

May 2, 2012

Mr. Ed Olson and Al Timm
Voluntary Investigation & Cleanup Program
Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, MN 55155

**RE: Soil Vapor Sampling Work Plan
MN Bio Business Center, Rochester, MN**

Dear Ed and Al:

On behalf of the City of Rochester (Client), Landmark Environmental, LLC (Landmark) proposes to complete a vapor intrusion investigation (Investigation) at the above-referenced property (Property). The Property location is shown on Figure 1. As discussed in the November 22, 2011, meeting between the Client, Landmark, and the Minnesota Pollution Control Agency (MPCA) Voluntary Investigation and Cleanup (VIC) Program, a soil gas sampling investigation is required to provide post-dual phase extraction (DPE) system soil vapor data at the Property to compare with soil gas data collected prior to installation of the DPE system, the vapor barrier system, and the passive venting system.

BACKGROUND

On October 7, 2011, Landmark submitted a *Vapor Intrusion Pathway Evaluation* letter to the MPCA. This letter provided a summary of the results from soil gas and groundwater sampling at and in the vicinity of the above referenced property (Property), which previously consisted of the 219 and 223 Parcels (the former 219 and 223 Parcels). Some of the data evaluated in this letter was obtained during the March 2007 *Phase II Environmental Investigation* conducted by Landmark on behalf of the City. This letter also referenced soil gas sampling results published in a July 2006 report by DPRA, titled *Implementation Report, Dual Phase Extraction System Installation and Start-up* (DPRA Report), on behalf of the previous owner of the former 219 Parcel. In addition, this letter compared current groundwater results at the Property to the MPCA's Groundwater Intrusion Screening Values (GWISVs). Previous soil gas sampling locations and current well locations are shown on Figure 2.

The former 219 Parcel was the site of two former dry cleaning operations and previous environmental investigations conducted there have documented significant quantities of the dry cleaning solvent tetrachloroethylene (PCE) in deep soils and groundwater. During redevelopment of the Property in 2009, the DPE system was installed to remediate source area PCE in the soil, fractured bedrock, and groundwater. In addition to the DPE system, vapor barrier and passive venting systems were installed to address the potential for vapor intrusion after source area remediation from the DPE system is completed.

The soil gas samples were collected for a number of volatile organic compounds (VOCs),

including benzene and PCE, both of which are reported carcinogens. The applicable MPCA screening criteria for soil gas samples collected on commercial/industrial properties, such as the Property, are the 10X Industrial Intrusion Screening Values (IISVs) (February 2009 version). Detections of soil gas were obtained during the investigation on the Property and on adjacent properties as described below.

DPRAs Soil Gas Results from November 2005

Soil gas sampling presented in the DPRAs Report involved four sampling locations. Two soil gas samples were collected on the former 219 Parcel, one soil gas sample was collected on the property located at former 223 Parcel and one soil gas sample was collected on an adjacent property located at 201 First Avenue S.W. (the 201 Parcel). The results from the DPRAs sampling event were submitted to the MPCA VIC Program for review. The DPRAs data is included in Table 1 of Attachment 1. The DPRAs soil gas sample locations are labeled SG-1 through SG-4 on the attached Figure 2.

PCE was reported in each soil gas sample ranging from 2.2 to 520 micrograms per cubic meter (ug/m^3). SG-2 was located on the 201 Parcel and reported PCE at a concentration of $2.2 \text{ ug}/\text{m}^3$, which is below the IISVs of $60 \text{ ug}/\text{m}^3$ and the 10X IISV of $600 \text{ ug}/\text{m}^3$. PCE concentrations in SG-1 (located on the southeast property boundary of the former 223 Parcel), SG-3 (located on the southwest property boundary of the former 219 Parcel) and SG-4 (located on the south boundary of the former 219 Parcel) were detected at concentrations ranging from $480 \text{ ug}/\text{m}^3$ to $520 \text{ ug}/\text{m}^3$, and were above the IISV, but below the 10X IISV. All other parameters analyzed were either not detected, or detected at concentrations that did not exceed the IISVs, or 10X IISVs.

