ANNUAL MONITORING REPORT – 2007/2008

PAYNESVILLE MUNICIPAL WATER SUPPLY / FORMER MIDTOWN SERVICE STATION
400 LAKE AVENUE SOUTH
PAYNESVILLE, MINNESOTA
MPCA SITE ID # LEAK00000131 AND LEAK00002181

Terracon Project No. 41987018
June 12, 2008
Volume I of II

Prepared for:

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Terracon

Section 1. GROUNDWATER MONITORING

Discuss the groundwater monitoring results, including water level measurements and analytical results, performed since the Investigation Report or the last progress report submitted. Include all cumulative data in the tables. Indicate whether samples were purged or unpurged (see Guidance Document 4-05). If purged, indicate purging method.

Introduction

This Annual Monitoring Report (AMR) includes groundwater monitoring results for monitoring events conducted since Terracon's *Annual Monitoring Report* dated June 30, 2007. In addition, this AMR includes the results of additional source area assessment activities performed during January 2008 and soil-gas sampling activities performed during November 2007, January 2008 and April 2008.

Background

The Paynesville Municipal Water Supply / Former Midtown Service Station site is located within the City of Paynesville (Figure 1). Based on available information and previous assessment work conducted by Terracon, the site has petroleum impacted soil, soil-gas, and groundwater in addition to a significant source mass of light non-aqueous phase liquid (NAPL) which appears to consist primarily of gasoline. Soil-gas impacts appear to be concentrated along Lake Avenue between the former Midtown Service Station and State Highway 23. Benzene and 1,2-dichloroethane have been detected in groundwater samples from City Wells CW-3 and CW-4 on several occasions in the past. The most recent corrective action for this issue involved assisting the City of Paynesville with the installation of new municipal water supply wells (CW-7 and CW-8) and utilizing City Well CW-4 as a plume-containment well. The available information indicates that the source of the impacts is a petroleum release that occurred at the former Midtown Service Station located at 400 Lake Avenue South (southwest corner of Lake Avenue South and Mill Street).

Previous soil-gas assessment activities were conducted at the site and included six soil probes (VP-1 through VP-6, Figure 2A) completed in the right-of-way of Lake Avenue as part of a Vapor Intrusion Assessment (VIA) Pilot Study performed for the MPCA. The results of the initial soil vapor monitoring work are discussed in Terracon's *VIA Pilot – Midtown Station* report dated January 21, 2005. Subsequent VIA activities included advancing four hand-driven soil-gas probes (VP-7 through VP-10, Figure 2A) to assess the vapor migration potential to receptors (i.e., buildings, residences) located near the previously identified source area. The results from soil gas probes VP-7 through VP-10 and soil gas probes VP-1A and VP-11 were discussed in Terracon's *Annual Monitoring Report* dated June 29, 2005.

Two additional soil-gas probes (VP-12 and VP-13) were advanced in conjunction with source area assessment during February/March 2007 to further assess the risk of vapor intrusion to nearby residences (347 Lake Avenue and 410 Lake Avenue). The results from soil gas probes VP-12 and VP-13 were discussed in Terracon's *Annual Monitoring Report* dated June 30, 2007.

Various petroleum-related volatile organic compounds (VOCs) have been detected in the soil-gas samples collected from the soil-gas probes advanced at the site. Soil gas probes VP-7, VP-8, VP-9, VP-10, VP-12, and VP-13 were completed near residences. In these and other soil-gas samples, one or more petroleum related VOCs were detected at concentrations that exceeded one of the MPCA soil-gas action levels [i.e., Minnesota Department of Health (MDH) Health Risk Values (HRVs) or Environmental Protection Agency (EPA) Reference Concentrations (RfCs)] (Tables 10A through 10C).

Terracon completed a review of the MPCA file for the former Midtown Service Station (LEAK00002181) in order to develop a limited focused feasibility study (FFS). The results of the FFS were submitted to the MPCA in Terracon's *Focused Feasibility Study* dated March 15, 2006. The FFS included a summary of the historic activities on site and assessment of the effectiveness of corrective actions that have previously targeted the source area at the site. The FFS also included recommendations for further definition of the source area to be remediated, proposed a plan for developing cleanup objectives for the site, and provided a summary of potential corrective actions. Corrective action alternatives evaluated in the FFS included: free product recovery, excavation, bioslurping (multi-phase extraction), soil excavation and in situ soil flushing. The FFS did not include a recommendation for implementing a specific corrective action to address the current extent and magnitude of the petroleum impacts in and near the source area.

During February and March 2007, 62 laser-induced fluorescence (LIF) probes (LIF-1 through LIF-58 and LIF-60 and LIF-61) and 13 soil probes (P-38 through P-50) confirming LIF probes were advanced in and surrounding the former Midtown Service Station to assess the horizontal and vertical extent of NAPL in soil pore spaces within the source area. The goal of the source area assessment was to develop a sufficient understanding of the source area hydrogeology, extent and magnitude of NAPL, migration pathways, and contaminant fate and transport mechanisms such that a Conceptual Corrective Action Design (CCAD) could be developed to address the risk to identified receptors. The results of the source area assessment activities indicated that in and near the source area the subsurface generally consists of up to 13-feet of fine to coarse grained sand with gravel and fill overlying a fine grained alluvium unit composed of sandy clay and clay to 17- to 24-feet bgs. The fine grained alluvium unit overlies a water bearing coarse grained alluvium unit consisting of fine

to coarse grained sand that grades to gravel some areas. The coarse grained alluvium unit extends to at least 35-feet bgs. Perched water was occasionally encountered within the upper sand / fill unit and in sand lenses within the fine grained alluvium unit. The water table was encountered within the source area approximately 18-feet bgs. Data from the LIF probes indicated that the NAPL migrated laterally on top of the fine grained alluvium unit as well as downward to the water bearing coarse grained alluvium unit. The NAPL also migrated laterally in the water bearing coarse grained alluvium unit. The estimated horizontal extent of NAPL was approximately within a 160-foot radius of the former tank basins. The interpreted depth to the top of the NAPL ranged from 5-feet to 24-feet bgs. The interpreted depth to the bottom of the NAPL was generally near 25-feet bgs, but ranged from approximately 6- to 26-feet. Several areas were identified which required additional assessment to delineate the horizontal extent of the NAPL and better understand the vertical extent of NAPL. The results of the source area assessment activities are summarized in Terracon's *Annual Monitoring Report* dated June 30, 2007.

Movement

Hydrogeologic Conditions

Depth to groundwater measurements were conducted at the following wells on a semi-annual basis during this reporting period (Figure 2).

Well ID	Map ID	Well ID	Map ID
DW-1	1	*Midtown wells*	
DW-2	2	MW-1	23
DW-3R	3	MW-10	24
DW-4	4	MW-10D	5
DW-5	45	MW-14	25
DW-6	46	MW-14D	6
DW-7S	48	MW-15	27
DW-7D	49	MW-17	28
DW-8	55	MW-19	30
DW-9	56	MW-20	31
MW-4	44	MW-21	50
MW-5	7	MW-22	51
MW-16	27	MW-23	52
City of Paynesville monitoring wells		MW-24	53
CMW-42	42	MW-25	54
CMW-43	43	RW-1	32

Well construction information is summarized in Table 1. The groundwater level data is presented in Table 2. The fluid level data from wells screened in the drinking water aquifer between 75- and 95-feet below ground surface were used to prepare the

groundwater contour maps depicted in Figures 3A and 3B. The groundwater contour maps developed using groundwater elevation data collected on September 25, 2007 and February 12, 2008 indicate the local horizontal groundwater flow direction in the drinking water aquifer is generally to the east-southeast which is consistent with previous collected data and the reported regional groundwater flow direction. Historical groundwater elevation data from water table monitoring wells in Paynesville indicate the local horizontal groundwater flow direction in the water table aquifer near the source area is to the north, towards the North Fork of the Crow River. However, local fluctuations and variations due to seasonal infiltration/exfiltration, geologic formations, groundwater pump-out, and/or other site features can affect the groundwater flow. Fluid level data from select monitoring wells screened within the drinking water aquifer and/or located near recovery well DW-5 are depicted on hydrographs in Figures 4A and 4B. The hydrographs illustrate seasonal fluctuations in groundwater elevations and, in the case of wells CMW-42 and DW-5 (Figure 4A), the results of groundwater pumping activities.

Groundwater Sampling

The following table summarizes the groundwater monitoring/sampling schedule.

Location	Analysis	Quarterly	Semi-Annual	Annual
WTP Influent	VOCs		*	
WTP Effluent	VOCs		*	
CW-3	VOCs		*	
CW-4	VOCs	*		
CW-5	VOCs			*
CW-6	VOCs			*
CW-7	VOCs			*
CW-8	VOCs			*
Nursery Well	VOCs			*
DW-3R	BTEX, MTBE, GRO		*	
DW-5	BTEX, MTBE, GRO		*	
DW-6	BTEX, MTBE, GRO		*	
DW-7S	BTEX, MTBE, GRO			*
DW-7D	BTEX, MTBE, GRO			*
DW-8	VOC, GRO		*	
DW-9	VOCs, GRO		*	
MW-14D	BTEX, MTBE, GRO		*	
MW-16	BTEX, MTBE, GRO		*	
MW-17	BTEX, MTBE, GRO		*	

Groundwater samples were collected from the City Wells via sampling taps after purging. Groundwater samples were collected from the monitoring wells after purging three well volumes using disposable bailers, dedicated plastic purge pumps with polyethylene tubing, or a Grundfos Redi-Flow 2 sampling pump with dedicated

polyethylene tubing as described in the attached sampling forms. The laboratory results are summarized in Tables 3A and 3B. Natural attenuation monitoring parameters are summarized in Table 4. Copies of laboratory reports are included in Appendix A, sampling methods are described in Appendix B and the sampling information forms are included in Appendix C.

Semi-annual and annual groundwater monitoring events occurred during September 2007 and February 2008. The annual groundwater monitoring event occurred in September 2007, while the semi-annual events occurred in September 2007 and February 2008. The most recent monitoring event was conducted in February 2008 and included collecting groundwater samples from wells DW-3R, DW-5, DW-6, DW-8, DW-9, MW-14D, MW-16, MW-17, CW-4, and the Paynesville water treatment plant (WTP) influent and effluent. The laboratory analytical results for the groundwater samples from these monitoring locations were reported below laboratory reporting limits for target VOCs, except for concentrations detected in samples collected from wells DW-5, DW-6, and DW-9. The VOCs detected in the groundwater samples collected from monitoring well DW-5 include benzene at 79 micrograms per liter (µg/L), ethyl benzene at 32 µg/L, total xylenes at 28 µg/L, and gasoline range organics (GRO) at 270 µg/L. The VOCs detected in the groundwater samples from monitoring well DW-6 include benzene at a concentration of 11 µg/L. The VOCs detected in the groundwater sample from monitoring well DW-9 include benzene at 1,200 µg/L, ethyl benzene at 200 µg/L, and GRO at 4,300 µg/L. The absence of benzene in the groundwater sample collected from monitoring well MW-8 during the February 2008 sampling event suggests that its presence during the initial two sampling events may be the result of contaminants introduced during the installation of the well. Attempts to access the Nursery well to collect a groundwater sample were not successful as the property owner did not want the well sampled.

VOC

Plume Containment Activities (CW-4)

City Well CW-4 is continually pumped to contain the dissolved phase petroleum plume. Water from the well is discharged to the City of Paynesville storm sewer without needing treatment under a National Pollutant Discharge Elimination System (NPDES) Permit. Groundwater samples are collected from the discharge from City Well CW-4 on a quarterly basis for laboratory analysis as required in the NPDES Permit. The groundwater samples were analyzed for the MDH list of VOCs. The target VOCs were not detected in the discharge samples collected during September and November 2007, and February and May 2008. The groundwater analytical results are summarized in Tables 3A and 3B. The laboratory reports are included in Appendix A. The sampling information forms are included in Appendix C.

The groundwater pumping rate for City Well CW-4 was observed to be decreasing during the summer of 2005 from approximately 103 gallons per minute (gpm) until it was shutdown on

August 31, 2005 to replace the RPZ backflow preventer on the well that had failed. The pump was restarted on September 14, 2005 and the maximum pumping rate was approximately 90 gpm. The pump in City Well CW-4 failed during March 2006. A new pump was installed in City Well CW-4 on May 5, 2006, but it had the wrong voltage motor. The pump was reinstalled in City Well CW-4 on June 1, 2006 and started the next day. The pumping rate was set to approximately 90 gpm. The pump installed in the well during May / June 2006 can operate at lower pumping rates than the previous pump. Water coming from the well was observed to be steaming when the sampling point was opened on May 20, 2008. The well was shutdown for investigation after it was allowed to pump at approximately 25 gpm for approximately one hour before as sample was collected. Further investigation by the City of Paynesville found the discharge line between the well and storm sewer was apparently blocked at a valve or the valve had somehow become closed. The pump would not restart. Thein Well Company (Thein) was contracted to remove and inspect the well pump to determine if it could be repaired or needed to be replaced. Thein found the pump and motor to be in good condition, but there was a hole in the drop pipe which apparently caused the pump to circulate water within the well until it overheated. Terracon plans to contract with Thein to install the pump in City Well CW-4.

The groundwater pumping rate for City Well CW-4 during the period from July 2006 to June 2007 was approximately 100 gpm. The groundwater pumping rate for City Well CW-4 during the current reporting period from July 2007 to May 2008 ranged from 80 to 100 gpm and appears to be controlling dissolved phase petroleum plume migration in the direction of City Wells CW-3, CW-5, CW-6, and CW-7. The pumping rate of City Well CW-4 should be limited so that it does not promote excessive migration of the contaminant plume to the north or downward into the drinking water aquifer.

Laser-Induced Fluorescence (LIF) and Soil Probes

Additional source area assessment activities were performed near the former Midtown Service Station during January 2008 including advancing 23 LIF probes (LIF-62 through LIF-84) and five soil probes (P-51 through P-55) to confirm LIF data. The 13 soil probes were advanced to attempt to confirm the data obtained from adjacent LIF probes. The goal of the source area assessment was to develop a sufficient understanding of the source area hydrogeology, extent and magnitude of NAPL, migration pathways, and contaminant fate and transport mechanisms such that a Conceptual Corrective Action Design (CCAD) could be developed to address the risk to identified receptors. The goal of the additional source area assessment activities include: additional assessment along the north, west and east edge of the proposed area for soil excavation; and further delineation of the horizontal extent along the northeast, northwest, southwest and southeast edges assessed during March 2007. In general, the LIF probes were advanced to 5-feet beyond significant LIF response.

Refer to Figures 5A through 5G for cross-sections based on LIF probes and soil borings / probes. See Appendix D for LIF images at full-scale, LIF images at 20 percent scale and soil boring / probe logs. See Figures 9A, 9B and 9C for maps illustrating the inferred horizontal and vertical extent of NAPL.

Based on interpretation of LIF data the horizontal and vertical extent of NAPL was estimated. The inferred horizontal extent of NAPL consists of an approximately 320-feet by 200-feet oval shape with NAPL extending approximately 200-feet northwest of the former tank basins (Figure 9A). The interpreted depth to the top of the NAPL ranges from 7.5-feet to 24-feet bgs. The interpreted depth to the bottom of the NAPL is generally near 25-feet bgs, but ranges from approximately 12.5- to 27-feet. The interpreted NAPL thickness is as much as 18.5 feet.

A total of five soil probes (P-51 through P-55) were advanced during January 2008 to collect soil and groundwater samples to confirm data from the LIF probes indicating the horizontal extent of the NAPL and assess other aspects of petroleum impacts near the source area. Soil headspace analysis indicates impacts in confirmation soil probes that generally coincide with impacts noted in the LIF probes (Table 6). Select soil samples were collected from the soil probes and submitted to Pace Analytical Services, Inc. (Pace) for laboratory analysis. The samples were analyzed for BTEX, MTBE and GRO. The laboratory analytical results from the five soil samples did not detect concentrations of BTEX, MTBE or GRO at or greater than the laboratory reporting limits (RLs). The soil analytical results from the soil probes are summarized in Table 7.

