

## MEMORANDUM

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DATE : July 8, 2023

TO : Shane LaFave / Roers Companies, LLC

FROM : Pratap Singh, Ph.D., PE / KSingh

SUBJECT : Weekly Progress Report for Week Ending 07/08/2023  
Community Within the Corridor - East Block

COPY TO : Que El-Amin / Scott Crawford, Inc., Robert Reineke, PE, Robert Fedorchak, PE  
Project #40441B

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The purpose of this memorandum is to summarize the work performed as a part of the emergency response for the referenced project for the week ending 07/08/2023. This document is intended to serve two purposes:

1. Summarizing the tasks performed during the past week, and
2. The action items for the following week.

Note that in the month of June and moving into July, significant improvements have been made toward depressurization throughout the building, and reduction of TCE concentrations both inside the residential units as well as beneath the concrete slab. The three primary goals of acceptable indoor air quality standards, effective depressurization, and sub-slab TCE detections have shown dramatic improvements based on the corrective actions implemented in June 2023.

There are isolated areas which will require additional remediation. Efforts moving forward will focus on these areas and will include source removal, Biochar application, and supplemental fan installation. With the proposed improvements, we are confident that the Vapor Mitigation System's performance will be protective of public health and the environment.

Please see below for the tasks that were performed this week:

1. Task #1 – GC Testing by KSingh

KSingh continues to work on conducting gas chromatograph (GC) testing for measurement of TCE in various units of the East Block focused on the first floor. The focus of testing for TCE is concentrated in units that have detected elevated levels of TCE. Attachment A is comprised of Figure 1, a floor plan for reference of Unit locations, vapor pins, and blowers, with the test results of TCE shown in Tables 1 to 5.

A comprehensive data table of Indoor Air Monitoring Data for TCE is provided in Table 7 (Attachment C). Note that highlighted cell values in green indicate levels that are **lower** than the vapor risk

screening levels for **residential** facilities. Graphs showing comprehensive data can be found in Attachment D. The findings of portable continuous and discrete testing for TCE are as follows:

- TCE detections ranged from 1.9  $\mu\text{g}/\text{m}^3$  to 3  $\mu\text{g}/\text{m}^3$  in Unit 1045 with an average of 2.4  $\mu\text{g}/\text{m}^3$ .
- TCE detections ranged from 0.5  $\mu\text{g}/\text{m}^3$  to 2  $\mu\text{g}/\text{m}^3$  in Unit 1050 with an average of 1.37  $\mu\text{g}/\text{m}^3$ .
- Continuous monitoring continues in Units 1045 and 1050 which are displayed in Attachment D in Figures 2-4. The continuous monitoring data shows a direct correlation with the barometric pressure and ambient temperature with the values of TCE.
- The increase in temperatures appeared to have aided the volatilization of TCE leading to higher ambient and sub-slab concentrations.
- TCE detections in Unit 1045 appear to have stabilized at  $\sim 2.4 \mu\text{g}/\text{m}^3$  with the most recent data indicating a level of 2.06  $\mu\text{g}/\text{m}^3$ .
- Overall, there was a **significant decline** in the indoor air concentrations in all the residential and utility units on the 1<sup>st</sup> floor of buildings 1B-W, 1B-SW, and 1B-S. Almost **all units comply to the Vapor Action Levels (VAL) set forth by WDNR.**

2. Task #2 – Sub-Slab TCE Concentration Distribution

Weekly readings of sub-slab vapor concentrations were recorded from the vapor pin installations to evaluate the magnitude and variation of sub-slab vapor contamination in the soil. Results include:

- Sub-slab vapor concentrations taken from various locations saw a decline in the levels after installation of the Obar Fans in the 1B-NW Garage and 1B-S.
- 75% of the residential units/common areas tested demonstrated lower values than the Vapor Risk Screening Level (VRSL) set forth by WDNR.
- The values of sub-slab TCE can be observed in Appendix D (Table 8). A major hotspot can be observed in the areas between Units 1043 – 1050, extending to the Laundry and Storage Room, which will require additional action.
- In addition to this, the area outside the Electrical Room (1058) extending to the center of the Gym continues to demonstrate higher values likely due to volatilization.
- The south-west section of the garage continues to indicate a high value of sub-slab TCE coupled with no vacuum making it another area of concern.

3. Task #3 – VMS Operations

Seven of the eight blowers continue to function properly and the addition of Blowers 5, 6, and 7 have provided consistent depressurization and indoor air quality results since their installation. Measures are being taken to either replace or repair Blower #8 coupled with source removal.

4. Task #4 – Depressurization

The results of vacuum measurements are shown in Table 6. Please note the following:

- Four additional vapor pins were installed in the SW and SE Garage areas – 3 in SW Garage and 1 in SE Garage.
- The vapor pin near the Blower #5 and the pin in the SE Garage demonstrated sufficient vacuum while the other two pins in the SW garage had no vacuum.

