

Hydrostratigraphic Database of West-Central Wisconsin



Site:	Craig Rasmussen Property (Baldwin Quicktrip)
Location:	Baldwin, St. Croix County, Wisconsin
Unit Evaluated:	Ordovician Prairie du Chien

File includes excerpts from:

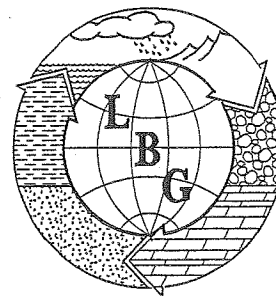
Leggette, Brashears & Graham, Inc., 2002, Remedial Investigation Report Addendum for Craig Rasmussen Property, I-94 & US HWY 63, Baldwin, Wisconsin, on file at Wisconsin Department of Natural Resources.

- Text: executive summary and groundwater discussion
- Tables: Water-level elevations and vertical gradient analysis
- Figures: site plan, cross-sections, potentiometric surface maps
- Boring logs

LEGGETTE, BRASHEARS & GRAHAM, INC.

Professional Ground-Water and Environmental Engineering Services

6525 Grand Teton Plaza
Madison, Wisconsin 53719
608-833-5555
Fax. 608-833-5551



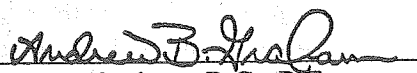
REMEDIAL INVESTIGATION REPORT ADDENDUM

CRAIG RASMUSSEN PROPERTY
I-94 & US HWY 63
BALDWIN, WISCONSIN


Prepared for


Craig Rasmussen
May 2002

Reviewed by:


Andrew B. Graham, P.G., P.E.
Associate

Prepared by:


Louis M. Racchini P.G., CHMM
Senior Hydrogeologist


J. Kevin Powers, CPG
Vice President

REMEDIAL INVESTIGATION REPORT ADDENDUM

CRAIG RASMUSSEN PROPERTY

I-94 & US HWY 63

BALDWIN, WISCONSIN

EXECUTIVE SUMMARY

In April 2001, Leggette, Brashears & Graham, Inc. (LBG) submitted a Remedial Investigation Report for the above-referenced site to the Wisconsin Department of Natural Resources (WDNR). The report recommended additional investigation at the site to further define the degree and extent of petroleum impacted ground water, determine the direction of deeper ground-water flow and determine if the private water supply wells in the immediate vicinity of the site had been impacted by petroleum compounds.

One additional water-table observation well and three piezometers were installed at the site, bringing the total number of water-table observation wells and piezometers to ten and four, respectively. The monitoring well network was sampled on two occasions after the additional wells were installed. Ground-water elevations and product thickness were measured in all wells during each sampling event.

Free-phase petroleum product is present in monitoring wells (MW-1 and MW-2) and has been measured at thicknesses ranging from 3-9 feet. The petroleum product plume, located approximately 85 feet below grade (ft bg) in the limestone formation, has an areal extent estimated to be approximately 25,000 square feet (ft²). The vertical thickness of petroleum product in MW-1 has generally decreased since the site investigation began, while the product thickness in MW-2 has generally increased.

A dissolved-phase petroleum contaminant plume with concentrations of petroleum-related compounds above the NR 140 Enforcement Standards is present adjacent to and beneath the free product plume. The estimated areal extent of the dissolved-phase plume is approximately 4.6 acres, and the vertical extent of the dissolved-phase plume is estimated to be approximately 40 feet below the water table (125 ft bg).

Ground-water monitoring at the site indicates that the ground-water flow direction near the water table is to the south-southwest. The average hydraulic gradient of the water table changes from relatively steep in the northern portion of the site, to relatively flat in the southern portion of the site. Piezometric head elevations indicate that the deeper ground-water flow direction is to the southwest, and a downward vertical hydraulic gradient exists between adjacent water-table observation wells and piezometers.

Analytical results for the two private water supply wells in the vicinity of the site indicate that neither of the wells has been contaminated with petroleum compounds. Based on the deeper ground-water flow direction, neither of the wells are located directly down gradient of the petroleum product plume.

Based on the findings of the remedial investigation conducted at the site, LBG believes that the degree and extent of petroleum impact to the subsurface has adequately defined. Therefore, we do not recommend further investigation. A remedial action plan should be prepared which provides remedial options for recovery of free-phase petroleum product.

3.5 Ground-Water Sampling

Ground-water sampling was conducted at the site on November 13, 2001, and February 21-22, 2002. All ground-water samples were shipped to Test America, Inc. for analysis. Analytical parameters for the samples included PVOCs by EPA Method SW846 8020, GRO by WI MOD GRO and PAHs by EPA Method SW846 8310. MW-1 and MW-2 were not sampled due to the presence of free-phase product in the wells. Prior to sampling, a minimum of four well volumes were removed from each well, except in MW-7 (due to its slow recharge rate). All monitoring wells were purged and sampled using disposable bailers. All samples were stored on ice immediately following collection. Ground-water sampling was conducted in general accordance with the WDNR publication "Groundwater Sampling Procedures Field Manual," PUBL-DG-038 96.

3.6 Private Well Sampling

Drinking water samples were collected from two private water supply wells in the immediate vicinity of the site. These wells are depicted on Figure 2 as the Hardee's well and the former Nelson well. These samples were analyzed for VOCs using EPA Method 524.2. The analysis was subcontracted to Northern Lake Service, Inc. by Test America, Inc.

4.0 FINDINGS

4.1 Geology

The geology of the site is illustrated on Figures 3 and 4, which include insets depicting the respective transect locations for each geologic cross section. The cross section transect depicted on Figure 3 traverses the greatest dimension of the well network and is generally parallel to the ground-water flow direction, while the Figure 4 cross section transect is generally perpendicular to the ground-water flow direction.

