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October 11, 2019
File No. 20.0155235.03

Mr. Jay Hnat, Advanced Hydrogeologist
Wisconsin Department of Natural Resources
2300 North Dr. Martin Luther King, Jr. Drive
Milwaukee, Wisconsin 53212-3128

Re: Response to WDNR September 20, 2019 Email for Vapor Intrusion Assessment Clarification
Estate of Robert Koch
3178 North Fratney Street
Milwaukee, Wisconsin
BRRTS #03-41-107384
FID #241393460

Dear Mr. Hnat:

GZA GeoEnvironmental, Inc. (GZA) is pleased to present this response to your September 20, 2019 electronic message requesting supplemental information regarding the vapor intrusion (VI) assessment services completed by GZA at the property formerly owned by Robert Koch located at 3178 North Fratney Street in the City of Milwaukee, Wisconsin ("Site"). As indicated in the electronic message forwarded to Ms. Pamela Mylotta from Mr. Donald P. Gallo of Axley Brynelson, LLP on September 18, 2019, the property was recently sold. The Estate remains responsible for closure in accordance with Chapter NR 726 of the Wisconsin Administrative Code (Wis. Adm. Code).

VI assessment samples were collected from on- and off-Site properties between 2014 and 2017. In early August 2019, additional vapor assessment activities were performed to evaluate the sewer line along East Auer Avenue and the on-Site Vapor Mitigation System (VMS) pressure gradient and sub-slab vapor testing. The results of the August 2019 Site vapor assessment services were presented to the Wisconsin Department of Natural Resources (WDNR) in the GZA submittal dated September 16, 2019. Following your review of our submittal, you requested supplemental information regarding the vapor assessment data and the effectiveness of the VMS within the main building.

The information you requested in your September 16, 2019 electronic message included the following:

> *"A map of the entire building floor that shows all indoor air and vapor sampling points with the results. Include the locations where the subslab extraction piping and extraction points are along with the exit pipe to the roof.*
>
> *Include the negative pressure testing points and data on this map.*
>
> *Explain how the negative pressure data in the areas they were taken are adequate enough to cover the entire building site and how it this system protects the building from vapor intrusion*
>
> *The above information will become part of the future revised closure packet.*
>
> *Note: The south building does have VRSL exceedances for carbon tetrachloride and chloroform, but if this building is only being used as a warehouse (verify this) and not occupied for future use, then there is a future vapor risk and will be included as a continuing obligation on the property. If usage changes or it's occupied, then a SSD system will have to be installed. You should verify (photos) that the floor is intact."*

GZA's responses to your request for supplemental information are presented below:

- The attached Figure B.4.a.2 presents the layout of the main building with the locations of the indoor air and sub-slab vapor samples. The VMS drop pits and the exit point are also shown on the figure and are located on the east side of the soil excavation within the building. The VMS exit point is located in an area of the roof, away from any air intake points or heating, ventilation, and air conditioning (HVAC) systems, which could potentially re-circulate the VMS exhaust air. The volatile organic compound (VOC) soil isocontours within the building for residual contaminant levels are also shown for the soil to groundwater pathway and for both the industrial and non-industrial direct contact values.
- The results of the indoor air samples show a reduction in the VOCs in ambient air over time following the soil excavation in 2004 and the installation of the VMS in 2006. Following a system shut-down in late July 2019, the sub-slab vapor sample collected in August 2019 reported the VOCs were below the vapor risk screening levels (VRSLs) for a residential building. The Site is located within a residential area.
- The results of the sub-slab pressure gradient testing show that the VMS is continuing to induce negative pressure beneath the building, which breaks the pathway for vapors to migrate into the overlying building. The pressure points of 1, 2, and 3 show negative pressure between -0.05 and -0.09 inches of water in the area of the residual VOC-affected soils. The pressure points of 4 and 5 also had negative pressure readings of -0.01 inches of water and are located near the former sample of B-13, which had elevated VOCs at the 6- to 8-foot sampling interval. The locations of points 4 and 5 are in a different room from the former soil excavation and drop pits of the VMS, the negative pressure readings at these points show the system is not impeded by any concrete footings or other obstacles to airflow. The residual soils located within the building footprint or around the building perimeter with VOCs exceeding the RCLs are located deeper than 4 feet below ground surface. The direct contact zone with VOCs exceeding the RCLs were addressed during the soil excavation in 2004, when 34% of the total VOC mass in soils were removed. The residual soil VOC impacts beneath the building and the groundwater plume will have VOC vapors addressed through the continued use of the VMS. It is understood that the VMS is not a long-term remedy for the residual VOC mass at the Site; however, the Robert Koch Estate will provide a backup blower to the current Site owner and provide information on system use and monitoring.
- The attached Figure B.4.a.1 is also provided to show the vapor sampling conducted in the adjacent area of the Site. The results of VOCs in vapor samples were below the VRSLs in the sewer vapor samples collected, as well as from the adjacent residences north of the Site.
- The south building was constructed as a garage and storage building with a loading dock. The floor of the building is approximately 6 inches thick. The uses of the building are currently, and will remain, as a garage and storage area for the foreseeable future. Information on the continuing obligations for the Site has been provided to the new property owner, including the need of a VMS and the related operations, maintenance, and inspection requirements within the south building if that building's usage changes.

