.C.
20 in W.C.
12 in W.C.
0.002 in W.C.

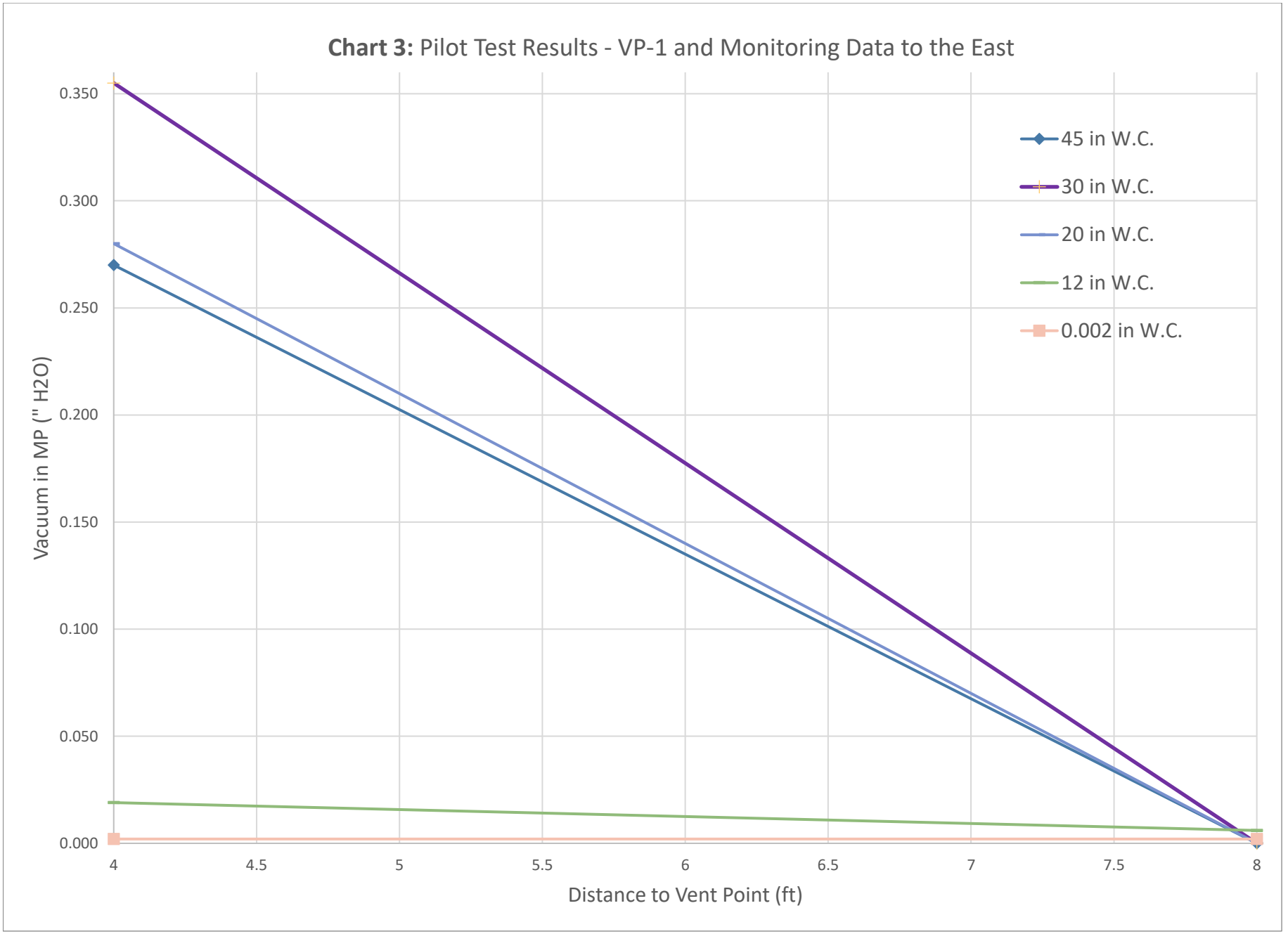


Chart 3: Pilot Test Results - VP-1 and Monitoring Data to the East
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
Vacuum in MP (" H2O)
4
4.5
5
5.5
6
6.5
7
7.5
8
Distance to Vent Point (ft)
45 in W.C.
30 in W.C.
20 in W.C.
12 in W.C.
0.002 in W.C.