As depicted on the geologic cross sections, unconsolidated deposits vary considerably in thickness across the site, ranging from as much as 70 feet in the northern portion of the site to as little as 4 feet in the southern portion of the site. The greater thickness of unconsolidated deposits in the northern portion of the site may be attributed to an east to west trending bedrock

valley. Unconsolidated deposits at the site consist of sand and gravel units alternating with till formations consisting of clay, silt and fine gravel. The sand and gravel units range from 10 to 25 feet thick, and the till formations range from 5 to 15 feet in thickness. The till formations consist primarily of clay and silt with an estimated 10% to 40% fine gravel, which is characteristic of ground moraine deposits in the area. In the northern portion of the site, the sand and gravel deposits included a small fraction (less than 10%) of silt. The depositional environment for the sand and gravel deposits is likely glacial outwash, but the lack of stratification could also indicate an in-glacial depositional setting, such as a kame.

The uppermost bedrock unit at the site is the St. Peter sandstone formation. Drill cuttings from boreholes completed in the southern half of the site indicate that the St. Peter formation consists of fine, well sorted sandstone in the upper 25 feet, but also includes thin shale and limestone/dolomite deposits in the lower half of the unit. The St. Peter sandstone overlies limestone/dolomite units of the Shakopee member of the Prairie Du Chein Group. The minimum thickness of the limestone/dolomite units, based on the geologic log from boring B-15 (PZ-4), is approximately 90 feet. Voids encountered while drilling in the southern portion of the site indicate the presence of solution cavities in the formation. Additionally, the wide range of recharge rates to the wells (observed during well development) indicates significant variability of joint size and/or spacing within the bedrock.

4.2 Soil Quality

Soil field screening results for boring B-12 are summarized on the Soil Boring Log Information form included in Appendix G and on Table 1. The highest PID reading, 12.1 parts per million (ppm), was detected in sample from the 8 to 10-foot depth interval. Although no soil samples were submitted for laboratory analysis during this phase of the site investigation, the soil quality summary table (Table 2) is included for reference. A complete discussion of the soil quality at the site is included in the Remedial Investigation Report (LBG, 2001).

4.3 Petroleum Product

Petroleum product and ground-water elevations are summarized for each well on Table 3. These measurements are converted to national geodetic vertical datum (NGVD) elevations on the table, and ground-water elevation corrections are applied to wells containing measurable

naphthalene contaminant plume (at 30 feet below the water table) with concentrations greater than the 40 ug/l Enforcement Standard is approximately 0.64 acres (27,700 ft²), and is slightly smaller than the naphthalene plume at the water table. Unlike the benzene contaminant plume, the naphthalene concentrations in deeper ground water are within the same order of magnitude as the concentrations in the shallow ground water. The vertical extent of naphthalene contamination is similar to that of benzene.

The laboratory analysis included PAHs because the petroleum product at the site is assumed to be primarily from the diesel release mentioned in Section 2.4 of this report. Analysis of the ground-water samples indicated that samples from most water-table observation wells and piezometers had low-level detections of a number of the PAH compounds included in the standard Method 8080 analytical list. With the exception of naphthalene, the concentrations reported for all PAH compounds were below their respective Enforcement Standards.

4.5 Private Well Sampling

The analytical results for the two private water supply wells that were sampled for VOCs indicated that no petroleum-related VOCs were detected in either of the samples. The only compound detected (in both samples) was methylene chloride. The concentrations of methylene chloride detected in the private well samples were below the NR 140 Preventive Action Limit of 0.5 ug/l, and were most likely the result of contamination by the laboratory.

4.6 Ground-Water Flow

The depth to ground water at the site ranges from approximately 66 to 99 ft bg. Ground-water elevation measurements for all monitoring wells are summarized on Table 3. It should be noted that the ground-water elevations for wells with measurable product on top of the water table (MW-1 and MW-2) are calculated elevations based on an assumed product density of 0.84 grams per cubic centimeter and the product thickness in the well. Figures 9 and 10 were constructed to illustrate the water-table contours and ground-water flow direction on November 13, 2001, and February 21, 2002, respectively. As illustrated on these figures, the ground-water flow direction is to the south-southwest. The average hydraulic gradient of the water table changes from relatively steep (0.051) in the northern portion of the site, to relatively

flat (0.012) in the southern portion of the site. The hydraulic gradient correlates with the variation in site topography.

Figures 11 and 12 depict the equipotential lines and ground-water flow directions based on ground-water elevations measured in the shallow piezometers on November 13, 2001 and February 21, 2002, respectively. As the figures illustrate, the ground-water flow direction on November 13, 2001, was generally to the west, and the ground-water flow direction on February 21, 2002, was generally to the southwest. Based on the piezometric heads, the average hydraulic gradient of the piezometric surface across the site is approximately 0.0011.

Vertical hydraulic gradients calculated for clustered well groups are summarized on Table 5. The calculated vertical gradients indicate that the ground-water flow direction has a downward flow component at all well cluster locations, with the exception of the February 2002 elevation data, which indicated a slight upward gradient between MW-1 and PZ-1. The highest downward vertical gradients, 0.0327 (November 2001) and 0.0196 (February 2002) occurred at the MW-8/PZ-3 cluster. The smallest calculated vertical gradients occurred between PZ-1 and PZ-4 at the MW-1/PZ-1/PZ-4 well cluster location. The generally downward vertical gradients at the well cluster locations indicate that the site is located in an area of ground-water recharge.