Groundwater samples were collected from the five soil probes (P-51 through P-55) and submitted to Pace for BTEX, MTBE, and GRO analyses. Low concentrations of one or more BTEX compounds were detected in groundwater samples collected from soil probes P-51, P-53 and P-54. MTBE was detected in the groundwater sample collected from soil probe P-51 at a concentration of 1.3 µg/L. The concentrations for BTEX and MTBE detected in the groundwater samples from the soil probes P-51, P-53 and P-54 do not exceed the MDH HRLs or HBVs. GRO concentrations in groundwater samples collected from soil probes P-51 and P-53 were reported at 1,100 µg/L and 850 µg/L respectively, exceeding the MDH HRV of 200 µg/L. BTEX, MTBE and GRO were not detected above laboratory reporting limits in the groundwater samples collected from soil probes P-52 and P-55. The groundwater sampling information and analytical results from the soil probes are summarized in Tables 8 and 9.

The results of the LIF and soil probe assessment activities indicated that in and near the source area that the subsurface generally consists of up to 13-feet of fine to coarse grained sand with gravel and fill overlying a fine grained alluvium unit composed of sandy clay, sandy silt, and clay to 17- to 30-feet below ground surface (bgs). The fine

grained alluvium unit overlies a water-bearing coarse grained alluvium unit consisting of fine to coarse grained sand that grades to gravel in some areas. The coarse grained alluvium unit extends to at least 35-feet bgs. Perched water was occasionally encountered within the upper sand / fill unit and in sand lenses within the fine grained alluvium unit. The water table was encountered within the source area approximately 18-feet bgs. Data from the LIF probes indicated that the NAPL migrated laterally on top of the fine grained alluvium unit as well as downward to the water bearing coarse grained alluvium unit. The NAPL also migrated laterally in the water bearing coarse grained alluvium unit.

Soil organic vapor monitoring data are summarized in Table 6. The laboratory analytical reports are included in Appendix A. The soil probes were advanced and samples collected as described in Appendix B. The sampling information forms are included in Appendix C. Boring logs are included in Appendix D.

Section 2. VAPOR IMPACT MONITORING

If vapor impacts were detected during previous assessments, discuss the results of follow-up vapor monitoring. Include in your discussion the sampling instrument and sampling method.

Past VIA activities near the source area have included soil gas probes advanced both as part of the MPCA VIA Pilot Study and site risk assessment activities. Various petroleum-related VOCs were detected in the soil gas samples collected from the soil gas probes (VP-1A through VP-13). One or more petroleum related VOCs were detected in samples from soil gas probes VP-1A and VP-13 at concentrations that exceeded their respective soil-gas MPCA action levels (i.e., MDH HRVs and EPA RfCs) (Tables 10A-C).

Three sub-slab monitoring points were installed through the basement floors of residences surrounding the source area to collect sub-slab soil gas samples to further assess the risk of petroleum vapors intruding into the buildings. A sub-slab monitoring point (SSMP-1) was installed in the basement at 154 Mill Street in November 2007 and then sampled on November 7, 2007 and April 8, 2008. A sub-slab monitoring point (SSMP-2) was installed in the basement at 347 Lake Avenue in January 2008 and then sampled on January 11, 2008 and April 8, 2008. A sub-slab monitoring point (SSMP-3) was installed in the basement at 410 Lake Avenue in January 2008 and then sampled on January 11, 2008 and May 20, 2008. Air samples were collected from the crawl space under the residence at 400 Lake Avenue on January 11, 2008 and April 8, 2008. The sub-slab soil gas and crawl space air samples were collected in laboratory certified Summa canisters using the method described in Appendix B. The Summa canisters were be submitted to Pace to be analyzed for the

MPCA list of VOCs using EPA Method TO-15 in general accordance with MPCA Guidance Document 4-01a *Vapor Intrusion Assessments Performed during Site Investigations*. Sub-slab soil gas samples and a crawl space air were also collected from each location during February 2008, but the samples were not analyzed when it was determined they were not collected in laboratory certified Summa canisters.

The analytical results from the two air samples collected from the crawl space under the home at 400 Lake Avenue detected low concentrations of a variety of non-petroleum related VOCs and ethanol which did not exceed MPCA actions levels (Table 10D). The VOCs detected appear to consist of common solvents (1,1,1-trichloroethane, methyl ethyl ketone, acetone and chloromethane) and Freons (trichlorofluoromethane and dichlorodifluoromethane). The analytical results from the two sub-slab soil gas samples collected from the residence at 154 Mill Street detected low concentrations of a variety of petroleum and non-petroleum related VOCs which did not exceed MPCA actions levels, except for 1,2,4-trimethylbenzene and naphthalene (Table 10E). The 1,2,4-trimethylbenzene concentration detected in the November 2007 sample [6.3 micrograms per cubic meter of air ($\mu g/m^3$) exceeded the MPCA action level of 6.0 $\mu g/m^3$. The naphthalene concentrations detected in the November 2007 and April 2008 samples (7.8 $\mu g/m^3$ and 14.0 $\mu g/m^3$) exceeded the MPCA action level of 3.0 $\mu g/m^3$. The analytical results from the two sub-slab soil gas samples collected from the residence at 347 Lake Avenue detected low concentrations of a variety of petroleum and non-petroleum related VOCs which did not exceed MPCA actions levels, except for naphthalene (Table 10F). The naphthalene concentration detected in the January 2008 sample (18.7 $\mu g/m^3$) exceeded the MPCA action level of 3.0 $\mu g/m^3$. The analytical results from the two sub-slab soil gas samples collected residence at 410 Lake Avenue detected low concentrations of a variety of petroleum and non-petroleum related VOCs which did not exceed MPCA actions levels, except for naphthalene and tetrachloroethene in the sample collected during January 2008 and May 2008 events, respectively (Table 10G). The naphthalene concentrations detected in the January 2008 sample (4.7 $\mu g/m^3$) exceeded the MPCA action level of 3.0 $\mu g/m^3$. The tetrachlorethene concentrations detected in the May 2008 sample (28.1 $\mu g/m^3$) exceeded the MPCA action level of 20 $\mu g/m^3$.

Information on soil vapor intrusion included in the USEPA *OSWER Draft Guidance for Evaluating the Vapor Intrusion to indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* dated November 2002 indicates that building components and dilution from air exchange may attenuate soil-gas concentrations entering a building by a factor of 10. Since the naphthalene and/or 1,2,4-trimethylbenzene concentrations detected in the sub-slab soil gas samples collected from the residences at 154 Mill Street, 347 Lake Avenue and 410 Lake Avenue do not exceed 10 times the MPCA action limits, the petroleum vapors should not pose a

significant threat to the indoor air quality in the buildings. However, the residence at 154 Mill Street has a crawl space with a dirt floor under the addition on the east side of the building such that petroleum vapors may move directly from the sub-surface into the basement. In addition, the residence is used as a daycare.

The soil-gas analytical results are summarized in Tables 10A-G. The laboratory analytical reports are included in Appendix A. The soil-gas sampling methods are described in Appendix B. Soil-gas sampling information forms and building conditions survey forms are included in Appendix C.

NOTE: If vapor concentrations exceed 10 percent of the lower explosive limit, exit the building and contact the local fire department immediately. Then contact the Minnesota Duty Officer (24 hours) at 651/649-5451 (metro and outside Minnesota) or 1-800/422-0798 (Greater Minnesota). TTY users call 651/297-5353 (V/TTY) or 1-800/627-3529 (V/TTY). **Vapor mitigation is required.**

Section 3. RECOMMENDATIONS

Discuss your recommendations. Your recommendation should be based on Guidance Document 1-01 *Petroleum Remediation Program General Policy.*

The dissolved phase petroleum plume emanating from the former Midtown Service Station continues to impact the water quality in the water table aquifer at the site and off-site to the north and northeast. In addition, the petroleum impacted groundwater appears to migrate downward into the underlying drinking water aquifer to the north and northeast of the site. The primary source of the dissolved phase petroleum plume appears to be NAPL which has consistently been observed in several monitoring wells on the former Midtown Service Station property (MW-1, MW-20, MW-21, MW-22, MW-24 and MW-25). Groundwater quality data indicates the dissolved phase petroleum plume within the drinking water aquifer is responsive to groundwater pumping activities. In comparing data from similar time periods, the City Well CW-4 pumping rates and laboratory analytical data for groundwater samples collected from wells at the site appear to correlate well. During increased groundwater pumping rates at City Well CW-4, dissolved phase petroleum concentrations for samples collected from City Well CW-4 at times increase while those in nearby monitoring wells MW-17 and DW-3/3R have remained below laboratory reporting limits or at concentrations below their respective MDH HRLs or HBVs. However, benzene concentrations in groundwater samples from monitoring wells that appear to be completed near the top of the drinking water aquifer (DW-5, DW-6 and possibly DW-9) consistently exceed the MDH HRL indicating that the dissolved phase petroleum

plume continues to impact the drinking water aquifer and poses a continuing risk of once again impacting one of the City Wells if pumping activities at City Well CW-4 cease. Continued analysis of groundwater samples from the water treatment plant, City Wells, and select monitoring wells should be performed in order to monitor the quality of the water supply and plume stability or migration.

The results from vapor intrusion assessment activities completed to date have detected concentrations of 1,2,4-trimethylbenzene and / or naphthalene in sub-slab soil-gas samples collected from beneath the residences located at 154 Mill Street, 347 Lake Avenue, and 410 Lake Avenue that exceed MPCA action levels, but by less than a factor of 10 (Tables 10A through 10G). Therefore, the 1,2,4-trimethylbenzene and / or naphthalene should not pose a significant threat to the indoor air quality in the buildings assuming sub-slab soil gas concentrations need to be more than 10 times the MPCA action level to result in an indoor air impact. However, the residence at 154 Mill Street, which is also used as a daycare, has a crawl space with a dirt floor under the addition on the east side of the building such that petroleum vapors may move directly from the sub-surface into the basement. Additional sampling during warm weather months is needed to further quantify the risk posed to the residential properties. Attempts by Terracon and the City of Paynesville to gain access to the property at 330 Lake Avenue have been unsuccessful.

Based upon the result from the groundwater monitoring and source area assessment activities, Terracon recommends that correction actions be taken to address the NAPL impacted soil in the source area at the site.

If additional corrective action is recommended, please provide your justification.

Please refer to MPCA Guidance Document 4-19 *Conceptual Corrective Action Design* which is included in Appendix E.

If significant reduction of risk has been achieved at the site, recommendations and rationale for the reduction or termination of corrective actions may be presented.
Not Applicable.

If additional monitoring is recommended, indicate the proposed monitoring schedule and frequency.

On going groundwater monitoring activities should continue at the former Midtown Service Station. Terracon recommends the following:

- **Continue groundwater extraction activities utilizing City Well CW-4 to contain the dissolved phase petroleum plume. Continue to adjust the pumping rate of City Well**

CW-4 to establish an extraction rate that helps prevent excessive migration of the dissolved phase petroleum plume in the direction of either well CW-4 or wells DW-7S, DW-7D, CW-3, CW-5, CW-6 and CW-7. Continue to collect quarterly discharge samples from City Well CW-4 for laboratory analysis. The discharge samples should be analyzed for the MDH list of VOCs per the requirement of the NPDES Permit.

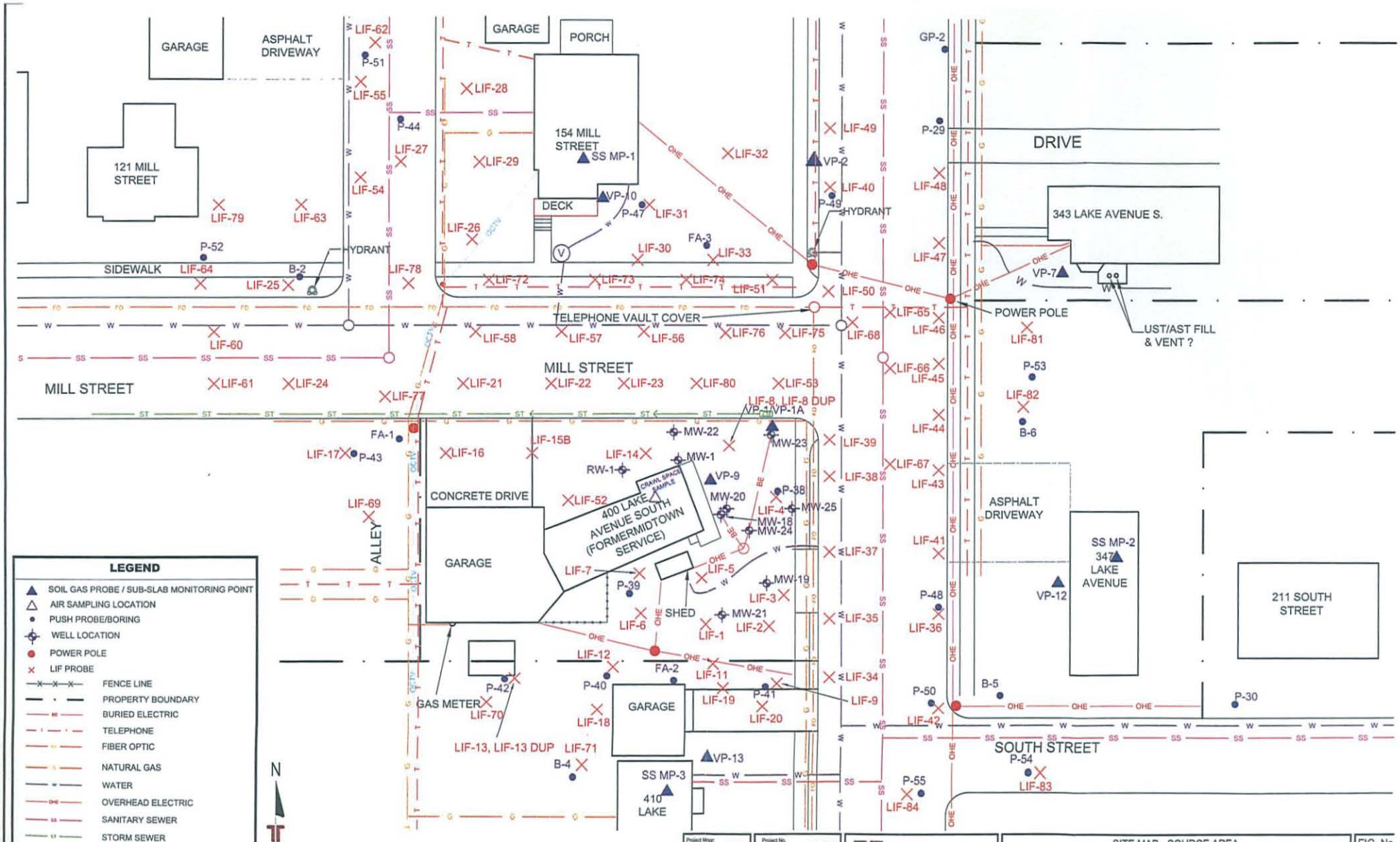
- Collect annual groundwater samples from City Wells CW-3, CW-5, CW-6, CW-7 and CW-8; and semi-annual samples from the water treatment plant influent and effluent. The groundwater samples should be analyzed for the MDH list of VOCs. The sampling schedule should be adjusted to monthly if the contaminant plume appears to become unstable.

- Conduct semi-annual site visits to collect fluid level data from wells DW-1, DW-2, DW-3R, DW-4, DW-5, DW-6, DW-7S, DW-7D, DW-8, and DW-9; Midtown wells MW-1, MW-10, MW-10D, MW-14, MW-14D, MW-15, MW-16, MW-17, MW-18, MW-19, MW-20, MW-21, MW-22, MW-23, MW-24, MW-25, and RW-1; Johnson Motors wells MW-4 and MW-5; City of Paynesville monitoring wells identified as CMW-42 and CMW-43.