We hope this supplemental information meets your needs and that the NR 726 closure can be completed. As we have previously discussed, GZA will abandon the remaining monitoring wells, with your approval. Should you have any questions regarding the information contained herein, please contact the undersigned at (262) 754-2594.

Very truly yours,

GZA GeoEnvironmental, Inc.

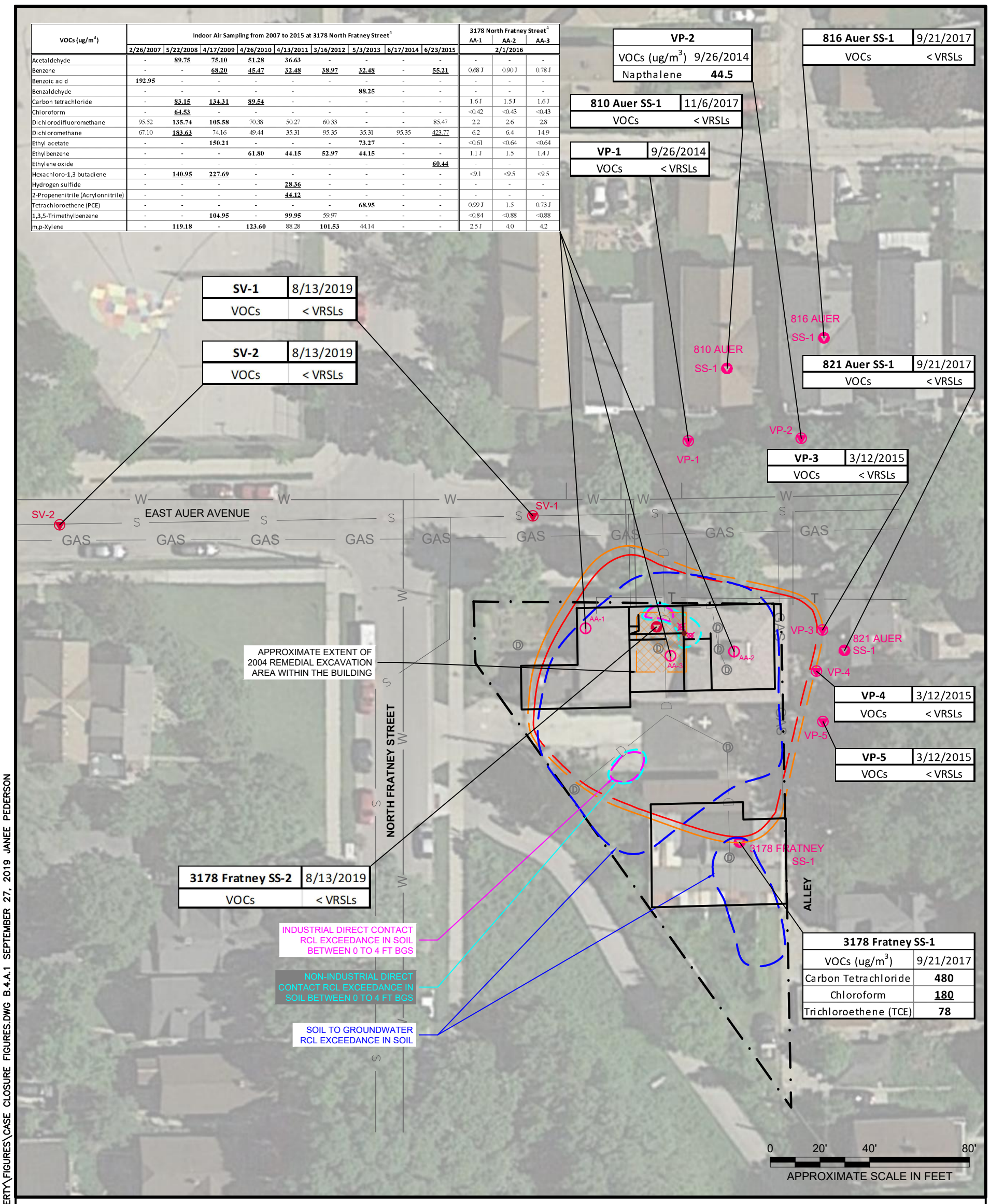
Heidi A. Woelfel
Project Manager, Geologist