5.0 SUMMARY AND CONCLUSIONS

1. The petroleum product plume, located approximately 85 ft bg in the limestone formation, is assumed to be comprised of diesel fuel and gasoline, based on the petroleum compounds detected in ground-water samples collected at the site. The plume has an areal extent estimated to be approximately 25,000 ft². The vertical thickness of petroleum product in MW-1 has generally decreased since the site investigation began, while the product thickness in MW-2 has generally increased. Petroleum product thicknesses in these wells have historically ranged from 3 to 9 feet thick.
2. A dissolved-phase petroleum contaminant plume with concentrations of petroleum-related compounds above their respective Enforcement Standards is present adjacent to and beneath the free product plume. The horizontal and vertical extents of the dissolved-phase plume have been defined. Based on benzene concentrations, the estimated areal extent of the dissolved-phase plume is approximately 4.6 acres. At the MW-1/PZ-1/PZ-4 well cluster location, the vertical extent of the dissolved-phase plume is estimated to be approximately 40 ft below the water table.
3. Ground-water monitoring at the site indicates that the ground-water flow direction at the water table is to the south-southwest. Piezometric heads measured in November 2001 and February 2002 indicate that the deeper ground water flow direction is to the

southwest. The average hydraulic gradient of the water table changes from relatively steep in the northern portion of the site, to relatively flat in the southern portion of the site. Ground-water elevations measured at the well clusters indicate that a downward vertical gradient exists between water-table observation wells and piezometers at the site. This downward vertical gradient indicates that the site is located in an area of ground-water recharge.

4. Analytical results for the two private water supply wells in the vicinity of the site indicate that neither of the wells has been contaminated with petroleum compounds. Based on the deeper ground-water flow direction, neither of the wells is located directly down gradient from the petroleum product plume. However, it should be noted that the geology at the site includes fractured bedrock with solution cavities, and therefore the ground-water flow path may be somewhat variable.

6.0 RECOMMENDATIONS

LBG believes that the investigation conducted to date has adequately defined the degree and extent of petroleum impact to the subsurface. Therefore, we do not recommend further investigation at the site. A remedial action plan should be prepared for the site which, at a minimum, provides remedial options for recovery of free-phase petroleum product.

TABLE 3

**CRAIG RASMUSSEN PROPERTY
I-94 & US HWY 63
BALDWIN, WISCONSIN**

FLUID-LEVEL MEASUREMENTS
(all measurements are in feet)

Location	Date	Depth to Product	Depth to Water	Product Thickness	Elevation TOC	Elevation Water	Corrected Elevation
MW-1	11/03/1999	89.20	> 99.95*	> 10.75	1052.03	NA	NA
MW-1	05/02/2000	91.26	98.64	7.38	1052.03	953.39	959.59
MW-1	09/19/2000	91.76	98.45	6.69	1052.03	953.58	959.20
MW-1	11/13/2001	89.41	94.53	5.12	1052.03	957.50	961.80
MW-1	02/22/2002	91.17	94.75	3.58	1052.03	957.28	960.29
MW-2	11/03/1999	79.19	82.33	3.14	1041.42	959.09	961.73
MW-2	05/02/2000	81.13	87.85	6.72	1041.42	953.57	959.21
MW-2	09/19/2000	81.33	88.04	6.71	1041.42	953.38	959.02
MW-2	11/13/2001	78.57	87.46	8.89	1041.42	953.96	961.43
MW-2	02/22/2002	80.25	87.37	7.12	1041.42	954.05	960.03
MW-3	11/03/1999	NP	68.75	0.00	1026.92	958.17	NA
MW-3	05/02/2000	NP	68.19	0.00	1026.92	958.73	NA
MW-3	09/19/2000	NP	68.37	0.00	1026.92	958.55	NA
MW-3	11/13/2001	NP	66.16	0.00	1026.92	960.76	NA
MW-3	02/21/2002	NP	67.28	0.00	1026.92	959.64	NA
MW-4	11/03/1999	NP	66.28	0.00	1026.34	960.06	NA
MW-4	05/02/2000	NP	67.59	0.00	1026.34	958.75	NA
MW-4	09/19/2000	NP	67.66	0.00	1026.34	958.68	NA
MW-4	11/13/2002	NP	69.29	0.00	1026.34	957.05	NA
MW-4	02/21/2002	NP	66.40	0.00	1026.34	959.94	NA
MW-5	11/03/1999	NP	72.89	0.00	1033.89	961.00	NA
MW-5	05/02/2000	NP	74.66	0.00	1033.89	959.23	NA
MW-5	09/19/2000	NP	74.65	0.00	1033.89	959.24	NA
MW-5	11/13/2001	NP	72.08	0.00	1033.89	961.81	NA
MW-5	02/21/2002	NP	73.29	0.00	1033.89	960.60	NA

TABLE 3

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I-94 & US HWY 63
BALDWIN, WISCONSIN**

FLUID-LEVEL MEASUREMENTS
(all measurements are in feet)

