Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS

February 21, 2020

Mr. Marvin Greenberg
486 Green Sun LLC
456 Merrick Rd
Lynbrook NY 11563

Re: Sub-Slab Depressurization System Implementation Plan
486 Sunrise Highway, Rockville Centre, New York

Dear Mr. Weinberg,

Advanced Cleanup Technologies, Inc. (ACT) is pleased to present the following Implementation plan for the construction of a Sub-Slab Depressurization system (SSDS) system at 486 Sunrise Highway, Rockville Centre, New York. A preliminary design plan providing the proposed number and layout of SSDS wells and system piping is attached to this document in Attachment A. The following outlines the details of construction and the methodology and sequencing of the construction related activities.

Scope of Work

1. **Pilot Testing**

   The New York State Department of Health (NYSDOH) has indicated that a minimum vacuum of 0.025 in. w.c. is required to maintain an effective vacuum within an area influenced by an SSDS system. Pilot testing was performed on a pilot SSDS well centrally located under the building to generate site-specific permeability data under varying conditions of pressure, flow and distance. The pilot well was vertically oriented, 2 inches in diameter, 2 feet deep, and surrounded with crushed stone.

   Prior to pilot testing, temporary vacuum points were installed at horizontal distances of 5, 10, 20, 30, 40, and 50-feet from the pilot SSDS well and at depths within 6 inches of the concrete layer. The vacuum was recorded at each vacuum point for all pressure and flow conditions applied to the pilot well.

The results of the pilot testing with the extraction well vacuum and flow rates required to maintain effective horizontal pressure fields beneath the site and its immediate vicinity are attached to this document in attachment B. This information was used to refine the layout of the proposed SSDS and sizing of the vacuum blower and treatment equipment. The blower will be selected with approval from the NYSDEC. Specifications of the proposed blower are attached to this document in attachment D.

2. Proposed Layout

The pilot testing demonstrated that it would be possible to generate a 40-foot radius of influence at a vacuum greater than the NYSDOH minimum of 0.025 in. w.c by applying 4.5 in. w.c. at 35CFM at each extraction well. The charts showing how the 4.5 in. w.c. required vacuum and 35 CFM was determined are attached to this document in attachment E and attachment F respectively. In addition, the pilot test confirmed that a system consisting of six 3-inch diameter SSDS wells with similar orientation to the pilot well (vertically oriented, 2-foot depth, and surrounded with gravel) will be sufficient to maintain effective horizontal pressure fields beneath the entire site. The proposed locations of the SSDS wells and radius of influences are attached to this document in attachment C. Each of the SSDS wells will be connected to 3-inch diameter solid PVC riser piping. The vertical riser piping will be routed up to the plenum in the ceiling and then routed horizontally to a manifold at a central location in the building. From the manifold in the ceiling, additional vertical 4-inch PVC piping will be routed to a blower located on the floor of the building. The estimated calculated friction loss of the piping layout is attached to this document in attachment G. The proposed piping layout and blower location is attached to this document in attachment A.

3. SSDS Well Installation

Each SSDS well will be installed utilizing a rotary hammer drill and coring bit. An 8-inch diameter borehole will be drilled to a depth of 2 feet below the concrete floor. The SSDS well will consist of 2 feet of 3-inch diameter 20 mil slotted schedule 40 PVC well screen with an end cap at its base. Once the SSDS well is inserted into the borehole, it will be backfilled with well gravel (#2 moray sand and rounded gravel) to just below the level of the concrete slab followed by concrete grout installed flush to the original grade elevation. Prior to pouring concrete, a sleeve will be place around the PVC screen and will be sealed to the screen with urethane caulking to prevent any vacuum from leaking from the well. A cross-section of the proposed SSDS well construction is attached to this document in attachment H.

4. Above Grade Piping Installation

All vertical piping leading from the concrete floor slab will be constructed of 3-inch diameter PVC pipe that will be fastened either to an existing building column or interior wall. 3-inch ball valves and vacuum gauges will be installed in-line with the vertical piping leading from each SSDS well. The ball valves will allow for adjustments in the vacuum applied to each well, and the vacuum gauges will be checked over the life of the system to insure the SSDS system is maintaining proper pressure to all vacuum wells. A 3-inch hole will be installed in the ceiling above each SSDS vacuum well. The vertical riser piping will be connected to 3-inch horizontal PVC piping in the ceiling plenum through 90-degree PVC bends. The horizontal piping will be fastened to the ceiling, and all piping will be secured at a minimum of every 8 feet. The 3-inch horizontal PVC piping from each vacuum well be connected to 4-inch piping that will lead to a manifold over the blower.

5. Vacuum System Installation

The vacuum system consisting of one FPZ K06-MS vacuum blower will be located on the floor at the location presented in attachment A. The FPZ K06-MS was chosen because of its ability to produce 210 CFM of flow at the required vacuum of 4.5 in. w.c. The specifications of the blower and blower curves are attached in attachment D. The vacuum blower will be exhausted to 4-inch PVC riser pipe protruding through the roof of the building. A vacuum gage and analog pressure sensor will be installed at the inlet of the vacuum blower to confirm the SSDS system in maintaining the required vacuum pressure field under the site. Wiring from the blower will terminate in a control panel where manual on/off switches will be located.