James F. Drought, P.H.
Principal Hydrogeologist

J:\155200to155299\155235 - Koch Property\03 Sewer Utility Vapor\Response to WDNR Comments\FINAL 20.0155235.03 VI Assessment Response Ltr_Fratney St Milwaukee 10-11-19.docx

Attachments: Figures B.4.a.1 and B.4.a.2, Photos

VOCs (ug/m^3)	Indoor Air Sampling from 2007 to 2015 at 3178 North Fratney Street[4]									3178 North Fratney Street[4]		
	2/26/2007	5/22/2008	4/17/2009	4/26/2010	4/13/2011	3/16/2012	5/3/2013	6/17/2014	6/23/2015	AA-1	AA-2	AA-3
										2/1/2016		
Acetaldehyde	-	**89.75**	**75.10**	**51.28**	**36.63**	-	-	-	-	-	-	-
Benzene	-	-	**68.20**	**45.47**	**32.48**	**38.97**	**32.48**	-	**55.21**	0.68 J	0.90 J	0.78 J
Benzoic acid	**192.95**	-	-	-	-	-	-	-	-	-	-	-
Benzaldehyde	-	-	-	-	-		**88.25**	-	-	-	-	-
Carbon tetrachloride	-	**83.15**	**134.31**	**89.54**	-	-	-	-	-	1.6 J	1.5 J	1.6 J
Chloroform	-	**64.53**	-	-	-	-	-	-	-	<0.42	<0.43	<0.43
Dichlorodifluoromethane	95.52	**135.74**	**105.58**	70.38	50.27	60.33	-	-	85.47	2.2	2.6	2.8
Dichloromethane	67.10	**183.63**	74.16	49.44	35.31	95.35	35.31	95.35	423.77	6.2	6.4	14.9
Ethyl acetate	-	-	**150.21**	-	-	-	**73.27**	-	-	<0.61	<0.64	<0.64
Ethylbenzene	-	-	-	**61.80**	**44.15**	**52.97**	**44.15**	-	-	1.1 J	1.5	1.4 J
Ethylene oxide	-	-	-	-	-	-	-	-	**60.44**	-	-	-
Hexachloro-1,3 butadiene	-	**140.95**	**227.69**	-	-	-	-	-	-	<9.1	<9.5	<9.5
Hydrogen sulfide	-	-	-	-	**28.36**	-	-	-	-	-	-	-
2-Propenenitrile (Acrylonnitrile)	-	-	-	-	**44.12**	-	-	-	-	-	-	-
Tetrachloroethene (PCE)	-	-	-	-	-	-	**68.95**	-	-	0.99 J	1.5	0.73 J
1,3,5-Trimethylbenzene	-	-	**104.95**	-	**99.95**	59.97	-	-	-	<0.84	<0.88	<0.88
m,p-Xylene	-	**119.18**	-	**123.60**	88.28	**101.53**	44.14	-	-	2.5 J	4.0	4.2



LEGEND

- APPROXIMATE SITE BOUNDARY
- SS-1 SUB-SLAB SAMPLE LOCATION (2019 SAMPLE LOCATION SS-2 IS SHOWN IN RED)
- SV-1 2019 SEWER VAPOR SAMPLE LOCATION
- VP-1 SOIL VAPOR SAMPLE LOCATION
- AA-1 INDOOR AIR SAMPLE LOCATION [4]
- APPROXIMATE LOCATION OF THE SUB-SLAB EXTRACTION POINTS FOR THE VAPOR MITIGATION SYSTEM (VMS)
- VMS ROOF EXHAUST LOCATION
- INFERRED EXTENT OF THE RCL EXCEEDANCES DETECTED IN UNSATURATED SOIL THAT REMAINS POST-REMEDIAL EXCAVATION (REFERENCE FIGURE B.2.b FOR MORE DETAILS)
- APPROXIMATE EXTENT OF VOC CONCENTRATIONS EXCEEDING A NR 140 ES [RED] AND/OR A PAL [ORANGE] IN SHALLOW GROUNDWATER - DASHED WHERE INFERRED (REFERENCE FIGURE B.3.b FOR MORE DETAILS)

