30 October 2024

Yildiz Palumbo, PE
Professional Engineer 1
New York State Department of Environmental Conservation
Division of Environmental Remediation
47-20 41st Street
Long Island City, New York 11101

Re: Soil Vapor Extraction System Pilot Test and Design Summary
NYSDEC BCP Site #C224274
100 Union Avenue, Brooklyn, New York
Langan Project No.: 170819101

Dear Ms. Palumbo:

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) has prepared this letter report to summarize the pilot testing activities and the results of the subsequent two-dimensional (2D) computational pneumatic modeling completed for the 100 Union Avenue, Brooklyn, New York ("site"). Based on the results of the pilot testing and modeling, we present herein the design specifications for a site-specific full-scale soil vapor extraction (SVE) system intended to mitigate potential offsite migration of soil vapor.

Langan performed SVE pilot testing and modeling to collect site-specific information and derive performance design criteria needed for the development of the full-scale SVE design. This memorandum summarizes the results of the pilot testing and subsequent 2D computational pneumatic modeling, and outlines the components, layout, and performance of the proposed SVE system.

SITE BACKGROUND

The New York City Tax Assessor identifies the site as Block 2242, Lot 3. Currently the site is undeveloped with surface cover consisting of mostly asphalt with areas of vegetation and concrete. The site is approximately 10,566 square feet. Adjoining properties consist of various land uses including multi-story residential, commercial, parking, industrial, and vacant properties. The site is bounded by Middleton Street to the north, a small parking area (Lot 2) and multi-story residential building (Lot 1) to the south/southeast, Union Avenue to the west, and a New York City Transit (NYCT) substation (Lot 57) and multi-story residential buildings (Lots 15 and 7502) to the east.

The site was occupied by a church and residential dwelling between 1887 and 1935. The site became vacant and undeveloped in 1950. The site was utilized for auto sales with a one-story building in the northern portion between 1965 and 1991, and as an auto repair shop and junkyard from 1992. The site is currently used for vehicle parking.

Remedial investigation (RI) activities were initiated in January 2014 with additional sampling performed in August 2020 by GZA Geoenvironmental. RI activities included (i) delineation of the horizontal and vertical extent of impacted soil, groundwater, and soil vapor at the site; (ii) assessment of the potential fate and transport of contaminants; and (iii) evaluation of potential remedial alternatives for exposure mitigation.

Results of the RI revealed elevated concentrations of tetrachloroethene (PCE) in soil vapor at concentrations as high as 1,450 ug/m^3, and trichloroethene (TCE) as high as 61.3 ug/m^3. Based on these levels, the NYSDEC requires the installation of an SVE system to limit off-site migration of PCE and TCE impacted soil vapor. Since development has been postponed, the NYSDEC requires installation of the system prior to development in order to protect human health and the environment.

PILOT TESTING

On 22 July 2024 AARCO Environmental Services (AARCO) installed one soil vapor extraction well (SVE-1), and six vapor monitoring points (VP-1 through VP-6) at varying distances and directions from the extraction well. The SVE well was installed in the target treatment area proximate to former soil vapor sample SV-5, where the maximum total volatile organic compounds (VOCs) concentration was observed during the RI in August 2020. The target treatment area was based on the area shown in the Remedial Action Work Plan (RAWP) prepared by GZA Geoenvironmental dated September 2023. The SVE well was constructed of 2-inch schedule 40 polyvinyl chloride (SCH. 40 PVC), and the VPs were constructed of 1-inch SCH. 40 PVC. The SVE well and the VPs were screened using 20-slot screen from 3- to 5-feet below grade surface (bgs). The wells were screened such that the bottom of screen was installed 1-foot above the observed water table at approximately 6-feet bgs. The SVE well and VPs were finished with No. 2 sand pack, bentonite, well plugs, and 8-inch flush mount well vaults. The SVE pilot test well layout and construction details are provided in **Figure 1**.

SVE pilot testing was completed by Langan with support from AARCO on 25 and 26 July 2024. The objective of the pilot testing was to derive site-specific information related to subsurface characteristics and design criteria of the proposed SVE system, including the air intrinsic permeability of the target treatment area.

The pilot test was conducted in two phases. Phase I consisted of a series of step tests performed at SVE-1. These tests involved the extraction of subsurface air from the SVE well at multiple air extraction flow rates and vacuums, and the subsequent monitoring of vacuum influence at the nearby VPs. The SVE well and VPs were installed such that the monitoring points were spaced at varying distances and in varying directions from the SVE well. The tests were performed at increasing flow rates – the lowest air extraction flow rate and vacuum condition was tested and then increased systematically until the highest sustainable extraction flow rate and vacuum condition was achieved. Between steps, vacuum readings were allowed to stabilize at nearby monitoring points, indicating equilibrium with the changed test condition. Phase II included a long-term test in which the highest sustainable extraction flow rate and vacuum condition was applied to the SVE well for an extended duration.

As would be expected, an increase in the air extraction flow rate and vacuum at the SVE well generally resulted in an increase in induced vacuum at each monitoring point. Equipment specifications and a summary of the pilot test data are included in **Attachment A**. The results of the pilot test were tabulated and used as input into a 2D computational pneumatic model, MDFIT, as discussed further herein.

PNEUMATIC MODELING

Key to designing SVE systems is determining the air intrinsic permeability of the extraction zone. The 2D computational pneumatic model, MDFIT, allows for the estimation and calibration of the site-specific air intrinsic permeability, based on the air extraction flow rate vs. vacuum relationships observed during pilot testing. The model provides the platform required to scale the results from the pilot-scale testing to full-scale design. Utilizing the calibrated site-specific air intrinsic permeability, the model allows for the prediction of full-scale system performance.

The pneumatic modeling input parameters presume that the extraction zone displays isotropic conditions (i.e., permeability in the horizontal direction is equivalent to that of the vertical direction). Although heterogeneous conditions may exist in discrete areas through the extraction zone, the results of the pilot test did not indicate that air moves preferentially horizontally or vertically. Anisotropy often occurs when subsurface elements exist that prevent or promote flow in a certain direction. A consistent element(s) that would promote anisotropic flow was not documented. This is further confirmed by the results of the pilot testing – anticipated dissipation of subsurface vacuum with distance was observed.

Based on the observed vacuum influence, an initial estimation of air intrinsic permeability for the extraction zone was calculated. Single well modeling simulations, using this estimated air intrinsic permeability, were then run at air extraction flow rates achieved during the pilot test. The pilot test flow rates were converted from actual cubic feet per minute (acfm) to standard cubic feet per minute (scfm) based on observed vacuum and temperature conditions for incorporation into the model. The outputs of these modeling simulations being a vacuum versus distance relationship (i.e., vacuum influence). The vacuum influence observed during the pilot testing was compared to the modeled vacuum influence at the specific air extraction flow rates. Air intrinsic permeability was then adjusted to allow for "calibration" of the model such that the modeled vacuum influence closely mimicked the observed vacuum influence. The calibrated air intrinsic permeability for the extraction zone is 4.50E-6 cm^2, generally corresponding to silty sand.

Single well design modeling simulations were completed using the calibrated air intrinsic permeability. Varying air extraction flow rate conditions were modeled to determine the required wellhead vacuum along with the resultant approximate vacuum influence and pneumatic pore volume exchanges associated with each respective flow condition. Outputs from these simulations are provided in **Attachment B**.

FULL-SCALE SOIL VAPOR EXTRACTION SYSTEM DESIGN

The air extraction flow rate, vacuum, and radius of influence (ROI) of each full-scale SVE well were determined using the following considerations:

- Maintain a minimum vacuum influence of 0.015 inches of water column (IWC) across the entirety of the target treatment area.

- Achieve a minimum of 2,000 pore volume exchanges per year. This number is estimated based on the site lithology, contaminants of concern, and concentrations of the contaminants of concern.

- Balance between the total number of wells and the total air extraction flow rate and vacuum capacity of the system. The ROI of each well can be increased with an increase in the air extraction flow rate (and resultantly the extraction vacuum), which may potentially reduce the total number of wells required. However, the increase in ROI (and potential decrease in the number of wells) is not always enough to offset the increase in total air extraction flow rate and vacuum capacity of the system.

The purpose of the SVE system is not to remediate the source, but to prevent the off-site migration of soil vapor impacted by PCE and TCE. Therefore, the primary design objective is to create a vacuum gradient of at least 0.015 IWC along the northern site boundary to prevent off-site migration. Based on the considerations mentioned and the results of the pneumatic modeling, the proposed full-scale SVE system design includes four SVE wells (SVE1 through SVE4). Each well will operate at 40 scfm at a vacuum of 3 IWC at the wellhead to achieve a 15-foot ROI. Under these conditions, a minimum vacuum of 0.02 IWC and a pore volume exchange of approximately 5,200 exchanges per year will be achieved within the 15-foot ROI. To allow for future operational flexibility, such as the potential installation of additional SVE wells, the total system flow rate and vacuum have been increased to 300 scfm and 20 IWC, respectively. The proposed design criteria are summarized in **Table 1** and the SVE system design is provided in **Attachment C**.

Sincerely,
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.

David Winslow, Ph.D., P.G.
Senior Associate

Matthew Ambrusch, P.E., MBA
Associate Principal

MA:ab

Enclosures:

Table 1 – Proposed Soil Vapor Extraction System Design Summary
Figure 1 – Soil Vapor Extraction System Pilot Test Well Layout and Details
Attachment A – Pilot Test Data
Attachment B – Pneumatic Modeling Results

Attachment C – Soil Vapor Extraction System Design
Attachment D – Soil Vapor Extraction System Installation Schedule

cc: Aroona Boodram, P.E.; BJ Parekh, P.E., LSRP; Alessandra Looman, E.I.T.

\\langan.com\data\NYC\data1\170819101\Project Data_Discipline\Environmental\Reports\2024-08 SVE Design\SVE Design Memo\2024-10-30 SVE Design Memo_Text.docx

CERTIFICATION

I, Matthew Ambrusch, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Remedial Design 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) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

	10/30/2024	
NYS Professional Engineer 110412-01	Date	Signature

Table 1
Proposed Soil Vapor Extraction System Design Summary
100 Union Avenue, Brooklyn, New York
Langan Project No.: 170819101

Well Type	Well ID	Well Diameter (inch)	Well Screen Interval (feet bgs)	ROI (feet)	Air Flow Rate (scfm)	Wellhead Vacuum (IWC)	Manifold Friction Loss (IWC)	Total Vacuum (IWC)	Pore Volume Exchanges (per year)
Soil Vapor Extraction	SVE1	4	3-5	15	40	3	5	8	5240
	SVE2								
	SVE3								
	SVE4								
TOTAL DESIGN FLOW RATE AND VACUUM					**300**			**20**	

Treatment Area (sqft)	No. VMPs
2,000	4

Notes:
bgs - below grade surface
IWC - inches of water column
ROI - radius of influence
scfm - standard cubic feet per minute
SVE - soil vapor extraction
VMP - vapor monitoring point

1. The required vacuum, air extraction flow rate, and ROI at each individual SVE well is based on the results of the pilot testing activities completed at the site in July 2024 and the subsequent 2D pneumatic modeling.
2. To account for frictional losses and allow for a more conservative design, a factor of safety was included when sizing the required process equipment.
3. The screen interval for each SVE well is approximate and is subject to change based on observed field conditions (i.e., groundwater table elevation) during installation.
4. The total design flow rate and vacuum was increased to allow for future operational flexibility (i.e., installation of additional SVE wells).

FIGURE

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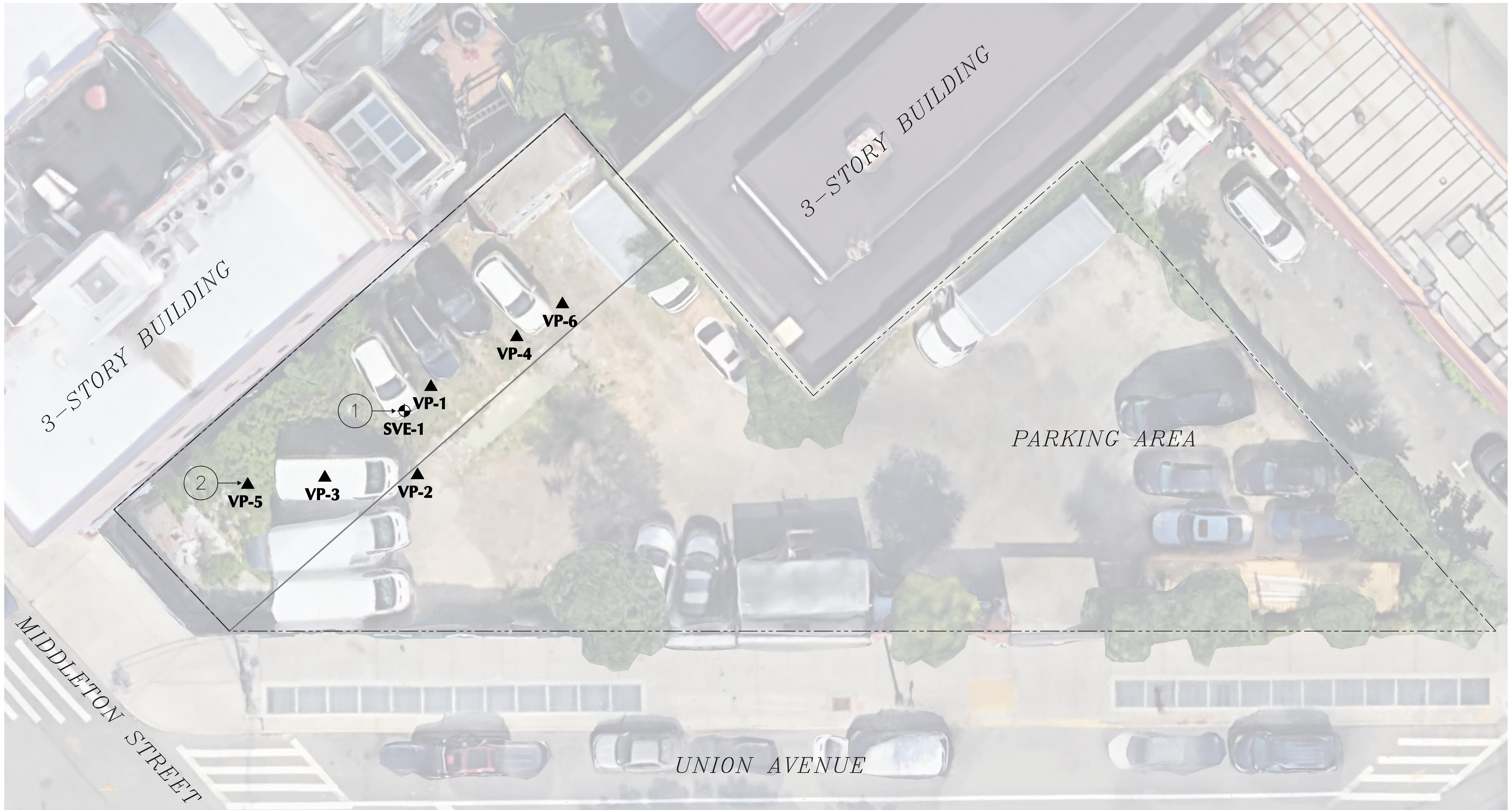
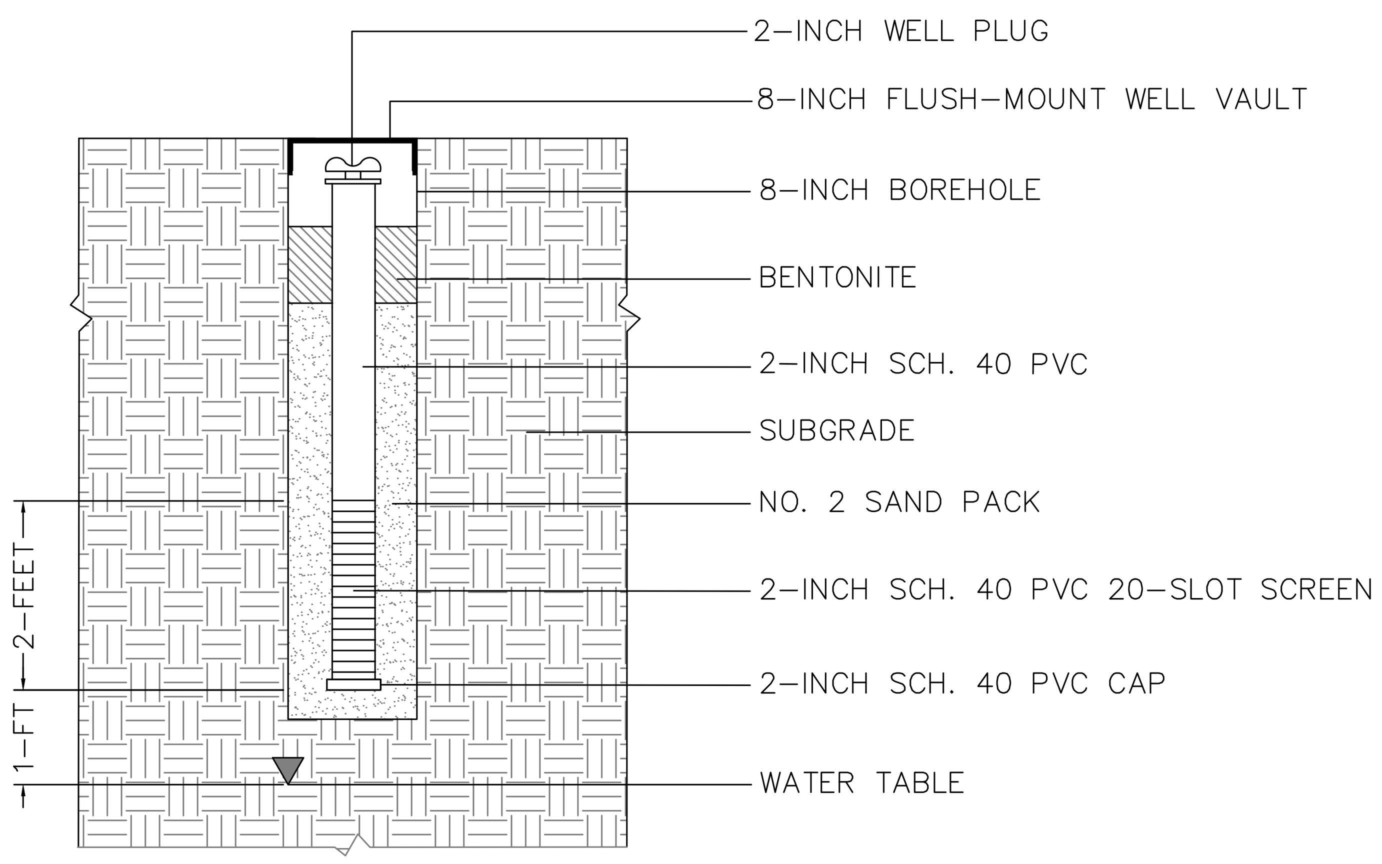


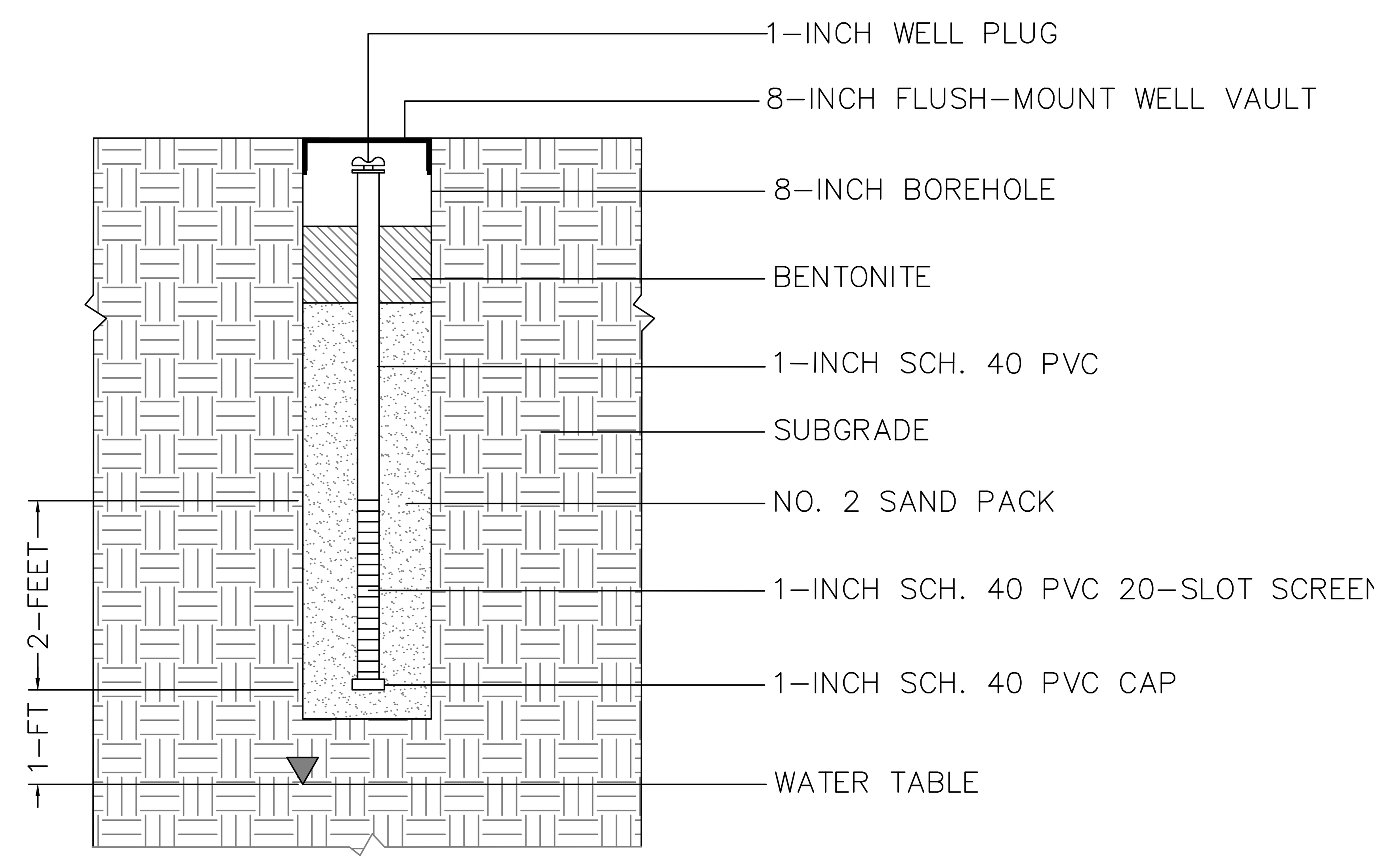
LEGEND:

- SVE-1 — PILOT TEST SOIL VAPOR EXTRACTION WELL
- VP-1 — PILOT TEST VAPOR MONITORING POINT
- TARGET TREATMENT AREA
- PROPERTY BOUNDARY
- (1) REFER TO DETAIL 1



(1) PILOT TEST SVE WELL CONSTRUCTION

N.T.S.



(2) PILOT TEST VP CONSTRUCTION

N.T.S.

GENERAL NOTES:

1. THE COMPONENTS SHOWN ARE NOT TO SURVEYED COORDINATES. THE PILOT TEST SOIL VAPOR EXTRACTION [SVE] WELL AND VAPOR MONITORING POINT [VP] LOCATIONS ARE APPROXIMATE BASED ON FIELD MEASUREMENTS.
2. THE SITE PLAN REFERENCED IS DEVELOPED FROM GOOGLE EARTH IMAGERY DATED JUNE 2022 AND LANGAN SITE OBSERVATIONS. THE SITE INFORMATION SHOWN IS FOR REFERENCE ONLY. THE PLAN DOES NOT SHOW EACH AND EVERY CONDITION EXISTING OR PROPOSED AT THE SITE.
3. THE TARGET TREATMENT AREA IS BASED ON THE AREA SHOWN IN THE REMEDIAL ACTION WORK PLAN [RAWP] PREPARED BY GZA GEOENVIRONMENTAL DATED SEPTEMBER 2023.
4. THE SVE WELL LOCATION WAS SELECTED TO BE PROXIMATE TO FORMER SOIL VAPOR SAMPLE SV-5, WHERE THE MAXIMUM TOTAL VOLATILE ORGANIC COMPOUNDS [VOCS] CONCENTRATION WAS OBSERVED DURING REMEDIAL INVESTIGATION ACTIVITIES PERFORMED BY GZA GEOENVIRONMENTAL IN AUGUST 2020.
5. THE VP LOCATIONS WERE SELECTED SUCH THAT VACUUM PROPAGATION COULD BE MONITORED AT DIFFERENT DISTANCES AND IN DIFFERENT DIRECTIONS FROM THE VEP.