6. Exhaust Treatment

Prior to operational startup, the vacuum system exhaust will be sampled and analyzed for volatile organic compounds pursuant to EPA Method TO-15. An ambient Air Quality Impact Analysis will be performed in accordance with NYS DAR-1 guidelines to determine if treatment of exhaust with granular activated carbon will be required.

7. Electrical Work

The vacuum system will be energized using a new electrical distribution panel installed by a licensed electrical contractor. Circuit breakers will be labeled “Active Sub-Slab Depressurization” with instructions to not disconnect the system and a contact number provided to address any issues. Additionally, a system description label will be placed on the vacuum system control panel.

Electrical conduit and wire will be run in a manner that meets or exceeds the National Electrical Code to the control panel will be located. A disconnect switch will be provided next to the control panel which will serve as a local means of disconnect for emergency or maintenance use.

8. **System Testing and Startup**

Prior to the startup of the SSDS, the vacuum blower and controls will be tested for correct operation, both electrically and mechanically. At startup, vacuum and flow measurements will be collected at each vacuum well and blower.

Six permanent vacuum points will be installed and connected to a hand-held digital manometer to check for vacuum influence. This vacuum influence will be used to demonstrate that the SSDS is providing adequate depressurization coverage. The proposed layout of the permanent vacuum points is attached to this document in attachment C.

Following startup of the SSDS, the flow, vacuum, temperature and vapor concentrations in the blower effluent will be monitored on a daily basis for the first 7 days and then monthly thereafter.

If you have any questions or require additional information, please do not hesitate to contact the undersigned.

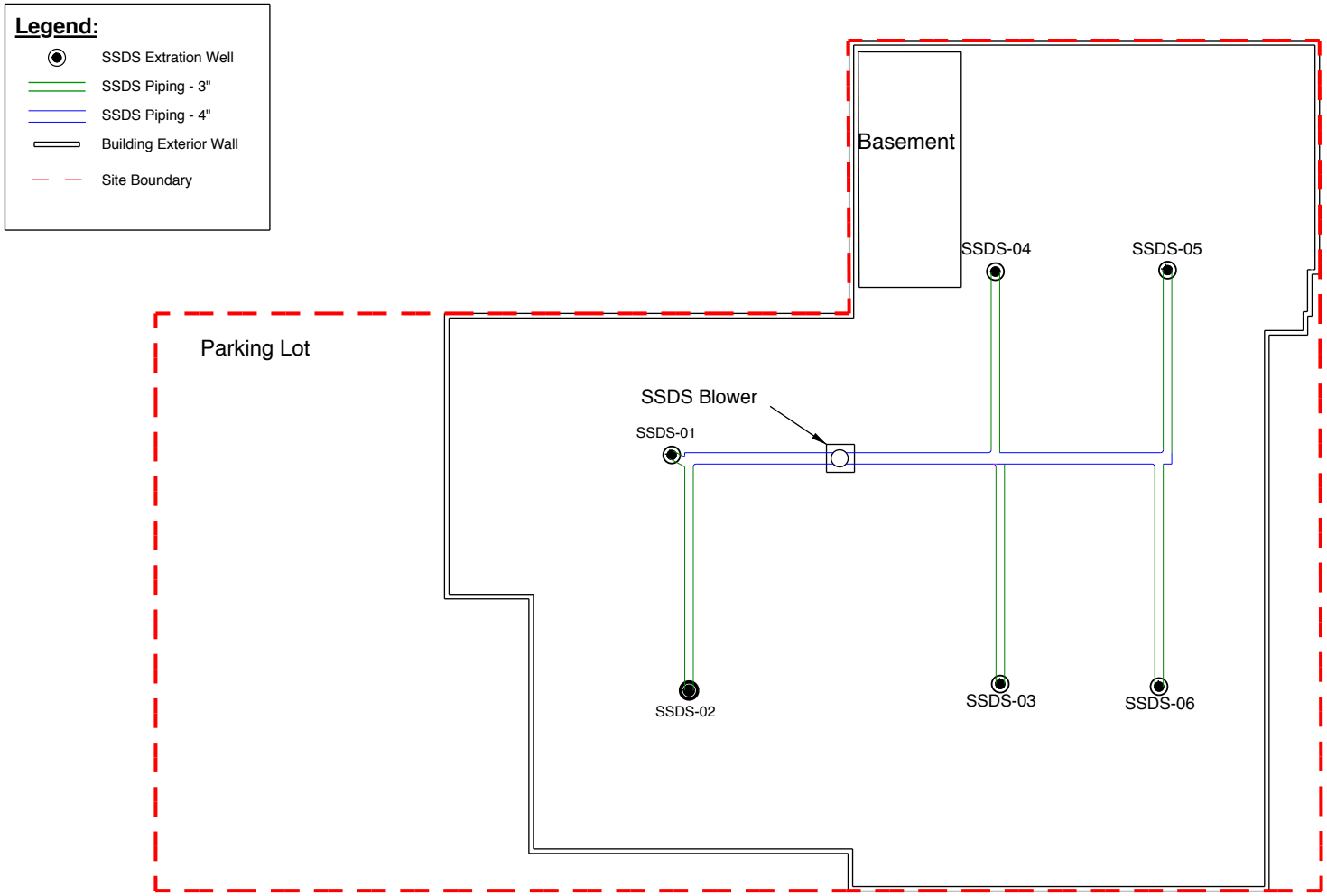
Very truly yours,

Paul P. Stewart, QEP
President

I, Andrew R. Levenbaum, certify that I am currently a NYS Licensed Professional Engineer and that this Sub-Slab Depressurization System Implementation Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the NYS Department of Environmental Conservation Technical Guidance for Site Investigation and Remediation (DER-10).

