RECOMMENDED DECISION
WATER PERMITS #5899 AND #5900
CITY OF HANKINSON – INDUSTRIAL WATER PERMIT APPLICATIONS

By Steve Pusc

North Dakota Ground Water
Studies No. 119

Office of the North Dakota State Engineer
Dale L. Frink, State Engineer
August, 2007

Office of the State Engineer
Water Permit Applications #5899 and #5900
Recommendations to the State Engineer

TO:	Dale L. Frink, North Dakota State Engineer, through Robert B. Shaver, Director, Water Appropriation Division & Jon Patch, Hydrologist Manager
FROM:	Steve Pusc, Hydrologist Manager
SUBJECT:	Conditional Water Permit Applications #5899 & #5900, city of Hankinson
DATE:	August 31, 2007

Introduction

On February 20, 2007 the State Engineer received two (2) conditional water permit applications from the city of Hankinson (#5899 & #5900) for industrial purposes (water supply for proposed ethanol plant, figs. 1 and 2).

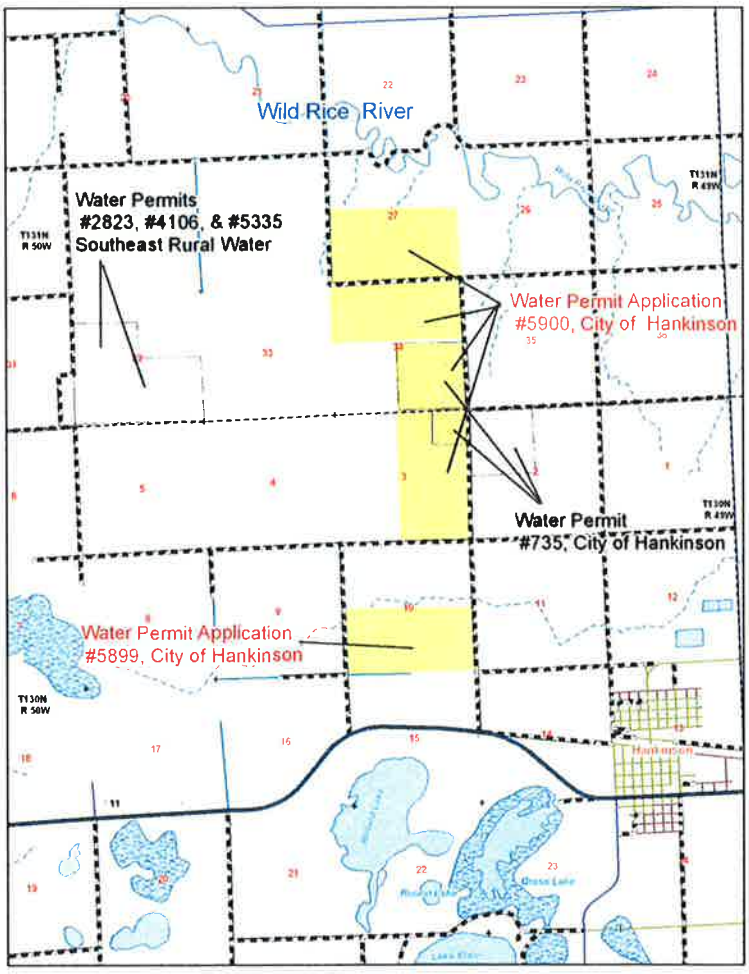

Figure 1. Location of city of Hankinson Water Permit Applications #5899 and #5900 and other existing water permits in the application area

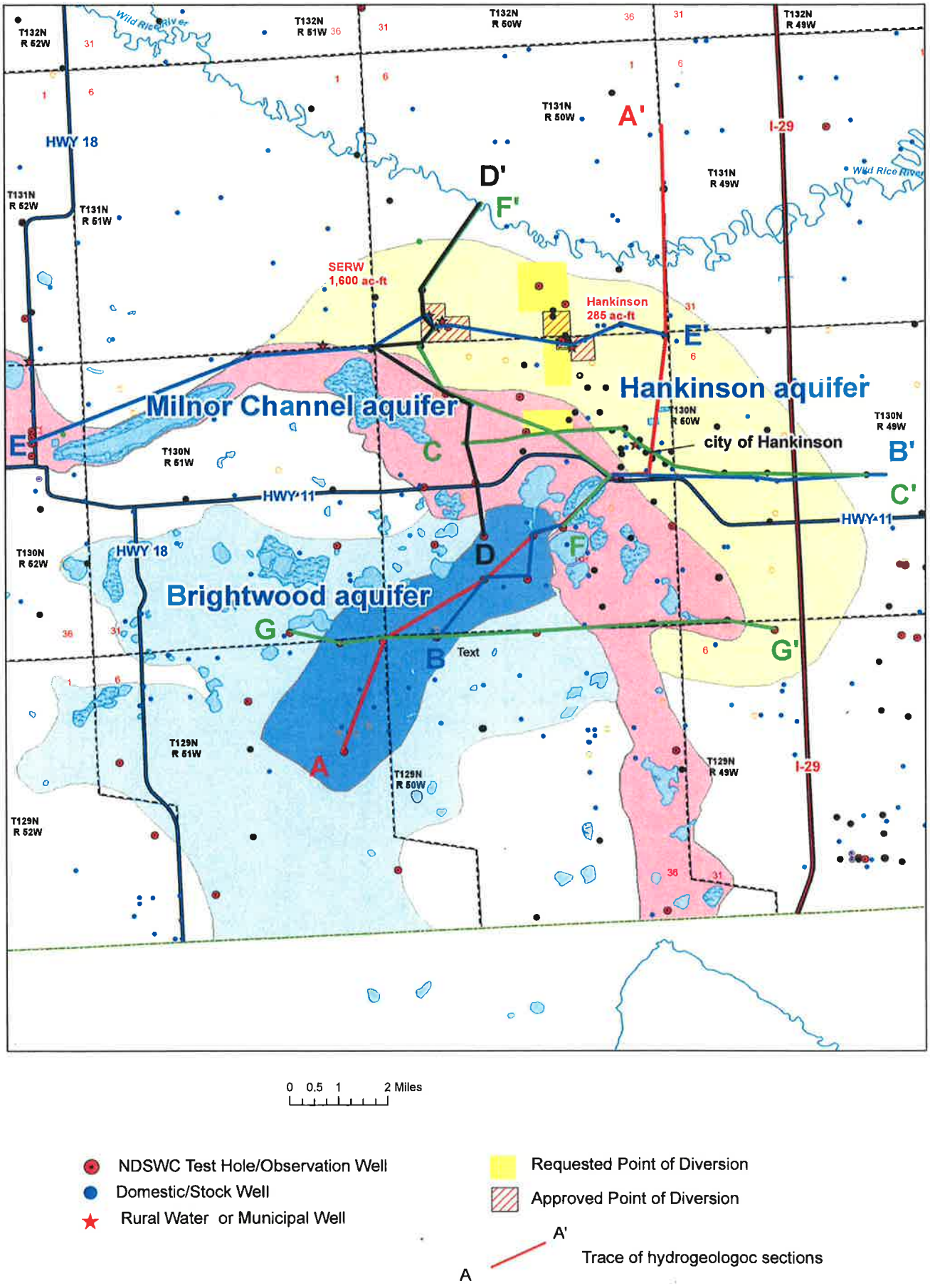

Figure 2. Location of major aquifers, test holes, observation wells. domestic and stock wells, rural and municipal wells and hydrogeologic sections in the Hankinson area

Water permit application #5899 requested to divert 2,420.0 acre-feet of ground water annually from point(s) of diversion located in the SW1/4 and the SE1/4 of Section 10, Township 130 North, Range 50 West (Milnor Channel aquifer) for industrial use (proposed ethanol plant, figs. 1 and 2). A maximum pumping rate of 1,500 gallons per minute was requested. The second water permit application, #5900 requested to divert 1,500 acre-feet of ground water annually from point(s) of diversion located in the E1/2 of section 3, Township 130 North, Range 50 west and S1/2 of section 27, the SE1/4 of section 34 and the N1/2 of section 34 all in Township 131 North, Range 50 West (Hankinson aquifer) for industrial use (proposed ethanol plant). A maximum pumping rate of 930 gpm was requested under water permit application #5900.

The city of Hankinson has applied for two water permits to balance the water quality and water quantity needs of the proposed ethanol plant while at the same time meeting North Dakota State Health Department discharge requirements for the plant's disposal of its wastewater. The slightly better water quality water from the Hankinson aquifer (at least in the area of the present day city of Hankinson supply wells) is the applicant's preferred water source. However, water from the Hankinson aquifer appears limited in quantity and is already heavily appropriated by the South East Water Users District (SEWUD). The Milnor Channel aquifer also contains good quality water, but the water is slightly higher in mineral content, resulting in increased treatment costs for the proposed ethanol plant. The Milnor Channel water was applied for as a possible mix with Hankinson aquifer water.

As stated earlier, the city of Hankinson is applying for the industrial water permits (#5899 and #5900) as a potential water supply for a proposed ethanol plant being built by U.S. BioEnergy. The total water needs of the ethanol plant vary depending on the initial water quality entering the plant and the resulting water quality of the wastewater discharge leaving the plant. In general, the better the water quality, the less water is needed and vice-versa. Presented in Table 1 are data supplied to our office by US BioEnergy summarizing the varying water quantity requirements needed from the different sources to keep the plant discharge water below the 450 mg/l sulfate requirement (discharge to Wild Rice River). The water quantity needs vary from 1,574 acre-feet of ground water solely from the Hankinson aquifer (application #5900) to 2,597 acre-feet of water solely from the Milnor Channel aquifer (application #5899). The lower projected water needs from the Hankinson aquifer (#5899) reflects the fact that the present day water analyzed from the

Hankinson aquifer (water from existing city of Hankinson production wells) has a lower total dissolved solids concentration thus resulting in discharge water that would be below State discharge requirements.

Table 1. Calculated annual ground-water withdrawals from the Hankinson and Milnor Channel aquifers to meet discharge requirements (for the Wild Rice River) and the resulting operating costs associated with each scenario

US Bio Hankinson

The Mix									Additional Operating Costs		
City Well Field (Hankinson Aquifer) Lab #01276015	New Well Field (Milnor Channel) Lab #01297022	Water Requirement (mean summer peak) GPM	Annualized Supply (90% of peak) acre ft	Discharge (mean summer peak) GPM	Annualized Discharge acre ft	Sulfate Discharge (ruling constituent) ppm	Discharge as a Percentage of Intake	Additional Capital Requirement	Materials, Labor, & Chemical	Additional Water Costs	Total
100%	0%	1,121	1,574	331	465	285	30%	base	base	base	-----
75%	25%	1,199	1,683	409	574	422	34%	0	0	$10,700	$10,700
50%	50%	1,241	1,742	451	633	440	36%	$500,000	$25,000	$16,500	$41,500
25%	75%	1,557	2,186	757	1,063	447	49%	$600,000	$100,000	$60,000	$160,000
0%	100%	1,850	2,597	1,060	1,488	450	57%	$1,000,000	$400,000	$100,000	$500,000

Note that the operating costs are at base level when using the water from the Hankinson aquifer (from city of Hankinson's existing well field) and increase to 1 million dollars per year to treat water from the Milnor Channel aquifer (Table 1). Caution however is advised because the aforementioned analyses of the volume of water needed by the plant assumes a static water quality. The analyses does not take into consideration that the quality of the ground water pumped from both the Hankinson and Milnor Channel aquifers will change in quality, with total dissolved solids likely increasing with increased use.

Letters concerning application #5899 were received from Steve Hanson, General Manager, Southeast Water Users District and Megan Estep, Chief, Water Resources Division, U.S. Fish and Wildlife Service.

Letters concerning application #5900 were received from Steve Hanson, General Manager, Southeast Water Users District, David and Paul Tiegs, Hankinson ND, James Medenwaldt, Hankinson, ND, and Steve and Kathy Bladow, Hankinson, ND.

Description of Water Permit Application Area
Physiography/Surficial Geology

The city of Hankinson water permit application area is located in Southeastern Richland County on the western edge of the Lake Agassiz Valley physiographic province and the eastern edge of the Central Lowland province (fig. 3). The Lake Agassiz Valley is characterized by a very flat glacial lake plain with associated beach, dune and delta deposits (fig. 4, modified from Baker, C.H. 1967, Part I). The Central Lowlands are characterized by outwash channels, stagnation and ground moraine and collapsed outwash (fig. 4). Water Permit Application #5899 overlies primarily sand and gravel deposits of the Milnor Channel aquifer and Water Permit Application #5900 overlies primarily very fine to fine sand of the Hankinson aquifer (fig. 4). Note also that Water Permit Application #5900 is located on the eastern side of a large sand dune complex (fig. 4)

Climate

The climate of Richland County is of a continental type, with short summers and long cold winters. For many years, a long term climate station was located at Hankinson, however that station was discontinued in 1992. A composite record was compiled by using climate records for Hankinson, ND and McCloud, SD (fig 5A).

Annual precipitation and the five-year moving average of annual precipitation are shown in figure 5A. The 1972 through 2000 normal precipitation for the State of North Dakota are shown in figure 5B. Mean annual precipitation from 1913 to 2006 was 20.92 inches. Minimum annual precipitation was 11.12 inches in 1976 and maximum annual precipitation was 34.03 inches in 1962. From 1993 through 2006 the five-year moving average has increased to 21.99 inches, indicating the wettest

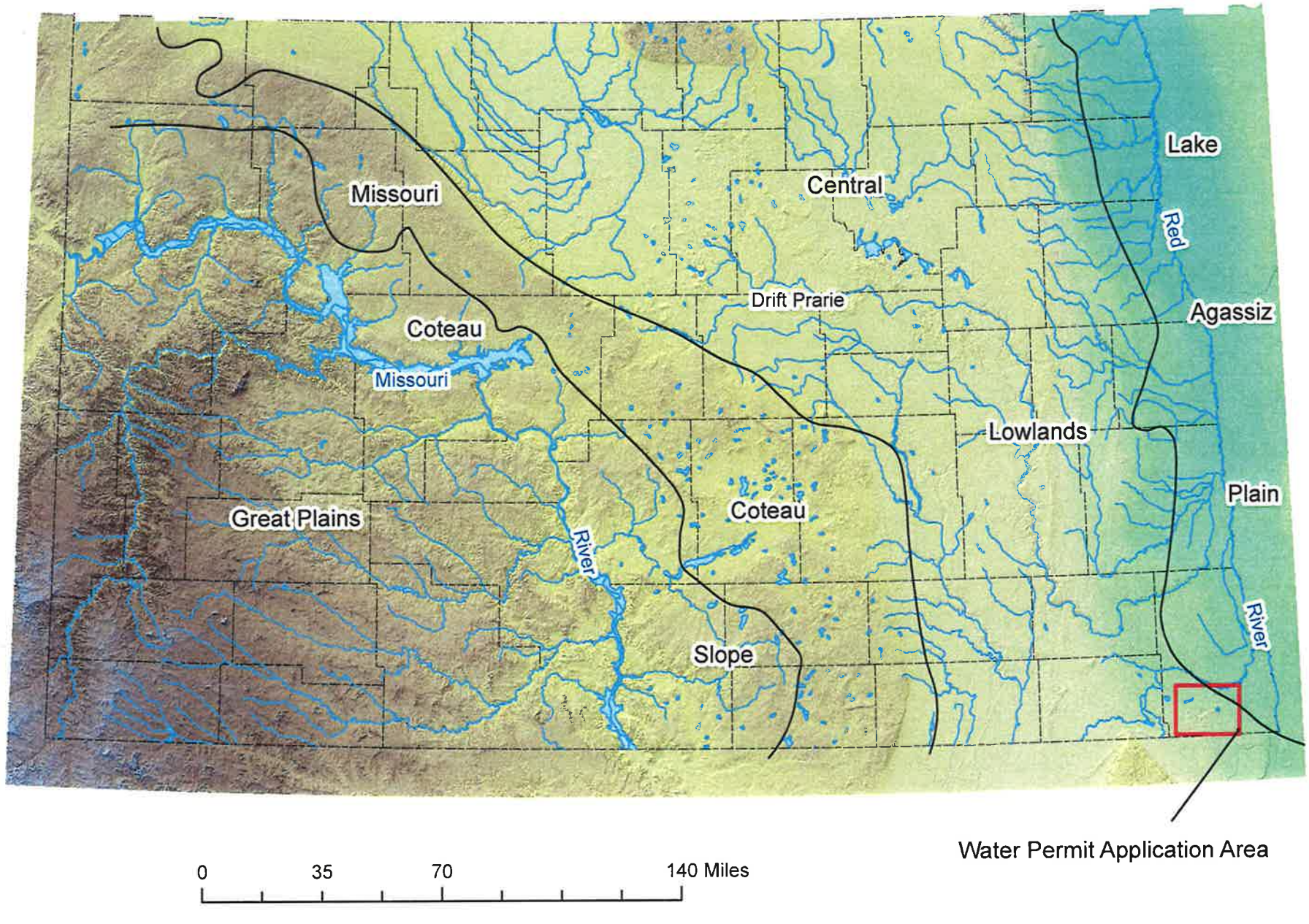

Figure 3. Physiographic divisions in North Dakota and Location of Ccty of Hankinson Water Permit Application Area

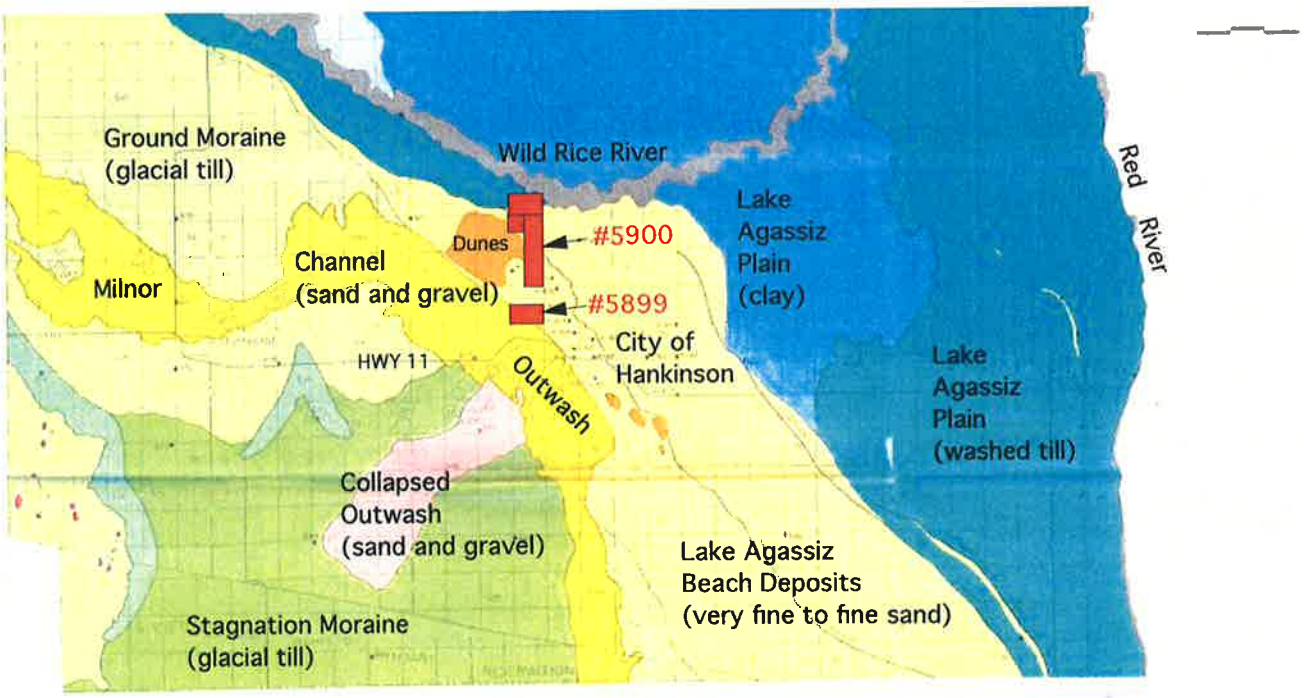

PLATE 1. Landforms map of Richland County, N. Dak.

Water Permit
Applications #5899 & #5900

Figure 4. Major Landforms in Hankinson area (modified from Baker, C. H. 1967, Part I)

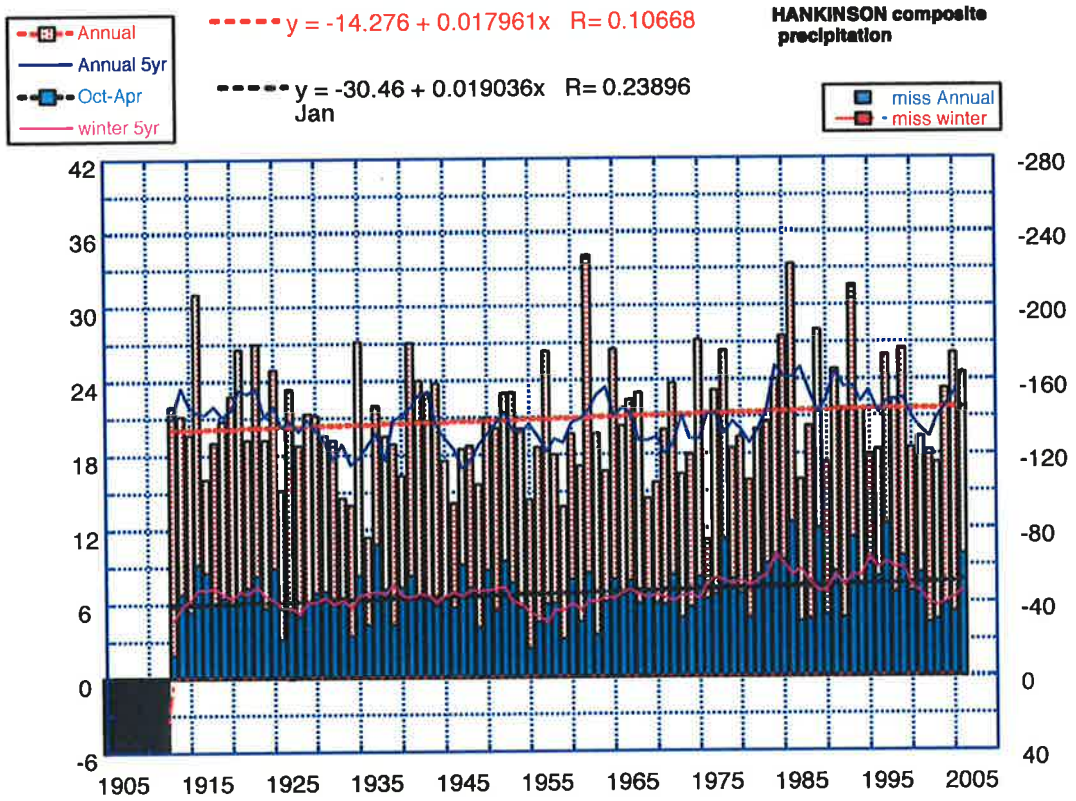

Figure 5A. Annual prepitation from composite stations in the Hankinson area

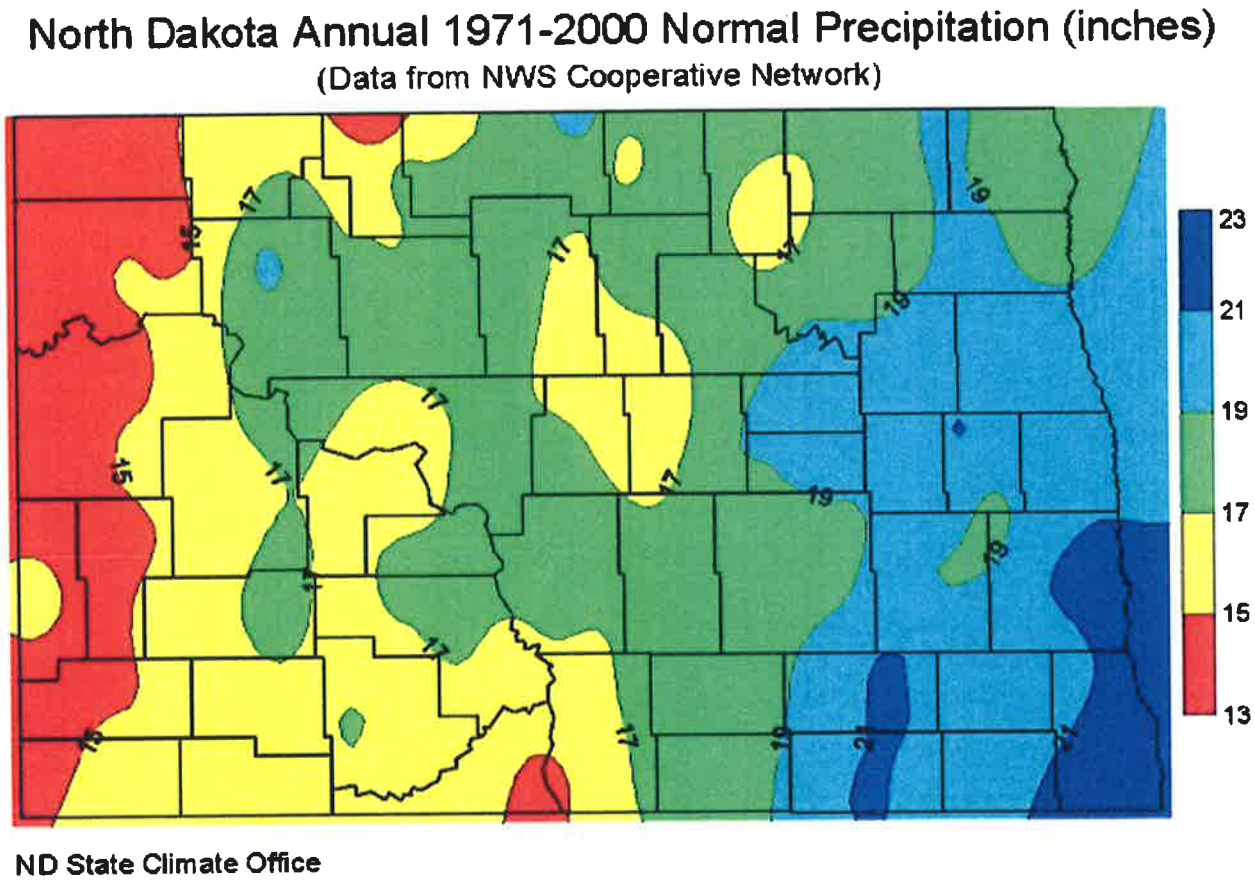

Figure 5B. North Dakota annual precipitation

period since records were first established in 1913. According to figure 5 B the southeastern portion of the state is the wettest with normal annual precipitation from 1971 through 2000 between 21 to 23 inches.

Soils

Classification of soils based on drainage characteristics in the Hankinson area is presented in figure 6. The soil types include the excessively drained soils in the sand dune complex, moderately to poorly drained soils over a large portion of the Hankinson aquifer, poorly drained soils overlying the Milnor Channel aquifer, and well drained overlying the Brightwood aquifer. Good-quality, low total-dissolved-solids water occurs in the area characterized by the excessively drained soils in the sand dune complex. The poorly drained soils overlying the Milnor Channel aquifer is characteristic of a high water table where discharge occurs primarily by evapotranspiration. These areas are where large volumes of water can be salvaged from evapotranspiration by pumping. The well-drained soils overlying the Brightwood aquifer represent an area of thick sand and gravel deposits and large depths to the water table, resulting in much less ground-water discharge due to evapotranspiration.

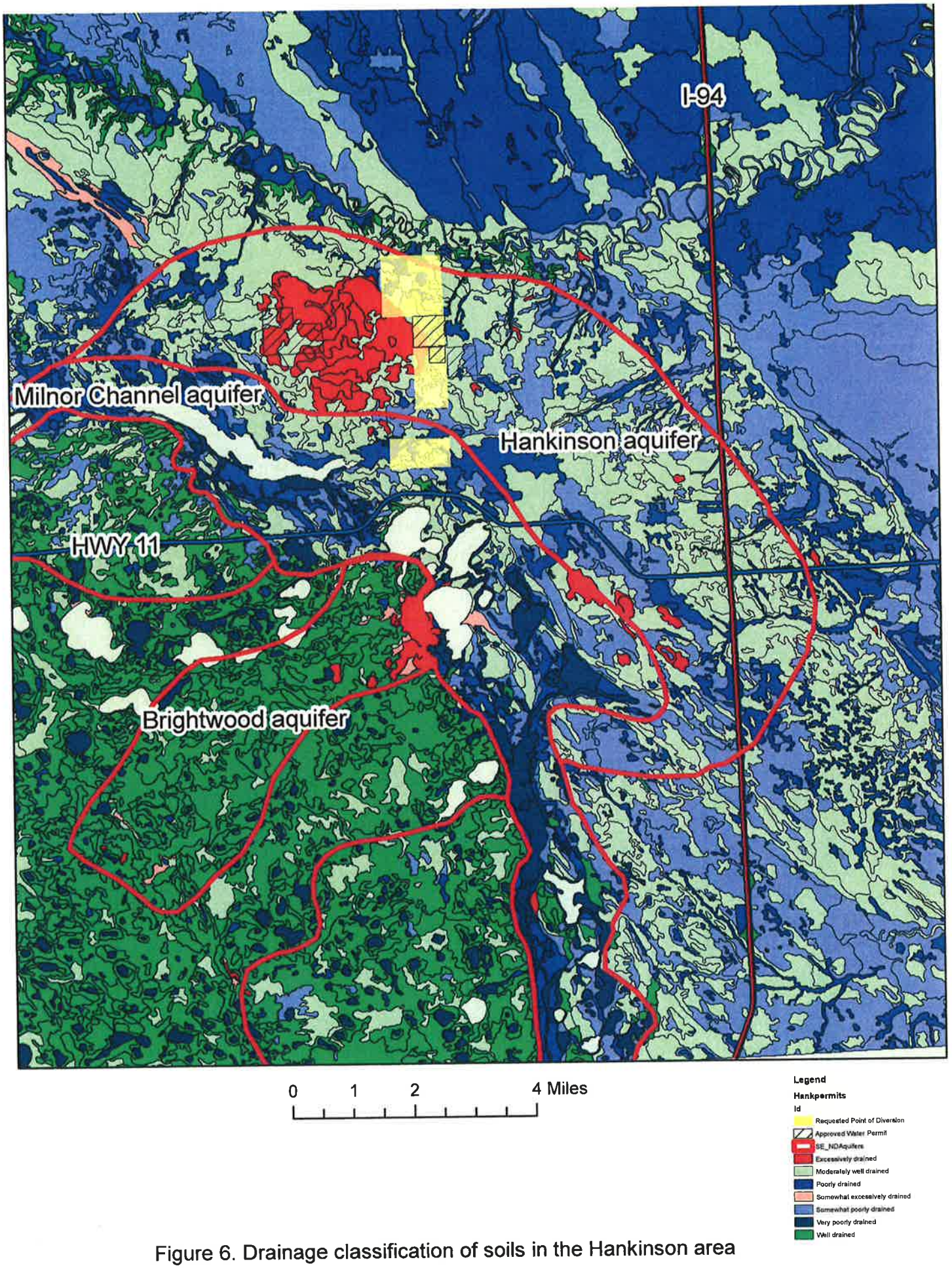

Figure 6. Drainage classification of soils in the Hankinson area

Hydrogeology

Four distinct aquifers or aquifer systems have been identified in the Hankinson area (Baker, C. H., Jr., 1967, Baker, C. H., Jr., and Paulson, Q. F., 1967, Bluemle, 1991, Brophy, J. A., and Bluemle, J. P., 1983, and Powell, J.E., 1956, fig. 2). Those aquifers include the Hankinson aquifer, the Milnor Channel aquifer, the Brightwood aquifer and finally, unnamed, buried deposits of sand and gravel. Each aquifer has its own unique properties resulting in a wide range of well yield and water quality. The stratigraphic relationships of the aquifers are shown on hydrogeologic sections A-A' through G-G' (figs. 7 through 13). Following is a discussion of the occurrence, movement, productivity (estimated well yields) and quality of ground water in these aquifers. For a detailed discussion of the geologic history and formation of these aquifers, the reader is referred to Baker, C. H., Jr., 1967, Baker, C. H., Jr., and Paulson, Q. F., 1967, Bluemle, 1991, Brophy, J. A., and Bluemle, J. P., 1983, and Powell, J.E., 1956.

Hankinson aquifer

Shoreline beach deposits of ancestral Glacial Lake Agassiz form a broad belt of surficial sand and gravel extending from the Wild Rice River north of the city of Hankinson southeastward to the South Dakota Border (fig. 4). These shoreline beach deposits are now saturated with ground water forming the Hankinson aquifer (fig. 2). In the Hankinson area geologic sediments of the Hankinson aquifer are generally very fine and fine grained sand, typical of a beach deposit. Another important feature of the Hankinson aquifer is a sand dune complex located in the northwest corner of the aquifer (fig. 4). According to Baker, 1967, Part I,

"The source of these area of dunes in not clear. Part of the sand may have been deposited as part of the Milnor channel deposits before Lake Agassiz came into existence; part may have been carried from the growing Sheyenne delta longshore currents. Data from test holes in the Hankinson area indicate that a marked low exists there in the surface of the underlying till. The presence of this depression in the till may help account for the accumulation of the thick deposits of sand"

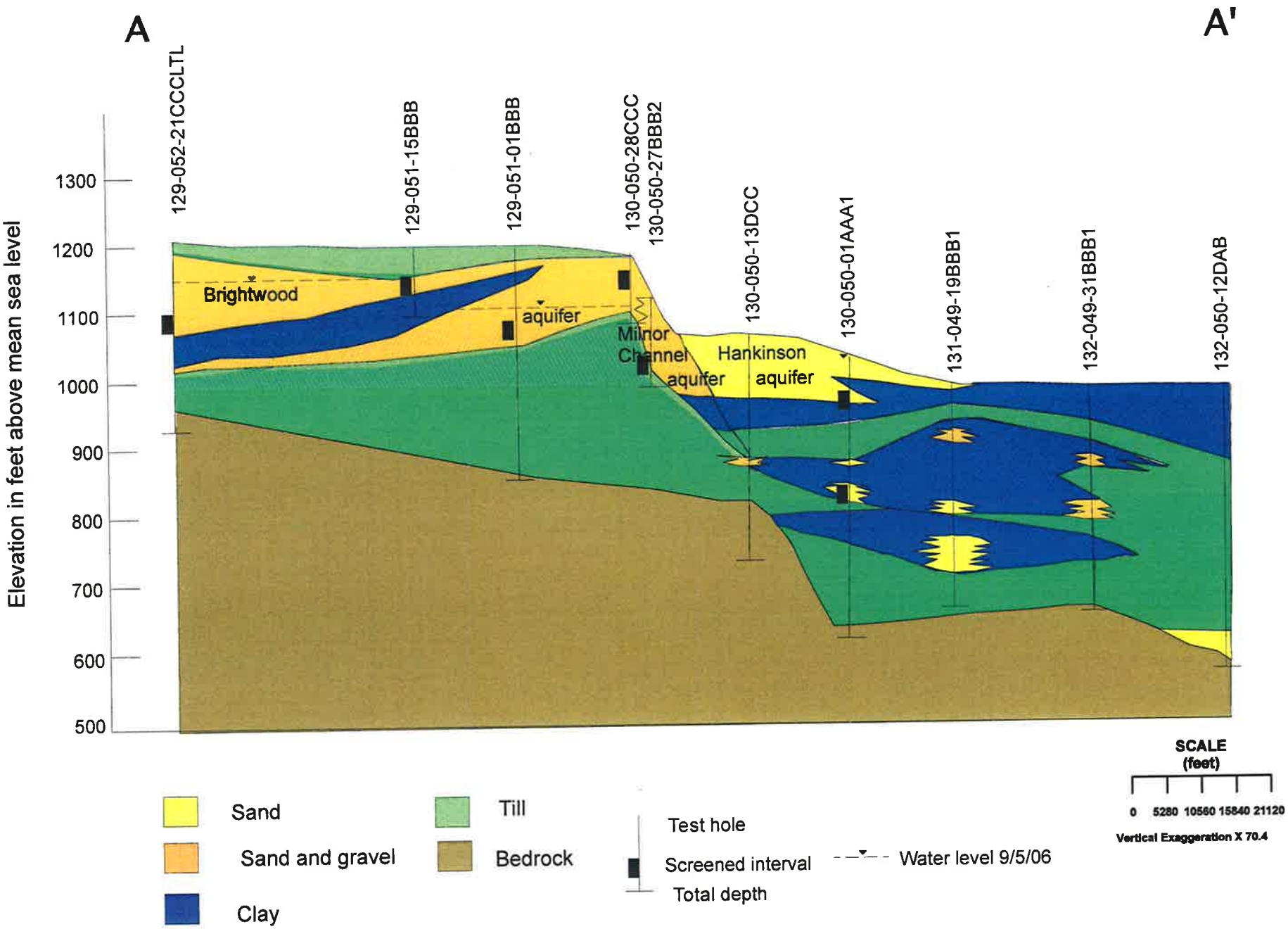

Figure 7. Hydrogeologic section A-A' illustrating the major aquifers in the Hankinson area

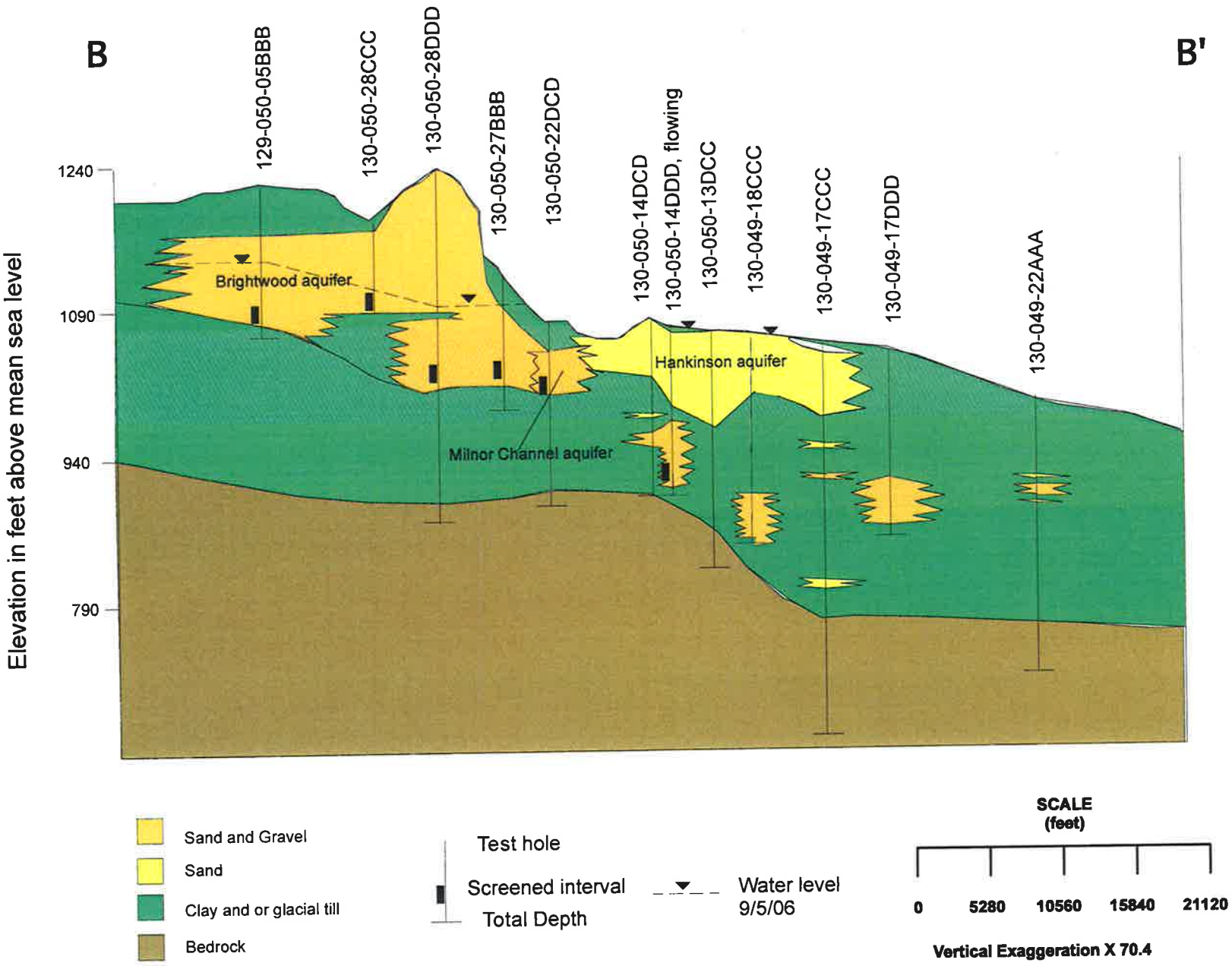

Figure 8. Hydrogeologic section B-B' illustrating the major aquifers in the Hankinson area

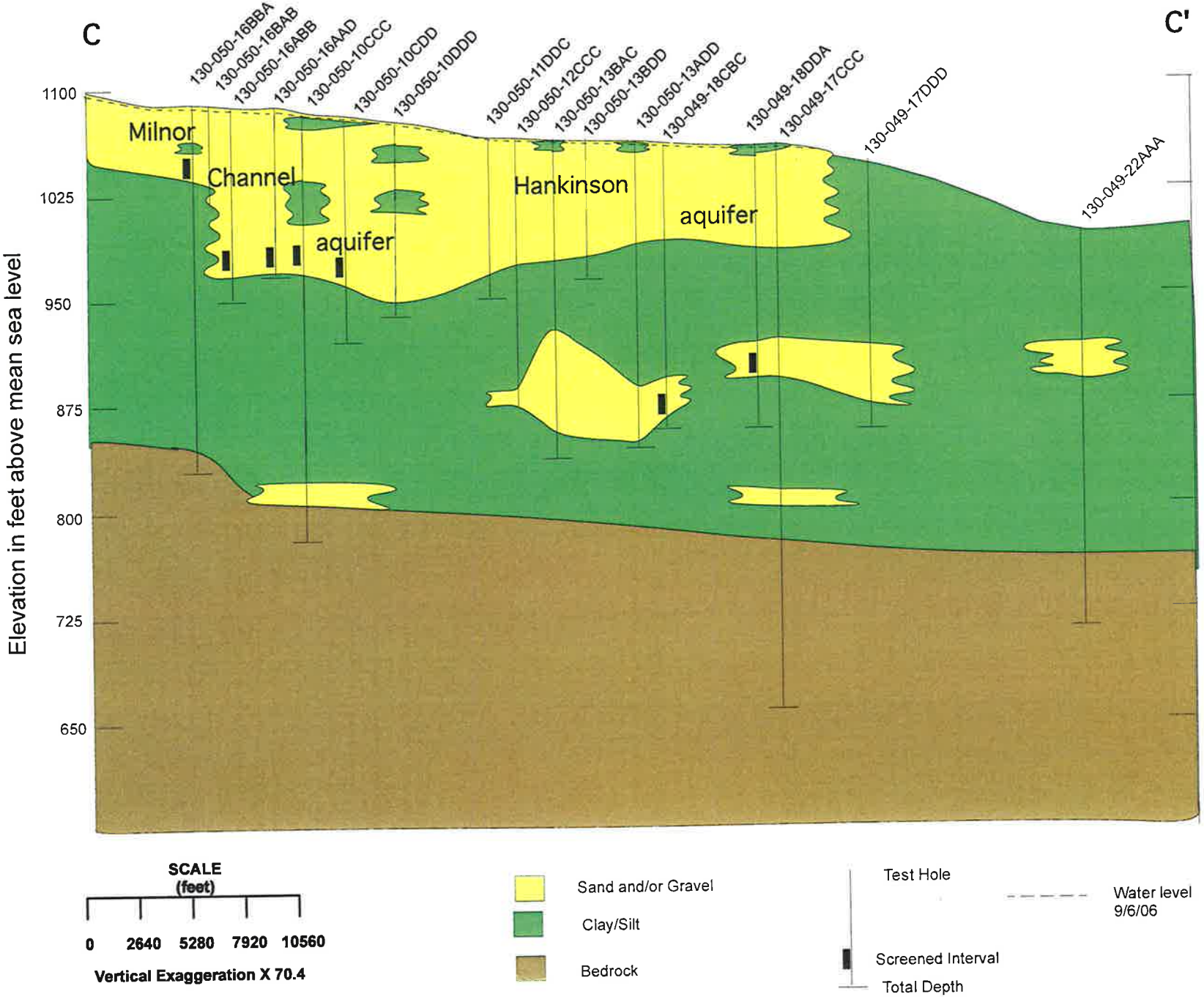

Figure 9. Hydrogeologic section C-C' illustrating the major aquifers in the Hankinson area

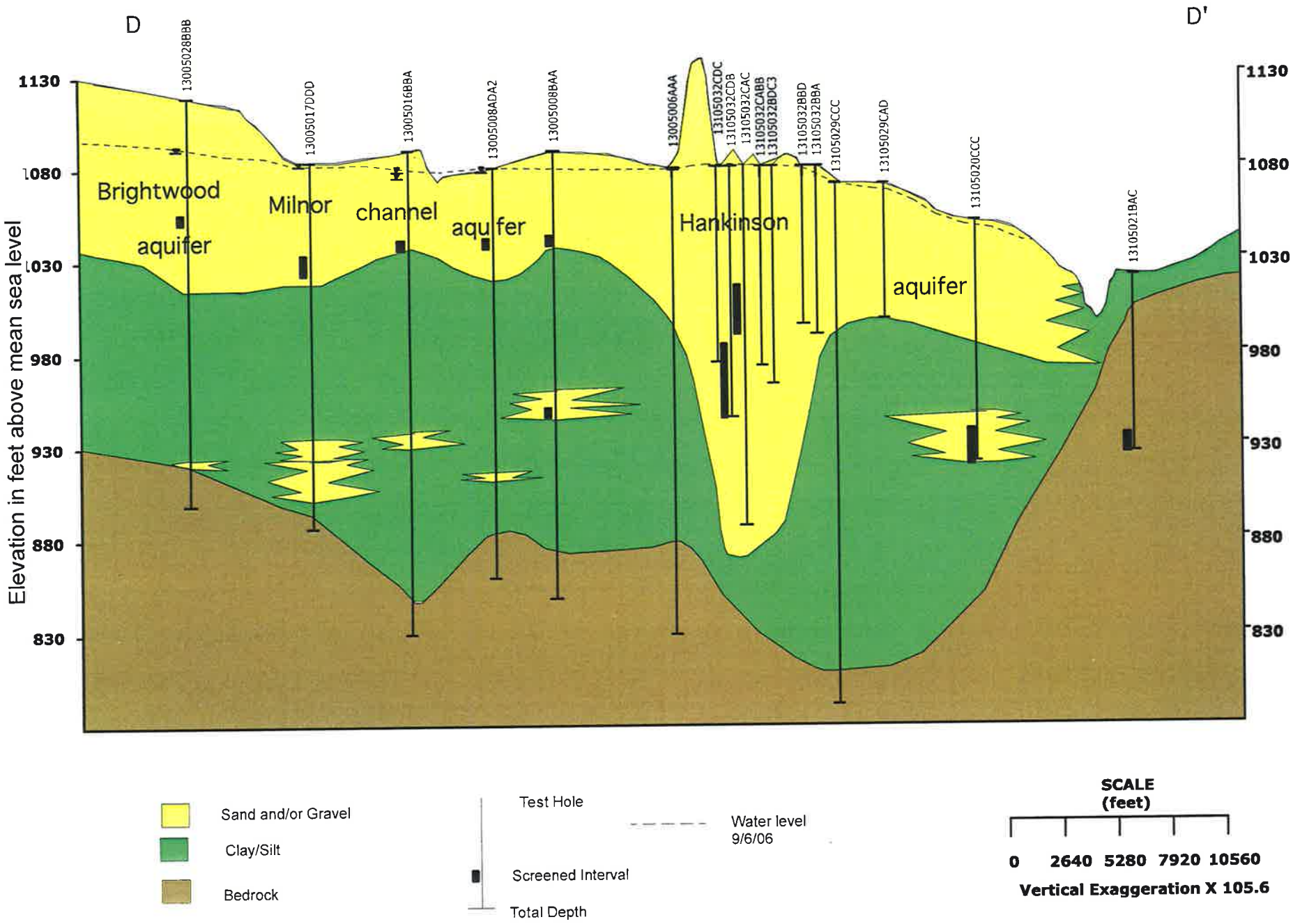

Figure 10. Hydrogeologic section D-D' illustrating the major aquifers in the Hankinson area

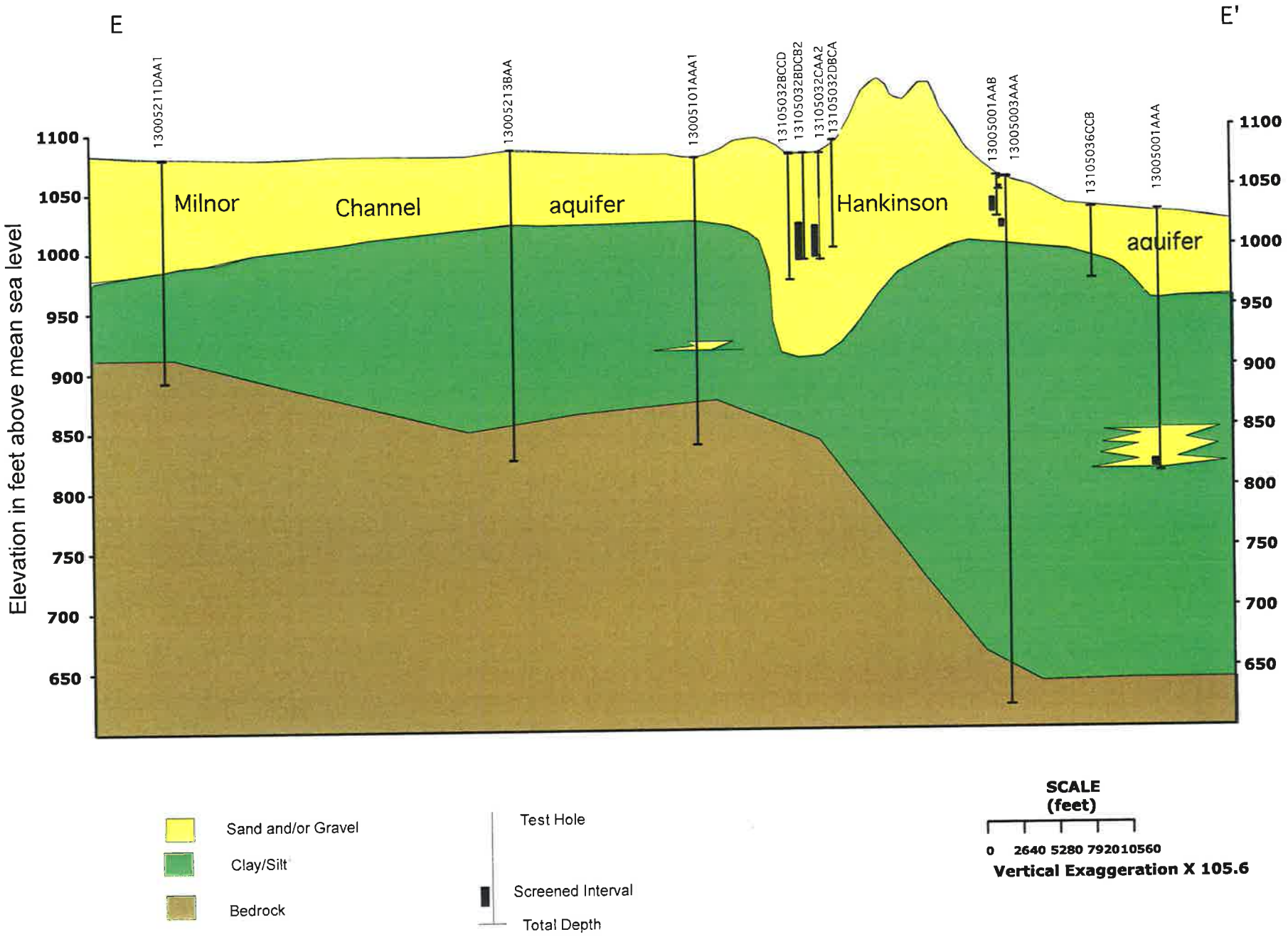

Figure 11. Hydrogeologic section E-E' illustrating the major aquifers in the Hankinson area

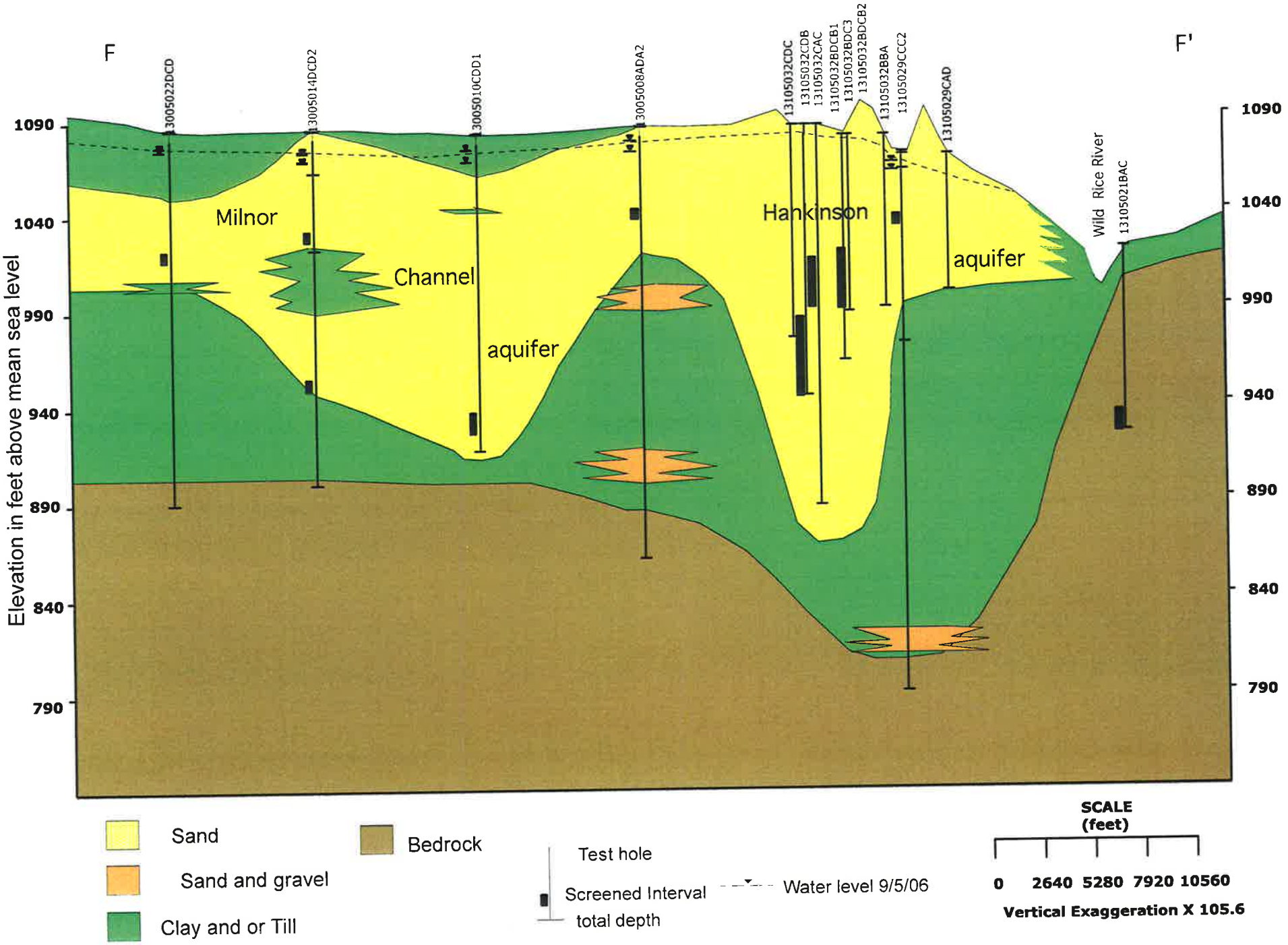

Figure 12. Hydrogeologic section F-F' illustrating the major aquifers in the Hankinson area

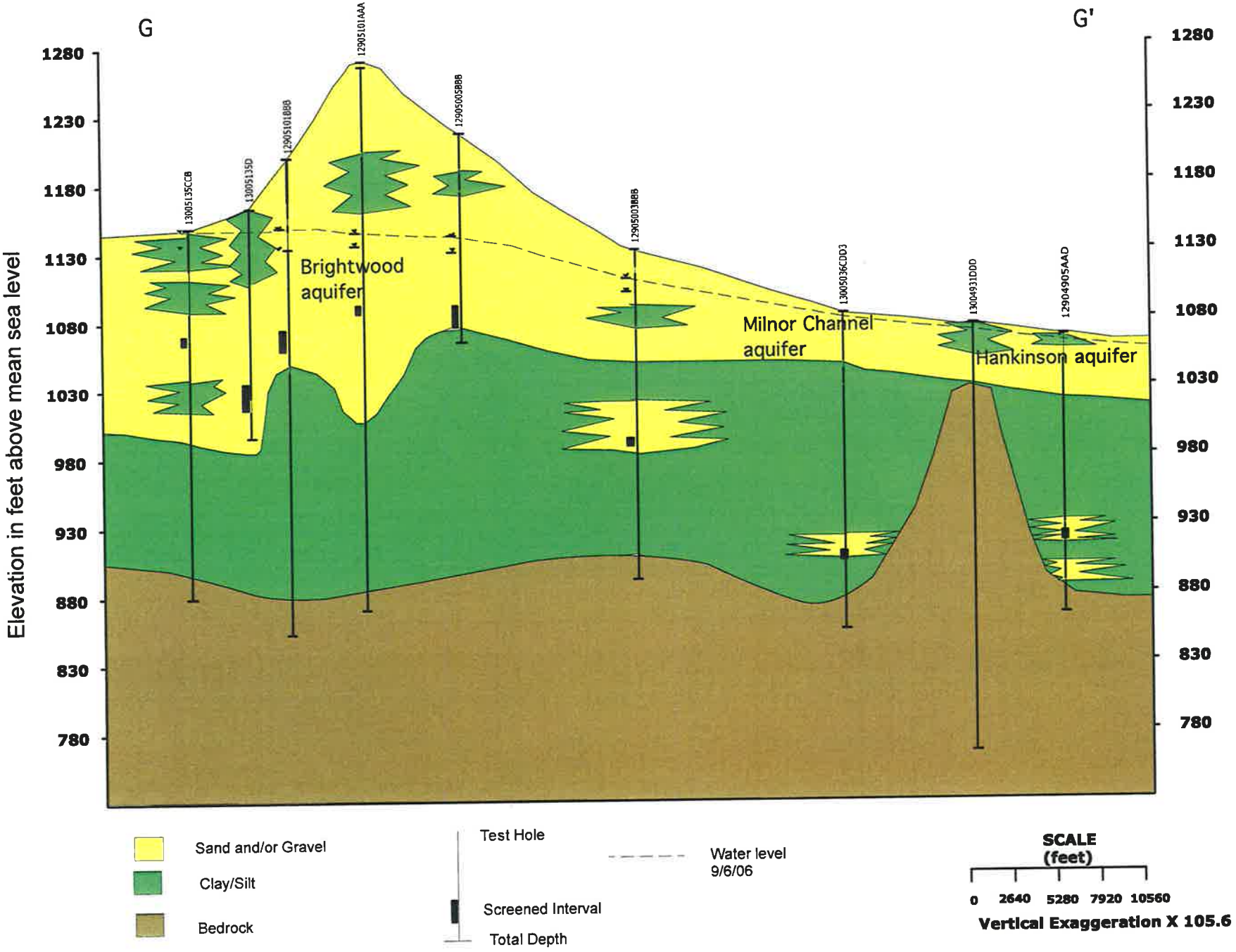

Figure 13. Hydrogeologic section G-G' illustrating the major aquifers in the Hankinson area

Near the city of Hankinson, saturated very fine to fine sand beach deposits range between 20 to 110 feet thick with an average thickness of 55 feet. The Hankinson aquifer is unconfined and the water table is less than 5 feet below land surface.

Generally, water is recharged into the Hankinson aquifer directly by precipitation falling on the area. Additional recharge to the Hankinson aquifer occurs as underflow from the adjoining Milnor Channel aquifer. The hydraulic gradient from the Milnor Channel aquifer to the Hankinson aquifer is about 10 feet per mile, based on water levels measured in observation wells on September 5, 2006 (fig. 14). Ground water in the Hankinson aquifer is discharged primarily by evapotranspiration and as spring flow at the foot of the higher slopes and seepage into small drains and creeks.

Wells yields from the Hankinson aquifer range from 5 to 10 gallons per minute from domestic and stock wells to 100 to 200 gpm from the Southeast Water Users District (SEWUD) wells and the Hankinson municipal supply wells. In the area of the city of Hankinson water permit application #5900, well yields of 50 to 100 gpm may be possible.

Presented in table 2 are summaries of water quality data for the Hankinson, Milnor Channel and Brightwood aquifers. Individual constituents for each sample are presented in Appendix III. The areal distribution of total dissolved solids is presented in figure 15 and the areal distribution of the sulfate concentration is presented in figure 16. The total dissolved solids concentration in 39 water samples collected from the Hankinson aquifer ranged between 203 mg/l in the area adjacent to the dunes to 3290 mg/l at Township 130 N, Range 50 W. Section 14DCD, just southwest of the city of Hankinson. Note that the total dissolved solids concentration is 2660 mg/l two miles east of the existing city well field. Sulfate concentrations ranged between 5 to 1990 mg/l. Carbonate hardness ranged between 107 and 1650 mg/l as CaCO3. Noncarbonate hardness ranged between 0 and 1,650 mg/l as CaCO3. In general ground water in the surficial unconfined aquifers is characterized by higher dissolved solids concentrations in areas where discharge occurs by evapotranspiration or seepage at land surface. Ground water is characterized by lower dissolved concentrations occurs in upland area where evapotranspiration is minor. In conclusion, the quality of ground water in the area is highly variable, both vertically and laterally, therefore, large scale pumping from the system will result in a change in the quality of water pumped.

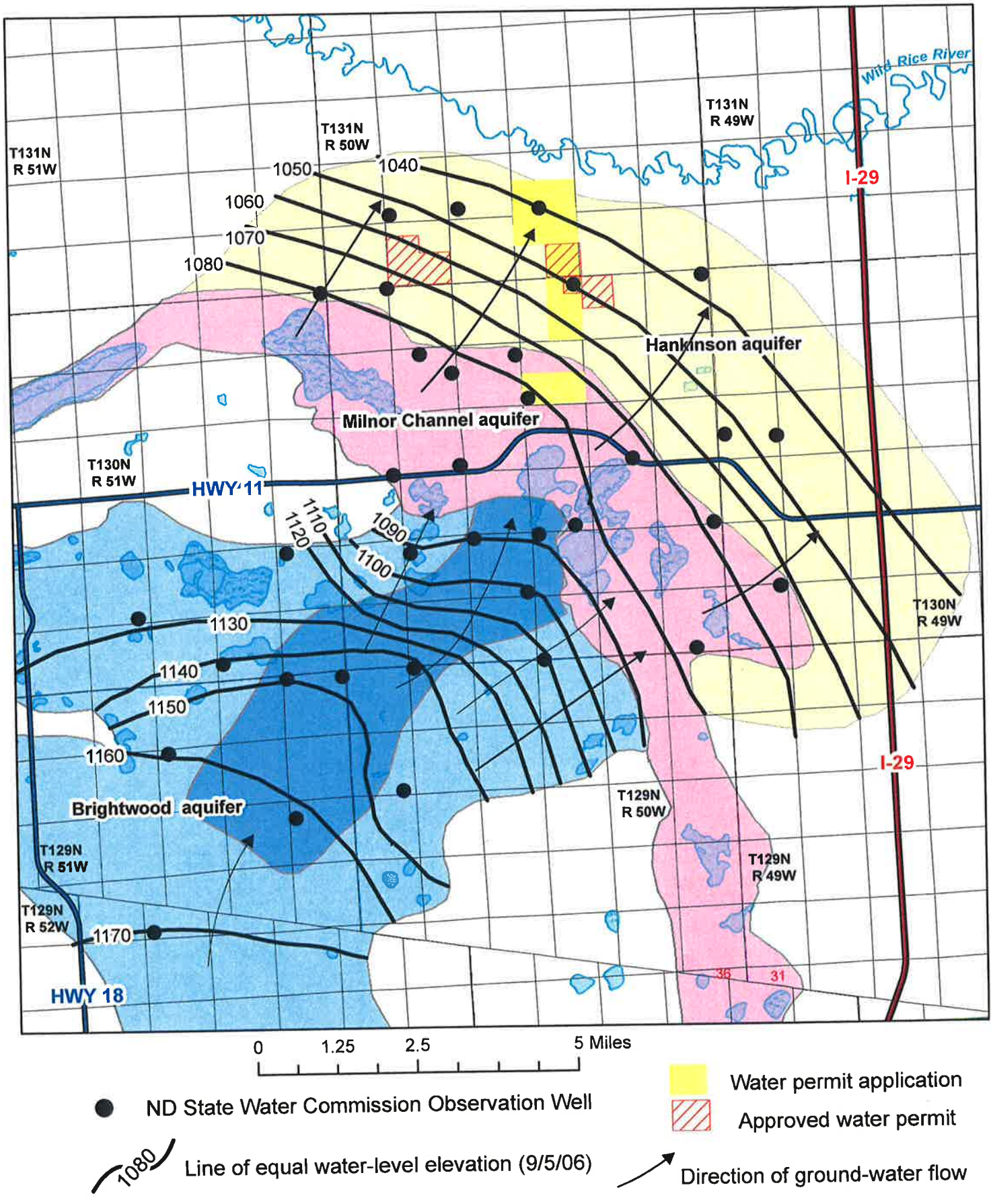

Figure 14. Regional direction of ground-water flow in the Brightwood, Milnor Channel and Hankinson aquifers in the Hankinson area.

Table 2. Chemical composition of ground-water samples collected from the Brightwood, Milnor Channel, and Hankinson aquifers.

	pH	Dissolved Solids (mg/L)	Hardness $CaCO_3$ (mg/L)	Hardness Non $CaCO_3$ (mg/L)	Calcium Ca (mg/L)	Magnesium Mg (mg/L)	Potassium K (mg/L)	Sodium Na (mg/L)	Bicarbonate HCO_3 (mg/L)	Sulfate SO_4 (mg/L)	Chloride Cl (mg/L)	Iron Fe (mg/L)	Manganese Mn (mg/L)
Brightwood Aquifer													
Range	6.9 - 8.1	404 - 2040	296 - 1200	11 - 759	80 - 314	19 - 100	4 - 15	2 - 288	149 - 555	83 - 1180	1 - 32	0.03 - 5	0.2 – 1.1
Mean	7.7	902	661	310	177	53	8	38	428	397	6	1.2	0.5
Samples	70												
Milnor Channel Aquifer													
Range	7.0 – 8.2	271 - 1380	240 - 993	5 - 450	65 - 190	18 - 158	2 - 21	4 - 214	260 - 693	37 - 650	1 - 150	0.1 – 4.2	0.3 – 1.2
Mean	7.7	849	558	177	128	58	11	68	468	325	18	1.2	0.6
Samples	40												
Hankinson Aquifer													
Range	6.4 – 8.1	203 - 3290	107 - 2300	0 - 1650	50 - 527	12 - 430	1 - 56	3 - 170	216 - 1050	5 - 1990	1 - 243	0.07 - 16	0.03 – 1.9
Mean	7.7	1047	665	349	165	85	11	40	437	488	28	2.4	0.7
Samples	39												

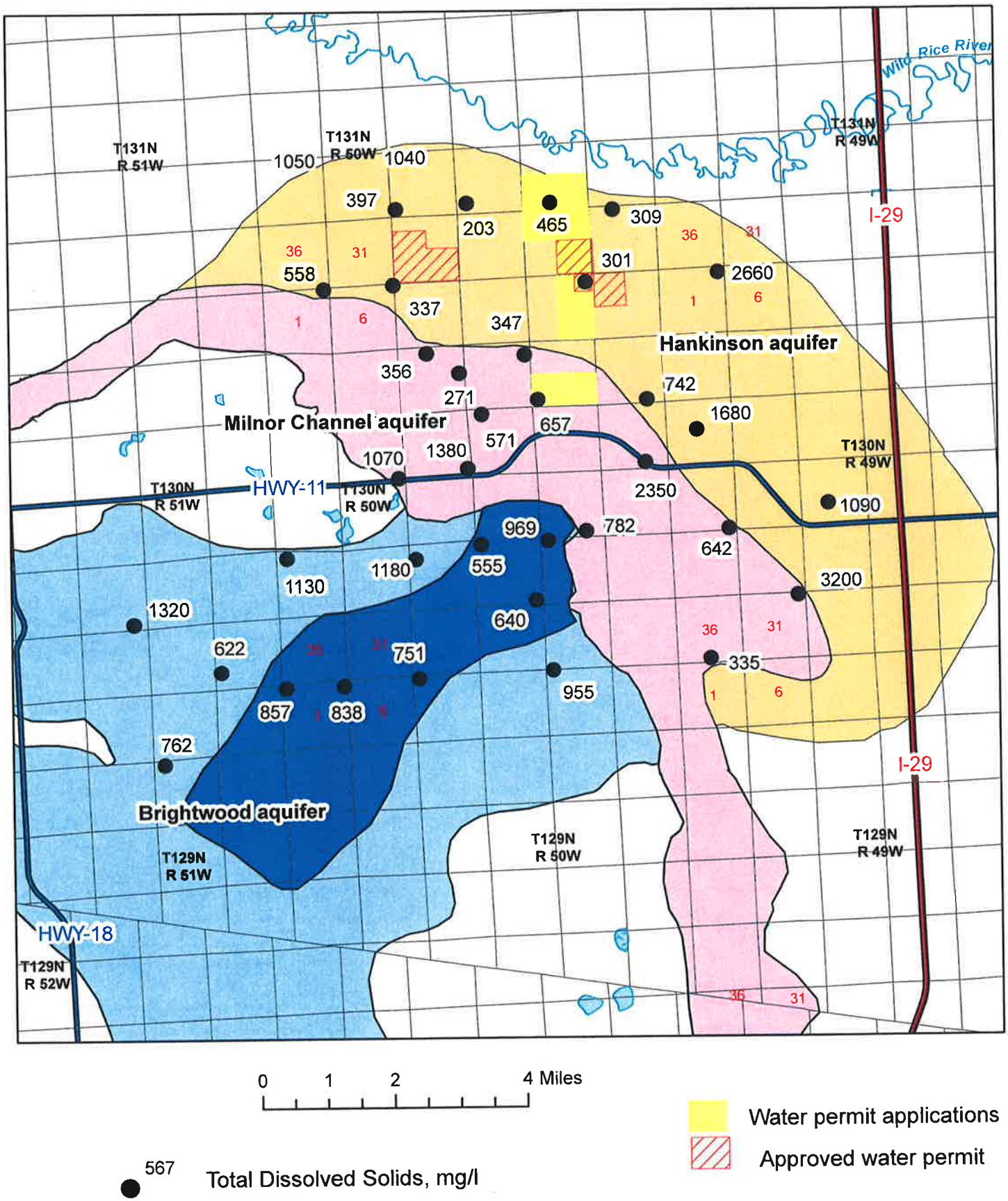

Figure 15. Total dissolved solids concentrations in Brightwood, Milnor Channel and Hankinson aquifers

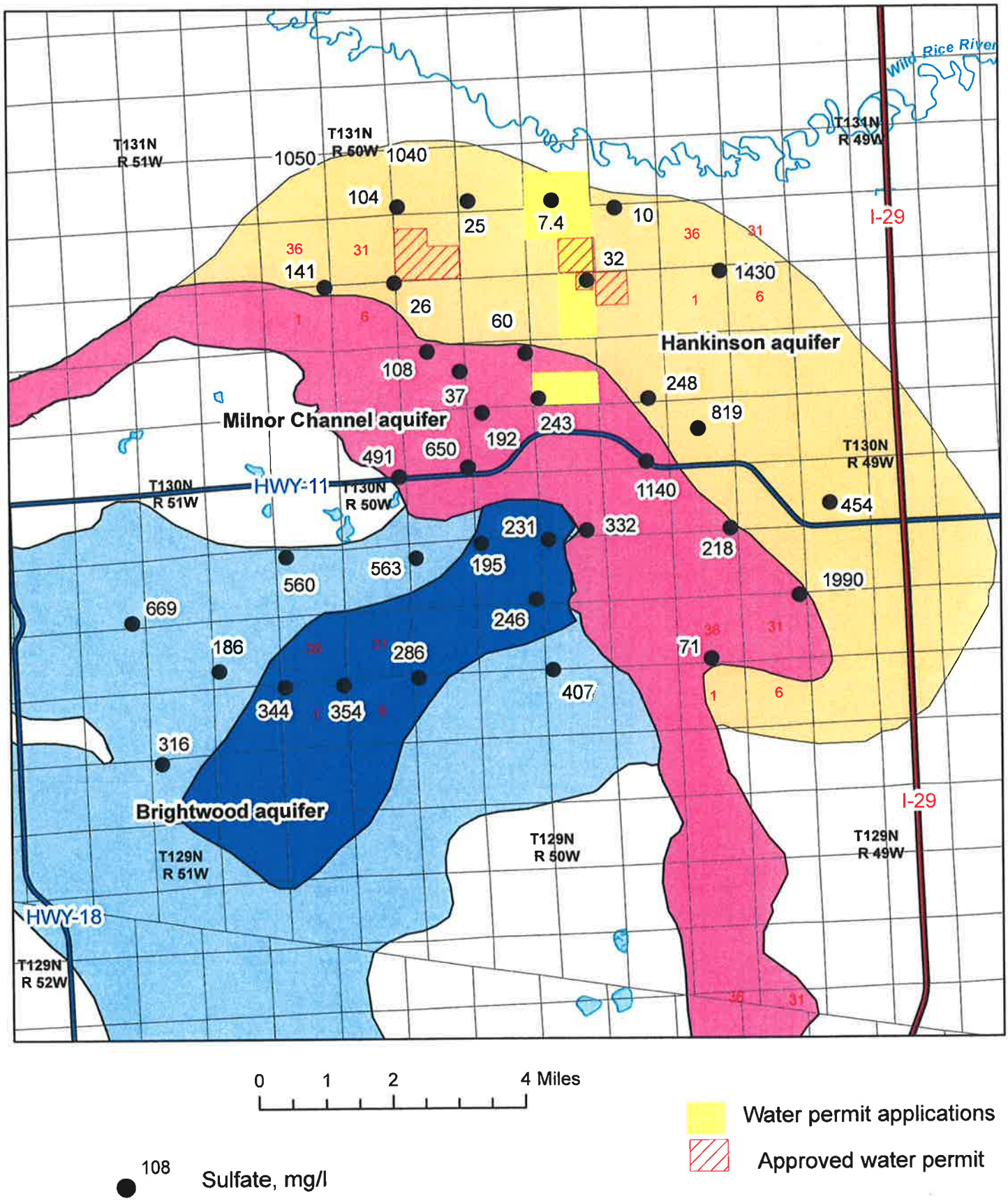

Figure 16. Sulfate concentrations in Brightwood, Milnor Channel and Hankinson aquifers

The sand dune complex is characterized by smaller dissolved solids concentrations ranging from about 230 to 400 mg/L. The SEWUD well field is located in the northwest part of the dune complex. Nine chemical analyses of raw ground-water samples from the well field were provided by the North Dakota Department of Health and Consolidated Laboratories. The samples were collected over a period from March 1977 to May 1997. Dissolved solids concentrations range from 215 to 290 mg/L. All analyses indicate the ground water is a calcium-bicarbonate type.

The dune complex is a local land-surface upland characterized by a hummocky topography. Serden Series soils are the primary mapping unit in the dune complex. These soils consist predominantly of loamy fine sand or fine sand. In addition, these soils are rapidly permeable with low available moisture holding capacity. Organic-matter content is low.

The upland, hummocky topography of the dune complex provides an excellent catchment area for winter snowfall and also enhances depression focused recharge that occurs during the spring. Soil infiltration rates are large and moisture-holding capacities are small, both of which facilitate aquifer recharge.

Oxidation of organic carbon is the major source of dissolved CO_2 in the infiltrating (recharge) ground water. Low organic carbon translates to lower partial pressures of CO_2 in recharge water, which reduces production of carbonic acid (H_2CO_3). Lower concentrations of carbonic acid results in less carbonate dissolution, which generally is the major source of dissolved solids (Ca, Mg, HCO_3) delivered to the water table in most shallow unconfined aquifers in North Dakota. Low organic carbon content in the soils associated with the dune complex therefore probably is the major constraint on dissolved-solids concentrations of water that ultimately is delivered to the water table.

Ground-water evapotranspiration in the dune complex is less than that associated with surrounding lower elevation areas. As a result, concentration of salts by evapotranspiration is minor. In short, the dune complex is an upland net recharge area where the unsaturated zone (particularly in depressional areas) is well flushed (leached) on an annual basis, thereby facilitating recharge characterized by relatively small dissolved-solids concentrations.

Hankinson Aquifer, Water Permits, Production Wells and Water Use

Southeast Water Users District (SEWUD)

Southeast Water Users District (SEWUD) holds perfected water permit #2823, authorizing an annual appropriation of 350.0 acre-feet of ground water from the S1/2 NW1/4 of Section 32, Township 131 North, Range 50 West (fig. 1, Table 3)) at a maximum pumping rate of 500 gallons per minute. SEWUD also holds conditional water permit #4106, authorizing an annual appropriation of 250.0 acre-feet of ground water from a point(s) of diversion located in the SW1/4 of Section 32, Township 131 North, Range 50 West (fig. 1, Table 3) at a maximum pumping rate of 400 gallons per minute. SEWUD also holds conditional water permit #5335 authorizing an annual appropriation of 150 acre-feet of ground water from points of diversion in the SW1/4 and the S1/2 NW1/4 of Section 32, Township 131 North, Range 50 West (fig. 1, Table 3) at 900 gallons per minute. SEWUD also holds conditional water permit #5734 authorizing an annual appropriation of 850.0 acre-feet of ground water annually from a point(s) of diversion located in the SW1/4 and the SE1/4 of Section 32, Township 131 North, Range 50 West to provide for a municipal-rural-domestic water supply at a maximum pumping rate of 1,300 gallons per minute. Total appropriations held by the SEWUD amounts to 1,600.0 acre-feet at 3,100 gpm (Table 3).

Table 3. Summary of Southeast Water Users District Water Permits

Permit #	**Acre-feet**	**Pumping Rate**
2823	350	500
4106	250	400
5335	150	900
5734	850	1,300
Total	**1,600**	**3,100**

SEWUD currently has 7 production wells that supply water to their users (Table 4). Below is a summary of each wells construction and test pumping details. Hydraulic properties calculated using pumping data collected from the wells are presented in table 7.

Well #1 was constructed in 1977. Sand of the Hankinson aquifer (dune complex) was encountered from land surface to 107 feet below land surface. The rural water well was constructed of 8-inch steel casing from land surface to 68 feet below land surface. Eight-inch diameter, sixteen-slot stainless-steel screen was set from 68

to 103 feet below land surface. Static water level on March 9, 1977 was 13.8 feet below land surface. The well was test pumped at 200 gpm for 24 hours with a resulting 26.7 feet of drawdown. This results in a specific capacity of 7.49 gallons per minute per foot of drawdown. Well #1 is pumped at a reported rate of 125 gpm.

Table 4. – Southeast Water Users District production well data.

Well No.	Year Drilled	Total Depth (Ft.)	Screened Interval (Ft., B.L.S.)	Well Diameter (In.)	Pumping Rate (gpm)
1	1977	107	68-103	8	125
2	1978	75	51-76	8	125
3	1978	90	60-90	8	125
4	?	90	64-90	10	?
5	1990	87	62-87	10	125
6	2006	90	60-90	10	?
7	2006	135	95-135	10	?

Well #2 was constructed in 1978. Sand of the Hankinson aquifer (dune complex) was encountered from 10 feet to 75 feet below land surface. The rural water well was constructed of 8-inch diameter steel casing from land surface to 51 feet below land surface. Eight-inch diameter, sixteen-slot stainless-steel screen was set from 51 to 76 feet below land surface. Static water level on May 18, 1978 was 6.42 feet below land surface. The well was test pumped at 200 gpm for 24 hours with a resulting 25.87 feet of drawdown. This results in a specific capacity of 7.73 gallons per minute per foot of drawdown. Well #2 is pumped at a reported rate of 125 gpm.

Well #3 was constructed in 1978. Sand of the Hankinson aquifer (dune complex) was encountered from land surface to 90 feet below land surface. The rural water well was constructed of 8-inch diameter steel casing from land surface to 60 feet below land surface. Eight-inch diameter, sixteen-slot stainless-steel screen was set from 60 to 90 feet below land surface. Static water level on May 19, 1978 was 7.17 feet below land surface. The well was test pumped at 205 gpm for 24 hours with a resulting 10.16 feet of drawdown. This results in a specific capacity of 20.18 gallons per minute per foot of drawdown. Well #3 is pumped at a reported 125 rate of gpm.

Records for Well #4 do not include a date of construction. Available records do show that sand and gravel of the Hankinson aquifer (dune complex) was encountered from land surface to 193 feet below land surface. The rural water well was constructed

of 10-inch diameter, steel casing from 2 feet above land surface to 64.1 feet below land surface. Ten-inch diameter, twenty five-slot stainless-steel screen was set from 64 to 90 feet below land surface. Water level and testing information was not reported for Well #4.

Well #5 was constructed in 1990. Sand of the Hankinson aquifer (dune complex) was encountered from land surface to 90 feet below land surface. The well was constructed of ten-inch diameter steel casing from land surface to 62 feet below land surface. Thirty-slot stainless-steel screen was set from 62 to 87 feet below land surface. Static water level on November of 1990 was 15 feet below land surface. The well was test pumped at 240 gpm for 48 hours with a resulting 30 feet of drawdown. This results in a specific capacity of 8 gallons per minute per foot of drawdown. Well #5 is pumped at a reported 125 rate of gpm.

Well #6 was constructed in 2006. Sand of the Hankinson aquifer (dune complex) was encountered from land surface to 90 feet below land surface. The well was constructed of ten-inch diameter steel casing from land surface to 60 feet below land surface. Twenty-slot stainless-steel screen was set from 60 to 90 feet below land surface. Static water level on November 11, 2006 was 11 feet below land surface. The well was test pumped at 250 gpm for 25 hours with a resulting 45 feet of drawdown. This results in a specific capacity of 5.56 gallons per minute per foot of drawdown.

Well #7 was constructed in 2006. Sand of the Hankinson aquifer (dune complex) was encountered from land surface to 135 feet below land surface. The well was constructed of ten-inch diameter steel casing from land surface to 90 feet below land surface. Twenty-slot stainless-steel screen was set from 95 to 135 feet below land surface. Static water level on November 11, 2006 was 15.7 feet below land surface. The well was test pumped at 250 gpm for 25 hours with a resulting 79.3 feet of drawdown. This results in a specific capacity of 3.15 gallons per minute per foot of drawdown.

Annual Water use data for SEWUD are summarized in table 5. Minimum water use for SEWUD was 31.6 acre-feet in 1979, the first year of operation. Maximum water use was 656.3 acre-feet in 2006. Annual water use has steadily increased since 1979 as additional users have been served by SEWUD.

Table 5. – Reported annual water use for permits in the Hankinson aquifer (acre-feet per Year)

Year	#2823 SEWUD	#4106 SEWUD	#5335 SEWUD	Total SEWUD	#735 Hankinson
1979	31.6			31.6	
1980	142.7			142.7	
1981	249.7			249.7	
1982	184.0			184.0	
1983	212.3			212.3	
1984	297.6			297.6	
1985	258.9			258.9	
1986	253.9			253.9	
1987	269.1			269.1	
1988	267.1			267.1	
1989	298.0			298.0	
1990	277.3			297.3	
1991	268.5	44.8		313.3	125.6
1992	243.7	87.6		331.3	130.5
1993	258.8	135.2		394.0	116.9
1994	278.5	159.0		437.5	157.6
1995	278.3	170.3		448.6	164.9
1996	280.7	171.0		451.7	189.1
1997	320.5	138.3		458.8	141.8
1998	308.3	159.7		468.0	152.9
1999	341.2	157.4		498.6	141.6
2000	243.3	182.5	67.7	493.5	164.9
2001	271.2	180.2	67.9	519.3	144.1
2002	261.2	201.8	79.3	542.3	165.6
2003	262.6	220.2	62.2	545.0	135.1
2004	253.4	189.2	54.4	497.0	137.0
2005	249.3	201.2	52.9	503.4	112.5
2006	322.5	275.6	58.2	656.3	110.4

City of Hankinson

Perfected Water Permit #735 authorizes the city of Hankinson to divert 285.0 acre-feet of ground water annually from the SE1/4 of Section 34, Township 131 North, Range 50 West, the NW1/4 of Section 2, and the NE1/4NE1/4 of Section 3, both in Township 130 North, Range 50 West at a maximum pumping rate of 450 gallons per minute (fig. 1). Construction details of the well capture system are shown in Table 6.

Table 6. – City of Hankinson production well data.

Well No.	Location	Year Drilled	Total Depth (Ft.)	Screened Interval (Ft., B.L.S.)	Well Diameter (In.)	Pumping Rate (gpm)
1	130-050-02BBC	1957	58	?	16	250
2	130-050-03AAB1	1961	68	?	19	160
3	131-050-34C	1978	80	60-80	8	165
4	130-050-03AAB2	1990	72	32-72	10	200

According to Glenn Bladow, city auditor, prior to 2006, the city did not use more than 3 wells at any one time. The city water supply from these three wells served 536 connections consisting of 1058 people. Annual water use from 1991 through 2004 is summarized in Table 5. Maximum reported use was 189.1 acre-feet in 1996. Beginning in 2007, the city of Hankinson quit pumping water under authority of Water Permit #735 and has been provided water from Southeast Water Users District.

Specific capacity data are not available for any of the four wells. A pumping test was conducted by Falk Bros. Well Drilling on well #4 but production well water-level measurements were not made due to cascading water in the well.

Hankinson aquifer, Hydraulic Properties

As discussed earlier, specific capacity data are available for the five SEWUD production wells. These data are summarized in table 7 (from, North Dakota State Water Commission Office Memo, Conditional Water Permit Application #5335, Southeast Water Users District, Shaver, 1999)

Table 7. -- Well construction, specific capacity, hydraulic conductivity and Transmissivity data for the 5 SEWUD production wells (Shaver, 1999).

Well No.	Total Depth (Ft.)	Diameter (Inches)	Screened Interval (Ft., BLS)	Saturated Thickness (Ft.)	Pumping Rate (gpm)	Duration Of Test (Hrs.)	Drawdown (Ft.)	Specific Capacity (gpm/Ft.)	Hydraulic Conductivity (Ft ²/ Day)	Transmissivity (Ft ²/ Day)
1	103	8	68-103	89.2	200	24	26.7	7.5	15.5	1383
2	76	8	51-76	69.6	200	24	19.4	10.3	30.0	2088
3	90	8	60-90	82.8	205	24	10.1	20.3	48.0	1673
4	89.6	10	64.1-89.6	67.7	200	32	28.2	7.1	19.0	1286
5	87	10	62-87	72.0	240	48	30.0	8.0	20.0	1440

The values of hydraulic conductivity for wells 2 and 3 are too large for a fine sand (#10-#12 slot) which the driller reported on the completion report. A typical hydraulic conductivity of a well-sorted fine sand should be between 10 and 20 feet per day. Thus, an average transmissivity for the well field area is estimated at 1500 Ft^2/Day.

Available pumping test data for the SEWUD District production wells are inconclusive with regard to the calculation of aquifer storativity. The pumping tests were not of sufficient duration to avoid the effects of delayed yield from gravity drainage. However, an aquifer test is reported in the Richland County ground-water study for a well completed in the Hankinson aquifer at Township 130 North, Range 50 west, SW1/4 of section 2. The transmissivity of the aquifer was reported as 2,400 Ft2/d (hydraulic conductivity of 24 Ft./d) and the coefficient of storage as 0.17. These values are within the range of typical values reported for very fine to fine sands.

Hankinson aquifer, water -level trends

Water levels from four wells completed in the Hankinson aquifer are presented in figure 17. Note that water levels in all the wells respond in a similar manner. Snowmelt and rain in March through May results in the infiltration of water downward into the Hankinson aquifer. This recharge results in a general rise in water levels. During the summer, the water level in the aquifers generally decline due to high summer evaporation rates, and in response to discharge from the system in the form of spring flow. Evapotranspiration ceases with the first killing frost. Throughout the fall and winter, water levels in the Hankinson aquifer slowly decline as water continues to flow toward the discharge areas (springs and local drains). Discharge from springs is continuous throughout the year peaking following spring recharge and declining throughout the remainder of the year. Seasonal fluctuations of spring flow are much smaller than fluctuations due to evapotranspiration. Highest water levels occur in April or May in drier years and June or July in wetter years. Occasionally heavy spring or summer rains can overcome soil moisture deficits and provide aquifer recharge thereby causing water levels to rise.