NOTES

1. BASE MAP DEVELOPED FROM A GOOGLE PROFESSIONAL ELECTRONIC IMAGE FILE. DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS PUBLISHED BY THE U.S.G.S.
2. THE USE OF AERIAL PHOTOGRAPHY CAN OFTEN MAKE BUILDINGS AND OTHER SITE FEATURES APPEAR TO BE OVERLAPPING AND DISTORTED WHEN OVERLAID WITH ACTUAL SITE FEATURES.
3. THE SITE BOUNDARY AND INVESTIGATION LOCATIONS WERE OBTAINED FROM THE "FIGURE 3 - SITE MAP DETAIL" CREATED BY MORAINE ENVIRONMENTAL, INC. (MORAINE), DATED MARCH 24, 2015.
4. INDOOR AIR SAMPLES WERE COLLECTED USING MINICAN CANISTERS WORN BY THE CLIENT DURING AN APPROXIMATELY 4 HOUR SHIFT WITHIN THE SITE BUILDING BETWEEN 2007 AND 2015. THE APPROXIMATE LOCATIONS OF THE INDOOR AIR SAMPLES COLLECTED IN 2016 BY MORAINE AND THE SUB-SLAB VMS INTAKES ARE DEPICTED.
5. ONLY ANALYTICAL RESULTS IN WHICH AN EXCEEDANCE OF A VAPOR ACTION LEVEL (VAL) OR VAPOR RISK SCREENING LEVEL (VRSL) ARE PRESENTED ABOVE AND PROVIDED IN MICROGRAMS PER CUBIC METER (µg/m^3). FOR MORE DETAILED INFORMATION, REFER TO THE VAPOR ANALYTICAL SUMMARY TABLES IN ATTACHMENT A.4.
6. *FOR INDOOR AIR AND SOIL VAPOR SAMPLES*, **BOLD** FONT INDICATES AN EXCEEDANCE OF THE APPLICABLE RESIDENTIAL/ SMALL COMMERCIAL VAL OR VRSL AND **UNDERLINED** FONT INDICATES AN EXCEEDANCE OF THE APPLICABLE LARGE COMMERCIAL/ INDUSTRIAL VAL OR VRSL. *FOR SUB-SLAB VAPOR SAMPLES*, **BOLD** FONT INDICATES AN EXCEEDANCE OF THE RESIDENTIAL VRSL AND **UNDERLINED** FONT INDICATES AN EXCEEDANCE OF THE SMALL COMMERCIAL VRSL. RESULTS FOR THE SUB-SLAB VAPOR SAMPLES DID NOT EXCEED THE LARGE COMMERCIAL/ INDUSTRIAL VRSL.