Andrew R. Levenbaum, P.E

Attachment A: Piping and Blower Layout



Piping Layout

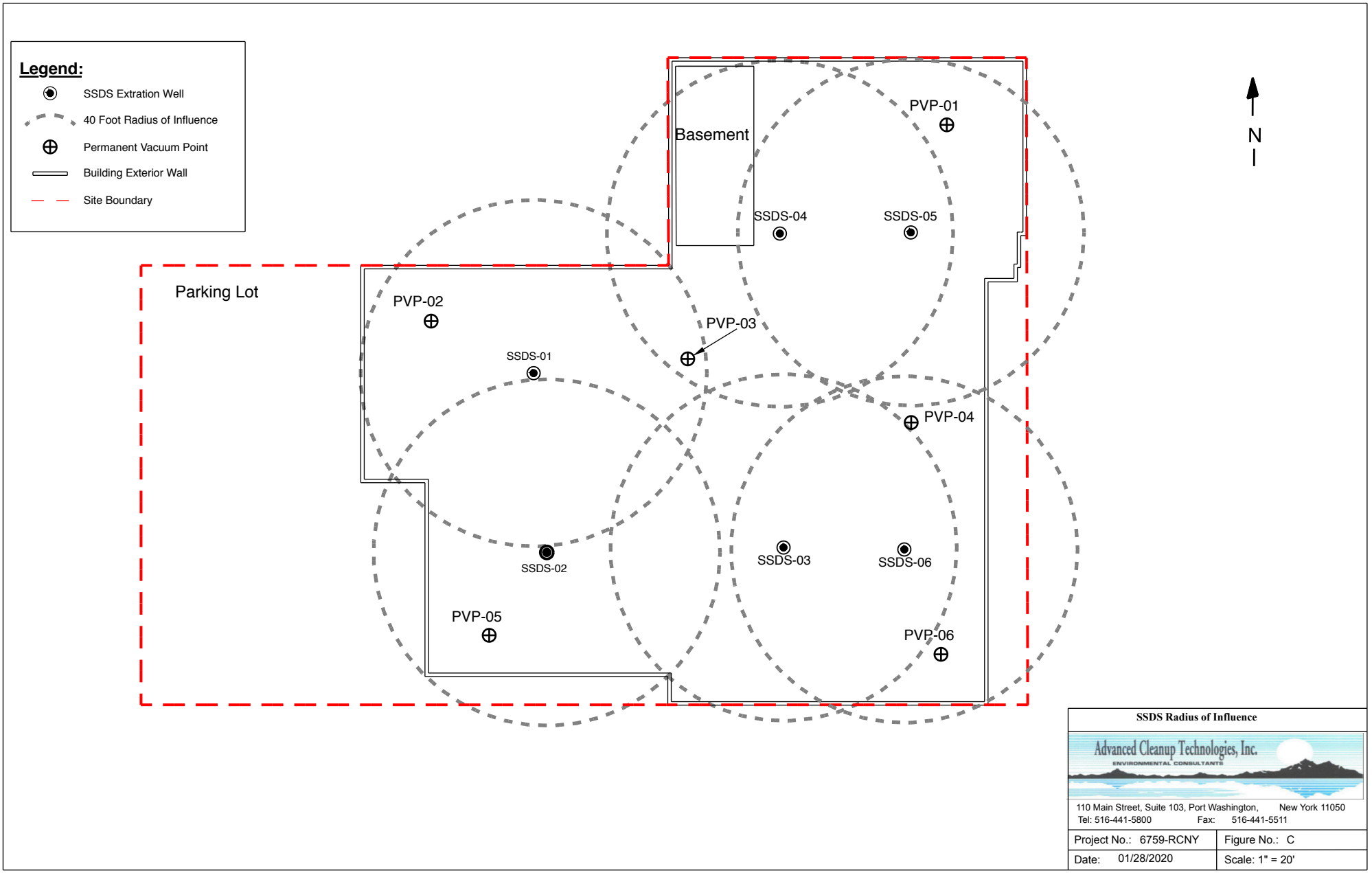
Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.: 6759-RCNY	Figure No.: A
Date: 01/28/2020	Scale: 1" = 20'