Location	Date	Depth to Product	Depth to Water	Product Thickness	Elevation TOC	Elevation Water	Corrected Elevation
MW-6	05/02/2000	NP	82.34	0.00	1056.53	974.19	NA
MW-6	09/19/2000	NP	81.69	0.00	1056.53	974.84	NA
MW-6	11/13/2001	NP	81.45	0.00	1056.53	975.08	NA
MW-6	02/21/2002	NP	81.68	0.00	1056.53	974.85	NA
MW-7	05/02/2000	NP	92.19	0.00	1052.05	959.86	NA
MW-7	09/19/2000	NP	91.73	0.00	1052.05	960.32	NA
MW-7	11/13/2001	NP	90.82	0.00	1052.05	961.23	NA
MW-7	02/21/2002	NP	90.89	0.00	1052.05	961.16	NA
MW-8	05/02/2000	NP	76.71	0.00	1036.24	959.53	NA
MW-8	09/19/2000	NP	77.03	0.00	1036.24	959.21	NA
MW-8	11/13/2001	NP	74.69	0.00	1036.24	961.55	NA
MW-8	02/21/2002	NP	76.00	0.00	1036.24	960.24	NA
MW-9	05/02/2000	NP	91.85	0.00	1051.12	959.27	NA
MW-9	09/19/2000	NP	92.20	0.00	1051.12	958.92	NA
MW-9	11/13/2001	NP	90.06	0.00	1051.12	961.06	NA
MW-9	02/21/2002	NP	91.14	0.00	1051.12	959.98	NA
MW-10	11/13/2001	NP	89.63	0.00	1050.66	961.03	NA
MW-10	02/21/2002	NP	90.58	0.00	1050.66	960.08	NA
PZ-1	05/02/2000	NP	92.53	0.00	1051.77	959.24	NA
PZ-1	09/19/2000	NP	92.98	0.00	1051.77	958.79	NA
PZ-1	11/13/2001	NP	90.77	0.00	1051.77	961.00	NA
PZ-1	02/21/2002	NP	91.83	0.00	1051.77	959.94	NA
PZ-2	11/13/2001	NP	90.09	0.00	1050.93	960.84	NA
PZ-2	02/21/2002	NP	91.00	0.00	1050.93	959.93	NA

TABLE 3

**CRAIG RASMUSSEN PROPERTY
I-94 & US HWY 63
BALDWIN, WISCONSIN**

FLUID-LEVEL MEASUREMENTS
(all measurements are in feet)

Location	Date	Depth to Product	Depth to Water	Product Thickness	Elevation TOC	Elevation Water	Corrected Elevation
PZ-3	11/13/2001	NP	74.80	0.00	1035.50	960.70	NA
PZ-3	02/21/2002	NP	75.77	0.00	1035.50	959.73	NA
PZ-4	11/13/2001	NP	90.89	0.00	1051.80	960.91	NA
PZ-4	02/21/2002	NP	91.83	0.00	1051.80	959.97	NA

TOC : Top of casing

* : 99.95 is the well depth, the entire column of fluid in the well was product

NP : No Product

NA : Not Applicable

Corrected : The elevation to which the water table would rise if not depressed by the layer of petroleum product. A

