HYDRODYNAMICS CONSULTANTS, INC.

Environmental Engineering, Consulting, and Contracting

November 13, 2019

Binyoti Felix Amungwafor, Environmental Program Associate
Wisconsin Department of Natural Resources
2300 Martin Luther King Drive
Milwaukee, WI 53212

Re: WDNR BRRTS #02-41-552537
Westwood Dry Cleaners
8731 W. North Ave
Wauwatosa, WI 53226

Dear Mr. Amungwafor:

Per your review comments dated October 15, 2019 to our 4th Quarterly Groundwater Monitoring Report, we have prepared the following for your review and approval. The responses use the same sequence as your initial comments.

1. *(i) Provide a figure showing the location of the sanitary sewer laterals to the dry cleaner building, SPA Nails, Super Cuts and the Adjoining Restaurant. Discuss the potential for migration of vapors within utilities especially the sanitary sewer and how you will evaluate that as a potential vapor migration pathway. Perform vapor testing of the laterals.*

Response: The City of Wauwatosa, WI provided water and sewer line location information. HDC has put together a Site Utility Line Location Map, Figure 1a for your review. Figure 1a is part of the attached Additional Site Investigation Workplan. At this time, no evidence of vapor migration along any utility line is identified. However, we propose to add a new vapor sampling port (SV6 in Figure 2) near the sewer line in the Super Cuts store.

(ii) Please add soil contamination data on Cross-Section B-B`.

Response: Soil contamination data has been added. Please see Figure 4a, B-B' Soil & Groundwater cVOC & Geological Cross Section, which is part of the attached Additional Site Investigation Workplan.

(iii) Prepare an E-W cross-section from NS-B3 to NSB1 and include soil vapor points.

Response: HDC has included an E-W cross section including vapor points for your review. Please see Figure 5a, A-A' Soil & Soil Vapor cVOC & Geological Cross Section, which is part of the attached Additional Site Investigation Workplan.

(iv) NSB (MW1) on the Cross-Section B-B` is mislabeled, it should be labelled NSB2 (MW2).

Response: Correct of label has been made. Please see Figure 4a, B-B' Soil & Groundwater cVOC & Geological Cross Section, which is part of the attached Additional Site Investigation Workplan.

(v) Soil and Groundwater results tables should show all results (not only those detected).

Response: The soil, groundwater, and vapor tables have been expended to include all results. The revised tables have been provided as attachments to this letter.

(vi) Put all groundwater monitoring wells, sampling dates and results on a single page instead of separate pages.

Response: All groundwater monitoring sampling data has been incorporated into one table. The revised tables have been provided as attachments to this letter.

2. Under the Request for Addition Site Investigation (SI). The DNR agrees that an additional SI should be completed for the site. Revise the submittal as follows:

(a) Submit Change Order #1 scope of work with a cost estimate.

Response: HDC has prepared a Change Order #1 / Additional Site Investigation Workplan. Please find it enclosed. Attached to the workplan are bid sheet tables which offer the estimated costs.

(b) Focus the additional investigation on vapor intrusion versus groundwater. DNR suggests that you install three soil borings that will be sampled and converted to groundwater monitoring wells. Remove all proposed soil borings PSB1, 4, 5, 6, 7 and PSB8 and leave PSB2 and PSB 3 renamed as NSB13, and NSB14 that will be converted to MW-7 and MW-8). Add a new proposed soil boring, PSB15, in the southwest corner of the Asphalt Parking Lot that will be converted to MW-9.

Response: We have revised the proposed sampling location map. Please see Figure 2, Additional Soil Boring/Monitoring Well & Soil Vapor Port Location Map, which is part of the attached Additional Site Investigation Workplan.

(c) Add a new sub slab vapor point near the dry-cleaning machine location shown on Figure 3, named as SV-3A and another vapor point north of SV-4 in the Super Cuts space and name it SV-6.

Response: HDC has revised the proposed sampling location map. Please see Figure 2; Additional Soil Boring/Monitoring Well & Soil Vapor Port Location Map, which is part of the attached Additional Site Investigation Workplan. HDC proposes to move SV6 to the back of the store near the sewer service line area because the business owner is very reluctant to allow us to damage the new floor and disturb customers. Also, this will help to assess the potential soil vapor migration along the sewer line.

(d) Revise/reduce completing four quarters to three quarters groundwater sampling/monitoring events with a contingency cost of sampling four quarters groundwater sampling/monitoring events if DNR approves this.

Response: HDC has completed the above as stated. See the attached Additional Site Investigation Workplan.

(e) Reduce proposed sub-slab vapor sampling/monitoring to three events in all seven vapor sampling ports (SV1 to SV-5, SV-3A and SV-6) with a minimum of one event conducted during the winter

season with a contingency cost to complete an additional sampling event if DNR approves this. Sub-slab sampling leak testing should include shut-in testing. The leak test done on the sampling train in the previous sampling utilized isopropyl alcohol as a tracer Isopropyl alcohol was detected in the samples making the validity of the results questionable. Tightness of the sampling train should be evaluated using a shut-in test.

Response: Please refer to the attached Additional Site Investigation Workplan. Shut-in tests will be performed before each sub-slab vapor sampling as described in the Workplan to eliminate any potential air leakage.

(f) Confirm whether PCE is still in use at the dry cleaner.

Response: Westwood Cleaners is still using tetrachloroethylene (PCE) as its solvent for the drycleaning business, but very stringent solvent handling and management have been enforced by the business owner, including secondary containments under the drycleaning machine and the waste containers. Waste solvent generated from the drycleaning facility is properly removed and disposed of by a licensed waste hauler from the facility. Based on our observation, it is unlikely that a new spill or release will happen at this facility.

(g) What is the suspected cause of increasing PCE contamination in the groundwater from MW-5 and MW-6? Is this a new release?

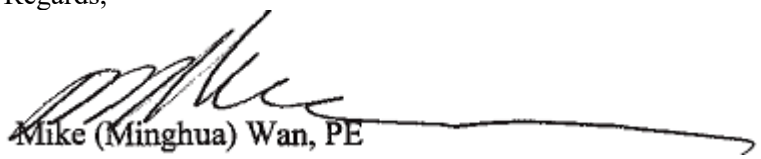
Response: The PCE concentration fluctuation in the groundwater samples in MW5 and MW6 may have been attributed to the seasonal groundwater table change and/or disruption of PCE within the soil where the PCE molecules were initially attached.

(h) Groundwater and vapor sampling results must be submitted to the DNR, owners and occupants, if applicable, within 10 business days according to § NR 716.14(1) and § NR 716.14 (2).

Response: HDC will submit all sampling results as noted above.

Please contact me at Mike_Wan@HydrodynamicsConsultants.com or 630-724-0098 for any questions.

Regards,



Mike (Minghua) Wan, PE
Maple Testing Services, Inc. D/B/A Hydrodynamics Consultants, Inc.

Attachments

1. Change Order #1 / Additional Site Investigation Workplan
   Including figures and bid sheet tables
2. Soil, groundwater, and vapor analytical result tables

Soil VOC Analytical Results

Sample ID:	NSB1-A	NSB1-B	NSB1-C	NSB2-A	NSB2-B	NSB2-C	NR 720 RCLs*		
Date:	9/16/2018						Groundwater Pathway RCL	Non-Industrial Direct Contact RCL	Industrial Direct Contact RCL
Sampling Depth (ft)	2	8	16	2	8	16			
Depth to GW (ft)	8			8					
VOCs							µg/Kg	µg/Kg	µg/Kg
Acetone	< 39 J	17 J	34 J	12 J	16 J	13 J	*NS*	*63400000*	*100000000*
Benzene	< 3.0 J	0.82 J	0.67 J	0.43 J	0.77 J	5.2	*5.1*	*1600*	*7070*
Bromodichloromethane	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*0.3*	*418*	*1830*
Bromoform	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*2.3*	*25400*	*113000*
Bromomethane	< 9.7	< 9.5	< 9.2	< 9.7	< 7.7	< 8.3	*NS*	*9600*	*43000*
2-Butanone	< 72	4.5 J	59 J	73 J	3.7 J	2.8 J	*NS*	*NS*	*NS*
Carbon disulfide	0.86 J	0.82 J	0.92 J	0.19 J	0.32 J	0.64 J	*NS*	*NS*	*NS*
Carbon tetrachloride	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*3.9*	*854*	*4250*
Chlorobenzene	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*NS*	*370000*	*761000*
Chloroethane	< 9.7	< 9.5	< 9.2	< 9.7	< 7.7	< 8.3	*226.6*	*NS*	*NS*
Chloroform	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*3.3*	*454*	*1.980*
Chloromethane	< 9.7	< 9.5	< 9.2	< 9.7	< 7.7	< 8.3	*15.5*	*159000*	*669000*
Dibromochloromethane	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*32*	*8280*	*38900*
1,1-Dichloroethane	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*483.6*	*5060*	*22200*
1,2-Dichloroethane	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*2.8*	*608*	*3030*
1,1-Dichloroethene	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*5*	*342000*	*1190000*
cis-1,2-Dichloroethene	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*41.2*	*156000*	*2040000*
trans-1,2-Dichloroethene	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*58.8*	*211000*	*976000*
1,2-Dichloropropane	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*3.3*	*406*	*1780*
cis-1,3-Dichloropropene	< 19	< 19	< 18	< 19	< 1.5	< 1.7	*NS*	*NS*	*NS*
trans-1,3-Dichloropropene	< 19	< 19	< 18	< 19	< 1.5	< 1..7	*NS*	*NS*	*NS*
Ethylbenzene	**1.9 J**	0.40 J	0.31 J	1.5 J	1.8 J	**2.4 J**	***1.57***	*7470*	*37000*
2-Hexanone	< 19	< 19	< 18	< 19	< 15	< 17	*NS*	*NS*	*NS*
4-Methyl-2-pentanone	< 19	< 19	< 18	< 19	< 15	< 17	*NS*	*NS*	*NS*
Methylene chloride	1.0 J	< 9.5	< 9.2	< 9.7	< 7.7	< 8.3	*2.6*	*61800*	*1150000*
Methyl tert-butyl ether	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*27*	*59400*	*293000*
Styrene	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*NS*	*NS*	*NS*
1,1,2,2-Tetrachloroethane	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*0.2*	*810*	*12300*
Tetrachloroethene	< 4.8	0.55 J	**< 17**	< 4.8	0.47 J	**38 J**	***4.5***	*30700*	*153000*
Toluene	< 5.8	1.2 J	0.92 J	0.52 J	0.63 J	8.7	*1107.2*	*818000*	*818000*
1,1,1-Trichloroethane	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*140.2*	*640000*	*640000*
1,1,2-Trichloroethane	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*3.2*	*1480*	*7340*
Trichloroethene	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*3.6*	*1260*	*8810*
Vinyl chloride	< 4.8	< 4.7	< 4.6	< 4.8	< 3.8	< 4.2	*0.1*	*67*	*2030*
Xylene - total	2.5 J	0.89 J	0.48 J	< 15	< 12	4.7 J	*3940*	*258000*	*258000*

Notes:

* RCL = Residual Contaminant Level per WDNR Remediation and Redeveopment Program

NR 720 RCLs are generic standards for the groundwater pathway for VOCs.

NS = No Standard

J - Analyte detected below reporting limit

All values in µg/Kg

Bold fonts/Shaded boxes indicate the levels exceed the Quality Standards.

Soil VOC Analytical Results

Sample ID:	NSB3-A	NSB3-B	NSB3-C	NSB4-A	NSB4-B	NSB4-C	NR 720 RCLs*		
Date:	9/16/2018						Groundwater Pathway RCL	Non-Industrial Direct Contact RCL	Industrial Direct Contact RCL
Sampling Depth (ft)	2	8	16	2	8	16			
Depth to GW (ft)	9			8					
VOCs							µg/Kg	µg/Kg	µg/Kg
Acetone	31 J	6.5 J	11 J	93 J	16 J	7.7 J	*NS*	*63400000*	*100000000*
Benzene	0.45 J	1.2 J	2.4 J	< 4.9	0.5 J	0.31 J	*5.1*	*1600*	*7070*
Bromodichloromethane	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*0.3*	*418*	*1830*
Bromoform	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*2.3*	*25400*	*113000*
Bromomethane	< 11	< 8.4	< 8.2	< 9.8	< 9.1	< 8.0	*NS*	*9600*	*43000*
2-Butanone	5.3 J	< 63	3.2 J	6.9 J	< 69	< 60	*NS*	*NS*	*NS*
Carbon disulfide	0.77 J	0.35 J	0.35 J	0.35 J	0.32 J	0.21 J	*NS*	*NS*	*NS*
Carbon tetrachloride	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*3.9*	*854*	*4250*
Chlorobenzene	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*NS*	*370000*	*761000*
Chloroethane	< 11	< 8.4	< 8.2	< 9.8	< 9.1	< 8.0	*226.6*	*NS*	*NS*
Chloroform	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*3.3*	*454*	*1.980*
Chloromethane	< 11	< 8.4	< 8.2	< 9.8	< 9.1	< 8.0	*15.5*	*159000*	*669000*
Dibromochloromethane	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*32*	*8280*	*38900*
1,1-Dichloroethane	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*483.6*	*5060*	*22200*
1,2-Dichloroethane	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*2.8*	*608*	*3030*
1,1-Dichloroethene	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*5*	*342000*	*1190000*
cis-1,2-Dichloroethene	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*41.2*	*156000*	*2040000*
trans-1,2-Dichloroethene	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*58.8*	*211000*	*976000*
1,2-Dichloropropane	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*3.3*	*406*	*1780*
cis-1,3-Dichloropropene	< 2.2	< 1.7	< 1.6	< 2.0	< 1.8	< 16	*NS*	*NS*	*NS*
trans-1,3-Dichloropropene	< 2.2	< 1.7	< 1.6	< 2.0	< 1.8	< 16	*NS*	*NS*	*NS*
Ethylbenzene	0.30 J	0.67 J	0.70 J	0.15 J	0.14 J	0.19 J	*1.57*	*7470*	*37000*
2-Hexanone	< 2.2	< 1.7	< 1.6	< 2.0	< 1.8	< 16	*NS*	*NS*	*NS*
4-Methyl-2-pentanone	< 2.2	< 1.7	< 1.6	< 2.0	< 1.8	< 16	*NS*	*NS*	*NS*
Methylene chloride	< 11	< 8.4	< 8.2	< 9.8	< 3.8	< 8.0	*2.6*	*61800*	*1150000*
Methyl tert-butyl ether	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*27*	*59400*	*293000*
Styrene	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*NS*	*NS*	*NS*
1,1,2,2-Tetrachloroethane	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*0.2*	*810*	*12300*
Tetrachloroethene	1.7 J	0.89 J	0.97 J	2.6 J	< 4.6	< 4.0	*4.5*	*30700*	*153000*
Toluene	0.76 J	2.0 J	3.2 J	0.33 J	0.35 J	0.43 J	*1107.2*	*818000*	*818000*
1,1,1-Trichloroethane	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*140.2*	*640000*	*640000*
1,1,2-Trichloroethane	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*3.2*	*1480*	*7340*
Trichloroethene	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*3.6*	*1260*	*8810*
Vinyl chloride	< 5.5	< 4.2	< 4.1	< 4.9	< 4.6	< 4.0	*0.1*	*67*	*2030*
Xylene - total	0.49 J	1.3 J	1.3 J	< 15	< 14	< 12	*3940*	*258000*	*258000*

Notes:

* RCL = Residual Contaminant Level per WDNR Remediation and Redeveopment Program

NR 720 RCLs are generic standards for the groundwater pathway for VOCs.

NS = No Standard

J - Analyte detected below reporting limit

All values in µg/Kg

Bold fonts/Shaded boxes indicate the levels exceed the Quality Standards.