Attachment B:
Pilot Testing Results

Soil Vapor Extraction Test Field Data															
Location: 486 Sunrise Highway, Rockville Centre, NY															
ACT Project No.: 6759-RCNY															
Site Personnel: TY, JL, PS															
		Blower		Extraction Well			Vapor Points (Distance from SVE Well in Feet)					Exhaust			
						VP-1a (10')	VP-1b (5')	VP-2 (20')	VP-3 (30')	VP-4 (40')	VP-5 (50')	PID Readings	Pressure	Flow	
Date	Time	Applied Vacuum (in. WC)	Flowrate (cfm)	Applied Vacuum (in WC)	Flowrate (cfm)	Vacuum (in. WC)	Vacuum (in. WC)	Vacuum (in. WC)	Vacuum (in. WC)	Vacuum (in. WC)	Vacuum (in. WC)	(ppb)	(in. WC)	(fpm)	Comments
3/12/19	-	0	-	0	0	-0.003	-0.005	-0.001	0.01 -0.006	-0.002	-0.007	-	-	-	Baseline, no vacuum/blower Baseline readings ranged from + to - and back Blower on for testing @ 1345 Blower stabilized for 15 minutes
3/12/19	1400	-8	55	-6	56	-0.24	-0.435	-0.115	-0.063	-0.034	-0.004	18	33	7183	
3/12/19	1420	-10	64.5	-7.5	57	-0.286	-0.526	-0.145	-0.062	-0.03	-0.002	0	31	6396	
3/12/19	1430	-14	86	-10	63	-0.394	-0.728	-0.191	-0.108	-0.058	-0.005	63	28	5215	
3/12/19	1443	-20	112.5	-15	104	-0.526	-0.97	-0.264	-0.136	-0.074	-0.009	150	27	4482	
3/12/19	1500	-26	135.5	-19	117	-0.643	-1.206	-0.334	-0.168	-0.085	-0.01	299	24	4191	
3/12/19	1508	-34	155.5	-24	143	-0.783	-1.461	-0.405	-0.203	-0.106	-0.013	460	22	3286	Completely closed

Attachment C:
Radius Of Influence



SSDS Radius of Influence

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS
110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.: 6759-RCNY	Figure No.: C
Date: 01/28/2020	Scale: 1" = 20'

Attachment D:
Blower Specifications

REGENERATIVE BLOWERS - PRESSURE

SCL K03 / K04 / K05 / K06

MS SERIES

SN 1874-13B 1/2

TECHNICAL CHARACTERISTICS

- Aluminium alloy construction
- Smooth operation
- High efficiency impeller
- Maintenance free
- Mountable in any position
- Recognized TEFC - cURus motor

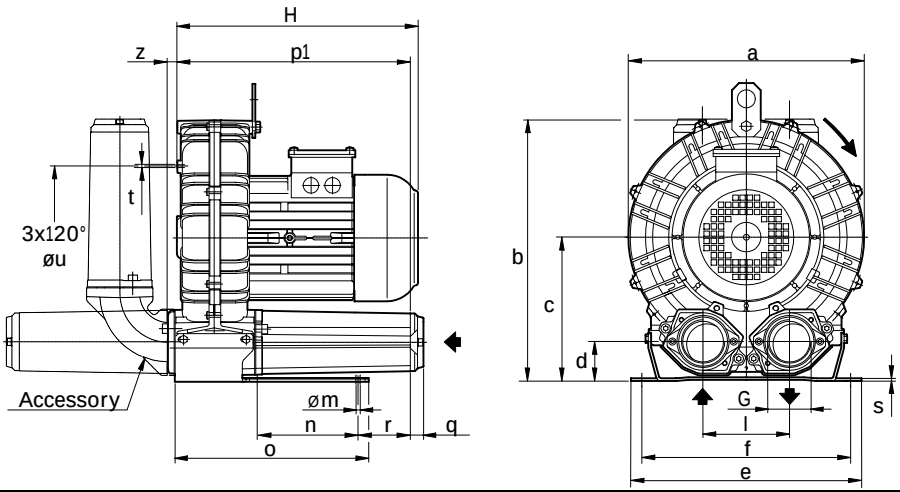
OPTIONS

- Special voltages (IEC 38)
- Surface treatments

ACCESSORIES

- Inlet and/or inline filters
- Additional inlet/outlet silencers
- Safety valves
- Flow converting device
- Optional connectors

Dimensions in inches.
Dimension for reference only.



Model	a	b	c	d	e	f	G	l	m	n	o	p1	q	r	s	t	u	z
K03-MS	9.49	10.55	5.79	1.69	9.06	8.07	1"1/4 NPT	3.39	0.39	3.27	5.59	8.07	0.71	2.95	0.16	M6	5.51	0.47
K04-MS	11.22	12.40	6.77	1.93	10.04	8.86	1"1/2 NPT	4.02	0.47	3.74	6.73	8.74	0.71	2.76	0.16	M6	6.89	0.71
K05-MS	12.87	14.37	7.87	2.13	12.80	10.24	2" NPT	4.72	0.59	4.53	10.43	12.60	0.71	3.86	0.16	M8	7.87	0.75
K06-MS	14.80	15.47	8.07	2.13	12.80	11.42	2" NPT	4.92	0.59	5.51	10.71	13.15	0.71	3.35	0.16	M8	9.45	0.75