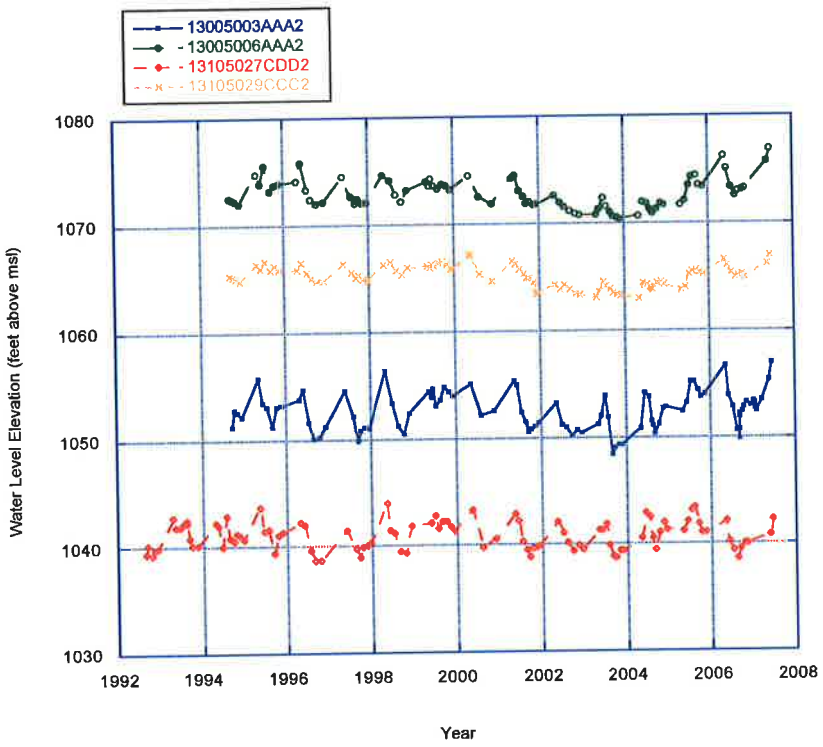

Figure 17. Water level fluctuations in the Hankinson aquifer

Milnor Channel aquifer

The Milnor Channel aquifer occurs along much of the southern and western flank of the beach deposits of the Hankinson aquifer (figs. 2 and 4). The Milnor Channel aquifer represents the course of ice-marginal stream flow of the ancestral Sheyenne River (Brophy, J. A., and Bluemle, J. P., 1983 and Baker, C. H., Jr., and Paulson, Q. F., 1967). The aquifer extends from the Sheyenne valley in Ransom County to the vicinity of Lake Traverse in South Dakota (figs. 2 and 4). In the area just west of Hankinson, Willard Lake, Grass Lake, Round Lake, and Lake Elsie, along with numerous wetlands and marshy areas overlie the Milnor Channel aquifer. This area is characterized by poorly drained soils; reflecting a high water table, discharge area (fig. 6). The Milnor Channel aquifer is comprised of fluvial sand and gravel deposits associated with a typical glacial meltwater channel.

The saturated thickness of the Milnor channel deposits range from 25 to 135 feet and average about 60 feet. The aquifer is unconfined and the water table is generally less than 10 feet below land surface and fluctuates seasonally. The most

productive part of the Milnor Channel aquifer near Hankinson covers an area of about 20 square miles (fig. 2).

Recharge to the Milnor Channel aquifer in the Hankinson area is from three sources: 1) infiltration of direct precipitation, 2) water moving as underflow from the northwest, and 3) underflow from the Brightwood aquifer. Discharge of water from the aquifer is primarily as underflow through the channel and by evapotranspiration. The hydraulic gradient from the Brightwood aquifer to the Milnor channel aquifer is about 4 feet per mile, based on water levels measured in observation wells (fig. 14).

The total dissolved solids concentrations in 40 water samples collected from the aquifer ranged from between 271 to 1,380 mg/l (Table 2, fig. 15). Sulfate concentrations ranged between 37 and 650 mg/l (Table 2, fig. 15). Carbonate hardness ranged between 240 and 993 mg/l as CaCO3. Noncarbonate hardness ranged between 5 and 450 mg/l as CaCO3.

The only large capacity wells completed into the Milnor Channel aquifer are located near Lidgerwood ND, 15 miles west of the city of Hankinson. These wells range in yield from 500 to 800 gpm. Much of the aquifer near Hankinson underlies low marshy ground and only a few farm wells are completed into the aquifer. Individual well yields of 500 to 800 gpm should be possible in the thicker and more permeable parts of the Milnor Channel aquifer near Hankinson.

In 2007, the city of Hankinson constructed an 8-inch diameter test well in the SW1/4SE1/4 of section 10, Township 130 North, Range 50 West. The well was completed into the Milnor Channel aquifer. Sand and gravel of the Milnor Channel aquifer was encountered from 61 to 160 feet below land surface. The test well was constructed of 8-inch diameter steel casing from land surface to 120 feet below land surface. Eight-inch diameter, thirty-slot stainless-steel screen was set from 120 to 150 feet below land surface. Static water level on January 7, 2007 was 2 feet below land surface. The well was test pumped at 410 gpm for 168 hours with a resulting 88 feet of drawdown. This results in a specific capacity of 4.66 gallons per minute per foot of drawdown. The well has subsequently been further developed and information from the driller (Falk Drilling) is that the well is far more efficient than when first pumped. Because of the poor well efficiency of the well and the highly variable pumping rate

during the test, water-level data collected during pumping were not useful in determining aquifer hydraulic properties.

Water levels from eight wells completed in the Milnor Channel aquifer are presented in figures 18 and 19. Note that water levels in all the wells respond in a similar manner. Snowmelt and rain in March through May results in the infiltration of water downward into the Milnor Channel aquifer. This recharge results in a general rise in water levels. During the summer, the water levels in the aquifer generally decline due to high summer evaporation rates, and in response to discharge to the Hankinson aquifer. Evapotranspiration ceases with the first killing frost. Throughout the fall and winter water levels in the Milnor Channel aquifer slowly decline as water continues to flow toward the discharge areas (springs and local drains). Spring discharge is continuous throughout the year peaking following spring recharge and declining throughout the remainder of the year. Seasonal fluctuations of spring flow are much smaller than that due to evapotranspiration. The highest water level occurs in April or May in drier years and June or July in wetter years. Occasionally heavy spring or summer rains can overcome soil moisture deficits and provide aquifer recharge thereby causing water levels to rise.

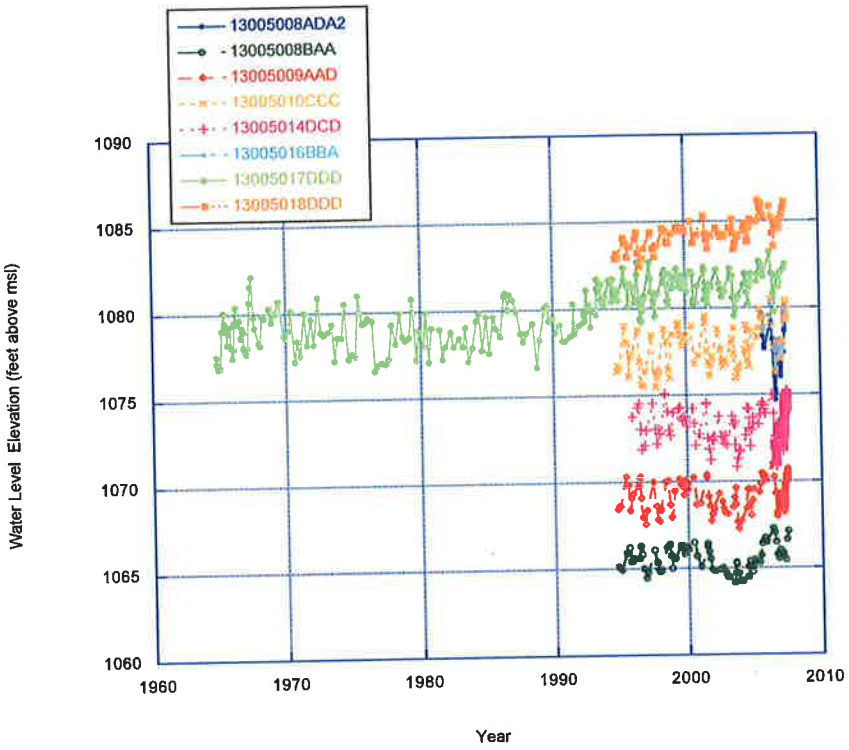

Figure 18. Water level fluctuations in the Milnor Channel aquifer, 1965-2007

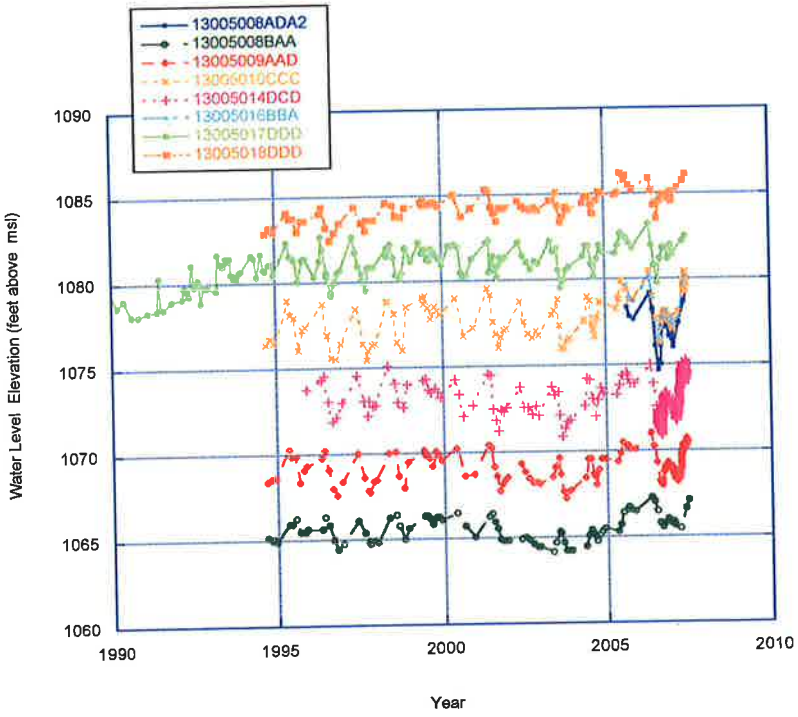

Figure 19. Water levels fluctuations in the Milnor Channel aquifer, 1990-2007

Water levels in the Milnor Channel aquifer also respond to long term climate trends. Increased yearly precipitation from 1993 to 2005 (fig. 5) resulted in a general rise in water levels with the level in the SW1/4 of section 17, Township 130 North, Range 51 West increasing as much as 5 feet (figs. 5, 18 and 19).

Brightwood Aquifer

The Brightwood aquifer is located several miles southwest of the city of Hankinson (fig. 2). The aquifer is comprised of coarse sand and gravel outwash deposits enclosed by deposits of stagnation moraine (till). Locally, where the outwash is overlain by till, the aquifer may be confined. In areas where the overlying till is absent, the aquifer is unconfined. The saturated thickness of the sand and gravel ranges from 50 to 130 feet and averages about 100 feet. Water levels in the Brightwood aquifer are nearly constant at a depth of 50 to 80 feet below land surface. Sand and gravel deposits associated with the Brightwood aquifer crop out just west of Lake Elsie (now the site of a large gravel pit). Individual well yields of as much as 500 gpm should be possible in places (Baker and Paulson, 1967).

Recharge to the Brightwood aquifer is from infiltration of a portion of the local precipitation. Ground water moves northeastward through the aquifer and discharges into Lake Elsie, Willard Lake, Round Lake, Grass Lake and marshy areas, and finally into the Milnor Channel aquifer (fig. 14). The hydraulic gradient in the Brightwood aquifer is about 15 feet per mile, based on water levels measured in observation wells on September 5, 2006.

The total dissolved solids in 70 water samples collected from the Brightwood aquifer ranged between 404 and 2040 mg/l (Table 2, fig. 15). Sulfate concentrations ranged between 83 and 1180 mg/l (Table 2, fig. 16). Carbonate hardness ranged from 296 to 1,200 mg/l as CaCO3. Noncarbonate hardness ranged from 11 to 759 mg/l as CaCO3.

Water levels from five wells completed in the Brightwood aquifer are presented in figures 20 and 21. Note that water levels in all the wells respond in a similar manner. Snowmelt and rain in March through May results in the infiltration of water downward into the Brightwood aquifer. This recharge results in a general rise in water

levels. During the summer, the water level in the aquifers generally decline due in response to discharge to the Milnor Channel aquifer. Because of large depths to water, evapotranspiration is not a major discharge mechanism in the Brightwood aquifer. Throughout the fall and winter months, water levels in the Brightwood aquifer slowly decline as water continues to flow toward the discharge areas (springs and local drains). Spring discharge is continuous throughout the year peaking following spring recharge and declining throughout the remainder of the year. The highest water level occurs in April or May in drier years and June or July in wetter years. Occasionally heavy spring or summer rains can overcome soil moisture deficits and provide aquifer recharge thereby causing water levels to rise.

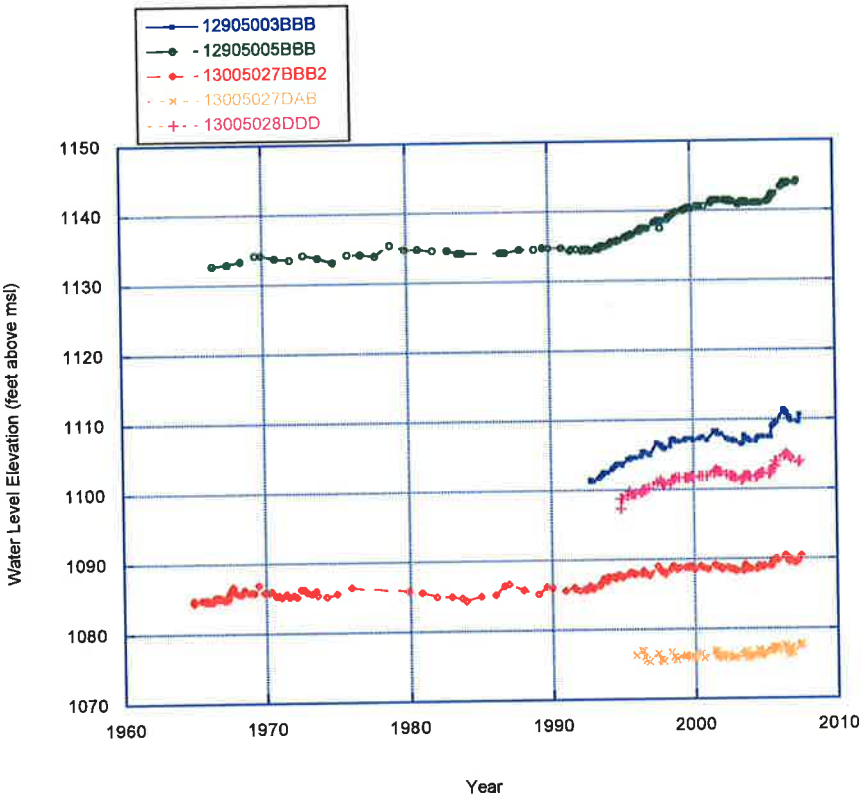

Figure 20. Water level fluctuations in the Brightwood aquifer, 1965-2007

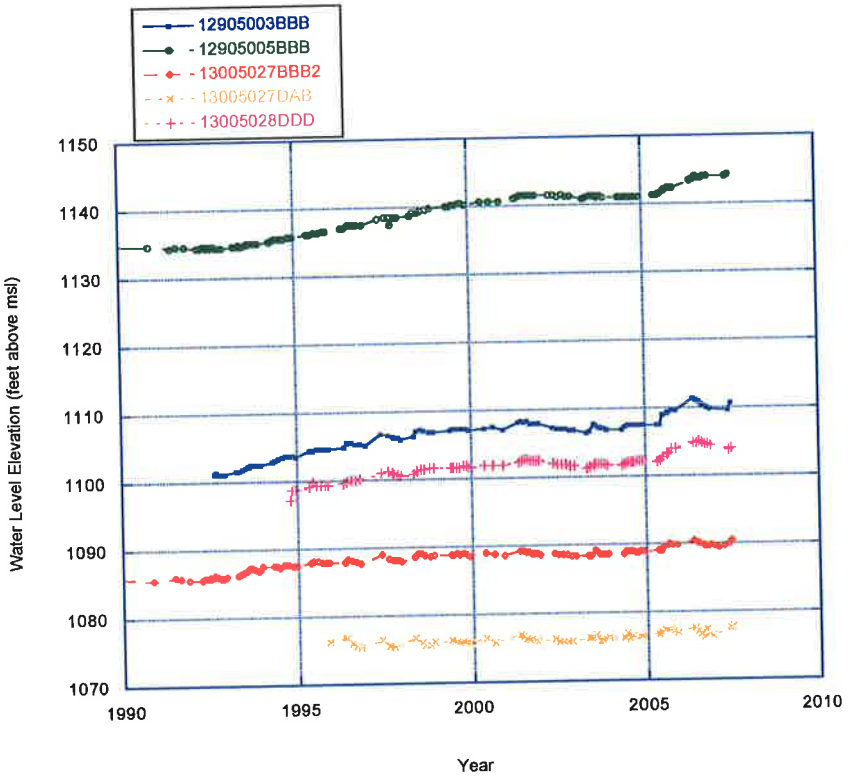

Figure 21. Water levels in the Brightwood aquifer, 1993-2007

Water levels in the Brightwood aquifer also respond to long term climate trends. Increased yearly precipitation from 1993 to 2005 (fig. 5) results in a general rise in water levels with the level at the observation well in the NW1/4 of section 5, Township 129 North, Range 50 West increasing as much as 10 feet (figs. 5, 20 and 21).

Undefined Buried Sand and Gravel Deposits Encased by Glacial Drift and/or Lake Clays

A large number of domestic and stock wells and one large capacity irrigation well in the area are completed into deeper buried deposits of sand and gravel. East of the city of Hankinson, these deposits occur randomly and may or may not be connected to one another or to more productive aquifers in the region (for example the Milnor Channel aquifer). Most all of the wells completed into these buried layers of sand and gravel flow and the prevailing theory is that the flowing head is driven by water flowing from the west towards the regional discharge area of the Wild Rice River and eventually the Red River.

Just east of the city of Hankinson, deeper buried deposits of sand and gravel were encountered from 158 to 212 feet below land surface (Township 130 North, Range 49 West, SW1/4 section 18). An observation well was constructed at this site with a resulting flowing head of an estimated 11 feet above land surface. The well was subsequently plugged and abandoned to prevent flowing conditions. At this site, fine to very fine sand of the overlying Hankinson aquifer occurred from 32 to 53 feet below land surface.

In July 2006, Steffl Drilling constructed two 12-inch diameter production wells into deeper aquifer intervals located east of the city to develop a water supply for the proposed ethanol plant. At site #1 (SE1/4 of section 18, Township 130 North, Range 49 West) the following geologic layers were encountered, 0-140, clay 140 to 160, sand and rocks (undefined buried channel aquifer), 160-163, rock and 163 to 200, clay. The production well was constructed of 12-inch diameter steel casing from 2 feet above land surface to 140 feet below and surface. The well was screened from 140 to 160 feet below land surface with # 60 slot stainless steel screen. Static water level was 28 feet below land surface. This well was not test pumped.

Production well #2, is located just east of the city of Hankinson. At this site, the following geologic layers were encountered, 1 to 66 feet, very fine to fine sand (Hankinson aquifer), 66 to 163, clay, 163 to 190 feet, sand and gravel of the buried undefined channels aquifer and 190 to 200, clay. The production well was constructed of 12-inch diameter steel casing from 2 feet above land surface to 164 feet below and surface. The well was screened from 164 to 189 feet below land surface with # 55-slot stainless steel screen. Upon completion, the test well flowed at 50 gpm. In contrast, flowing conditions were not experienced well #1 (28 feet to water) highlighting the complicated nature of flow in the deeper sand and gravel deposits. If the deposits at well #1 were hydraulically connected to deposits at well #2 the water levels should occur at similar elevations.

Production well #2 was test pumped at 425 gpm for 7 days with over 127 feet of drawdown in the pumping well. The water from the well had a total dissolved solids concentration of 1800 mg/l. Hardness was 1470 mg/l, sulfate was 1350 mg/l and arsenic was 52.1 ug/l. After testing, it was determined that the water quality was not acceptable for use for the proposed ethanol plant and as a result this potential water supply was abandoned.

Perfected Water Permit #4442 – Dan Pellman

Perfected water permit #4442 authorizes an annual appropriation of 172.5 acre-feet from the SW1/4 of Section 20, Township 131 North, Range 50 West, to irrigate 115 acres of land located in the SW1/4 of Section 20, Township 131 North, Range 50 West at a maximum pumping rate of 800 gallons per minute.

In February 1998, 4 test holes were completed in the proposed permit area. The driller's completion reports indicated the best potential for a large-capacity irrigation well is about 400 to 500 feet south of the center of the SW1/4 of Section 20. The completion report indicated yellow sand from 0-15 feet, coarse gray sand from 15 to 47 feet, sand with clay layers from 47 to 64 feet, fine clean sand from 64 to 80 feet, clean sand from 82 to 100 feet, coarse gray sand from 100 to 120 feet, and coarse gravel from 120 to 130 feet below land surface. The production well is screened from 120 to 139 feet below land surface with #9-slot pvc screen. The deeper lithologies suggest the occurrence of a narrow buried glacial outwash channel that may or may not be hydraulically connected to the overlying Hankinson aquifer.

Mr. Pellman has developed 115 acres for irrigation. Reported was use has varied from 20 acre-feet in 1999 to 58.1 acre-feet in 2003.

Relationships between aquifers

The stratigraphic relationships of the aquifers are shown on hydrogeologic sections A-A' through G-G' (figs. 7 through 13). Previous county-study work suggests hydraulic continuity between the Brightwood, Milnor Channel, and Hankinson aquifers. Additional test drilling/water-level monitoring data collected after the county study provides a stronger basis to support hydraulic continuity between the three aquifers. A water-table map of the application evaluation area was presented in figure 14. The water-table configuration is based primarily on water levels measured at SWC observation wells for which surveyed land surface and well measuring point elevations are available. Water levels were measured on September 5, 2006.

The regional direction of ground-water flow is from southwest to northeast toward the Wild Rice River (fig.14). Inspection of figure 14 suggests that ground water moves from the Brightwood into the Milnor Channel aquifer with a portion of the ground water discharging into the numerous lakes, wetlands and marshy areas which overlie the Milnor Channel aquifer. It also appears that some of the ground water moves as underflow from the Milnor Channel aquifer into the Hankinson aquifer. It appears the Wild Rice River is incised primarily into lacustrine silty clays and clays associated with glacial Lake Agassiz (fig. 2). In this area, a direct hydraulic connection between the Hankinson aquifer and the Wild Rice River is not confirmed. Discharge to the Wild Rice River from the Hankinson aquifer probably occurs through springs that occur along intermittent tributaries to the river (fig. 1).

The hydraulic gradient is smaller (rather flat) in the general area of the Milnor Channel aquifer as compared to that associated with the Hankinson aquifer (fig. 14). The flatter water level gradient on the Milnor Channel aquifer is likely the result of discharge due to evapotranspiration on a low elevation, flat-lying landscape.

COMPUTER SIMULATION OF GROUND WATER

Introduction

The U.S. Geological Survey finite-difference model MODFLOW-2000 (Harbaugh and others, 2000) was used to develop a ground-water flow model for the Hankinson area aquifers. ArcView GIS software and Argus graphical user interface software were use as preprocessors to generate MODFLOW-2000 input.

Conceptual Model

Computer simulation of any ground-water flow system first involves the development of a conceptual model of the system. A conceptual model of the natural flow system is developed by using the available hydrogeologic data to: 1) determine the geometry, and hydraulic properties of the system 2) to describe the recharge, flow through and discharge from the system and 3) identification and delineation of hydraulic boundaries surrounding the study area. Presented in figure 22 is a conceptual schematic of ground-water flow in the region. Prior to pumping (local domestic/stock wells, city of Hankinson wells, and Southeast Water Users District wells) the Brightwood, Milnor Channel and Hankinson aquifers were in quasi-equilibrium or quasi-steady state conditions; meaning that over the long term, the amount of water entering the system (recharge from precipitation) was equal to the amount of water leaving the system (discharge in the form of evapotranspiration, spring discharge, and underflow). Water enters the system as areal recharge from infiltration of precipitation. Of particular interest is the downward movement of ground water into the Brightwood aquifer. Water moves laterally from the Brightwood aquifer into the Milnor Channel aquifer. Water either discharges from the Milnor Channel aquifer as evapotranspiration from the shallow water table or as evaporation from the numerous lakes and wetlands that overlie the Milnor Channel aquifer. Excess water also exits the system as over flow from the lakes into the drainage ditches and streams which eventually flow into the Wild Rice River. Ground water also moves as underflow from the Milnor Channel aquifer laterally into the Hankinson aquifer. Ground water discharges from the Hankinson aquifer either as evapotranspiration from the surface or as spring flow along the northern and eastern flanks of the Hankinson aquifer (fig. 22).

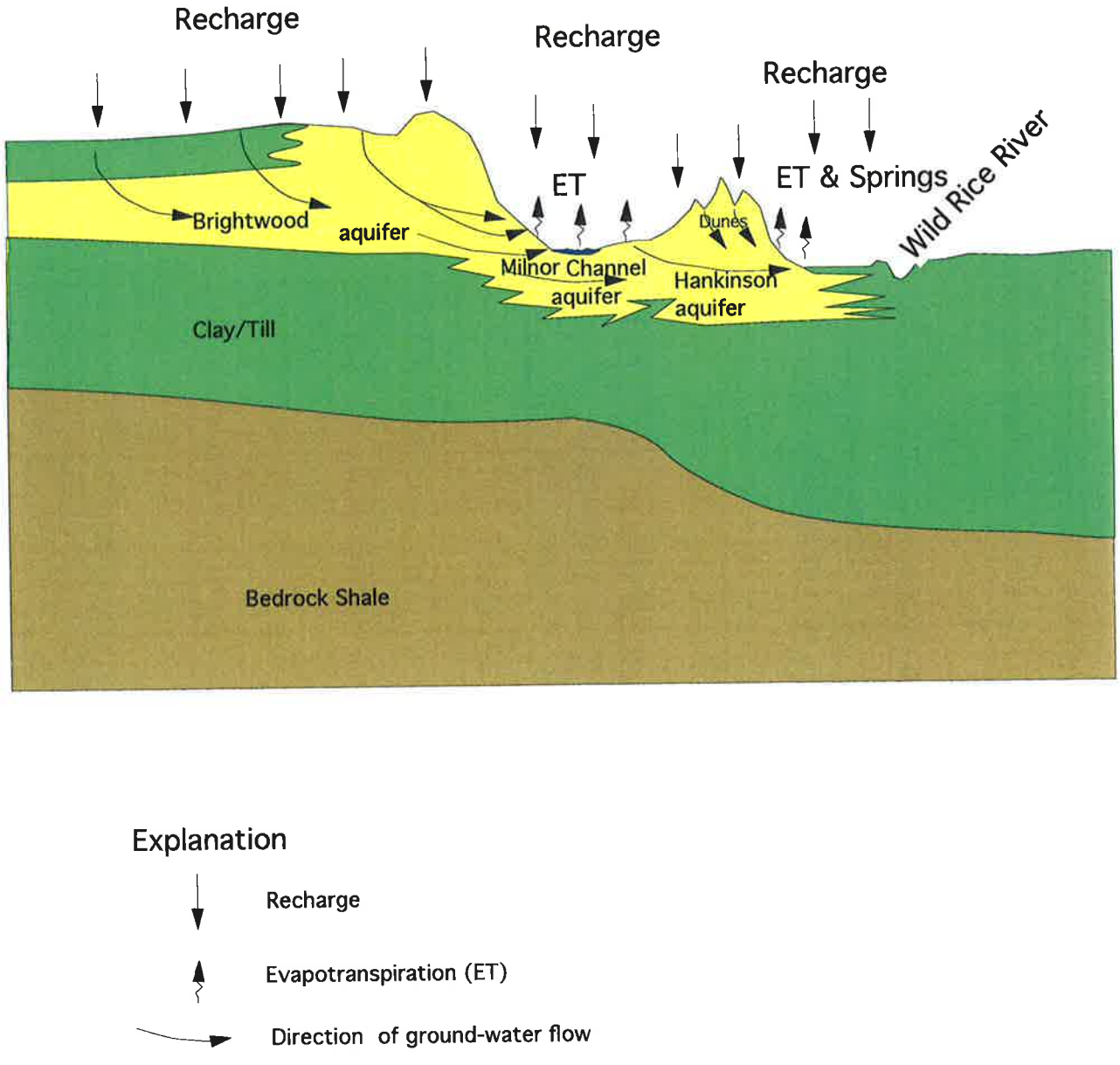

Figure 22. Conceptual model of ground-water flow in the Hankinson area

Direct precipitation onto the Milnor channel and Hankinson aquifers can either enter the system as direct recharge, or when the system is full, exit as rejected recharge. The rejected recharge water flows overland into the numerous lakes, depressions and drains and eventually discharges into the Wild Rice River. The discharge of ground water from the Hankinson and Milnor Channel aquifer occurs by evapotranspiration from the shallow water table.

Another area of interest is the sand dune area located in the northwest sector of the Hankinson aquifer (figs 4, 10, 11 and 12). A portion of the precipitation that falls on the dunes (nonintegrated drainage) infiltrates downward into the Hankinson aquifer. Ground water then moves slowly away from the dune area towards the Wild Rice River and eventually is discharged from the aquifer by evapotranspiration or as spring flow (fig. 22).

Description of the Model

To model the aquifer system, the study area was discretized into 6,825, 1000-foot by 1000-foot cells (fig. 23). The finite-difference grid used in modeling the aquifer system consisted of 75 rows and 91 columns (fig. 23). The Hankinson computer model represents an area 18 miles long and 15 miles wide (fig. 23). Values of land surface elevation, starting head, storage coefficient and/or specific yield, hydraulic conductivity and/or transmissivity, recharge rate, evapotranspiration rate and evapotranspiration extinction depth were assigned to each cell. Cells representing pumping wells were assigned well discharge values. Selected cells along the northern and eastern flanks of the Hankinson aquifer were specified as drain cells to simulate the effects of spring flow. The model assumes that values assigned to each cell are uniform over the entire cell.

A single layer was used in the model to represent three different hydrogeologic units. Area one represents the Brightwood aquifer, area two represents the Milnor Channel aquifer and area three represents the Hankinson aquifer. Zones of varying hydraulic conductivity were specified between the Brightwood aquifer and Milnor Channel aquifer to simulate underflow between the aquifers.

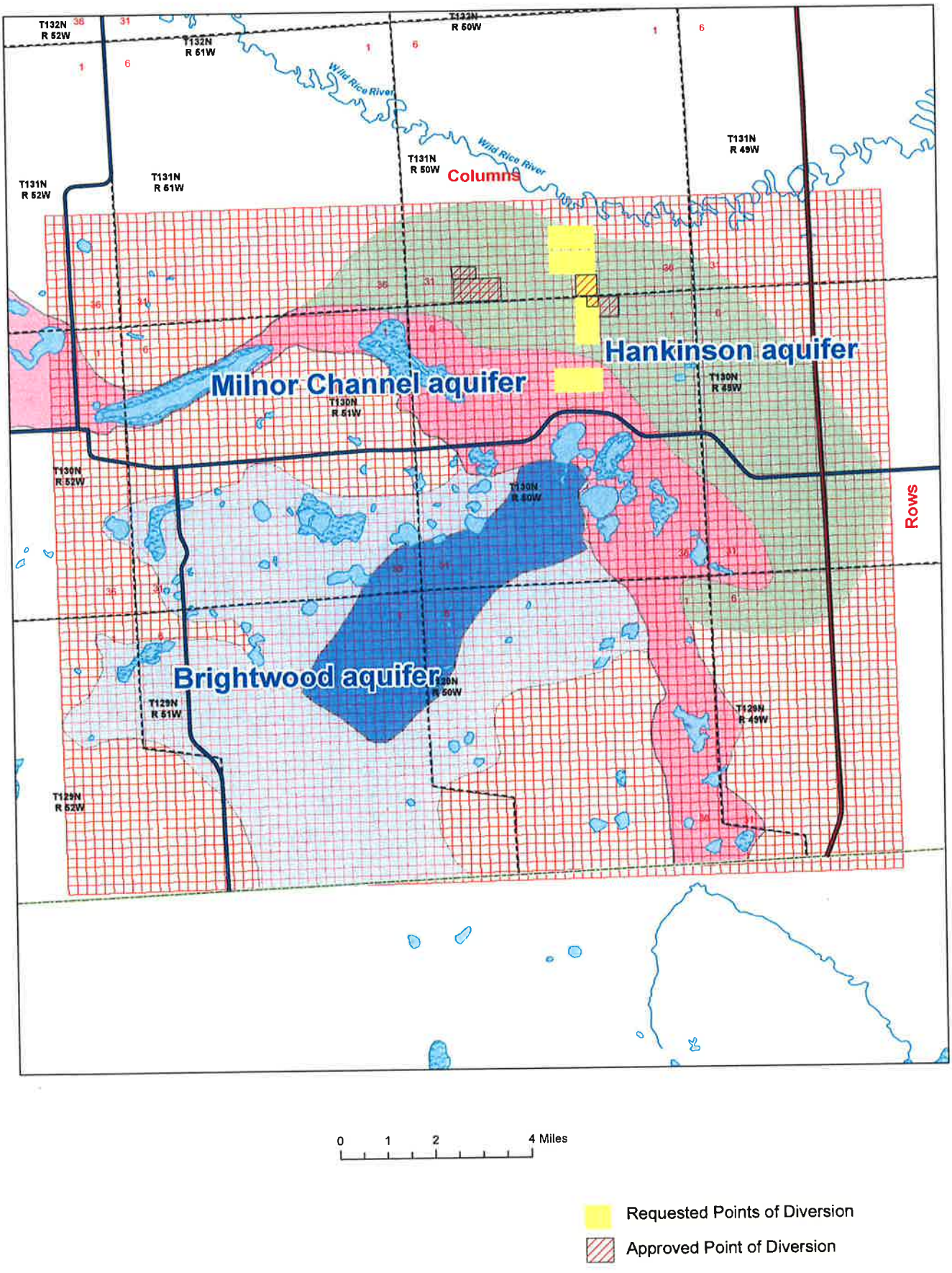

Figure 23. Model grid used for computer model of aquifers in the Hankinson area.

The physical boundaries of the aquifer system are of two types: (1) a semi-permeable boundary of lake clay or till which in places underlies and/or surrounds the aquifers and (2) the underlying low transmissivity bedrock material. Because these physical boundaries are of such a low hydraulic conductivity as compared to the aquifers, they were assumed to be no flow boundaries in the model. Cells within the model domain were specified as active or variable head cells.

Steady-State Model

The steady-state analysis of pumping effects on pending water permit applications #5899 and #5900 included the following:

1) Recharge rate: 2 to 3 inches per year in the Brightwood aquifer, 4.5 inches per year in the Milnor Channel and Hankinson aquifers
2) Maximum evapotranspiration rate (ET) of 18 inches and extinction depth of 6 to 8 feet.
3) Aquifer hydraulic conductivity: 20 ft/day in the Hankinson aquifer, 150 ft/day in the Milnor Channel aquifer and 50 to 200 ft/day in the Brightwood aquifer. Horizontal flow barriers (HFB) were used to restrict flow from the Brightwood aquifer to the Milnor Channel aquifer based on observation water-level differences near the interface of these two aquifers.
4) Storativity: 0.20
5) Average existing water use:
    a. Southeast Water Users District: 540 acre-feet/year
    b. City of Hankinson: 112 acre-feet/year

Areal Recharge

Recharge via precipitation was simulated by assigning recharge rates to individual cells within the steady-state model. The model then calculates a volumetric rate of recharge into a cell by multiplying the area of the cell and the recharge rate. Recharge to the computer model is applied only to the highest active node. Varying amounts of recharge were applied to different areas of the steady state model depending on surficial geology. Recharge rates of 4.5 inches per year were applied to cells in the Hankinson and Milnor Channel aquifers, and 2 to 3 inches per year in the Brightwood aquifer. Recharge rates in this range were sufficient to allow for a reasonable match between the steady-state model generated water levels and measured water levels.

Evapotranspiration

Evapotranspiration (ET) is a major ground-water discharge process in the study area. Maximum ET rates for the steady state-model were estimated by using a trial and error procedure by adjusting ET rates within reasonable limits. The ET rate used by the

computer model depends on the position of the water level relative to the ET surface, the ET extinction depth and the maximum ET rate selected. The ET rate is a linear function which decreases from the maximum ET rate selected, to zero as the water level declines to the extinction depth. The ET rate is set to zero when the water level falls below the ET extinction depth. A maximum ET rate of 18 inches/year with an extinction depth of 6 to 8 feet resulted in steady-state generated water levels which were in agreement with measured values. Evapotranspiration was not used to directly extract water from many of the cells representing Brightwood aquifer because water levels in this area are too deep to be affected by phreatophytes and evaporation from land surface.

Total input to the steady-state model, as areal recharge amounts to 28,023 acre-feet/year (Table 8). Total discharge from the stead-state model occurred as evapotranspiration (25,510 acre-feet/year), drainage to springs (1,861 acre-feet/year) and pumping from the Southeast Rural Water Wells and the city of Hankinson Wells (652 acre-feet/year).

Table 8 Volumetric budget for steady-state model

<----------Ft3/day---------->				
RECHARGE (in)	WELLS (out)	DRAINS (out)	ET (out)	TOTAL OUT
3,344,567	77,813	222,121	3,044,641	3,344,576

Calibration

The steady-state model was calibrated by comparing model-generated water levels with water levels measured during September 2006. Before any model can be used to predict the effects of ground-water development, it must be able to reproduce measured water levels within the aquifer with a reasonable degree of accuracy. During calibration of the steady-state model, several adjustments (within acceptable limits) were made to hydraulic conductivity/transmissivity, interaquifer leakage, areal recharge and evapotranspiration until model generated water levels were close to the measured values. As with any ground-water model, various combinations of the input parameters generated similar water levels. For example, increasing areal recharge could be adjusted for by increasing the ET rate, thereby resulting in the same solution as when a lower areal recharge, lower ET rate were used. Thus, all ground-water flow simulations are characterized by solution non-uniqueness. The stead-state model that was selected to be used as the basis for predictive simulations was based on a more conservative (drier) set of hydrologic parameters.

Presented in Figure 24a are steady-state model generated water levels in the area aquifers for September 5, 2006. Figure 14, shows the measured water levels for that date. In general, the model generated water-level contour map (fig. 24a) compares favorably with the water-level contour map drawn from the measured data (fig. 14 and 24a). Ground-water flow patterns generated by the model were similar to ground-water flow patterns determined using measured water levels. Generally acceptable root mean square (RMS) error is 5% or less of the total head change in the model (fig 24b). Total head change within the model is approximately 170 ft., therefore, a model with an RMS of 8.5 ft. or less would be considered acceptable. The RMS for the calibrated stead-state model is 3.5 ft. or 2.1%. Therefore the calibrated steady state model was accepted as a reasonable approximation or actual conditions.

Capture area and implications on water quality

The area from which the SEWUD wells capture water is shown on figure 25. Note the bending of water level contours (cones of depression) near the city of Hankinson wells and the SEWUD wells in response to pumping (fig. 24a). The capture area for the SEWUD pumping wells extends about 1½ mile to the southwest into the Milnor Channel aquifer (Fig 25). This means that with continued pumping, SEWUD will capture water from the Milnor Channel aquifer, and likely result in some water quality degradation solely due to SEWUD's own pumping.

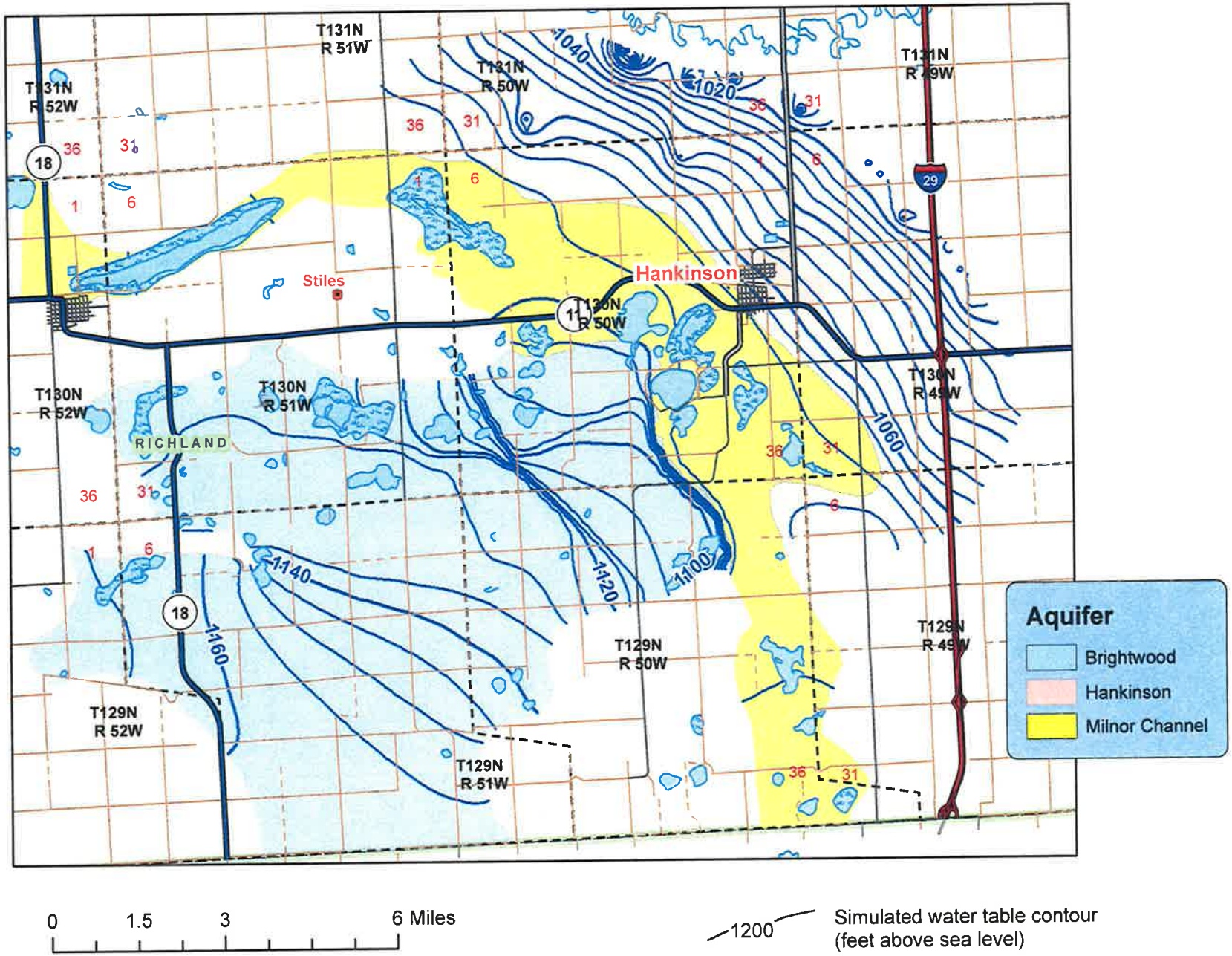

Figure 24a. Simulated water table configuration from steady-state model, SEWUD pumping 540 acre-feet/yr. and the City of Hankinson pumping 112 acre-feet/yr.

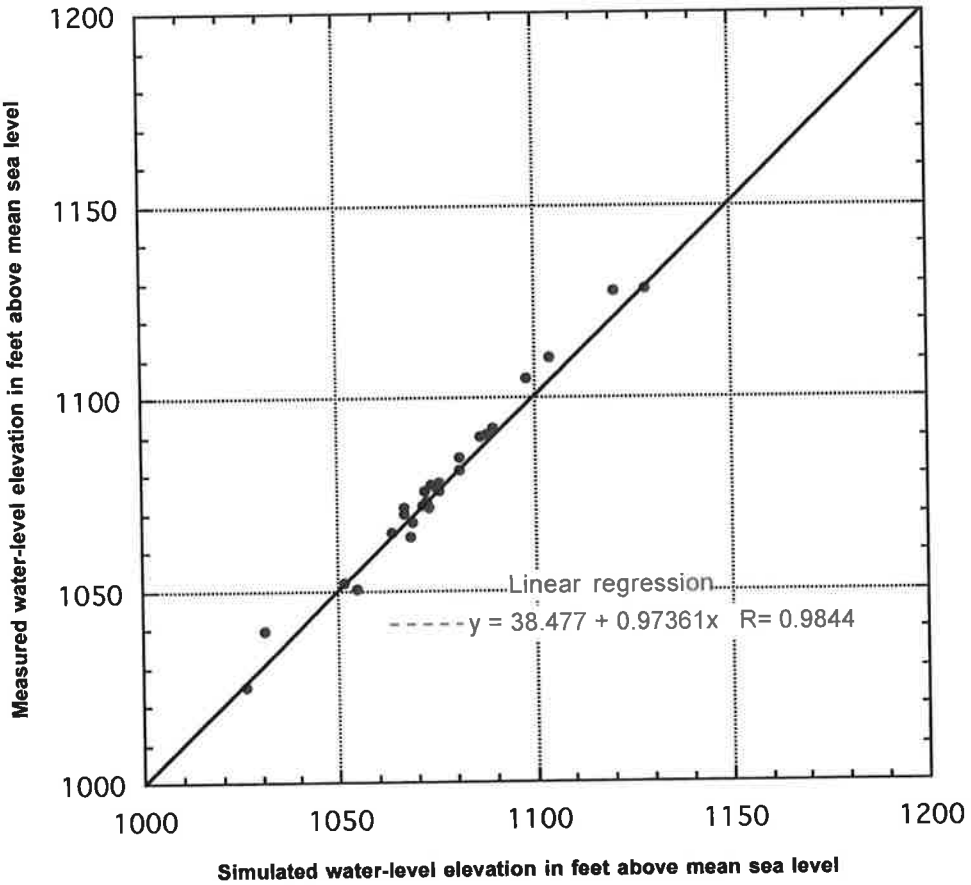

Fig. 24b. Comparison of measured and simulated steady-state water levels in Hankinson model

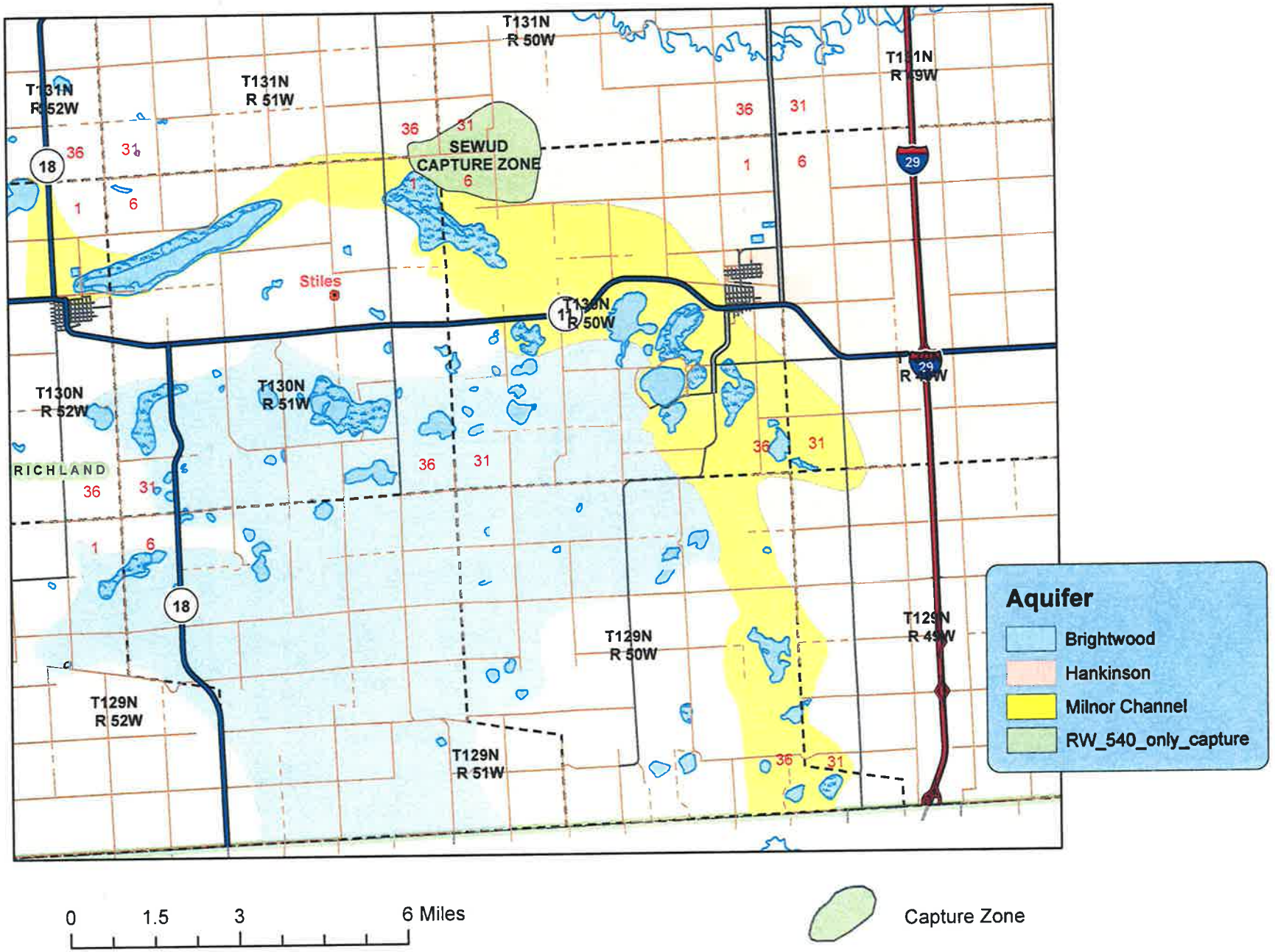

Figure 25. Simulated capture zone from steady-state model, resulting from SEWUD pumping 540 acre-ft./yr

Steady-State Simulation, Pumping 1,600 Acre-Feet from Southeast Water Users District (SEWUD) Wells

Prior to simulating pumping of the proposed industrial (ethanol) water supply, it was necessary to simulate pumping of SEWUD at their maximum allocated annual withdrawal volume of 1,600 acre-feet. SEWUD is concerned about potential water-quality changes that may occur due to the proposed industrial withdrawal. As previously indicated in the steady-state analysis, when SEWUD withdraws 540 acre-feet per year, the capture area extends southwest into the Milnor Channel aquifer where the water quality is characterized by larger dissolved concentrations. Pumping the full municipal/rural allocation of 1,600 acre-feet will increase the extent of the capture area and could further increase the potential for water quality degradation.

Presented in figure 26 are the steady-state model generated water levels in the area aquifers after pumping 1,600 acre-feet (permitted amount) from the area of the Southeast Water Users District (SEWUD). Presented in figure 27 are the drawdowns predicted from the 1,600 acre-feet appropriation. Ground-water movement simulated by this steady-state model was, in general, from southwest to northeast with a large cone of depression developing around the SEWUD wells (figs. 26 and 27). The model predicts a maximum of 20 to 24 feet of drawdown near the SEWUD pumping wells and approximately 1 foot of drawdown 1.5 to 2 miles from the SEWUD pumping wells (fig. 27). The capture area shown in figure 28 is an area extending into the Milnor Channel and Brightwood aquifers. This indicates that pumping by SEWUD at the maximum allocated amount of 1,600 acre-feet per year will capture significant amount of ground water from the Milnor Channel and Brightwood aquifers. As previously indicated, the Milnor Channel and Brightwood aquifer in many areas are characterized by more saline ground waters. Capture of these more saline ground waters will cause water-quality degradation at the SEWUD well field. Time of travel analysis presented in figure 29 indicates that it will take 50 to 100 years for water to move from the Milnor Channel and Brightwood aquifer into the SEWUD wells.

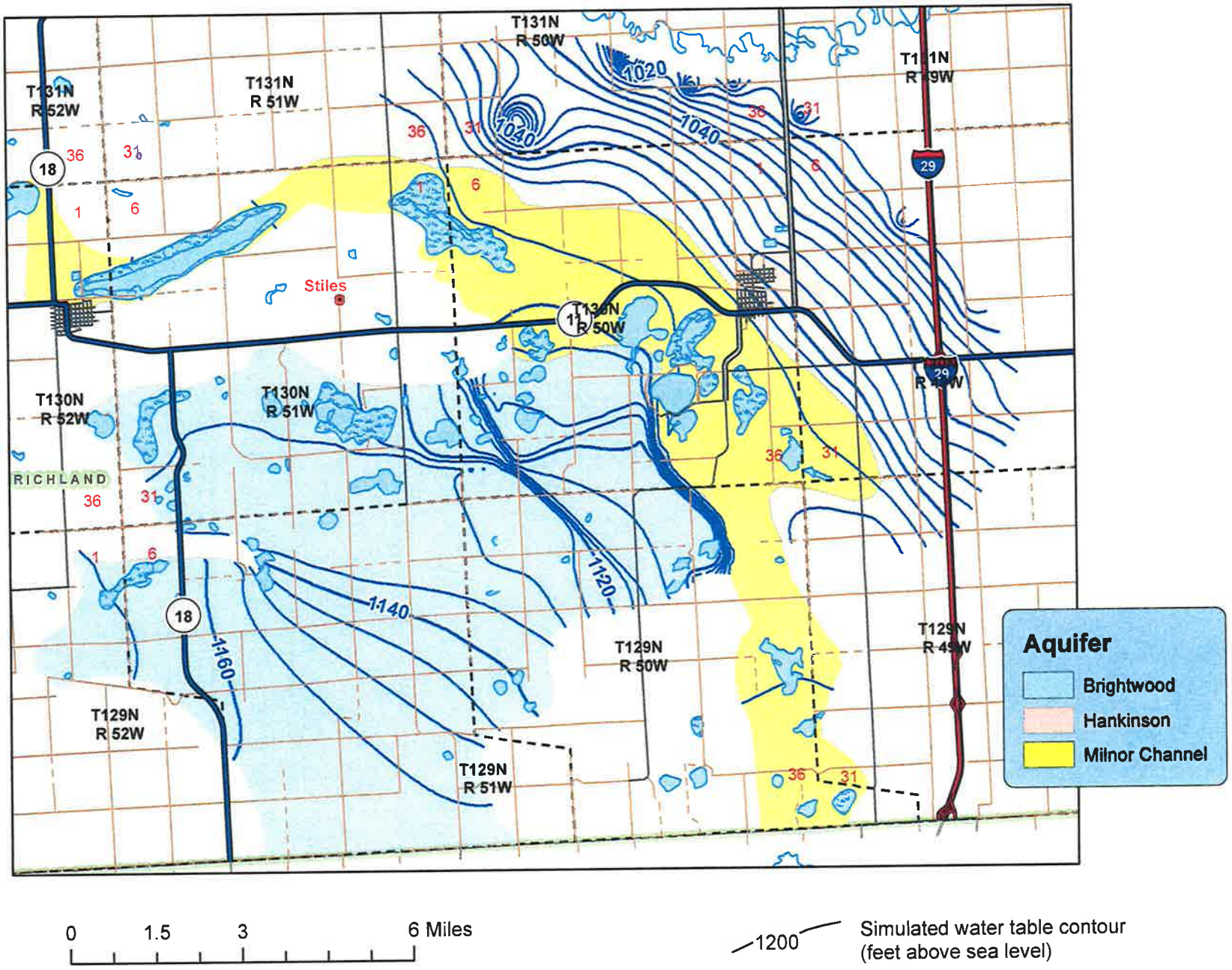

Figure 26. Simulated water table configuration from steady-state model, SEWUD pumping 1,600 acre-ft./yr.

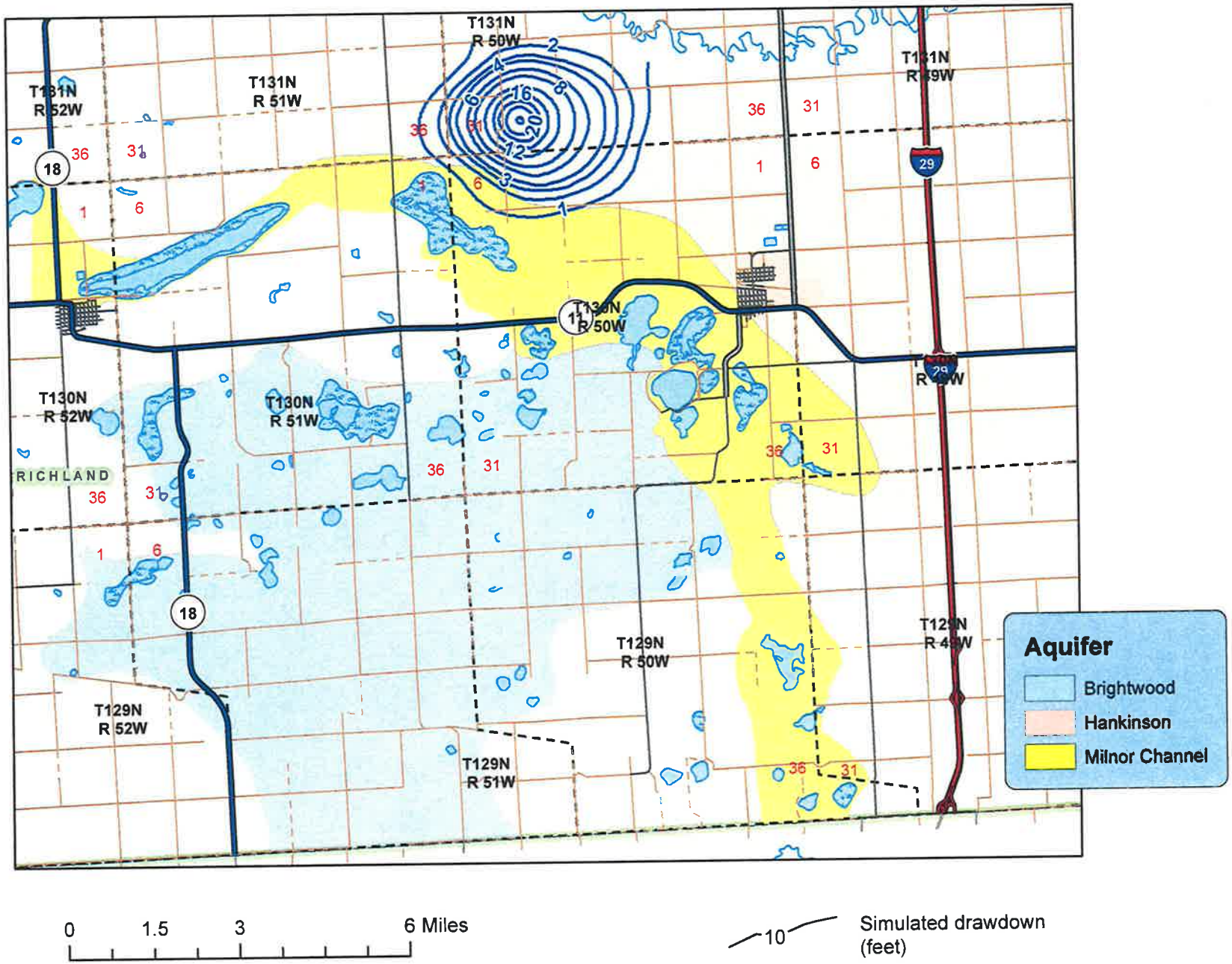

Figure 27. Simulated drawdown from steady-state model, SEWUD pumping 1,600 acre-ft./yr.

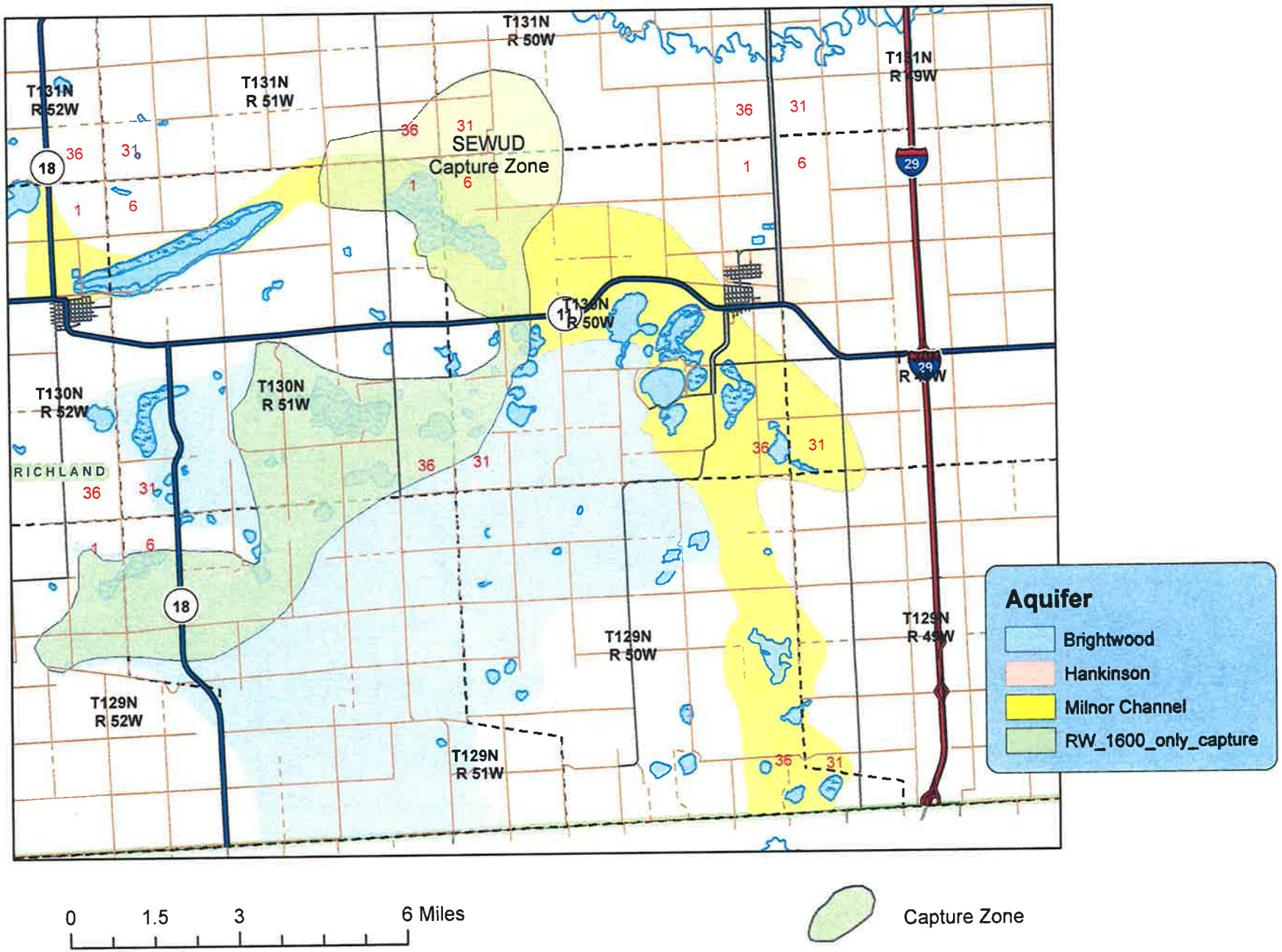

Figure 28. Simulated capture zone from steady-state model resulting from SEWUD pumping 1,600 acre-ft./yr

SEWUD 1600 ac-ft only - Time of Travel

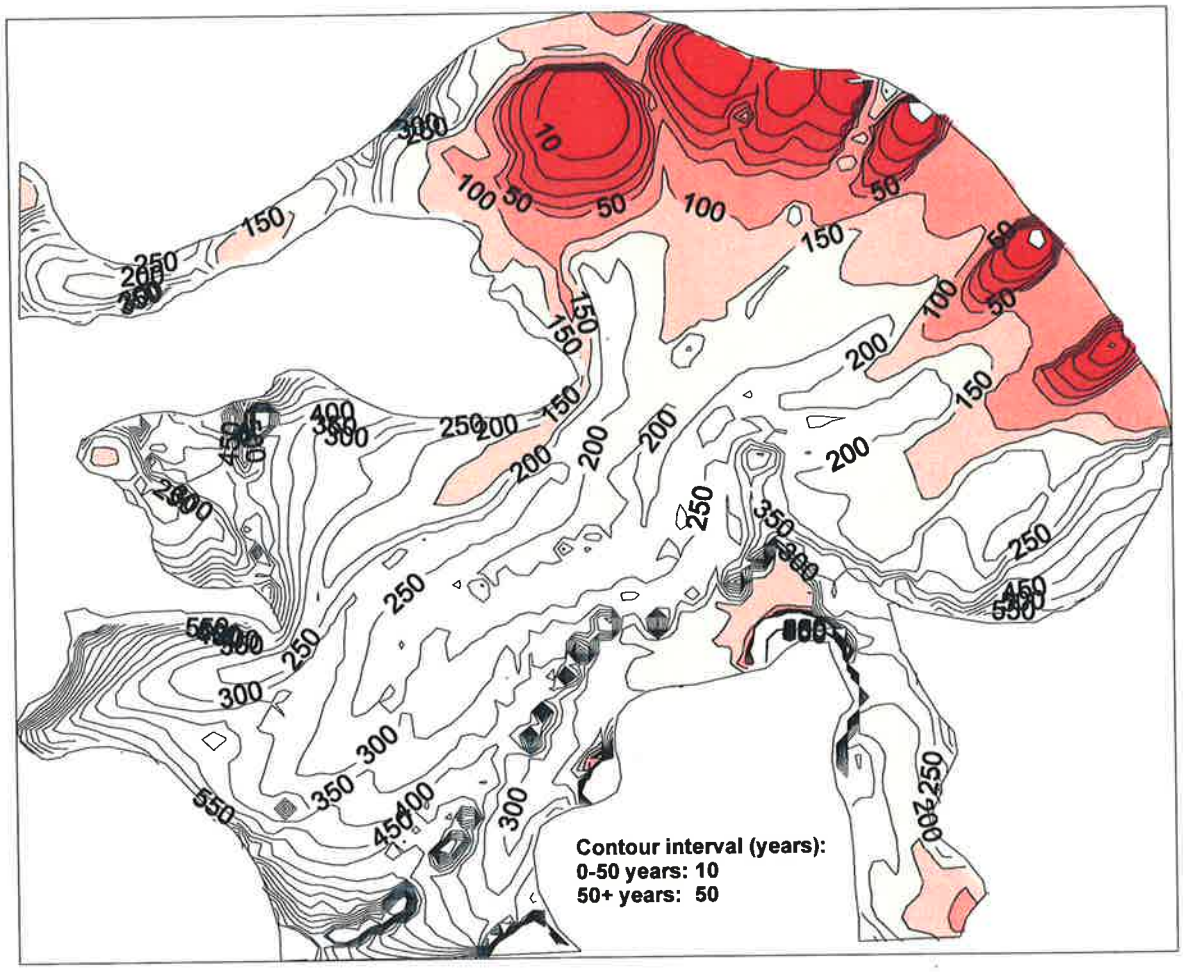

Figure 29. Steady-state time of travel in years resulting from SEWUD pumping 1,600 acre-feet per year from the Hankinson aquifer.

Steady State, Pumping Additional Water by the City of Hankinson

To evaluate the possible effects that the proposed industrial appropriation may have upon the area aquifers, five (5) pumping scenarios were examined. Those pumping scenarios were presented in Table 1 and also presented below in Table 9. The water budget for each pumping scenario is presented in Table 10. The proposed new well fields were assumed to be located in the SW1/2 section 10, Township 130 North, Range 50 West (Milnor Channel aquifer) and the NW1/4 of section 3 Township 130 North Range 50 West and the SE1/4 of section 34, Township 131 North, Range 51 West (Hankinson aquifer). The pumping water levels from the 1,600 acre-feet per year simulation were used as starting head values in the subsequent pumping scenarios for the city of Hankinson industrial application, thus resulting in a determination of what the additional pumping by the city would have on water levels in the area (in addition to the 1,600 acre-feet allocated to SEWUD). Following is a discussion of each pumping scenario and the predicted impacts on water levels for each pumping scenario.

Table 9. Varying water requirements to meet discharge requirements (from US Bio Energy)

Pumping scenario	**City Well Field** (Hankinson aquifer)	**New Well Field** (Milnor Channel aquifer)	**Water Requirement** (mean summer peak) GPM	**Annualized Supply** (90% of peak) acre ft/yr
1	100%	0%	1,121	1,574
2	75%	25%	1,199	1,683
3	50%	50%	1,241	1,742
4	25%	75%	1,557	2,186
5	0%	100%	1,850	2,597

Table 10. Volumetric water budget for steady-state model and five selected steady-state pumping scenarios

	<----------Ft3/day---------->				
	RECHARGE (in)	WELLS (out)	DRAINS (out)	ET (out)	TOTAL OUT
Baseline SS	3,344,567	190,960	217,505	2,936,111	3,344,576
Scenario 1	3,344,567	378,808	182,096	2,783,671	3,344,575
% increase/decrease		98.4%	-16.3%	-6.1%	
Scenario 2	3,344,567	391,818	192,392	2,760,365	3,344,575
% increase/decrease		105.2%	-11.5%	-6.8%	
Scenario 3	3,344,567	398,868	203,667	2,742,039	3,344,575
% increase/decrease		108.9%	-6.4%	-7.5%	
Scenario 4	3,344,567	451,859	210,237	2,682,479	3,344,576
% increase/decrease		136.6%	-3.3%	-9.5%	
Scenario 5	3,344,567	500,913	216,621	2,627,041	3,344,576
% increase/decrease		162.3%	-.04%	-11.3%	

Predicted Impacts Due to the Proposed Pumping

Scenario 1:
100% Hankinson Aquifer (1,574 acre-feet)
0% Milnor Channel Aquifer (0 acre-feet)
Total: 1,574 acre-feet

Presented in figure 30 are the steady-state model generated water levels in the study area from pumping 1,574 acre-feet from the Hankinson aquifer in the area of the existing city wells. (starting head includes the drawdown from the 1,600 acre-feet appropriation for SEWUD wells). Presented in figure 31 are the drawdowns predicted from the additional 1,574 acre-feet appropriation from the Hankinson aquifer. Ground-water movement simulated by the steady state model was in general from southwest to northeast with cones of depression developing around the SEWUD wells and the proposed city of Hankinson wells (figs. 30 and 31). The model predicts, a maximum of 40 feet of drawdown near the proposed city of Hankinson pumping wells and approximately 1 to 3 feet of additional drawdown in the vicinity of the SEWUD Wells (fig. 31). Most of the water is obtained from capturing a small portion of the water that would have left the system as evapotranspiration and a small amount is obtained from reducing flow to the drains (springs). Given that the saturated thickness of the Hankinson aquifer is only 45 to 50 feet in a large part of proposed pumping area, 40 feet of drawdown would result in a withdrawal that is probably not sustainable. Given the very fine grained nature of the aquifer it is probably not possible to withdraw water at a high enough rate without drawing the pumping level in the individual production wells below the intakes or into the screens. The model indicates that this volume of water (1,574 acre-feet) cannot be withdrawn from the Hankinson aquifer without causing local, severe de-watering of the Hankinson aquifer near the proposed well field.

The capture areas shown in figure 32 are areas extending into the Milnor Channel and Brightwood aquifers. This indicates that extensive pumping by SEWUD and the city of Hankinson will capture water from the Milnor Channel and Brightwood aquifers. This will cause water quality degradation in both the SEWUD rural water wells and the proposed Hankinson industrial well fields. The extent of the water quality degradation is indeterminate. Time of travel analysis presented in figure 33 indicates that it will take 50 to 100 years for water to move from the Milnor Channel and Brightwood aquifers and into the SEWUD rural water wells and the proposed Hankinson industrial well field.

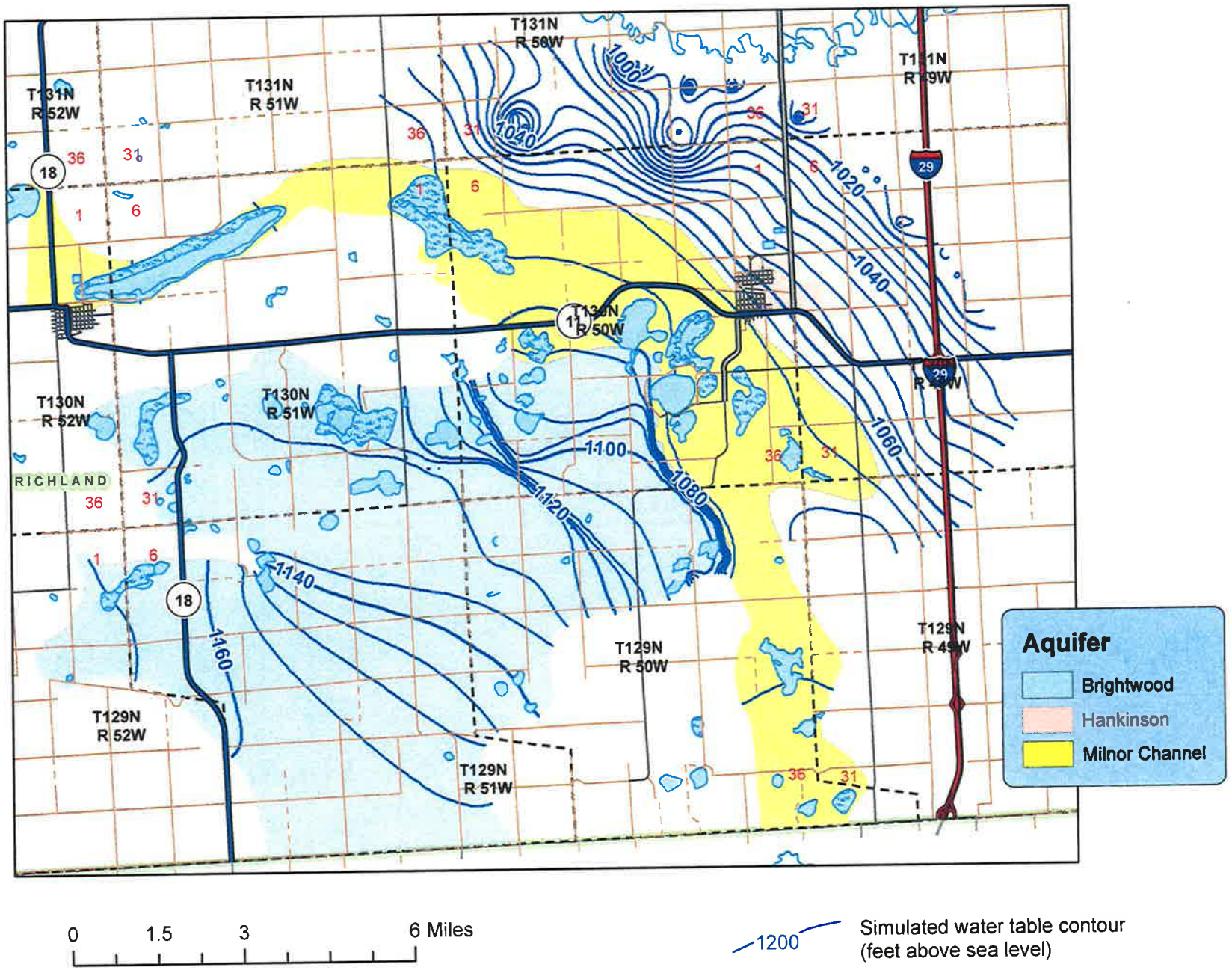

Figure 30. Simulated water table configuration from steady-state model, resulting from SEWUD pumping 1,600 acre-ft./yr and the city of Hankinson pumping 1,574 acre-feet/yr. from the Hankinson aquifer

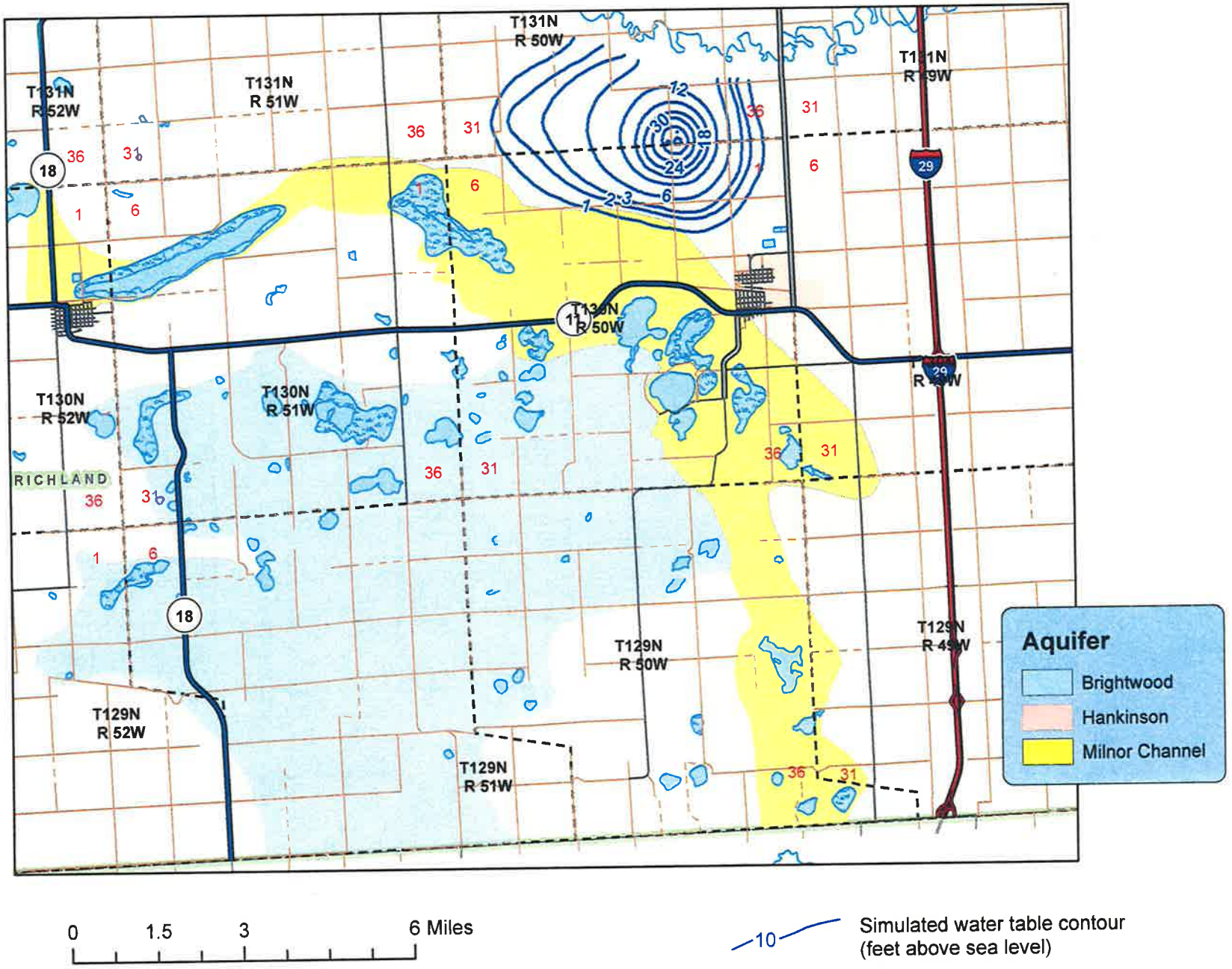

Figure 31. Simulated drawdown from steady-state model, resulting from SEWUD pumping 1,600 acre-ft./yr. and the Ccty of Hankinson pumping 1,574 acre-ft./yr. from the Hankinson aquifer

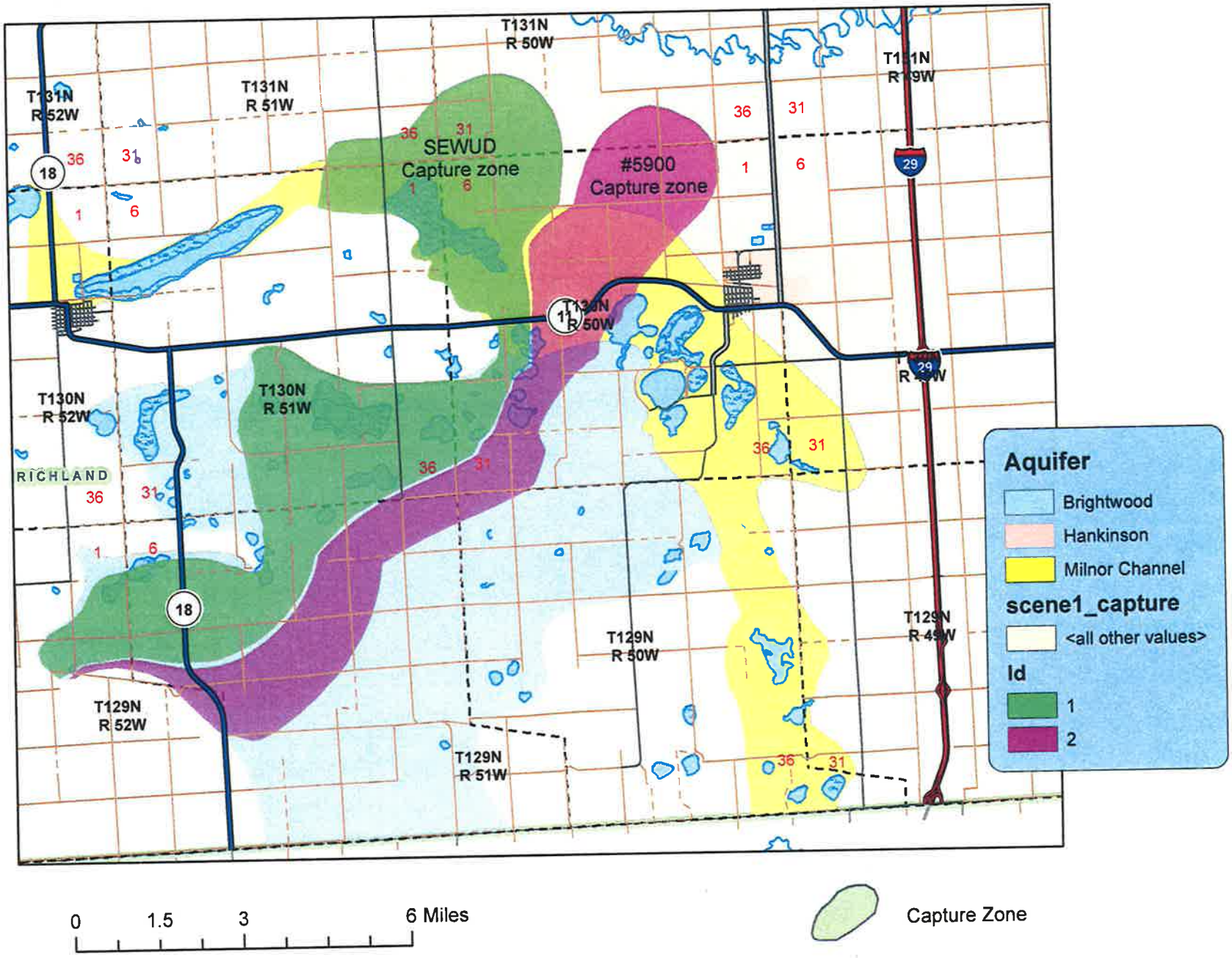

Figure 32. Simulated capture zones from steady-state model, resulting from SEWUD pumping 1,600 acre-ft./yr. and the city of Hankinson pumping 1,574 acre-ft./yr. from the Hankinson aquifer

Scenario 1 - Time of Travel in years

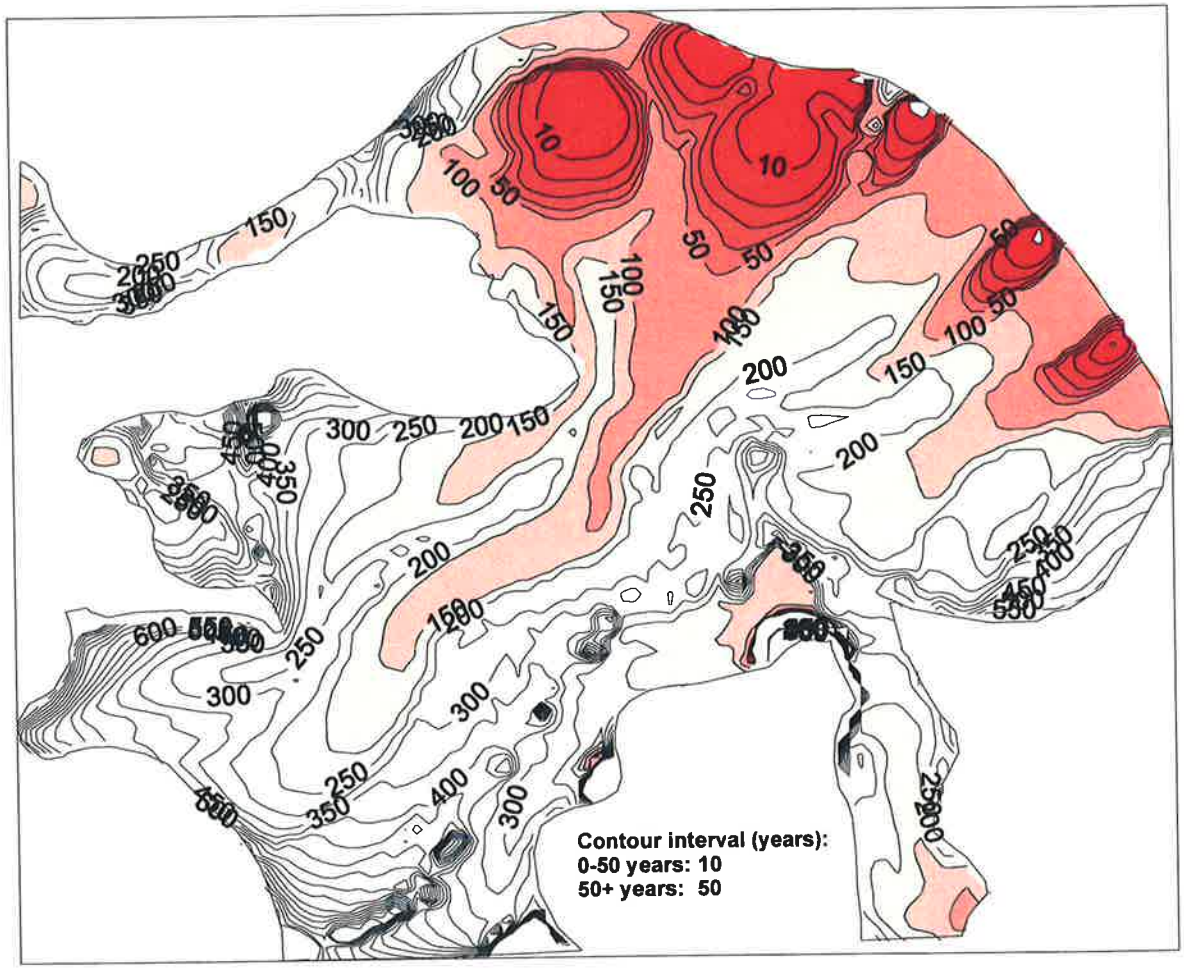

Figure 33. Steady-state time of travel in years resulting from SEWUD pumping 1,600 acre-feet per year and the city of Hankinson pumping 1,574 acre-feet from the Hankinson aquifer.

Scenario 2:
75% Hankinson Aquifer (1,262 acre-feet)
25% Milnor Channel Aquifer (421 acre-feet)
Total: 1,683 acre-feet

Presented in figure 34 are the steady-state model generated water levels in the area aquifers from pumping 1,262 acre-feet from the Hankinson aquifer in the area of the existing city wells and 421 acre-feet from the Milnor Channel aquifer in the S1/2 of section 10 (starting head includes the drawdown from the 1,600 acre-feet appropriation for SERW wells). Presented in figure 35 are the drawdowns predicted from the additional 1,262 acre-feet appropriation from the Hankinson aquifer and 421 acre-feet appropriation from the Milnor channel aquifer. Ground-water movement simulated by the steady-state model was, in general, from southwest to northeast with cones of depression developing around the SEWUD wells and proposed city of Hankinson wells (figs. 34 and 35). The model predicts, a maximum of 24 feet of drawdown near the Hankinson aquifer pumping wells, 1 to 2 feet of drawdown in the S1/2 of section 10 and approximately 1 to 2 feet of additional drawdown in the vicinity of the SEWUD Wells. Most of the water is obtained from capturing a small portion of the water that would have left the system as evapotranspiration and a small amount is obtained from reducing flow to the drains (springs). Again, given that the saturated thickness of the Hankinson aquifer is only 45 to 50 feet in the area, 24 feet of drawdown may result in a withdrawal rate that is not sustainable. In addition, given the very fine grained nature of the aquifer it is probably not possible to withdraw water at a high enough rate without drawing the pumping level in the individual production wells below the intakes or into the screens. The model indicates that this volume of water (1,264 acre-feet) cannot be withdrawn from the Hankinson aquifer without causing severe de-watering of the aquifer near the proposed industrial well field.

The capture areas shown in figure 36 are areas extending into the Milnor Channel and Brightwood aquifers. This indicates that extensive pumping by the SEWUD rural wells and the proposed city of Hankinson industrial wells will capture ground water from the Milnor Channel and Brightwood aquifers. This will cause water quality degradation at both the SEWUD wells and the proposed Hankinson industrial well fields. The extent of the water quality degradation is indeterminate. Time of travel analysis presented in figure 37 indicates that it will take 50 to 150 years for water to move from the Milnor Channel and Brightwood aquifers into the SEWUD and proposed Hankinson industrial wells.