Soil VOC Analytical Results

Sample ID:	NSB5-A	NSB5-B	NSB5-C	NSB6-A	NSB6-B	NSB6-C	NR 720 RCLs*		
Date:	9/16/2018						Groundwater Pathway RCL	Non-Industrial Direct Contact RCL	Industrial Direct Contact RCL
Sampling Depth (ft)	2	8	16	2	8	15			
Depth to GW (ft)	6			6					
VOCs							µg/Kg	µg/Kg	µg/Kg
Acetone	17 J	< 4000	14 J	< 4300	16 J	19 J	*NS*	*63400000*	*100000000*
Benzene	3.9 J	< 270	< 4.2	< 290	0.67 J	< 6.0	*5.1*	*1600*	*7070*
Bromodichloromethane	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*0.3*	*418*	*1830*
Bromoform	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*2.3*	*25400*	*113000*
Bromomethane	< 9.1	< 540	< 8.4	< 570	< 9.4	< 12	*NS*	*9600*	*43000*
2-Butanone	< 68	< 4000	< 63	< 430	< 71	< 90	*NS*	*NS*	*NS*
Carbon disulfide	0.28 J	< 2700	< 42	11 J	< 47	0.54 J	*NS*	*NS*	*NS*
Carbon tetrachloride	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*3.9*	*854*	*4250*
Chlorobenzene	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*NS*	*370000*	*761000*
Chloroethane	< 9.1	< 540	< 8.4	< 570	9.4	< 12	*226.6*	*NS*	*NS*
Chloroform	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*3.3*	*454*	*1.980*
Chloromethane	< 9.1	< 540	< 8.4	< 570	< 9.4	< 12	*15.5*	*159000*	*669000*
Dibromochloromethane	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*32*	*8280*	*38900*
1,1-Dichloroethane	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*483.6*	*5060*	*22200*
1,2-Dichloroethane	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*2.8*	*608*	*3030*
1,1-Dichloroethene	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*5*	*342000*	*1190000*
cis-1,2-Dichloroethene	< 4.5	< 270	< 4.2	< 290	4.3 J	< 6.0	*41.2*	*156000*	*2040000*
trans-1,2-Dichloroethene	< 4.5	< 270	< 4.2	< 290	0.78 J	< 6.0	*58.8*	*211000*	*976000*
1,2-Dichloropropane	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*3.3*	*406*	*1780*
cis-1,3-Dichloropropene	< 1.8	< 110	< 1.7	< 110	< 1.9	< 2.4	*NS*	*NS*	*NS*
trans-1,3-Dichloropropene	< 1.8	< 110	< 1.7	< 110	< 1.9	< 2.4	*NS*	*NS*	*NS*
Ethylbenzene	1.8 J	< 270	< 4.2	< 290	0.31 J	< 6.0	*1.57*	*7470*	*37000*
2-Hexanone	< 1.8	< 110	< 1.7	< 110	< 1.9	< 2.4	*NS*	*NS*	*NS*
4-Methyl-2-pentanone	< 1.8	< 110	< 1.7	< 110	< 1.9	< 2.4	*NS*	*NS*	*NS*
Methylene chloride	0.88 J	< 540	< 8.4	< 570	< 9.4	< 12	*2.6*	*61800*	*1150000*
Methyl tert-butyl ether	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*27*	*59400*	*293000*
Styrene	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*NS*	*NS*	*NS*
1,1,2,2-Tetrachloroethane	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*0.2*	*810*	*12300*
Tetrachloroethene	**210**	**2100**	< 4.2	**6300**	**1500**	1.4 J	***4.5***	*30700*	*153000*
Toluene	< 6.7	< 270	< 4.2	< 290	< 1.0 J	< 6.0	*1107.2*	*818000*	*818000*
1,1,1-Trichloroethane	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*140.2*	*640000*	*640000*
1,1,2-Trichloroethane	< 4.5	< 270	< 4.2	< 290	< 4.7	< 6.0	*3.2*	*1480*	*7340*
Trichloroethene	< 4.5	**53 J**	< 4.2	**750**	**60**	< 6.0	***3.6***	*1260*	*8810*
Vinyl chloride	< 4.5	< 270	< 4.2	< 290	**2.7 J**	< 6.0	***0.1***	*67*	*2030*
Xylene - total	4.2 J	< 810	< 13	< 860	< 14	< 18	*3940*	*258000*	*258000*

Notes:

* RCL = Residual Contaminant Level per WDNR Remediation and Redeveopment Program

NR 720 RCLs are generic standards for the groundwater pathway for VOCs.

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All values in µg/Kg

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Soil VOC Analytical Results

Sample ID:	NSB7-A	NSB7-B	NSB7-C	NSB8-A	NSB8-B	NSB8-C	NR 720 RCLs*		
Date:	9/16/2018						Groundwater Pathway RCL	Non-Industrial Direct Contact RCL	Industrial Direct Contact RCL
Sampling Depth (ft)	2	8	16	2	8	16			
Depth to GW (ft)	6			8					
VOCs							µg/Kg	µg/Kg	µg/Kg
Acetone	77	50 J	8.1 J	31 J	< 78	25 J	*NS*	*63400000*	*100000000*
Benzene	0.51 J	1.0 J	< 4.9	0.89 J	0.61 J	0.27 J	*5.1*	*1600*	*7070*
Bromodichloromethane	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*0.3*	*418*	*1830*
Bromoform	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*2.3*	*25400*	*113000*
Bromomethane	< 8.3	< 9.0	< 9.8	< 8.6	< 10	< 9.1	*NS*	*9600*	*43000*
2-Butanone	< 62	< 67	< 74	< 65	< 78	< 68	*NS*	*NS*	*NS*
Carbon disulfide	1.7 J	4.0 J	< 49	< 43	< 52	< 46	*NS*	*NS*	*NS*
Carbon tetrachloride	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*3.9*	*854*	*4250*
Chlorobenzene	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*NS*	*370000*	*761000*
Chloroethane	< 8.3	< 9.0	< 9.8	< 8.6	< 10	< 9.1	*226.6*	*NS*	*NS*
Chloroform	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*3.3*	*454*	*1.980*
Chloromethane	< 8.3	< 9.0	< 9.8	< 8.6	< 10	< 9.1	*15.5*	*159000*	*669000*
Dibromochloromethane	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*32*	*8280*	*38900*
1,1-Dichloroethane	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*483.6*	*5060*	*22200*
1,2-Dichloroethane	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*2.8*	*608*	*3030*
1,1-Dichloroethene	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*5*	*342000*	*1190000*
cis-1,2-Dichloroethene	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*41.2*	*156000*	*2040000*
trans-1,2-Dichloroethene	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*58.8*	*211000*	*976000*
1,2-Dichloropropane	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*3.3*	*406*	*1780*
cis-1,3-Dichloropropene	< 1.7	< 1.8	< 2.0	< 1.7	< 2.1	< 1.8	*NS*	*NS*	*NS*
trans-1,3-Dichloropropene	< 1.7	< 1.8	< 2.0	< 1.7	< 2.1	< 1.8	*NS*	*NS*	*NS*
Ethylbenzene	0.37 J	< 4.5	< 4.9	0.52 J	< 5.2	< 4.6	*1.57*	*7470*	*37000*
2-Hexanone	< 1.7	< 1.8	< 2.0	< 1.7	< 2.1	< 1.8	*NS*	*NS*	*NS*
4-Methyl-2-pentanone	< 1.7	< 1.8	< 2.0	< 1.7	< 2.1	< 1.8	*NS*	*NS*	*NS*
Methylene chloride	**2.6 J**	**3.4 J**	< 9.8	2.4 J	< 10	1.5 J	*2.6*	*61800*	*1150000*
Methyl tert-butyl ether	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*27*	*59400*	*293000*
Styrene	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*NS*	*NS*	*NS*
1,1,2,2-Tetrachloroethane	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*0.2*	*810*	*12300*
Tetrachloroethene	4.2 J	< 11	< 4.9	< 4.3	< 5.2	< 4.6	*4.5*	*30700*	*153000*
Toluene	1.1 J	2.0 J	< 4.9	1.5 J	1.1 J	< 4.6	*1107.2*	*818000*	*818000*
1,1,1-Trichloroethane	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*140.2*	*640000*	*640000*
1,1,2-Trichloroethane	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*3.2*	*1480*	*7340*
Trichloroethene	< 4.2	< 4.5	< 4.9	< 4.3	2.2 J	< 4.6	*3.6*	*1260*	*8810*
Vinyl chloride	< 4.2	< 4.5	< 4.9	< 4.3	< 5.2	< 4.6	*0.1*	*67*	*2030*
Xylene - total	0.56 J	0.85 J	< 15	< 13	0.64 J	< 14	*3940*	*258000*	*258000*

Notes:

* RCL = Residual Contaminant Level per WDNR Remediation and Redeveopment Program

NR 720 RCLs are generic standards for the groundwater pathway for VOCs.

NS = No Standard

J - Analyte detected below reporting limit

All values in µg/Kg

Bold fonts/Shaded boxes indicate the levels exceed the Quality Standards.

Soil VOC Analytical Results

Sample ID:	NSB9-A	NSB9-B	NSB9-C	NSB10-A	NSB10-B	NSB10-C	NR 720 RCLs*		
Date:	9/16/2018						Groundwater Pathway RCL	Non-Industrial Direct Contact RCL	Industrial Direct Contact RCL
Sampling Depth (ft)	2	8	16	2	6	15			
Depth to GW (ft)	8			6					
VOCs							µg/Kg	µg/Kg	µg/Kg
Acetone	66 J	< 78	32 J	100	< 68	< 65	*NS*	*63400000*	*100000000*
Benzene	< 5.0	0.97 J	1.8 J	< 4.8	1.8 J	< 4.3	*5.1*	*1600*	*7070*
Bromodichloromethane	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*0.3*	*418*	*1830*
Bromoform	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*2.3*	*25400*	*113000*
Bromomethane	< 10	< 10	< 8.3	< 9.6	< 9.1	< 8.7	*NS*	*9600*	*43000*
2-Butanone	< 75	< 78	< 62	< 72	< 68	< 65	*NS*	*NS*	*NS*
Carbon disulfide	< 50	< 52	< 41	< 48	< 46	< 43	*NS*	*NS*	*NS*
Carbon tetrachloride	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*3.9*	*854*	*4250*
Chlorobenzene	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*NS*	*370000*	*761000*
Chloroethane	< 10	< 10	< 8.3	< 9.6	< 9.1	< 8.7	*226.6*	*NS*	*NS*
Chloroform	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*3.3*	*454*	*1.980*
Chloromethane	< 10	< 10	< 8.3	< 9.6	< 9.1	< 8.7	*15.5*	*159000*	*669000*
Dibromochloromethane	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*32*	*8280*	*38900*
1,1-Dichloroethane	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*483.6*	*5060*	*22200*
1,2-Dichloroethane	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*2.8*	*608*	*3030*
1,1-Dichloroethene	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*5*	*342000*	*1190000*
cis-1,2-Dichloroethene	< 5.0	8	< 4.1	< 4.8	< 4.6	< 4.3	*41.2*	*156000*	*2040000*
trans-1,2-Dichloroethene	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*58.8*	*211000*	*976000*
1,2-Dichloropropane	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*3.3*	*406*	*1780*
cis-1,3-Dichloropropene	< 2.0	< 2.1	< 1.7	< 1.9	< 1.8	< 1.7	*NS*	*NS*	*NS*
trans-1,3-Dichloropropene	< 2.0	< 2.1	< 1.7	< 1.9	< 1.8	< 1.7	*NS*	*NS*	*NS*
Ethylbenzene	< 5.0	0.67 J	0.51 J	< 4.8	< 4.6	< 4.3	*1.57*	*7470*	*37000*
2-Hexanone	< 20	< 21	< 17	< 19	< 18	< 17	*NS*	*NS*	*NS*
4-Methyl-2-pentanone	< 20	< 21	< 17	< 19	< 18	< 17	*NS*	*NS*	*NS*
Methylene chloride	2.0 J	1.3 J	1.2 J	0.92 J	< 9.1	< 8.7	*2.6*	*61800*	*1150000*
Methyl tert-butyl ether	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*27*	*59400*	*293000*
Styrene	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*NS*	*NS*	*NS*
1,1,2,2-Tetrachloroethane	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*0.2*	*810*	*12300*
Tetrachloroethene	**14**	< 5.2	< 4.1	**1400**	**160**	< 4.3	*4.5*	*30700*	*153000*
Toluene	< 5.0	1.7 J	2.3 J	< 4.8	3.1 J	< 4.3	*1107.2*	*818000*	*818000*
1,1,1-Trichloroethane	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*140.2*	*640000*	*640000*
1,1,2-Trichloroethane	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*3.2*	*1480*	*7340*
Trichloroethene	< 5.0	**4.9 J**	< 4.1	**19**	**13**	< 4.3	*3.6*	*1260*	*8810*
Vinyl chloride	< 5.0	< 5.2	< 4.1	< 4.8	< 4.6	< 4.3	*0.1*	*67*	*2030*
Xylene - total	< 15	< 16	< 12	< 14	1.3 J	< 13	*3940*	*258000*	*258000*

Notes:

* RCL = Residual Contaminant Level per WDNR Remediation and Redeveopment Program

NR 720 RCLs are generic standards for the groundwater pathway for VOCs.

NS = No Standard

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All values in µg/Kg

Bold fonts/Shaded boxes indicate the levels exceed the Quality Standards.

Soil VOC Analytical Results

Sample ID:	NSB11-A	NSB11-B	NSB11-C	NSB12-A	NSB12-B	NSB12-C	NR 720 RCLs*		
Date:	9/16/2018						Groundwater Pathway RCL	Non-Industrial Direct Contact RCL	Industrial Direct Contact RCL
Sampling Depth (ft)	2	6	15	2	6	15			
Depth to GW (ft)	6			6					
VOCs							µg/Kg	µg/Kg	µg/Kg
Acetone	< 73	< 69	< 74	< 62	< 70	13 J	*NS*	*63400000*	*100000000*
Benzene	2.0 J	1.8 J	1.8 J	1.3 J	3.2 J	< 3.7	*5.1*	*1600*	*7070*
Bromodichloromethane	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*0.3*	*418*	*1830*
Bromoform	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*2.3*	*25400*	*113000*
Bromomethane	< 9.7	< 9.1	< 9.8	< 8.3	< 9.4	< 7.4	*NS*	*9600*	*43000*
2-Butanone	< 73	< 69	< 74	< 62	< 70	< 56	*NS*	*NS*	*NS*
Carbon disulfide	< 48	< 46	1.1 J	0.46 J	0.77 J	< 37	*NS*	*NS*	*NS*
Carbon tetrachloride	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*3.9*	*854*	*4250*
Chlorobenzene	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*NS*	*370000*	*761000*
Chloroethane	< 9.7	< 9.1	< 9.8	< 8.3	< 9.4	< 7.4	*226.6*	*NS*	*NS*
Chloroform	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*3.3*	*454*	*1.980*
Chloromethane	< 9.7	< 9.1	< 9.8	< 8.3	< 9.4	< 7.4	*15.5*	*159000*	*669000*
Dibromochloromethane	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*32*	*8280*	*38900*
1,1-Dichloroethane	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*483.6*	*5060*	*22200*
1,2-Dichloroethane	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*2.8*	*608*	*3030*
1,1-Dichloroethene	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*5*	*342000*	*1190000*
cis-1,2-Dichloroethene	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*41.2*	*156000*	*2040000*
trans-1,2-Dichloroethene	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*58.8*	*211000*	*976000*
1,2-Dichloropropane	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*3.3*	*406*	*1780*
cis-1,3-Dichloropropene	< 1.9	< 1.8	< 2.0	< 1.7	< 1.9	< 1.5	*NS*	*NS*	*NS*
trans-1,3-Dichloropropene	< 1.9	< 1.8	< 2.0	< 1.7	< 1.9	< 1.5	*NS*	*NS*	*NS*
Ethylbenzene	< 4.8	0.84 J	0.53 J	< 4.2	2.0 J	< 3.7	*1.57*	*7470*	*37000*
2-Hexanone	< 19	< 18	< 20	< 17	< 19	< 15	*NS*	*NS*	*NS*
4-Methyl-2-pentanone	< 19	< 18	< 20	< 17	< 19	< 15	*NS*	*NS*	*NS*
Methylene chloride	< 9.7	< 9.1	< 9.8	< 8.3	< 9.4	< 7.4	*2.6*	*61800*	*1150000*
Methyl tert-butyl ether	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*27*	*59400*	*293000*
Styrene	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*NS*	*NS*	*NS*
1,1,2,2-Tetrachloroethane	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*0.2*	*810*	*12300*
Tetrachloroethene	**67**	**220**	< 4.9	< 4.2	**27**	< 3.7	*4.5*	*30700*	*153000*
Toluene	3.5 J	2.9 J	2.5 J	2.1 J	6.4	< 3.7	*1107.2*	*818000*	*818000*
1,1,1-Trichloroethane	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*140.2*	*640000*	*640000*
1,1,2-Trichloroethane	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*3.2*	*1480*	*7340*
Trichloroethene	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*3.6*	*1260*	*8810*
Vinyl chloride	< 4.8	< 4.6	< 4.9	< 4.2	< 4.7	< 3.7	*0.1*	*67*	*2030*
Xylene - total	1.6 J	< 14	< 15	0.90 J	4.1 J	< 11	*3940*	*258000*	*258000*

Notes:

* RCL = Residual Contaminant Level per WDNR Remediation and Redeveopment Program

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J - Analyte detected below reporting limit

All values in µg/Kg

Bold fonts/Shaded boxes indicate the levels exceed the Quality Standards.