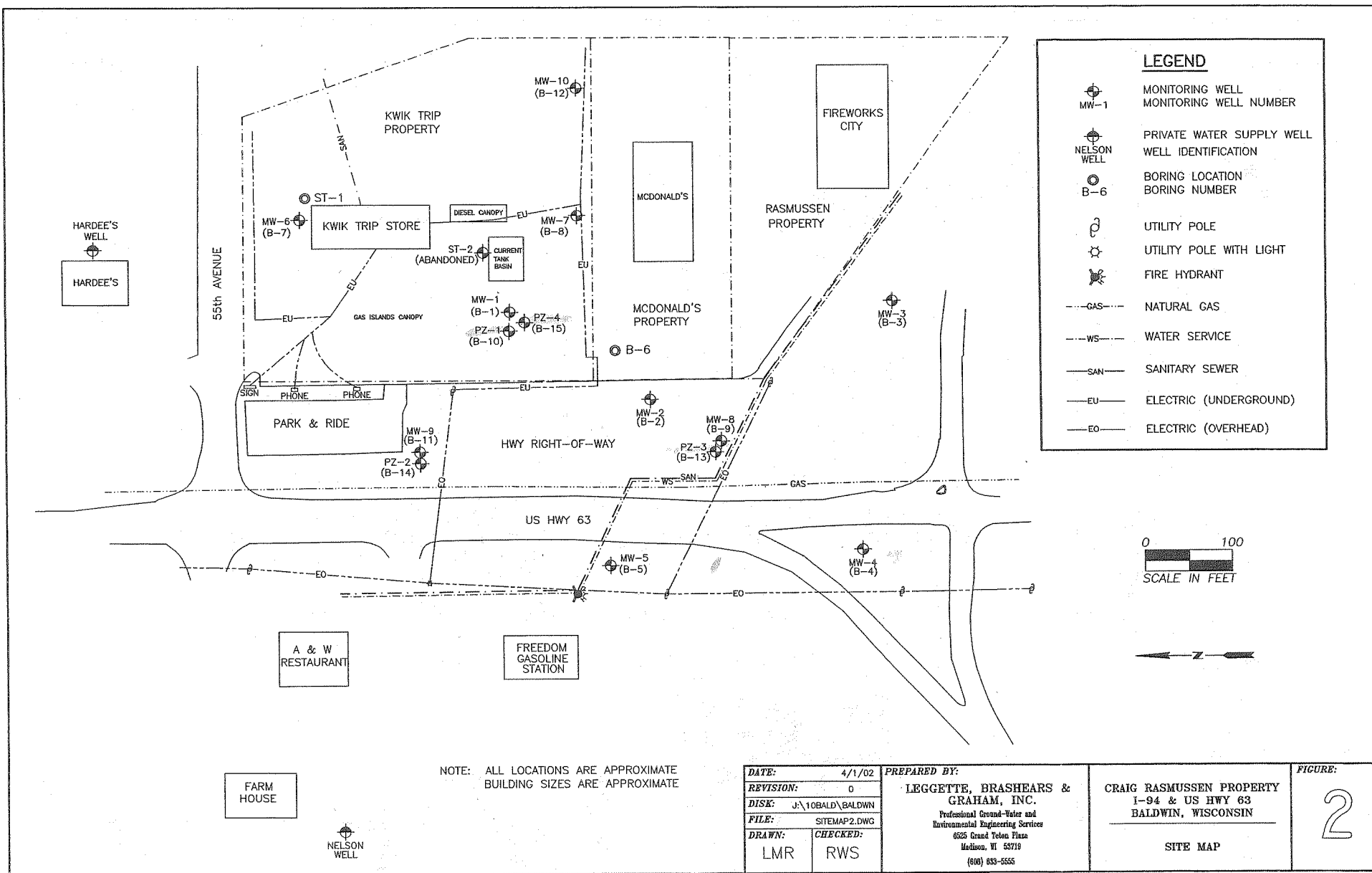
TABLE 5

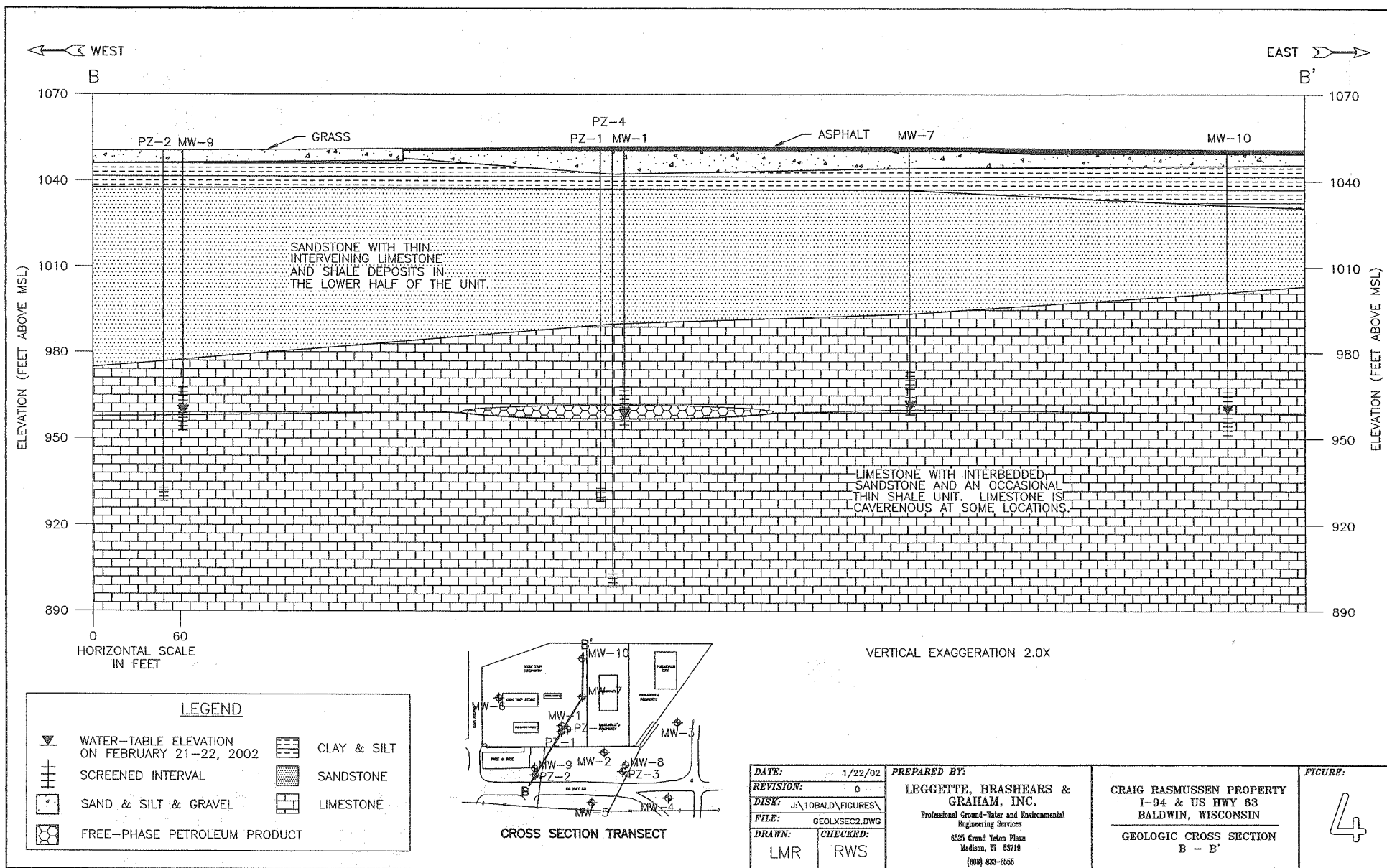
**CRAIG RASMUSSEN PROPERTY
I-94 & US HWY 63
BALDWIN, WISCONSIN**

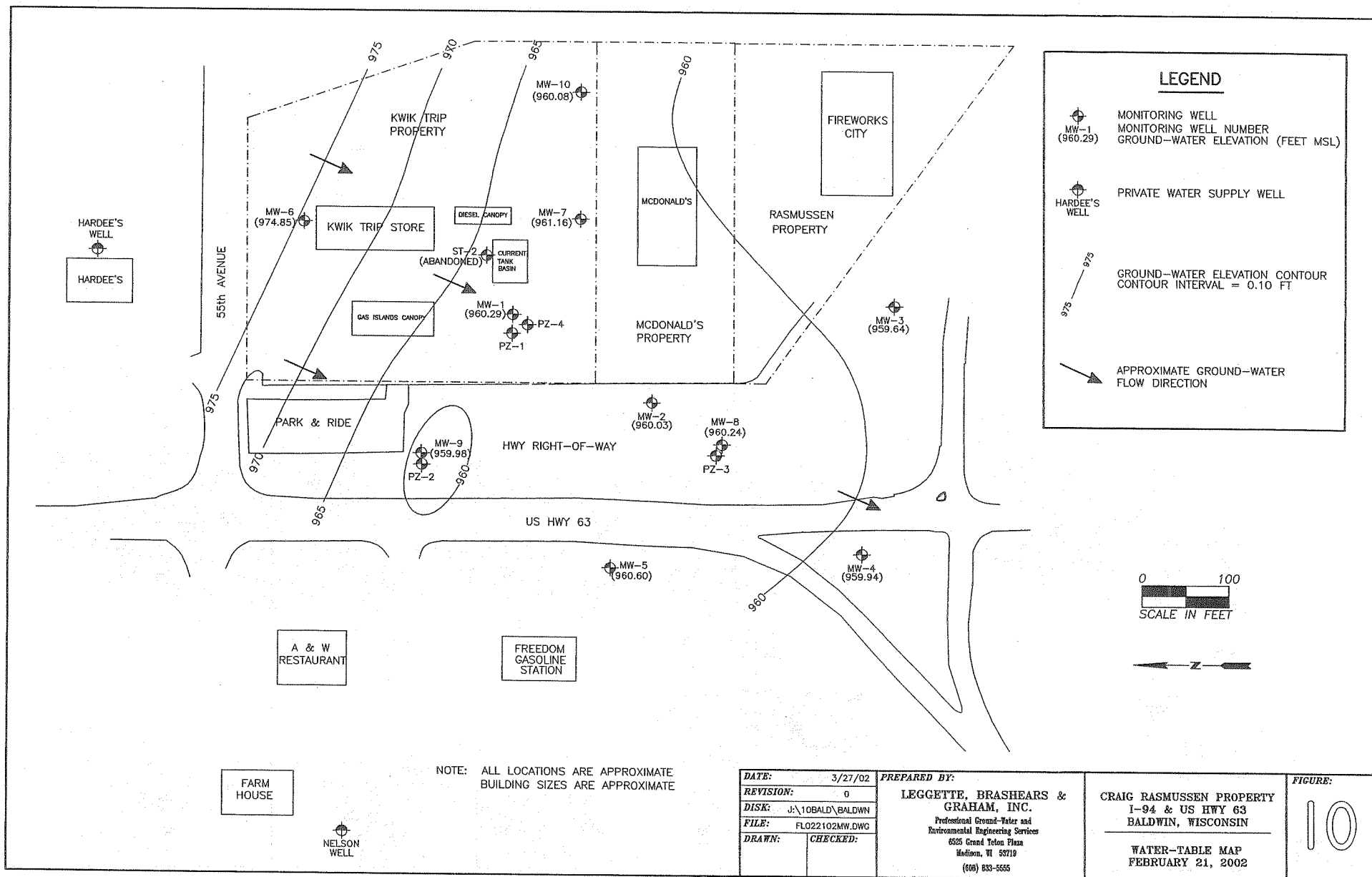
GROUND-WATER ELEVATIONS AND VERTICAL FLOW GRADIENTS
(all measurements are in feet)

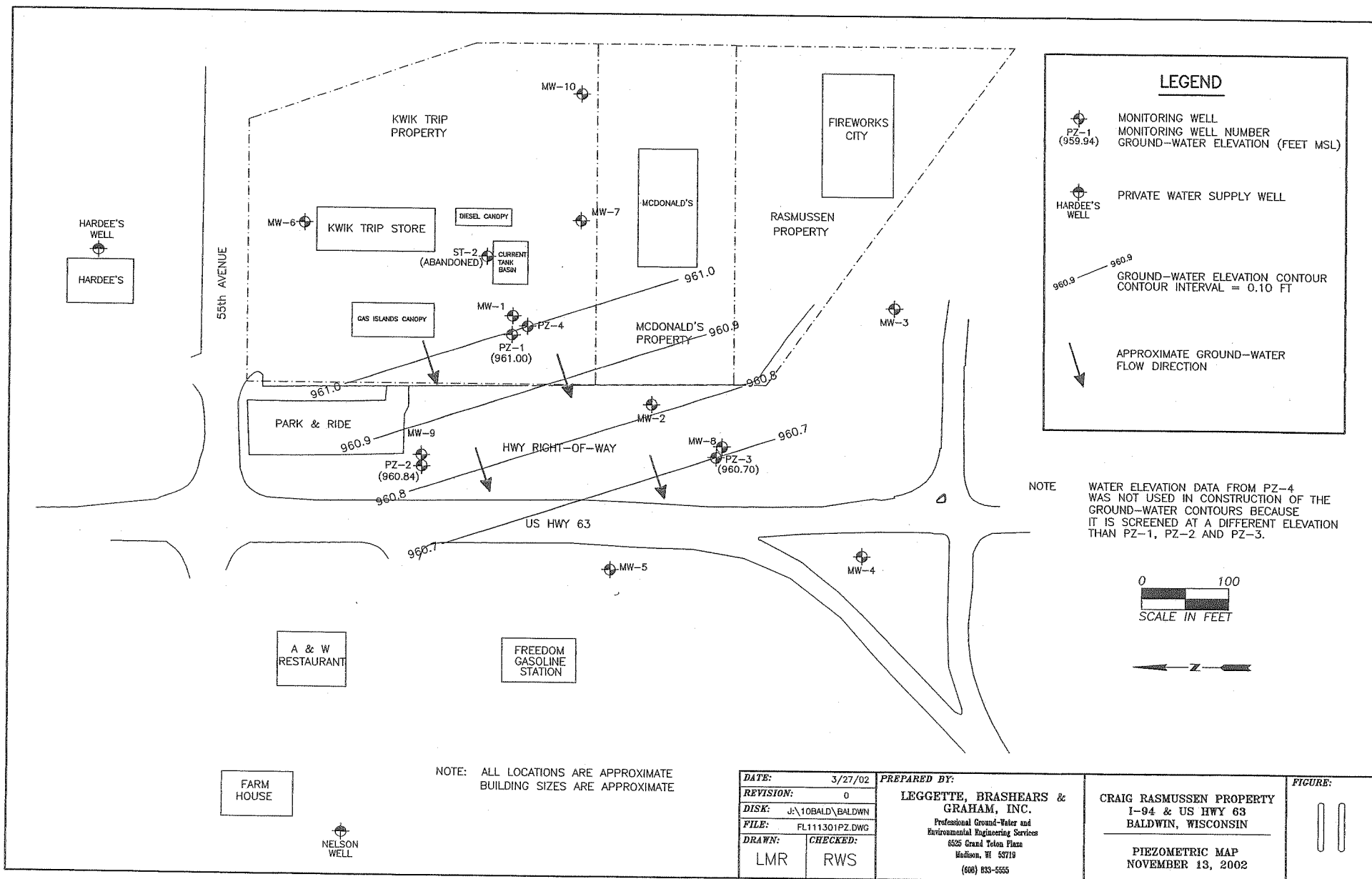
Location	Date	Water Elevation	Elevation Difference (MW-PZ)	Well Screen Depth (Center)	Vertical Distance Between Screens	Vertical Gradient	Flow Direction (Upward/Downward)
MW-1	11/13/2001	961.80	0.80	95	28	0.0291	Downward
MW-1	02/22/2002	960.29	0.35	95	28	0.0127	Downward
PZ-1	11/13/2001	961.00	0.09*	123	30	0.0030	Downward
PZ-1	02/21/2002	959.94	-0.03*	123	30	-0.0010	Upward
PZ-4	11/13/2001	960.91	0.89**	153	58	0.0155	Downward
PZ-4	02/21/2002	959.97	0.32**	153	58	0.0056	Downward
MW-9	11/13/2001	961.06	0.22	97	25	0.0088	Downward
MW-9	02/21/2002	959.98	0.05	97	25	0.0020	Downward
PZ-2	11/13/2001	960.84	-	122	-	-	-
PZ-2	02/21/2002	959.93	-	122	-	-	-
MW-8	11/13/2001	961.55	0.85	81	26	0.0327	Downward
MW-8	02/21/2002	960.24	0.51	81	26	0.0196	Downward
PZ-3	11/13/2001	960.70	-	107	-	-	-
PZ-3	02/21/2002	959.73	-	107	-	-	-