- Collect semi-annual groundwater quality samples for laboratory analysis from monitoring wells DW-3R, DW-5, DW-6, DW-8, DW-9, MW-16 and MW-17; and annual samples from monitoring wells DW-7S and DW-7D. Well DW-5 should be sampled after purging with the recovery well pump. The samples should be analyzed for BTEX, MTBE, and GRO. A duplicate sample and field blank should be analyzed during each sampling event.

- Collect one additional set of sub-slab soil gas samples during warm weather from the sub-slab monitoring points at 347 Lake Avenue, 410 Lake Avenue and 154 Mill Street to further assess the risk of vapor intrusion. Indoor air samples should also be collected from the basement, crawl space and main level of the residence located at 154 Mill Street to assess whether the petroleum vapors are entering the building through the crawl space. The indoor air samples should be collected with Summa canisters equipped with 24-hour flow controllers. The soil gas and indoor air samples should be analyzed for the MPCA List of VOCs using EPA Method TO-15. Additional sampling at 400 Lake Avenue is not recommended.

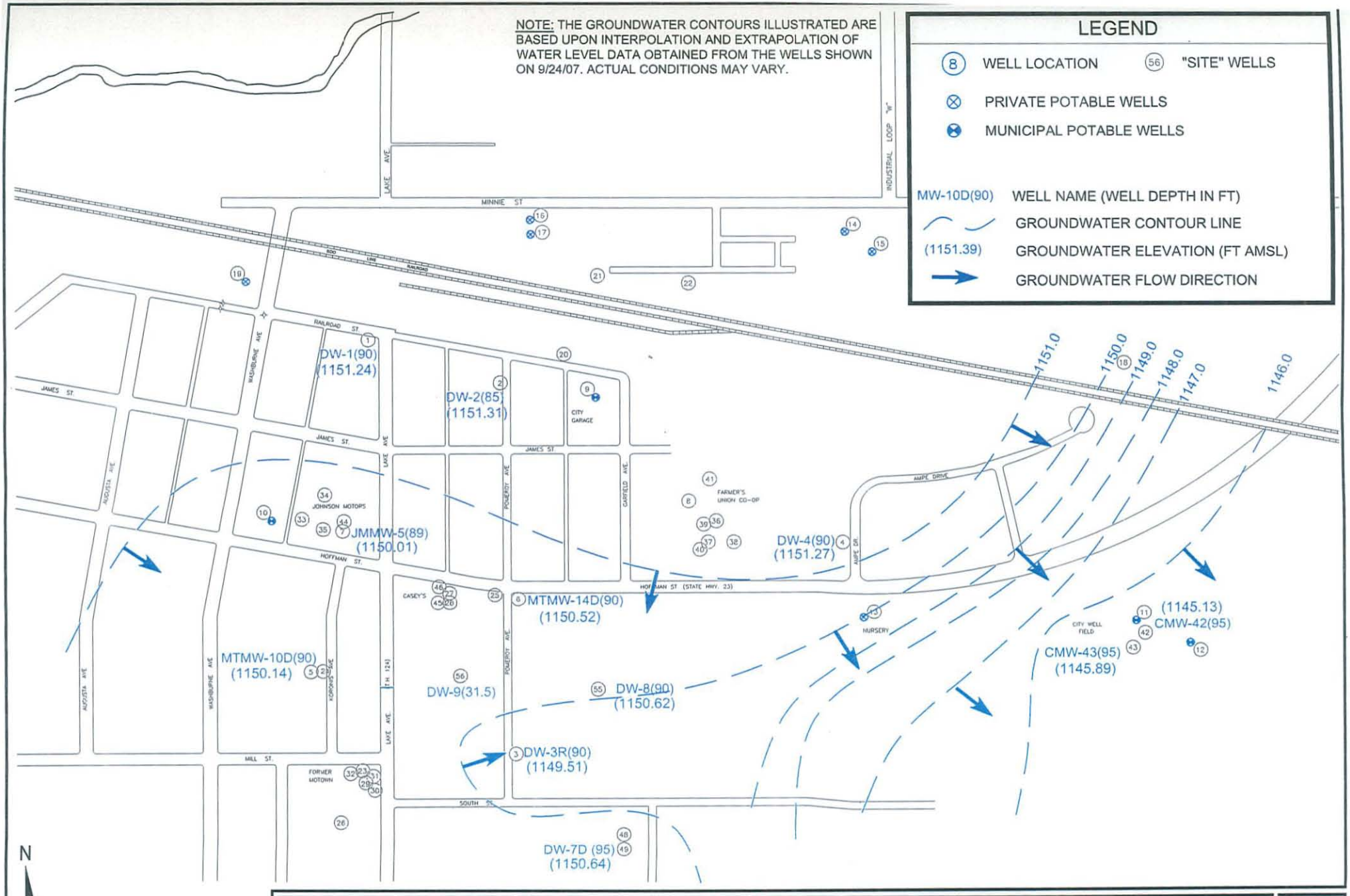
- Perform reporting and project management duties associated with the continued sampling of the municipal water supply and plume containment which includes permitting requirements, utility costs, submission of data to MPCA Staff and the City of Paynesville, and the preparation of an annual monitoring report. The annual report will fulfill the requirements of MPCA Guidance Document 4-08.


GARAGE
ASPHALT DRIVEWAY
121 MILL STREET
154 MILL STREET
SS MP-1
PORCH
DECK
VP-10
VP-2
HYDRANT
SIDEWALK
TELEPHONE VAULT COVER
MILL STREET
DRIVE
343 LAKE AVENUE S.
VP-7
POWER POLE
UST/AST FILL & VENT ?
CONCRETE DRIVE
400 LAKE AVENUE SOUTH (FORMERMIDTOWN SERVICE)
CRAWL SPACE SAMPLE
ALLEY
SHED
GAS METER
ASPHALT DRIVEWAY
SS MP-2
347 LAKE AVENUE
VP-12
211 SOUTH STREET
SOUTH STREET
SS MP-3
410 LAKE
VP-13
LEGEND
SOIL GAS PROBE / SUB-SLAB MONITORING POINT
AIR SAMPLING LOCATION
PUSH PROBE/BORING
WELL LOCATION
POWER POLE
LIF PROBE
FENCE LINE
PROPERTY BOUNDARY
BURIED ELECTRIC
TELEPHONE
FIBER OPTIC
NATURAL GAS
WATER
OVERHEAD ELECTRIC
SANITARY SEWER
STORM SEWER
OVERHEAD CABLE TV
VALVE
CATCH BASIN
N
APPROXIMATE SCALE: 1" =30'
DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES
Project Mngr: PJW
Drawn By: CDR
Checked By: CDB
Approved By: PJW
Project No. 41987018
Scale: AS SHOWN
File No. 41987018rev07
Date: 5/16/08
Terracon
Consulting Engineers and Scientists
3535 HOFFMAN ROAD E WHITE BEAR LAKE, MN 55110
PH. (651) 770-1500 FAX. (651) 770-1657
SITE MAP - SOURCE AREA
PAYNESVILLE MUNICIPAL WATER SUPPLY
FORMER MIDTOWN SERVICE STATION
PAYNESVILLE MINNESOTA
FIG. No
2B

NOTE: THE GROUNDWATER CONTOURS ILLUSTRATED ARE BASED UPON INTERPOLATION AND EXTRAPOLATION OF WATER LEVEL DATA OBTAINED FROM THE WELLS SHOWN ON 9/24/07. ACTUAL CONDITIONS MAY VARY.

LEGEND

- (8) WELL LOCATION
- (56) "SITE" WELLS
- PRIVATE POTABLE WELLS
- MUNICIPAL POTABLE WELLS
- MW-10D(90) WELL NAME (WELL DEPTH IN FT)
- GROUNDWATER CONTOUR LINE
- (1151.39) GROUNDWATER ELEVATION (FT AMSL)
- GROUNDWATER FLOW DIRECTION



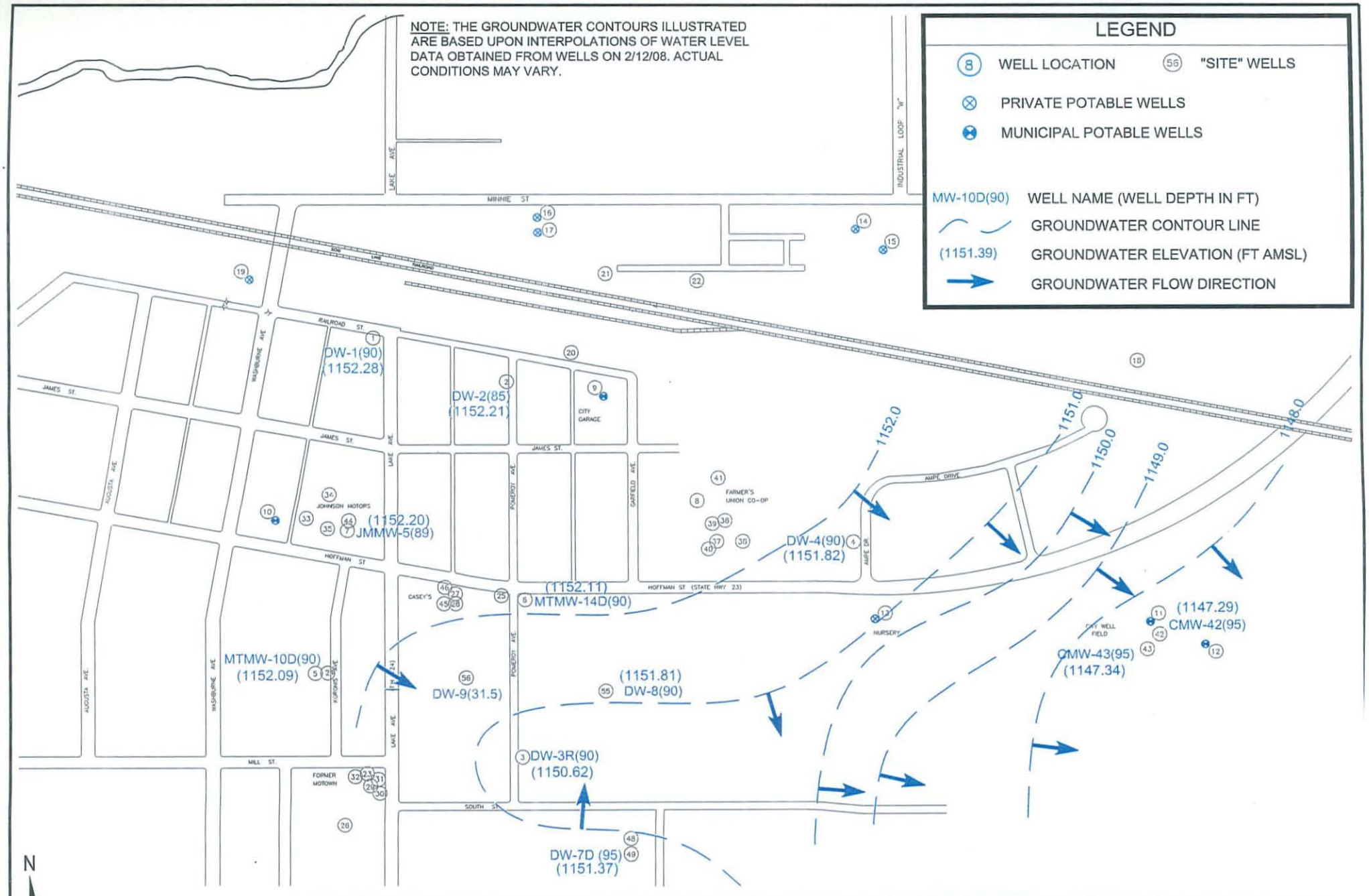
Project Mngr: PJW	Project No. 41987018	Terracon Consulting Engineers	GROUNDWATER CONTOUR MAP (9/24/07)
Drawn By: CDR	Scale: AS SHOWN	3535 HOFFMAN ROAD E	PAYNESVILLE MUNICIPAL WATER SUPPLY
Checked By: CDB	File No. 41987018gw	PH. (651) 770-1500	MPCA
Approved By: PJW	Date: 5/16/08		MINNESOTA HIGHWAY 23
			MINNESOTA

FIG. No. 3A (Layout6)

NOTE: THE GROUNDWATER CONTOURS ILLUSTRATED ARE BASED UPON INTERPOLATIONS OF WATER LEVEL DATA OBTAINED FROM WELLS ON 2/12/08. ACTUAL CONDITIONS MAY VARY.

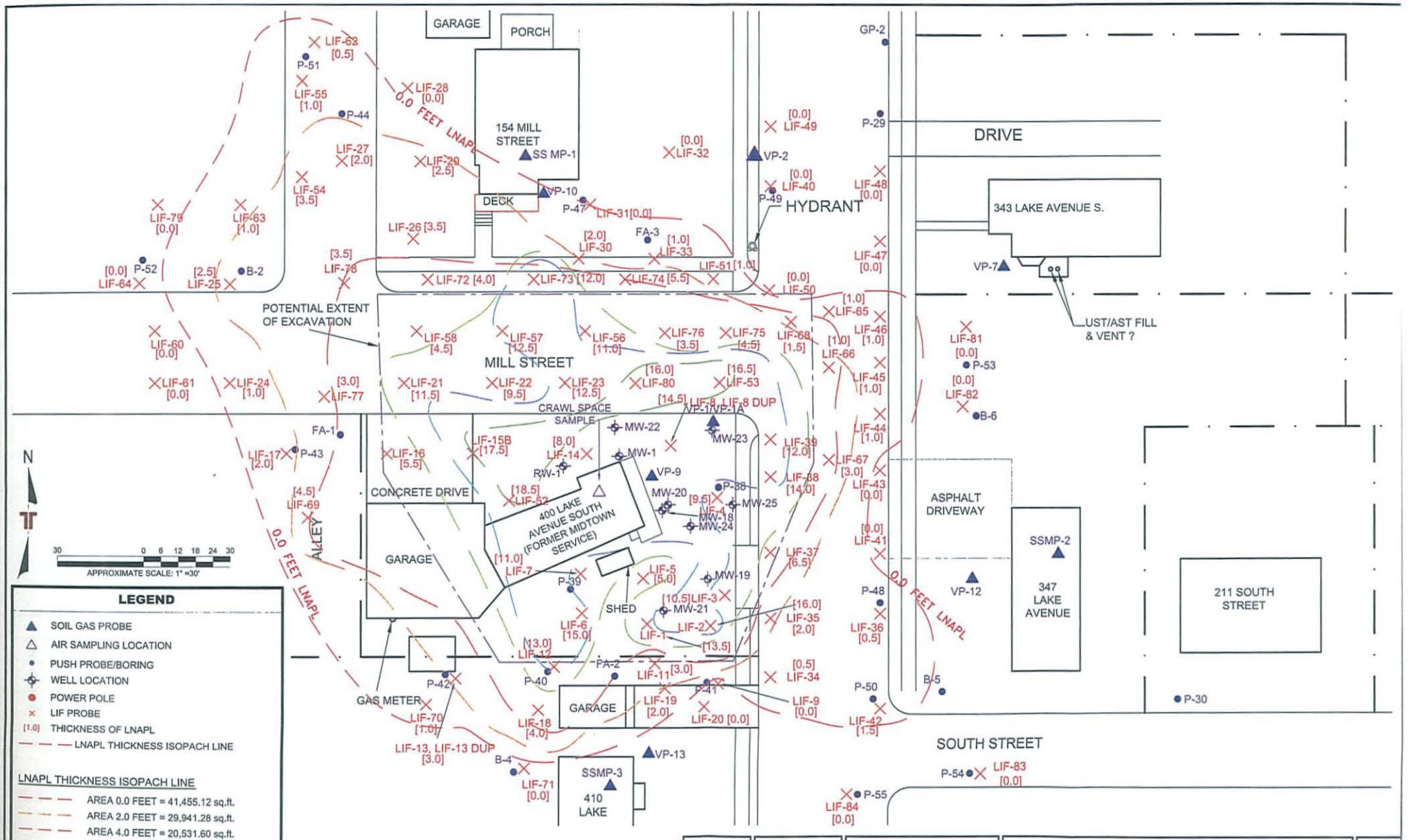
LEGEND

- (8) WELL LOCATION
- (56) "SITE" WELLS
- PRIVATE POTABLE WELLS
- MUNICIPAL POTABLE WELLS
- MW-10D(90) WELL NAME (WELL DEPTH IN FT)
- GROUNDWATER CONTOUR LINE
- (1151.39) GROUNDWATER ELEVATION (FT AMSL)
- GROUNDWATER FLOW DIRECTION