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SCALE IN FEET

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Project	Drawing Title	Project No.	Figure
100 UNION AVENUE KINGS COUNTY BROOKLYN NEW YORK	SOIL VAPOR EXTRACTION SYSTEM PILOT TEST WELL LAYOUT AND DETAILS	170819101 Date: 08/30/2024 Drawn By: AL Checked By: AB/MA	1

PROJECT NO. 170819101

Filename: C:\bms\langan-pw-01\d0605558\170819101-0501-ND101-0101.dwg Date: 8/30/2024 Time: 09:53 User: alooman Style Table: Langan.stb Layout: FIG 1 PILOT TEST

ATTACHMENT A
PILOT TEST DATA

Attachment A
Pilot Test Data
Step Test 1
100 Union Ave, Brooklyn, NY 11206
Langan Project No.: 170819101

Date: 7/25/2024
Langan Staff: Alessandra Looman
Ambient Temp (°F): 76
Barometric Pressure (inHg): 30.06

Flow Condition (blower setting, dilution valve position)	Time	Vapor Extraction Point (VEP) SVE-1				VEP Discharge		Vacuum Monitoring Point (VMP)												Notes
								5		10		15		20		25		30		
		Vacuum (IWC)	Temp (°F)	VOCs (ppb)	Measured Flow (acfm)	Carbon Influent VOCs	Carbon Effluent VOCs	VP-1 Distance - 5' from VEP		VP-2 Distance - 10' from VEP		VP-3 Distance - 15' from VEP		VP-4 Distance - 20' from VEP		VP-5 Distance - 25' from VEP		VP-6 Distance - 30' from VEP		
						ppb	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	
	Background	-0.001	82.3	243	0	57	85	0.000	97	0.001	5	0.000	205	0.002	0	0.004	27	0.003	18	blower powered on at 9:10, work zone PID 27 ppb
dilution valve fully open	9:20	-2.045	84.2	137	18			-0.012	108	-0.001	156	-0.005	128	-0.008	126	-0.002	480	-0.004	112	
	9:30	-2.082	86.7	115	35			-0.012	90	-0.004	81	-0.003	263	-0.006	257	-0.010	633	-0.011	276	
	9:40	-1.998	89.6	111	43	79	0	-0.017	83	-0.003	130	-0.006	273	-0.008	211	-0.002	527	-0.004	287	
	10:10	-1.989	89.0	91	46	83	0	-0.015	74	-0.007	116	-0.005	337	-0.007	165	-0.002	440	-0.004	443	
	10:40	-1.925	86.0	88	20	86	15	-0.015	77	-0.005	180	-0.006	306	-0.006	139	-0.002	524	-0.007	323	
	11:10	-2.028	89.5	95	35			-0.012	73	-0.001	238	-0.003	325	-0.008	120	-0.001	435	-0.006	215	
																				close dilution valve 25%, work zone PID 24 ppb

Notes:
acfm - actual cubic feet per minute
°F - degrees Fahrenheit
IWC - inches of water column
NM - not measured
ppb - parts per billion
VEP - vapor extraction point
VMP - vacuum monitoring point
VOCs - volatile organic compounds

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Attachment A
Pilot Test Data
Step Test 2
100 Union Ave, Brooklyn, NY 11206
Langan Project No.: 170819101

Date: 7/25/2024
Langan Staff: Alessandra Looman
Ambient Temp (°F): 80
Barometric Pressure (inHg): 30.05

Flow Condition (blower setting, dilution valve position)	Time	Vapor Extraction Point (VEP) SVE-1				VEP Discharge		Vacuum Monitoring Point (VMP)												Notes
								5		10		15		20		25		30		
		Vacuum (IWC)	Temp (°F)	VOCs (ppb)	Measured Flow (acfm)	Carbon Influent VOCs	Carbon Effluent VOCs	VP-1 Distance - 5' from VEP		VP-2 Distance - 10' from VEP		VP-3 Distance - 15' from VEP		VP-4 Distance - 20' from VEP		VP-5 Distance - 25' from VEP		VP-6 Distance - 30' from VEP		
						ppb	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	
	Background																			work zone PID 24 ppb
dilution valve closed 25%	11:45	-5.301	85.3	124	95			-0.041	55	-0.010	201	-0.013	370	-0.015	112	-0.008	437	-0.011	169	
	11:55	-5.135	88.8	135	106			-0.038	64	-0.004	266	-0.013	202	-0.015	106	-0.006	439	-0.008	158	
	12:05	-5.375	88.9	161	96	124	18	-0.041	69	-0.003	303	-0.014	205	-0.011	119	-0.005	402	-0.011	149	
	12:35	-5.321	98.4	136	102	125	10	-0.041	57	-0.001	425	-0.012	259	-0.012	120	-0.010	316	-0.006	131	
	13:05	-5.245	98.3	127	107	113	21	-0.045	105	-0.005	595	-0.018	380	-0.017	172	-0.014	446	-0.009	163	
	13:35	-5.180	101.5	158	104			-0.045	102	-0.006	630	-0.014	401	-0.014	149	-0.006	421	-0.010	155	
																				close dilution valve 50%, work zone PID 22 ppb

Notes:
acfm - actual cubic feet per minute
°F - degrees Fahrenheit
IWC - inches of water column
NM - not measured
ppb - parts per billion
VEP - vapor extraction point
VMP - vacuum monitoring point
VOCs - volatile organic compounds

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Attachment A
Pilot Test Data
Step Test 3
100 Union Ave, Brooklyn, NY 11206
Langan Project No.: 170819101

Date: 7/25/2024
Langan Staff: Alessandra Looman

Ambient Temp (°F): 83
Barometric Pressure (inHg): 30.05

Flow Condition (blower setting, dilution valve position)	Time	Vapor Extraction Point (VEP) SVE-1				VEP Discharge		Vacuum Monitoring Point (VMP)												Notes
								5		10		15		20		25		30		
		Vacuum (IWC)	Temp (°F)	VOCs (ppb)	Measured Flow (acfm)	Carbon Influent VOCs	Carbon Effluent VOCs	VP-1 Distance - 5' from VEP		VP-2 Distance - 10' from VEP		VP-3 Distance - 15' from VEP		VP-4 Distance - 20' from VEP		VP-5 Distance - 25' from VEP		VP-6 Distance - 30' from VEP		
						ppb	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	
	Background																			work zone PID 22 ppb
dilution valve closed 50%	14:05	-9.612	94.1	150	172			-0.078	70	-0.004	920	-0.026	270	-0.025	80	-0.017	430	-0.022	169	
	14:15	-9.521	96.5	154	148			-0.077	90	-0.007	570	-0.025	246	-0.025	125	-0.014	469	-0.021	183	
	14:25	-9.985	99.8	183	168	136	24	-0.077	100	-0.006	631	-0.023	268	-0.024	115	-0.010	460	-0.011	186	
	14:55	-9.450	95.5	211	166	156	20	-0.081	101	-0.005	1066	-0.026	245	-0.026	121	-0.021	524	-0.011	274	
	15:25	-9.845	99.0	213	145	187	25	-0.069	112	-0.002	1136	-0.017	280	-0.028	130	-0.007	676	-0.036	222	
	15:55	-9.724	92.7	211	178			-0.087	115	-0.005	517	-0.030	207	-0.031	127	-0.011	660	-0.015	224	
																				close dilution valve 75%, work zone PID 18 ppb

Notes:
acfm - actual cubic feet per minute
°F - degrees Fahrenheit
IWC - inches of water column
NM - not measured
ppb - parts per billion
VEP - vapor extraction point
VMP - vacuum monitoring point
VOCs - volatile organic compounds

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Attachment A
Pilot Test Data
Step Test 4
100 Union Ave, Brooklyn, NY 11206
Langan Project No.: 170819101

Date: 7/26/2024
Langan Staff: Alessandra Looman
Ambient Temp (°F): 70
Barometric Pressure (inHg): 30.09

Flow Condition (blower setting, dilution valve position)	Time	Vapor Extraction Point (VEP) SVE-1				VEP Discharge		Vacuum Monitoring Point (VMP)												Notes
								5		10		15		20		25		30		
		Vacuum (IWC)	Temp (°F)	VOCs (ppb)	Measured Flow (acfm)	Carbon Influent VOCs	Carbon Effluent VOCs	VP-1 Distance - 5' from VEP		VP-2 Distance - 10' from VEP		VP-3 Distance - 15' from VEP		VP-4 Distance - 20' from VEP		VP-5 Distance - 25' from VEP		VP-6 Distance - 30' from VEP		
						ppb	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	
	Background	0.00	70.7	118	0	7	112	0.000	262	0.000	1088	-0.002	364	-0.003	206	0.003	324	-0.003	340	blower powered on at 7:25, work zone PID 11 ppb
dilution valve closed 75%	7:45	-18.51	74.1	NM, too much vac	214			-0.161	39	-0.008	377	-0.054	169	-0.056	57	-0.028	393	-0.024	139	
	7:55	-18.52	73.4		216			-0.154	21	-0.010	310	-0.055	175	-0.059	44	-0.038	217	-0.031	114	
	8:05	-18.45	75.5		200	NM, too much vac	0	-0.148	22	-0.010	324	-0.058	156	-0.054	36	-0.035	284	-0.035	107	
	8:35	-18.32	79.2		198	NM, too much vac	0	-0.150	36	-0.014	465	-0.050	104	-0.051	37	-0.035	209	-0.028	119	
																				collect step test GAC influent/effluent samples
																				close dilution valve 100%, work zone PID 21 ppb

Notes:
acfm - actual cubic feet per minute
°F - degrees Fahrenheit
IWC - inches of water column
NM - not measured
ppb - parts per billion
VEP - vapor extraction point
VMP - vacuum monitoring point
VOCs - volatile organic compounds

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Attachment A
Pilot Test Data
Long-Term Test
100 Union Ave, Brooklyn, NY 11206
Langan Project No.: 170819101

Date: 7/26/2024
Langan Staff: Alessandra Looman
Ambient Temp (°F): 79
Barometric Pressure (inHg): 30.09

Flow Condition (blower setting, dilution valve position)	Time	Vapor Extraction Point (VEP) SVE-1				VEP Discharge		Vacuum Monitoring Point (VMP)												Notes
								5		10		15		20		25		30		
		Vacuum (IWC)	Temp (°F)	VOCs (ppb)	Measured Flow (acfm)	Carbon Influent VOCs	Carbon Effluent VOCs	VP-1 Distance - 5' from VEP		VP-2 Distance - 10' from VEP		VP-3 Distance - 15' from VEP		VP-4 Distance - 20' from VEP		VP-5 Distance - 25' from VEP		VP-6 Distance - 30' from VEP		
						ppb	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	IWC	ppb	
	Background																			long term test began 10:20, work zone PID 21 ppb
dilution valve closed 100%	10:45	-29.57	89.3	NM, too much vac	NM, too much flow			-0.249	73	-0.015	426	-0.083	113	-0.077	76	-0.050	222	-0.029	153	flow too high, open dilution valve to 75% closed
dilution valve closed 75%	11:15	-15.91	81.7		211	NM, too much vac	0	-0.130	96	-0.003	1492	-0.040	168	-0.039	121	-0.021	352	-0.018	182	
	11:45	-15.82	86.8		214		0	-0.131	133	-0.007	1436	-0.042	173	-0.044	162	-0.024	341	-0.025	267	
	12:15	-15.81	90.1		213		0	-0.138	115	-0.015	155	-0.034	166	-0.046	150	-0.028	225	-0.027	213	
	12:45	-15.67	86.7		210		20	-0.13	86	-0.014	1677	-0.042	177	-0.041	166	-0.030	285	-0.021	279	
	13:15	-15.47	91.8		207		16	-0.127	113	-0.004	1418	-0.043	240	-0.041	169	-0.019	710	-0.020	330	
	13:45	-15.55	89.5		194		21	-0.120	113	-0.007	2055	-0.038	264	-0.042	161	-0.025	992	-0.024	289	work zone PID 38 ppb
	14:15	-15.42	88.3		212		26	-0.129	130	-0.009	2027	-0.041	234	-0.041	193	-0.027	956	-0.021	391	collect long term test GAC influent/effluent samples

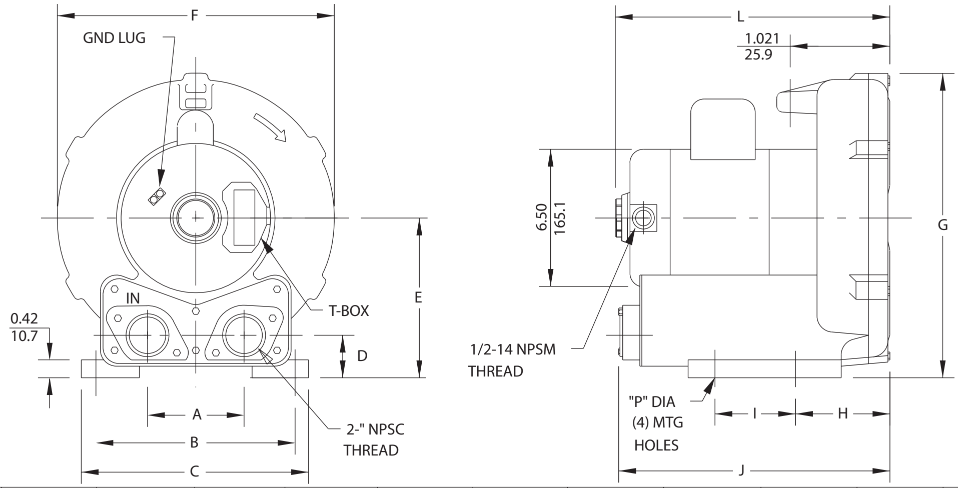
Notes:
acfm - actual cubic feet per minute
°F - degrees Fahrenheit
IWC - inches of water column
NM - not measured
ppb - parts per billion
VEP - vapor extraction point
VMP - vacuum monitoring point
VOCs - volatile organic compounds

LANGAN

DR 404/454/505/513/656

ROTRON®

Spa Blowers



IN / MM

NOTES
1 DRAWING NOT TO SCALE, CONTACT FACTORY FOR SCALE CAD DRAWING.
2 CONTACT FACTORY FOR BLOWER MODEL LENGTHS NOT SHOWN.

MODEL	A (IN/MM)	B (IN/MM)	C (IN/MM)	D (IN/MM)	E (IN/MM)	F (IN/MM)	G (IN/MM)	H (IN/MM)	I (IN/MM)	J (IN/MM)	K (IN/MM)	L (IN/MM)
DR404AQ58M	4.75/120.7	8.93/226.8	10.12/257	192/48.8	6.28/159.5	11.5/292.1	12.16/308.9	3.0/76.2	3.75/95.3	12.88/372.2	.59/15	12.91/327.9
DR454V58	4.75/120.7	10.30/261.6	11.38/289.1	1.92/48.8	6.98/177.3	12.55/318.8	13.52/343.4	3.25/82.6	4.50/114.3	10.81/274.6	.59/15	14.45/367
DR505AW58M	4.75/120.7	10.30/261.6	11.70/297.2	1.87/47.5	7.26/184.4	13.53/343.7	14.38/365.3	3.56/92.7	4.50/114.3	14.38/365.3	.59/15	15.0/381
DR513V58	4.75/120.7	11.42/290.1	13.0/330.2	2.23/56.6	8.69/220.7	14.21/360.9	15.8/401.3	3.72/94.5	5.50/139.7	13.74/349	.59/15	14.58/370.3
DR656K58X	4.92/125	11.42/290.1	12.8/325.1	2.25/57.2	7.46/189.5	15.42/391.7	15.17/385.3	4.14/105.2	5.5/139.7	15.12/384.1	.59/15	15.51/393.9

		Part/Model Number				
		DR404AQ58M	DR454V58M	DR505AW58M	DR513V58	DR656K58X
Specification	Units	037778	080485	037935	038143	080603
Motor Enclosure - Shaft Mtl.	-	SPA (ODP)-CS	SPA (ODP)-CS	SPA (ODP)-CS	SPA (ODP)-CS	TEFC-CS
Horsepower	-	1.0	1.5	2.0	1.5	3.0
Voltage	AC	115/230	115/230	115/230	115/230	115/230
Phase - Frequency	-	Single-50/60 Hz	Single-50/60 Hz	Single-50/60 Hz	Single-50/60 Hz	Single-50/60 Hz
Insulation Class	-	F	F	F	F	F
NEMA Rated Motor Amps	Amps (A)	15/7.5	15.2/7.6	21/10.5	15.2/7.6	31/15.5
Service Factor	-	1.4	1.3	1.2	1.3	1.0
Maximum Blower Amps	Amps (A)	8/4	17/8.5	26/13	17/8.5	27.8/13.9
Locked Rotor Amps	Amps (A)	32/16	85/43	136/68	85/43	200/100
Recommended NEMA Starter	Size-	0/00	1/0	1/0	1/0	1.5/1
Shipping Weight	Lbs	64	76	83	90	51
	Kg	29	34.5	37.6	40.8	23.1
Recommended Number of Jets	-	3-6	5-10	5-10	12-17	8-12

Voltage - ROTRON motors are designed to handle a broad range of world voltages and power supply variations. Our dual voltage 1 phase motors are factory tested and certified to operate on both: **104-115/208-230 VAC-1 ph-60 Hz** and **100-110/200-220 VAC-1 ph-50 Hz**. All voltages above can handle a ±10% voltage fluctuation. Special wound motors can be ordered for voltages outside our certified range.

Operating Temperatures - Maximum operating temperature: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F rated motors or 120°C for Class B rated motors. Blower outlet air temperature should not exceed 140°C (air temperature rise plus inlet temperature). Performance curve maximum pressure and suction points are based on a 40°C inlet and ambient temperature. Consult factory for inlet or ambient temperatures above 40°C.

Maximum Blower Amps - Corresponds to the performance point at which the motor or blower temperature rise with a 40°C inlet and/or ambient temperature reaches the maximum operating temperature.

Notes
- The blower should not be stopped/started more than four times an hour. - Use of relief valve 515092 is required for all blowers.

AMETEK DYNAMIC FLUID SOLUTIONS
75 North Street, Saugerties, NY 12477
USA: +1 215-256-6601 - Europe: +49 7703 930909 - Asia: +86 21 5763 1258
Customer Service Fax: +1 215.256.1338
www.ametekdfs.com

ROTRON®

Application Specific Blowers

DR 404/454/505/513/656

Spa Blowers

FEATURES

- Manufactured in the USA - ISO 9001 and NAFTA compliant
- CE compliant - Declaration of Conformity on file
- Maximum flow: 105, 127, 160, 200 or 78 SCFM
- Maximum pressure: 56, 58, 74, 69 or 88 IWG
- Standard motor: 1.0, 1.5, 2.0, 3.0 HP, Spa Duty ODP
- Cast aluminum blower housing, impeller & cover; cast iron flanges (threaded)
- UL & CSA approved motor with permanently sealed ball bearings and Class B rated thermal protection
- Inlet & outlet internal muffling
- Quiet operation within OSHA standards

MOTOR OPTIONS

- International voltage & frequency (Hz)
- Chemical duty, high efficiency, inverter duty or industry-specific designs
- Various horsepowers for application-specific needs

BLOWER OPTIONS

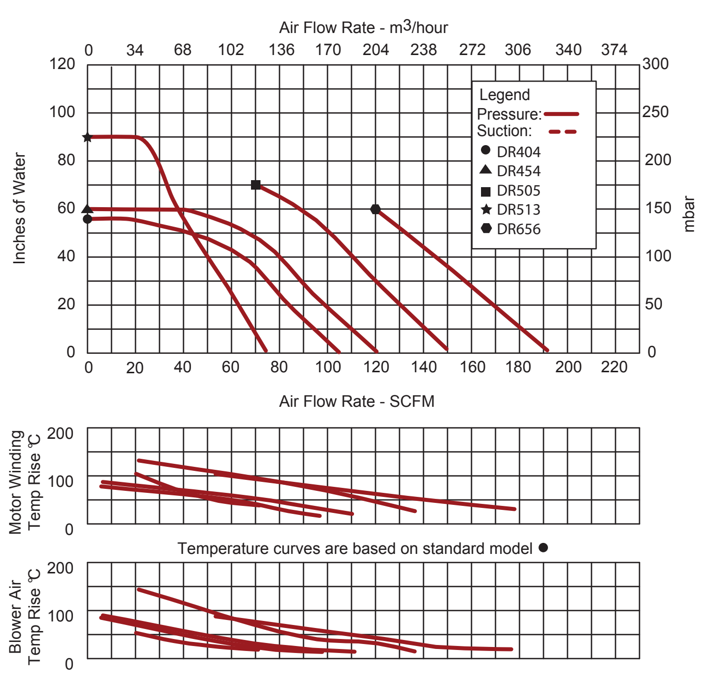
- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

ACCESSORIES

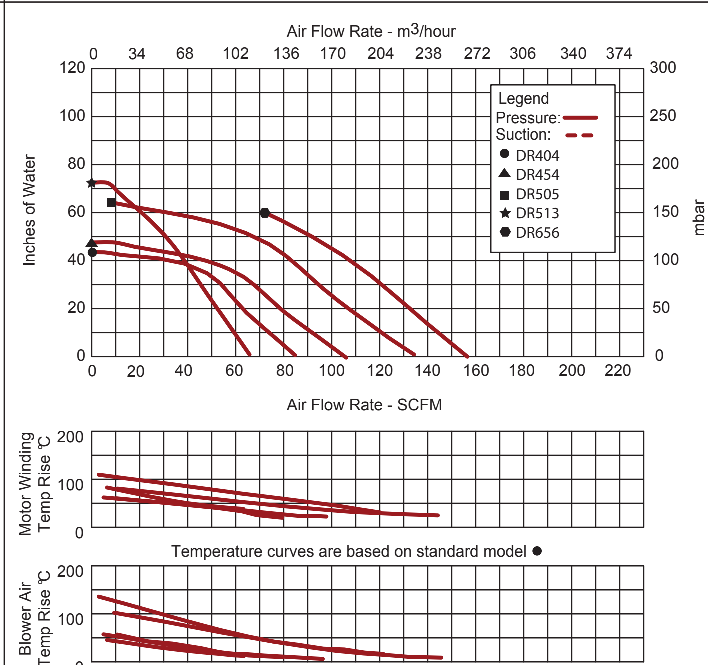
- Flowmeters reading in SCFM
- Filters & moisture separators
- Pressure gauges, vacuum gauges, & relief valves
- Switches - air flow, pressure, vacuum, or temperature
- External mufflers for additional silencing
- Variable frequency drive package

Blower Performance at Standard Conditions

60 Hz



50 Hz



This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. AMETEK is not responsible for blowers driven beyond factory specified speed, temperature, pressure, flow or without proper alignment. Actual performance will vary depending on the operating environment and application. AMETEK products are not designed for and should not be used in medical life support applications. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For product designed to meet specific applications, contact AMETEK Technical & Industrial Products Sales department.

ATTACHMENT B
PNEUMATIC MODELING RESULTS

Attachment B
Pneumatic Modeling Results
100 Union Avenue, Brooklyn, New York
Langan Project No.: 170819101

Approach

- In July 2024 Langan completed soil vapor extraction (SVE) system pilot testing at the site. One soil vapor extraction well (SVE-1) was installed in the target treatment area. Six vapor monitoring points (VP-1 through VP-6) were installed at varying distances and directions from the extraction well.
- The pilot test was conducted in two phases. Phase I included a series of step tests in which various extraction vacuum vs. flow relationships were applied to SVE-1. Phase II included a long-term test in which the highest sustainable extraction vacuum vs. flow relationship was applied to SVE-1. The resultant vacuum propagation was monitored and recorded at each of the vapor monitoring points.
- The pilot test data was used as input to a subsurface pneumatic computer model (MDFIT) to determine design parameters for the proposed full-scale SVE system required to mitigate potential offsite migration of soil vapor. Based on review of the pilot test data, the testing results from the step tests and the long-term test were input, and the resulting permeabilities were used in the subsequent modeling and design.

Objectives

- Predict air flow rate and vacuum distribution in the subsurface
- Predict system performance under varying subsurface conditions
- Determine system design and operational parameters

Output Results

- Air intrinsic permeability, K_i
- Design air flow rates
- Vacuum propagation in the subsurface
- Pore volume exchange rate in the subsurface
- SVE well radius of influence (ROI)
- Process equipment sizing

MDFIT Modeling Simulation Procedures

Step 1 – K_i Estimation in x, y, z directions for existing subsurface material
Step 2 – K_i Calibration for existing subsurface material
Step 3 – Single well vacuum simulation for existing subsurface **(Design Basis)**

MDFIT Modeling Simulation Results

Step 1: Air Intrinsic Permeability Estimation Model Runs

MDFIT Modeling Simulation Results
Step 1: Air Intrinsic Permeability Estimation
100 Union Ave, Brooklyn, NY
Langan Project No. 170819101

Flow Condition (scfm)	$K_R=K_Z$ (cm^2)	K_C/B_C (cm)	K_C (cm^2)
Test Area 1 [SVE-1]			
34.12	2.26E-05	1.78E-15	1.78E-14
101.42	1.90E-05	1.06E-11	1.06E-10
174.53	1.79E-05	5.58E-12	5.58E-11
212.28	1.86E-05	2.16E-15	2.16E-14
AVERAGE	**1.30E-05**	**2.69E-12**	**2.69E-11**

CALIBRATED	**4.50E-06**	**2.00E-08**	**2.00E-07**

Notes:
cm^2 = square centimeters
K_R = Horizontal Air Intrinsic Permeability of Existing Soils
K_Z = Vertical Air Intrinsic Permeability of Existing Soils
scfm = standard cubic feet per minute

1. The stabilized flow and vacuum conditions from each pilot test step were used as inputs into the model.
2. The pilot test flows were converted from actual cubic feet per minute (acfm) to scfm for modeling.

LANGAN

```
   SCENARIO ------     1



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KR=KZ=    .5756E-04 Kc/Bc=
KR=KZ=    .2937E-04 Kc/Bc=    .1133E-17
KR=KZ=    .3578E-04 Kc/Bc=
KR=KZ=    .2262E-04 Kc/Bc=    .1777E-14
KR=KZ=    .2429E-04 Kc/Bc=



   SCENARIO ------     2



KR=KZ=    .5261E-04 Kc/Bc=    .2357E-25
KR=KZ=    .3410E-03 Kc/Bc=
KR=KZ=    .2850E-04 Kc/Bc=    .2175E-15
KR=KZ=    .1810E-03 Kc/Bc=
KR=KZ=    .1898E-04 Kc/Bc=    .1057E-10
KR=KZ=    .5295E-04 Kc/Bc=



   SCENARIO ------     3



KR=KZ=    .5261E-04 Kc/Bc=    .3871E-27
KR=KZ=    .1243E-02 Kc/Bc=
KR=KZ=    .2821E-04 Kc/Bc=    .3064E-16
KR=KZ=    .6971E-03 Kc/Bc=
KR=KZ=    .1789E-04 Kc/Bc=    .5575E-11
```

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KR=KZ=    .2069E-03 Kc/Bc=



   SCENARIO ------     4



KR=KZ=    .5846E-04 Kc/Bc=    .3863E-34
KR=KZ=    .3469E-02 Kc/Bc=
KR=KZ=    .3296E-04 Kc/Bc=    .1005E-21
KR=KZ=    .2559E-02 Kc/Bc=
KR=KZ=    .1856E-04 Kc/Bc=    .2163E-14
KR=KZ=    .1309E-02 Kc/Bc=
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MDFIT Modeling Simulation Results

Step 2: Air Intrinsic Permeability Calibration Model Runs

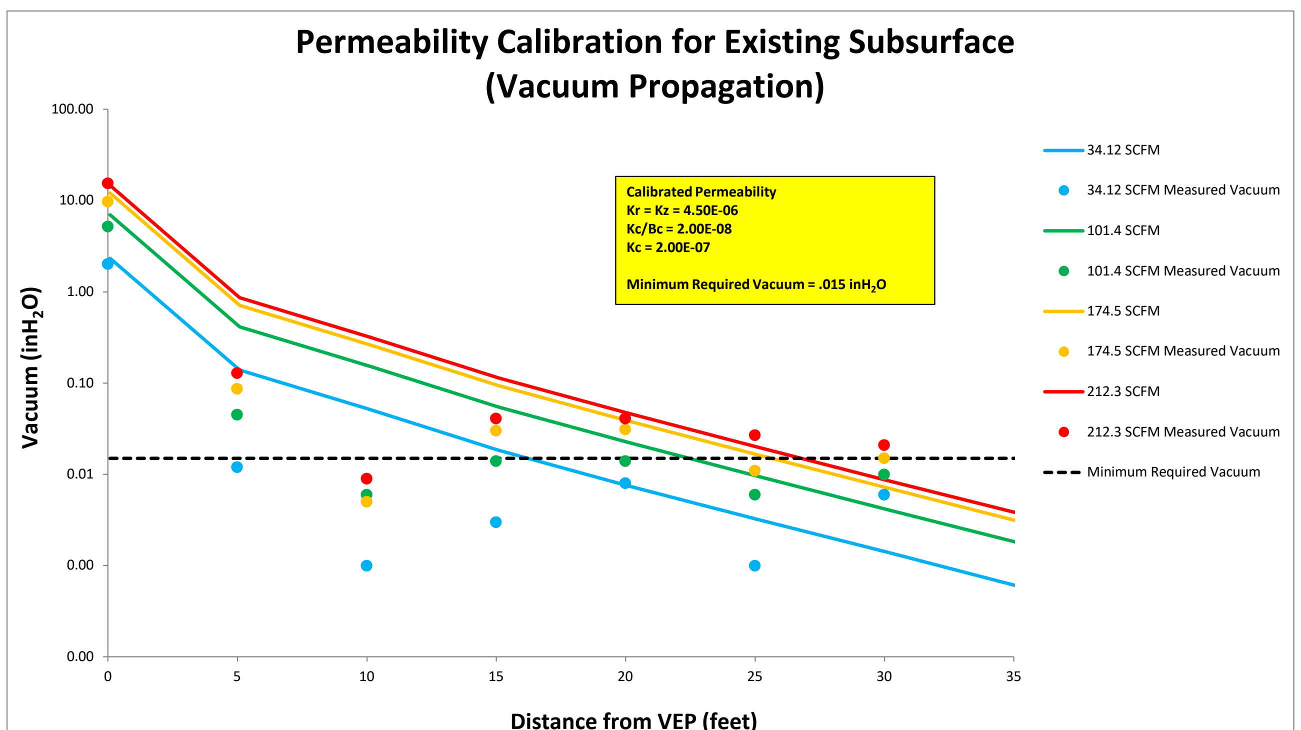
MDFIT Modeling Simulation Results
Step 2: Air Intrinsic Permeability Calibration
100 Union Ave, Brooklyn, NY
Langan Project No. 170819101

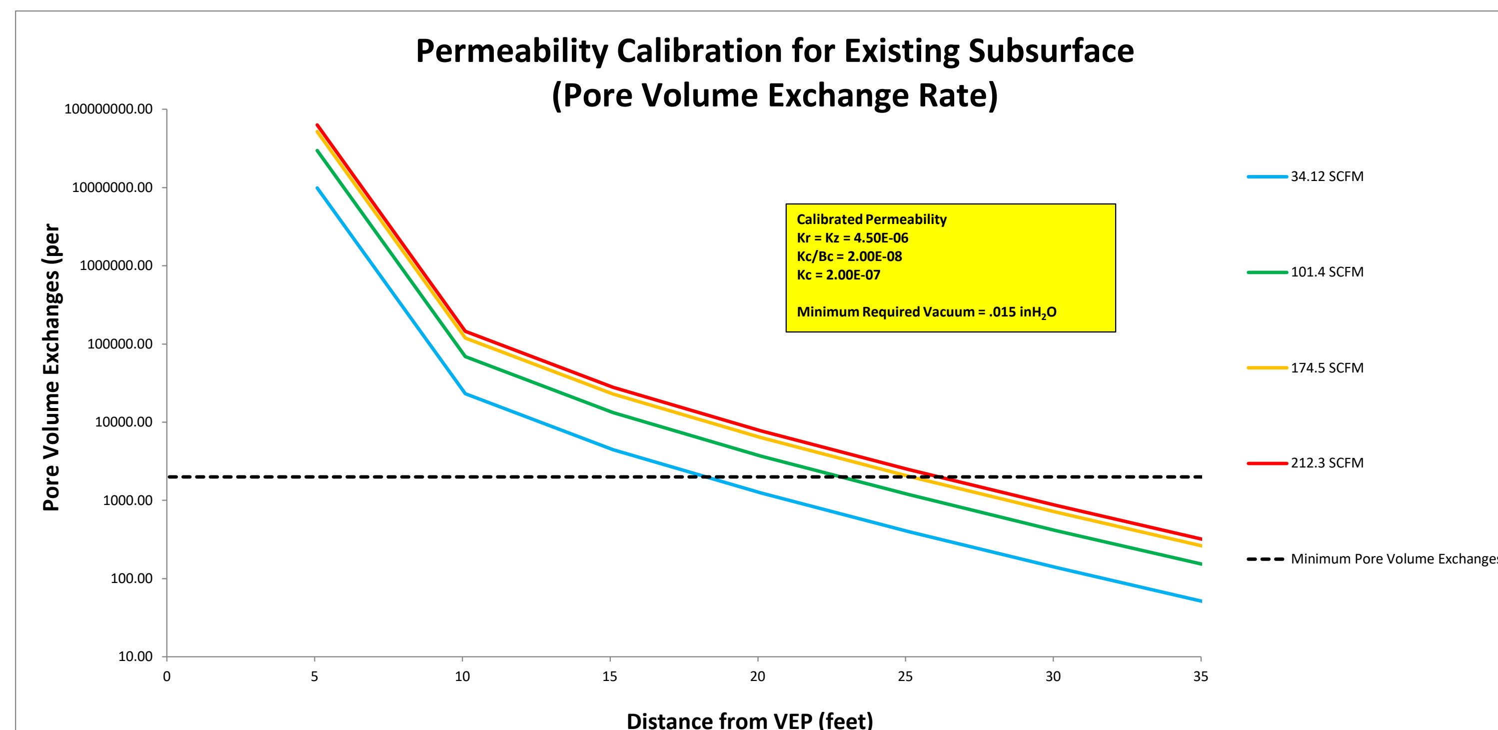
INPUT PARAMETERS		
Depth to the top of screen (ft)	=	3
Depth to the bottom of screen (ft)	=	5
Depth to the groundwater table (ft)	=	6
Depth to the simulated elevation (ft)	=	4
Radius of the simulating well (in)	=	1
Temperature of the soil (°C)	=	20
Flow rate of pumping/injection well (cfm)	=	VARIABLE
Soil porosity (dimensionless)	=	0.2
Permeability for R direction (cm^2)	=	4.50E-06
Permeability for Z direction (cm^2)	=	4.50E-06
Permeability Kc/Bc (cm)	=	2.00E-08