Groundwater VOC Analytical Results

TABULATION OF SAMPLE ANALYTICAL RESULTS		VOCS →	Acetone	Benzene	Bromodichloromethane	Bromoform	Bromomethane	2-Butanone	Carbon disulfide	Carbon tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	Dibromochloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone	4-Methyl-2-pentanone	Methylene chloride	Methyl tert-butyl ether	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl chloride	Xylene - total
Groundwater Quality Standards →		NR 140 ES (µg/L) →	9000	5	**0.6**	4.4	10	NS	1000	5	NS	400	6	30	60	850	5	7	70	100	5	0.4	0.4	700	NS	NS	5	60	100	0.2	**5**	800	200	**5**	**5**	**0.2**	2000
		NR 140 PAL (µg/L) →	1800	0.5	**0.06**	0.44	1	NS	NS	0.5	NS	80	**0.6**	3	6	85	0.5	0.7	**7**	20	0.5	0.04	0.04	140	NS	NS	0.5	12	10	0.02	**0.5**	160	40	**0.5**	**0.5**	**0.02**	400
Sample ID ↓	**Depth to Water ↓**	**Sampling Date ↓**	**Analytical Results (µg/L) ↓**																																			
MW1	8.72 ft.	09/19/2018	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1.1	< 1.1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2.2	< 15
	9.55 ft.	12/18/2018	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15
	9.22 ft.	03/08/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15
	9.35 ft.	07/13/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15
MW1-D	8.72 ft.	09/19/2018	< 20	< 0.22	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1.1	< 1.1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2.2	< 15
MW2	8.97 ft.	09/19/2018	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	**1.5 J**	< 10	< 5	< 5	< 5	< 5	6.9 J	< 5	< 5	< 1.1	< 1.1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**6.3**	0.85 J	< 5	< 5	< 5	< 2.2	< 15
	8.35 ft.	12/18/2018	< 20	< 5	**1.4**	< 5	< 10	< 20	< 10	< 5	< 5	< 10	**1.3**	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**12**	< 5	< 5	< 5	< 5	< 2	< 15
	8.01 ft.	03/08/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15
	8.15 ft.	07/13/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	4.4 J	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**53**	< 5	< 5	< 5	**18**	< 2	< 15
MW2-D	8.15 ft.	07/13/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	4.4 J	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**53**	< 5	< 5	< 5	**18**	< 2	< 15
MW3	10.23 ft.	09/19/2018	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	<5	< 5	< 1.1	< 1.1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2.2	< 15
	10.06 ft.	12/18/2018	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15
	9.75 ft.	03/08/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15
	9.65 ft.	07/13/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15
MW4	8.44 ft.	09/19/2018	< 20	< 5	< 5	< 5	< 10	< 20	0.38 J	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	<5	< 5	< 1.1	< 1.1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2.2	< 15
	8.15 ft.	12/18/2018	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15
	7.81 ft.	03/08/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15
	7.9 ft.	07/13/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15
MW5	9.61 ft.	09/19/2018	< 20	< 5	< 5	< 5	< 10	< 20	0.33 J	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	**26**	4.5 J	< 5	< 1.1	< 1.1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**160**	< 5	< 5	< 5	**70**	**38**	< 15
	9.89 ft.	12/18/2018	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	**29**	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**66**	< 5	< 5	< 5	**140**	**25**	< 15
	9.55 ft.	03/08/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	**15**	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**270**	< 5	< 5	< 5	**75**	**12**	< 15
	9.85 ft.	07/13/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	**23**	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**4300**	< 5	< 5	< 5	**120**	**20**	< 15
MW5-D	9.55 ft.	03/08/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	**15**	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**260**	< 5	< 5	< 5	**70**	**12**	< 15
MW6	9.76 ft.	09/19/2018	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	**8.6**	1.5 J	< 5	< 1.1	< 1.1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**110**	< 5	< 5	< 5	**11**	**3.3**	< 15
	9.89 ft.	12/18/2018	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	**17**	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**69**	< 5	< 5	< 5	**36**	**2.2**	< 15
	9.54 ft.	03/08/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	**12**	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**370**	< 5	< 5	< 5	**52**	**5.7**	< 15
	9.75 ft.	07/13/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	**7.8**	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**550**	< 5	< 5	**19**	**41**	< 2	< 15
MW6-D	9.89 ft.	12/18/2018	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	**13**	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	**78**	< 5	< 5	< 5	**41**	**2.4**	< 15
MW-TB	NA	09/18/2018	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	**0.75 J**	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1.1	< 1.1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2.2	< 15
	NA	12/18/2018	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	2.1	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15
	NA	03/08/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15
	NA	07/13/2019	< 20	< 5	< 5	< 5	< 10	< 20	< 10	< 5	< 5	< 10	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 1	< 5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 2	< 15

Notes:

NR 140 ES = Wisconsin Administrative Code, Chapter NR 140 Enforcement Standard

NR 140 PAL = Wisconsin Administrative Code, Chapter NR 140 Preventive Action Limit

NS = No Standard; NA - Not Applicable

Sample ID with " - D" and "TB" refer to duplicate and trip blank, respectively

J - Analyte detected below reporting limit

All values in µg/L or ppm

Bold fonts/Shaded boxes indicate the levels exceed the Quality Standards.

Soil Gas VOC Analytical Results

Sample ID:	SV3	SV3-D	SV1	SV2	SV4	SV5	Indoor Air Vapor Action Levels (VAL)*		Vapor Risk Screening Levels (VRSL)*	
Date:	9/16/2018		9/19/2018				Residential	Commercial	Residential	Commercial
VOCs							µg/m³	µg/m³	µg/m³	µg/m³
1,1,1-Trichloroethane	< 3.9	< 9.1	< 3.7	< 4.0	< 4.1	< 7.7	*5210*	*21900*	*174000*	*730000*
1,1,2-Trichloroethane	< 3.9	< 9.1	< 3.7	< 4.0	< 4.1	< 7.7	*0.209*	*0.876*	*6.95*	*29.2*
1,1-Dichloroethane	< 2.9	< 6.6	< 2.7	< 2.9	< 3.0	< 5.6	*17.5*	*76.7*	*585*	*2560*
1,1-Dichloroethene	< 2.9	< 6.6	< 2.7	< 2.9	< 3.0	< 5.6	*209*	*876*	*6950*	*29200*
1,2,4-Trichlorobenzene	5.4	< 12	< 5.0	< 5.5	< 5.6	< 11	*2.09*	*8.76*	*69.5*	*292*
1,2-Dibromoethane	5.4	< 12	< 5.0	< 5.5	< 5.6	< 11	*0.0468*	*0.204*	*1.56*	*6.81*
1,2-Dichlorobenzene	4.3	< 9.9	< 4.0	< 4.4	< 4.4	< 8.4	*209*	*876*	*6950*	*29200*
1,2-Dichloroethane	2.9	< 6.6	< 2.7	< 2.9	< 3.0	< 5.6	*1.08*	*4.72*	*36*	*157*
1,2-Dichloropropane	3.2	< 7.4	< 3.0	< 3.3	< 3.3	< 6.3	*4.17*	*17.5*	*139*	*584*
1,4-Dichlorobenzene	4.3	< 9.9	< 4.0	< 4.4	< 4.4	< 8.4	*2.55*	*11.1*	*85.1*	*372*
1,4-Dioxane	6.5	< 15	< 6.0	< 6.6	< 6.7	< 13	*5.62*	*24.5*	*187*	*818*
2-Butanone	5.4	< 12	< 5.0	6.5	< 5.6	< 11	*NV*	*NV*	*NV*	*NV*
Acetone	34	25 J	< 16	< 18	130	120	*32200*	*135000*	*1070000*	*4510000*
Benzene	2.5	2.9 J	3.7	5.2	< 2.2	4.3	*3.6*	*15.7*	*120*	*524*
Bromodichloromethane	**0.96 J**	1.1 J	< 4.3	< 4.8	< 4.8	< 9.1	***0.759***	*3.31*	*25.3*	*110*
Bromoform	< 19	< 43	< 17	< 19	< 19	< 36	*25.5*	*111*	*851*	*3720*
Bromomethane	< 6.8	< 16	< 6.3	< 7.0	< 7.0	< 13	*5.21*	*21.9*	*174*	*730*
Carbon disulfide	19	< 5.1	7	15	5.5	5.9	*730*	*3070*	*24300*	*102000*
Carbon tetrachloride	< 4.7	< 11	< 4.3	< 4.8	< 4.8	< 9.1	*4.68*	*20.4*	*156*	*681*
Chlorobenzene	< 3.2	< 7.4	< 3.0	< 3.3	< 3.3	< 6.3	*52.1*	*219*	*1740*	*7300*
Chloroform	**2.3**	2 J	< 3.3	8.4	< 3.7	< 7.0	***1.22***	*5.33*	*40.7*	*178*
cis-1,2-Dichloroethene	< 2.9	< 6.6	< 2.7	< 2.9	< 3.0	< 5.6	*NS*	*NS*	*NS*	*NS*
cis-1,3-Dichloropropene	< 3.2	< 7.4	< 3.0	< 3.3	< 3.3	< 6.3	*NS*	*NS*	*NS*	*NS*
Dibromochloromethane	< 6.1	< 14	< 5.7	< 6.2	< 6.3	< 12	*NS*	*NS*	*NS*	*NS*
Dichlorodifluoromethane	0.35 J	< 8.3	< 3.3	< 3.7	< 3.7	< 7.0	*104*	*438*	*3480*	*14600*
Ethylbenzene	4.7	2.2 J	10	12	4.7	11	*11.2*	*49.1*	*374*	*1640*
Isopropyl Alcohol	**1200**	**900**	---	---	---	---	***209***	***876***	*6950*	*29200*
m,p-Xylene	17	8.6 J	35	40	17	36	*104*	*438*	*3480*	*14600*
Methyl tert-butyl ether	< 2.5	< 5.8	< 2.3	< 2.6	< 2.6	< 4.9	*108*	*472*	*3600*	*15700*
Methylene chloride	8.1 J	33 J	< 23	< 25	< 26	< 48	*626*	*2630*	*20900*	*87600*
Naphthalene	< 3.6	< 8.3	< 0.99	< 1.1	< 1.1	< 2.1	*0.826*	*3.61*	*27.5*	*120*
o-Xylene	6.9	3.6 J	13	13	6.9	14	*104*	*438*	*3480*	*14600*
Styrene	7.2	3.2 J	15	15	8.5	13	*1040*	*4380*	*34800*	*146000*
Tetrachloroethene	**300**	**300**	17	**1200**	52	63	***41.7***	***175***	***1390***	*5840*
Toluene	22	11	57	62	21	50	*5210*	*21900*	*174000*	*730000*
trans-1,2-Dichloroethene	< 2.9	< 6.6	< 2.7	< 2.9	< 3.0	< 5.6	*NS*	*NS*	*NS*	*NS*
trans-1,3-Dichloropropene	< 3.2	< 7.4	< 3.0	< 3.3	< 3.3	< 6.3	*NS*	*NS*	*NS*	*NS*
Trichloroethene	**4.2**	**3.6 J**	< 3.7	100	< 4.1	< 7.7	***2.09***	*8.76*	*69.5*	*292*
Trichlorofluoromethane	0.81 J	0.93 J	< 3.7	< 4.0	< 4.1	< 7.7	*NS*	*NS*	*NS*	*NS*
Vinyl acetate	< 25	< 58	< 23	< 26	< 26	< 49	*209*	*876*	*6950*	*29200*
Vinyl chloride	< 1.8	< 4.1	< 1.7	< 1.8	< 1.9	< 3.5	*1.68*	*27.9*	*55.9*	*929*
Xylenes, Total	24	12	49	54	24	49	*104*	*438*	*3480*	*14600*

Notes:

* US EPA Vapor Intrusion Screening Levels (VISL) Calculator (Default Results)

J - Analyte detected below reporting limit

Bold fonts/Shaded boxes indicate the levels exceed the Quality Standards.

Change Order #1
ADDITIONAL SITE INVESTIGATION WORKPLAN

Prepared For
Westwood Cleaners
(WDNR BRRTS#02-41-552537)

Attn. Mr. Dong Sin
8731 West North Avenue
Wauwatosa, Wisconsin 53226

November 8, 2019

5403 Patton Dr., Suite 215, Lisle, Illinois 60532
Tel. 630-724-0098 Web Site: http://www.HydrodynamicsConsultants.com

Certifications

I, Mike (Minghua) Wan, hereby certify that I am a hydrogeologist as the term is defined in NR 712.03 (1), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wic. Adm. Code.

Signature: Mike (Minghua) Wan, PE

Title: Professional Engineer

Date: November 8, 2019

5403 Patton Dr., Suite 215, Lisle, Illinois 60532

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5403 Patton Dr., Suite 215, Lisle, Illinois 60532
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1.0 INTRODUCTION

1.1 Location and Project Information

1. Site Owner:
   Dong Sin
   8371 West North Avenue
   Wauwatosa, WI 53226

2. Site Address:
   8371 West North Avenue
   Wauwatosa, WI 53226

3. Site Location (Figure 1):
   NE ¼ of the NW ¼ of Section 21, T07N, R21E, Milwaukee County, Wisconsin.

4. Environmental Consultant:
   Mike Wan, PE, Project Manager
   Hydrodynamics Consultants, Inc.
   5403 Patton Drive, Suite 215
   Lisle, IL 60532
   Tel. 630-724-0098
   Email Mike_Wan@HydrodynamicsConsultants.com

5. WDNR BRRS#:
   02-41-552537

6. WDNR Project Manager:
   Binyoti Amungwafor
   Wisconsin Department of Natural Resources
   2300 Martin Luther King Drive, Milwaukee, WI 53212
   Tel. 414-263-8607
   Email: Binyoti.Amingwafor@Wisconsin.gov

1.2 Site Location Map

Please see attached Figure 1, Site Base Map

1.3 Site Physiographical and Geological Information

1.3.1 Topography/Geology

The general topography of land is flat with an elevation of 850 feet above sea level being the average. The local ground surface slopes gently to the southwest.

The bedrock is primarily medium to coarse grained, thin to thick bedded and very light to light gray.

The closest body of water is the Menomonee River which is approximately 1,600 feet to the southwest of the subject property.

Further topographical and geological information may be researched during further site investigation activities.

1.3.2 Hydrogeology

No groundwater study has been done at this site yet. But groundwater was encountered about 6' below the ground surface during previous site investigation soil sampling. Groundwater is anticipated to flow to the south/southwest toward the Menomonee River according to the local topography.

Further hydrogeological information may be researched during further site investigation activities.

1.4 Prior Site Investigation and Quarterly Groundwater Monitoring Outcomes, and Future Objectives

Hydrodynamics Consultants, Inc. (HDC) completed the following scope of work at this site chronologically:

August 19, 2008: Initial site investigation
HDC performed limited soil boring and testing at the subject property. Four (4) soil borings were advanced to a depth of 16' deep each, and two soil samples were collected from each boring for laboratory analysis of chlorinated volatile organic compounds (cVOCs). The analytical results indicated up to 320,000 ug/kg of tetrachloroethene (PCE or perc) and up to 3,970 um/kg trichloroethene (TCE) were present in the samples at the site.

September 16 – 19, 2018: Site Investigation
HDC performed a site investigation (SI) at this site. Twelve new soil borings (NSB1-NSB12) were completed to a depth of 16' each. Three representative soil samples were collected from each boring. Low levels of PCE, TCE, and vinyl chloride (VC) were detected from these borings. The soil sample cVOC results and distribution are illustrated in Figure 3. The soil cVOC plume cross section is illustrated in Figure 3a.

Six of the soil borings were converted to monitoring wells (MW1 to MW6). These wells were 1"- to 2"-diameter PVC wells constructed to the depth approximately 15' below the ground surface.

Five sub-slab soil vapor ports (SV1 - SV5) were installed at this site. One soil vapor sample was collected from each of these ports during the site investigation. Up to 1,200 ug/m^3 of PCE and 100 ug/m^3 of TCE were found in the soil vapor samples. The highest level of PCE was found in the basement of the adjoining restaurant building at SV2. The sub-slab soil vapor sampling results and distribution are illustrated in Figure 5 with their cross section in Figure 5a.

September 19, 2018 – July 13, 2019: Quarterly Groundwater Monitoring
Groundwater samples were collected from all the existing monitoring wells on a quarterly basis for a period of one year. The quarterly groundwater sampling results confirmed that up to 4,300 ug/l of PCE, 120 ug/l of TCE, 23 ug/l of cis-1,2-dichloroethene (cDCE), and 20 ug/l of VC were present in MW2, MW5, and MW6. The groundwater table depth is about 7.81' to 10.06' below the groundwater surface. The groundwater generally flows to the west with a small angle to the south. The groundwater sample cVOC results and distribution are illustrated in Figure 4. The groundwater cVOC plume cross section is illustrated in Figure 4a.

Westwood Cleaners is still using tetrachloroethylene (PCE) as its solvent for the drycleaning business, but very stringent solvent handling and management have been enforced by the business owner, including secondary containments under the drycleaning machine and the waste containers. Waste solvent generated from the drycleaning facility is properly removed and disposed of by a licensed waste hauler from the facility. Based on our observation, it is unlikely to have any new spill or release at this facility. The PCE concentration fluctuation in the groundwater samples in MW5 and MW6 may have been attributed to the seasonal groundwater table change and/or desorption of PCE from the soil where the PCE molecules were initially attached.

