

## *Hydrostratigraphic Database of West-Central Wisconsin*

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<b>Site:</b>	Nelson Farm Supply
<b>Location:</b>	River Falls, St. Croix County, Wisconsin
<b>Unit Evaluated:</b>	Ordovician Prairie du Chien

### ***File includes excerpts from:***

Alpha Terra Science, Inc., 2003, Remedial Action Plan and Groundwater Monitoring Report for Nelson Farm Supply, River Falls, Wisconsin, on file at Wisconsin Department of Agriculture, Trade and Consumer Protection.

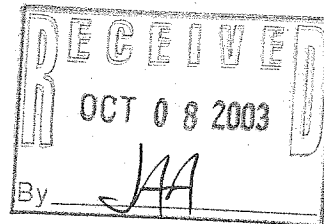
- Text: hydrogeology discussion, conclusions
- Tables: sampling results including water-level data
- Figures: site plan, cross-sections, potentiometric surface maps
- Boring logs
- Slug test summary table and data analyses



REMEDIAL ACTION

PLAN

and Revised Groundwater Monitoring Report  
for Nelson Farm Supply  
River Falls, WI



DATCP File Reference # 01409101001  
Alpha Terra Science, Inc. Project #NEL 2002-01

September 2003

Prepared For:

Dwight Nelson  
Nelson Farm Supply  
18 Glendale Drive  
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September 30, 2003

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Jeff Ackerman  
Wisconsin Department of Agriculture, Trade and  
Consumer Protection  
P.O. Box 8911  
Madison, WI 53708-8911

RE: Nelson Farm Supply - River Falls, WI      DATCP Case # 01409101001  
Groundwater monitoring and costs for soil remedial action

Dear Mr. Ackerman:

We completed two rounds of groundwater sampling on May 19-20, 2003 and August 19, 2003 at the above referenced site. As you know from your site visit during the monitoring well installation, the depth to groundwater is not as great as previously estimated. This has a couple of consequences related to the extent and behavior of the groundwater plume as well as soil remediation recommendations as discussed below.

Hydrogeology & Geology The groundwater is present at a depth of approximately 50 feet below grade, and occurs in a unit identified in the field as dolomite or a dolomitic sandstone. The groundwater elevation measurements are mapped on Figures 3 and 4, and water elevations and geology are shown on the two cross sections (Figure 5 and 7). The unit was present at all boring locations at a depth of approximately 40 to 50 feet, and it has been identified as a member of the Prairie du Chien Dolomite. Overlying the dolomite is unsaturated sandstone of the St. Peter formation.

A void was noted in the dolomite at boring MW-1, and voids, fractures, and bedding planes likely control the groundwater flow. Overall, the groundwater flow direction is to the west, although groundwater elevation data from monitoring well MW-5, located on the southwest corner of the property, displays a higher groundwater elevation than all other monitoring wells at the site.

In the *Site Investigation Report and Remedial Action Work Plan* we speculated that the pesticide plume might be diving and only occasionally impact the Way and the two mobile home court wells. Based on the observed conditions, we now believe flow and contaminant

migration is controlled by fracture flow, and the presence or absence of contamination is likely related to whether fractures that contain groundwater with elevated concentrations of pesticides have been encountered by a given well.

The chemistry data from the area water supply wells indicate a west-southwest flow direction.

Hydraulic conductivity tests were performed on all the wells using a water level probe. Due to the rapid recovery rates at wells MW-1 and MW-4, little meaningful data was obtained from these wells. The measured maximum drawdown at well MW-4 was only 0.25 feet, so the observed results are not considered an accurate representation of the conditions. All obtained data is included in the attachments. Data from wells MW-2 and MW-3 indicate a hydraulic conductivity of approximately  $1 \times 10^{-3}$  ft/min. Values from well MW-1 are higher, estimated at  $6 \times 10^{-3}$  to approximately  $1 \times 10^{-2}$  ft/min. Values at MW-5 are lower, ranging from  $5 \times 10^{-4}$  to  $8 \times 10^{-4}$  ft/min. The hydraulic conductivity at monitoring well MW-4 is expected to be similar to the values calculated for MW-1.

*little is  
meaningful*

The groundwater flow is suspected to be controlled by fractures, voids, and dissolution features in the dolomite aquifer. Values for hydraulic conductivity at individual wells is only representative of the conditions encountered within the 6-inch diameter borehole at that location. The calculated hydraulic conductivity values will not provide an accurate estimate of the advective groundwater velocity through this type of aquifer.

*No  
that  
rock is  
gone*

Nitrate Groundwater Contamination and Source Areas MW-1 (upgradient from source areas) has had nitrate/nitrite concentrations in groundwater of 15 mg/L and 9.6 mg/L, which we consider to be background concentrations for this agricultural area based on concentrations of 11 to 14 mg/l of nitrate/nitrite in groundwater from two sidegradient or upgradient private wells (Morrow and Dinteman). Groundwater from monitoring wells MW-2, -3, and -4 generally contains between 44 to 76 mg/L nitrate/nitrite, and groundwater from monitoring well MW-5 has been 28 to 34 mg/L.

The Nelson home, Kohler, Way and mobile home court wells that are impacted by alachlor do not show corresponding elevated nitrate impacts. This is most clearly demonstrated by the Nelson home well, which has alachlor levels comparable to the highest levels measured at the site, but the nitrate concentrations (9.2 to 9.8 mg/l) are slightly lower than background concentrations. This is difficult to explain, but may reflect separate sources for the nitrogen and pesticide contaminants. The pesticides and nitrogen may be transported in the groundwater by separate migratory pathways, for example, fractures or dissolution channels,

## Conclusions

### 1. Area 6 is the source area for the alachlor plume.

Given the extent and persistence of the alachlor groundwater plume and the depth to groundwater (approximately 50 feet), it can be concluded that a surface spill migrated to the deeper soils and bedrock. Soil sampling to date has not identified the precise location where a spill extends vertically to the bedrock surface; however, as discussed in the *Site Investigation Report* (January 2003), the soil chemistry sample results demonstrate extreme variability in adjacent samples, and it is likely a spill could have occurred and not have been detected from the existing soil sample layout. For instance, no detection of alachlor was present at boring 6-10 (2-4') but 2.2 mg/kg was measured at the same depth 2.5 feet away at boring 6-4. A sampling grid was proposed in the *Site Investigation Report* that would sample the excavation floor at Area 6 at a depth of 4 feet on a 4-foot grid (8 samples). Based on the mobile laboratory chemistry results, the excavation would be extended in appropriate areas as deep as practical and another six samples will be collected. If additional shallow pesticide contamination is found in Area 6 during the remedial action, it will be removed. Any pesticide that is removed from the site's shallow soil will not be available to leach to the groundwater, and should prevent additional contribution of pesticides to the groundwater.

Based on the chemical handling practices at the site, the spill is probably 15 to 20 years old. Traces of alachlor may have been virtually removed from the shallow sandy soils by leaching, but may continue to leach to the groundwater from pore spaces within the bedrock.

Sample results from the past 1.5 years indicate that the alachlor plume in the groundwater is stable or receding. This, combined with the large extent of the plume, supports the idea that the spill is not recent. Most of the residual pesticide that is acting as the source for continued groundwater contamination may be in the bedrock, which cannot easily be remediated.

As discussed in the *Site Investigation Report*, the estimated mass of alachlor present in the groundwater plume is small. Three scenarios were used to provide an estimated range of 0.8 to 4.9 pounds of alachlor. This estimate predated the monitoring well installation and resulting data, which tends to support an even lower estimated mass since we assumed a much higher alachlor concentration near the source than is present

based on the monitoring well data. Although this is a rough approximation, it demonstrates that a large source area need not be present to explain the extensive pesticide plume. A slow leak from a small alachlor container could have gone almost straight down through the sandy soil until reaching the bedrock surface.

Test results on soil from Area 6 indicates it contains up to 22.23 mg/kg of total pesticides. Detected compounds include alachlor at concentrations of up to 2.2 mg/kg, metolachlor at concentrations of up to 22 mg/kg, and dimethenamid at concentration of up to 0.23 mg/kg. These compounds have all been detected in the groundwater over a widespread area at concentrations of a few micrograms per liter (parts per billion) while the detections in the soil at Area 6 are registered in units of milligrams per kilogram (parts per million), or 1,000 times greater.

**2. Fertilizer handling at the site appears to have contributed to elevated nitrate/nitrite levels in the shallow groundwater.**

Groundwater from the site's monitoring wells contain nitrate levels roughly 2 to 7 times the enforcement standard of 10 mg/L. Most of the water supply wells surrounding the site are close to the enforcement standard (ranging from 5.8 to 16 mg/L), and typical background levels in the groundwater for this area appear to be approximately 10 to 15 mg/L.

The 9.6 to 15 mg/L nitrate/nitrite results from MW-1 (August and May, respectively) indicate that the shallow groundwater upgradient from the fertilizer source areas is at or close to background levels. The relatively high concentrations in groundwater from monitoring well MW-3 are unexpected and are the basis for suspecting that not all the elevated nitrate in the shallow groundwater is coming from the fertilizer operations. The septic system may be affecting the nitrogen levels, particularly at MW-3. Further evaluation of the nature of the groundwater at various areas using major ion analysis should help to evaluate this situation.

Removal of nitrogen-contaminated soil should reduce the potential for continued leaching of nitrogen to the groundwater.

3. Known areas of pesticide-contaminated soils should be removed and additional sampling conducted.

to MB The area west of the barn will be excavated as described in Section 5.1 of the January 2003 Site Investigation Report. The soil clean up goal will be 1.0 mg/kg total pesticides based on mobile laboratory analytical results. Modification to the previously provided remedial action excavation include exposure and inspection of the buried concrete slab. If the slab is intact, it will not be removed. If there are cracks, all or part of the slab will be removed and additional soil samples collected and analyzed by the mobile laboratory. Given the clean results at a depth of 24-25' from boring 6-11, which was drilled through the concrete, more extensive sampling under the slab will not be considered unless mobile lab results indicate that further sampling is appropriate.

Other modifications from the January 2003 remedial action description include completion of test pits in the area surrounding HB-1. Based on the 0.41 mg/kg alachlor result in the soil from HB-1-2', three additional test pits will be dug in the area surrounding HB-1. Soil samples will be taken from a depth of 3 to 4 feet. Any area where alachlor concentrations exceed 1 mg/kg will be removed and landspread until the extent of the contamination is defined, as confirmed by the mobile laboratory results.

Good An additional test pit will be dug next to the site supply well spigot. A soil sample will be collected under the spigot's weep hole where back-siphoning could possibly have resulted in pesticide contamination in the soil. The bottom of the spigot's riser pipe where the weep hole is located may be as deep as 8 feet (typically installed below frost level).

Not APPROVED The cost estimate included with the August 2003 monitoring report has been revised to include the test pits, additional soil volume and sampling, and analysis. An additional day has been added to the mobile laboratory and consultant oversight. A full day will not be needed if test pit and under-slab results are negative; however, the estimate allows for the possibility that pesticide detections will lead to additional sampling.

here too?  
Yes,  
JP.  
6-6-3

Two additional sampling rounds are included in the attached remedial action cost estimate (May 2004 and November 2004). The remedial action cost estimate assumes that nitrate/nitrite and pesticide analysis will be performed for seven private water supply wells (each round) and nitrate/nitrite, ammonia-N and pesticides will be performed for the five monitoring wells (each round). In addition, charges for including analysis and interpretation of major ions have been added to the November 2003 sample event.

The purpose of any future groundwater investigations will be to further monitor trends.

Attachments to this letter report include the following:

Table 1 – Monitoring Well Groundwater Summary Table

Table 2 – Groundwater Chemistry Summary Data Table – Private Water Supply Wells

Table 3 – Soil Sample Results – Post Nov. '02 Geoprobe Investigation

Table 4 – Estimated Soil Contaminant Mass, Soil Volume and Soil Mass

Table 5 – Estimated Soil Contaminant Mass, Soil Volume and Soil Mass for Soils Between  
100 & 200 PPM Nitrogen

Figure 1 – Site Location Map

Figure 2 – Alachlor Plume

Figure 3 – May 2003 Sample Results

Figure 4 – August 2003 Sample Results

Figure 5 – Cross Section A-A'

Figure 6 – Section A-A' Location

Figure 7 – Cross Section B-B'

Figure 8 – Area 6 – Soil Sample Results

Figure 9 – Area 1 Soil Sample Results and Estimated Excavation Area

Figure 10 – Area 2 Soil Sample Results and Estimated Excavation Area

Figure 11 – Area 3 Soil Sample Results and Estimated Excavation Area

Figure 12 – Area 4 Soil Sample Results and Estimated Excavation Area

Laboratory Analytical Reports

Soil Boring Logs from Monitoring Wells MW-1 through MW-5, 6-11, 6-12, HB-1, HB-2 and  
HB-3 (20 sheets)

Monitoring Well Construction Forms (MW-1 through MW-5; 5 sheets)

Well Development Forms (MW-1 through MW-5; 5 sheets)

Borehole Abandonment Forms (6 sheets)

Hydraulic Conductivity Test Results – data and plots (22 sheets)

Field notes from monitoring well installation (36 sheet)

Remedial Action Cost Estimate – Revision 2 (2 sheets)



**MONITORING WELL GROUNDWATER SUMMARY DATA TABLE  
TABLE 1**

Project: Nelson Farm Supply, River Falls, WI

MW-1																		
Top of PVC Casing: <u>98.19</u>			Top of Well Screen: <u>55.1</u> <i>elevation</i>															
Ground Elevation: <u>98.86</u>			Length of Well Screen: <u>10</u>															
Sample Date	Depth to Water	Water Level* (ft. site ref.)	Nitrate/Nitrite (mg/L)	Ammonia - N (mg/L)	Atrazine	DEA	DIA	Alachlor	Metolachlor	Acetochlor	Cyanazine	Dimethenamid	EPTC	Butylate	Metribuzin	Propazine	Prometon	Simazine
4/9/03	43.41	54.78	12	<1.0	0.22	0.18	<0.041	<0.031	0.036 J	<0.028	<0.051	0.099	<0.058	<0.042	<0.022	<0.035	<0.035	<0.021
5/20/03	43.61	54.58	15	<1.0	0.21	0.16	0.032	<0.057	<0.058	<0.034	<0.0044	0.46	<0.013	<0.021	<0.012	<0.0055	<0.011	<0.0090
8/19/03	41.47	56.72 *	9.6	<1.0	0.18	0.15	<0.038	0.043 J	0.099	<0.026	<0.048	0.69	<0.055	<0.039	<0.021	<0.033	<0.033	<0.020
ES	<del> </del>	<del> </del>	10	-	3	3	3	2	15	-	1	-	250	67	250	-	90	4
PAL	<del> </del>	<del> </del>	2	-	0.3	0.3	0.3	0.2	1.5	-	0.1	-	50	6.7	50	-	18	0.4

NOTES: \* Asterisk indicates water table well screen submerged below water table.  
 ES = NR 140 Enforcement Standard  
 PAL = NR 140 Preventive Action Limit  
**BOLD** results are above ES  
*ITALICIZED* results are above PAL but below ES  
 All chemistry results listed as µg/L, (ppb) unless otherwise noted.  
 "<n" denotes not detected where "n" is the detection limit other than listed under MDL.  
 -- indicates not sampled  
 DUPL = Duplicate sample  
 B = Analyte detected in associated method blank  
 J = Result between level of detection and level of quantitation

-- = Not analyzed  
 The following pesticides were analyzed but not detected:  
 trifluralin, chlorpyrifos, and pendimethalin.