UNDERGROUND UTILITY KEY

- GAS LINE
- ATT LINE
- WATER LINE
- SEWER LINE
- SEWER LATERAL
- ON-SITE SEWER CATCHMENT

N W E S

NO.	ISSUE/DESCRIPTION	BY	DATE

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3178 NORTH FRATNEY STREET
MILWAUKEE, WISCONSIN

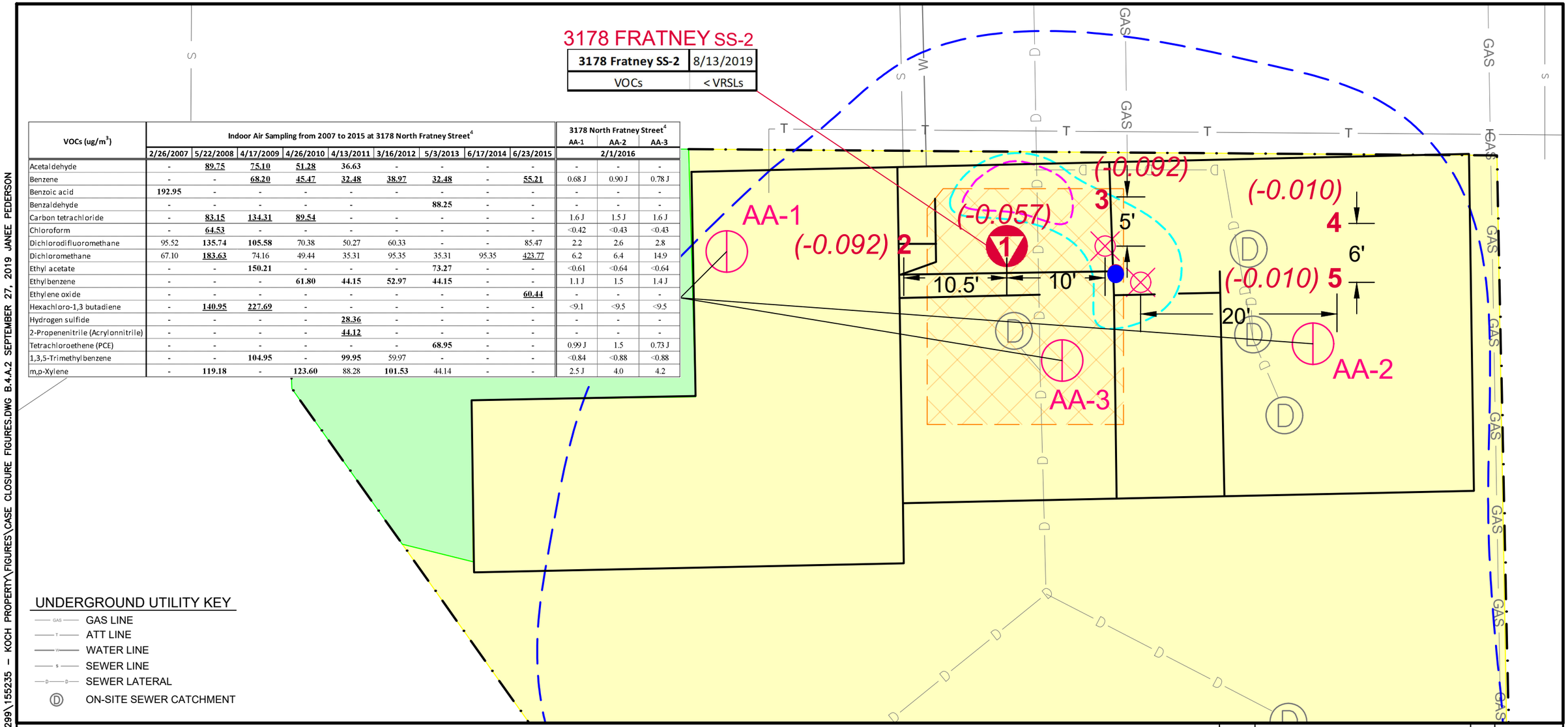
VAPOR INTRUSION MAP

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com

PREPARED FOR:

PROJ MGR: JJLP	REVIEWED BY: HAW	CHECKED BY: JFD	FIG B.4.a.1
DESIGNED BY: JJLP	DRAWN BY: JJLP	SCALE: see above	
DATE: 09/27/2019	PROJECT NO. 20.0155235.01	REVISION NO.	SHEET NO. OF

©2016 – GZA GeoEnvironmental, Inc. GZA–J:\155200T0155299\155235 – KOCH PROPERTY\FIGURES\CASE CLOSURE FIGURES.DWG B.4.A.1 SEPTEMBER 27, 2019 JANEE PEDERSON



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Benzoic acid	**192.95**	-	-	-	-	-	-	-	-	-	-	-
Benzaldehyde	-	-	-	-	-		**88.25**	-	-	-	-	-
Carbon tetrachloride	-	**83.15**	**134.31**	**89.54**	-	-	-	-	-	1.6 J	1.5 J	1.6 J
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Hydrogen sulfide	-	-	-	-	**28.36**	-	-	-	-	-	-	-
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- INFERRED EXTENT OF THE RCL EXCEEDANCES DETECTED IN UNSATURATED SOIL THAT REMAINS POST-REMEDIAL EXCAVATION (REFERENCE FIGURE B.2.b FOR MORE DETAILS)
- APPROXIMATE EXTENT OF BUILDING, ASPHALT, OR CONCRETE COVER TO BE MAINTAINED AS CAP
- APPROXIMATE EXTENT OF GRASS COVER TO BE MAINTAINED AS CAP

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0 5' 10' 20'
APPROXIMATE SCALE IN FEET

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MILWAUKEE, WISCONSIN

VAPOR INTRUSION MAP
(INDOOR SAMPLE AND VMS LOCATIONS)

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com

PREPARED FOR:

PROJ MGR: HAW	REVIEWED BY: HAW	CHECKED BY: JFD	FIG
DESIGNED BY: JJLP	DRAWN BY: JJLP	SCALE: see scale bar	B.4.a.2
DATE: 9/27/2019	PROJECT NO. 20.0155235.03	REVISION NO.	SHEET NO. OF

©2016 – GZA GeoEnvironmental, Inc. GZA–J:\155200T0155299\155235 – KOCH PROPERTY\FIGURES\CASE CLOSURE FIGURES.DWG B.4.A.2 SEPTEMBER 27, 2019 JANEE PEDERSON