Based on the above site investigation results, further site investigation is warranted to determine the contamination boundary and to assess the potential risks associated with the cVOCs found in the soil, soil gas, and groundwater. Therefore, with the permission of the property owner, Mr. Dong Sin, HDC submits this Additional Site Investigation Workplan in order to gain approval to conduct an Additional Site Investigation which will:

- Gather information needed to define the nature, degree and extent of chlorinated volatile organic compound contamination from the drycleaning operation at site in the soil, groundwater and sub-slab soil vapor. The locations of the new soil borings (NSB13, NSB14, NSB15), monitoring wells (MW7, MW8, and MW9), and soil vapor ports (SV3A, SV6) are illustrated in Figure 2.
- Conduct 3 quarters of monitoring and sampling from all the monitoring wells and soil gas sampling ports;
- Establish cleanup goals for cVOCs in the soil, groundwater, and soil gas to protect the public health, safety, welfare, and environment.

2.0 SITE INVESTIGATION SCOPING & CLOSURE OBJECTIVES

2.1 Site Investigation Scoping

Pursuant to Chapter NR 716.07, Site Investigations Scoping, the following will summarize the known conditions at this site.

2.1.1 History of the Site

According to our inquiry, the subject dry-cleaning plant has been situated here and in operation since about 1985. Prior to 1985, no knowledge of presence of hazardous materials on the property was found. The surrounding properties or store spaces have been used for commercial purposes without known involvement of any hazardous materials.

2.1.2 Knowledge of the Type of Contamination and Amount of the Contamination.

Drycleaning solvent, tetrachloroethene or perchloroethene (PCE) has been used at this site since 1985. Prior to 1985, no known record indicates that the site had been involved with any hazardous materials. Therefore, PCE and its degraded compounds (as volatile organic compounds, VOCs) are the only contaminants of concern for this site. The subsurface contamination of PCE may have been from historical spills or incidental releases during the drycleaning operation. The amount of PCE in the subsurface environmental needs to be further determined, but the total amount of the released PCE is estimated to be less than 10 gallons based on the previous soil analytical results.

2.1.3 History of Previous Hazardous Substance Discharge or Environmental Pollution

The site has been used by Westwood Cleaners as a drycleaning plant since 1985. The contamination of PCE may have come to be through historical spills or releases during the drycleaning operation. PCE pollution was discovered in the soil. Further delineation of PCE contamination in the soil, groundwater, and soil vapor is proposed.

2.1.4 Environmental Media Affected or Potentially Affected by the Contamination

PCE and its degraded compounds pollution was discovered in the soil. Further delineation of PCE contamination in the soil, groundwater, and soil vapor is warranted.

2.1.5 Location of the Site of Facility, and its Proximate to Other Contamination

The subject property is located on the southwest corner of the intersection of West North Avenue and Ludington Avenue in the City of Wauwatosa, WI (See Site Base Map, Figure 1). Based on the ERRTS databases, a gasoline filling station is present on the northwest corner of the intersection of North Avenue and Ludington Avenue (8806 W North Avenue, WDNR BRRTS#: 03-41-100572). The groundwater flow direction was reported to flow to the southwest. The gasoline station site

was closed with conditions. The property at 8901 West North Avenue, on the southwest corner of the intersection of North Avenue and Ludington Avenue (WDNR BRRTS#: 03-41-563748), was also used as a gasoline filling station. Petroleum release was found in that property. No further information was readily available for review.

The proposed site investigation will investigate potential subsurface environmental impact for volatile organic compounds (VOCs). So, if any petroleum components, such as benzene, toluene, ethyl-benzene, and xylenes are present, they can be identified in the samples.

2.1.6 Need for Permission from Property Owners to Allow Access the Site and Nearby Properties.

Since the VOC contamination may have migrated into the adjoining property to the east at 8725 West North Avenue, permission from the property owner to access that property for site investigation is needed. Furthermore, if the VOCs contamination has migrated to the public alley to the south or the street right of ways to the west or north, permission to site investigation from the City of Wauwatosa is warranted.

2.1.7 Potential or Known Impacts to Receptors

Exposure to tetrachloroethene (PCE or perc), trichloroethene (TCE), cis-1,2-dichloroethene (DCE), vinyl chloride (VC), and etc., may have negative impacts on human health. As with most chlorinated solvents, acute exposure primarily affects the central nervous system and causes skin, throat, and eye irritation. In addition, PCE adversely affect the liver and kidneys, and has been classified by the International Agency for Research on Cancer (IARC) as “probably carcinogenic to humans”.

No known receptor has been identified. The proposed Site Investigation will assist with the identification of potential receptors. However, due to the potential impacts of tetrachloroethene (PCE or perc), trichloroethene (TCE), cis-1,2-dichloroethene (DCE), and vinyl chloride (VC) it is important to prevent contamination of potable water and prevent vapor intrusion to buildings.

Potential receptor contact with the contamination can be facilitated through private or public water supplies, buildings and other cultural features, utilities and subsurface improvements. Utility lines, especially water lines, sanitary and storm sewer lines, natural gas lines, electric lines, any other buried lines, will be marked prior to the site investigation. Floor sumps and other subsurface improvements will also be marked in the maps so proper investigation can be performed.

Floor cracks or openings inside buildings will also be investigated to see if soil vapor intrusion is a concern. Vapor intrusion considers the possibility that the VOCs in soil and groundwater can vaporize to form a gas and move through soils into indoor air where it may be inhaled. The vapor may enter a dwelling through cracks, separations or other open spaces within a slab or foundation.

HDC preformed a private water well search by way of Wisconsin’s DNR Drinking Water System; Well Construction Reports database. There were no records found for private wells within 1,200

feet of the subject property. Next, HDC searched the Historic Well Construction Reports (1930-1989) database and found a record of a water well approximately 1080 feet northwest of the subject property. A water well survey map is located as Figure 4.

The Menomonee River is approximately 1,800' feet to the southwest of the subject property.

2.1.8 Potential for Impacts to Wetland, Water Resources, Sites with Significant Importance

No evidence indicates any impact of the wetland (specially designated in NR 103.04), water resources (as defined in NR102.10-11), or site with significant importance (such as historical or archaeological sites) from this site.

2.1.9 Potential Interim and Remedial Actions Applicable to the Site

The contamination may have come to be from historical spills or incidental releases. The owner/operator has maintained good housekeeping and has been very careful to prevent any potential releases from this operation. The current drycleaning equipment has been upgraded to a close-loop drycleaning machine with a secondary containment pan installed below the machine. The secondary containment pan can collect and hold 110% of the volume of the largest solvent tank in case there is a release from the solvent tanks installed under the drycleaning machine. The used solvent and filters have been placed inside a steel drum for recycling or proper disposal. The waste storage drum for the spent PCE and filters has been placed inside the store behind the drycleaning machine.

Based on the existing results, no active remedial action is determined. However, if further site investigation indicates any potential risks to the public health, safety, welfare, and/or the environment, remedial actions may be proposed.

2.1.10 Immediate or Interim Action Taken

No immediate or interim action has been taken. However, if further investigation results warrant immediate or interim action, is will be proposed.

2.1.11 Other Items, Including Climatologically Conditions, and background Water or Soil Information That May Affect the Site Investigation

No known climatologically conditions, and background water or soil Information is found that may affect the site investigation.

2.1.12 The Need to Gather Data to Determine the Hydraulic Conductivity of Materials Where Contamination Is Found

To determine the groundwater hydraulic conductivities in the strata where the VOCs are found, slug tests were conducted in the proposed piezometers, which are 2"-diameter monitoring wells installed

with augers. The groundwater flow direction and flow rate, as well as the water table gradient were determined by measurements of the surface elevation and the water depth in each well.

2.2 Site Closure Objectives

HDC will conduct the additional site investigation pursuant to the Ch. NR716, Site Investigation for the proposed work. Based on the data gathered from the proposed sampling and investigation, HDC will prepare an Additional Site Investigation Report and establish soil and vapor cleanup goals, and follow NR140 for Groundwater Standards. Appropriate remedial options analysis will be prepared pursuant to Ch. NR 722 and NR 726 for final closure goals and documentation.

The proposed scope of work for this additional site investigation may not be conclusive, and additional investigations may be proposed based on new results. However, the final case closure objectives for this site may include the following:

1) The degree and extent of contamination in the soil, groundwater, and soil gas will be adequately defined;
2) The source of the contamination will be removed, and/or remedial/interim actions will be completed, if warranted;
3) Soil vapor intrusion will be fully mitigated with sub-slab depressurization systems, if needed, and
4) Groundwater contaminant concentrations will be conclusively determined to be generally stable or decreasing without posing any threat to the public health, safety, welfare, and the environment.

Upon fully addressing the potential risks posed by the released CVOCs in the soil, groundwater, and soil gas, the residual contamination can be managed by continuing obligations, including:

- Maintaining site structures and pavements as engineered barriers to prevent contaminant ingestion and inhalation risks, and leaching from underlying soil to the groundwater;
- Implementing groundwater use restriction to limit construction of water supply wells within the potentially impact properties;
- Operation of the existing vapor mitigation system (VMS) to address the potential for vapor intrusion to the properties identified by the Site Investigation, if needed;
- Restricting the future use of the dry cleaner facility to commercial purposes.

3.0 SITE INVESTIGATION SUMMARY

To satisfy the requirements of the WDNR, HDC proposes to conduct the following:

- Contact the diggers hotline to request the public utility companies to mark all their utility lines at and around the property, including the property to the east and the surrounding public right of ways;

- Mobilize crews for drilling, sampling, and testing to the project site to conduct the field work.

- Complete **3** additional soil borings (NSB13, NSB14, NSB15) to a depth of 16 - 20 feet (each) below the ground surface. Each boring will be logged in accordance with the Unified Soil Classification System ("USCS") to document the subsurface strata, variation of soil color, compositions and visual evidence of drycleaning solvent contamination.

- Retrieve soil cores from each of the above soil borings, and collect soil samples at 2'-intervals for screening with a photo-ionization detector (PID) for VOC concentrations.

- Select **9** representative soil samples, three from each new soil boring, for laboratory analysis of VOCs. Each soil sample will be collected in accordance with SW-846 Method 5035 using a purge-and-trap soil sampler. A bulk soil sample will also be packed into a 4-ounce glass jar for the determination of the sample's dry weight. All soil samples submitted will be analyzed for volatile organic compounds (VOCs) utilizing SW-846 Method 8260B.

- Convert the 3 soil borings into **3** new groundwater monitoring wells (MW7, MW8, and MW9), with a depth of 15 feet or at least five feet below the water table. Each well will be completed with a 10'-long 1"-diameter PVC screen in the bottom and a 5'-long case above; installed inside a 2"-diameter boring drilled with the GeoProbe. The well annular space is to be packed with coarse silica sand from the bottom to about 1' above the screen section. Fine sand pack filter (about 2' thick) will be added above the coarse sand pack, and then the annular space will be sealed with bentonite to near the surface. The monitoring wells will be flush-mounted with steel manholes cemented at the ground surface. Upon completion, all wells will be developed.

- Perform **3** rounds of groundwater monitoring and sampling on a quarterly basis for a period of 9 months, with one additional quarter (4^{th} quarter) as a contingency pending the WDNR's review and approval. Each quarterly sampling will include collection and submission of **11** representative groundwater samples for laboratory analysis (9 samples from the 9 monitoring wells, 1 for duplicate, and 1 for trip bank). The groundwater samples will be collected using a PVC bailer designated to each well and immediately preserved in 4-ml glass vials containing HCl. The groundwater samples submitted will be analyzed for VOCs

utilizing SW-846 Method 8260B. Proper well development/purging will be completed before the sampling.

- Complete **3** rounds of water table depth measurements from the monitoring wells and survey the ground surface to determine the groundwater table slope or flow directions.

- Install **2** additional soil vapor ports (SV3A and SV-6) in the designated locations.

- Perform **3** rounds of soil vapor monitoring and sampling on a quarterly basis for a period of 9 months, with one additional quarter (4^{th} quarter) as contingency pending the WDNR's review and approval. Each quarterly sampling will include collection and submission of **8** representative soil vapor samples (7 from all the soil vapor sampling ports and one duplicate from the source areas) inside the subject building and the adjoining building to the east to determine if soil vapor intrusion is a risk concern at this site. 6-liter Summa canisters will be used for the soil vapor collection. RR-800, "Addressing Vapor Intrusion at Remediation and Redevelopment Sites in Wisconsin" procedures will be followed.

- Prepare a Site Investigation Report. Remedial goals will be established and options for remedial actions will be evaluated in accordance with Wis. Admin. Code § NR 722.

- Provide quarterly groundwater and soil vapor sampling results to summarize the monitoring and sampling results.

The locations of the proposed new borings/monitoring wells and soil vapor sampling ports are illustrated in Figure 2. The WDNR recommended installation of one additional soil sampling port north of the SV4 location in the Super Cuts store. However, this sampling port was moved towards the back of the store because the front (northern) 70% is a service area that was remodeled with a high-quality wooden floor and is mostly occupied by customers. The store owner is reluctant to allow drilling and installation of a sampling port there. Furthermore, the new location can be used to assess potential VOC migration along the sewer backfills.

4.0 SITE INVESTIGATION PLAN AND METHODOLOGIES

4.1 Soil Sampling

4.1.1 Selection of Soil Boring Locations

Prior to the emplacement of soil borings and monitoring wells, HDC visually and physically inspects the subject facility to identify the areas of concern that are present. This site inspection is also aided with the review of public records and as interview with the current storeowner or occupant. The previous reports, if any, will be a guide to the additional soil and groundwater sampling.

Based on the above studies, the following areas of concern have been identified at the subject drycleaner facility and warrant further investigation:

- Area around drycleaning machines, since the machines are presumed to be the main potential source for PCE release at the subject facility.
- Previous perc-based drycleaning machine locations are also major potential contamination sources;
- Locations near floor drains, sumps, or pipelines, if any;
- The back-door area where drycleaning solvent is/was delivered and waste solvent/filter are/were removed; and
- Areas identified by previous site investigation sampling.

Our proposed additional soil sampling locations (see Figure 2, Additional Sample Location Map) have been strategically selected based on the above conditions. Below is our rational:

NSB13/MW7 – to delineate the potential contamination plume to the south in the public alley.

NSB14/MW8 – to delineate the potential contamination plume to the south or southwest in the public alley.

NSB15/MW9 – to delineate the potential contamination plume to the southwest near the property line.

Soil boring locations (see Figure 2, Additional Sample Location Map) are designed to provide adequate coverage for the potentially contaminated areas to ensure that the source and extent of VOC contamination are properly investigated, and the contamination plume is reasonably defined, and the natural and/or potential man-made pathways, which mainly consist of the current and/or former underground utilities conduits and sanitary/storm sewer pipes, are adequately investigated in the study.

Soil sample collection locations are to be reviewed with the property owner or representative prior to subsurface activities to determine the location of private utilities and other obstructions. A one call service for utilities location will be also contacted in order to mark all the utility lines at and along adjoining streets at the site. Utility line placement information will be added to appropriate maps. Soil sample locations may need to be moved during the soil boring process due to various conditions, including but not limited to utility lines and subsurface refusal encountered while drilling.

Procedures used to collect the samples are provided in the subsections below.

4.1.2 Soil Sampling Point Determination from Soil Cores

During soil sampling activities in the field, each soil boring is continuously sampled, logged and described, with representative soil samples being collected at a depth interval of every two feet in any given soil boring. All of the soil samples are to be screened and measured with a photo-ionization detector (PID) (MiniRAE2000 equipped with a 10.6 eV lamp and calibrated with the 100-ppm benzene equivalent of isobutylene) in the field for the presence and concentrations of volatile organic compounds (VOCs) in the soil samples.

However, due to the cost concern, not every soil sample as collected is submitted for laboratory analysis. Rather, the soil sampling points, from which the representative soil samples are selected for laboratory analysis, are determined using the following criteria:

- The first soil sample is selected for analysis within the upper 3 feet to evaluate the soil ingestion pathway and the surface soil conditions.

- The second soil sample is selected for analysis at the most contaminated segment based on PID readings, odor, visual observation, etc. in order to define the highest level of contamination in the soil boring.

- The third soil sample is collected at a depth representing the lower boundary of the contamination plume in a vertical plane. This lower boundary of the contamination plume is identified in the field at the depth where no PID reading higher than zero ppm is recorded and no visual evidence of contamination, such as odor and/or discoloration, is observed. This soil sample is collected to help delineate the vertical soil contamination.

For the soil borings placed in the source area, additional soil samples may be collected to delineate the vertical distribution of the contaminants of concern (COCs).

4.1.3 Soil Sample Collection

During the soil sampling process, each soil boring is advanced with a GeoProbe system and is continuously sampled with a 4-foot stainless-steel sampling tube lined with a four-foot long plastic liner.