**MONITORING WELL GROUNDWATER SUMMARY DATA TABLE  
TABLE 1**

Project: Nelson Farm Supply, River Falls, WI

<b>MW-2</b>																		
Top of PVC Casing: <u>110.10</u>				Top of Well Screen: <u>54.5</u>														
Ground Elevation: <u>108.37</u>				Length of Well Screen: <u>10</u>														
Sample Date	Depth to Water	Water Level* (ft. site ref.)	Nitrate/Nitrite (mg/L)	Ammonia - N (mg/L)	Atrazine	DEA	DIA	Alachlor	Metolachlor	Acetochlor	Cyanazine	Dimethenamid	EPTC	Butylate	Metribuzin	Propazine	Prometon	Simazine
4/9/03	56.44	53.66	36	<1.0	1.7	0.58	0.18	0.63	1.6	5.0	0.093	17	<0.055	<0.040	<0.021	<0.033	<0.033	<0.020
5/20/03	57.57	52.53	76	<1.0	1.8	0.62	0.25	3.2	5.7	8.3	0.18	28	<0.013	<0.021	<0.012	0.033	<0.011	<0.0089
8/19/03	56.07	54.03	44	<1.0	1.1	0.39	0.18	1.1	2.1	5.5	0.093 J	27	<0.054	<0.039	<0.021	<0.032	<0.032	<0.020
8/19/03	DUPL	--	46	<1.0	1.1	0.39	0.17	1.1	2.1	5.4	0.092 J	28	<0.054	<0.039	<0.021	<0.032	<0.032	<0.020
ES			10	-	3	3	3	2	15	-	1	-	250	67	250	-	90	4
PAL			2	-	0.3	0.3	0.3	0.2	1.5	-	0.1	-	50	6.7	50	-	18	0.4

NOTES: \* Asterisk indicates water table well screen submerged below water table.

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The following pesticides were analyzed but not detected:

trifluralin, chlorpyrifos, and pendimethalin.

# **MONITORING WELL GROUNDWATER SUMMARY DATA TABLE** **TABLE 1**

Project: Nelson Farm Supply, River Falls, WI

<b>MW-3</b>																		
Top of PVC Casing: <u>110.24</u>			Top of Well Screen: <u>54.7</u>															
Ground Elevation: <u>108.12</u>			Length of Well Screen: <u>10</u>															
Sample Date	Depth to Water	Water Level* (ft. site ref.)	Nitrate/Nitrite (mg/L)	Ammonia - N (mg/L)	Atrazine	DEA	D/A	Alachlor	Metolachlor	Acetochlor	Cyanazine	Dimethenamid	EPTC	Butylate	Metribuzin	Propazine	Prometon	Simazine
4/10/03			50	<1.0	1.6	0.50	0.20	<0.028	0.32	<0.025	<0.047	0.44	<0.053	<0.038	<0.021	<0.032	<0.032	<0.020
5/20/03	56.67	53.57	56	<1.0	0.99	0.36	0.20	<0.057	0.32	<0.034	0.014 J	0.86	<0.013	<0.021	<0.012	<0.0055	<0.011	<0.0090
8/19/03	54.85	55.39 *	66	<1.0	1.2	0.42	0.39	<0.028	0.26	<0.025	<0.047	7.8	<0.054	<0.039	<0.021	<0.032	<0.032	<0.020
ES			10	-	3	3	3	2	15	-	1	-	250	67	250	-	90	4
PAL			2	-	0.3	0.3	0.3	0.2	1.5	-	0.1	-	50	6.7	50	-	18	0.4

NOTES: \* Asterisk indicates water table well screen submerged below water table.

ES = NR 140 Enforcement Standard

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**BOLD** results are above ES

*ITALICIZED* results are above PAL but below ES

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The following pesticides were analyzed but not detected:  
trifluralin, chlorpyrifos, and pendimethalin.

# **MONITORING WELL GROUNDWATER SUMMARY DATA TABLE** **TABLE 1**

Project: Nelson Farm Supply, River Falls, WI

MW-4																		
Top of PVC Casing: 107.31			Top of Well Screen: 56.5															
Ground Elevation: 104.89			Length of Well Screen: 10															
Sample Date	Depth to Water	Water Level* (ft, site ref.)	Nitrate/Nitrite (mg/L)	Ammonia - N (mg/L)	Atrazine	DEA	D/A	Alachlor	Metolachlor	Acetochlor	Cyanazine	Dimethenamid	EPTC	Butylate	Metribuzin	Propazine	Prometon	Simazine
4/10/03	53.08	54.23	63	<1.0	0.19	0.20	0.18	<0.028	1.5	0.087 J	<0.046	0.16	<0.053	<0.038	<0.020	<0.031	<0.031	0.049 J
5/19/03	53.42	53.89	64	<1.0	0.20	0.22	0.20 H	<0.057	2.0	<0.034	<0.0045	0.12	<0.013	<0.021	<0.012	<0.0055	<0.011	0.034
8/19/03	51.70	55.61	68	<1.0	0.17	0.19	0.19	<0.028	1.7	<0.025	<0.047	0.33	<0.053	<0.038	<0.021	<0.032	<0.032	<0.020
ES			10	-	3	3	3	2	15	-	1	-	250	67	250	-	90	4
PAL			2	-	0.3	0.3	0.3	0.2	1.5	-	0.1	-	50	6.7	50	-	18	0.4

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**MONITORING WELL GROUNDWATER SUMMARY DATA TABLE**  
**TABLE 1**

Project: Nelson Farm Supply, River Falls, WI

MW-5																		
Top of PVC Casing: 111.82			Top of Well Screen: 55.9															
Ground Elevation: 109.34			Length of Well Screen: 10															
Sample Date	Depth to Water	Water Level* (ft, site ref.)	Nitrate/Nitrite (mg/L)	Ammonia - N (mg/L)	Atrazine	DEA	DIA	Alachlor	Metolachlor	Acetochlor	Cyanazine	Dimethenamid	EPTC	Butylate	Metribuzin	Propazine	Prometon	Simazine
4/10/03			34	<1.0	0.12	0.21	0.34	<0.030	0.13	<0.027	<0.050	<0.013	<0.056	<0.041	<0.022	<0.034	<0.034	0.034 J
5/20/03	56.20	55.62	34	<1.0	0.093	0.20	0.28 H	<0.057	<0.059	<0.034	<0.0045	<0.034	<0.013	<0.021	<0.012	<0.0055	<0.011	0.019 J
8/19/03	54.41	57.41 *	28	<1.0	0.099 J	0.21	0.26	<0.028	0.10	<0.025	<0.047	<0.012	<0.054	<0.039	<0.021	<0.032	<0.032	<0.020
ES			10	-	3	3	3	2	15	-	1	-	250	67	250	-	90	4
PAL			2	-	0.3	0.3	0.3	0.2	1.5	-	0.1	-	50	6.7	50	-	18	0.4

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TABLE 2 - GROUNDWATER CHEMISTRY SUMMARY DATA - PRIVATE WATER SUPPLY WELLS

Sheet 2 of 2

Project: Nelson Farm Supply, River Falls, WI

WELL ID	Well Depth	Note	Sample Date	Nitrate/Nitrite (mg/L)	Ammonia - N (mg/L)	Alachlor	Atrazine	DEA	DIA	Metolachlor	Cyanazine	Dimethenamid	Metribuzin	Propazine	Simazine
MH court -new	285'	E	7/16/02	7.9	--	0.17	0.19	0.13	<0.061	<0.014	<0.019	<0.032	<0.029	<0.12	<0.036
MH court -new	285'	E	11/6/02	7.2	--	<0.056	<0.017 L	<0.0089	<0.014	<0.058	<0.0044	<0.034	<0.012	<0.0054	<0.0089 L
MH court -new	285'	E	2/12/03	<i>Not sampled. Owner concerned about removing insulated well cover during cold weather.</i>											
MH court -new	285'	E	5/19/03	8.2	--	0.19 J	0.14	0.094	0.037 J	<0.061	0.028	<0.035	<0.013	<0.0057	<0.0093
MH court -new	285'	E	8/19/03	7.8	--	0.19	0.16	0.10	<0.037	<0.019	<0.047	<0.012	<0.021	<0.032	<0.020
MH court -old	179' ?	E	7/16/02	<b>10</b>	--	0.30	0.23	0.17	<0.061	<0.014	<0.019	<0.032	<0.029	<0.12	<0.036
MH court -old	179' ?	E	11/6/02	9.5	--	<0.056	0.18 L	0.12	<0.014	<0.058	<0.0044	<0.034	<0.012	<0.0054	<0.0089 L
MH court -old	179' ?	E	2/12/03	<b>10</b>	--	0.30	0.16	0.094	0.019 J	<0.060 L	0.039	<0.035	<0.013	<0.0056	<0.0092
MH court -old	179' ?	E	5/19/03	9.4	--	0.32	0.20	0.13	0.049 J	<0.058	0.038	<0.034	<0.012	<0.0054	<0.0089
MH court -old	179' ?	E	8/19/03	9.1	--	0.32	0.21	0.15	<0.037	0.036 J	<0.046	<0.012	<0.020	<0.031	<0.019
Morrow rental	160'	E	7/16/02	<b>12</b>	--	<0.024	0.21	0.25	<0.062	0.053	<0.020	<0.033	<0.029	<0.12	<0.036
Morrow rental	160'	E	11/6/02	<b>11</b>	--	<0.057	0.28 L	0.17	<0.014	<0.058	<0.0044	<0.034	<0.012	<0.0055	<0.0090 L
Morrow rental	160'	E	2/12/03	<b>13</b>	--	<0.057	0.31	0.17	0.055	0.13 J	<0.0044	0.69	<0.012	<0.0055	<0.0090
Morrow rental	160'	E	5/19/03	<b>14</b>	--	<0.056	0.38	0.20	0.097 H	0.18 J	<0.0044	1.3	<0.012	<0.0054	<0.0089
Morrow rental	160'	E	8/19/03	<b>13</b>	--	0.042 J	0.43	0.21	0.11 J	0.19	<0.047	1.1	<0.021	<0.032	<0.020
Hile	250'	E	11/6/02	7.6	--	<0.056	0.15	0.16	<0.014	<0.058	<0.0044	<0.034	<0.012	<0.0054	<0.0089 L
Langlois	200'?	E	11/6/02	8.4	--	<0.034	<0.017 L	0.072	<0.014	<0.059	<0.0045	<0.034	<0.012	<0.0055	<0.0090 L
Redick	132?	E	2/12/03	5.8	--	<0.057	0.088	0.094	<0.014	<0.058 L	<0.0044	<0.034	<0.012	<0.0055	<0.0090
NR 140 ES / PAL				10 / 2	-	2 / 0.2	3 / 0.3	3 / 0.3	3 / 0.3	15 / 1.5	1 / 0.1	-	250 / 50	-	4 / 0.4

NOTES: -- = not analyzed

&lt;"n" denotes not detected where "n" is the detection limit

J = result between level of detection and level of quantitation, or otherwise estimated.

L = result may be biased low.

H = result may be biased high.

D = sample analyzed by DATCP lab

E = sample analyzed by ECCS

A = sample analyzed by A &amp; L Great Lakes Laboratories, Inc.

ES = NR 140 Enforcement Standard PAL = NR 140 Preventive Action Limit

**BOLD** results are above ES*ITALICIZED* results are above PAL but below ES

All chemistry results listed as µg/L, which is equivalent to parts per billion, unless otherwise noted.

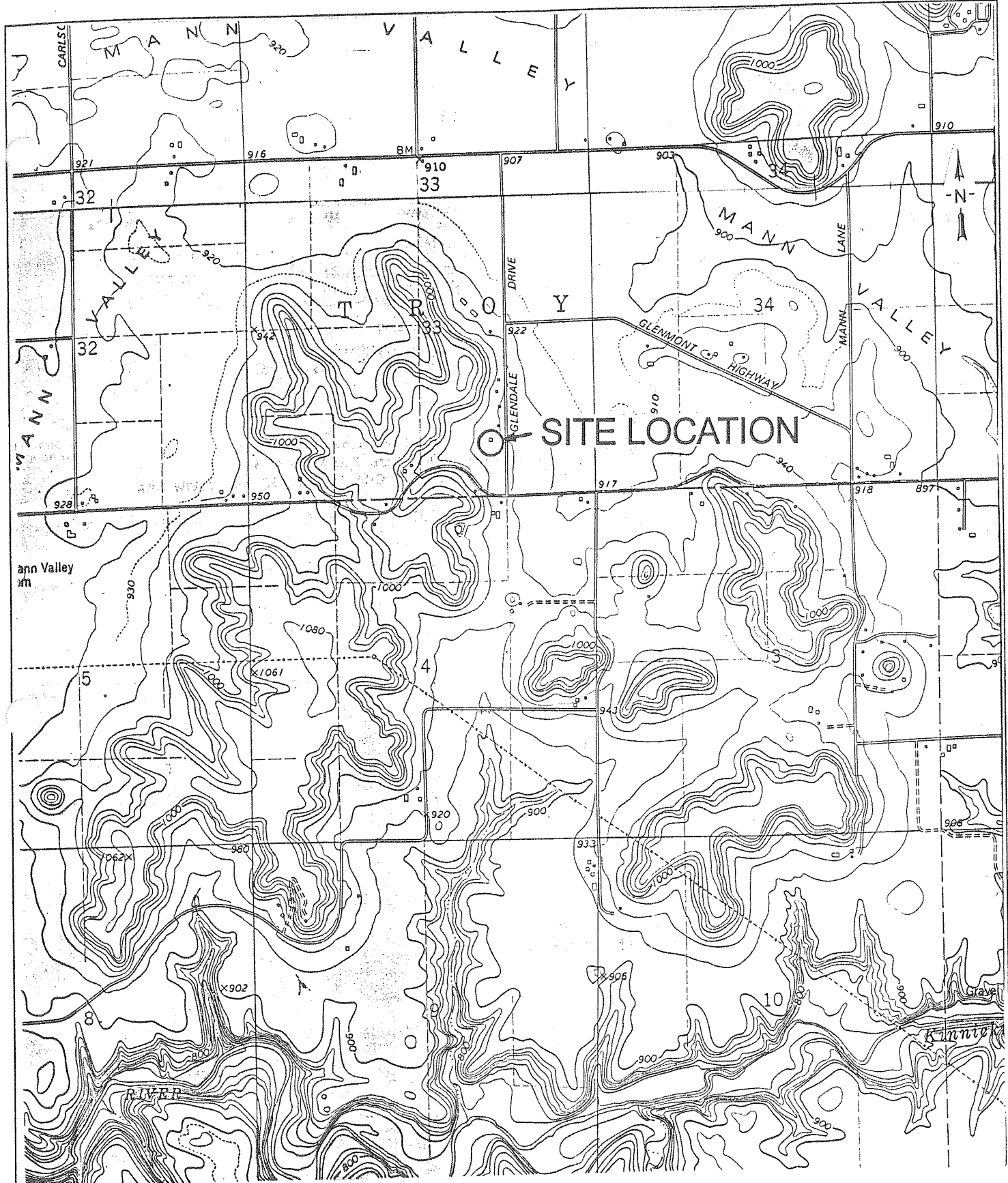
Pesticides not listed above were not detected in any of the samples (Method 8141 list).