Project Mngr: PJW	Project No. 41987018	Terracon	GROUNDWATER CONTOUR MAP (2/12/08)
Drawn By: CDR	Scale: AS SHOWN		PAYNESVILLE MUNICIPAL WATER SUPPLY
Checked By: CDB	File No. 41987018gw		MPCA
			MINNESOTA HIGHWAY 23

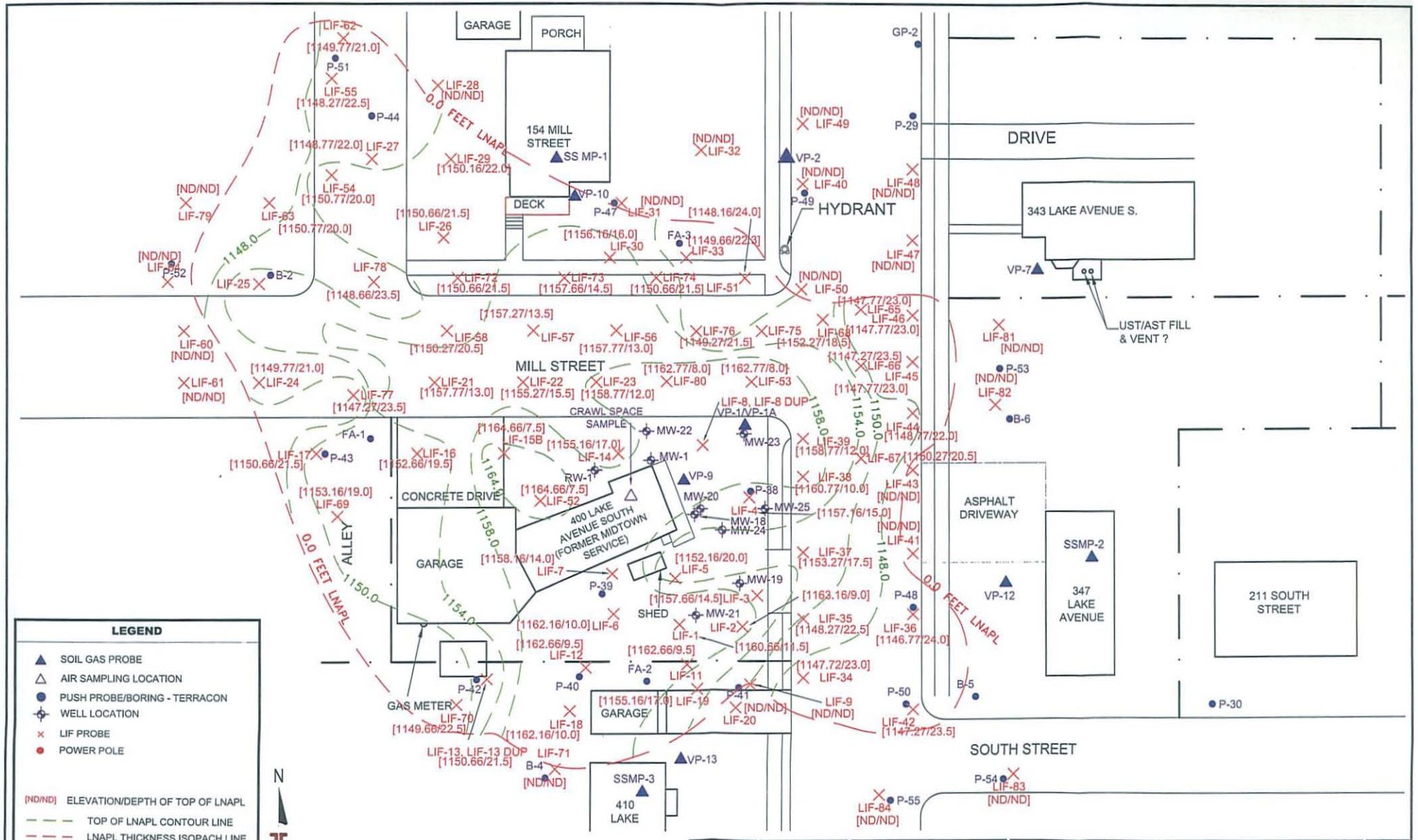
FIG. No. 3B



NOTE:
LNAPL THICKNESS ISOPACHS WERE CHOSEN BASED ON INTERPOLATION OF LASER INDUCED FLUORESCENCE DATA. ACTUAL CONDITIONS MAY VARY

Project Mngr: PJW	Project No. 41987018	Terracon Consulting Engineers and Scientists	LNAPL ISOPACH MAP
Drawn By: MTO	Scale: AS SHOWN	3535 HOFFMAN ROAD E WHITE BEAR LAKE, MN 55110	PAYNESVILLE MUNICIPAL WATER SUPPLY
Checked By: PJW	File No. 41987018LNAPL07rev	PH. (651) 770-1500 FAX. (651) 770-1657	FORMER MIDTOWN SERVICE STATION
Approved By: PJW	Date: 5/15/08		PAYNESVILLE MINNESOTA

FIG. No. 9A (Layout2)



NOTE:
DEPTHS TO TOP OF LNAPL WERE CHOSEN BASED ON INTERPOLATION OF LASER INDUCED FLUORESCENCE DATA. ACTUAL CONDITIONS MAY VARY

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mngr: PJW	Project No. 41987018	Terracon Consulting Engineers and Scientists	TOP OF LNAPL CONTOUR MAP
Drawn By: CDR	Scale: AS SHOWN	2525 HOFFMAN ROAD E WHITE BEAR LAKE, MN 55110	PAYNESVILLE MUNICIPAL WATER SUPPLY
Checked By: CDB	File No. 41987018LNAPL07rev	PH. (651) 770-1500 FAX. (651) 770-1657	FORMER MIDTOWN SERVICE STATION
Approved By: PJW	Date: 5/15/08		PAYNESVILLE MINNESOTA

FIG. No. 9B

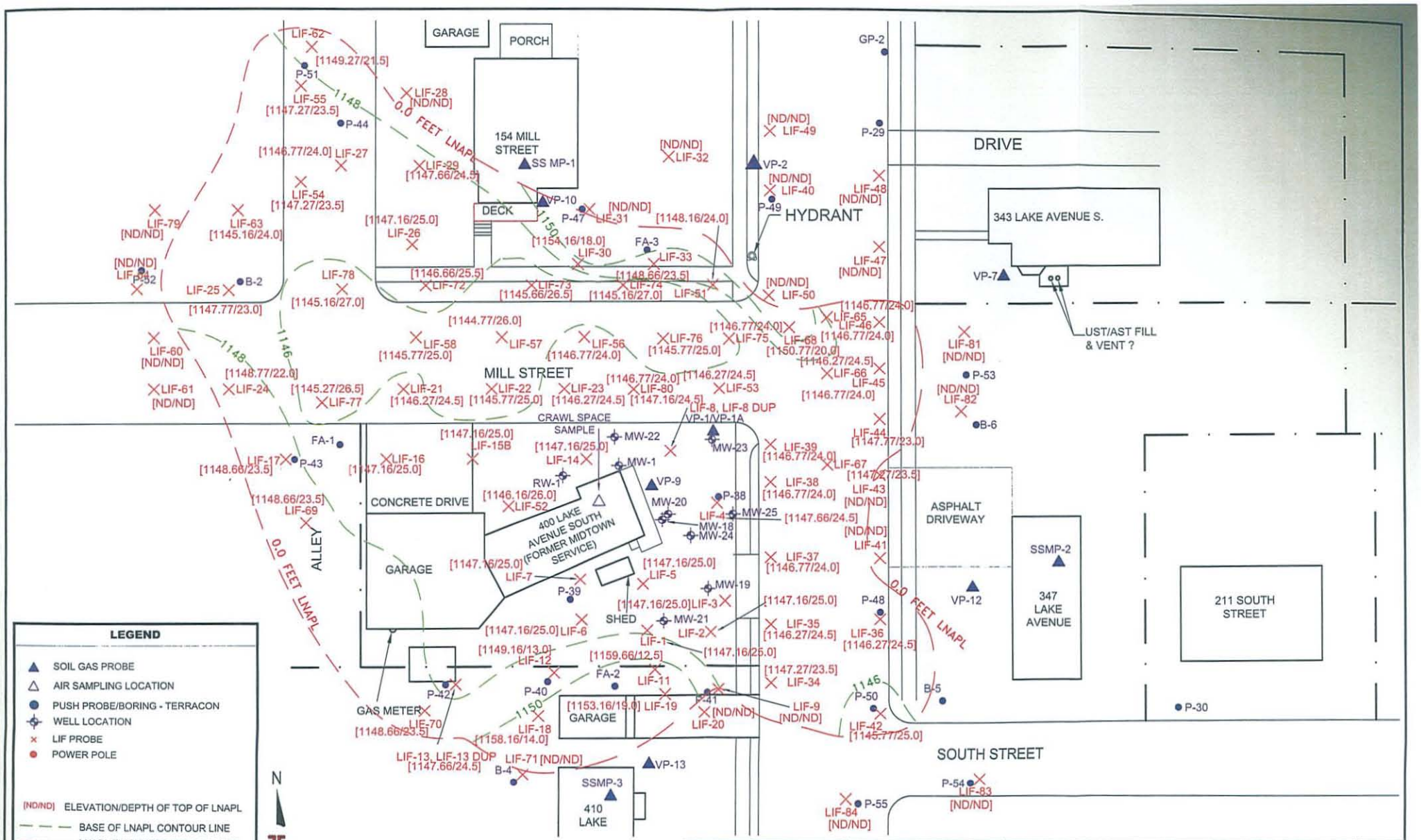

GARAGE
PORCH
154 MILL STREET
SS MP-1
DECK
VP-10
VP-2
HYDRANT
DRIVE
343 LAKE AVENUE S.
VP-7
UST/AST FILL & VENT ?
MILL STREET
CRAWL SPACE
SAMPLE
VP-1/VP-1A
LIF-8, LIF-8 DUP
CONCRETE DRIVE
400 LAKE AVENUE SOUTH (FORMER MIDTOWN SERVICE)
GARAGE
ALLEY
SHED
GAS METER
GARAGE
410 LAKE
SSMP-3
VP-13
ASPHALT DRIVEWAY
SSMP-2
347 LAKE AVENUE
VP-12
211 SOUTH STREET
SOUTH STREET
0.0 FEET LNAPL
1148
1150
1146
LEGEND
SOIL GAS PROBE
AIR SAMPLING LOCATION
PUSH PROBE/BORING - TERRACON
WELL LOCATION
LIF PROBE
POWER POLE
[ND/ND] ELEVATION/DEPTH OF TOP OF LNAPL
BASE OF LNAPL CONTOUR LINE
LNAPL THICKNESS ISOPACH LINE
30 0 6 12 18 24 30
APPROXIMATE SCALE: 1" =30'
DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES
N
NOTE:
DEPTHS TO BASE OF LNAPL WERE CHOSEN BASED ON INTERPOLATION OF LASER INDUCED FLUORESCENCE DATA. ACTUAL CONDITIONS MAY VARY
Project Mngr: PJW
Drawn By: CDR
Checked By: CDB
Approved By: PJW
Project No. 41987018
Scale: AS SHOWN
File No. 41987018LNAPL07rev
Date: 5/15/08
Terracon
Consulting Engineers and Scientists
3535 HOFFMAN ROAD E WHITE BEAR LAKE, MN 55110
PH. (651) 770-1500 FAX. (651) 770-1657
BASE OF LNAPL CONTOUR MAP
PAYNESVILLE MUNICIPAL WATER SUPPLY
FORMER MIDTOWN SERVICE STATION
PAYNESVILLE MINNESOTA
FIG. No.
9C

TABLE 8 - WATER LEVEL MEASUREMENTS AND DEPTH OF WATER SAMPLES COLLECTED FROM BORINGS/PROBES
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

	Soil Borings/Probes							
	VP-1	VP-2	VP-3	VP-4	VP-5	VP-6	P-38	P-39
Static Water Level Depth (ft)	6.3	19.3	Dry	ND	15.5	13.5	11.8	15.2
Sampled Depth (ft)	10 - 12	22 - 25	19 - 20	19 - 20	19 - 20	12 - 14	NS	20-24

	Soil Borings/Probes							
	P-40	P-41	P-42	P-43	P-44	P-45	P-46	P-47
Static Water Level Depth (ft)	20.0	19.35	NT	21.0	16.96	18.78	17.78	18.32
Sampled Depth (ft)	NS	19-29	20-24	20-24	19-24	23-28	19-24	19-24

	Soil Borings/Probes							
	P-48	P-49	P-50	P-51	P-52	P-53	P-54	P-55
Static Water Level Depth (ft)	18.70	18.0	NT	19	18	21	24	24
Sampled Depth (ft)	22-27	19-24	NS	19-23	19-23	25-29	23-27	24-28

Notes: Methods used to measure water levels and collect samples are included in Appendix B.
ND - Not Detected
NS - Not Sampled
NT - Not Taken

TABLE 9 - GROUNDWATER ANALYTICAL RESULTS (BORINGS/PROBES)
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

Sample		Date	Depth	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	1,2-Dichloro-ethane (µg/L)	Gasoline Range Organics (µg/L)	Diesel Range Organics (µg/L)	1,2,4-Trimethyl-benzene (µg/L)	1,3,5-Trimethyl-benzene (µg/L)
P-1	G	2/24/98	19	<1	<1	<1	<3	<5	<5	**1.2**	-	-	-	-
P-2	G	2/24/98	18	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-2		2/24/98	18	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
P-5	G	2/25/98	22	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-5		2/25/98	22	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
P-6	G	2/25/98	10	<1	<1	<1	<3	<5	<5	**120**	-	-	-	-
P-6		2/25/98	10	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
P-7	G	2/25/98	20	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-8	G	2/25/98	17	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-9	G	2/26/98	18	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-9		2/26/98	18	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
P-10	G	2/26/98	21	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-11	G	2/26/98	21	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-11		2/26/98	21	<1.0	<1.0	<1.0	<1.0	<5.0	-	-	<100	-	-	-
P-12	G	2/27/98	21	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-12		2/27/98	21	<1.0	<1.0	<1.0	<1.0	<5.0	-	-	<100	-	-	-
P-13	G	2/27/98	20	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-14	G	2/27/98	16	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-14		2/27/98	16	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
P-15	G	3/4/98	18	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-16	G	3/4/98	20	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-16		3/4/98	20	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
P-17	G	3/6/98	20	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-17		3/6/98	20	<1.0	<1.0	<1.0	<1.0	<5.0	-	-	**130**	**1,600**	-	-
P-19	G	3/6/98	19	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
P-20	G	3/6/98	21	<1	<1	<1	<3	<5	<5	**1.7**	-	-	-	-
P-20		3/6/98	21	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
P-21-45	G	4/23/98	45	**2.2**	<1	<1	<3	-	<5	**4.7**	-	-	-	-
P-22-36'	G	4/23/98	36	<1	<1	<1	<3	-	<5	<1	-	-	-	-
P-22-36'		4/23/98		<0.30	**0.42**	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
P-22-48'	G	4/23/98	48	<1	<1	<1	<3	-	<5	<1	-	-	-	-
P-23-24'	G	4/23/98	24	**1.3**	<1	<1	<3	-	<5	<1	-	-	-	-
P-23-24'		4/23/98		**1.5**	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
P-23-32'	G	4/23/98	32	<1	<1	<1	<3	-	<5	<1	-	-	-	-
P-24-24'	G	4/23/98	24	<1	**3.5**	<1	<3	-	<5	<1	-	-	-	-
P-24-24'		4/23/98	24	<0.30	**0.3**	<0.50	<0.80	<1.0	**1.5**	<0.50	-	-	-	-
P-24-36'	G	4/23/98	36	<1	<1	<1	<3	-	<5	<1	-	-	-	-
P-25-24'	G	6/10/98	24	**69**	<1	<1	<3	-	<5	<1	-	-	-	-
P-25-44'	G	6/10/98	44	**350**	<10	<10	<30	-	<50	**19.8**	-	-	-	-
P-25-60'	G	6/10/98	60	**22**	<1	<1	<3	-	<5	**6.7**	-	-	-	-
P-25-60'		6/10/98	60	**18**	<1.0	**3.4**	**9.4**	**1.6**	<1.0	**4.6**	-	-	-	-
P-26-24'	G	6/10/98	24	<10	<10	<10	<30	-	<50	<10	-	-	-	-
P-26-24'	1	6/10/98	24	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	-
P-26-44'	G	6/10/98	44	<10	<10	<10	<30	-	<50	<10	-	-	-	-
P-26-58'	G	6/10/98	58	**2**	<1	<1	<3	-	<5	<1	-	-	-	-
P-26-58'		6/10/98	58	**1.4**	<1.0	<1.0	<1.0	-	-	-	<100	-	-	-