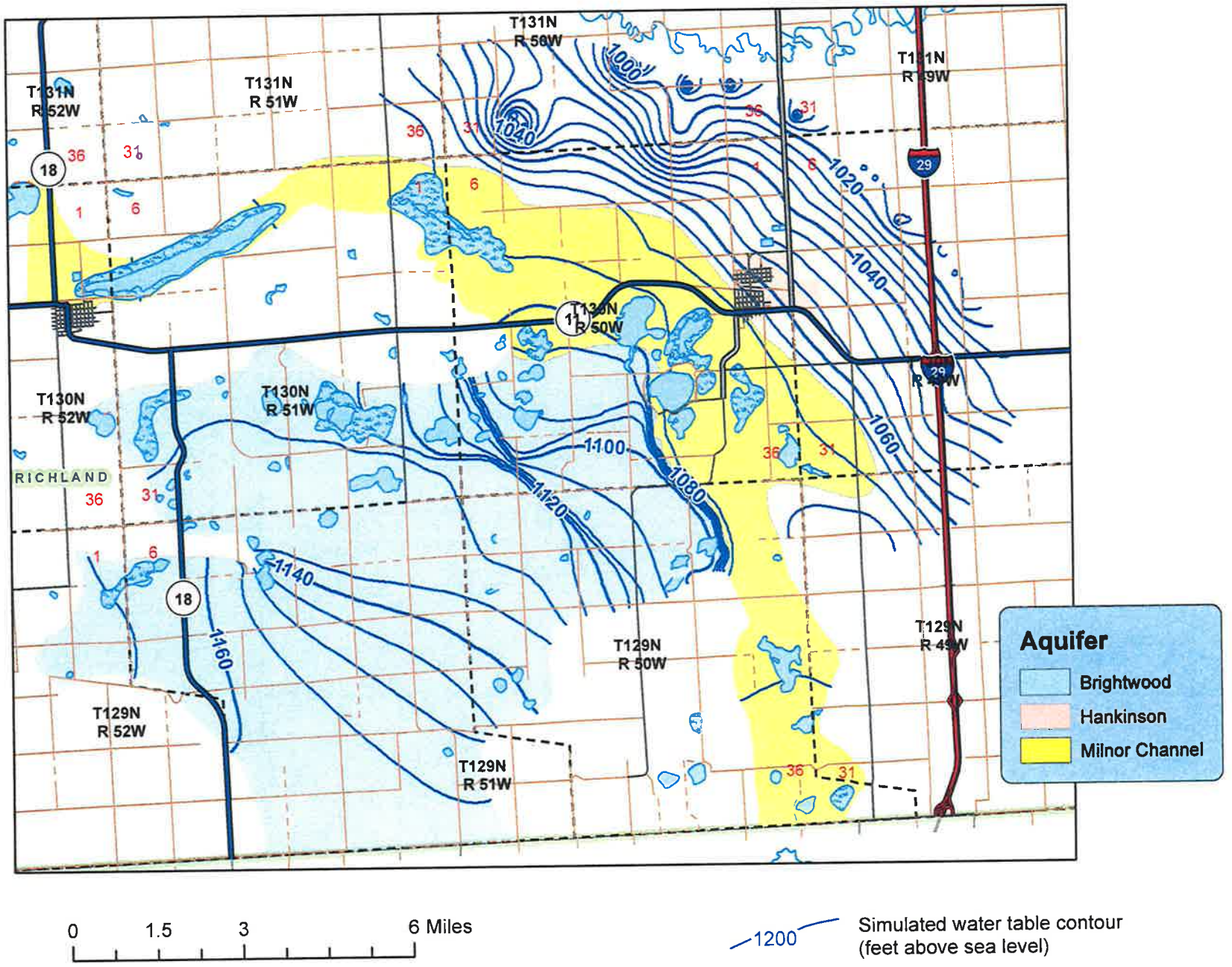

Figure 34. Simulated water table configuration from steady-state model resulting from SEWUD pumping 1,600 acre-ft./yr. and the city of Hankinson pumping 1,262 acre-ft./yr. from the Hankinson aquifer and 421 acre-ft./yr. from the Milnor Channel aquifer

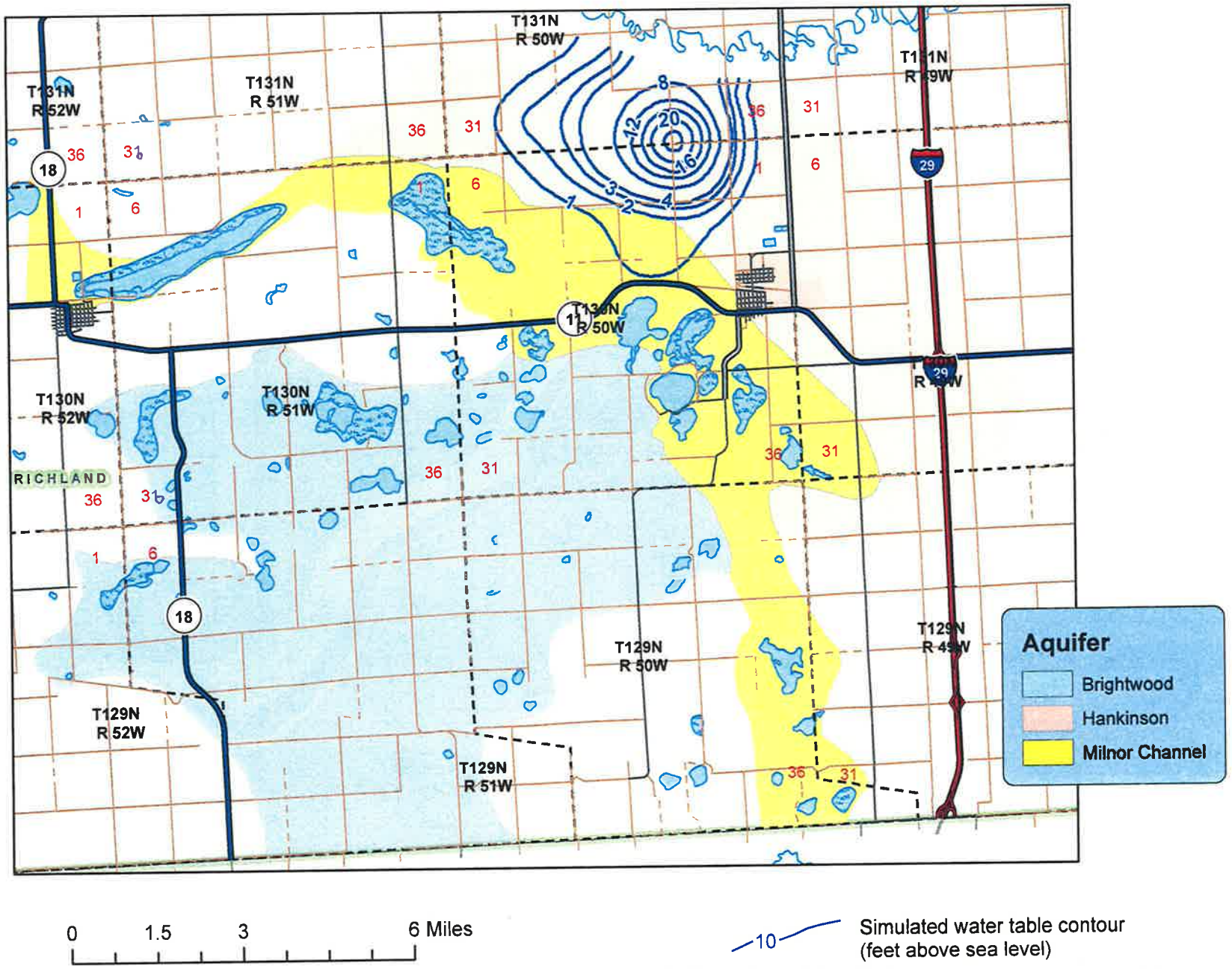

Figure 35. Simulated drawdown from steady-state model, resulting from SEWUD pumping 1,600 acre-ft./yr. and the city of Hankinson pumping 1,262 acre-ft./yr. from the Hankinson aquifer and 421 acre-ft./yr. from the Milnor Channel aquifer

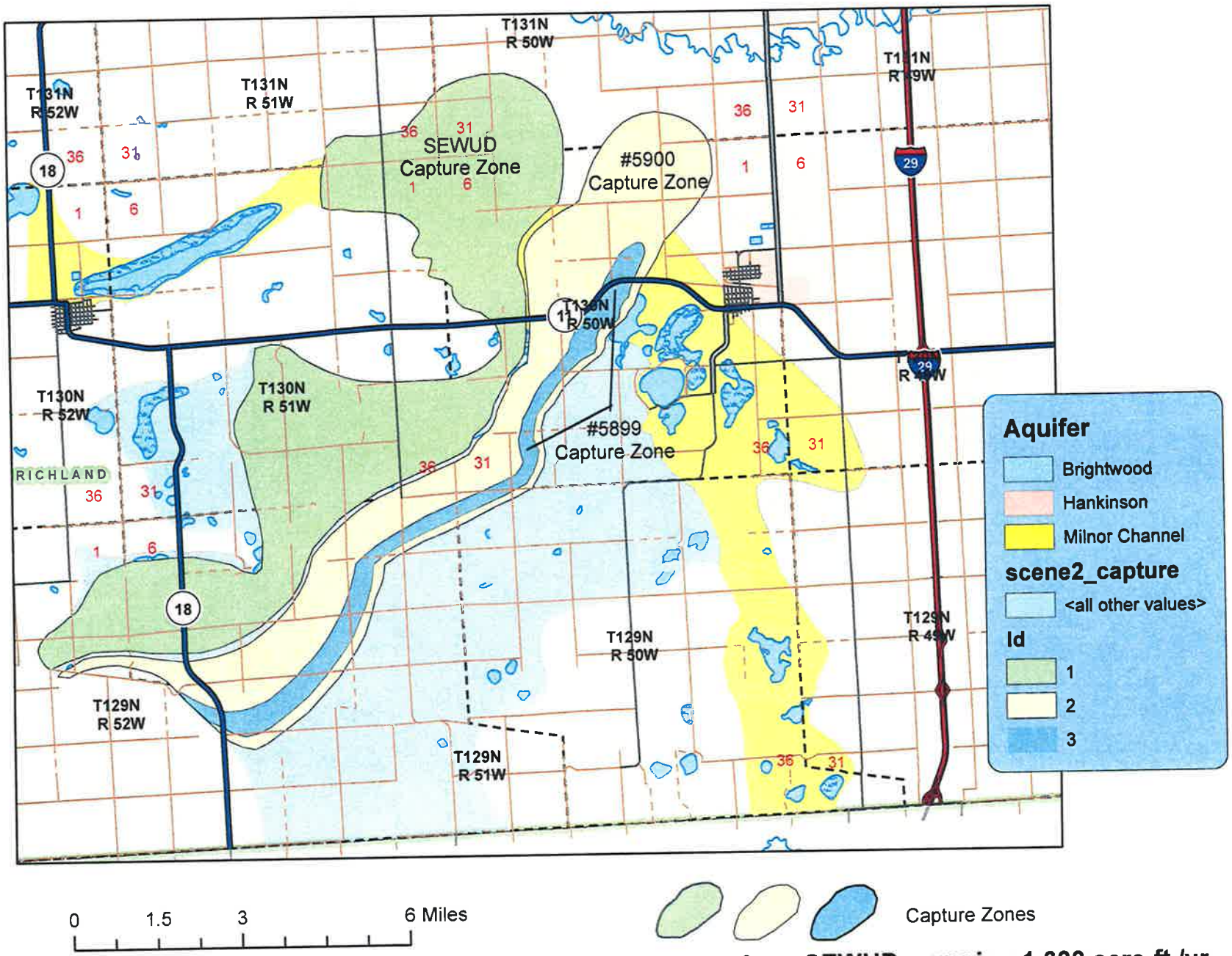

Figure 36. Simulated capture zones from steady-state model resulting from SEWUD pumping 1,600 acre-ft./yr and the city of Hankinson pumping 1,262 acre-ft./yr. from the Hankinson aquifer and 421 acre-ft./yr. from the Milnor Channel aquifer

Scenario 2 - Time of Travel in years

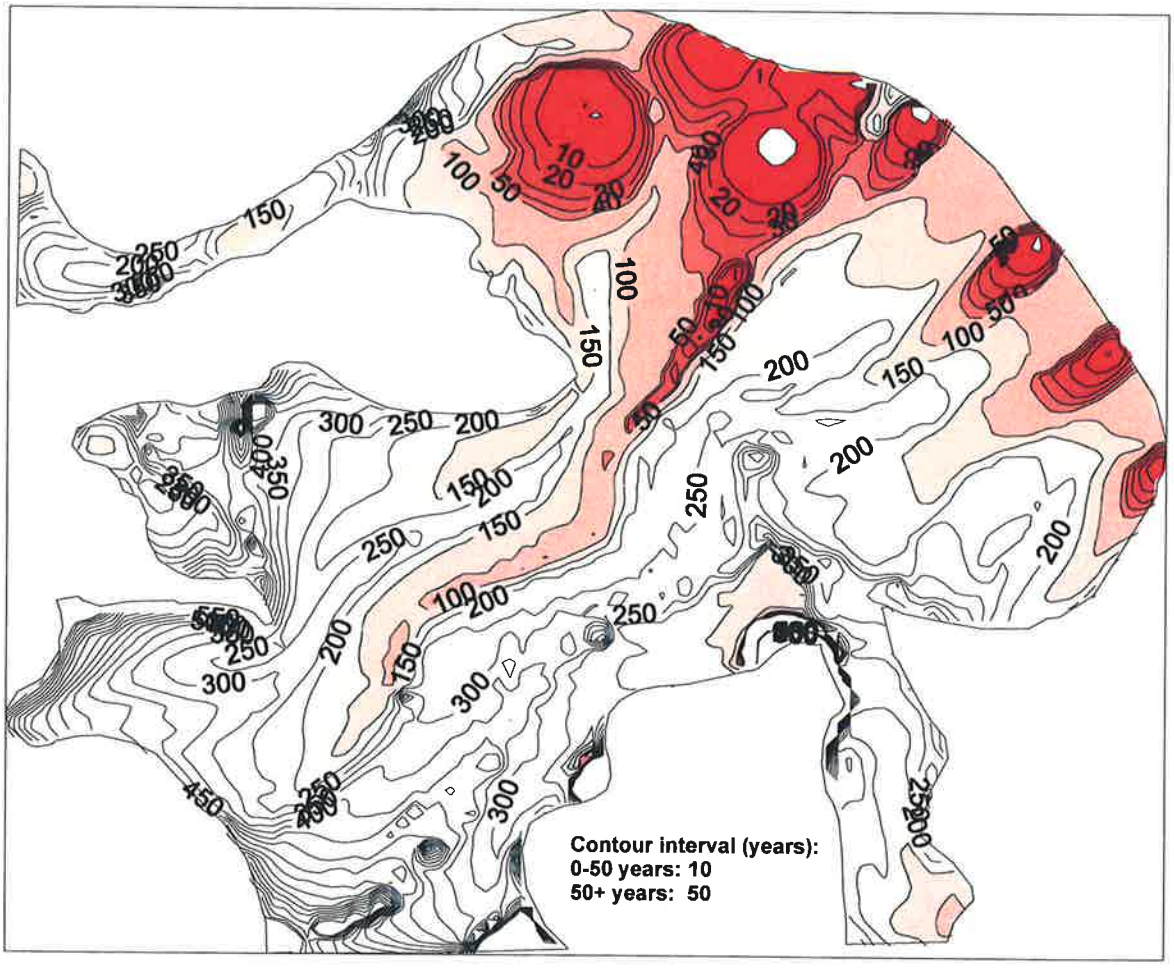

Figure 37. Steady-state time of travel in years resulting from SEWUD pumping 1,600 acre-feet per year and the city of Hankinson pumping 1,262 acre-feet from the Hankinson aquifer and 421 Milnor Channel aquifer.

Scenario 3:
50% Hankinson Aquifer (871 acre-feet)
50% Milnor Channel Aquifer (871 acre-feet)
Total 1,742 acre-feet

Presented in figure 38 are the steady state model generated water levels in the area aquifers from pumping 871 acre-feet from the Hankinson aquifer in the area of the existing city wells and 871 acre-feet from the Milnor Channel aquifer in the S1/2 of section 10 (starting head includes the drawdown from the 1,600 acre-feet appropriation for SERW wells). Presented in figure 39 are the drawdowns predicted from the additional 871 acre-feet appropriation from the Hankinson aquifer and 871 acre-feet appropriation from the Milnor channel aquifer. Ground-water movement simulated by the steady state model was, in general, from southwest to northeast with cones of depression developing around the SEWUD wells and the proposed city of Hankinson wells (figs. 38 and 39). The model predicts, a maximum of 14 feet of drawdown near the proposed Hankinson aquifer pumping wells, 2 feet of drawdown in the S1/2 of section 10 and approximately 1 to 2 feet of additional drawdown will occur in the vicinity of the SEWUD Wells. Most of the water is obtained from capturing a small portion of the water that would have left the system as evapotranspiration and a small amount is obtained from reducing flow to the drains (springs). Given 14 feet of drawdown within the proposed point of diversion in the Hankinson aquifer, an efficiently designed well field can capture 871 acre-feet per year without severe de-watering within the well field and without causing undue harm on prior appropriators in the area of influence.

The capture areas shown in figure 40 are areas extending into the Milnor Channel and Brightwood aquifers. This indicates that extensive pumping by the SEWUD rural water wells and the proposed city of Hankinson industrial wells will capture ground water from the Milnor Channel and Brightwood aquifers. This will cause water quality degradation at both the SEWUD rural water wells and the proposed Hankinson industrial well fields. The extent of water quality degradation is indeterminate. Time of travel analyses presented in figure 41 indicates that it will take 50 to 150 years for water to move from the Milnor Channel and Brightwood aquifer into the SEWUD rural water wells and city of Hankinson industrial wells.

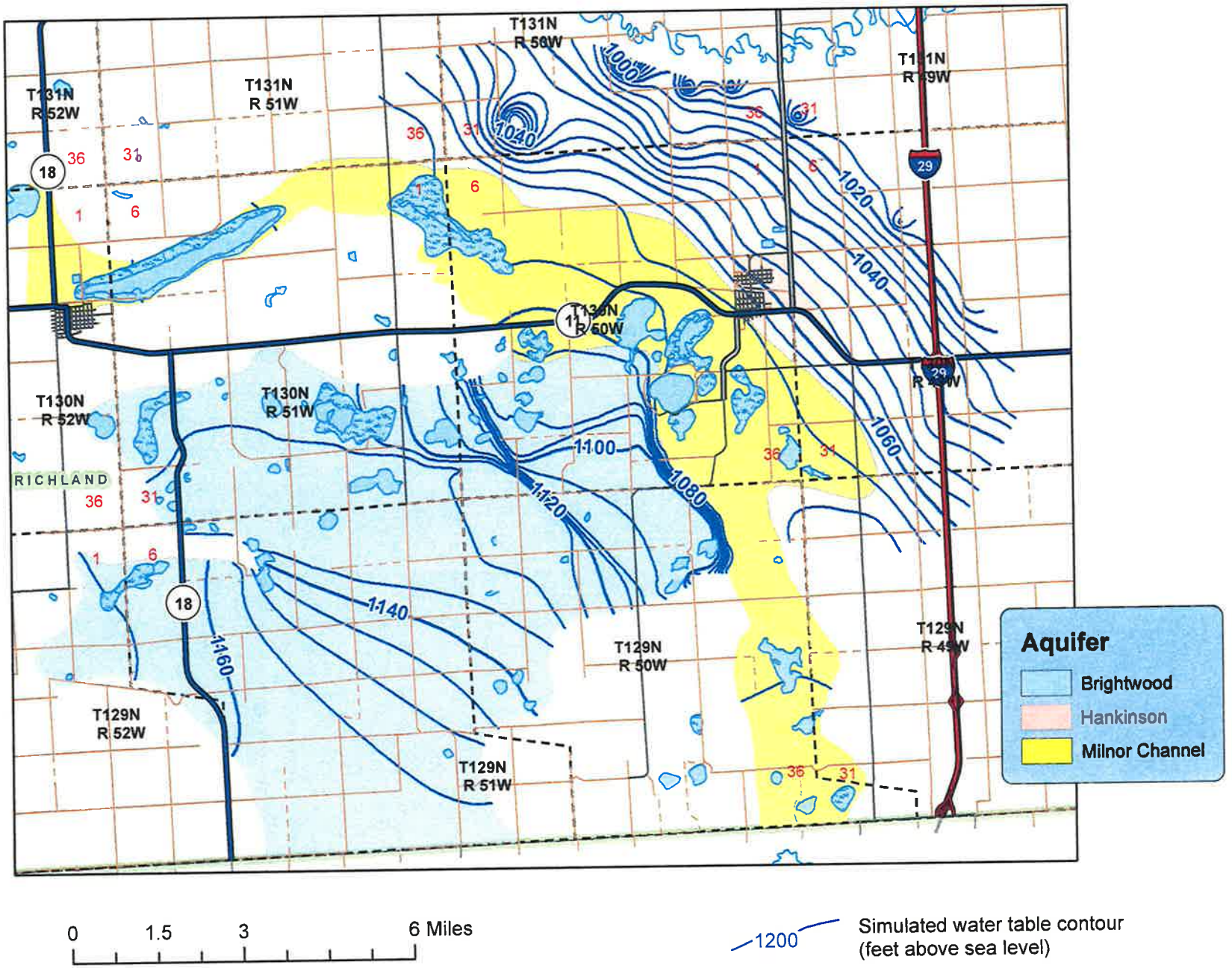

Figure 38. Simulated water table configuration from steady-state model resulting from SEWUD pumping 1,600 acre-ft./yr. and the city of Hankinson pumping 871 acre- ft./yr. from the Hankinson aquifer and 871 acre-ft./yr. from the Milnor Channel aquifer

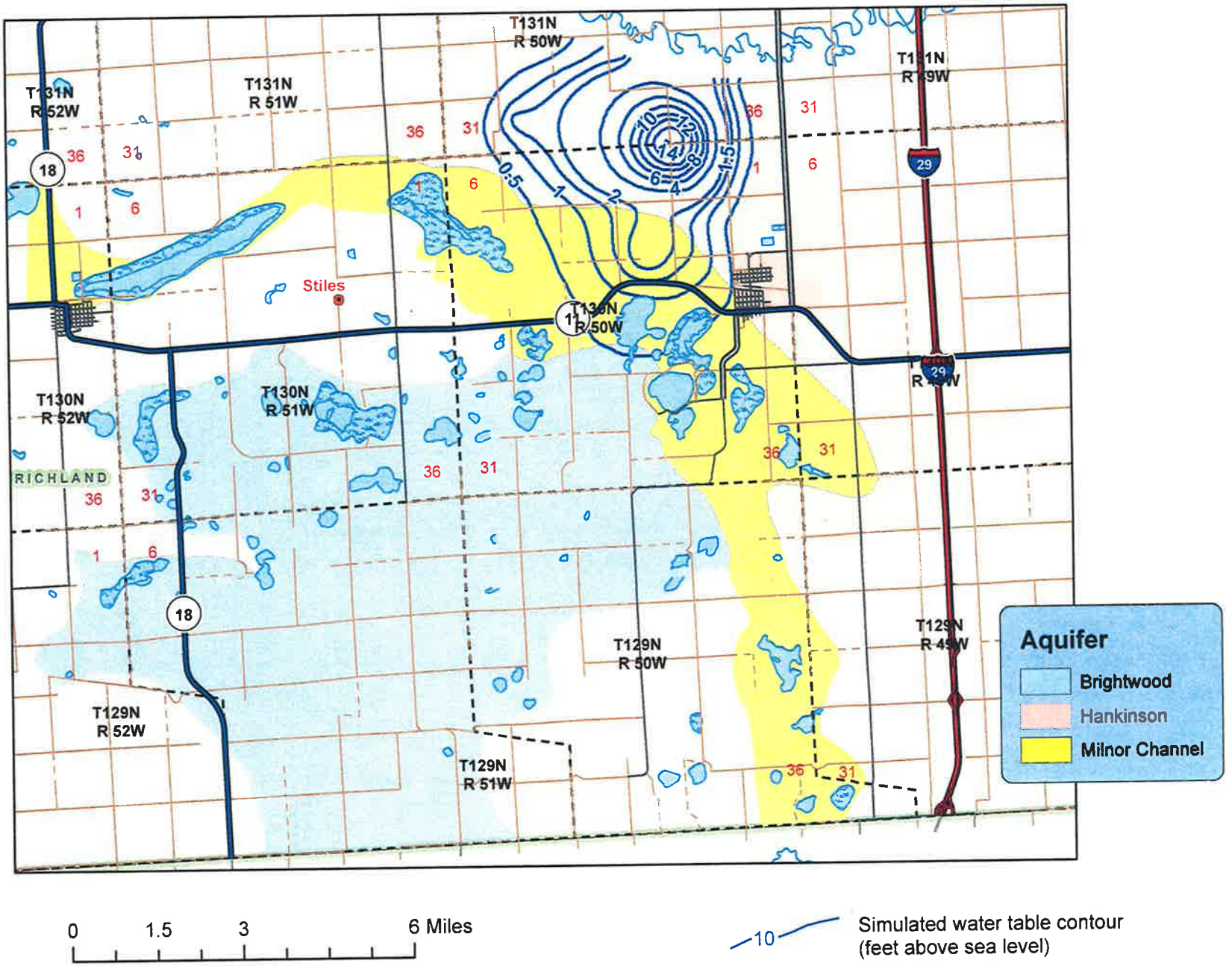

Figure 39. Simulated drawdown from steady-state model, resulting from SEWUD pumping 1,600 acre-ft./yr. and the city of Hankinson pumping 871 acre-ft./yr. from the Hankinson aquifer and 871 acre-ft./yr. from the Milnor Channel aquifer

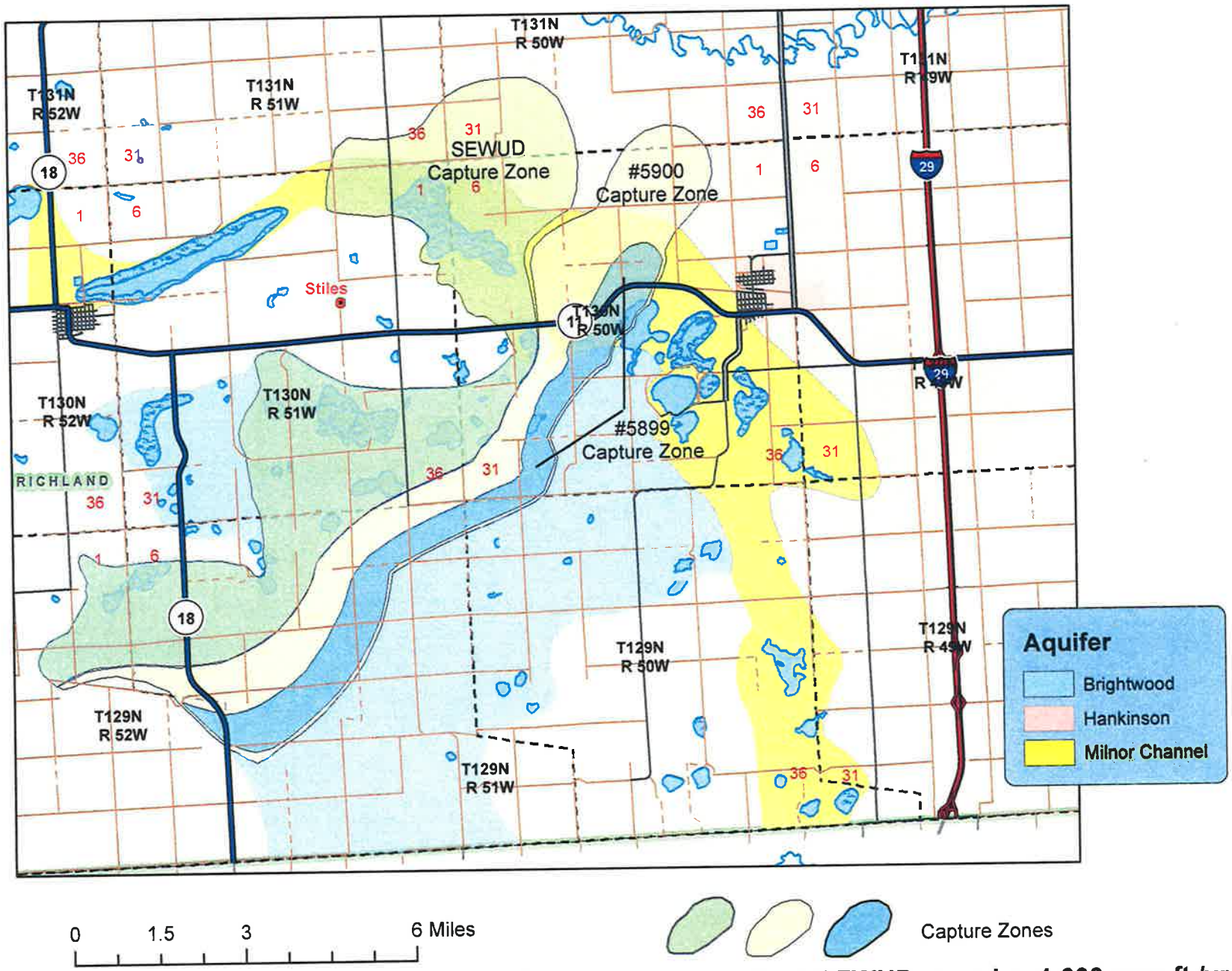

Figure 40. Simulated capture zones from steady-state model resulting from SEWUD pumping 1,600 acre-ft./yr and the city of Hankinson pumping 871 acre-ft./yr. from the Hankinson aquifer and 871 acre-ft./yr. from the Milnor Channel aquifer

Scenario 3 - Time of Travel in years.

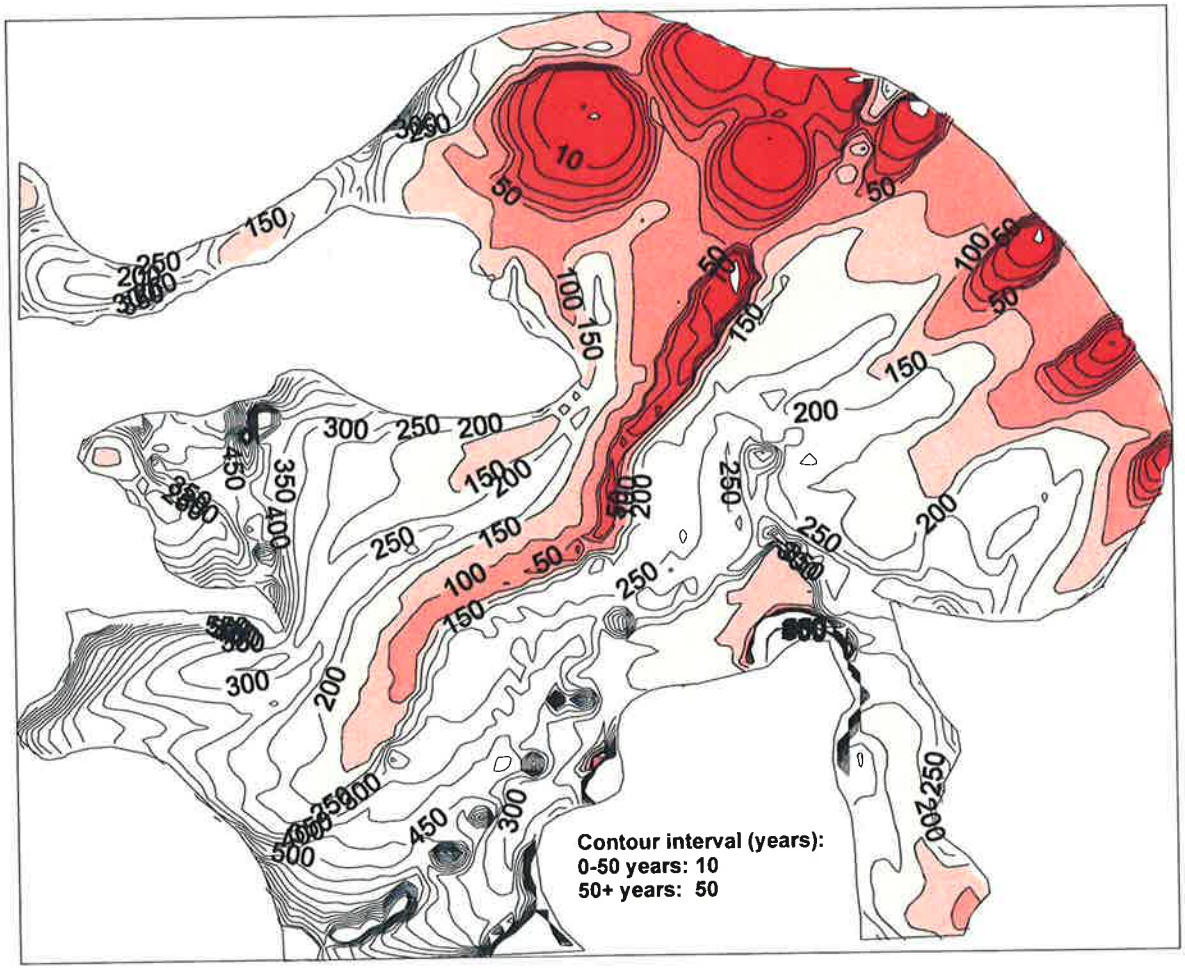

Figure 41. Steady-state time of travel in years resulting from SEWUD pumping 1,600 acre-feet per year and the city of Hankinson pumping 871acre-feet from the Hankinson aquifer and 871 Milnor Channel aquifer.

Scenario 4:
25% Hankinson Aquifer (546 acre-feet)
75% Milnor Channel Aquifer (1,640 acre-feet)
Total 2,186 acre-feet

Presented in figure 42 are the steady-state model generated water levels in the area aquifers from pumping 546 acre-feet from the Hankinson aquifer in the area of the existing city wells and 1,640 acre-feet from the Milnor Channel aquifer in the S1/2 of section 10 (starting head includes the drawdown from the 1,600 acre-feet appropriation for SERW wells). Presented in figure 43 are the drawdowns predicted from the additional 546 acre-feet appropriation from the Hankinson aquifer and 1,640 acre-feet appropriation from the Milnor channel aquifer. Ground-water movement simulated by the steady state model was, in general, from southwest to northeast with cones of depression developing around the SEWUD wells and city of Hankinson wells (figs. 42 and 43). The model predicts, a maximum of 10 feet of drawdown near the Hankinson aquifer pumping wells, 4 feet of drawdown in the S1/2 of section 10 (Milnor Channel pumping wells) and approximately 1 to 2 feet of additional drawdown in the vicinity of the SWUD Wells. Most of the water is obtained from capturing a small portion of the water that would have left the system as evapotranspiration and a small amount is obtained from reducing flow to the drains (springs). Ten feet of drawdown is acceptable (no undue impacts to other water users) with a properly designed well field.

The capture areas shown in figure 45 are areas extending into the Milnor Channel and Brightwood aquifers. This indicates that extensive pumping by SEWUD and the city of Hankinson will capture ground water from the Milnor Channel and Brightwood aquifers. This will cause water quality degradation at both the SEWUD and proposed Hankinson industrial well fields. The extent of water quality degradation is indeterminate. Time of travel analyses presented in figure 45 indicates that it will take 50 to 200 years for water to move from the Milnor Channel and Brightwood aquifer into the SEWUD and city of Hankinson wells.

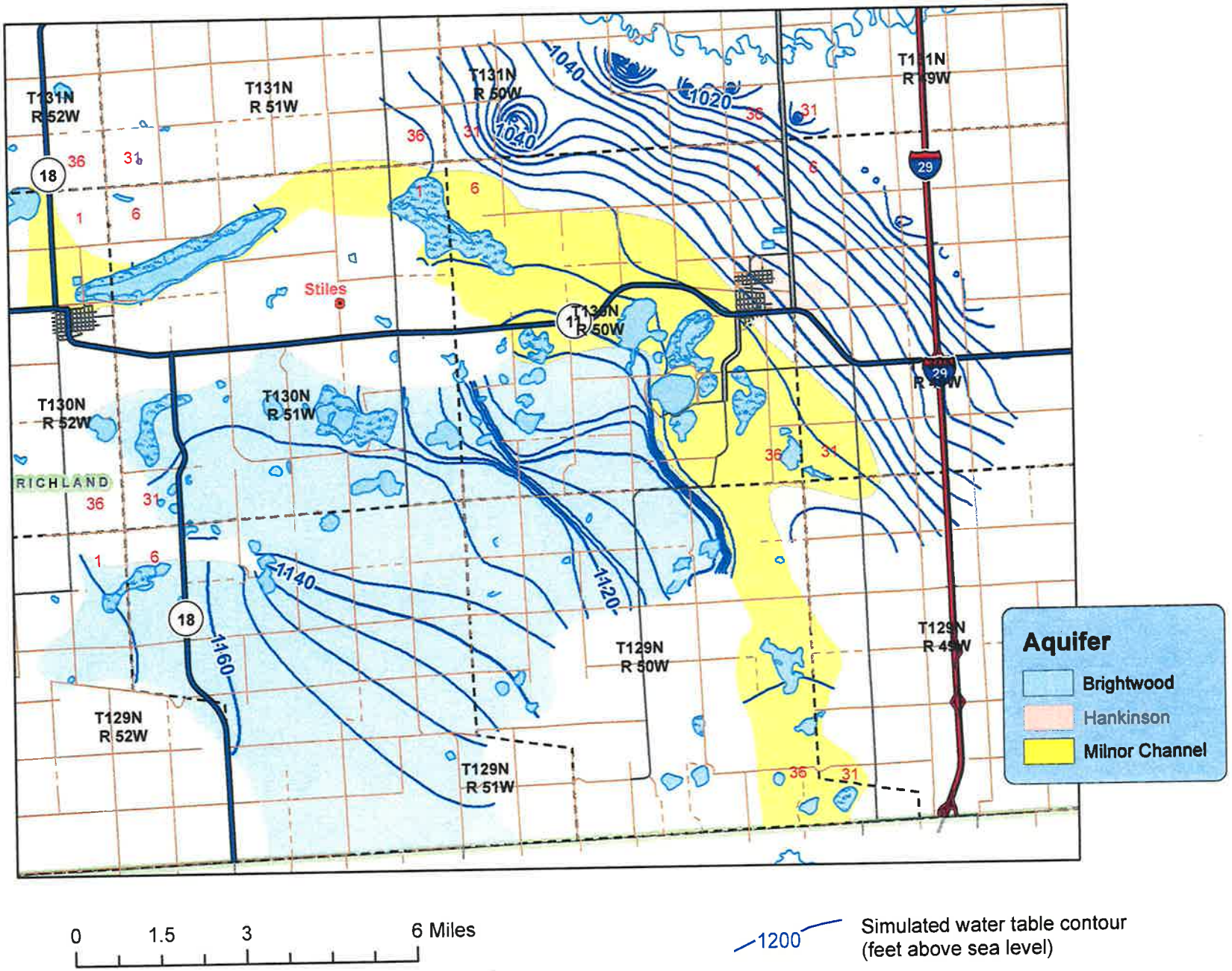

Figure 42. Simulated water table configuration from steady-state model resulting from SEWUD pumping 1,600 acre-ft./yr. and the city of Hankinson pumping 546 acre-ft./yr. from the Hankinson aquifer and 1,640 acre-ft./yr. from the Milnor Channel aquifer

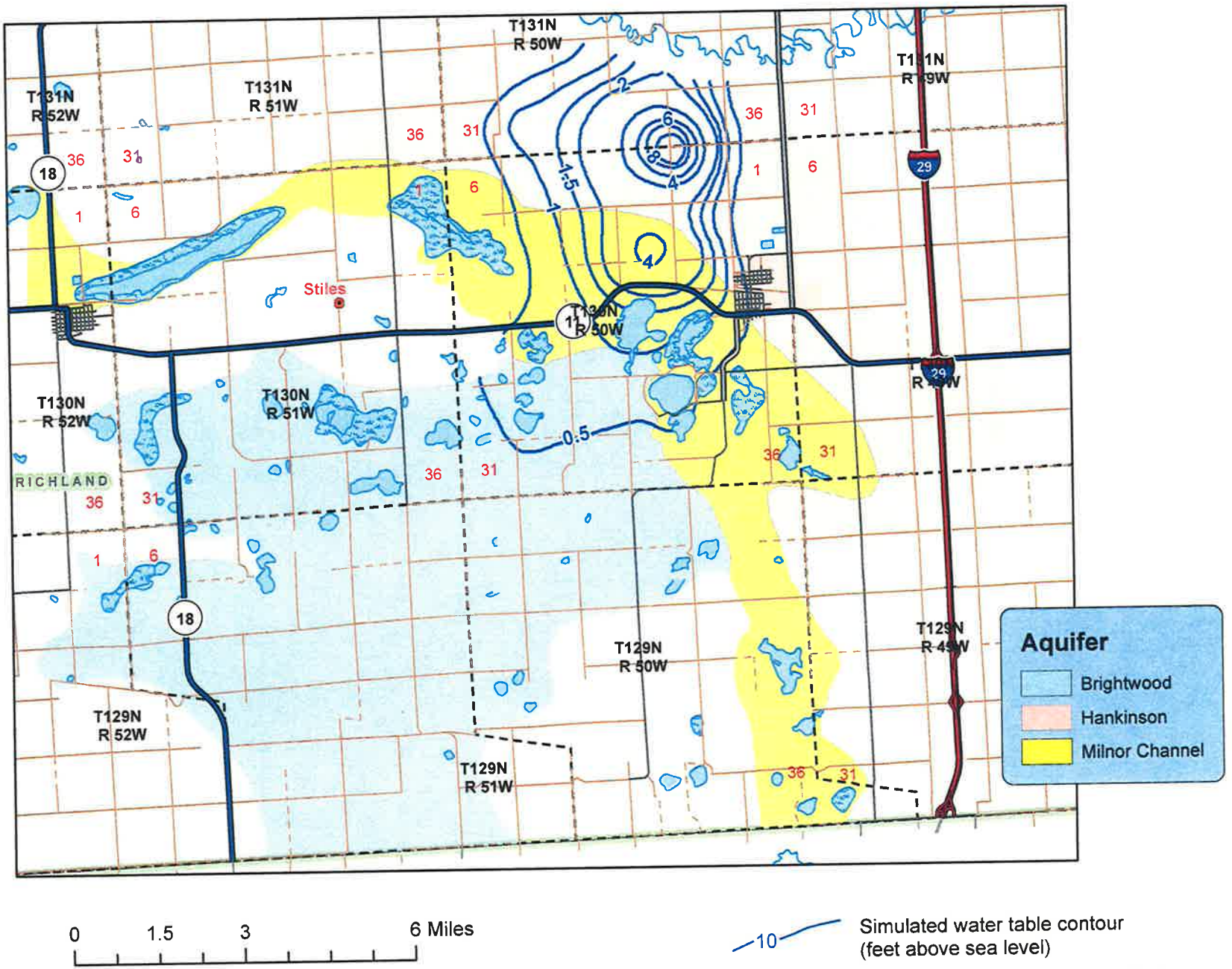

Figure 43. Simulated drawdown from steady-state model, resulting from SEWUD pumping 1,600 acre-ft./yr. and the city of Hankinson pumping 546 acre-ft./yr. from the Hankinson aquifer and 1,640 acre-ft./yr. from the Milnor Channel aquifer

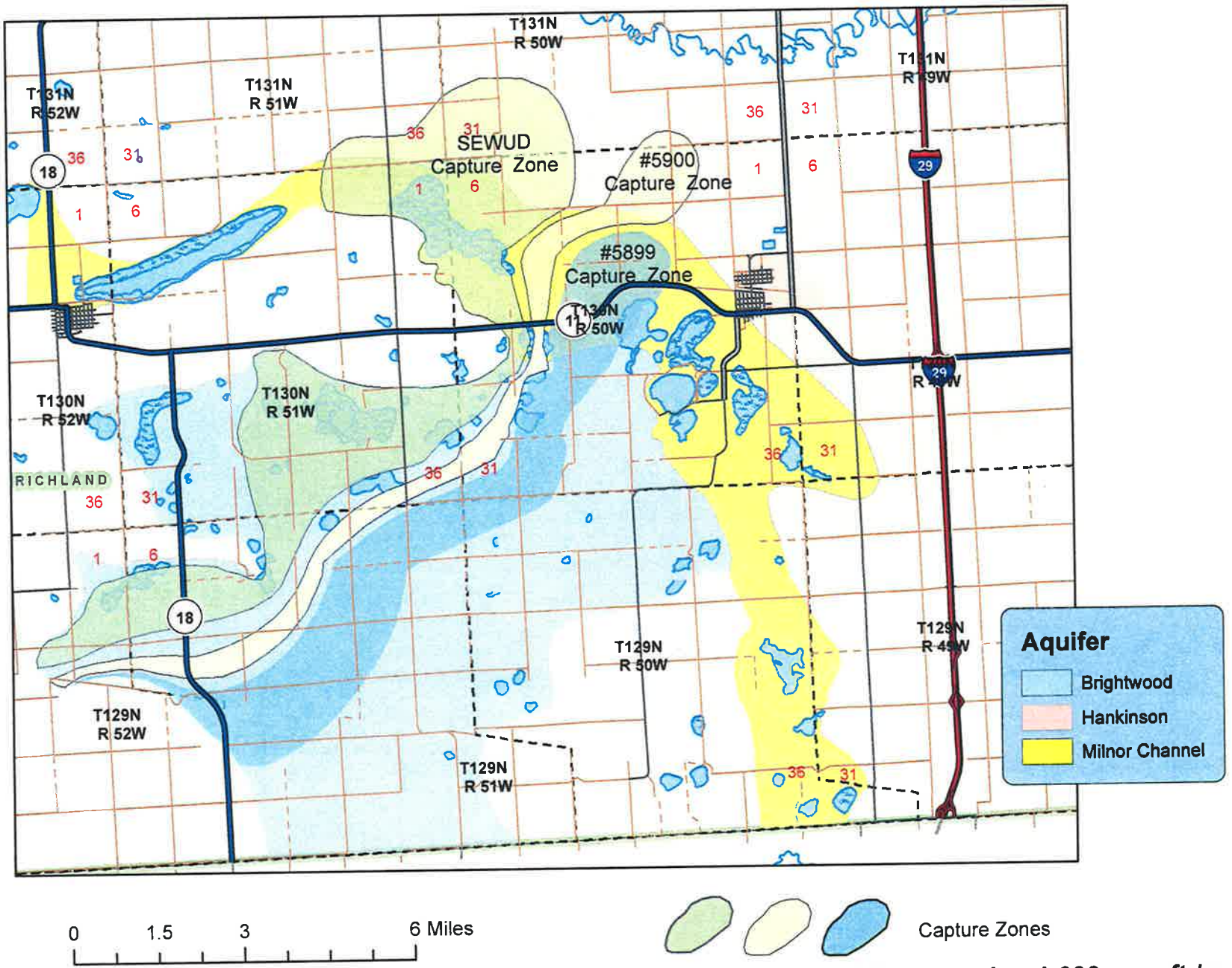

Figure 44. Simulated capture zones from steady-state model resulting from SEWUD pumping 1,600 acre-ft./yr and the city of Hankinson pumping 546 acre-ft./yr. from the Hankinson aquifer and 1,640 acre-ft./yr. from the Milnor Channel aquifer

Scenario 4 - Time of Travel

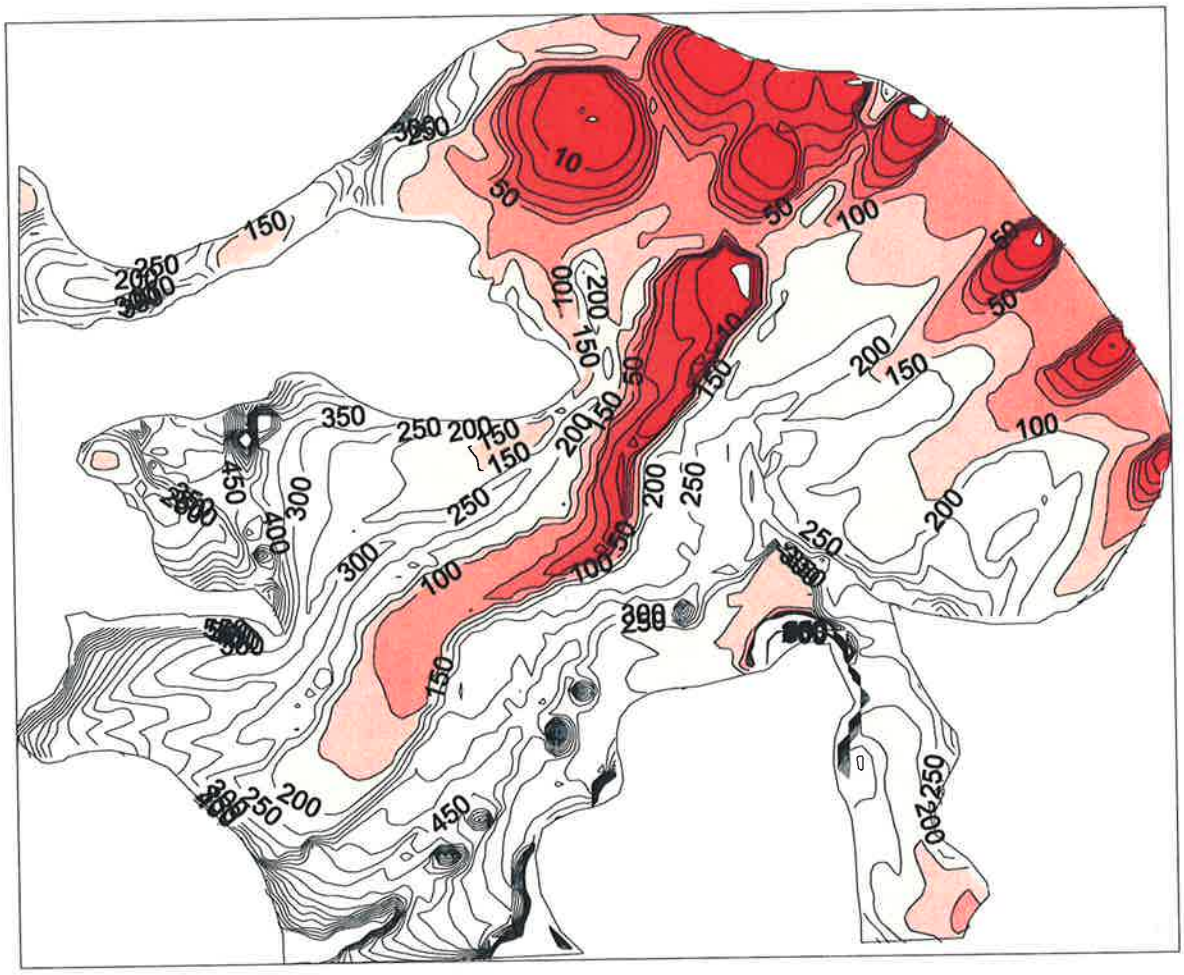

Figure 45. Steady-state time of travel in years resulting from SEWUD pumping 1,600 acre-feet per year and the city of Hankinson pumping 546 acre-feet from the Hankinson aquifer and 1,640 Milnor Channel aquifer.

Scenario 5:
0% Hankinson Aquifer (0 acre-feet)
100% Milnor Channel Aquifer (2,597 acre-feet)
Total 2,597 acre-feet

Presented in figure 46 are the steady-state model generated water levels in the area aquifers from pumping all the needed water or, 2,597 acre-feet from the Milnor Channel aquifer in the S1/2 of section 10 (starting head includes the drawdown from the 1,600 acre-feet appropriation for SERW wells). Presented in figure 47 are the drawdowns predicted from the additional 2,597 acre-feet appropriation from the Milnor channel aquifer. Ground-water movement simulated by the steady state model was, in general, from southwest to northeast with cones of depression developing around the SEWUD wells and the proposed city of Hankinson wells (figs. 46 and 47). The model predicts, a maximum of 1 foot of drawdown near the existing Hankinson aquifer wells, 10 feet of drawdown in the S1/2 of section 10 (proposed Milnor Channel wells) and less than an additional 1 foot of drawdown in the vicinity of the SEWUD Wells. Most of the water is obtained from capturing a small portion of the water that would have left the system as evapotranspiration and a small amount is obtained from reducing flow to the drains (springs). Ten feet of drawdown is acceptable (no undue impacts to other water users) with a properly designed well field.

The capture areas shown in figure 48 are areas extending into the Milnor Channel and Brightwood aquifers. This indicates that extensive pumping by the SEWUD rural water wells and the proposed city of Hankinson industrial wells will capture ground water from the Milnor Channel and Brightwood aquifers. This will cause water quality degradation at both the SEWUD rural water wells and the proposed Hankinson industrial wells. The extent of water quality degradation is indeterminate. Time of travel analyses presented in figure 49 indicates that it will take 50 to 200 years for water to move from the Milnor Channel and Brightwood aquifers into the SEWUD and city of Hankinson wells.

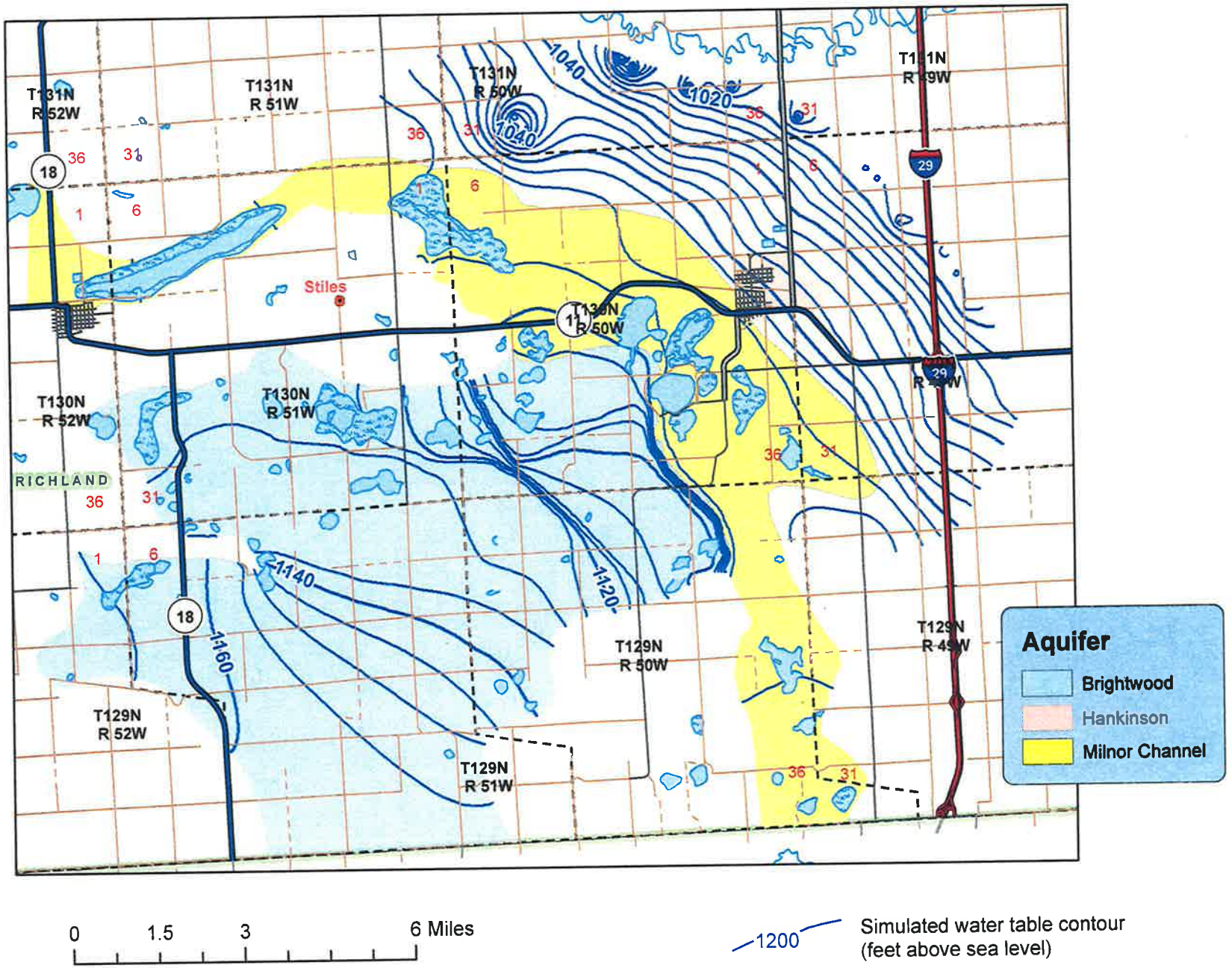

Figure 46. Simulated water table configuration from steady-state model resulting from SEWUD pumping 1,600 acre-ft./yr. and the city of Hankinson pumping 2,597 acre-ft./yr. from the Milnor Channel aquifer

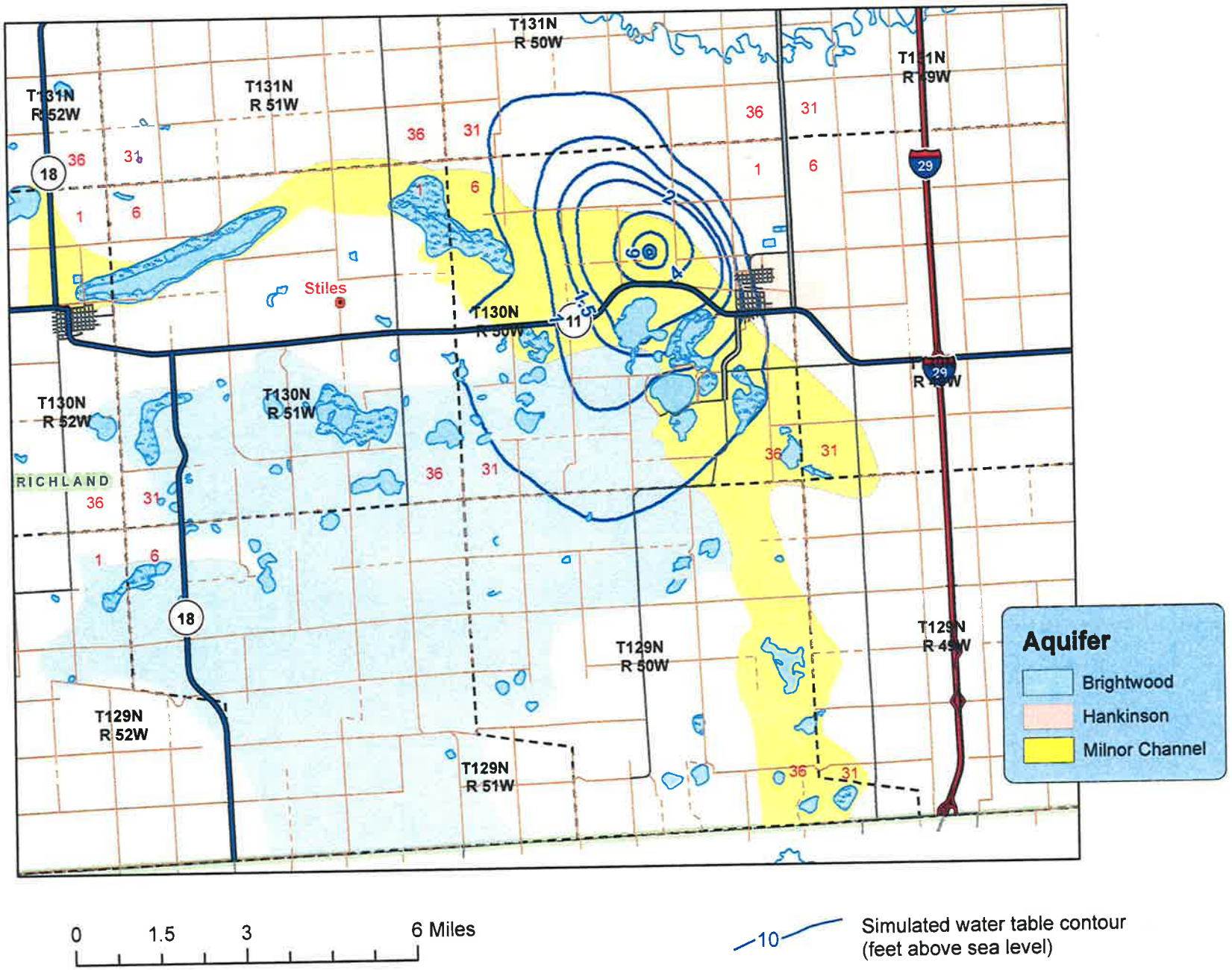

Figure 47. Simulated drawdown from steady-state model, resulting from SEWUD pumping 1,600 acre-ft/yr. and the city of Hankinson pumping 2,597 acre-ft./yr. from the Milnor Channel aquifer

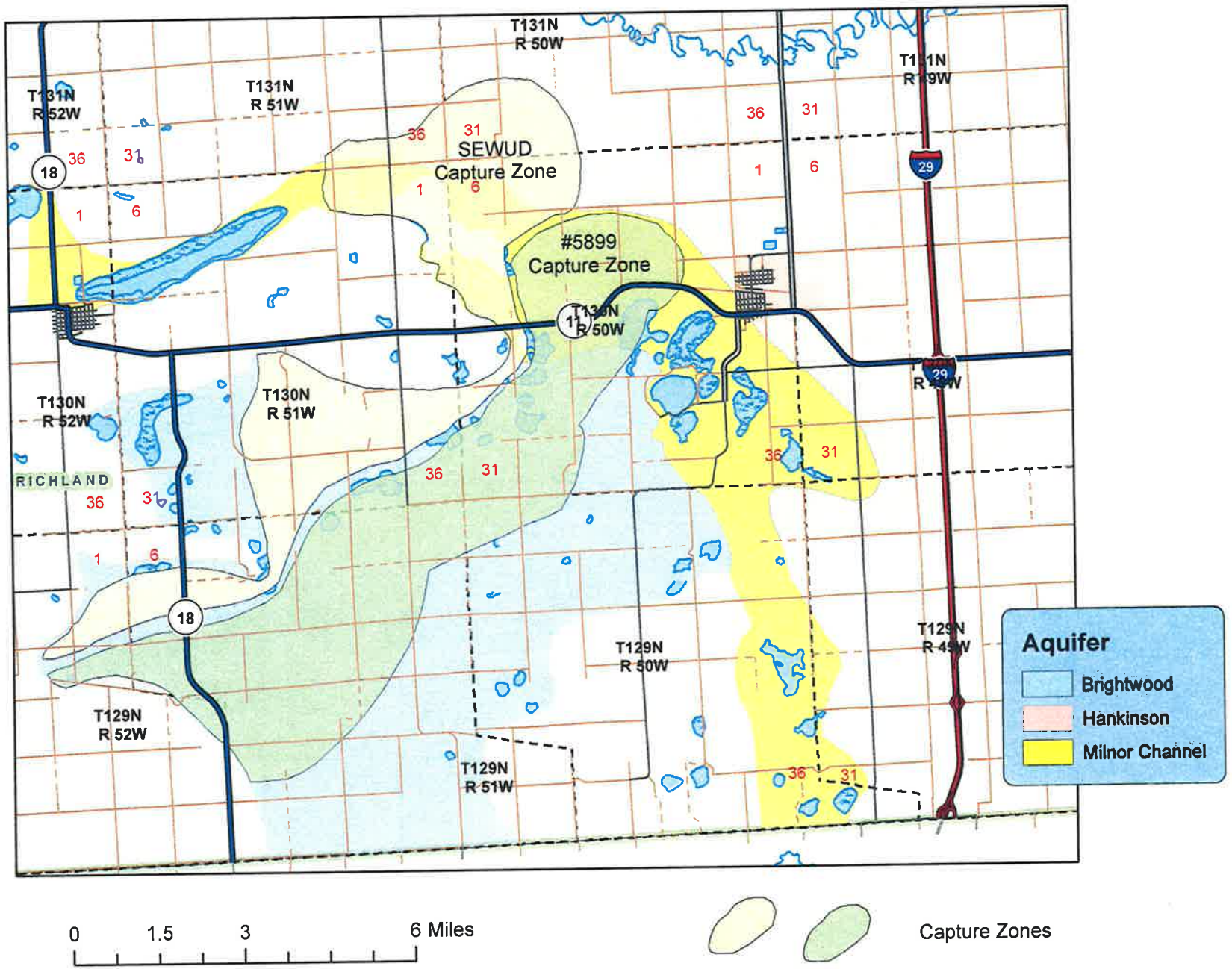

Figure 48. Simulated capture zones from steady-state model resulting from SEWUD pumping 1,600 acre-ft./yr and the city of Hankinson pumping 2,597 acre-ft./yr. from the Milnor Channel aquifer

Scenario 5 - Time of Travel

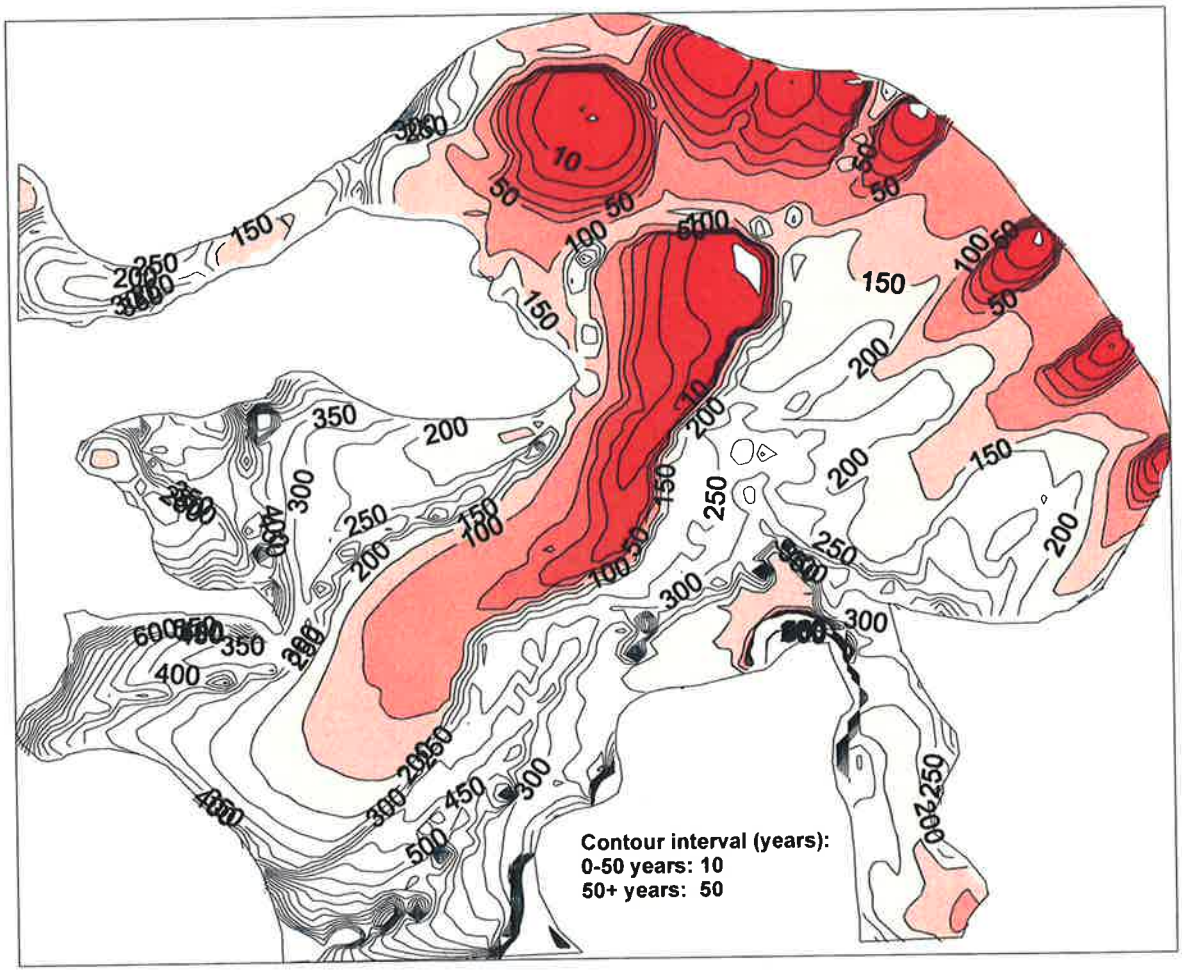

Figure 49. Steady-state time of travel in years resulting from SEWUD pumping 1,600 acre-feet per year and the city of Hankinson pumping 2,597 acre-feet from the Milnor Channel aquifer.

Selection of an Appropriate Pumping Scenario

In selecting an appropriate pumping scenario, the following issues received major consideration:

1). Sustainability and efficient development of the aquifers
2). Impacts on prior appropriators and harm to others
3). Potential changes in water quality

Each of the five pumping scenarios have both positive and negative attributes. The Hankinson aquifer near the dune complex (existing Hankinson municipal well field and the SEWUD well field) northwest of the city of Hankinson is locally characterized by a less saline ground water. This ground water is the most desirable for municipal, rural and industrial use because treatment requirements are less. However, the Hankinson aquifer in the area of the dunes is limited in areal extent and consists of very fine to fine sand. As a result, individual well yields will be much smaller than individual well yields of wells completed in the Milnor Channel aquifer. More wells would be required in the Hankinson aquifer than in the Milnor Channel aquifer to pump the same volume of ground water.

Available data indicates that there are more appropriators pumping from the Hankinson aquifer than in the Milnor Channel aquifer within the various areas of influence of the five pumping scenarios. Lakes, wetlands and a waterfowl production area occur south and southwest of the proposed pumping area in the Milnor Channel aquifer (SW1/2 section 10, Township 130 North, Range 50 West). Efforts need to be made to reduce water-level drawdown in these areas. Based on the above, Scenario 3 (871 acre-feet from the Hankinson aquifer and 871 acre-feet from the Milnor Channel aquifer) results in the least overall adverse impact on the local ground-water flow system. The 50/50 blend will reduce the potential for severe aquifer dewatering (Hankinson aquifer) and will allow for a more efficient development of the aquifer system by spreading the effects of pumping over a larger area. This also reduces the possibility of developing a non-sustainable water supply.

Given the water quality variability in the project area, it has been shown that in all pumping scenarios, (even SEWUD pumping 1,600 acre-feet per year without any additional ground-water withdrawals) there is a strong potential for water quality degradation to occur over time. Pumping a 50/50 blend of Hankinson and Milnor Channel aquifer ground water may help reduce the magnitude of water quality

degradation. In addition, US Bio Energy indicates that a 50/50 blend is an acceptable water quality for their ethanol plant.

Finally, the 50/50 blend results in less than about 1 foot of long-term water level decline in the lakes, wetland, and waterfowl production areas south of the proposed points of diversion (S1/2 of section 10) in the Milnor Channel aquifer.

The previous analysis indicates pumping up to 871 acre-feet from the Hankinson aquifer and 871 acre-feet from Milnor channel aquifer will not adversely affect other appropriators. Further evidence to support this conclusion is shown by the hydrographs of observation wells in figure 17. Observation wells 130-050-06AAA2 and 131-050-29CCC2 are closest to the SEWUD well field. Temporal water-level fluctuations for these two wells are very similar to those in the other 2 observation wells (08BAA2, and 09AAD2) located outside of the practical area of influence of the municipal/rural well field. There are no large-scale water users near observation wells 130-050-08BAA2 and 09AAD2. It is apparent from figure 17 that natural spring recharge events and summer discharge due to evapotranspiration are the most significant factors affecting water-level fluctuations in the observation well network in the application evaluation area. Water-level fluctuations due to ground-water withdrawals from the SEWUD well field are small in relation to natural water-level fluctuations. This response supports the conclusion that sufficient ground water is available to accommodate the proposed annual withdrawal of 871 acre-feet from the Hankinson aquifer and 871 acre-feet from the Milnor Channel aquifer.

Well Field Design Considerations

A major concern that city of Hankinson may have however is mutual well interference within their own well fields. Given the fine textured nature of the aquifer and relatively thin saturated thickness in much of the Hankinson aquifer, wells within the well field may not be able to tolerate long-term interference if pumping rates are too large and the wells a too closely spaced. Careful attention should be paid to designing the well field to efficiently develop the aquifer without causing undue harm to prior appropriators. The State Water Commission will not restrict additional ground-water development in the area of influence of the proposed industrial well field to protect an inefficiently designed capture system.

Letters Received Concerning Water Permit Applications #5899 and #5900

Written Comments:

The following parties submitted written comments concerning water permit applications #5899 and #5900

#5899

Steve Hanson, General Manager, Southeast Water Users, PO Box Mantador, ND 58058

Megan Estep, Chief, Water Resources Division, U.S. Fish and Wildlife Service, P.O. Box 25486, Devner Federal Center, Denver, CO 80225

#5900

Steve Hanson, General Manager, Southeast Water Users, PO Box Mantador, ND 58058

David Tiegs and Paul Tiegs, 9175 167 Ave. SE, Hankinson, ND 58041

James Medenwaldt, 16630 89 St. SE, Hankinson, ND 58041

Steve and Kathy Bladow 16570 89th St. SE, Hankinson, ND 58041

#5899

Steve Hanson, General Manager, Southeast Water Users

"As the General Manager of the Southeast Water Users District (SEWUD), I have serious concerns regarding the above referenced applications. SEWUD is a regional supplier of drinking water to area communities through bulk service and to rural residences on individual meters. The population served by the eastern portion of SEWUD is approximately 7,339. Included in this population figure are the communities of Hankinson, Milnor, Rutland, and Wyndmere. All four of these communities and a majority of the rural users were forced to abandon their previous water supplies because of arsenic contamination in the groundwater. For these users, SEWUD is their only option as a drinking water source. In addition, the United States Environmental Protection Agency (EPS) is currently considering SEWUD as a Superfund remedy for an additional 380 rural residences. All of these users are or would be served from the existing SEWUD well field and Water Treatment Plant located directly west of the proposed points of withdrawal. Because our drinking water source is within the same aquifer as is proposed well field site of application #5900 and, I believe, hydrogeologically connected to the source of the other proposed withdrawal, application #5899, I have the following concerns.

1) *Is the aquifer system capable of handling the proposed 3.5 million gallon per day withdrawal?*
2) *How will the proposed withdrawals from the system affect the recharge capabilities for the system?*
3) *Will the proposed withdrawals increase the transmission of residual arsenic into the aquifer system?*

4) *Will the proposed withdrawals increase the transmission of other undesirable inorganic chemicals, namely iron and manganese, into the aquifer system?*
5) *Will the proposed withdrawals increase the overall total dissolved solids concentrations in the aquifer system?*
6) *Will the proposed withdrawals affect the current hardness values of the aquifer system?*
7) *What are the anticipated radii of influence of the proposed withdrawal sites and will they in any way impact our currently permitted wells in the Hankinson aquifer?*
8) *We have just recently added the communities of Hankinson and Wyndmere to our system and the full impacts of their usage will not be recognized until summer peak usage.*

Again, as the sole source supply of safe drinking water for area communities and rural residents, I am extremely concerned that our present source of water is not compromised. The North Dakota Department of Health and the EPA have documented the health risk experience by area water users and have accepted SEWUD as the most viable solution for them. I would ask your assistance in ensuring that this last reasonable option of drinking water not be jeopardized.

Thank you for the opportunity to comment on these two applications and please understand that in the absence of assurances from your office that my concerns will be addressed, I would not be able to support these applications."

Response:

1. Computer simulation of the area indicates that 871 acre-feet of ground water can be pumped from both the Hankinson aquifer and the Milnor Channel aquifer without undue harm to the SEWUD wells
2. Pumping by the city of Hankinson with have very little if any effect on the recharge capabilities.

3, 4, 5, and 6.

In general all these questions are basically the same, what will the impact be on the water quality as a result of pumping by the city of Hankinson. As previously stated, there is a high degree of water quality variability (both vertically and horizontally) in the three major aquifers in the project area. Simulation of just SEWUD pumping 1600 acre-feet per year indicated a steady-state capture area that extends southward into both the Milnor Channel and Brightwood aquifers (fig. 28). Referring to figures 5 and 6, it is evident that the capture area encompasses a wide range of dissolved solids concentrations. Given the complex nature of the distribution of water quality, it is not possible to determine the evolution of water quality that will occur as pumping continues at the recommended levels in the project area. The modeling analysis does indicate that pumping 871 acre-feet per year from both the Hankinson and Milnor Channel aquifers will cause less than two feet of additional drawdown at the SEWUD wells and <u>will not</u> significantly alter the capture area created by SEWUD pumping 1600 acre-feet per year. Thus, pumping 871 acre-feet in both the Hankinson and Milnor Channel aquifers should not cause significant water quality degradation at the SEWUD wells.

7. Computer simulation of the area indicates that 871 acre-feet of ground water can be pumped from both the Hankinson aquifer and the Milnor Channel aquifer without undue harm to the SEWUD's ability to obtain water.

8. The analyses to determine the possible impacts from the city of Hankinson's permit request took into account the full appropriation of SEWUD.

Megan Estep, Chief, Water Resources Division, U.S. Fish and Wildlife Service

"The Fish and Wildlife Service received Notice of Application for Appropriation of Water, filed by city of Hankinson, to divert ground water at a rate of 1,500 gallons per minute. Up to 2,420.0 acre-feet annual appropriation for industrial use. The proposed points of diversion are located in the SW1/4 and SE1/4 of Section 10, Township 130 North, Range 50 West, Richland County, North Dakota.

The Service is concerned about the impacts of the proposed diversion on its property interests as Section 9, Township 130 North, Range 50 West, Richland County has been acquired by the Service in fee title. This area is a wetland production area and is part of the National Wildlife Refuge System. The Service requests that your office provide us with any analysis done to determine whether this appropriation should be granted. The Service reserves the right to provide additional comments or information after review of the analysis and recommendation on this application."

Response:

Computer simulation of the area aquifers predicts that the withdrawal of 50% of ground water from the requested points of diversion in the S1/2 of section 10 (Milnor Channel aquifer, 871 acre-feet/year) and 50% of the ground water from the requested points of diversion in the old city of Hankinson well field (Hankinson aquifer, 871 acre-feet/year), would have a combined drawdown of less than 1 foot to 2 feet within a 1 mile radius of the proposed point of diversion in section 10. Thus the impacts from pumping on water levels beneath lands in section 9, Township 130 North, Range 50 West will be small in comparison to the impact on water levels due to climate variability.

#5900

Steve Hanson, General Manager, Southeast Water Users

"As the General Manager of the Southeast Water Users District (SEWUD), I have serious concerns regarding the above referenced applications. SEWUD is a regional supplier of drinking water to area communities through bulk service and to rural residences on individual meters. The population served by the eastern portion of SEWUD is approximately 7,339. Included in this population figure are the communities of Hankinson, Milnor, Rutland, and Wyndmere. All four of these communities and a majority of the rural users were forced to abandon their previous water supplies because of arsenic contamination in the groundwater. For these users, SEWUD is their only option as a drinking water source. In addition, the United States Environmental Protection Agency (EPS) is currently considering SEWUD as a Superfund remedy for an additional 380 rural residences. All of these users are or would be served from the existing SEWUD well field and Water Treatment Plant located directly west of the proposed points of withdrawal. Because our drinking water source is within the same aquifer as is proposed well field site of application #5900 and, I believe, hydrogeologically connected to the source of the other proposed withdrawal, application #5900, I have the following concerns.

1) *Is the aquifer system capable of handling the proposed 3.5 million gallon per day withdrawal?*
2) *How will the proposed withdrawals from the system affect the recharge capabilities for the system?*
3) *Will the proposed withdrawals increase the transmission of residual arsenic into the aquifer system?*
4) *Will the proposed withdrawals increase the transmission of other undesirable inorganic chemicals, namely iron and manganese, into the aquifer system?*
5) *Will the proposed withdrawals increase the overall total dissolved solids concentrations in the aquifer system?*
6) *Will the proposed withdrawals affect the current hardness values of the aquifer system?*
7) *What are the anticipated radii of influence of the proposed withdrawal sites and will they in any way impact our currently permitted wells in the Hankinson aquifer?*
8) *We have just recently added the communities of Hankinson and Wyndmere to our system and the full impacts of their usage will not be recognized until summer peak usage.*

Again, as the sole source supply of safe drinking water for area communities and rural residents, I am extremely concerned that our present source of water is not compromised. The North Dakota Department of Health and the EPA have documented the health risk experience by area water users and have accepted SEWUD as the most viable solution for them. I would ask your assistance in ensuring that this last reasonable option of drinking water not be jeopardized.

Thank you for the opportunity to comment on these two applications and please understand that in the absence of assurances from your office that my concerns will be addressed, I would not be able to support these applications."

Response:

These concerns were addressed under #5899.

David Tiegs and Paul Tiegs, 9175 167 Ave. SE, Hankinson, ND 58041

"I have some serious concerns regarding the above application. There are springs on Section 27-131-50, which we use to water our cattle. There is also a well on Section 27 we have concerns with; the well is used for human consumption as well as for the cattle.

We also are concerned about surface water being available for growing crops. We do not want to de-water our land to our detriment.

I understand there is plenty of water for the land affected by application #5899. It is my belief that the corn plant can take their water from that land."

Response:

On May 17, 2007 a site visit was conducted to the Tiegs Farm in section 27. Information provided at that time indicated that the well in section 27 is 27 to 30 feet

deep and is used mainly for livestock watering. The house is now served by rural water. Small seeps and spring flow were observed north of the farmstead.

Computer simulation of the area aquifers indicates that the withdrawal of 871 acre-feet from the requested point of diversion in the Hankinson aquifer, and 871 acre-feet from the requested point of diversion in the Milnor Channel aquifer plus the existing permitted withdrawals would result in a combined water level drawdown of 1 to 3 feet at the Tiegs farm (fig. 39). Given the saturated thickness, no undue impacts to a properly constructed domestic and stock wells will occur from this small amount of drawdown. In, addition, as stated earlier, NDCC §61-04-06.3 provides that, "Priority of appropriation does not include the right to prevent changes in the condition of water occurrence, such as the increase or decrease of stream flow, or the lowering of a water table, artesian pressure, or water, by later appropriators, if the prior appropriator can reasonably acquire the water under the changed conditions." In the case of a stock-watering dugout where the water supply represents a "window" in the water table, or natural spring discharge from the aquifer, the water right for stock watering purposes would not prevent the lowering of the water table to a level that would dry up the dugout or reduce spring discharge. The water user would need to acquire the water under the changed conditions, by deepening the dugout or installing a well to more efficiently withdraw water from the aquifer.

The Issue of Subirrigation

Subirrigation is a process in which plant roots intersect the capillary fringe of the water table and as a result are able to capture ground water for plant growth. Subirrigation is an efficient method of ground-water capture within a relatively narrow range of water-level depths below the land surface. During prolonged drought periods, the water table and associated capillary fringe generally drops below the depth of the root zone and subirrigation does not occur. During wet climatic periods, as occurred throughout much of the state from 1993 to about 2001, water levels in surficial, unconfined aquifers rose significantly causing soil water logging and associated drown out, which reduced agricultural production. Thus, over the long term, subirrigation is an inefficient and unreliable method of ground-water capture.

An important objective of ground-water resource management is to maximize the beneficial use of the resource on a sustainable basis. The sustained yield of an aquifer is the amount of water an aquifer will yield without depleting the resource available to

efficient capture. Under this management approach the volume of ground water put to beneficial use over the long term is more stable and reliable. This provides a more stable agricultural base in areas where irrigation is the predominant beneficial use. This is not the case when beneficial use is based on subirrigation.

An aquifer is a reservoir that can both store and transmit significant quantities of ground water. During drought periods, ground water is temporarily mined, that is, pumping and natural discharge exceed recharge. Available storage within the aquifer provides a buffer against drought that can supply water over short time periods when pumping exceeds average recharge. If subirrigation and maintenance of a relatively fixed, high water-table position is the management objective, then large volumes of ground water cannot be temporarily removed from storage during drought periods and beneficial use is severely restricted. As a result, the net economic benefit is significantly reduced.

The previously described hydrologic analysis indicates the water table will be lowered in the area of influence of the proposed irrigation development. This will result in a reduction of subirrigation over the long term in some areas. However, because subirrigation is an unstable, unreliable and inefficient method of ground-water capture that severely restricts the amount of ground water that can be put to beneficial use from an aquifer, its benefit is considered minor in relation to the benefits that result from efficient capture and the resulting increased beneficial use.

James Medenwaldt, 16630 89 St. SE, Hankinson, ND 58041

"I am writing in regards to the application for appropriation of water made by the city of Hankinson, application number 5900, which concerns the drilling of wells in Belford township for industrial use. These wells will be within a mile of my farm. I have many concerns about this issue.

First, I have a flowing spring that flows off my property on the North ½ of section 35-131-50. The flow has diminished since the rural water wells were installed in the same area. I have cattle and horses who use the water from this spring even in the winter. I have video documentation of it's existence.

Secondly, my water well is only 50 feet deep and what will happen when it dries up since rural water is several miles away and I have heard several years from reaching my residence.

Thirdly, they are asking to pump a great deal of ground water away. The movement of the water table an inch or two could dry up my land, greatly reducing the property value.

My great grandfather homesteaded this land in 1883 and it has been in my family since and I would hate to see it dry up, especially since my 15 year old son expressed a desire to take it over when he finishes school. Please take into consideration my thoughts and concerns, as well as these of my neighbors, when deciding on this matter."

Response:

On May 17, 2007 a site visit was conducted to the Medenwaldt Farm in section 35. Information provided at that time indicated that the well is 50 feet deep and is used mainly for livestock watering and house use. Small seeps and spring flow were observed north of the farmstead, and it appeared that this water was used for livestock watering.

Computer simulation of the area aquifers indicates that the withdrawal of 871 acre-feet from the requested point of diversion in the Hankinson aquifer, and 871 acre-feet from the requested point of diversion in the Milnor Channel aquifer plus the permitted withdrawals may result in a combined water level drawdown of 1 to 3 feet at the Medenwaldt farm. Given the saturated thickness, no undue impacts to a properly constructed domestic and stock wells will occur from this amount of drawdown. In, addition, as stated earlier, NDCC §61-04-06.3 provides that, "Priority of appropriation does not include the right to prevent changes in the condition of water occurrence, such as the increase or decrease of stream flow, or the lowering of a water table, artesian pressure, or water, by later appropriators, if the prior appropriator can reasonably acquire the water under the changed conditions." In the case of a stock-watering dugout where the water supply represents a "window" in the water table or natural spring discharge from the aquifer, the water right for stock watering purposes would

not prevent the lowering of the water table to a level that would dry up the dugout or reduce spring discharge. The water user would need to acquire the water under the changed conditions, by deepening the dugout or installing a well to more efficiently withdraw water from the aquifer.

The Issue of Subirrigation

Subirrigation is a process in which plant roots intersect the capillary fringe of the water table and as a result are able to capture ground water for plant growth. Subirrigation is an efficient method of ground-water capture within a relatively narrow range of water-level depths below the land surface. During prolonged drought periods, the water table and associated capillary fringe generally drops below the depth of the root zone and subirrigation does not occur. During wet climatic periods, as occurred throughout much of the state from 1993 to about 2001, water levels in surficial, unconfined aquifers rose significantly causing soil water logging and associated drown out, which reduced agricultural production. Thus, over the long term, subirrigation is an inefficient and unreliable method of ground-water capture.

An important objective of ground-water resource management is to maximize the beneficial use of the resource on a sustainable basis. The sustained yield of an aquifer is the amount of water an aquifer will yield without depleting the resource available to efficient capture. Under this management approach the volume of ground water put to beneficial use over the long term is more stable and reliable. This provides a more stable agricultural base in areas where irrigation is the predominant beneficial use. This is not the case when beneficial use is based on subirrigation.

An aquifer is a reservoir that can both store and transmit significant quantities of ground water. During drought periods, ground water is temporarily mined, that is, pumping and natural discharge exceed recharge. Available storage within the aquifer provides a buffer against drought that can supply water over short time periods when pumping exceeds average recharge. If subirrigation and maintenance of a relatively fixed, high water-table position is the management objective, then large volumes of ground water cannot be temporarily removed from storage during drought periods and beneficial use is severely restricted. As a result, the net economic benefit is significantly reduced.

The previously described hydrologic analysis indicates the water table will be lowered in the area of influence of the proposed irrigation development. This will result in a reduction of subirrigation over the long term in some areas. However, because subirrigation is an unstable, unreliable and inefficient method of ground-water capture that severely restricts the amount of ground water that can be put to beneficial use from an aquifer, its benefit is considered minor in relation to the benefits that result from efficient capture and the resulting increased beneficial use.

Steve and Kathy Bladow 16570 89th St. SE, Hankinson, ND 58041

"On April 9, 2007 we received a certified letter from Moore Engineering, Inc., West Fargo, ND regarding the notice of application by the city of Hankinson for appropriation of water, Application No. 5900. Our home and property are located between two of these well locations, one approximately one and one-half (1 1/2) miles to the south and the other is about a half (1/2) mile to the west of us. We have some serious concerns regarding our future supply of water. We have no idea how this will affect us! Our well is only sixty-five (65) feet deep. How deep are these wells going to be? If we can't get water from our well and we need a deeper well because of this diversion who will be responsible for that expense, us? What happens to the quality of our water when you remove these huge amounts of water from the ground? What if we have a few years of drought-like conditions. Our water holes and creeks dry. Can they continue to divert these huge amounts of water? If we can't get water are they responsible for hooking us up to rural water and paying for the expenses and the water? No one can predict what will happen when these huge amounts of water are removed from the ground but we can't just ignore the possibility that at some future time we won't have good water for us and our animals because of these diversions! Do we just take someone else's word for it when they say "Oh, don't worry about it, it won't affect you!" If you approve these permits do we have any recourse? We all need water?"

Response:

Computer simulation of the area aquifers indicates that the withdrawal of 871 acre-feet from the requested point of diversion in the Hankinson aquifer, and 871 acre-feet from the requested point of diversion in the Milnor Channel aquifer plus the permitted withdrawals would result in a combined water level drawdown of 3 to 5 feet at the Bladow farm in section 34 (fig. 39). Given the saturated thickness, no undue impacts to a properly constructed domestic and stock wells will occur from this amount of drawdown. In, addition, as stated earlier, NDCC §61-04-06.3 provides that, "Priority of appropriation does not include the right to prevent changes in the condition of water occurrence, such as the increase or decrease of stream flow, or the lowering of a water table, artesian pressure, or water, by later appropriators, if the prior appropriator can reasonably acquire the water under the changed conditions." In the case of a stock-watering dugout where the water supply represents a "window" in the water table, the water right for stock watering purposes would not prevent the lowering of the water table to a level that would dry up the dugout. The water user would need to acquire the water under the changed conditions, by deepening the dugout or installing a well to more efficiently withdraw water from the aquifer.

Statutory Authority for Appropriation of Water

The criteria from which the State Engineer must base his decision to grant or deny a water permit application are in NDCC §61-04-06 which is as follows:

1) The rights of a prior appropriator will not be unduly affected.

2) The proposed means of diversion or construction are adequate.

3) The proposed use of water is beneficial.

4) The proposed appropriation is in the public interest. In determining the public interest, the state engineer shall consider all of the following:

   a) The benefit to the applicant resulting from the proposed appropriation.

   b) The effect of the economic activity resulting from the proposed appropriation.

   c) The effect on the fish and game resources and public recreational opportunities.

   d) The effect of loss of alternate uses of water that might be made within a reasonable time if not precluded or hindered by the proposed appropriation.

   e) Harm to other persons resulting from the proposed appropriation.

   f) The intent and ability of the applicant to complete the appropriation.