TABLE 2 - GROUNDWATER CHEMISTRY SUMMARY DATA - PRIVATE WATER SUPPLY WELLS

Sheet 1 of 2

Project: Nelson Farm Supply, River Falls, WI

WELL ID	Well Depth	Note	Sample Date	Nitrate/Nitrite (mg/L)	Ammonia - N (mg/L)	Alachlor	Atrazine	DEA	D/A	Metolachlor	Cyanazine	Dimethenamid	Metribuzin	Propazine	Simazine
Site	225'	D	10/10/01	19.3	--	4.33*	1.76	0.646	<0.50	1.77	<0.50	--	<0.05	--	<0.15
Site	225'	D	1/2/02	19.4	--	2.62	0.99	0.551	<0.50	1.14	<0.50	--	<0.05	--	<0.15
Site	225'	E	7/16/02	18	--	2.3	0.99	0.38	0.18	0.96	<0.019	0.15	<0.029	<0.12	<0.036
Site	225'	E	11/8/02	19	--	3.3	1.0	0.39	<0.014	1.6	<0.0045	<0.035	<0.012	<0.0056	<0.0091 L
Site	225'	E	2/12/03	18	--	2.3	1.3	0.44	0.15	1.4 L	0.047	<0.034	<0.012	0.024	0.046
Site	225'	E	5/20/03	18	--	1.2	0.91	0.36	0.15 H	0.91	0.022	0.40	<0.012	<0.0055	<0.0090
Site	225'	E	8/19/03	17	--	1.2	0.95	0.38	0.18	0.96	<0.046	0.26	<0.020	<0.031	<0.019
D. Nelson	200'	A	1/4/02	9.69	--	2.0	0.8	--	--	<1.0	--	--	--	--	--
D. Nelson	200'	E	7/16/02	9.8	--	2.3	0.69	0.18	0.11 J	0.074	0.22	<0.032	<0.029	<0.12	<0.036
D. Nelson	200'	E	11/8/02	9.6	--	1.7	0.47	0.11	<0.014	<0.058	0.19	<0.034	<0.012	<0.0055	<0.0090 L
D. Nelson	200'	E	2/12/03	9.7	--	1.8	0.50	0.11	0.029 J	0.10 J	0.19	<0.034	0.026 J	<0.0055	0.014 J
D. Nelson	200'	E	5/19/03	9.2	--	1.9	0.51	0.16	0.077 H	<0.058	0.17	<0.034	0.042 J	0.021	<0.0090
D. Nelson	200'	E	8/19/03	8.9	--	2.1	0.56	0.16	<0.037	0.056 J	0.24	0.019 J	<0.020	<0.031	<0.019
Kohler	215'	E	7/16/02	16	--	0.13	0.59	0.31	0.15 J	0.25	<0.019	<0.032	<0.029	<0.12	<0.036
Kohler	215'	E	11/6/02	15	--	<0.057	0.47 L	0.24	<0.014	<0.059	<0.0045	<0.034	<0.012	<0.0055	<0.0090 L
Kohler	215'	E	2/12/03	15	--	0.19 J	0.87	0.26	0.067	0.20 L	<0.0045	<0.034	<0.012	0.032	<0.0090
Kohler	215'	E	5/19/03	15	--	0.14 J	0.82	0.33	0.14 H	0.24	<0.0044	<0.034	<0.012	<0.0054	<0.0089
Kohler	215'	E	8/19/03	14	--	0.10	0.89	0.31	0.11 J	0.20	<0.046	<0.022 J	<0.020	<0.031	<0.019
Dinteman	?	E	7/16/02	12	--	<0.024	0.22	0.23	0.18 J	0.17	<0.020	<0.033	<0.029	<0.12	<0.036
Dinteman	?	E	11/7/02	11	--	<0.057	0.13	0.14	<0.014	<0.059	<0.0045	<0.034	<0.012	<0.0055	<0.0090 L
Dinteman	?	E	2/12/03	12	--	<0.057	0.17	0.16	0.061	<0.059 L	0.023	<0.034	<0.012	<0.0055	<0.0090
Dinteman	?	E	5/19/03	11	--	<0.056	0.18	0.19	0.095 H	0.15 J	<0.0044	<0.034	<0.012	<0.0054	<0.0089
Dinteman	?	E	8/19/03	10	--	<0.028	0.20	0.20	<0.037	0.13	<0.047	<0.012	<0.021	<0.032	<0.020
Way	185' ?	E	7/16/02	10	--	0.30	0.22	0.18	0.16 J	0.047 J	<0.020	<0.033	<0.029	<0.12	<0.036
Way	185' ?	E	11/6/02	7.0	--	<0.057	0.072 L	<0.0090 L	<0.014	<0.059	<0.0045	<0.034	<0.012	<0.0055	<0.0090 L
Way	185' ?	E	2/12/03	6.7	--	<0.058	<0.017	<0.0091	<0.014	<0.060 L	<0.0045	<0.035	<0.013	<0.0056	<0.0091
Way	185' ?	E	5/19/03	7.2	--	<0.056	0.073	0.082	<0.014	<0.058	<0.0044	<0.034	<0.012	<0.0054	<0.0089
Way	185' ?	E	8/19/03	6.3	--	0.083 J	0.077 J	<0.014	<0.037	<0.019	<0.047	<0.012	<0.021	<0.032	<0.020
NR 140 ES / PAL				10 / 2	-	2 / 0.2	3 / 0.3	3 / 0.3	3 / 0.3	15 / 1.5	1 / 0.1	-	250 / 50	-	4 / 0.4



SOURCE: U.S. GEOLOGICAL SURVEY  
 RIVER FALLS WEST QUADRANGLE, 1974  
 NORTHLINE QUADRANGLE, 1974  
 7.5 MINUTE

SCALE: 1:24,000

DATCP FILE # 01409101001

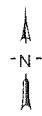


QUADRANGLE LOCATION

Nelson Farm Supply - River Falls, WI				ALPHA TERRA SCIENCE	
SITE LOCATION				DATE: 5-9-02	DWG #.: NEL-site-loc.sld
REV	DATE	DESCRIPTION	APPVD	APPROVED: GCP	FIGURE 1







SEPTIC & DRAIN FIELD

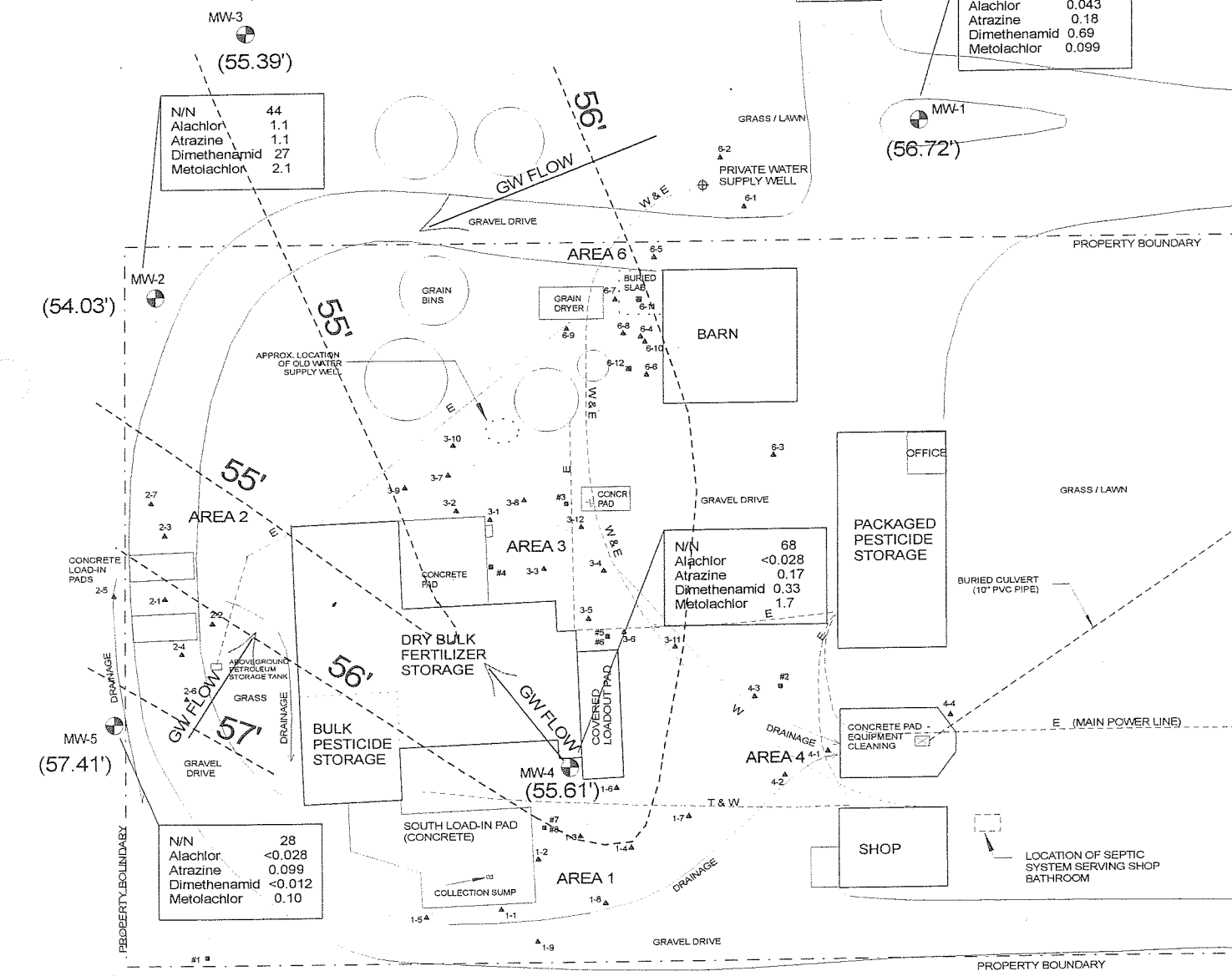
HOUSE

GARAGE

N/N	9.6
Alachlor	0.043
Atrazine	0.18
Dimethenamid	0.69
Metolachlor	0.099

N/N	66
Alachlor	<0.028
Atrazine	1.2
Dimethenamid	7.8
Metolachlor	0.26

N/N	44
Alachlor	1.1
Atrazine	1.1
Dimethenamid	27
Metolachlor	2.1

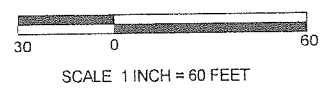


LEGEND

- #9 = DATCP SOIL SAMPLE LOCATION, OCT. 2001
- ▲ 3-1 = GEOPROBE SOIL SAMPLE COLLECTED 11-7-02 & 11-8-02 (FIRST NUMBER DESIGNATES SAMPLE AREA)
- ▲ 6-11 = ADDITIONAL SOIL SAMPLE LOCATION, HOLLOW STEM AUGER (APRIL '03)
- = MONITORING WELL WITH GROUNDWATER ELEVATION (SITE REFERENCE)

CHEMISTRY RESULTS: N/N = NITRATE/NITRITE (MG/L)  
PESTICIDES (UG/L)

UNDERGROUND UTILITY LINES  
W = WATER  
E = ELECTRICAL  
T = TELEPHONE

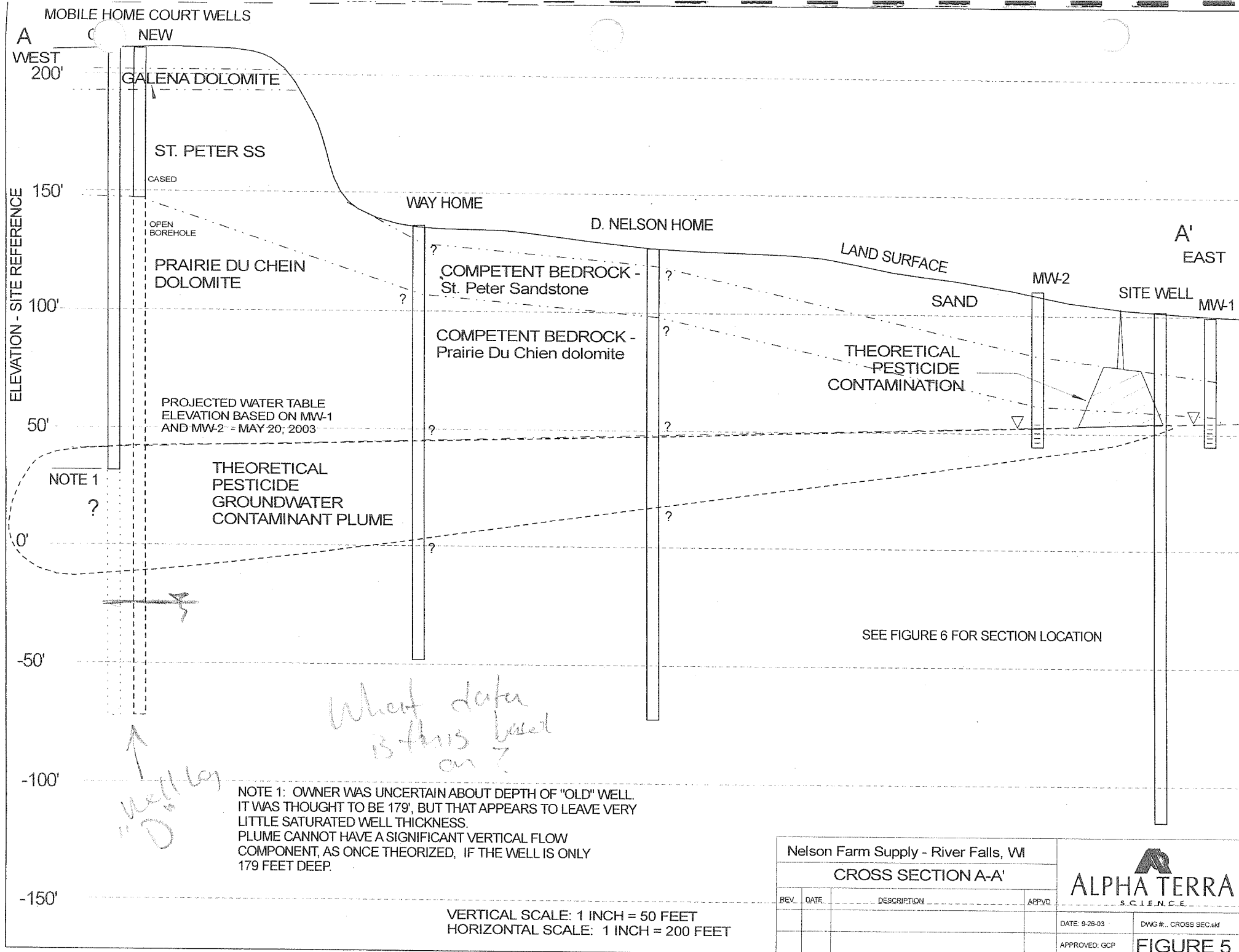


GROUNDWATER ELEVATIONS TAKEN AUGUST 19, 2003

Nelson Farm Supply - River Falls, WI			
AUGUST 2003 SAMPLE RESULTS			
REV	DATE	DESCRIPTION	APPROV