TABLE 9 - GROUNDWATER ANALYTICAL RESULTS (BORINGS/PROBES)
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

Sample		Date	Depth	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	1,2-Dichloro-ethane (µg/L)	Gasoline Range Organics (µg/L)	Diesel Range Organics (µg/L)	1,2,4-Trimethyl-benzene (µg/L)	1,3,5-Trimethyl-benzene (µg/L)
P-27-24'	G	6/11/98	24	<10	<10	**81**	<30	-	<50	<10	-	-	-	-
P-27-32'	G	6/11/98	32	<10	<10	**45**	<30	-	<50	<10	-	-	-	-
P-27-40'	G	6/11/98	40	<10	<10	**29**	<30	-	<50	<10	-	-	-	-
P-27-48'	G	6/11/98	48	<10	<10	**30**	<30	-	<50	<10	-	-	-	-
P-27-56'	G	6/11/98	56	<10	<10	**24**	<30	-	<50	<10	-	-	-	-
P-27-56'		6/11/98	56	**7.5**	**2.1**	**24**	<1.0	-	-	-	**220**	-	-	-
P-28-24'	G	6/11/98	24	**1.0**	<1	**1.9**	<3	-	<5	<1	-	-	-	-
P-28-44'	G	6/11/98	44	<1	**1.0**	<1	<3	-	<5	<1	-	-	-	-
P-28-56'	G	6/11/98	56	<1	**1.0**	<1	<3	-	<5	<1	-	-	-	-
P-28-56'		6/11/98	56	<1.0	<1.0	<1.0	<1.0	-	-	-	<100	-	-	-
P-29-24'	G	6/11/98	24	**270**	**130**	**130**	**240**	-	<500	<100	-	-	-	-
P-29-37'	G	6/11/98	37	**1.3**	**3.0**	**2.5**	**6.7**	-	<5	<1	-	-	-	-
P-29-55'	G	6/11/98	55	<1	**1.9**	**1.7**	**4.1**	-	<5	<1	-	-	-	-
P-29-55'		6/11/98	55	<1.0	**1.6**	**1.3**	**1.6**	-	-	-	<100	-	-	-
P-30-24'	G	6/11/98	24	<1	<1	<1	<3	-	<5	<1	-	-	-	-
P-30-44'	G	6/11/98	44	<1	<1	<1	<3	-	<5	<1	-	-	-	-
P-30-44'		6/11/98	44	<1.0	<1.0	<1.0	<1.0	-	-	-	<100	-	-	-
P-30-52'	G	6/11/98	52	<1	<1	<1	<3	-	<5	<1	-	-	-	-
P-31-24'	G	6/12/98	24	**67**	<10	<10	<30	-	<50	<10	-	-	-	-
P-31-34'	G	6/12/98	34	**150**	**10**	<10	<30	-	<50	**12**	-	-	-	-
P-31-42'	G	6/12/98	42	**1,300**	<50	<50	<150	-	<250	**77**	-	-	-	-
P-31-50'	G	6/12/98	50	**320**	<20	<20	<60	-	<100	**43**	-	-	-	-
P-31-55'	G	6/12/98	55	**880**	<20	<20	<60	-	<100	**36**	-	-	-	-
P-31-55'	E	6/12/98	55	**510**	**1.3**	**3.1**	**29**	**1.6**	<1.0	**40**				
P-33-30'	G	6/12/98	30	<1	<1	<1	<3	-	<5	<1	-	-	-	-
P-33-44'	G	6/12/98	44	<1	<1	<1	<3	-	<5	<1	-	-	-	-
P-33-55'	G	6/12/98	55	<1	<1	<1	<3	-	<5	**1.4**	-	-	-	-
P-33-55'		6/12/98	55	<1.0	<1.0	<1.0	**1.2**	**9.6**	<1.0	<1.0	-	-	-	-
P-34-24'	G	6/12/98	24	**150**	<20	**48**	<60	-	<100	<20	-	-	-	-
P-34-44'	G	6/12/98	44	**1,200**	<100	<100	<300	-	<500	**69**	-	-	-	-
P-34-44'	E'	6/12/98	44	**180**	**14**	**57**	**200**	**1.4**	<1.0	**71**	-	-	-	-
P-35-24'	G	6/12/98	24	**2.4**	<1	**7.7**	<3	-	**17.5**	<1	-	-	-	-
P-35-44'	G	6/12/98	44	**2.2**	<1	**21**	<3	-	<5	<1	-	-	-	-
P-35-44'	'	6/12/98	44	**2.8**	<1.0	**23**	<1.0	<1.0	<1.0	<1.0	-	-	-	-
P-36-24'	G	6/12/98	24	<1	<1	<1	<3	-	<5	<1	-	-	-	-
P-36-44'	G	6/12/98	44	<1	<1	<1	<3	-	<5	<1	-	-	-	-
P-36-44'		6/12/98	44	<1.0	<1.0	<1.0	<1.0	-	-	-	<100	-	-	-
P-37-24'	G	6/13/98	24	<10	<10	**12**	<30	-	<50	<10	-	-	-	-
P-37-24'		6/13/98	24	**8**	<1.0	**11**	<1.0	-	-	-	**490**	-	-	-
P-37-44'	G	6/13/98	44	**235**	**60**	<10	<30	-	<50	<10	-	-	-	-
P-37-44'	'	6/13/98	44	**170**	**41**	**160**	**58.3**	<1.0	**2.6**	**11**	-	-	-	-
P-39W (20-24)	2,4	2/21/07	20-24	**63**	**31**	**120**	**318**	**16**	-	-	**9,700**	-	-	-
P-41W (19-29)	2,4	2/22/07	19-29	**3.7**	**130**	**41**	**110**	**9.4**	-	-	**4,300**	-	-	-
P-42W (20-24)	2,4	2/22/07	20-24	<1.0	<1.0	**5.0**	**1.2**	<1.0	-	-	**1,400**	-	-	-
P-43W	2,4,D	2/22/07	20-24	<2.0	<2.0	**10**	**42**	**5.8**	-	-	**3,900**	-	-	-

TABLE 9 - GROUNDWATER ANALYTICAL RESULTS (BORINGS/PROBES)
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

Sample		Date	Depth	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	1,2-Dichloro-ethane (µg/L)	Gasoline Range Organics (µg/L)	Diesel Range Organics (µg/L)	1,2,4-Trimethyl-benzene (µg/L)	1,3,5-Trimethyl-benzene (µg/L)
P-44W (19-24)	2	2/26/07	19-24	**1.2**	**1.1**	**2.5**	**5.9**	**2.0**	-	-	**1,500**	-	-	-
P-45W (23-28)	2, 3	2/26/07	23-28	**36**	**89**	**220**	**406**	**2.3**	**51**	<2.5	**2,400**	-	**130**	**24**
P-46W (19-24)	2	2/27/07	19-24	**70**	**86**	**350**	**940**	<5.0	-	-	**5,400**	-	-	-
P-47W (19-24)	2	2/27/07	19-24	**150**	**58**	**600**	**1,470**	**5.1**	-	-	**7,800**	-	-	-
P-48W (22-27)	2	2/27/07	22-27	<10	<10	**210**	**936**	**10**	-	-	**11,000**	-	-	-
P-49W (19-24)	2	2/28/07	19-24	**750**	**390**	**930**	**3,480**	<10	-	-	**14,000**	-	-	-
P-51	2	1/9/08	19-23	<1.0	<1.0	**1.5**	**4.8**	**1.3**	-	-	**1,100**	-	-	-
P-52		1/9/08	19-23	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	<50	-	-	-
P-53	2	1/10/08	19-23	**2.4**	**2.7**	**70**	**34.5**	<1.0	-	-	**850**	-	-	-
P-54		1/11/08	19-23	<1.0	**1.1**	<1.0	<1.0	<1.0	-	-	<50	-	-	-
P-55		1/11/08	19-23	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	<50	-	-	-
GP-1-28'-32'	G	4/23/98	28-32	**3.6**	**3.4**	**140**	**3.3**	-	<5	<1	-	-	-	-
GP-1-36'-40'	G	4/23/98	36-40	**274**	**360**	**70**	<150	-	<250	<50	-	-	-	-
GP-1-46'-50'	G	4/23/98	46-50	**750**	**60**	**74**	**82**	-	<5	**51**	-	-	-	-
GP-2-16'-20'	G	4/23/98	16-20	<1	<1	<1	<3	-	<5	<1	-	-	-	-
GP-2-26'-30'	G	4/23/98	26-30	<1	**5.4**	**10.9**	**4.1**	-	<5	<1	-	-	-	-
GP-2-36'-40'	G	4/23/98	36-40	**3.5**	<1	<1	<3	-	<5	<1	-	-	-	-
GP-2-46'-50'	G	4/23/98	46-50	<1	**1.2**	<1	<3	-	<5	<1	-	-	-	-
DW-1-55'	G	2/26/98	55	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
DW-1-55'		2/26/98	55	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
DB-1-20'	*G	2/27/98	20	**6.7**	<1	<1	<3	<5	**135**	**11.6**	-	-	-	-
DB-1-20'	*	2/27/98	20	**4.9**	<0.30	<0.50	**2.6**	<1.0	**56**	<0.50	-	**57,000**	-	-
DB-1-40'	*G	2/27/98	40	<1	<1	<1	<3	<5	<5	**1.3**	-	-	-	-
DB-1-40'	*	2/27/98	40	**0.84**	**0.54**	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
DB-1-90'	*G	2/27/98	90	<1	<1	**1.6**	<3	**7.4**	<5	**3.5**	-	-	-	-
DB-1-90'	*	2/27/98	90	**0.42**	**0.72**	**0.58**	<0.80	<1.0	<0.40	<0.50	-	-	-	-
DB-2-20'	G	3/3/98	20	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
DB-2-20'		3/3/98	20	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
DB-2-50'	G	3/3/98	50	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
DB-2-50'	*	3/3/98	50	**0.62**	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
DB-2-90'	G	3/3/98	90	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
DB-2-90'		3/3/98	90	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
DB-3-20'	*G	3/4/98	20	<1	<1	<1	<3	<5	**400**	<1	-	-	-	-
DB-3-20'	*	3/4/98	20	**0.45**	<0.30	**0.96**	**1.94**	<1.0	**240**	<0.50	-	-	-	-
DB-3-65'	G	3/4/98	65	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
DB-3-65'	*	3/4/98	65	<0.30	<0.30	<0.50	<0.80	<1.0	**0.41**	<0.50	-	-	-	-
DW-2-50'	G	3/3/98	50	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
DW-2-50'		3/3/98	50	**0.38**	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
DW-3-40'	G	3/5/98	40	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
DW-3-40'		3/5/98	40	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
DW-4-20'	G	3/6/98	20	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
DW-4-20'		3/6/98	20	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-
DW-4-20'	G	3/6/98	60	<1	<1	<1	<3	<5	<5	<1	-	-	-	-
DW-4-20'	*	3/6/98	60	**0.36**	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-	-	-

TABLE 9 - GROUNDWATER ANALYTICAL RESULTS (BORINGS/PROBES)
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

Sample	Date	Depth	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	1,2-Dichloro-ethane (µg/L)	Gasoline Range Organics (µg/L)	Diesel Range Organics (µg/L)	1,2,4-Trimethyl-benzene (µg/L)	1,3,5-Trimethyl-benzene (µg/L)
VIA PILOT SOIL BORINGS													
VP-1 (11-15')	11/4/04	15	**198**	**122**	**20.0**	**298**	**<40.0**	-	-	**2,940**	-	**172**	**144**
VP-2 (21 -25')	11/4/04	25	**250**	**188**	**781**	**2,670**	**96.9**	-	-	**8,340**	-	**719**	**187**
VP-4 (16 -20')	11/4/04	20	**1.0**	**1.5**	**2.1**	**6.4**	<4.0	-	-	<100	-	<1.0	**6.0**
VP-5 (16 -20')	11/4/04	20	<1.0	<1.0	<1.0	<3.0	<4.0	-	-	<100	-	<1.0	<1.0
VP-6 (16 -20')	11/4/04	20	<1.0	<1.0	<1.0	<3.0	<4.0	-	-	<100	-	<1.0	<1.0
QA/QC DUPLICATES & BLANKS													
Trip Blank	3/20/07	-	<1.0	<1.0	<1.0	<3.0	<1.0	<5.0	<1.0	<50	-	<1.0	<1.0
Trip Blank	1/8/08	-	<1.0	<1.0	<1.0	<3.0	<1.0	<5.0	-	<50	-	-	-
Method Blank	11/4/04	-	<1.0	<1.0	<1.0	<3.0	<4.0	-	-	<100	-	<0.51	<0.52
Method Blank	3/20/07	-	<1.0	<1.0	<1.0	<2.0	<1.0	<5.0	<1.0	-	-	<1.0	<1.0
Method Blank	1/8/08	-	<1.0	<1.0	<1.0	<2.0	<1.0	<5.0	-	-	-	-	-
HRL/*HBV*	-	-	10	1,000	700	10,000	*70*	300	4	*200*	*200*	NE	NE
MCL			5	1,000	700	10,000	NE	NE	5	NE	NE	NE	NE

Note: Concentrations in micrograms per liter (µg/L), equivalent to parts per billion.
Results at or below the laboratory reporting limits (RLs) are preceded by the less than symbol (<).
Analytes not sampled, or results not applicable, were represented with a hyphen (-).
Bolded values exceeded the RL for the analyte.
G - Samples analyzed using GC in Geoprobe Sampling Vehicle.
D - Duplicate
* - Other petroleum related volatile organic compounds detected.
HRL/HBV - Health Risk Limit / Health Based Values (Minnesota Department of Health, http://www.health.state.mn.us/divs/eh/groundwater/hrltable.html, 11/30/2004)
MCL - Maximum Contaminant Levels (Environmental Protection Agency, http://www.epa.gov/safewater/mcl.html#mcls, 3/8/2005)
1 - Tetrachloroethane detected: P-26-24 = 83 µg/l E, E denotes concentrations exceeds calibration curve and should be considered an estimate.
2 - Early and late eluting peaks were present outside the window of analysis.
3 - Other VOCs detected. See laboratory report.
4 - Analyzed outside holding time

5/7/2008

TABLE 10A - SOIL GAS ANALYTICAL RESULTS
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