Consideration of Statutory Criteria

1. **The rights of a prior appropriator will not be unduly affected.**
   The proposed ground-water withdrawals will result in additional water-level decline in aquifer intervals within the permit application areas. Calculations based on the modeling estimate that between 1 to 3 feet of decline will occur beyond 2 miles of the proposed well fields (scenario 3, 871 acre-feet from Hankinson aquifer and 871 acre-feet from the Milnor Channel aquifer). This additional decline is a very small percentage of the saturated thickness of the aquifers. Based on the available data, no undue impacts to fully penetrating, properly constructed wells in the area should result from the additional appropriation. The proposed well field must be efficiently constructed as to not unreasonably restrict continued appropriation from the aquifer.

2. **The proposed means of diversion or construction are adequate.**

Production wells shall be constructed in compliance with requirements of the North Dakota Department of Health and the North Dakota Board of Water Well Contractors.

3. **The proposed use of water is beneficial.**

The use of water for industrial purposes is considered by state law to be beneficial.

4. **The proposed appropriation is in the public interest. In determining the public interest, the state engineer shall consider all of the following:**

   a. **The benefit to the applicant resulting from the proposed appropriation.**

   The applicant should benefit from the proposed industrial use of the water.

   b. **The effect of the economic activity resulting from the proposed appropriation.**

   The area should benefit from the proposed ethanol plant in the area.

   c. **The effect on fish and game resources and public recreational opportunities.**

   The proposed appropriation will not have an undue effect on fish and game resources and public recreational opportunities.

   d. **The effect of loss of alternate uses of water that might be made within a reasonable time if not precluded or hindered by the proposed appropriation.**

   The proposed industrial use should not unduly affect future alternate uses of water in the permit application area.

   e. **Harm to other persons resulting from the proposed appropriation.**

   The proposed industrial use should not cause harm to other persons.

   f. **The intent and ability of the applicant to complete the appropriation.**

   The applicant has the intent and ability to complete the proposed industrial development. Therefore, the proposed appropriation is in the public interest.

Recommendations

Based on the foregoing interpretations and analysis, it is found that a portion of the water requested by the city of Hankinson in Water Permit Application #5899 meets the criteria specified in NDCC Section §61-04-06. Therefore, it is recommended that the State Engineer issue approval of a portion of conditional water permit application #5899 to divert 871 acre-feet of ground water annually from a point(s) of diversion located in the S1/2 of Section 10, Township 130 North, Range 50 West to provide for an industrial water supply at a maximum pumping rate of 1,500 gallons per minute. The remainder of the request, or 1,549 acre-feet/yr shall be held in abeyance until additional hydrologic data are obtained and analyzed.

Based on the foregoing interpretations and analysis, it is found that a portion of the water requested by the city of Hankinson in Water Permit Application #5900 meets the criteria specified in NDCC Section §61-04-06. Therefore, it is recommended that the State Engineer issue approval of a portion of conditional water permit application #5900 to divert 871 acre-feet of ground water annually from the E1/2 of section 3, Township 130 North, Range 50 west and the S1/2 of section 27, the SE1/4 of section 34 and the N1/2 of section 34 all in Township 131 North, Range 50 West, for industrial use (proposed ethanol plant) at a maximum pumping rate of 930 gallons per minute. The remainder of the request, or 629 acre-feet/yr shall be held in abeyance until additional hydrologic data are obtained and analyzed. The following conditions shall apply:

1) The well(s) shall be placed in such a location, constructed to such a depth, have such an efficiency, and pumped at such a rate that will not unreasonably restrict further development of the aquifer system.

2) The production well(s) shall be constructed with a measuring port and a tube having a minimum ¾-inch inside diameter installed in the annular space between the pump column and the well casing and extending to the top of the bowl assembly or submersible pump to allow the measurement of water levels in the well(s). The bottom end of the tube shall be plugged and the bottom 2 feet perforated. Any other facility for water level measurement must be approved by the State Engineer.

3) The pumping rate shall be subject to the results of an aquifer test.

Conditions Continued:

4) Prior to the beneficial use of water, an in-line continuous recording totalizing water flowmeter shall be installed on the pump discharge line to measure the quantity of water pumped from the water source. The water flowmeter must meet the following requirements:

   a. The water flowmeter must be certified by the manufacturer to record neither less than 98 percent nor more than 102 percent of the actual volume of water passing the water flowmeter when installed according to the manufacturer's instructions.

   b. The water flowmeter must have a display that is readable at all times, whether the system is operating or not.

   c. The water flowmeter must have a totalizer that meets the following criteria:

      i. Is continuously updated to read directly only in acre-feet, acre-inches, gallons, cubic feet, or barrels (42 U.S. gallons)

      ii. Has sufficient capacity, without cycling past zero more than once each year, to record the quantity of water diverted in any one calendar year;

      iii. Has a dial or counter that can be timed with a stopwatch over not more than a 10-minute period to accurately determine the rate of flow under normal operating conditions; and

      iv. Has a nonvolatile memory if the meter is equipped with an electronic totalizer.

   d. The water flowmeter must be installed according to manufacturer's specifications and must be properly maintained according to manufacturer's recommendations, including proper winterization such as removal during the winter.

   e. The water flowmeter shall be available for inspection by the representatives of the State Engineer.

5) The annular space between the casing for the production well(s) and the drilled hole shall be sealed in accordance with the Rules for Water Well Construction and Water Well Pump Installation, Article 33-18.

6) A completion report for the production well(s) shall be filed with the State Engineer within 30 days of completion of construction, or before the beneficial use of water, whichever occurs first. The report shall include but not be limited to, information on the location, depth length and types of casing used, depth to which annular space was sealed, a log of the materials penetrated by drilling, static water level, and pumping water level.

7) Failure to comply with any order of the State Engineer may result in forfeiture of this water permit.

Selected References

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APPENDIX I
LITHOLOGIC LOGS OF WELLS AND TEST HOLES

130-049-01BBB
NDSWC 13035

Date Completed:	08/13/1992	Purpose:	Test Hole
L.S. Elevation (ft):	980		
Depth Drilled (ft):	240		
		Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	CLAY	Road fill; cobble at 1 foot.
2-27	CLAY	Clay, light olive-brown, soft, plastic, oxidized (Lacustrine).
27-74	TILL	Clay, silty, sandy, pebbly, olive-gray, soft; cobbles at 73 to 74 feet (Till).
74-180	TILL	Clay, silty, slightly sandy, slightly pebbly, dark gray, firm; interbedded sand from 107 to 111 feet; cobbles at 113 feet; interbedded sand and gravel from 121 to 124 feet; sand and gravel from 124 to 125 feet (Till).
180-212	CLAY	Clay, olive-gray, firm, slightly plastic (possible reworked shale).
212-240	SHALE	Shale, silty, olive-black, soft, nonplastic; white lamination.

130-049-01DDB
RALPH BRACKEN

Date Completed:	0/0	Purpose:	Stock Well
L.S. Elevation (ft):	982	Well Type:	2 in. - Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-20	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description

130-049-03BAB
Mary Boelke

Date Completed:	00/00/00	Purpose:	Stock Well
L.S. Elevation (ft):	N/A	Well Type:	3 in. -
Depth Drilled (ft):	105	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-049-04BBB
NDSWC 13048

Date Completed:	08/26/1992	Purpose:	Test Hole
L.S. Elevation (ft):	1000		
Depth Drilled (ft):	160		
		Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, black.
2-8	CLAY	Clay, silty, sandy, light olive-brown, soft.
8-11	SAND	Sand, very fine, oxidized.
11-22	SAND	Sand, very fine, olive-gray, well sorted, unoxidized.
22-34	SILT	Silt, clayey, olive-gray, soft.
34-93	TILL	Clay, silty, sandy, pebbly, olive-gray, soft; pebbly, fine and medium at 41 feet; cobbles at 80 feet; very sandy, numerous cobbles, interbedded gravel from 80 to 93 feet (Till).
93-106	CLAY	Clay, silty, slightly sandy, fine, olive-gray, slightly firm; less sand with depth.
106-113	GRAVEL	Gravel, fine and medium, sandy, angular to sub-rounded, carbonate, shale, igneous; cobbles from 111 to 113 feet.
113-122	TILL	Clay, silty, sandy, pebbly, light brown, oxidized; interbedded oxidized gravel, fine and medium; calcareous (Till).
122-126	TILL	Clay, silty, sandy, pebbly, light olive-gray, slightly oxidized; occasional cobbles (Till).
126-130	TILL	Clay, silty, very sandy, pebbly, olive-gray, soft (Till).
130-132	GRAVEL	Gravel, fine and medium.
132-154	TILL	Clay, silty, very sandy, pebbly, olive-gray, soft, interbedded gravel; cobbles at 154 feet.
154-160	CLAY	Clay, dark gray, slightly firm; some light gray return (Shale).

130-049-06BBD1
Barbara Schallen

Date Completed:	09/20/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	1027	Well Type:	4 in. - Steel
Depth Drilled (ft):	38	Aquifer:	Undefined
Screen Int. (ft.):	29-35	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-8	CLAY	Yellow
8-38	SAND	Quicksand

130-049-06BBD2
Barbara Scheller

Date Completed:	09/24/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	1027	Well Type:	4 in. - Steel
Depth Drilled (ft):	40	Aquifer:	Undefined
Screen Int. (ft.):	29-35	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-8	CLAY	yellow
8-12	SHALE	
12-40	SAND	fine

130-049-07DDD
NDSWC 13404

Date Completed:	08/16/1994	Purpose:	Test Hole
L.S. Elevation (ft):	1045		
Depth Drilled (ft)	220	Data Source:	NDSWC

Completion Info: Hole plug

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, silt loam, black.
2-12	CLAY	Clay, silty, slightly sandy, very fine, light olive brown (5Y 5/6), soft, sticky, plastic, oxidized.
12-28	CLAY	Clay, silty, slightly sandy, very fine, olive gray (5Y 3/2), soft, sticky, plastic, reduced.
28-42	SAND	Sand, very fine, slightly silty, olive gray.
42-62	SILT	Silt, sandy, very fine, olive gray, soft, slightly sticky, slightly plastic.
62-73	CLAY	Clay, silty, sandy, olive gray, soft, sticky, plastic.
73-102	CLAY	Clay, silty, sandy, pebbly, olive gray, soft, slightly sticky, slightly plastic; interbedded sand and gravel from 77 to 79 and 91 to 101 ft.
102-122	GRAVEL	Gravel, fine to coarse, predominantly medium, sandy, mixed mineralogy, subangular and subrounded.
122-163	TILL	Clay, silty, sandy, pebbly, dark olive gray, firm, sticky, slightly plastic; more clayey below 140 ft; occasional cobbles and interbedded sand and gravel from 153 to 163 ft; rock at 156 ft (Till).
163-176	CLAY	Clay, slightly silty, slightly sandy, slightly pebbly, dark olive gray.
176-220	SHALE	Clay, olive black (5Y 2/1), soft, sticky, plastic, slightly calcareous; waxy appearance; indurated, silty, sandy, very fine from 192 to 193 ft (Shale).

130-049-08DCB
Henry Thomas

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	22	Aquifer:	Undefined
Screen Int. (ft.)	0-0	Data Source:	

Completion Info:

Remarks: Data from Henkinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-049-09ABB
Ed Weiser

Date Completed:	1951	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. -
Depth Drilled (ft):	187	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-049-10AAA
WAYNE HUBRIG

Date Completed:	09/02/1973	Purpose:	Domestic Well
L.S. Elevation (ft):	989	Well Type:	3 in - Stainless Steel
Depth Drilled (ft):	165	Aquifer:	Undefined
Screen Int. (ft.):	148-158	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-14	CLAY	Clay, yellow.
14-58	CLAY	Clay.
58-68	SAND	Sand.
68-148	CLAY	Clay.
148-158	SAND	Sand.
158-165	CLAY	Clay.

130-049-10BB
Melvin Hubrig

Date Completed:	09/03/1973	Purpose:	Domestic Well
L.S. Elevation (ft):	989	Well Type:	4 in. - Steel
Depth Drilled (ft):	75	Aquifer:	Undefined
Screen Int. (ft.):	63-69	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-14	CLAY	yellow
14-58	SHALE	
58-69	SAND	
69-75	SHALE	

130-049-11AAA

Date Completed:	0/0	Purpose:	Surface Water Monitoring Site
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Surface Water
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: RICHLAND CO DRAIN #65 NR GREAT BEND, USGS gaging station, #05052100

Lithologic Log

Depth (ft)	Unit	Description

130-049-12BCB
BOB KINN

Date Completed: 07/11/1974
L.S. Elevation (ft): 984
Depth Drilled (ft): 109
Screen Int. (ft.): 101-109

Purpose: Stock Well
Well Type: 2 in. - PVC
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-3	TOPSOIL	Black.
3-40	CLAY	Clay, yellow.
40-80	CLAY	Clay, gray.
80-90	SAND	Sand, fine and medium.
90-100	CLAY	Clay, blue.
100-109	SAND	Sand.

130-049-15BCA
Rudy Gustman

Date Completed: 1938
L.S. Elevation (ft): N/A
Depth Drilled (ft): 16
Screen Int. (ft.): 0-0

Purpose: Domestic Well
Well Type: 36 in. -
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: Data from Henkinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-049-16BAC
F.O. Healy

Date Completed: 10/22/1974
L.S. Elevation (ft): 1027
Depth Drilled (ft): 120
Screen Int. (ft.): 108-118

Purpose: Stock Well
Well Type: 4 in. - Steel
Aquifer: Undefined
Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-18	CLAY	yellow
18-105	SHALE	
105-107	SAND	
107-108	SHALE	
108-118	SAND	
118-120	SHALE	

130-049-17AAA

Date Completed: 11/27/1953
L.S. Elevation (ft): 1029
Depth Drilled (ft): 200

Purpose: Test Hole
Data Source:

Completion Info:

Remarks: GW 25
H-821

Lithologic Log

Depth (ft)	Unit	Description
0-6	SAND	Sand, very fine, light gray (lacustrine).
6-9	CLAY	Clay, light gray (lacustrine).
9-55	SAND	Sand, very fine and fine, clayey (lacustrine).
55-98	SAND	Sand, very fine, very clayey (lacustrine).
98-161	TILL	Till, light gray.
161-163	SAND & GRAVEL	Sand, pebbly.
163-200	TILL	Till, light gray to medium gray.

130-049-17CCC

Date Completed: 11/06/1953
L.S. Elevation (ft): 1052
Depth Drilled (ft): 400
Purpose: Test Hole
Data Source:

Completion Info:

Remarks: GW 25
H-813

Lithologic Log

Depth (ft)	Unit	Description
0-7	CLAY	Clay, silty and sandy (lacustrine).
7-50	SAND	Sand, very fine and fine, light gray (lacustrine).
50-72	SAND	Sand, very fine, very clayey, very silty (lacustrine).
72-102	TILL	Till, light gray, soft.
102-105	SAND	Sand.
105-132	TILL	Till, light gray.
132-136	SAND & GRAVEL	Sand, pebbly.
136-241	TILL	Till, light gray to medium gray.
241-249	SAND	Sand, fine to coarse.
249-274	TILL	Till, medium gray, hard.
274-383	SHALE	Shale, very dark gray to black.
383-400	CLAY	Clay, white; grades downward to green (weathered granite).

130-049-17DDD
USGS

Date Completed: 11/11/1953
L.S. Elevation (ft): 1046
Depth Drilled (ft): 190
Purpose: Test Hole
Data Source:

Completion Info:

Remarks: H-814

Lithologic Log

Depth (ft)	Unit	Description
0-4	CLAY	Clay, sandy, orange (lacustrine).
4-8	CLAY	Clay, light gray (lacustrine).
8-54	SILT	Silt, sandy (lacustrine).
54-132	TILL	Till, light gray.
132-140	SAND	Sand, coarse and very coarse, slightly clayey.
140-179	SAND & GRAVEL	Sand, pebbly; boulders at base.
179-190	SHALE	Shale, silty, very dark gray.

130-049-18CBC
NDSWC PW#2

Date Completed: 07/12/2006
L.S. Elevation (ft): 1057
Depth Drilled (ft): 190
Screen Int. (ft.): 164-189
Purpose: Industrial Well
Well Type: 12 in. - Steel
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: BioHank production Well #2, Wellll flowed 50 gpm upon completion

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-66	SAND	gray, fine
66-163	CLAY	gray
163-190	SAND	and rocks
190-200	CLAY	gray

130-049-18CBC2
BioHank

Date Completed: 00/00/00
L.S. Elevation (ft): 1057
Depth Drilled (ft): 0
Screen Int. (ft.): 0-0
Purpose: Observation Well
Well Type: 6 in. -
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description

130-049-18CCC
NDSWC 12208

Date Completed:	10/03/1988	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1058	Well Type:	2 in. - PVC
Depth Drilled (ft):	212	Aquifer:	Undefined
Screen Int. (ft.):	198-203	Data Source:	

Completion Info:

Remarks: Plugged 8/92; Flowed; Adj Elev; WL above L S Elev

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Sand.
2-4	SAND	Sand, very fine, well sorted.
4-32	CLAY	Clay, very silty, olive-gray, soft; interbedded silt.
32-53	SAND	Sand, very fine, well sorted, subangular to rounded; interbedded clay, silt and detrital lignite.
53-76	CLAY	Clay, slighty silty, gray, soft, plastic; cobbles from 75 to 76 feet.
76-125	TILL	Clay, very silty, slighty sandy, slighty pebbly, olive-gray, soft, plastic (till).
125-158	CLAY	Clay, silty, gray, firm, slighty plastic; lamination; contains detrital lignite.
158-186	SAND	Sand, coarse and very coarse, pebbly, subrounded and rounded, limestone, igneous, shale and detrital lignite.
186-201	GRAVEL	Gravel, fine to coarse, sandy, subrounded and rounded, limestone and igneous; interbedded.
201-203	CLAY	Clay.
203-212	GRAVEL	Gravel, coarse, limestone and igneous; cobbles from 210 to 212 feet; boulder at 212 feet.

130-049-18DDA
NDSWC PW#1

Date Completed:	07/11/2006	Purpose:	Industrial Well
L.S. Elevation (ft):	1057	Well Type:	12 in. - Steel
Depth Drilled (ft):	160	Aquifer:	Undefined
Screen Int. (ft.):	140-160	Data Source:	

Completion Info:

Remarks: BioHank production well #1

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	black
1-8	CLAY	yellow
8-140	CLAY	sandy
140-160	SAND	and rocks
160-163	ROCK	
163-200	CLAY	gray

130-049-19DBB
NORTHERN IMPROVEMENT

Date Completed:	02/11/1976	Purpose:	Industrial Well
L.S. Elevation (ft):	1060	Well Type:	3 in. - Stainless Steel
Depth Drilled (ft):	190	Aquifer:	Undefined
Screen Int. (ft.):	168-180	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-6	CLAY	Clay, yellow.
6-18	SAND	Sand, yellow.
18-38	SAND	Sand, fine.
38-90	CLAY	Clay, soft.
90-102	CLAY	Clay, hard.
102-103	SAND	Sand.
103-128	CLAY	Clay; contains cobbles.
128-131	SAND	Sand
131-168	CLAY	Clay.
168-180	SAND	Sand.
180-190	CLAY	Clay.

130-049-20ABA
G Medenwaldt

Date Completed:	1951	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	3 in. -
Depth Drilled (ft):	55	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-049-20DDD
USGS

Date Completed:	11/30/1953	Purpose:	Test Hole
L.S. Elevation (ft):	1046		
Depth Drilled (ft):	200	Data Source:	

Completion Info:

Remarks: H-823

Lithologic Log

Depth (ft)	Unit	Description
0-16	CLAY	Clay, silty, grayish-orange; limonite concretions (lacustrine).
16-65	SILT	Silt, sandy, light gray (lacustrine).
65-126	TILL	Till, light gray.
126-149	SAND & GRAVEL	Sand, clayey and pebbly.
149-200	TILL	Till, light gray to medium gray

130-049-21BB
Fred Fonde

Date Completed:	08/25/1972	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - Steel
Depth Drilled (ft).	129	Aquifer:	Undefined
Screen Int. (ft.):	117-129	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-12	CLAY	yellow
12-30	SAND	
30-117	SHALE	
117-129	SAND	

130-049-21CCB
Fred Emde

Date Completed:	00/00/00	Purpose:	Stock Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. -
Depth Drilled (ft):	125	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Henkinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-049-22AAA
USGS

Date Completed:	11/14/1953	Purpose:	Test Hole
L.S. Elevation (ft):	996		
Depth Drilled (ft):	280	Data Source:	

Completion Info:

Remarks: H-815

Lithologic Log

Depth (ft)	Unit	Description
0-16	CLAY	Clay, silty, grayish-orange.
16-82	TILL	Till, light gray.
82-85	SAND	Sand.
85-89	TILL	Till, light gray.
89-102	SAND & GRAVEL	Sand, clayey and pebbly.
102-106	TILL	Till, light gray.
106-109	SAND	Sand, clayey.
109-228	TILL	Till, medium gray, hard.
228-280	SHALE	Shale, very dark gray, hard.

130-049-24CCC
NDSWC 11310

Date Completed: 08/24/1983
L.S. Elevation (ft): 995
Depth Drilled (ft): 180

Purpose: Test Hole

Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, dark brown.
1-21	SILT	Silt, clayey, moderate yellowish-brown, oxidized; mottling, light bluish-gray (lacustrine).
21-41	TILL	Clay, silty to pebbly, very sandy, gray, soft (till).
41-48	SILT	Silt, clayey, gray, cohesive.
48-120+	TILL	Clay, silty to pebbly, gray, firm, cohesive; cobbles from 108 to 109 feet (till)
120-124	SAND & GRAVEL	Sand, coarse, pebbly, medium sorted, angular to subrounded, silicate, shale and carbonate.
124-130	TILL	Clay, silty to pebbly, gray, firm, cohesive; sand from 126 to 128 feet (till)
130-137	GRAVEL	Gravel; interbedded till from 132 to 136 feet, cobbles from 136 to 137 feet.
137-157	TILL	Clay, silty to pebbly, gray, firm, cohesive (till).
157-180	SHALE	Shale, brownish-black.

130-049-24DCC
NDSWC 11303

Date Completed: 08/18/1983
L.S. Elevation (ft): 990
Depth Drilled (ft): 230
Screen Int. (ft.): 198-203

Purpose: Observation Well
Well Type: 2 in. - PVC
Aquifer: Sonora
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-10	CLAY	Clay, silty, yellow, oxidized.
10-14	TILL	Clay, silty and sandy, yellow (till).
14-66	TILL	Clay, silty and sandy, gray (till).
66-95	SAND & GRAVEL	Sand, pebbly; interbedded clay from 84 to 94 feet; cobbles from 94 to 95 feet.
95-105	CLAY	Clay, silty and sandy, gray.
105-118	SAND & GRAVEL	Sand, pebbly; contains cobbles.
118-125	TILL	Clay, silty and sandy, gray (till).
125-147	SAND & GRAVEL	Sand, pebbly; clay from 131 to 132 feet; cobbles from 143 to 145 feet.
147-151	CLAY	Clay, very silty, micaceous.
151-161	SAND	Sand, fine and medium, micaceous; interbedded clay and silt.
161-169	SAND & GRAVEL	Sand, pebbly; contains cobbles.
169-172	CLAY	Clay, silty; interbedded sand.
172-180	SAND	Sand, medium and coarse; interbedded clay and detrital lignite.
180-196	SAND	Sand, medium, clayey and silty, poorly sorted, interbedded clay.
196-220	SAND & GRAVEL	Sand, coarse, pebbly, poorly sorted, subangular and subrounded.
220-230	SHALE	Shale, silty, dark gray, slighty plastic, micaceous.

130-049-24DDD
NDSWC 11630

Date Completed: 08/05/1981
L.S. Elevation (ft): 988
Depth Drilled (ft): 260
Screen Int. (ft.): 226-229

Purpose: Observation Well
Well Type: 2 in. - PVC
Aquifer: Sonora
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-21	CLAY	Clay, silty, moderate yellowish-brown, cohesive, oxidized.
21-62	TILL	Clay, silty to pebbly, olive-gray, cohesive (till).
62-111	SAND	Sand, very fine and fine, clayey and silty, olive-gray (lacustrine).
111-120	SAND	Sand, fine and medium, clayey to pebbly, light olive-gray, medium sorted.
120-134	SAND	Sand, fine, silty, moderate olive-brown.
134-170	GRAVEL	Gravel, fine, sandy, medium sorted, subangular and subrounded, carbonate, shale, quartz and igneous.
170-191	TILL	Clay, very silty, very sandy, very pebbly, olive-gray (till)
191-221	GRAVEL	Gravel, fine, sandy, well sorted, subangular and subrounded, quartz, shale, carbonate and igneous.
221-245	GRAVEL	Gravel, fine and medium, sandy, medium sorted, subangular and subrounded, carbonate, shale and igneous.
245-260	CLAYSTONE	Claystone, silty, dark gray, hard.

130-049-25AAA1
Hilary Wieser

Date Completed: 11/18/1975
L.S. Elevation (ft): 992
Depth Drilled (ft): 75
Screen Int. (ft.): 63-70

Purpose: Domestic Well
Well Type: 4 in. - Steel
Aquifer: Undefined
Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-18	CLAY	Yellow
18-37	SHALE	
37-39	SAND	Sand lens
39-60	SHALE	
60-75	SAND	Sand lens

130-049-26BAD
Jerry Meyer

Date Completed:	09/12/1985	Purpose:	Domestic Well
L.S. Elevation (ft):	1000	Well Type:	4 in. - PVC
Depth Drilled (ft):	252	Aquifer:	Undefined
Screen Int. (ft.):	246-252	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-75	CLAY	yellow
75-125	CLAY	very hard, blue
125-175	CLAY	with small stones
175-220	SAND	mixed with clay
220-240	SHALE	very hard
240-252	SAND	coarse, white, very clean

130-049-26DCC
NDSWC 11306

Date Completed:	08/23/1983	Purpose:	Test Hole
L.S. Elevation (ft):	1015		
Depth Drilled (ft):	180	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Sandy loam, dark brown.
1-20	SILT	Silt, clayey, slighty sandy, moderate yellowish-brown, oxidized; mottling, light bluish-gray; carbonate concretions (lacustrine).
20-32	SILT	Silt, clayey, slighty sandy, dark bluish-gray (lacustrine).
32-72	TILL	Clay, sandy and very pebbly, dark bluish-gray, soft; gravel from 71 to 72 feet (till).
72-81	TILL	Clay, sandy and pebbly, dark gray, cohesive; boulder at 81 feet (till).
81-84	TILL	Clay, sandy and pebbly, dark bluish-gray, cohesive (till).
84-86	SAND & GRAVEL	Sand, coarse, pebbly, shale, carbonate and silicate
86-97	TILL	Clay, sandy and pebbly, dark bluish-gray, cohesive; sand and gravel from 91 to 92 feet; gravel and cobbles from 96 to 97 feet (till).
97-132	TILL	Clay, pebbly, dark gray, cohesive; cobbles from 131 to 132 feet; poor return (till).
132-167	TILL	Clay, slighty silty to pebbly, dark gray, cohesive (till).
167-180	SHALE	Shale, slighty silty, grayish-black; indurated layers.

130-049-26DCDB
NORMAN WIRTZ

Date Completed:	0/0	Purpose:	Stock Well
L.S. Elevation (ft):	1016	Well Type:	4 in. - Steel
Depth Drilled (ft):	0	Aquifer:	Sonora
Screen Int. (ft.):	0-183	Data Source:	

Completion Info:

Remarks: WL

Lithologic Log

Depth (ft)	Unit	Description

130-049-26DCDC
NDSWC 11628

Date Completed:	08/05/1981	Purpose:	Observation Well
L.S. Elevation (ft):	1016	Well Type:	2 in. - PVC
Depth Drilled (ft):	120	Aquifer:	Undefined
Screen Int. (ft.):	81-84	Data Source:	

Completion Info:

Remarks: MAP ON BACK

Lithologic Log

Depth (ft)	Unit	Description
0-23	CLAY	Clay, silty, dark yellowish-brown, oxidized; mottling, olive-gray.
23-44	SILT	Silt, clayey, olive-gray.
44-81	CLAY	Clay, silty to pebbly, olive-gray; more sandy and pebbly with depth; sand from 71 to 72 feet.
81-84	SAND	Sand, fine and medium; poor return.
84-120	TILL	Clay, silty to pebbly, olive-gray, firm (till).

130-049-29BCC
Edward Kuehl

Date Completed: 10/05/1975
L.S. Elevation (ft): 1062
Depth Drilled (ft): 35
Screen Int. (ft.): 27-31

Purpose: Domestic Well
Well Type: 4 in. - Steel
Aquifer: Undefined
Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-6	CLAY	Yellow
6-14	SAND	
14-27	SHALE	
27-31	SAND	Sand lens

130-049-29DDD
JAMES BLADON

Date Completed: 05/18/1974
L.S. Elevation (ft): 1053
Depth Drilled (ft): 135
Screen Int. (ft.): 127-133

Purpose: Stock Well
Well Type: 3 in. - Stainless Steel
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-18	CLAY	Clay, yellow.
18-50	SAND	Sand.
50-124	CLAY	Clay.
124-133	SAND	Sand.
133-135	CLAY	Clay.

130-049-30ADD
George Krump

Date Completed: 11/25/1987
L.S. Elevation (ft): 1075
Depth Drilled (ft): 45
Screen Int. (ft.): 36-42

Purpose: Domestic Well
Well Type: 4 in. - PVC
Aquifer: Undefined
Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-18	SAND	Yellow
18-28	SHALE	
28-45	SAND	Sand lens

130-049-30CC
Bill Wieser

Date Completed: 04/22/1974
L.S. Elevation (ft): 1074
Depth Drilled (ft): 154
Screen Int. (ft.): 144-150

Purpose: Domestic Well
Well Type: 4 in. - Steel
Aquifer: Undefined
Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-16	CLAY	yellow
16-54	SHALE	soft
54-56	ROCK	
56-118	SHALE	hard
118-140	SAND	
140-154	SAND	coarse
154-0	ROCK	

130-049-31AAB
NDSWC 13406

Date Completed:	08/17/1994	Purpose:	Test Hole
L.S. Elevation (ft):	1072		
Depth Drilled (ft):	200	Data Source:	NDSWC

Completion Info: Hole Plug

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, sand, very fine, brown.
1-17	SAND	Sand, very fine and fine, light olive brown (5Y 5/6), oxidized.
17-43	SAND	Sand, very fine and fine, light olive gray (5Y 5/2), reduced.
43-58	SILT	Silt, sandy, very fine, olive gray, soft, slightly sticky, slightly plastic.
58-67	CLAY	Clay, silty, olive gray.
67-72	SILT	Silt, clayey, olive gray.
72-88	CLAY	Clay, silty, olive gray.
88-121	CLAY	Clay, silty, sandy, pebbly, olive gray, slightly firm, slightly sticky, slightly plastic; rock at 96 ft.
121-143	CLAY	Clay, silty, olive gray, slightly firm, sticky, slightly plastic.
143-161	SAND & GRAVEL	Sand and gravel, mixed mineralogy, subangular and subrounded; interbedded 1 to 2 ft beds of clay; coarse gravel and cobbles below 154 ft.
161-164	CLAY	Clay, silty, sandy, pebbly, olive gray.
164-178	CLAY	Clay, silty, dark olive gray, slightly firm sticky, plastic.
178-185	SAND	Sand, very clayey, silty, olive gray.
185-190	BEDROCK	Clay, slightly silty, dark olive gray, soft, sticky, plastic, calcareous; interbedded sand, very fine with gray laminations (Bedrock).
190-200	SHALE	Clay, olive black (5Y 2/1), firm, sticky, plastic, calcareous, waxy appearance; indurated sand, very fine, gray, calcareous cement at about 200 ft.

130-049-31AAB2
NDSWC 13406B

Date Completed:	08/18/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1072	Well Type:	2 in. - PVC
Depth Drilled (ft):	40	Aquifer:	Hankinson
Screen Int. (ft.):	28-33	Data Source:	NDSWC

Completion Info: 30 ft 2 in PVC, 5 ft #12 PVC screen, collapse, bent. chips; PC

Remarks: West of approach

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, sand, very fine, brown.
1-17	SAND	Sand, very fine and fine, light olive brown (5Y 5/6), oxidized.
17-40	SAND	Sand, very fine and fine, light olive gray (5Y 5/2), reduced.

130-049-31DDD
City of Hankinson

Date Completed:	06/27/1980	Purpose:	Test Hole
L.S. Elevation (ft):	1075		
Depth Drilled (ft):	310	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-15	CLAY	
15-25	SHALE	
25-45	SAND	fine
45-180	SHALE	with stones
180-310	SAND	

130-049-34BAA
Jeff Schmidt

Date Completed:	04/10/1994	Purpose:	Domestic Well - Plugged
L.S. Elevation (ft):	N/A	Well Type:	4 in. - Unknown
Depth Drilled (ft):	120	Aquifer:	Undefined
Screen Int. (ft.):	110-120	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-45	SAND	yellow, soft
45-94	SAND	muddy, grey
94-110	CLAY	hard
110-120	CLAY	coarse

130-049-35CDB
VELLENGA BROS.

Date Completed: 05/18/1981
L.S. Elevation (ft): 1038
Depth Drilled (ft): 180

Purpose: Test Hole

Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-5	TOPSOIL	Topsoil.
5-15	CLAY	Clay, yellow.
15-118	CLAY	Clay.
118-119	SAND	Sand.
119-132	CLAY	Clay.
132-133	SAND	Sand.
133-148	CLAY	Clay.
148-149	SAND	Sand.
149-180	CLAY	Clay.

130-049-35DDD
RON VELLENGA

Date Completed: 08/05/1980
L.S. Elevation (ft): 1024
Depth Drilled (ft): 165
Screen Int. (ft.): 146-160

Purpose: Domestic Well
Well Type: 3 in. - Stainless Steel
Aquifer: Sonora
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-10	CLAY	Clay, yellow.
10-75	CLAY	Clay, soft.
75-90	CLAY	Clay, hard.
90-105	BOULDERS	Boulders.
105-160	SAND	Sand.
160-165	BOULDERS	Boulders

130-049-36BBB
NDSWC 11307

Date Completed: 08/23/1983
L.S. Elevation (ft): 1009
Depth Drilled (ft): 200

Purpose: Test Hole

Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Sandy loam, dark brown.
1-21	SILT	Silt, clayey, pale yellowish-brown, soft.
21-29	SILT	Silt, clayey, bluish-gray, soft.
29-71	TILL	Clay, sandy and pebbly, dark bluish-gray, soft (till)
71-73	GRAVEL	Gravel, fine, shale, carbonate and silicate.
73-78	TILL	Clay, sandy and pebbly, dark bluish-gray, cohesive (till)
78-83	SAND & GRAVEL	Sand, coarse, pebbly, shale, carbonate and silicate.
83-125	TILL	Clay, pebbly, gray; sand and gravel from 92 to 95 feet; interbedded gravel from 95 to 114 feet; cobbles from 114 to 115 feet (till)
125-129	SILT	Silt, very clayey, medium grey, cohesive.
129-175	TILL	Clay, pebbly, dark gray, cohesive; cobbles at 150 and 170 feet (till).
175-200	SHALE	Shale, slighty silty, grayish-black; indurated layers.

130-049-36DCC
NDSWC 13049

Date Completed: 08/26/1992
L.S. Elevation (ft): 1011
Depth Drilled (ft): 220
Screen Int. (ft.): 79-84

Purpose: Observation Well
Well Type: 2 in. - PVC
Aquifer: Sonora
Data Source: NDSWC

Completion Info: 2 in pvc; PC

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, black.
2-20	CLAY	Clay, silty, slightly sandy, fine, light olive-brown, soft, oxidized (Lacustrine)
20-28	CLAY	Clay, silty, slightly sandy, fine, olive-gray, soft, slightly sticky, slightly plastic (Lacustrine)
28-65	TILL	Clay, silty, very sandy, pebbly, olive-gray, soft (Till)
65-92	GRAVEL	Gravel, fine to coarse, predominantly medium, sandy, coarse, angular to sub-rounded, carbonate, igneous, shale; cobbles from 90 to 92 feet.
92-148	TILL	Clay, silty, very sandy, pebbly, olive-gray, soft; cobbles at 98 and 102 feet; less sand, firm from 120 to 148 feet (Till).
148-150	SAND	Sand; no return.
150-152	CLAY	Clay, silty, sandy, pebbly, olive-gray, soft.
152-156	SILT	Silt, clayey, sandy, very fine, olive-gray, soft, slightly sticky, nonplastic.
156-180	TILL	Clay, silty, sandy, pebbly, olive-gray, soft (Till).
180-194	CLAY	Clay, olive-grey, firm, slightly sticky, plastic.
194-220	SHALE	Shale, olive-black, firm; some white streaks.

130-050-01AAA1
NDSWC 12201A

Date Completed:	09/20/1988	Purpose:	Test Hole
L.S. Elevation (ft):	1030		
Depth Drilled (ft):	400		
		Data Source:	NDSWC

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-10	SAND	Sand, very fine and fine, well sorted, subrounded and rounded, oxidized.
10-36	SAND	Sand, fine and very fine, gray, well sorted, subrounded and rounded.
36-49	SILT	Silt, slighty clayey, olive-gray, soft.
49-76	SAND	Sand, very fine, gray, well sorted, subrounded and rounded.
76-80	SILT	Silt, slighty clayey, gray; interbedded clay.
80-100	CLAY	Clay, slighty silty, olive-gray, soft, plastic; gravel at 100 feet (lacustrine).
100-138	TILL	Clay, silty to pebbly, olive-gray, soft, plastic; cobbles from 115 to 116 feet (till).
138-158	TILL	Clay, very silty, very sandy, pebbly, light olive-gray, firm, slighty plastic; interbedded gravel from 140 to 150 feet (till).
158-162	SAND	Sand, fine to very coarse, pebbly, poorly sorted, angular to rounded, quartz, igneous and limestone.
162-169	TILL	Clay, very silty, very sandy, pebbly, light olive-gray, firm, slighty plastic (till).
169-180	SILT	Silt, clayey, slighty pebbly, light olive-gray, nonplastic.
180-216	SAND	Sand, fine to very coarse, slighty pebbly, poorly sorted, angular to rounded, quartz, limestone and igneous; interbedded.
216-229	TILL	Clay, very silty to pebbly, light olive-gray, soft, plastic (till).
229-268	CLAY	Clay, slighty silty, gray, soft, plastic; interbedded silt and clay; gravel at 259 feet; cobbles from 265 to 268 feet.
268-277	CLAY	Clay, silty, dark greenish-gray, firm; cobbles at 276 feet.
277-296	TILL	Clay, very silty, very sandy, pebbly, light olive-gray, firm, plastic; interbedded gravel from 292 to 296 feet (till).
296-305	GRAVEL	Gravel, coarse; contains cobbles.
305-395	TILL	Clay, silty to pebbly, gray, soft, plastic; cobbles from 394 to 395 (till).
395-400	CLAY	Clay, very sandy, bluish-green (weathered granite).

130-050-01AAA2
NDSWC 12201B

Date Completed:	09/21/1988	Purpose:	Observation Well
L.S. Elevation (ft):	1030	Well Type:	2 in. - PVC
Depth Drilled (ft):	218	Aquifer:	Undefined
Screen Int. (ft.):	209-214	Data Source:	

Completion Info:

Remarks: East Well

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil.
2-11	SAND	Sand, very fine and fine, well sorted, subrounded and rounded, oxidized.
11-36	SAND	Sand, very fine and fine, gray, well sorted, subrounded and rounded.
36-46	CLAY	Clay, very silty, olive-gray, soft, plastic.
46-76	SAND	Sand, very fine, gray, well sorted; clayey and silty from 56 to 60 feet.
76-96	CLAY	Clay, very silty, gray; interbedded silt.
96-125	TILL	Clay, very silty to pebbly, olive-gray, soft, plastic; cobbles from 124 to 125 feet.
125-165	TILL	Clay, silty, very sandy, pebbly, light olive-gray, firm, slighty plastic; gravel from 163 to 165 feet (till).
165-183	TILL	Clay, silty, very sandy, pebbly, grey, soft, slighty plastic (till).
183-218	SAND & GRAVEL	Sand, fine to very coarse, pebbly, poorly sorted, angular to rounded, igneous.

130-050-01AAA3
NDSWC 12201C

Date Completed:	09/21/1988	Purpose:	Observation Well
L.S. Elevation (ft):	1030	Well Type:	2 in. - PVC
Depth Drilled (ft):	80	Aquifer:	Hankinson
Screen Int. (ft.):	67-72	Data Source:	NDSWC

Completion Info:

Remarks: West Well

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil.
2-11	SAND	Sand, very fine to medium, subrounded and rounded, oxidized.
11-35	SAND	Sand, very fine to medium, gray, subrounded and rounded.
35-44	SILT	Silt, clayey, gray; interbedded clay.
44-72	SAND	Sand, very fine to medium, gray, subrounded and rounded; interbedded silt at 56 feet.
72-80	CLAY	Clay, silty, gray, soft, plastic.

130-050-01AAA4
Brad Bladow

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well NE of house
9003 Co RD 1
Hankinson ND 58041
701-242-9854

Lithologic Log

Depth (ft)	Unit	Description

130-050-01BBA
Kurt R. Steinwelz

Date Completed:	00/00/00	Purpose:	Stock Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well north part of yard
90th St. SE
Hankinson ND 58041
701-242-7867

Lithologic Log

Depth (ft)	Unit	Description

130-050-01CBB
Tami Metzen

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - Steel
Depth Drilled (ft):	60	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well south of house
9080 167 Ave. SE
Hankinson ND 58041

Lithologic Log

Depth (ft)	Unit	Description

130-050-02BAB
John Pankow

Date Completed:	1952	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - Steel
Depth Drilled (ft):	67	Aquifer:	Undefined
Screen Int. (ft.):	0-67	Data Source:	

Completion Info:

Remarks: Well south of house
16632 90th St. SE
Hankinson ND 58041
701-242-7471
Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-02BBC
City of Hankinson

Date Completed:	1954	Purpose:	Municipal Well
L.S. Elevation (ft):	N/A	Well Type:	48 in. -
Depth Drilled (ft):	60	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-02CAA
August Pankow

Date Completed:	00/00/00	Purpose:	Stock Well
L.S. Elevation (ft):	N/A	Well Type:	1.5 in. -
Depth Drilled (ft):	15	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-02CCA1
USGS #H-803

Date Completed:	10/16/1953	Purpose:	Test Hole
L.S. Elevation (ft):	1070		
Depth Drilled (ft):	70	Data Source:	

Completion Info:

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-18	SAND	Sand, very fine, silty (lacustrine)
18-35	SAND	Sand, very fine and fine, light gray (lacustrine)
35-40	SAND	Sand, very fine and fine, yellowish-gray (lacustrine)
40-70	SAND	Sand, very fine and fine, light gray (lacustrine)

130-050-02CCA2
Soo Line Railroad

Date Completed:	00/00/00	Purpose:	Industrial Well
L.S. Elevation (ft):	N/A	Well Type:	108 in. -
Depth Drilled (ft):	42	Aquifer:	Hankinson
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25
Pump test conducted.
69 gpm
T: 18,000 gal/d/ft.
S: 0.17

Lithologic Log

Depth (ft)	Unit	Description

130-050-03AAA
NDSWC 13409

Date Completed:	08/22/1994	Purpose:	Test Hole
L.S. Elevation (ft):	1059		
Depth Drilled (ft):	440	Data Source:	NDSWC

Completion Info: 100 ft tremie; slurry grout

Remarks: 100 ft west of intersection

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, loam, black.
1-9	CLAY	Clay, silty, light olive brown (5Y 5/6), soft, sticky, plastic, oxidized; mottles.
9-20	CLAY	Clay, slightly silty, olive gray (5Y 3/2), soft, sticky, plastic, reduced.
20-52	SAND	Sand, very fine and fine, light olive gray (5Y 5/2); detrital lignite.
52-62	SILT	Silt, sandy, very fine, olive gray.
62-126	CLAY	Clay, silty, sandy, pebbly, olive gray, soft, sticky, plastic; more sandy, slightly firm below 84 ft.
126-171	TILL	Clay, silty, sandy, pebbly, olive gray, slightly firm, slightly sticky, slightly plastic; rock at 126 ft; sand, pebbly, fine, predominantly shale from 127 to 128 ft; numerous cobbles from 152 to 171 ft (Till)
171-358	TILL	Clay, very silty, slightly sandy, slightly pebbly, olive gray, firm nonsticky, nonplastic, occasional cobbles; clay, silty, sandy, pebbly, more firm at 203 ft; interbedded gravel, fine, predominantly shale, less than 1 ft beds from 235 to 240 ft; clay, silty, sandy, very pebbly from 240 to 304 ft; interbedded gravel, less than 1 ft beds from 240 to 260 and 270 to 285 ft, numerous cobbles from 285 to 340 ft; rock at 347 ft; pebbly with cobbles from 347 to 356 ft; rock at 357 ft (Till).
358-367	CLAY	Clay, silty, sandy, pebbly, dark olive gray.
367-407	CLAY	Clay, olive gray, sticky, plastic.
407-426	CLAY	Clay, olive gray, slightly firm, sticky, plastic, calcareous; some return dark olive gray, slightly silty.
426-440	SHALE	Clay, olive black (5Y 2/1), slightly firm, sticky, plastic, noncalcareous; waxy appearance (Shale).

130-050-03AAA2
NDSWC 13409B

Date Completed:	08/23/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1059	Well Type:	2 in. - PVC
Depth Drilled (ft):	60	Aquifer	Hankinson
Screen Int. (ft.):	38-43	Data Source:	NDSWC

Completion Info: 40 ft 2 in PVC, 5 ft #18 PVC screen, collapse, bent. chips, PC

Remarks: Near City of Hankinson wells

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, loam, black.
1-9	CLAY	Clay, silty, light olive brown (5Y 5/6), soft, sticky, plastic, oxidized
9-20	CLAY	Clay, silty, olive gray (5Y 3/2), soft, sticky, plastic, reduced.
20-52	SAND	Sand, very fine and fine, light olive gray (5Y 5/2), reduced.
52-60	SILT	Silt, sandy, olive gray, soft, slightly sticky, slightly plastic.

130-050-03AAB
NDHD

Date Completed:	06/24/1997	Purpose:	Observation Well
L.S. Elevation (ft):	1060	Well Type:	2 in - PVC
Depth Drilled (ft):	35	Aquifer:	Undefined
Screen Int. (ft.):	20-30	Data Source:	Boart Longyear

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil roots
2-4	SAND	Fine sand
4-6	SAND	Fine sand w/trace silt, brown
6-12	SAND	Fine sand, clay mix
12-14	SAND	Fine sand, gray
14-16	SAND	Fine sand, trace clay, gray
16-20	CLAY	Silty clay, gray
20-30	SAND	Fine sand, gray
30-35	SAND	Silty, fine sand

130-050-03AAB1
City of Hankinson

Date Completed:	01/01/1960	Purpose:	Municipal Well
L.S. Elevation (ft):	1059	Well Type:	10 in. - Steel
Depth Drilled (ft):	0	Aquifer:	Hankinson
Screen Int. (ft.):	0-68	Data Source:	

Completion Info:

Remarks: WQ; GW 7

Lithologic Log

Depth (ft)	Unit	Description

130-050-03AAB2
Dean Prochnow

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft)	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well west of house
9015 166th Ave SE
Hankinson ND 58041
701-242-7413

Lithologic Log

Depth (ft)	Unit	Description

130-050-03CAB
Gordon Prochnow

Date Completed:	06/16/1978	Purpose:	Domestic Well
L.S. Elevation (ft):	1074	Well Type:	4 in. - PVC
Depth Drilled (ft):	60	Aquifer:	Undefined
Screen Int. (ft.):	50-56	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-15	CLAY	Yellow
15-60	SAND	Fine

130-050-03CABC
Paul Bladow

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - Steel
Depth Drilled (ft):	56	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well south of sylow
16525 91st. ST. SE
Hankinson ND 58041
701-242-7062

Lithologic Log

Depth (ft)	Unit	Description

130-050-03CBA2
T. Prochnow .

Date Completed:	1952	Purpose:	Observation Well
L.S. Elevation (ft):	N/A	Well Type:	1.25 in. -
Depth Drilled (ft):	48	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-03CBB
USGS #H-818

Date Completed:	11/19/1953	Purpose:	Test Hole
L.S. Elevation (ft):	1076		
Depth Drilled (ft):	80	Data Source:	

Completion Info:

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-6	SAND	Sand, fine, brown (lacustrine).
6-11	CLAY	Clay, gray (lacustrine).
11-20	SAND	Sand, very fine, clayey (lacustrine)
20-66	SAND	Sand, very fine, slightly clayey (lacustrine).
66-80	TILL	Till, light gray.

130-050-04ACD
Sheyenne Valley Land Grazing Association

Date Completed:	00/00/00	Purpose:	Stock Well
L.S. Elevation (ft):	N/A	Well Type:	1.25 in. -
Depth Drilled (ft):	25	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-05ADA
Sheyenne Valley Land Grazing Association

Date Completed:	00/00/00	Purpose:	Stock Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. -
Depth Drilled (ft):	20	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-06AAA
NDSWC 13397

Date Completed:	08/04/1994	Purpose:	Test Hole
L.S. Elevation (ft):	1079		
Depth Drilled (ft):	250	Data Source:	NDSWC

Completion Info: 80 ft tremie, slurry grout

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, sand, moderate brown (5YR 3/4).
1-8	SAND	Sand, very fine and fine, light olive brown (5Y 5/6), oxidized.
8-77	SAND	Sand, very fine and fine, light olive gray (5Y 5/2), reduced.
77-87	SILT	Silt, sandy, olive gray (5Y 3/2).
87-103	CLAY	Clay, silty, sandy, pebbly, olive gray, soft, slightly sticky, plastic.
103-127	CLAY	Clay, very silty, soft, olive gray, slightly sticky, plastic.
127-142	CLAY	Clay, silty, sandy, pebbly, dark olive gray, slightly firm, occasional cobble; pebbly, shale at 138 ft.
142-157	INTERBEDDED	Interbedded gravel, fine and clay.
157-160	GRAVEL	Gravel.
160-163	CLAY	Clay, silty, sandy, pebbly, dark olive gray, slightly firm.
163-164	COBBLES	Cobbles.
164-175	TILL	Clay, silty, very sandy, very pebbly, olive gray; rock at 172 ft (Till).
175-200	CLAY	Clay, slightly silty, olive black (5Y 2/1), soft to slightly firm, sticky, plastic, calcareous; white return from 180 to 200 ft (possibly reworked bedrock).
200-250	BEDROCK	Clay, olive black, firm, calcareous; indurated layers; waxy appearance; black (N1) at 209 ft; interbedded bentonite clay, gray (N5), noncalcareous, below 229 ft (Bedrock).

130-050-06AAA2
NDSWC 13397B

Date Completed:	08/05/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1079	Well Type:	2 in. - PVC
Depth Drilled (ft):	80	Aquifer:	Hankinson
Screen Int. (ft.):	58-63	Data Source:	NDSWC

Completion Info: 60 ft 2 in PVC, 5 ft #12 PVC screen, collapse, bent. chips; PC

Remarks: South of Southeast Rural Water wells

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, sand, moderate brown (5YR 3/4).
1-8	SAND	Sand, very fine and fine, some medium, light olive brown (5Y 5/6), oxidized.
8-67	SAND	Sand, very fine and fine, some medium, light olive gray (5Y 5/2), reduced.
67-80	SAND	Sand, silty, olive gray, interbedded.

130-050-07AAA
Steve Gindsbach

Date Completed:	04/20/1992	Purpose:	Domestic Well
L.S. Elevation (ft):	1080	Well Type:	4 in. - Unknown
Depth Drilled (ft):	50	Aquifer:	Undefined
Screen Int. (ft.):	40-50	Data Source:	Wieber Well Drilling

Completion Info:

Remarks: South side of house
16290 91 St. SE
Hankinson ND 58041
242-7291

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-10	CLAY	Sandy
10-20	CLAY	Blue
20-35	CLAY	Silty, gray
35-40	SAND & GRAVEL	
40-50	SAND	Sand producing good water
50-60	SAND	Finer sand

130-050-08ADA
Edwin Stuack

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. -
Depth Drilled (ft):	100	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-08ADA2
NDSWC 15296

Date Completed:	08/09/2005	Purpose:	Observation Well
L.S. Elevation (ft):	1080	Well Type:	2 in. - PVC
Depth Drilled (ft):	220	Aquifer:	Milnor Channel
Screen Int. (ft.):	38-43	Data Source:	NDSWC

Completion Info: 40 ft 2 inch PVC, 5 ft No. 18 screen, collapse, holeplug

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-4	SAND	Sand, very fine, silty, clayey, olive black (5Y 2/1), oxidized to reduced; organic-rich, shells
4-16	INTERBEDDED	Interbedded clay through fine sand, olive gray (5Y 4/1), reduced
16-21	SAND	Sand, fine
21-61	SAND	Sand, fine and medium
61-81	CLAY	Clay, silty, olive gray, firm
81-90	INTERBEDDED	Interbedded clay through gravel
90-97	CLAY	Clay, silty, olive gray
97-100	INTERBEDDED	Interbedded clay through gravel
100-104	COBBLES	Cobbles, clayey; some white calcareous return
104-164	CLAY	Clay, silty, sandy, pebbly, olive gray; cobbles at 126 ft
164-168	GRAVEL	Gravel
168-182	INTERBEDDED	Interbedded clay through gravel
182-196	CLAY	Clay, silty, sandy, olive gray
196-220	CLAYSTONE	Clay, olive black (5Y 2/1) (Bedrock)

130-050-08BAA
NDSWC 13398

Date Completed:	08/09/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1089	Well Type:	2 in. - PVC
Depth Drilled (ft):	240	Aquifer:	Undefined
Screen Int. (ft.):	138-143	Data Source:	NDSWC

Completion Info: West well, 140 ft 2 in PVC, 5 ft #18 PVC screen, 60 ft tremie, collapse, bent. grout; PC

Remarks: West well

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, sandy loam, black.
1-3	SILT	Silt, sandy, very fine, light olive brown (5Y 5/6), oxidized.
3-16	SAND	Sand, very fine and fine, light olive brown, oxidized.
16-51	SAND	Sand, very fine and fine, light olive gray (5Y 5/2), reduced.
51-60	CLAY	Clay, slightly silty, olive gray (5Y 3/2), sticky, plastic.
60-73	CLAY	Clay, very silty, slightly pebbly, olive gray, slightly sticky, slightly plastic.
73-127	CLAY	Clay, silty, olive gray, sticky, slightly plastic; very fine laminations; sand, very fine from 104 to 106 ft; more silty from 106 to 116 ft.
127-144	GRAVEL	Gravel, fine to coarse, sandy, mixed mineralogy, angular to subrounded; detrital lignite.
144-178	TILL	Clay, silty, sandy, pebbly, dark olive gray, slightly sticky, slightly plastic, occasionals cobbles; rocks from 147 to 149 ft; clay, slightly silty, slightly pebbly from 166 to 178 ft (Till).
178-183	SAND	Sand.
183-187	CLAY	Clay, silty, sandy, olive gray, sticky, plastic.
187-215	CLAY	Clay, very sandy, very fine and fine, dark olive gray, soft, slightly sticky; sand from 192 to 196 ft; drill chatter and lignite return from 209 to 211 ft; rocks at 213 to 215 ft.
215-240	SHALE	Clay, slightly silty, olive black (5Y 2/1), firm, slightly sticky, plastic; indurated white, sandy, calcareous return at 220 ft; noncalcareous by 240 ft (Shale).

130-050-08BAA2
NDSWC 13398B

Date Completed:	08/09/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1089	Well Type:	2 in. - PVC
Depth Drilled (ft):	60	Aquifer:	Hankinson
Screen Int. (ft.):	45-50	Data Source:	NDSWC

Completion Info: East well, 47 ft 2 in PVC, 5 ft #12 PVC screen, collapse, bent. chips; PC

Remarks: East well

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, sandy loam, black.
1-3	SILT	Silt, sandy, light olive brown (5Y 5/6), oxidized.
3-16	SAND	Sand, very fine and fine, light olive brown, oxidized.
16-51	SAND	Sand, very fine and fine, light olive gray (5Y 5/2), reduced.
51-60	CLAY	Clay, silty, sandy, olive gray (5Y 3/2).

130-050-08BAB
Mrs. L. Vedder

Date Completed:	00/00/00	Purpose:	Stock Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	35	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-09AAD
NDSWC 13399

Date Completed:	08/09/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1081	Well Type:	2 in. - PVC
Depth Drilled (ft):	420	Aquifer:	Undefined
Screen Int. (ft.):	138-143	Data Source:	NDSWC

Completion Info: North well, 140 ft 2 in PVC, 5 ft #12 PVC screen, tremie, collapse, bent. grout; PC

Remarks: North well
ran out of drill stem, depth to bedrock not determined

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, loamy sand, brown.
1-9	SAND	Sand, very fine and fine, light olive brown (5Y 5/6), oxidized.
9-20	CLAY	Clay, light olive brown, soft, sticky, plastic, oxidized.
20-42	SAND	Sand, very fine to medium, light olive gray (5Y 5/2), reduced.
42-54	SILT	Silt, sandy, olive gray.
54-64	INTERBEDDED	Interbedded sand and silt, olive gray.
64-66	SAND & GRAVEL	Sand and gravel.
66-94	CLAY	Clay, silty, sandy, pebbly, olive gray, slightly firm, sticky, plastic.
94-115	SILT	Silt, slightly clayey, slightly sandy, very fine, olive gray, slightly firm, slightly sticky, nonplastic; interbedded sand and shale gravel, less than 1 ft beds from 104 to 115 ft.
115-150	GRAVEL	Gravel, fine and medium, mixed mineralogy, angular to subrounded; coarse gravel by 127 ft; interbedded clay from 149 to 150 ft.
150-180	TILL	Clay, silty, sandy, pebbly, olive gray, firm, occasional cobbles; interbedded gravel, coarse, less than 1 ft beds; sand and gravel from 167 to 168 ft, rocks from 168 to 169 and 177 to 178 ft; oxidized return from 178 to 180 ft (Till).
180-183	COBBLES	Cobbles.
183-226	TILL	Clay, silty, sandy, pebbly, dark olive gray, firm, occasional cobbles; rocks at 201 and 203 ft; more firm by 208 ft, interbedded gravel, shale, less than 1 ft beds from 213 to 226 ft (Till).
226-240	SAND	Sand, clayey, dark olive gray; interbedded gravel, fine, shale.
240-244	GRAVEL	Gravel, fine, shale.
244-260	SAND	Sand, clayey, dark olive gray; interbedded gravel, fine, shale.
260-267	CLAY	Clay, silty, sandy, pebbly, olive gray.
267-320	SAND	Sand, clayey, olive gray, firm; interbedded gravel, fine, shale; rocks at 286 to 288 and 316 ft; very firm at 294 ft, gravel, fine, shale from 316 to 318 ft.
320-338	CLAY	Clay, silty, sandy, pebbly, olive gray; rocks at 328 ft, pebbles, coarse from 320 to 333 ft.
338-389	CLAY	Clay, silty, slightly sandy, brownish black (5YR 2/1) (possible bedrock block).
389-420	CLAY	Clay, sandy, very fine, olive gray, slightly sticky, nonplastic.

130-050-09AAD2
NDSWC 13399B

Date Completed:	08/09/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1081	Well Type:	2 in. - PVC
Depth Drilled (ft):	50	Aquifer:	Hankinson
Screen Int. (ft.):	35-40	Data Source:	NDSWC

Completion Info: South well, 37 ft 2 in PVC, 5 ft #12 PVC screen, collapse, bent. chips; PC

Remarks: South well

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, loamy sand, light brown.
1-9	SAND	Sand, very fine and fine, light olive brown (5Y 5/6), oxidized.
9-20	CLAY	Clay, silty, light olive brown, soft, sticky, plastic, oxidized.
20-43	SAND	Sand, very fine and fine, some medium, light olive gray (5Y 5/2), reduced.
43-50	SILT	Silt, sandy, very fine, olive gray (5Y 3/2).

130-050-10CCC
NDSWC 13400

Date Completed:	08/10/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1080	Well Type:	2 in. - PVC
Depth Drilled (ft):	300	Aquifer:	Milnor Channel
Screen Int. (ft.):	98-103	Data Source:	NDSWC

Completion Info: 100 ft 2 in PVC, 5 ft #18 PVC screen, collapse, bent. chips; PC

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, clay loam, black.
2-10	CLAY	Clay, very silty, light olive brown (5Y 5/6), soft, oxidized.
10-16	CLAY	Clay, very silty, olive gray (5Y 3/2), soft, slightly sticky, slightly plastic, reduced.
16-20	CLAY	Clay, silty, sandy, olive gray.
20-44	SAND	Sand, very fine and fine, some medium, light olive gray (5Y 5/2).
44-63	CLAY	Clay, silty, olive gray, soft, sticky, plastic.
63-76	CLAY	Clay, silty, sandy, pebbly, olive gray.
76-124	SAND & GRAVEL	Sand, fine to coarse, pebbly, fine and medium, mixed mineralogy, angular to subrounded; coarse gravel from 101 to 110 ft; clay from 110 to 114 ft; coarser downward from 114 to 124 ft, rock at 124 ft.
124-127	CLAY	Clay, silty, sandy, pebbly, olive gray, slightly firm.
127-135	CLAY	Clay, silty; poor return.
135-166	TILL	Clay, silty, sandy, pebbly, olive gray, slightly frim; occasional cobbles; firm at 150 ft; interbedded gravel, less than 1 ft beds from 155 to 165 ft; rock at 165 ft; white, calcareous return from 165 to 166 ft (Till).
166-260	TILL	Clay, slightly silty, slightly sandy, slightly pebbly, olive gray, firm; occasional cobble; very sandy from 183 to 190 ft; rock at 190 ft; interbedded sand and gravel, less than 1 ft beds from 216 to 219 and 234 to 241 ft (Till).
260-274	SAND & GRAVEL	Sand and gravel.
274-278	CLAY	Clay, silty, sandy, pebbly, olive gray.
278-300	SHALE	Clay, slightly silty, olive black (5Y 2/1), firm, plastic, noncalcareous, waxy appearance.

130-050-10CDD1
NDSWC #5

Date Completed:	11/25/2006	Purpose:	Observation Well
L.S. Elevation (ft):	1077	Well Type:	2 in. - PVC
Depth Drilled (ft):	160	Aquifer:	Milnor Channel
Screen Int. (ft.):	140-150	Data Source:	Falk Drilling

Completion Info:

Remarks: South Well, located on Jum Mauch Land

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-16	CLAY	yellow
16-38	SAND	fine, gray, clay stringers
38-40	CLAY	stiff, blue
40-61	SAND	fine, gray, clay stringers, coarse sand stringers
61-66	SAND	fine, gray, more chatter, better sample, no clay
66-160	SAND	medium coarse

130-050-10CDD2
NDSWC #6

Date Completed:	11/25/2006	Purpose:	Observation Well
L.S. Elevation (ft):	1077	Well Type:	2 in. - PVC
Depth Drilled (ft):	100	Aquifer:	Milnor Channel
Screen Int. (ft.):	88-98	Data Source:	Falk Drilling

Completion Info:

Remarks: North Well, see log for CDD1

Lithologic Log

Depth (ft)	Unit	Description

130-050-10DAD

Date Completed: 07/17/1980
L.S. Elevation (ft): 1068
Depth Drilled (ft): 195

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: Hankinson

Lithologic Log

Depth (ft)	Unit	Description
0-10	CLAY	Clay, yellow.
10-50	SAND	Sand, fine.
50-100	CLAY	Clay.
100-105	SAND	Sand.
105-142	CLAY	Clay.
142-150	SAND	Sand, medium.
150-155	SAND	Sand, coarse.
155-175	SAND	Sand, medium.
175-192	SAND	Sand, fine.
192-195	CLAY	Clay.

130-050-10DCC

Date Completed: 00/00/00
L.S. Elevation (ft): 1076
Depth Drilled (ft): 0
Screen Int. (ft.): 0-150

Purpose: Test Well
Well Type: 8 in. - PVC
Aquifer: Milnor Channel
Data Source: Falk Drilling

Completion Info:

Remarks: 8 inch test well for BioHenk ethanol plant; Reference point for MP is the inside purple line

Lithologic Log

Depth (ft)	Unit	Description

130-050-10DDD1
NDSWC #7

Date Completed: 11/17/2006
L.S. Elevation (ft): 1080
Depth Drilled (ft): 140
Screen Int. (ft.): 108-118

Purpose: Observation Well
Well Type: 2 in. - PVC
Aquifer: Milnor Channel
Data Source: Falk Drilling

Completion Info:

Remarks: South Well, located on south east corner of Procknow land

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-20	CLAY	soft, blue
20-35	CLAY	with some sand
35-40	SAND	fine, with some clay
35-52	SAND	fine, 8-19 slot, clean
52-70	CLAY	
70-90	SAND	hard, drilling some clay
90-97	CLAY	
97-110	SAND	10-12 slot, very clean, rig chatters
110-115	SAND	very clean, 10 slot
115-134	SAND	very clean
134-140	CLAY	hard

130-050-10DDD2
NDSWC #8

Date Completed: 11/26/2006
L.S. Elevation (ft): 1080
Depth Drilled (ft): 55
Screen Int. (ft.): 40-50

Purpose: Observation Well
Well Type: 2 in. - PVC
Aquifer: Milnor Channel
Data Source: Falk Drilling

Completion Info:

Remarks: North Well, see log for 10DDD1

Lithologic Log

Depth (ft)	Unit	Description

130-050-11ABA
NDSWC 13403

Date Completed:	08/16/1994	Purpose:	Test Hole
L.S. Elevation (ft):	1065		
Depth Drilled (ft):	417	Data Source:	NDSWC

Completion Info: Hole plug

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, sandy loam, brown.
1-7	SAND	Sand, very fine and fine, light olive brown (5Y 5/6), oxidized.
7-17	SAND	Sand, very fine, silty, light olive brown, soft, oxidized.
17-27	SAND	Sand, silty, light olive gray (5Y 5/2), soft, reduced.
27-56	SAND	Sand, slightly silty, light olive gray.
56-60	SAND	Sand, very fine and fine.
60-63	SAND	Sand, silty.
63-70	SAND	Sand, fine to coarse, pebbly, fine; detrital lignite.
70-126	CLAY	Clay, silty, sandy, pebbly, olive gray (5Y 3/2), soft, sticky, plastic; occasional cobbles from 110 to 126 ft.
126-131	SAND	Sand, very fine, clayey, soft, sticky, slightly plastic, olive gray.
131-136	CLAY	Clay, silty, olive gray, slightly firm, sticky, plastic.
136-141	CLAY	Clay, silty, sandy, pebbly, olive gray.
141-151	SAND	Sand, clayey, olive gray.
151-227	TILL	Clay, silty, sandy, pebbly, olive gray, soft, slightly sticky, slightly plastic; white calcareous return from 151 to 160 ft; interbedded sand and gravel, less than 1 ft beds from 151 to 160, 161 to 163, and 169 to 227 ft; rocks at 163 and 169 ft (Till).
227-245	TILL	Clay, silty, very sandy, pebbly, olive gray, firm, slightly sticky, nonplastic; occasional cobble (Till).
245-257	CLAY	Clay, silty, very sandy, very fine, olive gray, slightly firm, nonsticky, nonplastic, less sandy below 250 ft; occasional granular and very fine pebbles.
257-288	TILL	Clay, silty, sandy, pebbly, dark olive gray, firm, slightly sticky, plastic; occasional cobbles (Till).
288-294	SAND & GRAVEL	Sand and gravel.
294-346	TILL	Clay, silty, very sandy, pebbly, dark olive gray, firm; interbedded sand and gravel, less than 1 ft beds from 321 to 323 ft (Till).
346-370	CLAY	Clay, very silty, slightly sandy, dark olive gray.
370-404	TILL	Clay, silty, sandy, pebbly, olive gray, firm, occasional cobbles; rock at 398 ft; white calcareous return at 402 ft (Till).
404-417	BEDROCK	Clay, greenish gray (5GY 6/1), soft, sticky, plastic, very calcareous; angular sand, fine; fine indurated laminations of white, greenish gray, olive black (5Y 2/1), and dark greenish gray (5GY 4/1); moderate red (5R 4/6) specks; hydrogen sulfide smell on acid treatment.

130-050-11BAB
USGS #H-806

Date Completed:	10/20/1953	Purpose:	Test Hole
L.S. Elevation (ft):	1072		
Depth Drilled (ft):	400	Data Source:	

Completion Info:

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-17	SAND	Sand, very fine and fine, carbonaceous (lacustrine).
17-108	SAND	Sand, very fine and fine, light gray (lacustrine).
108-365	TILL	Till, sandy, light gray; darker gray with depth.
365-400	SHALE	Shale, very dark gray to black.

130-050-11CAC
Kenneth Jones

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. -
Depth Drilled (ft):	45	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-11CBB

Date Completed: 07/16/1980
L.S. Elevation (ft): 1069
Depth Drilled (ft): 251

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: Hankinson

Lithologic Log

Depth (ft)	Unit	Description
0-8	CLAY	Clay, yellow.
8-75	SAND	Sand, fine.
75-135	CLAY	Clay.
135-150	SAND	Sand.
150-195	CLAY	Clay.
195-220	SAND	Sand; interbedded clay.
220-225	SAND	Sand, fine.
225-245	SAND	Sand, medium.
245-250	SAND	Sand, fine.
250-251	CLAY	Clay.

130-050-11CBBB

Date Completed: 07/18/2006
L.S. Elevation (ft): N/A
Depth Drilled (ft): 0
Screen Int. (ft.): 0-0

Purpose: Surface Water Monitoring Site
Well Type: 0 in. -
Aquifer: Surface Water
Data Source:

Completion Info:

Remarks: Sample of surface water which is ground water seepage from Hankenson aquifer

Lithologic Log

Depth (ft)	Unit	Description

130-050-11DBB
USGS #H-807

Date Completed: 10/23/1953
L.S. Elevation (ft): 1063
Depth Drilled (ft): 110

Purpose: Test Hole

Data Source:

Completion Info: County study book has it 11DBD

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-9	SAND	Sand, very fine and fine, yellowish-gray (lacustrine).
9-102	SAND	Sand, very fine and fine, light gray (lacustrine).
102-110	TILL	Till, medium gray.

130-050-11DDC
USGS #H-808

Date Completed: 10/24/1953
L.S. Elevation (ft): 1062
Depth Drilled (ft): 110

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-7	SAND	Sand, very fine and fine (lacustrine).
7-9	SAND	Sand, very fine and fine, carbonaceous (lacustrine).
9-70	SAND	Sand, very fine, silty, light gray (lacustrine).
70-97	SAND	Sand, very fine, clayey and silty; contains snail shells (lacustrine)
97-110	TILL	Till, light gray.

130-050-12CCC
City of Hankinson

Date Completed:	06/16/1980	Purpose:	Test Hole
L.S. Elevation (ft):	1064		
Depth Drilled (ft):	190		
		Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-80	SAND	
80-87	SHALE	
87-90	SAND	
90-180	SHALE	
180-190	SAND	

130-050-13
City of Hankinson

Date Completed:	1937	Purpose:	Unknown
L.S. Elevation (ft):	N/A	Well Type:	6 in. -
Depth Drilled (ft):	154	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description

130-050-13A
A. H. Mekher

Date Completed:	6/1929	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	36 in. -
Depth Drilled (ft):	12	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description

130-050-13ACD
William Golnick

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	36 in. -
Depth Drilled (ft):	23	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-13ADD
City of Hankinson

Date Completed: 06/15/1980
L.S. Elevation (ft): 1059
Depth Drilled (ft): 215

Purpose: Test Hole
Data Source: Falk brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-8	CLAY	yellow
8-80	SAND	
80-175	SHALE	
175-215	SAND	

130-050-13B
City of Hankinson

Date Completed: 6/1929
L.S. Elevation (ft): N/A
Depth Drilled (ft): 170
Screen Int. (ft.): 0-0

Purpose: Municipal Well
Well Type: 2 in. -
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description

130-050-13BAC

Date Completed: 07/17/1980
L.S. Elevation (ft): 1061
Depth Drilled (ft): 225

Purpose: Test Hole
Data Source:

Completion Info:

Remarks: Hankinson

Lithologic Log

Depth (ft)	Unit	Description
0-8	CLAY	Clay, yellow.
8-60	SAND	Sand, fine.
60-130	CLAY	Clay.
130-150	SAND	Sand, fine and medium.
150-180	SAND	Sand, medium.
180-195	SAND	Sand; interebedded clay.
195-210	SAND	Sand.
210-225	CLAY	Clay; interbedded sand.

130-050-13BBB
Martin Wolfe

Date Completed: 00/00/00
L.S. Elevation (ft): N/A
Depth Drilled (ft): 24
Screen Int. (ft.): 0-0

Purpose: Domestic Well
Well Type: 36 in. -
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-13BCB1
Robert Dumpke

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	36 in. -
Depth Drilled (ft):	20	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-13BDB
Gilbert Miller

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	36 in. -
Depth Drilled (ft):	25	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-13BDD
USGS #H-819

Date Completed:	11/23/1953	Purpose:	Test Hole
L.S. Elevation (ft):	1063		
Depth Drilled (ft):	100	Data Source:	

Completion Info:

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-6	SAND	Sand, very fine, brown; contains snail shells (lacustrine).
6-54	SAND	Sand, very fine and fine, light gray (lacustrine).
54-86	SAND	Sand, very fine, clayey, light gray (lacustrine).
86-94	CLAY	Clay, sandy, light gray (lacustrine).
94-100	TILL	Till, light gray.

130-050-13CDA2
Mrs. Tom Bisek

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. -
Depth Drilled (ft):	15	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-13DAC
City of Hankinson

Date Completed: 08/27/1980
L.S. Elevation (ft): 1060
Depth Drilled (ft): 240

Purpose: Test Hole

Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-70	SAND	fine to medium, pred. qtz. w/sh grains
70-125	TILL	olive gray, soft, pred. silt, becoming clayey and harder w/depth
125-140	CLAY	olive gray, w/occasional silty laminae, very solid
140-164	TILL	olive gray, solid as at 125'
164-219	GRAVEL	sandy, angular grag. of rock to well-rded, granules, predominately carbonates and granites with shale grains E-log indicates clay stringers. Hole tends to bridge with falling rock at 220 feet.
219-240	CLAY	olive gray, silty, solid, very poor samples

130-050-13DBB
City of Hankinson

Date Completed: 08/26/1980
L.S. Elevation (ft): 1065
Depth Drilled (ft): 300

Purpose: Test Hole

Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-68	SAND	v. fine to fine, pred. qtz. w/ sh grains
68-83	TILL	clay thru pebbles, v. silty, sdy, soft olive gray
83-113	TILL	clay thru grvl , silty, cohesive, solid, olive gray
113-136	TILL	clay thru grvl. grully lenses, slightly cohesive, olive gray
136-151	GRAVEL	sandy w/till lenses, carbonates, sh & grnitics are sub ang to rded
151-170	TILL	clay thru grvl., silty, cohesive, solit, olive gray
170-248	GRAVEL	sandy w/till lenses, very dirty, looked more like till while drilling, did not drill like grvl. This may be a very gravelly till?.
248-253	SHALE	olive blk, solid, boulder
253-300	GRAVEL	possibly gravelly till as above

130-050-13DCC
USGS #H-812

Date Completed: 11/04/1953
L.S. Elevation (ft): 1064
Depth Drilled (ft): 250

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-6	SAND	Sand, very fine and fine, yellowish-gray (lacustrine).
6-19	SAND	Sand, very fine and fine, light gray (lacustrine).
19-27	SAND	Sand, fine (lacustrine).
27-96	SAND	Sand, very fine, clayey (lacustrine).
96-102	CLAY	Clay, silty and sandy, medium gray (lacustrine).
102-120	CLAY	Clay, silty; contains carbonized wood, conifer (lacustrine).
120-140	CLAY	Clay, sandy.
140-155	TILL	Clay, sandy and pebbly, yellowish-gray, oxidized; contains decayed wood (till).
155-183	TILL	Till, medium gray.
183-187	SAND & GRAVEL	Sand, pebbly.
187-193	TILL	Till, medium gray.
193-196	SAND & GRAVEL	Sand, pebbly.
196-248	TILL	Till, medium gray.
248-250	SHALE	Shale, very dark gray.

130-050-13DDA
F. Boomersbach

Date Completed: 00/00/00
L.S. Elevation (ft): N/A
Depth Drilled (ft): 35
Screen Int. (ft.): 0-0

Purpose: Domestic Well
Well Type: 1.25 in. -
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-14ADA
USGS #H-809

Date Completed: 10/29/1953
L.S. Elevation (ft): 1065
Depth Drilled (ft): 190

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-8	CLAY	Clay, sandy, yellowish-gray (lacustrine)
8-50	SAND	Sand, very fine and fine, light gray (lacustrine).
50-72	SAND	Sand, very fine, silty (lacustrine).
72-105	CLAY	Clay, silty, light gray (lacustrine)
105-138	TILL	Till, medium gray.
138-140	SAND & GRAVEL	Sand, pebbly.
140-190	TILL	Till, medium gray.

130-050-14ADD
City of Hankinson

Date Completed: 00/00/00
L.S. Elevation (ft): 1065
Depth Drilled (ft): 255

Purpose: Test Hole

Data Source: Falk Brothers

Completion Info:

Remarks: Chemistry data is taken from the Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description
0-80	SAND	
80-183	SHALE	
183-185	SAND	
185-250	SANDSTONE	Very hard drill, drilled like sandstone, no shale in sample
250-255	SHALE	

130-050-14BBB

Date Completed: 00/00/00
L.S. Elevation (ft): N/A
Depth Drilled (ft): 0
Screen Int. (ft.): 0-0

Purpose: Surface Water Monitoring Site
Well Type: 0 in. -
Aquifer: Surface Water
Data Source:

Completion Info:

Remarks: water sample of ground water seepage from Hankinson aquifer into small creek west of Hankinson

Lithologic Log

Depth (ft)	Unit	Description

130-050-14DAD
USGS #H-810

Date Completed: 10/31/1953
L.S. Elevation (ft): 1072
Depth Drilled (ft): 100

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-10	CLAY	Clay, silty, yellowish-gray (lacustrine).
10-21	SAND	Sand, very fine, clayey (lacustrine)
21-30	SAND	Sand, very fine to coarse, clayey (lacustrine)
30-50	SAND	Sand, very fine, clayey (lacustrine)
50-85	SAND	Sand, very fine, slightly clayey (lacustrine).
85-100	TILL	Till, light gray.

130-050-14DCD
NDSWC 13490

Date Completed:	10/03/1995	Purpose:	Observation Well
L.S. Elevation (ft):	1080	Well Type:	2 in. - PVC
Depth Drilled (ft):	180	Aquifer:	Undefined
Screen Int. (ft.):	125-130	Data Source:	NDSWC

Completion Info: west well; 127 ft 2 in pipe; 5 ft #18 screen; collapse/tremie/grout

Remarks: west well / MAP ON BACK

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Sand loam, black.
2-6	SAND	Sand, very fine, very silty, clayey, very dark gray (5Y 3/1), carbonaceous (pond sediment).
6-17	SAND	Sand, very fine, very silty, clayey, olive yellow (2.5Y 6/8), oxidized.
17-20	SAND	Sand, very fine, very silty, clayey, olive gray (5Y 5/2), reduced.
20-58	SAND	Sand, very fine and fine.
58-82	CLAY	Clay, silty, slightly pebbly, olive gray, slightly firm, sticky, plastic.
82-96	SILT	Silt, clayey, olive gray, slightly firm, sticky, nonplastic.
96-100	SAND	Sand, very fine, very silty; interbedded clayey silt.
100-116	CLAY	Clay, silty, sandy, very fine, olive gray.
116-132	SAND	Sand, fine to coarse, gravel, fine, mixed mineralogy, subangular and subrounded; interbedded layers of granular to fine gravel, well rounded, predominantly shale.
132-177	CLAY	Clay, silty, very sandy, slightly pebbly, olive gray, slightly firm, nonsticky, slightly plastic; sand and gravel from 142 to 143 ft; interbedded sand and gravel, less than 1 ft beds, from 157 to 172 ft; rock at 173 ft; oxidized return from 174 ft.
177-180	SHALE	Clay, slightly silty, olive black (5Y 3/1), slightly firm, sticky, plastic (shale).

130-050-14DCD2
NDSWC 13490B

Date Completed:	10/04/1995	Purpose:	Observation Well
L.S. Elevation (ft):	1080	Well Type:	2 in. - PVC
Depth Drilled (ft):	60	Aquifer:	Hankinson
Screen Int. (ft.):	48-53	Data Source:	NDSWC

Completion Info: east well; 50 ft 2 in pipe; 5 ft #8 screen; collapse/holepug

Remarks: east well

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Silt loam, black.
2-7	SILT	Silt, very sandy, very fine, clayey, very dark gray (5Y 3/1), soft, sticky, nonplastic (pond sediment)
7-17	SILT	Silt, very sandy, very fine, clayey, light yellowish brown (2.5Y 6/4), soft, sticky, nonplastic, oxidized.
17-24	SILT	Silt, very sandy, very fine, clayey, olive gray (5Y 5/2), soft, sticky, nonplastic, reduced.
24-59	SAND	Sand, very fine and fine.
59-60	CLAY	Clay, silty, sandy, slightly pebbly, olive gray, slightly firm, sticky, plastic.

130-050-14DDD
USGS #H-811

Date Completed:	11/02/1953	Purpose:	Test Hole
L.S. Elevation (ft):	1073		
Depth Drilled (ft):	180	Data Source:	

Completion Info:

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-4	CLAY	Clay, yellowish-gray (lacustrine).
4-7	CLAY	Clay, light gray (lacustrine).
7-40	SAND	Sand, very fine and fine (lacustrine).
40-45	SAND	Sand, fine (lacustrine).
45-81	SAND	Sand, very fine and fine (lacustrine).
81-97	CLAY	Clay, sandy; poor return (lacustrine).
97-120	SAND	Sand, fine to very coarse, clayey (lacustrine).
120-135	SAND & GRAVEL	Sand, very coarse, pebbly.
135-166	GRAVEL	Gravel, fine and medium.
166-180	TILL	Till, light gray.

130-050-15BBB
Martin Krump

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well east of house
326 2nd Ave SW
Hankinson ND 58041
242-7486

Lithologic Log

Depth (ft)	Unit	Description

130-050-15BBC
Mike Gutzek

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well south of house

Lithologic Log

Depth (ft)	Unit	Description

130-050-15DAB
Marvin Held

Date Completed:	06/28/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	1090	Well Type:	4 in. - PVC
Depth Drilled (ft):	170	Aquifer:	Undefined
Screen Int. (ft.):	162-168	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-15	CLAY	yellow
15-145	SAND	
145-160	SHALE	
160-170	SAND	

130-050-15DAC
Lyle Buckhouse

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - Steel
Depth Drilled (ft):	60	Aquifer:	Undefined
Screen Int. (ft.):	0-60	Data Source:	

Completion Info:

Remarks: Well south of next to shop
16470 92nd St. SE
Hankinson ND. 58041
701-242-7833

Lithologic Log

Depth (ft)	Unit	Description

130-050-15DAC2
Lyle Buckhouse

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - PVC
Depth Drilled (ft):	190	Aquifer:	Undefined
Screen Int. (ft.):	0-190	Data Source:	

Completion Info:

Remarks: Well west of house
16470 92nd St. SE
Hankinson ND. 58041
701-242-7833

Lithologic Log

Depth (ft)	Unit	Description

130-050-16AABD
Dave Sylvester

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - Steel
Depth Drilled (ft):	70	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well west of house
9223 165th Ave SE
Hankinson ND 58041

Lithologic Log

Depth (ft)	Unit	Description

130-050-16AAC
Lee Stein

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well west of house
9225 165th Ave. SE
Hankinson ND 58041
701-242-7220

Lithologic Log

Depth (ft)	Unit	Description

130-050-16AAD
NDSWC #4

Date Completed:	11/24/2006	Purpose:	Observation Well
L.S. Elevation (ft):	1085	Well Type:	2 in. - PVC
Depth Drilled (ft):	118	Aquifer:	Milnor Channel
Screen Int. (ft.):	88-98	Data Source:	Falk Drilling

Completion Info:

Remarks: located next to Sylvestor's driveway

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-16	SAND	yellow
16-38	SAND	gray
38-43	CLAY	blue, with sand stringers
43-50	SAND	gray
50-55	SAND	20 slot
55-60	SAND	35 slot
60-65	SAND	35 slot
65-75	SAND	15 slot
75-80	SAND	25-30 slot
80-85	SAND	40 slot
85-90	SAND	15 slot
90-95	SAND	20 25 slot
95-100	SAND	25 - 30 slot
100-105	SAND	15-20 slot
105-110	SAND	25-50 slot
110-116	SAND	50-55 slot
116-118	CLAY	

130-050-16AADA
Bus Witt

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well north east of house
9235 165th Ave SE
Hankinson ND 58041
242-7025

Lithologic Log

Depth (ft)	Unit	Description

130-050-16ABB
Lyle Buchhouse

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	60	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well north of house
16470 92nd St. SE
Hankinson ND, 58041
701-242-7833 of house

Lithologic Log

Depth (ft)	Unit	Description

130-050-16ABB1
NDSWC #1

Date Completed:	11/24/2006	Purpose:	Observation Well
L.S. Elevation (ft):	1085	Well Type:	2 in. - PVC
Depth Drilled (ft):	135	Aquifer:	Milnor Channel
Screen Int. (ft.):	120-130	Data Source:	

Completion Info:

Remarks: North Well

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-18	SAND	yellow
18-20	SAND	Gray, fine
20-25	SAND	gray, fine, 10 slot
25-30	SAND	gray, fine, 10-12 slot
30-35	SAND	gray, bits of clay, fine, 10-12 slot
35-40	SAND	gray, bits of clay, fine 10 slot
40-45	SAND	gray, no clay, fine, 10 slot
45-50	SAND	gray, no clay, fine 10 slot
50-80	SAND	gray, no clay, very clean, fine
80-85	SAND	gray, with clay, fine, 10 slot
85-90	SAND	gray, with clay, more clay
90-95	CLAY	used pull down
95-100	CLAY	used pull down
100-118	CLAY	some rock, pull down and coarse sand
118-125	SAND	coarse
125-130	SAND	coarse, 50 slot
130-135	CLAY	hard, bedrock

130-050-16ABB2
NDSWC #2

Date Completed:	11/24/2006	Purpose:	Observation Well
L.S. Elevation (ft):	1085	Well Type:	2 in. - PVC
Depth Drilled (ft):	82	Aquifer:	Milnor Channel
Screen Int. (ft.):	58-78	Data Source:	

Completion Info:

Remarks: South Well

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-1	SAND	yellow, fine
18-78	SAND	gray, fine
78-82	CLAY	

130-050-16ADA
Hankinson

Date Completed:	07/28/1980	Purpose:	Test Hole
L.S. Elevation (ft):	1092		
Depth Drilled (ft):	300	Data Source:	

Completion Info:

Remarks: Hankinson, city test hole

Lithologic Log

Depth (ft)	Unit	Description
0-10	SAND	Sand, yellow.
10-40	SAND	Sand, fine.
40-135	SAND	Sand, coarse.
135-230	CLAY	Clay.
230-300	SAND	Sand; interbedded clay.

130-050-16BAB
NDSWC #3

Date Completed:	11/24/2006	Purpose:	Observation Well
L.S. Elevation (ft):	1085	Well Type:	2 in. - PVC
Depth Drilled (ft):	65	Aquifer:	Milnor Channel
Screen Int. (ft.):	48-58	Data Source:	Falk Drilling

Completion Info:

Remarks: East of SWC well

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-16	CLAY	yellow
16-40	SAND	gray, fine, 8-10 slot
40-45	SAND	gray, coarser, 10 -12 slot
45-62	SAND	gray, coarse, 10-12 slot
62-65	CLAY	blue

130-050-16BBA
NDSWC 15295

Date Completed:	08/09/2005	Purpose:	Observation Well
L.S. Elevation (ft):	1090	Well Type:	2 in. - PVC
Depth Drilled (ft):	260	Aquifer:	Milnor Channel
Screen Int. (ft.):	49-54	Data Source:	NDSWC

Completion Info: 51 ft 2 inch PVC, 5 ft No. 18 screen, collapse, holeplug

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-4	CLAY	Clay, silty, dusky yellow (5Y 6/4), oxidized
4-16	CLAY	Clay, silty, sandy, dusky yellow, oxidized
16-26	SAND	Sand, fine, oxidized
26-36	SAND	Sand, fine, reduced
36-41	CLAY	Clay, silty, olive gray (5Y 3/2)
41-54	SAND	Sand, fine
54-66	CLAY	Clay, silty, olive gray
66-83	CLAY	Clay, silty, olive gray
83-111	CLAY	Clay, firm, olive grey
111-142	CLAY	Clay, silty, sandy, gravelly, olive gray
142-151	INTERBEDDED	Interbedded clay through gravel
151-161	SAND & GRAVEL	Sand and gravel
161-166	CLAY	Clay, silty, olive gray
166-167	COBBLES	Cobbles
167-177	CLAY	Clay, silty, olive gay
177-183	COBBLES	Cobbles, gravelly
183-186	INTERBEDDED	Interbedded clay through gravel
186-222	CLAY	Clay, silty, olive gay
222-233	INTERBEDDED	Interbedded clay through sand
233-241	CLAY	Clay, silty, olive gray
241-260	CLAYSTONE	Clay, very dark brown (bedrock)

130-050-17DDD
NDSWC 3177

Date Completed:	10/16/1964	Purpose:	Observation Well
L.S. Elevation (ft):	1083	Well Type:	2 in. - PVC
Depth Drilled (ft):	197	Aquifer:	Milnor Channel
Screen Int. (ft.):	50-60	Data Source:	

Completion Info:

Remarks:
PC has settled, standing water

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Sandy loam, black.
1-8	SAND	Sand, fine and medium, brownish-gray, well sorted, subangular and subrounded, quartz, limestone, shale and detrital lignite.
8-17	TILL	Clay, silty to pebbly, olive-gray, soft, plastic, cohesive (till).
17-66	SAND	Sand, fine to coarse, medium sorted, subangular and subrounded, quartz, shale and detrital lignite.
66-89	TILL	Clay, sandy, slighty pebbly, olive-grey, soft, slighty plastic, cohesive; interbedded sand (till).
89-103	CLAY	Clay, silty and sandy, slighty pebbly, olive-gray, soft, slighty plastic, calcareous.
103-132	CLAY	Clay, sandy and pebbly, olive-grey, soft; interbedded sand and gravel.
132-148	CLAY	Clay, silty and sandy, olive-gray, soft, slighty plastic, cohesive, calcareous.
148-161	SAND & GRAVEL	Sand, medium to very coarse, pebbly, medium sorted, subangular and subrounded, limestone, shale, igneous and detrital lignite.
161-182	SAND	Sand, fine and medium, well sorted, subrounded, quartz, limestone, shale, detrital lignite and mica.
182-189	TILL	Clay, silty to pebbly, olive-gray, soft, plastic, cohesive; contains cobbles (till)
189-197	SHALE	Shale, very silty, olive-black, firm, slighty plastic, cohesive, highly calcareous.