Measured Vacuum		
Flow	Vacuum	Distance
34.12	2.03	0
	0.01	5
	0.00	10
	0.00	15
	0.01	20
	0.00	25
	0.01	30
101.4	5.18	0
	0.05	5
	0.01	10
	0.01	15
	0.01	20
	0.01	25
	0.01	30
174.5	9.72	0
	0.09	5
	0.01	10
	0.03	15
	0.03	20
	0.01	25
	0.02	30
212.3	15.42	0
	0.13	5
	0.01	10
	0.04	15
	0.04	20
	0.03	25
	0.02	30

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESSURE (atm)	PRESSURE (inH_2O)	VELOCITY (ft/s)	Pore Volume Exchanges (per year)
34.12 SCFM						
2.54E+00	0.08	4.00E+00	0.9943	2.33	3.17E+00	0.00
1.55E+02	5.08	4.00E+00	0.9997	0.14	1.17E-02	9882581.00
3.07E+02	10.10	4.00E+00	0.9999	0.05	3.14E-03	23224.09
4.60E+02	15.10	4.00E+00	1	0.02	1.13E-03	4469.99
6.12E+02	20.10	4.00E+00	1	0.01	4.49E-04	1241.69
7.65E+02	25.10	4.00E+00	1	0.00	1.86E-04	398.66
9.17E+02	30.10	4.00E+00	1	0.00	7.89E-05	138.67
1.07E+03	35.10	4.00E+00	1	0.00	3.41E-05	50.80
1.22E+03	40.10	4.00E+00	1	0.00	1.50E-05	19.31
1.37E+03	45.10	4.00E+00	1	0.00	6.61E-06	7.54
1.53E+03	50.10	4.00E+00	1	0.00	2.94E-06	3.01
1.68E+03	55.10	4.00E+00	1	0.00	1.32E-06	1.22
1.83E+03	60.10	4.00E+00	1	0.00	5.94E-07	0.50
1.98E+03	65.10	4.00E+00	1	0.00	2.68E-07	0.21
2.14E+03	70.10	4.00E+00	1	0.00	1.22E-07	0.09
2.29E+03	75.10	4.00E+00	1	0.00	5.54E-08	0.04
2.44E+03	80.10	4.00E+00	1	0.00	2.52E-08	0.02
2.59E+03	85.10	4.00E+00	1	0.00	1.15E-08	0.01
2.75E+03	90.10	4.00E+00	1	0.00	5.28E-09	0.00
2.90E+03	95.10	4.00E+00	1	0.00	2.42E-09	0.00
101.4 SCFM						
2.54E+00	0.08	4.00E+00	0.9829	6.97	9.55E+00	0
1.55E+02	5.08	4.00E+00	0.999	0.41	3.48E-02	29714630
3.07E+02	10.10	4.00E+00	0.9996	0.15	9.34E-03	69072.72
4.60E+02	15.10	4.00E+00	0.9999	0.05	3.37E-03	13289.57
6.12E+02	20.10	4.00E+00	0.9999	0.02	1.33E-03	3691.15
7.65E+02	25.10	4.00E+00	1	0.01	5.52E-04	1185.03
9.17E+02	30.10	4.00E+00	1	0.00	2.35E-04	412.18
1.07E+03	35.10	4.00E+00	1	0.00	1.01E-04	151.01
1.22E+03	40.10	4.00E+00	1	0.00	4.44E-05	57.39
1.37E+03	45.10	4.00E+00	1	0.00	1.97E-05	22.41
1.53E+03	50.10	4.00E+00	1	0.00	8.75E-06	8.94
1.68E+03	55.10	4.00E+00	1	0.00	3.92E-06	3.63
1.83E+03	60.10	4.00E+00	1	0.00	1.77E-06	1.49
1.98E+03	65.10	4.00E+00	1	0.00	7.98E-07	0.62
2.14E+03	70.10	4.00E+00	1	0.00	3.62E-07	0.26
2.29E+03	75.10	4.00E+00	1	0.00	1.65E-07	0.11
2.44E+03	80.10	4.00E+00	1	0.00	7.50E-08	0.05
2.59E+03	85.10	4.00E+00	1	0.00	3.43E-08	0.02
2.75E+03	90.10	4.00E+00	1	0.00	1.57E-08	0.01
2.90E+03	95.10	4.00E+00	1	0.00	7.19E-09	0

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESSURE (atm)	PRESSURE (inH_2O)	VELOCITY (ft/s)	Pore Volume Exchanges (per year)
174.5 SCFM						
2.54E+00	0.08	4.00E+00	0.9704	12.06	1.66E+01	0
1.55E+02	5.08	4.00E+00	0.9983	0.71	6.00E-02	51792410
3.07E+02	10.10	4.00E+00	0.9994	0.26	1.61E-02	118940.1
4.60E+02	15.10	4.00E+00	0.9998	0.09	5.80E-03	22874.67
6.12E+02	20.10	4.00E+00	0.9999	0.04	2.29E-03	6352.47
7.65E+02	25.10	4.00E+00	1	0.02	9.50E-04	2039.34
9.17E+02	30.10	4.00E+00	1	0.01	4.04E-04	709.32
1.07E+03	35.10	4.00E+00	1	0.00	1.75E-04	259.86
1.22E+03	40.10	4.00E+00	1	0.00	7.65E-05	98.76
1.37E+03	45.10	4.00E+00	1	0.00	3.38E-05	38.57
1.53E+03	50.10	4.00E+00	1	0.00	1.51E-05	15.39
1.68E+03	55.10	4.00E+00	1	0.00	6.75E-06	6.24
1.83E+03	60.10	4.00E+00	1	0.00	3.04E-06	2.57
1.98E+03	65.10	4.00E+00	1	0.00	1.37E-06	1.07
2.14E+03	70.10	4.00E+00	1	0.00	6.23E-07	0.45
2.29E+03	75.10	4.00E+00	1	0.00	2.83E-07	0.19
2.44E+03	80.10	4.00E+00	1	0.00	1.29E-07	0.08
2.59E+03	85.10	4.00E+00	1	0.00	5.90E-08	0.03
2.75E+03	90.10	4.00E+00	1	0.00	2.70E-08	0.02
2.90E+03	95.10	4.00E+00	1	0.00	1.24E-08	0.01
212.3 SCFM						
2.54E+00	0.08	4.00E+00	9.64E-01	14.72	2.04E+01	
1.55E+02	5.08	4.00E+00	9.98E-01	0.86	7.30E-02	63420160.00
3.07E+02	10.10	4.00E+00	9.99E-01	0.32	1.96E-02	144713.80
4.60E+02	15.10	4.00E+00	1.00E+00	0.11	7.05E-03	27825.59
6.12E+02	20.10	4.00E+00	1.00E+00	0.05	2.79E-03	7726.80
7.65E+02	25.10	4.00E+00	1.00E+00	0.02	1.16E-03	2480.48
9.17E+02	30.10	4.00E+00	1.00E+00	0.01	4.91E-04	862.74
1.07E+03	35.10	4.00E+00	1.00E+00	0.00	2.12E-04	316.07
1.22E+03	40.10	4.00E+00	1.00E+00	0.00	9.30E-05	120.12
1.37E+03	45.10	4.00E+00	1.00E+00	0.00	4.11E-05	46.91
1.53E+03	50.10	4.00E+00	1.00E+00	0.00	1.83E-05	18.71
1.68E+03	55.10	4.00E+00	1.00E+00	0.00	8.21E-06	7.59
1.83E+03	60.10	4.00E+00	1.00E+00	0.00	3.69E-06	3.12
1.98E+03	65.10	4.00E+00	1.00E+00	0.00	1.67E-06	1.30
2.14E+03	70.10	4.00E+00	1.00E+00	0.00	7.57E-07	0.55
2.29E+03	75.10	4.00E+00	1.00E+00	0.00	3.44E-07	0.23
2.44E+03	80.10	4.00E+00	1.00E+00	0.00	1.57E-07	0.10
2.59E+03	85.10	4.00E+00	1.00E+00	0.00	7.17E-08	0.04
2.75E+03	90.10	4.00E+00	1.00E+00	0.00	3.28E-08	0.02
2.90E+03	95.10	4.00E+00	1.00E+00	0.00	1.51E-08	0.01





LANGAN

Welcom to FSS program

VAPEX

----- Simulated Scenario ----- 1

Simulating information:

Depth to the top of screen (ft) = 3.00E+00

Depth to the bottom of screen (ft) = 5.00E+00

Depth to the groundwater table (ft) = 6.00E+00

Depth to the simulated elevation(ft) =
4.00E+00

Radius of the simulating well (in.) = 1.00E+00

Temperature of the soil (C) = 2.00E+01

Flow rate of pumping/injection well(cfm)=
3.41E+01

Soil porosity(Dimensionless) =
2.00E-01

Peameability for R direction (cm**2) =
4.50E-06

Peameability for Z direction (cm**2) =
4.50E-06

Peameability Kc/Bc = 2.00E-08

Aquifer geological structure properties

01:00 Aquifer is isotropic.

02:00 There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS RADIUS ELEVATION PRESS PRESS VELOCITY

(cm) (ft) (ft) (atm.) (in H20) (ft/s)

2.54E+00	8.33E-02	4.00E+00	0.9943	2.3301	3.17E+00
1.55E+02	5.08E+00	4.00E+00	0.9997	0.1387	1.17E-02
3.07E+02	1.01E+01	4.00E+00	0.9999	0.0514	3.14E-03
4.60E+02	1.51E+01	4.00E+00	1	0.0183	1.13E-03
6.12E+02	2.01E+01	4.00E+00	1	0.0075	4.49E-04
7.65E+02	2.51E+01	4.00E+00	1	0.0032	1.86E-04
9.17E+02	3.01E+01	4.00E+00	1	0.0014	7.89E-05

1.07E+03	3.51E+01	4.00E+00	1	0.0006	3.41E-05
1.22E+03	4.01E+01	4.00E+00	1	0.0003	1.50E-05
1.37E+03	4.51E+01	4.00E+00	1	0.0001	6.61E-06
1.53E+03	5.01E+01	4.00E+00	1	0	2.94E-06
1.68E+03	5.51E+01	4.00E+00	1	0	1.32E-06
1.83E+03	6.01E+01	4.00E+00	1	0	5.94E-07
1.98E+03	6.51E+01	4.00E+00	1	0	2.68E-07
2.14E+03	7.01E+01	4.00E+00	1	0	1.22E-07
2.29E+03	7.51E+01	4.00E+00	1	0	5.54E-08
2.44E+03	8.01E+01	4.00E+00	1	0	2.52E-08
2.59E+03	8.51E+01	4.00E+00	1	0	1.15E-08
2.75E+03	9.01E+01	4.00E+00	1	0	5.28E-09
2.90E+03	9.51E+01	4.00E+00	1	0	2.42E-09

----- Simulated Scenario ----- 2

Simulating information:

Depth to the top of screen (ft) = 3.00E+00

Depth to the bottom of screen (ft) = 5.00E+00

Depth to the groundwater table (ft) = 6.00E+00

Depth to the simulated elevation(ft) = 4.00E+00

Radius of the simulating well (in.) = 1.00E+00

Temperature of the soil (C) = 2.00E+01

Flow rate of pumping/injection well(cfm)= 1.01E+02

Soil porosity(Dimensionless) = 2.00E-01

Peameability for R direction (cm**2) =
4.50E-06

Peameability for Z direction (cm**2) =
4.50E-06

Peameability Kc/Bc = 2.00E-08

Aquifer geological structure properties

01:00 Aquifer is isotropic.

02:00 There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS	RADIUS	ELEVATION	PRESS	PRESS	VELOCITY
(cm)	(ft)	(ft)	(atm.)	(in H20)	(ft/s)
2.54E+00	8.33E-02	4.00E+00	0.9829	6.9658	9.55E+00
1.55E+02	5.08E+00	4.00E+00	0.999	0.4123	3.48E-02

3.07E+02	1.01E+01	4.00E+00	0.9996	0.1529	9.34E-03
4.60E+02	1.51E+01	4.00E+00	0.9999	0.0543	3.37E-03
6.12E+02	2.01E+01	4.00E+00	0.9999	0.0224	1.33E-03
7.65E+02	2.51E+01	4.00E+00	1	0.0095	5.52E-04
9.17E+02	3.01E+01	4.00E+00	1	0.0041	2.35E-04
1.07E+03	3.51E+01	4.00E+00	1	0.0018	1.01E-04
1.22E+03	4.01E+01	4.00E+00	1	0.0008	4.44E-05
1.37E+03	4.51E+01	4.00E+00	1	0.0004	1.97E-05
1.53E+03	5.01E+01	4.00E+00	1	0.0002	8.75E-06
1.68E+03	5.51E+01	4.00E+00	1	0.0001	3.92E-06
1.83E+03	6.01E+01	4.00E+00	1	0	1.77E-06
1.98E+03	6.51E+01	4.00E+00	1	0	7.98E-07
2.14E+03	7.01E+01	4.00E+00	1	0	3.62E-07
2.29E+03	7.51E+01	4.00E+00	1	0	1.65E-07
2.44E+03	8.01E+01	4.00E+00	1	0	7.50E-08
2.59E+03	8.51E+01	4.00E+00	1	0	3.43E-08
2.75E+03	9.01E+01	4.00E+00	1	0	1.57E-08
2.90E+03	9.51E+01	4.00E+00	1	0	7.19E-09

----- Simulated Scenario ----- 3

Simulating information:

Depth to the top of screen (ft) = 3.00E+00

Depth to the bottom of screen (ft) = 5.00E+00

Depth to the groundwater table (ft) = 6.00E+00

Depth to the simulated elevation(ft) = 4.00E+00

Radius of the simulating well (in.) = 1.00E+00

Temperature of the soil (C) = 2.00E+01

Flow rate of pumping/injection well(cfm)= 1.75E+02

Soil porosity(Dimensionless) = 2.00E-01

Peameability for R direction (cm**2) =
4.50E-06

Peameability for Z direction (cm**2) =
4.50E-06

Peameability Kc/Bc = 2.00E-08

Aquifer geological structure properties

01:00 Aquifer is isotropic.

02:00 There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS RADIUS ELEVATION PRESS PRESS VELOCITY

(cm) (ft) (ft) (atm.) (in H20) (ft/s)

2.54E+00	8.33E-02	4.00E+00	0.9704	12.0634	1.66E+01
1.55E+02	5.08E+00	4.00E+00	0.9983	0.7098	6.00E-02
3.07E+02	1.01E+01	4.00E+00	0.9994	0.2632	1.61E-02
4.60E+02	1.51E+01	4.00E+00	0.9998	0.0935	5.80E-03
6.12E+02	2.01E+01	4.00E+00	0.9999	0.0386	2.29E-03
7.65E+02	2.51E+01	4.00E+00	1	0.0164	9.50E-04
9.17E+02	3.01E+01	4.00E+00	1	0.0071	4.04E-04
1.07E+03	3.51E+01	4.00E+00	1	0.0031	1.75E-04
1.22E+03	4.01E+01	4.00E+00	1	0.0014	7.65E-05
1.37E+03	4.51E+01	4.00E+00	1	0.0006	3.38E-05
1.53E+03	5.01E+01	4.00E+00	1	0.0003	1.51E-05
1.68E+03	5.51E+01	4.00E+00	1	0.0001	6.75E-06
1.83E+03	6.01E+01	4.00E+00	1	0.0001	3.04E-06
1.98E+03	6.51E+01	4.00E+00	1	0	1.37E-06
2.14E+03	7.01E+01	4.00E+00	1	0	6.23E-07
2.29E+03	7.51E+01	4.00E+00	1	0	2.83E-07
2.44E+03	8.01E+01	4.00E+00	1	0	1.29E-07
2.59E+03	8.51E+01	4.00E+00	1	0	5.90E-08
2.75E+03	9.01E+01	4.00E+00	1	0	2.70E-08
2.90E+03	9.51E+01	4.00E+00	1	0	1.24E-08

----- Simulated Scenario ----- 4

Simulating information:

Depth to the top of screen (ft) = 3.00E+00

Depth to the bottom of screen (ft) = 5.00E+00

Depth to the groundwater table (ft) = 6.00E+00

Depth to the simulated elevation(ft) = 4.00E+00

Radius of the simulating well (in.) = 1.00E+00

Temperature of the soil (C) = 2.00E+01

Flow rate of pumping/injection well(cfm)= 2.12E+02

Soil porosity(Dimensionless) = 2.00E-01

Peameability for R direction (cm**2) =
4.50E-06

Peameability for Z direction (cm**2) =
4.50E-06

Peameability Kc/Bc = 2.00E-08

Aquifer geological structure properties

01:00 Aquifer is isotropic.

02:00 There is a upper confining unit.

************************* OUTPUT ********************************

RADIUS RADIUS ELEVATION PRESS PRESS VELOCITY

(cm) (ft) (ft) (
atm.) (in H20) (ft/s)

2.54E+00	8.33E-02	4.00E+00	0.9638	14.7214	2.04E+01
1.55E+02	5.08E+00	4.00E+00	0.9979	0.8635	7.30E-02
3.07E+02	1.01E+01	4.00E+00	0.9992	0.3201	1.96E-02
4.60E+02	1.51E+01	4.00E+00	0.9997	0.1137	7.05E-03
6.12E+02	2.01E+01	4.00E+00	0.9999	0.0469	2.79E-03
7.65E+02	2.51E+01	4.00E+00	1	0.0199	1.16E-03
9.17E+02	3.01E+01	4.00E+00	1	0.0086	4.91E-04
1.07E+03	3.51E+01	4.00E+00	1	0.0038	2.12E-04
1.22E+03	4.01E+01	4.00E+00	1	0.0017	9.30E-05
1.37E+03	4.51E+01	4.00E+00	1	0.0008	4.11E-05
1.53E+03	5.01E+01	4.00E+00	1	0.0003	1.83E-05
1.68E+03	5.51E+01	4.00E+00	1	0.0001	8.21E-06
1.83E+03	6.01E+01	4.00E+00	1	0.0001	3.69E-06
1.98E+03	6.51E+01	4.00E+00	1	0	1.67E-06
2.14E+03	7.01E+01	4.00E+00	1	0	7.57E-07
2.29E+03	7.51E+01	4.00E+00	1	0	3.44E-07
2.44E+03	8.01E+01	4.00E+00	1	0	1.57E-07

2.59E+03	8.51E+01	4.00E+00	1	0	7.17E-08
2.75E+03	9.01E+01	4.00E+00	1	0	3.28E-08
2.90E+03	9.51E+01	4.00E+00	1	0	1.51E-08

---------- Simulation finished ----------

----- Simulated Scenario ----- 1

************************ OUTPUT ********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.000000E+00	.00
.155E+03	.508E+01	.363282E-04	9882581.00
.307E+03	.101E+02	.782960E-02	23224.09
.460E+03	.151E+02	.348978E-01	4469.99
.612E+03	.201E+02	.108081E+00	1241.69
.765E+03	.251E+02	.290587E+00	398.66
.917E+03	.301E+02	.728079E+00	138.67
.107E+04	.351E+02	.175205E+01	50.80
.122E+04	.401E+02	.411034E+01	19.31
.137E+04	.451E+02	.947887E+01	7.54
.153E+04	.501E+02	.215930E+02	3.01
.168E+04	.551E+02	.487415E+02	1.22
.183E+04	.601E+02	.109248E+03	.50
.198E+04	.651E+02	.243489E+03	.21
.214E+04	.701E+02	.540196E+03	.09
.229E+04	.751E+02	.119390E+04	.04
.244E+04	.801E+02	.263016E+04	.02
.259E+04	.851E+02	.577828E+04	.01
.275E+04	.901E+02	.126642E+05	.00
.290E+04	.951E+02	.276982E+05	.00

----- Simulated Scenario ----- 2

************************ OUTPUT *********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.276982E+05	.00
.155E+03	.508E+01	.120821E-04	29714630.00
.307E+03	.101E+02	.263239E-02	69072.72
.460E+03	.151E+02	.117369E-01	13289.57
.612E+03	.201E+02	.363556E-01	3691.15
.765E+03	.251E+02	.977529E-01	1185.03
.917E+03	.301E+02	.244933E+00	412.18
.107E+04	.351E+02	.589417E+00	151.01
.122E+04	.401E+02	.138280E+01	57.39
.137E+04	.451E+02	.318889E+01	22.41
.153E+04	.501E+02	.726438E+01	8.94
.168E+04	.551E+02	.163977E+02	3.63
.183E+04	.601E+02	.367534E+02	1.49
.198E+04	.651E+02	.819152E+02	.62
.214E+04	.701E+02	.181734E+03	.26
.229E+04	.751E+02	.401654E+03	.11
.244E+04	.801E+02	.884845E+03	.05
.259E+04	.851E+02	.194395E+04	.02
.275E+04	.901E+02	.426053E+04	.01
.290E+04	.951E+02	.931829E+04	.00

----- Simulated Scenario ----- 3

************************ OUTPUT *********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR

.254E+01	.833E-01	.931829E+04	.00
.155E+03	.508E+01	.693183E-05	51792410.00
.307E+03	.101E+02	.152864E-02	118940.10
.460E+03	.151E+02	.681809E-02	22874.67
.612E+03	.201E+02	.211230E-01	6352.47
.765E+03	.251E+02	.568000E-01	2039.34
.917E+03	.301E+02	.142326E+00	709.32
.107E+04	.351E+02	.342505E+00	259.86
.122E+04	.401E+02	.803541E+00	98.76
.137E+04	.451E+02	.185307E+01	38.57
.153E+04	.501E+02	.422134E+01	15.39
.168E+04	.551E+02	.952878E+01	6.24
.183E+04	.601E+02	.213575E+02	2.57
.198E+04	.651E+02	.476012E+02	1.07
.214E+04	.701E+02	.105606E+03	.45
.229E+04	.751E+02	.233402E+03	.19
.244E+04	.801E+02	.514187E+03	.08
.259E+04	.851E+02	.112963E+04	.03
.275E+04	.901E+02	.247581E+04	.02
.290E+04	.951E+02	.541489E+04	.01

----- Simulated Scenario ----- 4

************************* OUTPUT *********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.541489E+04	.01
.155E+03	.508E+01	.566092E-05	63420160.00
.307E+03	.101E+02	.125635E-02	144713.80
.460E+03	.151E+02	.560467E-02	27825.59
.612E+03	.201E+02	.173652E-01	7726.80
.765E+03	.251E+02	.466973E-01	2480.48
.917E+03	.301E+02	.117013E+00	862.74
.107E+04	.351E+02	.281594E+00	316.07
.122E+04	.401E+02	.660643E+00	120.12
.137E+04	.451E+02	.152353E+01	46.91

.153E+04	.501E+02	.347065E+01	18.71
.168E+04	.551E+02	.783426E+01	7.59
.183E+04	.601E+02	.175595E+02	3.12
.198E+04	.651E+02	.391362E+02	1.30
.214E+04	.701E+02	.868263E+02	.55
.229E+04	.751E+02	.191896E+03	.23
.244E+04	.801E+02	.422748E+03	.10
.259E+04	.851E+02	.928750E+03	.04
.275E+04	.901E+02	.203553E+04	.02
.290E+04	.951E+02	.445195E+04	.01

MDFIT Modeling Simulation Results

Step 3: Design Subsurface Vacuum Propagation Model Runs

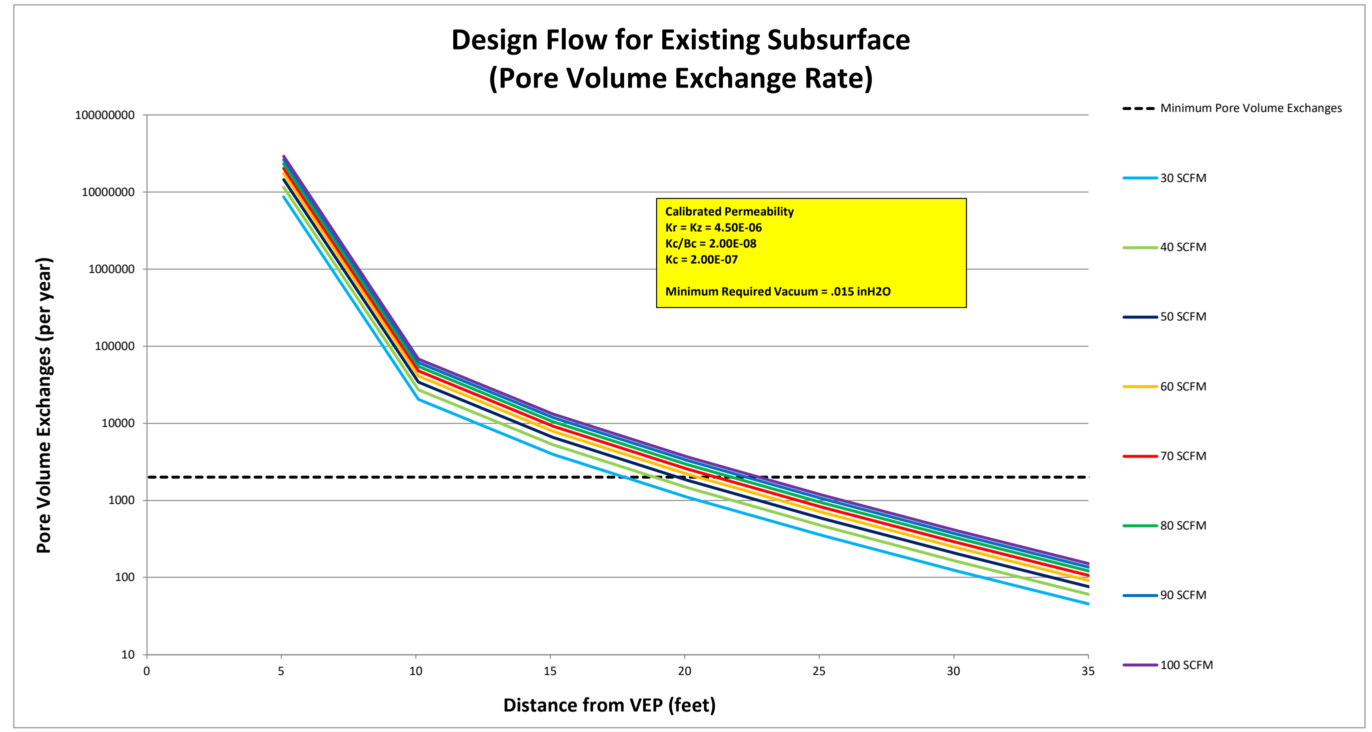
MDFIT Modeling Simulation Results

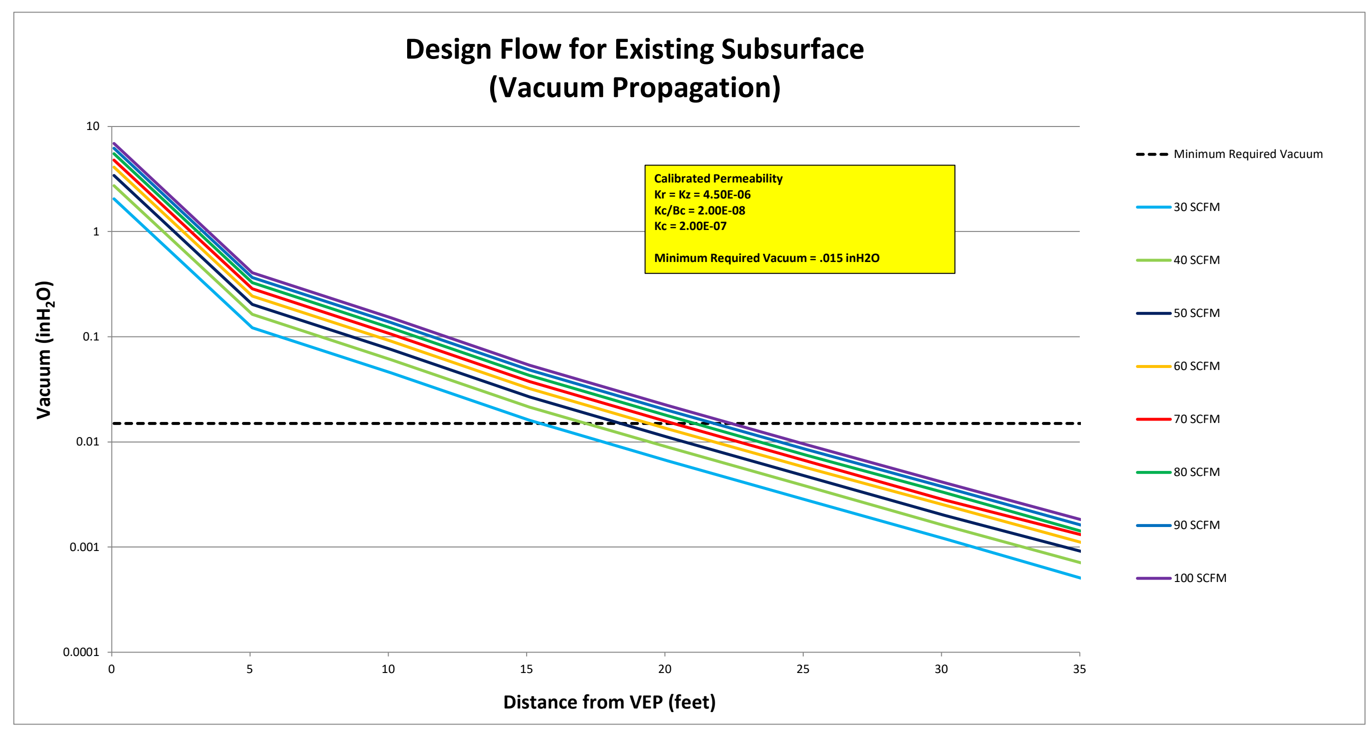
Step 3: Design Subsurface Pore Volume Exchange Rate and Vacuum Propagation