Sample Location (depth in feet)		Sample Date	Sample Duration	Benzene (ug/m3)	Ethylbenzene (ug/m3)	Toluene (ug/m3)	Total Hydrocarbons as Gas (ug/m3)	1,3,5-Trimethylbenzene (ug/m3)	1,2,4-Trimethylbenzene (ug/m3)	m-& p-Xylene (ug/m3)	o-Xylene (ug/m3)	Method
Soil Vapor Assessment												
VP-1 2' - 0724	1	11/04/04	Grab	**20.5**	18.5	35.2	1,650	<17	<17	<30	<15	TO-15
VP-1 5' - 0633	1	11/04/04	Grab	<11	<15	16.5	<580	<17	<17	<30	<15	TO-15
VP-1A 5' - 0682		10/18/05	Grab	**520**	**16,800**	**5,360**	-	**1,750**	**1,500**	**38,400**	**7,060**	TO-14
VP-2 5' - 0145	1	11/04/04	Grab	**24.4**	53	54.4	5,990	<18	<17	31.8	<16	TO-15
VP-2 16' - 0501	1	11/04/04	Grab	**34.1**	34	105.0	8,290	<17	**44.5**	75.9	27.4	TO-15
VP-3 5' - 0561	1	11/04/04	Grab	<750	**1000**	**880**	72,900	<1100	<1100	<2000	<1000	TO-15
VP-3 19.5' - 0357	1	11/04/04	Grab	<6000	<8100	<7000	16,900,000	<9200	<9000	<16000	<8100	TO-15
VP-4 5' - 0722	1	11/04/04	Grab	**61.4**	39.3	64.4	38,400	<17	**25**	36.2	15.9	TO-15
VP-4 14' - 0088	1	11/04/04	Grab	<45	<61	<53	46,900	<69	<68	<120	<61	TO-15
VP-5 5' - 0354	1	11/04/04	Grab	<12	<16	28.0	10,500	<18	**19.5**	48.1	<16	TO-15
VP-5 14' - 0007	1	11/04/04	Grab	**15.6**	21.6	69.3	3,290	<18	**63.5**	79.5	30.0	TO-15
VP-6 5' - 0324	1	11/04/04	Grab	**23.1**	<16	18.8	4,730	<18	**18.0**	<30	<16	TO-15
VP-6 12' - 0414	1	11/04/04	Grab	**14.6**	19.4	48.7	2,740	<17	**52.0**	75.9	27.8	TO-15
VP-7 8.5' - 0741		04/21/05	Grab	<3.2	5.3	8.4	525	<4.9	**12.0**	21.2	8.4	TO-15
VP-8 5.5' - 0803		04/21/05	Grab	**66.2**	20.7	56.7	2,010	<4.5	**13.5**	32.2	13.2	TO-15
VP-9 5.5' - 0126		04/21/05	Grab	**5.9**	14.6	17.6	677	5.0	**15.5**	26.9	11.9	TO-15
VP-10 6.5' - 0566		04/21/05	Grab	**12.7**	30.9	26.8	1,980	**15.0**	**34.5**	71.5	36.2	TO-15
VP-11 6' - 0425		10/18/05	Grab	<5.3	167	49.7	-	**27.1**	**50.7**	417	48.4	TO-15
VP-11 6' - 1033 (dup)		10/18/05	Grab	**4.5**	42.4	15.9	-	**7.6**	**17.4**	107	15.9	TO-15
VP-12 8' - 0017		02/23/07	Grab	**18.0**	25.2	34.9	-	<3.4	**7.5**	13.8	5.5	TO-15
VP-13 8' - 0147		02/23/07	Grab	**30.4**	18.0	45.7	-	<3.4	**11.9**	22.5	8.4	TO-15

Terracon

TABLE 10A - SOIL GAS ANALYTICAL RESULTS
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

Sample Location (depth in feet)		Sample Date	Sample Duration	Benzene (ug/m3)	Ethylbenzene (ug/m3)	Toluene (ug/m3)	Total Hydrocarbons as Gas (ug/m3)	1,3,5-Trimethylbenzene (ug/m3)	1,2,4-Trimethylbenzene (ug/m3)	m-& p-Xylene (ug/m3)	o-Xylene (ug/m3)	Method
QA/QC Samples												
Method Blank: 25167		11/04/04	-	ND	ND	ND	-	ND	ND	ND	ND	TO-15
Method Blank: 81927		04/21/05	-	ND	ND	ND	-	ND	ND	ND	ND	TO-15
Method Blank: 156048		10/18/05	-	ND	ND	ND	-	ND	ND	ND	ND	TO-15
Method Blank: 317227		02/23/07	-	ND	ND	ND	-	ND	ND	ND	ND	TO-15
MDH HRV Acute / *Chronic*	A	-	-	1000 / *1.3 - 4.5*	10000 / *NE*	37000 / *400*	NE	NE	NE	43000t / *NE*	43000t / *NE*	-
EPA Rfc	B			NE	1,000	NE	NE	6	6	700t	700t	-
MDH ISC	C	-	-	NE	NE	NE	NE	NE	NE	NE	NE	-

Notes: Analytical data reported in micrograms per cubic meter (ug/m3).
Results at or below the laboratory reporting limits (RLs) were preceded by the less than symbol (<).
Concentrations above MPCA screening levels (A through C) are in bold.
A. MDH Health Risk Value (http://www.health.state.mn.us/divs/eh/air/hrvtable.htm, 3/21/05)
B. EPA Reference concentrations
C. MDH Interim Screening Concentration

ND - Non-detect
NE - Not Established
1. Sample diluted during laboratory analysis.

6/2/08

TABLE 10B - OTHER NOTABLE SOIL GAS ANALYTICAL RESULTS
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

Sample Location (depth in feet)		Sample Date	Sample Duration	Acetone	1,3-Butadiene	2-Butanone (MEK)	Cyclohexane	4-Ethyltoluene	Methylene Chloride	n-Heptane	n-Hexane	Propylene	Tetrahydro-furan	Method
				(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	
Soil Vapor Assessment														
VP-1 2' - 0724	1	11/04/04	Grab	54.8	<7.9	20.7	<12	<18	<12	<15	19.7	87.1	<10	TO-15
VP-1 5' - 0633	1	11/04/04	Grab	32.1	<7.9	<11	<12	<18	<12	<15	<13	16.4	<10	TO-15
VP-2 5' - 0145	1	11/04/04	Grab	<9.2	<8.1	<11	<13	<18	<13	37.9	177	<6.1	<11	TO-15
VP-2 16' - 0501	1,3	11/04/04	Grab	280	**99.2**	124	<12	27.5	<12	30.8	53	359	40.8	TO-15
VP-3 5' - 0561	1	11/04/04	Grab	<590	<520	<730	<800	<1200	**4,240**	<960	<840	<390[2]	<690	TO-15
VP-3 19.5' - 0357	1	11/04/04	Grab	<4700	<4100	<5800	<6400	<9300	<6500	<7700	<6700	<3100	<5500	TO-15
VP-4 5' - 0722	1	11/04/04	Grab	321	<7.9	121	<12	<18	<12	<15	<13	227	<10	TO-15
VP-4 14' - 0088	1	11/04/04	Grab	128.0	<31	51.0	261	<71	<49	<58	<51	<24[2]	<42	TO-15
VP-5 5' - 0354	1	11/04/04	Grab	133.0	<8.3	42.0	<13	<19	<13	<15	<14	250[2]	<11	TO-15
VP-5 14' - 0007	1	11/04/04	Grab	161	<8.1	44.7	<13	37	<13	<15	24	268	<11	TO-15
VP-6 5' - 0324	1	11/04/04	Grab	46.1	<8.1	15.6	<13	<18	<13	<15	<13	213	<11	TO-15
VP-6 12' - 0414	1	11/04/04	Grab	101	<7.9	37.8	<12	30.5	<12	<15	<13	<5.9[2]	<10	TO-15
VP-7 8.5' - 0741	3	04/21/05	Grab	4.83	**5.85**	8.99	<3.4	20.5	<3.5	<4.1	<3.6	<6.6	<2.9	TO-15
VP-8 5.5' - 0803	3	04/21/05	Grab	3.62	**103**	10.5	5.6	13.5	<3.2	15	26.2	341	<2.7	TO-15
VP-9 5.5' - 0126	3	04/21/05	Grab	3.38	**8.77**	8.09	3.85	12	<3	5.42	7.52	12.1	<2.6	TO-15
VP-10 6.5' - 0566	3	04/21/05	Grab	7.49	**21.8**	14.7	25.9	21	<2.6	15	21.9	27.8	<2.2	TO-15
VP-1A 5' - 0682		10/18/05	Grab	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TO-14
VP-11 6' - 0425	*	10/18/05	Grab	<3.9	<3.7	<4.9	12,900	60.6	<5.8	11,600	**27,800**	<2.8	<4.9	TO-15
VP-11 6' - 1033 (dup)	*	10/18/05	Grab	<0.81	<0.76	<1.0	460	15.6	<1.2	426	964	<0.59	<1.0	TO-15
VP-12 8' - 0017	*, 3	02/23/07	Grab	49.6	**9.8**	8.20	15.2	3.7	<0.95	21.5	21.7	85.4	13.1	TO-15
VP-13 8' - 0147	*	02/23/07	Grab	104	<0.60	23.6	22.5	6.0	<1.1	24.1	50.1	361	19.6	TO-15
QA/QC Samples														
Method Blank: 25167		11/04/04	-	ND	ND	ND	ND	ND	ND	ND	ND	ND[2]	ND	TO-15
Method Blank: 81927		04/21/05	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	TO-15
Method Blank: 156048		10/18/05	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	TO-15
Method Blank: 317227		02/23/07	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	TO-15
MDH HRV Acute / *Chronic*	A	-	-	NE / *NE*	0.04 / *NE*	NE / *NE*	NE / NE	NE / NE	10,000 / 20	NE / NE	2000 / *NE*	NE / *NE*	NE / *NE*	-
EPA Rfc	B			350	2	1000	NE	NE	NE	NE	200	NE	NE	-
MDH ISC	C	-	-	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	-

Notes: Analytical data reported in micrograms per cubic meter (ug/m3).
Results at or below the laboratory reporting limits (RLs) were preceded by the less than symbol (<).
Concentrations above MPCA screening levels (A through C) are in bold.
A. MDH Health Risk Value (http://www.health.state.mn.us/divs/eh/air/hrvtable.htm, 3/21/05)
B. EPA Reference concentrations
C. MDH Interim Screening Concentration

ND - Non-detect above RLs.
NE - Not Established
* - Other VOCs Detected (see laboratory report)
1. Sample diluted during laboratory analysis.
2. Initial calibration for this compound is outside of method control limits, therefore results is an estimation.
3. 1,3-Butadiene may have been misidentified

6/2/08

TABLE 10C - RESULTS OF SOIL GAS SAMPLES FOR VAPOR INTRUSION SCREENING
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

SAMPLE LOCATION	VP-12			VP-13									Action Level	
DATE SAMPLE	2/23/07			2/23/07										
DEPTH (-#) or HEIGHT (+#) in feet	-8			-8										Source: HRV[A], ISC[B], RFC[C]
PARAMETERS	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	(µg/m³)	
1,1,1-Trichloroethane	ND	1.5		ND	1.5								140000	HRV (Acute)
1,1,2,2-Tetrachloroethane	ND	1.9		ND	1.9								0.4	RfC
1,1,2-Trichloroethane	ND	1.5		ND	1.5								2	RfC
1,1,2-Trichlorotrifluoroethane	ND	2.1		ND	2.1								30000	RfC
1,1-Dichloroethane	ND	1.1		ND	1.1								500	RfC
1,1-Dichloroethene	ND	1.1		ND	1.1								200	RfC
1,2,4-Trichlorobenzene	ND	1.3		ND	1.3								200	RfC
1,2,4-Trimethylbenzene	7.5	3.4		**11.9**	3.4								6	RfC
1,2-Dibromoethane (EDB)	ND	2.1		ND	2.1								0.05	HRV (Chronic)
1,2-Dichlorobenzene	ND	1.6		ND	1.6								200	RfC
1,2-Dichloroethane	ND	1.1		ND	1.1								1	RfC
1,2-Dichloropropane	ND	1.3		ND	1.3								4	RfC
1,3,5-Trimethylbenzene	ND	3.4		ND	3.4								6	RfC
1,3-Butadiene	9.8	0.60		ND	0.60								0.04	HRV (Chronic)
1,3-Dichlorobenzene	ND	1.6		ND	1.6								110	RfC
1,4-Dichlorobenzene	ND	1.6		ND	1.6								800	RfC
2-Butanone (MEK)	8.2	0.80		23.6	0.80								1000	RfC
2-Hexanone	ND	1.1		ND	1.1								NE	-
2-Propanol	-	-		-	-								NE	-
4-Ethyltoluene	3.7	3.4		6.0	3.4								NE	-
4-Methyl-2-pentanone (MIBK)	ND	1.1		13.1	1.1								80	RfC
Acetone	49.6	0.64	LL, SS	104	6.4	CO, LL, SS							350	RfC
Benzene	18.0	0.87		30.4	0.87								1,000 / 1.3-4.5	HRV (Acute / Chronic)
Bromodichloromethane	ND	1.9		ND	1.9								1	RfC
Bromoform	ND	2.8		ND	2.8								22	RfC
Bromomethane	ND	1.1		2.0	1.1								5	HRV (Chronic)
Carbon disulfide	5.0	0.84		3.4	0.84								6,000 / 700	HRV (Acute / Chronic)
Carbon tetrachloride	ND	1.7		ND	1.7								2	RfC
Chlorobenzene	ND	1.3		ND	1.3								60	RfC
Chloroethane	ND	0.72		ND	0.72								10000	RfC
Chloroform	ND	1.3		ND	1.3								1	RfC
Chloromethane	ND	0.56		ND	0.56								90	RfC
Cyclohexane	15.2	0.91		22.5	0.91								NE	-
Dibromochloromethane	ND	2.3		ND	2.3								NE	-
Dichlorodifluoromethane	2.4	1.3		3.4	1.3								200	RfC
Dichlorotetrafluoroethane	ND	1.9		ND	1.9								NE	-
Ethanol	-	-		-	-								NE	-
Ethyl acetate	ND	0.98		ND	0.98								3200	RfC
Ethylbenzene	25.2	1.2		18.0	1.2								10000	HRV (Acute)
Hexachloro-1,3-butadiene	ND	2.9		ND	2.9								1	RfC
Methyl-tert-butyl ether	ND	0.98		ND	0.98								10,000 / 20	HRV (Acute / Chronic)
Methylene Chloride	ND	0.95		ND	0.95								3000	RfC
Naphthalene	5.1	3.6		5.5	3.6								3	RfC

TABLE 10C - RESULTS OF SOIL GAS SAMPLES FOR VAPOR INTRUSION SCREENING
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

SAMPLE LOCATION	VP-12			VP-13									Action Level	
DATE SAMPLE	2/23/07			2/23/07										Source: HRV[A], ISC[B], RFC[C]
DEPTH (-#) or HEIGHT (+#) in feet	-8			-8										
PARAMETERS	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	(µg/m³)	
Propylene	85.4	0.47	E	361	4.7	D6							NE	-
Styrene	1.4	1.2		2.4	1.2								21,000 / 1,000	HRV (Acute / Chronic)
Tetrachloroethene	ND	1.9		ND	1.9								20000 / 20	HRV (Acute / Chronic)
Tetrahydrofuran	13.1	0.80	L1, SS	19.6	0.80	L1, SS							NE	-
Toluene	34.9	1.0		45.7	1.0								37,000 / 400	HRV (Acute / Chronic)
Trichloroethene	ND	1.5		ND	1.5								2000	HRV (Acute)
Trichlorofluoromethane	ND	1.5		ND	1.5								700	RfC
Vinyl acetate	ND	0.95		ND	0.95								200	HRV (Chronic)
Vinyl chloride	ND	0.70		ND	0.70								1	HRV (Chronic)
cis-1,2-Dichloroethene	ND	1.1		ND	1.1								35	RfC
cis-1,3-Dichloropropene	ND	1.2		ND	1.2								6	RfC
m&p-Xylene	13.8	2.4		22.5	2.4								43,000*	HRV (Acute)
n-Heptane	21.5	1.1		24.1	1.1								NE	-
n-Hexane	21.7	0.96		50.1	0.96								2000	HRV (Chronic)
o-Xylene	5.5	1.2		8.4	1.2								43,000*	HRV (Acute)
trans-1,2-Dichloroethene	ND	1.1		ND	1.1								70	RfC
trans-1,3-Dichloropropene	ND	1.2		ND	1.2								6	RfC

Notes: Analytical data reported in micrograms per cubic meter (µg/m3). 6/2/08
Results below the laboratory reporting limits (RLs) were preceded by the less than symbol (<) or listed as not detected (ND).
Bold indicates parameter concentration above the respective action level criteria.
NE indicates action levels are not established for the respective parameter.
RL column includes laboratory reporting limits for the respective parameter.
* The action levels shown are for TOTAL Xylenes (combined m&p-Xylene and o-Xylene).
Q column includes footnotes for referencing laboratory reporting qualifiers.
D6 = The relative percent difference (RPD) between the sample and the sample duplicate exceeds laboratory control limits.
E = Analyte concentration exceeded the calibration range. The reported result is estimated.
L1 = Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.
SS = Analyte did not meet the secondary source verification criteria for the initial calibration. The reported result should be considered and estimate.
[1] = Collected using certified canister and 200 cubic centimeter per minute (30 min) flow controller.