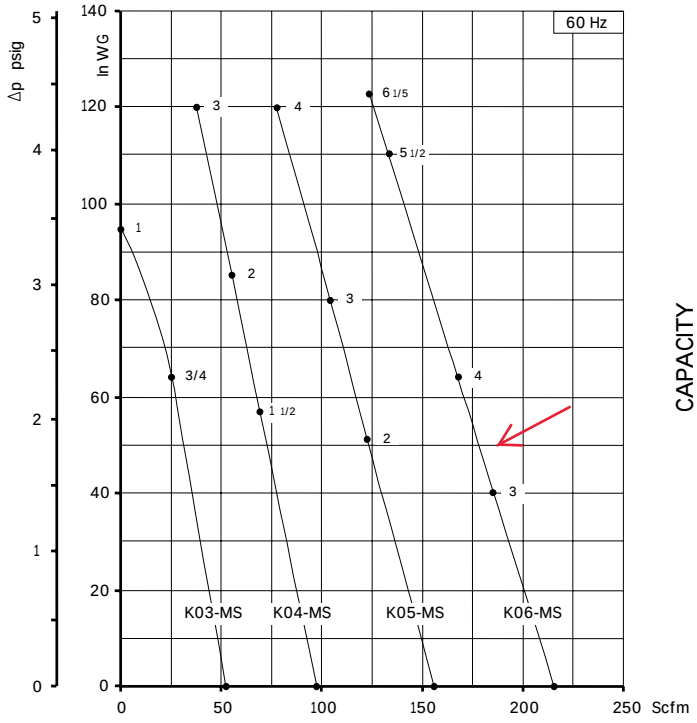
Model	Maximum flow Scfm		Installed power Hp		Maximum differential pressure △p (In WG)		Noise level Lp dB (A) (1)		Overall dimensions H	Weight
	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	Inches	Lbs
K03-MS	52	43	3/4	3/4	64	60	62.0	60.0	10.43	24.3
			1	1	95	72	62.3	60.3	12.0	32.0
K04-MS	98	81	1 ½	1 ½	58	80	64.8	62.8	11.65	40.3
			2	2	85	100	65.0	63.0	13.78	48.0
			3	-	120	-	65.2	-	13.78	52.5
K05-MS	156	129	2	2	52	70	70.5	68.5	13.20	56.7
			3	3	80	110	70.8	68.8	13.20	60.6
			4	4	120	120	71.1	69.1	14.40	77.2
K06-MS	216	179	3	3	40	65	73.0	71.0	13.80	69.0
			4	4	64	95	73.3	71.3	14.17	82.5
			5 ½	5 ½	110	130	73.6	71.6	15.5	85.3
			6 1/5	-	122	-	73.9	-	16.3	95.5

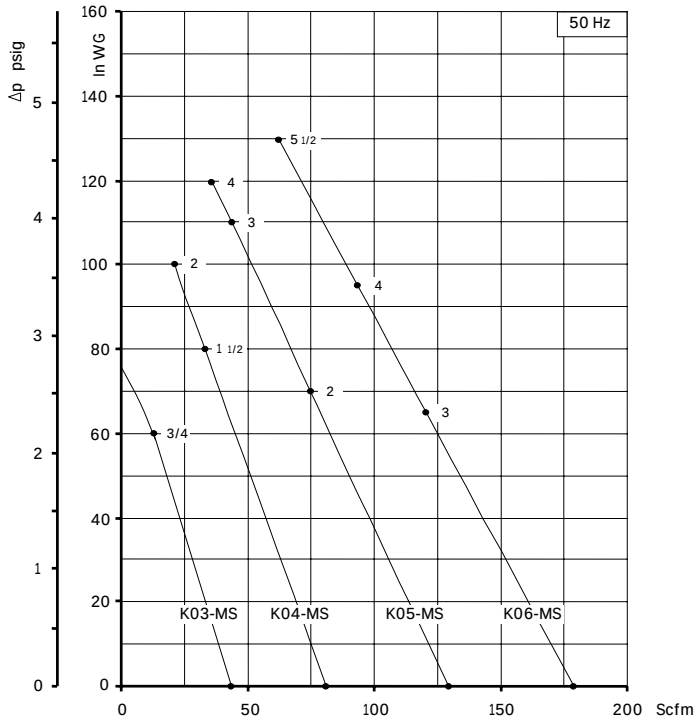
(1) Noise measured at 1 m distance with inlet and outlet ports piped, in accordance to ISO 3744.

- For proper use, the blower should be equipped with inlet filter and safety valve; other accessories available on request.
- Ambient temperaturefrom +5° to +104°F.
- Specifications subject to change without notice.