130-050-18CAD
Willert Hoeft

Date Completed:	06/15/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	1092	Well Type:	4 in. - PVC
Depth Drilled (ft):	105	Aquifer:	Undefined
Screen Int. (ft.):	94-100	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-19	CLAY	yellow
19-75	SHALE	
75-105	SAND	

130-050-18DDC
Oscar Prachnow

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. -
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-18DDD
NDSWC 13401

Date Completed:	08/11/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1087	Well Type:	2 in. - PVC
Depth Drilled (ft):	200	Aquifer:	Milnor Channel
Screen Int. (ft.):	98-103	Data Source:	NDSWC

Completion Info: 100 ft 2 in PVC, 5 ft #18 PVC screen, collapse, bent. chips; PC

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, silt loam, black.
2-8	SILT	Silt, clayey, sandy, very fine, light olive brown (5Y 5/6), oxidized.
8-9	SAND & GRAVEL	Sand and gravel.
9-26	CLAY	Clay, silty, sandy, pebbly, olive gray (5Y 3/2), slightly firm, sticky, plastic, reduced.
26-39	CLAY	Clay, silty, olive gray, moderately firm, slightly sticky, slightly plastic.
39-44	SAND & GRAVEL	Sand and gravel.
44-52	CLAY	Clay, slightly silty, olive gray, moderately firm, sticky, plastic.
52-58	CLAY	Clay, silty, sandy, pebbly, olive gray.
58-125	SAND & GRAVEL	Sand, fine to coarse, granular, mixed mineralogy, subangular and subrounded; clay from 61 to 63 ft; coarser with depth; coarse gravel and cobbles from 104 to 110 ft; coarse gravel from 111 to 125 ft.
125-142	CLAY	Clay, silty, sandy, pebbly, olive gray, slightly firm; occasional cobble; interbedded sand and gravel, less than 1 ft beds from 125 to 142 ft.
142-163	TILL	Clay, silty, sandy, pebbly, olive gray, firm; occasional cobble (Till).
163-200	SHALE	Clay, olive black (5Y 2/1), firm, slightly sticky, plastic, noncalcareous; waxy appearance; brown, granular, angular to rounded, siderite concretions (Shale).

130-050-19BAA
Gustave Muehler

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. -
Depth Drilled (ft):	105	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-19DCC
Ed Berg

Date Completed:	05/15/1978	Purpose:	Domestic Well
L.S. Elevation (ft):	1120	Well Type:	0 in. - PVC
Depth Drilled (ft):	150	Aquifer:	Undefined
Screen Int. (ft.):	138-144	Data Source:	Falk brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-18	CLAY	yellow
18-120	SHALE	
120-150	SAND	

130-050-20ABD
Tom Haus

Date Completed:	10/01/1977	Purpose:	Stock Well
L.S. Elevation (ft):	1098	Well Type:	4 in. - PVC
Depth Drilled (ft):	145	Aquifer:	Undefined
Screen Int. (ft.):	125-145	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-10	SILT	Silt, clayey.
10-30	SILT	Silt, clayey and pebbly.
30-70	CLAY	Clay, blue.
70-120	SAND	Sand; interbedded clay.
120-125	CLAY	Clay, dark gray.
125-145	SAND	Sand, medium.

130-050-21DDA
Allen Coppin

Date Completed:	10/27/1981	Purpose:	Domestic Well
L.S. Elevation (ft):	1105	Well Type:	4 in. - PVC
Depth Drilled (ft):	95	Aquifer:	Undefined
Screen Int. (ft.):	80-90	Data Source:	Falk Brothers

Completion Info:

Remarks: Chemistry data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-14	CLAY	yellow
14-38	GRAVEL	
38-95	SAND	

130-050-22DCD
NDSWC 13492

Date Completed:	10/10/1995	Purpose:	Observation Well
L.S. Elevation (ft):	1080	Well Type:	2 in. - PVC
Depth Drilled (ft):	190	Aquifer:	Milnor Channel
Screen Int. (ft.):	58-63	Data Source:	NDSWC

Completion Info: 60 ft 2 in pipe; 5 ft #18 screen; collapse/holeplug

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Loam, black.
2-12	CLAY	Clay, silty, sandy, pebbly, dusky yellow (5Y 6/4), soft, sticky, plastic, oxidized.
12-31	CLAY	Clay, silty, sandy, pebbly, olive gray (5Y 3/2), soft, sticky, plastic, reduced.
31-77	SAND & GRAVEL	Sand, fine to coarse, gravel, fine, mixed mineralogy, predominantly shale, subangular and subrounded.
77-82	CLAY	Clay, silty, sandy, olive gray, slightly firm.
82-132	CLAY	Clay, very silty, very sandy, olive gray, soft, slightly sticky, nonplastic; slightly firm by 111 ft.
132-176	TILL	Clay, silty, sandy, pebbly, olive gray, firm; interbedded sand and gravel, less than 1 ft beds, from 143 to 176 ft; rocks at 164 ft (till).
176-190	SHALE	Clay, slightly silty, olive black (5Y 2/1), firm, slightly sticky, plastic, noncalcareous; waxy appearance (shale).

130-050-22DDD
H. O. Medenwaldt

Date Completed:	1945	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. -
Depth Drilled (ft):	86	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-23DBA
Donald Loll

Date Completed:	04/15/1974	Purpose:	Stock Well
L.S. Elevation (ft):	1080	Well Type:	4 in. - Steel
Depth Drilled (ft):	80	Aquifer:	Undefined
Screen Int. (ft.):	69-75	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-15	CLAY	yellow
15-30	SHALE	
30-35	SAND	
35-40	SHALE	
40-80	SAND	

130-050-24ACC
USGS #H-820

Date Completed:	11/25/1953	Purpose:	Test Hole
L.S. Elevation (ft):	1073		
Depth Drilled (ft):	60	Data Source:	

Completion Info:

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-4	CLAY	Clay, sandy, light brown (lacustrine).
4-20	SAND	Sand, very fine and fine, light brown (lacustrine).
20-30	SAND	Sand, very fine and fine, light gray (lacustrine).
30-45	SAND	Sand, fine (lacustrine).
45-52	SAND & GRAVEL	Sand, very fine to coarse, pebbly.
52-60	TILL	Till, light gray.

130-050-24BBB
John R. Scheller

Date Completed:	00/00/00	Purpose:	Unknown
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	27	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-24DDD
NDSWC 13405

Date Completed:	08/17/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1074	Well Type:	2 in. - PVC
Depth Drilled (ft):	360	Aquifer:	Undefined
Screen Int. (ft.):	138-143	Data Source:	NDSWC

Completion Info: South well, 140 ft 2 in PVC, 5 ft #18 PVC screen, tremie, collapse, bent. grout; PC

Remarks: South well

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, sand, very fine, brown.
1-21	SAND	Sand, very fine and fine, light olive brown (5Y 5/6), oxidized.
21-63	SAND	Sand, very fine and fine, light olive gray (5Y 5/2), reduced.
63-80	SILT	Silt, sandy, very fine, olive gray (5Y 3/2), slightly sticky, slightly plastic.
80-92	CLAY	Clay, silty, olive gray, sticky, slightly plastic.
92-119	CLAY	Clay, silty, sandy, pebbly, olive gray.
119-161	SAND & GRAVEL	Sand, fine to coarse, pebbly, fine, mixed mineralogy, subangular and subrounded; clay from 128 to 134 ft; gravel, coarse from 134 to 150 ft; rocks from 150 to 155 ft, interbedded clay, less than 1 ft beds from 155 to 161 ft.
161-172	TILL	Clay, silty, sandy, pebbly, olive gray, slightly firm, slightly sticky, slightly plastic; occasional cobble; rocks at 162, 168, and 169 ft (Till).
172-176	SAND & GRAVEL	Sand and gravel.
176-181	INTERBEDDED	interbedded clay, sand and gravel, less than 1 ft beds.
181-204	TILL	Clay, silty, sandy, pebbly, olive gray, slightly firm, slightly sticky, slightly plastic (Till).
204-220	CLAY	Clay, slightly silty, olive gray, firm, sticky, plastic; rocks at 212 and 219 ft.
220-228	SAND & GRAVEL	Sand, fine to coarse, pebbly, fine and medium, mixed mineralogy, subangular and subrounded.
228-252	CLAY	Clay, silty, slightly pebbly, olive gray; interbedded sand and gravel, less than 1 ft beds.
252-256	SAND & GRAVEL	Sand and gravel, predominantly shale.
256-290	TILL	Clay, silty, sandy, pebbly, olive gray; occasional cobble; rocks at 271, 273 to 276 ft.
290-305	GRAVEL	Gravel, coarse, numerous cobbles.
305-315	TILL	Clay, silty, sandy, pebbly, olive gray; occasional cobble; rocks at 312 ft (Till)
315-336	TILL	Clay, silty, sandy, pebbly, dark olive gray, frim slightly sticky, slightly plastic; rocks at 317 and 327 ft; clay, dark olive gray, from about 318 to 325 ft (Till).
336-360	SHALE	Clay, slightly silty, olive black (5Y 2/1), firm, sticky, plastic, calcareous; waxy appearance; indurated at 341, 347, and 354 ft (Shale).

130-050-24DDD2
NDSWC 13405B

Date Completed:	08/17/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1075	Well Type:	2 in. - PVC
Depth Drilled (ft):	60	Aquifer:	Hankinson
Screen Int. (ft.):	48-53	Data Source:	NDSWC

Completion Info: North well, 50 ft 2 in PVC, 5 ft #12 PVC screen, collapse, bent. chips; PC

Remarks: North well

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, sand, very fine, brown.
1-21	SAND	Sand, very fine and fine, light olive brown (5Y 5/6), oxidized.
21-60	SAND	Sand, very fine and fine, light olive gray (5Y 5/2), reduced.

130-050-25BBC

Date Completed:	06/18/1980	Purpose:	Test Hole
L.S. Elevation (ft):	1075		
Depth Drilled (ft):	290	Data Source:	

Completion Info:

Remarks: Hankinson

Lithologic Log

Depth (ft)	Unit	Description
0-70	SAND	Sand.
70-75	CLAY	Clay.
75-85	SAND	Sand.
85-150	CLAY	Clay.
150-155	SAND	Sand.
155-160	CLAY	Clay.
160-165	SAND	Sand.
165-195	CLAY	Clay; interbedded sand.
195-245	CLAY	Clay.
245-280	SAND	Sand, fine.
280-290	CLAY	Clay.

130-050-26BCD
R.C. Bladow

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. -
Depth Drilled (ft):	66	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-26CBB
NDSWC 13491

Date Completed: 10/04/1995
L.S. Elevation (ft): 1080
Depth Drilled (ft): 190
Screen Int. (ft.): 68-73

Purpose: Observation Well - Plugged
Well Type: 2 in. - PVC
Aquifer: Milnor Channel
Data Source: NDSWC

Completion Info: flowing well; 70 ft 2 in pipe; 5 ft #18 screen; collapse/holeplug

Remarks: flowing well; wl about 7 ft above land surface; 1 to 2 gpm flow; Well was plugged by SWC drill rig on 11/2/95.

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Silt loam, black.
2-9	SILT	Silt, very sandy, very fine, clayey, very dark gray (5Y 3/1), slightly firm, nonsticky, slightly plastic (pond sediment)
9-11	SAND	Sand, very fine and fine, slightly pebbly, oxidized.
11-14	SILT	Silt, sandy, clayey, olive gray (5Y 5/2), reduced.
14-22	SAND	Sand, very fine and fine.
22-43	CLAY	Clay, silty, sandy, pebbly, olive gray, slightly firm, sticky, plastic.
43-47	GRAVEL	Gravel, fine and medium, sandy, mixed mineralogy, angular to subrounded.
47-48	CLAY	Clay.
48-76	SAND & GRAVEL	Sand, fine to coarse, gravel, fine, mixed mineralogy, predominantly shale, subangular and subrounded.
76-107	CLAY	Clay, silty, sandy, slightly pebbly, olive gray, slightly firm, sticky, slightly plastic; interbedded sand, less than 1 ft beds, from 90 to 106 ft; rock at 106 ft.
107-122	SILT	Silt, clayey, olive gray, slightly firm, slightly sticky, slightly plastic.
122-180	TILL	Clay, silty, sandy, pebbly, olive gray, firm, slightly sticky, slightly plastic; occasional cobble; very clayey, more firm from 146 to 150 ft; interbedded sand and gravel, less than 1 ft beds, from 155 to 160 ft; numerous rocks from 160 to 180 ft (till).
180-190	SHALE	Clay, slightly silty, olive black (5Y 3/1), firm, sticky, plastic (shale)

130-050-26CCD
Hillview Farms, Inc.

Date Completed: 00/00/00
L.S. Elevation (ft): N/A
Depth Drilled (ft): 48
Screen Int. (ft.): 0-0

Purpose: Domestic Well
Well Type: 0 in. -
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-26CDB
NDSWC 13408

Date Completed: 08/18/1994
L.S. Elevation (ft): 1085
Depth Drilled (ft): 370

Purpose: Test Hole
Data Source: NDSWC

Completion Info: Hole plug

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, silt loam, black.
2-27	CLAY	Clay, silty, light olive brown (5Y 5/6), soft, sticky, plastic, oxidized.
27-34	SAND	Sand, very fine and fine, oxidized.
34-48	SILT	Silt, sandy, olive gray (5Y 3/2), reduced.
48-71	CLAY	Clay, silty, sandy, pebbly, olive gray, slightly firm, slightly sticky, slightly plastic; sand and gravel from 55 to 56 ft.
71-78	GRAVEL	Gravel, coarse.
78-85	CLAY	Clay, silty, sandy, pebbly, olive gray.
85-89	SAND & GRAVEL	Sand and gravel.
89-97	CLAY	Clay, silty, sandy, pebbly, olive gray.
97-103	SAND & GRAVEL	Sand and gravel.
103-128	SILT	Silt, slightly clayey, very sandy, very fine, olive gray, soft, slightly sticky, nonplastic.
128-129	ROCK	Rock.
129-131	CLAY	Clay, silty, sandy, pebbly, olive gray.
131-142	CLAY	Clay, very silty, olive gray, slightly firm, slightly sticky, slightly plastic.
142-168	TILL	Clay, silty, sandy, pebbly, olive gray, firm; occasional cobble; rocks at 145, 149, and 155 ft (Till).
168-178	GRAVEL	Gravel, fine, sandy, mixed mineralogy, subangular and subrounded.
178-183	INTERBEDDED	Interbedded clay, sand, and gravel, less than 1 ft beds.
183-222	TILL	Clay, silty, sandy, pebbly, olive gray, slightly sticky, slightly plastic; occasional cobble (Till).
222-255	INTERBEDDED	Interbedded clay, sand, and gravel, less than 1 ft beds.
255-277	CLAY	Clay, silty, sandy, pebbly, olive gray; white return at about 256 ft.
277-310	GRAVEL	Gravel, fine and medium, sandy, mixed mineralogy, predominantly shale, angular to subrounded; interbedded clay and silt, about 1 to 2 ft beds; rock at 309 ft.
310-322	SAND	Sand, very fine, very clayey, olive gray, soft.
322-345	TILL	Clay, silty, sandy, pebbly, olive gray; rocks at 322, 335, 338, 342, and 344 ft (Till).
345-370	SHALE	Clay, olive black (5Y 2/1), firm, sticky, plastic, noncalcareous, waxy appearance (Shale).

130-050-27A
Henry Foeltz

Date Completed:	6/1929	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Spring

Lithologic Log

Depth (ft)	Unit	Description

130-050-27BBB
Hillview Farms, Inc.

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. -
Depth Drilled (ft):	160	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-27BBB2
NDSWC 3178

Date Completed:	10/19/1964	Purpose:	Observation Well
L.S. Elevation (ft):	1126	Well Type:	2 in. - PVC
Depth Drilled (ft):	137	Aquifer:	Brightwood
Screen Int. (ft.):	90-100	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-5	TILL	Clay, silty to pebbly, moderate olive-brown, soft, plastic, cohesive, calcareous, oxidized (till).
5-83	SAND & GRAVEL	Sand, fine to very coarse, with fine to coarse gravel, subangular and subrounded; contains cobbles; cross bedding, oxidized to 44 feet.
83-110	SAND	Sand, fine to very coarse, pebbly, medium sorted, subangular and subrounded, quartz, limestone, shale, igneous and detrital lignite; interbedded.
110-137	TILL	Clay, very sandy, pebbly, olive-gray, soft, slighty plastic, cohesive, calcareous; interbedded sand (till).

130-050-27DAB
NDSWC

Date Completed:	00/00/00	Purpose:	Surface Water Monitoring Site
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Surface Water
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: STAFF GAUGE; Lake Elsie; Located on NE side of cement box culvert under road crossing

Lithologic Log

Depth (ft)	Unit	Description

130-050-28BBB
NDSWC 13041

Date Completed: 08/20/1992
L.S. Elevation (ft): 1119
Depth Drilled (ft): 220
Screen Int. (ft.): 63-68

Purpose: Observation Well
Well Type: 2 in. - PVC
Aquifer: Brightwood
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, black.
2-13	TILL	Clay, silty, sandy, pebbly, light olive-brown, soft, oxidized (Till).
13-16	CLAY	Clay, slightly silty, light olive-brown, soft, slightly sticky, plastic, oxidized.
16-25	TILL	Clay, silty, sandy, pebbly, light olive-brown, soft, oxodized (Till).
25-27	TILL	Clay, silty, sandy, pebbly, olive-gray, soft, unoxodized (Till).
27-31	SAND & GRAVEL	Sand, pebbly, fine, oxodized.
31-34	TILL	Clay, silty, sandy, pebbly, light olive-brown, soft, oxidized (Till).
34-41	CLAY	Clay, silty, very sandy, pebbly, olive-gray.
41-92	SAND	Sand, fine to coarse, predominantly medium and coarse, pebbly, granular and fine, angular to sub-rounded, medium sorted, igneous, carbonate, shale; interbedded silt, clayey, medium dark gray from 73 to 92 feet, most beds less than 1 foot in thickness.
92-96	TILL	Clay, silty, very sandy, pebbly, olive-gray, slightly firm (Till).
96-104	SAND	Sand, fine to coarse, pebbly, granular and fine; interbedded silt.
104-111	CLAY	Clay, very sandy, pebbly, olive-gray, soft.
111-152	SILT	Silt, very sandy, very fine sand, olive-gray, very soft; interbedded clay, silt, sand; more sandy from 140 to 152 feet; lignite return from 140 feet.
152-196	TILL	Clay, silty, sandy, pebbly, olive-gray, slightly firm; cobbles from 168 to 169 feet; very sandy, pebbly at bottom of section; medium shale, fine igneous and carbonate pebbles (Till).
196-198	GRAVEL	Gravel, fine and medium, angular to sub-rounded, carbonate, igneous, shale.
198-220	SHALE	Shale, olive-black, slightly firm; laminations of very fine, white crystalline material; some very fine pyrite crystals.

130-050-28CCC
NDSWC 3179

Date Completed: 10/20/1964
L.S. Elevation (ft): 1181
Depth Drilled (ft): 92
Screen Int. (ft.): 70-80

Purpose: Observation Well - Destroyed
Well Type: 2 in. - PVC
Aquifer: Brightwood
Data Source:

Completion Info:

Remarks: Can Not Locate

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Sandy loam, black.
1-7	TILL	Silt, clayey to pebbly, moderate olive-brown, soft, calcareous, oxidized (till).
7-79	SAND & GRAVEL	Sand, fine to very coarse, with fine to coarse gravel; contains cobbles; cross bedding; iron stained.
79-92	TILL	Clay, very silty to pebbly, olive-gray, soft, plastic, cohesive, calcareous (till).

130-050-28DDD
NDSWC 13414

Date Completed: 09/12/1994
L.S. Elevation (ft): 1233
Depth Drilled (ft): 360
Screen Int. (ft.): 178-183

Purpose: Observation Well
Well Type: 2 in. - PVC
Aquifer: Brightwood
Data Source: NDSWC

Completion Info: 180 ft 2 in PVC; 5 ft #18 PVC screen; collapse; holeplug; PC

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-0.5	TOPSOIL	Topsoil, gravel, sandy, brown.
0.5-122	GRAVEL	Gravel, fine to coarse, sandy, coarse, mixed mineralogy, angular to subrounded, oxidized, iron stained; interbedded sand and clay from 24 to 29 and 35 to 39 ft; coarse gravel from 29 to 35 and 39 to 122 ft; rocks at 74 and 108 ft.
122-151	SAND & GRAVEL	Sand, coarse, pebbly, fine and medium, mixed mineralogy, oxidized.
151-160	INTERBEDDED	Interbedded clay, olive gray (5Y 3/2) and sand, fine to coarse, 1 to 2 ft beds, reduced.
160-207	SAND & GRAVEL	Sand, coarse, gravel, fine to coarse, mixed mineralogy, subangular to rounded, reduced; rock at 200 ft; clay from 203 to 207 ft.
207-217	INTERBEDDED	Interbedded clay, sand, and gravel, less than 1 ft beds.
217-224	SAND & GRAVEL	Sand, coarse, gravel, fine to coarse, mixed mineralogy, subemgular to rounded.
224-256	SILT	Silt, clayey, sandy, very fine, olive gray, soft, slightly sticky, slightly plastic; more clayey by 240 ft.
256-308	TILL	Clay, silty, sandy, pebbly, olive gray, slightly firm, slightly sticky, slightly plastic; occasional cobble, firm by 280 ft; white, calcareous return at about 303 ft (Till).
308-341	TILL	Clay, silty, sandy, pebbly, dark olive gray, firm, slightly sticky, slightly plastic; rock at 310 ft; numerous cobbles from 310 to 320 ft (Till).
341-360	SHALE	Clay, olive black (5Y 2/1), slightly firm, slightly sticky, plastic, slightly calcareous; waxy appearance (Shale)

130-050-29BBC
NDSWC 13402

Date Completed: 08/11/1994
L.S. Elevation (ft): 1129
Depth Drilled (ft): 260
Screen Int. (ft.): 158-163

Purpose: Observation Well
Well Type: 2 in. - PVC
Aquifer: Brightwood
Data Source: NDSWC

Completion Info: 160 ft 2 in PVC, 5 ft #18 PVC screen, collapse, bent. chips; PC

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, loam, black.
2-16	CLAY	Clay, silty, sandy, pebbly, light olive brown (5Y 5/6), soft, sticky, slightly plastic, oxidized.
16-20	CLAY	Clay, silty, sandy, pebbly, light olive gray (5Y 5/2), slightly firm, sticky, slightly plastic, reduced.
20-22	SAND	Sand, oxidized.
22-34	CLAY	Clay, silty, sandy, pebbly, light olive brown (5Y 5/6), oxidized.
34-43	SAND	Sand, fine to coarse, pebbly, fine, mixed mineralogy, oxidized.
43-48	SAND	Sand, fine to coarse, pebbly, fine, light olive gray (5Y 5/2), mixed mineralogy, reduced.
48-113	CLAY	Clay, very silty, olive gray (5Y 3/2), soft, slightly sticky, slightly plastic (Lacustrine).
113-114	SAND & GRAVEL	Sand and gravel.
114-132	CLAY	Clay, silty, very sandy, pebbly, olive gray, soft.
132-142	SAND	Sand, fine to coarse, pebbly, fine, mixed mineralogy, predominantly shale, angular to subrounded.
142-173	GRAVEL	Gravel, fine to coarse, sandy, mixed mineralogy, angular to subrounded, rock at 149 ft, very coarse gravel and cobbles from 149 to 158 ft.
173-195	TILL	Clay, silty, sandy, pebbly, olive gray; occasional cobble; interbedded sand and gravel, less than 1 ft beds from 173 to 176 ft; rock at 187 ft; sand and gravel from 191 to 193 ft (Till).
195-228	CLAY	Clay, slightly silty, slightly sandy, slightly pebbly, olive gray, very firm, sticky, plastic.
228-237	SAND & GRAVEL	Sand and gravel.
237-238	ROCK	Rock.
238-260	SHALE	Clay, olive black (5Y 2/1), soft, sticky, plastic, calcareous; waxy appearance (Shale).

130-050-31DDD
Jim King

Date Completed:	11/05/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	1235	Well Type:	4 in. - PVC
Depth Drilled (ft):	158	Aquifer:	Undefined
Screen Int. (ft.):	148-158	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-3	TOPSOIL	
3-10	SAND	fine
10-75	GRAVEL	very coarse
75-135	CLAY	blue, mixed with medium gravel
135-158	SAND	coarse, grey

130-050-32CCC
Orvill King

Date Completed:	10/30/1975	Purpose:	Stock Well
L.S. Elevation (ft):	1220	Well Type:	4 in. - Steel
Depth Drilled (ft):	131	Aquifer:	Brightwood
Screen Int. (ft.):	121-131	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Black.
1-20	CLAY	Clay, pebbly, yellow.
20-50	CLAY	Clay.
50-90	SAND	Sand, red.
90-110	SAND	Sand, red; interbedded clay.
110-120	SAND	Sand, fine.
120-131	SAND	Sand, coarse, dark gray.

130-050-33BAA
Henry Benle

Date Completed:	05/05/1974	Purpose:	Domestic Well
L.S. Elevation (ft):	1185	Well Type:	4 in. - Steel
Depth Drilled (ft):	150	Aquifer:	Undefined
Screen Int. (ft.):	139-145	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-22	CLAY	yellow
22-110	SHALE	
110-150	SAND	

130-050-34BAB
Allen Weber

Date Completed:	10/04/1980	Purpose:	Domestic Well
L.S. Elevation (ft):	1100	Well Type:	4 in. - PVC
Depth Drilled (ft):	166	Aquifer:	Undefined
Screen Int. (ft.):	156-166	Data Source:	Manikowski Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-3	TOPSOIL	black
3-28	CLAY	yellow
28-33	CLAY	blue
33-80	GRAVEL	yellow
80-129	CLAY	blue
129-141	SAND	fine
141-150	CLAY	blue
150-166	SAND	fine water

130-050-35CAA
NDSWC 13407

Date Completed: 08/18/1994
L.S. Elevation (ft): 1080
Depth Drilled (ft): 220

Purpose: Test Hole

Data Source: NDSWC

Completion Info: Hole plug

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, silt loam, black.
2-27	SILT	Silt, clayey, sandy, very fine, light olive brown (5Y 5/6), soft, sticky, slightly plastic, oxidized.
27-39	SAND	Sand, very fine and fine, light olive gray (5Y 5/2), reduced; detrital lignite.
39-44	SILT	Silt, sandy, olive gray (5Y 3/2).
44-52	CLAY	Clay, silty, sandy, pebbly, olive gray.
52-57	CLAY	Clay, silty, olive gray, slightly firm, slightly sticky, slightly plastic.
57-69	GRAVEL	Gravel, fine and medium, sandy, mixed mineralogy, subangular and subrounded.
69-92	CLAY	Clay, silty, very sandy, olive gray, slightly firm, slightly sticky, slightly plastic.
92-111	SAND & GRAVEL	Sand, coarse, pebbly, fine, mixed mineralogy, subangular and subrounded.
111-121	CLAY	Clay, silty, sandy, olive gray.
121-135	CLAY	Clay, silty, very sandy, very pebbly, olive gray, firm, slightly sticky, nonplastic; occasional cobble.
135-140	INTERBEDDED	Interbedded clay, sand, and gravel, less than 1 ft beds.
140-170	CLAY	Clay, silty, very sandy, very pebbly, olive gray, firm, slightly sticky, nonplastic; occasional cobble; rocks at 145, 158 to 160, and 168 ft; more firm at 149 ft; sand and gravel from 155 to 158 and 163 to 165 ft.
170-177	TILL	Clay, silty, sandy, pebbly, dark olive gray, firm, slightly sticky, slightly plastic; white calcareous return at 171 ft; rocks at 174 and 177 ft (Till).
177-184	CLAY	Clay, slightly pebbly, dark olive gray, firm sticky, plastic.
184-186	SAND	Sand or silt, no return.
186-190	CLAY	Clay, silty, very sandy, pebbly, dark olive gray, firm, slightly sticky, nonplastic; occasional cobble.
190-220	BEDROCK	Clay, olive black (5Y 2/1), firm sticky, plastic, calcareous; laminations of indurated, light olive gray (5Y 5/2) sand, very fine, silty and white calcareous return from 197 to 199 ft (Bedrock).

130-050-35CCC
Carl Wallman

Date Completed: 04/20/1994
L.S. Elevation (ft): N/A
Depth Drilled (ft): 38
Screen Int. (ft.): 28-38

Purpose: Domestic Well
Well Type: 4 in. - PVC
Aquifer: Undefined
Data Source: Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-10	CLAY	Yellow
10-23	CLAY	Blue clay mixed with rocks
23-28	SAND	Gray
28-38	SAND	Clean gray sand

130-050-36ABB
Fred Buckhause

Date Completed: 00/00/00
L.S. Elevation (ft): N/A
Depth Drilled (ft): 130
Screen Int. (ft.): 0-0

Purpose: Domestic Well
Well Type: 2.5 in. -
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

130-050-36CDD1
NDSWC 12188

Date Completed: 09/13/1988
L.S. Elevation (ft): 1084
Depth Drilled (ft): 230

Purpose: Test Hole

Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil.
2-17	SAND	Sand, fine, rounded, oxidized; interbedded silt.
17-37	SAND	Sand, fine and medium, gray, rounded; interbedded silt.
37-49	CLAY	Clay, silty, slighty pebbly, olive-gray, soft, plastic; cobbles from 48 to 49 feet.
49-72	CLAY	Clay, silty, light olive-gray, soft, plastic; lamination; interbedded till to 62 feet; gravel at 52 feet.
72-76	TILL	Clay, very silty to pebbly, olive-gray, soft, plastic (till).
76-162	CLAY	Clay, silty and sandy, slighty pebbly, gray, plastic; laminaton; interbedded; sand at 95 feet.
162-180	SAND	Sand, coarse and very coarse, granular, sub angular and subrounded; interbedded clay from 172-175 feet.
180-219	TILL	Clay, silty to pebbly, gray, plastic; interbedded clay, gravel and cobbles (till).
219-230	SHALE	Shale, brownish-black, firm.

130-050-36CDD2
NDSWC 12206

Date Completed:	09/27/1988	Purpose:	Observation Well
L.S. Elevation (ft):	1084	Well Type:	2 in. - PVC
Depth Drilled (ft):	190	Aquifer:	Undefined
Screen Int. (ft.):	178-183	Data Source:	

Completion Info:

Remarks: North Well / WEST OF POST

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil.
2-17	SAND	Sand, fine, oxidized.
17-37	SAND	Sand, fine, gray.
37-42	CLAY	Clay, silty and sandy, slighty pebbly, olive-gray.
42-53	CLAY	Clay, sandy, slighty pebbly, gray.
53-55	ROCK	Cobbles.
55-71	CLAY	Clay, silty, gray.
71-81	CLAY	Clay, silty and sandy, slighty pebbly, gray.
81-162	CLAY	Clay, silty and sandy, gray.
162-170	SAND & GRAVEL	Sand, very coarse, granular.
170-176	SAND & GRAVEL	Sand, pebbly; interbedded till.
176-190	SAND & GRAVEL	Sand, with coarse gravel.

130-050-36CDD3
NDSWC

Date Completed:	09/27/1988	Purpose:	Observation Well
L.S. Elevation (ft):	1084	Well Type:	2 in. - PVC
Depth Drilled (ft):	40	Aquifer:	Milnor Channel
Screen Int. (ft.):	32-37	Data Source:	

Completion Info:

Remarks: South Well / EAST OF POST

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil.
2-17	SAND	Sand, fine, oxidized.
17-36	SAND	Sand, fine, gray.
36-40	CLAY	Clay, silty and sandy, gray.

130-051-01AAA1
NDSWC 12274A

Date Completed:	11/21/1988	Purpose:	Test Hole
L.S. Elevation (ft):	1077		
Depth Drilled (ft):	240	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-3	TOPSOIL	Topsoil.
3-7	SAND	Sand, fine and medium, subrounded to rounded, quartz and carbonate, oxidized.
7-27	SAND	Sand, fine and medium, gray, subrounded and rounded, quartz and carbonate.
27-46	TILL	Clay, silty and sandy, olive-gray, soft, plastic (till).
46-53	SAND	Sand; no return.
53-98	TILL	Clay, silty and sandy, olive-gray, soft, plastic: interbedded silty clay (till).
98-155	CLAY	Clay, silty, gray, firm, plastic (lacustrine).
155-157	GRAVEL	Gravel, fine, carbonate.
157-200	TILL	Clay, very sandy, silty, slighty pebbly, gray, soft, plastic; interbedded gravel; gravel from 176 to 178 feet (till).
200-210	CLAY	Clay, sandy, detrital shale; interbedded till.
210-240	SHALE	Shale, black, carbonaceous; lamination.

130-051-01AAA2
NDSWC 12274B

Date Completed:	11/22/1988	Purpose:	Observation Well
L.S. Elevation (ft):	1077	Well Type:	2 in. - PVC
Depth Drilled (ft):	40	Aquifer:	Milnor Channel
Screen Int. (ft.):	18-23	Data Source:	

Completion Info:

Remarks: 95ft SOUTH OF ROAD ALONG WEST SIDE FENCE
WELL IS BROKEN BELOW WATER LEVEL,

Lithologic Log

Depth (ft)	Unit	Description
0-3	TOPSOIL	Topsoil.
3-7	SAND	Sand, fine and medium, subrounded and rounded, oxidized.
7-27	SAND	Sand, fine and medium, gray, subrounded and rounded.
27-40	TILL	Clay, silty and sandy, olive-gray, soft, plastic (till).

130-051-02DAD
Dale Lugert

Date Completed: 10/01/1999
L.S. Elevation (ft): N/A
Depth Drilled (ft): 50
Screen Int. (ft.): 40-60

Purpose: Stock Well
Well Type: 4 in. - PVC
Aquifer: Undefined
Data Source: Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	SAND	top
1-10	SILT	
10-20	SILT	yellow
20-30	SAND	gray
30-40	SILT	silty strips and sand
40-50	SAND	best sand

130-051-03BAA
NDSWC 13047

Date Completed: 08/26/1992
L.S. Elevation (ft): 1085
Depth Drilled (ft): 260

Purpose: Test Hole

Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, black.
2-11	CLAY	Clay, silty, light olive-brown, soft, oxidized.
11-18	CLAY	Clay, silty, olive-gray, soft, slightly sticky, plastic, unoxidized.
18-60	SAND	Sand, very fine and fine, olive-gray, well sorted; some lignite return; pebbly, fine, angular to sub-rounded, shale, carbonate, igneous from 57 to 58 feet.
60-62	CLAY	Clay, silty, olive-gray, soft, sticky, plastic.
62-63	SAND	Sand, clayey, silty; poor return.
63-76	CLAY	Clay, silty, sandy, very fine, olive-gray, soft.
76-83	CLAY	Clay, silty, slightly sandy, slightly pebbly, olive-gray, soft.
83-231	CLAY	Clay, slightly silty, olive-gray, soft, slightly sticky, plastic; slightly firm, non-sticky, plastic from 103 to 231 feet (Lacustrine).
231-239	TILL	Clay, silty, sandy, pebbly, olive-gray, soft; cobbles at 231 feet (Till).
239-260	SHALE	Shale, grayish-brown, brownish-black with depth, slightly firm; indurated laminae; waxy appearance.

130-051-04ABA
Robert Foertsch

Date Completed: 10/17/1979
L.S. Elevation (ft): 1085
Depth Drilled (ft): 53
Screen Int. (ft.): 45-53

Purpose: Domestic Well
Well Type: 4 in. - PVC
Aquifer: Undefined
Data Source: Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	black
1-5	CLAY	yellow, sandy
5-25	SAND	fine, gray
25-35	SAND	fine, a little coarser
35-53	SAND	fine

130-051-05DDC2
Dan Pelman

Date Completed: 10/02/1997
L.S. Elevation (ft): N/A
Depth Drilled (ft): 120
Screen Int. (ft.): 98-118

Purpose: Irrigation Well
Well Type: 8 in. - PVC
Aquifer: Undefined
Data Source: Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	sod
2-15	SAND	yellowish
15-20	SAND	yellowish
20-30	CLAY	fine dirty clay and sand
30-35	CLAY	fine, dirty
35-80	SAND	clean, fine
80-100	SAND	clean, medium, fine
100-120	SAND	medium, fine, clean

130-051-06CC
Harley Hinrichs

Date Completed:	1980	Purpose:	Domestic Well
L.S. Elevation (ft):	1095	Well Type:	4 in. - Unknown
Depth Drilled (ft):	55	Aquifer:	Undefined
Screen Int. (ft.):	44-55	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-6	CLAY	Yellow
6-20	SAND	Yellow
20-30	CLAY	Blue
30-45	SAND	Dirty
45-55	SAND	Uniform gray sand

130-051-06DAB
Andy Haul

Date Completed:	04/28/1973	Purpose:	Stock Well
L.S. Elevation (ft):	1092	Well Type:	4 in. - PVC
Depth Drilled (ft):	82	Aquifer:	Undefined
Screen Int. (ft.):	65-82	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-20	SILT	Silt, clayey, yellow.
20-40	CLAY	Clay, blue, interbedded sand.
40-50	SAND	Sand, fine, clayey.
50-55	CLAY	Clay, blue.
55-65	SAND	Sand, medium, gray, clayey.
65-82	SAND	Sand, medium, gray.

130-051-06BBB
James Hauza

Date Completed:	11/28/1973	Purpose:	Stock Well
L.S. Elevation (ft):	1088	Well Type:	2 in. - Steel
Depth Drilled (ft):	56	Aquifer:	Undefined
Screen Int. (ft.):	48-56	Data Source:	Frank's Well Service

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-48	ROCK	Rocks and clay
48-56	SAND	Medium

130-051-09AED
George Novotny

Date Completed:	12/08/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	1105	Well Type:	4 in. - PVC
Depth Drilled (ft):	80	Aquifer:	Undefined
Screen Int. (ft.):	70-80	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-43	CLAY	Yellow
43-60	CLAY	Soft, blue
60-80	SAND	Fine, gray sand

130-051-09ACA
George Noventy

Date Completed: 11/21/1976
L.S. Elevation (ft): 1100
Depth Drilled (ft): 90
Screen Int. (ft.): 77-83

Purpose: Domestic Well
Well Type: 4 in. - Steel
Aquifer: Undefined
Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-18	CLAY	yellow
18-60	SHALE	
60-90	SAND	fine

130-051-12BAA
NDSWC 3168

Date Completed: 09/28/1964
L.S. Elevation (ft): 1075
Depth Drilled (ft): 197

Purpose: Test Hole
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Fine sandy loam, black.
2-7	SAND	Sand, fine and medium, clayey, oxidized.
7-38	SAND	Sand, fine and medium, clayey, gray; interbedded clay and silt.
38-117	SILT	Silt, clayey, olive-gray, soft, plastic, cohesive, calcareous; interbedded very fine sand.
117-162	TILL	Clay, silty, very sandy, pebbly, olive-gray, soft, plastic, cohesive, calcareous; contains cobbles; interbedded sand (till).
162-178	SAND & GRAVEL	Sand, fine to coarse, pebbly, poorly sorted, subangular and subrounded; interbedded clay.
178-197	SHALE	Shale, olive-black, soft, plastic, cohesive, calcite crystals; massive.

130-051-13CCC
NDSWC 3175

Date Completed: 10/14/1964
L.S. Elevation (ft): 1148
Depth Drilled (ft): 632

Purpose: Test Hole
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Stony silt loam, black.
2-26	TILL	Clay, silty to pebbly, olive-brown, soft, plastic, cohesive, calcareous, oxidized; contains cobbles and boulders (till).
26-83	TILL	Clay, silty to pebbly, olive-gray, soft, plastic, cohesive; interbedded clay and sand (till).
83-149	SILT	Silt, clayey, olive-gray, soft, slighty plastic, cohesive, highly calcareous.
149-183	CLAY	Clay, sandy, pebbly, olive-gray; interbedded fine to coarse sand; contains detrital lignite.
183-189	TILL	Clay, sandy, pebbly, light gray, soft, slighty plastic, cohesive, highly calcareous (till).
189-225	TILL	Clay, sandy, very pebbly, olive-gray, soft, nonplastic, slighty cohesive; contains cobbles and boulders (till).
225-259	SHALE	Shale, very silty, granular, olive-black, soft, slighty plastic, cohesive, highly calcareous
259-319	SHALE	Shale, brownish-black, soft, carbonaceous; interbedded calcareous silt.
319-333	SHALE	Shale, as above; contains calcite crystals; interbedded light blue bentonite.
333-466	SHALE	Shale, olive-black, firm, cohesive, calcareous; contains calcite crystals; interbedded limestone.
466-547	SHALE	Shale, silty, olive-black, hard, cohesive; interbedded very hard, black, micaceous, fissile shale; limestone at base.
547-575	SHALE	Shale, silty and sandy, medium light gray, firm, slighty plastic, cohesive, micaceous; lamination.
575-593	SAND	Sand, medium to very coarse, granular, white, medium sorted, angular to rounded, loose.
593-616	SHALE	Shale, silty, medium light gray, soft; interbedded hard, black, fissile lignite.
616-632	CLAY	Clay, silty, white, light green, pale pink and dusky red, soft (weathered granite).

130-051-15ADD
Ray Fogarty

Date Completed: 07/15/1980
L.S. Elevation (ft): 1140
Depth Drilled (ft): 115
Screen Int. (ft.): 100-110

Purpose: Stock Well
Well Type: 4 in. - PVC
Aquifer: Undefined
Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-25	CLAY	yellow
25-100	SHALE	
100-112	SAND	
112-115	SHALE	

130-051-15CCC
Weldon Hoesel

Date Completed:	02/28/1987	Purpose:	Domestic Well
L.S. Elevation (ft):	1165	Well Type:	4 in. - PVC
Depth Drilled (ft):	178	Aquifer:	Undefined
Screen Int. (ft.):	168-178	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-53	CLAY	yellow, mixed with gravel strips
53-110	CLAY	very soft, blue
110-156	CLAY	hard, blue
156-168	SAND	fine, grey
168-178	SAND	little coarser, grey, very clean

130-051-16CCC
NDSWC 3176

Date Completed:	10/15/1964	Purpose:	Test Hole
L.S. Elevation (ft):	1151		
Depth Drilled (ft):	212	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Gravelly, silt loam, black.
2-25	TILL	Clay, silty to pebbly, moderate olive-brown, soft, plastic, cohesive, calcareous, oxidized; contains cobbles (till).
25-85	TILL	Clay, silty and sandy, very pebbly, olive-gray, soft, plastic, cohesive, calcareous; contains cobbles (till).
85-94	SAND	Sand, fine, silty, light olive-gray, subangular and subrounded, quartz, limestone and shale.
94-154	SILT	Silt, clayey, olive-gray, soft, plastic, cohesive, highly calcareous.
154-173	GRAVEL	Gravel, fine to coarse, sandy, medium sorted, subrounded, limestone, shale, and igneous.
173-187	CLAY	Clay, sandy, olive-gray, soft, slighty plastic, slighty cohesive, calcareous; interbedded sand and fine gravel.
187-190	CLAY	Clay, silty, olive-gray; contains cobbles and boulders.
190-212	SHALE	Shale, very silty, olive-black, soft, slighty plastic, cohesive, calcareous and carbonaceous; massive.

130-051-19AAA
Roger Thielman

Date Completed:	1/1981	Purpose:	Domestic Well
L.S. Elevation (ft):	1138	Well Type:	4 in. - PVC
Depth Drilled (ft):	163	Aquifer:	Undefined
Screen Int. (ft.):	153-163	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	black
1-27	CLAY	yellow, hard
27-55	CLAY	yellow, little softer
55-135	CLAY	blue, small stones
135-150	SAND	fine, gray, dirty
150-163	SAND	more uniform, gray, clean

130-051-20CCC
NDSWC 15300

Date Completed:	08/16/2005	Purpose:	Test Hole
L.S. Elevation (ft):	1150		
Depth Drilled (ft):	240	Data Source:	NDSWC

Completion Info: Holeplug

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-7	CLAY	Clay, silty, yellow, oxidized
7-32	CLAY	Clay, silty, sandy, pebbly, yellow, oxidized
32-62	CLAY	Clay, silty, sandy, pebbbly, gray, reduced
62-76	CLAY	Clay, silty, gray
76-86	INTERBEDDED	Interbedded clay through gravel
86-92	CLAY	Clay, silty, sandy, gray
92-109	CLAY	Clay, silty, gray
109-123	CLAY	Clay, silty, sandy, gray
123-141	INTERBEDDED	Interbedded clay through gravel
141-146	CLAY	Clay, silty, sandy, gray
146-148	SAND	Sand
148-156	CLAY	Clay, silty, sandy, gray
156-158	SAND	Sand
158-167	CLAY	Clay, silty, sandy, gray
167-176	CLAY	Clay, sandy, gray
176-186	CLAY	Clay, sandy, pebbly, gray
186-196	CLAY	Clay, silty, sandy, gray
196-198	SAND	Sand
198-206	CLAY	Clay, silty, sandy, gray
206-209	CLAY	Clay, silty, sandy, pebbly, gray
209-240	CLAYSTONE	Clay, silty, black (bedrock)

130-051-20DDB
Don and Ken Haase

Date Completed:	12/27/1999	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - PVC
Depth Drilled (ft):	120	Aquifer:	Undefined
Screen Int. (ft.):	110-120	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	black
1-40	CLAY	
40-90	CLAY	with fine sand lenses
90-100	SILT	silt sand lenses
100-110		start of something mixed
110-120	SAND	good, coarse

130-051-22CBC
NDSWC 15301

Date Completed:	08/16/2005	Purpose:	Observation Well
L.S. Elevation (ft):	1150	Well Type:	2 in. - PVC
Depth Drilled (ft):	220	Aquifer:	Brightwood
Screen Int. (ft.):	145-150	Data Source:	NDSWC

Completion Info: 147 ft 2 inch PVC, 5 ft No. 18 screen, sandpack, grout

Remarks: North Well

Lithologic Log

Depth (ft)	Unit	Description
0-7	CLAY	Clay, silty, yellow, oxidized
7-27	CLAY	Clay, silty, sandy, pebbly, yellow, oxidized
27-34	CLAY	Clay, silty, sandy, yellow, oxidized
34-38	SAND	Sand, fine to coarse, oxidized
38-43	CLAY	Clay, silty, sandy, gray, reduced
43-58	SAND & GRAVEL	Sand, fine to coarse, gravelly, fine and medium; detrital coal
58-76	CLAY	Clay, silty, sandy, grey
76-87	SAND & GRAVEL	Sand, fine to coarse, gravelly, fine and medium; layers predominantly shale, detrital coal
87-120	SAND & GRAVEL	Sand, fine to coarse, gravelly
120-142	CLAY	Clay, silty, very sandy, black
142-188	SAND & GRAVEL	Sand, fine to coarse, gravelly; detrital coal
188-190	CLAY	Clay, silty, sandy, pebbly, gray
190-191	COBBLES	Cobbles
191-208	CLAY	Clay, silty, sandy, pebbly, gray
208-220	CLAYSTONE	Clay, black (bedrock)

130-051-22CBC2
NDSWC 15301B

Date Completed:	08/16/2005	Purpose:	Observation Well
L.S. Elevation (ft):	1150	Well Type:	2 in. - PVC
Depth Drilled (ft):	120	Aquifer:	Brightwood
Screen Int. (ft.):	78-83	Data Source:	

Completion Info: 80 ft 2 inch PVC, 5 ft No. 18 screen, collapse, holeplug

Remarks: South Well

Lithologic Log

Depth (ft)	Unit	Description
0-27	CLAY	Clay, silty, sandy, yellow, oxidized
27-33	CLAY	Clay, silty, yellow, oxidized
33-40	SAND	Sand, fine to coarse, oxidized
40-52	CLAY	Clay, silty, gray, reduced
52-66	SAND	Sand, fine to coarse; detrital coal
66-80	SAND & GRAVEL	Interbedded sand, fine to coarse, gravel, fine to coarse; detrital coal
80-89	SAND	Sand, fine to coarse, gravelly
89-114	INTERBEDDED	Interbedded clay through gravel
114-120	SAND	Sand, fine to coarse

130-051-24BBD
Kenneth Roeder

Date Completed:	01/04/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	1145	Well Type:	4 in. - PVC
Depth Drilled (ft):	165	Aquifer:	Undefined
Screen Int. (ft.):	157-163	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-23	CLAY	yellow
23-95	SHALE	
95-102	SAND	
102-152	SHALE	
152-165	SAND	

130-051-25BBB
NDSWC 13418

Date Completed:	09/15/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1142	Well Type:	2 in. - PVC
Depth Drilled (ft):	280	Aquifer:	Brightwood
Screen Int. (ft.):	158-163	Data Source:	NDSWC

Completion Info: 160 ft 2 in PVC; 5 ft #18 PVC screen; collapse, holeplug; PC

Remarks: End of tree row; 100 ft east of road

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, loam, black.
2-24	CLAY	Clay, silty, sandy, pebbly, light olive brown (5Y 5/6), slightly firm, slightly sticky, slightly plastic, oxidized.
24-64	CLAY	Clay, silty, sandy, pebbly, olive gray (5Y 3/2), slightly firm, slightly sticky, slightly plastic, reduced.
64-92	CLAY	Clay, slightly silty, olive gray, soft, sticky, plastic; oxidized, light olive brown return from 79 to 80 ft.
92-110	SAND	Sand, fine and medium; poor return.
110-122	SILT	Silt, clayey, olive gray, soft, slightly sticky, slightly plastic.
122-130	INTERBEDDED	Interbedded silt and sand, less than 1 ft beds.
130-154	SAND	Sand, fine to coarse; coarser with depth.
154-203	GRAVEL	Gravel, fine to coarse, mixed mineralogy, subrounded and rounded; coarser with depth; medium gravel by 194 ft; coarse gravel by 196 ft.
203-210	INTERBEDDED	Interbedded clay and sand, less than 1 ft beds.
210-228	CLAY	Clay, silty, sandy, pebbly, olive gray, soft, slightly sticky, slightly plastic; rocks at 214 and 216 ft; firm, light olive gray from 222 to 228 ft.
228-262	CLAY	Clay, light olive gray to olive gray, firm, sticky, plastic.
262-280	SHALE	Clay, slightly silty, brownish black (5YR 2/1), soft, sticky, slightly plastic, calcareous; indurated at 276 ft (Shale)

130-051-25CAC
Gerhard Frittin

Date Completed:	03/10/1982	Purpose:	Domestic Well
L.S. Elevation (ft):	1165	Well Type:	4 in. - PVC
Depth Drilled (ft):	108	Aquifer:	Undefined
Screen Int. (ft.):	98-108	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Black.
1-30	CLAY	Clay, yellow.
30-60	CLAY	Clay, blue.
60-108	GRAVEL	Gravel, interbedded clay from 70 to 90 feet; coarse from 90 to 108 feet.

130-051-25CDB
Gerhard Tritten

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	1160	Well Type:	2 in. - Steel
Depth Drilled (ft):	0	Aquifer:	Brightwood
Screen Int. (ft.):	0-74	Data Source:	

Completion Info:

Remarks: WQ; GW 7

Lithologic Log

Depth (ft)	Unit	Description

130-051-26BAC
Richard Gully

Date Completed:	09/21/1982	Purpose:	Domestic Well
L.S. Elevation (ft):	1143	Well Type:	4 in. - PVC
Depth Drilled (ft):	166	Aquifer:	Undefined
Screen Int. (ft.):	156-166	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	FILL	
2-40	CLAY	yellow
40-60	SAND & GRAVEL	mixed with clay layers
60-90	CLAY	blue, soft
90-120	SAND	fine
120-140	SAND	medium sand-clay layers
140-166	GRAVEL	clean, uniform

130-051-27CAB
Lawrence Stroehl

Date Completed:	06/10/1982	Purpose:	Domestic Well
L.S. Elevation (ft):	1175	Well Type:	4 in. - PVC
Depth Drilled (ft):	100	Aquifer:	Undefined
Screen Int. (ft.):	90-100	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Black.
2-40	CLAY	Clay, yellow.
40-60	GRAVEL	Gravel; interbedded clay.
60-70	SAND	Sand, fine.
70-90	SAND	Sand, medium.
90-100	GRAVEL	Gravel, coarse.

130-051-28DDC
NDSWC 13417

Date Completed:	09/14/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1167	Well Type:	2 in. - PVC
Depth Drilled (ft):	250	Aquifer:	Brightwood
Screen Int. (ft.):	98-103	Data Source:	NDSWC

Completion Info: 100 ft 2 in PVC; 5 ft #18 PVC screen; collapse; boleplug; PC

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, loam, black.
2-20	CLAY	Clay, silty, sandy, pebbly, light olive brown (5Y 5/6), slightly firm, sticky, slightly plastic, oxidized.
20-45	CLAY	Clay, silty, sandy, pebbly, light olive gray (5Y 5/2), slightly firm, sticky, slightly plastic, partially reduced.
45-57	CLAY	Clay, silty, olive gray (5Y 3/2), firm, sticky, plastic, reduced.
57-65	SAND	Sand, fine to coarse, pebbly, fine, predominantly shale.
65-67	CLAY	Clay; no return.
67-73	SAND	Sand, fine and medium.
73-77	INTERBEDDED	Interbedded clay and sand, less than 1 ft beds.
77-97	SAND	Sand, fine and medium, mixed mineralogy.
97-100	GRAVEL	Gravel, fine and medium, mixed mineralogy, subangular to rounded.
100-140	SAND & GRAVEL	Sand, coarse, pebbly fine, mixed mineralogy, subangular to rounded.
140-150	CLAY	Clay, olive gray; poor return.
150-164	INTERBEDDED	Interbedded clay and sand, less than 1 ft beds.
164-190	TILL	Clay, silty, sandy, pebbly, olive gray, slightly firm, slightly sticky, slightly plastic; rock at 187 ft (Till).
190-223	INTERBEDDED	Interbedded clay, sand, and gravel, less than 1 ft beds; rock at 210 ft.
223-229	SAND	Sand, very clayey, olive black (5Y 2/1), soft, nonsticky, plastic (possibly reworked shale).
229-250	SHALE	Clay, olive black, firm, slightly sticky, plastic, noncalcareous, waxy appearance (Shale).

130-051-30CBC
Wally Haase

Date Completed:	11/21/1997	Purpose:	Domestic Well - Plugged
L.S. Elevation (ft):	N/A	Well Type:	4 in. - PVC
Depth Drilled (ft):	116	Aquifer:	Undefined
Screen Int. (ft.):	106-116	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	sod
1-10	CLAY	yellow
10-20	CLAY	yellow
20-40	CLAY	dark
40-60	CLAY	light blue
60-70	SAND	sand lenses and clay
70-80	CLAY	soft, blue
80-100	SAND	fine water sand
100-116	SAND	nice water-bearing sand

130-051-31ACA
Walter Haase

Date Completed:	04/21/1988	Purpose:	Domestic Well
L.S. Elevation (ft):	1180	Well Type:	2 in. - PVC
Depth Drilled (ft):	128	Aquifer:	Undefined
Screen Int. (ft.):	119-124	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Black.
1-64	CLAY	Clay, yellow.
64-72	TILL	Till.
72-95	CLAY	Clay, blue.
95-126	SAND	Sand, fine.
126-128	CLAY	Clay, blue.

130-051-32BBC
Kenneth Clark

Date Completed:	07/01/1981	Purpose:	Domestic Well
L.S. Elevation (ft):	1192	Well Type:	4 in. - PVC
Depth Drilled (ft):	160	Aquifer:	Undefined
Screen Int. (ft.):	150-160	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-40	CLAY	yellow
40-70	CLAY	hard
70-90	CLAY	soft
90-120	CLAY	strips clay and gravel
120-140	SAND	fine
140-160	SAND	course

130-051-34DDA
Ken Hasse

Date Completed:	05/16/1988	Purpose:	Domestic Well
L.S. Elevation (ft):	1170	Well Type:	4 in. - PVC
Depth Drilled (ft):	148	Aquifer:	Undefined
Screen Int. (ft.):	138-148	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil
2-45	CLAY	Clay, yellow.
45-106	CLAY	Clay, blue, soft.
106-129	SAND	Sand; interbedded blue clay.
129-140	CLAY	Clay, pebbly, blue; contains cobbles.
140-148	SAND	Sand, gray.

130-051-35CCB
NDSWC 13039

Date Completed:	08/19/1992	Purpose:	Observation Well
L.S. Elevation (ft):	1149	Well Type:	2 in. - PVC
Depth Drilled (ft):	270	Aquifer:	Brightwood
Screen Int. (ft.):	79-84	Data Source:	

Completion Info:

Remarks: 100ft EAST OF ROAD

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, black.
2-30	TILL	Clay, silty, slightly sandy, pebbly, shale, light olive-brown, slightly firm, oxidized (Till).
30-33	TILL	Clay, silty, slightly sandy, pebbly, shale, olive-gray, slightly firm, unoxidized (Till).
33-36	GRAVEL	Gravel, fine, predominantly shale, sandy.
36-62	TILL	Clay, silty, sandy, pebbly, olive-gray, slightly firm; interbedded gravel, less than 1 foot thick, from 55 to 62 feet (Till).
62-111	SAND	Sand, fine to coarse, pebbly, granular and fine, angualr to sub-rounded, medium sorted, carbonate, igneous, shale; interbedded clay from 67 to 72 feet, some interbedded silt from 82 to 100 feet.
111-122	TILL	Clay, silty, sandy, pebbly, olive-gray, soft (Till).
122-137	SILT	Silt, clayey, sandy, very fine, medium dark gray, soft.
137-156	GRAVEL	Gravel, granular and fine, shale; some interbedded clay and silt; lignite return at 149 feet.
156-167	SILT	Silt, clayey, sandy, very fine, medium dark gray, soft.
167-255	TILL	Clay, silty, sandy, pebbly, olive-gray, firm; cobbles from 183 to 184 feet; very firm, grayish-olive from 196 to 198 feet; cobbles at 225 feet; interbedded gravel and cobbles from 247 to 255 feet (Till).
255-270	SHALE	Shale, olive-black, firm; some light olive-gray return at 255 feet.

130-051-35D
City of Lidgerwood

Date Completed:	10/30/1983	Purpose:	Test Well
L.S. Elevation (ft):	1165	Well Type:	4 in. - PVC
Depth Drilled (ft):	170	Aquifer:	Undefined
Screen Int. (ft.):	130-148	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	sod, black
2-20	CLAY	yellow
20-30	CLAY	yellow
30-55	CLAY	blue-gray
55-90	SAND	yellow
90-100	SAND	good water sand, medium
100-120	SAND	good water sand, medium
120-140	SAND	025-030 slot water sand
140-150	SAND	nice water sand
150-160	SAND	fine water sand, gray
160-170	SAND	fine water sand

131-049-02AAA
Allen Berndt

Date Completed: 08/29/1973
L.S. Elevation (ft): 965
Depth Drilled (ft): 90
Screen Int. (ft.): 79-85

Purpose: Domestic Well
Well Type: 4 in. - Steel
Aquifer: Undefined
Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-21	CLAY	yellow
21-44	SHALE	soft
44-72	SAND	
72-86	SAND	fine
86-90	SHALE	

131-049-03DCD
LAARRY GEHLER

Date Completed: 08/11/1985
L.S. Elevation (ft): 971
Depth Drilled (ft): 185
Screen Int. (ft.): 174-180

Purpose: Domestic Well
Well Type: 3 in. - Stainless Steel
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-15	CLAY	Clay, yellow.
15-165	CLAY	Clay, soft; interbedded sand from 110 to 130 feet.
165-185	SAND	Sand.

131-049-04DDD
Luther Baumen

Date Completed: 05/06/1986
L.S. Elevation (ft): 973
Depth Drilled (ft): 150
Screen Int. (ft.): 140-150

Purpose: Domestic Well
Well Type: 4 in. - PVC
Aquifer: Undefined
Data Source: Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-10	CLAY	yellow, soft
10-88	CLAY	blue
88-136	CLAY	very hard, blue, mixed gravel
136-140	SAND	fine, grey
140-150	SAND	fine, clean

131-049-05BBB
VIRGIL PAUSCH

Date Completed: 01/01/1959
L.S. Elevation (ft): 976
Depth Drilled (ft): 0
Screen Int. (ft.): 0-126

Purpose: Domestic Well
Well Type: 2 in. - Steel
Aquifer: Colfax
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description

131-049-05DB
Craig and Vengel Pauch

Date Completed:	09/20/1986	Purpose:	Stock Well - Plugged
L.S. Elevation (ft):	N/A	Well Type:	2 in. - Steel
Depth Drilled (ft):	134	Aquifer:	Undefined
Screen Int. (ft.):	121-134	Data Source:	Frank's Well Service

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-70	CLAY	
70-121	SAND	hard, coarse
121-134	SAND	medium

131-049-06AAB
MRS HERB HOEFT

Date Completed:	08/04/1981	Purpose:	Domestic Well
L.S. Elevation (ft):	978	Well Type:	3 in. - Stainless Steel
Depth Drilled (ft):	235	Aquifer:	Dakota Group
Screen Int. (ft.):	226-232	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-15	CLAY	Clay, yellow.
15-222	CLAY	Clay.
222-233	SAND	Sand.
233-235	CLAY	Clay.

131-049-06CDD
MELVIN WEFEL

Date Completed:	08/10/1973	Purpose:	Domestic Well
L.S. Elevation (ft):	979	Well Type:	3 in. - Stainless Steel
Depth Drilled (ft):	135	Aquifer:	Colfax
Screen Int. (ft.):	124-130	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-16	CLAY	Clay, yellow.
16-121	CLAY	Clay; sand from 118 to 120 feet.
121-133	SAND	Sand.
133-135	CLAY	Clay.

131-049-07DCC
Doug Puetz

Date Completed:	11/20/1990	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - PVC
Depth Drilled (ft):	134	Aquifer:	Undefined
Screen Int. (ft.):	127-131	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-18	CLAY	yellow
18-95	SHALE	
95-115	SAND	muddy
115-122	SHALE	
122-134	SAND	

131-049-08CDC
Harold Fenske

Date Completed: 07/28/1975
L.S. Elevation (ft): 979
Depth Drilled (ft): 105
Screen Int. (ft.): 92-98

Purpose: Domestic Well
Well Type: 4 in. - Steel
Aquifer: Undefined
Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-18	CLAY	yellow
18-75	SHALE	soft
75-80	SHALE	hard
80-98	SAND	
98-105	SHALE	

131-049-10CDD
NDSWC 13036

Date Completed: 08/13/1992
L.S. Elevation (ft): 974
Depth Drilled (ft): 220
Screen Int. (ft.): 178-183

Purpose: Observation Well
Well Type: 2 in. - PVC
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: MAP ON BACK

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, black.
1-28	CLAY	Clay, light olive-brown, soft, plastic, oxidized (lacustrine).
28-42	CLAY	Clay, olive-gray, soft, plastic (Lacustrine).
42-85	TILL	Clay, silty, sandy, pebbly, olive-gray, soft (Till)
85-163	TILL	Clay, silty, very sandy, pebbly, medium dark gray, slightly firm; cobbles from 144 to 145 feet, olive-gray from 145 to 163 feet; interbedded sand and gravel from 145 to 154 feet (Till).
163-195	GRAVEL	Gravel, fine and medium, sandy, coarse, angular to rounded, igneous, carbonate, shale.
195-220	SHALE	Shale, dark gray, soft; firm by 220 feet.

131-049-10DDA
MARVIN HOEFT

Date Completed: 12/12/1978
L.S. Elevation (ft): 972
Depth Drilled (ft): 240
Screen Int. (ft.): 232-238

Purpose: Domestic Well
Well Type: 3 in. - Stainless Steel
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-22	CLAY	Clay, yellow.
22-75	CLAY	Clay, soft.
75-80	CLAY	Clay, hard.
80-89	SAND	Sand.
89-102	CLAY	Clay.
102-104	SAND	Sand.
104-195	CLAY	Clay.
195-240	SAND	Sand.

131-049-13BCA
John Thiele

Date Completed: 09/24/1978
L.S. Elevation (ft): 965
Depth Drilled (ft): 125
Screen Int. (ft.): 113-123

Purpose: Domestic Well
Well Type: 4 in. - PVC
Aquifer: Undefined
Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-18	CLAY	yellow
18-75	SHALE	soft
75-105	SHALE	hard
105-125	SAND	

131-049-14ADD
ERNEST STOLTNOW

Date Completed:	06/19/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	967	Well Type:	3 in. - Stainless Steel
Depth Drilled (ft):	85	Aquifer:	Undefined
Screen Int. (ft.):	76-82	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-15	CLAY	Clay, yellow.
15-62	CLAY	Clay, blue.
62-82	SAND	Sand.
82-85	CLAY	Clay.

131-049-14CBD
EVERETT THIELE

Date Completed:	11/15/1974	Purpose:	Domestic Well
L.S. Elevation (ft):	973	Well Type:	1.25 in. - PVC
Depth Drilled (ft):	142	Aquifer:	Undefined
Screen Int. (ft.):	134-142	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, black.
2-30	CLAY	Clay, yellow.
30-90	CLAY	Clay, blue.
90-100	CLAY	Clay, hard, contains cobbles.
100-120	SAND	Sand, fine, gray.
120-130	SAND	Sand, interbedded clay.
130-142	SAND	Sand, coarse.

131-049-14CCD
Wahpeton School Post

Date Completed:	02/25/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	973	Well Type:	4 in. - Steel
Depth Drilled (ft):	165	Aquifer:	Undefined
Screen Int. (ft.):	149-155	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-15	CLAY	yellow
15-147	SHALE	
147-165	SAND	

131-049-15DDB
MANVILLE STOTENOW

Date Completed:	06/19/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	975	Well Type:	3 in. - Stainless Steel
Depth Drilled (ft):	150	Aquifer:	Undefined
Screen Int. (ft.):	142-148	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-15	CLAY	Clay, yellow.
15-126	CLAY	Clay.
126-132	SAND	Sand.
132-135	CLAY	Clay.
135-150	SAND	Sand.

131-049-18CCC
RALPH BLADON

Date Completed: 08/28/1972
L.S. Elevation (ft): 992
Depth Drilled (ft): 265
Screen Int. (ft.): 256-262

Purpose: Domestic Well
Well Type: 3 in. - Stainless Steel
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-15	CLAY	Clay, yellow.
15-90	CLAY	Clay.
90-110	SAND	Sand.
110-242	CLAY	Clay; interbedded sand from 200 to 242 feet.
242-265	SAND	Sand.

131-049-19BBB
GEORGE PROCHNOW

Date Completed: 00/00/00
L.S. Elevation (ft): N/A
Depth Drilled (ft): 0
Screen Int. (ft.): 0-118

Purpose: Domestic Well
Well Type: 2 in. - Unknown
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description

131-049-19BBB2
NDSWC 12202

Date Completed: 09/21/1988
L.S. Elevation (ft): 993
Depth Drilled (ft): 320

Purpose: Test Hole

Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil.
2-18	CLAY	Clay, slightly silty, yellow, soft, plastic, oxidized (lacustrine).
18-34	CLAY	Clay, slightly silty, gray, soft, plastic; interbedded silt at 30 feet (lacustrine).
34-57	TILL	Clay, very silty, sandy, pebbly, gray, soft, plastic; gravel from 56 to 57 feet (till).
57-63	CLAY	Clay, silty, gray, firm, slightly plastic; very pebbly from 57 to 58 feet.
63-70	CLAY	Clay, silty to pebbly, gray, firm; interbedded sand from 67 to 70 feet.
70-92	SAND & GRAVEL	Sand, medium to very coarse, pebbly, poorly sorted, subrounded and rounded, quartz, igneous and limestone.
92-155	CLAY	Clay, very silty, gray, soft, slightly plastic; interbedded silt (lacustrine).
155-158	SILT	Silt, gray (lacustrine).
158-178	CLAY	Clay, very silty, gray, soft, slightly plastic; interbedded very fine sand and detrital lignite (lacustrine).
178-200	SAND	Sand, very fine; interbedded silt and clay.
200-223	SILT	Silt, clayey; interbedded detrital lignite from 214 to 215 feet.
223-260	SAND	Sand, very fine and fine, clayey, gray.
260-280	SAND	Sand, fine to very coarse, clayey, poorly sorted, subrounded and rounded.
280-285	CLAY	Clay.
285-320	SHALE	Shale, slightly silty, dark gray to black, firm, lamination.

131-049-19BBB3
NDSWC 12202B

Date Completed: 09/21/1988
L.S. Elevation (ft): 993
Depth Drilled (ft): 100
Screen Int. (ft.): 87-92

Purpose: Observation Well
Well Type: 2 in. - PVC
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: Adj Elev

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil.
2-18	CLAY	Clay, slightly silty, yellow, soft, plastic, oxidized (lacustrine).
18-35	CLAY	Clay, silty, gray, soft, plastic (lacustrine).
35-55	TILL	Clay, very silty, sandy, pebbly, olive-gray, soft, plastic; gravel from 54 to 55 feet (till).
55-58	TILL	Clay, silty to pebbly, dark olive-gray, firm, slightly plastic (till).
58-62	CLAY	Clay, silty, gray, soft, plastic; cobbles from 61 to 62 feet (lacustrine).
62-67	TILL	Clay, very silty, slightly pebbly, gray, soft (till).
67-92	SAND & GRAVEL	Sand, coarse and very coarse, pebbly, poorly sorted, subrounded and rounded; gravel from 91 to 92 feet.
92-100	CLAY	Clay, silty, gray, soft, slightly plastic.

131-049-20DB
Delmer Witt

Date Completed:	06/23/1988	Purpose:	Stock Well - Plugged
L.S. Elevation (ft):	N/A	Well Type:	2 in. - PVC
Depth Drilled (ft):	60	Aquifer:	Undefined
Screen Int. (ft.):	52-60	Data Source:	Frank's Well Service

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-60	CLAY	clay-sand

131-049-22DA'B
Melvin Fenske

Date Completed:	09/01/1972	Purpose:	Domestic Well
L.S. Elevation (ft):	975	Well Type.	4 in. - Steel
Depth Drilled (ft):	132	Aquifer:	Undefined
Screen Int. (ft.):	126-132	Data Source	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-12	CLAY	yellow
12-90	SHALE	
90-124	SHALE	with sand
124-132	SAND	

131-049-23CCC
Larae Fenske

Date Completed:	01/01/1993	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. - PVC
Depth Drilled (ft):	135	Aquifer:	Undefined
Screen Int. (ft.):	128-135	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
1-15	SOIL	light, soft
15-40	CLAY	yellow
40-60	CLAY	gray
60-90	CLAY	blue
90-100	GRAVEL	gravel strips
100-125	SAND	fine
125-135	SAND	water bearing sand, fairly good

131-049-24AAA
NDSWC 12211

Date Completed:	10/06/1988	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	969	Well Type:	2 in. - PVC
Depth Drilled (ft):	280	Aquifer:	Undefined
Screen Int. (ft.):	258-263	Data Source:	

Completion Info:

Remarks: Plugged 8/92; Cutoff; Flowed; WL above L S Elev

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-24	CLAY	Clay, slightly silty, soft, plastic, oxidized (lacustrine).
24-57	TILL	Clay, very silty, sandy, pebbly, olive-gray, soft, plastic; gravel from 56 to 57 feet (till).
57-66	TILL	Clay, silty, sandy, pebbly, light olive-gray, firm, slightly plastic (till).
66-82	SAND	Sand, very fine and fine, well sorted, subrounded and rounded.
82-90	CLAY	Clay, very silty, gray, soft.
90-91	GRAVEL	Gravel.
91-96	TILL	Clay, gray (till).
96-134	SAND	Sand, very fine and fine, well sorted, subrounded and rounded; clay from 105 to 107 feet; interbedded clay from 116 to 118 feet.
134-160	SAND	Sand, coarse and very coarse, granular, medium sorted, subrounded and rounded, quartz, carbonate, igneous, shale and detrital lignite.
160-220	GRAVEL	Gravel, fine, sandy, subangular to rounded; interbedded coarse gravel.
220-271	GRAVEL	Gravel, fine to coarse, subrounded and rounded, quartz, igneous, carbonate and shale; interbedded.
271-280	SHALE	Shale, slightly silty, brownish-black, firm; lamination.

131-049-31CBC
ELMER BLADON

Date Completed: 09/30/1974
L.S. Elevation (ft): 1018
Depth Drilled (ft): 180
Screen Int. (ft.): 169-175

Purpose: Domestic Well
Well Type: 3 in. - Stainless Steel
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-8	CLAY	Clay, yellow.
8-30	SAND	Sand.
30-164	CLAY	Clay.
164-175	SAND	Sand.
175-180	CLAY	Clay.

131-049-34ABA
RUEBEN BLADOW

Date Completed: 0/0
L.S. Elevation (ft): 979
Depth Drilled (ft): 0
Screen Int. (ft.): 0-120

Purpose: Domestic Well
Well Type: 2 in. - Steel
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description

131-049-36DAA
DARREL STOLTENOW

Date Completed: 11/25/1990
L.S. Elevation (ft): 974
Depth Drilled (ft): 100
Screen Int. (ft.): 90-94

Purpose: Domestic Well
Well Type: 3 in. - Stainless Steel
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-15	CLAY	Clay, yellow.
15-85	CLAY	Clay.
85-97	SAND	Sand.
97-100	CLAY	Clay.

131-050-03BAA
Arnold Foersch

Date Completed: 08/25/1992
L.S. Elevation (ft): N/A
Depth Drilled (ft): 175
Screen Int. (ft.): 165-175

Purpose: Domestic Well
Well Type: 4 in. - PVC
Aquifer: Undefined
Data Source: Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	black
2-5	CLAY	yellow
5-40	SILT	yellowish, soft
40-80	CLAY	blue
80-145	CLAY	some fine sand strips
145-165	SAND	fine, dirty
165-175	SAND	good water sand

131-050-04AAD
Lawrence Mauch

Date Completed:	11/02/1974	Purpose:	Domestic Well
L.S. Elevation (ft):	1004	Well Type:	0 in. - PVC
Depth Drilled (ft):	179	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	Frank's Well Service

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-30	CLAY	yellow
30-155	CLAY	blue
155-173	ROCK	some sand
173-179	SAND	fine

131-050-05ADD
Victor Foyar

Date Completed:	05/11/1985	Purpose:	Stock Well - Plugged
L.S. Elevation (ft):	1013	Well Type:	2 in. - Steel
Depth Drilled (ft):	180	Aquifer:	Undefined
Screen Int. (ft.):	174-180	Data Source:	Frank's Well Service

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-25	CLAY	yellow
25-174	CLAY	blue
174-180	SAND	

131-050-07AC
Frank Fetters

Date Completed:	10/01/1972	Purpose:	Stock Well - Plugged
L.S. Elevation (ft):	1032	Well Type:	2 in. - Steel
Depth Drilled (ft):	158	Aquifer:	Undefined
Screen Int. (ft.):	150-158	Data Source:	Frank's Well Service

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-70	CLAY	topsoil and clay
70-130	SAND	very fine
130-150	ROCK	many rocks

131-050-08BBC
Herb Rickard

Date Completed:	05/11/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	1028	Well Type:	4 in. - Steel
Depth Drilled (ft):	120	Aquifer:	Undefined
Screen Int. (ft.):	111-115	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-22	CLAY	yellow
22-111	SHALE	
111-115	SAND	
115-120	SHALE	

131-050-09DCD
Duane Haus

Date Completed: 11/25/1990
L.S. Elevation (ft): 1010
Depth Drilled (ft): 160
Screen Int. (ft.): 145-155

Purpose: Domestic Well
Well Type: 4 in. - PVC
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, black.
2-33	CLAY	Clay, yellow.
33-134	CLAY	Clay, blue.
134-155	SAND	Sand.
155-160	CLAY	Clay, blue.

131-050-09DDD
Jentz Brothers

Date Completed: 07/21/1982
L.S. Elevation (ft): 1005
Depth Drilled (ft): 128
Screen Int. (ft.): 118-124

Purpose: Domestic Well
Well Type: 4 in. - PVC
Aquifer: Undefined
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-15	CLAY	Clay, yellow.
15-118	CLAY	Clay.
118-124	SAND	Sand.
124-128	CLAY	Clay.

131-050-11CAA
Arlain Schultz

Date Completed: 07/21/1976
L.S. Elevation (ft): 994
Depth Drilled (ft): 330
Screen Int. (ft.): 304-310

Purpose: Domestic Well
Well Type: 4 in. - Steel
Aquifer: Undefined
Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-18	CLAY	yellow
18-288	SHALE	
288-330	SAND	

131-050-12BBB
NDSWC 13045

Date Completed: 08/25/1992
L.S. Elevation (ft): 993
Depth Drilled (ft): 220

Purpose: Test Hole
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, black.
2-29	CLAY	Clay, light olive-brown, soft, slightly sticky, plastic, oxidized (Lacustrine).
29-69	CLAY	Clay, olive-gray, soft, slightly sticky, plastic, unoxidized (Lacustrine)
69-84	TILL	Clay, silty, sandy, pebbly, olive-gray, soft (Till).
84-94	CLAY	Clay, silty, olive-gray, soft.
94-107	SAND	Sand, very fine, well sorted.
107-111	SAND	Sand, very fine, olive-gray; interbedded clay and silt.
111-120	TILL	Clay, silty, sandy, pebbly, olive-gray; interbedded gravel (Till)
120-146	TILL	Clay, silty, sandy, pebbly, olive-black, firm; interbedded sand and gravel from 134 to 143 feet (Till).
146-149	SAND & GRAVEL	Sand, pebbly, fine.
149-179	TILL	Clay, silty, sandy, pebbly, firm; cobbles from 152 to 153 feet (Till).
179-220	SHALE	Shale, olive-black, firm; very fine white crystalline material; few very fine pyrite crystals; waxy appearance.

131-050-12DDC
Wayne & Jim Mauch

Date Completed:	06/05/1979	Purpose:	Domestic Well
L.S. Elevation (ft):	991	Well Type:	4 in. - PVC
Depth Drilled (ft):	265	Aquifer:	Undefined
Screen Int. (ft.):	246-258	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-15	CLAY	Clay, yellow.
15-105	CLAY	Clay, soft.
105-138	CLAY	Clay, hard.
138-148	SAND	Sand, coarse.
148-185	CLAY	Clay.
185-260	SAND	Sand, fine.
260-265	CLAY	Clay.

131-050-14ACD
Paul Krump

Date Completed:	12/12/1989	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - PVC
Depth Drilled (ft):	176	Aquifer:	Undefined
Screen Int. (ft.):	166-176	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-83	CLAY	small rocks and gravel strips and clay
83-132	CLAY	soft, blue
132-150	SAND	fine, grey, .008
150-176	SAND	very clean, grey, nice, .05

131-050-17ADB
City of Mantador

Date Completed:	08/22/1974	Purpose:	Municipal Well
L.S. Elevation (ft):	1023	Well Type:	4 in. - Steel
Depth Drilled (ft):	150	Aquifer:	Undefined
Screen Int. (ft.):	142-150	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-18	CLAY	Clay, yellow.
18-112	CLAY	Clay, gray.
112-117	GRAVEL	Gravel.
117-133	TILL	Till; contains cobbles.
133-150	GRAVEL	Gravel.

131-050-19BAA
NDSWC 13043

Date Completed:	08/20/1992	Purpose:	Test Hole
L.S. Elevation (ft):	1040		
Depth Drilled (ft):	400	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, black.
1-9	CLAY	Clay, silty, sandy, light olive-brown, soft, oxidized.
9-18	SAND	Sand, fine, well sorted, oxidized.
18-21	SAND	Sand, very fine and fine, well sorted, unoxidized.
21-93	SILT	Silt, clayey, very sandy, very fine, olive-gray, soft; very clayey, slightly sandy at 40 feet, interbedded clay and very fine sand from 60 to 80 feet.
93-101	CLAY	Clay, olive-gray, slightly firm, non-sticky, non-plastic; very fine laminations at 100 feet.
101-106	TILL	Clay, silty, sandy, pebbly, olive-gray (Till).
106-111	GRAVEL	Gravel, sandy.
111-153	TILL	Clay, silty, sandy, pebbly, olive-gray, slightly firm; very sandy from 123 to 128 feet; cobbles at 142 and 152 feet (Till).
153-155	CLAY	Clay, very silty, slightly sandy, very fine, olive-gray, soft.
155-158	TILL	Clay, silty, very sandy, pebbly, olive-gray, very firm (Till).
158-160	CLAY	Clay, silty, very sandy, very fine, olive-gray, soft.
160-166	SAND	Sand, no return.
166-180	TILL	Clay, silty, very sandy, pebbly, olive-gray, firm; numerous cobbles (Till).
180-186	CLAY	Clay, olive-gray, slightly firm, slightly sticky, non-plastic.
186-385	TILL	Clay, silty, sandy, pebbly, olive-gray, firm; very sandy with interbedded shale gravel from 267 to 337 feet; cobbles and very pebbly from 337 to 340 feet; numerous large cobbles from 355 to 385 feet (Till).
385-400	SHALE	Shale, dusky brown at top, olive-black to light brownish-gray with depth, slighty firm.

131-050-20ACB
Harry Pellman

Date Completed: 05/20/1982
L.S. Elevation (ft): N/A
Depth Drilled (ft): 50
Screen Int. (ft.): 0-50

Purpose: Domestic Well
Well Type: 4 in. - Steel
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: 8730 163rd 1/2 AV. SE
MANTADOR
242-7916

Lithologic Log

Depth (ft)	Unit	Description

131-050-20CCC
Dan and Tim Pellman

Date Completed: 07/01/1999
L.S. Elevation (ft): 1050
Depth Drilled (ft): 139
Screen Int. (ft.): 120-139

Purpose: Irrigation Well
Well Type: 12 in. - PVC
Aquifer: Undefined
Data Source: Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-15	SAND	yellow
15-47	SAND	course, gray, gwl
47-64	SAND	with clay strips
64-80	SAND	clean, fine
80-100	SAND	clean, gwl
100-120	SAND	nice, course, gray, .020
120-130	ROCK	course, much bentonite

131-050-20DAC
Ronald Hohenstern

Date Completed: 00/00/00
L.S. Elevation (ft): N/A
Depth Drilled (ft): 45
Screen Int. (ft.): 0-45

Purpose: Domestic Well
Well Type: 4 in. - Steel
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: 8770 163 1/2 Ave
Hankinson N.D. 58041
701-640-1119

Lithologic Log

Depth (ft)	Unit	Description

131-050-21BAC
Ervin and Mariem Falk

Date Completed: 09/20/1995
L.S. Elevation (ft): 1020
Depth Drilled (ft): 95
Screen Int. (ft.): 85-95

Purpose: Domestic Well
Well Type: 4 in. - PVC
Aquifer: Undefined
Data Source: Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-14	CLAY	yellow
14-50	SHALE	soft
50-60	SHALE	hard
60-65	ROCK	
65-75	SAND	muddy
75-95	SAND	

131-050-21BAD
Weber

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well west of the house

Lithologic Log

Depth (ft) Unit Description

131-050-21DAC
Otto Klawitter

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	1010	Well Type:	2 in. - Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-75	Data Source:	

Completion Info:

Remarks: WQ; GW 7

Lithologic Log

Depth (ft) Unit Description

131-050-21DAC2
Aaron & Barb Bladow

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well west of house
8765 165th Ave SE
Hankinson ND 58041
701-242-7106

Lithologic Log

Depth (ft) Unit Description

131-050-22CAA
Joe Mauch

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: 8753 167th Ave. SE
Hankinson ND 58041
701-242-7528

Lithologic Log

Depth (ft) Unit Description

131-050-22DDC
Clifford Krause

Date Completed:	11/15/1981	Purpose:	Domestic Well
L.S. Elevation (ft):	1002	Well Type:	4 in. - PVC
Depth Drilled (ft):	270	Aquifer:	Undefined
Screen Int. (ft.):	0-180	Data Source:	

Completion Info:

Remarks: Well north west of old house
16595 88th St SE
Hankinson ND 58041
701-242-7442

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil.
2-15	CLAY	Clay, yellow.
15-175	CLAY	Clay.
175-205	SAND	Sand.
205-270	CLAY	Clay.

131-050-23DAA
Alvin Krump

Date Completed:	08/08/1973	Purpose:	Domestic Well
L.S. Elevation (ft):	1002	Well Type:	4 in. - Steel
Depth Drilled (ft):	265	Aquifer:	Undefined
Screen Int. (ft.):	208-218	Data Source:	Falk Brothers

Completion Info:

Remarks: Well NW of house
8755 167th Ave S
Hankinson ND 58041
701-242-7335

Lithologic Log

Depth (ft)	Unit	Description
0-14	CLAY	yellow
14-186	SHALE	
186-220	SAND	
220-265	SHALE	with rocks and small sand lens

131-050-24CBC
Milton Bladow

Date Completed:	09/10/1985	Purpose:	Domestic Well
L.S. Elevation (ft):	1002	Well Type:	4 in. - PVC
Depth Drilled (ft):	135	Aquifer:	Undefined
Screen Int. (ft.):	127-133	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-18	CLAY	Clay, yellow.
18-72	CLAY	Clay.
72-75	SAND	Sand.
75-77	CLAY	Clay.
77-90	SAND	Sand.
90-92	CLAY	Clay.
92-106	SAND	Sand.
106-126	CLAY	Clay.
126-133	SAND	Sand.
133-135	CLAY	Clay.

131-050-25AAD
Dale Bladow

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well south of house

Lithologic Log

Depth (ft)	Unit	Description

131-050-25ADC
Dale Bladow

Date Completed:	06/20/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	1020	Well Type:	4 in. - PVC
Depth Drilled (ft):	180	Aquifer:	Undefined
Screen Int. (ft.):	174-180	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-15	CLAY	yellow
15-147	SHALE	
147-180	SAND	

131-050-25BAB
Leon Bladow

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well south east of house
16740 88th St. SE
Hankinson ND 58041
701-242-7225

Lithologic Log

Depth (ft)	Unit	Description

131-050-25BAC
Leon Bladow

Date Completed:	02/26/1982	Purpose:	Domestic Well
L.S. Elevation (ft):	1002	Well Type:	4 in. - PVC
Depth Drilled (ft):	160	Aquifer:	Undefined
Screen Int. (ft.):	150-156	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-22	CLAY	Clay, yellow.
22-72	CLAY	Clay.
72-73	SAND	Sand.
73-98	CLAY	Clay.
98-99	SAND	Sand.
99-131	CLAY	Clay.
131-144	COBBLES	Cobbles; contains boulders.
144-160	SAND	Sand.

131-050-25CBC
NDSWC 13410

Date Completed:	08/23/1994	Purpose:	Test Hole
L.S. Elevation (ft):	1020		
Depth Drilled (ft):	300	Data Source:	NDSWC

Completion Info: Hole plug

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, loam, black.
2-5	CLAY	Clay, silty, light olive brown (5Y 5/6), oxidized.
5-24	CLAY	Clay, silty, sandy, pebbly, light olive brown, slightly firm, slightly sticky, slightly plastic, oxidized.
24-54	CLAY	Clay, silty, sandy, pebbly, olive gray (5Y 3/2), slightly firm, slightly sticky, slightly plastic, reduced.
54-72	SAND	Sand, very fine and fine; clayey from 62 to 64 ft.
72-83	SILT	Silt, sandy; no return.
83-94	CLAY	Clay, very silty, slightly sandy, very fine, olive gray, slightly firm, slightly sticky, slightly plastic.
94-122	CLAY	Clay, silty, sandy, pebbly, olive gray, firm, slightly sticky, slightly plastic.
122-162	CLAY	Clay, olive gray, slightly firm, sticky, plastic.
162-180	INTERBEDDED	Interbedded clay, sand, and gravel; less than 1 ft beds.
180-192	CLAY	Clay, silty, olive gray.
192-264	SAND	Sand, very clayey, olive gray; interbedded clay and sand, less than 1 ft beds.
264-287	CLAY	Clay, very sandy, pebbly, very fine and fine, olive gray; numerous cobbles; rocks at 274 and 286 ft.
287-294	BEDROCK	Clay, very silty, slightly sandy, brownish black (5YR 2/1), soft, slightly sticky, slightly plastic, calcareous, white, indurated, sandy, calcareous return (micritic laminations) (Bedrock).
294-300	SHALE	Clay, slightly silty, olive black (5Y 2/1), firm, sticky, plastic (Shale).

131-050-26ABD
Curtis Krump

Date Completed: 00/00/00
L.S. Elevation (ft): N/A
Depth Drilled (ft): 0
Screen Int. (ft.): 0-0

Purpose: Domestic Well
Well Type: 0 in. -
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: Well east of house
16680 88th St. SE
Hankinson ND 58041
701-242-8356

Lithologic Log

Depth (ft)	Unit	Description

131-050-26BAB
Cliff Krause

Date Completed: 08/02/1981
L.S. Elevation (ft): 1006
Depth Drilled (ft): 180
Screen Int. (ft.): 169-175

Purpose: Domestic Well
Well Type: 4 in. - PVC
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: Well south of the house
16595 88th St. SE
Hankinson ND 58041
701-242-7442

Lithologic Log

Depth (ft)	Unit	Description
0-15	CLAY	Clay, yellow.
15-160	CLAY	Clay.
160-175	SAND	Sand.
175-180	CLAY	Clay.