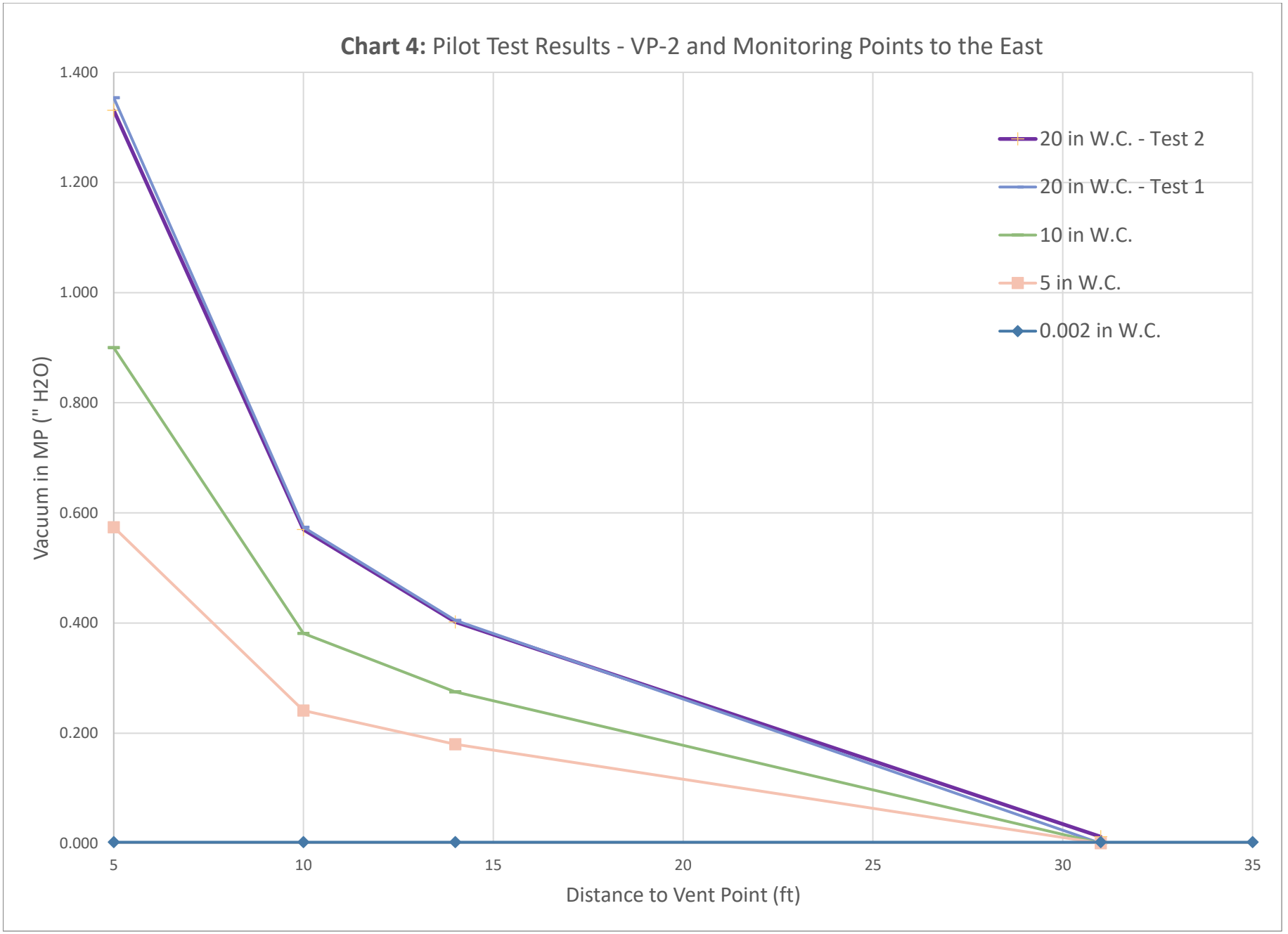


Chart 4: Pilot Test Results - VP-2 and Monitoring Points to the East
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Vacuum in MP (" H2O)
5
10
15
20
25
30
35
Distance to Vent Point (ft)
20 in W.C. - Test 2
20 in W.C. - Test 1
10 in W.C.
5 in W.C.
0.002 in W.C.