- All the units and common areas in the East Block have demonstrated sufficient vacuum (> 0.01) except for Stairwell 4, SW Garage, and the N Mechanical Room as of July 7<sup>th</sup>.
- Figure 7 in Attachment E shows the correlation between sub-slab vapor TCE values and the corresponding vacuum levels at all the vapor pin installations. An improved positive correlation coefficient indicates that presence of higher vacuum would result in lower sub-slab TCE levels giving evidence of the efficient functioning of the VMS system (vacuum readings and sub-slab TCE levels are inversely proportional).
- The overall increase in the correlation coefficient indicates improved performance of the VMS.

### **Action Items for Week of July 9, 2023 – July 15, 2023**

KSingh plans to perform the following tasks in the upcoming week:

1. Finalize work plan for additional remediation. The plan will include a combination of source removal, Biochar application, and supplemental radon fan installation to be submitted to WDNR.
2. Conduct pilot study on additional sealing of wooden columns using a biochar-alginate compound mix.
3. Conduct discrete sampling for units being vacated by residents.
4. Continue discrete sampling in various units and common areas and add results to comprehensive data table.
5. Continue continuous sampling of Units 1045 and 1050.
6. Conduct vacuum measurements at strategic locations within the buildings daily.
7. Continue to measure sub-slab TCE concentrations on a weekly basis to evaluate the performance of the VMS.

### **Attachments**

KSingh has included the following attachments, figures and tables for reference:

- Attachment A: Floor Plan and Summary of Monitoring Results by Date
  - Figure 1 – Floor Plan and Unit Location Map
  - Tables 1-5 – Indoor Air Monitoring Results by Date
- Attachment B/Table 6: Comprehensive Vacuum Measurements (inches H<sub>2</sub>O)
- Attachment C/Table 7: Comprehensive Data Table – Indoor Air
- Attachment D/Table 8: Comprehensive Data Table – Sub-Slab Vapor TCE
- Attachment E: Figures 2-7 of TCE Levels through July 8, 2023