131-050-26CDD
Kendall Pankow

Date Completed: 00/00/00
L.S. Elevation (ft): N/A
Depth Drilled (ft): 105
Screen Int. (ft.): 0-0

Purpose: Domestic Well
Well Type: 4 in. - Steel
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: Well north of house
16643 89th St. SE
Hankinson ND 58041
701-242-7739

Lithologic Log

Depth (ft)	Unit	Description

131-050-27BDB
Teigs

Date Completed: 00/00/00
L.S. Elevation (ft): 1025
Depth Drilled (ft): 0
Screen Int. (ft.): 0-0

Purpose: Stock Well
Well Type: 0 in. -
Aquifer: Hankinson
Data Source:

Completion Info:

Remarks: Well is used for livestock, House is served by Rural Water

Lithologic Log

Depth (ft)	Unit	Description

131-050-27CCC
City of Hankinson

Date Completed:	03/19/2007	Purpose:	Observation Well
L.S. Elevation (ft):	1050	Well Type:	2 in. - PVC
Depth Drilled (ft):	75	Aquifer:	Hankinson
Screen Int. (ft.):	50-50	Data Source:	

Completion Info:

Remarks: well is on fence line

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-8	SAND	Brown
8-15	SAND	gray, medium
15-20	SAND	gray, medium
20-30	SAND	gray, medium
30-45	SAND	gray, coarse
45-50	SAND	gray, medium
50-73	SAND	gray, fine
73-75	CLAY	gray

131-050-27CDC
City of Hankinson

Date Completed:	03/20/2007	Purpose:	Observation Well
L.S. Elevation (ft):	1050	Well Type:	2 in. - PVC
Depth Drilled (ft):	65	Aquifer:	Hankinson
Screen Int. (ft.):	40-50	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-8	SAND	brown
8-20	SAND	gray, coarse
20-35	SAND	gray, medium
35-40	SAND	gray, coarse
45-60	SAND	gray, fine with clay stringers
60-65	CLAY	

131-050-27CDD
NDSWC 13044

Date Completed:	08/25/1992	Purpose:	Test Hole
L.S. Elevation (ft):	1044		
Depth Drilled (ft):	340	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, black.
2-11	SAND	Sand, fine, well sorted, oxidized.
11-36	SAND	Sand, fine, well sorted, unoxidized.
36-42	SILT	Silt, sandy, no return.
42-63	SAND	Sand, very fine and fine, well sorted; some lignite return.
63-84	CLAY	Clay, silty, olive-gray, soft.
84-187	TILL	Clay, silty, sandy, slightly pebbly, olive-gray, soft; slightly firm by 153 feet; cobbles at 164 and 170 feet (Till).
187-192	CLAY	Clay, very silty, olive-gray, soft, slightly sticky, nonplastic.
192-201	TILL	Clay, silty, sandy, pebbly, olive-gray, firm; some interbedded gravel.
201-208	GRAVEL	Gravel, poor return.
208-320	TILL	Clay, silty, sandy, pebbly, olive-gray, firm; some interbedded sand and gravel from 220 to 240 feet; occasional cobbles from 240 to 320 feet (Till).
320-340	SHALE	Shale, olive-black, firm, slightly sticky, plastic, waxy appearance.

131-050-27CDD2
NDSWC 13044B

Date Completed:	08/25/1992	Purpose:	Observation Well
L.S. Elevation (ft):	1044	Well Type:	2 in. - PVC
Depth Drilled (ft):	60	Aquifer:	Hankinson
Screen Int. (ft.):	39-44	Data Source:	

Completion Info:

Remarks: MAP ON BACK

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, black.
2-11	SAND	Sand, fine, oxidized.
11-43	SAND	Sand, fine, well sorted, reduced
43-60	SAND	Sand, fine; interbedded silt.

131-050-28BAA
Ora Lee Lugest

Date Completed: 1930
L.S. Elevation (ft): N/A
Depth Drilled (ft): 12
Screen Int. (ft.): 0-12

Purpose: Domestic Well
Well Type: 36 in. -
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: Well north of house
16435 88R St. S.E.
Hankinson N.D. 58041
701-242-8222

Lithologic Log

Depth (ft)	Unit	Description

131-050-28CCC
NDSWC 15297

Date Completed: 08/10/2005
L.S. Elevation (ft): 1066
Depth Drilled (ft): 240
Screen Int. (ft.): 53-58

Purpose: Observation Well
Well Type: 2 in. - PVC
Aquifer: Hankinson
Data Source: NDSWC

Completion Info: 55 ft 2 inch PVC, 5 ft No. 18 screen, collapse, holeplug

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-22	SAND	Sand, fine, well sorted, oxidized
22-61	SAND	Sand, fine, well sorted, reduced
61-116	CLAY	Clay, silty, olive gray (5Y 3/2) (lacustrine)
116-117	COBBLES	Cobbles
117-146	CLAY	Clay, silty, sandy, pebbly, olive gray (till)
146-149	SAND & GRAVEL	Sand, fine to coarse, gravelly, fine and medium
149-164	CLAY	Clay, silty, sandy, olive gray
164-165	COBBLES	Cobbles
165-186	CLAY	Clay, silty, sandy, olive gray
186-188	COBBLES	Cobbles
188-203	CLAY	Clay, silty, sandy, olive gray
203-210	SAND & GRAVEL	Sand and gravel
210-215	COBBLES	Cobbles, gravelly
215-221	CLAYSTONE	Clay, dark olive gray (5Y 4/1) (bedrock)
221-222	SANDSTONE	Sand, very fine, silty, indurated (bedrock)
222-240	CLAYSTONE	Clay, dark olive gray (bedrock)

131-050-28DAD1
NDSWC 1

Date Completed: 05/11/1976
L.S. Elevation (ft): 1038
Depth Drilled (ft): 91
Screen Int. (ft.): 59-64

Purpose: Test Well
Well Type: 2 in. - Steel
Aquifer: Hankinson
Data Source:

Completion Info:

Remarks: Test well #1

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Black
2-3	SOIL	Silty
3-10	SAND	Red, fine
10-15	SAND	Brown reddish
15-20	SAND	Fine, gray
20-25	SAND	Fine, gray
25-30	SAND	Medium sized, gray
30-35	SAND	Gray
35-40	SAND	Medium, gray
40-45	SAND	Medium, grayish black
45-50	SAND	Medium, grayish black
50-55	SAND	Medium, dark grayish
55-60	SAND	Medium, dark grayish
60-65	SAND	Medium, dark grayish
65-70	SAND	Medium (softer layer)
70-75	SAND	Fine powder like
75-80	SAND	Fine
80-85	SAND	Fine
85-91	SAND	Fine

131-050-28DAD2
NDSWC 2

Date Completed: 05/12/1976
L.S. Elevation (ft): 1038
Depth Drilled (ft): 76
Screen Int. (ft.): 45-50

Purpose: Test Well
Well Type: 2 in. - Steel
Aquifer: Hankinson
Data Source:

Completion Info:

Remarks: Test Well #2

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Black
2-5	CLAY	Yellow
5-10	SAND	Fine, brown
10-15	SAND	Gray, medium
15-20	SAND	Medium, gray
20-25	SAND	Blackish gray
25-30	SAND	Blackish gray
30-35	SAND	Lighter, grayish
35-40	SAND	Lighter, grayish
40-45	SAND	Lighter, grayish
45-50	SAND	Lighter, grayish
50-55	SAND	Darker, medium
55-60	SAND	Fine, gray
60-65	SAND	Fine, gray
65-70	SAND	Fine, gray
70-76	SAND	Fine, gray

131-050-28DCA
NDSWC L2

Date Completed: 01/25/1977
L.S. Elevation (ft): 1050
Depth Drilled (ft): 72

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: Test hole L2

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Black
1-6	SAND	Brown
6-30	SAND	Fine, colored
30-57	SAND	Coarse, colored
57-72	SAND	Fine, blue, drilled dirty
72-0	SAND	Blue, drilled dirty

131-050-28DDD
NDSWC L1

Date Completed: 01/25/1977
L.S. Elevation (ft): 1026
Depth Drilled (ft): 97

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: test hole L1

Lithologic Log

Depth (ft)	Unit	Description
0-0.5	TOPSOIL	Black
0.5-11	SAND	Brown
11-43	SAND	Colored
43-49	CLAY	Sandy, blue
49-53	SAND	Colored
53-82	SAND	Blue
82-89	SAND	Colored
89-97	SAND	Blue, drilled dirty

131-050-29CAD
NDSWC L4

Date Completed: 02/01/1977
L.S. Elevation (ft): 1070
Depth Drilled (ft): 72

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: test hole L4

Lithologic Log

Depth (ft)	Unit	Description
0-25	SAND	Brown
25-54	SAND	Fine, colored
54-72	SAND	Fine

131-050-29CCC
NDSWC 13396

Date Completed: 08/04/1994
L.S. Elevation (ft): 1071
Depth Drilled (ft): 280

Purpose: Test Hole

Data Source: NDSWC

Completion Info: 80 ft tremie, slurry grout

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, sand, moderate brown (5YR 3/4).
1-9	SAND	Sand, very fine and fine, light olive brown (5Y 5/6), oxidized.
9-43	SAND	Sand, very fine and fine, light olive gray (5Y 5/2), reduced.
43-68	SILT	Silt, sandy, very fine, olive gray (5Y 3/2), soft, slightly sticky, slightly plastic.
68-78	CLAY	Clay, silty, very sandy, slightly pebbly, olive gray; rock at 72 ft.
78-86	CLAY	Clay, slightly silty, slightly sandy, slightly pebbly, olive gray; rock at 86 ft.
86-96	CLAY	Clay, silty, sandy, pebbly, olive gray; interbedded clay, sand, and gravel, less than 1 ft beds from 86 to 90 and 92 to 96 ft; white return from 86 to 90 ft.
96-99	CLAY	Clay, slightly silty, sandy, very fine, olive black (5Y 2/1), soft, sticky, plastic, calcareous; rock at 98 ft.
99-164	TILL	Clay, silty, very sandy, very pebbly, olive gray, firm; occasional cobble; interbedded clay, olive black, less than 1 ft beds; rocks at 118 and 155 ft; interbedded gravel at 124 to 126 and 151 to 156 ft; lighter olive gray below 132 ft (Till).
164-172	SILT	Silt, sandy, very fine, olive gray, slightly firm.
172-180	CLAY	Clay, silty, very sandy, pebbly, olive black.
180-186	CLAY	Clay, silty, olive black, soft, sticky, slightly plastic, calcareous (possibly bedrock block).
186-204	TILL	Clay, silty, very sandy, slightly pebbly, olive black, soft, slightly sticky; occasional cobble (Till).
204-217	CLAY	Clay, slightly silty, olive black, slightly firm, sticky, slightly plastic, calcareous; firm by 207 ft, some return has waxy appearance (possibly bedrock block).
217-224	CLAY	Clay, slightly silty, slightly pebbly, granular, olive black, firm, plastic.
224-249	CLAY	Clay, very silty, sandy, very fine, olive gray to olive black, soft, slightly sticky, slightly plastic.
249-262	GRAVEL	Gravel, fine and medium, mixed mineralogy, subangular and subrounded; rocks from 261 to 262 ft.
262-280	BEDROCK	Clay, slightly silty, olive black, firm, sticky, plastic; indurated, brownish black (5YR 2/1), and white, calcareous laminations (micrite) (Bedrock).

131-050-29CCC2
NDSWC 13396B

Date Completed:	08/04/1994	Purpose:	Observation Well
L.S. Elevation (ft):	1071	Well Type:	2 in. - PVC
Depth Drilled (ft):	40	Aquifer:	Hankinson
Screen Int. (ft.):	33-38	Data Source:	NDSWC

Completion Info: 35 ft 2 in PVC, 5 ft #12 PVC screen, collapse, bent. chips; PC

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil, sand, brown (5YR 4/4).
1-9	SAND	Sand, very fine and fine, light olive brown (5Y 5/6), oxidized.
9-40	SAND	Sand, very fine and fine, light olive gray (5Y 5/2), reduced.

131-050-30BAA
Garry Gutzman

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: East of house 1/8th mile
16250 88th St SE
701-242-7065

Lithologic Log

Depth (ft)	Unit	Description

131-050-31BBB
NDSWC 3167

Date Completed:	09/25/1964	Purpose:	Test Hole
L.S. Elevation (ft):	1079		
Depth Drilled (ft):	227	Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Sandy loam, black.
1-26	SAND	Sand, fine to coarse, brown, medium sorted, subrounded, igneous, shale and limestone; highly calcareous clayey silt from 14 to 17 feet.
26-42	TILL	Clay, silty to pebbly, olive-gray, soft, plastic, cohesive (till).
42-57	SILT	Silt, clayey, olive-gray, soft, slightly plastic, cohesive, calcareous; interbedded sand.
57-120	CLAY	Clay, silty, olive-gray, soft, plastic, cohesive, calcareous.
120-153	TILL	Clay, silty to pebbly, olive-gray, soft, plastic, cohesive; contains cobbles and boulders (till)
153-171	TILL	Clay, very sandy to pebbly, olive-gray; interbedded gravel (till)
171-173	CLAY	Clay, hard.
173-178	SHALE	Shale, silty, olive-black, soft, cohesive, calcareous.
178-191	SHALE	Shale, sandy, olive-black, soft, slightly cohesive, calcareous.
191-193	SHALE	Shale, olive-black, firm, plastic, cohesive, calcareous.
193-198	SHALE	Shale, silty, olive-black, soft, slightly plastic, cohesive, calcareous.
198-216	SHALE	Shale, olive-black, soft, plastic, cohesive, slightly calcareous; contains calcite crystals.
216-219	LIMESTONE	Limestone, white, indurated.
219-227	SHALE	Shale, olive-black, firm, plastic, cohesive, slightly calcareous; massive.

131-050-31BBC
Alfred Witt

Date Completed:	1949	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	1.25 in. - Unknown
Depth Drilled (ft):	28	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hankinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

131-050-31BBC2
Erma Witt

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	4 in. - Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well south of house

Lithologic Log

Depth (ft)	Unit	Description

131-050-32BBA
NDSWC W1

Date Completed:	01/19/1989	Purpose:	Test Hole
L.S. Elevation (ft):	1080		
Depth Drilled (ft):	90	Data Source:	

Completion Info:

Remarks: test hole W1

Lithologic Log

Depth (ft)	Unit	Description
0-5	SAND	Yellow
5-10	SAND	Yellow
10-15	SAND	Yellow
15-20	SAND	Fine, gray
20-25	SAND	Fine, gray, good water loss
25-30	SAND	Fine, gray, good water loss
30-35	SAND	10 slot, good water loss
35-40	SAND	Same as above
40-45	SAND	Same as above
45-50	SAND	Fine, 10 slot, water loss
50-55	SAND	Fine, 10 slot, water loss
55-58	SAND	Coarse, good
58-60	CLAY	Sandy, needed pulldown
60-65	CLAY	Sandy
65-70	SAND & CLAY	Mixed layers
70-75	SAND & CLAY	Mixed layers
75-80	SAND	Fine, muddy
80-85	SAND	Fine, muddy
85-90	CLAY	No description

131-050-32BBB
NDSWC L5

Date Completed:	02/01/1977	Purpose:	Test Hole
L.S. Elevation (ft):	1075		
Depth Drilled (ft):	57	Data Source:	

Completion Info:

Remarks: test hole L5

Lithologic Log

Depth (ft)	Unit	Description
0-0.5	TOPSOIL	Black
0.5-15	SAND	Brown
15-47	SAND	Colored
47-57	SAND	Including clay lense
57-60	CLAY	Sandy, blue

131-050-32BBD
NDSWC W2

Date Completed:	01/19/1989	Purpose:	Test Hole
L.S. Elevation (ft):	1080		
Depth Drilled (ft):	85	Data Source:	

Completion Info:

Remarks: test hole W2

Lithologic Log

Depth (ft)	Unit	Description
0-15	SAND	Fine, yellow
15-30	SAND	Fine, gray
30-42	SAND	Clay fine
42-45	SAND	Muddy, needed pulldown
45-50	MUD	No description
50-60	MUD	No description
60-65	MUD	No description
65-66	ROCK	Coarse
66-70	CLAY	Mud, soft
70-75	CLAY	No description
75-80	CLAY	No description
80-85	CLAY	No description

131-050-32BCCC
NDSWC L11

Date Completed: 03/11/1977
L.S. Elevation (ft): 1080
Depth Drilled (ft): 92

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: test hole L11

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	No description
1-57	SAND	Took water, blue
57-92	CLAY	Blue

131-050-32BCCD
NDSWC L10

Date Completed: 03/10/1977
L.S. Elevation (ft): 1080
Depth Drilled (ft): 107

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: test hole L10

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Black
1-77	SAND	Took water, blue/brown
77-107	CLAY	Blue

131-050-32BCD
NDSWC RWW #2

Date Completed: 05/18/1978
L.S. Elevation (ft): 1072
Depth Drilled (ft): 76
Screen Int. (ft.): 51-76

Purpose: Municipal Well
Well Type: 8 in. - Steel
Aquifer: Hankinson
Data Source: Well Driller's Report

Completion Info: Static WL 6.5, Pumping WL 25.8 after 24 hours at 200 gpm, SC 10.4 gpm/ft

Remarks: Southeat Water Users: Well No 2

Lithologic Log

Depth (ft)	Unit	Description
0-10	TILL	Till.
10-75	SAND	Sand, fine.
75-76	CLAY	Clay.

131-050-32BCD2
Southeast Rural Water

Date Completed: 00/00/00
L.S. Elevation (ft): 1080
Depth Drilled (ft): 0
Screen Int. (ft.): 0-0

Purpose: Observation Well
Well Type: 0 in. -
Aquifer: Hankinson
Data Source:

Completion Info:

Remarks: Just east of RRW #2

Lithologic Log

Depth (ft)	Unit	Description

131-050-32BDC1
NDSWC L7

Date Completed: 02/03/1977
L.S. Elevation (ft): 1080
Depth Drilled (ft): 97

Purpose: Test Hole
Data Source:

Completion Info:

Remarks: test L7

Lithologic Log

Depth (ft)	Unit	Description
0-14	SAND	Brown
14-92	SAND	Colored
92-97	CLAY	Sandy, blue

131-050-32BDC2
NDSWC L8

Date Completed: 02/03/1977
L.S. Elevation (ft): 1080
Depth Drilled (ft): 57

Purpose: Test Hole
Data Source:

Completion Info:

Remarks: test hole L8

Lithologic Log

Depth (ft)	Unit	Description
0-14	SAND	Brown
14-57	SANd	Colored

131-050-32BDC3
NDSWC L9

Date Completed: 02/11/1977
L.S. Elevation (ft): 1080
Depth Drilled (ft): 117

Purpose: Test Hole
Data Source:

Completion Info:

Remarks: test hole L9, Log for Production Well #1

Lithologic Log

Depth (ft)	Unit	Description
0-24	SAND	Brown
24-33	SAND	Fine, colored
33-107	SAND	Coarser, colored
107-117	CLAY	Sandy, blue

131-050-32BDC4
NDSWC RWW #1

Date Completed: 03/09/1977
L.S. Elevation (ft): 1080
Depth Drilled (ft): 103
Screen Int. (ft.): 68-103

Purpose: Rural Water Well
Well Type: 8 in. - Steel
Aquifer: Hankinson
Data Source:

Completion Info: see log for test hole L9 for geology

Remarks: Rural Water Well #1

Lithologic Log

Depth (ft)	Unit	Description

131-050-32BDCB1
NDSWC L12

Date Completed: 03/11/1977
L.S. Elevation (ft): 1080
Depth Drilled (ft): 92

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: test hole L12

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Black
1-77	SAND	Blue/brown
77-82	SAND	Including black shale, black
82-90	SAND	Blue
90-92	CLAY	No description

131-050-32BDCB2
NDSWC RWW #3

Date Completed: 05/19/1978
L.S. Elevation (ft): 1080
Depth Drilled (ft): 90
Screen Int. (ft.): 60-90

Purpose: Rural Water Well
Well Type: 8 in. - Steel
Aquifer: Hankinson
Data Source:

Completion Info:

Remarks: Rural water well #3

Lithologic Log

Depth (ft)	Unit	Description
0-10	SAND	Yellow
10-48	SAND	Fine
48-50	SAND	Fine, little coal
50-90	SAND	Fine

131-050-32CAA1
NDSWC W3

Date Completed: 00/00/00
L.S. Elevation (ft): N/A
Depth Drilled (ft): 161

Purpose: Test Hole

Data Source:

Completion Info:

Remarks: test hole W3

Lithologic Log

Depth (ft)	Unit	Description
0-15	SAND	Yellow
15-30	SAND	Medium, good water loss
30-80	SAND	Medium, good water loss
80-85	SAND	Dirty, fine
85-90	SAND	Muddy, fine
90-105	SAND	Medium fine, good formation
105-110	SAND	Same. good water loss
110-120	SAND	As above
120-129	SAND	Same as above
129-132	Fine	
132-135	SAND	Coarser and nice
135-150	SAND	Best, coarse
150-160	SAND	Same as above, good drilling
160-161	SAND	Fine, dirty

131-050-32CAA2
NDSWC RWW #5

Date Completed: 11/07/1990
L.S. Elevation (ft): 1080
Depth Drilled (ft): 90
Screen Int. (ft.): 62-87

Purpose: Rural Water Well
Well Type: 10 in. - Steel
Aquifer: Hankinson
Data Source: Well Driller's Report

Completion Info: Static WL 15, Pumping WL 45 after 48 hours at 240 gpm; SC of 8 gpm/ft

Remarks: Southeast Water Users: Well No 5

Lithologic Log

Depth (ft)	Unit	Description
0-38	SAND	Sand, fine
38-86	SAND	Sand, coarser
86-90	SAND	Sand, some coal

131-050-32CAA3
Southeast Rural Water

Date Completed:	00/00/00	Purpose:	Observation Well
L.S. Elevation (ft):	1080	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Hankinson
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Inside fence of RRW #5

Lithologic Log

Depth (ft)	Unit	Description

131-050-32CABB
NDSWC L6

Date Completed:	02/03/1977	Purpose:	Test Hole
L.S. Elevation (ft):	1080		
Depth Drilled (ft):	107	Data Source:	

Completion Info:

Remarks: test hole L6

Lithologic Log

Depth (ft)	Unit	Description
0-15	SAND	Including lenses of clay, brown
15-102	SAND	Colored
102-107	CLAY	Sandy, blue

131-050-32CABD
NDSWC H1

Date Completed:	05/12/1978	Purpose:	Observation Well
L.S. Elevation (ft):	1080	Well Type:	2 in. - PVC
Depth Drilled (ft):	105	Aquifer:	Hankinson
Screen Int. (ft.):	100-105	Data Source:	

Completion Info:

Remarks: observation well H1, well to be used by the Forest Service

Lithologic Log

Depth (ft)	Unit	Description
0-20	TILL	No description
20-105	SAND	Fine

131-050-32CAC
NDSWC RWW #4

Date Completed:	00/00/00	Purpose:	Rural Water Well
L.S. Elevation (ft):	1080	Well Type:	10 in. - Steel
Depth Drilled (ft):	193	Aquifer:	Hankinson
Screen Int. (ft.):	64.1-89.6	Data Source:	Wieber Well Drilling

Completion Info:

Remarks: SE Rural well #4

Lithologic Log

Depth (ft)	Unit	Description
0-45	SAND	fine
45-55	SAND	nice, clean, .012 slot sand
55-60	SAND	mixed sizes, .012 and down
60-70	SAND	very good, takes a lot of water
70-75	SAND	.015 nice and clean, a little dirty, as nice sand however
75-85	SAND	.010 dirty, does not take as much water
85-90	SAND	fine, dirty
90-100	SAND	fine
100-105	SAND	a little coarser, clean
105-110	SAND	clean, .012
110-115	SAND	clean, .012
115-120	SAND	clean, .012
120-125	SAND	clean, .012, with coal chunks
125-135	SAND	a little finer, clean
135-140	SAND	very fine, .012 slot
140-150	SAND	very fine, .012 slot
150-155	SAND	fine, .008 slot
155-165	SAND	fine, .008 slot
165-180	SAND	fine sand mixed with mud chunks
180-193	SAND	fine, dirty water, not very good
193-193	ROCK	bottom of hole is a rock

131-050-32CAD
NDSWC H2

Date Completed: 05/12/1978
L.S. Elevation (ft): 1080
Depth Drilled (ft): 100
Screen Int. (ft.): 95-100

Purpose: Observation Well
Well Type: 2 in. - PVC
Aquifer: Hankinson
Data Source:

Completion Info:

Remarks: Observation well H2, Well to be used by Forest Service

Lithologic Log

Depth (ft)	Unit	Description
0-20	CLAY	No description
20-35	CLAY & SAND	Mixed
35-100	SAND	Fine

131-050-32CDA
NDSWC W4

Date Completed: 01/20/1989
L.S. Elevation (ft): 1080
Depth Drilled (ft): 136

Purpose: Test Hole
Data Source:

Completion Info:

Remarks: test hole W4

Lithologic Log

Depth (ft)	Unit	Description
0-5	SILT	No description
5-10	CLAY	Silty
10-15	SAND	Yellow
15-20	SHALE	Black sand
20-40	SAND	Medium black
40-45	SAND	Coarser, gray
45-50	SAND	Coarser, gray
50-55	SAND	Finer
55-60	SAND	Coarser, dirty clumpy
60-70	SAND	Nice, chatter, little dirty
70-75	SAND	Same as above
75-80	SAND	Best, large amount of water loss
80-85	SAND	Same, less water loss, darker color, some shale
85-90	SAND	Finer, darker
90-95	SAND	Finer, darker, muddy
95-100	SAND	Same as above
100-105	SAND	Fine, dark dirty streaks
105-120	SAND	Same as above
120-130	SAND	Dirty, muddy
130-135	CLAY	Sandy
135-136	CLAY	Hard, used pulldown

131-050-32CDB
NDSWC RWW #7

Date Completed: 11/02/2007
L.S. Elevation (ft): 1080
Depth Drilled (ft): 135
Screen Int. (ft.): 95-135

Purpose: Rural Water Well
Well Type: 10 in. - PVC
Aquifer: Hankinson
Data Source:

Completion Info:

Remarks: Well # 7

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-25	SAND	brown
25-120	SAND	
120-135	SAND	coarser

131-050-32CDC
NDSWC W6

Date Completed: 01/20/1989
L.S. Elevation (ft): 1080
Depth Drilled (ft): 105

Purpose: Test Hole
Data Source:

Completion Info:

Remarks: test hole W6

Lithologic Log

Depth (ft)	Unit	Description
0-5	SAND	Yellow
5-10	SAND	Yellow to black
10-14	SAND	Same as above
14-15	CLAY	No description
15-20	SAND	Fine, gray, clean, little water loss
20-25	SAND	Same as above
25-30	SAND	Dirty, dark
30-45	SAND	Fine, gray to black
45-50	SAND	Same as above
50-55	SAND	A littler clean, light gray
55-60	SAND	Dirty
60-70	SAND	Clean, tool water 010 slot medium sand
70-75	SAND	Finer, little dirty
75-80	SAND	Fine, dirty
80-85	SAND	Same as above
85-90	SAND	Fine, almost muddy
90-105	SAND	Fine, dirty

131-050-32DBC
NDSWC H3

Date Completed:	05/12/1978	Purpose:	Observation Well
L.S. Elevation (ft):	1080	Well Type:	2 in. - PVC
Depth Drilled (ft):	90	Aquifer:	Hankinson
Screen Int. (ft.)	85-90	Data Source:	

Completion Info: Well to be used for observation by Forest Service.

Remarks: Observation well #H3, (H for Huron Drilling)

Lithologic Log

Depth (ft)	Unit	Description
0-20	CLAY	Clay.
20-88	SAND	Sand.
88-90	CLAY	Clay.

131-050-32DBCA
NDSWC RWW #6

Date Completed:	00/00/00	Purpose:	Rural Water Well
L.S. Elevation (ft):	1090	Well Type:	10 in. - PVC
Depth Drilled (ft):	90	Aquifer:	Hankinson
Screen Int. (ft.):	60-90	Data Source:	

Completion Info:

Remarks: Well # 6

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-25	SAND	brown
25-90	SAND	grey

131-050-32DBD
NDSWC H4

Date Completed:	05/12/1978	Purpose:	Observation Well
L.S. Elevation (ft):	1080	Well Type:	2 in. - PVC
Depth Drilled (ft):	75	Aquifer:	Hankinson
Screen Int. (ft.):	70-75	Data Source:	

Completion Info:

Remarks: H4, observation Well to be used by Forest Service

Lithologic Log

Depth (ft)	Unit	Description
0-20	CLAY	No description
20-35	CLAY	No description
35-75	SAND	No description

131-050-32DCB
NDSWC W5

Date Completed:	01/20/1989	Purpose:	Test Hole
L.S. Elevation (ft):	1080		
Depth Drilled (ft):	75	Data Source:	

Completion Info:

Remarks: test hole W5

Lithologic Log

Depth (ft)	Unit	Description
0-5	SAND	Yellow
5-10	SAND	Black, shaley fine
10-15	SAND	Same as above
15-30	SAND	Dirty, no water loss
30-35	SAND	Same as above
35-40	SAND	Cleaner, no water loss
40-45	SAND	Cleaner, gray, some water loss
45-48	CLAY	Sandy strip
48-50	SAND	No description
50-55	SAND	Clumpy-white
55-60	SAND	Same as above
60-70	SAND	Small amount of clatter, some water loss
70-75	CLAY	Gray, used pulldown, hard soil

131-050-34ABB
Kathy Bladow

Date Completed: 00/00/00
L.S. Elevation (ft): N/A
Depth Drilled (ft): 65
Screen Int. (ft.): 0-0

Purpose: Domestic Well
Well Type: 4 in. - Steel
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: Well north of the house
16570 89th St SE
Hankinson ND 58041
701-242-5748

Lithologic Log

Depth (ft)	Unit	Description

131-050-34ACD
City of Hankinson

Date Completed: 04/28/1989
L.S. Elevation (ft): 1050
Depth Drilled (ft): 95

Purpose: Test Hole
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-12	SAND	Sand, yellow.
12-85	SAND	Sand, fine.
85-90	SAND	Sand, fine, slightly clayey.
90-95	SAND	Sand , fine, clayey.

131-050-34ADA
City of Hankinson

Date Completed: 04/28/1989
L.S. Elevation (ft): 1045
Depth Drilled (ft): 65
Screen Int. (ft.): 40-60

Purpose: Observation Well
Well Type: 1.25 in. - PVC
Aquifer: Hankinson
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Topsoil.
1-12	SAND	Sand, yellow.
12-16	CLAY	Clay.
16-62	SAND	Sand, fine.
62-65	CLAY	Clay.

131-050-34BCA
NDSWC L3

Date Completed: 01/26/1977
L.S. Elevation (ft): 1050
Depth Drilled (ft): 62

Purpose: Test Hole
Data Source:

Completion Info:

Remarks: test hole L3

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Black
1-6	SAND	Brown
6-15	SAND	Fine, colored
15-30	SAND	Coarser, colored
30-53	SAND	Fine, colored
53-62	SAND	Including lenses of clay, colored

131-050-34DBA
City of Hankinson

Date Completed: 08/19/1974
L.S. Elevation (ft): 1057
Depth Drilled (ft): 90

Purpose: Test Hole
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-4	TOPSOIL	Topsoil.
4-14	SAND	Sand, fine, brown.
14-80	SAND	Sand, fine.
80-85	SAND	Sand, clayey.
85-90	CLAY	Clay.

131-050-34DDD
USGS #H-817

Date Completed: 11/18/1953
L.S. Elevation (ft): 1059
Depth Drilled (ft): 110

Purpose: Test Hole
Data Source:

Completion Info:

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-13	CLAY	Clay, sandy, light gray (lacustrine).
13-92	SAND	Sand, very fine and fine, light gray (lacustrine)
92-110	CLAY	Clay, light gray, soft (lacustrine).

131-050-35BAA
Jim Medenwaldt

Date Completed: 00/00/00
L.S. Elevation (ft): 1030
Depth Drilled (ft): 0
Screen Int. (ft.): 0-0

Purpose: Domestic Well
Well Type: 0 in. -
Aquifer: Hankinson
Data Source:

Completion Info:

Remarks: Domestic/stock well
Sample from spicket in garage

Lithologic Log

Depth (ft)	Unit	Description

131-050-35BAB
Jim Medenwaldt

Date Completed: 00/00/00
L.S. Elevation (ft): 1030
Depth Drilled (ft): 0
Screen Int. (ft.): 0-0

Purpose: Surface Water Monitoring Site
Well Type: 0 in. -
Aquifer: Hankinson
Data Source:

Completion Info:

Remarks: Spring water quality

Lithologic Log

Depth (ft)	Unit	Description

131-050-35DCA
August Pankow

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	2 in. -
Depth Drilled (ft):	20	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Data from Hmkinson city study #25

Lithologic Log

Depth (ft)	Unit	Description

131-050-35DCB
Dale Bladow

Date Completed:	04/22/1989	Purpose:	Domestic Well
L.S. Elevation (ft):	1042	Well Type:	4 in. - PVC
Depth Drilled (ft):	182	Aquifer:	Undefined
Screen Int. (ft.):	172-180	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-18	CLAY	yellow
18-165	SHALE	
165-182	SAND	

131-050-35DCC
August Pankow III

Date Completed:	00/00/00	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0 in. -
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-0	Data Source:	

Completion Info:

Remarks: Well NW of the house
16675 90th St. SE
Hankinson ND 58041
701-242-7793

Lithologic Log

Depth (ft)	Unit	Description

131-050-36CCB
USGS #H-816

Date Completed:	11/18/1953	Purpose:	Test Hole
L.S. Elevation (ft):	1032		
Depth Drilled (ft):	60	Data Source:	

Completion Info:

Remarks: GW 25

Lithologic Log

Depth (ft)	Unit	Description
0-7	CLAY	Clay, sandy, dark brown, carbonaceous (lacustrine).
7-42	SAND	Sand, very fine and fine (lacustrine).
42-60	TILL	Till, light gray, soft.

131-051-11AAA
NDSWC 13046

Date Completed: 08/25/1992
L.S. Elevation (ft): 1045
Depth Drilled (ft): 200

Purpose: Test Hole
Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	Topsoil, black.
2-16	CLAY	Clay, silty, light olive-brown, soft, slightly sticky, plastic, oxidized (Lacustrine).
16-64	CLAY	Clay, silty, olive-gray, soft, slightly sticky, plastic, unoxidized (Lacustrine).
64-74	TILL	Clay, silty, sandy, pebbly, olive-gray (Till).
74-87	CLAY	Clay, slightly silty, olive-gray, soft, plastic.
87-91	GRAVEL	Gravel, fine to coarse, angular and sub-angular, carbonate, shale, igneous.
91-136	TILL	Clay, silty, sandy, pebbly, olive-gray, slightly firm; occasional cobbles; interbedded sand and gravel from 129 to 136 feet (Till).
136-143	SAND & GRAVEL	Sand, coarse, pebbly, medium and coarse, angular to sub-rounded, carbonate, shale, igneous.
143-180	TILL	Clay, silty, sandy, pebbly, olive-gray, firm; cobbles and pebbles from 145 to 146 feet; cobbles from 175 to 180 feet (Till).
180-200	SHALE	Shale, brownish-black, yellowish-gray, some dark gray, soft; laminated, fine; indurated laminae, 1 to 2 mm thick.

131-051-11CCC
Marvin Lugert

Date Completed: 09/03/1997
L.S. Elevation (ft): N/A
Depth Drilled (ft): 182
Screen Int. (ft.): 170-180

Purpose: Domestic Well
Well Type: 4 in. - Unknown
Aquifer: Undefined
Data Source: Manikowski Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-22	SAND	yellow
22-28	CLAY	blue
28-40	SAND	fine
40-98	CLAY	blue
98-105	SAND	medium
105-128	CLAY	blue, till
128-133	SAND	medium
133-139	CLAY	blue, silt
139-142	SAND & GRAVEL	
142-143	CLAY	blue, with rocks
143-162	CLAY	blue, with till
162-165	SAND	medium
165-169	CLAY	blue
169-176	SAND	medium
176-180	SAND	medium with some fine
180-182	CLAY	blue

131-051-11DDD1
SHD

Date Completed: 06/07/1984
L.S. Elevation (ft): 1042
Depth Drilled (ft): 390
Screen Int. (ft.): 372.5-377.5

Purpose: Observation Well - Plugged
Well Type: 2 in. - PVC
Aquifer: Undefined
Data Source:

Completion Info:

Remarks: SHD; 2-1; Flowed;

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Silt, black.
1-13	CLAY	Clay, sandy, yellowish-brown.
13-44	CLAY	Clay, sandy, olive-gray.
44-74	CLAY	Clay, silty, olive-gray.
74-88	TILL	Clay, silty, olive-gray (till).
88-99	TILL	Clay, silty, pebbly, olive-gray (till).
99-106	SAND	Sand, fine to coarse.
106-125	TILL	Clay, silty, pebbly, olive-gray (till).
125-131	GRAVEL	Gravel, fine to coarse, sandy.
131-159	TILL	Clay, silty, pebbly, olive-gray (till).
159-166	GRAVEL	Gravel, fine to coarse; contains cobbles.
166-168	TILL	Clay, silty, olive-gray (till).
168-170	ROCK	Cobbles.
170-177	TILL	Clay, silty, olive-gray (till).
177-179	ROCK	Cobbles.
179-180	TILL	Clay, silty, olive-gray (till).
180-182	GRAVEL	Gravel; contains cobbles.
182-186	TILL	Clay, silty, olive-gray (till).
186-188	GRAVEL	Gravel; contains cobbles.
188-191	TILL	Clay, silty, olive-gray (till).
191-203	TILL	Clay, silty, pebbly, olive-gray (till).
203-209	GRAVEL	Gravel, fine to coarse, sandy.
209-273	TILL	Clay, silty, olive-grey; contains cobbles (till).
273-295	TILL	Clay, silty, medium gray (till).
295-338	SAND & GRAVEL	Sand, fine to coarse, pebbly.
338-340	TILL	Clay, silty, olive-gray (till).
340-390	GRAVEL	Gravel, fine to coarse, sandy.

131-051-11DDD2
SHD

Date Completed:	06/07/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1042	Well Type:	2 in. - PVC
Depth Drilled (ft):	164	Aquifer:	Undefined
Screen Int. (ft.):	159-164	Data Source:	

Completion Info:

Remarks: SHD; 2-2; Flowed;

Lithologic Log

Depth (ft)	Unit	Description
0-0	See 13105111DDD1	Except; Gravel and sand 95 to 99 feet.

131-051-11DDD3
SHD

Date Completed:	06/08/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1043	Well Type:	2 in. - PVC
Depth Drilled (ft):	106	Aquifer:	Undefined
Screen Int. (ft.):	101-106	Data Source:	

Completion Info:

Remarks: SHD; 2-3;

Lithologic Log

Depth (ft)	Unit	Description
0-0	See 131051DDD1	Except; Till from 88 to 100 feet; Sand from 100 to 106 feet.

131-051-11DDD4
SHD

Date Completed:	06/11/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1043	Well Type:	2 in. - PVC
Depth Drilled (ft):	131	Aquifer:	Undefined
Screen Int. (ft.):	125-131	Data Source:	

Completion Info:

Remarks: SHD; 2-4;

Lithologic Log

Depth (ft)	Unit	Description
0-0	See 13105111DDD1	Except; Till from 74 to 89 feet; Sand from 89 to 106 feet.

131-051-11DDD5
SHD

Date Completed:	06/12/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1043	Well Type:	2 in. - PVC
Depth Drilled (ft):	210	Aquifer:	Undefined
Screen Int. (ft.):	205-210	Data Source:	

Completion Info:

Remarks: SHD; 2-5; WL Above Surface,

Lithologic Log

Depth (ft)	Unit	Description
0-0	See 13105111DDD1	Except; Clay and gravel from 118 to 119 feet; Gravel and sand from 119 to 132 feet.

131-051-11DDD6
SHD

Date Completed:	06/25/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1043	Well Type:	2 in. - PVC
Depth Drilled (ft):	20	Aquifer:	Undefined
Screen Int. (ft.):	8-18	Data Source:	

Completion Info:

Remarks: SHD; 2-6

Lithologic Log

Depth (ft)	Unit	Description
0-0	See 13105111DDD1	

131-051-12DAA
Laverne Gutzmen

Date Completed:	09/24/1974	Purpose:	Domestic Well
L.S. Elevation (ft):	1033	Well Type:	4 in. - Steel
Depth Drilled (ft):	195	Aquifer:	Undefined
Screen Int. (ft.):	170-180	Data Source:	Falk Brothers

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-18	CLAY	yellow
18-135	SHALE	
135-170	SHALE	with sand lens
170-180	SAND	
180-195	SHALE	

131-051-13AAB
NDSWC 3169

Date Completed:	09/29/1964	Purpose:	Test Hole
L.S. Elevation (ft):	1030		
Depth Drilled (ft):	358		
		Data Source:	

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-20	SILT	Silt, clayey, dusky yellow, soft, plastic, cohesive, calcareous.
20-33	SILT	Silt, clayey, olive-gray, soft, slightly plastic, cohesive, calcareous; interbedded fine sand.
33-46	SAND	Sand, very fine and fine, clayey, gray, medium sorted, subrounded, calcareous.
46-50	TILL	Clay, very sandy, pebbly, gray, soft, slightly plastic, cohesive, calcareous (till).
50-55	SAND	Sand, medium, grey, well sorted, subrounded, quartz, calcareous.
55-59	CLAY	Clay, very sandy, olive-gray, soft, slightly plastic, cohesive, calcareous.
59-79	TILL	Clay, very sandy, pebbly, olive-gray, soft, slightly plastic, slightly cohesive; interbedded sand (till).
79-85	SAND	Sand, medium, grey, well sorted, subangular and subrounded, limestone, shale, and igneous.
85-124	TILL	Sand, very clayey, pebbly, light olive-gray, firm, nonplastic, cohesive; interbedded sand (till).
124-145	TILL	Clay, very sandy, pebbly, olive-gray, firm, slightly plastic, cohesive, calcareous (till).
145-152	SAND	Sand, medium, grey, well sorted, subrounded, quartz, limestone and shale.
152-170	TILL	Clay, sandy, pebbly, olive-gray, soft, plastic, cohesive (till).
170-178	SAND	Sand, fine to coarse, medium sorted, subangular and subrounded, shale, limestone and quartz.
178-193	TILL	Clay, sandy, pebbly, olive-gray, soft, slightly plastic, cohesive; contains cobbles (till).
193-197	SAND	Sand, fine and medium, well sorted, subrounded.
197-201	TILL	Clay, very sandy, pebbly, olive-gray, soft, plastic, cohesive; contains cobbles (till).
201-268	SAND & GRAVEL	Sand, fine to coarse, pebbly, poorly sorted, subangular and subrounded, shale, limestone and igneous; interbedded till, cobbles and boulders.
268-280	TILL	Clay, silty, sandy, olive-gray to olive-black, soft, plastic, cohesive; interbedded gravel.
280-336	SHALE	Shale, olive-black, soft, plastic, cohesive, calcareous.
336-345	SAND	Sand, fine, light gray, well sorted, subangular, quartz, limestone and shale.
345-358	CLAY	Clay, sandy, light greenish-gray to white, soft (weathered granite).
358-358	ROCK	Granite, hard; no return.

131-051-15CCB
Leonard Jelinek

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	1072	Well Type:	2 in. - Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screen Int. (ft.):	0-45	Data Source:	

Completion Info:

Remarks: WQ; GW ?

Lithologic Log

Depth (ft)	Unit	Description

131-051-19AAA
Henry Dalczal

Date Completed:	06/10/1998	Purpose:	Domestic Well
L.S. Elevation (ft):	1097	Well Type:	4 in. - PVC
Depth Drilled (ft):	55	Aquifer:	Undefined
Screen Int. (ft.):	45-55	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	SOIL	
1-30	CLAY	yellow
30-40	CLAY	blue
40-50	SAND	fine, clean, gwl
50-55	SAND	clean, fine, gwl

131-051-19CBB
Arthur Heley

Date Completed:	04/08/1974	Purpose:	Domestic Well
L.S. Elevation (ft):	1097	Well Type:	4 in. - PVC
Depth Drilled (ft):	65	Aquifer:	Undefined
Screen Int. (ft.):	55-65	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-3	SOIL	black
3-25	CLAY	yellow
25-30	GRAVEL	coarse
30-40	SAND	fine
40-50	CLAY	very hard, blue
50-55	CLAY	blue, with fine sand strips
55-65	SAND	very good water bearing, grayish

131-051-21BBA
Harvey Heley

Date Completed:	09/20/1974	Purpose:	Domestic Well
L.S. Elevation (ft):	1075	Well Type:	4 in. - PVC
Depth Drilled (ft):	55	Aquifer:	Undefined
Screen Int. (ft.):	45-55	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-20	CLAY	yellow
20-25	SILT	silt, soil
25-30	CLAY	blue
30-35	SAND	fine
35-45	SAND	fine, dirty
45-55	SAND	fine

131-051-22CCC1
SHD

Date Completed:	06/14/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1076	Well Type:	2 in. - PVC
Depth Drilled (ft):	269	Aquifer:	Undefined
Screen Int. (ft.):	221-230	Data Source:	

Completion Info:

Remarks: SHD; NO. 3-1,

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Silt, black.
1-6	CLAY	Clay, silty, sandy, yellowish-brown.
6-14	TILL	Clay, silty, yellowish-brown (till).
14-26.5	TILL	Clay, silty, olive-gray (till).
26.5-55	SAND	Sand, fine and medium, medium gray.
55-59	TILL	Clay, silty, olive-gray (till).
59-72	CLAY	Clay, sandy, olive-gray.
72-75	TILL	Clay, silty, sandy, olive-gray (till).
75-110	CLAY	Clay, silty, sandy, olive-gray.
110-137	CLAY	Clay, silty, light gray to olive-gray.
137-140	TILL	Clay, silty, olive-gray (till).
140-148	GRAVEL	Gravel; contains cobbles.
148-207	TILL	Clay, silty, olive-gray; contains cobbles from 148 to 158 feet (till).
207-210	CLAY	Clay, silty, olive-gray.
210-235	TILL	Clay, silty, olive-gray; pebbly from 220 to 230 feet (till).
235-240	CLAY	Clay, silty, brownish-gray.
240-250	TILL	Clay, silty, brownish-gray (till)
250-269	SHALE	Shale, silty, brownish-gray.

131-051-22CCC2

Date Completed:	06/21/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1076	Well Type:	2 in. - PVC
Depth Drilled (ft):	148	Aquifer:	Undefined
Screen Int. (ft.):	143-148	Data Source:	

Completion Info:

Remarks: SHD; 3-2,

Lithologic Log

Depth (ft)	Unit	Description
0-0	See 13105122CCC1	

131-051-22CCC3

Date Completed:	06/21/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1077	Well Type:	2 in. - PVC
Depth Drilled (ft):	55	Aquifer:	Undefined
Screen Int. (ft.):	50-55	Data Source:	

Completion Info:

Remarks: SHD; 3-3,

Lithologic Log

Depth (ft)	Unit	Description
0-0	See 13105122CCC1	

131-051-22CCC4

Date Completed:	06/22/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1077	Well Type:	2 in. - PVC
Depth Drilled (ft):	20	Aquifer:	Undefined
Screen Int. (ft.):	10-20	Data Source:	

Completion Info:

Remarks: SHD; 3-4,

Lithologic Log

Depth (ft)	Unit	Description
0-0	See 13105122CCC1	

131-051-23BBB1
SHD

Date Completed:	06/06/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1073	Well Type:	2 in. - PVC
Depth Drilled (ft):	306	Aquifer:	Undefined
Screen Int. (ft.):	289-299	Data Source:	

Completion Info:

Remarks: SHD,1-1,

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Silt, black.
1-7	SAND	Sand, fine to coarse, pebbly.
7-19	TILL	Clay, silty, yellowish-brown; interbedded sand from 15 to 19 feet (till).
19-21	CLAY	Clay, silty, olive-gray.
21-31	SAND	Sand, fine, medium gray.
31-40	CLAY	Clay, silty, sandy, olive-gray, interbedded sand.
40-49	CLAY	Clay, very sandy, medium gray.
49-62	SAND	Sand, fine, medium gray.
62-81	CLAY	Clay, silty, very sandy, medium gray.
81-129	CLAY	Clay, silty, olive-gray.
129-138	TILL	Clay, silty, olive-gray (till).
138-147	SAND	Sand, fine and medium, contains detrital lignite.
147-154	TILL	Clay, silty, pebbly, olive-grey (till).
154-157	GRAVEL	Gravel, fine to coarse.
157-169	TILL	Clay, silty, olive-grey (till).
169-173	GRAVEL	Gravel; contains cobbles.
173-193	TILL	Clay, silty, pebbly, olive-grey (till)
193-196	GRAVEL	Gravel, sandy.
196-198	TILL	Clay, silty, olive-grey till).
198-199	GRAVEL	Gravel, sandy.
199-204	CLAY	Clay, silty, brownish-gray.
204-222	TILL	Clay, silty, olive-gray; interbedded sand, gravel and cobbles from 209 to 222 feet (till)
222-248	GRAVEL	Gravel, fine to coarse, sandy; contains cobbles.
248-277	SAND	Sand, fine to coarse, pebbly.
277-285	TILL	Clay, silty, olive-gray (till).
285-290	TILL	Clay, silty, yellowish-brown (till).
290-295	TILL	Clay, silty, olive-gray (till).
295-306	SHALE	Shale, silty, brownish-gray.

131-051-23BBB2
NDSWC

Date Completed:	06/13/1984	Purpose:	Observation Well
L.S. Elevation (ft):	1071	Well Type:	2 in. - PVC
Depth Drilled (ft):	276	Aquifer:	Undefined
Screen Int. (ft.):	271-276	Data Source:	Well Driller's Report

Completion Info:

Remarks:
SHD; 1-2

Lithologic Log

Depth (ft)	Unit	Description
0-0	See 13105123BBB1	

131-051-23BBB3
SHD

Date Completed:	06/20/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1073	Well Type:	2 in. - PVC
Depth Drilled (ft):	147	Aquifer:	Undefined
Screen Int. (ft.):	142-147	Data Source:	

Completion Info:

Remarks: SHD; 1-3,

Lithologic Log

Depth (ft)	Unit	Description
0-0	See 13105123BBB1	

131-051-23BBB4
SHD

Date Completed:	06/20/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1073	Well Type:	2 in. - PVC
Depth Drilled (ft):	62	Aquifer:	Undefined
Screen Int. (ft.):	57-62	Data Source:	

Completion Info:

Remarks: SHD; 1-4,

Lithologic Log

Depth (ft)	Unit	Description
0-0	See 13105123BBB1	

131-051-23BBB5
SHD

Date Completed:	06/21/1984	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1073	Well Type:	2 in. - PVC
Depth Drilled (ft).	26	Aquifer:	Undefined
Screen Int. (ft.):	16-26	Data Source:	

Completion Info:

Remarks: SHD; 1-5,

Lithologic Log

Depth (ft)	Unit	Description
0-0	See 13105123BBB1	

131-051-24CBA
Howard Haley

Date Completed:	10/26/1973	Purpose:	Stock Well
L.S. Elevation (ft):	1060	Well Type:	2 in. - Steel
Depth Drilled (ft):	30	Aquifer:	Undefined
Screen Int. (ft.):	20-30	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	Black
1-10	SOIL	Silty, brown
10-20	SAND	Fine, very dirty
20-30	SAND	Medium and fine sand mixed with layers of clay

131-051-24CBA2
Howard Heley

Date Completed:	10/06/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	1060	Well Type:	4 in. - PVC
Depth Drilled (ft):	45	Aquifer:	Undefined
Screen Int. (ft.):	35-45	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-25	CLAY	yellow
25-30	SAND	fine, mixed clay
30-35	SAND	fine
35-45	SAND	.008 slot, gray

131-051-25CCB
Leonard Hejtmanek

Date Completed:	07/16/1989	Purpose:	Domestic Well
L.S. Elevation (ft):	1081	Well Type:	4 in. - PVC
Depth Drilled (ft):	52	Aquifer:	Undefined
Screen Int. (ft.):	42-52	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-35	CLAY	small, rock, yellow clay
35-40	CLAY	hard
40-52	SAND	fine, grey, very clean, bottom formation

131-051-26BBC
Ray Jelinek

Date Completed:	06/05/1979	Purpose:	Domestic Well
L.S. Elevation (ft):	1080	Well Type:	4 in. - PVC
Depth Drilled (ft):	60	Aquifer:	Undefined
Screen Int. (ft.):	50-60	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	SOIL	black
2-20	CLAY	fine, yellow
20-50	SAND	fine, dirty
50-60	SAND	fine, gray

131-051-31DBA
Hubert Honl

Date Completed:	1/1913	Purpose:	Domestic Well
L.S. Elevation (ft):	1104	Well Type:	1.25 in. - Steel
Depth Drilled (ft):	0	Aquifer:	Dakota Group
Screen Int. (ft.):	0-760	Data Source:	

Completion Info:

Remarks: WQ; GW 7

Lithologic Log

Depth (ft)	Unit	Description

131-051-34DAD
Ray Zajac

Date Completed:	12/14/1992	Purpose:	Domestic Well
L.S. Elevation (ft):	1100	Well Type:	4 in. - PVC
Depth Drilled (ft):	100	Aquifer:	Undefined
Screen Int. (ft.):	50-60	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
1-20	SOIL	fine, sandy
20-30	SOIL	silty
30-40	CLAY	gray, silty
40-50	SAND	no good sand
50-60	SAND	good sand, .010-.012
60-100	SAND	sand strips, muddy, no good

131-051-35DDD
City Lidgerwood

Date Completed:	10/30/1983	Purpose:	Municipal Well
L.S. Elevation (ft):	1084	Well Type:	4 in. - PVC
Depth Drilled (ft):	170	Aquifer:	Undefined
Screen Int. (ft.)	130-148	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-2	TOPSOIL	black
2-20	CLAY	yellow
20-30	CLAY	yellow
30-55	CLAY	blue-gray
55-90	SAND	yellow
90-100	SAND	good water sand
100-120	SAND	water bearing sand
120-140	SAND	.025-.030 slot water sand
140-150	SAND	nice water sand
150-160	SAND	fine water sand, gray
160-170	SAND	fine water sand

131-051-36BBC
David Heley

Date Completed:	06/23/1989	Purpose:	Domestic Well
L.S. Elevation (ft):	1083	Well Type:	4 in. - Unknown
Depth Drilled (ft):	32	Aquifer:	Undefined
Screen Int. (ft.):	22-32	Data Source:	Wieber Well Drilling

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-1	TOPSOIL	
1-6	CLAY	Yellow
6-10	CLAY	Soft, blue
10-18	SAND	Fine, gray
18-32	SAND	Clean, fine

APPENDIX II
WATER LEVELS IN WELLS

128-051-26BBB2S **MP Elev (msl,ft)=1,201.03**
Undefined Aquifer **SI (ft.)=75-80**

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
07/17/91	48.42	1152.61	
08/20/91	48.20	1152.83	
04/07/92	47.92	1153.11	
05/07/92	47.96	1153.07	
06/03/92	47.88	1153.15	
07/07/92	47.84	1153.19	
07/29/92	47.88	1153.15	
08/10/92	47.89	1153.14	
09/09/92	47.68	1153.35	
10/13/92	47.68	1153.35	
11/10/92	47.71	1153.32	
12/08/92	47.69	1153.34	
04/13/93	47.73	1153.30	
05/11/93	47.63	1153.40	
06/15/93	47.38	1153.65	
07/07/93	46.80	1154.23	
08/10/93	45.90	1155.13	
09/08/93	45.35	1155.68	
10/06/93	44.99	1156.04	
11/17/93	44.86	1156.17	
12/14/93	44.75	1156.28	
04/20/94	44.03	1157.00	
05/19/94	43.33	1157.70	
06/22/94	42.76	1158.27	
07/26/94	42.37	1158.66	
08/24/94	42.08	1158.95	
09/21/94	42.08	1158.95	
10/25/94	42.25	1158.78	
11/17/94	42.09	1158.94	
12/14/94	42.47	1158.56	
05/16/95	41.64	1159.39	
06/13/95	40.98	1160.05	
07/25/95	40.29	1160.74	
09/06/95	40.29	1160.74	
10/18/95	40.31	1160.72	
11/21/95	40.32	1160.71	
05/01/96	40.21	1160.82	

Date	Depth to Water (ft)	WL Elev (msl, ft)
07/16/96	38.82	1162.21
05/28/97	37.30	1163.73
08/13/97	36.71	1164.32
09/17/97	36.78	1164.25
10/15/97	37.04	1163.99
11/19/97	37.20	1163.83
12/15/97	37.26	1163.77
05/12/98	36.30	1164.73
06/16/98	34.56	1166.47
07/15/98	34.11	1166.92
08/25/98	33.99	1167.04
10/12/98	34.51	1166.52
10/15/98	34.46	1166.57
12/02/98	34.18	1166.85
05/25/99	33.08	1167.95
06/23/99	31.93	1169.10
07/21/99	31.88	1169.15
09/01/99	32.14	1168.89
10/06/99	32.65	1168.38
11/03/99	32.77	1168.26
12/08/99	33.07	1167.96
05/16/00	33.99	1167.04
08/16/00	32.35	1168.68
11/28/00	32.70	1168.33
05/16/01	31.50	1169.53
06/13/01	29.92	1171.11
07/19/01	29.31	1171.72
08/15/01	29.59	1171.44
09/12/01	30.19	1170.84
10/11/01	30.29	1170.74
11/15/01	30.96	1170.07
12/04/01	31.11	1169.92
05/15/02	32.58	1168.45
06/26/02	32.78	1168.25
08/07/02	33.03	1168.00
09/18/02	33.11	1167.92

Date	Depth to Water (ft)	WL (msl,
11/06/02	33.59	1167.44
12/11/02	33.81	1167.22
05/08/03	35.20	1165.83
06/04/03	35.02	1166.01
07/09/03	34.44	1166.59
08/06/03	34.06	1166.97
09/03/03	34.16	1166.87
09/18/03	34.00	1167.03
10/01/03	34.40	1166.63
11/04/03	34.47	1166.56
12/03/03	34.77	1166.26
05/05/04	35.44	1165.59
06/09/04	35.50	1165.53
07/14/04	34.66	1166.37
08/11/04	34.08	1166.95
09/01/04	34.14	1166.89
10/13/04	34.07	1166.96
11/09/04	33.87	1167.16
12/08/04	33.20	1167.83
05/04/05	34.01	1167.02
06/02/05	33.68	1167.35
07/06/05	30.88	1170.15
08/10/05	29.21	1171.82
09/06/05	28.17	1172.86
10/03/05	27.42	1173.61
11/10/05	27.16	1173.87
06/07/06	24.81	1176.22
07/12/06	24.99	1176.04
08/08/06	25.81	1175.22
09/05/06	26.47	1174.56
10/11/06	26.92	1174.11
11/06/06	27.24	1173.79
05/16/07	27.19	1173.84
06/13/07	24.69	1176.34
07/18/07	23.05	1177.98
08/16/07	23.83	1177.20

129-049-19CBD2S
Unnamed Aquifer

MP Elev (msl,ft)=1,092.00
SI (ft.)=85-90

Date	Depth to Water (ft)	WL Elev (msl, ft)
11/05/02	24.07	1067.93
12/11/02	23.54	1068.46
05/06/03	23.82	1068.18
06/04/03	23.31	1068.69
07/09/03	22.61	1069.39
08/06/03	31.65	1060.35
09/03/03	35.12	1056.88
10/01/03	38.13	1053.87
11/04/03	28.90	1063.10
12/03/03	26.28	1065.72
05/05/04	37.25	1054.75
06/09/04	30.42	1061.58
07/14/04	25.23	1066.77
08/10/04	28.08	1063.92
09/01/04	26.41	1065.59
10/13/04	24.12	1067.88
11/09/04	23.48	1068.52
12/08/04	22.92	1069.08
05/04/05	24.84	1067.16
06/01/05	23.89	1068.11
07/06/05	24.06	1067.94
08/09/05	27.57	1064.43
09/07/05	24.35	1067.65
10/03/05	24.10	1067.90
11/09/05	24.10	1067.90
05/11/06	22.85	1069.15
06/07/06	23.98	1068.02
07/12/06	28.28	1063.72
08/08/06	30.83	1061.17
09/05/06	27.55	1064.45
10/11/06	26.97	1065.03
11/07/06	26.26	1065.74
05/16/07	23.06	1068.94
06/13/07	20.45	1071.55
06/14/07	20.67	1071.33
07/18/07	21.76	1070.24
08/16/07	26.26	1065.74

129-049-27CDD2
Unnamed Aquifer

MP Elev (msl,ft)=1,171.85
SI (ft.)=70-75

Date	Depth to Water (ft)	WL Elev (msl, ft)
11/05/02	5.60	-5.60
12/11/02	5.60	-5.60
05/06/03	6.71	-6.71
06/04/03	6.68	-6.68
07/09/03	6.31	-6.31
08/06/03	6.33	-6.33
09/03/03	7.35	-7.35
10/01/03	11.61	-11.61
11/04/03	12.52	-12.52
12/03/03	10.92	-10.92
05/05/04	11.84	-11.84
06/09/04	12.82	-12.82
07/14/04	10.50	-10.50
08/10/04	10.31	-10.31
09/01/04	9.76	-9.76
10/13/04	7.95	-7.95
11/09/04	7.18	-7.18
12/08/04	6.57	-6.57
05/04/05	6.52	-6.52
06/01/05	6.35	-6.35
07/06/05	6.00	-6.00
08/09/05	7.37	-7.37
09/07/05	6.77	-6.77
10/03/05	6.10	-6.10
11/09/05	5.26	-5.26
05/11/06	4.23	-4.23
06/07/06	4.54	-4.54
07/12/06	6.73	-6.73
08/08/06	10.65	-10.65
09/05/06	12.12	-12.12
10/11/06	9.35	-9.35
11/07/06	7.88	-7.88
05/16/07	5.67	1166.18
06/13/07	5.04	1166.81
06/14/07	4.88	1166.97
07/18/07	4.89	1166.96
08/16/07	8.04	1163.81

129-049-30DCC2
Unnamed Aquifer

MP Elev (msl,ft)=1,082.10
SI (ft.)=60-65

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
11/05/02	11.35	1070.75	
12/11/02	11.50	1070.60	
05/06/03	11.23	1070.87	
06/04/03	10.37	1071.73	
07/09/03	9.60	1072.50	
08/06/03	10.85	1071.25	
09/03/03	12.45	1069.65	
10/01/03	13.20	1068.90	
11/04/03	13.29	1068.81	
12/03/03	13.13	1068.97	
05/05/04	12.51	1069.59	
06/09/04	10.47	1071.63	
07/14/04	9.88	1072.22	
08/10/04	10.68	1071.42	
09/01/04	11.32	1070.78	
10/13/04	9.94	1072.16	
11/09/04	9.63	1072.47	
12/08/04	9.78	1072.32	
05/04/05	10.20	1071.90	
06/01/05	9.69	1072.41	
07/06/05	8.67	1073.43	
08/09/05	9.15	1072.95	
09/07/05	9.03	1073.07	
10/03/05	9.08	1073.02	
11/09/05	8.82	1073.28	
05/11/06	7.72	1074.38	
06/07/06	8.41	1073.69	
07/12/06	9.54	1072.56	
08/08/06	10.82	1071.28	
09/05/06	10.49	1071.61	
10/11/06	9.83	1072.27	
11/07/06	9.75	1072.35	
05/16/07	8.62	1073.48	
06/13/07	7.82	1074.28	
06/14/07	7.70	1074.40	
07/18/07	8.94	1073.16	
08/16/07	9.74	1072.36	

129-049-30DDD
Undefined Aquifer

MP Elev (msl,ft)=1,096.70
SI (ft.)=169-174

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
11/05/02	31.32	1065.38	
12/11/02	31.28	1065.42	
05/06/03	31.93	1064.77	
06/04/03	31.52	1065.18	
07/09/03	31.07	1065.63	
08/06/03	31.19	1065.51	
09/03/03	31.80	1064.90	
10/01/03	32.40	1064.30	
11/04/03	32.83	1063.87	
12/03/03	32.99	1063.71	
05/05/04	32.90	1063.80	
06/09/04	32.59	1064.11	
07/14/04	32.02	1064.68	
08/10/04	31.93	1064.77	
09/01/04	32.00	1064.70	
10/13/04	31.47	1065.23	
11/09/04	31.16	1065.54	
12/08/04	30.72	1065.98	
05/04/05	31.15	1065.55	
06/01/05	30.84	1065.86	
07/06/05	30.37	1066.33	
08/09/05	30.19	1066.51	
09/07/05	30.19	1066.51	
10/03/05	30.10	1066.60	
11/09/05	29.90	1066.80	
05/11/06	29.28	1067.42	
06/07/06	29.31	1067.39	
07/12/06	29.75	1066.95	
08/08/06	30.47	1066.23	
09/05/06	30.73	1065.97	
10/11/06	30.68	1066.02	
11/07/06	30.82	1065.88	
05/16/07	30.15	1066.55	
06/13/07	29.88	1066.82	
06/14/07	29.57	1067.13	
07/18/07	29.85	1066.85	
08/16/07	29.91	1066.79	

129-050-03BBB
Brightwood Aquifer

MP Elev (msl,ft)=1,131.83
SI (ft.)=138-143

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/02/92	30.46	1101.37
09/08/92	30.43	1101.40
10/14/92	30.57	1101.26
11/10/92	30.60	1101.23
12/09/92	30.56	1101.27
04/13/93	30.20	1101.63
05/11/93	30.06	1101.77
06/14/93	29.93	1101.90
07/08/93	29.78	1102.05
08/09/93	29.49	1102.34
08/18/93	29.45	1102.38
09/08/93	29.38	1102.45
10/06/93	29.30	1102.53
11/16/93	29.35	1102.48
12/15/93	29.37	1102.46
04/21/94	28.80	1103.03
05/19/94	28.58	1103.25
06/21/94	28.55	1103.28
07/27/94	28.25	1103.58
08/24/94	28.13	1103.70
09/21/94	28.12	1103.71
10/26/94	28.10	1103.73
11/16/94	28.07	1103.76
12/14/94	28.27	1103.56
05/16/95	27.50	1104.33
06/14/95	27.38	1104.45
07/25/95	27.20	1104.63
09/06/95	27.27	1104.56
10/18/95	27.21	1104.62
11/21/95	27.29	1104.54
05/01/96	27.02	1104.81
06/06/96	26.48	1105.35
07/17/96	26.40	1105.43
08/27/96	26.54	1105.29
10/08/96	26.64	1105.19
12/10/96	26.82	1105.01
05/28/97	25.12	1106.71
08/13/97	25.42	1106.41
09/17/97	25.60	1106.23
10/15/97	25.80	1106.03
11/19/97	25.84	1105.99
12/16/97	26.05	1105.78
05/12/98	25.45	1106.38
06/11/98	24.67	1107.16
07/15/98	24.49	1107.34
08/25/98	24.66	1107.17
10/15/98	24.92	1106.91
12/02/98	24.89	1106.94
05/25/99	24.69	1107.14
06/23/99	24.53	1107.30
07/22/99	24.45	1107.38
09/01/99	24.56	1107.27
10/06/99	24.52	1107.31
11/03/99	24.53	1107.30
12/08/99	24.74	1107.09
05/16/00	24.57	1107.26
08/16/00	24.34	1107.49
11/28/00	24.63	1107.20
05/16/01	23.72	1108.11
06/13/01	23.48	1108.35
07/19/01	23.66	1108.17
08/15/01	23.56	1108.27
09/12/01	23.82	1108.01
10/11/01	23.83	1108.00
11/15/01	23.98	1107.85
12/04/01	23.94	1107.89
05/15/02	24.44	1107.39
06/26/02	24.64	1107.19
08/07/02	24.73	1107.10
09/18/02	24.74	1107.09
11/06/02	24.98	1106.85
12/11/02	25.03	1106.80
05/06/03	25.38	1106.45
06/04/03	25.19	1106.64
07/09/03	24.19	1107.64
08/06/03	24.28	1107.55
09/03/03	24.47	1107.36
09/18/03	24.50	1107.33
10/01/03	24.73	1107.10
11/04/03	24.71	1107.12
12/03/03	24.91	1106.92
05/05/04	25.02	1106.81
06/09/04	24.48	1107.35
07/14/04	24.20	1107.63
08/10/04	24.22	1107.61
09/01/04	24.34	1107.49
10/13/04	24.33	1107.50
11/09/04	24.26	1107.57
12/08/04	24.28	1107.55
05/04/05	24.39	1107.44
06/01/05	24.32	1107.51
07/06/05	22.93	1108.90
08/09/05	22.71	1109.12
09/07/05	22.35	1109.48
10/03/05	22.12	1109.71
11/09/05	22.12	1109.71
05/11/06	20.62	1111.21
06/07/06	20.73	1111.10
07/12/06	21.06	1110.77
08/08/06	21.44	1110.39
09/05/06	21.66	1110.17
10/11/06	21.82	1110.01
11/07/06	21.97	1109.86
05/16/07	22.16	1109.67
06/13/07	21.25	1110.58
07/18/07	21.31	1110.52
08/16/07	21.53	1110.30

129-050-05BBB
Brightwood Aquifer

MP Elev (msl,ft)=1,218.70
SI (ft.)=125-140

Date	Depth to Water (ft)	WL Elev (msl, ft)
07/07/66	86.05	1132.65
07/12/67	85.70	1133.00
07/10/68	85.31	1133.39
07/10/69	84.58	1134.12
12/02/69	84.52	1134.18
12/01/70	85.01	1133.69
12/01/71	85.06	1133.64
12/06/72	84.50	1134.20
12/04/73	84.94	1133.76
12/03/74	85.56	1133.14
12/03/75	84.42	1134.28
12/01/76	84.43	1134.27
12/06/77	84.77	1133.93
11/21/78	83.25	1135.45
11/29/79	83.84	1134.86
11/18/80	83.86	1134.84
12/01/81	84.02	1134.68
11/30/82	84.18	1134.52
08/25/83	84.42	1134.28
11/29/83	84.47	1134.23
07/17/86	84.54	1134.16
11/25/86	84.57	1134.13
11/25/87	84.10	1134.60
11/22/88	84.14	1134.56
08/01/89	83.85	1134.85
11/29/89	83.84	1134.86
11/13/90	83.95	1134.75
06/28/91	84.22	1134.48
08/20/91	84.04	1134.66
11/18/91	84.00	1134.70
04/07/92	84.20	1134.50
05/07/92	84.20	1134.50
06/03/92	84.17	1134.53
06/23/92	84.10	1134.60
07/07/92	84.21	1134.49
07/29/92	84.18	1134.52
08/10/92	84.20	1134.50
09/08/92	84.12	1134.58
10/14/92	84.32	1134.38
11/10/92	84.27	1134.43
12/09/92	84.26	1134.44
04/13/93	84.16	1134.54
05/11/93	84.07	1134.63
06/14/93	84.08	1134.62
06/15/93	83.94	1134.76
07/08/93	84.02	1134.68
08/09/93	83.88	1134.82
08/18/93	83.83	1134.87
09/08/93	83.73	1134.97
10/06/93	83.69	1135.01
11/09/93	83.64	1135.06
11/16/93	83.73	1134.97
12/15/93	83.68	1135.02
04/21/94	83.39	1135.31
05/19/94	83.25	1135.45
06/21/94	83.08	1135.62
07/27/94	83.04	1135.66
08/24/94	82.98	1135.72
09/21/94	83.00	1135.70
10/26/94	82.86	1135.84
11/16/94	82.77	1135.93
12/14/94	82.82	1135.88
05/16/95	82.50	1136.20
06/13/95	82.36	1136.34
07/25/95	82.25	1136.45
09/06/95	82.18	1136.52
10/18/95	82.00	1136.70
11/21/95	81.99	1136.71
05/01/96	81.68	1137.02
06/06/96	81.52	1137.18
07/16/96	81.20	1137.50
08/27/96	81.20	1137.50
10/08/96	81.18	1137.52
12/10/96	81.10	1137.60
05/28/97	80.36	1138.34
08/13/97	80.17	1138.53
09/17/97	80.10	1138.60
10/15/97	81.07	1137.63
11/19/97	80.09	1138.61
12/16/97	80.19	1138.51
05/12/98	79.89	1138.81
06/11/98	79.56	1139.14
07/15/98	79.45	1139.25
08/25/98	79.21	1139.49
10/15/98	79.01	1139.69
12/02/98	78.97	1139.73
05/25/99	78.72	1139.98
06/23/99	78.63	1140.07
07/21/99	78.54	1140.16
09/01/99	78.43	1140.27
10/06/99	78.31	1140.39
11/03/99	78.35	1140.35
12/08/99	78.41	1140.29
05/16/00	78.13	1140.57
08/16/00	78.07	1140.63
11/28/00	78.05	1140.65
05/16/01	77.60	1141.10
06/13/01	77.41	1141.29
07/19/01	77.27	1141.43
08/15/01	77.24	1141.46
09/12/01	77.30	1141.40
10/11/01	77.12	1141.58
11/15/01	77.19	1141.51
12/04/01	77.24	1141.46
05/15/02	77.18	1141.52
06/26/02	77.21	1141.49
08/07/02	77.33	1141.37
09/18/02	77.25	1141.45
11/06/02	77.44	1141.26
12/11/02	77.47	1141.23
05/07/03	77.90	1140.80
06/04/03	77.63	1141.07
07/09/03	77.44	1141.26
08/06/03	77.42	1141.28
09/03/03	77.44	1141.26
09/18/03	77.50	1141.20
10/01/03	77.56	1141.14
11/04/03	77.48	1141.22
12/03/03	77.59	1141.11
05/05/04	77.61	1141.09
06/09/04	77.67	1141.03
07/14/04	77.60	1141.10
08/11/04	77.58	1141.12
09/01/04	77.59	1141.11
10/13/04	77.60	1141.10
11/09/04	77.54	1141.16
12/08/04	77.55	1141.15
05/04/05	77.50	1141.20
06/02/05	77.51	1141.19
07/06/05	77.21	1141.49
08/10/05	76.86	1141.84
09/06/05	76.66	1142.04
10/03/05	76.41	1142.29
11/09/05	76.28	1142.42
05/11/06	75.42	1143.28
06/07/06	75.14	1143.56
07/12/06	74.81	1143.89
08/08/06	74.84	1143.86
09/05/06	74.85	1143.85
10/11/06	74.81	1143.89
11/06/06	74.78	1143.92

129-050-05BBB (Continued),MP Elev (msl,ft)=1218.7Brightwood AquiferSI (ft.)=125-140

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
05/16/07	74.70	1144.00	
08/16/07	74.22	1144.48	
07/18/07	74.22	1144.48	
06/13/07	74.47	1144.23	

129-050-08DDD2
Brightwood Aquifer

MP Elev (msl,ft)=1,151.14
SI (ft.)=68-73

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
10/26/94	25.98	1125.16	
11/16/94	25.90	1125.24	
12/14/94	26.17	1124.97	
05/16/95	25.37	1125.77	
06/13/95	24.80	1126.34	
07/25/95	24.57	1126.57	
09/06/95	24.75	1126.39	
10/18/95	24.72	1126.42	
11/21/95	24.74	1126.40	
05/01/96	24.55	1126.59	
06/06/96	23.53	1127.61	
07/16/96	23.60	1127.54	
08/27/96	23.88	1127.26	
10/08/96	23.98	1127.16	
12/10/96	24.14	1127.00	
05/28/97	21.38	1129.76	
08/13/97	21.76	1129.38	
09/17/97	22.34	1128.80	
10/15/97	22.70	1128.44	
11/19/97	22.64	1128.50	
12/15/97	22.73	1128.41	
05/12/98	21.82	1129.32	
07/15/98	19.66	1131.48	
08/25/98	20.45	1130.69	
10/15/98	20.93	1130.21	
12/02/98	20.76	1130.38	
05/25/99	20.20	1130.94	
06/16/99	19.92	1131.22	
06/23/99	19.59	1131.55	
07/21/99	19.59	1131.55	
09/01/99	20.02	1131.12	
10/06/99	19.98	1131.16	
11/03/99	20.05	1131.09	
12/08/99	20.37	1130.77	
05/16/00	20.62	1130.52	
08/16/00	18.80	1132.34	
11/28/00	20.59	1130.55	
05/16/01	18.44	1132.70	
06/13/01	18.18	1132.96	
07/19/01	18.23	1132.91	
08/15/01	18.61	1132.53	
09/12/01	19.27	1131.87	
10/11/01	19.30	1131.84	
11/15/01	19.60	1131.54	
12/04/01	19.69	1131.45	
05/15/02	20.34	1130.80	
06/26/02	20.71	1130.43	
08/07/02	20.88	1130.26	
09/18/02	20.93	1130.21	
11/06/02	21.31	1129.83	
12/11/02	21.33	1129.81	
05/07/03	22.02	1129.12	
06/04/03	21.80	1129.34	
07/09/03	19.67	1131.47	
08/06/03	20.15	1130.99	
09/03/03	20.59	1130.55	
10/01/03	20.88	1130.26	
11/04/03	20.91	1130.23	
12/03/03	21.23	1129.91	
05/05/04	21.64	1129.50	
06/09/04	20.34	1130.80	
07/14/04	20.02	1131.12	
08/11/04	20.30	1130.84	
08/19/04	20.40	1130.74	
09/01/04	20.62	1130.52	
10/13/04	20.78	1130.36	
11/09/04	20.70	1130.44	
12/08/04	20.76	1130.38	
05/04/05	21.34	1129.80	
06/02/05	21.08	1130.06	
07/06/05	17.16	1133.98	
08/10/05	17.92	1133.22	
09/06/05	16.83	1134.31	
10/03/05	16.39	1134.75	
11/10/05	16.39	1134.75	
05/09/06	13.50	1137.64	
06/07/06	14.27	1136.87	
07/12/06	15.05	1136.09	
08/08/06	15.85	1135.29	
09/05/06	16.22	1134.92	
10/11/06	16.38	1134.76	
11/06/06	16.71	1134.43	
05/16/07	16.20	1134.94	
06/13/07	13.80	1137.34	
07/18/07	14.90	1136.24	
08/16/07	15.68	1135.46	

129-050-18CCC
Brightwood Aquifer

MP Elev (msl,ft)=1,200.42
SI (ft.)=138-143

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/02/92	58.34	1142.08
09/09/92	58.90	1141.52
10/13/92	58.39	1142.03
11/10/92	58.75	1141.67
12/08/92	58.89	1141.53
04/13/93	59.14	1141.28
05/11/93	59.19	1141.23
06/15/93	58.54	1141.88
07/07/93	58.50	1141.92
08/10/93	58.33	1142.09
08/18/93	58.25	1142.17
09/08/93	57.83	1142.59
10/06/93	57.85	1142.57
11/17/93	58.10	1142.32
04/20/94	57.54	1142.88
05/19/94	57.38	1143.04
06/22/94	56.95	1143.47
07/26/94	57.06	1143.36
08/24/94	56.93	1143.49
09/21/94	56.85	1143.57
10/25/94	56.86	1143.56
11/17/94	56.09	1144.33
12/14/94	56.55	1143.87
05/16/95	56.09	1144.33
06/13/95	55.74	1144.68
07/25/95	55.81	1144.61
09/06/95	55.49	1144.93
10/18/95	55.20	1145.22
11/21/95	55.44	1144.98
05/01/96	54.88	1145.54
06/06/96	54.70	1145.72
07/16/96	54.44	1145.98
08/27/96	54.30	1146.12
10/08/96	53.93	1146.49
12/10/96	53.85	1146.57
08/13/97	52.79	1147.63
09/17/97	52.53	1147.89
10/15/97	52.87	1147.55
11/19/97	52.21	1148.21
12/15/97	52.03	1148.39
05/12/98	51.70	1148.72
06/16/98	51.54	1148.88
07/15/98	51.46	1148.96
08/25/98	50.99	1149.43
10/15/98	50.55	1149.87
12/02/98	50.39	1150.03
05/25/99	49.78	1150.64
06/23/99	49.42	1151.00
07/21/99	49.42	1151.00
09/01/99	49.15	1151.27
10/06/99	49.01	1151.41
11/03/99	48.94	1151.48
12/08/99	49.14	1151.28
05/16/00	48.69	1151.73
08/16/00	48.59	1151.83
11/28/00	48.12	1152.30
05/16/01	47.83	1152.59
06/13/01	47.38	1153.04
07/19/01	47.42	1153.00
08/15/01	47.04	1153.38
09/12/01	47.44	1152.98
10/11/01	46.92	1153.50
11/15/01	46.99	1153.43
12/04/01	46.99	1153.43
05/15/02	46.73	1153.69
06/26/02	46.89	1153.53
08/07/02	47.58	1152.84
09/18/02	47.26	1153.16
11/06/02	47.86	1152.56
12/11/02	47.63	1152.79
05/07/03	48.30	1152.12
06/04/03	48.36	1152.06
07/09/03	48.24	1152.18
08/06/03	48.43	1151.99
09/03/03	48.39	1152.03
09/18/03	48.45	1151.97
10/01/03	48.63	1151.79
11/04/03	48.17	1152.25
12/03/03	48.49	1151.93
05/05/04	48.19	1152.23
06/09/04	48.79	1151.63
07/14/04	48.56	1151.86
08/11/04	48.59	1151.83
09/01/04	48.62	1151.80
10/13/04	48.61	1151.81
11/09/04	48.38	1152.04
12/08/04	48.43	1151.99
05/04/05	48.48	1151.94
06/02/05	48.43	1151.99
07/06/05	48.20	1152.22
08/10/05	47.76	1152.66
09/06/05	47.40	1153.02
10/03/05	46.84	1153.58
11/10/05	46.29	1154.13
05/09/06	44.16	1156.26
06/07/06	44.07	1156.35
07/12/06	43.51	1156.91
08/08/06	43.59	1156.83
09/05/06	43.40	1157.02
10/11/06	43.03	1157.39
11/06/06	43.10	1157.32
05/16/07	43.33	1157.09
06/13/07	42.85	1157.57
07/18/07	42.26	1158.16
08/16/07	42.29	1158.13
05/28/97	53.21	1147.21

129-050-24CCD1S
Undefined Aquifer

MP Elev (msl,ft)=1,090.97
SI (ft.)=198-203

Date	Depth to Water (ft)	WL Elev (msl, ft)
05/07/92	21.55	1069.42
06/03/92	21.51	1069.46
07/07/92	21.28	1069.69
07/30/92	16.98	1073.99
08/10/92	21.41	1069.56
09/09/92	21.39	1069.58
10/13/92	21.53	1069.44
11/10/92	21.56	1069.41
12/08/92	21.45	1069.52
04/13/93	21.46	1069.51
05/11/93	21.34	1069.63
06/15/93	21.04	1069.93
07/07/93	20.66	1070.31
08/10/93	20.39	1070.58
08/18/93	20.30	1070.67
09/08/93	20.32	1070.65
10/06/93	20.20	1070.77
11/17/93	20.15	1070.82
12/14/93	20.01	1070.96
04/20/94	19.82	1071.15
05/19/94	19.66	1071.31
06/22/94	19.70	1071.27
07/26/94	19.40	1071.57
08/24/94	19.48	1071.49
09/21/94	19.50	1071.47
10/25/94	19.52	1071.45
11/17/94	19.44	1071.53
12/14/94	19.29	1071.68
05/16/95	18.90	1072.07
06/14/95	19.16	1071.81
07/25/95	18.85	1072.12
09/06/95	18.58	1072.39
10/18/95	18.74	1072.23
11/21/95	18.67	1072.30
05/01/96	18.67	1072.30
06/06/96	18.49	1072.48
07/17/96	18.75	1072.22
08/27/96	19.00	1071.97
10/08/96	19.16	1071.81
12/10/96	18.68	1072.29
12/15/97	19.22	1071.75
05/12/98	18.76	1072.21
06/10/98	18.79	1072.18
07/15/98	18.92	1072.05
08/25/98	19.06	1071.91
10/15/98	19.40	1071.57
12/02/98	19.24	1071.73
05/25/99	18.98	1071.99
06/23/99	18.83	1072.14
07/22/99	18.86	1072.11
09/01/99	18.99	1071.98
10/06/99	19.11	1071.86
11/03/99	19.15	1071.82
12/08/99	19.28	1071.69
05/16/00	19.24	1071.73
08/16/00	19.37	1071.60
11/28/00	19.51	1071.46
05/16/01	19.47	1071.50
06/13/01	19.27	1071.70
07/19/01	19.34	1071.63
08/15/01	19.38	1071.59
09/12/01	18.61	1072.36
10/11/01	19.49	1071.48
11/15/01	19.61	1071.36
12/04/01	19.44	1071.53
05/15/02	19.56	1071.41
06/26/02	19.67	1071.30
08/07/02	19.81	1071.16
09/18/02	19.90	1071.07
11/05/02	20.05	1070.92
11/06/02	20.20	1070.77
12/11/02	20.09	1070.88
05/06/03	20.55	1070.42
06/04/03	20.49	1070.48
07/09/03	20.19	1070.78
08/06/03	20.39	1070.58
09/03/03	20.73	1070.24
10/01/03	21.09	1069.88
11/04/03	21.28	1069.69
12/03/03	21.58	1069.39
05/05/04	21.77	1069.20
06/09/04	21.54	1069.43
07/14/04	21.34	1069.63
08/10/04	21.37	1069.60
09/01/04	21.42	1069.55
10/13/04	20.95	1070.02
11/09/04	20.73	1070.24
12/08/04	20.52	1070.45
05/04/05	20.34	1070.63
06/01/05	20.17	1070.80
07/06/05	19.80	1071.17
08/09/05	19.63	1071.34
09/07/05	19.59	1071.38
10/03/05	19.56	1071.41
11/09/05	19.42	1071.55
05/11/06	18.60	1072.37
06/07/06	18.70	1072.27
07/12/06	18.87	1072.10
08/08/06	19.35	1071.62
09/05/06	19.47	1071.50
10/11/06	19.52	1071.45
11/07/06	19.53	1071.44
05/16/07	19.31	1071.66
07/18/07	20.30	1070.67
08/16/07	20.00	1070.97

129-050-24CCD2S
Undefined Aquifer

MP Elev (msl,ft)=1,092.59
SI (ft.)=137-142

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
05/07/92	23.38	1069.21	08/27/96	22.32	1070.27			
06/03/92	23.69	1068.90	10/08/96	22.59	1070.00	05/06/03	23.01	1069.58
07/07/92	22.82	1069.77	12/10/96	22.44	1070.15	06/04/03	22.46	1070.13
07/30/92	23.42	1069.17				07/09/03	21.64	1070.95
08/10/92	23.90	1068.69	12/15/97	21.92	1070.67	08/06/03	23.19	1069.40
09/09/92	24.27	1068.32				09/03/03	24.67	1067.92
10/13/92	24.71	1067.88	05/12/98	20.70	1071.89	10/01/03	25.45	1067.14
11/10/92	24.64	1067.95	06/10/98	19.38	1073.21	11/04/03	25.08	1067.51
12/08/92	24.33	1068.26	07/15/98	20.46	1072.13	12/03/03	24.58	1068.01
			08/25/98	22.13	1070.46			
04/13/93	23.05	1069.54	10/15/98	22.94	1069.65	05/05/04	24.70	1067.89
05/11/93	22.60	1069.99	12/02/98	21.54	1071.05	06/09/04	22.89	1069.70
06/15/93	22.30	1070.29				07/14/04	22.16	1070.43
07/07/93	21.06	1071.53	05/25/99	20.70	1071.89	08/10/04	22.90	1069.69
08/10/93	20.90	1071.69	06/23/99	20.85	1071.74	09/01/04	23.32	1069.27
08/18/93	21.01	1071.58	07/22/99	21.22	1071.37	10/13/04	22.13	1070.46
09/08/93	21.57	1071.02	09/01/99	22.18	1070.41	11/09/04	21.83	1070.76
10/06/93	21.96	1070.63	10/06/99	22.09	1070.50	12/08/04	21.93	1070.66
11/17/93	22.13	1070.46	11/03/99	22.01	1070.58			
12/14/93	22.06	1070.53	12/08/99	22.24	1070.35	05/04/05	22.24	1070.35
						06/01/05	21.80	1070.79
04/20/94	21.04	1071.55	05/16/00	21.34	1071.25	07/06/05	20.79	1071.80
05/19/94	20.80	1071.79	08/16/00	22.26	1070.33	08/09/05	21.44	1071.15
06/22/94	21.70	1070.89	11/28/00	22.59	1070.00	09/07/05	21.32	1071.27
07/26/94	20.77	1071.82				10/03/05	21.29	1071.30
08/24/94	21.60	1070.99	05/16/01	20.60	1071.99	11/09/05	21.18	1071.41
09/21/94	21.89	1070.70	06/13/01	21.57	1071.02			
10/25/94	21.81	1070.78	07/19/01	21.52	1071.07	05/11/06	19.96	1072.63
11/17/94	21.68	1070.91	08/15/01	22.28	1070.31	06/07/06	20.84	1071.75
12/14/94	21.80	1070.79	09/12/01	22.04	1070.55	07/12/06	22.13	1070.46
			10/11/01	22.53	1070.06	08/08/06	23.62	1068.97
05/16/95	19.96	1072.63	11/15/01	22.40	1070.19	09/05/06	23.04	1069.55
06/14/95	20.23	1072.36	12/04/01	22.25	1070.34	10/11/06	22.29	1070.30
07/25/95	20.90	1071.69				11/07/06	21.94	1070.65
09/06/95	21.50	1071.09	05/15/02	21.63	1070.96			
10/18/95	20.75	1071.84	06/26/02	22.26	1070.33	05/16/07	20.55	1072.04
11/21/95	20.54	1072.05	08/07/02	22.69	1069.90	06/13/07	19.74	1072.85
			09/18/02	23.39	1069.20	07/18/07	20.86	1071.73
05/01/96	20.75	1071.84	11/05/02	23.00	1069.59	08/16/07	21.95	1070.64
06/06/96	20.08	1072.51	11/06/02	23.02	1069.57	07/17/96	21.24	1071.35
12/11/02	23.24	1069.35						

129-050-24CCD3S **MP Elev (msl,ft)=1,090.64**
Undefined Aquifer **SI (ft.)=82-87**