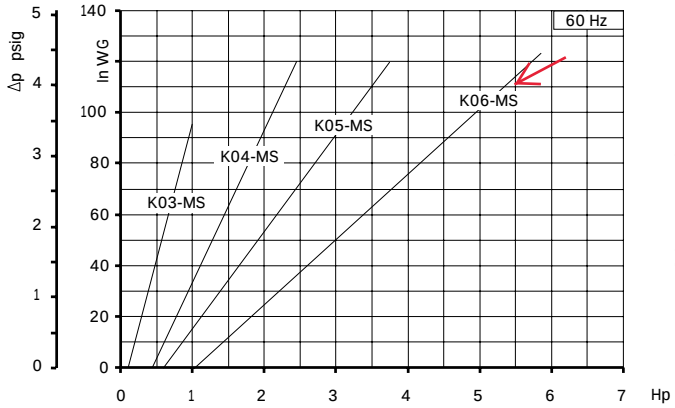
FPZ, Inc. 150 N. Progress Drive Saukville, WI 53080 USA Tel. (262) 268-0180 usa@fpz.com www.fpz.com

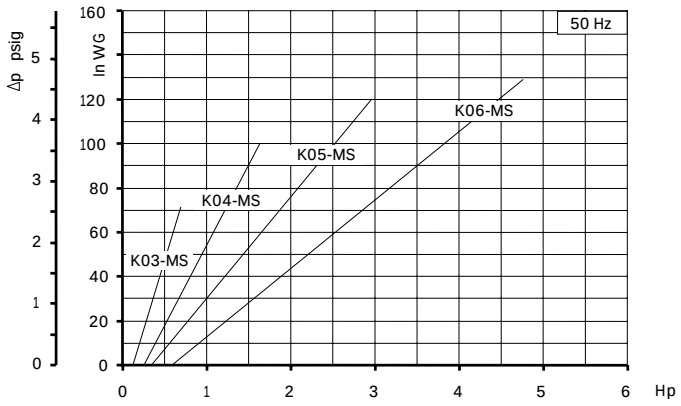
CAPACITY



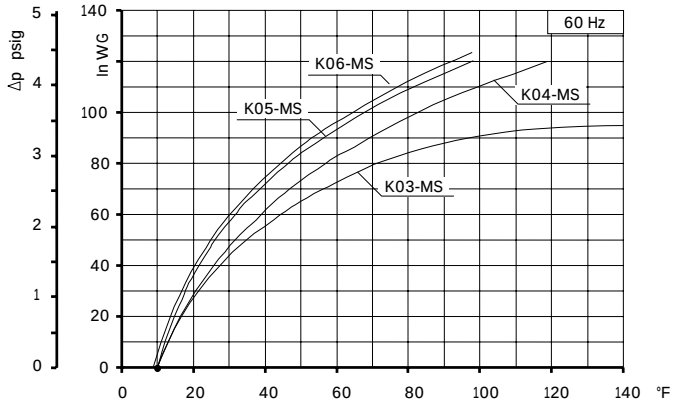


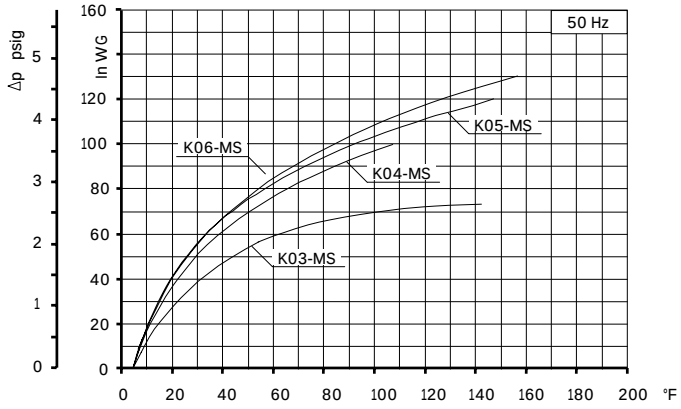
ABSORBED POWER





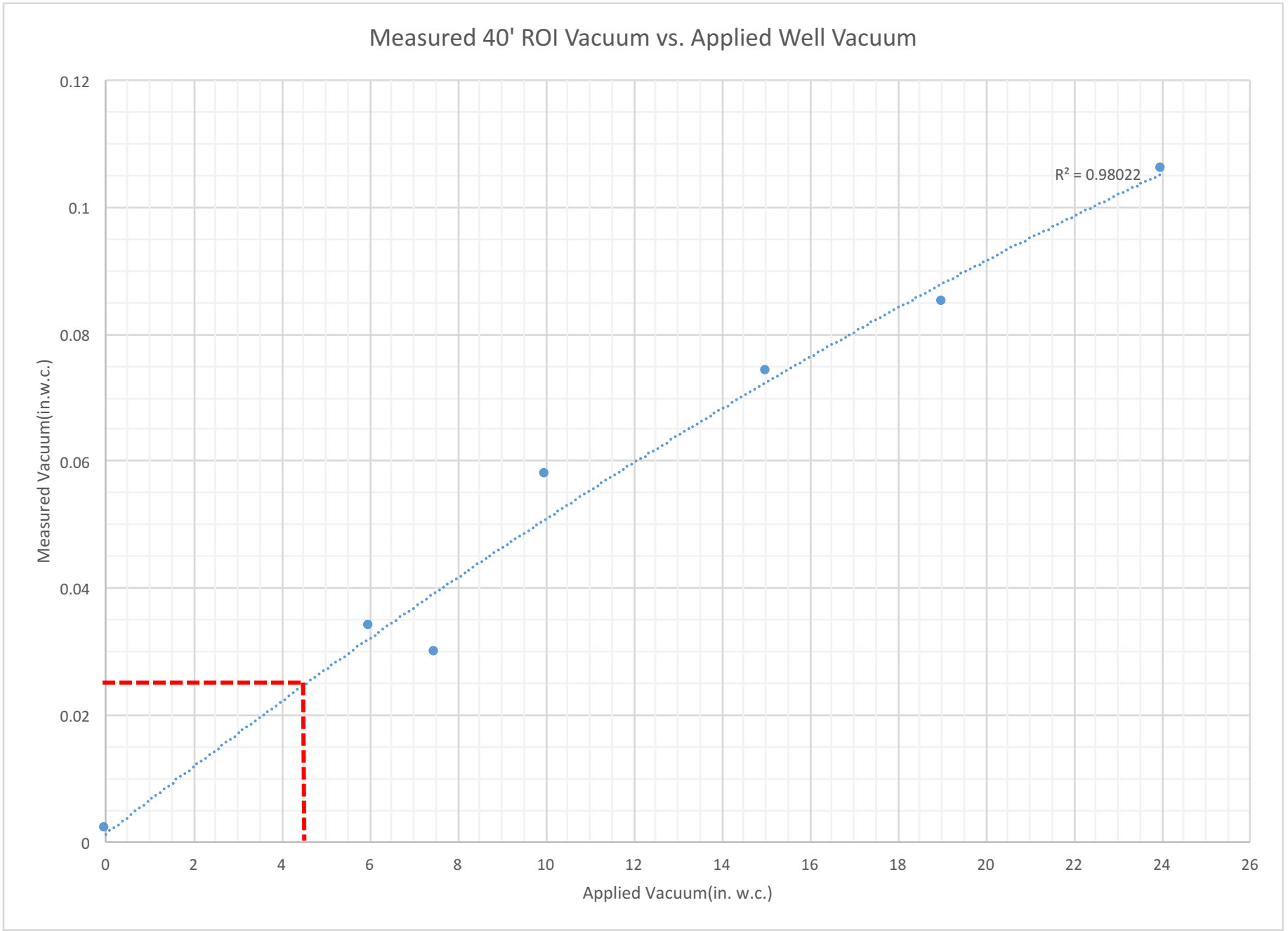
TEMPERATURE INCREASE



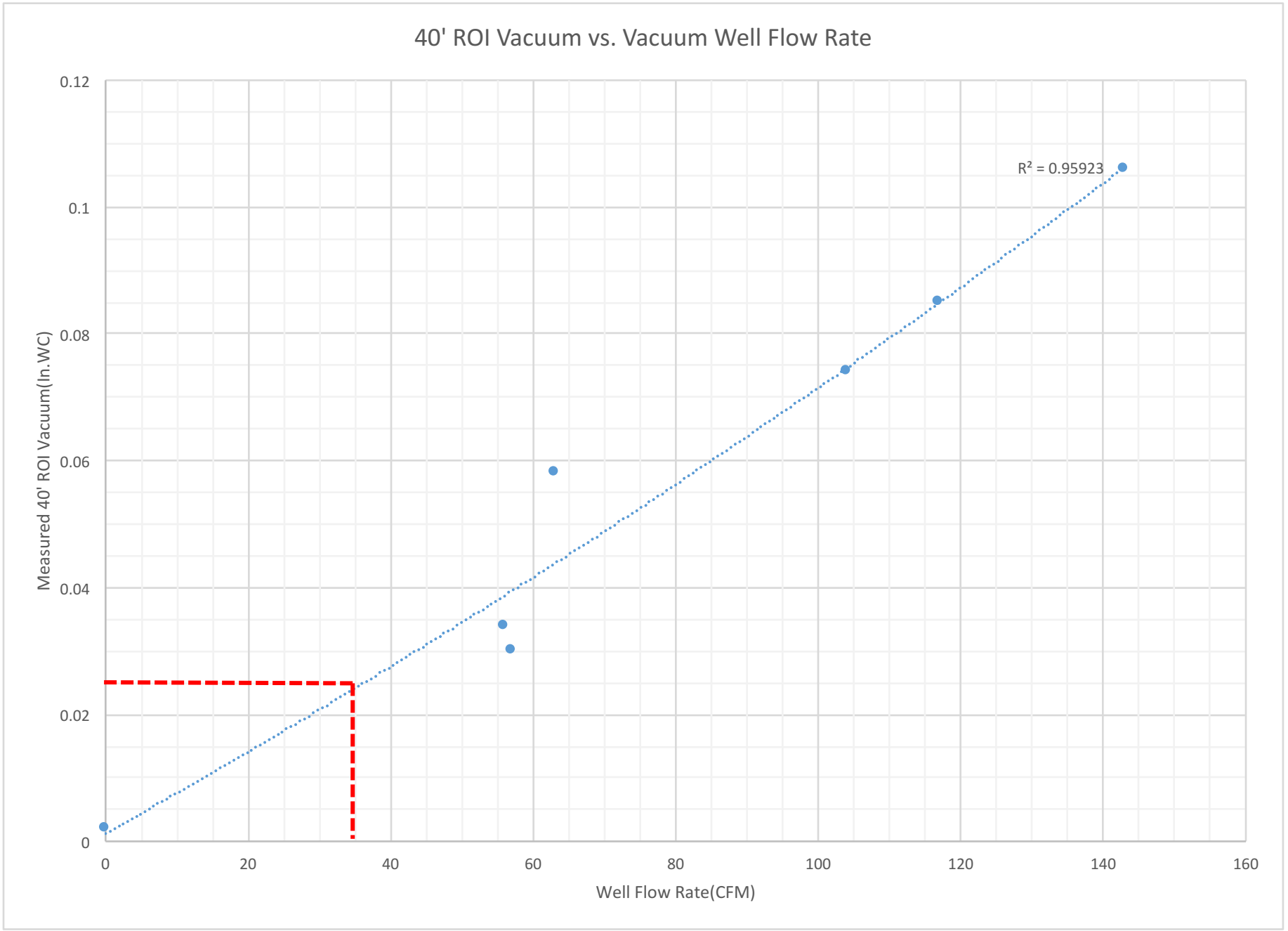


Curves refer to air at 68°F temperature and 29.92 In Hg atmospheric pressure (abs) measured at inlet port.
Values for flow, power consumption and temperature rise: +/- 10% tolerance.
Data subject to change without notice.

Attachment E:
Required Well Vacuum


Measured 40' ROI Vacuum vs. Applied Well Vacuum
Measured Vacuum(in.w.c.)
Applied Vacuum(in. w.c.)
R² = 0.98022
0.12
0.1
0.08
0.06
0.04
0.02
0
0
2
4
6
8
10
12
14
16
18
20
22
24
26

Attachment F:
Required Well Flowrate