**Attachment A**  
Floor Plan and Monitoring Results by Date

# East Building Level 1

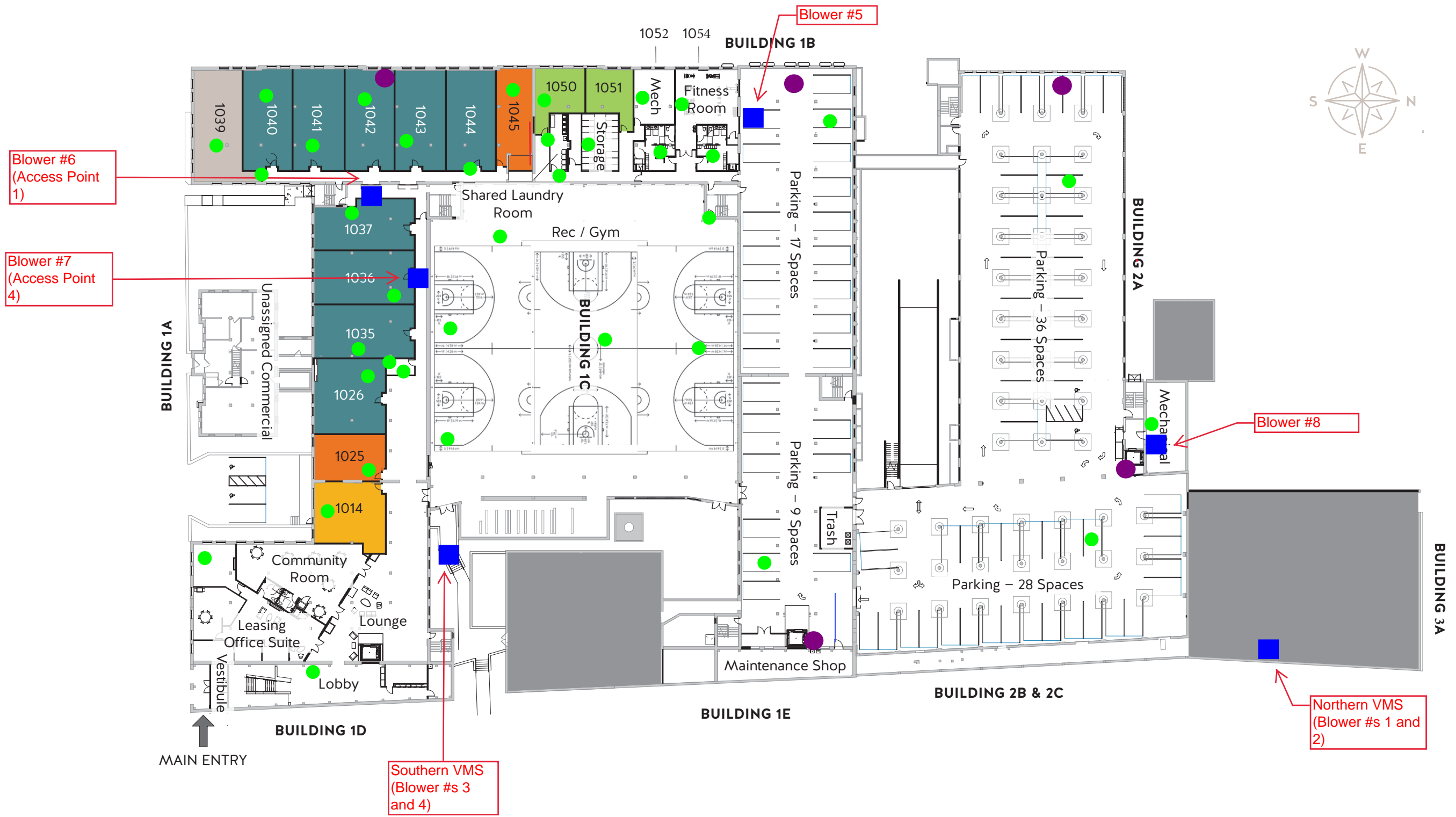


Figure 1 - CWC EB Level 1 Map with Blower, Vapor Pin and Sump Locations

**Attachment A**  
**Monitoring Results by Date**  
**On-site EPA Method TO-14 Data**

Instrument: SRI 8610 Gas Chromatograph with ECD

Operator: KSingh

**Table 1: Indoor Air Monitoring Results from 07/03/2023**

Sample ID	Sample Location	Sample Time	TCE ( $\mu\text{g}/\text{m}^3$ )	PCE ( $\mu\text{g}/\text{m}^3$ )
IA - 1005	1042	9:45	ND	ND
IA - 1006	1043	9:53	1.19	ND
IA - 1007	1044	10:03	1.79	ND
IA - 1008	1052	10:17	ND	ND
IA - 1009	1053	10:25	0.6	ND
IA - 1010	1054	10:47	0.69	ND
IA - 1011	N Mech Room	10:56	1.78	ND
IA - 1012	SSD 1	11:28	20.1	2.13
IA - 1013	SSD 2	11:38	18.3	2.19
IA - 1014	SSD 6	11:50	23.8	3.38
IA - 1015	SSD 7	11:58	2.93	ND
IA - 1016	SSD 5	12:06	388.7	2.02
IA - 1017	1048	14:00	0.55	ND
Reporting Limit ( $\mu\text{g}/\text{m}^3$ )			0.6	0.6
ND Indicates Not Detected at listed reporting level				

**Table 2: Indoor Air Monitoring Results from 07/04/2023**

\*No measurements were taken on July 4<sup>th</sup> due to observance of Independence Day

**Table 3: Indoor Air Monitoring Results from 07/05/2023**

Sample ID	Sample Location	Sample Time	TCE ( $\mu\text{g}/\text{m}^3$ )	PCE ( $\mu\text{g}/\text{m}^3$ )
IA - 1018	1039	9:14	ND	ND
IA - 1019	1040	9:24	ND	ND
IA - 1020	1041	9:32	ND	ND
IA - 1021	1037	9:40	ND	ND
IA - 1022	1036	9:51	ND	ND
IA - 1023	1035	10:02	ND	ND
IA - 1024	1026	10:10	ND	ND
IA - 1025	1025	10:18	ND	ND
IA - 1026	1045	10:27	1.87	ND
IA - 1027	1050	10:36	1.36	ND
IA - 1028	1014	11:03	ND	ND
IA - 1029	1006	11:11	ND	ND
IA - 1030	1011	11:19	ND	ND
IA - 1031	1051	11:27	ND	ND
Reporting Limit ( $\mu\text{g}/\text{m}^3$ )			0.6	0.6
ND Indicates Not Detected at listed reporting level				

**Table 4: Sub-Slab Monitoring Results from 07/06/2023**

Sample ID	Sample Location	Sample Time	TCE ( $\mu\text{g}/\text{m}^3$ )	PCE ( $\mu\text{g}/\text{m}^3$ )
IA - 1032	Oppo. 1054	15:11	48.2	1.16
IA - 1033	SW Garage (2)	15:18	307	0.85
IA - 1034	1055	15:35	25.8	ND
IA - 1035	1054	15:46	2.6	ND
IA - 1036	1053	15:54	76.2	ND
IA - 1037	Stairwell 4	16:09	22.1	ND
IA - 1038	1052	16:21	5.96	ND
IA - 1039	1051	16:44	25.8	ND
IA - 1040	1049	16:52	2	ND
IA - 1041	1048	17:03	637	2.27
IA - 1042	1050	17:19	283	0.61
IA - 1043	1050 - out	17:27	46.3	ND
IA - 1044	Basketball -2	16:36	65	23.3
IA - 1045	1045	17:36	238	2.42
IA - 1046	1044	17:43	205	9.3
IA - 1047	1043	17:51	14.3	3
IA - 1048	Basketball -1	18:08	553	36.8
Reporting Limit ( $\mu\text{g}/\text{m}^3$ )			0.6	0.6
ND Indicates Not Detected at listed reporting level				