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
05/07/92	20.15	1070.49	
06/03/92	20.36	1070.28	
07/07/92	19.36	1071.28	
07/30/92	19.95	1070.69	
08/10/92	20.44	1070.20	
09/09/92	21.05	1069.59	
10/13/92	21.52	1069.12	
11/10/92	21.47	1069.17	
12/08/92	21.18	1069.46	
04/13/93	19.84	1070.80	
05/11/93	19.09	1071.55	
06/15/93	18.75	1071.89	
07/07/93	17.80	1072.84	
08/10/93	17.53	1073.11	
08/18/93	17.71	1072.93	
09/08/93	18.31	1072.33	
10/06/93	18.78	1071.86	
11/17/93	19.07	1071.57	
12/14/93	19.00	1071.64	
04/20/94	17.77	1072.87	
05/19/94	17.45	1073.19	
06/22/94	18.42	1072.22	
07/26/94	17.39	1073.25	
08/24/94	18.22	1072.42	
09/21/94	18.57	1072.07	
10/25/94	18.57	1072.07	
11/17/94	18.45	1072.19	
12/14/94	18.61	1072.03	
05/16/95	16.49	1074.15	
06/14/95	16.68	1073.96	
07/25/95	17.43	1073.21	
09/06/95	18.11	1072.53	
10/18/95	17.30	1073.34	
11/21/95	17.09	1073.55	
05/01/96	17.50	1073.14	
06/06/96	16.55	1074.09	
07/17/96	17.73	1072.91	
08/27/96	18.95	1071.69	
10/08/96	19.46	1071.18	
12/10/96	19.36	1071.28	
12/15/97	18.81	1071.83	
05/12/98	17.30	1073.34	
06/10/98	17.07	1073.57	
07/15/98	16.91	1073.73	
08/25/98	18.79	1071.85	
10/15/98	19.87	1070.77	
12/02/98	18.30	1072.34	
05/25/99	17.30	1073.34	
06/23/99	17.40	1073.24	
07/22/99	17.78	1072.86	
09/01/99	18.92	1071.72	
10/06/99	18.84	1071.80	
11/03/99	18.80	1071.84	
12/08/99	19.08	1071.56	
05/16/00	18.10	1072.54	
08/16/00	19.04	1071.60	
11/28/00	19.61	1071.03	
05/16/01	17.21	1073.43	
06/13/01	17.19	1073.45	
07/19/01	18.05	1072.59	
08/15/01	18.91	1071.73	
09/12/01	19.76	1070.88	
10/11/01	19.47	1071.17	
11/15/01	19.30	1071.34	
12/04/01	19.18	1071.46	
05/15/02	18.64	1072.00	
06/26/02	18.96	1071.68	
08/07/02	19.68	1070.96	
09/18/02	20.49	1070.15	
11/05/02	20.20	1070.44	
11/06/02	20.08	1070.56	
12/11/02	20.52	1070.12	
05/06/03	20.50	1070.14	
06/04/03	19.55	1071.09	
07/09/03	18.49	1072.15	
08/06/03	20.20	1070.44	
09/03/03	21.81	1068.83	
10/01/03	22.80	1067.84	
11/04/03	22.53	1068.11	
12/03/03	22.09	1068.55	
05/05/04	22.38	1068.26	
06/09/04	20.04	1070.60	
07/14/04	19.15	1071.49	
08/10/04	19.96	1070.68	
09/01/04	20.45	1070.19	
10/13/04	19.13	1071.51	
11/09/04	18.79	1071.85	
12/08/04	18.82	1071.82	
05/04/05	19.30	1071.34	
06/01/05	18.78	1071.86	
07/06/05	17.47	1073.17	
08/09/05	18.14	1072.50	
09/07/05	18.02	1072.62	
10/03/05	17.97	1072.67	
11/09/05	17.78	1072.86	
06/07/06	17.19	1073.45	
07/12/06	18.55	1072.09	
08/08/06	20.20	1070.44	
09/05/06	19.75	1070.89	
10/11/06	18.95	1071.69	
11/07/06	18.53	1072.11	
05/16/07	16.93	1073.71	
07/18/07	18.82	1071.82	
08/16/07	19.97	1070.67	

129-051-01AAA
Brightwood Aquifer

MP Elev (msl,ft)=1,271.43
SI (ft.)=178-183

Date	Depth to Water (ft)	WL Elev (msl, ft)
10/26/94	133.84	1137.59
11/16/94	133.48	1137.95
12/14/94	133.78	1137.65
05/16/95	133.61	1137.82
06/13/95	133.14	1138.29
07/25/95	133.36	1138.07
09/06/95	132.90	1138.53
10/18/95	132.91	1138.52
11/21/95	134.65	1136.78
05/01/96	132.70	1138.73
06/06/96	132.64	1138.79
07/16/96	132.05	1139.38
08/27/96	132.23	1139.20
10/08/96	131.92	1139.51
12/10/96	132.02	1139.41
05/28/97	131.36	1140.07
08/13/97	131.18	1140.25
09/17/97	131.10	1140.33
10/15/97	131.40	1140.03
11/19/97	130.84	1140.59
12/16/97	130.71	1140.72
05/12/98	130.58	1140.85
07/15/98	130.54	1140.89
08/25/98	130.20	1141.23
10/15/98	129.81	1141.62
12/02/98	129.66	1141.77
05/25/99	129.45	1141.98
06/16/99	129.46	1141.97
06/23/99	129.30	1142.13
07/21/99	129.27	1142.16
09/01/99	129.16	1142.27
10/06/99	128.94	1142.49
11/03/99	128.90	1142.53
12/08/99	129.23	1142.20
05/16/00	128.61	1142.82
08/16/00	128.65	1142.78
11/28/00	128.39	1143.04
05/16/01	128.36	1143.07
06/13/01	127.98	1143.45
07/19/01	128.06	1143.37
08/15/01	127.76	1143.67
09/12/01	128.07	1143.36
10/11/01	127.71	1143.72
11/15/01	127.78	1143.65
12/04/01	127.82	1143.61
05/15/02	127.28	1144.15
06/26/02	127.81	1143.62
08/07/02	127.76	1143.67
09/18/02	127.50	1143.93
11/06/02	128.04	1143.39
12/11/02	127.73	1143.70
05/07/03	128.12	1143.31
06/04/03	128.06	1143.37
07/09/03	127.91	1143.52
08/06/03	128.11	1143.32
09/03/03	128.13	1143.30
10/01/03	128.19	1143.24
11/04/03	127.80	1143.63
12/03/03	128.07	1143.36
05/05/04	127.85	1143.58
06/09/04	128.35	1143.08
07/14/04	128.16	1143.27
08/11/04	128.14	1143.29
08/19/04	128.25	1143.18
09/01/04	128.19	1143.24
10/13/04	128.23	1143.20
11/09/04	127.82	1143.61
12/08/04	128.09	1143.34
05/04/05	128.14	1143.29
06/02/05	127.95	1143.48
07/06/05	127.86	1143.57
08/10/05	127.68	1143.75
09/06/05	127.78	1143.65
10/03/05	127.21	1144.22
11/09/05	127.12	1144.31
05/11/06	126.25	1145.18
06/07/06	125.92	1145.51
07/12/06	125.33	1146.10
08/08/06	125.23	1146.20
09/05/06	125.14	1146.29
10/11/06	124.85	1146.58
11/06/06	124.91	1146.52
05/16/07	125.03	1146.40
06/13/07	124.76	1146.67
07/18/07	124.53	1146.90
08/16/07	124.58	1146.85

129-051-01BBB
Brightwood Aquifer

MP Elev (msl,ft)=1,201.55
SI (ft.)=125-140

Date	Depth to Water (ft)	WL Elev (msl, ft)
11/11/64	65.42	1136.13
12/09/64	65.48	1136.07
01/19/65	65.44	1136.11
04/01/65	65.88	1135.67
06/11/65	65.78	1135.77
07/15/65	65.59	1135.96
08/17/65	65.43	1136.12
09/14/65	65.47	1136.08
10/21/65	65.91	1135.64
11/16/65	65.78	1135.77
12/14/65	65.71	1135.84
01/11/66	65.79	1135.76
02/08/66	65.45	1136.10
03/14/66	65.53	1136.02
04/14/66	65.79	1135.76
05/10/66	65.57	1135.98
06/14/66	65.75	1135.80
07/06/66	65.69	1135.86
08/17/66	65.54	1136.01
09/28/66	65.15	1136.40
10/25/66	65.57	1135.98
11/30/66	65.62	1135.93
12/28/66	65.25	1136.30
01/25/67	65.74	1135.81
03/01/67	65.20	1136.35
03/21/67	65.53	1136.02
04/27/67	65.56	1135.99
05/24/67	65.29	1136.26
06/21/67	65.31	1136.24
07/12/67	65.49	1136.06
08/16/67	65.56	1135.99
10/11/67	65.13	1136.42
02/01/68	64.98	1136.57
04/16/68	64.89	1136.66
07/10/68	64.81	1136.74
10/09/68	64.88	1136.67
01/09/69	65.20	1136.35
04/02/69	64.94	1136.61
07/10/69	64.36	1137.19
12/02/69	64.22	1137.33
03/24/70	63.82	1137.73
06/24/70	64.17	1137.38
09/22/70	64.18	1137.37
12/01/70	64.08	1137.47
03/03/71	64.05	1137.50
06/02/71	64.57	1136.98
08/31/71	64.22	1137.33
12/01/71	64.69	1136.86
03/08/72	64.73	1136.82
03/01/73	64.41	1137.14
06/12/73	64.35	1137.20
12/04/73	64.22	1137.33
03/14/74	64.22	1137.33
12/03/74	64.66	1136.89
12/03/75	63.98	1137.57
12/01/76	64.00	1137.55
12/06/77	64.37	1137.18
11/29/79	63.46	1138.09
11/18/80	63.11	1138.44
12/01/81	63.11	1138.44
11/30/82	63.22	1138.33
08/25/83	63.68	1137.87
11/29/83	63.62	1137.93
11/29/84	63.98	1137.57
12/05/85	64.01	1137.54
07/17/86	63.58	1137.97
11/25/86	63.49	1138.06
11/25/87	63.34	1138.21
11/22/88	63.12	1138.43
08/01/89	62.87	1138.68
11/29/89	62.90	1138.65
11/13/90	64.00	1137.55
06/28/91	63.17	1138.38
08/20/91	62.89	1138.66
11/19/91	63.24	1138.31
04/07/92	63.20	1138.35
05/07/92	62.92	1138.63
06/03/92	62.76	1138.79
06/23/92	62.98	1138.57
07/07/92	63.00	1138.55
07/29/92	63.18	1138.37
08/10/92	63.22	1138.33
09/08/92	62.86	1138.69
10/14/92	63.28	1138.27
11/10/92	63.22	1138.33
12/09/92	62.90	1138.65
06/15/93	63.06	1138.49
07/08/93	62.94	1138.61
08/09/93	62.75	1138.80
09/08/93	62.46	1139.09
10/06/93	62.35	1139.20
11/09/93	62.78	1138.77
11/16/93	62.59	1138.96
12/15/93	62.68	1138.87
04/21/94	62.39	1139.16
05/19/94	62.10	1139.45
06/21/94	61.96	1139.59
07/27/94	62.03	1139.52
08/24/94	61.92	1139.63
09/21/94	61.84	1139.71
10/26/94	61.73	1139.82
11/16/94	61.36	1140.19
12/14/94	61.64	1139.91
05/16/95	61.35	1140.20
06/13/95	61.02	1140.53
07/25/95	61.09	1140.46
09/06/95	60.85	1140.70
10/18/95	60.70	1140.85
11/21/95	60.86	1140.69
05/01/96	60.39	1141.16
06/06/96	60.26	1141.29
07/16/96	60.04	1141.51
08/27/96	59.95	1141.60
10/08/96	59.95	1141.60
12/10/96	59.90	1141.65
05/28/97	59.10	1142.45
08/13/97	58.86	1142.69
09/17/97	58.66	1142.89
10/15/97	59.09	1142.46
11/19/97	58.42	1143.13
12/16/97	58.61	1142.94
05/12/98	58.02	1143.53
06/11/98	57.48	1144.07
07/15/98	57.79	1143.76
08/25/98	57.47	1144.08
10/15/98	57.17	1144.38
12/02/98	57.04	1144.51
05/25/99	56.82	1144.73
06/23/99	56.49	1145.06
07/21/99	56.56	1144.99
09/01/99	56.36	1145.19
10/06/99	56.24	1145.31
11/03/99	56.21	1145.34
12/08/99	56.41	1145.14
05/16/00	55.84	1145.71
08/16/00	55.87	1145.68

06/06/72	64.32	1137.23	04/13/93	63.00	1138.55	11/28/00	55.52	1146.03
09/06/72	63.59	1137.96	05/11/93	63.04	1138.51			
12/06/72	64.62	1136.93	06/14/93	63.16	1138.39	05/16/01	55.29	1146.26

129-051-01BBB (Continued),MP Elev (msl,ft)=1201.55Brightwood AquiferSI (ft.)=125-140

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/13/01	55.01	1146.54	08/06/03	55.31	1146.24	07/06/05	54.83	1146.72
07/19/01	55.14	1146.41	09/03/03	55.26	1146.29	08/10/05	54.61	1146.94
08/15/01	54.84	1146.71	09/18/03	55.35	1146.20	09/06/05	54.35	1147.20
09/12/01	55.29	1146.26	10/01/03	55.56	1145.99	10/03/05	54.00	1147.55
10/11/01	54.83	1146.72	11/04/03	55.12	1146.43	11/09/05	53.97	1147.58
11/15/01	54.89	1146.66	12/03/03	55.45	1146.10			
12/04/01	54.88	1146.67				05/11/06	52.70	1148.85
			05/05/04	55.02	1146.53	06/07/06	52.48	1149.07
05/15/02	54.42	1147.13	06/09/04	55.63	1145.92	07/12/06	52.05	1149.50
06/26/02	54.92	1146.63	07/14/04	55.44	1146.11	08/08/06	52.12	1149.43
08/07/02	54.84	1146.71	08/11/04	55.45	1146.10	09/05/06	52.02	1149.53
09/18/02	54.55	1147.00	09/01/04	55.53	1146.02	10/11/06	51.57	1149.98
11/06/02	54.46	1147.09	10/13/04	55.45	1146.10	11/06/06	51.62	1149.93
12/11/02	54.17	1147.38	11/09/04	55.23	1146.32			
			12/08/04	55.27	1146.28	05/16/07	51.53	1150.02
05/06/03	53.82	1147.73				06/13/07	51.10	1150.45
06/04/03	54.63	1146.92	05/04/05	55.30	1146.25	07/18/07	50.82	1150.73
07/09/03	55.15	1146.40	06/02/05	55.18	1146.37	08/16/07	50.94	1150.61

129-051-08CCCS
Brightwood Aquifer

MP Elev (msl,ft)=1,197.95
SI (ft.)=148-153

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/02/92	45.31	1152.64
09/09/92	45.35	1152.60
10/13/92	45.36	1152.59
11/10/92	45.60	1152.35
12/08/92	45.40	1152.55
04/13/93	45.56	1152.39
05/11/93	45.58	1152.37
06/15/93	45.28	1152.67
07/07/93	44.96	1152.99
08/18/93	44.20	1153.75
09/08/93	43.83	1154.12
10/06/93	43.51	1154.44
11/17/93	43.63	1154.32
04/20/94	43.05	1154.90
05/19/94	42.56	1155.39
06/22/94	42.15	1155.80
07/26/94	41.95	1156.00
08/24/94	41.80	1156.15
09/21/94	41.72	1156.23
10/25/94	41.88	1156.07
11/17/94	41.30	1156.65
12/14/94	41.83	1156.12
05/16/95	40.99	1156.96
06/13/95	40.70	1157.25
07/25/95	40.46	1157.49
09/06/95	40.25	1157.70
10/18/95	40.21	1157.74
11/21/95	40.36	1157.59
05/01/96	39.90	1158.05
06/06/96	39.32	1158.63
07/16/96	38.78	1159.17
08/27/96	38.80	1159.15
10/08/96	38.65	1159.30
12/10/96	38.42	1159.53
05/28/97	37.53	1160.42
08/13/97	37.07	1160.88
09/17/97	36.76	1161.19
10/15/97	37.15	1160.80
11/19/97	36.86	1161.09
12/15/97	36.74	1161.21
05/12/98	36.24	1161.71
06/16/98	35.16	1162.79
07/15/98	34.65	1163.30
08/25/98	34.27	1163.68
10/15/98	34.28	1163.67
12/02/98	34.14	1163.81
05/25/99	33.22	1164.73
06/23/99	32.47	1165.48
07/21/99	32.55	1165.40
09/01/99	32.44	1165.51
10/06/99	32.57	1165.38
11/03/99	32.43	1165.52
12/08/99	32.58	1165.37
05/16/00	32.56	1165.39
08/16/00	31.73	1166.22
11/28/00	31.68	1166.27
05/16/01	30.69	1167.26
06/13/01	30.08	1167.87
07/19/01	29.85	1168.10
08/15/01	29.84	1168.11
09/12/01	30.21	1167.74
10/11/01	29.98	1167.97
11/15/01	30.24	1167.71
12/04/01	30.26	1167.69
05/15/02	30.70	1167.25
06/26/02	31.10	1166.85
08/07/02	31.24	1166.71
09/18/02	31.08	1166.87
11/06/02	31.50	1166.45
12/11/02	31.47	1166.48
05/08/03	32.24	1165.71
06/04/03	32.34	1165.61
07/09/03	31.72	1166.23
08/06/03	31.74	1166.21
09/03/03	31.80	1166.15
09/18/03	31.68	1166.27
10/01/03	32.06	1165.89
11/04/03	31.85	1166.10
12/03/03	32.11	1165.84
05/05/04	32.16	1165.79
06/09/04	32.51	1165.44
07/14/04	32.25	1165.70
08/11/04	32.21	1165.74
09/01/04	32.24	1165.71
10/13/04	32.20	1165.75
11/09/04	32.20	1165.75
12/08/04	31.94	1166.01
05/04/05	32.25	1165.70
06/02/05	31.99	1165.96
07/06/05	29.76	1168.19
08/10/05	29.14	1168.81
09/06/05	28.09	1169.86
10/03/05	27.65	1170.30
11/10/05	27.54	1170.41
05/09/06	25.54	1172.41
06/07/06	25.02	1172.93
07/12/06	24.79	1173.16
08/08/06	25.13	1172.82
09/05/06	25.23	1172.72
10/11/06	25.13	1172.82
11/06/06	25.27	1172.68
05/16/07	24.55	1173.40
06/13/07	22.68	1175.27
07/18/07	22.15	1175.80
08/16/07	22.63	1175.32

129-051-10BBB
Brightwood Aquifer

MP Elev (msl,ft)=1,196.49
SI (ft.)=98-103

Date	Depth to Water (ft)	WL Elev (msl, ft)
10/25/94	51.24	1145.25
11/16/94	51.07	1145.42
12/14/94	51.22	1145.27
05/16/95	50.80	1145.69
06/13/95	50.36	1146.13
07/25/95	50.22	1146.27
09/06/95	50.19	1146.30
10/18/95	50.09	1146.40
11/21/95	50.17	1146.32
05/01/96	49.85	1146.64
06/06/96	49.33	1147.16
07/16/96	49.00	1147.49
08/27/96	48.96	1147.53
10/08/96	48.88	1147.61
05/28/97	47.51	1148.98
08/13/97	47.46	1149.03
09/17/97	47.37	1149.12
10/15/97	47.62	1148.87
11/19/97	47.41	1149.08
12/15/97	47.40	1149.09
05/12/98	46.65	1149.84
07/15/98	45.36	1151.13
08/25/98	45.19	1151.30
10/15/98	45.30	1151.19
12/02/98	45.15	1151.34
05/25/99	44.20	1152.29
06/15/99	44.11	1152.38
06/23/99	43.97	1152.52
07/22/99	43.91	1152.58
09/01/99	43.86	1152.63
10/06/99	43.47	1153.02
11/03/99	43.50	1152.99
12/08/99	43.70	1152.79
05/16/00	43.11	1153.38
08/16/00	42.66	1153.83
05/16/01	41.97	1154.52
06/13/01	41.73	1154.76
07/19/01	41.84	1154.65
08/15/01	41.81	1154.68
09/12/01	42.15	1154.34
10/11/01	41.89	1154.60
11/15/01	42.10	1154.39
12/04/01	42.15	1154.34
05/15/02	42.09	1154.40
06/26/02	42.41	1154.08
08/07/02	42.49	1154.00
09/18/02	42.34	1154.15
11/06/02	42.76	1153.73
12/11/02	42.68	1153.81
05/06/03	43.20	1153.29
06/04/03	43.16	1153.33
07/09/03	42.64	1153.85
08/06/03	42.73	1153.76
09/03/03	42.84	1153.65
10/01/03	43.02	1153.47
11/04/03	42.86	1153.63
12/03/03	43.07	1153.42
05/05/04	42.98	1153.51
06/09/04	43.21	1153.28
07/14/04	43.10	1153.39
08/11/04	43.11	1153.38
08/19/04	43.08	1153.41
09/01/04	43.17	1153.32
10/13/04	43.23	1153.26
11/09/04	43.00	1153.49
12/08/04	42.90	1153.59
05/04/05	42.97	1153.52
06/02/05	42.80	1153.69
07/06/05	40.40	1156.09
08/10/05	40.54	1155.95
09/06/05	40.00	1156.49
10/03/05	39.83	1156.66
11/09/05	39.93	1156.56
05/11/06	37.10	1159.39
06/07/06	37.12	1159.37
07/12/06	37.20	1159.29
08/08/06	37.55	1158.94
09/05/06	37.68	1158.81
10/11/06	37.50	1158.99
11/06/06	37.34	1159.15
05/16/07	35.56	1160.93
07/18/07	34.64	1161.85
08/16/07	35.22	1161.27

129-051-19ABAS
Brightwood Aquifer

MP Elev (msl,ft)=1,193.07
SI (ft.)=128-133

Date	Depth to Water (ft)	WL Elev (msl, ft)
10/25/94	29.00	1164.07
11/17/94	28.92	1164.15
12/14/94	29.20	1163.87
05/16/95	28.35	1164.72
06/13/95	27.90	1165.17
07/25/95	27.40	1165.67
09/06/95	27.43	1165.64
10/18/95	27.40	1165.67
11/21/95	27.48	1165.59
05/01/96	27.25	1165.82
06/06/96	26.25	1166.82
07/16/96	25.76	1167.31
08/27/96	25.80	1167.27
10/08/96	25.86	1167.21
12/10/96	25.82	1167.25
05/28/97	24.57	1168.50
08/13/97	24.23	1168.84
09/17/97	24.08	1168.99
10/15/97	24.21	1168.86
11/19/97	24.28	1168.79
12/15/97	24.28	1168.79
05/12/98	23.35	1169.72
07/15/98	21.34	1171.73
08/25/98	21.25	1171.82
10/15/98	21.55	1171.52
12/02/98	21.33	1171.74
05/25/99	19.89	1173.18
06/15/99	19.56	1173.51
06/23/99	19.20	1173.87
07/21/99	19.24	1173.83
09/01/99	19.33	1173.74
10/06/99	19.58	1173.49
11/03/99	19.60	1173.47
12/08/99	19.77	1173.30
05/16/00	19.95	1173.12
08/16/00	18.68	1174.39
11/28/00	19.15	1173.92
05/16/01	17.99	1175.08
06/13/01	17.13	1175.94
07/19/01	16.91	1176.16
08/15/01	17.08	1175.99
09/12/01	17.40	1175.67
10/11/01	17.42	1175.65
11/15/01	17.83	1175.24
12/04/01	17.83	1175.24
05/15/02	18.78	1174.29
06/26/02	18.99	1174.08
08/07/02	19.13	1173.94
09/18/02	19.23	1173.84
11/06/02	19.53	1173.54
12/11/02	19.69	1173.38
05/08/03	20.44	1172.63
06/04/03	20.56	1172.51
07/09/03	19.82	1173.25
08/06/03	19.59	1173.48
09/03/03	19.65	1173.42
10/01/03	19.78	1173.29
11/04/03	19.79	1173.28
12/03/03	19.99	1173.08
05/05/04	20.49	1172.58
06/09/04	20.27	1172.80
07/14/04	19.96	1173.11
08/11/04	19.88	1173.19
08/19/04	19.90	1173.17
09/01/04	19.92	1173.15
10/13/04	19.94	1173.13
11/09/04	19.91	1173.16
12/08/04	19.64	1173.43
05/04/05	19.99	1173.08
06/02/05	19.54	1173.53
07/06/05	16.48	1176.59
08/10/05	15.66	1177.41
09/06/05	14.45	1178.62
10/03/05	14.25	1178.82
11/10/05	14.23	1178.84
05/09/06	12.36	1180.71
06/07/06	11.68	1181.39
07/12/06	11.70	1181.37
08/08/06	12.14	1180.93
09/05/06	12.33	1180.74
10/11/06	12.43	1180.64
11/06/06	12.56	1180.51
05/16/07	11.23	1181.84

129-051-21BBAS
Brightwood Aquifer

MP Elev (msl,ft)=1,182.20
SI (ft.)=117-122

Date	Depth to Water (ft)	WL Elev (msl, ft)
08/31/05	15.18	1167.02
10/03/05	14.75	1167.45
11/10/05	14.62	1167.58
05/09/06	12.31	1169.89
07/12/06	11.80	1170.40
08/08/06	12.20	1170.00
09/05/06	12.34	1169.86
10/11/06	12.30	1169.90
11/06/06	12.49	1169.71
05/16/07	11.89	1170.31
06/13/07	10.16	1172.04
07/18/07	9.55	1172.65
08/16/07	10.02	1172.18
06/07/06	11.88	1170.32

129-052-05BBB
Undefined Aquifer

MP Elev (msl,ft)=1,160.51
SI (ft.)=138-143

Date	Depth to Water (ft)	WL Elev (msl, ft)
07/17/91	18.77	1141.74
08/20/91	18.89	1141.62
04/07/92	18.60	1141.91
05/07/92	18.53	1141.98
06/03/92	18.61	1141.90
07/07/92	18.30	1142.21
07/29/92	18.54	1141.97
08/10/92	18.61	1141.90
09/09/92	18.31	1142.20
10/13/92	18.36	1142.15
11/10/92	18.47	1142.04
12/08/92	18.09	1142.42
04/13/93	17.69	1142.82
05/11/93	17.74	1142.77
06/15/93	17.67	1142.84
07/07/93	17.37	1143.14
08/10/93	17.22	1143.29
09/08/93	17.07	1143.44
10/06/93	16.95	1143.56
11/17/93	16.75	1143.76
04/20/94	15.78	1144.73
05/19/94	15.73	1144.78
06/22/94	15.70	1144.81
07/26/94	15.47	1145.04
08/24/94	15.55	1144.96
09/21/94	15.47	1145.04
10/25/94	15.30	1145.21
11/17/94	15.23	1145.28
12/14/94	15.19	1145.32
05/16/95	14.63	1145.88
06/13/95	14.65	1145.86
07/25/95	14.61	1145.90
09/06/95	14.65	1145.86
10/18/95	14.40	1146.11
11/21/95	14.32	1146.19
05/01/96	13.98	1146.53
06/06/96	13.76	1146.75
07/16/96	13.90	1146.61
08/27/96	14.08	1146.43
10/08/96	13.97	1146.54
12/10/96	13.72	1146.79
05/28/97	13.60	1146.91
08/13/97	13.90	1146.61
09/17/97	13.86	1146.65
10/15/97	13.80	1146.71
11/19/97	13.73	1146.78
12/15/97	13.67	1146.84
05/12/98	13.25	1147.26
06/16/98	13.17	1147.34
07/15/98	13.14	1147.37
08/25/98	13.18	1147.33
10/15/98	13.01	1147.50
12/02/98	12.58	1147.93
05/25/99	12.08	1148.43
06/23/99	11.95	1148.56
07/21/99	11.89	1148.62
09/01/99	11.75	1148.76
10/06/99	11.53	1148.98
11/03/99	11.47	1149.04
12/08/99	11.37	1149.14
05/16/00	11.02	1149.49
08/16/00	11.21	1149.30
11/28/00	11.02	1149.49
05/16/01	10.97	1149.54
06/13/01	11.09	1149.42
07/19/01	11.40	1149.11
08/15/01	11.41	1149.10
09/12/01	11.52	1148.99
10/11/01	11.32	1149.19
11/15/01	11.43	1149.08
12/04/01	11.39	1149.12
05/15/02	11.61	1148.90
06/26/02	11.91	1148.60
08/07/02	11.93	1148.58
09/18/02	12.13	1148.38
11/06/02	12.23	1148.28
12/11/02	12.35	1148.16
05/08/03	12.59	1147.92
06/04/03	12.63	1147.88
07/09/03	12.43	1148.08
08/06/03	12.66	1147.85
09/03/03	12.79	1147.72
09/18/03	12.78	1147.73
10/01/03	12.83	1147.68
11/04/03	12.77	1147.74
12/03/03	12.81	1147.70
05/05/04	12.95	1147.56
06/09/04	12.72	1147.79
07/14/04	12.73	1147.78
08/11/04	12.90	1147.61
09/01/04	12.95	1147.56
10/13/04	12.69	1147.82
11/09/04	12.50	1148.01
12/08/04	12.39	1148.12
05/04/05	12.32	1148.19
06/02/05	12.29	1148.22
07/06/05	11.73	1148.78
08/10/05	11.88	1148.63
09/06/05	11.82	1148.69
10/03/05	11.68	1148.83
11/10/05	11.42	1149.09
05/09/06	10.40	1150.11
06/07/06	10.63	1149.88
07/12/06	10.71	1149.80
08/08/06	10.77	1149.74
09/05/06	10.35	1150.16
10/11/06	10.22	1150.29
11/06/06	10.21	1150.30
05/16/07	9.83	1150.68
06/13/07	9.74	1150.77
07/18/07	9.91	1150.60
08/16/07	9.98	1150.53

129-052-05DDAS
Brightwood Aquifer

MP Elev (msl,ft)=1,191.80
SI (ft.)=98-103

Date	Depth to Water (ft)	WL Elev (msl, ft)

08/31/05	1.80	1190.00
10/03/05	2.79	1189.01
11/10/05	3.00	1188.80
05/09/06	1.04	1190.76
07/12/06	3.70	1188.10
08/08/06	5.35	1186.45
09/05/06	4.73	1187.07
10/11/06	3.44	1188.36
11/06/06	3.13	1188.67
05/16/07	1.29	1190.51
06/13/07	0.82	1190.98
07/18/07	2.16	1189.64
08/16/07	3.51	1188.29
06/07/06	1.96	1189.84

129-052-14AAA
Brightwood Aquifer

MP Elev (msl,ft)=1,221.70
SI (ft.)=78-83

Date	Depth to Water (ft)	WL Elev (msl, ft) Elev ft)
11/21/95	38.70	-38.70
05/01/96	38.37	-38.37
06/06/96	37.84	-37.84
07/16/96	37.53	-37.53
08/27/96	37.80	-37.80
10/08/96	37.57	-37.57
12/10/96	37.07	-37.07
05/28/97	36.63	-36.63
08/13/97	36.23	-36.23
09/17/97	35.96	-35.96
10/15/97	36.28	-36.28
11/19/97	35.97	-35.97
12/15/97	35.85	-35.85
05/12/98	35.22	-35.22
07/15/98	33.06	-33.06
08/25/98	32.38	-32.38
10/15/98	32.22	-32.22
12/02/98	31.90	-31.90
05/25/99	30.72	-30.72
06/23/99	29.61	-29.61
07/21/99	29.34	-29.34
09/01/99	28.96	-28.96
10/06/99	28.87	-28.87
11/03/99	28.54	-28.54
12/08/99	28.67	-28.67
05/16/00	29.56	-29.56
06/29/00	28.75	-28.75
08/16/00	29.73	-29.73
11/28/00	29.13	-29.13
05/16/01	29.74	-29.74
06/13/01	29.06	-29.06
07/19/01	28.53	-28.53
08/15/01	28.28	-28.28
09/12/01	28.53	-28.53
10/11/01	28.37	-28.37
11/15/01	28.77	-28.77
12/04/01	28.85	-28.85
05/15/02	30.09	-30.09
06/26/02	30.60	-30.60
08/07/02	30.84	-30.84
09/18/02	30.75	-30.75
11/06/02	31.27	-31.27
12/11/02	31.29	-31.29
05/08/03	32.14	-32.14
06/04/03	32.21	-32.21
07/09/03	32.00	-32.00
08/06/03	31.89	-31.89
09/03/03	31.77	-31.77
10/01/03	31.89	-31.89
11/04/03	31.64	-31.64
12/03/03	31.88	-31.88
05/05/04	31.95	-31.95
06/09/04	32.22	-32.22
07/14/04	31.96	-31.96
08/11/04	31.86	-31.86
09/01/04	31.84	-31.84
10/13/04	31.71	-31.71
11/09/04	31.70	-31.70
12/08/04	31.38	-31.38
05/04/05	31.60	-31.60
06/02/05	31.46	-31.46
07/06/05	29.02	-29.02
08/10/05	28.00	1193.70
08/31/05	26.52	1195.18
09/06/05	26.32	1195.38
10/03/05	25.21	1196.49
11/10/05	24.76	1196.94
05/09/06	23.48	1198.22
06/07/06	22.23	1199.47
07/12/06	21.73	1199.97
08/08/06	22.26	1199.44
09/05/06	22.69	1199.01
10/11/06	22.99	1198.71
11/06/06	22.95	1198.75
05/16/07	21.92	1199.78
06/13/07	19.04	1202.66
07/18/07	16.65	1205.05
08/16/07	17.22	1204.48

129-052-21CCCS
Undefined Aquifer

MP Elev (msl,ft)=1,223.70
SI (ft.)=128-133

Date	Depth to Water (ft)	WL Elev (msl, ft)
07/17/91	45.40	1178.30
08/20/91	45.30	1178.40
04/07/92	45.33	1178.37
05/07/92	45.29	1178.41
06/03/92	45.14	1178.56
07/07/92	45.07	1178.63
07/29/92	45.08	1178.62
08/10/92	45.42	1178.28
09/09/92	45.35	1178.35
10/13/92	45.41	1178.29
11/10/92	45.50	1178.20
12/08/92	45.33	1178.37
04/13/93	45.47	1178.23
05/11/93	45.26	1178.44
06/15/93	45.24	1178.46
07/07/93	45.11	1178.59
08/10/93	45.00	1178.70
09/08/93	44.79	1178.91
10/06/93	44.68	1179.02
11/17/93	44.62	1179.08
12/14/93	44.58	1179.12
04/20/94	44.21	1179.49
05/19/94	44.08	1179.62
06/22/94	43.92	1179.78
07/26/94	43.75	1179.95
08/24/94	43.68	1180.02
09/21/94	43.65	1180.05
10/25/94	43.57	1180.13
11/17/94	43.42	1180.28
12/14/94	43.48	1180.22
05/16/95	43.26	1180.44
06/13/95	43.07	1180.63
07/25/95	42.96	1180.74
09/06/95	42.87	1180.83
10/18/95	42.68	1181.02
11/21/95	42.66	1181.04
05/01/96	42.51	1181.19
06/06/96	42.20	1181.50
07/16/96	41.85	1181.85
08/27/96	41.70	1182.00
10/08/96	40.64	1183.06
12/10/96	41.59	1182.11
05/28/97	41.02	1182.68
08/13/97	40.72	1182.98
09/17/97	40.65	1183.05
10/15/97	40.78	1182.92
11/19/97	40.60	1183.10
12/15/97	40.65	1183.05
05/12/98	40.54	1183.16
06/16/98	40.23	1183.47
07/15/98	40.09	1183.61
08/25/98	39.73	1183.97
10/15/98	39.40	1184.30
12/02/98	39.21	1184.49
05/25/99	38.78	1184.92
06/23/99	38.67	1185.03
07/21/99	38.44	1185.26
09/01/99	38.27	1185.43
10/06/99	38.11	1185.59
11/03/99	38.07	1185.63
12/08/99	38.11	1185.59
05/16/00	38.08	1185.62
08/16/00	37.91	1185.79
11/28/00	38.25	1185.45
05/16/01	37.37	1186.33
06/13/01	37.06	1186.64
07/19/01	36.96	1186.74
08/15/01	36.79	1186.91
09/12/01	36.95	1186.75
10/11/01	36.77	1186.93
11/15/01	36.87	1186.83
12/04/01	36.89	1186.81
05/15/02	37.07	1186.63
06/26/02	37.13	1186.57
08/07/02	37.25	1186.45
09/18/02	37.16	1186.54
11/06/02	37.42	1186.28
12/11/02	37.35	1186.35
05/08/03	37.68	1186.02
06/04/03	37.77	1185.93
07/09/03	37.39	1186.31
08/06/03	36.88	1186.82
09/03/03	36.63	1187.07
09/18/03	36.60	1187.10
10/01/03	36.62	1187.08
11/04/03	36.50	1187.20
12/03/03	36.53	1187.17
05/05/04	36.60	1187.10
06/09/04	36.82	1186.88
07/14/04	36.54	1187.16
08/11/04	36.50	1187.20
09/01/04	36.47	1187.23
10/13/04	36.48	1187.22
11/09/04	36.38	1187.32
12/08/04	36.30	1187.40
05/04/05	36.23	1187.47
06/02/05	36.35	1187.35
07/06/05	35.79	1187.91
08/10/05	34.86	1188.84
09/06/05	34.34	1189.36
10/03/05	33.74	1189.96
11/10/05	33.20	1190.50
05/09/06	32.02	1191.68
06/07/06	31.53	1192.17
07/12/06	31.13	1192.57
08/08/06	31.13	1192.57
09/05/06	31.13	1192.57
10/11/06	31.04	1192.66
11/06/06	31.00	1192.70
05/16/07	30.74	1192.96
06/13/07	29.94	1193.76
07/18/07	28.48	1195.22
08/16/07	28.34	1195.36

130-049-31AAB2
Hankinson Aquifer

MP Elev (msl,ft)=1,072.69
SI (ft.)=28-33

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/21/94	6.74	1065.95
10/25/94	6.15	1066.54
11/17/94	6.46	1066.23
12/14/94	6.62	1066.07
05/16/95	3.42	1069.27
06/14/95	5.12	1067.57
07/25/95	4.98	1067.71
09/06/95	7.45	1065.24
10/18/95	5.08	1067.61
11/21/95	4.96	1067.73
05/01/96	4.31	1068.38
06/06/96	3.95	1068.74
07/17/96	7.07	1065.62
08/27/96	8.28	1064.41
10/08/96	8.62	1064.07
12/10/96	7.09	1065.60
05/28/97	4.85	1067.84
08/13/97	7.74	1064.95
09/17/97	8.65	1064.04
10/15/97	8.25	1064.44
11/19/97	7.63	1065.06
12/16/97	7.50	1065.19
05/12/98	4.33	1068.36
07/15/98	4.82	1067.87
08/25/98	6.94	1065.75
10/15/98	7.66	1065.03
12/02/98	4.39	1068.30
05/25/99	4.97	1067.72
06/16/99	6.17	1066.52
06/23/99	5.96	1066.73
07/22/99	6.31	1066.38
09/01/99	6.13	1066.56
10/06/99	6.51	1066.18
11/03/99	6.85	1065.84
12/08/99	7.14	1065.55
05/16/00	5.64	1067.05
08/16/00	8.10	1064.59
11/28/00	7.84	1064.85
05/16/01	4.95	1067.74
06/13/01	5.89	1066.80
07/19/01	7.87	1064.82
08/15/01	8.51	1064.18
09/12/01	9.27	1063.42
10/11/01	8.76	1063.93
11/15/01	8.28	1064.41
12/04/01	8.23	1064.46
05/15/02	6.37	1066.32
06/26/02	7.51	1065.18
08/07/02	7.48	1065.21
09/18/02	6.90	1065.79
11/06/02	7.30	1065.39
12/10/02	7.79	1064.90
05/06/03	6.90	1065.79
06/04/03	6.33	1066.36
07/09/03	5.77	1066.92
08/05/03	7.74	1064.95
09/03/03	9.08	1063.61
10/01/03	9.07	1063.62
11/04/03	9.11	1063.58
12/03/03	8.99	1063.70
05/05/04	7.94	1064.75
06/09/04	4.78	1067.91
07/14/04	5.68	1067.01
08/10/04	7.24	1065.45
08/18/04	7.60	1065.09
09/01/04	8.08	1064.61
10/12/04	7.37	1065.32
11/09/04	6.33	1066.36
12/08/04	7.00	1065.69
05/04/05	6.80	1065.89
06/01/05	6.05	1066.64
07/06/05	4.57	1068.12
08/09/05	5.63	1067.06
09/07/05	4.93	1067.76
10/03/05	5.47	1067.22
11/09/05	5.95	1066.74
05/11/06	4.49	1068.20
06/07/06	6.50	1066.19
07/12/06	7.96	1064.73
08/08/06	9.00	1063.69
08/29/06	9.27	1063.42
08/30/06	9.31	1063.38
08/31/06	9.30	1063.39
09/01/06	9.32	1063.37
09/05/06	8.71	1063.98
09/07/06	8.54	1064.15
09/26/06	8.08	1064.61
10/11/06	7.76	1064.93
11/07/06	7.78	1064.91
12/07/06	8.20	1064.49
01/03/07	8.23	1064.46
01/08/07	8.14	1064.55
01/09/07	8.17	1064.52
01/10/07	8.18	1064.51
01/11/07	8.17	1064.52
01/12/07	8.19	1064.50
01/15/07	8.35	1064.34
01/16/07	8.38	1064.31
01/25/07	8.61	1064.08
03/21/07	7.90	1064.79
05/16/07	5.52	1067.17
06/13/07	4.69	1068.00
07/18/07	7.15	1065.54
08/16/07	8.11	1064.58

130-050-01AAA2
Undefined Aquifer

MP Elev (msl,ft)=1,032.00
SI (ft.)=209-214

Date	Depth to Water (ft)	WL Elev (msl, ft)
06/27/91	45.56	986.44
08/20/91	45.73	986.27
04/07/92	45.49	986.51
05/07/92	45.42	986.58
06/03/92	45.45	986.55
07/07/92	45.24	986.76
07/29/92	45.40	986.60
08/10/92	45.39	986.61
09/08/92	45.33	986.67
10/14/92	45.39	986.61
11/10/92	45.25	986.75
12/09/92	45.11	986.89
04/12/93	44.93	987.07
05/11/93	44.98	987.02
06/14/93	44.91	987.09
07/08/93	44.76	987.24
08/09/93	44.62	987.38
08/17/93	44.60	987.40
09/08/93	44.76	987.24
10/06/93	44.73	987.27
11/16/93	44.68	987.32
12/15/93	44.53	987.47
04/21/94	44.42	987.58
05/19/94	44.35	987.65
06/21/94	44.48	987.52
07/27/94	44.17	987.83
08/24/94	44.52	987.48
09/21/94	44.30	987.70
10/26/94	44.15	987.85
11/16/94	44.05	987.95
12/14/94	44.05	987.95
05/16/95	43.82	988.18
06/14/95	43.90	988.10
07/25/95	43.85	988.15
09/06/95	45.55	986.45
10/18/95	44.62	987.38
11/21/95	44.26	987.74
05/01/96	45.38	986.62
06/06/96	44.34	987.66
07/17/96	48.19	983.81
08/27/96	47.98	984.02
10/08/96	45.10	986.90
12/10/96	51.37	980.63
05/28/97	46.40	985.60
08/13/97	46.05	985.95
09/17/97	45.19	986.81
10/15/97	47.60	984.40
11/19/97	51.66	980.34
12/16/97	48.62	983.38
05/12/98	46.99	985.01
06/11/98	45.81	986.19
07/15/98	45.98	986.02
08/25/98	45.64	986.36
10/15/98	46.20	985.80
12/02/98	45.30	986.70
05/25/99	46.16	985.84
06/23/99	46.36	985.64
07/22/99	44.54	987.46
09/01/99	45.41	986.59
10/06/99	46.38	985.62
11/03/99	45.62	986.38
12/08/99	49.33	982.67
05/16/00	49.98	982.02
08/16/00	55.66	976.34
11/28/00	50.16	981.84
05/16/01	49.39	982.61
06/13/01	46.90	985.10
07/19/01	50.40	981.60
08/15/01	47.29	984.71
09/12/01	45.92	986.08
10/11/01	44.93	987.07
11/15/01	46.10	985.90
12/04/01	49.18	982.82
05/15/02	48.47	983.53
06/26/02	47.54	984.46
08/07/02	46.02	985.98
09/17/02	46.47	985.53
11/05/02	66.05	965.95
11/06/02	63.54	968.46
12/09/02	54.84	977.16
05/06/03	48.66	983.34
06/04/03	47.75	984.25
07/08/03	54.60	977.40
08/05/03	46.75	985.25
09/03/03	47.83	984.17
10/01/03	46.20	985.80
11/04/03	56.30	975.70
12/03/03	57.04	974.96
05/05/04	49.12	982.88
06/07/04	46.27	985.73
07/14/04	46.66	985.34
08/10/04	48.78	983.22
09/01/04	47.08	984.92
10/12/04	44.97	987.03
11/08/04	45.22	986.78
12/07/04	52.29	979.71
05/04/05	51.38	980.62
06/01/05	50.23	981.77
07/06/05	46.97	985.03
08/09/05	47.20	984.80
09/07/05	45.23	986.77
10/04/05	47.99	984.01
11/09/05	47.52	984.48
05/11/06	47.41	984.59
06/07/06	49.98	982.02
07/12/06	55.58	976.42
07/18/06	56.99	975.01
07/27/06	53.95	978.05
08/08/06	48.59	983.41
08/29/06	46.93	985.07
08/30/06	46.70	985.30
08/31/06	46.68	985.32
09/01/06	46.97	985.03
09/05/06	46.04	985.96
09/05/06	46.02	985.98
09/07/06	45.84	986.16
09/26/06	46.06	985.94
10/11/06	46.28	985.72
11/07/06	45.87	986.13
05/17/07	47.37	984.63
06/13/07	46.59	985.41
07/17/07	51.05	980.95
07/19/07	50.49	981.51
08/15/07	44.83	987.17

130-050-01AAA3
Hankinson Aquifer

MP Elev (msl,ft)=1,030.99
SI (ft.)=67-72

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
06/27/91	4.11	1026.88	
08/20/91	5.75	1025.24	
04/07/92	4.90	1026.09	
05/07/92	4.74	1026.25	
06/03/92	5.33	1025.66	
07/07/92	3.68	1027.31	
07/29/92	4.81	1026.18	
08/10/92	4.69	1026.30	
09/08/92	5.02	1025.97	
10/14/92	6.19	1024.80	
11/10/92	5.24	1025.75	
12/09/92	4.93	1026.06	
04/12/93	2.61	1028.38	
05/11/93	3.53	1027.46	
06/14/93	3.54	1027.45	
07/08/93	3.16	1027.83	
08/09/93	3.48	1027.51	
08/17/93	3.62	1027.37	
09/08/93	4.46	1026.53	
10/06/93	4.99	1026.00	
11/16/93	4.83	1026.16	
12/15/93	4.52	1026.47	
04/21/94	3.30	1027.69	
05/19/94	3.55	1027.44	
06/21/94	4.92	1026.07	
07/27/94	3.02	1027.97	
08/24/94	4.58	1026.41	
09/21/94	4.72	1026.27	
10/26/94	4.01	1026.98	
11/16/94	4.12	1026.87	
12/14/94	4.45	1026.54	
05/16/95	2.68	1028.31	
06/14/95	3.75	1027.24	
07/25/95	4.01	1026.98	
09/06/95	5.90	1025.09	
10/18/95	4.00	1026.99	
11/21/95	3.90	1027.09	
05/01/96	3.58	1027.41	
06/06/96	3.40	1027.59	
07/17/96	5.38	1025.61	
08/27/96	7.18	1023.81	
10/08/96	7.42	1023.57	
12/10/96	5.68	1025.31	
05/28/97	3.71	1027.28	
08/13/97	5.54	1025.45	
09/17/97	6.99	1024.00	
10/15/97	6.15	1024.84	
11/19/97	5.69	1025.30	
12/16/97	5.35	1025.64	
05/12/98	2.06	1028.93	
06/11/98	3.63	1027.36	
07/15/98	4.18	1026.81	
08/25/98	6.30	1024.69	
10/15/98	6.92	1024.07	
12/02/98	4.24	1026.75	
05/25/99	3.94	1027.05	
06/23/99	3.23	1027.76	
07/22/99	4.36	1026.63	
09/01/99	4.08	1026.91	
10/06/99	3.81	1027.18	
11/03/99	4.06	1026.93	
12/08/99	4.27	1026.72	
05/16/00	3.45	1027.54	
08/16/00	5.77	1025.22	
11/28/00	5.07	1025.92	
05/16/01	3.66	1027.33	
06/13/01	3.57	1027.42	
07/19/01	5.45	1025.54	
08/15/01	6.55	1024.44	
09/12/01	7.67	1023.32	
10/11/01	7.08	1023.91	
11/15/01	6.62	1024.37	
12/04/01	6.41	1024.58	
05/15/02	4.46	1026.53	
06/26/02	5.03	1025.96	
08/07/02	4.67	1026.32	
09/17/02	6.10	1024.89	
11/05/02	5.39	1025.60	
12/09/02	6.03	1024.96	
05/06/03	4.71	1026.28	
06/04/03	4.40	1026.59	
07/08/03	3.64	1027.35	
08/05/03	5.14	1025.85	
09/03/03	6.95	1024.04	
10/01/03	7.02	1023.97	
11/04/03	6.53	1024.46	
12/03/03	6.45	1024.54	
05/05/04	5.05	1025.94	
06/07/04	2.97	1028.02	
07/14/04	3.18	1027.81	
08/10/04	4.94	1026.05	
09/01/04	6.08	1024.91	
10/12/04	4.50	1026.49	
11/08/04	3.40	1027.59	
12/07/04	3.90	1027.09	
05/04/05	4.10	1026.89	
06/01/05	3.52	1027.47	
07/06/05	2.83	1028.16	
08/09/05	2.51	1028.48	
09/07/05	3.46	1027.53	
10/04/05	3.95	1027.04	
11/09/05	3.98	1027.01	
05/11/06	2.69	1028.30	
06/07/06	4.20	1026.79	
07/12/06	5.64	1025.35	
08/08/06	7.31	1023.68	
08/29/06	7.50	1023.49	
08/30/06	7.56	1023.43	
08/31/06	7.56	1023.43	
09/01/06	7.60	1023.39	
09/05/06	6.24	1024.75	
09/05/06	6.26	1024.73	
09/07/06	6.33	1024.66	
09/26/06	5.84	1025.15	
10/11/06	5.38	1025.61	
11/07/06	4.93	1026.06	
05/17/07	3.64	1027.35	
06/13/07	2.38	1028.61	
07/17/07	4.58	1026.41	
07/19/07	4.90	1026.09	
08/15/07	5.13	1025.86	

130-050-03AAA2
Hankinson Aquifer

MP Elev (msl,ft)=1,059.67
SI (ft.)=38-43

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/21/94	8.45	1051.22
10/26/94	6.91	1052.76
11/16/94	7.09	1052.58
12/14/94	7.52	1052.15
05/16/95	3.97	1055.70
06/14/95	6.20	1053.47
07/25/95	6.58	1053.09
09/06/95	8.37	1051.30
10/18/95	6.63	1053.04
11/21/95	6.53	1053.14
05/01/96	5.92	1053.75
06/06/96	5.02	1054.65
07/17/96	8.08	1051.59
08/27/96	9.66	1050.01
10/08/96	9.47	1050.20
12/10/96	8.40	1051.27
05/28/97	5.18	1054.49
08/13/97	7.58	1052.09
09/17/97	9.92	1049.75
10/15/97	8.80	1050.87
11/19/97	8.62	1051.05
12/16/97	8.70	1050.97
05/12/98	3.40	1056.27
07/15/98	6.36	1053.31
08/25/98	8.46	1051.21
10/15/98	9.23	1050.44
12/02/98	7.27	1052.40
05/25/99	5.30	1054.37
06/16/99	5.87	1053.80
06/23/99	4.98	1054.69
07/22/99	6.55	1053.12
09/01/99	6.08	1053.59
10/06/99	4.91	1054.76
11/03/99	5.28	1054.39
12/08/99	5.71	1053.96
05/16/00	4.65	1055.02
08/16/00	7.48	1052.19
11/28/00	7.16	1052.51
05/16/01	4.42	1055.25
06/13/01	4.73	1054.94
07/19/01	7.20	1052.47
08/15/01	8.11	1051.56
09/12/01	9.03	1050.64
10/11/01	8.76	1050.91
11/15/01	8.59	1051.08
12/04/01	8.30	1051.37
05/15/02	6.42	1053.25
06/26/02	8.46	1051.21
08/07/02	8.65	1051.02
09/17/02	9.45	1050.22
11/05/02	8.97	1050.70
12/09/02	9.17	1050.50
05/06/03	8.38	1051.29
06/04/03	7.63	1052.04
07/08/03	5.86	1053.81
08/05/03	7.74	1051.93
09/03/03	11.26	1048.41
10/01/03	10.64	1049.03
11/04/03	10.43	1049.24
12/03/03	10.40	1049.27
05/05/04	8.76	1050.91
06/07/04	5.63	1054.04
07/14/04	5.90	1053.77
08/10/04	8.14	1051.53
08/18/04	8.55	1051.12
09/01/04	9.37	1050.30
10/12/04	8.49	1051.18
11/08/04	7.01	1052.66
12/07/04	6.90	1052.77
05/04/05	7.20	1052.47
06/01/05	6.47	1053.20
07/06/05	4.53	1055.14
08/09/05	4.49	1055.18
09/07/05	5.29	1054.38
10/04/05	5.99	1053.68
11/09/05	5.74	1053.93
05/11/06	3.09	1056.58
06/07/06	5.89	1053.78
07/12/06	6.90	1052.77
08/08/06	9.02	1050.65
08/29/06	8.99	1050.68
08/30/06	9.89	1049.78
08/31/06	9.88	1049.79
09/01/06	8.96	1050.71
09/05/06	7.76	1051.91
09/07/06	7.57	1052.10
09/26/06	7.24	1052.43
10/11/06	6.91	1052.76
11/07/06	6.52	1053.15
12/07/06	6.75	1052.92
01/03/07	6.43	1053.24
01/08/07	6.36	1053.31
01/09/07	6.42	1053.25
01/10/07	6.44	1053.23
01/11/07	6.50	1053.17
01/12/07	6.52	1053.15
01/15/07	6.89	1052.78
01/16/07	6.98	1052.69
01/25/07	7.27	1052.40
03/21/07	6.24	1053.43
05/17/07	4.40	1055.27
06/13/07	2.89	1056.78
07/19/07	6.00	1053.67
08/15/07	6.76	1052.91

130-050-06AAA2
Hankinson Aquifer

MP Elev (msl,ft)=1,081.48
SI (ft.)=58-63

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/21/94	8.94	1072.54
10/26/94	9.04	1072.44
11/16/94	9.20	1072.28
12/14/94	9.36	1072.12
05/16/95	6.62	1074.86
06/14/95	7.54	1073.94
07/25/95	5.95	1075.53
09/06/95	8.28	1073.20
10/18/95	7.76	1073.72
11/21/95	7.60	1073.88
05/01/96	7.30	1074.18
06/06/96	5.69	1075.79
07/17/96	8.04	1073.44
08/27/96	9.05	1072.43
10/08/96	9.41	1072.07
12/10/96	9.33	1072.15
05/28/97	6.88	1074.60
08/13/97	8.70	1072.78
09/17/97	9.35	1072.13
10/15/97	9.05	1072.43
11/19/97	9.37	1072.11
12/16/97	9.43	1072.05
05/12/98	6.79	1074.69
07/15/98	7.38	1074.10
08/25/98	8.61	1072.87
10/15/98	9.25	1072.23
12/02/98	8.17	1073.31
05/25/99	7.50	1073.98
11/04/03	10.98	1070.50
06/23/99	7.24	1074.24
07/22/99	7.87	1073.61
09/01/99	8.10	1073.38
10/06/99	7.68	1073.80
11/03/99	7.89	1073.59
12/08/99	8.19	1073.29
05/16/00	6.94	1074.54
08/16/00	8.92	1072.56
11/28/00	9.50	1071.98
05/16/01	7.18	1074.30
06/13/01	6.90	1074.58
07/19/01	8.35	1073.13
08/15/01	8.90	1072.58
09/12/01	9.49	1071.99
10/11/01	9.46	1072.02
11/15/01	9.65	1071.83
12/04/01	9.73	1071.75
05/15/02	8.95	1072.53
06/26/02	9.57	1071.91
08/07/02	9.97	1071.51
09/17/02	10.28	1071.20
11/05/02	10.60	1070.88
12/09/02	10.73	1070.75
05/06/03	10.75	1070.73
06/04/03	10.20	1071.28
07/08/03	9.20	1072.28
08/05/03	9.92	1071.56
09/03/03	10.50	1070.98
10/01/03	10.85	1070.63
12/03/03	11.12	1070.36
05/05/04	10.78	1070.70
06/07/04	9.60	1071.88
07/14/04	9.61	1071.87
08/10/04	10.25	1071.23
08/18/04	10.38	1071.10
09/01/04	10.56	1070.92
10/12/04	10.15	1071.33
11/08/04	9.73	1071.75
12/07/04	9.80	1071.68
05/04/05	9.77	1071.71
06/01/05	9.42	1072.06
07/06/05	7.94	1073.54
08/09/05	7.24	1074.24
09/07/05	7.12	1074.36
10/04/05	7.93	1073.55
11/09/05	8.12	1073.36
05/11/06	5.28	1076.20
06/07/06	6.39	1075.09
07/12/06	8.10	1073.38
08/08/06	8.91	1072.57
09/05/06	8.48	1073.00
10/11/06	8.30	1073.18
11/07/06	8.29	1073.19
05/17/07	5.72	1075.76
06/13/07	4.57	1076.91
07/19/07	6.21	1075.27
08/15/07	7.85	1073.63
06/16/99	7.80	1073.68

130-050-08ADA2
Milnor Channel Aquifer

MP Elev (msl,ft)=1,081.92
SI (ft.)=38-43

Date	Depth to Water (ft)	WL Elev (msl, ft)
08/30/05	1.75	1078.35
10/04/05	4.06	1077.86
11/09/05	4.27	1077.65
05/11/06	2.80	1079.12
06/07/06	3.74	1078.18
07/12/06	5.80	1076.12
08/08/06	7.23	1074.69
08/29/06	6.70	1075.22
09/01/06	6.92	1075.00
09/05/06	5.67	1076.25
09/07/06	5.81	1076.11
09/26/06	4.76	1077.16
10/11/06	4.76	1077.16
11/07/06	4.52	1077.40
12/07/06	5.24	1076.68
01/03/07	5.06	1076.86
01/10/07	5.34	1076.58
01/11/07	5.37	1076.55
01/12/07	5.39	1076.53
01/15/07	5.67	1076.25
01/16/07	5.74	1076.18
01/25/07	5.87	1076.05
03/21/07	4.50	1077.42
05/17/07	3.23	1078.69
06/13/07	2.73	1079.19

08/30/06	6.71	1075.21	01/08/07	5.17	1076.75	07/19/07	4.52	1077.40
08/31/06	6.72	1075.20	01/09/07	5.30	1076.62	08/15/07	5.85	1076.07

130-050-08BAA
Undefined Aquifer

MP Elev (msl,ft)=1,090.53
SI (ft.)=138-143

Date	Depth to Water (ft)	WL Elev (msl, ft) Elev ft)
09/21/94	25.40	1065.13
10/26/94	25.49	1065.04
11/16/94	25.47	1065.06
12/14/94	25.56	1064.97
05/16/95	24.55	1065.98
06/14/95	24.55	1065.98
07/25/95	24.30	1066.23
09/06/95	25.05	1065.48
10/18/95	25.08	1065.45
11/21/95	24.90	1065.63
05/01/96	24.90	1065.63
06/06/96	24.23	1066.30
07/17/96	24.67	1065.86
08/27/96	25.50	1065.03
10/08/96	26.03	1064.50
12/10/96	25.73	1064.80
05/28/97	24.45	1066.08
08/13/97	25.10	1065.43
09/17/97	25.56	1064.97
10/15/97	25.79	1064.74
11/19/97	25.62	1064.91
12/16/97	25.66	1064.87
05/12/98	24.29	1066.24
07/15/98	24.08	1066.45
08/25/98	24.73	1065.80
10/15/98	25.55	1064.98
12/02/98	24.93	1065.60
05/25/99	24.23	1066.30
06/16/99	24.23	1066.30
06/23/99	24.17	1066.36
07/22/99	24.32	1066.21
09/01/99	24.64	1065.89

Date	Depth to Water (ft)	WL Elev (msl, ft)
10/06/99	24.30	1066.23
11/03/99	24.26	1066.27
12/08/99	24.44	1066.09
05/16/00	24.04	1066.49
08/16/00	24.79	1065.74
11/28/00	25.45	1065.08
05/16/01	24.29	1066.24
06/13/01	24.09	1066.44
07/19/01	24.58	1065.95
08/15/01	24.97	1065.56
09/12/01	25.62	1064.91
10/11/01	25.66	1064.87
11/15/01	25.68	1064.85
12/04/01	25.65	1064.88
05/15/02	25.56	1064.97
06/26/02	25.49	1065.04
08/07/02	25.66	1064.87
09/17/02	25.90	1064.63
11/05/02	26.04	1064.49
12/09/02	26.10	1064.43
05/06/03	26.38	1064.15
06/04/03	25.82	1064.71
07/08/03	25.17	1065.36
08/05/03	25.30	1065.23
09/03/03	25.87	1064.66
10/01/03	26.29	1064.24
11/04/03	26.27	1064.26
12/03/03	26.33	1064.20
05/05/04	26.10	1064.43
06/07/04	25.44	1065.09
07/14/04	25.14	1065.39
08/10/04	25.40	1065.13

Date	Depth to Water (ft)	WL (msl,
08/18/04	25.52	1065.01
09/01/04	25.78	1064.75
10/12/04	25.47	1065.06
11/08/04	25.21	1065.32
12/07/04	25.02	1065.51
05/04/05	25.20	1065.33
06/01/05	24.84	1065.69
07/06/05	24.15	1066.38
08/09/05	23.92	1066.61
09/07/05	23.83	1066.70
10/04/05	23.93	1066.60
11/09/05	24.02	1066.51
05/11/06	23.28	1067.25
06/07/06	23.46	1067.07
07/12/06	24.02	1066.51
08/08/06	24.75	1065.78
09/05/06	24.95	1065.58
10/11/06	24.71	1065.82
11/07/06	24.53	1066.00
12/07/06	24.72	1065.81
01/03/07	24.69	1065.84
01/08/07	24.73	1065.80
01/09/07	24.78	1065.75
01/10/07	24.77	1065.76
01/11/07	24.75	1065.78
01/12/07	24.78	1065.75
01/15/07	24.82	1065.71
01/16/07	24.84	1065.69
01/25/07	24.92	1065.61
03/21/07	25.09	1065.44
05/17/07	23.86	1066.67
06/13/07	23.40	1067.13
07/19/07	23.78	1066.75
08/15/07	24.23	1066.30

130-050-08BAA2
Hankinson Aquifer

MP Elev (msl,ft)=1,090.85
SI (ft.)=45-50

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/21/94	13.77	1077.08
10/26/94	14.00	1076.85
11/16/94	14.14	1076.71
12/14/94	14.37	1076.48
05/16/95	12.00	1078.85
06/14/95	12.00	1078.85
07/25/95	11.40	1079.45
09/06/95	13.02	1077.83
10/18/95	12.85	1078.00
11/21/95	12.97	1077.88
05/01/96	12.60	1078.25
06/06/96	11.10	1079.75
07/17/96	12.48	1078.37
08/27/96	13.82	1077.03
10/08/96	14.60	1076.25
12/10/96	14.75	1076.10
05/28/97	11.58	1079.27
08/13/97	13.39	1077.46
09/17/97	14.21	1076.64
10/15/97	14.30	1076.55
11/19/97	14.45	1076.40
12/16/97	14.66	1076.19
05/12/98	11.93	1078.92
07/15/98	11.44	1079.41
08/25/98	12.97	1077.88
10/15/98	14.14	1076.71
12/02/98	13.12	1077.73
05/25/99	11.95	1078.90
06/16/99	11.77	1079.08
06/23/99	11.52	1079.33
07/22/99	12.03	1078.82
09/01/99	12.83	1078.02
10/06/99	12.67	1078.18
11/03/99	11.97	1078.88
12/08/99	12.44	1078.41
05/16/00	11.41	1079.44
08/16/00	12.95	1077.90
11/28/00	14.11	1076.74
05/16/01	10.87	1079.98
06/13/01	11.19	1079.66
07/19/01	12.37	1078.48
08/15/01	13.19	1077.66
09/12/01	14.64	1076.21
10/11/01	14.29	1076.56
11/15/01	14.58	1076.27
12/04/01	14.73	1076.12
05/15/02	14.39	1076.46
06/26/02	14.12	1076.73
08/07/02	14.56	1076.29
09/17/02	15.05	1075.80
11/05/02	15.39	1075.46
12/09/02	15.56	1075.29
05/06/03	15.54	1075.31
06/04/03	14.65	1076.20
07/08/03	13.01	1077.84
08/05/03	13.75	1077.10
09/03/03	14.69	1076.16
10/01/03	15.29	1075.56
11/04/03	15.46	1075.39
12/03/03	15.66	1075.19
05/05/04	15.28	1075.57
06/07/04	13.54	1077.31
07/14/04	13.37	1077.48
08/10/04	14.11	1076.74
08/18/04	14.31	1076.54
09/01/04	14.66	1076.19
10/12/04	14.05	1076.80
11/08/04	13.63	1077.22
12/07/04	13.49	1077.36
05/04/05	13.91	1076.94
06/01/05	13.45	1077.40
07/06/05	11.43	1079.42
08/09/05	11.34	1079.51
09/07/05	11.10	1079.75
10/04/05	11.75	1079.10
11/09/05	12.00	1078.85
05/11/06	10.00	1080.85
06/07/06	10.72	1080.13
07/12/06	11.97	1078.88
08/08/06	13.12	1077.73
09/05/06	13.18	1077.67
10/11/06	12.58	1078.27
11/07/06	12.42	1078.43
12/07/06	12.99	1077.86
01/03/07	13.33	1077.52
01/08/07	13.31	1077.54
01/09/07	13.32	1077.53
01/10/07	13.32	1077.53
01/11/07	13.33	1077.52
01/12/07	13.34	1077.51
01/15/07	13.41	1077.44
01/16/07	13.43	1077.42
01/25/07	13.60	1077.25
03/21/07	13.63	1077.22
05/17/07	10.50	1080.35
06/13/07	9.75	1081.10
07/19/07	11.13	1079.72
08/15/07	12.18	1078.67

130-050-09AAD
Undefined Aquifer

MP Elev (msl,ft)=1,082.52
SI (ft.)=138-143

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/21/94	14.06	1068.46
10/26/94	13.88	1068.64
11/16/94	13.90	1068.62
12/14/94	13.94	1068.58
05/16/95	12.23	1070.29
06/14/95	12.66	1069.86
07/25/95	12.63	1069.89
09/06/95	14.17	1068.35
10/18/95	13.43	1069.09
11/21/95	13.22	1069.30
05/01/96	12.74	1069.78
06/06/96	12.30	1070.22
07/17/96	13.46	1069.06
08/27/96	14.57	1067.95
10/08/96	14.92	1067.60
12/10/96	14.17	1068.35
05/28/97	12.48	1070.04
08/13/97	13.89	1068.63
09/17/97	14.68	1067.84
10/15/97	14.75	1067.77
11/19/97	14.17	1068.35
12/16/97	14.11	1068.41
05/12/98	12.49	1070.03
07/15/98	12.46	1070.06
08/25/98	13.81	1068.71
10/15/98	14.55	1067.97
12/02/98	13.03	1069.49
05/25/99	12.37	1070.15
06/16/99	12.70	1069.82
06/23/99	12.56	1069.96
07/22/99	12.83	1069.69
09/01/99	13.26	1069.26
10/06/99	12.44	1070.08
11/03/99	12.70	1069.82
12/08/99	12.96	1069.56
05/16/00	12.24	1070.28
08/16/00	13.81	1068.71
11/28/00	13.75	1068.77
05/16/01	12.09	1070.43
06/13/01	12.29	1070.23
07/19/01	13.34	1069.18
08/15/01	13.90	1068.62
09/12/01	14.76	1067.76
10/11/01	14.41	1068.11
11/15/01	14.16	1068.36
12/04/01	14.03	1068.49
05/15/02	13.22	1069.30
06/26/02	13.66	1068.86
08/07/02	14.08	1068.44
09/17/02	14.32	1068.20
11/05/02	14.29	1068.23
12/09/02	14.38	1068.14
05/06/03	13.97	1068.55
06/04/03	13.42	1069.10
07/08/03	12.89	1069.63
08/05/03	13.80	1068.72
09/03/03	14.87	1067.65
10/01/03	15.21	1067.31
11/04/03	14.86	1067.66
12/03/03	14.79	1067.73
05/05/04	14.05	1068.47
06/07/04	12.99	1069.53
07/14/04	12.98	1069.54
08/10/04	13.80	1068.72
08/18/04	14.02	1068.50
09/01/04	14.43	1068.09
10/12/04	13.58	1068.94
11/08/04	13.00	1069.52
12/07/04	12.98	1069.54
05/04/05	13.10	1069.42
06/01/05	12.70	1069.82
07/06/05	12.06	1070.46
08/09/05	12.30	1070.22
09/07/05	12.22	1070.30
10/04/05	12.44	1070.08
11/09/05	12.43	1070.09
05/11/06	11.52	1071.00
06/07/06	12.26	1070.26
07/12/06	13.25	1069.27
08/08/06	14.29	1068.23
08/29/06	14.44	1068.08
08/30/06	14.48	1068.04
08/31/06	14.46	1068.06
09/01/06	14.52	1068.00
09/05/06	14.29	1068.23
09/07/06	14.19	1068.33
09/26/06	13.75	1068.77
10/11/06	13.48	1069.04
10/18/06	13.40	1069.12
11/07/06	13.23	1069.29
12/07/06	13.58	1068.94
01/03/07	13.51	1069.01
01/08/07	13.53	1068.99
01/09/07	13.62	1068.90
01/09/07	13.62	1068.90
01/10/07	13.62	1068.90
01/11/07	13.64	1068.88
01/12/07	13.82	1068.70
01/15/07	14.03	1068.49
01/16/07	14.09	1068.43
01/25/07	14.03	1068.49
03/21/07	13.79	1068.73
05/17/07	12.36	1070.16
06/13/07	12.03	1070.49
07/19/07	13.09	1069.43
08/16/07	13.60	1068.92

130-050-09AAD2
Hankinson Aquifer

MP Elev (msl,ft)=1,083.06
SI (ft.)=35-40

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/21/94	12.48	1070.58
10/26/94	11.90	1071.16
11/16/94	12.06	1071.00
12/14/94	12.26	1070.80
05/16/95	8.63	1074.43
06/14/95	9.97	1073.09
07/25/95	9.68	1073.38
09/06/95	12.49	1070.57
10/18/95	10.79	1072.27
11/21/95	10.68	1072.38
05/01/96	9.74	1073.32
06/06/96	9.12	1073.94
07/17/96	11.63	1071.43
08/27/96	13.65	1069.41
10/08/96	13.88	1069.18
12/10/96	12.75	1070.31
05/28/97	9.56	1073.50
08/13/97	12.22	1070.84
09/17/97	13.97	1069.09
10/15/97	12.66	1070.40
11/19/97	12.35	1070.71
12/16/97	12.33	1070.73
05/12/98	8.80	1074.26
07/15/98	10.05	1073.01
08/25/98	12.37	1070.69
10/15/98	13.10	1069.96
12/02/98	10.11	1072.95
05/25/99	9.48	1073.58
06/16/99	9.99	1073.07
06/23/99	9.40	1073.66
07/22/99	10.31	1072.75
09/01/99	10.99	1072.07
10/06/99	9.76	1073.30
11/03/99	9.97	1073.09
05/16/00	9.03	1074.03
08/16/00	12.22	1070.84
11/28/00	11.79	1071.27
05/16/01	8.80	1074.26
06/13/01	9.17	1073.89
07/19/01	11.47	1071.59
08/15/01	12.58	1070.48
09/12/01	13.94	1069.12
10/11/01	13.11	1069.95
11/15/01	12.76	1070.30
12/04/01	12.69	1070.37
05/15/02	10.56	1072.50
06/26/02	11.63	1071.43
08/07/02	12.78	1070.28
09/17/02	14.01	1069.05
11/05/02	13.48	1069.58
12/09/02	13.81	1069.25
05/06/03	12.03	1071.03
06/04/03	11.42	1071.64
07/08/03	10.31	1072.75
08/05/03	12.29	1070.77
09/03/03	14.25	1068.81
10/01/03	14.71	1068.35
11/04/03	13.99	1069.07
12/03/03	13.99	1069.07
05/05/04	12.40	1070.66
06/07/04	9.79	1073.27
07/14/04	10.13	1072.93
08/10/04	11.89	1071.17
08/18/04	13.51	1069.55
09/01/04	13.21	1069.85
10/12/04	11.22	1071.84
11/08/04	9.83	1073.23
12/07/04	10.45	1072.61
05/04/05	10.70	1072.36
06/01/05	9.84	1073.22
07/06/05	8.50	1074.56
08/09/05	8.78	1074.28
09/07/05	8.78	1074.28
10/04/05	9.50	1073.56
11/09/05	9.50	1073.56
05/11/06	7.82	1075.24
06/07/06	9.24	1073.82
07/12/06	11.20	1071.86
08/08/06	12.92	1070.14
08/29/06	12.95	1070.11
08/30/06	13.01	1070.05
08/31/06	13.02	1070.04
09/01/06	13.15	1069.91
09/05/06	11.72	1071.34
09/07/06	11.77	1071.29
09/26/06	10.79	1072.27
10/11/06	10.79	1072.27
11/07/06	10.51	1072.55
12/07/06	11.31	1071.75
01/03/07	11.25	1071.81
01/08/07	11.29	1071.77
01/09/07	11.36	1071.70
01/09/07	11.35	1071.71
01/10/07	11.37	1071.69
01/11/07	11.42	1071.64
01/12/07	11.52	1071.54
01/15/07	11.74	1071.32
01/16/07	11.81	1071.25
01/25/07	12.09	1070.97
03/21/07	11.29	1071.77
05/17/07	9.00	1074.06
06/13/07	8.28	1074.78
07/19/07	10.46	1072.60
08/16/07	11.58	1071.48
12/08/99	10.47	1072.59

130-050-10CCC
Milnor Channel Aquifer

MP Elev (msl,ft)=1,081.72
SI (ft.)=98-103

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/21/94	4.66	1076.40
10/26/94	4.31	1076.75
11/16/94	4.35	1076.71
12/14/94	4.57	1076.49
05/16/95	2.04	1079.02
06/14/95	2.91	1078.15
07/25/95	3.07	1077.99
09/06/95	4.94	1076.12
10/18/95	3.75	1077.31
11/21/95	3.65	1077.41
06/06/96	2.29	1078.77
07/17/96	4.12	1076.94
08/27/96	5.39	1075.67
10/08/96	5.49	1075.57
12/10/96	4.68	1076.38
05/28/97	2.62	1078.44
08/13/97	4.66	1076.40
09/17/97	5.55	1075.51
10/15/97	5.06	1076.00
11/19/97	4.70	1076.36
12/16/97	4.64	1076.42
05/12/98	2.22	1078.84
07/15/98	2.93	1078.13
08/25/98	4.58	1076.48
10/15/98	5.01	1076.05
12/02/98	2.57	1078.49
05/25/99	2.01	1079.05
06/16/99	2.41	1078.65
06/23/99	2.54	1079.18
07/22/99	3.30	1078.42
09/01/99	3.87	1077.85
10/06/99	3.22	1078.50
11/03/99	3.39	1078.33
12/08/99	3.68	1078.04
05/16/00	2.70	1079.02
08/16/00	4.90	1076.82
11/28/00	4.47	1077.25
05/16/01	2.14	1079.58
06/13/01	2.54	1079.18
07/19/01	4.14	1077.58
08/15/01	4.84	1076.88
09/12/01	5.64	1076.08
10/11/01	4.97	1076.75
11/15/01	4.60	1077.12
12/04/01	4.52	1077.20
05/15/02	2.99	1078.73
06/26/02	4.16	1077.56
08/07/02	4.83	1076.89
09/17/02	5.10	1076.62
11/05/02	4.70	1077.02
12/10/02	4.92	1076.80
05/06/03	3.72	1078.00
06/04/03	3.54	1078.18
07/08/03	2.92	1078.80
08/05/03	4.40	1077.32
09/03/03	5.68	1076.04
10/01/03	5.79	1075.93
11/04/03	5.29	1076.43
12/03/03	5.12	1076.60
05/05/04	4.14	1077.58
06/07/04	2.76	1078.96
07/14/04	2.94	1078.78
08/10/04	4.29	1077.43
08/18/04	4.65	1077.07
09/01/04	5.09	1076.63
10/12/04	3.94	1077.78
11/08/04	3.00	1078.72
05/04/05	3.40	1078.32
06/01/05	2.89	1078.83
07/06/05	1.75	1079.97
08/09/05	2.20	1079.52
09/07/05	2.35	1079.37
10/04/05	2.93	1078.79
11/09/05	2.88	1078.84
05/11/06	1.25	1080.47
06/07/06	2.69	1079.03
07/12/06	4.07	1077.65
08/08/06	5.23	1076.49
08/29/06	5.31	1076.41
08/30/06	5.46	1076.26
08/31/06	5.44	1076.28
09/01/06	5.30	1076.42
09/05/06	4.59	1077.13
09/07/06	4.58	1077.14
09/26/06	4.11	1077.61
10/11/06	3.83	1077.89
10/18/06	3.59	1078.13
11/07/06	3.56	1078.16
12/07/06	4.11	1077.61
01/03/07	3.92	1077.80
01/08/07	4.00	1077.72
01/09/07	4.03	1077.69
01/09/07	4.11	1077.61
01/10/07	4.17	1077.55
01/11/07	4.30	1077.42
01/12/07	4.31	1077.41
01/15/07	4.59	1077.13
01/16/07	4.62	1077.10
01/25/07	4.48	1077.24
03/21/07	3.67	1078.05
05/17/07	2.36	1079.36
06/13/07	1.89	1079.83
07/19/07	3.70	1078.02
08/16/07	4.35	1077.37

130-050-10CDD1
Milnor Channel Aquifer

MP Elev (msl,ft)=1,079.00
SI (ft.)=140-150

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
12/07/06	5.60	1073.40	
01/03/07	5.15	1073.85	
01/08/07	5.43	1073.57	
01/09/07	5.31	1073.69	
01/09/07	7.87	1071.13	
01/10/07	8.29	1070.71	
01/11/07	8.33	1070.67	
01/12/07	8.52	1070.48	
01/15/07	8.86	1070.14	
01/16/07	8.92	1070.08	
01/25/07	5.93	1073.07	
03/21/07	5.01	1073.99	
05/17/07	4.29	1074.71	
06/13/07	3.78	1075.22	
07/16/07	5.30	1073.70	
07/19/07	5.59	1073.41	
08/16/07	5.96	1073.04	

130-050-10CDD2
Milnor Channel Aquifer

MP Elev (msl,ft)=1,079.00
SI (ft.)=88-98

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
12/07/06	5.66	1073.34	
01/03/07	5.24	1073.76	
01/08/07	5.45	1073.55	
01/09/07	7.29	1071.71	
01/09/07	7.47	1071.53	
01/10/07	7.85	1071.15	
01/11/07	7.91	1071.09	
01/12/07	8.15	1070.85	
01/15/07	8.46	1070.54	
01/16/07	8.54	1070.46	
01/25/07	5.97	1073.03	
03/21/07	4.99	1074.01	
05/17/07	4.27	1074.73	
06/13/07	3.76	1075.24	
07/16/07	5.30	1073.70	
07/19/07	5.60	1073.40	
08/16/07	5.92	1073.08	

130-050-10DCC
Milnor Channel Aquifer

MP Elev (msl,ft)=1,077.05
SI (ft.)=0-150

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
01/03/07	2.38	1074.67	
01/08/07	2.65	1074.40	
01/09/07	86.94	990.11	
01/09/07	2.51	1074.54	
01/09/07	96.55	980.50	
01/09/07	97.80	979.25	
01/09/07	98.47	978.58	
01/09/07	86.00	991.05	
01/09/07	86.18	990.87	
01/09/07	86.36	990.69	
01/09/07	86.80	990.25	
01/09/07	87.23	989.82	
01/09/07	87.39	989.66	
01/09/07	87.56	989.49	
01/09/07	87.65	989.40	
01/16/07	5.27	1071.78	
01/09/07	87.75	989.30	
01/09/07	87.76	989.29	
01/09/07	86.53	990.52	
01/09/07	86.54	990.51	
01/09/07	86.56	990.49	
01/09/07	86.60	990.45	
01/09/07	86.62	990.43	
01/09/07	86.70	990.35	
01/09/07	87.04	990.01	
01/10/07	88.36	988.69	
01/11/07	86.57	990.48	
01/12/07	90.25	986.80	
01/16/07	90.51	986.54	
01/16/07	5.50	1071.55	
01/16/07	5.40	1071.65	
01/16/07	5.22	1071.83	
01/16/07	5.16	1071.89	
01/16/07	4.97	1072.08	
01/16/07	4.83	1072.22	
01/16/07	4.69	1072.36	
01/16/07	4.63	1072.42	
01/16/07	4.56	1072.49	
01/16/07	4.03	1073.02	
01/25/07	3.08	1073.97	
03/21/07	2.12	1074.93	
05/17/07	1.41	1075.64	
06/13/07	0.90	1076.15	
07/19/07	2.70	1074.35	
08/16/07	3.07	1073.98	
01/09/07	87.62	989.43	

130-050-10DDD1
Milnor Channel Aquifer

MP Elev (msl,ft)=1,082.00
SI (ft.)=108-118

Date	Depth to Water (ft)	WL Elev (msl, ft)
01/03/07	<<	<<
01/08/07	<<	<<
01/09/07	<<	<<
01/09/07	0.32	1081.68
03/21/07	<<	<<
05/17/07	<<	<<
06/13/07	<<	<<
07/19/07	<<	<<
08/16/07	0.47	1081.53

130-050-10DDD2
Milnor Channel Aquifer

MP Elev (msl,ft)=1,082.00
SI (ft.)=40-50

Date	Depth to Water (ft)	WL Elev (msl, ft)
05/17/07	2.70	1079.30
08/16/07	4.10	1077.90
07/19/07	3.94	1078.06
06/13/07	2.15	1079.85

130-050-14DCD
Undefined Aquifer

MP Elev (msl,ft)=1,082.00
SI (ft.)=125-130

Date	Depth to Water (ft)	WL Elev (msl, ft)
11/21/95	8.27	1073.73
05/01/96	7.66	1074.34
06/06/96	7.46	1074.54
07/17/96	8.98	1073.02
08/27/96	10.15	1071.85
10/08/96	9.87	1072.13
12/10/96	9.05	1072.95
05/28/97	7.48	1074.52
08/13/97	8.94	1073.06
09/17/97	9.83	1072.17
10/15/97	8.91	1073.09
11/19/97	9.25	1072.75
12/16/97	9.21	1072.79
05/12/98	6.92	1075.08
07/15/98	7.92	1074.08
08/25/98	9.02	1072.98
10/15/98	9.35	1072.65
12/02/98	7.97	1074.03
05/25/99	7.77	1074.23
06/23/99	7.73	1074.27
07/22/99	8.29	1073.71
09/01/99	8.50	1073.50
10/06/99	8.22	1073.78
11/03/99	8.44	1073.56
12/08/99	8.79	1073.21
05/16/00	7.74	1074.26
06/29/00	8.62	1073.38
08/16/00	9.88	1072.12
11/28/00	9.24	1072.76
05/16/01	7.46	1074.54
06/13/01	7.54	1074.46
10/04/05	8.06	1073.94
08/15/01	10.09	1071.91
09/12/01	10.72	1071.28
10/11/01	9.53	1072.47
11/15/01	9.67	1072.33
12/04/01	9.45	1072.55
05/15/02	8.24	1073.76
06/26/02	9.45	1072.55
08/07/02	9.41	1072.59
09/17/02	9.80	1072.20
11/05/02	9.36	1072.64
12/10/02	9.85	1072.15
05/06/03	8.22	1073.78
06/04/03	8.71	1073.29
07/08/03	8.54	1073.46
08/05/03	9.85	1072.15
09/03/03	11.10	1070.90
10/01/03	10.64	1071.36
11/04/03	10.29	1071.71
12/03/03	10.23	1071.77
05/05/04	9.31	1072.69
06/07/04	7.80	1074.20
07/14/04	7.82	1074.18
08/10/04	8.94	1073.06
09/01/04	9.92	1072.08
10/12/04	9.04	1072.96
11/08/04	8.28	1073.72
12/07/04	8.60	1073.40
05/04/05	8.69	1073.31
06/01/05	8.13	1073.87
07/06/05	7.64	1074.36
08/09/05	7.49	1074.51
08/30/05	7.85	1074.15
09/07/05	7.62	1074.38
11/09/05	8.10	1073.90
05/11/06	6.98	1075.02
06/07/06	8.10	1073.90
07/12/06	9.41	1072.59
07/18/06	9.89	1072.11
07/27/06	10.08	1071.92
08/08/06	10.66	1071.34
08/29/06	10.56	1071.44
08/30/06	10.79	1071.21
08/31/06	10.98	1071.02
08/31/06	10.98	1071.02
09/01/06	11.07	1070.93
09/05/06	9.75	1072.25
09/07/06	9.73	1072.27
09/26/06	8.99	1073.01
10/11/06	8.89	1073.11
10/18/06	8.67	1073.33
11/07/06	8.92	1073.08
12/07/06	9.59	1072.41
01/03/07	9.03	1072.97
01/08/07	9.06	1072.94
01/09/07	9.13	1072.87
01/09/07	9.15	1072.85
01/10/07	9.13	1072.87
01/11/07	9.32	1072.68
01/12/07	9.40	1072.60
01/15/07	9.65	1072.35
01/16/07	9.71	1072.29
01/25/07	9.82	1072.18
03/21/07	8.80	1073.20
05/16/07	8.05	1073.95
06/13/07	7.40	1074.60
07/19/07	8.90	1073.10
08/16/07	9.36	1072.64
07/19/01	9.47	1072.53

130-050-14DCD2
Hankinson Aquifer

MP Elev (msl,ft)=1,082.00
SI (ft.)=48-53

Date	Depth to Water (ft)	WL Elev (msl, ft)
11/21/95	8.89	1073.11
05/01/96	7.62	1074.38
06/06/96	7.36	1074.64
07/17/96	9.58	1072.42
08/27/96	11.13	1070.87
10/08/96	10.83	1071.17
12/10/96	9.70	1072.30
05/28/97	7.53	1074.47
08/13/97	9.88	1072.12
09/17/97	11.03	1070.97
10/15/97	10.08	1071.92
11/19/97	9.92	1072.08
12/16/97	9.83	1072.17
05/12/98	6.40	1075.60
07/15/98	8.05	1073.95
08/25/98	9.98	1072.02
10/15/98	10.46	1071.54
12/02/98	8.05	1073.95
05/25/99	7.78	1074.22
06/23/99	8.20	1073.80
07/22/99	8.86	1073.14
09/01/99	9.43	1072.57
10/06/99	8.67	1073.33
11/03/99	8.99	1073.01
12/08/99	9.37	1072.63
05/16/00	7.75	1074.25
06/29/00	9.05	1072.95
08/16/00	10.40	1071.60
11/28/00	9.78	1072.22
05/16/01	7.09	1074.91
06/13/01	7.63	1074.37
07/19/01	9.66	1072.34
08/15/01	10.71	1071.29
09/12/01	11.86	1070.14
10/11/01	10.74	1071.26
11/15/01	10.18	1071.82
12/04/01	10.06	1071.94
05/15/02	7.96	1074.04
06/26/02	9.58	1072.42
08/07/02	9.60	1072.40
09/17/02	9.82	1072.18
11/05/02	9.62	1072.38
12/10/02	9.94	1072.06
05/06/03	8.08	1073.92
06/04/03	8.16	1073.84
07/08/03	7.72	1074.28
08/05/03	9.55	1072.45
09/03/03	11.44	1070.56
10/01/03	11.17	1070.83
11/04/03	10.65	1071.35
12/03/03	10.44	1071.56
05/05/04	9.11	1072.89
06/07/04	6.64	1075.36
07/14/04	7.31	1074.69
08/10/04	9.02	1072.98
09/01/04	10.13	1071.87
10/12/04	9.13	1072.87
11/08/04	8.12	1073.88
12/07/04	8.63	1073.37
05/04/05	8.48	1073.52
06/01/05	7.97	1074.03
07/06/05	6.80	1075.20
08/09/05	7.02	1074.98
08/30/05	7.60	1074.40
09/07/05	7.51	1074.49
10/04/05	8.06	1073.94
11/09/05	8.19	1073.81
05/11/06	6.14	1075.86
06/07/06	8.14	1073.86
07/12/06	9.38	1072.62
08/08/06	11.19	1070.81
08/29/06	11.37	1070.63
08/30/06	11.51	1070.49
08/31/06	11.53	1070.47
09/01/06	11.56	1070.44
09/05/06	10.15	1071.85
09/07/06	10.14	1071.86
09/26/06	9.58	1072.42
10/11/06	9.10	1072.90
11/07/06	9.06	1072.94
12/07/06	9.60	1072.40
01/03/07	9.32	1072.68
01/08/07	9.31	1072.69
01/09/07	9.37	1072.63
01/10/07	9.33	1072.67
01/11/07	9.41	1072.59
01/12/07	9.50	1072.50
01/15/07	9.72	1072.28
01/16/07	9.79	1072.21
01/25/07	10.02	1071.98
03/21/07	8.62	1073.38
05/16/07	7.38	1074.62
06/13/07	6.56	1075.44
07/19/07	8.94	1073.06
08/16/07	9.59	1072.41

130-050-16AAD
Milnor Channel Aquifer

MP Elev (msl,ft)=1,087.00
SI (ft.)=88-98

Date	Depth to Water (ft)	WL Elev (msl, ft)
12/07/06	7.95	-7.95
01/03/07	7.83	-7.83
01/08/07	7.83	-7.83
01/09/07	7.92	-7.92
03/21/07	7.52	1079.48
01/11/07	8.10	-8.10
01/12/07	8.17	-8.17
01/15/07	8.31	-8.31
01/16/07	8.35	-8.35
01/25/07	8.33	-8.33
05/17/07	6.14	1080.86
06/13/07	5.70	1081.30
07/19/07	7.45	1079.55
08/16/07	8.14	1078.86
01/10/07	7.97	-7.97