100 Union Ave, Brooklyn, NY

Langan Project No. 170819101

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESSURE (atm)	PRESSURE (inH_2O)	VELOCITY (ft/s)	Pore Volume Exchanges (per year)	RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESSURE (atm)	PRESSURE (inH_2O)	VELOCITY (ft/s)	Pore Volume Exchanges (per year)
30 SCFM							**70 SCFM**						
2.54E+00	0.08	4.00E+00	0.995	2.0480	2.79E+00	0.00	2.54E+00	0.08	4.00E+00	0.9882	4.7949	6.55E+00	0.00
1.55E+02	5.08	4.00E+00	0.9997	0.1219	1.03E-02	8683227.00	1.55E+02	5.08	4.00E+00	0.9993	0.2846	2.40E-02	20398720.00
3.07E+02	10.10	4.00E+00	0.9999	0.0452	2.76E-03	20419.04	3.07E+02	10.10	4.00E+00	0.9997	0.1055	6.45E-03	47660.95
4.60E+02	15.10	4.00E+00	1	0.0161	9.96E-04	3930.19	4.60E+02	15.10	4.00E+00	0.9999	0.0375	2.33E-03	9171.56
6.12E+02	20.10	4.00E+00	1	0.0066	3.94E-04	1091.75	6.12E+02	20.10	4.00E+00	1	0.0155	9.20E-04	2547.54
7.65E+02	25.10	4.00E+00	1	0.0028	1.63E-04	350.52	7.65E+02	25.10	4.00E+00	1	0.0066	3.81E-04	817.89
9.17E+02	30.10	4.00E+00	1	0.0012	6.94E-05	121.92	9.17E+02	30.10	4.00E+00	1	0.0028	1.62E-04	284.48
1.07E+03	35.10	4.00E+00	1	0.0005	3.00E-05	44.67	1.07E+03	35.10	4.00E+00	1	0.0013	7.00E-05	104.22
1.22E+03	40.10	4.00E+00	1	0.0002	1.31E-05	16.98	1.22E+03	40.10	4.00E+00	1	0.0006	3.07E-05	39.61
1.37E+03	45.10	4.00E+00	1	0.0001	5.81E-06	6.63	1.37E+03	45.10	4.00E+00	1	0.0002	1.36E-05	15.47
1.53E+03	50.10	4.00E+00	1	0.0000	2.59E-06	2.64	1.53E+03	50.10	4.00E+00	1	0.0001	6.04E-06	6.17
1.68E+03	55.10	4.00E+00	1	0.0000	1.16E-06	1.07	1.68E+03	55.10	4.00E+00	1	0.0000	2.71E-06	2.50
1.83E+03	60.10	4.00E+00	1	0.0000	5.22E-07	0.44	1.83E+03	60.10	4.00E+00	1	0.0000	1.22E-06	1.03
1.98E+03	65.10	4.00E+00	1	0.0000	2.36E-07	0.18	1.98E+03	65.10	4.00E+00	1	0.0000	5.51E-07	0.43
2.14E+03	70.10	4.00E+00	1	0.0000	1.07E-07	0.08	2.14E+03	70.10	4.00E+00	1	0.0000	2.50E-07	0.18
2.29E+03	75.10	4.00E+00	1	0.0000	4.87E-08	0.03	2.29E+03	75.10	4.00E+00	1	0.0000	1.14E-07	0.08
2.44E+03	80.10	4.00E+00	1	0.0000	2.22E-08	0.01	2.44E+03	80.10	4.00E+00	1	0.0000	5.18E-08	0.03
2.59E+03	85.10	4.00E+00	1	0.0000	1.01E-08	0.01	2.59E+03	85.10	4.00E+00	1	0.0000	2.37E-08	0.01
2.75E+03	90.10	4.00E+00	1	0.0000	4.64E-09	0.00	2.75E+03	90.10	4.00E+00	1	0.0000	1.08E-08	0.01
2.90E+03	95.10	4.00E+00	1	0.0000	2.13E-09	0.00	2.90E+03	95.10	4.00E+00	1	0.0000	4.97E-09	0.00
40 SCFM							**80 SCFM**						
2.54E+00	0.08	4.00E+00	0.9933	2.7330	3.73E+00	0.00	2.54E+00	0.08	4.00E+00	0.9865	5.4846	7.50E+00	0.00
1.55E+02	5.08	4.00E+00	0.9996	0.1626	1.37E-02	11597180.00	1.55E+02	5.08	4.00E+00	0.9992	0.3252	2.75E-02	23352720.00
3.07E+02	10.10	4.00E+00	0.9999	0.0603	3.69E-03	27227.75	3.07E+02	10.10	4.00E+00	0.9997	0.1206	7.37E-03	54474.38
4.60E+02	15.10	4.00E+00	0.9999	0.0214	1.33E-03	5240.41	4.60E+02	15.10	4.00E+00	0.9999	0.0429	2.66E-03	10482.11
6.12E+02	20.10	4.00E+00	1	0.0089	5.26E-04	1455.69	6.12E+02	20.10	4.00E+00	1	0.0177	1.05E-03	2911.51
7.65E+02	25.10	4.00E+00	1	0.0038	2.18E-04	467.36	7.65E+02	25.10	4.00E+00	1	0.0075	4.35E-04	934.74
9.17E+02	30.10	4.00E+00	1	0.0016	9.25E-05	162.56	9.17E+02	30.10	4.00E+00	1	0.0033	1.85E-04	325.13
1.07E+03	35.10	4.00E+00	1	0.0007	4.00E-05	59.56	1.07E+03	35.10	4.00E+00	1	0.0014	8.00E-05	119.11
1.22E+03	40.10	4.00E+00	1	0.0003	1.75E-05	22.63	1.22E+03	40.10	4.00E+00	1	0.0006	3.51E-05	45.27
1.37E+03	45.10	4.00E+00	1	0.0001	7.75E-06	8.84	1.37E+03	45.10	4.00E+00	1	0.0003	1.55E-05	17.68
1.53E+03	50.10	4.00E+00	1	0.0001	3.45E-06	3.53	1.53E+03	50.10	4.00E+00	1	0.0001	6.90E-06	7.05
1.68E+03	55.10	4.00E+00	1	0.0000	1.55E-06	1.43	1.68E+03	55.10	4.00E+00	1	0.0001	3.09E-06	2.86
1.83E+03	60.10	4.00E+00	1	0.0000	6.96E-07	0.59	1.83E+03	60.10	4.00E+00	1	0.0000	1.39E-06	1.18
1.98E+03	65.10	4.00E+00	1	0.0000	3.15E-07	0.24	1.98E+03	65.10	4.00E+00	1	0.0000	6.29E-07	0.49
2.14E+03	70.10	4.00E+00	1	0.0000	1.43E-07	0.10	2.14E+03	70.10	4.00E+00	1	0.0000	2.85E-07	0.21
2.29E+03	75.10	4.00E+00	1	0.0000	6.49E-08	0.04	2.29E+03	75.10	4.00E+00	1	0.0000	1.30E-07	0.09
2.44E+03	80.10	4.00E+00	1	0.0000	2.96E-08	0.02	2.44E+03	80.10	4.00E+00	1	0.0000	5.92E-08	0.04
2.59E+03	85.10	4.00E+00	1	0.0000	1.35E-08	0.01	2.59E+03	85.10	4.00E+00	1	0.0000	2.70E-08	0.02
2.75E+03	90.10	4.00E+00	1	0.0000	6.19E-09	0.00	2.75E+03	90.10	4.00E+00	1	0.0000	1.24E-08	0.01
2.90E+03	95.10	4.00E+00	1	0.0000	2.84E-09	0.00	2.90E+03	95.10	4.00E+00	1	0.0000	5.68E-09	0.00
50 SCFM							**90 SCFM**						
2.54E+00	0.08	4.00E+00	0.9916	3.4191	4.66E+00	0.00	2.54E+00	0.08	4.00E+00	0.9848	6.1754	8.45E+00	0.00
1.55E+02	5.08	4.00E+00	0.9995	0.2032	1.72E-02	14521030.00	1.55E+02	5.08	4.00E+00	0.9991	0.3659	3.09E-02	26316920.00
3.07E+02	10.10	4.00E+00	0.9998	0.0754	4.61E-03	34037.64	3.07E+02	10.10	4.00E+00	0.9997	0.1357	8.29E-03	61288.98
4.60E+02	15.10	4.00E+00	0.9999	0.0268	1.66E-03	6550.71	4.60E+02	15.10	4.00E+00	0.9999	0.0482	2.99E-03	11792.74
6.12E+02	20.10	4.00E+00	1	0.0111	6.57E-04	1819.63	6.12E+02	20.10	4.00E+00	1.0000	0.0199	1.18E-03	3275.48
7.65E+02	25.10	4.00E+00	1	0.0047	2.72E-04	584.20	7.65E+02	25.10	4.00E+00	1.0000	0.0085	4.90E-04	1051.59
9.17E+02	30.10	4.00E+00	1	0.0020	1.16E-04	203.20	9.17E+02	30.10	4.00E+00	1.0000	0.0037	2.08E-04	365.77
1.07E+03	35.10	4.00E+00	1	0.0009	5.00E-05	74.45	1.07E+03	35.10	4.00E+00	1.0000	0.0016	9.00E-05	134.00
1.22E+03	40.10	4.00E+00	1	0.0004	2.19E-05	28.29	1.22E+03	40.10	4.00E+00	1.0000	0.0007	3.94E-05	50.93
1.37E+03	45.10	4.00E+00	1	0.0002	9.69E-06	11.05	1.37E+03	45.10	4.00E+00	1.0000	0.0003	1.74E-05	19.89
1.53E+03	50.10	4.00E+00	1	0.0001	4.31E-06	4.41	1.53E+03	50.10	4.00E+00	1	0.0001	7.77E-06	7.93
1.68E+03	55.10	4.00E+00	1	0.0000	1.93E-06	1.79	1.68E+03	55.10	4.00E+00	1	0.0001	3.48E-06	3.22
1.83E+03	60.10	4.00E+00	1	0.0000	8.70E-07	0.74	1.83E+03	60.10	4.00E+00	1	0.0000	1.57E-06	1.32
1.98E+03	65.10	4.00E+00	1	0.0000	3.93E-07	0.31	1.98E+03	65.10	4.00E+00	1	0.0000	7.08E-07	0.55
2.14E+03	70.10	4.00E+00	1	0.0000	1.78E-07	0.13	2.14E+03	70.10	4.00E+00	1	0.0000	3.21E-07	0.23
2.29E+03	75.10	4.00E+00	1	0.0000	8.11E-08	0.05	2.29E+03	75.10	4.00E+00	1	0.0000	1.46E-07	0.10
2.44E+03	80.10	4.00E+00	1	0.0000	3.70E-08	0.02	2.44E+03	80.10	4.00E+00	1	0.0000	6.66E-08	0.04
2.59E+03	85.10	4.00E+00	1	0.0000	1.69E-08	0.01	2.59E+03	85.10	4.00E+00	1	0.0000	3.04E-08	0.02
2.75E+03	90.10	4.00E+00	1	0.0000	7.74E-09	0.00	2.75E+03	90.10	4.00E+00	1	0.0000	1.39E-08	0.01
2.90E+03	95.10	4.00E+00	1	0.0000	3.55E-09	0.00	2.90E+03	95.10	4.00E+00	1	0.0000	6.38E-09	0.00
60 SCFM							**100 SCFM**						
2.54E+00	0.08	4.00E+00	0.9899	4.1064	5.61E+00	0.00	2.54E+00	0.08	4.00E+00	0.9831	6.8674	9.41E+00	0.00
1.55E+02	5.08	4.00E+00	0.9994	0.2439	2.06E-02	17454850.00	1.55E+02	5.08	4.00E+00	0.999	0.4066	3.43E-02	29291410.00
3.07E+02	10.10	4.00E+00	0.9998	0.0905	5.53E-03	40848.70	3.07E+02	10.10	4.00E+00	0.9996	0.1508	9.21E-03	68104.78
4.60E+02	15.10	4.00E+00	0.9999	0.0321	1.99E-03	7861.10	4.60E+02	15.10	4.00E+00	0.9999	0.0536	3.32E-03	13103.44
6.12E+02	20.10	4.00E+00	1	0.0133	7.89E-04	2183.58	6.12E+02	20.10	4.00E+00	0.9999	0.0221	1.32E-03	3639.46
7.65E+02	25.10	4.00E+00	1	0.0057	3.27E-04	701.05	7.65E+02	25.10	4.00E+00	1	0.0094	5.44E-04	1168.43
9.17E+02	30.10	4.00E+00	1	0.0025	1.39E-04	243.84	9.17E+02	30.10	4.00E+00	1	0.0041	2.31E-04	406.41
1.07E+03	35.10	4.00E+00	1	0.0011	6.00E-05	89.33	1.07E+03	35.10	4.00E+00	1	0.0018	1.00E-04	148.89
1.22E+03	40.10	4.00E+00	1	0.0005	2.63E-05	33.95	1.22E+03	40.10	4.00E+00	1	0.0008	4.38E-05	56.58
1.37E+03	45.10	4.00E+00	1	0.0002	1.16E-05	13.26	1.37E+03	45.10	4.00E+00	1	0.0004	1.94E-05	22.10
1.53E+03	50.10	4.00E+00	1	0.0001	5.18E-06	5.29	1.53E+03	50.10	4.00E+00	1	0.0002	8.63E-06	8.82
1.68E+03	55.10	4.00E+00	1	0.0000	2.32E-06	2.15	1.68E+03	55.10	4.00E+00	1	0.0001	3.87E-06	3.58
1.83E+03	60.10	4.00E+00	1	0.0000	1.04E-06	0.88	1.83E+03	60.10	4.00E+00	1	0.0000	1.74E-06	1.47
1.98E+03	65.10	4.00E+00	1	0.0000	4.72E-07	0.37	1.98E+03	65.10	4.00E+00	1	0.0000	7.87E-07	0.61
2.14E+03	70.10	4.00E+00	1	0.0000	2.14E-07	0.15	2.14E+03	70.10	4.00E+00	1	0.0000	3.57E-07	0.26
2.29E+03	75.10	4.00E+00	1	0.0000	9.73E-08	0.07	2.29E+03	75.10	4.00E+00	1	0.0000	1.62E-07	0.11
2.44E+03	80.10	4.00E+00	1	0.0000	4.44E-08	0.03	2.44E+03	80.10	4.00E+00	1	0.0000	7.40E-08	0.05
2.59E+03	85.10	4.00E+00	1	0.0000	2.03E-08	0.01	2.59E+03	85.10	4.00E+00	1	0.0000	3.38E-08	0.02
2.75E+03	90.10	4.00E+00	1	0.0000	9.28E-09	0.01	2.75E+03	90.10	4.00E+00	1	0.0000	1.55E-08	0.01
2.90E+03	95.10	4.00E+00	1	0.0000	4.26E-09	0.00	2.90E+03	95.10	4.00E+00	1	0.0000	7.09E-09	0.00





INPUT PARAMETERS		
Depth to the top of screen (ft)	=	3
Depth to the bottom of screen (ft)	=	5
Depth to the groundwater table (ft)	=	6
Depth to the simulated elevation (ft)	=	4
Radius of the simulating well (in)	=	1
Temperature of the soil (°C)	=	20
Flow rate of pumping/injection well (cfm)	=	VARIABLE
Soil porosity (dimensionless)	=	0.2
Permeability for R direction (cm^2)	=	4.50E-06
Permeability for Z direction (cm^2)	=	4.50E-06
Permeability Kc/Bc (cm)	=	2.00E-08

Assumptions:

At least 2000 PVE/year

At least 0.015 IWC vacuum at ROI

PVE	5,240
ROI (ft)	15
Vacuum at ROI (IWC)	0.021
Vacuum at VEP (IWC)	2.73
Flow at VEP (scfm)	40

LANGAN

Welcom to FSS program

VAPEX

----- Simulated Scenario ----- 1

Simulating information:

Depth to the top of screen (ft)	=	.3000E+01
Depth to the bottom of screen (ft)	=	.5000E+01
Depth to the groundwater table (ft)	=	.6000E+01
Depth to the simulated elevation(ft)	=	.4000E+01
Radius of the simulating well (in.)	=	.1000E+01
Temperature of the soil (C)	=	.2000E+02
Flow rate of pumping/injection well(cfm)	=	.3000E+02
Soil porosity(Dimensionless)	=	.2000E+00
Peameability for R direction (cm**2)	=	.4500E-05
Peameability for Z direction (cm**2)	=	.4500E-05
Peameability Kc/Bc	=	.2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9950	2.0480	.2789E+01
.155E+03	.508E+01	.400E+01	.9997	.1219	.1029E-01
.307E+03	.101E+02	.400E+01	.9999	.0452	.2763E-02
.460E+03	.151E+02	.400E+01	1.0000	.0161	.9962E-03
.612E+03	.201E+02	.400E+01	1.0000	.0066	.3944E-03
.765E+03	.251E+02	.400E+01	1.0000	.0028	.1632E-03
.917E+03	.301E+02	.400E+01	1.0000	.0012	.6938E-04
.107E+04	.351E+02	.400E+01	1.0000	.0005	.3001E-04
.122E+04	.401E+02	.400E+01	1.0000	.0002	.1314E-04
.137E+04	.451E+02	.400E+01	1.0000	.0001	.5812E-05
.153E+04	.501E+02	.400E+01	1.0000	.0000	.2589E-05
.168E+04	.551E+02	.400E+01	1.0000	.0000	.1160E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.5221E-06
.198E+04	.651E+02	.400E+01	1.0000	.0000	.2360E-06
.214E+04	.701E+02	.400E+01	1.0000	.0000	.1070E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.4867E-07
.244E+04	.801E+02	.400E+01	1.0000	.0000	.2219E-07
.259E+04	.851E+02	.400E+01	1.0000	.0000	.1014E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.4641E-08
.290E+04	.951E+02	.400E+01	1.0000	.0000	.2128E-08

----- Simulated Scenario ----- 2

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft)	=	.5000E+01
Depth to the groundwater table (ft)	=	.6000E+01
Depth to the simulated elevation(ft)	=	.4000E+01
Radius of the simulating well (in.)	=	.1000E+01
Temperature of the soil (C)	=	.2000E+02
Flow rate of pumping/injection well(cfm)	=	.4000E+02
Soil porosity(Dimensionless)	=	.2000E+00
Peameability for R direction (cm**2)	=	.4500E-05
Peameability for Z direction (cm**2)	=	.4500E-05
Peameability Kc/Bc	=	.2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9933	2.7330	.3725E+01
.155E+03	.508E+01	.400E+01	.9996	.1626	.1373E-01
.307E+03	.101E+02	.400E+01	.9999	.0603	.3685E-02
.460E+03	.151E+02	.400E+01	.9999	.0214	.1328E-02

.612E+03	.201E+02	.400E+01	1.0000	.0089	.5258E-03
.765E+03	.251E+02	.400E+01	1.0000	.0038	.2176E-03
.917E+03	.301E+02	.400E+01	1.0000	.0016	.9250E-04
.107E+04	.351E+02	.400E+01	1.0000	.0007	.4001E-04
.122E+04	.401E+02	.400E+01	1.0000	.0003	.1753E-04
.137E+04	.451E+02	.400E+01	1.0000	.0001	.7749E-05
.153E+04	.501E+02	.400E+01	1.0000	.0001	.3452E-05
.168E+04	.551E+02	.400E+01	1.0000	.0000	.1546E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.6961E-06
.198E+04	.651E+02	.400E+01	1.0000	.0000	.3146E-06
.214E+04	.701E+02	.400E+01	1.0000	.0000	.1427E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.6489E-07
.244E+04	.801E+02	.400E+01	1.0000	.0000	.2958E-07
.259E+04	.851E+02	.400E+01	1.0000	.0000	.1352E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.6188E-08
.290E+04	.951E+02	.400E+01	1.0000	.0000	.2838E-08

----- Simulated Scenario ----- 3

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft) = .5000E+01

Depth to the groundwater table (ft) = .6000E+01

Depth to the simulated elevation(ft) = .4000E+01

Radius of the simulating well (in.) = .1000E+01

Temperature of the soil (C) = .2000E+02

Flow rate of pumping/injection well(cfm)= .5000E+02

Soil porosity(Dimensionless) = .2000E+00

Peameability for R direction (cm**2) = .4500E-05

Peameability for Z direction (cm**2) = .4500E-05

Peameability Kc/Bc = .2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9916	3.4191	.4664E+01
.155E+03	.508E+01	.400E+01	.9995	.2032	.1716E-01
.307E+03	.101E+02	.400E+01	.9998	.0754	.4606E-02
.460E+03	.151E+02	.400E+01	.9999	.0268	.1660E-02
.612E+03	.201E+02	.400E+01	1.0000	.0111	.6573E-03
.765E+03	.251E+02	.400E+01	1.0000	.0047	.2721E-03
.917E+03	.301E+02	.400E+01	1.0000	.0020	.1156E-03
.107E+04	.351E+02	.400E+01	1.0000	.0009	.5001E-04
.122E+04	.401E+02	.400E+01	1.0000	.0004	.2191E-04
.137E+04	.451E+02	.400E+01	1.0000	.0002	.9686E-05
.153E+04	.501E+02	.400E+01	1.0000	.0001	.4314E-05
.168E+04	.551E+02	.400E+01	1.0000	.0000	.1933E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.8702E-06
.198E+04	.651E+02	.400E+01	1.0000	.0000	.3933E-06
.214E+04	.701E+02	.400E+01	1.0000	.0000	.1783E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.8111E-07
.244E+04	.801E+02	.400E+01	1.0000	.0000	.3698E-07
.259E+04	.851E+02	.400E+01	1.0000	.0000	.1690E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.7735E-08
.290E+04	.951E+02	.400E+01	1.0000	.0000	.3547E-08

----- Simulated Scenario ----- 4

```
Simulating information:

Depth to the top of screen (ft)           =           .3000E+01

Depth to the bottom of screen (ft)        =           .5000E+01

Depth to the groundwater table (ft)       =           .6000E+01

Depth to the simulated elevation(ft)      =           .4000E+01

Radius of the simulating well (in. )      =           .1000E+01

Temperature of the soil ( C )             =           .2000E+02

Flow rate of pumping/injection well( cfm )=           .6000E+02

Soil porosity( Dimensionless )            =           .2000E+00

Peameability for R direction ( cm**2 )    =           .4500E-05

Peameability for Z direction ( cm**2 )    =           .4500E-05

Peameability  Kc/Bc                       =           .2000E-07



 Aquifer geological structure properties



 1:  Aquifer is isotropic.
 2:  There is a upper confining unit.




************************* OUTPUT *********************************

   RADIUS    RADIUS   ELEVATION   PRESS     PRESS      VELOCITY
```

(cm)	(ft)	(ft)	(atm.)	(in H20)	(ft/s)
.254E+01	.833E-01	.400E+01	.9899	4.1064	.5607E+01
.155E+03	.508E+01	.400E+01	.9994	.2439	.2059E-01
.307E+03	.101E+02	.400E+01	.9998	.0905	.5527E-02
.460E+03	.151E+02	.400E+01	.9999	.0321	.1992E-02
.612E+03	.201E+02	.400E+01	1.0000	.0133	.7887E-03
.765E+03	.251E+02	.400E+01	1.0000	.0057	.3265E-03
.917E+03	.301E+02	.400E+01	1.0000	.0025	.1388E-03
.107E+04	.351E+02	.400E+01	1.0000	.0011	.6002E-04
.122E+04	.401E+02	.400E+01	1.0000	.0005	.2629E-04
.137E+04	.451E+02	.400E+01	1.0000	.0002	.1162E-04
.153E+04	.501E+02	.400E+01	1.0000	.0001	.5177E-05
.168E+04	.551E+02	.400E+01	1.0000	.0000	.2320E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.1044E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.4719E-06
.214E+04	.701E+02	.400E+01	1.0000	.0000	.2140E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.9733E-07
.244E+04	.801E+02	.400E+01	1.0000	.0000	.4438E-07
.259E+04	.851E+02	.400E+01	1.0000	.0000	.2028E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.9282E-08
.290E+04	.951E+02	.400E+01	1.0000	.0000	.4256E-08

----- Simulated Scenario ----- 5

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft) = .5000E+01

Depth to the groundwater table (ft) = .6000E+01

Depth to the simulated elevation(ft) = .4000E+01

Radius of the simulating well (in.) = .1000E+01

Temperature of the soil (C) = .2000E+02

Flow rate of pumping/injection well(cfm)= .7000E+02

Soil porosity(Dimensionless) = .2000E+00

Peameability for R direction (cm**2) = .4500E-05

Peameability for Z direction (cm**2) = .4500E-05

Peameability Kc/Bc = .2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9882	4.7949	.6552E+01
.155E+03	.508E+01	.400E+01	.9993	.2846	.2403E-01
.307E+03	.101E+02	.400E+01	.9997	.1055	.6449E-02
.460E+03	.151E+02	.400E+01	.9999	.0375	.2325E-02
.612E+03	.201E+02	.400E+01	1.0000	.0155	.9202E-03
.765E+03	.251E+02	.400E+01	1.0000	.0066	.3809E-03
.917E+03	.301E+02	.400E+01	1.0000	.0028	.1619E-03
.107E+04	.351E+02	.400E+01	1.0000	.0013	.7002E-04
.122E+04	.401E+02	.400E+01	1.0000	.0006	.3067E-04
.137E+04	.451E+02	.400E+01	1.0000	.0002	.1356E-04
.153E+04	.501E+02	.400E+01	1.0000	.0001	.6040E-05
.168E+04	.551E+02	.400E+01	1.0000	.0000	.2706E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.1218E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.5506E-06
.214E+04	.701E+02	.400E+01	1.0000	.0000	.2497E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.1136E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.5177E-07

.259E+04	.851E+02	.400E+01	1.0000	.0000	.2365E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.1083E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.4966E-08

----- Simulated Scenario ----- 6

Simulating information:

Depth to the top of screen (ft)	=	.3000E+01
Depth to the bottom of screen (ft)	=	.5000E+01
Depth to the groundwater table (ft)	=	.6000E+01
Depth to the simulated elevation(ft)	=	.4000E+01
Radius of the simulating well (in.)	=	.1000E+01
Temperature of the soil (C)	=	.2000E+02
Flow rate of pumping/injection well(cfm)	=	.8000E+02
Soil porosity(Dimensionless)	=	.2000E+00
Peameability for R direction (cm**2)	=	.4500E-05
Peameability for Z direction (cm**2)	=	.4500E-05
Peameability Kc/Bc	=	.2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9865	5.4846	.7501E+01
.155E+03	.508E+01	.400E+01	.9992	.3252	.2747E-01
.307E+03	.101E+02	.400E+01	.9997	.1206	.7370E-02
.460E+03	.151E+02	.400E+01	.9999	.0429	.2657E-02
.612E+03	.201E+02	.400E+01	1.0000	.0177	.1052E-02
.765E+03	.251E+02	.400E+01	1.0000	.0075	.4353E-03
.917E+03	.301E+02	.400E+01	1.0000	.0033	.1850E-03
.107E+04	.351E+02	.400E+01	1.0000	.0014	.8002E-04
.122E+04	.401E+02	.400E+01	1.0000	.0006	.3505E-04
.137E+04	.451E+02	.400E+01	1.0000	.0003	.1550E-04
.153E+04	.501E+02	.400E+01	1.0000	.0001	.6903E-05
.168E+04	.551E+02	.400E+01	1.0000	.0001	.3093E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.1392E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.6293E-06
.214E+04	.701E+02	.400E+01	1.0000	.0000	.2854E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.1298E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.5917E-07
.259E+04	.851E+02	.400E+01	1.0000	.0000	.2703E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.1238E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.5675E-08

----- Simulated Scenario ----- 7

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft) = .5000E+01

Depth to the groundwater table (ft) = .6000E+01

Depth to the simulated elevation(ft) = .4000E+01

```
Radius of the simulating well (in. )      =           .1000E+01

Temperature of the soil ( C )             =           .2000E+02

Flow rate of pumping/injection well( cfm )=           .9000E+02

Soil porosity( Dimensionless )            =           .2000E+00

Peameability for R direction ( cm**2 )    =           .4500E-05

Peameability for Z direction ( cm**2 )    =           .4500E-05

Peameability  Kc/Bc                       =           .2000E-07
```

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************* OUTPUT *********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9848	6.1754	.8453E+01
.155E+03	.508E+01	.400E+01	.9991	.3659	.3090E-01
.307E+03	.101E+02	.400E+01	.9997	.1357	.8292E-02
.460E+03	.151E+02	.400E+01	.9999	.0482	.2989E-02
.612E+03	.201E+02	.400E+01	1.0000	.0199	.1183E-02
.765E+03	.251E+02	.400E+01	1.0000	.0085	.4897E-03
.917E+03	.301E+02	.400E+01	1.0000	.0037	.2081E-03
.107E+04	.351E+02	.400E+01	1.0000	.0016	.9002E-04
.122E+04	.401E+02	.400E+01	1.0000	.0007	.3943E-04

.137E+04	.451E+02	.400E+01	1.0000	.0003	.1744E-04
.153E+04	.501E+02	.400E+01	1.0000	.0001	.7766E-05
.168E+04	.551E+02	.400E+01	1.0000	.0001	.3479E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.1566E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.7079E-06
.214E+04	.701E+02	.400E+01	1.0000	.0000	.3210E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.1460E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.6656E-07
.259E+04	.851E+02	.400E+01	1.0000	.0000	.3041E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.1392E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.6384E-08

----- Simulated Scenario ----- 8

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft) = .5000E+01

Depth to the groundwater table (ft) = .6000E+01

Depth to the simulated elevation(ft) = .4000E+01

Radius of the simulating well (in.) = .1000E+01

Temperature of the soil (C) = .2000E+02

Flow rate of pumping/injection well(cfm)= .1000E+03

Soil porosity(Dimensionless) = .2000E+00

Peameability for R direction (cm**2) = .4500E-05

Peameability for Z direction (cm**2) = .4500E-05

Peameability Kc/Bc = .2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9831	6.8674	.9409E+01
.155E+03	.508E+01	.400E+01	.9990	.4066	.3434E-01
.307E+03	.101E+02	.400E+01	.9996	.1508	.9214E-02
.460E+03	.151E+02	.400E+01	.9999	.0536	.3321E-02
.612E+03	.201E+02	.400E+01	.9999	.0221	.1315E-02
.765E+03	.251E+02	.400E+01	1.0000	.0094	.5441E-03
.917E+03	.301E+02	.400E+01	1.0000	.0041	.2313E-03
.107E+04	.351E+02	.400E+01	1.0000	.0018	.1000E-03
.122E+04	.401E+02	.400E+01	1.0000	.0008	.4381E-04
.137E+04	.451E+02	.400E+01	1.0000	.0004	.1937E-04
.153E+04	.501E+02	.400E+01	1.0000	.0002	.8629E-05
.168E+04	.551E+02	.400E+01	1.0000	.0001	.3866E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.1740E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.7866E-06
.214E+04	.701E+02	.400E+01	1.0000	.0000	.3567E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.1622E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.7396E-07
.259E+04	.851E+02	.400E+01	1.0000	.0000	.3379E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.1547E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.7094E-08

----- Simulated Scenario ----- 9

Simulating information:

```
Depth to the top of screen (ft)           =           .3000E+01

Depth to the bottom of screen (ft)        =           .5000E+01

Depth to the groundwater table (ft)       =           .6000E+01

Depth to the simulated elevation(ft)      =           .4000E+01

Radius of the simulating well (in. )      =           .1000E+01

Temperature of the soil ( C )             =           .2000E+02

Flow rate of pumping/injection well( cfm )=           .1100E+03

Soil porosity( Dimensionless )            =           .2000E+00

Peameability for R direction ( cm**2 )    =           .4500E-05

Peameability for Z direction ( cm**2 )    =           .4500E-05

Peameability  Kc/Bc                       =           .2000E-07



 Aquifer geological structure properties



 1:  Aquifer is isotropic.
 2:  There is a upper confining unit.



************************* OUTPUT ********************************

   RADIUS    RADIUS   ELEVATION   PRESS     PRESS      VELOCITY
   ( cm )     ( ft )    ( ft )   ( atm.)  ( in H20 )   ( ft/s )
__________________________________________________________________

  .254E+01  .833E-01  .400E+01     .9814      7.5607   .1037E+02
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.155E+03	.508E+01	.400E+01	.9989	.4472	.3778E-01
.307E+03	.101E+02	.400E+01	.9996	.1659	.1014E-01
.460E+03	.151E+02	.400E+01	.9999	.0589	.3653E-02
.612E+03	.201E+02	.400E+01	.9999	.0243	.1446E-02
.765E+03	.251E+02	.400E+01	1.0000	.0103	.5985E-03
.917E+03	.301E+02	.400E+01	1.0000	.0045	.2544E-03
.107E+04	.351E+02	.400E+01	1.0000	.0020	.1100E-03
.122E+04	.401E+02	.400E+01	1.0000	.0009	.4819E-04
.137E+04	.451E+02	.400E+01	1.0000	.0004	.2131E-04
.153E+04	.501E+02	.400E+01	1.0000	.0002	.9492E-05
.168E+04	.551E+02	.400E+01	1.0000	.0001	.4253E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.1914E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.8652E-06
.214E+04	.701E+02	.400E+01	1.0000	.0000	.3924E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.1784E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.8136E-07
.259E+04	.851E+02	.400E+01	1.0000	.0000	.3717E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.1702E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.7803E-08

----- Simulated Scenario ----- 10

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft) = .5000E+01

Depth to the groundwater table (ft) = .6000E+01

Depth to the simulated elevation(ft) = .4000E+01

Radius of the simulating well (in.) = .1000E+01

Temperature of the soil (C) = .2000E+02

Flow rate of pumping/injection well(cfm)= .1200E+03

Soil porosity(Dimensionless) = .2000E+00

Peameability for R direction (cm**2) = .4500E-05

Peameability for Z direction (cm**2) = .4500E-05

Peameability Kc/Bc = .2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9797	8.2551	.1133E+02
.155E+03	.508E+01	.400E+01	.9988	.4879	.4121E-01
.307E+03	.101E+02	.400E+01	.9996	.1809	.1106E-01
.460E+03	.151E+02	.400E+01	.9998	.0643	.3985E-02
.612E+03	.201E+02	.400E+01	.9999	.0265	.1578E-02
.765E+03	.251E+02	.400E+01	1.0000	.0113	.6530E-03
.917E+03	.301E+02	.400E+01	1.0000	.0049	.2775E-03
.107E+04	.351E+02	.400E+01	1.0000	.0021	.1200E-03
.122E+04	.401E+02	.400E+01	1.0000	.0009	.5258E-04
.137E+04	.451E+02	.400E+01	1.0000	.0004	.2325E-04
.153E+04	.501E+02	.400E+01	1.0000	.0002	.1035E-04
.168E+04	.551E+02	.400E+01	1.0000	.0001	.4639E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.2088E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.9439E-06
.214E+04	.701E+02	.400E+01	1.0000	.0000	.4280E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.1947E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.8875E-07
.259E+04	.851E+02	.400E+01	1.0000	.0000	.4055E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.1856E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.8513E-08

----- Simulated Scenario ----- 11

Simulating information:

Depth to the top of screen (ft)	=	.3000E+01
Depth to the bottom of screen (ft)	=	.5000E+01
Depth to the groundwater table (ft)	=	.6000E+01
Depth to the simulated elevation(ft)	=	.4000E+01
Radius of the simulating well (in.)	=	.1000E+01
Temperature of the soil (C)	=	.2000E+02
Flow rate of pumping/injection well(cfm)	=	.1300E+03
Soil porosity(Dimensionless)	=	.2000E+00
Peameability for R direction (cm**2)	=	.4500E-05
Peameability for Z direction (cm**2)	=	.4500E-05
Peameability Kc/Bc	=	.2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9780	8.9508	.1230E+02
.155E+03	.508E+01	.400E+01	.9987	.5286	.4465E-01
.307E+03	.101E+02	.400E+01	.9995	.1960	.1198E-01
.460E+03	.151E+02	.400E+01	.9998	.0696	.4317E-02
.612E+03	.201E+02	.400E+01	.9999	.0288	.1709E-02
.765E+03	.251E+02	.400E+01	1.0000	.0122	.7074E-03
.917E+03	.301E+02	.400E+01	1.0000	.0053	.3006E-03
.107E+04	.351E+02	.400E+01	1.0000	.0023	.1300E-03
.122E+04	.401E+02	.400E+01	1.0000	.0010	.5696E-04
.137E+04	.451E+02	.400E+01	1.0000	.0005	.2518E-04
.153E+04	.501E+02	.400E+01	1.0000	.0002	.1122E-04
.168E+04	.551E+02	.400E+01	1.0000	.0001	.5026E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.2262E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.1023E-05
.214E+04	.701E+02	.400E+01	1.0000	.0000	.4637E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.2109E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.9615E-07
.259E+04	.851E+02	.400E+01	1.0000	.0000	.4393E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.2011E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.9222E-08

----- Simulated Scenario ----- 12

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft) = .5000E+01

Depth to the groundwater table (ft) = .6000E+01

Depth to the simulated elevation(ft) = .4000E+01

Radius of the simulating well (in.) = .1000E+01

Temperature of the soil (C) = .2000E+02

Flow rate of pumping/injection well(cfm)= .1400E+03

Soil porosity(Dimensionless) = .2000E+00

Peameability for R direction (cm**2) = .4500E-05

Peameability for Z direction (cm**2) = .4500E-05

Peameability Kc/Bc = .2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9763	9.6477	.1326E+02
.155E+03	.508E+01	.400E+01	.9986	.5693	.4809E-01
.307E+03	.101E+02	.400E+01	.9995	.2111	.1290E-01
.460E+03	.151E+02	.400E+01	.9998	.0750	.4650E-02
.612E+03	.201E+02	.400E+01	.9999	.0310	.1840E-02
.765E+03	.251E+02	.400E+01	1.0000	.0132	.7618E-03
.917E+03	.301E+02	.400E+01	1.0000	.0057	.3238E-03
.107E+04	.351E+02	.400E+01	1.0000	.0025	.1400E-03
.122E+04	.401E+02	.400E+01	1.0000	.0011	.6134E-04
.137E+04	.451E+02	.400E+01	1.0000	.0005	.2712E-04
.153E+04	.501E+02	.400E+01	1.0000	.0002	.1208E-04
.168E+04	.551E+02	.400E+01	1.0000	.0001	.5412E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.2436E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.1101E-05

.214E+04	.701E+02	.400E+01	1.0000	.0000	.4994E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.2271E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.1035E-06
.259E+04	.851E+02	.400E+01	1.0000	.0000	.4731E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.2166E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.9931E-08

----- Simulated Scenario ----- 13

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft) = .5000E+01

Depth to the groundwater table (ft) = .6000E+01

Depth to the simulated elevation(ft) = .4000E+01

Radius of the simulating well (in.) = .1000E+01

Temperature of the soil (C) = .2000E+02

Flow rate of pumping/injection well(cfm)= .1500E+03

Soil porosity(Dimensionless) = .2000E+00

Peameability for R direction (cm**2) = .4500E-05

Peameability for Z direction (cm**2) = .4500E-05

Peameability Kc/Bc = .2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

*********************** OUTPUT ******************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9746	10.3457	.1424E+02
.155E+03	.508E+01	.400E+01	.9985	.6100	.5153E-01
.307E+03	.101E+02	.400E+01	.9994	.2262	.1382E-01
.460E+03	.151E+02	.400E+01	.9998	.0803	.4982E-02
.612E+03	.201E+02	.400E+01	.9999	.0332	.1972E-02
.765E+03	.251E+02	.400E+01	1.0000	.0141	.8162E-03
.917E+03	.301E+02	.400E+01	1.0000	.0061	.3469E-03
.107E+04	.351E+02	.400E+01	1.0000	.0027	.1500E-03
.122E+04	.401E+02	.400E+01	1.0000	.0012	.6572E-04
.137E+04	.451E+02	.400E+01	1.0000	.0005	.2906E-04
.153E+04	.501E+02	.400E+01	1.0000	.0002	.1294E-04
.168E+04	.551E+02	.400E+01	1.0000	.0001	.5799E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.2611E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.1180E-05
.214E+04	.701E+02	.400E+01	1.0000	.0000	.5350E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.2433E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.1109E-06
.259E+04	.851E+02	.400E+01	1.0000	.0000	.5069E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.2320E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.1064E-07

----- Simulated Scenario ----- 14

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft) = .5000E+01

Depth to the groundwater table (ft)	=	.6000E+01
Depth to the simulated elevation(ft)	=	.4000E+01
Radius of the simulating well (in.)	=	.1000E+01
Temperature of the soil (C)	=	.2000E+02
Flow rate of pumping/injection well(cfm)	=	.1600E+03
Soil porosity(Dimensionless)	=	.2000E+00
Peameability for R direction (cm**2)	=	.4500E-05
Peameability for Z direction (cm**2)	=	.4500E-05
Peameability Kc/Bc	=	.2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9729	11.0451	.1521E+02
.155E+03	.508E+01	.400E+01	.9984	.6507	.5497E-01
.307E+03	.101E+02	.400E+01	.9994	.2413	.1474E-01
.460E+03	.151E+02	.400E+01	.9998	.0857	.5314E-02
.612E+03	.201E+02	.400E+01	.9999	.0354	.2103E-02
.765E+03	.251E+02	.400E+01	1.0000	.0150	.8706E-03

.917E+03	.301E+02	.400E+01	1.0000	.0065	.3700E-03
.107E+04	.351E+02	.400E+01	1.0000	.0029	.1600E-03
.122E+04	.401E+02	.400E+01	1.0000	.0013	.7010E-04
.137E+04	.451E+02	.400E+01	1.0000	.0006	.3100E-04
.153E+04	.501E+02	.400E+01	1.0000	.0003	.1381E-04
.168E+04	.551E+02	.400E+01	1.0000	.0001	.6186E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.2785E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.1259E-05
.214E+04	.701E+02	.400E+01	1.0000	.0000	.5707E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.2596E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.1183E-06
.259E+04	.851E+02	.400E+01	1.0000	.0000	.5407E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.2475E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.1135E-07

----- Simulated Scenario ----- 15

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft) = .5000E+01

Depth to the groundwater table (ft) = .6000E+01

Depth to the simulated elevation(ft) = .4000E+01

Radius of the simulating well (in.) = .1000E+01

Temperature of the soil (C) = .2000E+02

Flow rate of pumping/injection well(cfm)= .1700E+03

Soil porosity(Dimensionless) = .2000E+00

Peameability for R direction (cm**2) = .4500E-05

Peameability for Z direction (cm**2) = .4500E-05

Peameability Kc/Bc = .2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ******************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9711	11.7456	.1619E+02
.155E+03	.508E+01	.400E+01	.9983	.6914	.5842E-01
.307E+03	.101E+02	.400E+01	.9994	.2563	.1567E-01
.460E+03	.151E+02	.400E+01	.9998	.0910	.5646E-02
.612E+03	.201E+02	.400E+01	.9999	.0376	.2235E-02
.765E+03	.251E+02	.400E+01	1.0000	.0160	.9250E-03
.917E+03	.301E+02	.400E+01	1.0000	.0069	.3931E-03
.107E+04	.351E+02	.400E+01	1.0000	.0030	.1700E-03
.122E+04	.401E+02	.400E+01	1.0000	.0013	.7448E-04
.137E+04	.451E+02	.400E+01	1.0000	.0006	.3293E-04
.153E+04	.501E+02	.400E+01	1.0000	.0003	.1467E-04
.168E+04	.551E+02	.400E+01	1.0000	.0001	.6572E-05
.183E+04	.601E+02	.400E+01	1.0000	.0000	.2959E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.1337E-05
.214E+04	.701E+02	.400E+01	1.0000	.0000	.6064E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.2758E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.1257E-06
.259E+04	.851E+02	.400E+01	1.0000	.0000	.5745E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.2630E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.1206E-07

----- Simulated Scenario ----- 16

Simulating information:

Depth to the top of screen (ft)	=	.3000E+01
Depth to the bottom of screen (ft)	=	.5000E+01
Depth to the groundwater table (ft)	=	.6000E+01
Depth to the simulated elevation(ft)	=	.4000E+01
Radius of the simulating well (in.)	=	.1000E+01
Temperature of the soil (C)	=	.2000E+02
Flow rate of pumping/injection well(cfm)	=	.1800E+03
Soil porosity(Dimensionless)	=	.2000E+00
Peameability for R direction (cm**2)	=	.4500E-05
Peameability for Z direction (cm**2)	=	.4500E-05
Peameability Kc/Bc	=	.2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)

.254E+01	.833E-01	.400E+01	.9694	12.4474	.1718E+02
.155E+03	.508E+01	.400E+01	.9982	.7321	.6186E-01
.307E+03	.101E+02	.400E+01	.9993	.2714	.1659E-01
.460E+03	.151E+02	.400E+01	.9998	.0964	.5978E-02
.612E+03	.201E+02	.400E+01	.9999	.0398	.2366E-02
.765E+03	.251E+02	.400E+01	1.0000	.0169	.9794E-03
.917E+03	.301E+02	.400E+01	1.0000	.0073	.4163E-03
.107E+04	.351E+02	.400E+01	1.0000	.0032	.1800E-03
.122E+04	.401E+02	.400E+01	1.0000	.0014	.7886E-04
.137E+04	.451E+02	.400E+01	1.0000	.0006	.3487E-04
.153E+04	.501E+02	.400E+01	1.0000	.0003	.1553E-04
.168E+04	.551E+02	.400E+01	1.0000	.0001	.6959E-05
.183E+04	.601E+02	.400E+01	1.0000	.0001	.3133E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.1416E-05
.214E+04	.701E+02	.400E+01	1.0000	.0000	.6421E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.2920E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.1331E-06
.259E+04	.851E+02	.400E+01	1.0000	.0000	.6083E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.2785E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.1277E-07

----- Simulated Scenario ----- 17

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft) = .5000E+01

Depth to the groundwater table (ft) = .6000E+01

Depth to the simulated elevation(ft) = .4000E+01

Radius of the simulating well (in.) = .1000E+01

Temperature of the soil (C) = .2000E+02

Flow rate of pumping/injection well(cfm)= .1900E+03

Soil porosity(Dimensionless) = .2000E+00

Peameability for R direction (cm**2) = .4500E-05

Peameability for Z direction (cm**2) = .4500E-05

Peameability Kc/Bc = .2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9677	13.1505	.1816E+02
.155E+03	.508E+01	.400E+01	.9981	.7728	.6530E-01
.307E+03	.101E+02	.400E+01	.9993	.2865	.1751E-01
.460E+03	.151E+02	.400E+01	.9998	.1018	.6310E-02
.612E+03	.201E+02	.400E+01	.9999	.0420	.2498E-02
.765E+03	.251E+02	.400E+01	1.0000	.0179	.1034E-02
.917E+03	.301E+02	.400E+01	1.0000	.0077	.4394E-03
.107E+04	.351E+02	.400E+01	1.0000	.0034	.1901E-03
.122E+04	.401E+02	.400E+01	1.0000	.0015	.8325E-04
.137E+04	.451E+02	.400E+01	1.0000	.0007	.3681E-04
.153E+04	.501E+02	.400E+01	1.0000	.0003	.1639E-04
.168E+04	.551E+02	.400E+01	1.0000	.0001	.7345E-05
.183E+04	.601E+02	.400E+01	1.0000	.0001	.3307E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.1494E-05
.214E+04	.701E+02	.400E+01	1.0000	.0000	.6777E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.3082E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.1405E-06
.259E+04	.851E+02	.400E+01	1.0000	.0000	.6421E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.2939E-07

```
  .290E+04  .951E+02  .400E+01    1.0000       .0000   .1348E-07
```

----- Simulated Scenario -----   18

Simulating information:

```
Depth to the top of screen (ft)           =           .3000E+01
Depth to the bottom of screen (ft)        =           .5000E+01
Depth to the groundwater table (ft)       =           .6000E+01
Depth to the simulated elevation(ft)      =           .4000E+01
Radius of the simulating well (in. )      =           .1000E+01
Temperature of the soil ( C )             =           .2000E+02
Flow rate of pumping/injection well( cfm )=           .2000E+03
Soil porosity( Dimensionless )            =           .2000E+00
Peameability for R direction ( cm**2 )    =           .4500E-05
Peameability for Z direction ( cm**2 )    =           .4500E-05
Peameability  Kc/Bc                       =           .2000E-07
```

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************* OUTPUT *********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9660	13.8548	.1915E+02
.155E+03	.508E+01	.400E+01	.9980	.8135	.6875E-01
.307E+03	.101E+02	.400E+01	.9993	.3016	.1843E-01
.460E+03	.151E+02	.400E+01	.9997	.1071	.6643E-02
.612E+03	.201E+02	.400E+01	.9999	.0442	.2629E-02
.765E+03	.251E+02	.400E+01	1.0000	.0188	.1088E-02
.917E+03	.301E+02	.400E+01	1.0000	.0081	.4625E-03
.107E+04	.351E+02	.400E+01	1.0000	.0036	.2001E-03
.122E+04	.401E+02	.400E+01	1.0000	.0016	.8763E-04
.137E+04	.451E+02	.400E+01	1.0000	.0007	.3875E-04
.153E+04	.501E+02	.400E+01	1.0000	.0003	.1726E-04
.168E+04	.551E+02	.400E+01	1.0000	.0001	.7732E-05
.183E+04	.601E+02	.400E+01	1.0000	.0001	.3481E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.1573E-05
.214E+04	.701E+02	.400E+01	1.0000	.0000	.7134E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.3244E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.1479E-06
.259E+04	.851E+02	.400E+01	1.0000	.0000	.6759E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.3094E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.1419E-07

----- Simulated Scenario ----- 19

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft) = .5000E+01

Depth to the groundwater table (ft) = .6000E+01

Depth to the simulated elevation(ft) = .4000E+01

Radius of the simulating well (in.) = .1000E+01