- MW-PZ : Monitoring well water elevation minus piezometer water elevation
Notes : All elevations are referenced to the USGS Vertical Datum.
: At locations having three wells in a cluster, vertical flow gradients are calculated between monitoring wells and intermediate depth piezometers (approximately 125 ft bg), between intermediate depth piezometers and deep piezometers (155 ft bg), and between monitoring wells and deep piezometers.
* : Value equals the shallow piezometer water elevation minus the deep piezometer water elevation
** : Value equals the monitoring well water elevation minus the deep piezometer water elevation









Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☒ Other ☐

Page 1 of 3

Facility/Project Name Rasmussen Property		License/Permit/Monitoring Number		Boring Number B-12	
Boring Drilled By (Firm name and name of crew chief) Badger State Drilling, Inc. Kevin McCumber		Date Drilling Started 10/9/2001		Date Drilling Completed 10/9/2001	
Drilling Method 6.25 HSA / Air Rotary					
WI Unique Well No. PB351	DNR Well ID No.	Common Well Name MW-10	Final Static Water Level Feet MSL	Surface Elevation Feet MSL	Borehole Diameter 10.25/6.0 Inches
Boring Location or Local Grid Origin (Check if estimated: <input type="checkbox"/>) State Plane S/C NW 1/4 of SW 1/4 of Section 6, T 28 N, R 16 W			Local Grid Location (If applicable) Lat. ° ' " Long. ° ' " Feet <input type="checkbox"/> N <input type="checkbox"/> E Feet <input type="checkbox"/> S <input type="checkbox"/> W		
Facility ID		County St. Croix	County Code 56	Civil Town/City/ or Village Town of Cady	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
AUGER	12			Asphalt and Gravel Fill.										
1	24	10		<u>Sand</u> , very fine to coarse; some medium	SW			0.0		Moist				
SS	14	26	2	gravel; light brown.										
2	24	20		<u>Silt</u> and fine <u>Sand</u> ; brown.	MLS			12.1		Moist				
SS	16	4	4											
3	24	11		<u>Silt</u> and <u>Sand</u> and <u>Clay</u> ; trace pea	MLS			3.1		Moist				
SS	14	10	6	gravel; dark brown.										
4	24	7		<u>Silt</u> and <u>Clay</u> ; brown; occasional sand	CL-MI			0.0		Moist				
SS	16	2	8	seams.										
5	24	6		<u>Silt</u> and <u>Clay</u> ; some medium, weathered	CL-MI			0.0		Moist				
SS	16	7	10	gravel; orange-brown; occasional sand										
6	24	9		seams.	MLS			1.0		Moist				Swampy Smell
SS	18	6	12	<u>Silt</u> and very fine to fine <u>Sand</u> ; little										
7	24	10		weathered gravel; dark brown; lots of										
SS	2	4	14	small roots.				0.0		Moist				Swampy Smell
8	24	3		<u>Sand</u> and <u>Silt</u> and <u>Clay</u> ; little fine										
SS	6	6		gravel; dark brown; some roots.	MLS			-		Moist				
9	24	1	16											
SS	12	0												
10	24	1												
SS	8	1	18							Moist				
11	24	0												
12	8	0												
13	48	1	20	<u>Sandstone</u> , very fine to fine, white.										
AUGER	0													
	50/3													
	948		24											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature  Firm **Leggette, Brashears & Graham, Inc.** Tel: (608) 833-5555
Fax: (608) 833-5551

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completions of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

Boring Number

B-12

Use only as an attachment to Form 4400-122.