Landmark Soil Gas Results from December 2006

In December 2006, Landmark installed six soil gas monitoring ports and collected six soil gas samples, labeled LSG-1 through LSG-6. VOCs were reported in each soil gas sample. The results from the December 2006 soil gas sampling event are shown in Table 1 of Attachment 1. The Landmark soil gas sample locations are shown in Figure 2. Benzene was detected above the IISV of $13 \text{ ug}/\text{m}^3$ at locations LSG-1 ($15.7 \text{ ug}/\text{m}^3$), LSG-2 ($27.9 \text{ ug}/\text{m}^3$), LSG-5 ($38.8 \text{ ug}/\text{m}^3$), and LSG-6 ($15.5 \text{ ug}/\text{m}^3$). However, the benzene concentrations were below the applicable 10X IISV of $130 \text{ ug}/\text{m}^3$. PCE was either not detected at any of the sampling locations, or was detected at concentrations below the IISV.

Landmark Groundwater Results from August 2011

The soil gas results from DPRAs investigation in November 2005 and Landmark's investigation in 2006 delineated the horizontal extent of soil gas to the north, south, and west of the Property. August 2011 groundwater concentrations at monitoring wells MW-19 and MW-20 were compared with GWISVs to evaluate the potential risk for soil gas migration to the east of the Property. During the August 2011 groundwater monitoring event, PCE was the only VOC detected at MW-19 ($2.9 \text{ micrograms per liter [ug/L]}$) and MW-20 (12.2 ug/L). PCE was detected at these wells below the GWISV of 60 ug/L . PCE concentrations exceeded the

GWISV for PCE at DPE-1 (309 ug/L), DPE-2 (2,080 ug/L), DPE-3 (4,260 ug/L), DPE-4 (771 ug/L), DPE-8 (700 ug/L), MW-16 (590 ug/L), and MW-17 (107 ug/L). Detected VOCs from the August 2011 groundwater monitoring event are included in Table 2 of Attachment 1.

A Phase I Environmental Site Assessment completed by Landmark for the properties located at 227 and 229 First Avenue S.W. in January 2007 identified the groundwater flow in the area to the west/northwest. Groundwater monitoring activities by Landmark prior to and during DPE system operation (from December 2008 through August 2011) have shown the groundwater flow to be to the west/southwest.

Based on the results of the DPRA's and Landmark's previous investigation results, the MPCA approved the following response actions (RAs) be implemented during the redevelopment of the Property: 1. installation of a DPE system to remediate source area PCE contamination in the soil, fractured bedrock, and groundwater; and, 2. installation of a vapor barrier and venting systems to prevent vapor intrusion into the building from residual and source area PCE contamination in the subsurface.

Soil gas results prior to DPE system source area remediation were below the MPCA's applicable 10x IISVs for PCE to the north, south, and west of the Property. August 2011 groundwater concentrations at MW-19 and MW-20, located on the east side of the Property, were below the MPCA's GWISV for PCE. In addition, the groundwater flow direction to the west should prevent shallow VOC groundwater contamination from migrating to the east, and causing vapor intrusion issues.

SCOPE OF WORK

Soil gas and sump headspace sampling will be conducted to assess the potential risk of vapor intrusion resulting from residual VOC contamination in the fractured bedrock and groundwater on the Property. Sampling activities will be conducted in general accordance with the following MPCA vapor intrusion guidance documents:

- Vapor Intrusion Technical Support Document, Remediation Division, August 2010; and,
- Risk-Based Guidance for the Vapor Intrusion Pathway, Superfund RCRA and Voluntary Cleanup Section, September 2008.