**Table 5: Sub-Slab Monitoring Results from 07/07/2023**

Sample ID	Sample Location	Sample Time	TCE ( $\mu\text{g}/\text{m}^3$ )	PCE ( $\mu\text{g}/\text{m}^3$ )
IA - 1049	SE Lobby	8:01	0.37	ND
IA - 1050	1011	8:09	5.24	3.2
IA - 1051	1042	8:17	1.22	0.15
IA - 1052	1041	8:25	4.24	ND
IA - 1053	1040	8:35	1.13	ND
IA - 1054	1040 - out	8:46	10.3	ND
IA - 1055	1039	8:55	23.8	ND
IA - 1056	BB 3	9:10	1.05	0.92
IA - 1057	BB 4	9:18	0.77	3.93
IA - 1058	BB 5	9:26	87	13.9
IA - 1059	SE Garage (14)	9:34	2.02	13.9
IA - 1060	NE Garage (36)	9:42	13	ND
IA - 1061	NW Garage (80)	9:50	27.2	ND
IA - 1062	N Mech Room	9:58	18.7	ND
IA - 1063	1037	10:05	50.1	21.5
IA - 1064	1036	10:16	10.2	18.6
IA - 1065	1035	10:24	1.4	ND
IA - 1066	Out 1035	10:31	98.9	3.82
IA - 1067	1058 E	10:40	307	28.5
IA - 1068	1058 W	10:53	5.3	ND
IA - 1069	1026	11:02	20.8	3.38
IA - 1070	1025	11:14	10.5	ND
IA - 1071	1014	11:31	124	14.9
Reporting Limit ( $\mu\text{g}/\text{m}^3$ )			0.6	0.6
ND Indicates Not Detected at listed reporting level				

**Attachment B**

**Table 6: Comprehensive Vacuum Measurements (inches H<sub>2</sub>O)**

Note	Obar @ 75%				
	Date	3-Jul	5-Jul	6-Jul	7-Jul
Time	12:30	11:30	9:00	10:00	
Location					
1055	-0.375	-0.383	-0.379	-0.367	
1054	-0.769	-0.783	-0.777	-0.78	
1053	-0.407	-0.418	-0.416	-0.411	
Oppo. 1054	-0.256	-0.262	-0.258	-0.259	
Stairwell 4	-0.003	0	-0.004	-0.003	
1052	-0.763	-0.758	-0.761	-0.764	
1051	-0.173	-0.161	-0.169	-0.163	
1049	-0.177	-0.189	-0.181	-0.184	
1048	-0.057	-0.081	-0.079	-0.076	
1050	-0.083	-0.089	-0.084	-0.087	
Out 1050	-0.114	-0.111	-0.116	-0.114	
1045	-0.053	-0.048	-0.051	-0.054	
Out 1044	-0.122	-0.13	-0.129	-0.133	
1043	-0.043	-0.021	-0.039	-0.04	
1042	-0.022	-0.036	-0.031	-0.029	
1041	-0.041	-0.047	-0.043	-0.044	
1040	-0.051	-0.08	-0.077	-0.074	
Out 1040	-0.059	-0.061	-0.064	-0.061	
1039	-0.005	-0.007	-0.014	-0.013	
1037	-0.051	-0.057	-0.058	-0.053	
1036	-0.191	-0.173	-0.187	-0.184	
1035	-0.105	-0.087	-0.099	-0.095	
Out 1035	-0.025	-0.038	-0.033	-0.034	
1058 E	-0.076	-0.06	-0.079	-0.074	
1058 W	-0.107	-0.092	-0.099	-0.106	
1026	-0.125	-0.118	-0.123	-0.127	
1025	-0.067	-0.071	-0.077	-0.069	
1014	-0.215	-0.209	-0.217	-0.221	

1011	-0.054	-0.046	-0.049	-0.052
SE Lobby	-0.565	-0.578	-0.571	-0.577
BB 1	-0.017	-0.018	-0.016	-0.017
BB 2	-0.015	-0.011	-0.015	-0.009
BB 3	-0.055	-0.053	-0.051	-0.056
BB 4	-0.013	-0.011	-0.014	-0.012
BB 5	-0.027	-0.025	-0.026	-0.024
SW Garage (2)	0	0	0	0
SW Garage (26)				-0.254
SW Garage (6)				0
SW Garage (19)				0
SE Garage (11)				-0.018
SE Garage (14)	-0.025	-0.026	-0.024	-0.023
NW Garage (80)	-0.032	-0.029	-0.031	-0.03
NE Garage (36)	-1.571	-1.563	-1.561	-1.559
N Mech Room	0	0	0	0
Red highlighted cells indicate values below the desired level on -0.01 inH2O				

