

February 1, 2021

Ms. Jennifer Dorman  
Remediation and Redevelopment Program  
Wisconsin Department of Natural Resources  
2300 North Martin Luther King Drive  
Milwaukee, WI, 53212

**Project # 40420**

**Subject: Pressure Field Extension Testing and Sub-Slab Depressurization System Feasibility Study Work Plan for the Community Within the Corridor, Limited Partnership, located at 2748 N. 32nd Street, 3212 West Center Street, 2727 N. 32nd Street, 2758 N. 33rd Street, and 2784 N. 32nd Street, in Milwaukee, WI**

Dear Ms. Dorman:

K. Singh & Associates, Inc. (KSingh) is pleased to submit this sub-slab vapor investigation work plan for the referenced facility.

### **Project Background**

The Community Within the Corridor Limited Partnership is proposing to redevelop the property into a mix of affordable housing, commercial spaces, and other amenities. The proposed development includes the following: The Corridor Lofts (64 Units), Creme City Lofts (36 Units) & 30 Square Townhomes (6 Units) and the Briggs Apartment Homes (91 Units) and a Community Service Facility which will include early childhood education, Science, Technology, Engineering, Art & Math after school programming, a health club (Basketball, Volleyball & Futsal, Skatepark), laundromat and a petite grocery store. The property has been rezoned Industrial Mix to facilitate development of the project.

No demolition of existing buildings is planned. The building interiors will be renovated and reconfigured. A ramp will be constructed to utilize the basement as a parking garage. Paved areas will be milled and paved or have pavement removed, be regraded, and then restored with asphalt.

The property was previously investigated and granted Case Closure with continuing obligations as an industrial property under BRRS # 02-41-263675. KSingh was retained to perform environmental consulting services for the redevelopment of the property. Following a Phase I Environmental Site Assessment, a Phase II Environmental Site Assessment, and Sub-Slab Vapor Sampling, a Post-Closure Modification Request was submitted to the WDNR on July 8, 2020. Following submission of the Post-Closure Modification Request, KSingh performed a Sub-Slab Vapor Investigation of the building. Based on the Sub-Slab Vapor Investigation, it was determined that a vapor mitigation system would be required for the facility in addition to construction and maintenance of engineered barriers. The extent of Trichloroethylene (TCE) in subslab vapors above residential and industrial Vapor Risk Screening Levels (VRSLs) is shown on Figure 1.

### **Installation of Vapor Extraction Points for Pressure Field Extension Testing**

Nine (9) vapor extraction points are planned for Pressure Field Extension (PFE) tests to determine radius of influence for vapor extraction points. The approximate locations of the proposed vapor extraction points are shown on Figure 2. The proposed vapor extraction points may be adjusted in the field due to the presence of obstructions, high water table, lack of granular material, or other conditions that may affect the performance of the vapor extraction point.

The procedures for installing vapor extraction points and performing PFE tests are described below.

1. Properly evaluate the property sub-slab and select points away from outer walls, cut using a 3-inch diameter core drill, and evacuate a pit, 2.5 to 5 gallons of soils, for a 3" PVC pipe. Fill pit with pea gravel if pit collapses. Drum soils for later disposal.
2. Partially insert a short (12" long) 3" diameter PVC pipe into the pit and seal.
3. Based on observations of the sub-slab vapor extraction point installation, select a suitable fan for PFE testing.
4. Attach a fan to the vapor extraction point with ports, spaced to avoid fan turbulence, to allow manometer and air flow readings before and after the fan.
6. Connect a flexible duct to the fan outlet and exhaust air to outside the building.
7. Drill several small 5/8-inch holes in building foundation slab for pressure field extension evaluation. Measure distance to holes and to nearby existing sub-slab vapor sampling points from vapor extraction point.
8. Turn fan on.
9. Turn the digital manometer on and read pressure drop across the fan and record the reading.
10. Seal cracks in foundation as necessary.
11. Check pressure field extension holes and existing sub-slab vapor sampling points in vicinity for good communication. The list of existing sub-slab vapor monitoring points that will be utilized for each test location is summarized in Table 1.
12. Record readings for fan with 1 reading every minute for first five minutes and every 5 minutes thereafter.
13. Record manometer readings from PFE evaluation holes and from existing sub-slab vapor sampling points every 15 minutes.
14. Record readings for 45 minutes to 1 hour until stabilized readings are measured.
15. Repeat steps at each vapor extraction point until complete.