[illegible]

[illegible]

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☒ Other ☐

Page 1 of 4

Facility/Project Name Rasmussen Property			License/Permit/Monitoring Number		Boring Number B-13	
Boring Drilled By (Firm name and name of crew chief) Badger State Drilling, Inc. Kevin McCumber			Date Drilling Started 10/10/2001		Date Drilling Completed 10/10/2001	
Drilling Method 6.25 HSA / Air Rotary						
WI Unique Well No. PB352	DNR Well ID No.	Common Well Name PZ-3	Final Static Water Level Feet MSL	Surface Elevation Feet MSL	Borehole Diameter 10.25/6.0 Inches	
Boring Location or Local Grid Origin (Check if estimated: <input type="checkbox"/>) State Plane S/C			Lat. ° ' "		Local Grid Location (If applicable) <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
NW 1/4 of SW 1/4 of Section 6, T 28 N, R 16 W			Long. ° ' "			
Facility ID		County St. Croix	County Code 56	Civil Town/City/ or Village Town of Cady		

Sample	Number and Type	Length Alt. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					P 200	RQD/ Comments
										Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index			
AUGER	480			0	Topsoil											
				2	Silt and Clay and Sand; brown.											
				4												
				6	Sandstone, fine, white.											
				8												
				10												
				12												
				14												
				16												
				18												
				20												
				22												
				24												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature  Firm **Leggette, Brashears & Graham, Inc.** Tel: (608) 833-5555
Fax: (608) 833-5551

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Use only as an attachment to Form 4400-122.





















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Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☒ Other ☐

Page 1 of 4

Facility/Project Name Rasmussen Property			License/Permit/Monitoring Number		Boring Number B-14	
Boring Drilled By (Firm name and name of crew chief) Badger State Drilling, Inc. Kevin McCumber			Date Drilling Started 10/11/2001		Date Drilling Completed 10/11/2001	
Drilling Method 6.25 HSA / Air Rotary						
WI Unique Well No. PB353	DNR Well ID No.	Common Well Name PZ-2	Final Static Water Level Feet MSL	Surface Elevation Feet MSL	Borehole Diameter 10.25/6.0 Inches	
Boring Location or Local Grid Origin (Check if estimated: <input type="checkbox"/>) State Plane S/C/N			Lat. ° ' "		Local Grid Location (If applicable) <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
NW 1/4 of SW 1/4 of Section 6, T 28 N, R 16 W			Long. ° ' "		Feet <input type="checkbox"/> S Feet <input type="checkbox"/> W	
Facility ID		County St. Croix	County Code 56	Civil Town/City/ or Village Town of Cady		

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
AUGER	864			Topsoil, Sandy Loam.										
			2	<u>Sand</u> and <u>Silt</u> and <u>Clay</u> ; some fine gravel; light brown.						Moist				
			4											
			6	<u>Sand</u> ; some silt; little fine gravel; light brown.										
			8		SM									
			10	<u>Sand</u> ; some silt; brown.						Moist				
			12	<u>Sand</u> and <u>Silt</u> and <u>Clay</u> ; brown.										
			14	<u>Sandstone</u> , fine, white.						Moist				
			16											
			18											

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Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☒ Other ☐

Page 1 of 5

Facility/Project Name Rasmussen Property			License/Permit/Monitoring Number		Boring Number B-15	
Boring Drilled By (Firm name and name of crew chief) Badger State Drilling, Inc. Kevin McCumber			Date Drilling Started 10/16/2001		Date Drilling Completed 10/16/2001	
WI Unique Well No. PB354		DNR Well ID No.		Common Well Name PZ-4		Borehole Diameter 10.25/6.0 Inches
Boring Location or Local Grid Origin (Check if estimated: <input type="checkbox"/>) State Plane S/C/N			Final Static Water Level Feet MSL		Surface Elevation Feet MSL	
Boring Location or Local Grid Origin (Check if estimated: <input type="checkbox"/>) NW 1/4 of SW 1/4 of Section 6, T 28 N, R 16 W			Lat. ° ' "		Local Grid Location (If applicable) Feet <input type="checkbox"/> N <input type="checkbox"/> E Feet <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID		County St. Croix		County Code 56		Civil Town/City/ or Village Town of Cady

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
AUGER	744			Asphalt and Gravel fill.										
			2	<u>Sand</u> , fine to coarse; some silt; some gravel; light brown.	SW									
			4	<u>Sand</u> , fine to coarse; some silt; some gravel; light brown; 4-inch silt and clay layer.	SW ML									
			6	<u>Sand</u> , fine to very coarse; brown.	SW									
			8	<u>Sand</u> , fine to coarse; some silt; some clay; some fine gravel; brown.	SW									
			10											
			12	<u>Silt and Clay</u> ; 2-inches of fine Sandstone in tip of spoon.	CL-ML									
			14	<u>Sandstone</u> , orange banding. <u>Sandstone</u> , white.										
			16											
			18											
		20												
		22												
		24												

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Boring Number **B-15**

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Page **2** of **5**

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
			26											
			28											
			30											
			32	<u>Shale, gray.</u>										
			34											
			36											
			38											
			40	<u>Sandstone, fine.</u>										
			42											
			44											
			46											
			48											
			50											
			52											
			54											
			56											
			58											
			60											
			62	<u>Shale.</u>										
				<u>Sandstone, fine to coarse.</u>										
				<u>Limestone, tan.</u>										
			64											

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Page 5 of 5

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