**Attachment C**  
**Comprehensive Data Table – Indoor Air**





**Attachment D**

**Table 8: Comprehensive Data Table – Sub-Slab Vapor TCE**

Green cells indicate the VRSL levels below the DNR limit of 70 ug/m3						
Location		Week of 6/3	Week of 6/17	Week of 6/24	Week of 7/1	Week of 7/8
1055	Women's Locker Room		46.5	17.3	13.5	25.8
1054	Fitness Room	596	0.8	4.8	0.483	2.6
1053	Men's Locker Room		102.3	71.31	55.7	76.2
Oppo. 1054			58.9	55.6	46.9	48.2
Stairwell 4			252.5	6.3	27.4	22.1
1052	Mechanical Room		63.9	38.1	14.9	5.96
1051			47.3	32.4	22.7	25.8
1049	Storage Room	426	2.6	3.38	1.76	2
1048	Laundry Room	322	679	572	561	637
1050		1443	303.4	377	265	283
Out 1050		971	113.1	10.1	64.1	46.3
1045		750	271.6	206	253	238
Out 1044		456	380.5	364	419	205
1043			178.5	185	7.92	14.3
1042		11.8	15.93	10.4	2.67	1.22
1041			108.7	13.2	4.48	4.24
1040		1.6	11.7	16.1	3.22	1.13
1040 - out				21.3	3.1	10.3
1039		23.5	62.2	4.3	15.2	23.8
1037			240.4	4.3	11.04	50.1
1036			17.2	5.5	2.85	10.2
1035			0.8	7	0.534	1.4
1035 - out			87	55.4	73.2	98.9
1058 E	Electric Room		433.8	1.5	87	307

1058 W	Electric Room		73.3	6.99	0.1	5.3
1026			16.7	6.6	7.39	20.8
1025			2.2	2.1	1.01	10.5
1014			23.9	2.2	21.2	124
1011	Conference Room		17.5	1.6	1.5	5.24
SE Lobby	Near Exit	328	0.46	0.5	0.1	0.37
BB 1	SW of the Gym			73	25.1	553
BB 2	South part of the Gym		30.8	1.5	286	65
BB 3	SE part of the Gym		2.2	1.6	0.733	1.05
BB 4	N of the Gym		2.6	1.9	0.569	0.77
BB 5	Center of the Gym		58.9	1.9	27.5	87
SW Garage (2)			227.4	63.7	300	307
SW Garage (26)						24.3
SW Garage (6)						43.9
SW Garage (19)						7.49
SE Garage (11)						49.5
SE Garage (14)			10.3	1.6	1.24	2.02
NW Garage (80)			141.5	4.7	12.7	27.2
NE Garage (36)			24.8	2.8	9.87	13
N Mech Room			60.2	147	27.07	18.7