DATE: 8-20-03      DWG #.: 60P site GW Aug03.skf  
APPROVED: GCP      **FIGURE 4**



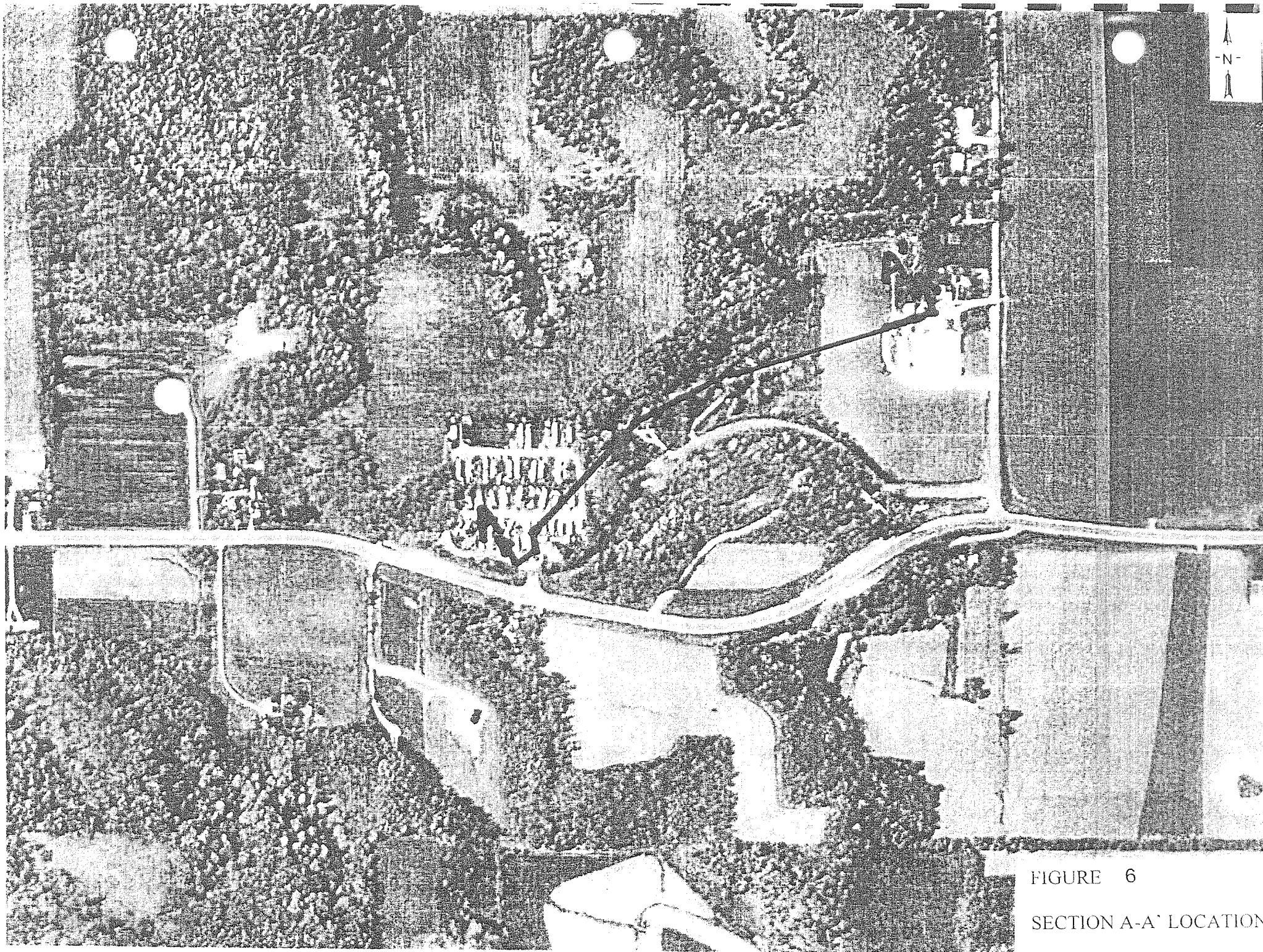
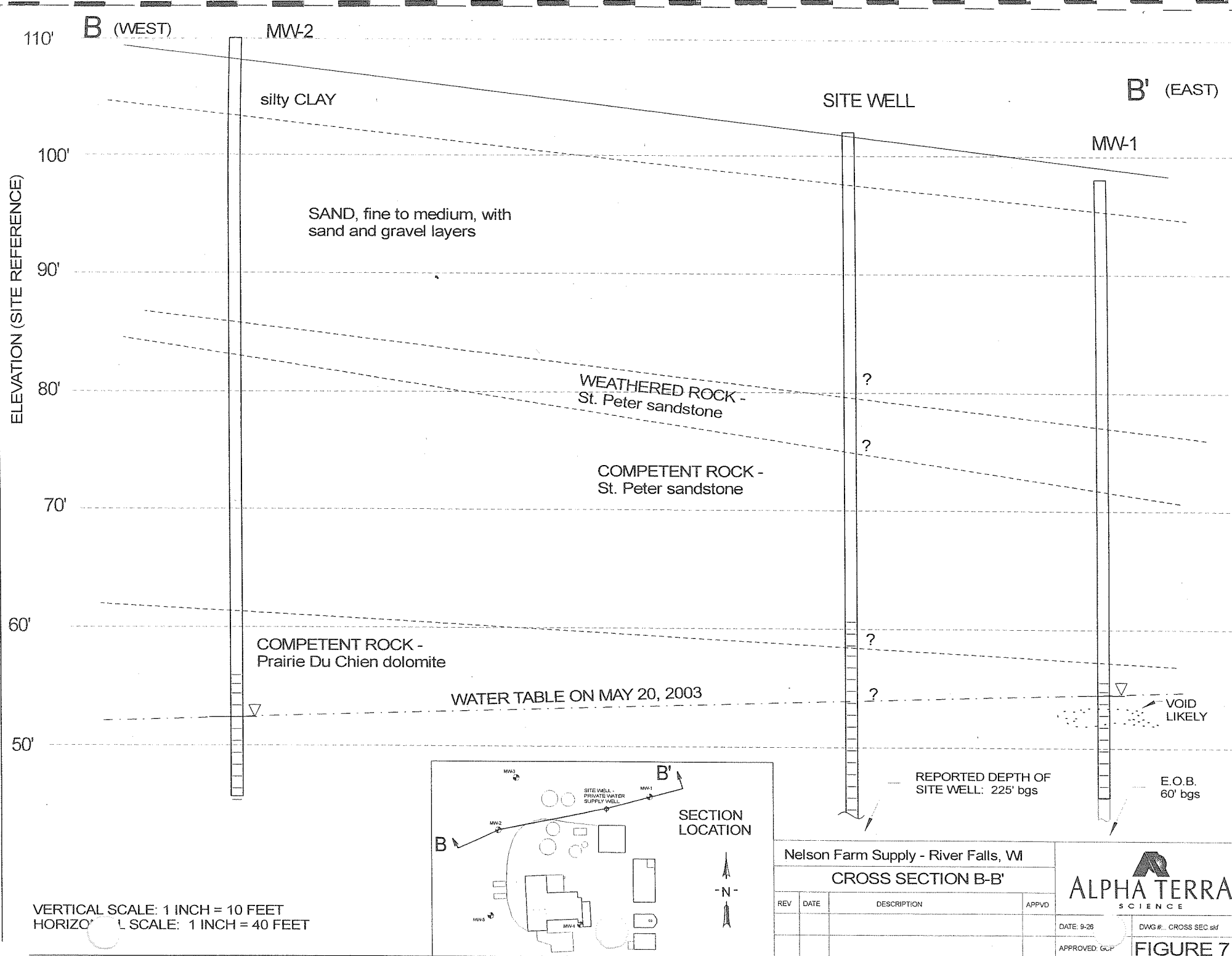


FIGURE 6

SECTION A-A' LOCATION



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

Page 1 of 4

Project Name <u>1elson Farm Supply</u>		License/Permit/Monitoring Number		Boring Number <u>MW-1</u>
Drilled By: Name of crew chief (first, last) and Firm <u>Environmental Drilling Services, Inc.</u>		Date Drilling Started <u>07/10/2003</u>	Date Drilling Completed <u>07/10/2003</u>	Drilling Method <u>6" AIR ROTARY</u>
Unique Well No.	DNR Well ID No. <u>MW-1</u>	Well Name <u>MW-1</u>	Final Static Water Level Feet MSL	Surface Elevation Feet MSL
Boring Location Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input type="checkbox"/> Name <u>N</u> , <u>E</u> S/C/N		Lat <u>0</u> ' "	Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E Feet <input type="checkbox"/> S Feet <input type="checkbox"/> W	
1/4 of <u>SE</u> 1/4 of Section <u>33</u> , T <u>28</u> N, R <u>19</u> W		County <u>St. Croix</u>	County Code <u>56</u>	Civil Town/City/Village <u>Troy</u>

Length Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	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	
			Adjacent to Center Pole/Light Post										
		0-3'	SILTY CLAY										
		1	Black grades to brown, high plasticity, moist (TOPSOIL / SUBSOIL, CL)	CL									
		2											
		3	3.0-3.5' SILTY SAND										
2.0/	3.4,		Fine sand, low plasticity, moist, dark red brown.	SP/SM									
1.7	4.5		(SUBSOIL / ICE CONTACT DEPOSIT ?, SP/SM)	SP/									
		4											
		5	3.5-7' POORLY GRADED SAND WITH GRAVEL										
			Sand dominantly fine to medium grained, loose, light brown. Gravel 15 to 25%, subrounded to subangular, sandstone and dolomite.	GP									
2.0/	7.4,		(OUTWASH/ ICE CONTACT DEPOSITS ? SP/GP)										
1.5	5.5												
		6											
		7											
		8											
		9	7-18' POORLY GRADED SAND										
2.0/	3.4,		Fine grained, light brown, quartz, loose, moist, 0 to 10% gravel to 1" diameter, subrounded.	SP									
1.5	4.5		(OUTWASH, SP)										
		10											
		11											
		12											

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

Kendall A. Sluts

Firm Alpha Terra Science, Inc.

Form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file 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. All 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.





[illegible]



[illegible]

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

Page 1 of 4

Facility/Project Name <u>Nelson Farm Supply</u>		License/Permit/Monitoring Number		Boring Number <u>MW-2</u>	
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: _____ Last Name: _____		Date Drilling Started <u>04/07/2003</u>		Date Drilling Completed <u>04/07/2003</u>	
Firm: <u>Environmental Drilling Services, Inc.</u>		Final Static Water Level _____ Feet MSL		Drilling Method <u>8 1/2" HSA to 25'</u> <u>6" AIR SHANK BELOW</u>	
WT Unique Well No.	DNR Well ID No.	Well Name <u>MW-2</u>	Surface Elevation _____ Feet MSL		Borehole Diameter <u>10" to 6" inches</u>
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input type="checkbox"/>		Lat <u>0</u> ' " <u>0</u> ' "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
State Plane _____ N, _____ E S/C/N		Long _____ Feet		_____ Feet	
SW 1/4 of SE 1/4 of Section <u>33</u> , T <u>28</u> N, R <u>19</u> W		County <u>St. Croix</u>		Civil Town/City or Village <u>Troy</u>	
Facility ID		County Code <u>56</u>			

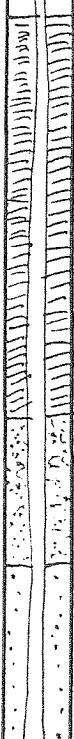
Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
			1	0 - 3.5' SILTY CLAY										
			2	Black grades to dark yellow brown, 10% sand, cohesive, high plasticity, moist (TOPSOIL / SUBSOIL, CL)	CL									
1	2.0 / 2.1 1.6 / 2.1		3	3.5-4.5' CLAYEY SAND										
			4	Cohesive, moist, low plasticity, Dark yellow brown. (SUBSOIL / ICE CONTACT DEPOSIT ?, SC)	SC									
			5	4.5 - 18' POORLY GRADED SAND	SP/									
			6	WITH GRAVEL 4.5 - 8' and 15-18', the rest has less gravel. Sand dominantly medium grained, quartz, loose, moist. Gravel to 1	GP									
2	2.0 / 3.5 1.5 / 5.8		7	inch diameter, subrounded carbonates, granite. (OUTWASH/ ICE CONTACT DEPOSITS ? SP, SP/GP)										
			8											
			9	18-21.8' POORLY GRADED SAND	SP									
			10	Fine to medium grained, light brown, loose, no gravel, quartz (OUTWASH, SP)										
			11											
			12											

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

Signature Kenneth A. Elmer Firm Alpha Terra Science, Inc.

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion 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.

Sample ID and Type	Length Au. & 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	
	2.0/3.5 1.8 5 6		13 14		SP									
	2.0/3.5 1.3 8 11		15 16 17		SP/ GP									
	2.0/4.6 1.5 5, 8		18 19 20		SP									
	2.0/8.6 2, 13		21 22 23	21.8 - 25 WEATHERED BEDROCK Sand fine, white to orange, quartz, loose.  (WEATHERED ST. PETER SANDSTONE)	WEATHERED BEDROCK									
	0.8/8 0.8 50/3"		24 25	Auger to 25', Air Rotary Drill 25 to 62.5' Grab samples from cuttings 30', 35', 40', 45', 50', 55', 60'										
			26 27 28 29 30 31 32	25.5-47' SANDSTONE fine sand, quartz, white to pale yellow brown, loosely cemented. (ST. PETER SANDSTONE)  Penetration rate : 7 min 25' to 40', 5 min 40-55'	ST  P E T E R  S S									

Sample	Length An. & Covered (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	
			33		S T  P E S T R  S A N D S T O N E		B E N T O N I S S A N D  S C R E Y							
			34											
			35											
			36											
			37											
			38											
			39											
			40											
			41											
			42											
			43											
			44		D O L O M I T E									
			45											
			46											
			47	47-62' DOLOMITE / DOLOMITIC SANDSTONE										
			48	Gray Brown, chips of cemented sand grains and dolomite, reaction with acid, slightly harder										
			49	(PRAIRIE DU CHEIN DOLOMITE)										
			50	Water level Approximately 56'										
			51											
			52	62' END OF BORING										



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

Page 1 of 4

Facility/Project Name <u>Nelson Farm Supply</u>			License/Permit/Monitoring Number		Boring Number <u>MW-3</u>
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: Last Name: <u>Environmental Drilling Services, Inc.</u>			Date Drilling Started <u>04/09/2003</u> m m d d y y y y	Date Drilling Completed <u>04/09/2003</u> m m d d y y y y	Drilling Method <u>6 1/2" HSA 25.5'</u> <u>6" AIR ROSSARY TO 60'</u>
WI Unique Well No.	DNR Well ID No.	Well Name <u>MW-3</u>	Final Static Water Level Feet MSL	Surface Elevation Feet MSL	Borehole Diameter <u>10" to 6" inches</u>
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input type="checkbox"/> State Plane <u>N</u> , <u>E</u> S/C/N			Lat <u>0</u> ' " Long <u>0</u> ' "	Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
SW 1/4 of <u>SE</u> 1/4 of Section <u>33</u> , T <u>28</u> N, R <u>19</u> W					
Facility ID		County <u>St. Croix</u>	County Code <u>56</u>	Civil Town/City or Village <u>Troy</u>	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (below ground surface)	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	
			1											
			2											
			3	0 - 3' NO SAMPLES										
1	2' / 2'	1 / 2 / 3	4	3 - 3.5' SANDY CLAYEY SILT Cohesive, moist, nonplastic to low plasticity. Dark brown. (SUBSOIL, ML)	ML									
			5		SM									
			6	3.5 - 7.5' SILTY SAND										
2	2' / 2'	3 / 5 / 6	7	Brown, well graded, decreasing silt and increasing gravel with depth, Loose. (ICE CONTACT DEPOSITS ?, SM)										
			8		SW									
			9	7.5 - 22.5' WELL GRADED SAND										
3	2' / 1.5'	4 / 5 / 7	10	Sand fine to coarse grained, quartz, loose, light brown. Gravel 10% 9 to 11' and 18- 19', 30 to 50% from 12 - 13.25' and 21 - 22.5', Silty clay 19-19.8', high plasticity, soft. (OUTWASH/ ICE CONTACT DEPOSITS ? SW, SW/GW, CL)	SW									
			11		SW									
			12											

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

Signature Kenneth A. EBBOTT \* Firm Alpha Terra Science, Inc.