### **Analysis and Design of Sub-Slab Vapor Depressurization System**

Following the PFE testing, K Singh will analyze data and prepare a design of the vapor extraction system for each point. Data from the PFE testing will be input into fan manufacturer design charts and utilized to estimate sub-slab properties. Design goals will include 1) diameter of extraction point and piping, 2) fan size, and 3) radius of influence. The number of extraction points will be designed based on the radius of influence characteristics. Routing, length of piping, and number of bends will be estimated as part of the design in consultation with the client and Greenfire Management, LLC.

### **Project Schedule**

The schedule for this PFE testing work and design is as follows:

- Seek approval of work plan

February 2, 2021

- Begin installation of vapor extraction points February 12, 2021
- Begin PFE Testing February 17, 2021
- Design and Report Preparation February 22, 2021
- Submit Report to Client February 28, 2021

Should you have any questions or require any additional information, please feel free to contact us at 262-821-1171.

Sincerely,

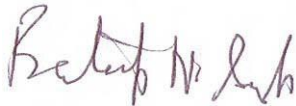
**K. SINGH & ASSOCIATES, INC.**



Kyle R. Vander Heiden  
Staff Geologist



Robert T. Reineke, P.E.  
Project Manager



Pratap N. Singh, Ph.D., P.E.  
Principal Engineer

cc: Mr. Shane LaFave / Roers Companies  
Mr. Que El-Amin / Scott Crawford, Inc.