## Attachment E Figures of TCE Levels through July 8, 2023

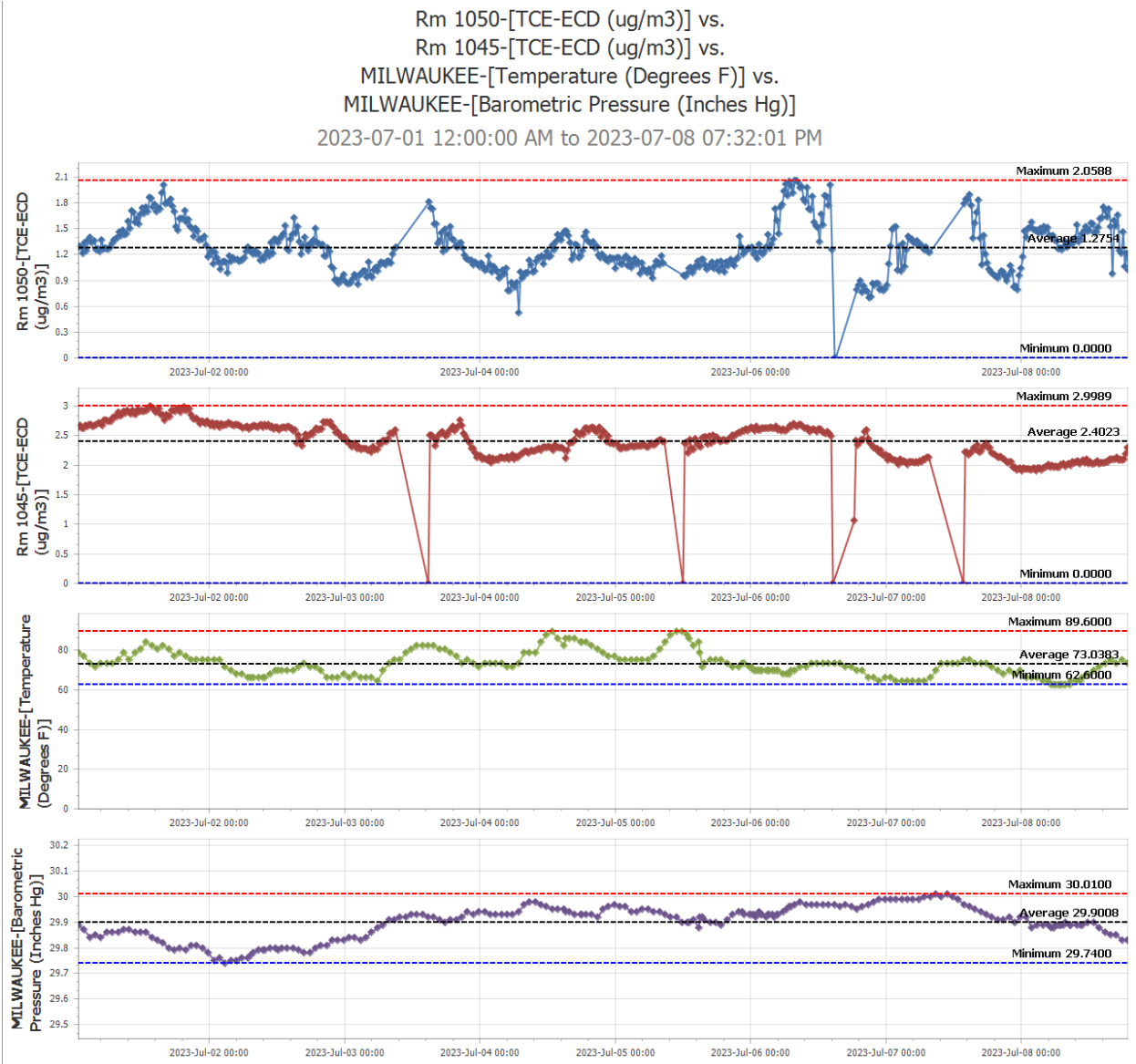


Figure 2 – Continuous Monitoring Data for Units 1045 and 1050 through July 2, 2023