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion 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. \* LOGGED BY JOHN MARTIN. NOTES INTERPRETED BY KEN EBBOTT

Sample Number and Type	Length Au. & 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	
4	2' 1.5	2 3 3 4	13		Sw/ Gw									
			14											
			15											
5	2' 1.5	2 3 3 4	16		Sw									
			17											
			18											
6	2' 1.5	2 2 2 2	19											
			20		CL									
			21		Sw									
	2' 1.5	2 3 4 7	22		Sw/ Gw									
			23											
			24	22.5 - 25.5 WEATHERED BEDROCK Sand fine, white to orange, loose.	WEATHERED BEDROCK									
	1.5 1.25	12 12 50 over 3'	25	(WEATHERED ST. PETER SANDSTONE)										
			26	Auger to 25.5', Air Rotary Drill 25.5 to 62.5' Grab samples from cuttings 30', 35', 40', 45', 50', 55', 60'	ST PETER SANDSTONE									
			27											
			28	25.5-49' SANDSTONE fine sand, quartz, white to orange to 40', light brown to 49', loosely cemented, some white rounded coarse grains of sand from 40 to 49'. (ST. PETER SANDSTONE)										
			29											
			30											
			31	Penetration rate : 3-4 min from 25.5 - 40'										
			32											

[illegible]



Sample Length Au. & 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	
		53	WATER LEVEL $\nabla$	D U  C H E I N  D O L O M I T E									
		54											
		55											
		56											
		57											
		58											
		59											
		60											
		61											
		62											
		63											
		64											
		65											
		66											
		67											
		68											
		69											
		70											
		71											
		72											

40  
-4 ft  
70'

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

Page 1 of 4

Facility/Project Name <u>Nelson Farm Supply</u>		License/Permit/Monitoring Number		Boring Number <u>MW-4</u>	
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: Last Name:		Date Drilling Started <u>04/07/2003</u> m m d d y y y y	Date Drilling Completed <u>04/07/2003</u> m m d d y y y y	Drilling Method <u>6" HY to 26 ft</u> <u>6" AIR ROTARY TO 70'</u>	
Firm: <u>Environmental Drilling Services, Inc.</u>		Final Static Water Level Feet MSL		Surface Elevation Feet MSL	
WI Unique Well No.	DNR Well ID No.	Well Name <u>MW-4</u>		Borehole Diameter <u>6" to 10" inches</u>	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input type="checkbox"/>		Lat <u>0</u> ' "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
State Plane <u>N</u> , <u>E S/C/N</u>		Long <u>0</u> ' "		Feet <u>0</u> Feet <u>0</u>	
<u>SW 1/4 of SE 1/4 of Section 33, T 28 N, R 19 W</u>		County <u>St. Croix</u>		Civil Town/City or Village <u>Troy</u>	
Facility ID		Country Code <u>5 6</u>			

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	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	
				<u>Uphill near building</u>										
			1	0 - 2.3' SILTY CLAY	CL									
			2	Black to dark brown, high plasticity, moist (FILL, CL)										
		22	3	2-3-3.0 SILTY CLAY	CL									
		23	4	High Plasticity, dark yellow brown (FILL, CL)										
		1.3 3,4	5	3.0-21' POORLY GRADED SAND										
		5,6	6	Sand fine to medium grained, quartz, moist, cohesive and clayey to 6', low plasticity. Loose 6' to 21'. Dark yellow brown to 6', brown to 12', light brown to 21'. Gravel 5 to 10% from 12 to 21', angular dolomits, sandstone; rounded quartz, siltstone. Silt layer 19.6 to 19.8'. (OUTWASH/ ICE CONTACT DEPOSITS ? SP)	SP									
		4,4	8											
		4,5	9											
		2,0 6,7	10											
		7,8	11											
			12											

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

Signature: Kenneth A. Stettin Firm: Alpha Terra Science, Inc.

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Number and Type	Sample Length Au. & 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	
3	4.0/	3, 3	13		SP									
		3, 5	14											
		2.1 5, 6	15											
		7, 11	16											
			17											
			18											
	2.0/	5, 6	19											
	1.8	3, 4	20											
			21											
	2.0/	7, 3	22	21 - 26' SAND AND GRAVEL / WEATHERED BEDROCK	WEATHERED									
	.5	5, 10	23	Sand fine to coarse, gravel to >1", subrounded to angular. Dolomite dominant, but also red quartzite, black gabbro?. Dark yellow brown and orange brown, pale gray brown silt layer 21.5-22'.										
			24	(ICE CONTACT DEPOSITS / WEATHERED ST. PETER SANDSTONE, SW/GW)	SANDSTONE									
	2.0/	22 11	25											
	1.5	5, 8	26	Auger to 26', Air Rotary Drill 26 to 70' Grab samples from cuttings 30', 40', 45', 50', 55', 60', 65', 70'	ST PETER									
			27											
			28	26-50' SANDSTONE fine sand, quartz, light brown to light yellow brown, loosely cemented (ST. PETER SANDSTONE)	SANDSTONE									
			29											
			30	Penetration rates : 8 minutes 40' to 60'; 6 min 60' to 70'										
			31											
			32											

MW-3

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 An. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200		
			33		ST										
			34		PETER										
			35		SAND										
			36		STONE										
			37												
			38												
			39												
			40												
			41												
			42												
			43												
			44												
			45												
			46		50-70' DOLOMITE / DOLOMITIC SANDSTONE										
			47		Brown to gray brown, chips of cemented sand grains and dolomite, no reaction with acid on tested grains, but due to color change and increased cementation, infer dolomite or dolomitic sandstone (PRAIRIE DU CHEIN DOLOMITE)										
			48												
			49		Water level Approximately 50.4'										
			50		70' END OF BORING										
			51												
			52												

100  
4-30  
E/

MW-3

Sample	Length An. & 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	
			53		DOLO-									
			54		MITE/									
			55		DOLOMITIC									
			56		SAND									
			57		STONE									
			58											
			59		PRAIRIE									
			60		DU									
			61		CHEIN									
			62											
			63											
			64											
			65											
			66											
			67											
			68											
			69											
			70											
			71											
			72											

MW4

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

Page 1 of 4

City/Project Name <u>Nelson Farm Supply</u>			License/Permit/Monitoring Number		Boring Number <u>MW-5</u>
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: _____ Last Name: _____			Date Drilling Started <u>04/09/2003</u>	Date Drilling Completed <u>04/09/2003</u>	Drilling Method <u>6" HSA to 20'</u> <u>6" AIR ROW to 62'</u>
Firm: <u>Environmental Drilling Services, Inc.</u>			Final Static Water Level _____ Feet MSL	Surface Elevation _____ Feet MSL	Borehole Diameter <u>10" to 6" inches</u>
WI Unique Well No.	DNR Well ID No.	Well Name			
		<u>MW-5</u>			
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input type="checkbox"/>			Local Grid Location		
State Plane _____ N, _____ E S/C/N			_____ N _____ E _____ S _____ W		
SW 1/4 of SE 1/4 of Section <u>33</u> , T <u>28</u> N, R <u>19</u> W			Long _____ Feet _____ Feet _____ Feet		
Facility ID	County	County Code	Civil Town/City or Village		
	<u>St. Croix</u>	<u>56</u>	<u>Troy</u>		

Sample				Depth in Feet (Below ground surface)	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)	Blow Counts	Compressive Strength							Moisture Content	Liquid Limit	Plasticity Index	P 200		
					30' N 70' W of Post 3 br SW corner										
					10:30 START										
				1	0 - 3' SILTY CLAY Not directly observed, inferred (NATIVE TOPSOIL / SUBSOIL, CL)	CL									
				2	3-3.8' SILTY CLAYEY SAND, Fine to medium, dominantly fine, cohesive, low plasticity, dark brown.										
	2.2/1.5	3.4/4.4		3	(ICE CONTACT DEPOSIT ? SP-CL)										
1				4	3.8-22.8' POORLY GRADED SAND WITH GRAVEL 3.8 - 8' and 18-22.8', the rest has less gravel. Sand dominantly fine grained, quartz, loose, subrounded. Gravel subrounded carbonates, siltstone, sandstone.	SP/ GP									
				5	(OUTWASH ? SP, SP/GP)										
				6											
2	2.0/2.0	4.5/5.8		7											
				8											
				9											
3	2.2/1.7	4.5/6.8		10		SP									
				11											
				12											

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

Signature Kevin A. Smith Firm Alpha Terra Science, Inc.

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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 Au. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
4	2.2/ 1.8	5, 5, 9, 13	13 14 15 16 17		SP									
5	2.0/		18 19 20 21	22.8-23' WEATHERED BEDROCK Orange / White fine sandstone, quartz, loose. (ST. PETER SANDSTONE)  Auger to 20', Air Rotary Drill 20 to 62' Grab samples from cuttings 30', 35', 40', 45', 50'	SP/ GP									
6	2.0/ 1.7	10, 9, 10, 14	22 23	23-53' SANDSTONE fine sand, quartz, orange / light brown to 40', light brown to white, some larger round grains, 40 to 53' (ST. PETER SANDSTONE)	WEATHERED SS  WEATHERED SS									
	2.0/ 1.5	9, 9, 10, 18	24 25 26 27 28 29 30 31 32	Penetration rate : 4 minutes 22 to 40'	ST. P E T E R  S A N D  S T O N E									





[illegible]

Facility/Project Name Nelson Farm Supply Local Grid Location of Well \_\_\_\_\_ ft. ☐ N. \_\_\_\_\_ ft. ☐ E. \_\_\_\_\_ ft. ☐ S. \_\_\_\_\_ ft. ☐ W.

Facility License, Permit or Monitoring Number \_\_\_\_\_ Grid Origin Location \_\_\_\_\_

Lat. \_\_\_\_\_ Long. \_\_\_\_\_ or \_\_\_\_\_

St. Plane \_\_\_\_\_ ft. N. \_\_\_\_\_ ft. E.

Section Location of Waste/Source \_\_\_\_\_

1/4 of \_\_\_\_\_ 1/4 of Sec. \_\_\_\_\_ T. \_\_\_\_\_ N. R. \_\_\_\_\_ ☐ E. ☐ W.

Location of Well Relative to Waste/Source \_\_\_\_\_

u ☐ Upgradient s ☐ Sidegradient

d ☐ Downgradient n ☐ Not Known

Well Name MW-1

Wis. Unique Well Number 124573 DNR Well Number \_\_\_\_\_

Date Well Installed 04/08/03

Well Installed By: (Person's Name and Firm) E.D.S. Craig Plant

A. Protective pipe, top elevation \_\_\_\_\_ ft. MSL

B. Well casing, top elevation \_\_\_\_\_ ft. MSL

C. Land surface elevation \_\_\_\_\_ ft. MSL

D. Surface seal, bottom \_\_\_\_\_ ft. MSL or 1.0 ft.

12. USCS classification of soil near screen:  
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐  
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐  
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☒ 30  
Hollow Stem Auger ☒ 41  
Other ☐

15. Drilling fluid used: Water ☐ 02 Air ☒ 01  
Drilling Mud ☐ 03 None ☐ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe \_\_\_\_\_

Source of water (attach analysis): \_\_\_\_\_

E. Bentonite seal, top \_\_\_\_\_ ft. MSL or 340 ft.

F. Fine sand, top \_\_\_\_\_ ft. MSL or 390 ft.

G. Filter pack, top \_\_\_\_\_ ft. MSL or 410 ft.

H. Screen joint, top \_\_\_\_\_ ft. MSL or 430 ft.

I. Well bottom \_\_\_\_\_ ft. MSL or 530 ft.

J. Filter pack, bottom \_\_\_\_\_ ft. MSL or 600 ft.

K. Borehole, bottom \_\_\_\_\_ ft. MSL or 600 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.37 in.

N. I.D. well casing 1.94 in.

1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:  
a. Inside diameter: 4.0 in.  
b. Length: 2.0 ft.  
c. Material: Steel ☒ 04  
Other ☐

d. Additional protection? ☐ Yes ☒ No  
If yes, describe: \_\_\_\_\_

3. Surface seal: Bentonite ☒ 30  
Concrete ☐ 01  
Other ☐

4. Material between well casing and protective pipe: Bentonite ☒ 30  
Annular space seal ☐

5. Annular space seal: a. Granular Bentonite ☐ 33  
b. \_\_\_\_\_ Lbs/gal mud weight \_\_\_\_\_ Bentonite-sand slurry ☒ 35  
c. \_\_\_\_\_ Lbs/gal mud weight \_\_\_\_\_ Bentonite slurry ☐ 31  
d. \_\_\_\_\_ % Bentonite \_\_\_\_\_ Bentonite cement grout ☐ 50  
e. \_\_\_\_\_ Ft. volume added for any of the above  
f. How installed: Tremie ☐ 01  
Tremie pumped ☒ 02  
Gravity ☐ 08

6. Bentonite seal: a. Bentonite granules ☐ 33  
b. ☐ 1/4 in. ☒ 1/8 in. ☐ 1/2 in. Bentonite pellets ☐ 32  
c. \_\_\_\_\_ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size  
a. 40/60 Badger  
b. Volume added 1 50# BAG

8. Filter pack material: Manufacturer, product name and mesh size  
a. 20/40 Badger  
b. Volume added 13 50# BAGS \*

9. Well casing: Flush threaded PVC schedule 40 ☐ 23  
Flush threaded PVC schedule 80 ☒ 24  
Other ☐

10. Screen material: PVC  
a. Screen type: Factory cut ☒ 11  
Continuous slot ☐ 01  
Other ☐

b. Manufacturer T.O. Co  
c. Slot size: 0.010 in.  
d. Slotted length: 10.0 ft.

11. Backfill material (below filter pack): None ☐ 14  
20/40 BADGER \* Other ☒

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

Signature Craig Plant Firm E.D.S.