## FIGURES

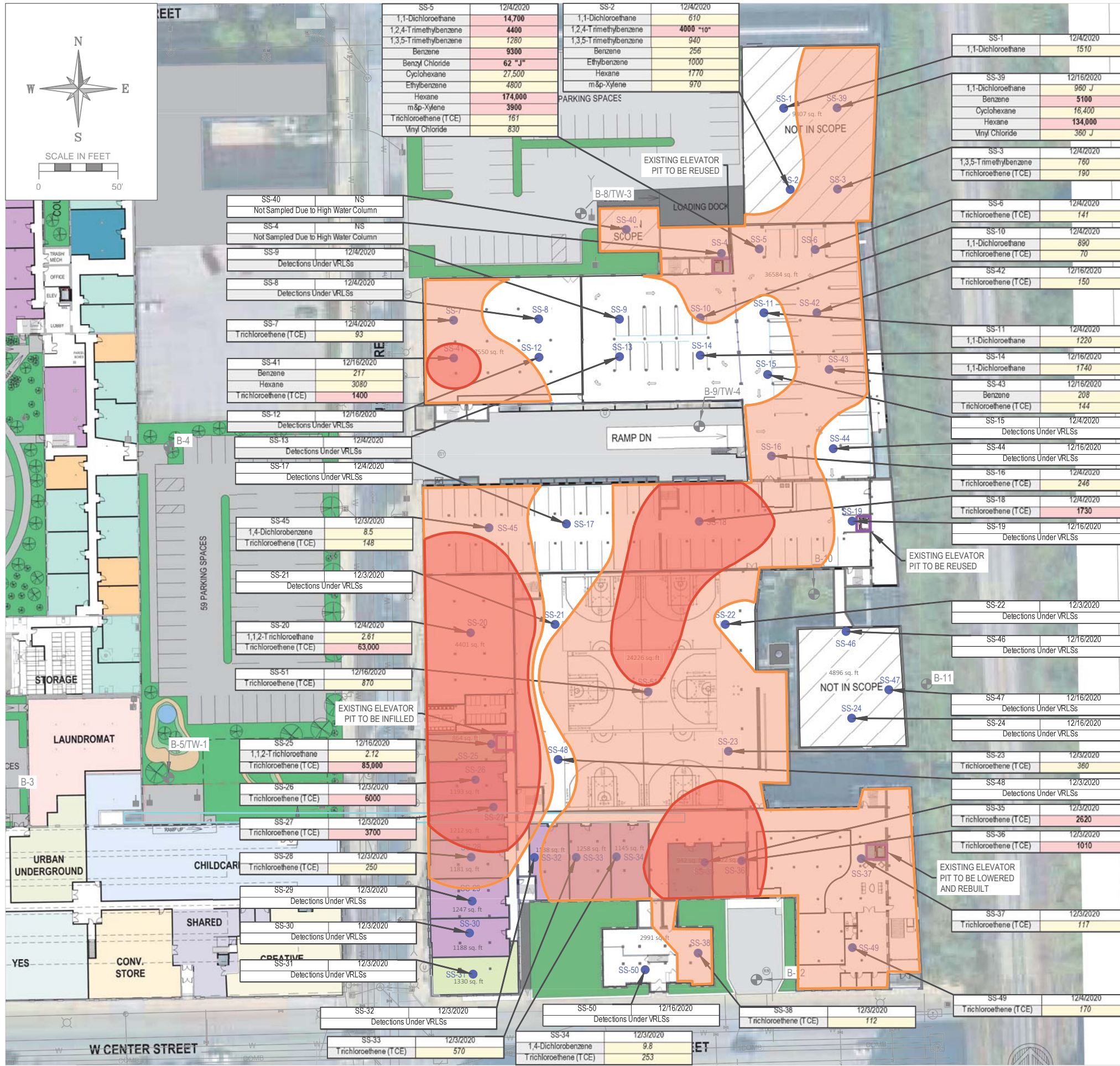
REVISIONS	DATE	DESCRIPTION

DRAWN BY	DATE
AMZ	01/07/2021
CHECKED BY	DATE
KVH	01/07/2021

SHEET TITLE

VRSLS EXCEEDANCE PLUMES FOR TCE

# FIGURE 1



**LEGEND**

- Sub-Slab Sampling Locations (51)
- ⊕ Previous Boring and Temporary Well Locations
- Known Elevator Shaft
- 1 - Bedroom Apartment
- 2 - Bedroom Apartment
- 3 - Bedroom Apartment
- 4 - Bedroom Apartment
- Studio Apartment
- WI Residential VRSL Exceedance Extents
- WI Large Commercial / Industrial VRSL Exceedance Extents

Attenuation Factor	Sub-Slab Vapor	
	0.03	0.01
Analyte	Residential Vapor Risk Screening Level (VRSL)	Large Commercial / Industrial VRSL
1,1,2-Trichloroethane	0.7	8.8
1,1-Dichloroethane	600	7700
1,2,4-Trimethylbenzene	210	2600
1,3,5-Trimethylbenzene	210	2600
1,4-Dichlorobenzene	8	110
Benzene	120	1600
Benzyl Chloride	1.9	25
Cyclohexane	3333	44000
Ethylbenzene	370	4900
Hexane	1400	18000
m&p-Xylene	333	4400
Methyl tert-butyl ether (MTBE)	3700	47000
Naphthalene	28	360
o-Xylene	3300	44000
Tetrachloroethane	1400	18000
trans-1,2-Dichloroethane	---	---
Trichloroethane (TCE)	70	880
Vinyl Chloride	57	2800