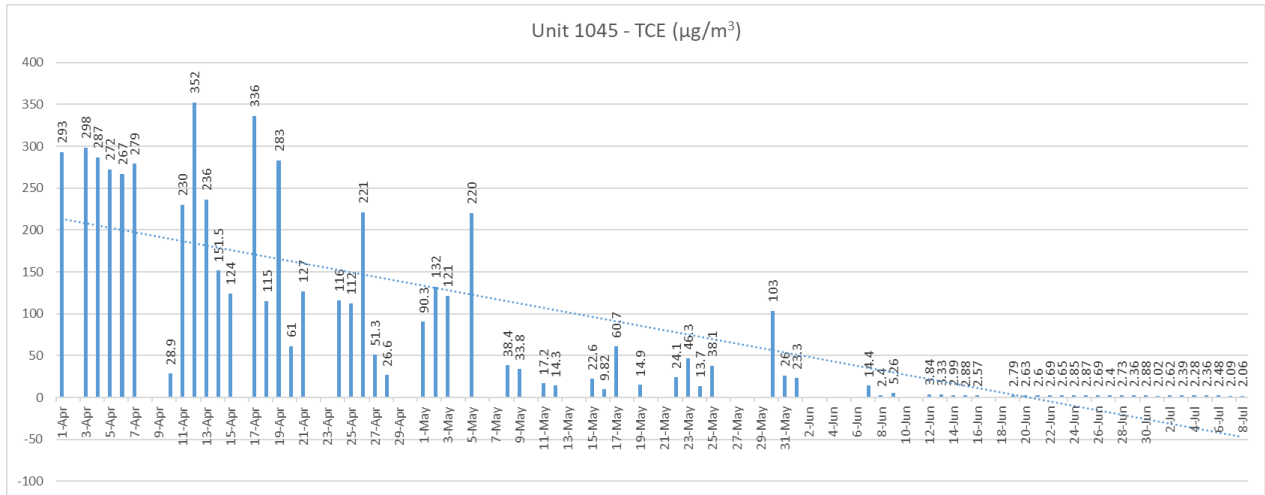


Figure 3 – YTD Data of TCE Concentration in Unit 1045

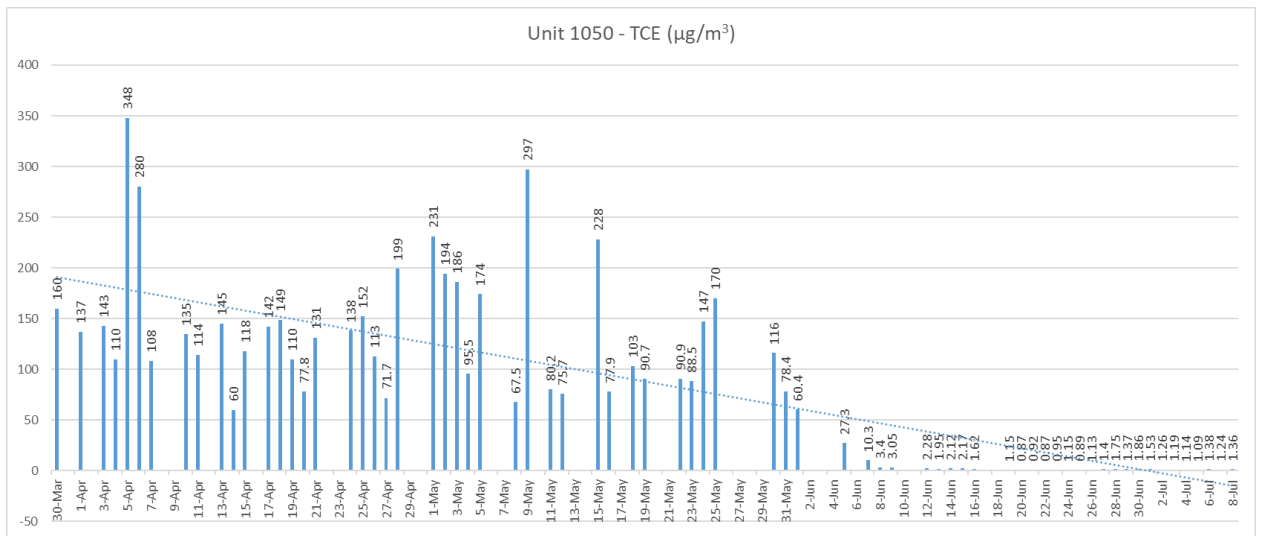


Figure 4 – YTD Data of TCE Concentration in Unit 1050

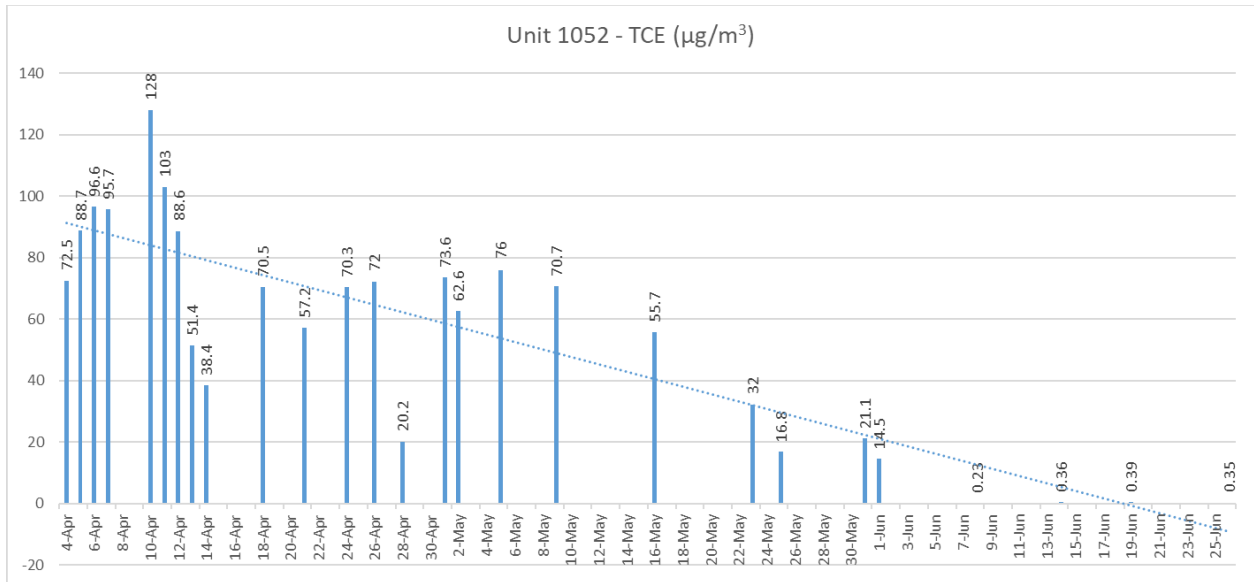