\* 13 BAGS TOTAL - BELOW WELL TO TOP OF SCREEN

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Facility/Project Name <u>Nelson Farm Supply</u>	Local Grid Location of Well _____ ft. <input type="checkbox"/> N. _____ ft. <input type="checkbox"/> E. _____ ft. <input type="checkbox"/> S. _____ ft. <input type="checkbox"/> W.	Well Name <u>MW-2</u>
Facility License, Permit or Monitoring Number _____	Grid Origin Location Lat. _____ Long. _____ or _____	Wis. Unique Well Number <u>01572</u> DNR Well Number _____
Type of Well Water Table Observation Well <input checked="" type="checkbox"/> 1 Piezometer <input type="checkbox"/> 2	St. Plane _____ ft. N. _____ ft. E.	Date Well Installed <u>04/08/03</u> m m d d y y
Distance Well Is From Waste/Source Boundary _____ ft.	Section Location of Waste/Source 1/4 of _____ 1/4 of Sec. _____ T. _____ N. R. _____ <input type="checkbox"/> E. <input type="checkbox"/> W.	Well Installed By: (Person's Name and Firm) <u>E.D.S.</u> <u>Craig Plant</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	

A. Protective pipe, top elevation \_\_\_\_\_ ft. MSL  
B. Well casing, top elevation \_\_\_\_\_ ft. MSL  
C. Land surface elevation \_\_\_\_\_ ft. MSL  
D. Surface seal, bottom \_\_\_\_\_ ft. MSL or 1.0 ft.

12. USCS classification of soil near screen:  
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐  
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐  
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☒ 30  
Hollow Stem Auger ☒ 41  
Other ☐

15. Drilling fluid used: Water ☐ 02 Air ☒ 01  
Drilling Mud ☐ 03 None ☐ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe \_\_\_\_\_

7. Source of water (attach analysis):  
\_\_\_\_\_

E. Bentonite seal, top \_\_\_\_\_ ft. MSL or 430 ft.

F. Fine sand, top \_\_\_\_\_ ft. MSL or 480 ft.

G. Filter pack, top \_\_\_\_\_ ft. MSL or 500 ft.

H. Screen joint, top \_\_\_\_\_ ft. MSL or 520 ft.

I. Well bottom \_\_\_\_\_ ft. MSL or 620 ft.

J. Filter pack, bottom \_\_\_\_\_ ft. MSL or 625 ft.

K. Borehole, bottom \_\_\_\_\_ ft. MSL or 635 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.37 in.

N. I.D. well casing 1.94 in.

1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:

a. Inside diameter: 4.0 in.

b. Length: 2.0 ft.

c. Material: Steel ☒ 04

Other ☐

d. Additional protection? ☐ Yes ☒ No

If yes, describe: \_\_\_\_\_

3. Surface seal: Bentonite ☒ 3.0

Concrete ☐ 0.1

Other ☐

4. Material between well casing and protective pipe:

Bentonite ☒ 3.0

Annular space seal ☐

Other ☐

5. Annular space seal: a. Granular Bentonite ☐ 3.3

b. \_\_\_\_\_ Lbs/gal mud weight \_\_\_\_\_ Bentonite-sand slurry ☒ 3.5

c. \_\_\_\_\_ Lbs/gal mud weight \_\_\_\_\_ Bentonite slurry ☐ 3.1

d. \_\_\_\_\_ % Bentonite \_\_\_\_\_ Bentonite cement grout ☐ 5.0

e. \_\_\_\_\_ Ft<sup>3</sup> volume added for any of the above

f. How installed: Tremie ☐ 0.1

Tremie pumped ☒ 0.2

Gravity ☐ 0.8

6. Bentonite seal: a. Bentonite granules ☐ 3.3

b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite pellets ☐ 3.2

c. \_\_\_\_\_ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size

a. 40/60 Badger

b. Volume added 1 50# BAG

8. Filter pack material: Manufacturer, product name and mesh size

a. 20/40 Badger

b. Volume added 5 50# BAGS

9. Well casing: Flush threaded PVC schedule 40 ☐ 2.3

Flush threaded PVC schedule 80 ☒ 2.4

Other ☐

10. Screen material: PVC

a. Screen type: Factory cut ☒ 1.1

Continuous slot ☐ 0.1

Other ☐

b. Manufacturer L.M. CO

c. Slot size: 0.010 in.

d. Slotted length: 10.0 ft.

11. Backfill material (below filter pack): None ☒ 1.4

Other ☐

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

Signature Craig Plant

Firm E.D.S.

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Facility/Project Name

Nelson Farm Supply  
Facility License, Permit or Monitoring Number

Local Grid Location of Well

Grid Origin Location  
Lat. \_\_\_\_\_ Long. \_\_\_\_\_ or  
St. Plane \_\_\_\_\_ ft. N. \_\_\_\_\_ ft. E.  
Section Location of Waste/Source  
1/4 of \_\_\_\_\_ 1/4 of Sec. \_\_\_\_\_ T. \_\_\_\_\_ N. R. \_\_\_\_\_ E. W.  
Location of Well Relative to Waste/Source  
u ☐ Upgradient s ☐ Sidegradient  
d ☐ Downgradient n ☐ Not Known

Well Name

MW-3  
Wis. Unique Well Number 01575 DNR Well Number  
Date Well Installed 04/09/03  
Well Installed By: (Person's Name and Firm)  
E.D.S.  
Craig Plant

Type of Well Water Table Observation Well ☒ 1  
Piezometer ☐ 2

Distance Well Is From Waste/Source Boundary \_\_\_\_\_ ft.

Is Well A Point of Enforcement Std. Application?  
☐ Yes ☐ No

A. Protective pipe, top elevation \_\_\_\_\_ ft. MSL

B. Well casing, top elevation \_\_\_\_\_ ft. MSL

C. Land surface elevation \_\_\_\_\_ ft. MSL

D. Surface seal, bottom \_\_\_\_\_ ft. MSL or 1.0 ft.

12. USCS classification of soil near screen:  
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐  
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐  
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☒ 30  
Hollow Stem Auger ☒ 41  
Other ☐

15. Drilling fluid used: Water ☐ 02 Air ☒ 01  
Drilling Mud ☐ 03 None ☐ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe \_\_\_\_\_  
source of water (attach analysis):

E. Bentonite seal, top \_\_\_\_\_ ft. MSL or 430 ft.

F. Fine sand, top \_\_\_\_\_ ft. MSL or 480 ft.

G. Filter pack, top \_\_\_\_\_ ft. MSL or 500 ft.

H. Screen joint, top \_\_\_\_\_ ft. MSL or 530 ft.

I. Well bottom \_\_\_\_\_ ft. MSL or 630 ft.

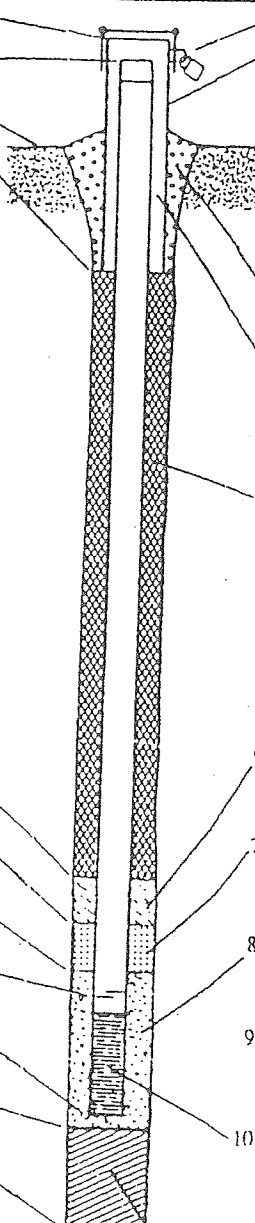
J. Filter pack, bottom \_\_\_\_\_ ft. MSL or 625 ft.

K. Borehole, bottom \_\_\_\_\_ ft. MSL or 635 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.37 in.

N. I.D. well casing 1.94 in.



1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:

a. Inside diameter: 4.2 in.

b. Length: 2.2 ft.

c. Material: Steel ☒ 04  
Other ☐

d. Additional protection? ☐ Yes ☒ No

If yes, describe: \_\_\_\_\_

3. Surface seal: Bentonite ☒ 30  
Concrete ☐ 01  
Other ☐

4. Material between well casing and protective pipe: Bentonite ☒ 30  
Annular space seal ☐

5. Annular space seal: a. Granular Bentonite ☐ 33  
b. \_\_\_\_\_ Lbs/gal mud weight \_\_\_\_\_ Bentonite-sand slurry ☒ 35  
c. \_\_\_\_\_ Lbs/gal mud weight \_\_\_\_\_ Bentonite slurry ☐ 31  
d. \_\_\_\_\_ % Bentonite \_\_\_\_\_ Bentonite cement grout ☐ 50  
e. \_\_\_\_\_ Ft<sup>3</sup> volume added for any of the above  
f. How installed: Tremie ☐ 01  
Tremie pumped ☒ 02  
Gravity ☐ 08

6. Bentonite seal: a. Bentonite granules ☐ 33  
b. ☐ 1/4 in. ☒ 1/8 in. ☐ 1/2 in. Bentonite pellets ☐ 32  
c. \_\_\_\_\_ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size  
a. 40/60 Badger  
b. Volume added NR ft<sup>3</sup>

8. Filter pack material: Manufacturer, product name and mesh size  
a. 20/40 Badger  
b. Volume added NR ft<sup>3</sup>

9. Well casing: Flush threaded PVC schedule 40 ☐ 23  
Flush threaded PVC schedule 80 ☒ 24  
Other ☐

10. Screen material: PVC

a. Screen type: Factory cut ☒ 11  
Continuous slot ☐ 01  
Other ☐

b. Manufacturer Tim Co

c. Slot size: 0.010 in.

d. Slotted length: 10.0 ft.

11. Backfill material (below filter pack): None ☒ 14  
Other ☐

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

Signature Craig Plant

Firm E.D.S.

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$1000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Facility/Project Name

Nelson Farm Supply

Facility License, Permit or Monitoring Number

Local Grid Location of Well

Grid Origin Location

Lat. \_\_\_\_\_ Long. \_\_\_\_\_ or

St. Plane \_\_\_\_\_ ft. N. \_\_\_\_\_ ft. E.

Section Location of Waste/Source

1/4 of \_\_\_\_\_ 1/4 of Sec. \_\_\_\_\_ T. \_\_\_\_\_ N. R. \_\_\_\_\_

Location of Well Relative to Waste/Source

u ☐ Upgradient s ☐ Sidegradient  
d ☐ Downgradient n ☐ Not Known

Well Name

MW-4

Wis. Unique Well Number DNR Well Number

Date Well Installed

04/07/03  
m m d d y y

Well Installed By: (Person's Name and Firm)

E.D.S.

Craig Plant

A. Protective pipe, top elevation \_\_\_\_\_ ft. MSL

B. Well casing, top elevation \_\_\_\_\_ ft. MSL

C. Land surface elevation \_\_\_\_\_ ft. MSL

D. Surface seal, bottom \_\_\_\_\_ ft. MSL or 1.0 ft.

12. USCS classification of soil near screen:

GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐  
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐  
Bedrock ☐13. Sieve analysis attached? ☐ Yes ☐ No14. Drilling method used: Rotary ☒ 30  
Hollow Stem Auger ☒ 41  
Other ☐15. Drilling fluid used: Water ☐ 02 Air ☒ 01  
Drilling Mud ☐ 03 None ☐ 9916. Drilling additives used? ☐ Yes ☒ No

Describe \_\_\_\_\_

Source of water (attach analysis): \_\_\_\_\_

E. Bentonite seal, top \_\_\_\_\_ ft. MSL or 380 ft.

F. Fine sand, top \_\_\_\_\_ ft. MSL or 430 ft.

G. Filter pack, top \_\_\_\_\_ ft. MSL or 450 ft.

H. Screen joint, top \_\_\_\_\_ ft. MSL or 470 ft.

I. Well bottom \_\_\_\_\_ ft. MSL or 570 ft.

J. Filter pack, bottom \_\_\_\_\_ ft. MSL or 700 ft.

K. Borehole, bottom \_\_\_\_\_ ft. MSL or 700 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 23.7 in.

N. I.D. well casing 1.94 in.

1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:

a. Inside diameter: 4.2 in.

b. Length: 2.0 ft.

c. Material: Steel ☒ 04  
Other ☐d. Additional protection? ☐ Yes ☒ No

If yes, describe: \_\_\_\_\_

3. Surface seal:

Bentonite ☒ 30Concrete ☐ 01Other ☐

4. Material between well casing and protective pipe:

Bentonite ☒ 30Annular space seal ☐Other ☐

5. Annular space seal:

a. Granular Bentonite ☐ 33b. \_\_\_\_\_ Lbs/gal mud weight \_\_\_\_\_ Bentonite-sand slurry ☒ 35c. \_\_\_\_\_ Lbs/gal mud weight \_\_\_\_\_ Bentonite slurry ☐ 31d. \_\_\_\_\_ % Bentonite \_\_\_\_\_ Bentonite cement grout ☐ 50e. \_\_\_\_\_ Ft<sup>3</sup> volume added for any of the above

f. How installed:

Tremie ☐ 01Tremie pumped ☒ 02Gravity ☐ 08

6. Bentonite seal:

b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite pellets ☐ 32c. \_\_\_\_\_ Other ☐

7. Fine sand material: Manufacturer, product name &amp; mesh size

a. 40/60 Badger

b. Volume added 1 50# BAG

8. Filter pack material: Manufacturer, product name and mesh size

a. 20/40 Badger

b. Volume added 4 50# BAGS

9. Well casing: Flush threaded PVC schedule 40 ☐ 23Flush threaded PVC schedule 80 ☒ 24Other ☐

10. Screen material: PVC

a. Screen type:

Factory cut ☒ 11Continuous slot ☐ 01Other ☐

b. Manufacturer T.M. CO

c. Slot size: 0.010 in.

d. Slotted length: 10.0 ft.

11. Backfill material (below filter pack):

6 50# BAGS 20/40 BADGER

None ☒ 14Other ☒

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

Signature \_\_\_\_\_ Firm E.D.S.

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Facility/Project Name  
Nelson Farm Supply  
Facility License, Permit or Monitoring Number

Local Grid Location of Well  
\_\_\_\_\_ ft. ☐ N. \_\_\_\_\_ ft. ☐ E.  
\_\_\_\_\_ ft. ☐ S. \_\_\_\_\_ ft. ☐ W.  
Grid Origin Location  
Lat. \_\_\_\_\_ Long. \_\_\_\_\_ or  
St. Plane \_\_\_\_\_ ft. N. \_\_\_\_\_ ft. E.

Well Name  
MW-5  
Wis. Unique Well Number 04109103 DNR Well Number

Type of Well Water Table Observation Well ☒ 1  
Piezometer ☐ 2

Section Location of Waste/Source  
1/4 of \_\_\_\_\_ 1/4 of Sec. \_\_\_\_\_ T. \_\_\_\_\_ N. R. \_\_\_\_\_ E. W.

Date Well Installed  
04/09/03  
m m d d y y

Distance Well Is From Waste/Source Boundary  
\_\_\_\_\_ ft.

Location of Well Relative to Waste/Source  
u ☐ Upgradient s ☐ Sidegradient  
d ☐ Downgradient n ☐ Not Known

Well Installed By: (Person's Name and Firm)  
E.D.S.