Upon retrieval, the plastic liner along with the soil core is immediately taken out of the sampling tube and is cut open for soil sampling. To minimize the loss of the contaminants through volatilization, the following procedure is followed in soil sampling activities in chronological order:

After the plastic liner is cut open, the entire soil core is screened with the PID to determine the highest VOC concentration segment of the soil core where it is then immediately sampled using purge-and-trap samplers (plastic syringes) for a total of four discrete soil samples on the same segment. Each discrete soil sample is collected into two 40-ml glass vials; one containing a sodium bisulfate preservative, and one 40-ml glass vial containing a methanol preservative. Said glass vials are provided by the laboratory and are deemed clean. Upon collection, soil samples are immediately preserved in an ice chilled cooler. One 4-ounce glass jar is also packed with the same sample for testing of the moisture content and other parameters.

One soil sample is also taken at an interval of every 2-feet of the entire length of the four-foot soil core for head-space screening with PID. These PID screening samples are placed in air-tight plastic bags. Prior to taking the PID readings, we allowed enough time for each soil sample to stabilize. PID measurements are performed using the standard headspace method in which the soil organic vapors that built up in the top 3/4 empty headspace are directly measured with a MiniRAE2000 PID meter. The PID meter is calibrated daily to read in 100 ppm benzene equivalent of Isobutylene in a detection range from 0.1 ppm to 9,999 ppm.

The entire four-foot long soil core is then carefully inspected for visual signs of contamination, and a description of the subsurface strata, variation of soil color, compositions, etc. is noted.

Based on the combined results of the field PID measurements and visual inspection/observation of the soil core brought up by the GeoProbe, HDC selects representative soil samples for laboratory analyses from each soil boring.

All VOC samples are collected, stored, and handled in accordance with the SW-846 Method 5035. Each set of soil samples is contained in four containers, with three 40-ml glass vials respectively containing sodium bisulfate & methanol, and one 4-oz glass jar. The soil sample packed in the 4-ounce jar is used to measure the moisture content of the soil sample among other purposes.

Proper decontamination procedures are followed during the soil sampling activities. The sampling tubes are washed and rinsed prior to and between each sampling activity. A new plastic liner is used for each soil boring advancement. A new pair of gloves is used for the collection of each soil sample.

The Chain of Custody documentation is strictly adhered to during the field sampling activities and during the holding and delivery of the soil samples from the field to a NELAP NIHA-LAP accredited laboratory (Stat Analytical Corporation in Chicago, Illinois) for analysis.

During the field sampling activities, a waterproof pen is used to mark each soil sample container. The information marked on the sample containers includes, but is not limited to, the sample date & time, the sample identification & depth, the sample location, and any other applicable data.

All samples are generally picked up by an analytical laboratory the same day of sampling or the next working day. Before they are picked up, they are stored in a cooler with ice packs. The cooler is stored in our refrigerator, which is set up to 4ºC.

A temperature blank is included within each cooler.

Upon completion of the soil boring activities, each soil boring is filled with bentonite, and then patched with concrete or asphalt to match the original surface finish.

4.2 Sub-Slab Soil Gas/Vapor Sampling

Based on the existing soil VOC results, HDC proposes collection of additional soil vapor samples from 7 vapor ports (existing SV1 to SV5, and new SV3A and SV6, in Figure 2) in the subject property and the adjoining restaurant to the east and the hair salon to the west. HDC has provided a map which shows a 100-foot radius from the soil contamination plume (Please see Figure 1, Site Base Map).

Pursuant to Publication RR-800 (January 2018), Addressing Vapor Intrusion at Remediation and Redevelopment Sites in Wisconsin, and RR986 (Sub-Slab Sampling Procedures), to assess the indoor sub-slab vapor quality, the following air sampling procedures are applied for each sub-slab indoor sampling port (see Figure 6, Sub-Slab Vapor Sampling Diagram):

Construction of Sampling Port:

- Drilling a ¾”-diameter sub-slab penetration hole through the concrete floor inside the building at the designated location where drilling is accessible.
- Expanding the surface 2” depth of the ¾”-diameter penetration hole with a 1”-diameter drill bit, and thoroughly cleaning the entire hole with vacuum and brush.
- Properly insert a vapor sampling assembly into the sub-slab sampling hole. The vapor sampling assembly includes a ½”-diameter copper tube connector that connects a Teflon tube (1/8” ID and 1/4” OD) on each end, with a 1”-diameter stainless steel sleeve mounted on the top of the tube connector. The 1”-diameter stainless sleeve retains the vapor assembly into the hole at 2” depth inside the concrete floor (See Figure 6).
- Sealing the surface 1.5” depth of the annular space in the sampling hole with modeling clay, and push the modeling clay tightly against the concrete wall and around the Teflon tube in the center.
- Extending the Teflon tube from the vapor sample assembly to above the concrete floor for vapor sampling with a coupler and shut-off valve.

Sampling Port Water Dam Test:
To ensure there is no air leakage from the sampling port, a water dam test will be used and described as following:

- The floor around the sampling port is carefully cleaned;
- A 1.5"-diameter and 1.5" tall PVC coupler ring is placed around the sampling port with the sampling outlet tubing extruding about 2" above the ground;
- Modeling clay is used to seal between the bottom of the PVC ring and the concrete floor to create a water dam around the sampling port;
- Bottled water is poured inside the dam and we watch for a water level change. If the water level inside the dam drops, re-seal the port and re-test, until it is stable for 5 minutes.

Sampling Device and Shut-In Test
The sampling device is a 6-liter Summa canister and attached air flow regulator prepared by a certified lab. The shut-in test for the device provided by the lab is as following:

- Check to make sure the canister valve (C) is tightly closed, the air flow regulator is tightly connected on the canister, and the air inlet cap on the regulator has a tight fit;
- Quickly open and close the canister valve; ½ turn, and watch to make sure the pressure gauge stays at its preselected pressure (around 30" Hg) without dropping for 30 seconds. If a pressure drop is observed, re-tighten the connections and cap, and re-test it until it is tight.

Sampling Train Assembly

- A 3-way valve (A) that has one inlet and two outlets is tightly connected with a ¼" OD and 1/8" ID Teflon tube on each of the three ends. The 3-way valve can turn on one outlet while turning off the other outlets simultaneously.
- The inlet end of the 3-way valve is connected to a shut off valve which is attached to the sampling tube inserted in the sampling port inside the concrete floor. One of the two outlets on the 3-way valve is connected to the inlet of the Summa canister while the other outlet is connected to a purging pump (with PID instrument) to purge the vapor sampling train and test the subsurface vapor VOCs.

Sampling Train Shut-In Test

- Check to make sure the canister valve (C) is tightly closed;
- Remove inlet cap from the canister and connect the inlet to one of the outlets of the 3-way valve (A);
- Turn off the vapor sampling port valve (B) and turn on the 3-way valve to allow flow to the canister inlet;
- Quickly open and close the canister valve; ½ turn, and watch to make sure the pressure gauge stays at its preselected pressure (around 30" Hg) without dropping. If a pressure dropping is observed, re-tighten the connections and cap until they are tight without leakage.

Sampling Train Purging and PID Reading

- Turn on the outlet valve connected to the sampling port to allow soil vapor flow from the sub-slab space;

- The 3-way valve is first turned on to the purging pump outlet to purge 3 times the volume of the sampling train (including volume of tubing and the sampling port cavity, up to about 1 liter or 5 minutes) prior to sampling;
- Read the VOC concentrations while purging with the photo-ionization detector;
- Turn the 3-way valve to the canister inlet direction before removing the purging pump.

Sub-slab Soil Vapor Sampling

- Turn the 3-way valve to connect the inlet for the Summa canister to allow soil vapor to be sucked into the pre-vacuumed Summa canister from the sub-slab;
- Paper towels are placed over the sampling train and Isopropyl Alcohol tracer fluid is spread over the towels covering the sampling train during the sampling to ensure no leakage into the sampling train.
- Turn on the Summa canister valve to withdraw soil vapor from the sub-slab space and observe the vacuum pressure drop on the gauge from about -30" Hg to about -5" Hg.
- Turn off the canister valve when the pressure gauge reaches below -5" Hg and replace and tighten the canister cap (the withdrawing process may take about 60 minutes for each sample to fill a 6-liter Summa canister).
- Record the final canister pressure and flow controller number on the canister sample tag, including sample ID and other information.
- The sample is then sent to the laboratory for analysis of VOCs using Method TO-15, including isopropyl alcohol content as its QA/QC parameter.
- The sampling port is sealed and covered for next sampling.

Figure 6 is the diagram that illustrates the sub-slab vapor sampling.

Upon completion all boreholes will be sealed with cement to match the existing conditions.

4.3 Groundwater Sampling

Groundwater will be sampled from the existing monitoring wells (MW1 to MW6). Additional monitoring wells will be drilled to further define the extent of groundwater contamination plumes.

Our proposed additional monitoring well locations (see Figure 2, Additional Sample Location Map) have been strategically selected based on the above conditions. Below is our rational:

NSB13/MW7 – to delineate the potential contamination plume to the south in the public alley.

NSB14/MW8 – to delineate the potential contamination plume to the south or southwest in the public alley.

NSB15/MW9 – to delineate the potential contamination plume to the southwest near the property line.

4.3.1 Monitoring Well Preparation

Generally, monitoring wells are constructed with 1"-diameter 10-foot PVC screen and 5-foot PVC riser. The annular space of the well is first filled with coarse silica sand to a depth of about 1 foot above the well screen, topped with two about feet of fine sand filter, and then bentonite seal above. The wells will be covered with flush-mounted steel manholes and grouted onto the surface. Upon completion, the groundwater monitoring well is developed by purging the standing water in the well until it is free or largely free of fines.

Monitoring Wells Variance Request:

The proposed monitoring wells are 15'-deep groundwater table observation/sampling wells to be installed in the glacial till formation located inside and around the Westwood Cleaners facility. Due to space limitations, access to sampling locations with large drilling equipment is unattainable; therefore, we proposed construction of the monitoring wells with 1"-diameter screens and casings installed inside boreholes drilled with 2"-diameter probes.

We previously requested WDNR's approval for variance from Wis. *Admin Code, § NR 141.19* which requires permanent monitoring wells be installed in borings with a diameter of at least 4" larger than the diameter of the well casing.

4.3.2 Groundwater Sample Collection

During groundwater sampling, the following procedures are adhered to:

- Prior to groundwater sampling, the wells are purged with a disposal bailer until they are free of visible fines.
- A groundwater sample is then retrieved with a disposable PVC bailer equipped with a Teflon ball check valve at the bottom.
- Each groundwater sample retrieved is divided and dispensed into two 40-ml glass vials containing HCL.
- The sample containers are closed with Teflon-lined lids.
- Upon completion, groundwater samples are immediately stored in an ice-chilled cooler.

After the vials are filled with water samples, we check to see if the vials are free of bubbles by holding the vials upside down. If bubbles are found, a new groundwater sample is collected from the well.

Proper decontamination procedures are followed during the groundwater sampling activities. A new PVC bailer is used in each groundwater sampling activity. A new pair of gloves is used for collecting each groundwater sample.

The Chain of Custody documentation is strictly adhered to during the groundwater sampling activities and during the delivery of the groundwater samples from the field to the laboratory.

During the field sampling activities, a waterproof pen is used to mark each groundwater sample container. The information marked on the sample containers includes, but is not limited to, the sample date and time, the sample identification, the sample locations, and any other applicable data.

All samples are generally picked up by an analytical laboratory the same day of sampling or the next working day. Before they are picked up, they are stored in a cooler with ice packs. The cooler is stored in our refrigerator, which is set to 4ºC. Collected groundwater samples are analyzed by Stat Analytical Corporation which is a laboratory accredited by WDNR.

A trip blank, a duplicate sample, and a temperature blank are included with each groundwater sampling event.

4.4 Sample Handling

The collected samples are labeled, packaged, and shipped in accordance with procedures outlined above.

4.5 Quality Assurance/Quality Control

Quality control (QC) samples may be collected to evaluate the field sampling and decontamination methods, and the overall reproducibility of the laboratory analytical results. Specifically, QC samples may be collected at the following frequencies:

- Trip Blank - 1 per shipment or cooler for water samples
- Field duplicate samples - 1 per 10 investigative samples for groundwater samples
- Matrix spike/matrix spike duplicate samples - 1 per 20 non-air investigative samples

Trip blanks are submitted for laboratory analysis to assess for potential contamination during handling, shipment, and storage of the investigative samples. Trip blanks are filled by the analytical laboratory with organic-free water and are kept with the investigative water samples throughout the field event. Field duplicate samples are collected for each investigative matrix (soil gas, sub-slab vapor, ambient air, indoor air, groundwater, and/or soil) as associated investigative samples. Field duplicate samples are processed, stored, packaged, and analyzed by the same methods as the investigative samples.

The HDC project manager, Mr. Mike Wan, PE, is responsible for ensuring that sample quality and integrity are maintained and that sample labels and documentation procedures are correct and accurate.

4.6 Decontamination

Dedicated sampling equipment is primarily used during the collection of soil and groundwater samples. Used sampling equipment and personal protective equipment (PPE) is double-bagged and disposed of as dry, industrial waste.

Non-disposable equipment (such as the stainless-steel dual tube coring devices, waster table measurement and slug test equipment) is decontaminated between sampling locations. They will be cleaned with environment-friendly detergent and rinsed with tap water. Decontamination water use will be kept to a minimum, and typically 5-10 gallons of rinsate water is generated. The decontamination water is disposed of on-site by evaporation over a hard surface.

5.0 COST ESTIMATE

Please see the revised DERF Additional Site Investigation Bid Sheets in Appendix I.

6.0 PROPOSED SCHEDULE

HDC anticipates that the fieldwork may take 2 to 3 days. The tentative schedule is as follows.

Activities	Estimated Completion Date
Workplan Completion and Submittal to WDNR	November 2019
WDNR Review and Approval	December 2019
Field Work	2-3 working days Upon Approval of DNR and Owner
(3) Quarterly Monitoring	9 to 12 Months
Evaluate Data and Prepare Reports	10 Working Days after Lab Results

7.0 TERMS & CONDITIONS

The terms and conditions between the Client and Hydrodynamics Consultant, Inc. are agreed upon as follows:

- Client will provide HDC and/or its subcontractors with adequate physical access to the subject property;
- The Client will pay each new invoice within 30 days and a 1.5% monthly interest will be assessed for each month of delayed payment.
- HDC will provide equipment and labor to complete the scope of work proposed herein in a manner consistent with all regulatory requirements (especially NR 716) and/or industry standards.
- The fieldwork may take 2 to 3 days to complete each time.
- HDC will try to complete report(s) within one month after each quarterly sampling is completed.
- HDC will assist Client reimbursement of the costs from the Wisconsin Drycleaners Environmental Response Fund. But HDC will not guarantee full reimbursement, nor will Client's payment for HDC's work be conditioned with any third-party payment to the Client.