40' ROI Vacuum vs. Vacuum Well Flow Rate
Measured 40' ROI Vacuum(In.WC)
Well Flow Rate(CFM)
R² = 0.95923
0.12
0.1
0.08
0.06
0.04
0.02
0
0
20
40
60
80
100
120
140
160

Attachment G:
Piping Calculations

Assumptions:

- $\frac{210 CFM\ at\ Blower}{6\ SSDS\ Wells} = 35\ CFM\ per\ well$
- $Pipe\ Cross - Sectional\ Area: 7.1\ in^2$
- Schedule 40 PVC

Piping Friction Loss (Based Upon Layout):

Friction Loss Sources	Pressure Loss
10-feet vertical 3-inch OD schedule 40 PVC	0.025 in.wc
40-feet horizontal 3-inch OD schedule 40 PVC at 35 CFM	0.1 in.wc
40- feet horizontal 4-inch OD schedule 40 PVC at 90 CFM	0.24 in.w.c.
2x90-degree PVC fittings Equivalent Length: 10 feet each=20 feet total	0.05 in.wc
Manifold- equivalent to tee with branch flow Equivalent Length: 15.3 feet	0.02 in.wc
10-feet vertical 4-inch OD schedule 40 PVC:	0.025 in.wc
Total Pressure Loss	0.46 in.wc