Is Well A Point of Enforcement Std. Application?  
☐ Yes ☐ No

Craig Plant

A. Protective pipe, top elevation \_\_\_\_\_ ft. MSL  
B. Well casing, top elevation \_\_\_\_\_ ft. MSL  
C. Land surface elevation \_\_\_\_\_ ft. MSL  
D. Surface seal, bottom \_\_\_\_\_ ft. MSL or 1.0 ft.

12. USCS classification of soil near screen:  
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐  
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐  
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☒ 30  
Hollow Stem Auger ☒ 41  
Other ☐

15. Drilling fluid used: Water ☐ 02 Air ☒ 01  
Drilling Mud ☐ 03 None ☐ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe \_\_\_\_\_  
Source of water (attach analysis):

E. Bentonite seal, top \_\_\_\_\_ ft. MSL or 43.0 ft.

F. Fine sand, top \_\_\_\_\_ ft. MSL or 48.0 ft.

G. Filter pack, top \_\_\_\_\_ ft. MSL or 50.0 ft.

H. Screen joint, top \_\_\_\_\_ ft. MSL or 52.0 ft.

I. Well bottom \_\_\_\_\_ ft. MSL or 62.0 ft.

J. Filter pack, bottom \_\_\_\_\_ ft. MSL or 62.5 ft.

K. Borehole, bottom \_\_\_\_\_ ft. MSL or 62.5 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.37 in.

N. I.D. well casing 1.94 in.

1. Cap and lock? ☒ Yes ☐ No  
2. Protective cover pipe:  
a. Inside diameter: 4.0 in.  
b. Length: 7.0 ft.  
c. Material: Steel ☒ 04  
Other ☐  
d. Additional protection? ☐ Yes ☒ No  
If yes, describe: \_\_\_\_\_

3. Surface seal: Bentonite ☒ 30  
Concrete ☐ 01  
Other ☐

4. Material between well casing and protective pipe:  
Bentonite ☒ 30  
Annular space seal ☐  
Other ☐

5. Annular space seal:  
a. Granular Bentonite ☐ 33  
b. \_\_\_\_\_ Lbs/gal mud weight \_\_\_\_\_ Bentonite-sand slurry ☒ 35  
c. \_\_\_\_\_ Lbs/gal mud weight \_\_\_\_\_ Bentonite slurry ☐ 31  
d. \_\_\_\_\_ % Bentonite \_\_\_\_\_ Bentonite cement grout ☐ 50  
e. \_\_\_\_\_ Ft<sup>3</sup> volume added for any of the above  
f. How installed: Tremie ☐ 01  
Tremie pumped ☒ 02  
Gravity ☐ 08

6. Bentonite seal:  
a. Bentonite granules ☐ 33  
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite pellets ☐ 32  
c. \_\_\_\_\_ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size  
a. 40/60 Badger  
b. Volume added NR ft<sup>3</sup>

8. Filter pack material: Manufacturer, product name and mesh size  
a. 20/40 Badger  
b. Volume added NR ft<sup>3</sup>

9. Well casing: Flush threaded PVC schedule 40 ☐ 23  
Flush threaded PVC schedule 80 ☒ 24  
Other ☐

10. Screen material: PVC  
a. Screen type: Factory cut ☒ 11  
Continuous slot ☐ 01  
Other ☐

b. Manufacturer T.D. CO  
c. Slot size: 0.010 in.  
d. Slotted length: 10.0 ft.

11. Backfill material (below filter pack): None ☒ 14  
Other ☐

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

Signature Craig Plant

Firm E.D.S.

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Route to: Watershed/Wastewater ☐

Waste Management ☐

Remediation/Redevelopment ☐

Other ☒ DATCP

Project Name <u>Nelson Farm Supply</u>	County Name <u>St Croix</u>	Well Name <u>MW-2</u>
City License, Permit or Monitoring Number	County Code <u>56</u>	Wis. Unique Well Number
		DNR Well ID Number

Is this well be purged dry? ☒ Yes ☐ No

Well development method

- ☒ surged with bailer and bailed ☒ 41
- ☐ surged with bailer and pumped ☐ 61
- ☐ surged with block and bailed ☐ 42
- ☐ surged with block and pumped ☐ 62
- ☐ surged with block, bailed and pumped ☐ 70
- ☐ compressed air ☐ 20
- ☐ bailed only ☐ 10
- ☐ pumped only ☐ 51
- ☐ pumped slowly ☐ 50
- Other ☐

Time spent developing well 60 min.

Depth of well (from top of well casing) 64.2 ft.

Inside diameter of well 2.0 in.

Volume of water in filter pack and well 4.2 gal.

Volume of water removed from well 16.0 gal.

Volume of water added (if any) 0 gal.

Force of water added                     

Analysis performed on water added? ☐ Yes ☐ No  
If yes, attach results

Additional comments on development:

Purged dry with bailer 3x, goes dry after about 2-6 gallons each time

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. <u>56.4</u> ft.	<u>57.57</u> ft.
Date	b. <u>04/08/2003</u> m m d d y y y y	<u>05/20/2003</u> m m d d y y y y
Time	c. <u>13:03</u> <input type="checkbox"/> a.m. <input checked="" type="checkbox"/> p.m.	<u>08:08</u> <input type="checkbox"/> a.m. <input checked="" type="checkbox"/> p.m.

12. Sediment in well bottom 1.0 inches

Water clarity	Clear <input type="checkbox"/> 10	Clear <input checked="" type="checkbox"/> 20
	Turbid <input checked="" type="checkbox"/> 15	Turbid <input type="checkbox"/> 25
(Describe)	<u>pale gray brown</u>	<u>clear</u>
	<u>trace sediment</u>	<u>no sediment</u>

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids                      mg/l

15. COD                      mg/l

16. Well developed by: Name (first, last) and Firm

First Name: JOHN Last Name: MARTIN

Firm: Alpha Terra Science, Inc.

Name and Address of Facility Contact/Owner/Responsible Party

Name: Dwight Nelson

Firm: Nelson Farm Supply

Address: 8 Glendale Drive

State/Zip: River Falls WI 54022

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

Signature: Kendrick Ebbott

Print Name: Kendrick Ebbott

Firm: Alpha Terra Science, Inc.

# TABLE B : HYDRAULIC CONDUCTIVITY TESTING RESULTS

Nelson Farm Supply ACCP Investigation, Riuver Falls, WI

TEST RESULTS				
Well	Hvorslev (ft/min)	Bouwer and Rice (ft/min)	Saturated Interval and Screen Length (feet)	Comments
MW-1	0.00949	0.00604	8.82	
MW-2	0.00156	0.00108	6.65	
MW-3	0.00125	0.00100	7.76	
				Poor Data, Insufficient Drawdown
MW-4	0.00137	0.00106	6.47	
MW-5	0.00080	0.000521	8.48	
Input Parameters for All Wells				
Radius Borehole (feet)	0.25			
Radius Well (feet)	0.08			
Effective Radius Well (feet)	0.14			
Aquifer Thickness (feet)	50			
Gravel Pack Porosity (%)	25			
Partially Penetrating Well	YES			

Accounts for  
sand pack effects.



Waterloo Hydrogeologic  
180 Columbia St. W.  
Waterloo, Ontario, Canada  
ph. (519) 746-1798

HVORSLEV's method

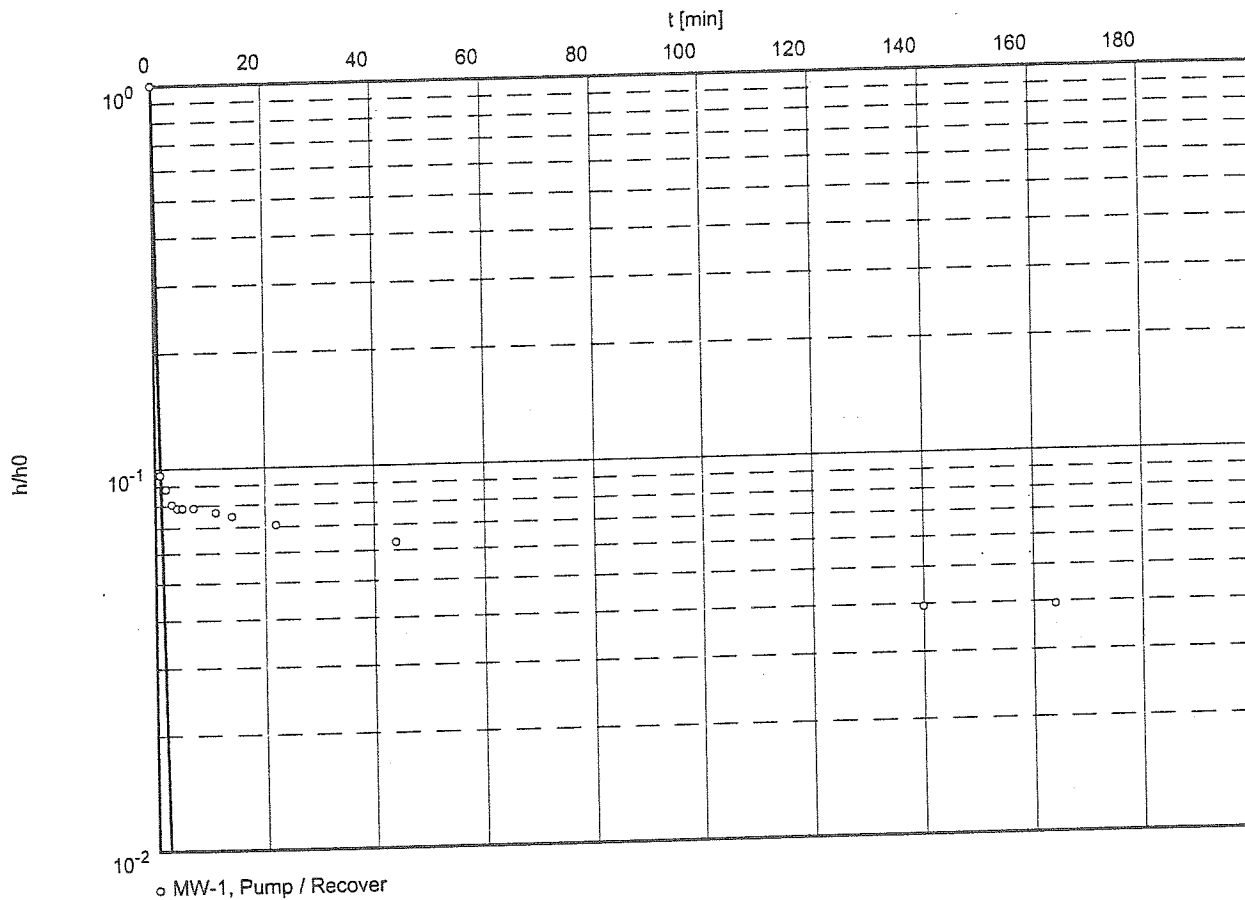
Project: Nelson Farm Center

Evaluated by: KAE

Slug Test No.

Test conducted on: April 9, 2003

MW-1



Hydraulic conductivity [ft/min]:  $9.49 \times 10^{-3}$

Waterloo Hydrogeologic  
180 Columbia St. W.  
Waterloo, Ontario, Canada  
ph. (519) 746-1798

slug test analysis  
BOUWER-RICE's method

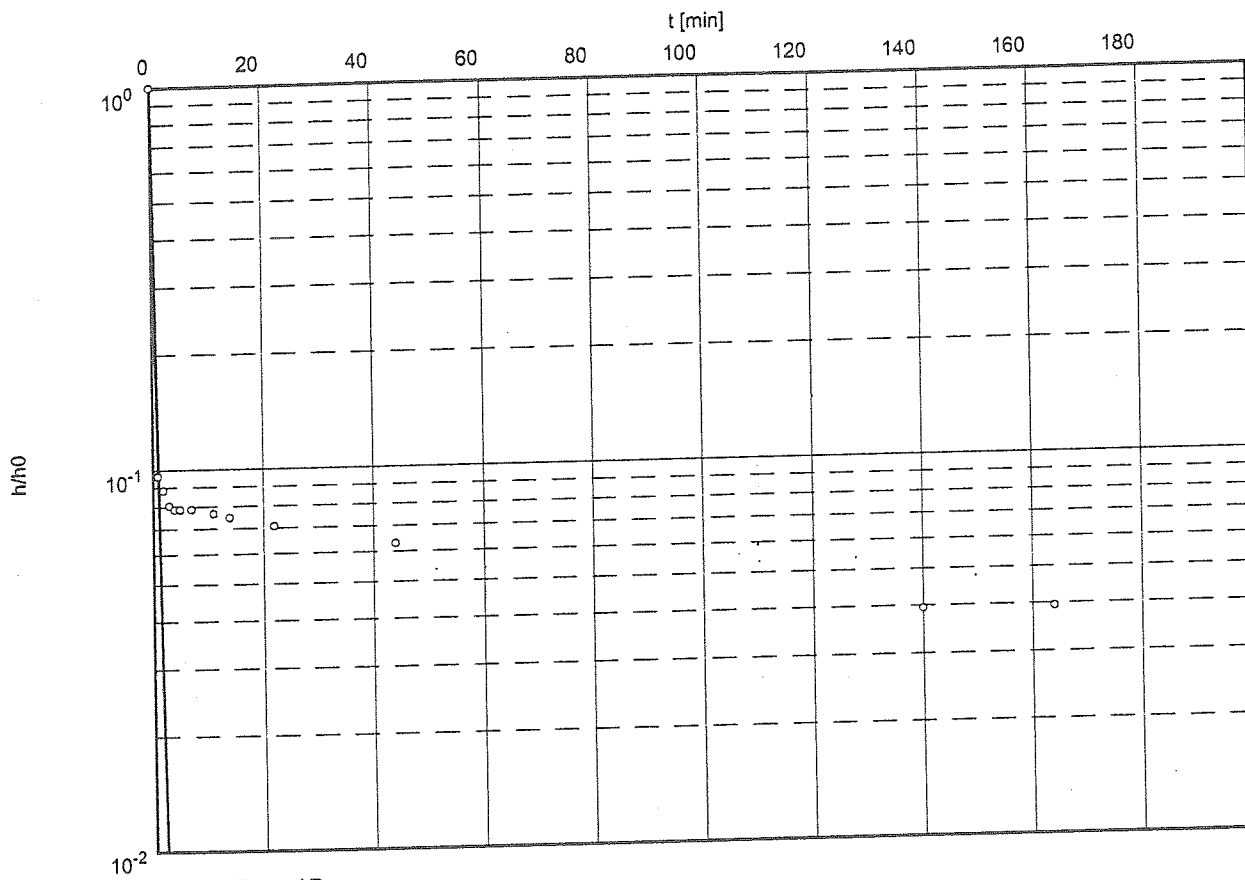
Project: Nelson Farm Center

Evaluated by: KAE

Slug Test No.