8.0 WORKPLAN PREPARER'S SIGNATURE

The above Additional Site Investigation Workplan is prepared and submitted by

Mike (Minghua) Wan, PE
Vice President
Consultant: Hydrodynamics Consultants, Inc

9.0 OWNER'S APPROVAL AND ACCEPTANCE OF THE ABOVE WORKPLAN

The above Additional Site Investigation Workplan is approved and accepted by

Dong Sin _____ (Signature), Date _____

Title _____

Westwood Cleaners
8371 West North Avenue
Wauwatosa, WI 53226

Attachments:

FIGURES

Figure 1	Site Base Map
Figure 1a	Site Utility Line Location Map
Figure 2	Additional Soil Boring/Monitoring Well & Soil Vapor Port Location Map
Figure 3	Soil cVOC Isoconcentration Plume Map
Figure 3a	A-A' Soil cVOC & Geological Cross Section
Figure 4	Groundwater cVOC Distribution Map
Figure 4a	B-B' Soil & Groundwater cVOC & Geological Cross Section
Figure 5	Sub-Slab Vapor cVOC Distribution Map
Figure 5a	A-A' Soil & Soil Vapor cVOC & Geological Cross Section
Figure 6	Sub-Slab Soil Gas Sampling Diagram

APPENDIX I

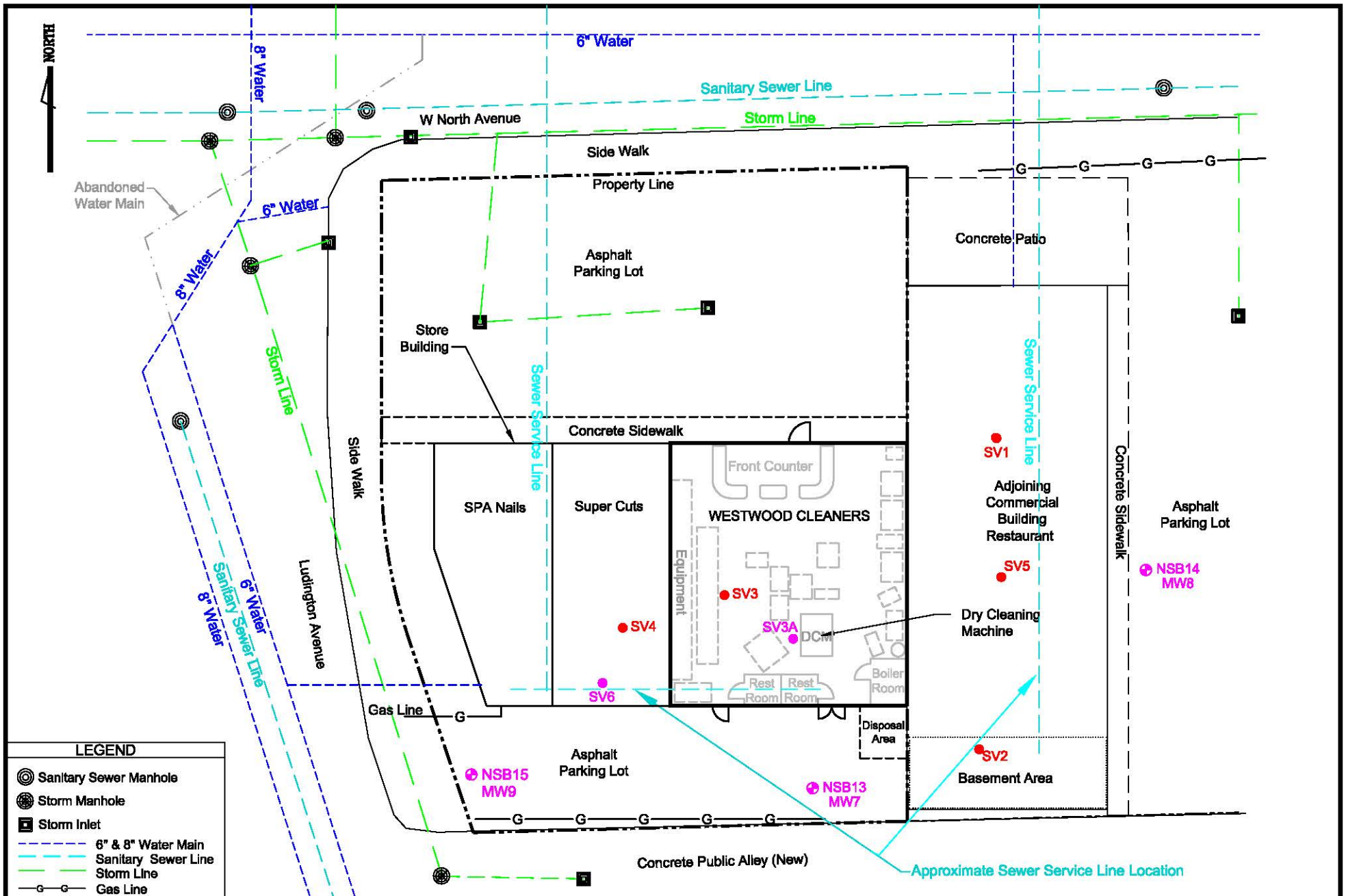
DERF Site Investigation Bid Sheets

5403 Patton Dr., Suite 215, Lisle, Illinois 60532
Tel. 630-724-0098 Web Site: http://www.HydrodynamicsConsultants.com

FIGURES

Figure 1 Site Vicinity Map

WDNR BRRTS #02-41-552537/Milwaukee County
Westwood Cleaners
8751 W. North Avenue, Wauwatosa, WI 53226



SITE NAME	Westwood Dry Cleaners (#02-41-552537)	FIGURE NO.	1a
FIGURE NAME	Site Utility Line Location Map		
ADDRESS	8731 West North Avenue, Wauwatosa, WI 53226		

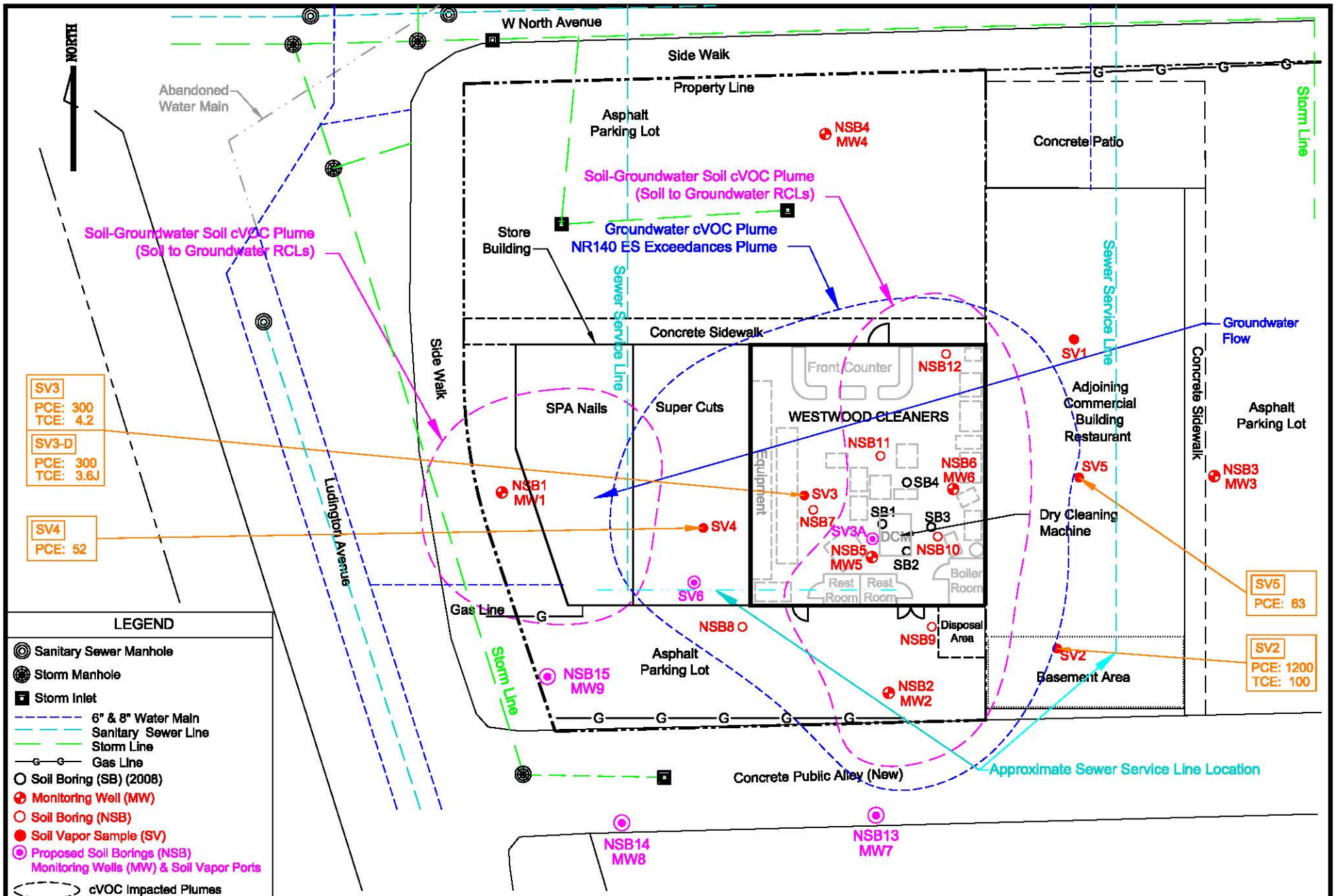
SCALE

0 25' 50'

HYDRODYNAMICS CONSULTANTS, INC.

5403 Patton Dr. Unit 215, Lisle, IL 60532

Tel: (630) 724-0098, HydrodynamicsConsultants.com



SITE NAME	Westwood Dry Cleaners (#02-41-552537)	FIGURE NO.	2
FIGURE NAME	Additional Soil Boring/Monitoring Well & Soil Vapor Port Location Map		
ADDRESS	8731 West North Avenue, Wauwatosa, WI 53226		

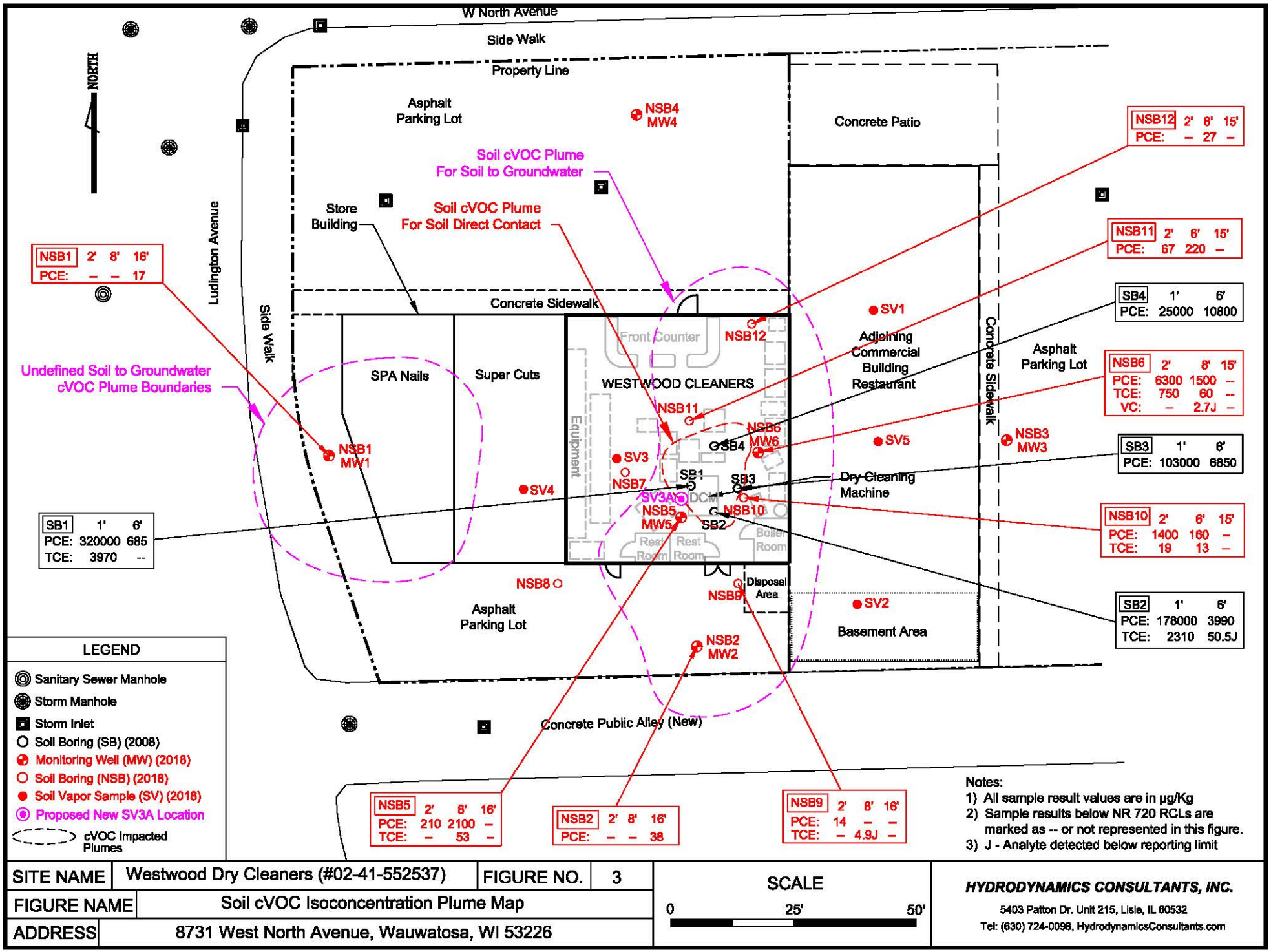
SCALE

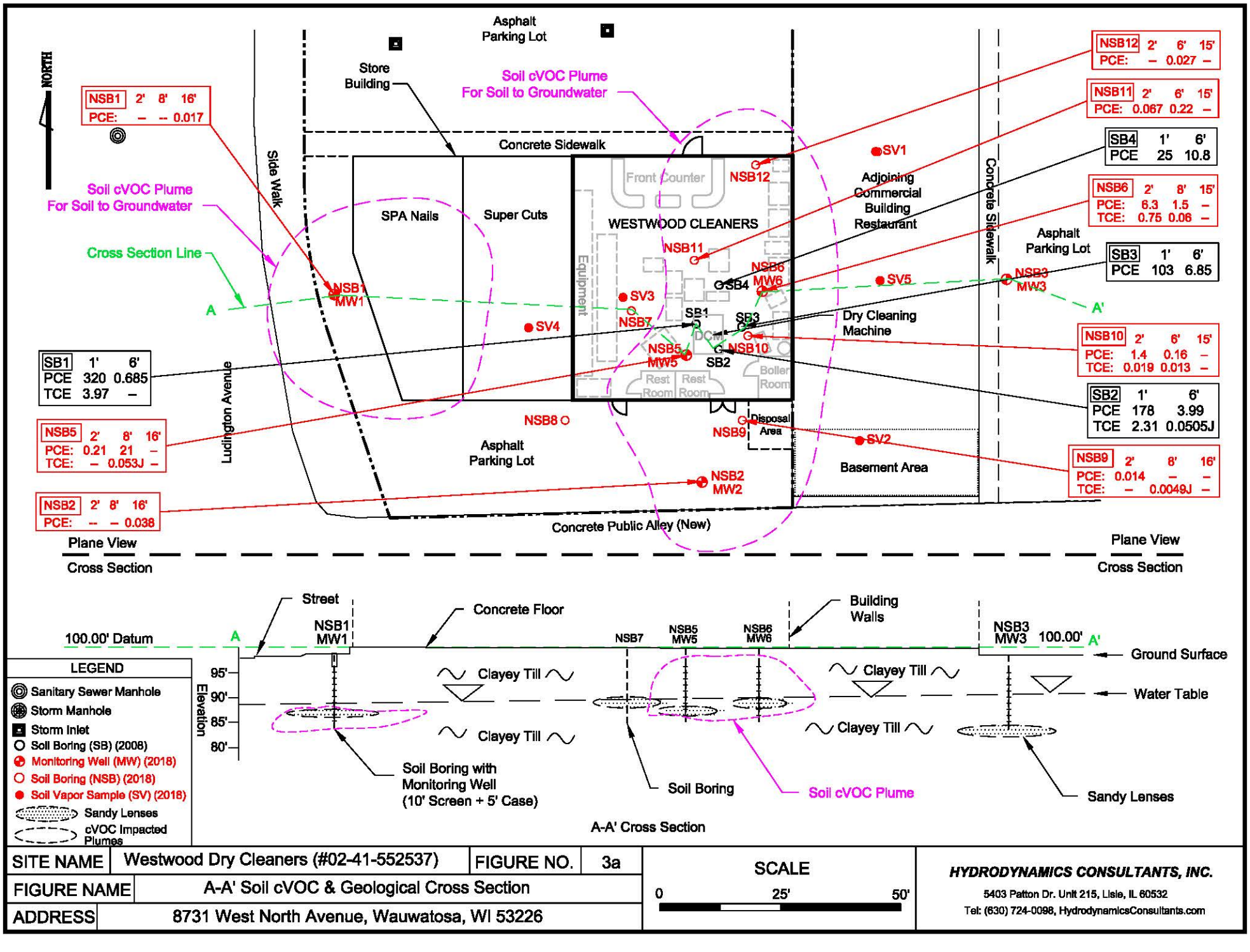
0 25' 50'

HYDRODYNAMICS CONSULTANTS, INC.