**NOTES:**

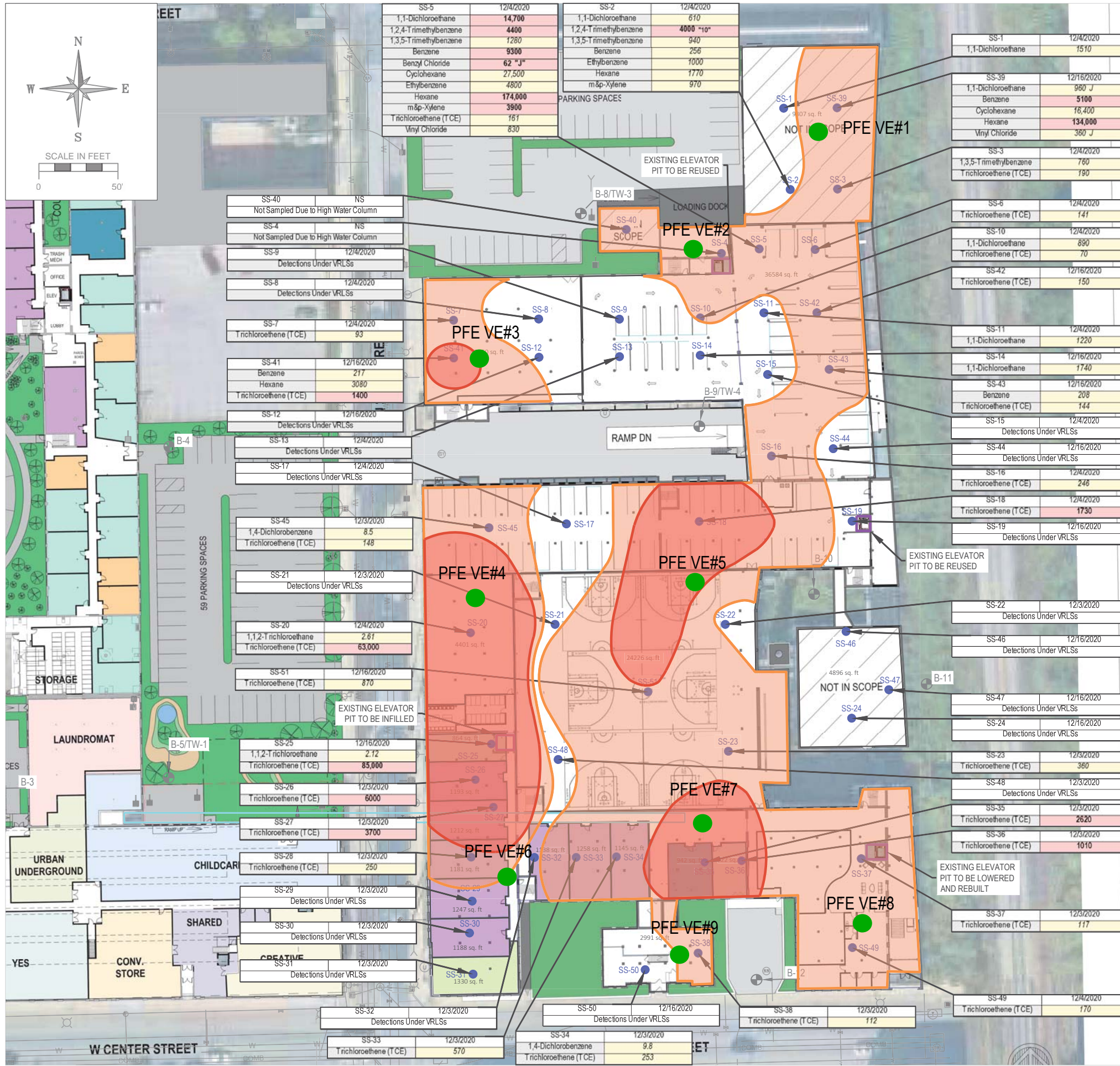
1. REPORTED UNITS IN ug/m<sup>3</sup>
2. BASED ON WI VAPOR QUICK LOOKUP - TABLE VAPOR RISK SCREENING LEVELS
3. NS = NOT SAMPLED
4. SAMPLING LOCATIONS ARE APPROXIMATE
5. "J" = ANALYTE DETECTED BETWEEN 'LIMIT OF DETECTION' AND 'LIMIT OF QUANTITATION'
6. "10" = LINEAR RANGE OF CALIBRATION CURVE EXCEEDED DURING ANALYSIS
7. BOLD INDICATES DETECTION IS ABOVE LARGE COMMERCIAL / INDUSTRIAL VRSL
8. ITALICS INDICATES DETECTION IS ABOVE RESIDENTIAL VRSL