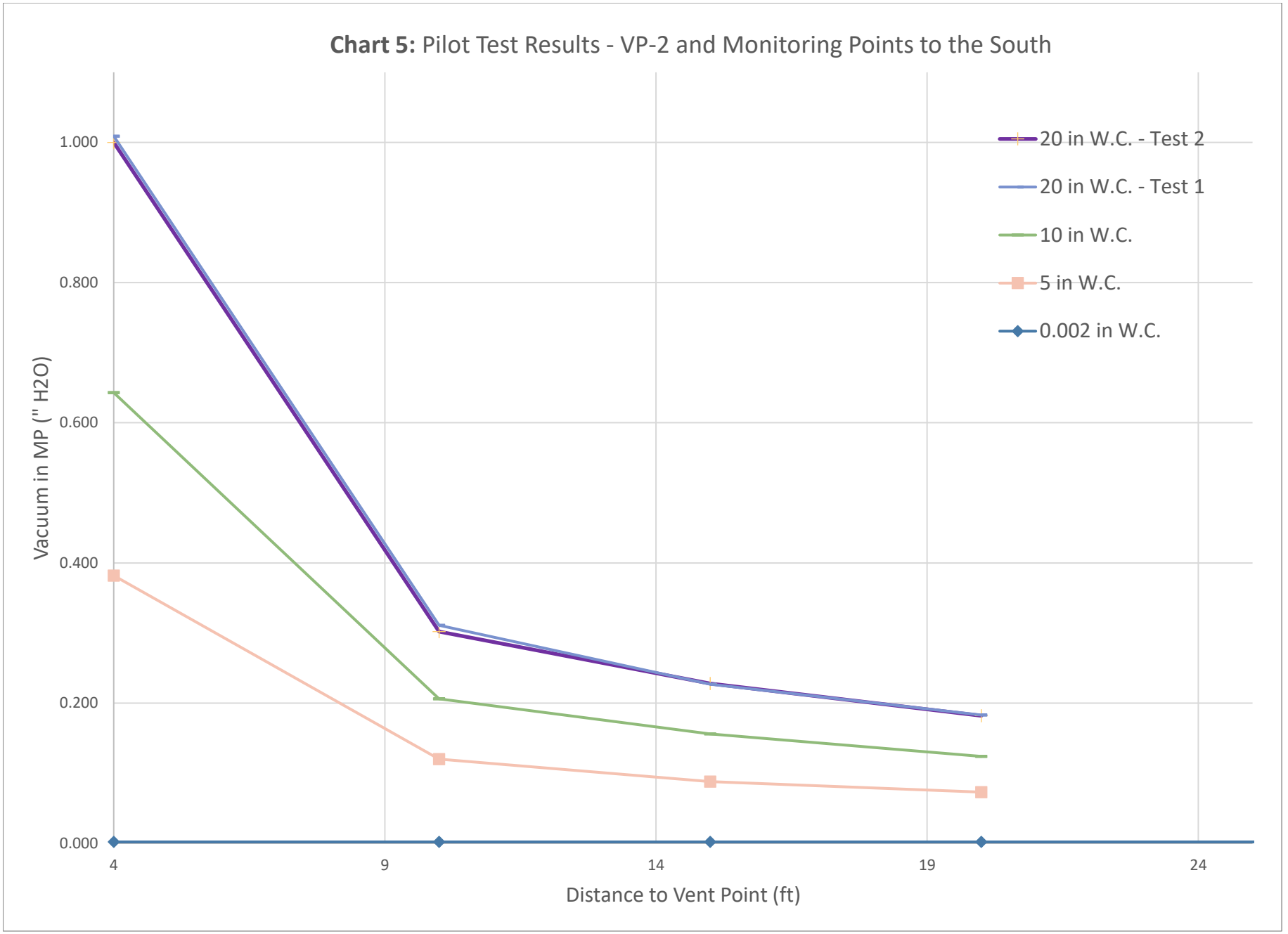


Chart 5: Pilot Test Results - VP-2 and Monitoring Points to the South
1.000
0.800
0.600
0.400
0.200
0.000
Vacuum in MP (" H2O)
4
9
14
19
24
Distance to Vent Point (ft)
20 in W.C. - Test 2
20 in W.C. - Test 1
10 in W.C.
5 in W.C.
0.002 in W.C.