5403 Patton Dr. Unit 215, Lisle, IL 60532

Tel: (630) 724-0098, HydrodynamicsConsultants.com


W North Avenue
Side Walk
Property Line
NORTH
Asphalt Parking Lot
NSB4 MW4
Concrete Patio
Soil cVOC Plume For Soil to Groundwater
Soil cVOC Plume For Soil Direct Contact
Store Building
Ludington Avenue
Side Walk
NSB1 2' 8' 16'
PCE: – – 17
Concrete Sidewalk
Undefined Soil to Groundwater cVOC Plume Boundaries
SPA Nails
Super Cuts
Front Counter
NSB12
WESTWOOD CLEANERS
NSB11
NSB6 MW6
SB4
SV1
Adjoining Commercial Building Restaurant
Asphalt Parking Lot
Concrete Sidewalk
NSB3 MW3
SV5
NSB1 MW1
SV3
NSB7
SB1
SB3
SV4
SV3A
NSB5 MW5
NSB10
SB2
Dry Cleaning Machine
Equipment
DCM
Rest Room
Rest Room
Boiler Room
Disposal Area
NSB8
NSB9
SV2
Basement Area
Asphalt Parking Lot
NSB2 MW2
Concrete Public Alley (New)
NSB12 2' 6' 15'
PCE: – 27 –
NSB11 2' 6' 15'
PCE: 67 220 –
SB4 1' 6'
PCE: 25000 10800
NSB6 2' 8' 15'
PCE: 6300 1500 –
TCE: 750 60 –
VC: – 2.7J –
SB3 1' 6'
PCE: 103000 6850
SB1 1' 6'
PCE: 320000 685
TCE: 3970 –
NSB10 2' 6' 15'
PCE: 1400 160 –
TCE: 19 13 –
SB2 1' 6'
PCE: 178000 3990
TCE: 2310 50.5J
NSB5 2' 8' 16'
PCE: 210 2100 –
TCE: – 53 –
NSB2 2' 8' 16'
PCE: – – 38
NSB9 2' 8' 16'
PCE: 14 – –
TCE: – 4.9J –
LEGEND
Sanitary Sewer Manhole
Storm Manhole
Storm Inlet
Soil Boring (SB) (2008)
Monitoring Well (MW) (2018)
Soil Boring (NSB) (2018)
Soil Vapor Sample (SV) (2018)
Proposed New SV3A Location
cVOC Impacted Plumes
Notes:
1) All sample result values are in µg/Kg
2) Sample results below NR 720 RCLs are marked as -- or not represented in this figure.
3) J - Analyte detected below reporting limit
SITE NAME Westwood Dry Cleaners (#02-41-552537)
FIGURE NO. 3
FIGURE NAME Soil cVOC Isoconcentration Plume Map
ADDRESS 8731 West North Avenue, Wauwatosa, WI 53226
SCALE
0 25' 50'
HYDRODYNAMICS CONSULTANTS, INC.
5403 Patton Dr. Unit 215, Lisle, IL 60532
Tel: (630) 724-0098, HydrodynamicsConsultants.com



SITE NAME	Westwood Dry Cleaners (#02-41-552537)	FIGURE NO.	3a
FIGURE NAME	A-A' Soil cVOC & Geological Cross Section		
ADDRESS	8731 West North Avenue, Wauwatosa, WI 53226		

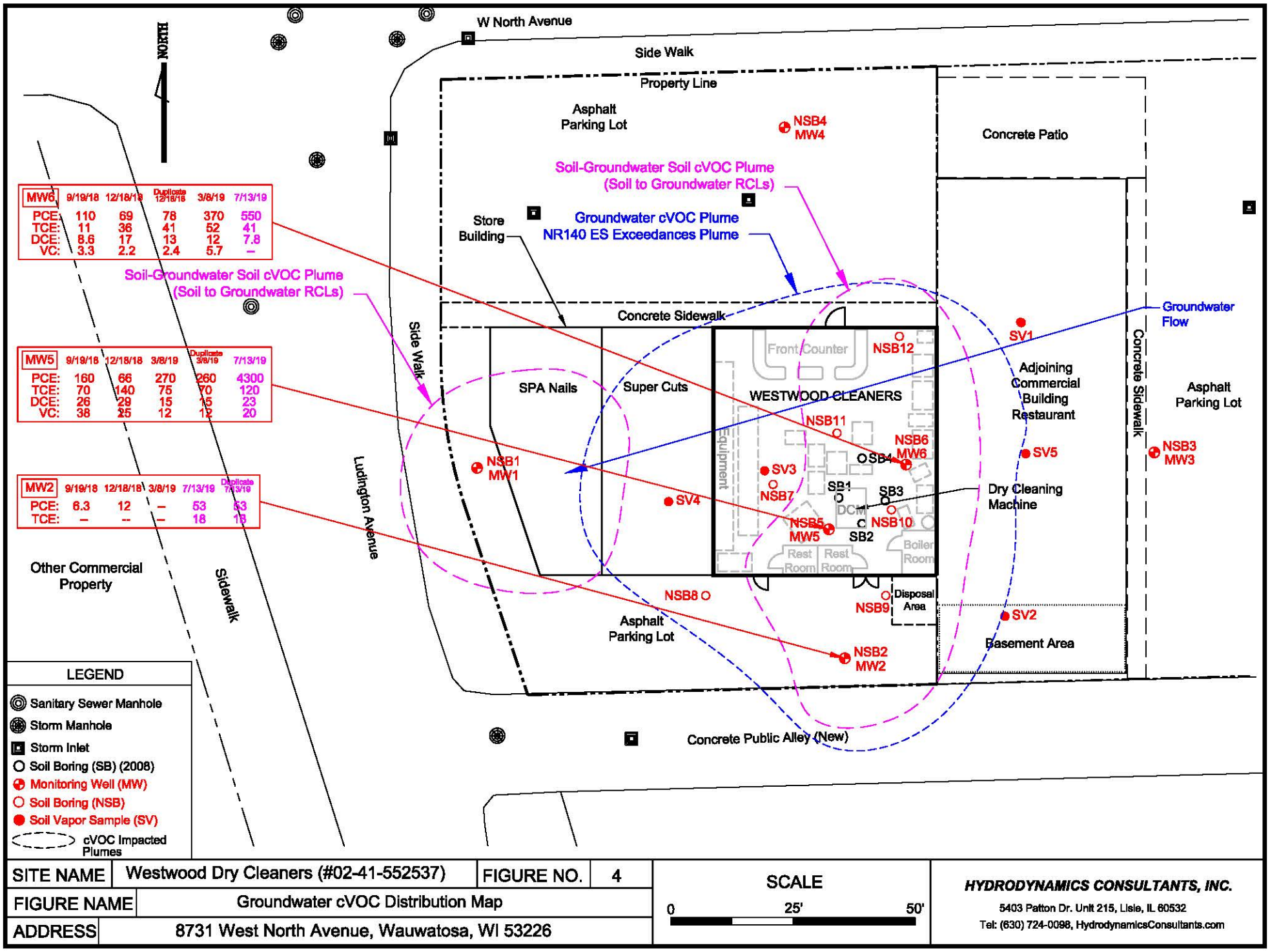
SCALE

0 25' 50'

HYDRODYNAMICS CONSULTANTS, INC.

5403 Patton Dr. Unit 215, Lisle, IL 60532

Tel: (630) 724-0098, HydrodynamicsConsultants.com



SITE NAME	Westwood Dry Cleaners (#02-41-552537)	FIGURE NO.	4
FIGURE NAME	Groundwater cVOC Distribution Map		
ADDRESS	8731 West North Avenue, Wauwatosa, WI 53226		

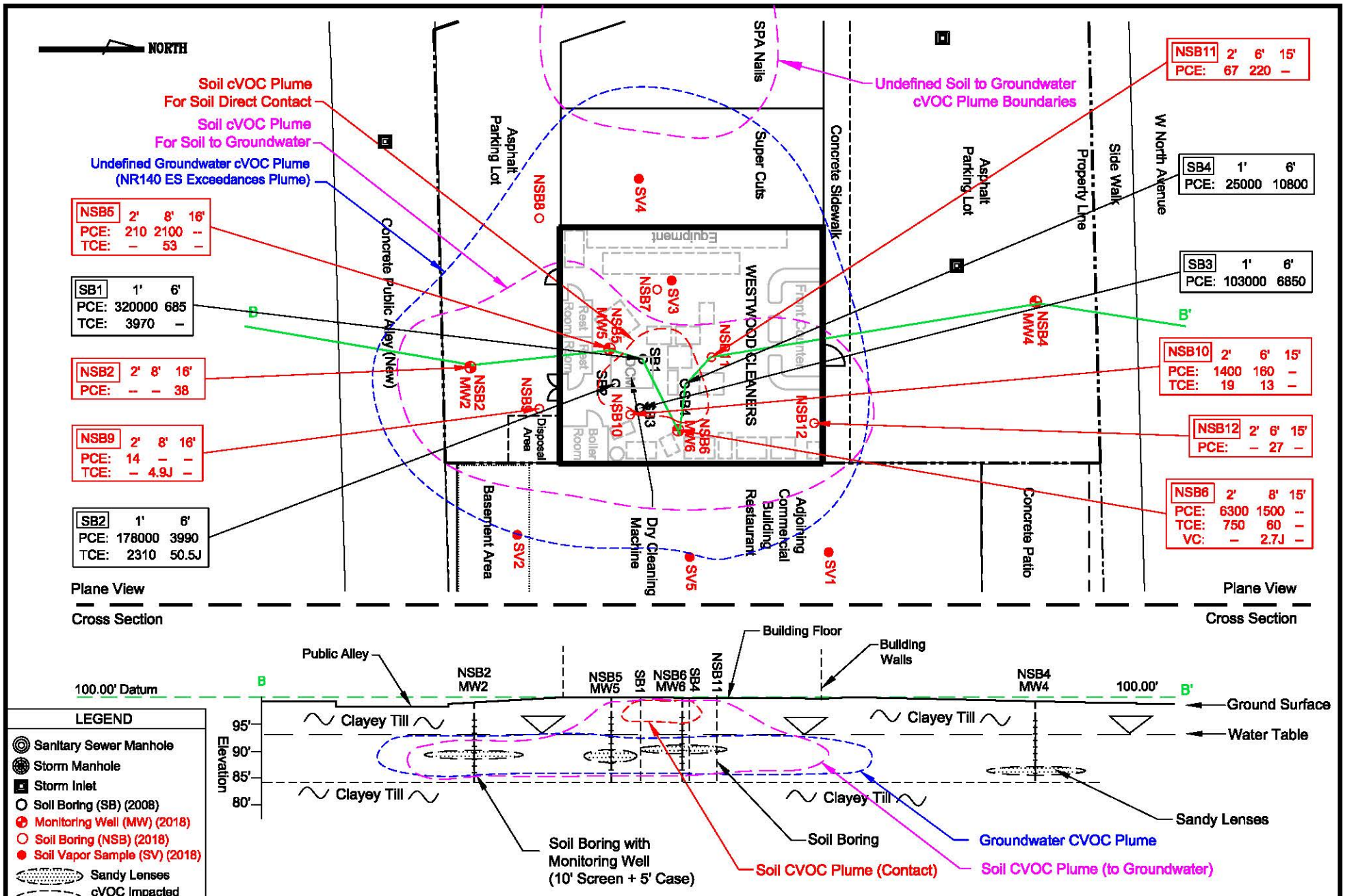
SCALE

0 25' 50'

HYDRODYNAMICS CONSULTANTS, INC.

5403 Patton Dr. Unit 215, Lisle, IL 60532

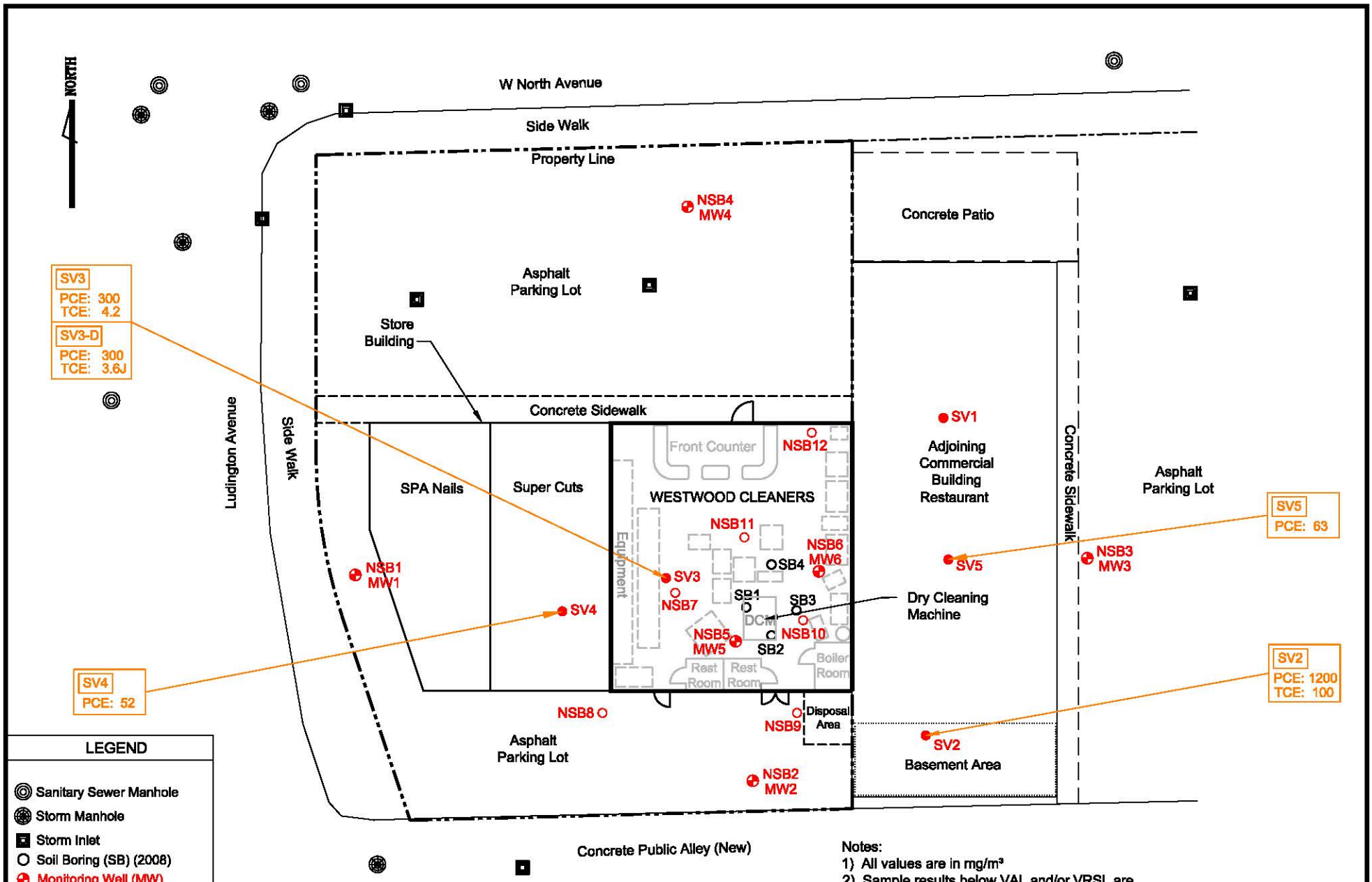
Tel: (630) 724-0098, HydrodynamicsConsultants.com



SITE NAME	Westwood Dry Cleaners (#02-41-552537)	FIGURE NO.	4a
FIGURE NAME	B-B' Soil & Groundwater cVOC & Geological Cross Section		
ADDRESS	8731 West North Avenue, Wauwatosa, WI 53226		

SCALE
0 25' 50'

HYDRODYNAMICS CONSULTANTS, INC.
5403 Patton Dr. Unit 215, Lisle, IL 60532
Tel: (630) 724-0098, HydrodynamicsConsultants.com



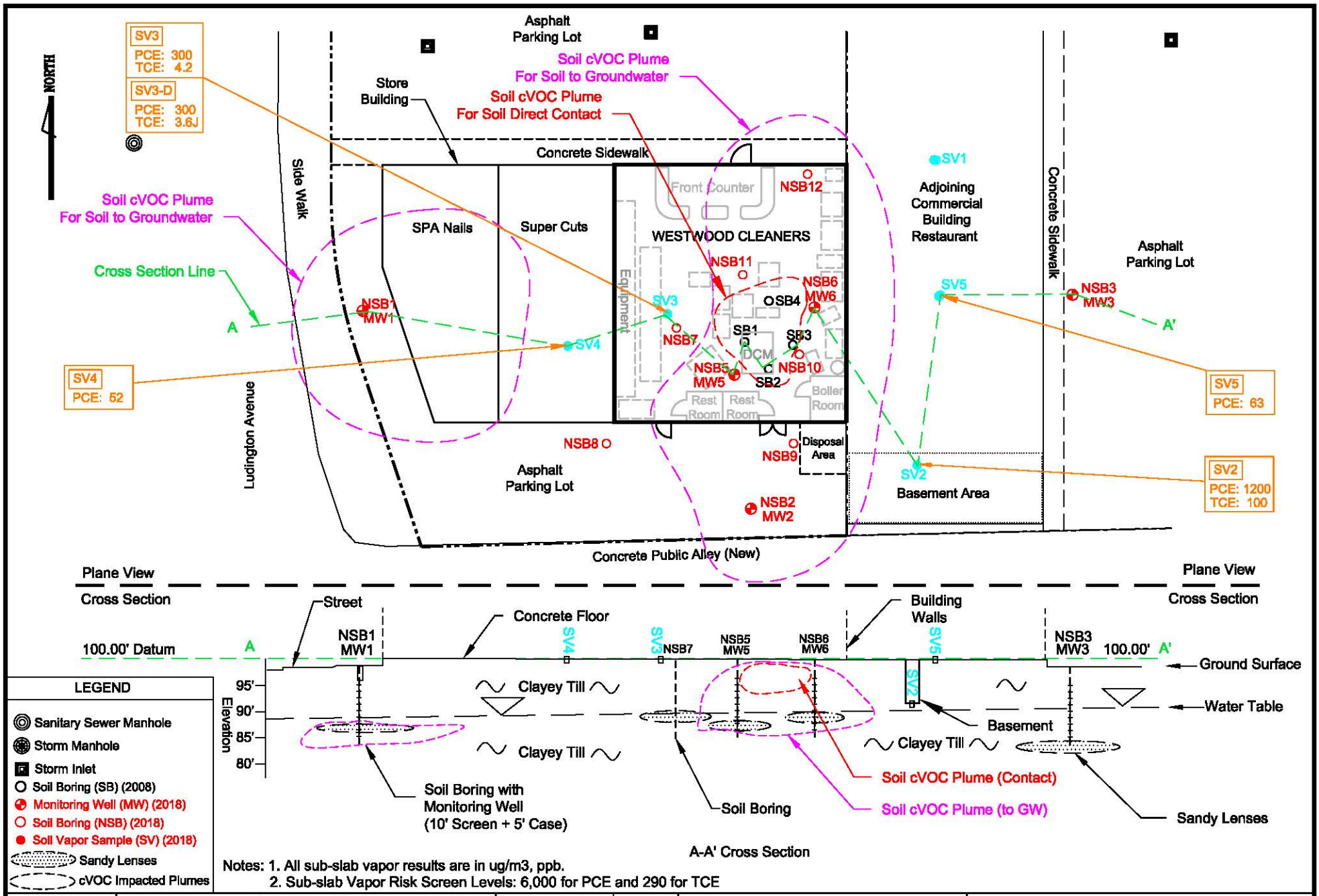
Notes: 1. All sub-slab vapor results are in ug/m3, ppb.
2. Sub-slab Vapor Risk Screen Levels: 6,000 for PCE and 290 for TCE