4.5 in.wc. required @ 35 CFM + 0.46 in.wc friction losses=4.96 in.wc required at each well

Blower can supply 6 in.wc at 210 CFM total

FPZ K06-MS Blower will sufficiently be able to achieve 0.025 in.wc vacuum at 40 ROI with calculated friction losses

Attachment H: SSDS Well Cross-Section

PVC Rain Cap

Exhaust

Building Roof

3” x 4” PVC
90° Elbow

4” SCH 40 PVC Pipe

Drop Ceiling

4” SCH 40 PVC Riser

3” SCH 40 PVC Riser

Sampling Port

Remote Vacuum
Transducer

Blower

3” Ball Valve

Grout

Sleeve with Urethane Caulking

Ground Floor

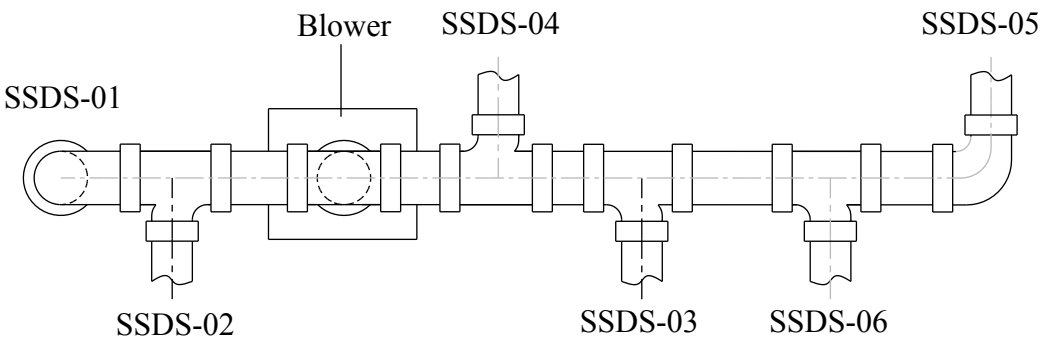
Concrete Slab

Native Soil

#2 Moray Sand and
Round Gravel

3” X 2’ SCH 40 PVC
Screen (0.02 Slot)
w/3” PVC End Cap

Overhead of Piping Manifold
(Not To Scale)



SSDS Well Cross-Section

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Project No.: 6759-RCNY	Figure No.: H
Date: 01/23/2020	Scale: Not to Scale