A. MDH Health Risk Value (http://www.health.state.mn.us/divs/eh/air/hrvtable.htm, 3/21/05) (HRV)
B. MDH Interim Screening Concentration (ISC)
C. EPA Reference concentrations (RFC)

TABLE 10D - RESULTS OF SOIL GAS SAMPLES FOR VAPOR INTRUSION SCREENING (400 LAKE AVE.)
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

SAMPLE LOCATION	Crawl Space' (400 Lake Ave)			Crawl Space' (400 Lake Ave)						Action Level	
DATE SAMPLE	11/7/07			4/8/08							
DEPTH (-#) or HEIGHT (+#) in feet	0.5			0.5							
PARAMETERS	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	(µg/m³)	Source: HRV[A], ISC[B], RFC[C]
1,1,1-Trichloroethane	2.5	1.4		ND	1.8					140000	HRV (Acute)
1,1,2,2-Tetrachloroethane	ND	1.8		ND	2.3					0.4	RfC
1,1,2-Trichloroethane	ND	1.4		ND	1.8					2	RfC
1,1,2-Trichlorotrifluoroethane	ND	2.0		ND	2.7					30000	RfC
1,1-Dichloroethane	ND	1.0		ND	1.4					500	RfC
1,1-Dichloroethene	ND	1.0		ND	1.3					200	RfC
1,2,4-Trichlorobenzene	ND	1.2		ND	1.6					200	RfC
1,2,4-Trimethylbenzene	ND	3.1		ND	4.2					6	RfC
1,2-Dibromoethane (EDB)	ND	2.0		ND	2.7					0.05	HRV (Chronic)
1,2-Dichlorobenzene	ND	1.5		ND	2.0					200	RfC
1,2-Dichloroethane	ND	1.0		ND	1.4					1	RfC
1,2-Dichloropropane	ND	1.2		ND	1.6					4	RfC
1,3,5-Trimethylbenzene	ND	3.1		ND	4.2					6	RfC
1,3-Butadiene	ND	0.56		ND	0.75					0.04	HRV (Chronic)
1,3-Dichlorobenzene	ND	1.5		ND	2.0					110	RfC
1,4-Dichlorobenzene	ND	1.5		ND	2.0					800	RfC
2-Butanone (MEK)	1.5	0.75		ND	1.0					1000	RfC
2-Hexanone	ND	1.0		ND	1.4					NE	-
2-Propanol	ND	3.1		ND	4.2					NE	-
4-Ethyltoluene	ND	3.1		ND	4.2					NE	-
4-Methyl-2-pentanone (MIBK)	ND	1.0		ND	1.4					80	RfC
Acetone	5.2	0.60		ND	0.80					350	RfC
Benzene	ND	0.81		ND	1.1					1,000 / 1.3-4.5	HRV (Acute / Chronic)
Bromodichloromethane	ND	1.8		ND	2.3					1	RfC
Bromoform	ND	2.6		ND	3.5					22	RfC
Bromomethane	ND	0.99		ND	1.3					5	HRV (Chronic)
Carbon disulfide	ND	0.79		ND	1.0					6,000 / 700	HRV (Acute / Chronic)
Carbon tetrachloride	ND	1.6		ND	2.2					2	RfC
Chlorobenzene	ND	1.2		ND	1.6					60	RfC
Chloroethane	ND	0.68		ND	0.90					10000	RfC
Chloroform	ND	1.2		ND	1.6					1	RfC
Chloromethane	ND	0.52		1.3	0.70					90	RfC
Cyclohexane	ND	0.85		ND	1.1					NE	-
Dibromochloromethane	ND	2.1		ND	2.8					NE	-
Dichlorodifluoromethane	2.2	1.2		ND	1.7					200	RfC
Dichlorotetrafluoroethane	ND	1.8		ND	2.3					NE	-
Ethanol	3.1	2.4		ND	3.2					NE	-
Ethyl acetate	ND	0.91		ND	1.2					3200	RfC
Ethylbenzene	ND	1.1		ND	1.5					10000	HRV (Acute)
Hexachloro-1,3-butadiene	ND	2.8		ND	3.7					1	RfC
Methyl-tert-butyl ether	ND	0.91		ND	1.2					10,000 / 20	HRV (Acute / Chronic)
Methylene Chloride	ND	0.89		ND	1.2					3000	RfC
Naphthalene	ND	3.4	SS	ND	4.5					3	RfC

TABLE 10D - RESULTS OF SOIL GAS SAMPLES FOR VAPOR INTRUSION SCREENING (400 LAKE AVE.)
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

SAMPLE LOCATION	Crawl Space' (400 Lake Ave)			Crawl Space' (400 Lake Ave)						Action Level	
DATE SAMPLE	11/7/07			4/8/08							
DEPTH (-#) or HEIGHT (+#) in feet	0.5			0.5							
PARAMETERS	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	(µg/m³)	Source: HRV[A], ISC[B], RFC[C]
Propylene	ND	0.44		ND	0.58					NE	-
Styrene	ND	1.1		ND	1.4					21,000 / 1,000	HRV (Acute / Chronic)
Tetrachloroethene	ND	1.8		ND	2.3					20000 / 20	HRV (Acute / Chronic)
Tetrahydrofuran	ND	0.75		ND	1.0					NE	-
Toluene	ND	0.96		ND	1.3					37,000 / 400	HRV (Acute / Chronic)
Trichloroethene	ND	1.4		ND	1.8					2000	HRV (Acute)
Trichlorofluoromethane	2.1	1.4		ND	1.8					700	RfC
Vinyl acetate	ND	0.89		ND	1.2					200	HRV (Chronic)
Vinyl chloride	ND	0.65		ND	0.86					1	HRV (Chronic)
cis-1,2-Dichloroethene	ND	1.0		ND	1.3					35	RfC
cis-1,3-Dichloropropene	ND	1.2		ND	1.5					6	RfC
m&p-Xylene	ND	2.2		ND	2.9					43,000*	HRV (Acute)
n-Heptane	ND	1.0		ND	1.4					NE	-
n-Hexane	ND	0.90		ND	1.2					2000	HRV (Chronic)
o-Xylene	ND	1.1		ND	1.5					43,000*	HRV (Acute)
trans-1,2-Dichloroethene	ND	1.0		ND	1.3					70	RfC
trans-1,3-Dichloropropene	ND	1.2		ND	1.5					6	RfC

Notes: Analytical data reported in micrograms per cubic meter (ug/m3). 6/2/08
Results below the laboratory reporting limits (RLs) were preceded by the less than symbol (<) or listed as not detected (ND).
Bold indicates parameter concentration above the respective action level criteria.
NE indicates action levels are not established for the respective parameter.
RL column includes laboratory reporting limits for the respective parameter.
* The action levels shown are for TOTAL Xylenes (combined m&p-Xylene and o-Xylene).
Q column includes footnotes for referencing laboratory reporting qualifiers.
D6 = The relative percent difference (RDP) between the sample and the sample duplicate exceeds laboratory control limits
E = Analyte concentration exceeded the calibration range. The reported result is estimated.
L1 = Analyte recovery in the laboratory control sample (LCS) wa above QC limits. Results for this analyte in associated samples may be biased high.
SS = Analyte did not meet the secondary source verfiication criteria for the initial calibration. The reported result should be considered and estimate.
D3 = Sample diluted due to presence of high levels of non-target analytes or other matrix interference.
IR = Internal standard recovery associated with this analyte exceeds upper control limit. Reported result estimated.
1 = Collected using certified canister and 200 cubic centimeter per minute (30 min) flow controller.

A. MDH Health Risk Value (http://www.health.state.mn.us/divs/eh/air/hrvtable.htm, 3/21/05) (HRV)
B. MDH Interim Screening Concentration (ISC)
C. EPA Reference concentrations (RFC)

TABLE 10E - RESULTS OF SOIL GAS SAMPLES FOR VAPOR INTRUSION SCREENING (154 MILL ST.)
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

SAMPLE LOCATION	SSMP-1' (154 Mill St)			SSMP-1' (154 Mill St)			Action Level	
DATE SAMPLE	11/7/07			4/8/08				
DEPTH (-#) or HEIGHT (+#) in feet	-0.3			-0.3				Source: HRV[A], ISC[B], RFC[C]
PARAMETERS	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	(µg/m³)	
1,1,1-Trichloroethane	ND	1.5		ND	1.9		140000	HRV (Acute)
1,1,2,2-Tetrachloroethane	ND	1.9		ND	2.4		0.4	RfC
1,1,2-Trichloroethane	ND	1.5		ND	1.9		2	RfC
1,1,2-Trichlorotrifluoroethane	ND	2.2		ND	2.8		30000	RfC
1,1-Dichloroethane	ND	1.1		ND	1.4		500	RfC
1,1-Dichloroethene	ND	1.1		ND	1.4		200	RfC
1,2,4-Trichlorobenzene	ND	1.4		ND	1.7		200	RfC
1,2,4-Trimethylbenzene	6.3	3.4		ND	4.4		6	RfC
1,2-Dibromoethane (EDB)	ND	2.2		ND	2.8		0.05	HRV (Chronic)
1,2-Dichlorobenzene	ND	1.7		ND	2.1		200	RfC
1,2-Dichloroethane	ND	1.1		ND	1.4		1	RfC
1,2-Dichloropropane	ND	1.3		ND	1.6		4	RfC
1,3,5-Trimethylbenzene	ND	3.4		ND	4.4		6	RfC
1,3-Butadiene	ND	0.62		ND	0.78		0.04	HRV (Chronic)
1,3-Dichlorobenzene	ND	1.7		ND	2.1		110	RfC
1,4-Dichlorobenzene	ND	1.7		ND	2.1		800	RfC
2-Butanone (MEK)	12.8	0.83		ND	1.0		1000	RfC
2-Hexanone	2.8	1.1		ND	1.4		NE	-
2-Propanol	ND	3.4		ND	4.4		NE	-
4-Ethyltoluene	ND	3.4		ND	4.4		NE	-
4-Methyl-2-pentanone (MIBK)	1.9	1.1		ND	1.4		80	RfC
Acetone	73.2	0.66	E	9.5	0.84		350	RfC
Benzene	1.0	0.90		ND	1.1		1,000 / 1.3-4.5	HRV (Acute / Chronic)
Bromodichloromethane	ND	1.9		ND	2.4		1	RfC
Bromoform	ND	2.9		ND	3.7		22	RfC
Bromomethane	ND	1.1		ND	1.4		5	HRV (Chronic)
Carbon disulfide	3.3	0.87		ND	1.1		6,000 / 700	HRV (Acute / Chronic)
Carbon tetrachloride	ND	1.8		ND	2.3		2	RfC
Chlorobenzene	ND	1.3		ND	1.6		60	RfC
Chloroethane	ND	0.75		ND	0.94		10000	RfC
Chloroform	ND	1.4		ND	1.7		1	RfC
Chloromethane	ND	0.58		ND	0.73		90	RfC
Cyclohexane	ND	0.94		ND	1.2		NE	-
Dibromochloromethane	ND	2.3		ND	3.0		NE	-
Dichlorodifluoromethane	2.1	1.4		ND	1.7		200	RfC
Dichlorotetrafluoroethane	ND	1.9		ND	2.4		NE	-
Ethanol	54.0	2.6	E	ND	3.3		NE	-
Ethyl acetate	ND	1.0		ND	1.3		3200	RfC
Ethylbenzene	2.5	1.2		ND	1.5		10000	HRV (Acute)
Hexachloro-1,3-butadiene	ND	3.0		ND	3.8		1	RfC
Methyl-tert-butyl ether	ND	1.0		ND	1.3		10,000 / 20	HRV (Acute / Chronic)
Methylene Chloride	1.1	0.98		ND	1.2		3000	RfC
Naphthalene	7.8	3.7	SS	14.0	4.7		3	RfC

TABLE 10E - RESULTS OF SOIL GAS SAMPLES FOR VAPOR INTRUSION SCREENING (154 MILL ST.)
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

SAMPLE LOCATION	SSMP-1[1] (154 Mill St)			SSMP-1[1] (154 Mill St)			Action Level	
DATE SAMPLE	11/7/07			4/8/08				
DEPTH (-#) or HEIGHT (+#) in feet	-0.3			-0.3				
PARAMETERS	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	(µg/m³)	Source: HRV[A], ISC[B], RFC[C]
Propylene	ND	0.48		ND	0.61		NE	-
Styrene	1.7	1.2		ND	1.5		21,000 / 1,000	HRV (Acute / Chronic)
Tetrachloroethene	ND	1.9		ND	2.4		20000 / 20	HRV (Acute / Chronic)
Tetrahydrofuran	ND	0.83		ND	1.0		NE	-
Toluene	6.5	1.1		1.3	1.3		37,000 / 400	HRV (Acute / Chronic)
Trichloroethene	ND	1.5		ND	1.9		2000	HRV (Acute)
Trichlorofluoromethane	1.6	1.5		ND	1.9		700	RfC
Vinyl acetate	ND	0.98		ND	1.2		200	HRV (Chronic)
Vinyl chloride	ND	0.72		ND	0.90		1	HRV (Chronic)
cis-1,2-Dichloroethene	ND	1.1		ND	1.4		35	RfC
cis-1,3-Dichloropropene	ND	1.3		ND	1.6		6	RfC
m&p-Xylene	4.5	2.4		ND	3.1		43,000*	HRV (Acute)
n-Heptane	ND	1.1		ND	1.4		NE	-
n-Hexane	1.0	0.99		ND	1.3		2000	HRV (Chronic)
o-Xylene	1.9	1.2		ND	1.5		43,000*	HRV (Acute)
trans-1,2-Dichloroethene	ND	1.1		ND	1.4		70	RfC
trans-1,3-Dichloropropene	ND	1.3		ND	1.6		6	RfC

Notes: Analytical data reported in micrograms per cubic meter (µg/m3). 6/2/08
Results below the laboratory reporting limits (RLs) were preceded by the less than symbol (<) or listed as not detected (ND).
Bold indicates parameter concentration above the respective action level criteria.
NE indicates action levels are not established for the respective parameter.
RL column includes laboratory reporting limits for the respective parameter.
* The action levels shown are for TOTAL Xylenes (combined m&p-Xylene and o-Xylene).
Q column includes footnotes for referencing laboratory reporting qualifiers.
D6 = The relative percent difference (RPD) between the sample and the sample duplicate exceeds laboratory control limits.
E = Analyte concentration exceeded the calibration range. The reported result is estimated.
L1 = Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be bi
SS = Analyte did not meet the secondary source verification criteria for the initial calibration. The reported result should be considered an es
D3 = Sample diluted due to presence of high levels of non-target analytes or other matrix interference.
IR = Internal standard recovery associated with this analyte exceeds upper control limit. Reported result estimated.
1 = Collected using certified canister and 200 cubic centimeter per minute (30 min) flow controller.