Figure 5 – YTD Data of TCE Concentration in Unit 1052

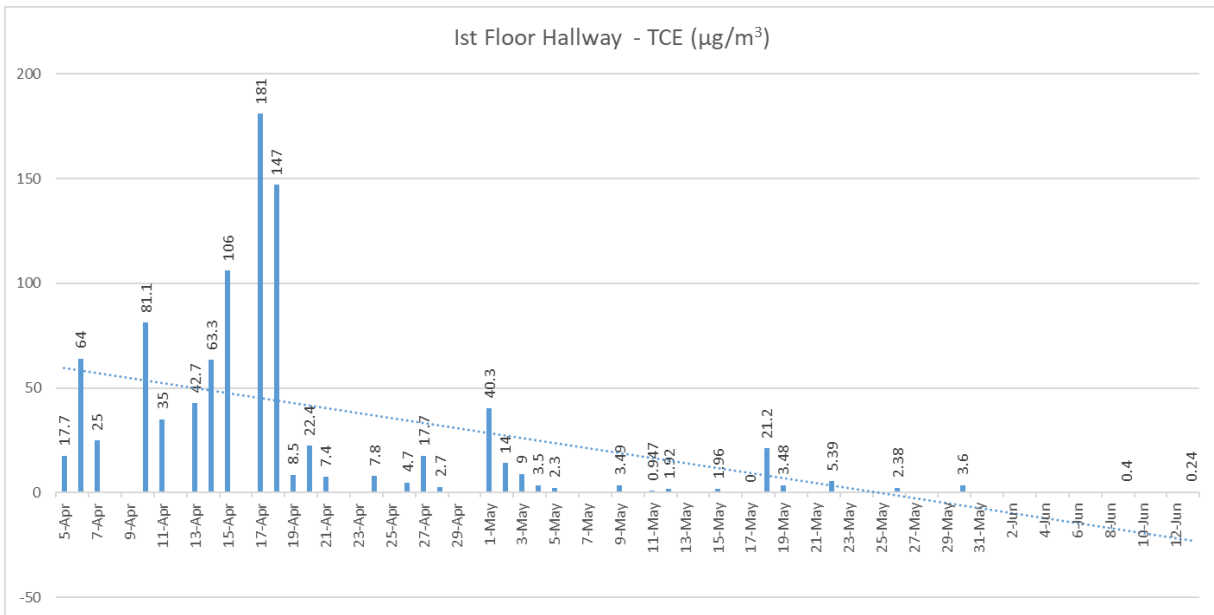


Figure 6 – YTD Data of TCE Concentration in 1<sup>st</sup> Floor Hallway

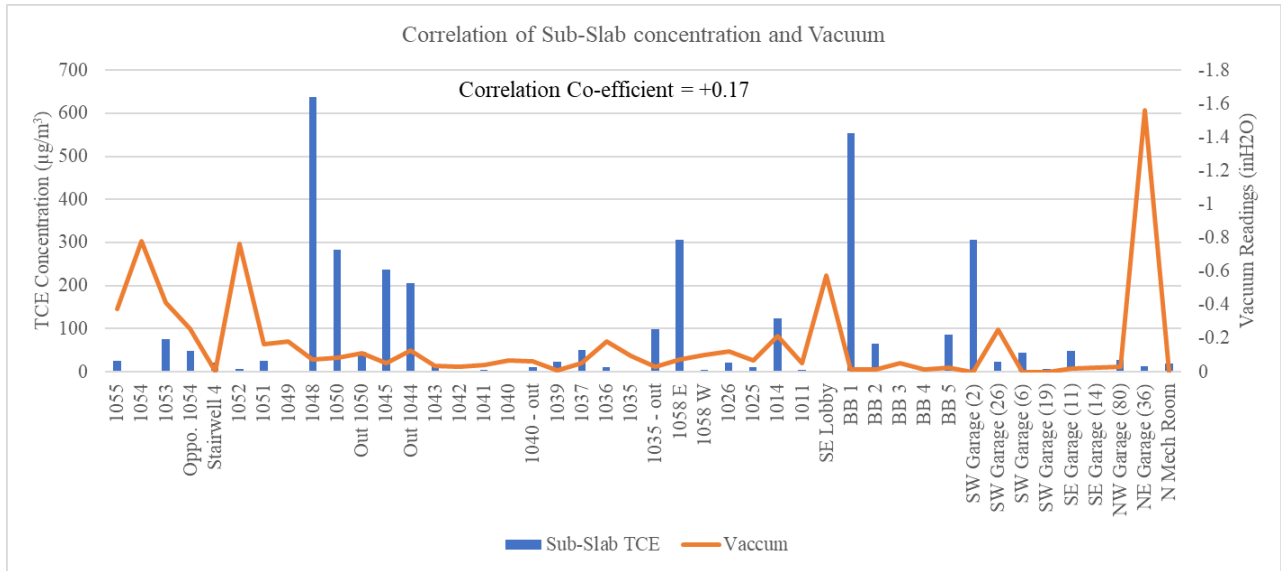


Figure 7 – Correlation of TCE Concentration with Vacuum Measurements