```
Temperature of the soil ( C )                =          .2000E+02

Flow rate of pumping/injection well( cfm )=          .2100E+03

Soil porosity( Dimensionless )              =          .2000E+00

Peameability for R direction ( cm**2 )      =          .4500E-05

Peameability for Z direction ( cm**2 )      =          .4500E-05

Peameability  Kc/Bc                         =          .2000E-07
```

```
 Aquifer geological structure properties
```

```
 1:  Aquifer is isotropic.
 2:  There is a upper confining unit.
```

************************* OUTPUT *********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9642	14.5604	.2015E+02
.155E+03	.508E+01	.400E+01	.9979	.8542	.7219E-01
.307E+03	.101E+02	.400E+01	.9992	.3167	.1936E-01
.460E+03	.151E+02	.400E+01	.9997	.1125	.6975E-02
.612E+03	.201E+02	.400E+01	.9999	.0464	.2761E-02
.765E+03	.251E+02	.400E+01	1.0000	.0197	.1143E-02
.917E+03	.301E+02	.400E+01	1.0000	.0085	.4856E-03
.107E+04	.351E+02	.400E+01	1.0000	.0037	.2101E-03
.122E+04	.401E+02	.400E+01	1.0000	.0017	.9201E-04
.137E+04	.451E+02	.400E+01	1.0000	.0008	.4068E-04
.153E+04	.501E+02	.400E+01	1.0000	.0003	.1812E-04

.168E+04	.551E+02	.400E+01	1.0000	.0001	.8119E-05
.183E+04	.601E+02	.400E+01	1.0000	.0001	.3655E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.1652E-05
.214E+04	.701E+02	.400E+01	1.0000	.0000	.7491E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.3407E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.1553E-06
.259E+04	.851E+02	.400E+01	1.0000	.0000	.7096E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.3249E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.1490E-07

----- Simulated Scenario ----- 20

Simulating information:

Depth to the top of screen (ft) = .3000E+01

Depth to the bottom of screen (ft) = .5000E+01

Depth to the groundwater table (ft) = .6000E+01

Depth to the simulated elevation(ft) = .4000E+01

Radius of the simulating well (in.) = .1000E+01

Temperature of the soil (C) = .2000E+02

Flow rate of pumping/injection well(cfm)= .2200E+03

Soil porosity(Dimensionless) = .2000E+00

Peameability for R direction (cm**2) = .4500E-05

Peameability for Z direction (cm**2) = .4500E-05

Peameability Kc/Bc = .2000E-07

Aquifer geological structure properties

1: Aquifer is isotropic.
2: There is a upper confining unit.

************************ OUTPUT ********************************

RADIUS (cm)	RADIUS (ft)	ELEVATION (ft)	PRESS (atm.)	PRESS (in H20)	VELOCITY (ft/s)
.254E+01	.833E-01	.400E+01	.9625	15.2672	.2114E+02
.155E+03	.508E+01	.400E+01	.9978	.8950	.7563E-01
.307E+03	.101E+02	.400E+01	.9992	.3318	.2028E-01
.460E+03	.151E+02	.400E+01	.9997	.1178	.7307E-02
.612E+03	.201E+02	.400E+01	.9999	.0487	.2892E-02
.765E+03	.251E+02	.400E+01	.9999	.0207	.1197E-02
.917E+03	.301E+02	.400E+01	1.0000	.0090	.5088E-03
.107E+04	.351E+02	.400E+01	1.0000	.0039	.2201E-03
.122E+04	.401E+02	.400E+01	1.0000	.0017	.9639E-04
.137E+04	.451E+02	.400E+01	1.0000	.0008	.4262E-04
.153E+04	.501E+02	.400E+01	1.0000	.0004	.1898E-04
.168E+04	.551E+02	.400E+01	1.0000	.0002	.8505E-05
.183E+04	.601E+02	.400E+01	1.0000	.0001	.3829E-05
.198E+04	.651E+02	.400E+01	1.0000	.0000	.1730E-05
.214E+04	.701E+02	.400E+01	1.0000	.0000	.7847E-06
.229E+04	.751E+02	.400E+01	1.0000	.0000	.3569E-06
.244E+04	.801E+02	.400E+01	1.0000	.0000	.1627E-06
.259E+04	.851E+02	.400E+01	1.0000	.0000	.7434E-07
.275E+04	.901E+02	.400E+01	1.0000	.0000	.3403E-07
.290E+04	.951E+02	.400E+01	1.0000	.0000	.1561E-07

---------- Simulation finished ----------

----- Simulated Scenario ----- 1

************************ OUTPUT ********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.000000E+00	.00
.155E+03	.508E+01	.413460E-04	8683227.00
.307E+03	.101E+02	.890521E-02	20419.04
.460E+03	.151E+02	.396912E-01	3930.19
.612E+03	.201E+02	.122925E+00	1091.75
.765E+03	.251E+02	.330496E+00	350.52
.917E+03	.301E+02	.828070E+00	121.92
.107E+04	.351E+02	.199266E+01	44.67
.122E+04	.401E+02	.467483E+01	16.98
.137E+04	.451E+02	.107806E+02	6.63
.153E+04	.501E+02	.245585E+02	2.64
.168E+04	.551E+02	.554354E+02	1.07
.183E+04	.601E+02	.124251E+03	.44
.198E+04	.651E+02	.276928E+03	.18
.214E+04	.701E+02	.614383E+03	.08
.229E+04	.751E+02	.135786E+04	.03
.244E+04	.801E+02	.299137E+04	.01
.259E+04	.851E+02	.657184E+04	.01
.275E+04	.901E+02	.144034E+05	.00
.290E+04	.951E+02	.315020E+05	.00

----- Simulated Scenario ----- 2

************************ OUTPUT ********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.315020E+05	.00
.155E+03	.508E+01	.309572E-04	11597180.00
.307E+03	.101E+02	.667828E-02	27227.75
.460E+03	.151E+02	.297670E-01	5240.41
.612E+03	.201E+02	.921920E-01	1455.69
.765E+03	.251E+02	.247869E+00	467.36
.917E+03	.301E+02	.621049E+00	162.56
.107E+04	.351E+02	.149449E+01	59.56
.122E+04	.401E+02	.350612E+01	22.63
.137E+04	.451E+02	.808547E+01	8.84
.153E+04	.501E+02	.184189E+02	3.53
.168E+04	.551E+02	.415765E+02	1.43
.183E+04	.601E+02	.931883E+02	.59
.198E+04	.651E+02	.207696E+03	.24
.214E+04	.701E+02	.460787E+03	.10
.229E+04	.751E+02	.101839E+04	.04
.244E+04	.801E+02	.224352E+04	.02
.259E+04	.851E+02	.492888E+04	.01
.275E+04	.901E+02	.108026E+05	.00
.290E+04	.951E+02	.236265E+05	.00

----- Simulated Scenario ----- 3

************************ OUTPUT ********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR

.254E+01	.833E-01	.236265E+05	.00
.155E+03	.508E+01	.247239E-04	14521030.00
.307E+03	.101E+02	.534212E-02	34037.64
.460E+03	.151E+02	.238125E-01	6550.71
.612E+03	.201E+02	.737520E-01	1819.63
.765E+03	.251E+02	.198293E+00	584.20
.917E+03	.301E+02	.496837E+00	203.20
.107E+04	.351E+02	.119559E+01	74.45
.122E+04	.401E+02	.280489E+01	28.29
.137E+04	.451E+02	.646837E+01	11.05
.153E+04	.501E+02	.147351E+02	4.41
.168E+04	.551E+02	.332612E+02	1.79
.183E+04	.601E+02	.745506E+02	.74
.198E+04	.651E+02	.166157E+03	.31
.214E+04	.701E+02	.368630E+03	.13
.229E+04	.751E+02	.814715E+03	.05
.244E+04	.801E+02	.179482E+04	.02
.259E+04	.851E+02	.394310E+04	.01
.275E+04	.901E+02	.864207E+04	.00
.290E+04	.951E+02	.189012E+05	.00

----- Simulated Scenario ----- 4

************************ OUTPUT ********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.189012E+05	.00
.155E+03	.508E+01	.205683E-04	17454850.00
.307E+03	.101E+02	.445135E-02	40848.70
.460E+03	.151E+02	.198429E-01	7861.10
.612E+03	.201E+02	.614586E-01	2183.58
.765E+03	.251E+02	.165243E+00	701.05
.917E+03	.301E+02	.414028E+00	243.84
.107E+04	.351E+02	.996323E+00	89.33
.122E+04	.401E+02	.233740E+01	33.95
.137E+04	.451E+02	.539031E+01	13.26

.153E+04	.501E+02	.122792E+02	5.29
.168E+04	.551E+02	.277177E+02	2.15
.183E+04	.601E+02	.621255E+02	.88
.198E+04	.651E+02	.138464E+03	.37
.214E+04	.701E+02	.307192E+03	.15
.229E+04	.751E+02	.678929E+03	.07
.244E+04	.801E+02	.149568E+04	.03
.259E+04	.851E+02	.328592E+04	.01
.275E+04	.901E+02	.720172E+04	.01
.290E+04	.951E+02	.157510E+05	.00

----- Simulated Scenario ----- 5

************************ OUTPUT ********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.157510E+05	.00
.155E+03	.508E+01	.175999E-04	20398720.00
.307E+03	.101E+02	.381508E-02	47660.95
.460E+03	.151E+02	.170074E-01	9171.56
.612E+03	.201E+02	.526777E-01	2547.54
.765E+03	.251E+02	.141635E+00	817.89
.917E+03	.301E+02	.354879E+00	284.48
.107E+04	.351E+02	.853989E+00	104.22
.122E+04	.401E+02	.200349E+01	39.61
.137E+04	.451E+02	.462026E+01	15.47
.153E+04	.501E+02	.105251E+02	6.17
.168E+04	.551E+02	.237580E+02	2.50
.183E+04	.601E+02	.532504E+02	1.03
.198E+04	.651E+02	.118683E+03	.43
.214E+04	.701E+02	.263307E+03	.18
.229E+04	.751E+02	.581939E+03	.08
.244E+04	.801E+02	.128201E+04	.03
.259E+04	.851E+02	.281650E+04	.01
.275E+04	.901E+02	.617290E+04	.01
.290E+04	.951E+02	.135009E+05	.00

----- Simulated Scenario ----- 6

*********************** OUTPUT *******************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.135009E+05	.00
.155E+03	.508E+01	.153736E-04	23352720.00
.307E+03	.101E+02	.333789E-02	54474.38
.460E+03	.151E+02	.148808E-01	10482.11
.612E+03	.201E+02	.460920E-01	2911.51
.765E+03	.251E+02	.123929E+00	934.74
.917E+03	.301E+02	.310518E+00	325.13
.107E+04	.351E+02	.747238E+00	119.11
.122E+04	.401E+02	.175305E+01	45.27
.137E+04	.451E+02	.404273E+01	17.68
.153E+04	.501E+02	.920942E+01	7.05
.168E+04	.551E+02	.207882E+02	2.86
.183E+04	.601E+02	.465941E+02	1.18
.198E+04	.651E+02	.103848E+03	.49
.214E+04	.701E+02	.230394E+03	.21
.229E+04	.751E+02	.509197E+03	.09
.244E+04	.801E+02	.112176E+04	.04
.259E+04	.851E+02	.246444E+04	.02
.275E+04	.901E+02	.540129E+04	.01
.290E+04	.951E+02	.118133E+05	.00

----- Simulated Scenario ----- 7

************************* OUTPUT *********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.118133E+05	.00
.155E+03	.508E+01	.136420E-04	26316920.00
.307E+03	.101E+02	.296673E-02	61288.98
.460E+03	.151E+02	.132268E-01	11792.74
.612E+03	.201E+02	.409697E-01	3275.48
.765E+03	.251E+02	.110158E+00	1051.59
.917E+03	.301E+02	.276014E+00	365.77
.107E+04	.351E+02	.664210E+00	134.00
.122E+04	.401E+02	.155826E+01	50.93
.137E+04	.451E+02	.359353E+01	19.89
.153E+04	.501E+02	.818615E+01	7.93
.168E+04	.551E+02	.184784E+02	3.22
.183E+04	.601E+02	.414170E+02	1.32
.198E+04	.651E+02	.923093E+02	.55
.214E+04	.701E+02	.204794E+03	.23
.229E+04	.751E+02	.452619E+03	.10
.244E+04	.801E+02	.997122E+03	.04
.259E+04	.851E+02	.219061E+04	.02
.275E+04	.901E+02	.480115E+04	.01
.290E+04	.951E+02	.105007E+05	.00

----- Simulated Scenario ----- 8

************************* OUTPUT *********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR

.254E+01	.833E-01	.105007E+05	.00
.155E+03	.508E+01	.122567E-04	29291410.00
.307E+03	.101E+02	.266980E-02	68104.78
.460E+03	.151E+02	.119036E-01	13103.44
.612E+03	.201E+02	.368719E-01	3639.46
.765E+03	.251E+02	.991412E-01	1168.43
.917E+03	.301E+02	.248411E+00	406.41
.107E+04	.351E+02	.597787E+00	148.89
.122E+04	.401E+02	.140243E+01	56.58
.137E+04	.451E+02	.323418E+01	22.10
.153E+04	.501E+02	.736753E+01	8.82
.168E+04	.551E+02	.166306E+02	3.58
.183E+04	.601E+02	.372753E+02	1.47
.198E+04	.651E+02	.830783E+02	.61
.214E+04	.701E+02	.184315E+03	.26
.229E+04	.751E+02	.407357E+03	.11
.244E+04	.801E+02	.897410E+03	.05
.259E+04	.851E+02	.197155E+04	.02
.275E+04	.901E+02	.432103E+04	.01
.290E+04	.951E+02	.945061E+04	.00

----- Simulated Scenario ----- 9

************************* OUTPUT *********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.945061E+04	.00
.155E+03	.508E+01	.111232E-04	32276270.00
.307E+03	.101E+02	.242687E-02	74921.75
.460E+03	.151E+02	.108210E-01	14414.23
.612E+03	.201E+02	.335192E-01	4003.45
.765E+03	.251E+02	.901274E-01	1285.28
.917E+03	.301E+02	.225827E+00	447.05
.107E+04	.351E+02	.543441E+00	163.78
.122E+04	.401E+02	.127494E+01	62.24
.137E+04	.451E+02	.294016E+01	24.31

.153E+04	.501E+02	.669775E+01	9.70
.168E+04	.551E+02	.151187E+02	3.93
.183E+04	.601E+02	.338866E+02	1.62
.198E+04	.651E+02	.755258E+02	.67
.214E+04	.701E+02	.167559E+03	.28
.229E+04	.751E+02	.370325E+03	.12
.244E+04	.801E+02	.815827E+03	.05
.259E+04	.851E+02	.179232E+04	.02
.275E+04	.901E+02	.392821E+04	.01
.290E+04	.951E+02	.859146E+04	.00

----- Simulated Scenario ----- 10

************************ OUTPUT ********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.859146E+04	.00
.155E+03	.508E+01	.101786E-04	35271570.00
.307E+03	.101E+02	.222442E-02	81739.90
.460E+03	.151E+02	.991877E-02	15725.09
.612E+03	.201E+02	.307253E-01	4367.45
.765E+03	.251E+02	.826158E-01	1402.13
.917E+03	.301E+02	.207007E+00	487.69
.107E+04	.351E+02	.498153E+00	178.67
.122E+04	.401E+02	.116869E+01	67.90
.137E+04	.451E+02	.269514E+01	26.52
.153E+04	.501E+02	.613960E+01	10.58
.168E+04	.551E+02	.138588E+02	4.29
.183E+04	.601E+02	.310627E+02	1.77
.198E+04	.651E+02	.692319E+02	.73
.214E+04	.701E+02	.153596E+03	.31
.229E+04	.751E+02	.339464E+03	.13
.244E+04	.801E+02	.747842E+03	.06
.259E+04	.851E+02	.164296E+04	.02
.275E+04	.901E+02	.360086E+04	.01
.290E+04	.951E+02	.787551E+04	.00

----- Simulated Scenario ----- 11

*********************** OUTPUT *******************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.787551E+04	.00
.155E+03	.508E+01	.937933E-05	38277410.00
.307E+03	.101E+02	.205312E-02	88559.25
.460E+03	.151E+02	.915538E-02	17036.04
.612E+03	.201E+02	.283612E-01	4731.46
.765E+03	.251E+02	.762599E-01	1518.98
.917E+03	.301E+02	.191083E+00	528.34
.107E+04	.351E+02	.459832E+00	193.56
.122E+04	.401E+02	.107879E+01	73.56
.137E+04	.451E+02	.248782E+01	28.73
.153E+04	.501E+02	.566733E+01	11.46
.168E+04	.551E+02	.127928E+02	4.65
.183E+04	.601E+02	.286733E+02	1.91
.198E+04	.651E+02	.639064E+02	.80
.214E+04	.701E+02	.141781E+03	.33
.229E+04	.751E+02	.313352E+03	.14
.244E+04	.801E+02	.690315E+03	.06
.259E+04	.851E+02	.151658E+04	.03
.275E+04	.901E+02	.332387E+04	.01
.290E+04	.951E+02	.726970E+04	.00

----- Simulated Scenario ----- 12

************************* OUTPUT *********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.726970E+04	.00
.155E+03	.508E+01	.869418E-05	41293860.00
.307E+03	.101E+02	.190628E-02	95379.77
.460E+03	.151E+02	.850104E-02	18347.07
.612E+03	.201E+02	.263348E-01	5095.47
.765E+03	.251E+02	.708120E-01	1635.84
.917E+03	.301E+02	.177433E+00	568.98
.107E+04	.351E+02	.426986E+00	208.45
.122E+04	.401E+02	.100173E+01	79.22
.137E+04	.451E+02	.231012E+01	30.94
.153E+04	.501E+02	.526251E+01	12.34
.168E+04	.551E+02	.118790E+02	5.01
.183E+04	.601E+02	.266252E+02	2.06
.198E+04	.651E+02	.593417E+02	.86
.214E+04	.701E+02	.131653E+03	.36
.229E+04	.751E+02	.290969E+03	.15