REVISIONS	DATE	DESCRIPTION

DRAWN BY	DATE
AMZ	01/07/2021
CHECKED BY	DATE
KVH	01/07/2021

SHEET TITLE  
PFE Testing Plan

# FIGURE 2



**LEGEND**

- Sub-Slab Sampling Locations (51)
- ⊕ Previous Boring and Temporary Well Locations
- Known Elevator Shaft
- 1 - Bedroom Apartment
- 2 - Bedroom Apartment
- 3 - Bedroom Apartment
- 4 - Bedroom Apartment
- Studio Apartment
- WI Residential VRSL Exceedance Extents
- WI Large Commercial / Industrial VRSL Exceedance Extents
- PFE Vapor Extraction Point (approximate locations)

Attenuation Factor	Sub-Slab Vapor	
	0.03	0.01
Analyte	Residential Vapor Risk Screening Level (VRSL)	Large Commercial / Industrial VRSL
1,1,2-Trichloroethane	0.7	8.8
1,1-Dichloroethane	600	7700
1,2,4-Trimethylbenzene	210	2600
1,3,5-Trimethylbenzene	210	2600
1,4-Dichlorobenzene	8	110
Benzene	120	1600
Benzyl Chloride	1.9	25
Cyclohexane	3333	44000
Ethylbenzene	370	4900
Hexane	1400	18000
m&p-Xylene	333	4400
Methyl tert-butyl ether (MTBE)	3700	47000
Naphthalene	28	360
o-Xylene	3300	44000
Tetrachloroethene	1400	18000
trans-1,2-Dichloroethene	---	---
Trichloroethene (TCE)	70	880
Vinyl Chloride	57	2800

- NOTES:**
- REPORTED UNITS IN ug/m<sup>3</sup>
  - BASED ON WI VAPOR QUICK LOOKUP - TABLE VAPOR RISK SCREENING LEVELS
  - NS = NOT SAMPLED
  - SAMPLING LOCATIONS ARE APPROXIMATE
  - "J" = ANALYTE DETECTED BETWEEN 'LIMIT OF DETECTION' AND 'LIMIT OF QUANTITATION'
  - "10" = LINEAR RANGE OF CALIBRATION CURVE EXCEEDED DURING ANALYSIS
  - BOLD INDICATES DETECTION IS ABOVE LARGE COMMERCIAL / INDUSTRIAL VRSL
  - ITALICS INDICATES DETECTION IS ABOVE RESIDENTIAL VRSL

TABLE

**Table 1**  
 Pressure Field Extension Testing - Existing Monitoring Points

<b>Vapor Extraction Point</b>	<b>Existing Subslab Vapor Monitoring Points</b>
VE#1	SS-1, SS-2, SS-3, SS-39
VE#2	SS-4, SS-5, SS-6, SS-9, SS-10, SS-11, SS-13, SS-14, SS-40, SS-42
VE#3	SS-7, SS-8, SS-9, SS-12, SS-13, SS-41
VE#4	SS-17, SS-20, SS-21, SS-25, SS-26, SS-45, SS-48, SS-51
VE#5	SS-17, SS-18, SS-19, SS-21, SS-22, SS-51
VE#6	SS-26, SS-27, SS-28, SS-29, SS-30, SS-31, SS-32, SS-33, SS-34, SS-48
VE#7	SS-23, SS-32, SS-33, SS-34, SS-48
VE#8	SS-35, SS-36, SS-37, SS-49
VE#9	SS-38, SS-50