Soil gas samples will be collected from 3 exterior soil gas sampling ports (LSG-7 through LSG-9) on one occasion in conjunction with collecting air samples from the headspace of each of the two stormwater sumps (SP-1 and SP-2) located in the basement of the MN Bio Business Center building (see Figure 3). It is not possible to collect a soil gas sample south of the former 223 parcel, which would be comparable to former soil gas sampling locations LSG-1, LSG-2, and SG-1, because the MN Bio Business Center Building extends to the south 3rd street southwest. The DPE system will be shut down for approximately 30 days prior to collecting the soil gas and sump pit samples. The soil gas samples will be collected at a depth of 4 feet below ground surface using a Geoprobe. Prior to collecting the soil gas samples,

approximately two volumes of air will be purged from the sampling ports using a peristaltic pump connected to the monitoring point by a short length of Teflon tubing. The soil gas and sump samples will be collected by connecting the Teflon tubing to a Summa canister equipped with a 200 milliliter per minute flow regulator, filter and vacuum gauge provided by the laboratory. Each soil gas sample will be collected using a 45-minute flow controller. The Sump pit samples will be grab samples collected over approximately 5 minutes. Following the collection of the soil gas samples, the soil gas VOC concentration will be measured using a photoionization detector (PID). Summa canister start and end vacuum levels and PID measurements will be recorded on a field sampling form and chain of custody form. The Summa canisters will be submitted to a State certified laboratory to be analyzed for the MPCA list of VOCs using EPA Method TO-15.

The scope of work outlined in this work plan will be conducted approximately 30 days after shutting down the DPE system for emissions rebound sampling. The date for shutting down the DPE system for emissions rebound sampling has not been established yet. A report summarizing the soil gas and sump sampling results will be submitted to the MPCA approximately 2 weeks after the laboratory analytical results are available.

We look forward to completing this project in the near future. We appreciate your assistance with this project. Please contact me if you have any questions or need additional information.

Sincerely,

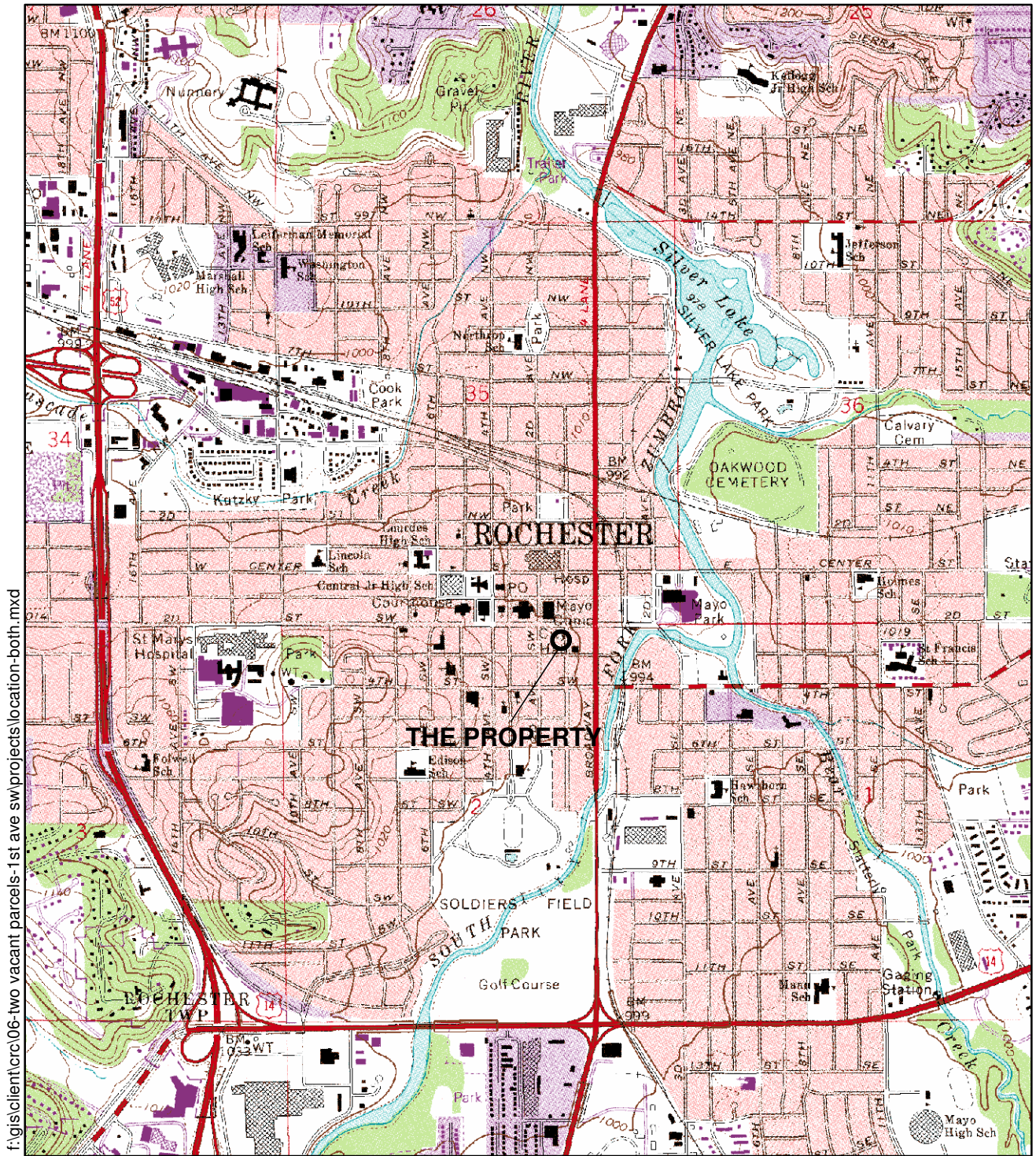
A handwritten signature in black ink, appearing to read "Jason D. Skramstad". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Jason D. Skramstad