.244E+04	.801E+02	.641007E+03	.07
.259E+04	.851E+02	.140825E+04	.03
.275E+04	.901E+02	.308645E+04	.01
.290E+04	.951E+02	.675044E+04	.01

----- Simulated Scenario ----- 13

************************* OUTPUT *********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR

.254E+01	.833E-01	.675044E+04	.01
.155E+03	.508E+01	.810037E-05	44321000.00
.307E+03	.101E+02	.177903E-02	102201.50
.460E+03	.151E+02	.793395E-02	19658.18
.612E+03	.201E+02	.245786E-01	5459.49
.765E+03	.251E+02	.660905E-01	1752.69
.917E+03	.301E+02	.165603E+00	609.62
.107E+04	.351E+02	.398519E+00	223.34
.122E+04	.401E+02	.934950E+00	84.88
.137E+04	.451E+02	.215611E+01	33.15
.153E+04	.501E+02	.491168E+01	13.22
.168E+04	.551E+02	.110871E+02	5.37
.183E+04	.601E+02	.248502E+02	2.21
.198E+04	.651E+02	.553856E+02	.92
.214E+04	.701E+02	.122877E+03	.39
.229E+04	.751E+02	.271572E+03	.16
.244E+04	.801E+02	.598273E+03	.07
.259E+04	.851E+02	.131437E+04	.03
.275E+04	.901E+02	.288069E+04	.01
.290E+04	.951E+02	.630041E+04	.01

----- Simulated Scenario ----- 14

************************ OUTPUT ********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.630041E+04	.01
.155E+03	.508E+01	.758076E-05	47358920.00
.307E+03	.101E+02	.166768E-02	109024.40
.460E+03	.151E+02	.743774E-02	20969.37
.612E+03	.201E+02	.230419E-01	5823.52
.765E+03	.251E+02	.619592E-01	1869.54
.917E+03	.301E+02	.155252E+00	650.26
.107E+04	.351E+02	.373611E+00	238.23
.122E+04	.401E+02	.876515E+00	90.53
.137E+04	.451E+02	.202135E+01	35.36

.153E+04	.501E+02	.460470E+01	14.11
.168E+04	.551E+02	.103941E+02	5.72
.183E+04	.601E+02	.232970E+02	2.35
.198E+04	.651E+02	.519240E+02	.98
.214E+04	.701E+02	.115197E+03	.41
.229E+04	.751E+02	.254598E+03	.17
.244E+04	.801E+02	.560881E+03	.07
.259E+04	.851E+02	.123222E+04	.03
.275E+04	.901E+02	.270065E+04	.01
.290E+04	.951E+02	.590663E+04	.01

----- Simulated Scenario ----- 15

************************ OUTPUT ********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.590663E+04	.01
.155E+03	.508E+01	.712225E-05	50407710.00
.307E+03	.101E+02	.156944E-02	115848.50
.460E+03	.151E+02	.699991E-02	22280.64
.612E+03	.201E+02	.216860E-01	6187.56
.765E+03	.251E+02	.583139E-01	1986.40
.917E+03	.301E+02	.146119E+00	690.91
.107E+04	.351E+02	.351633E+00	253.12
.122E+04	.401E+02	.824954E+00	96.19
.137E+04	.451E+02	.190245E+01	37.57
.153E+04	.501E+02	.433383E+01	14.99
.168E+04	.551E+02	.978269E+01	6.08
.183E+04	.601E+02	.219266E+02	2.50
.198E+04	.651E+02	.488696E+02	1.04
.214E+04	.701E+02	.108421E+03	.44
.229E+04	.751E+02	.239622E+03	.19
.244E+04	.801E+02	.527888E+03	.08
.259E+04	.851E+02	.115974E+04	.03
.275E+04	.901E+02	.254178E+04	.01
.290E+04	.951E+02	.555918E+04	.01

----- Simulated Scenario ----- 16

************************ OUTPUT ********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.555918E+04	.01
.155E+03	.508E+01	.671467E-05	53467460.00
.307E+03	.101E+02	.148211E-02	122673.70
.460E+03	.151E+02	.661073E-02	23591.99
.612E+03	.201E+02	.204808E-01	6551.61
.765E+03	.251E+02	.550736E-01	2103.26
.917E+03	.301E+02	.138000E+00	731.55
.107E+04	.351E+02	.332096E+00	268.01
.122E+04	.401E+02	.779122E+00	101.85
.137E+04	.451E+02	.179675E+01	39.78
.153E+04	.501E+02	.409306E+01	15.87
.168E+04	.551E+02	.923921E+01	6.44
.183E+04	.601E+02	.207085E+02	2.65
.198E+04	.651E+02	.461546E+02	1.10
.214E+04	.701E+02	.102397E+03	.46
.229E+04	.751E+02	.226310E+03	.20
.244E+04	.801E+02	.498561E+03	.08
.259E+04	.851E+02	.109531E+04	.04
.275E+04	.901E+02	.240057E+04	.02
.290E+04	.951E+02	.525034E+04	.01

----- Simulated Scenario ----- 17

************************ OUTPUT ********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.525034E+04	.01
.155E+03	.508E+01	.634997E-05	56538260.00
.307E+03	.101E+02	.140397E-02	129500.20
.460E+03	.151E+02	.626252E-02	24903.43
.612E+03	.201E+02	.194025E-01	6915.66
.765E+03	.251E+02	.521744E-01	2220.11
.917E+03	.301E+02	.130736E+00	772.19
.107E+04	.351E+02	.314617E+00	282.90
.122E+04	.401E+02	.738114E+00	107.51
.137E+04	.451E+02	.170219E+01	41.99
.153E+04	.501E+02	.387764E+01	16.75
.168E+04	.551E+02	.875293E+01	6.80
.183E+04	.601E+02	.196186E+02	2.80
.198E+04	.651E+02	.437254E+02	1.16
.214E+04	.701E+02	.970078E+02	.49
.229E+04	.751E+02	.214399E+03	.21
.244E+04	.801E+02	.472321E+03	.09
.259E+04	.851E+02	.103766E+04	.04
.275E+04	.901E+02	.227423E+04	.02
.290E+04	.951E+02	.497401E+04	.01

----- Simulated Scenario ----- 18

************************ OUTPUT ********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR

.254E+01	.833E-01	.497401E+04	.01
.155E+03	.508E+01	.602173E-05	59620180.00
.307E+03	.101E+02	.133364E-02	136327.80
.460E+03	.151E+02	.594912E-02	26214.94
.612E+03	.201E+02	.184319E-01	7279.72
.765E+03	.251E+02	.495651E-01	2336.97
.917E+03	.301E+02	.124199E+00	812.83
.107E+04	.351E+02	.298885E+00	297.79
.122E+04	.401E+02	.701208E+00	113.17
.137E+04	.451E+02	.161708E+01	44.20
.153E+04	.501E+02	.368375E+01	17.63
.168E+04	.551E+02	.831528E+01	7.15
.183E+04	.601E+02	.186376E+02	2.94
.198E+04	.651E+02	.415392E+02	1.22
.214E+04	.701E+02	.921574E+02	.51
.229E+04	.751E+02	.203679E+03	.22
.244E+04	.801E+02	.448705E+03	.09
.259E+04	.851E+02	.985775E+03	.04
.275E+04	.901E+02	.216052E+04	.02
.290E+04	.951E+02	.472531E+04	.01

----- Simulated Scenario ----- 19

************************* OUTPUT **********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.472531E+04	.01
.155E+03	.508E+01	.572472E-05	62713340.00
.307E+03	.101E+02	.127002E-02	143156.60
.460E+03	.151E+02	.566558E-02	27526.53
.612E+03	.201E+02	.175538E-01	7643.79
.765E+03	.251E+02	.472044E-01	2453.83
.917E+03	.301E+02	.118284E+00	853.48
.107E+04	.351E+02	.284652E+00	312.67
.122E+04	.401E+02	.667816E+00	118.83
.137E+04	.451E+02	.154007E+01	46.41

.153E+04	.501E+02	.350833E+01	18.51
.168E+04	.551E+02	.791932E+01	7.51
.183E+04	.601E+02	.177501E+02	3.09
.198E+04	.651E+02	.395611E+02	1.29
.214E+04	.701E+02	.877690E+02	.54
.229E+04	.751E+02	.193980E+03	.23
.244E+04	.801E+02	.427338E+03	.10
.259E+04	.851E+02	.938834E+03	.04
.275E+04	.901E+02	.205763E+04	.02
.290E+04	.951E+02	.450029E+04	.01

----- Simulated Scenario ----- 20

************************* OUTPUT *********************************

RADIUS CM	RADIUS FT	TIME DAYS	PORE VOL/ YEAR
.254E+01	.833E-01	.450029E+04	.01
.155E+03	.508E+01	.545470E-05	65817810.00
.307E+03	.101E+02	.121217E-02	149986.70
.460E+03	.151E+02	.540781E-02	28838.21
.612E+03	.201E+02	.167556E-01	8007.87
.765E+03	.251E+02	.450582E-01	2570.69
.917E+03	.301E+02	.112907E+00	894.12
.107E+04	.351E+02	.271712E+00	327.56
.122E+04	.401E+02	.637460E+00	124.49
.137E+04	.451E+02	.147007E+01	48.62
.153E+04	.501E+02	.334886E+01	19.40
.168E+04	.551E+02	.755935E+01	7.87
.183E+04	.601E+02	.169433E+02	3.24
.198E+04	.651E+02	.377629E+02	1.35
.214E+04	.701E+02	.837795E+02	.57
.229E+04	.751E+02	.185162E+03	.24
.244E+04	.801E+02	.407914E+03	.10
.259E+04	.851E+02	.896159E+03	.04
.275E+04	.901E+02	.196411E+04	.02
.290E+04	.951E+02	.429573E+04	.01

ATTACHMENT C
SOIL VAPOR EXTRACTION SYSTEM DESIGN

SOIL VAPOR EXTRACTION SYSTEM DESIGN

100 UNION AVENUE
BROOKLYN, NEW YORK 11206

INDEX OF SHEETS	
DRAWINGS	**DESCRIPTION**
ENV101	SOIL VAPOR EXTRACTION SYSTEM WELL LAYOUT
ENV102	SOIL VAPOR EXTRACTION SYSTEM MANIFOLD LAYOUT
ENV103	SOIL VAPOR EXTRACTION SYSTEM DETAILS
ENV104	SOIL VAPOR EXTRACTION SYSTEM PROCESS AND INSTRUMENTATION DIAGRAM
ATTACHMENTS	**DESCRIPTION**
1	SYSTEM INPUT/OUTPUT SUMMARY

Date	Description	No.
REVISIONS		

STATE OF NEW YORK – MATTHEW JAMES AMBRUSCH – 110412 – LICENSED PROFESSIONAL ENGINEER

SIGNATURE — DATE SIGNED 9/9/2024
MATTHEW J. AMBRUSCH
NEW YORK LIC. No. 110412-01

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Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
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Project: 100 UNION AVENUE
BROOKLYN
KINGS COUNTY NEW YORK

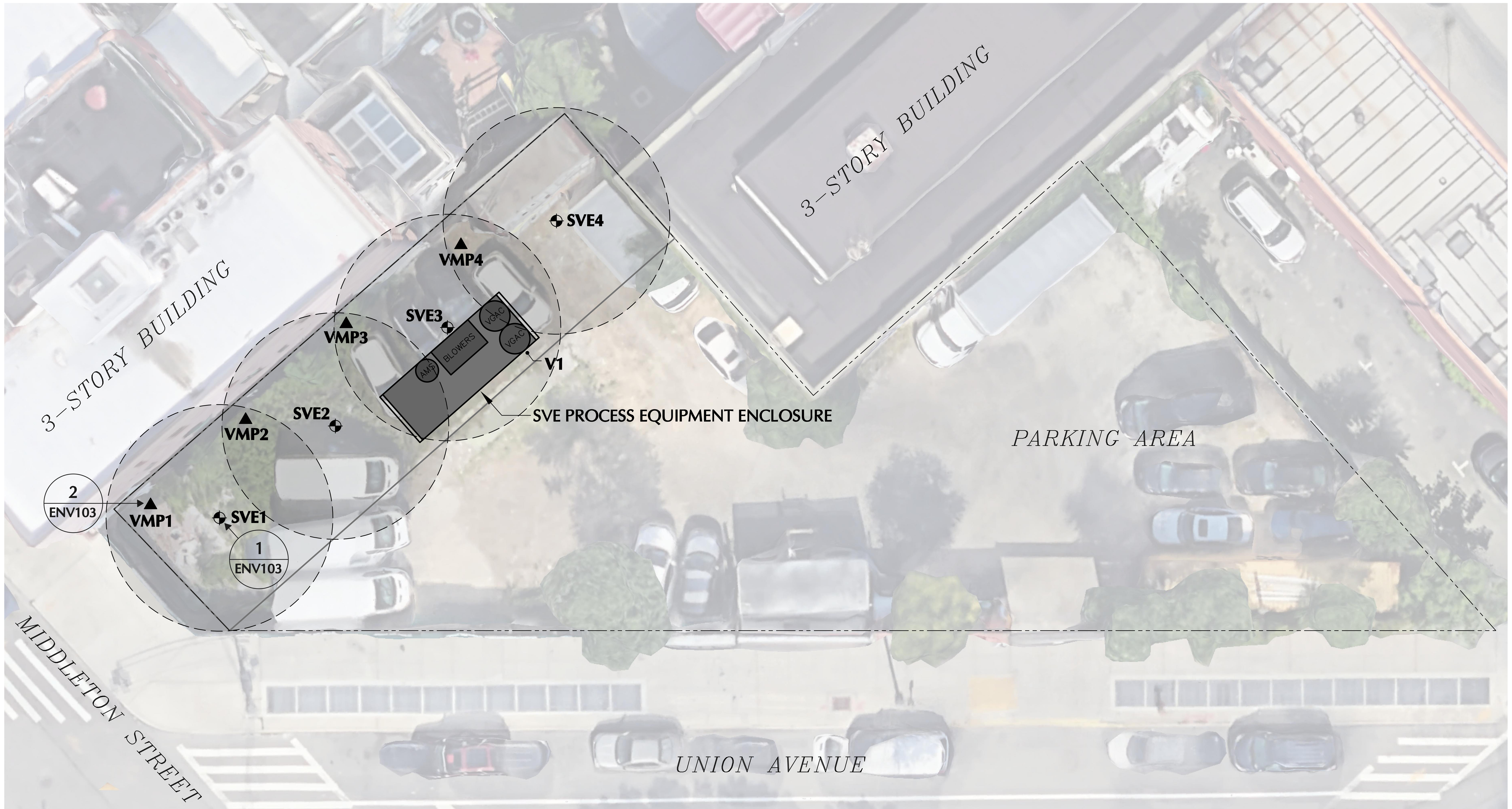
Drawing Title: COVER

Project No. 170819101
Date 09/06/2024
Drawn By AL
Checked By AB/MA

Drawing No. ENV100
Sheet 1 of 5

Filename: C:\bms\langan-pw-01\d0605558\170819101-0501-ND101-0101.dwg Date: 9/6/2024 Time: 15:27 User: aboodram Style Table: Langan.stb Layout: ENV100 COVER

LANGAN
PROJECT NO. 170819101



LEGEND:

SVE1 ⊕	SOIL VAPOR EXTRACTION WELL
VMP1 ▲	VAPOR MONITORING POINT
(dashed circle)	ESTIMATED RADIUS OF INFLUENCE [15-FEET]
V1 •	4-INCH SVE DISCHARGE STACK
(open rectangle)	TARGET TREATMENT AREA
(shaded rectangle)	SVE PROCESS EQUIPMENT ENCLOSURE
(dash-dot rectangle)	PROPERTY BOUNDARY
1 / ENV103	REFER TO DETAIL 1 ON DRAWING ENV103

GENERAL NOTES:

1. THE COMPONENTS SHOWN ARE NOT TO SURVEYED COORDINATES. THE CONTRACTOR SHALL COORDINATE THE EXACT LOCATIONS AND LAYOUT OF THE SYSTEM COMPONENTS IN THE FIELD BASED ON ACTUAL SITE CONDITIONS AND OTHER PROPOSED WORK.
2. THE SITE PLAN REFERENCED IS DEVELOPED FROM GOOGLE EARTH IMAGERY DATED JUNE 2022 AND LANGAN SITE OBSERVATIONS. THE SITE INFORMATION SHOWN IS FOR REFERENCE ONLY. THE PLAN DOES NOT SHOW EACH AND EVERY CONDITION EXISTING OR PROPOSED AT THE SITE. THE CONTRACTOR SHALL CONFIRM THE EXISTING AND PROPOSED SITE CONDITIONS, INCLUDING, BUT NOT LIMITED TO, MECHANICAL, ELECTRICAL, AND PLUMBING SYSTEMS; UTILITIES; STRUCTURAL COMPONENTS; AND ARCHITECTURAL REQUIREMENTS [AS APPLICABLE] PRIOR TO INITIATING INSTALLATION OF THE SYSTEM COMPONENTS.
3. THE TARGET TREATMENT AREA IS BASED ON THE AREA SHOWN IN THE REMEDIAL ACTION WORK PLAN [RAWP] PREPARED BY GZA GEOENVIRONMENTAL DATED SEPTEMBER 2023.
4. BASED ON THE RESULTS OF THE SOIL VAPOR EXTRACTION [SVE] PILOT TEST CONDUCTED BY LANGAN IN JULY 2024 AND SUBSEQUENT DATA EVALUATION, THE ACHIEVABLE RADIUS OF INFLUENCE OF EACH SVE WELL IS ESTIMATED TO BE 15-FEET.
5. INSTALLATION OF THE SVE SYSTEM PIPING SHALL BE COORDINATED WITH CONSTRUCTION OF OTHER UTILITIES, STRUCTURAL ELEMENTS, AND ALL OTHER TRADES, AS APPLICABLE.
6. NOTIFY THE ENGINEER OF RECORD IMMEDIATELY OF ANY CONFLICTS WITH THE WORK SHOWN ON THIS DRAWING.
7. SPECIFICATIONS FOR ALL SVE SYSTEM COMPONENTS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL.
8. THE SVE SYSTEM IS DESIGNED TO OPERATE CONTINUOUSLY. THE SVE SYSTEM PROCESS EQUIPMENT SHALL INCLUDE A BLOWER CONFIGURATION CAPABLE OF ACHIEVING APPROXIMATELY 300 STANDARD CUBIC FEET PER MINUTE [SCFM] AT 20 INCHES OF WATER COLUMN [IWC] VACUUM.
9. THE POWERED SVE SYSTEM COMPONENTS SHALL REQUIRE APPROXIMATELY 240V 3-PHASE 100 AMP ELECTRICAL SERVICE. ELECTRICAL REQUIREMENTS SHALL BE VERIFIED BY THE ELECTRICAL CONTRACTOR PRIOR TO INSTALLATION, BASED ON THE ACTUAL EQUIPMENT SELECTED AND PROCURED. THE SITE OWNER SHALL BE RESPONSIBLE FOR COORDINATING SITE POWER REQUIREMENTS AND ACCESS WITH THE ELECTRICAL COMPANY.

SOIL VAPOR EXTRACTION PIPING NOTES:

1. THE SVE SYSTEM SHALL CONSIST OF FOUR [4] SVE WELLS [SVE1 THROUGH SVE4]. THE SVE WELLS SHALL MANIFOLD TO BELOW GRADE 2-INCH SCHEDULE 40 POLYVINYL CHLORIDE [SCH. 40 PVC] SUB-HEADER LINES, WHICH SHALL PENETRATE THE SVE PROCESS EQUIPMENT ENCLOSURE SLAB AND MANIFOLD TO A 4-INCH SCH. 40 PVC MAIN HEADER LINE AT THE SVE PROCESS EQUIPMENT ENCLOSURE CEILING LEVEL. THE SVE MAIN HEADER LINE SHALL MANIFOLD TO THE INLET OF THE PROCESS EQUIPMENT. COLLECTED VAPORS SHALL BE DISCHARGED AT THE SVE PROCESS EQUIPMENT ENCLOSURE ROOF LEVEL VIA A 4-INCH SCH. 40 PVC DISCHARGE STACK. THE EXTERIOR PIPING SHALL BE INSULATED WITH UV-RATED INSULATION.
2. THE SVE WELLS SHALL BE CONSTRUCTED OF 4-INCH SCH. 40 PVC. THE VAPOR MONITORING POINTS [VMPS] SHALL BE CONSTRUCTED OF 1-INCH SCH. 40 PVC. THE SVE WELLS AND THE VMPS SHALL BE SCREENED FROM APPROXIMATELY 3 TO 5 FEET BELOW EXISTING GRADE SURFACE BASED ON FIELD OBSERVATIONS [I.E., SCREENED ABOVE THE GROUNDWATER TABLE]. THE SVE SUB-HEADER MANIFOLD SHALL BE CONSTRUCTED OF 2-INCH SCH. 40 PVC. THE SVE MAIN HEADER MANIFOLD SHALL BE CONSTRUCTED OF 4-INCH SCH. 40 PVC. ALL SUB-GRADE PIPING SHALL BE INSTALLED AT A 0.5% DOWNWARD SLOPE TOWARDS THE SVE WELLS, WITH THE SHALLOWEST PIPING INSTALLED A MINIMUM OF 2-FEET BELOW GRADE SURFACE LEVEL. WHERE REQUIRED, PIPING SHALL BE EQUIPPED WITH SWEEP FITTINGS IN THE PLACE OF 90 DEGREE ELBOWS, AS APPLICABLE.
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5. ABOVE-GRADE PIPING SHALL BE LABELED AS "CAUTION – VAPOR VENT PIPE. DO NOT ALTER IN ANY WAY. REPORT ANY DAMAGE IMMEDIATELY" WITHIN THE FIRST 5 FEET OF THE SVE PROCESS EQUIPMENT ENCLOSURE SLAB AND AT A MINIMUM OF EVERY 15 LINEAR FEET OF PIPE.
6. THE DISCHARGE STACK TERMINATION SHALL BE LOCATED AS FOLLOWS: AT LEAST ONE FOOT ABOVE THE HIGHEST PARAPET OR EAVE WITHIN 10 FEET HORIZONTALLY OF THE VENT; AT LEAST 10 FEET HORIZONTALLY FROM, AND NOT DIRECTLY BELOW, ANY OPENING WINDOW, DOOR, AIR INTAKE, OR OTHER OPENING INTO ANY BUILDING; AND AT LEAST 10 FEET AWAY FROM ANY ADJACENT BUILDING, SIDEWALK, OR AREA FREQUENTED BY PERSONS ONSITE.

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

8 0 4 8
SCALE IN FEET

Date	Description	No.
REVISIONS		

STATE OF NEW YORK · MATTHEW JAMES AMBRUSCH · 110412 · LICENSED PROFESSIONAL ENGINEER

SIGNATURE 9/9/2024 DATE SIGNED
MATTHEW J. AMBRUSCH
NEW YORK LIC. No. 110412-01

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
360 West 31st Street, 8th Floor
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T: 212.479.5400 F: 212.479.5444 www.langan.com

Project: 100 UNION AVENUE
BROOKLYN
KINGS COUNTY NEW YORK

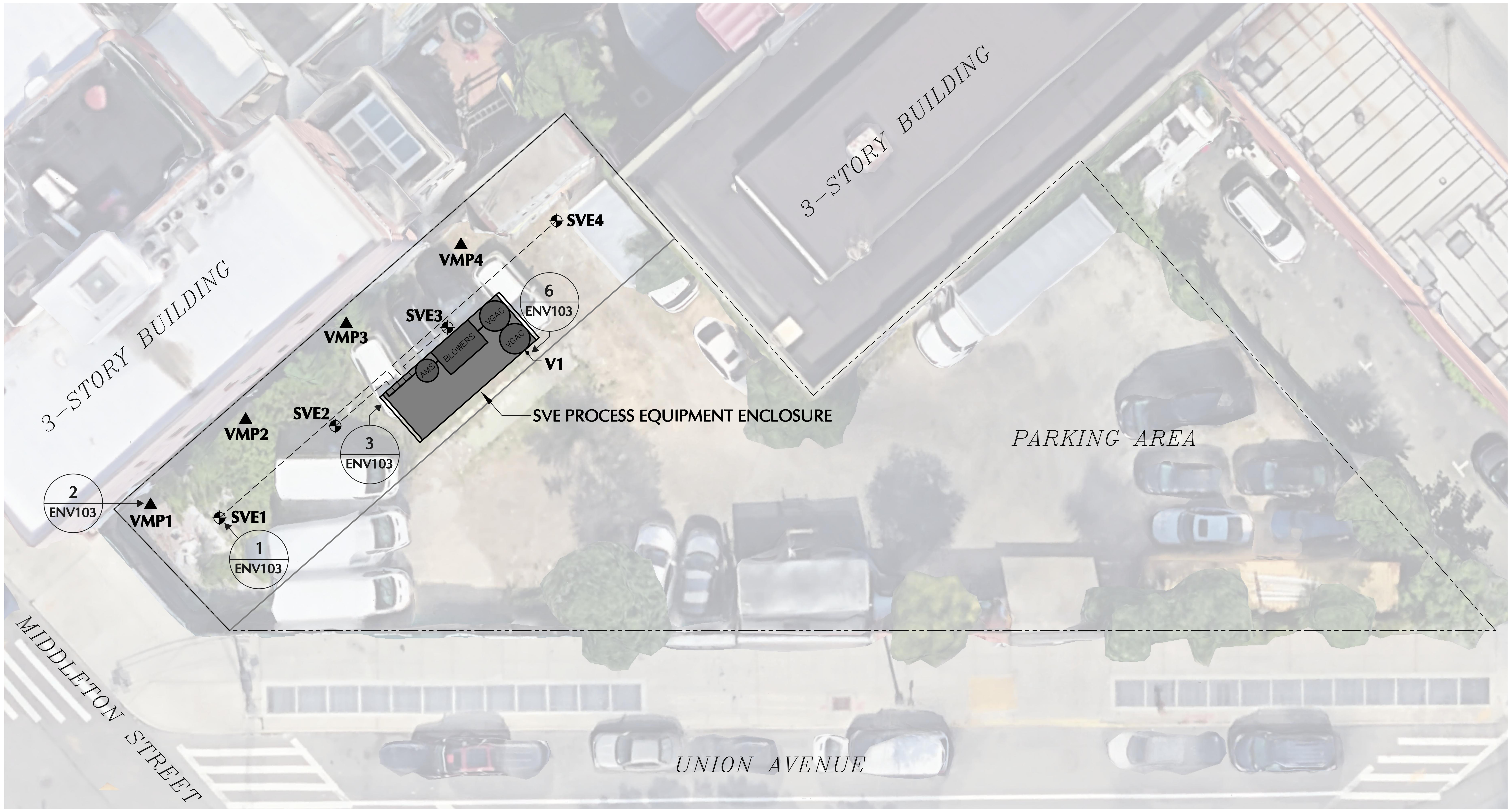
Drawing Title: SOIL VAPOR EXTRACTION SYSTEM WELL LAYOUT

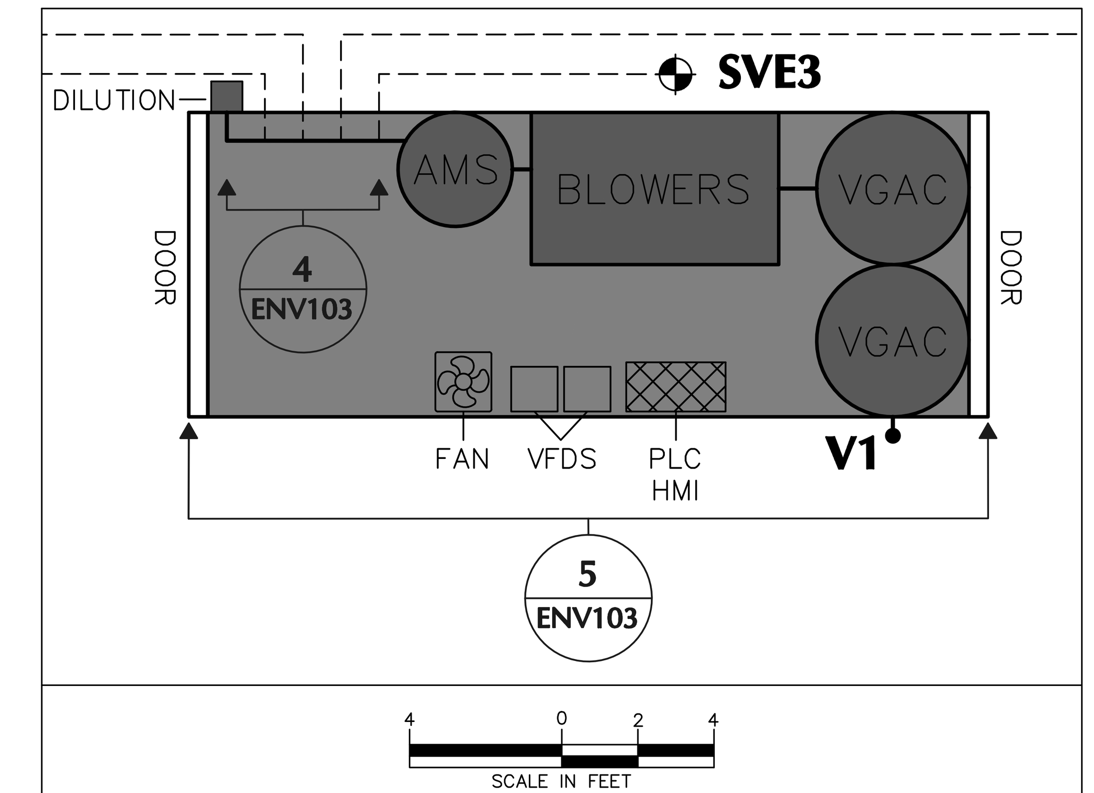
Project No.: 170819101
Date: 09/06/2024
Drawn By: AL