Notes:
1) All values are in mg/m³
2) Sample results below VAL and/or VRSL are marked as -- or not represented in this figure.
3) All the results are below the Sub-Slab VRSL for Small Commercial Property

SITE NAME	Westwood Dry Cleaners (#02-41-552537)	FIGURE NO.	5
FIGURE NAME	Sub-Slab Vapor cVOC Distribution Map		
ADDRESS	8731 West North Avenue, Wauwatosa, WI 53226		

SCALE
0 25' 50'

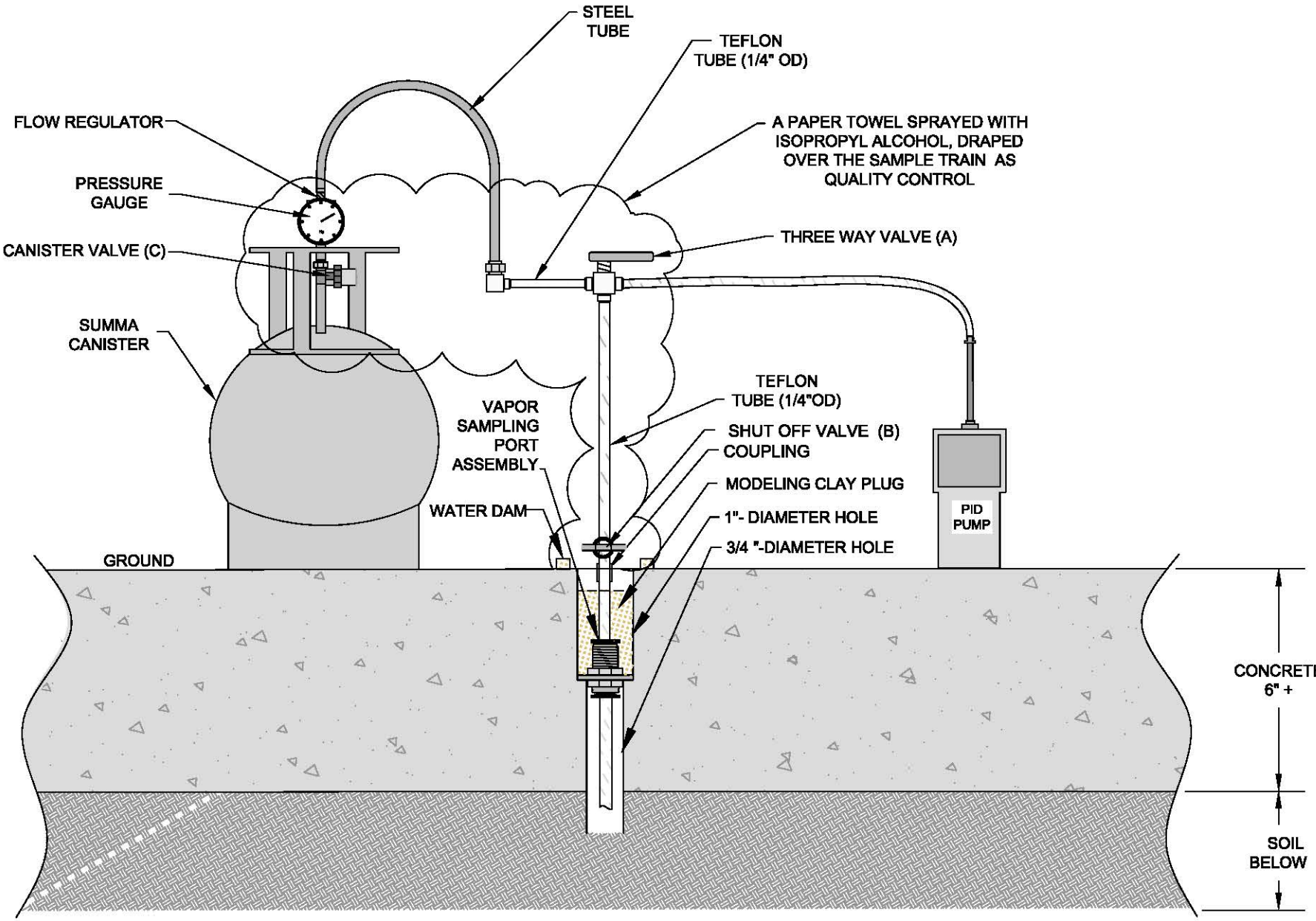
HYDRODYNAMICS CONSULTANTS, INC.
5403 Patton Dr. Unit 215, Lisle, IL 60532
Tel: (630) 724-0098, HydrodynamicsConsultants.com



SITE NAME	Westwood Dry Cleaners (#02-41-552537)	FIGURE NO.	5a
FIGURE NAME	A-A' Soil & Soil Vapor cVOC & Geological Cross Section		
ADDRESS	8731 West North Avenue, Wauwatosa, WI 53226		

SCALE
0 25' 50'

HYDRODYNAMICS CONSULTANTS, INC.
5403 Patton Dr. Unit 215, Lisle, IL 60532
Tel: (630) 724-0098, HydrodynamicsConsultants.com



SITE NAME	North Suburban Cleaners	FIGURE NO.	6
FIGURE NAME	Sub-Slab Soil Gas Sampling Diagram		
ADDRESS	7620-7622 Dempster St. Morton Grove, IL 60053		

NOT TO SCALE

HYDRODYNAMICS CONSULTANTS, INC.
5403 Patton Dr. Unit 215, Lisle, IL 60532
Tel: (630) 724-0098

APPENDIX I
DERF Site Investigation Bid Sheets

State of WIsconsin
Department of Natural Resources
PO Box 7921, Madison WI 53707-7921
dnr.wi.gov

DERF Site Investigation Bid Summary
Consultant Selection Cover Sheet

Notice: Use this form to notify the Department of Natural Resources of the consultant you are selecting to conduct a site investigation and to submit and summarize the bids required in the Dry Cleaner Environmental Response Fund (DERF) Program. This form is authorized under s. 292.65, Wis. Stats. and s. NR 169.23, Wis. Adm. Code. Completion of this form is mandatory for any person applying for DERF reimbursement. Persons who do not submit a completed form will not be eligible for reimbursement under DERF. Personal information will be used to manage the DERF program, and be made available to requesters under Wisconsin's Open Records laws (ss. 19.32-19.39, Wis. Stats.) and requirements.

Complete the following information and submit it to your DNR regional project manager. Copy this form as necessary.

Site Information		
Site name:	**Facility Name:** Westwood Cleaners	**BRRTS #** 02-41-552537
Consultant Selected		
Consultant Name: Hydrodynamics Consultants, Inc.	**Consultant Address:** 5403 Patton Dr. Suite 215, Lisle, IL 60532	
Summary of Costs:		

Intitial Site Investigation: Completed Work

Consultant Name: Hydrodynamics Consultants	
Consulting costs:	$19,460.00
Drilling costs:	$8,191.00
Analytical costs:	$10,800.00
Miscellaneous costs:	$4,500.00
Total Costs:	$42,951.00

Additional Site Investigation: Change Order #1

Consultant Name: Hydrodynamics Consultants	
Consulting costs:	$21,720.00
Drilling costs:	$3,020.00
Analytical costs:	$14,360.00
Miscellaneous costs:	$2,600.00
Total Costs:	**$41,700.00**

Justification for Selection:

Applicant Information and Certification			
I certify that the information contained above is true and correct to the best of my knowledge.			
Applicant Name: Dong J. Sin		Date	
Street Address: 8731 W. North Ave	City: Wauwatosa	State: WI	Zip Code: 53226
Signature			
Department Use Only			
Project Manager Approval Signature	Phone Number	Date	

If not approved, reason for non-approval:

Consultant Name: HDC Inc.
Site Name: Westwood Cleaners
BRRTS #02-41-552537
WDNR FID #241836100

DERF Site Investigation Bid Sheet
Consultant Bid Summary

Site Information	
Site Name: Westwood Cleaners	
Consultant Name: Hydrodynamics Consultants, Inc. (HDC Inc.)	Applicant Name: Mike Wan

Bid Summary	
Drilling Costs Total =	**$3,020.00**
Analytical Costs Total =	**$14,360.00**
Consulting Costs Total =	**$21,720.00**
Misc Costs Total =	**$2,600.00**
Grand Total =	**$41,700.00**

I certify that the costs are an accurate estimate of my total projected costs for the site investigation and I understand and will adhere to s.292.65 Stats. and ch NR 169, Wis. Adm. Code.

Consultant Signature	11/08/2019

Please attach to these forms a written narratige specifying how the tasks outlined in these sheets will be performed.

Consultant Name: HDC, Inc.
Site Name: Westwood Cleaners
BRRTS #02-41-552537
WDNR FID #241836100

DERF Site Investigation Bid Sheet
Drilling Costs

Drilling Costs						
Task	Interval	Number of Borings or Wells	Number of Days	Total Number Feet Drilled	Cost/feet, Day or Well	Total Cost
Well installation and Completion						
1" to 2" diameter PVC Wells	0 ft to 15 ft	3			$230	$690.00
	0 ft to 20 ft					
2" diameter PVC piezometers	0 ft to 20 ft	0			$260	$0.00
	> ___ ft					
Decontamination Costs		Included in soil boring cost				$0.00
Mobilization Costs		Included in soil boring cost				$0.00
Auger Borings (continuous sampling)						
	0 ft to 16 ft					
	___ ft to ___ ft					
	___ ft to ___ ft					
	> ___ ft					
Decontamination Costs		Included in cost per well				
Mobilization Costs		Included in soil boring cost				
Auger Borings (specify split spoon sampling interval)						
Piezometer borings without sampling	0 ft to 20 ft	0			$300	$0.00
	___ ft to ___ ft					
	___ ft to ___ ft					
	> ___ ft					
Decontamination Costs			0		$250	$0.00
Mobilization Costs			0		$200	$0.00
Direct Push Borings (per point)						
Soil Boring	< 16 ft depth	3			$350	$1,050.00
	___ ft - __ ft depth					
	> ____ ft depth					
Decontamination Costs			1		$250	$250.00
Mobilization Costs			1		$200	$200.00
Well Development (if done by subcontractor)						
	Monitoring Wells					
	Piezometers					
	Recovery Wells					
Other						
Drums		1			$80	$80.00
Flush Mount Covers		3			$50	$150.00
Protector Pipes						
Sub-Slab soil vapor sampling port installation & abandonment		3			$150	$450.00
Monitoring well development		3			$50	$150.00
Total Drilling Costs						$3,020.00

Consultant Name: HDC Inc.
Site Name: Westwood Cleaners
BRRTS #02-41-552537
WDNR FID #241836100

DERF Site Investigation Bid Sheet
Analytical Costs

Parameter	WI Certified Lab			Field Test/Field Kit			Mobile Lab			
	$/ sample	# samples	Method Used	$/ sample	# samples	Method Used	$/Sample $/Day	# Samples # Days	Method Used	Total Costs
Solids Analysis										
VOCs	$120	9	SW-846 Method 8260B							$1,080.00
TCLP										$0.00
RCRA Metals										$0.00
Duplicate Analyses										$0.00
Blank Analyses										$0.00
Other: TOC	$40	0	ASTM D 2974-87							$0.00
										$0.00
Water Analysis (low flow sampling assumed unless otherwise indicated at bottom of this sheet)										
VOCs	$120	36	SW-846 Method 8260B							$4,320.00
Nitrate*										$0.00
Dissolved Oxygen*										$0.00
Temperature*										$0.00
Ferrous Iron*										$0.00
Sulfate*										$0.00
Sulfide*										$0.00
ORP*										$0.00
pH*										$0.00
TOC*										$0.00
Alkalinity*										$0.00
Chloride*										$0.00
Spec. Conductance*										$0.00
Ethene/Ethane/Methane*										$0.00
Hydrogen*										$0.00
Carbon Dioxide*										$0.00
RCRA Metals										$0.00
Duplicate Analyses	$120	4	SW-846 Method 8260B							$480.00
Blank Analyses	$120	4	SW-846 Method 8260B							$480.00
Other: (Specify)										$0.00
Air Analysis										
VOCs	$250	28	TO-15							$7,000.00
TCE										$0.00
PCE (minimum detection limit is <10 ppbv)										$0.00
Other: Tracer Analysis	$0	28	TO-15							$0.00
Duplicate	$250	4								$1,000.00
Waste Analyses (soil/water)										
VOCs	$120	0	SW-846 Method 8260B							$0.00
Miscellaneous (specify)										
										$0.00
Charge for Mobile Lab (indicate # days and daily fee)										
Total Analytical Costs										$14,360.00

* Natural Attenuation parameters required for consideration of NA as remedy.

Consultant Name: HDC Inc.
Site Name: Westwood Cleaners
BRRTS #02-41-552537
WDNR FID #241836100

DERF Site Investigation Bid Summary
Consultant Costs
Form 4400-233 (R 4/04) Page 5 of 6

		Hours/Task																	
																Other (specify)			
Position (specify)	Hourly Rate	Workplan Development (update)	Access	Receptor Survey	Waste Determination	Drilling	Hydraulic Conductivity Test	Well Development	Soil Sampling	Groundwater sampling	Soil gas/vapor intrusion Sampling	SSRCL calculations (contained out or remedial actions)	SI Report preparation (update)	Quarterly Report preparation	Project Management			**Total Hours**	Total Costs
Professional Staff																			
Sr. Prof. Engineer	$160	8											8	32	8			56	$8,960.00
Field Staff																			
Prof. Engineer	$135					4			4	16	48							72	$9,720.00
Senior Technician	$60							4										4	$240.00
Office Support Staff																			
Sr. Admin. Assistant	$50	4											4	16	4			28	$1,400.00
Sr. Draftsperson/CAD	$50	4											4	16	4			28	$1,400.00
Total Consulting Costs																			**$21,720.00**

Consultant Name: HDC Inc.
Site Name: Westwood Cleaners
BRRTS #02-41-552537
WDNR FID #241836100

DERF SIte Investigation Bid Summary Sheet
Miscellaneous Costs

Major Activity	Specifications	Commodity Unit (specify)	Unit Rate	Number of Units	Total Cost
IDW Disposal					
Site Investigation Waste Disposal	Non-Hazardous				
	Hazardous	Drums	$200	1	$200.00
Equipment Rental (list and include shipping costs if applicable)					
Field Supplies (list)					
Supplies, PID meter, etc.	Intital Site Visit (drilling, etc.)	Lump Sum	$900	1	$900.00
Mobilization (crew, equipment, etc.) For Drilling	Travel to & from site	Each trip	$300	1	$300.00
Mobilization (crew, equipment, etc.) For Quarterly Monitoring	Travel to & from site	Each trip	$300	4	$1,200.00
Surveying					
Personal Protection Equipment (list)					
Sample Shipping Costs					
Other (specify)					
Total Miscellaneous Costs					$2,600.00

Reminders: DERF does not reimburse for attorney, closure or GIS fees. Mileage and meals are also non-reimbursable. Also, costs to prepare a reimbursement application and discuss the application with the department are not reimburseable. No expedited shipping w/o prior PM approval.