APPENDIX B

Equipment Specifications

Models R4P115, R4P315A

Max. pressure – 65 inH_2O (60 Hz), 50 inH_2O (50 Hz)
Max. vacuum – 60 inH_2O (60 Hz), 45 inH_2O (50Hz)
Max. air flow – 127 CFM (60 Hz), 110 CFM (50 Hz)

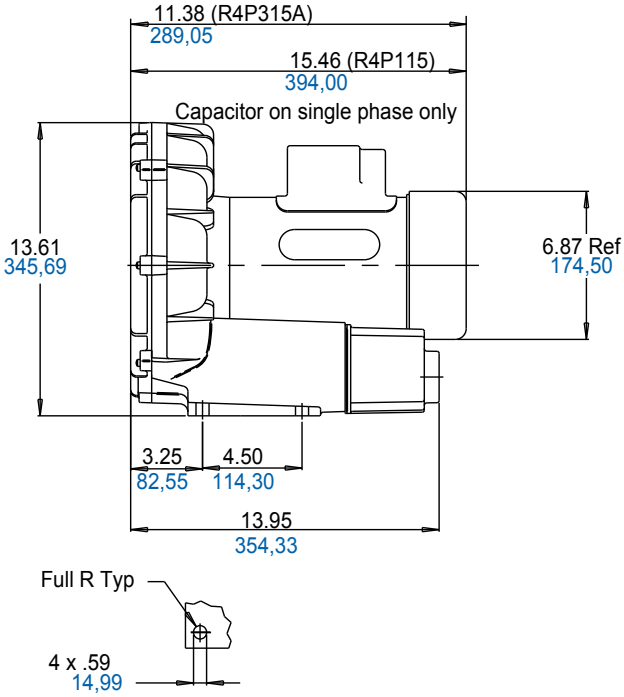
PRODUCT FEATURES

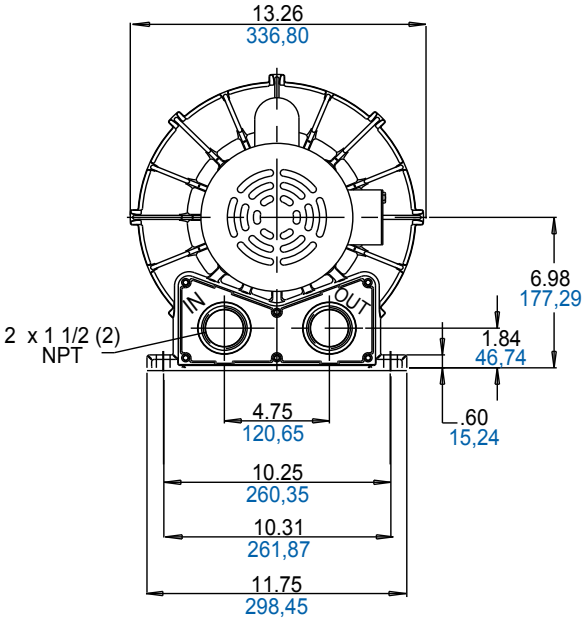
- Rugged construction, low maintenance
- Oilless operation
- UL and CSA approved TEFC motors with permanently sealed ball bearings
- Automatic restart thermal protection on single phase motors
- Aluminum blower housing, impeller, and cover
- Can be mounted in any plane
- Inlet and outlet have internal muffling

RECOMMENDED ACCESSORIES

- Pressure gauge AE133
- Inlet filter AJ126D (pressure)
- Vacuum gauge AJ497
- Inline filter AJ151E (vacuum)
- Muffler AJ121D
- Relief valve AG258
- Liquid separator RMS200 (vacuum)
- Foam replacement kit K906

Product Dimensions (inches, mm)





Product Specifications

MODEL NUMBER		R4P115	R4P315A
Motor Enclosure		TEFC	TEFC
HP/kW	60 Hz	1.5/1,1	1.5/1,1
	50 Hz	1.0/0,75	1.0/0,75
Voltage	60 Hz	115/208-230-1	208-230/460-3
	50 Hz	110/220-240-1	190-220/380-415-3
Amps	60 Hz	17.5/10-9	5.1-4.9/2.5
	50 Hz	14.2/8.1	3.9-4.3/1.9-2.0
Starting Amps	60 Hz	58 @ 230V	18.5 @ 460V
	50 Hz	56 @ 220V	19 @ 380V
Insulation Class		F	B
Recommended NEMA Starter Size		1/0	00/00
Net Weight (lbs/kg)		61/27,7	43/24,1

Product Performance