Checked By: AB/MA

Drawing No.: ENV101
Sheet 2 of 5

PROJECT NO. 170819101

Filename: C:\bms\langan-pw-01\d0605558\170819101-0501-ND101-0101.dwg Date: 9/6/2024 Time: 15:28 User: aboodram Style Table: Langan.stb Layout: ENV101 WELL LAYOUT





SVE PROCESS EQUIPMENT ENCLOSURE

NOTES:

AMS	AIR MOISTURE SEPARATOR
HMI	HUMAN-MACHINE INTERFACE
PLC	PROGRAMMABLE LOGIC CONTROLLER
VFD	VARIABLE FREQUENCY DRIVE
VGAC	VAPOR GRANULAR ACTIVATED CARBON

1. ALL SVE PROCESS EQUIPMENT SHALL BE INSTALLED WITHIN A DESIGNATED SVE PROCESS EQUIPMENT ENCLOSURE. THE EXACT SIZE, LOCATION, AND LAYOUT OF THE SVE PROCESS EQUIPMENT ENCLOSURE SHALL BE DETERMINED BASED ON FINAL EQUIPMENT SELECTION AND SPECIFIED BY THE SVE EQUIPMENT FABRICATOR.
2. THE SVE PROCESS EQUIPMENT ENCLOSURE SHALL BE INSTALLED ON A CONCRETE SLAB, WHICH SHALL BE DESIGNED BY OTHERS AND CONSTRUCTED SUCH THAT IT IS ABLE TO SUPPORT THE WEIGHT OF THE SVE PROCESS EQUIPMENT INSIDE, AND THE ENCLOSURE ITSELF.

LEGEND:

SVE1	SOIL VAPOR EXTRACTION WELL
VMP1	VAPOR MONITORING POINT
- - - - - -	2-INCH SVE SUB-HEADER MANIFOLD
———	4-INCH SVE MAIN HEADER MANIFOLD
V1 •	4-INCH SVE DISCHARGE STACK
	TARGET TREATMENT AREA
	SVE PROCESS EQUIPMENT ENCLOSURE
	PROPERTY BOUNDARY
1 ENV103	REFER TO DETAIL 1 ON DRAWING ENV103

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6. THE DISCHARGE STACK TERMINATION SHALL BE LOCATED AS FOLLOWS: AT LEAST ONE FOOT ABOVE THE HIGHEST PARAPET OR EAVE WITHIN 10 FEET HORIZONTALLY OF THE VENT; AT LEAST 10 FEET HORIZONTALLY FROM, AND NOT DIRECTLY BELOW, ANY OPENING WINDOW, DOOR, AIR INTAKE, OR OTHER OPENING INTO ANY BUILDING; AND AT LEAST 10 FEET AWAY FROM ANY ADJACENT BUILDING, SIDEWALK, OR AREA FREQUENTED BY PERSONS ONSITE.

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SCALE IN FEET

Date	Description	No.
REVISIONS		

STATE OF NEW YORK · MATTHEW JAMES AMBRUSCH · 110412 · LICENSED PROFESSIONAL ENGINEER

SIGNATURE — DATE SIGNED 9/9/2024

MATTHEW J. AMBRUSCH
NEW YORK LIC. No. 110412-01

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360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project: 100 UNION AVENUE — BROOKLYN — KINGS COUNTY — NEW YORK

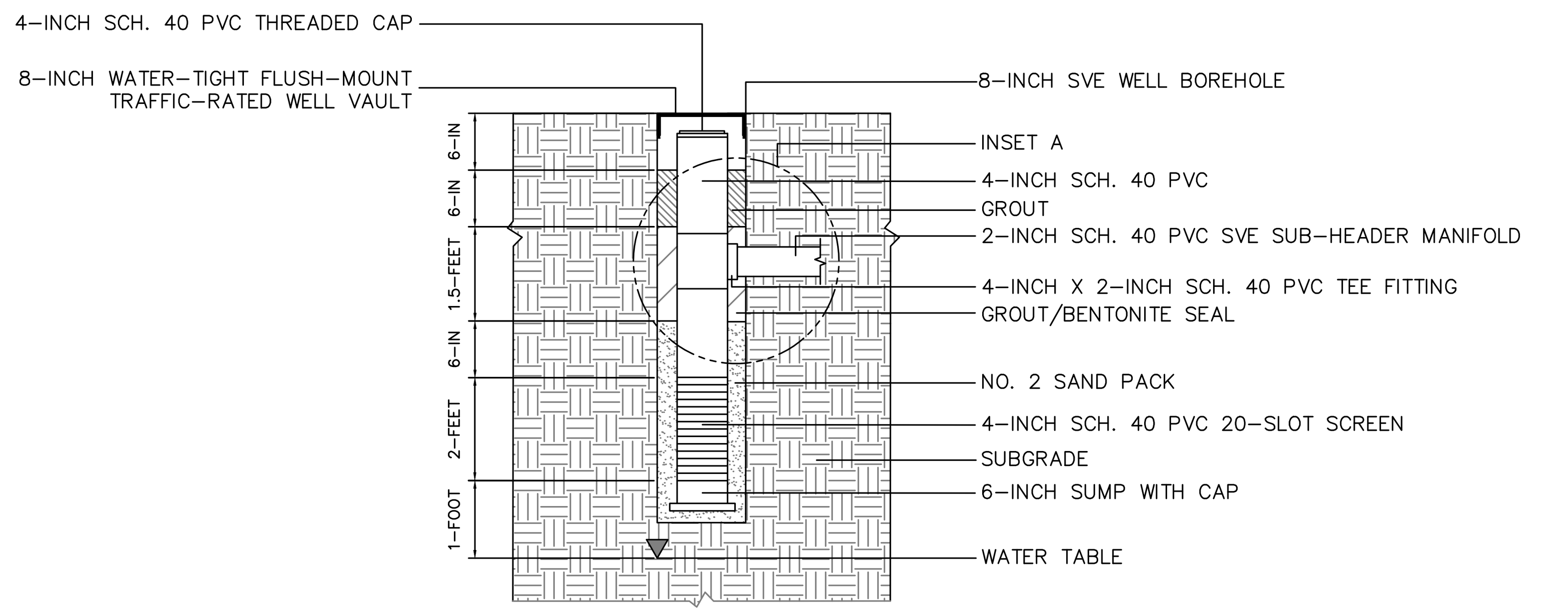
Drawing Title: SOIL VAPOR EXTRACTION SYSTEM MANIFOLD LAYOUT

Project No. 170819101
Date 09/06/2024
Drawn By AL
Checked By AB/MA

Drawing No. ENV102

PROJECT NO. 170819101

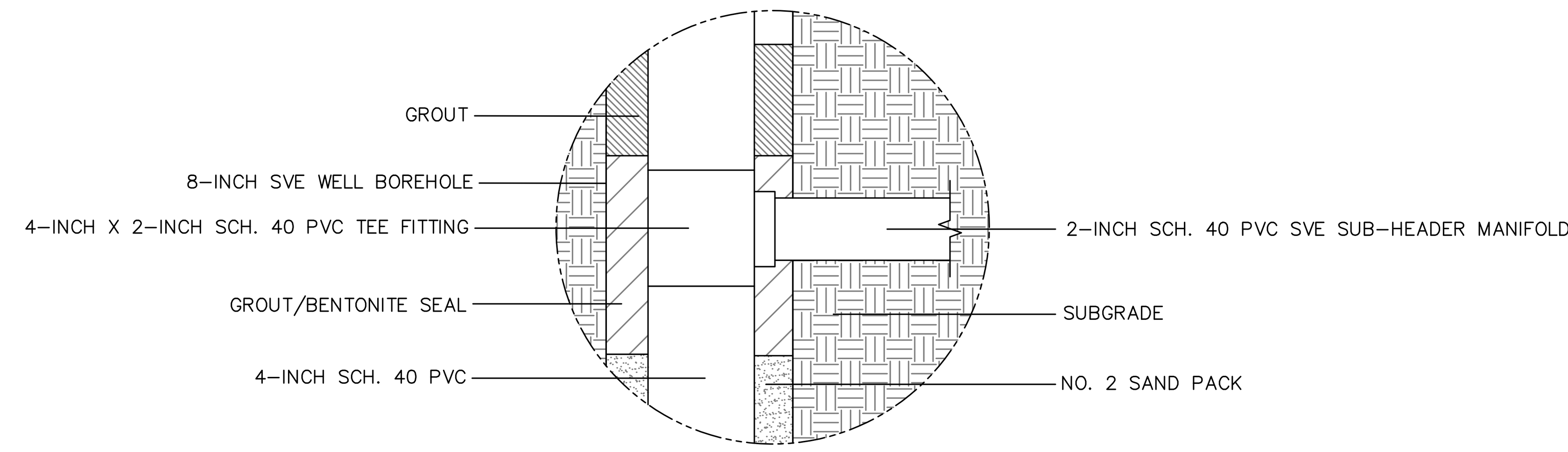
Filename: C:\bms\langan-pw-01\d0605558\170819101-0501-ND101-0101.dwg Date: 9/6/2024 Time: 15:28 User: aboodram Style Table: Langan.stb Layout: ENV102 MANIFOLD LAYOUT



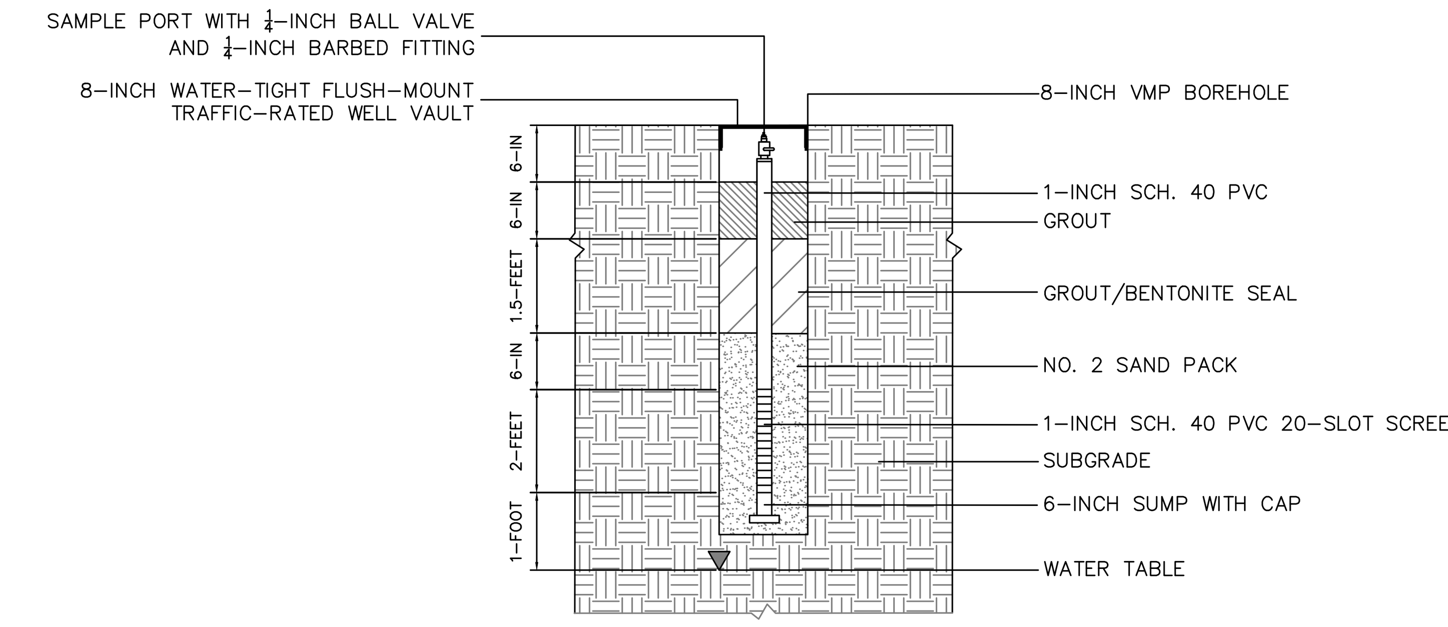
1 SOIL VAPOR EXTRACTION WELL
N.T.S.

NOTES:

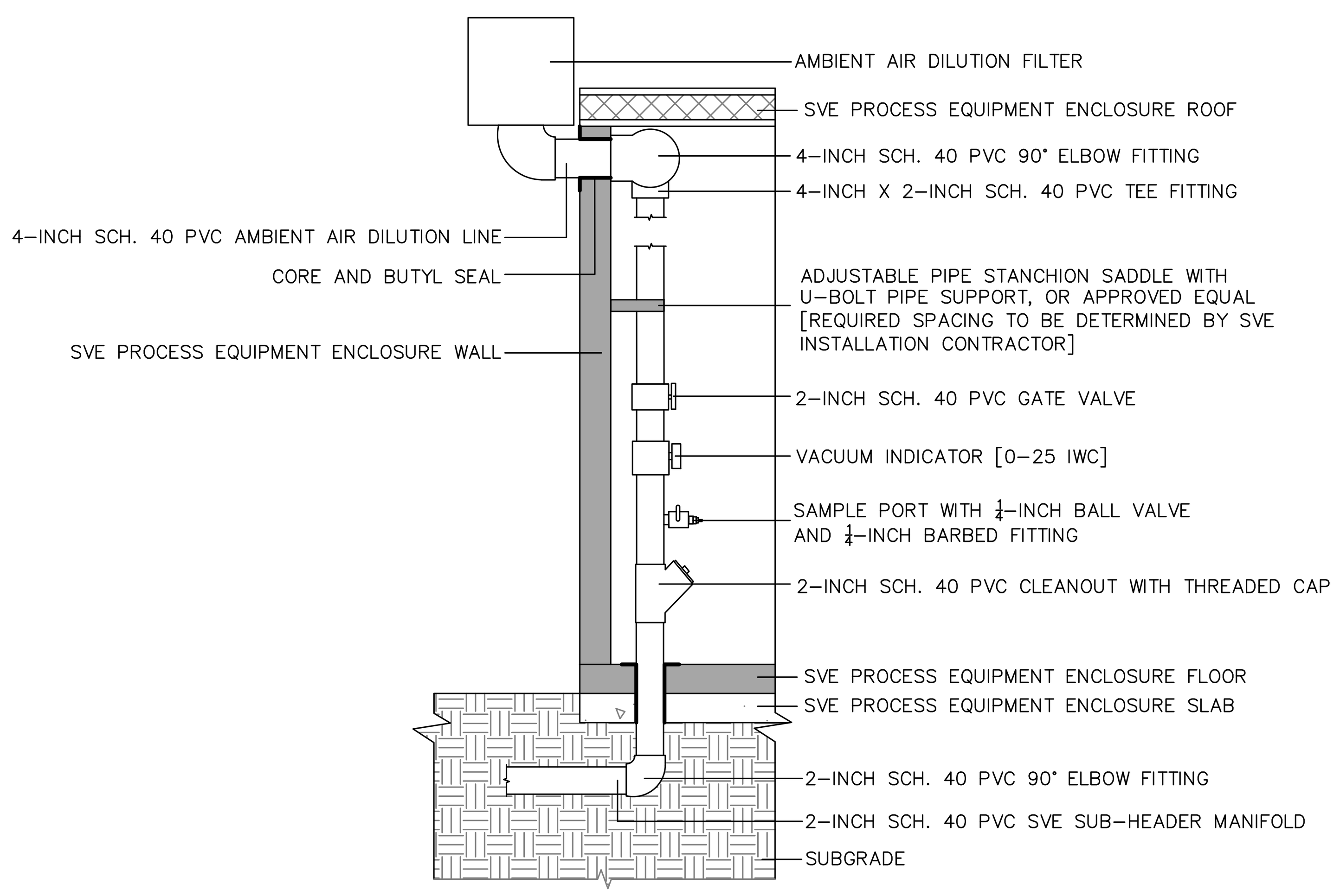
1. THE SVE WELL SCREEN SHALL BE INSTALLED AT LEAST 1-FOOT ABOVE THE OBSERVED WATER TABLE.
2. THE SVE SUB-HEADER MANIFOLD SHALL BE INSTALLED A MINIMUM OF 2-FEET BELOW GRADE SURFACE [BGS] AND SLOPED 0.5% TOWARD THE SVE WELL.
3. THE EXACT DEPTH OF THE TEE ON EACH SVE WELL WILL VARY BASED ON THE SLOPING.



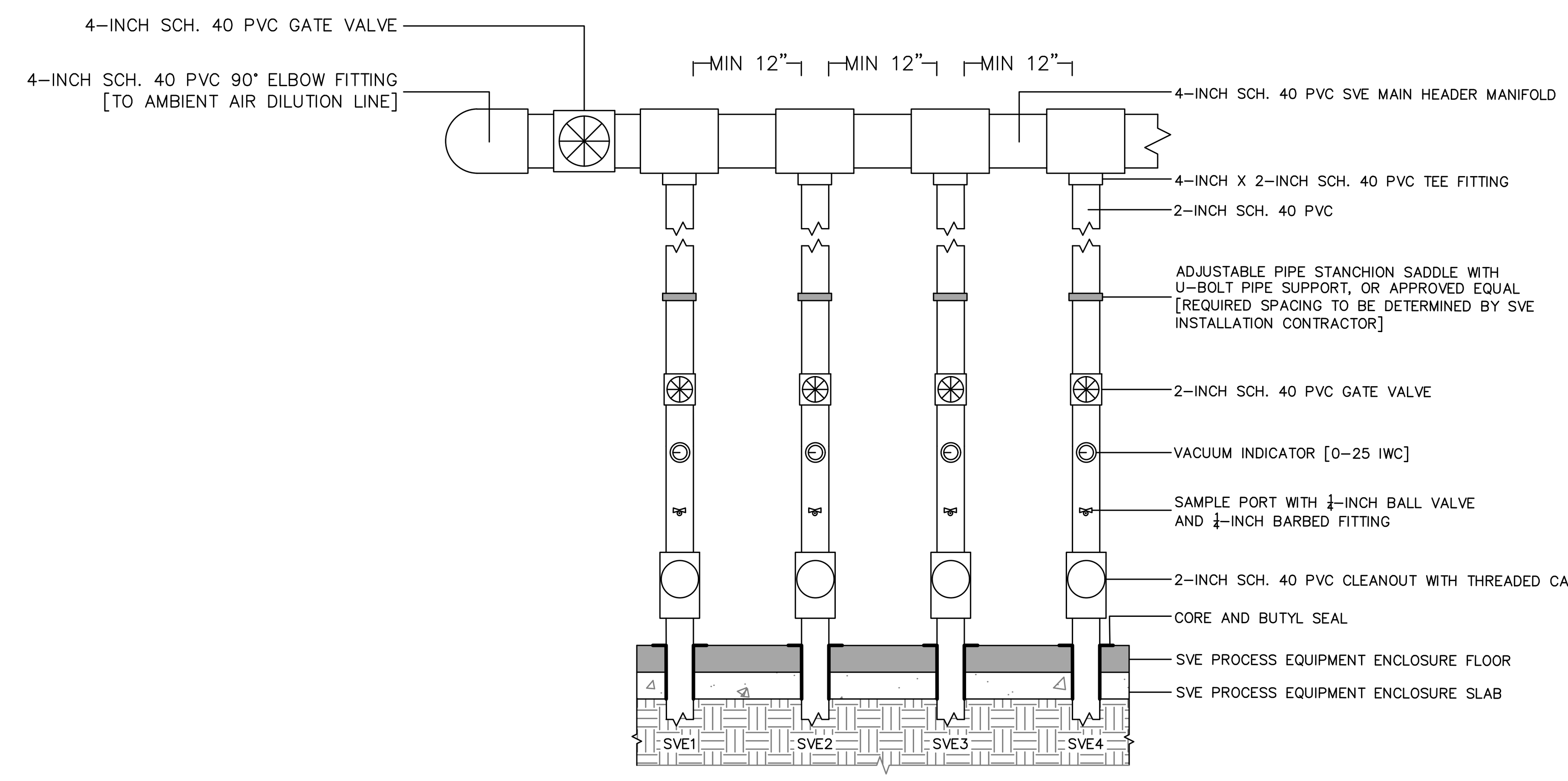
A SVE SUB-HEADER MANIFOLD
N.T.S.



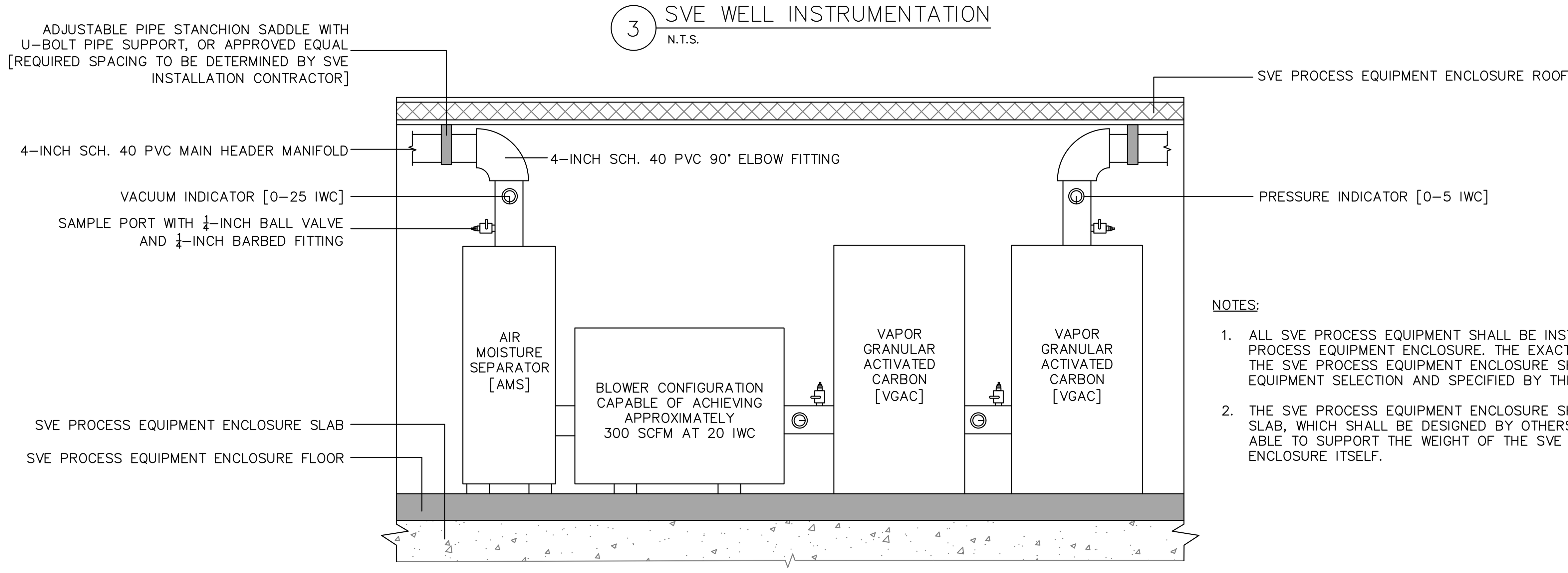
2 VAPOR MONITORING POINT
N.T.S.



3 SVE WELL INSTRUMENTATION
N.T.S.



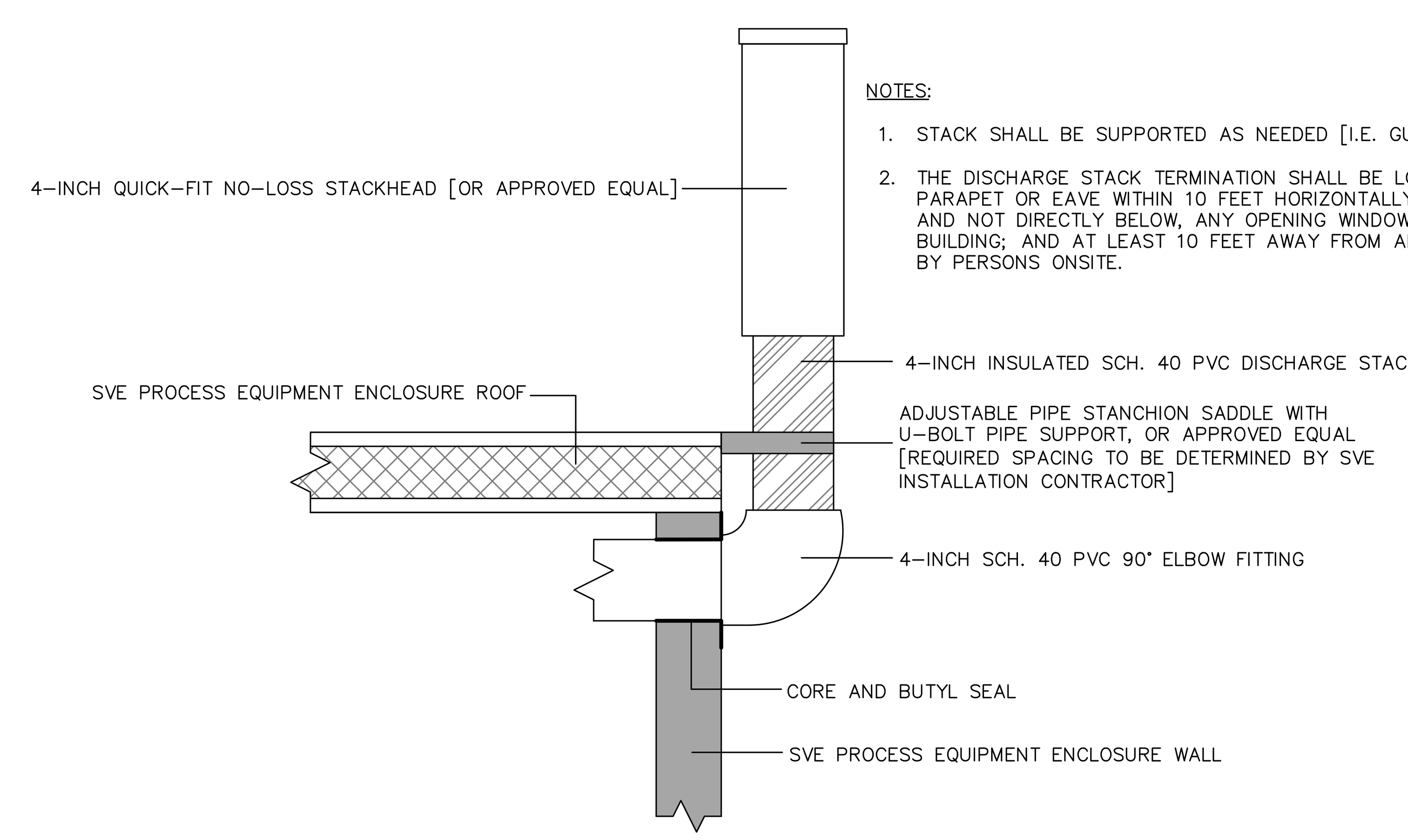
4 SVE MAIN HEADER MANIFOLD
N.T.S.



NOTES:

1. ALL SVE PROCESS EQUIPMENT SHALL BE INSTALLED WITHIN A DESIGNATED SVE PROCESS EQUIPMENT ENCLOSURE. THE EXACT SIZE, LOCATION, AND LAYOUT OF THE SVE PROCESS EQUIPMENT ENCLOSURE SHALL BE DETERMINED BASED ON FINAL EQUIPMENT SELECTION AND SPECIFIED BY THE SVE EQUIPMENT FABRICATOR.
2. THE SVE PROCESS EQUIPMENT ENCLOSURE SHALL BE INSTALLED ON A CONCRETE SLAB, WHICH SHALL BE DESIGNED BY OTHERS AND CONSTRUCTED SUCH THAT IT IS ABLE TO SUPPORT THE WEIGHT OF THE SVE PROCESS EQUIPMENT INSIDE, AND THE ENCLOSURE ITSELF.

5 SCHEMATIC SVE PROCESS EQUIPMENT
N.T.S.



NOTES:

1. STACK SHALL BE SUPPORTED AS NEEDED [I.E. GUY WIRES WITH ANCHOR SUPPORTS, OR APPROVED EQUAL].
2. THE DISCHARGE STACK TERMINATION SHALL BE LOCATED AT LEAST ONE FOOT ABOVE THE HIGHEST PARAPET OR EAVE WITHIN 10 FEET HORIZONTALLY OF THE VENT; AT LEAST 10 FEET HORIZONTALLY FROM, AND NOT DIRECTLY BELOW, ANY OPENING WINDOW, DOOR, AIR INTAKE, OR OTHER OPENING INTO THE BUILDING; AND AT LEAST 10 FEET AWAY FROM ANY ADJACENT BUILDING, SIDEWALK, OR AREA FREQUENTED BY PERSONS ONSITE.

6 DISCHARGE STACK TERMINATION
N.T.S.

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

Date	Description	No.
REVISIONS		

STATE OF NEW YORK — MATTHEW JAMES AMBRUSCH — 110412 — LICENSED PROFESSIONAL ENGINEER

SIGNATURE 9/9/2024 DATE SIGNED
MATTHEW J. AMBRUSCH
NEW YORK LIC. No. 110412-01

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
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Project
100 UNION AVENUE
BROOKLYN
KINGS COUNTY NEW YORK

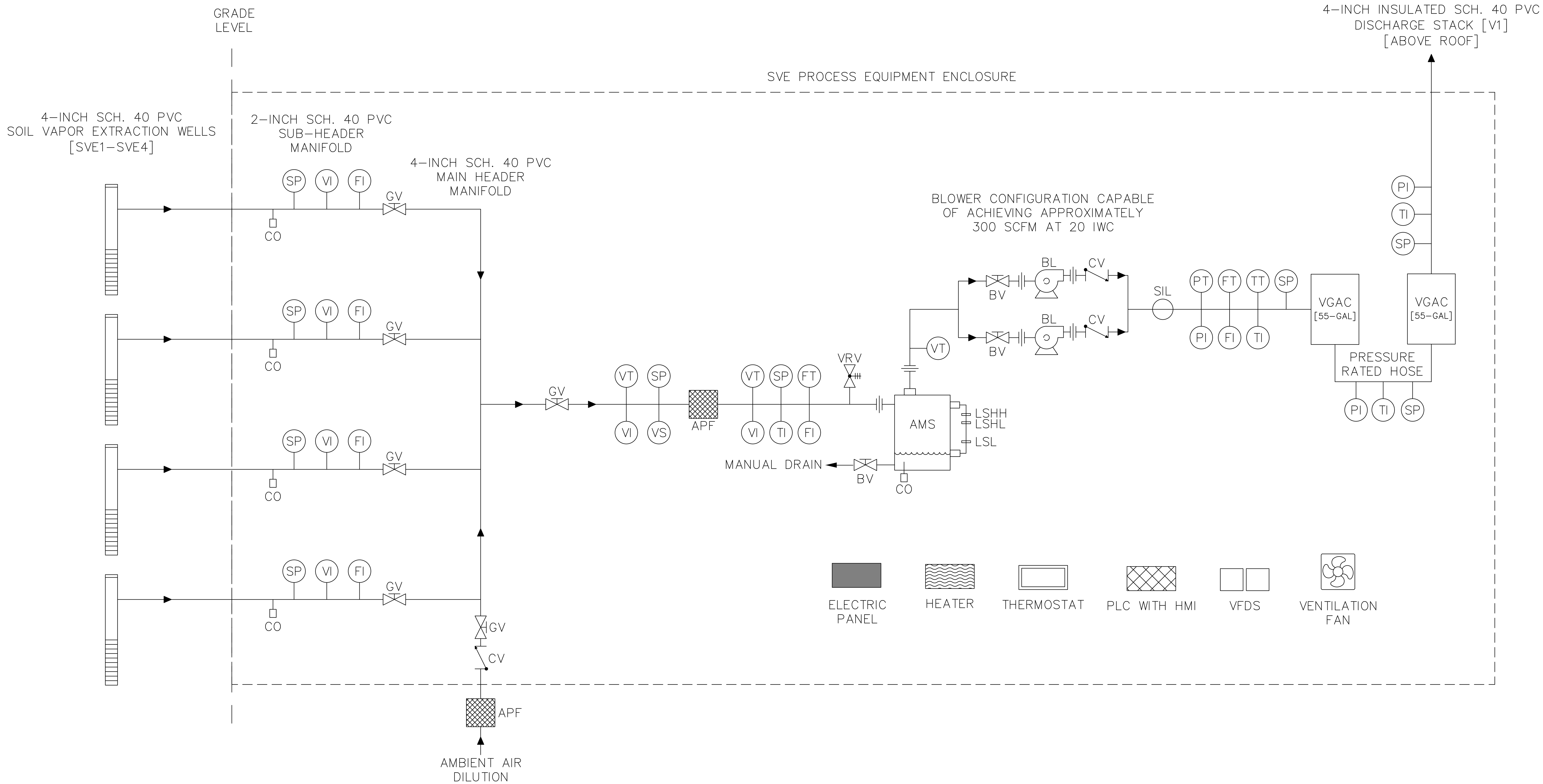
Drawing Title
SOIL VAPOR EXTRACTION SYSTEM DETAILS

Project No. 170819101
Date 09/06/2024
Drawn By AL
Checked By AB/MA

Drawing No.
ENV103
Sheet 4 of 5

LANGAN
PROJECT NO. 170819101

Filename: C:\bms\langan-pw-01\d0605558\170819101-0501-ND501-0101.dwg Date: 9/6/2024 Time: 15:30 User: aboodram Style Table: Langan.stb Layout: ENV103 DETAILS



SYMBOL KEY:

- CHECK VALVE
- GATE VALVE / BALL VALVE
- UNION FITTING
- VACUUM/PRESSURE RELIEF VALVE
- SILENCER/VIBRATION ISOLATOR
- AIR PARTICULATE FILTER
- BLOWER
- CLEANOUT
- LEVEL SWITCH
- VARIABLE FREQUENCY DRIVES
- PROGRAMMABLE LOGIC CONTROLLER WITH HUMAN MACHINE INTERFACE

AMS	AIR MOISTURE SEPARATOR
APF	AIR PARTICULATE FILTER
BL	BLOWER
BV	BALL VALVE
CO	CLEANOUT
CV	CHECK VALVE
FI	FLOW INDICATOR
FT	FLOW TRANSMITTER
GV	GATE VALVE
HMI	HUMAN-MACHINE INTERFACE
LSHH	LEVEL SWITCH HIGH HIGH
LSHL	LEVEL SWITCH HIGH LOW
LSL	LEVEL SWITCH LOW
PI	PRESSURE INDICATOR
PLC	PROGRAMMABLE LOGIC CONTROLLER
PT	PRESSURE TRANSMITTER
SIL	SILENCER
SP	SAMPLE PORT
SVE	SOIL VAPOR EXTRACTION
TI	TEMPERATURE INDICATOR
TT	TEMPERATURE TRANSMITTER
VFD	VARIABLE FREQUENCY DRIVE
VGAC	VAPOR GRANULAR ACTIVATED CARBON
VI	VACUUM INDICATOR
VRV	VACUUM RELIEF VALVE
VS	LOW VACUUM SWITCH
VT	VACUUM TRANSMITTER

GENERAL NOTES:

1. THE SVE SYSTEM IS DESIGNED TO OPERATE CONTINUOUSLY. THE SVE SYSTEM PROCESS EQUIPMENT SHALL INCLUDE A BLOWER CONFIGURATION CAPABLE OF ACHIEVING APPROXIMATELY 300 STANDARD CUBIC FEET PER MINUTE [SCFM] AT 20 INCHES OF WATER COLUMN [IWC].
2. THE POWERED SVE SYSTEM COMPONENTS SHALL REQUIRE APPROXIMATELY 240V 3-PHASE 100 AMP ELECTRICAL SERVICE. ELECTRICAL REQUIREMENTS SHALL BE VERIFIED BY THE ELECTRICAL CONTRACTOR PRIOR TO INSTALLATION, BASED ON THE ACTUAL EQUIPMENT SELECTED AND PROCURED. THE SITE OWNER SHALL BE RESPONSIBLE FOR COORDINATING SITE POWER REQUIREMENTS AND ACCESS WITH THE ELECTRICAL COMPANY.
3. THE SVE SYSTEM SHALL CONSIST OF FOUR [4] SVE WELLS [SVE1 THROUGH SVE4]. THE SVE WELLS SHALL MANIFOLD TO BELOW GRADE 2-INCH SCHEDULE 40 POLYVINYL CHLORIDE [SCH. 40 PVC] SUB-HEADER LINES, WHICH SHALL PENETRATE THE SVE PROCESS EQUIPMENT ENCLOSURE SLAB AND MANIFOLD TO A 4-INCH SCH. 40 PVC MAIN HEADER LINE AT THE SVE PROCESS EQUIPMENT ENCLOSURE CEILING LEVEL. THE SVE MAIN HEADER LINE SHALL MANIFOLD TO THE INLET OF THE PROCESS EQUIPMENT. COLLECTED VAPORS SHALL BE DISCHARGED AT THE SVE PROCESS EQUIPMENT ENCLOSURE ROOF LEVEL VIA A 4-INCH SCH. 40 PVC DISCHARGE STACK. THE EXTERIOR PIPING SHALL BE INSULATED WITH UV-RATED INSULATION.
4. ALL SVE PROCESS EQUIPMENT SHALL BE INSTALLED WITHIN A DESIGNATED SVE PROCESS EQUIPMENT ENCLOSURE. THE EXACT SIZE, LOCATION, AND LAYOUT OF THE SVE PROCESS EQUIPMENT ENCLOSURE SHALL BE DETERMINED BASED ON FINAL EQUIPMENT SELECTION AND SPECIFIED BY THE SVE EQUIPMENT FABRICATOR. THE SVE PROCESS EQUIPMENT ENCLOSURE SHALL BE INSTALLED ON A CONCRETE SLAB, WHICH SHALL BE DESIGNED BY OTHERS AND CONSTRUCTED SUCH THAT IT IS ABLE TO SUPPORT THE WEIGHT OF THE SVE PROCESS EQUIPMENT INSIDE, AND THE ENCLOSURE ITSELF.
5. SPECIFICATIONS FOR ALL SVE SYSTEM COMPONENTS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL.

Date	Description	No.
REVISIONS		

STATE OF NEW YORK · MATTHEW JAMES AMBRUSCH · 110412 · LICENSED PROFESSIONAL ENGINEER

SIGNATURE — DATE SIGNED 9/9/2024

MATTHEW J. AMBRUSCH
NEW YORK LIC. No. 110412-01

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Project: 100 UNION AVENUE
BROOKLYN
KINGS COUNTY — NEW YORK

Drawing Title: SOIL VAPOR EXTRACTION SYSTEM PROCESS AND INSTRUMENTATION DIAGRAM

Project No.: 170819101
Date: 09/06/2024
Drawn By: AL
Checked By: AB/MA

Drawing No.: ENV104
Sheet 5 of 5

Filename: C:\bms\langan-pw-01\d0605558\170819101-0501-ND601-0101.dwg Date: 9/6/2024 Time: 15:32 User: aboodram Style Table: Langan.stb Layout: ENV104 P&ID

PROJECT NO. 170819101

Attachment 1
System Input/Output Summary
Soil Vapor Extraction System Design
100 Union Avenue
Brooklyn, NY
Langan Project No.: 170819101

Input / Output Type	Instrumentation Equipment Category	Interlock Data	Description	Function
Digital Input	Blowers	BL	Blower status	Blower running green light.
			Blower overload (VFD fault, alarm condition)	Shut down blower and alarm notification in the event of motor overload detection.
	Low Vacuum Switch	VS	System low vacuum (alarm condition)	Shut down blower and alarm notification in the event of low vacuum detection.
	AMS Level Switch	LSHH	AMS level high high (alarm condition)	Shut down blower and alarm notification if AMS level reaches high high setpoint.
		LSHL	AMS level high low	Alarm notification if AMS level reaches high low setpoint.
		LSL	AMS level low	Notification if AMS level reaches low setpoint.
	Power Failure	Power Failure	Power failure/interruption (alarm condition)	Alarm notification in the event of power failure/interruption.
	Thermostat	TS	Equipment room thermostat	Monitor equipment room temperature.
Digital Output	Blowers	BL	Blower permissive operation	Blower permissive on/off performed manually.
			Blower operation	Blower on/off controlled by PLC during AUTO mode.
	AMS Level Switch	LSHH	AMS level high high	Alarm notification if AMS level reaches high high setpoint. The system will not operate until the AMS is drained.
		LSHL	AMS level high low	Alarm notification if AMS level reaches high low setpoint.
		LSL	AMS level low	Notification if AMS level reaches low setpoint.
	System Operational Status	-	System operational status to remote telemetry	Under normal operating conditions provide system operational status (on/off) to remote telemetry system.
	System Alarm Conditions	-	System alarm notification to auto dialer/remote telemetry system	In the event of any system alarm, provide notification to auto dialer/remote telemetry system.
	Thermostat	TS	Equipment room thermostat	Activate heaters if the equipment room temperature is under 55°F; activate fans if the equipment room temperature is over 75°F.
Analog Input/Output	Temperature Indicator Analog	TT	Blowers combined effluent air temperature indicator analog	Provides effluent air temperature to the control panel and remote telemetry system.
	Flow Indicator Analog	FT	Blowers combined influent and discharge air flow indicator analog	Provides air flow data to the control panel and remote telemetry system.
	Pressure Indicator Analog	PT	Blowers combined discharge pressure indicator analog	Provides pressure data to the control panel and remote telemetry system.
	Vacuum Indicator Analog	VT	Blowers combined influent vacuum indicator analog	Provides vacuum data to the control panel and remote telemetry system.
	Hour Meter	HM	Total run time / hour meter	Provides blower total runtime.

Notes:

°F - degrees Fahrenheit
AMS - air moisture separator
BL - blower
FT - flow indicator analog
HM - hour meter
LSHH - AMS level high high
LSHL - AMS level high low
LSL - AMS level low
PT - pressure indicator analog
TT - temperature indicator analog
VFD - variable frequency drive
VS - low vacuum switch
VT - vacuum indicator analog

1. By default, all electrical equipment including the blowers and valves shall be in "AUTO" mode and will be controlled through control panel.
2. When a major process equipment (i.e., blowers) is in "HAND" position, the corresponding motor will run continuously bypassing all alarms except an overload condition.
3. When a major process equipment (i.e., blowers) is in "OFF" position, the corresponding motor will remain off.
4. When a major process equipment (i.e., blowers) is in "AUTO" position, the corresponding equipment will operate continuously except under any alarm conditions.
5. The system will activate on power up with no active alarms and all HOA switches shall be in "AUTO" position.
6. The final instrumentation set points will be determined during start-up of the system operation.
7. Emergency response procedures will be provided in the Operations, Maintenance, and Monitoring (OM&M) Plan.

ATTACHMENT D
SOIL VAPOR EXTRACTION SYSTEM
INSTALLATION SCHEDULE

Attachment D
Soil Vapor Extraction Installation Schedule
100 Union Ave, Brooklyn, NY 11206
Langan Project No.: 170819101

Task	Date
SVE System Design Submittal to NYSDEC	September 9, 2024
Receipt of NYSDEC Submittal Review Comments	October 24, 2024
Langan Response to NYSDEC Comments	October 31, 2024
NYSDEC Final Approval	November 6, 2024
Bid Procurement	November 6, 2024 - January 6, 2025
Permitting and Electrical Drop Installation	January 6 - March 3, 2025
Equipment Procurement	January 6 - February 3, 2025
SVE Installation	March 3 - April 4, 2025
SVE Startup/Shakedown Testing	April 7 - 11, 2025

Notes:
SVE - soil vapor extraction