Test conducted on: April 9, 2003

MW-1



Hydraulic conductivity [ft/min]:  $6.04 \times 10^{-3}$

[illegible]

Waterloo Hydrogeologic  
180 Columbia St. W.  
Waterloo, Ontario, Canada  
ph.(519)746-1798

HVORSLEV's method

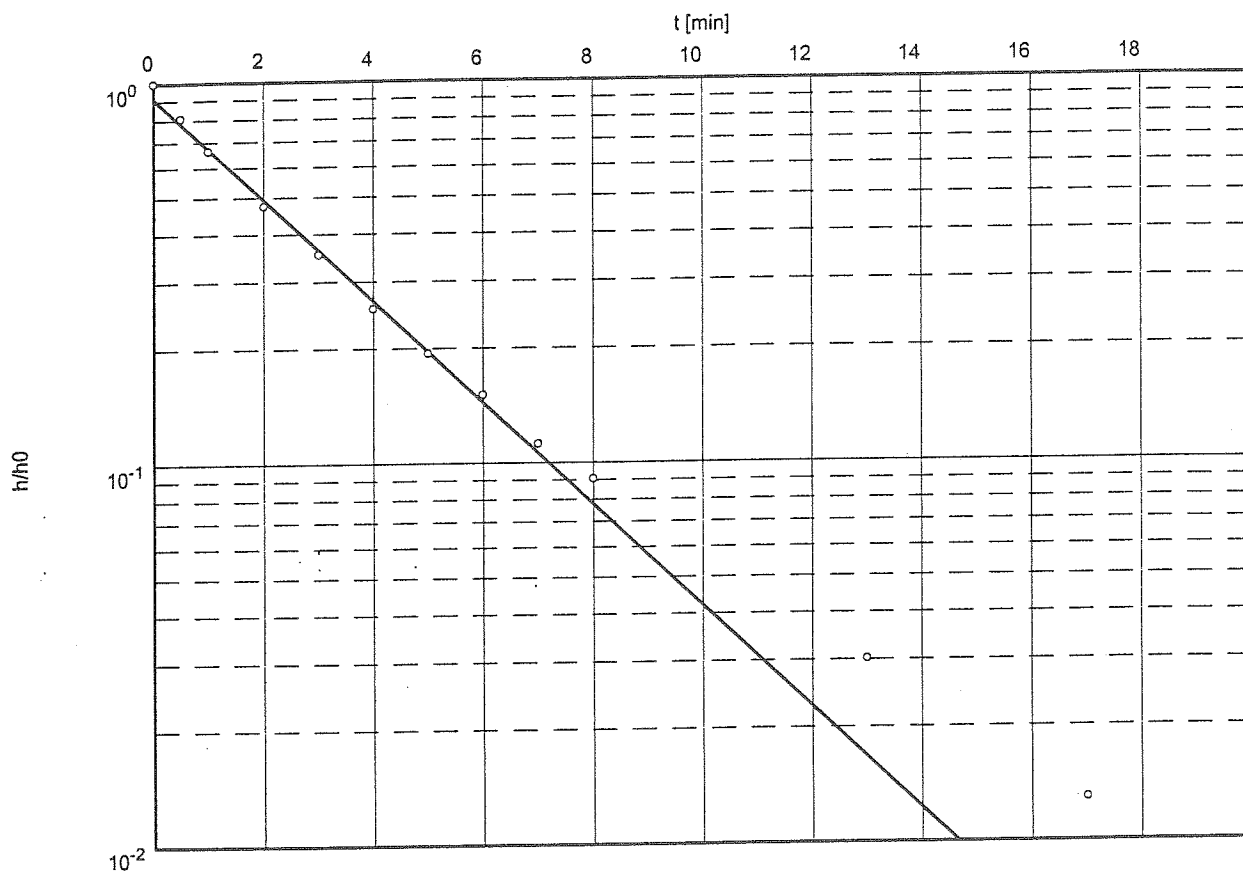
Project: Nelson Farm Center

Evaluated by: KAE

Slug Test No.

Test conducted on: May 20, 2003

MW-2



o MW-2, Bail Recovery

Hydraulic conductivity [ft/min]:  $1.56 \times 10^{-3}$

[illegible]

Waterloo Hydrogeologic  
180 Columbia St. W.  
Waterloo, Ontario, Canada  
ph.(519)746-1798

Slug test analysis  
Hvorslev's method

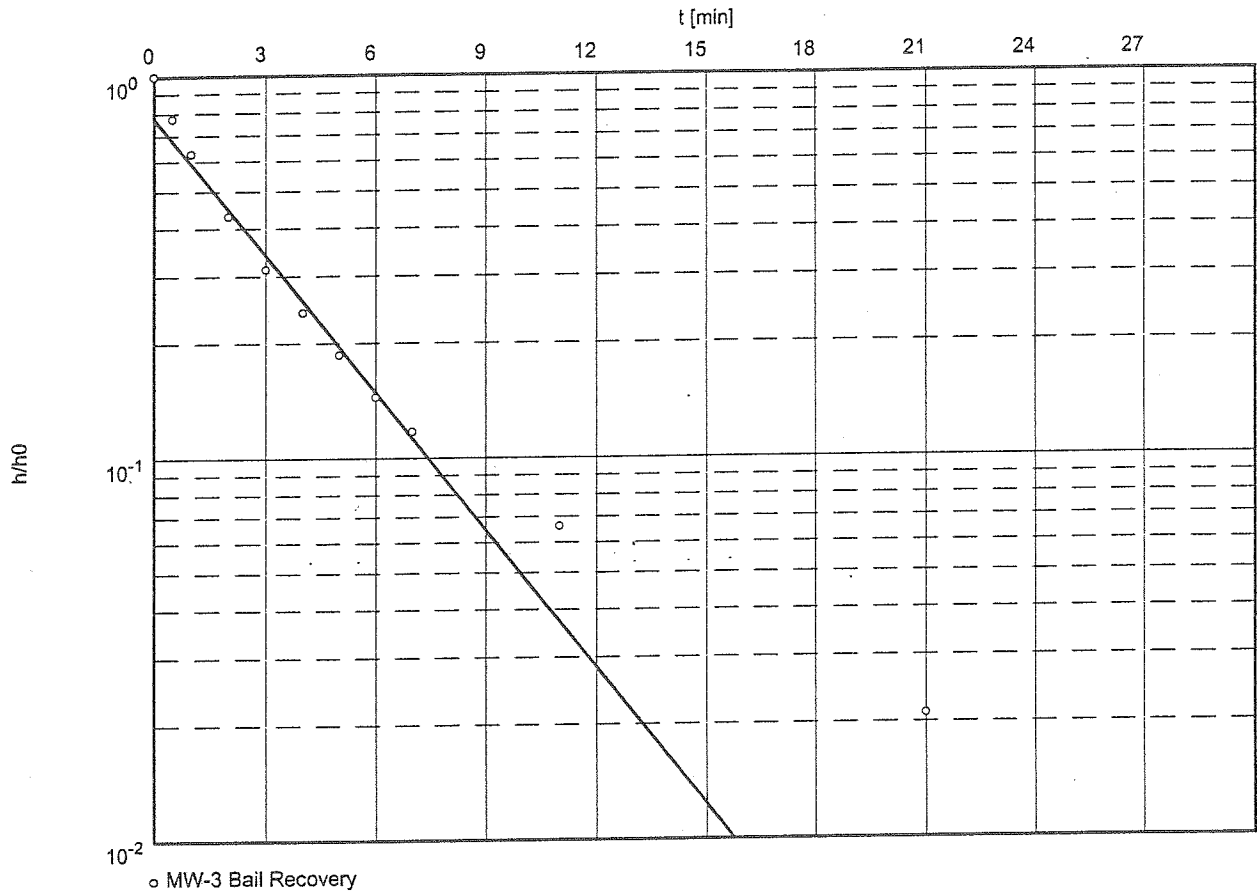
Project: Nelson Farm Center

Evaluated by: KAE

Slug Test No.

Test conducted on: May 20, 2003

MW-3



Hydraulic conductivity [ft/min]:  $1.25 \times 10^{-3}$

[illegible]

Waterloo Hydrogeologic  
180 Columbia St. W.  
Waterloo, Ontario, Canada  
ph. (519) 746-1798

slug/bail test analysis  
HVORSLEV's method

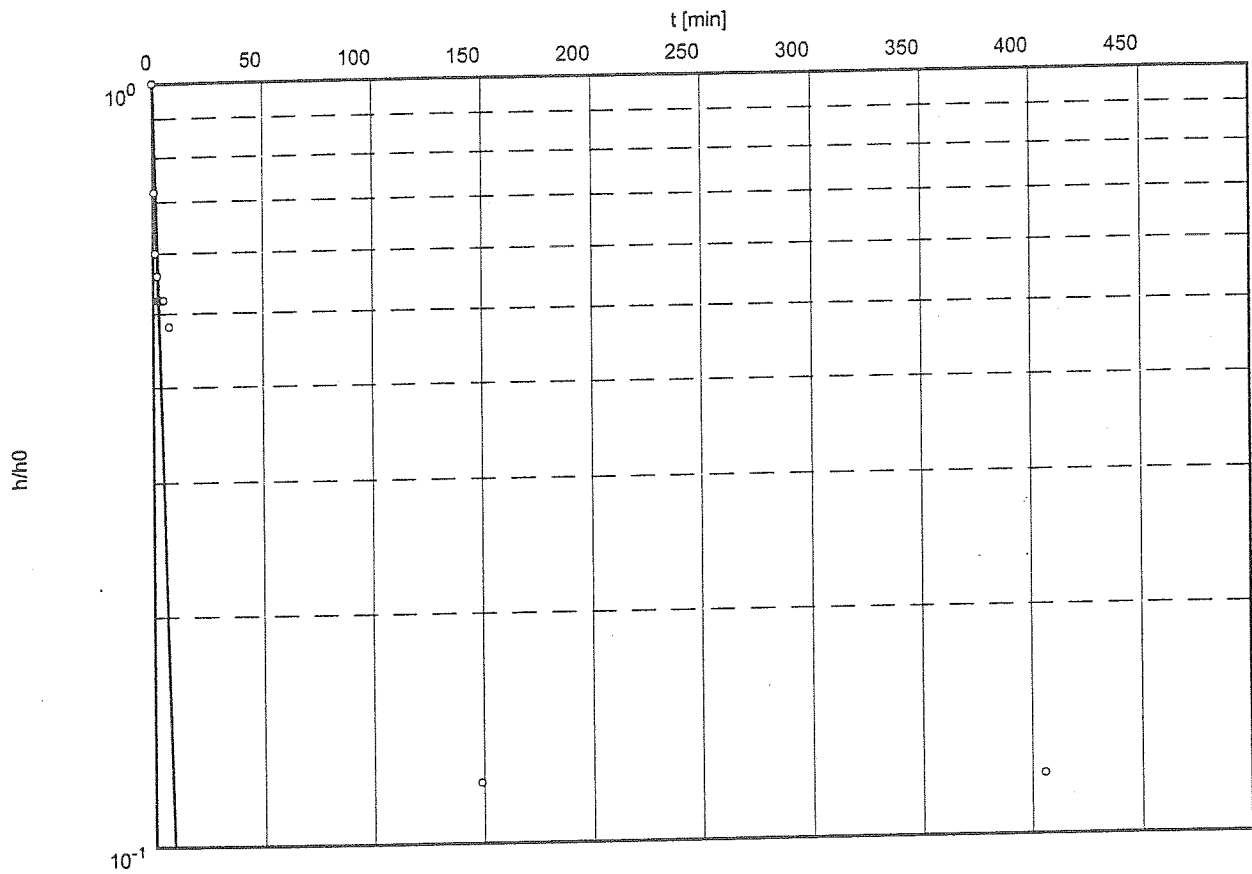
Project: Nelson Farm Center

Evaluated by: KAE

Slug Test No.

Test conducted on: April 8, 2003

MW-4



Hydraulic conductivity [ft/min]:  $1.37 \times 10^{-3}$



Evaluated by: KAE

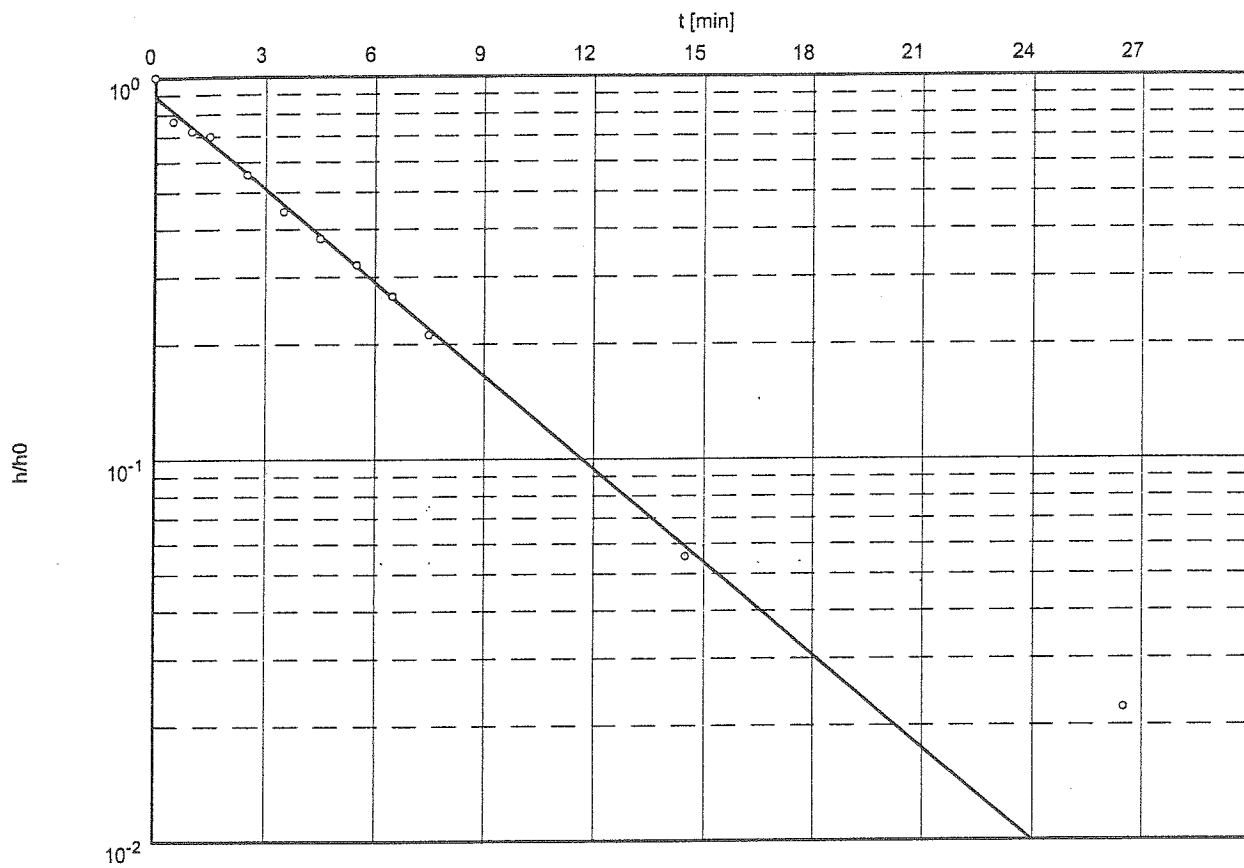
MW-4, Bail Recovery

[illegible]

Slug Test No.

Test conducted on: May 20, 2003

MW-5



○ MW-5 Bail Recovery

Hydraulic conductivity [ft/min]:  $8.00 \times 10^{-4}$

Slug Test No.

Test conducted on: May 20, 2003

MW-5

### MW-5 Bail Recovery

Static water level: 0.00 ft below datum

[illegible]