A. MDH Health Risk Value (http://www.health.state.mn.us/divs/eh/air/hrvtable.htm, 3/21/05) (HRV)
B. MDH Interim Screening Concentration (ISC)
C. EPA Reference concentrations (RFC)

TABLE 10F - RESULTS OF SOIL GAS SAMPLES FOR VAPOR INTRUSION SCREENING (347 LAKE AVE.)
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

SAMPLE LOCATION	SSMP-2' (347 Lake Ave)			SSMP-2' (347 Lake Ave)			Action Level	
DATE SAMPLE	1/11/2008			4/8/08				
DEPTH (-#) or HEIGHT (+#) in feet	-0.3			-0.3				Source: HRV[A], ISC[B], RFC[C]
PARAMETERS	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	(µg/m³)	
1,1,1-Trichloroethane	ND	1.6		ND	1.8		140000	HRV (Acute)
1,1,2,2-Tetrachloroethane	ND	2.0		ND	2.3		0.4	RfC
1,1,2-Trichloroethane	ND	1.6		ND	1.8		2	RfC
1,1,2-Trichlorotrifluoroethane	ND	2.3		ND	2.7		30000	RfC
1,1-Dichloroethane	ND	1.2		ND	1.4		500	RfC
1,1-Dichloroethene	ND	1.2		ND	1.3		200	RfC
1,2,4-Trichlorobenzene	ND	1.4		ND	1.6		200	RfC
1,2,4-Trimethylbenzene	5.2	3.6		4.5	4.2		6	RfC
1,2-Dibromoethane (EDB)	ND	2.3		ND	2.7		0.05	HRV (Chronic)
1,2-Dichlorobenzene	ND	1.7		ND	2.0		200	RfC
1,2-Dichloroethane	ND	1.2		ND	1.4		1	RfC
1,2-Dichloropropane	ND	1.3		ND	1.6		4	RfC
1,3,5-Trimethylbenzene	ND	3.6		ND	4.2		6	RfC
1,3-Butadiene	ND	0.64		ND	0.75		0.04	HRV (Chronic)
1,3-Dichlorobenzene	ND	1.7		ND	2.0		110	RfC
1,4-Dichlorobenzene	ND	1.7		ND	2.0		800	RfC
2-Butanone (MEK)	16.0	0.86		ND	1.0		1000	RfC
2-Hexanone	1.7	1.2		ND	1.4		NE	-
2-Propanol	9.1	3.6		ND	4.2		NE	-
4-Ethyltoluene	ND	3.6		ND	4.2		NE	-
4-Methyl-2-pentanone (MIBK)	2.6	1.2		ND	1.4		80	RfC
Acetone	130	0.69	E	23.1	0.80		350	RfC
Benzene	ND	0.93		1.8	1.1		1,000 / 1.3-4.5	HRV (Acute / Chronic)
Bromodichloromethane	ND	2.0		ND	2.3		1	RfC
Bromoform	ND	3.0		ND	3.5		22	RfC
Bromomethane	ND	1.1		ND	1.3		5	HRV (Chronic)
Carbon disulfide	2.1	0.90		ND	1.0		6,000 / 700	HRV (Acute / Chronic)
Carbon tetrachloride	ND	1.9		ND	2.2		2	RfC
Chlorobenzene	ND	1.3		ND	1.6		60	RfC
Chloroethane	ND	0.77		ND	0.90		10000	RfC
Chloroform	ND	1.4		ND	1.6		1	RfC
Chloromethane	ND	0.60		ND	0.70		90	RfC
Cyclohexane	ND	0.97		1.8	1.1		NE	-
Dibromochloromethane	ND	2.4		ND	2.8		NE	-
Dichlorodifluoromethane	ND	1.4		4.0	1.7		200	RfC
Dichlorotetrafluoroethane	ND	2.0		ND	2.3		NE	-
Ethanol	33.5	2.7		10	3.2	SS	NE	-
Ethyl acetate	ND	1.0		ND	1.2		3200	RfC
Ethylbenzene	ND	1.3		2.4	1.5		10000	HRV (Acute)
Hexachloro-1,3-butadiene	ND	3.1		ND	3.7		1	RfC
Methyl-tert-butyl ether	ND	1.0		ND	1.2		10,000 / 20	HRV (Acute / Chronic)
Methylene Chloride	ND	1.0		9.3	1.2		3000	RfC
Naphthalene	18.7	3.9	L1	ND	4.5		3	RfC

TABLE 10F - RESULTS OF SOIL GAS SAMPLES FOR VAPOR INTRUSION SCREENING (347 LAKE AVE.)
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

SAMPLE LOCATION	SSMP-2' (347 Lake Ave)			SSMP-2' (347 Lake Ave)			Action Level	
DATE SAMPLE	1/11/2008			4/8/08				
DEPTH (-#) or HEIGHT (+#) in feet	-0.3			-0.3				Source
PARAMETERS	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	(µg/m³)	HRV[A], ISC[B], RFC[C]
Propylene	ND	0.50		ND	0.58		NE	-
Styrene	ND	1.2		ND	1.4		21,000 / 1,000	HRV (Acute / Chronic)
Tetrachloroethene	ND	2.0		ND	2.3		20000 / 20	HRV (Acute / Chronic)
Tetrahydrofuran	ND	0.86		ND	1.0		NE	-
Toluene	ND	1.1		7.2	1.3		37,000 / 400	HRV (Acute / Chronic)
Trichloroethene	ND	1.6		ND	1.8		2000	HRV (Acute)
Trichlorofluoromethane	ND	1.6		ND	1.8		700	RfC
Vinyl acetate	3.0	1.0		ND	1.2		200	HRV (Chronic)
Vinyl chloride	ND	0.74		ND	0.86		1	HRV (Chronic)
cis-1,2-Dichloroethene	ND	1.2		ND	1.3		35	RfC
cis-1,3-Dichloropropene	ND	1.3		ND	1.5		6	RfC
m&p-Xylene	ND	2.5		7.1	2.9		43,000*	HRV (Acute)
n-Heptane	ND	1.2		1.5	1.4		NE	-
n-Hexane	ND	1.0		4.2	1.2		2000	HRV (Chronic)
o-Xylene	ND	1.3		2.8	1.5		43,000*	HRV (Acute)
trans-1,2-Dichloroethene	ND	1.2		ND	1.3		70	RfC
trans-1,3-Dichloropropene	ND	1.3		ND	1.5		6	RfC

Notes: Analytical data reported in micrograms per cubic meter (ug/m3). 6/2/08
Results below the laboratory reporting limits (RLs) were preceded by the less than symbol (<) or listed as not detected (ND).
Bold indicates parameter concentration above the respective action level criteria.
NE indicates action levels are not established for the respective parameter.
RL column includes laboratory reporting limits for the respective parameter.
* The action levels shown are for TOTAL Xylenes (combined m&p-Xylene and o-Xylene).
Q column includes footnotes for referencing laboratory reporting qualifiers.
D6 = The relative percent difference (RPD) between the sample and the sample duplicate exceeds laboratory control limits.
E = Analyte concentration exceeded the calibration range. The reported result is estimated.
L1 = Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be
SS = Analyte did not meet the secondary source verification criteria for the initial calibration. The reported result should be considered an
D3 = Sample diluted due to presence of high levels of non-target analytes or other matrix interference.
IR = Internal standard recovery associated with this analyte exceeds upper control limit. Reported result estimated.
[1] = Collected using certified canister and 200 cubic centimeter per minute (30 min) flow controller.

A. MDH Health Risk Value (http://www.health.state.mn.us/divs/eh/air/hrvtable.htm, 3/21/05) (HRV)
B. MDH Interim Screening Concentration (ISC)
C. EPA Reference concentrations (RFC)

TABLE 10G - RESULTS OF SOIL GAS SAMPLES FOR VAPOR INTRUSION SCREENING (410 LAKE AVE.)
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

SAMPLE LOCATION	SSMP-3[1] (410 Lake Ave)			SSMP-3[1] (0255) (410 Lake Ave)			0255 Cert (410 Lake Ave)			Action Level	
DATE SAMPLE	1/11/2008			5/20/08			5/20/08				
DEPTH (-#) or HEIGHT (+#) in feet	-0.3			-0.3			-				
PARAMETERS	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	(µg/m³)	Source HRV[a] ISC[b] RIC[c]
1,1,1-Trichloroethane	ND	1.6		ND	1.5		ND	1.1		140000	HRV (Acute)
1,1,2,2-Tetrachloroethane	ND	2.0		ND	1.9		ND	1.4		0.4	RIC
1,1,2-Trichloroethane	ND	1.6		ND	1.5		ND	1.1		2	RIC
1,1,2-Trichlorotrifluoroethane	ND	2.3		ND	2.1		ND	1.6		30000	RIC
1,1-Dichloroethane	ND	1.2		ND	1.1		ND	0.82		500	RIC
1,1-Dichloroethene	ND	1.2		ND	1.1		ND	0.81		200	RIC
1,2,4-Trichlorobenzene	ND	1.4		ND	1.3		ND	0.99		200	RIC
1,2,4-Trimethylbenzene	ND	3.6		ND	3.4		ND	2.5		6	RIC
1,2-Dibromoethane (EDB)	ND	2.3		ND	2.1		ND	1.6		0.05	HRV (Chronic)
1,2-Dichlorobenzene	ND	1.7		ND	1.6		ND	1.2		200	RIC
1,2-Dichloroethane	ND	1.2		ND	1.1		ND	0.82		1	RIC
1,2-Dichloropropane	ND	1.3		ND	1.3		ND	0.94		4	RIC
1,3,5-Trimethylbenzene	ND	3.6		ND	3.4		ND	2.5		6	RIC
1,3-Butadiene	ND	0.64		ND	0.60		ND	0.45		0.04	HRV (Chronic)
1,3-Dichlorobenzene	ND	1.7		ND	1.6		ND	1.2		110	RIC
1,4-Dichlorobenzene	ND	1.7		ND	1.6		ND	1.2		800	RIC
2-Butanone (MEK)	3.0	0.86		1.1	0.80		ND	0.60		1000	RIC
2-Hexanone	ND	1.2		ND	1.1		ND	0.83		NE	
2-Propanol	ND	3.6		ND	3.4		ND	2.5		NE	
4-Ethyltoluene	ND	3.6		ND	3.4		ND	2.5		NE	-
4-Methyl-2-pentanone (MIBK)	ND	1.2		ND	1.1		ND	0.83		80	RIC
Acetone	13.6	0.69		12.2	0.64		ND	0.48		350	RIC
Benzene	ND	0.93		ND	0.87		ND	0.65		1,000 / 1.3-4.5	HRV (Acute / Chronic)
Bromodichloromethane	ND	2.0		ND	1.9		ND	1.4		1	RIC
Bromoform	ND	3.0		ND	2.8		ND	2.1		22	RIC
Bromomethane	ND	1.1		ND	1.1		ND	0.79		5	HRV (Chronic)
Carbon disulfide	1.7	0.90		ND	0.84		ND	0.63		6,000 / 700	HRV (Acute / Chronic)
Carbon tetrachloride	ND	1.9		ND	1.7		ND	1.3		2	RIC
Chlorobenzene	ND	1.3		ND	1.3		ND	0.94		60	RIC
Chloroethane	ND	0.77		ND	0.72		ND	0.54		10000	RIC
Chloroform	ND	1.4		ND	1.3		ND	0.99		1	RIC
Chloromethane	ND	0.60		ND	0.56		ND	0.42		90	RIC
Cyclohexane	ND	0.97		ND	0.91		ND	0.68		NE	-
Dibromochloromethane	ND	2.4		ND	2.3		ND	1.7		NE	-
Dichlorodifluoromethane	ND	1.4		2.7	1.3		ND	1.0		200	RIC
Dichlorotetrafluoroethane	ND	2.0		ND	1.9		ND	1.4		NE	-
Ethanol	33.1	2.7		16.3	2.5		ND	1.9		NE	-
Ethyl acetate	ND	1.0		ND	0.98		ND	0.73		3200	RIC
Ethylbenzene	ND	1.3		ND	1.2		ND	0.88		10000	HRV (Acute)
Hexachloro-1,3-butadiene	ND	3.1		ND	2.9		ND	2.2		1	RIC
Methyl-tert-butyl ether	ND	1.0		ND	0.98		ND	0.73		10,000 / 20	HRV (Acute / Chronic)
Methylene Chloride	112	1.0	E	22.0	0.95		ND	0.71		3000	RIC
Naphthalene	4.7	3.9	L1	ND	3.6		ND	2.7		3	RIC

TABLE 10G - RESULTS OF SOIL GAS SAMPLES FOR VAPOR INTRUSION SCREENING (410 LAKE AVE.)
PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA 56362
TERRACON PROJECT NO. 41987018

SAMPLE LOCATION	SSMP-3' (410 Lake Ave)			SSMP-3 [1] (0255) (410 Lake Ave)			0255 Cert. (410 Lake Ave)			Action Level	
DATE SAMPLE	1/11/2008			5/20/08			5/20/08				
DEPTH (-#) or HEIGHT (+#) in feet	-0.3			-0.3			-				Source: HRV[A], ISC[B], RFC[C]
PARAMETERS	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	Result (µg/m³)	RL (µg/m³)	Q	(µg/m³)	
Propylene	1.0	0.50		ND	0.47		ND	0.35		NE	-
Styrene	ND	1.2		ND	1.2		ND	0.87		21,000 / 1,000	HRV (Acute / Chronic)
Tetrachloroethene	ND	2.0		28.1	1.9		ND	1.4		20000 / 20	HRV (Acute / Chronic)
Tetrahydrofuran	ND	0.86		ND	0.80		ND	0.60		NE	-
Toluene	ND	1.1		2.1	1.0		ND	0.77		37,000 / 400	HRV (Acute / Chronic)
Trichloroethene	ND	1.6		ND	1.5		ND	1.1		2000	HRV (Acute)
Trichlorofluoromethane	ND	1.6		ND	1.5		ND	1.1		700	RfC
Vinyl acetate	ND	1.0		ND	0.95		ND	0.71		200	HRV (Chronic)
Vinyl chloride	ND	0.74		ND	0.70		ND	0.52		1	HRV (Chronic)
cis-1,2-Dichloroethene	ND	1.2		ND	1.1		ND	0.81		35	RfC
cis-1,3-Dichloropropene	ND	1.3		ND	1.2		ND	0.92		6	RfC
m&p-Xylene	ND	2.5		ND	2.4		ND	1.8		43,000*	HRV (Acute)
n-Heptane	ND	1.2		ND	1.1		ND	0.83		NE	-
n-Hexane	ND	1.0		3.2	0.96		ND	0.72		2000	HRV (Chronic)
o-Xylene	ND	1.3		ND	1.2		ND	0.88		43,000*	HRV (Acute)
trans-1,2-Dichloroethene	ND	1.2		ND	1.1		ND	0.81		70	RfC
trans-1,3-Dichloropropene	ND	1.3		ND	1.2		ND	0.92		6	RfC

Notes: Analytical data reported in micrograms per cubic meter (ug/m3). 6/2/08
Results below the laboratory reporting limits (RLs) were preceded by the less than symbol (<) or listed as not detected (ND).
Bold indicates parameter concentration above the respective action level criteria.
NE indicates action levels are not established for the respective parameter.
RL column includes laboratory reporting limits for the respective parameter.
* The action levels shown are for TOTAL Xylenes (combined m&p-Xylene and o-Xylene).
Q column includes footnotes for referencing laboratory reporting qualifiers.
D6 = The relative percent difference (RDP) between the sample and the sample duplicate exceeds laboratory control limits
E = Analyte concentration exceeded the calibration range. The reported result is estimated.
L1 = Analyte recovery in the laboratory control sample (LCS) wa above QC limits. Results for this analyte in associated samples may be biased high.
SS = Analyte did not meet the secondary source verfiication criteria for the initial calibration. The reported result should be considered and estimate.
D3 = Sample diluted due to presence of high levels of non-target analytes or other matrix interference.
IR = Internal standard recovery associated with this analyte exceeds upper control limit. Reported result estimated.
[1] = Collected using certified canister and 200 cubic centimeter per minute (30 min) flow controller.

A. MDH Health Risk Value (http://www.health.state.mn.us/divs/eh/air/hrvtable.htm, 3/21/05) (HRV)
B. MDH Interim Screening Concentration (ISC)
C. EPA Reference concentrations (RFC)