Encl.

cc: Mr. Terry Spaeth, City of Rochester

Figures



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Source: Rochester, Minnesota Topographic Quadrangle, 7.5-Minute Series

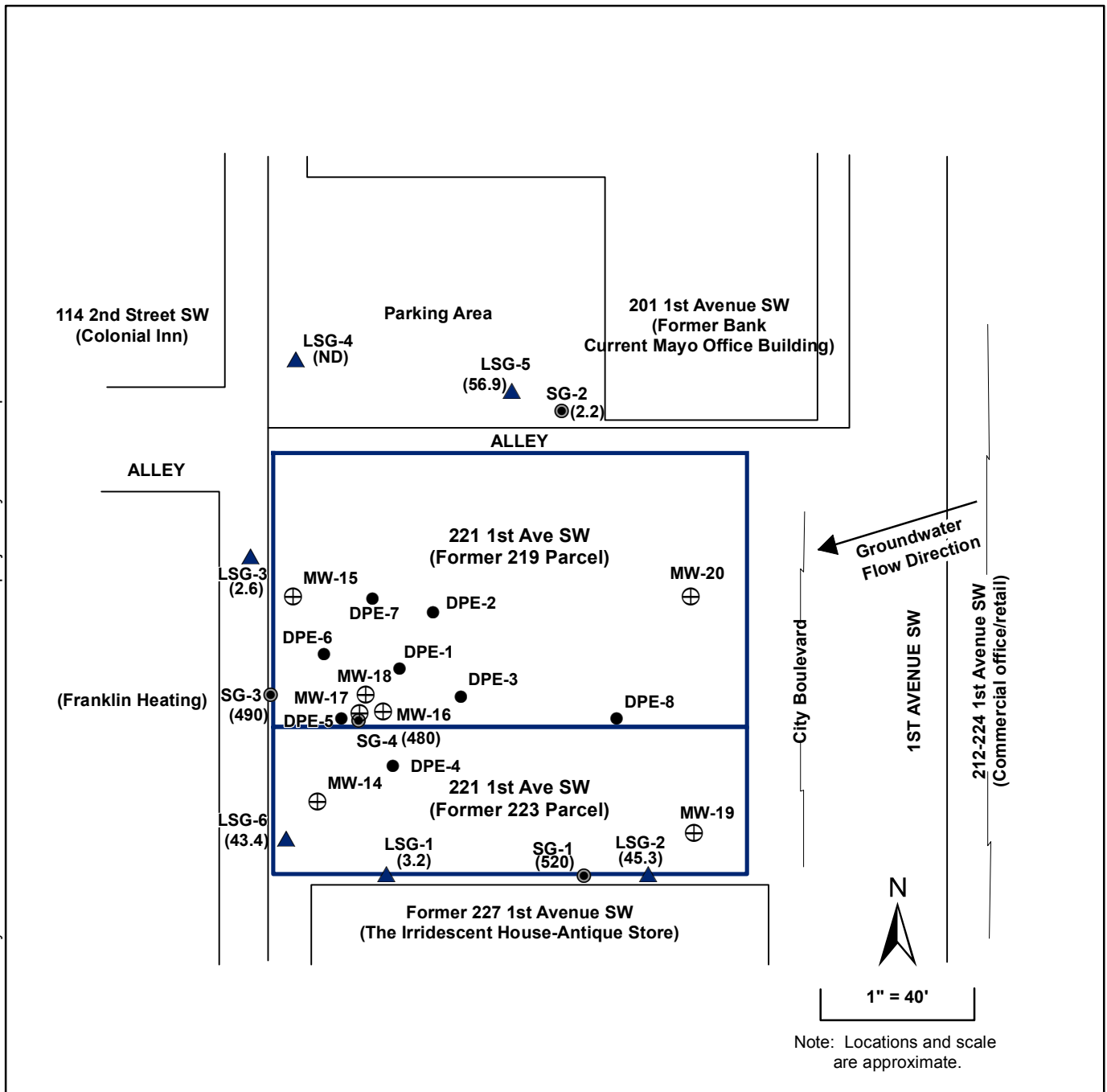


2,000 1,000 0 2,000 Feet



FIGURE 1

PROPERTY LOCATION MAP
219 and 223 1ST Avenue Southwest
Rochester, Minnesota



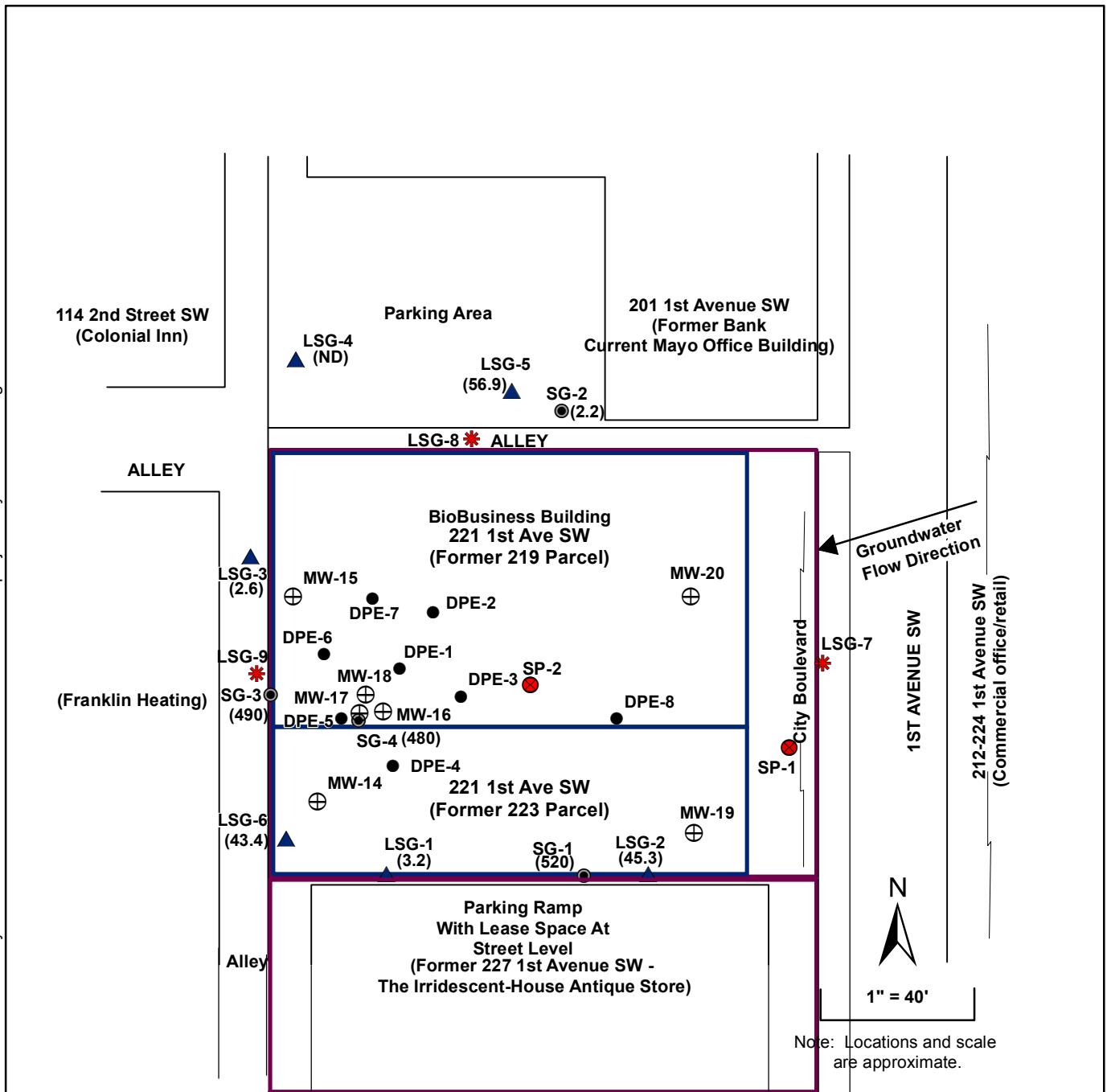
LEGEND

- Property Line
- (520) DPRA Soil Vapor Point (11/2005) (ug/m3)
- (3.2) Landmark Soil Vapor Point (12/2006) (ug/m3)
- 2008 DPE and Monitoring Wells
- DPE Well
- Monitoring Well

FIGURE 2

**PREVIOUS SOIL VAPOR LOCATIONS
AND CURRENT WELL LOCATIONS
221 1st Avenue SW
Rochester, Minnesota**

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LEGEND

- MN BioBusiness Center Building and Parking Ramp
- (520) DPRA Soil Vapor Point (11/2005) (ug/m3)
- (3.2) Landmark Soil Vapor Point (12/2006) (ug/m3)
- DPE Well
- ⊕ Monitoring Well
- SP-1 ● Proposed Sump Pit Vapor Sampling Location
- LSG-7 Proposed Landmark Soil Vapor Sampling Location

FIGURE 3

**PROPOSED
VAPOR SAMPLING LOCATIONS
221 1st Avenue SW
Rochester, Minnesota**

LANDMARK ENVIRONMENTAL, LLC

Attachment 1

Table 1
Soil Gas Sampling Results from Previous Investigations

221 First Ave S.W.
Rochester, MN

Compound	MPCA IISVs ug/m ³	MPCA 10X IISVs ug/m ³	SG-1 Grab 9-Nov-05 ug/m ³	SG-2 Grab 9-Nov-05 ug/m ³	SG-3 Grab 9-Nov-05 ug/m ³	SG-4 Grab 9-Nov-05 ug/m ³	LSG-1 Grab 29-Dec-06 ug/m ³	LSG-2 Grab 29-Dec-06 ug/m ³	LSG-3 Grab 29-Dec-06 ug/m ³	LSG-4 Grab 29-Dec-06 ug/m ³	LSG-5 Grab 29-Dec-06 ug/m ³	LSG-6 Grab 29-Dec-06 ug/m ³
Acetone	87000	870000	21	11	7.6	24	24.5	45.5	61.1	64.8	ND	ND
Benzene	13	130	1.5	<0.64	<0.64	0.8	15.7	27.9	3.0	3.0	38.8	15.5
2-Butanone (MEK)	10000	100000	NA	NA	NA	NA	ND	6.2	9.0	14.7	ND	ND
Carbon disulfide	2000	20000	NA	NA	NA	NA	ND	3.6	ND	27.7	362 E	2.1
Chloroform	300	3000	NA	NA	NA	NA	10.4	ND	ND	ND	ND	ND
Chloroethane	30000	300000	NA	NA	NA	NA	ND	ND	ND	23.6	270 E	2.1
Chloromethane	300	3000	NA	NA	NA	NA	ND	0.76	1.1	ND	ND	1.3
Cyclohexane	20000	200000	NA	NA	NA	NA	1.8	ND	ND	3.0	ND	ND
1,2-Dichloroethane	1	10	<0.81	<0.81	<0.81	<0.81	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	600	6000	NA	NA	NA	NA	5.2	3.4	3.3	5.5	ND	3.6
Dichlorotetrafluoroethane	ns	ns	NA	NA	NA	NA	ND	ND	ND	ND	3.6	ND
Ethyl acetate	8000	80000	NA	NA	NA	NA	ND	ND	ND	26.3	17.3	ND
Ethylbenzene	3000	30000	1.6	<0.87	<0.87	<0.87	3.0	6.8	3.2	ND	6.3	6.7
4-Ethyltoluene	ns	ns	NA	NA	NA	NA	ND	8.2	6.3	ND	7.7	4.8
n-Hexane	6000	60000	NA	NA	NA	NA	2.6	20.6	ND	6.3	51.6	12.6
Methylene chloride	60	600	NA	NA	NA	NA	2.8	4.7	3.1	1.9	ND	ND
2-Propanol	20000	200000	27	5.9	<3.1	<3.1	NA	NA	NA	NA	NA	NA
Propylene	8000	80000	5.5	4.8	6.2	5.3	21.4	8.7	3.5	12.7	21.9	3.3
Tetrachloroethylene	60	600	520	2.2	490	480	3.2	45.3	2.6	ND	56.9	43.4
Tetrahydrofuran	ns	ns	NA	NA	NA	NA	ND	6.3	ND	ND	17.6	ND
Toluene	10000	100000	100	1.4	1.7	2.4	19.8	66.9	9.1	1.6	74.4	57.3
1,1,1-Trichloroethane	10000	100000	<1.1	<1.1	<1.1	<1.1	NA	NA	NA	NA	NA	NA
Trichloroethylene	8	80	<1.1	<1.1	2.6	<1.1	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2000	20000	1700	<4.8	64	370	20.1	ND	1.6	14.5	ND	ND
1,2,4-Trimethylbenzene	20	200	4.6	1.2	1.5	1.5	4.0	13.4	9.9	ND	12.3	5.0
1,3,5-Trimethylbenzene	20	200	1.3	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA
Vinyl acetate	600	6000	NA	NA	NA	NA	ND	ND	2.8	ND	ND	ND
Vinyl Chloride	3	30	<0.51	<0.51	<0.51	<0.51	NA	NA	NA	NA	NA	NA
Xylenes	300	3000	8.1	<1.7	2.3	2	15.5	35.8	20.4	ND	31.8	32.7

Notes:

IISVs = Industrial Intrusion Screening Values

10x IISVs = 10x the Industrial Intrusion Screening Values

ns = No Standard

ND = No Detection

NA = Not Analyzed

Table 2
August 2011 Groundwater Analytical Results
(detected parameters)

221 First Avenue S.W.
Rochester, Minnesota

Parameter	MPCA GW _{ISV}	Units	DPE-1	DPE-2	DPE-3	DPE-4	DPE-6	DPE-7	DPE-8	MW-14	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20
1,1,2-Trichlorotrifluoroethane	3000	ug/L	9.5	212	348	93.8	NA*	3.8	32.4	NA*	1.1	19.7	6.5	NA*	NA*	NA*
Chloroform	1000	ug/L	NA*	NA*	NA*	NA*	NA*	1.2	NA*	1.6	1.0	NA*	NA*	NA*	NA*	NA*
Tetrachloroethene	60	ug/L	309	2080	4260	771	7.7	26.9	700	1.5	1.2	590	107	3.6	2.9	12.2
cis-1,2-Dichloroethene	500	ug/L	2.9	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	7.3	1.3	NA*	NA*	NA*

Notes:

NA*: Not Analyzed

9.5 Parameter detected above laboratory reporting limit

309 Parameter detected above MPCA GW ISV