130-050-16ABB1 **MP Elev (msl,ft)=1,087.00**
Milnor Channel Aquifer **SI (ft.)=120-130**

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
12/07/06	10.27	-10.27	01/11/07	10.32	-10.32	05/17/07	8.47	1078.53
			01/12/07	10.33	-10.33	06/13/07	7.96	1079.04
01/03/07	10.18	-10.18	01/15/07	10.55	-10.55	06/13/07	7.95	1079.05
01/08/07	10.17	-10.17	01/16/07	10.58	-10.58	07/19/07	9.61	1077.39
01/09/07	10.24	-10.24	01/25/07	10.59	-10.59	08/16/07	10.32	1076.68
01/10/07	10.28	-10.28	03/21/07	9.86	1077.14			

130-050-16ABB2 **MP Elev (msl,ft)=1,087.00**
Milnor Channel Aquifer **SI (ft.)=58-78**

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
12/07/06	10.65	-10.65	01/11/07	10.91	-10.91	05/17/07	8.75	1078.25
			01/12/07	10.93	-10.93	06/13/07	8.57	1078.43
01/03/07	10.82	-10.82	01/15/07	10.98	-10.98	06/13/07	8.20	1078.80
01/08/07	10.84	-10.84	01/16/07	11.01	-11.01	07/19/07	9.45	1077.55
01/09/07	10.89	-10.89	01/25/07	11.16	-11.16	08/16/07	10.24	1076.76
01/10/07	10.90	-10.90	03/21/07	10.63	1076.37			

130-050-16BAB **MP Elev (msl,ft)=1,087.00**
Milnor Channel Aquifer **SI (ft.)=48-58**

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
12/07/06	16.00	-16.00	01/11/07	16.29	-16.29	05/17/07	14.19	1072.81
			01/12/07	16.31	-16.31	06/13/07	13.31	1073.69
01/03/07	16.14	-16.14	01/15/07	16.31	-16.31	07/19/07	14.32	1072.68
01/08/07	16.22	-16.22	01/16/07	16.32	-16.32	08/16/07	15.17	1071.83
01/09/07	16.27	-16.27	01/25/07	16.37	-16.37	01/10/07	16.27	-16.27
03/21/07	16.27	1070.73						

130-050-16BBA
Milnor Channel Aquifer

MP Elev (msl,ft)=1,092.00
SI (ft.)=49-54

Date	Depth to Water (ft)	WL Elev (msl, ft)
08/30/05	12.30	1079.70
10/04/05	13.08	1078.92
11/09/05	13.34	1078.66
05/11/06	11.81	1080.19
06/07/06	13.09	1078.91
07/12/06	14.41	1077.59
08/08/06	15.40	1076.60
08/29/06	15.37	1076.63
08/30/06	15.43	1076.57
08/31/06	15.44	1076.56
09/01/06	15.53	1076.47
09/05/06	14.91	1077.09
09/07/06	14.85	1077.15
09/26/06	14.28	1077.72
10/11/06	14.23	1077.77
11/07/06	13.84	1078.16
12/07/06	14.40	1077.60
01/03/07	14.23	1077.77
01/08/07	14.29	1077.71
01/09/07	14.36	1077.64
01/10/07	14.38	1077.62
01/11/07	14.40	1077.60
01/12/07	14.41	1077.59
01/15/07	14.58	1077.42
01/16/07	14.63	1077.37
01/25/07	14.76	1077.24
03/21/07	14.28	1077.72
05/17/07	12.29	1079.71
06/13/07	11.95	1080.05
07/19/07	13.61	1078.39
08/16/07	14.24	1077.76

Elev Date ft)

130-050-17DDD
Milnor Channel Aquifer

MP Elev (msl,ft)=1,085.17
SI (ft.)=50-60

Date	Depth to Water (ft)	WL Elev (msl, ft)
11/11/64	7.56	1077.52
12/09/64	7.94	1077.14
01/19/65	8.29	1076.79
04/01/65	8.18	1076.90
04/21/65	6.06	1079.02
06/11/65	5.03	1080.05
07/15/65	5.58	1079.50
08/17/65	5.79	1079.29
09/14/65	6.87	1078.21
10/13/65	5.97	1079.11
10/21/65	6.02	1079.06
11/09/65	6.21	1078.87
11/16/65	6.27	1078.81
12/14/65	5.84	1079.24
01/11/66	7.00	1078.08
02/08/66	7.65	1077.43
03/14/66	7.12	1077.96
04/14/66	5.64	1079.44
05/10/66	4.69	1080.39
06/14/66	5.67	1079.41
07/06/66	5.50	1079.58
08/17/66	5.49	1079.59
09/28/66	6.51	1078.57
10/25/66	5.91	1079.17
11/30/66	6.19	1078.89
12/28/66	7.02	1078.06
01/25/67	7.18	1077.90
03/01/67	7.41	1077.67
03/21/67	7.07	1078.01
05/24/67	4.48	1080.60
06/21/67	3.50	1081.58
07/12/67	2.99	1082.09
08/16/67	5.33	1079.75
10/11/67	5.91	1079.17
02/01/68	6.75	1078.33
03/13/68	6.97	1078.11
04/16/68	5.19	1079.89
07/10/68	5.39	1079.69
10/09/68	4.79	1080.29
01/09/69	5.63	1079.45
04/02/69	5.06	1080.02
07/10/69	4.37	1080.71
12/02/69	6.42	1078.66
03/24/70	6.10	1078.98
06/24/70	4.92	1080.16
09/22/70	7.90	1077.18
12/01/70	6.69	1078.39
03/03/71	7.57	1077.51
06/02/71	5.10	1079.98
08/31/71	6.91	1078.17
12/01/71	5.44	1079.64
03/08/72	6.92	1078.16
06/06/72	4.18	1080.90
09/06/72	6.28	1078.80
12/06/72	6.36	1078.72
03/01/73	6.21	1078.87
06/12/73	5.77	1079.31
08/28/73	7.91	1077.17
12/04/73	6.56	1078.52
03/14/74	6.55	1078.53
06/04/74	4.59	1080.49
09/11/74	7.78	1077.30
12/03/74	7.49	1077.59
03/18/75	7.66	1077.42
06/17/75	4.15	1080.93
09/23/75	5.77	1079.31
12/03/75	5.69	1079.39
03/12/76	5.44	1079.64
06/01/76	5.63	1079.45
09/09/76	8.47	1076.61
12/01/76	8.19	1076.89
03/10/77	8.00	1077.08
06/14/77	8.15	1076.93
09/22/77	7.84	1077.24
12/06/77	5.82	1079.26
03/21/78	6.96	1078.12
06/21/78	5.13	1079.95
09/21/78	6.54	1078.54
11/21/78	6.80	1078.28
03/23/79	6.64	1078.44
06/22/79	4.33	1080.75
09/19/79	7.92	1077.16
11/29/79	6.18	1078.90
03/19/80	7.09	1077.99
06/18/80	5.14	1079.94
09/11/80	8.04	1077.04
11/18/80	6.07	1079.01
06/12/81	6.13	1078.95
09/04/81	7.88	1077.20
12/01/81	7.21	1077.87
03/30/82	6.34	1078.74
07/07/82	7.16	1077.92
11/30/82	6.69	1078.39
03/10/83	7.18	1077.90
06/15/83	6.12	1078.96
08/25/83	8.00	1077.08
11/29/83	7.23	1077.85
04/03/84	5.67	1079.41
06/12/84	5.19	1079.89
08/30/84	7.39	1077.69
11/29/84	5.43	1079.65
02/28/85	7.58	1077.50
06/26/85	5.47	1079.61
09/11/85	6.16	1078.92
12/03/85	6.62	1078.46
04/12/86	4.30	1080.78
05/23/86	4.10	1080.98
07/17/86	5.04	1080.04
09/04/86	4.18	1080.90
11/25/86	4.56	1080.52
02/26/87	5.14	1079.94
07/10/87	6.49	1078.59
09/08/87	6.98	1078.10
11/25/87	6.50	1078.58
06/15/88	5.95	1079.13
09/07/88	8.40	1076.68
11/22/88	6.86	1078.22
05/24/89	5.01	1080.07
08/01/89	4.87	1080.21
08/24/89	5.80	1079.28
11/29/89	5.55	1079.53
03/14/90	6.40	1078.68
06/05/90	5.98	1079.10
08/21/90	6.93	1078.15
11/13/90	6.91	1078.17
02/28/91	6.73	1078.35
06/04/91	6.62	1078.46
06/27/91	4.78	1080.30
07/24/91	6.48	1078.60
08/20/91	6.56	1078.52
11/19/91	6.09	1078.99
03/10/92	5.90	1079.18
04/07/92	5.33	1079.75
05/07/92	5.43	1079.65
06/03/92	5.77	1079.31
06/23/92	3.95	1081.13
07/07/92	3.95	1081.13
07/29/92	5.20	1079.88
08/10/92	4.96	1080.12
09/08/92	4.86	1080.22
10/14/92	6.20	1078.88
11/10/92	5.22	1079.86
12/09/92	5.32	1079.76
03/23/93	5.47	1079.61
04/13/93	3.39	1081.69
05/11/93	3.87	1081.21
06/14/93	4.01	1081.07
06/15/93	4.02	1081.06
07/08/93	3.59	1081.49
08/09/93	3.76	1081.32
08/18/93	3.59	1081.49

130-050-17DDD (Continued),MP Elev (msl,ft)=1085.17Milnor Channel AquiferSI (ft.)=50-60

Date	Depth to Water (ft)	WL Elev (msl, ft) Elev ft)
09/08/93	4.50	1080.58
10/05/93	4.70	1080.38
10/06/93	4.74	1080.34
11/09/93	4.81	1080.27
11/16/93	4.55	1080.53
12/15/93	4.34	1080.74
04/21/94	3.40	1081.68
05/19/94	3.56	1081.52
06/21/94	4.71	1080.37
07/27/94	3.36	1081.72
08/24/94	4.30	1080.78
09/21/94	4.40	1080.68
10/26/94	3.97	1081.11
11/16/94	3.98	1081.10
12/14/94	4.58	1080.50
05/16/95	2.72	1082.36
06/14/95	3.52	1081.56
07/25/95	3.74	1081.34
09/06/95	4.99	1080.09
10/18/95	3.71	1081.37
11/21/95	3.67	1081.41
03/06/96	4.78	1080.30
05/01/96	3.80	1081.28
05/17/96	2.44	1082.64
06/06/96	3.11	1081.97
07/11/96	4.55	1080.53
07/16/96	4.75	1080.33
08/27/96	5.72	1079.36
09/05/96	5.89	1079.19
10/07/96	5.12	1079.96
10/08/96	5.10	1079.98
11/14/96	4.55	1080.53
12/10/96	4.37	1080.71
04/20/97	2.43	1082.65
05/28/97	3.39	1081.69
06/19/97	4.17	1080.91
08/07/97	4.61	1080.47
08/13/97	4.96	1080.12
09/17/97	5.50	1079.58
10/15/97	4.28	1080.80
10/17/97	4.23	1080.85
11/19/97	4.24	1080.84
12/16/97	4.22	1080.86
12/19/97	4.20	1080.88
04/29/98	3.14	1081.94
05/12/98	3.56	1081.52
06/11/98	3.19	1081.89
06/17/98	2.92	1082.16
07/15/98	3.65	1081.43
08/25/98	4.70	1080.38
10/06/98	4.89	1080.19
10/15/98	4.59	1080.49
11/25/98	3.09	1081.99
12/02/98	3.19	1081.89
01/26/99	3.93	1081.15
05/05/99	2.79	1082.29
05/25/99	3.46	1081.62
06/10/99	3.39	1081.69
06/23/99	3.23	1081.85
07/20/99	3.58	1081.50
07/22/99	3.82	1081.26
09/01/99	3.88	1081.20
09/09/99	3.23	1081.85
10/06/99	3.49	1081.59
10/14/99	3.35	1081.73
11/03/99	3.59	1081.49
12/08/99	3.74	1081.34
12/09/99	3.75	1081.33
01/13/00	4.15	1080.93
03/16/00	3.05	1082.03
04/26/00	3.05	1082.03
05/16/00	2.97	1082.11
07/07/00	3.12	1081.96
08/10/00	4.59	1080.49
08/16/00	4.81	1080.27
10/06/00	4.77	1080.31
11/28/00	3.85	1081.23
05/16/01	2.89	1082.19
06/13/01	2.74	1082.34
06/14/01	4.64	1080.44
07/19/01	4.07	1081.01
07/25/01	3.68	1081.40
08/15/01	4.55	1080.53
09/12/01	4.94	1080.14
09/26/01	4.20	1080.88
10/11/01	3.71	1081.37
10/30/01	3.79	1081.29
11/15/01	3.88	1081.20
12/04/01	3.73	1081.35
05/15/02	2.86	1082.22
06/26/02	3.66	1081.42
08/07/02	4.09	1080.99
09/18/02	4.47	1080.61
11/06/02	3.95	1081.13
12/11/02	4.16	1080.92
05/06/03	2.75	1082.28
06/04/03	3.40	1081.63
07/09/03	3.21	1081.82
08/06/03	4.48	1080.55
09/03/03	5.51	1079.52
10/01/03	5.06	1079.97
11/04/03	4.46	1080.57
12/03/03	4.33	1080.70
05/05/04	3.70	1081.33
06/09/04	3.04	1081.99
07/14/04	3.09	1081.94
08/10/04	4.16	1080.87
09/01/04	4.90	1080.13
10/13/04	3.86	1081.17
11/09/04	3.04	1081.99
12/08/04	3.42	1081.61
05/04/05	3.50	1081.53
06/01/05	3.10	1081.93
07/06/05	2.39	1082.64
08/09/05	2.56	1082.47
09/07/05	2.57	1082.46
10/03/05	3.07	1082.10
11/09/05	3.33	1081.84
05/11/06	1.99	1083.18
06/07/06	3.21	1081.96
07/12/06	4.35	1080.82
08/08/06	5.36	1079.81
09/05/06	3.99	1081.18
10/11/06	3.34	1081.83
11/06/06	3.37	1081.80
12/07/06	3.97	1081.20
01/03/07	3.22	1081.95
01/08/07	3.22	1081.95
01/09/07	3.27	1081.90
01/10/07	3.28	1081.89
01/11/07	3.29	1081.88
01/12/07	3.27	1081.90
01/15/07	3.67	1081.50
01/16/07	3.73	1081.44
01/25/07	3.70	1081.47
05/16/07	2.96	1082.21
06/13/07	2.69	1082.48
07/18/07	3.71	1081.46
08/16/07	4.24	1080.93

130-050-18DDD
Milnor Channel Aquifer

MP Elev (msl,ft)=1,088.69
SI (ft.)=98-103

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/21/94	5.77	1082.92
10/26/94	5.58	1083.11
11/16/94	5.51	1083.18
12/14/94	5.75	1082.94
05/16/95	4.64	1084.05
06/14/95	4.91	1083.78
07/25/95	4.95	1083.74
09/06/95	5.74	1082.95
10/18/95	5.10	1083.59
11/21/95	5.06	1083.63
05/01/96	4.73	1083.96
06/06/96	4.32	1084.37
07/16/96	5.44	1083.25
08/27/96	6.23	1082.46
10/08/96	5.78	1082.91
12/10/96	5.23	1083.46
05/28/97	4.29	1084.40
08/13/97	5.28	1083.41
09/17/97	5.73	1082.96
10/15/97	5.08	1083.61
11/19/97	5.05	1083.64
12/16/97	5.05	1083.64
05/12/98	4.04	1084.65
07/15/98	4.19	1084.50
08/25/98	4.89	1083.80
10/15/98	4.91	1083.78
12/02/98	4.37	1084.32
05/25/99	4.08	1084.61
06/16/99	4.19	1084.50
06/23/99	3.98	1084.71
07/22/99	4.16	1084.53
09/01/99	4.23	1084.46
10/06/99	4.08	1084.61
11/03/99	4.13	1084.56
12/08/99	4.31	1084.38
05/16/00	3.70	1084.99
08/16/00	4.94	1083.75
11/28/00	4.50	1084.19
05/16/01	3.40	1085.29
06/13/01	3.48	1085.21
07/19/01	4.41	1084.28
08/15/01	4.80	1083.89
09/12/01	5.21	1083.48
10/11/01	4.44	1084.25
11/15/01	4.53	1084.16
12/04/01	4.48	1084.21
05/15/02	4.06	1084.63
06/26/02	4.40	1084.29
08/07/02	4.53	1084.16
09/18/02	4.63	1084.06
11/06/02	4.49	1084.20
12/11/02	4.60	1084.09
05/06/03	4.08	1084.61
06/04/03	4.10	1084.59
07/09/03	3.59	1085.10
08/06/03	4.41	1084.28
09/03/03	5.34	1083.35
10/01/03	4.97	1083.72
11/04/03	4.49	1084.20
12/03/03	4.59	1084.10
05/05/04	4.19	1084.50
06/09/04	3.82	1084.87
07/14/04	3.81	1084.88
08/11/04	4.29	1084.40
08/19/04	4.80	1083.89
09/01/04	4.88	1083.81
10/13/04	4.08	1084.61
11/09/04	3.60	1085.09
12/08/04	3.70	1084.99
05/04/05	3.74	1084.95
06/01/05	3.66	1085.03
07/06/05	2.52	1086.17
08/09/05	2.90	1085.79
09/06/05	2.70	1085.99
10/03/05	3.23	1085.46
11/09/05	3.44	1085.25
05/11/06	2.85	1085.84
06/07/06	3.50	1085.19
07/12/06	4.40	1084.29
08/08/06	5.19	1083.50
09/05/06	4.15	1084.54
10/11/06	3.79	1084.90
11/06/06	3.77	1084.92
12/07/06	4.02	1084.67
01/03/07	3.63	1085.06
01/08/07	3.69	1085.00
01/09/07	3.73	1084.96
01/10/07	3.74	1084.95
01/11/07	3.76	1084.93
01/12/07	3.78	1084.91
01/15/07	3.95	1084.74
01/16/07	4.02	1084.67
01/25/07	4.16	1084.53
03/21/07	3.34	1085.35
05/16/07	2.96	1085.73
06/13/07	2.62	1086.07
07/18/07	3.47	1085.22
08/16/07	3.88	1084.81

130-050-22DCD
Milnor Channel Aquifer

MP Elev (msl,ft)=1,082.00
SI (ft.)=58-63

Date	Depth to Water (ft)	WL Elev (msl, ft)
11/21/95	4.83	1077.17
05/01/96	4.40	1077.60
06/06/96	4.28	1077.72
07/17/96	4.87	1077.13
08/27/96	5.21	1076.79
10/08/96	5.31	1076.69
12/10/96	5.03	1076.97
05/28/97	4.26	1077.74
08/13/97	4.93	1077.07
09/17/97	5.15	1076.85
10/15/97	5.12	1076.88
11/19/97	5.13	1076.87
12/16/97	5.27	1076.73
05/12/98	4.26	1077.74
07/15/98	4.34	1077.66
08/25/98	4.76	1077.24
10/15/98	4.98	1077.02
12/02/98	4.54	1077.46
05/25/99	4.28	1077.72
06/23/99	4.40	1077.60
07/22/99	4.49	1077.51
09/01/99	4.54	1077.46
10/06/99	4.37	1077.63
11/03/99	4.43	1077.57
12/08/99	4.56	1077.44
05/16/00	4.21	1077.79
06/29/00	4.47	1077.53
08/16/00	4.74	1077.26
11/28/00	4.70	1077.30
05/16/01	3.89	1078.11
06/13/01	3.97	1078.03
07/19/01	4.51	1077.49
08/15/01	4.66	1077.34
09/12/01	4.86	1077.14
10/11/01	4.70	1077.30
11/15/01	4.75	1077.25
12/04/01	4.71	1077.29
05/15/02	4.31	1077.69
06/26/02	4.88	1077.12
08/07/02	4.93	1077.07
09/17/02	4.96	1077.04
11/06/02	4.98	1077.02
12/10/02	4.98	1077.02
05/06/03	4.67	1077.33
06/04/03	4.63	1077.37
07/09/03	4.26	1077.74
08/05/03	4.63	1077.37
09/03/03	5.03	1076.97
10/01/03	5.14	1076.86
11/04/03	5.04	1076.96
12/03/03	4.97	1077.03
05/05/04	4.72	1077.28
06/07/04	4.17	1077.83
07/14/04	4.21	1077.79
08/10/04	4.50	1077.50
09/01/04	4.73	1077.27
10/12/04	4.52	1077.48
11/08/04	4.34	1077.66
12/08/04	4.35	1077.65
05/04/05	4.32	1077.68
06/01/05	4.25	1077.75
07/06/05	3.71	1078.29
08/09/05	3.78	1078.22
08/30/05	3.76	1078.24
09/07/05	3.75	1078.25
10/03/05	3.90	1078.10
11/09/05	4.00	1078.00
05/11/06	3.51	1078.49
06/07/06	3.89	1078.11
07/12/06	4.31	1077.69
08/08/06	4.65	1077.35
08/29/06	4.67	1077.33
08/30/06	4.68	1077.32
08/31/06	4.68	1077.32
09/01/06	4.69	1077.31
09/05/06	4.50	1077.50
09/07/06	4.51	1077.49
09/26/06	4.41	1077.59
10/11/06	4.38	1077.62
11/07/06	4.40	1077.60
12/07/06	4.48	1077.52
01/03/07	4.35	1077.65
01/08/07	4.35	1077.65
01/09/07	4.39	1077.61
01/10/07	4.41	1077.59
01/11/07	4.42	1077.58
01/12/07	4.51	1077.49
01/15/07	4.41	1077.59
01/16/07	4.43	1077.57
01/25/07	4.44	1077.56
03/21/07	4.05	1077.95
05/16/07	3.79	1078.21
06/13/07	3.59	1078.41
07/18/07	4.12	1077.88
08/16/07	4.29	1077.71

130-050-24DDD
Undefined Aquifer

MP Elev (msl,ft)=1,076.12
SI (ft.)=138-143

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
09/21/94	3.67	1072.45	
10/26/94	3.22	1072.90	
11/16/94	3.30	1072.82	
12/14/94	3.72	1072.40	
05/16/95	1.70	1074.42	
06/14/95	2.26	1073.86	
07/25/95	2.35	1073.77	
09/06/95	3.48	1072.64	
10/18/95	2.55	1073.57	
11/21/95	2.53	1073.59	
05/01/96	2.20	1073.92	
06/06/96	1.75	1074.37	
07/17/96	3.11	1073.01	
08/27/96	4.22	1071.90	
10/08/96	4.02	1072.10	
12/10/96	3.34	1072.78	
05/28/97	1.84	1074.28	
08/13/97	3.17	1072.95	
09/17/97	3.99	1072.13	
10/15/97	3.27	1072.85	
11/19/97	3.59	1072.53	
12/16/97	3.64	1072.48	
05/12/98	1.84	1074.28	
07/15/98	2.23	1073.89	
08/25/98	3.28	1072.84	
10/15/98	3.53	1072.59	
12/02/98	2.38	1073.74	
05/25/99	2.12	1074.00	
06/16/99	2.58	1073.54	
06/23/99	2.26	1073.86	
07/22/99	2.63	1073.49	
09/01/99	2.79	1073.33	
10/06/99	2.60	1073.52	
11/03/99	2.78	1073.34	
12/08/99	3.11	1073.01	

Date	Depth to Water (ft)	WL Elev (msl, ft)
05/16/00	2.18	1073.94
08/16/00	4.21	1071.91
11/28/00	3.64	1072.48
05/16/01	2.06	1074.06
06/13/01	2.18	1073.94
07/19/01	3.94	1072.18
08/15/01	4.46	1071.66
09/12/01	4.97	1071.15
10/11/01	3.99	1072.13
11/15/01	4.16	1071.96
12/04/01	3.97	1072.15
05/15/02	2.89	1073.23
06/26/02	4.05	1072.07
08/07/02	4.13	1071.99
09/17/02	4.35	1071.77
11/06/02	4.07	1072.05
12/10/02	4.62	1071.50
05/06/03	3.22	1072.90
06/04/03	3.50	1072.62
07/09/03	3.23	1072.89
08/05/03	4.66	1071.46
09/03/03	5.74	1070.38
10/01/03	5.26	1070.86
11/04/03	4.97	1071.15
12/03/03	5.03	1071.09
05/05/04	4.30	1071.82
06/09/04	2.72	1073.40
07/14/04	2.60	1073.52
08/10/04	3.64	1072.48
08/18/04	4.18	1071.94
09/01/04	4.59	1071.53
10/12/04	3.73	1072.39
11/09/04	2.98	1073.14
12/08/04	3.37	1072.75

Date	Depth to Water (ft)	WL (msl,
05/04/05	3.38	1072.74
06/01/05	2.90	1073.22
07/06/05	2.29	1073.83
08/09/05	2.50	1073.62
09/07/05	2.20	1073.92
10/03/05	2.43	1073.69
11/09/05	2.50	1073.62
05/11/06	1.66	1074.46
06/07/06	2.53	1073.59
07/12/06	3.79	1072.33
07/18/06	4.65	1071.47
07/27/06	4.85	1071.27
08/08/06	5.35	1070.77
08/29/06	5.37	1070.75
08/30/06	5.39	1070.73
09/01/06	7.63	1068.49
09/05/06	7.06	1069.06
09/07/06	5.39	1070.73
09/26/06	3.58	1072.54
10/11/06	3.65	1072.47
10/18/06	3.56	1072.56
11/07/06	3.56	1072.56
12/07/06	4.21	1071.91
01/03/07	3.73	1072.39
01/08/07	3.71	1072.41
01/09/07	3.83	1072.29
01/10/07	3.71	1072.41
01/11/07	4.04	1072.08
01/12/07	4.00	1072.12
01/15/07	4.20	1071.92
01/16/07	4.25	1071.87
01/25/07	4.30	1071.82
03/21/07	3.80	1072.32
05/16/07	2.60	1073.52
06/13/07	2.10	1074.02
07/18/07	3.23	1072.89
08/16/07	3.89	1072.23

130-050-24DDD2
Hankinson Aquifer

MP Elev (msl,ft)=1,076.34
SI (ft.)=48-53

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/21/94	8.06	1068.28
10/26/94	7.81	1068.53
11/16/94	8.03	1068.31
12/14/94	8.21	1068.13
05/16/95	5.77	1070.57
06/14/95	6.56	1069.78
07/25/95	6.57	1069.77
09/06/95	8.01	1068.33
10/18/95	7.68	1068.66
11/21/95	7.48	1068.86
05/01/96	7.20	1069.14
06/06/96	6.29	1070.05
07/17/96	7.71	1068.63
08/27/96	8.75	1067.59
10/08/96	9.65	1066.69
12/10/96	8.95	1067.39
05/28/97	6.35	1069.99
08/13/97	8.11	1068.23
09/17/97	8.97	1067.37
10/15/97	9.07	1067.27
11/19/97	8.99	1067.35
12/16/97	9.03	1067.31
05/12/98	6.85	1069.49
07/15/98	6.58	1069.76
08/25/98	7.79	1068.55
10/15/98	9.06	1067.28
12/02/98	7.55	1068.79
05/25/99	6.77	1069.57
06/16/99	7.19	1069.15
06/23/99	6.95	1069.39
07/22/99	7.40	1068.94
09/01/99	7.46	1068.88
10/06/99	7.46	1068.88
11/03/99	7.67	1068.67
12/08/99	8.10	1068.24
05/16/00	6.98	1069.36
08/16/00	8.45	1067.89
11/28/00	9.29	1067.05
05/16/01	6.64	1069.70
06/13/01	6.98	1069.36
07/19/01	8.02	1068.32
08/15/01	8.78	1067.56
09/12/01	9.66	1066.68
10/11/01	9.88	1066.46
11/15/01	9.94	1066.40
12/04/01	9.97	1066.37
05/15/02	9.04	1067.30
06/26/02	9.47	1066.87
08/07/02	9.49	1066.85
09/17/02	9.25	1067.09
11/06/02	9.58	1066.76
12/10/02	9.80	1066.54
05/06/03	9.55	1066.79
06/04/03	8.58	1067.76
07/09/03	7.86	1068.48
08/05/03	8.78	1067.56
09/03/03	9.72	1066.62
10/01/03	10.19	1066.15
11/04/03	10.45	1065.89
12/03/03	10.57	1065.77
05/05/04	9.97	1066.37
06/09/04	7.69	1068.65
07/14/04	7.55	1068.79
08/10/04	8.48	1067.86
08/18/04	8.66	1067.68
09/01/04	8.94	1067.40
10/12/04	8.82	1067.52
11/09/04	8.11	1068.23
12/08/04	8.26	1068.08
05/04/05	8.50	1067.84
06/01/05	8.04	1068.30
07/06/05	6.75	1069.59
08/09/05	7.11	1069.23
09/07/05	6.54	1069.80
10/03/05	6.66	1069.68
11/09/05	6.84	1069.50
05/11/06	5.07	1071.27
06/07/06	5.91	1070.43
07/12/06	7.14	1069.20
08/08/06	8.41	1067.93
08/29/06	8.89	1067.45
08/30/06	8.91	1067.43
08/31/06	9.01	1067.33
09/01/06	9.00	1067.34
09/05/06	8.41	1067.93
09/07/06	8.40	1067.94
09/26/06	8.41	1067.93
10/11/06	8.37	1067.97
11/07/06	8.53	1067.81
12/07/06	8.91	1067.43
01/03/07	9.16	1067.18
01/08/07	9.07	1067.27
01/09/07	9.22	1067.12
01/10/07	9.09	1067.25
01/11/07	9.10	1067.24
01/12/07	9.11	1067.23
01/15/07	9.15	1067.19
01/16/07	9.18	1067.16
01/25/07	9.50	1066.84
03/21/07	8.82	1067.52
05/16/07	7.00	1069.34
06/13/07	6.10	1070.24
07/18/07	7.32	1069.02
08/16/07	8.31	1068.03

130-050-27BBB2
Brightwood Aquifer

MP Elev (msl,ft)=1,127.64
SI (ft.)=90-100

Date	Depth to Water (ft)	WL Elev (msl, ft)
11/11/64	42.82	1084.82
12/09/64	43.18	1084.46
06/11/65	42.80	1084.84
07/15/65	42.73	1084.91
08/17/65	42.81	1084.83
09/14/65	42.93	1084.71
10/17/65	42.92	1084.72
10/21/65	42.91	1084.73
11/09/65	43.11	1084.53
11/16/65	42.92	1084.72
12/14/65	42.92	1084.72
01/11/66	42.95	1084.69
02/08/66	43.04	1084.60
03/14/66	43.05	1084.59
04/14/66	42.79	1084.85
05/10/66	42.56	1085.08
06/14/66	42.48	1085.16
07/06/66	42.45	1085.19
08/17/66	42.53	1085.11
09/28/66	42.47	1085.17
10/25/66	42.55	1085.09
11/30/66	42.59	1085.05
12/28/66	42.71	1084.93
01/25/67	42.74	1084.90
03/01/67	42.75	1084.89
03/21/67	42.77	1084.87
04/27/67	42.51	1085.13
05/24/67	42.20	1085.44
06/21/67	41.85	1085.79
07/12/67	41.43	1086.21
08/16/67	41.03	1086.61
11/02/67	41.72	1085.92
02/01/68	41.99	1085.65
04/16/68	42.00	1085.64
07/10/68	41.44	1086.20
10/09/68	41.88	1085.76
01/09/69	41.80	1085.84
04/02/69	41.80	1085.84
07/10/69	40.83	1086.81
12/02/69	41.70	1085.94
03/24/70	41.80	1085.84
06/24/70	41.53	1086.11
09/22/70	42.20	1085.44
12/01/70	42.29	1085.35
03/03/71	42.50	1085.14
06/02/71	42.09	1085.55
08/31/71	42.45	1085.19
12/01/71	42.27	1085.37
03/08/72	42.33	1085.31
06/06/72	41.45	1086.19
09/06/72	41.41	1086.23
12/06/72	41.75	1085.89
03/01/73	41.92	1085.72
06/12/73	41.60	1086.04
08/04/73	42.19	1085.45
03/14/74	42.47	1085.17
12/03/74	42.00	1085.64
12/03/75	41.07	1086.57
11/29/79	41.88	1085.76
11/18/80	42.03	1085.61
12/01/81	42.69	1084.95
11/30/82	42.66	1084.98
08/25/83	42.91	1084.73
11/29/83	43.16	1084.48
11/29/84	42.57	1085.07
12/05/85	42.47	1085.17
07/17/86	41.21	1086.43
11/25/86	41.05	1086.59
11/25/87	41.88	1085.76
11/22/88	42.45	1085.19
08/01/89	41.32	1086.32
11/29/89	41.55	1086.09
11/13/90	42.03	1085.61
06/27/91	41.62	1086.02
08/20/91	41.71	1085.93
11/19/91	42.02	1085.62
04/07/92	42.00	1085.64
05/07/92	41.85	1085.79
06/03/92	41.87	1085.77
06/23/92	41.73	1085.91
07/07/92	41.50	1086.14
07/29/92	41.50	1086.14
08/10/92	41.46	1086.18
09/08/92	41.55	1086.09
10/14/92	41.69	1085.95
11/10/92	41.73	1085.91
12/09/92	41.67	1085.97
04/13/93	41.26	1086.38
05/11/93	41.09	1086.55
06/14/93	40.94	1086.70
06/15/93	40.91	1086.73
07/08/93	40.80	1086.84
08/09/93	40.42	1087.22
08/18/93	40.36	1087.28
09/08/93	40.39	1087.25
10/06/93	40.56	1087.08
11/09/93	40.73	1086.91
11/16/93	40.75	1086.89
12/15/93	40.02	1087.62
04/21/94	40.19	1087.45
05/19/94	40.10	1087.54
06/21/94	40.24	1087.40
07/27/94	39.82	1087.82
08/24/94	39.85	1087.79
09/21/94	39.97	1087.67
10/26/94	40.03	1087.61
11/16/94	40.04	1087.60
12/14/94	40.18	1087.46
05/16/95	39.62	1088.02
06/14/95	39.57	1088.07
07/25/95	39.42	1088.22
09/06/95	39.73	1087.91
10/18/95	39.65	1087.99
11/21/95	39.80	1087.84
05/01/96	39.60	1088.04
06/06/96	39.22	1088.42
07/17/96	39.43	1088.21
08/27/96	39.64	1088.00
10/08/96	39.82	1087.82
05/28/97	38.71	1088.93
08/13/97	39.22	1088.42
09/17/97	39.43	1088.21
10/15/97	39.53	1088.11
11/19/97	39.59	1088.05
12/16/97	39.67	1087.97
05/12/98	39.13	1088.51
06/11/98	38.70	1088.94
07/15/98	38.63	1089.01
08/25/98	38.93	1088.71
10/15/98	39.17	1088.47
12/02/98	38.94	1088.70
05/25/99	38.78	1088.86
06/23/99	38.84	1088.80
07/22/99	38.72	1088.92
09/01/99	38.86	1088.78
10/06/99	38.69	1088.95
11/03/99	38.78	1088.86
12/08/99	38.97	1088.67
05/16/00	38.64	1089.00
08/16/00	38.93	1088.71
11/28/00	39.09	1088.55
05/16/01	38.40	1089.24
06/13/01	38.46	1089.18
07/19/01	38.62	1089.02
08/15/01	38.71	1088.93
09/12/01	38.87	1088.77

130-050-27BBB2 (Continued),MP Elev (msl,ft)=1127.64Brightwood AquiferSI (ft.)=90-100

Date	Depth to Water (ft)	WL Elev (msl, ft)
10/11/01	38.85	1088.79
11/15/01	38.96	1088.68
12/04/01	38.98	1088.66
05/15/02	38.92	1088.72
06/26/02	39.10	1088.54
08/07/02	39.10	1088.54
09/18/02	39.05	1088.59
11/06/02	39.28	1088.36
12/11/02	39.36	1088.28
05/06/03	39.34	1088.30
06/04/03	39.18	1088.46
07/09/03	38.51	1089.13
08/06/03	38.74	1088.90
09/03/03	38.99	1088.65
10/01/03	39.16	1088.48
11/04/03	39.09	1088.55
12/03/03	39.14	1088.50
05/05/04	39.10	1088.54
06/09/04	38.72	1088.92
07/14/04	38.60	1089.04
08/10/04	38.74	1088.90
09/01/04	38.91	1088.73
10/13/04	38.78	1088.86
11/09/04	38.65	1088.99
12/08/04	38.74	1088.90
05/04/05	38.75	1088.89
06/01/05	38.61	1089.03
07/06/05	38.02	1089.62
08/09/05	37.88	1089.76
09/07/05	37.70	1089.94
10/03/05	37.79	1089.85
11/09/05	37.87	1089.77
05/11/06	37.29	1090.35
06/07/06	37.39	1090.25
07/12/06	37.56	1090.08
08/08/06	37.81	1089.83
08/29/06	37.90	1089.74
08/30/06	37.96	1089.68
08/31/06	37.94	1089.70
09/01/06	37.93	1089.71
09/05/06	37.81	1089.83
09/07/06	37.76	1089.88
09/26/06	38.00	1089.64
10/11/06	37.95	1089.69
11/07/06	37.85	1089.79
12/07/06	38.07	1089.57
01/03/07	38.03	1089.61
01/08/07	38.10	1089.54
01/09/07	38.09	1089.55
01/10/07	38.10	1089.54
01/11/07	38.11	1089.53
01/12/07	38.10	1089.54
01/15/07	38.15	1089.49
01/16/07	38.17	1089.47
01/25/07	38.21	1089.43
03/21/07	38.05	1089.59
05/16/07	37.65	1089.99
06/13/07	37.25	1090.39
07/18/07	37.43	1090.21
08/16/07	37.68	1089.96

130-050-27DAB
Surface Water

MP Elev (msl,ft)=1,000.00
SI (ft.)=0-0

Date	Depth to Water (ft)	WL Elev (msl, ft)
11/21/95	-76.38	1076.38
05/01/96	-76.90	1076.90
06/06/96	-77.00	1077.00
07/17/96	-76.08	1076.08
08/27/96	-75.60	1075.60
10/08/96	-75.40	1075.40
05/28/97	-76.50	1076.50
08/13/97	-75.74	1075.74
09/17/97	-75.42	1075.42
10/15/97	-75.54	1075.54
05/12/98	-76.60	1076.60
07/15/98	-76.16	1076.16
08/25/98	-75.70	1075.70
10/15/98	-75.60	1075.60
12/02/98	-75.98	1075.98
05/25/99	-76.30	1076.30
06/23/99	-76.08	1076.08
07/22/99	-76.00	1076.00
09/01/99	-75.96	1075.96
10/06/99	-75.98	1075.98
11/03/99	-75.98	1075.98
12/08/99	-75.94	1075.94
05/16/00	-76.40	1076.40
08/16/00	-75.79	1075.79
05/16/01	-76.98	1076.98
06/13/01	-76.76	1076.76
07/19/01	-76.24	1076.24
08/15/01	-76.17	1076.17
09/12/01	-76.18	1076.18
10/11/01	-76.08	1076.08
11/15/01	-75.84	1075.84
05/15/02	-76.21	1076.21
06/26/02	-75.92	1075.92
08/07/02	-75.94	1075.94
09/17/02	-75.88	1075.88
11/06/02	-75.90	1075.90
05/06/03	-76.28	1076.28
06/04/03	-76.34	1076.34
07/09/03	-76.74	1076.74
08/05/03	-76.33	1076.33
09/03/03	-75.90	1075.90
10/01/03	-75.88	1075.88
11/04/03	-76.06	1076.06
12/03/03	-76.29	1076.29
05/05/04	-76.28	1076.28
06/07/04	-76.96	1076.96
07/14/04	-76.01	1076.01
08/10/04	-76.55	1076.55
09/01/04	-76.26	1076.26
10/12/04	-76.44	1076.44
11/08/04	-76.54	1076.54
05/04/05	-76.68	1076.68
06/01/05	-76.80	1076.80
07/06/05	-77.28	1077.28
08/09/05	-77.26	1077.26
09/07/05	-77.33	1077.33
10/03/05	-77.08	1077.08
11/09/05	-76.85	1076.85
05/11/06	-77.60	1077.60
06/07/06	-77.20	1077.20
07/12/06	-76.66	1076.66
08/08/06	-76.26	1076.26
09/05/06	-77.33	1077.33
10/11/06	-76.60	1076.60
11/07/06	-76.52	1076.52
05/16/07	-77.58	1077.58
06/13/07	-77.80	1077.80
07/18/07	-77.00	1077.00
08/16/07	-76.70	1076.70

130-050-28BBB
Brightwood Aquifer

MP Elev (msl,ft)=1,120.49
SI (ft.)=63-68

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/02/92	35.87	1084.62
09/08/92	35.75	1084.74
10/14/92	36.17	1084.32
11/10/92	37.22	1083.27
12/09/92	36.06	1084.43
04/13/93	35.62	1084.87
05/11/93	35.32	1085.17
06/14/93	35.16	1085.33
07/08/93	34.83	1085.66
08/09/93	34.09	1086.40
08/18/93	34.06	1086.43
09/08/93	33.94	1086.55
10/06/93	34.17	1086.32
11/16/93	34.60	1085.89
12/15/93	34.70	1085.79
04/21/94	34.18	1086.31
05/19/94	33.88	1086.61
06/21/94	33.97	1086.52
07/27/94	33.76	1086.73
08/24/94	33.67	1086.82
09/21/94	33.87	1086.62
10/26/94	33.88	1086.61
11/16/94	33.77	1086.72
12/14/94	34.13	1086.36
05/16/95	33.34	1087.15
06/14/95	33.03	1087.46
07/25/95	32.95	1087.54
09/06/95	33.28	1087.21
10/18/95	33.32	1087.17
11/21/95	33.46	1087.03
05/01/96	33.26	1087.23
06/06/96	32.58	1087.91
07/17/96	32.54	1087.95
08/27/96	32.97	1087.52
10/08/96	33.25	1087.24
05/28/97	31.70	1088.79
08/13/97	32.39	1088.10
09/17/97	32.71	1087.78
10/15/97	33.08	1087.41
11/19/97	32.98	1087.51
12/16/97	33.22	1087.27
05/12/98	32.35	1088.14
06/11/98	31.38	1089.11
07/15/98	31.47	1089.02
08/25/98	31.82	1088.67
10/15/98	32.22	1088.27
12/02/98	31.95	1088.54
05/25/99	31.70	1088.79
06/23/99	31.57	1088.92
07/22/99	31.50	1088.99
09/01/99	31.70	1088.79
10/06/99	31.27	1089.22
11/03/99	31.39	1089.10
12/08/99	31.81	1088.68
05/16/00	31.27	1089.22
08/16/00	31.66	1088.83
11/28/00	32.03	1088.46
05/16/01	30.88	1089.61
06/13/01	30.54	1089.95
07/19/01	30.74	1089.75
08/15/01	30.96	1089.53
09/12/01	31.48	1089.01
10/11/01	31.43	1089.06
11/15/01	31.69	1088.80
12/04/01	31.78	1088.71
05/15/02	31.82	1088.67
06/26/02	32.15	1088.34
08/07/02	32.13	1088.36
09/18/02	31.95	1088.54
11/06/02	32.35	1088.14
12/11/02	32.25	1088.24
05/06/03	32.49	1088.00
06/04/03	32.20	1088.29
07/09/03	31.14	1089.35
08/06/03	31.30	1089.19
09/03/03	31.67	1088.82
09/18/03	31.85	1088.64
10/01/03	31.92	1088.57
11/04/03	31.86	1088.63
12/03/03	32.09	1088.40
05/05/04	31.96	1088.53
06/09/04	31.93	1088.56
07/14/04	31.60	1088.89
08/10/04	31.60	1088.89
09/01/04	31.76	1088.73
10/13/04	31.66	1088.83
11/09/04	31.29	1089.20
12/08/04	31.32	1089.17
05/04/05	31.33	1089.16
06/01/05	31.20	1089.29
07/06/05	29.81	1090.68
08/09/05	29.70	1090.79
09/07/05	29.44	1091.05
10/03/05	29.57	1090.92
11/09/05	29.88	1090.61
05/11/06	28.71	1091.78
06/07/06	28.84	1091.65
07/12/06	29.39	1091.10
08/08/06	29.92	1090.57
09/05/06	30.22	1090.27
10/11/06	30.23	1090.26
11/07/06	30.12	1090.37
12/07/06	30.64	1089.85
01/03/07	30.40	1090.09
01/08/07	30.66	1089.83
01/09/07	30.74	1089.75
01/10/07	30.76	1089.73
01/11/07	30.81	1089.68
01/12/07	30.79	1089.70
01/15/07	30.70	1089.79
01/16/07	30.73	1089.76
01/25/07	30.77	1089.72
03/21/07	30.62	1089.87
05/16/07	29.77	1090.72
06/13/07	28.75	1091.74
07/18/07	28.99	1091.50
08/16/07	29.60	1090.89

130-050-28DDD
Brightwood Aquifer

MP Elev (msl,ft)=1,235.26
SI (ft.)=178-183

Date	Depth to Water (ft)	WL Elev (msl, ft)
10/26/94	137.81	1097.35
11/16/94	136.35	1098.81
12/14/94	136.40	1098.76
05/16/95	136.05	1099.11
06/14/95	135.39	1099.77
07/25/95	135.84	1099.32
09/06/95	135.79	1099.37
10/18/95	135.68	1099.48
11/21/95	135.67	1099.49
05/01/96	135.58	1099.58
06/06/96	135.26	1099.90
07/17/96	135.05	1100.11
08/27/96	135.10	1100.06
10/08/96	134.90	1100.26
05/28/97	134.00	1101.16
08/13/97	133.97	1101.19
09/17/97	134.09	1101.07
10/15/97	134.28	1100.88
11/19/97	134.33	1100.83
12/16/97	134.51	1100.65
05/12/98	134.27	1100.89
06/11/98	133.97	1101.19
07/15/98	133.72	1101.44
08/25/98	133.59	1101.57
10/15/98	133.55	1101.61
12/02/98	133.52	1101.64
05/25/99	133.56	1101.60
06/16/99	133.53	1101.63
06/23/99	133.50	1101.66
07/22/99	133.46	1101.70
09/01/99	133.38	1101.78
10/06/99	133.28	1101.88
11/03/99	133.31	1101.85
12/08/99	133.42	1101.74
05/16/00	133.35	1101.81
08/16/00	133.30	1101.86
11/28/00	133.32	1101.84
05/16/01	132.91	1102.25
06/13/01	132.66	1102.50
07/19/01	132.50	1102.66
08/15/01	132.47	1102.69
09/12/01	132.58	1102.58
10/11/01	132.53	1102.63
11/15/01	132.73	1102.43
12/04/01	132.73	1102.43
05/15/02	133.12	1102.04
06/26/02	133.27	1101.89
08/07/02	133.33	1101.83
09/18/02	133.34	1101.82
11/06/02	133.50	1101.66
12/11/02	133.55	1101.61
05/06/03	133.83	1101.33
06/04/03	133.77	1101.39
07/09/03	133.44	1101.72
08/06/03	133.29	1101.87
09/03/03	133.28	1101.88
10/01/03	133.30	1101.86
11/04/03	133.28	1101.88
12/03/03	133.38	1101.78
05/05/04	133.55	1101.61
06/09/04	133.32	1101.84
07/14/04	133.08	1102.08
08/10/04	132.99	1102.17
08/19/04	133.10	1102.06
09/01/04	132.98	1102.18
10/13/04	132.88	1102.28
11/09/04	132.83	1102.33
12/08/04	132.87	1102.29
05/04/05	133.00	1102.16
06/01/05	132.78	1102.38
07/06/05	132.48	1102.68
08/09/05	131.98	1103.18
09/07/05	131.74	1103.42
10/03/05	131.25	1103.91
11/09/05	131.10	1104.06
05/11/06	130.40	1104.76
06/07/06	130.25	1104.91
07/12/06	130.10	1105.06
08/08/06	130.31	1104.85
09/05/06	130.51	1104.65
10/11/06	130.64	1104.52
11/07/06	130.78	1104.38
05/16/07	131.49	1103.77
06/13/07	131.20	1104.06
07/18/07	130.90	1104.36
08/16/07	130.83	1104.43

130-050-29BBC
Brightwood Aquifer

MP Elev (msl,ft)=1,131.05
SI (ft.)=158-163

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
09/21/94	42.00	1089.05	06/23/99	39.17	1091.88	10/01/03	39.17	1091.88
10/26/94	41.93	1089.12	07/22/99	39.14	1091.91	11/04/03	39.02	1092.03
11/16/94	41.93	1089.12	09/01/99	39.13	1091.92	12/03/03	39.27	1091.78
12/14/94	42.05	1089.00	10/06/99	39.19	1091.86			
			11/03/99	39.10	1091.95	05/05/04	38.97	1092.08
05/16/95	41.00	1090.05	12/08/99	39.44	1091.61	06/09/04	38.54	1092.51
06/14/95	41.02	1090.03				07/14/04	38.44	1092.61
07/25/95	41.02	1090.03	05/16/00	38.56	1092.49	08/11/04	38.74	1092.31
09/06/95	41.43	1089.62	08/16/00	39.48	1091.57	09/01/04	39.40	1091.65
10/18/95	41.28	1089.77	11/28/00	39.63	1091.42	10/13/04	39.10	1091.95
11/21/95	41.35	1089.70				11/09/04	38.66	1092.39
			05/16/01	38.16	1092.89	12/08/04	38.43	1092.62
05/01/96	40.94	1090.11	06/13/01	38.07	1092.98			
06/06/96	40.22	1090.83	07/19/01	38.61	1092.44	05/04/05	38.78	1092.27
07/16/96	40.69	1090.36	08/15/01	38.85	1092.20	06/01/05	38.79	1092.26
08/27/96	41.14	1089.91	09/12/01	39.33	1091.72	07/06/05	37.41	1093.64
10/08/96	41.19	1089.86	10/11/01	39.24	1091.81	08/09/05	38.03	1093.02
			11/15/01	39.42	1091.63	09/06/05	37.36	1093.69
05/28/97	39.77	1091.28	12/04/01	39.37	1091.68	10/03/05	37.92	1093.13
08/13/97	40.46	1090.59				11/09/05	38.15	1092.90
09/17/97	40.78	1090.27	05/15/02	39.17	1091.88			
10/15/97	40.82	1090.23	06/26/02	39.29	1091.76	05/11/06	37.88	1093.17
11/19/97	40.75	1090.30	08/07/02	39.24	1091.81	06/07/06	38.33	1092.72
12/16/97	40.84	1090.21	09/18/02	39.16	1091.89	07/12/06	38.85	1092.20
			11/06/02	39.42	1091.63	08/08/06	39.20	1091.85
05/12/98	39.75	1091.30	12/11/02	39.44	1091.61	09/05/06	38.96	1092.09
07/15/98	39.42	1091.63				10/11/06	38.45	1092.60
08/25/98	39.93	1091.12	05/06/03	39.17	1091.88	11/06/06	38.48	1092.57
10/15/98	40.13	1090.92	06/04/03	39.06	1091.99			
12/02/98	39.78	1091.27	07/09/03	37.96	1093.09	05/16/07	37.59	1093.46
			08/06/03	38.60	1092.45	06/13/07	37.10	1093.95
05/25/99	39.35	1091.70	09/03/03	39.09	1091.96	07/18/07	37.97	1093.08
06/16/99	39.22	1091.83	09/18/03	39.05	1092.00	08/16/07	38.28	1092.77

130-050-36CDD2
Undefined Aquifer

MP Elev (msl,ft)=1,086.40
SI (ft.)=178-183

Date	Depth to Water (ft)	WL Elev (msl, ft)
06/27/91	11.52	1074.88
08/20/91	12.86	1073.54
04/07/92	11.80	1074.60
05/07/92	11.77	1074.63
06/03/92	12.41	1073.99
07/07/92	11.14	1075.26
07/30/92	12.29	1074.11
08/10/92	12.45	1073.95
09/09/92	12.32	1074.08
10/13/92	13.33	1073.07
11/10/92	12.70	1073.70
12/08/92	12.38	1074.02
04/13/93	10.36	1076.04
05/11/93	10.64	1075.76
06/15/93	10.92	1075.48
07/07/93	10.45	1075.95
08/10/93	10.67	1075.73
09/08/93	11.11	1075.29
10/06/93	11.44	1074.96
11/17/93	11.20	1075.20
12/14/93	11.07	1075.33
04/20/94	10.10	1076.30
05/19/94	10.31	1076.09
06/22/94	11.76	1074.64
07/26/94	10.15	1076.25
08/24/94	11.04	1075.36
09/21/94	11.13	1075.27
10/25/94	10.60	1075.80
11/17/94	10.57	1075.83
12/14/94	10.99	1075.41
05/16/95	9.20	1077.20
06/14/95	9.82	1076.58
07/25/95	10.00	1076.40
09/06/95	10.89	1075.51
10/18/95	9.95	1076.45
11/21/95	9.90	1076.50
05/01/96	9.46	1076.94
06/06/96	9.25	1077.15
07/17/96	10.78	1075.62
08/27/96	11.78	1074.62
10/08/96	11.30	1075.10
12/10/96	10.42	1075.98
12/03/03	11.61	1074.79

Date	Depth to Water (ft)	WL Elev (msl, ft)
08/13/97	10.85	1075.55
09/17/97	11.57	1074.83
10/15/97	10.57	1075.83
11/19/97	10.64	1075.76
12/16/97	10.60	1075.80
05/12/98	9.33	1077.07
06/11/98	9.31	1077.09
07/15/98	9.84	1076.56
08/25/98	10.74	1075.66
10/15/98	10.88	1075.52
12/02/98	9.76	1076.64
05/25/99	9.66	1076.74
06/23/99	9.68	1076.72
07/22/99	10.09	1076.31
09/01/99	11.07	1075.33
10/06/99	9.96	1076.44
11/03/99	10.04	1076.36
12/08/99	10.25	1076.15
05/16/00	9.51	1076.89
08/16/00	11.26	1075.14
11/28/00	10.48	1075.92
05/16/01	9.43	1076.97
06/13/01	9.48	1076.92
07/19/01	11.08	1075.32
08/15/01	11.73	1074.67
09/12/01	12.16	1074.24
10/11/01	10.78	1075.62
11/15/01	10.91	1075.49
12/04/01	10.70	1075.70
05/15/02	9.71	1076.69
06/26/02	10.70	1075.70
08/07/02	10.92	1075.48
09/18/02	11.20	1075.20
11/06/02	10.80	1075.60
12/10/02	11.19	1075.21
05/06/03	9.99	1076.41
06/04/03	10.16	1076.24
07/09/03	10.09	1076.31
08/05/03	11.40	1075.00
09/03/03	12.77	1073.63
10/01/03	12.17	1074.23
11/04/03	11.69	1074.71

Date	Depth to Water (ft)	WL (msl,
05/05/04	10.70	1075.70
06/09/04	9.71	1076.69
07/14/04	9.71	1076.69
08/10/04	10.50	1075.90
09/01/04	11.45	1074.95
10/12/04	10.50	1075.90
11/09/04	9.96	1076.44
12/08/04	10.16	1076.24
05/04/05	9.97	1076.43
06/01/05	9.78	1076.62
07/06/05	9.45	1076.95
08/09/05	9.59	1076.81
09/07/05	9.38	1077.02
10/03/05	9.60	1076.80
11/09/05	9.60	1076.80
05/11/06	9.00	1077.40
06/07/06	9.84	1076.56
07/12/06	10.90	1075.50
08/08/06	12.12	1074.28
08/29/06	11.92	1074.48
08/30/06	11.98	1074.42
08/31/06	11.99	1074.41
09/01/06	12.25	1074.15
09/05/06	11.13	1075.27
09/07/06	11.16	1075.24
09/26/06	10.33	1076.07
10/11/06	10.36	1076.04
11/07/06	10.35	1076.05
12/07/06	10.84	1075.56
01/03/07	10.38	1076.02
01/08/07	10.35	1076.05
01/09/07	10.44	1075.96
01/10/07	10.35	1076.05
01/11/07	10.36	1076.04
01/12/07	10.38	1076.02
01/15/07	10.78	1075.62
01/16/07	10.86	1075.54
01/25/07	11.07	1075.33
03/21/07	10.34	1076.06
05/16/07	9.51	1076.89
06/13/07	9.27	1077.13
07/18/07	10.33	1076.07
08/16/07	10.94	1075.46
05/28/97	9.46	1076.94

130-050-36CDD3
Milnor Channel Aquifer

MP Elev (msl,ft)=1,085.21
SI (ft.)=32-37

Date	Depth to Water (ft)	WL Elev (msl, ft)
06/27/91	9.58	1075.63
08/20/91	10.45	1074.76
04/07/92	10.83	1074.38
05/07/92	10.38	1074.83
06/03/92	10.56	1074.65
07/07/92	9.49	1075.72
07/30/92	9.88	1075.33
08/10/92	10.34	1074.87
09/09/92	10.76	1074.45
10/13/92	11.32	1073.89
11/10/92	11.22	1073.99
12/08/92	10.91	1074.30
04/13/93	9.88	1075.33
05/11/93	9.35	1075.86
06/15/93	9.11	1076.10
07/07/93	8.84	1076.37
08/10/93	8.65	1076.56
09/08/93	8.96	1076.25
10/06/93	9.35	1075.86
11/17/93	9.53	1075.68
12/14/93	9.50	1075.71
04/20/94	8.36	1076.85
05/19/94	8.27	1076.94
06/22/94	9.05	1076.16
07/26/94	7.87	1077.34
08/24/94	8.75	1076.46
09/21/94	9.00	1076.21
10/25/94	8.96	1076.25
11/17/94	9.01	1076.20
12/14/94	9.20	1076.01
05/16/95	7.15	1078.06
06/14/95	7.38	1077.83
07/25/95	7.50	1077.71
09/06/95	8.48	1076.73
10/18/95	8.10	1077.11
11/21/95	8.06	1077.15
05/01/96	7.62	1077.59
06/06/96	7.07	1078.14
07/17/96	8.32	1076.89
08/27/96	9.12	1076.09
10/08/96	9.28	1075.93
12/10/96	8.85	1076.36
12/03/03	10.28	1074.93
08/13/97	8.64	1076.57
09/17/97	9.14	1076.07
10/15/97	9.04	1076.17
11/19/97	9.06	1076.15
12/16/97	9.00	1076.21
05/12/98	7.53	1077.68
06/11/98	7.54	1077.67
07/15/98	7.60	1077.61
08/25/98	8.61	1076.60
10/15/98	8.90	1076.31
12/02/98	8.19	1077.02
05/25/99	7.74	1077.47
06/23/99	7.99	1077.22
07/22/99	8.34	1076.87
09/01/99	8.53	1076.68
10/06/99	8.62	1076.59
11/03/99	8.71	1076.50
12/08/99	8.81	1076.40
05/16/00	7.83	1077.38
08/16/00	8.97	1076.24
11/28/00	9.16	1076.05
05/16/01	7.46	1077.75
06/13/01	7.83	1077.38
07/19/01	8.69	1076.52
08/15/01	9.37	1075.84
09/12/01	9.94	1075.27
10/11/01	9.64	1075.57
11/15/01	9.59	1075.62
12/04/01	9.51	1075.70
05/15/02	8.70	1076.51
06/26/02	9.19	1076.02
08/07/02	9.46	1075.75
09/18/02	9.37	1075.84
11/06/02	9.38	1075.83
12/10/02	9.68	1075.53
05/06/03	9.22	1075.99
06/04/03	8.66	1076.55
07/09/03	8.16	1077.05
08/05/03	9.07	1076.14
09/03/03	10.02	1075.19
10/01/03	10.26	1074.95
11/04/03	10.28	1074.93
05/05/04	7.64	1077.57
06/09/04	7.92	1077.29
07/14/04	8.16	1077.05
08/10/04	8.89	1076.32
09/01/04	9.40	1075.81
10/12/04	9.26	1075.95
11/09/04	8.84	1076.37
12/08/04	8.95	1076.26
05/04/05	8.88	1076.33
06/01/05	8.47	1076.74
07/06/05	7.59	1077.62
08/09/05	8.20	1077.01
09/07/05	7.56	1077.65
10/03/05	7.81	1077.40
11/09/05	8.06	1077.15
05/11/06	6.84	1078.37
06/07/06	7.70	1077.51
07/12/06	8.50	1076.71
08/08/06	9.50	1075.71
08/29/06	9.87	1075.34
08/30/06	10.10	1075.11
08/31/06	10.16	1075.05
09/01/06	9.94	1075.27
09/05/06	9.48	1075.73
09/07/06	9.45	1075.76
09/26/06	9.18	1076.03
10/11/06	9.18	1076.03
11/07/06	9.14	1076.07
12/07/06	9.39	1075.82
01/03/07	9.24	1075.97
01/08/07	9.20	1076.01
01/09/07	9.23	1075.98
01/10/07	9.22	1075.99
01/11/07	9.23	1075.98
01/12/07	9.23	1075.98
01/15/07	9.41	1075.80
01/16/07	9.46	1075.75
01/25/07	9.73	1075.48
03/21/07	9.42	1075.79
05/16/07	7.75	1077.46
06/13/07	7.16	1078.05
07/18/07	8.32	1076.89
08/16/07	8.90	1076.31
05/28/97	7.36	1077.85

130-051-01AAA2
Milnor Channel Aquifer

MP Elev (msl,ft)=1,078.91
SI (ft.)=18-23

Date	Depth to Water (ft)	WL Elev (msl, ft) Elev ft)
06/27/91	4.07	1074.84
08/20/91	5.05	1073.86
09/19/91	5.32	1073.59
04/07/92	4.85	1074.06
05/07/92	5.13	1073.78
06/03/92	5.05	1073.86
07/29/92	4.32	1074.59
08/10/92	4.44	1074.47
09/08/92	3.36	1075.55
10/14/92	5.46	1073.45
11/10/92	4.28	1074.63
12/09/92	4.76	1074.15
11/16/93	2.35	1076.56
06/21/94	2.82	1076.09
10/26/94	2.60	1076.31
11/16/94	2.76	1076.15
07/25/95	1.03	1077.88
09/06/95	2.48	1076.43
08/27/96	5.88	1073.03
10/08/96	5.18	1073.73
12/16/97	4.20	1074.71
05/12/98	1.63	1077.28
08/25/98	5.00	1073.91
10/14/98	4.70	1074.21
10/15/98	4.86	1074.05
12/02/98	2.58	1076.33
05/25/99	2.35	1076.56
06/23/99	2.27	1076.64
07/22/99	2.81	1076.10
09/01/99	2.75	1076.16
10/06/99	2.48	1076.43
11/03/99	2.79	1076.12
12/08/99	3.03	1075.88
05/16/00	2.21	1076.70
08/16/00	5.33	1073.58
11/28/00	4.80	1074.11
05/16/01	1.49	1077.42
06/13/01	1.54	1077.37
07/19/01	2.76	1076.15
08/15/01	5.27	1073.64
09/12/01	6.07	1072.84
10/11/01	3.90	1075.01
11/15/01	4.87	1074.04
12/04/01	4.40	1074.51
05/15/02	2.90	1076.01
06/26/02	4.07	1074.84
08/07/02	4.60	1074.31
09/17/02	5.84	1073.07
11/05/02	5.20	1073.71
12/09/02	6.00	1072.91
05/06/03	3.33	1075.58
06/04/03	4.39	1074.52
07/08/03	2.38	1076.53
08/05/03	5.12	1073.79
09/03/03	6.73	1072.18
10/01/03	6.63	1072.28
11/04/03	5.97	1072.94
12/03/03	5.95	1072.96
05/05/04	4.85	1074.06
06/07/04	2.19	1076.72
07/14/04	2.63	1076.28
08/10/04	4.83	1074.08
09/01/04	6.10	1072.81
10/12/04	4.55	1074.36
11/08/04	2.90	1076.01
12/07/04	3.73	1075.18
05/04/05	3.74	1075.17
06/01/05	2.53	1076.38
07/06/05	1.61	1077.30
08/09/05	1.52	1077.39
09/07/05	1.55	1077.36
10/04/05	1.89	1077.02
11/09/05	2.01	1076.90
07/12/06	2.70	1076.21
08/08/06	5.72	1073.19
09/05/06	3.06	1075.85
10/11/06	2.61	1076.30
11/07/06	2.72	1076.19
07/19/07	1.97	1076.94
08/15/07	3.15	1075.76

130-051-22CBC
Brightwood Aquifer

MP Elev (msl,ft)=1,152.20
SI (ft.)=145-150

Date	Depth to Water (ft)	WL Elev (msl, ft) Elev ft)
08/30/05	24.25	1127.95
10/03/05	24.59	1127.61
11/09/05	24.85	1127.35
05/11/06	22.94	1129.26
07/12/06	23.51	1128.69
08/08/06	23.96	1128.24
09/05/06	24.02	1128.18
10/11/06	23.82	1128.38
11/06/06	23.85	1128.35
05/16/07	22.40	1129.80
06/13/07	21.95	1130.25
07/18/07	22.35	1129.85
08/16/07	22.87	1129.33
06/07/06	23.08	1129.12

130-051-22CBC2
Brightwood Aquifer

MP Elev (msl,ft)=1,152.60
SI (ft.)=78-83

Date	Depth to Water (ft)	WL Elev (msl, ft)
08/30/05	24.60	1128.00
10/03/05	24.94	1127.66
11/09/05	25.20	1127.40
05/11/06	23.28	1129.32
07/12/06	23.85	1128.75
08/08/06	24.30	1128.30
09/05/06	24.35	1128.25
10/11/06	24.19	1128.41
11/06/06	24.20	1128.40
05/16/07	22.74	1129.86
06/13/07	22.30	1130.30
07/18/07	22.72	1129.88
08/16/07	23.21	1129.39
06/07/06	23.43	1129.17

130-051-25BBB
Brightwood Aquifer

MP Elev (msl,ft)=1,144.11
SI (ft.)=158-163

Date	Depth to Water (ft)	WL Elev (msl, ft)
10/25/94	21.71	1122.40
11/16/94	21.65	1122.46
12/14/94	21.78	1122.33
05/16/95	20.89	1123.22
06/13/95	20.75	1123.36
07/25/95	20.75	1123.36
09/06/95	21.08	1123.03
10/18/95	21.03	1123.08
11/21/95	20.98	1123.13
05/01/96	20.62	1123.49
06/06/96	20.00	1124.11
07/16/96	20.28	1123.83
08/27/96	20.62	1123.49
10/08/96	20.70	1123.41
12/10/96	20.40	1123.71
05/28/97	18.76	1125.35
08/13/97	19.54	1124.57
09/17/97	19.75	1124.36
10/15/97	19.84	1124.27
11/19/97	19.81	1124.30
12/16/97	19.85	1124.26
05/12/98	18.50	1125.61
07/15/98	17.97	1126.14
08/25/98	18.44	1125.67
10/15/98	19.02	1125.09
12/02/98	18.65	1125.46
05/25/99	18.00	1126.11
06/16/99	17.90	1126.21
06/23/99	17.76	1126.35
07/22/99	17.82	1126.29
09/01/99	17.93	1126.18
10/06/99	17.84	1126.27
11/03/99	17.91	1126.20
12/08/99	18.09	1126.02
05/16/00	17.64	1126.47
08/16/00	17.98	1126.13
11/28/00	18.19	1125.92
05/16/01	16.85	1127.26
06/13/01	16.75	1127.36
07/19/01	17.07	1127.04
08/15/01	17.35	1126.76
09/12/01	17.76	1126.35
10/11/01	17.68	1126.43
11/15/01	17.84	1126.27
12/04/01	17.82	1126.29
05/15/02	17.71	1126.40
06/26/02	17.93	1126.18
08/07/02	17.98	1126.13
09/18/02	17.99	1126.12
11/06/02	18.17	1125.94
12/11/02	18.16	1125.95
05/06/03	18.06	1126.05
06/04/03	17.89	1126.22
07/09/03	17.34	1126.77
08/06/03	17.64	1126.47
09/03/03	17.98	1126.13
10/01/03	18.17	1125.94
11/04/03	18.11	1126.00
12/03/03	18.27	1125.84
05/05/04	17.99	1126.12
06/09/04	17.74	1126.37
07/14/04	17.63	1126.48
08/11/04	17.77	1126.34
08/19/04	17.85	1126.26
09/01/04	17.97	1126.14
10/13/04	17.80	1126.31
11/09/04	17.55	1126.56
12/08/04	17.49	1126.62
05/04/05	17.55	1126.56
06/01/05	17.31	1126.80
07/06/05	15.96	1128.15
08/10/05	15.97	1128.14
09/06/05	15.52	1128.59
10/03/05	15.82	1128.29
11/09/05	16.12	1127.99
05/11/06	14.37	1129.74
06/07/06	15.54	1128.57
07/12/06	16.10	1128.01
08/08/06	16.56	1127.55
09/05/06	16.56	1127.55
10/11/06	16.42	1127.69
11/06/06	16.41	1127.70
05/16/07	15.43	1128.68
06/13/07	14.84	1129.27
07/18/07	15.46	1128.65
08/16/07	16.00	1128.11

130-051-28DDC
Brightwood Aquifer

MP Elev (msl,ft)=1,168.43
SI (ft.)=98-103

Date	Depth to Water (ft)	WL Elev (msl, ft)
10/25/94	32.35	1136.08
11/16/94	31.94	1136.49
12/14/94	32.22	1136.21
05/16/95	31.59	1136.84
06/13/95	31.19	1137.24
07/25/95	30.99	1137.44
09/06/95	31.15	1137.28
10/18/95	31.24	1137.19
11/21/95	31.34	1137.09
05/01/96	31.05	1137.38
06/06/96	30.34	1138.09
07/16/96	30.30	1138.13
08/27/96	30.54	1137.89
10/08/96	30.65	1137.78
12/10/96	30.65	1137.78
05/28/97	29.22	1139.21
08/13/97	29.71	1138.72
09/17/97	29.83	1138.60
10/15/97	30.16	1138.27
11/19/97	30.04	1138.39
12/16/97	30.10	1138.33
05/12/98	28.80	1139.63
07/15/98	27.43	1141.00
08/25/98	27.88	1140.55
10/15/98	28.37	1140.06
12/02/98	28.12	1140.31
05/25/99	27.28	1141.15
06/15/99	27.20	1141.23
06/23/99	26.98	1141.45
07/22/99	27.09	1141.34
09/01/99	27.25	1141.18
10/06/99	27.07	1141.36
11/03/99	27.10	1141.33
12/08/99	27.37	1141.06
05/16/00	26.93	1141.50
08/16/00	26.93	1141.50
11/28/00	27.42	1141.01
05/16/01	25.98	1142.45
06/13/01	25.79	1142.64
07/19/01	25.93	1142.50
08/15/01	26.09	1142.34
09/12/01	26.62	1141.81
10/11/01	26.58	1141.85
11/15/01	26.81	1141.62
12/04/01	26.75	1141.68
05/15/02	26.80	1141.63
06/26/02	27.16	1141.27
08/07/02	27.21	1141.22
09/18/02	27.11	1141.32
11/06/02	27.46	1140.97
12/11/02	27.42	1141.01
05/06/03	27.58	1140.85
06/04/03	27.43	1141.00
07/09/03	26.52	1141.91
08/06/03	26.75	1141.68
09/03/03	27.08	1141.35
10/01/03	27.44	1140.99
11/04/03	27.40	1141.03
12/03/03	27.64	1140.79
05/05/04	27.40	1141.03
06/09/04	27.40	1141.03
07/14/04	27.18	1141.25
08/11/04	27.20	1141.23
08/19/04	27.25	1141.18
09/01/04	27.39	1141.04
10/13/04	27.33	1141.10
11/09/04	27.07	1141.36
12/08/04	26.91	1141.52
05/04/05	27.09	1141.34
06/02/05	26.64	1141.79
07/06/05	24.05	1144.38
08/10/05	24.06	1144.37
09/06/05	23.39	1145.04
10/03/05	23.55	1144.88
11/09/05	23.79	1144.64
05/11/06	22.17	1146.26
06/07/06	22.25	1146.18
07/12/06	22.85	1145.58
08/08/06	23.47	1144.96
09/05/06	23.62	1144.81
10/11/06	23.33	1145.10
11/06/06	23.27	1145.16
05/16/07	21.68	1146.75
06/13/07	20.74	1147.69
07/18/07	21.33	1147.10
08/16/07	22.18	1146.25

130-051-35CCB
Brightwood Aquifer

MP Elev (msl,ft)=1,150.38
SI (ft.)=79-84

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/02/92	13.41	1136.97
10/14/92	13.56	1136.82
11/10/92	13.57	1136.81
12/09/92	13.45	1136.93
04/13/93	13.39	1136.99
05/11/93	13.32	1137.06
06/14/93	13.22	1137.16
07/08/93	12.95	1137.43
08/09/93	12.56	1137.82
08/18/93	12.53	1137.85
09/08/93	12.52	1137.86
10/06/93	12.50	1137.88
11/16/93	12.55	1137.83
12/15/93	12.64	1137.74
04/21/94	12.16	1138.22
05/19/94	11.80	1138.58
06/21/94	11.96	1138.42
07/27/94	11.85	1138.53
08/24/94	11.84	1138.54
09/21/94	11.86	1138.52
10/25/94	12.01	1138.37
11/16/94	11.79	1138.59
12/14/94	11.95	1138.43
05/16/95	11.37	1139.01
06/13/95	11.17	1139.21
07/25/95	11.09	1139.29
09/06/95	11.12	1139.26
10/18/95	11.12	1139.26
11/21/95	11.11	1139.27
05/01/96	10.75	1139.63
06/06/96	10.30	1140.08
07/16/96	10.16	1140.22
08/27/96	10.22	1140.16
10/08/96	10.17	1140.21
12/10/96	10.08	1140.30
05/28/97	9.14	1141.24
08/13/97	9.17	1141.21
09/17/97	9.11	1141.27
10/15/97	9.33	1141.05
11/19/97	9.08	1141.30
12/16/97	9.14	1141.24
05/12/98	8.26	1142.12
06/11/98	7.60	1142.78
07/15/98	7.50	1142.88
08/25/98	7.60	1142.78
10/15/98	7.69	1142.69
12/02/98	7.53	1142.85
05/25/99	6.94	1143.44
06/23/99	6.64	1143.74
07/22/99	6.72	1143.66
09/01/99	6.69	1143.69
10/06/99	6.58	1143.80
11/03/99	6.53	1143.85
12/08/99	6.63	1143.75
05/16/00	6.20	1144.18
08/16/00	6.16	1144.22
11/28/00	6.23	1144.15
05/16/01	5.33	1145.05
06/13/01	5.17	1145.21
07/19/01	5.29	1145.09
08/15/01	5.29	1145.09
09/12/01	5.47	1144.91
10/11/01	5.44	1144.94
11/15/01	5.52	1144.86
12/04/01	5.50	1144.88
05/15/02	5.25	1145.13
06/26/02	5.63	1144.75
08/07/02	5.65	1144.73
09/18/02	5.51	1144.87
11/06/02	5.82	1144.56
12/11/02	5.74	1144.64
05/06/03	5.98	1144.40
06/04/03	5.91	1144.47
07/09/03	5.29	1145.09
08/06/03	5.46	1144.92
09/03/03	5.63	1144.75
09/18/03	5.65	1144.73
10/01/03	5.90	1144.48
11/04/03	5.80	1144.58
12/03/03	6.02	1144.36
05/05/04	5.85	1144.53
06/09/04	5.91	1144.47
07/14/04	5.80	1144.58
08/11/04	5.85	1144.53
09/01/04	5.95	1144.43
10/13/04	5.86	1144.52
11/09/04	5.72	1144.66
12/08/04	5.59	1144.79
05/04/05	5.78	1144.60
06/02/05	5.51	1144.87
10/03/05	3.33	1147.05
11/09/05	3.46	1146.92
07/12/06	1.96	1148.42
08/08/06	2.32	1148.06
09/05/06	2.31	1148.07
10/11/06	1.97	1148.41
11/06/06	1.89	1148.49

130-052-09DAA2 **MP Elev (msl,ft)=1,098.00**
Milnor Channel Aquifer **SI (ft.)=58-63**

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
08/31/05	3.32	1093.28	08/08/06	4.95	1093.05	05/16/07	1.07	1096.93
10/03/05	3.38	1093.22	09/05/06	3.87	1094.13	06/13/07	0.98	1097.02
11/10/05	3.36	1093.24	10/11/06	3.83	1094.17	07/18/07	1.99	1096.01
			11/06/06	3.89	1094.11	08/16/07	3.04	1094.96
07/12/06	2.04	1094.56						

130-052-20BBA **MP Elev (msl,ft)=1,141.60**
Unnamed Aquifer **SI (ft.)=98-103**

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
08/31/05	45.60	1096.00	06/07/06	44.51	1097.09			
09/06/05	45.39	1096.21	07/12/06	44.71	1096.89	05/16/07	44.92	1096.68
10/03/05	45.26	1096.34	08/08/06	45.23	1096.37	06/13/07	44.40	1097.20
11/10/05	45.14	1096.46	09/05/06	45.11	1096.49	07/18/07	44.21	1097.39
			10/11/06	45.08	1096.52	08/16/07	44.53	1097.07
05/09/06	44.60	1097.00	11/06/06	45.07	1096.53			

131-050-27CCC **MP Elev (msl,ft)=0.00**
Hankinson Aquifer **SI (ft.)=50-50**

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/11/07	3.95	-3.95	07/19/07	7.03	-7.03	06/13/07	3.94	-3.94
08/15/07	8.00	-8.00						

131-050-27CDC **MP Elev (msl,ft)=0.00**
Hankinson Aquifer **SI (ft.)=40-50**

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/11/07	3.90	-3.90	07/19/07	7.11	-7.11	06/13/07	3.92	-3.92
08/15/07	7.89	-7.89						

131-050-27CDD2
Hankinson Aquifer

MP Elev (msl,ft)=1,045.84
SI (ft.)=39-44

Date	Depth to Water (ft)	WL Elev (msl, ft)
09/03/92	6.39	1039.45
09/08/92	5.69	1040.15
10/14/92	6.59	1039.25
11/10/92	6.04	1039.80
12/09/92	5.87	1039.97
04/12/93	3.05	1042.79
05/11/93	4.01	1041.83
06/14/93	3.98	1041.86
07/08/93	3.76	1042.08
08/09/93	3.59	1042.25
08/18/93	3.35	1042.49
09/08/93	5.03	1040.81
10/06/93	5.66	1040.18
11/16/93	5.61	1040.23
04/21/94	3.55	1042.29
05/19/94	3.80	1042.04
06/21/94	5.79	1040.05
07/27/94	2.90	1042.94
08/24/94	4.98	1040.86
09/21/94	5.31	1040.53
10/26/94	4.57	1041.27
11/16/94	4.72	1041.12
12/14/94	5.16	1040.68
05/16/95	2.20	1043.64
06/14/95	4.38	1041.46
07/25/95	4.27	1041.57
09/06/95	6.41	1039.43
10/18/95	4.71	1041.13
11/21/95	4.45	1041.39
05/01/96	3.57	1042.27
06/06/96	3.87	1041.97
07/17/96	6.14	1039.70
08/27/96	7.15	1038.69
10/08/96	7.04	1038.80
05/28/97	4.32	1041.52
08/13/97	6.06	1039.78
09/17/97	6.87	1038.97
10/15/97	5.87	1039.97
11/19/97	5.76	1040.08
12/16/97	5.54	1040.30
05/12/98	1.94	1043.90
06/11/98	4.40	1041.44
07/15/98	4.62	1041.22
08/25/98	6.30	1039.54
10/15/98	6.49	1039.35
12/02/98	3.95	1041.89
05/25/99	3.74	1042.10
06/23/99	3.06	1042.78
07/22/99	4.18	1041.66
09/01/99	3.55	1042.29
10/06/99	3.52	1042.32
11/03/99	4.07	1041.77
12/08/99	4.46	1041.38
05/16/00	2.49	1043.35
08/16/00	6.08	1039.76
11/28/00	5.22	1040.62
05/16/01	2.98	1042.86
06/13/01	3.60	1042.24
07/19/01	5.50	1040.34
08/15/01	6.38	1039.46
09/12/01	6.98	1038.86
10/11/01	6.24	1039.60
11/15/01	6.05	1039.79
12/04/01	5.98	1039.86
05/15/02	3.71	1042.13
06/26/02	4.72	1041.12
08/07/02	5.70	1040.14
09/17/02	6.42	1039.42
11/05/02	5.90	1039.94
12/09/02	6.29	1039.55
05/06/03	4.48	1041.36
06/04/03	4.45	1041.39
07/08/03	3.94	1041.90
08/05/03	5.91	1039.93
09/03/03	6.94	1038.90
09/18/03	7.10	1038.74
10/01/03	7.08	1038.76
11/04/03	6.51	1039.33
12/03/03	6.40	1039.44
05/05/04	5.34	1040.50
06/07/04	2.87	1042.97
07/14/04	3.27	1042.57
08/10/04	5.34	1040.50
09/01/04	6.28	1039.56
10/12/04	4.81	1041.03
11/08/04	3.78	1042.06
12/07/04	4.47	1041.37
05/04/05	4.61	1041.23
06/01/05	3.68	1042.16
07/06/05	2.72	1043.12
08/09/05	2.41	1043.43
09/07/05	4.00	1041.84
10/04/05	4.78	1041.06
11/09/05	4.76	1041.08
05/11/06	3.74	1042.10
06/07/06	5.66	1040.18
07/12/06	6.50	1039.34
08/08/06	7.21	1038.63
09/05/06	6.35	1039.49
10/11/06	5.85	1039.99
11/07/06	5.86	1039.98
05/17/07	4.98	1040.86
06/13/07	3.55	1042.29
07/19/07	6.24	1039.60
08/15/07	6.89	1038.95

131-050-28CCC
Hankinson Aquifer

MP Elev (msl,ft)=1,068.06
SI (ft.)=53-58

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
08/30/05	10.20	1040.60	
10/04/05	11.80	1040.26	
11/09/05	11.85	1040.21	
05/11/06	10.31	1041.75	
07/12/06	10.93	1041.13	
08/08/06	11.44	1040.62	
09/05/06	11.75	1040.31	
10/11/06	11.53	1040.53	
11/07/06	11.66	1040.40	
05/17/07	10.21	1057.85	
06/13/07	9.76	1058.30	
07/19/07	10.16	1057.90	
08/15/07	10.55	1057.51	
06/07/06	10.38	1041.68	

131-050-29CCC2
Hankinson Aquifer

MP Elev (msl,ft)=1,072.62
SI (ft.)=33-38

Date	Depth to Water (ft)	WL Elev (msl, ft)	Elev ft)
09/21/94	7.29	1065.33	
10/26/94	7.45	1065.17	
11/16/94	7.60	1065.02	
12/14/94	7.80	1064.82	
05/16/95	6.30	1066.32	
06/14/95	6.70	1065.92	
07/25/95	6.06	1066.56	
09/06/95	6.82	1065.80	
10/18/95	6.44	1066.18	
11/21/95	6.75	1065.87	
05/01/96	6.82	1065.80	
06/06/96	6.10	1066.52	
07/17/96	7.00	1065.62	
08/27/96	7.55	1065.07	
10/08/96	7.78	1064.84	
12/10/96	7.90	1064.72	
05/28/97	6.26	1066.36	
08/13/97	7.11	1065.51	
09/17/97	7.55	1065.07	
10/15/97	7.33	1065.29	
11/19/97	7.73	1064.89	
12/16/97	7.85	1064.77	
05/12/98	6.36	1066.26	
07/15/98	6.12	1066.50	
08/25/98	6.88	1065.74	
10/15/98	7.30	1065.32	
12/02/98	6.61	1066.01	
05/25/99	6.55	1066.07	
11/04/03	9.24	1063.38	
06/23/99	6.41	1066.21	
07/22/99	6.49	1066.13	
09/01/99	6.31	1066.31	
10/06/99	6.14	1066.48	
11/03/99	6.44	1066.18	
12/08/99	6.77	1065.85	
05/16/00	5.43	1067.19	
08/16/00	7.30	1065.32	
11/28/00	8.01	1064.61	
05/16/01	6.12	1066.50	
06/13/01	6.35	1066.27	
07/19/01	6.91	1065.71	
08/15/01	7.29	1065.33	
09/12/01	7.73	1064.89	
10/11/01	7.77	1064.85	
11/15/01	8.06	1064.56	
12/04/01	9.18	1063.44	
05/15/02	8.41	1064.21	
06/26/02	8.78	1063.84	
08/07/02	8.38	1064.24	
09/17/02	8.72	1063.90	
11/05/02	9.12	1063.50	
12/09/02	9.30	1063.32	
05/06/03	9.51	1063.11	
06/04/03	9.06	1063.56	
07/08/03	8.06	1064.56	
08/05/03	8.44	1064.18	
09/03/03	8.79	1063.83	
10/01/03	9.09	1063.53	
12/03/03	9.46	1063.16	
05/05/04	9.64	1062.98	
06/07/04	8.28	1064.34	
07/14/04	8.30	1064.32	
08/10/04	8.63	1063.99	
08/18/04	8.72	1063.90	
09/01/04	8.87	1063.75	
10/12/04	8.27	1064.35	
11/08/04	8.08	1064.54	
12/07/04	8.40	1064.22	
05/04/05	8.88	1063.74	
06/01/05	8.66	1063.96	
07/06/05	7.48	1065.14	
08/09/05	7.19	1065.43	
09/07/05	7.05	1065.57	
10/04/05	7.29	1065.33	
11/09/05	7.46	1065.16	
05/11/06	6.12	1066.50	
06/07/06	6.68	1065.94	
07/12/06	7.27	1065.35	
08/08/06	7.70	1064.92	
09/05/06	7.52	1065.10	
10/11/06	7.42	1065.20	
11/07/06	7.67	1064.95	
05/17/07	6.58	1066.04	
06/13/07	5.74	1066.88	
07/19/07	6.50	1066.12	
08/15/07	6.99	1065.63	
06/16/99	6.64	1065.98	

131-050-32BCD2
Hankinson Aquifer

MP Elev (msl,ft)=0.00
SI (ft.)=0-0

Date	Depth to Water (ft)	WL Elev (msl, ft) Elev ft)
06/11/07	10.78	-10.78
08/15/07	11.62	-11.62
07/19/07	11.96	-11.96
06/13/07	10.39	-10.39

131-050-32CAA3
Hankinson Aquifer

MP Elev (msl,ft)=0.00
SI (ft.)=0-0

Date	Depth to Water (ft)	WL Elev (msl, ft) Elev ft)
06/11/07	15.52	-15.52
08/15/07	13.62	-13.62
07/19/07	14.12	-14.12
06/13/07	15.50	-15.50

131-050-32CAD
Hankinson Aquifer

MP Elev (msl,ft)=1,080.00
SI (ft.)=95-100

Date	Depth to Water (ft)	WL Elev (msl, ft) Elev ft)
06/11/07	11.95	1068.05
08/15/07	12.89	1067.11
07/19/07	10.16	1069.84
06/13/07	11.82	1068.18

APPENDIX III
WATER CHEMISTY ANALYSES BY AQUIFER

Appendix III
Milnor Channel Aquifer
40 Samples

Location	Well_No	Aquifer	Date_Sampled	Lab_Conduct	Lab_pH	TDS_Calculated	Hardness	NCH	Calcium	Magnesium	Potassium	Sodium	Bicarbonate	Sulfate	Chloride	Iron	Manganese
13005008ADA2	15296	Milnor Channel	8/30/05	506	7.35	271	240	5	65.8	18.3	2.3	4	285	37.3	1.11	0.149	0.658
13005010CCC	13400	Milnor Channel	8/31/94	1010	7.88	707	540	190	140	47	6.8	18	431	250	1.1	1.8	0.29
13005010CCC	13400	Milnor Channel	6/16/99	996	7.58	667	540	200	140	46	5.3	16	418	250	1.8	1.8	0.25
13005010CCC	13400	Milnor Channel	8/18/04	1000	7.81	657	530	186	133	48.1	6.5	15.6	420	243	1.72	1.39	0.271
13005016BBA	15295	Milnor Channel	8/30/05	929	7.3	571	440	105	112	38.9	5.9	16.8	408	192	1.93	0.395	0.55
13005017DDD	3177	Milnor Channel	10/20/64	1250	8.2	889	635	422	78	107	13	38	260	497	4	3.2	
13005017DDD	3177	Milnor Channel	7/6/78	1580	7.9	1120	880	400	150	120	7.2	42	579	480	7	0.2	0.31
13005017DDD	3177	Milnor Channel	8/25/83	1610	7.8	1180	890	450	160	120	14	41	544	540	5.4	0.87	0.36
13005017DDD	3177	Milnor Channel	7/29/92	1530	7.85	1090	800	300	140	110	13	40	613	450	7.5	1.6	0.33
13005017DDD	3177	Milnor Channel	8/18/93														
13005017DDD	3177	Milnor Channel	6/11/98	1580	7.62	1140	900	420	130	140	14	36	582	520	8.6	0.97	0.68
13005017DDD	3177	Milnor Channel	6/4/03	1450	8	993	768	315	113	118	14.4	43.1	554	424	5.7	0.784	0.585
13005017DDD	3177	Milnor Channel	7/23/03	1870	7.95	1380	993	426	137	158	18.7	62.6	693	650	8.06	1.07	0.73
13005018DDD	13401	Milnor Channel	8/31/94	1420	7.68	1050	770	340	150	97	15	34	529	450	6	2.8	0.3
13005018DDD	13401	Milnor Channel	6/16/99	1440	7.79	1040	780	350	160	93	13	30	532	470	8.8	3.2	0.28
13005018DDD	13401	Milnor Channel	8/19/04	1520	7.62	1070	815	379	165	97.7	13.6	31.6	532	491	7.53	4.24	0.31
13005022DCD	13492	Milnor Channel	10/25/95	1290	7.46	959	590	230	150	51	10	73	435	450	8.9	0.33	0.43
13005022DCD	13492	Milnor Channel	6/29/00	1160	7.85	815	620	300	170	47	6.9	33	389	360	4.2	0.88	0.48
13005022DCD	13492	Milnor Channel	8/30/05	1170	7.52	782	576	239	157	44.6	6.8	34.2	410	332	3.62	1.26	0.404
13005036CDD3		Milnor Channel	10/25/88	538	7.96	367	280	13	65	29	3.7	7.5	328	65	3.5	0.22	0.37
13005036CDD3		Milnor Channel	7/30/92	573	7.57	362	300	30	70	30	3.1	8.5	327	58	1.5	0.28	0.37
13005036CDD3		Milnor Channel	8/18/93														
13005036CDD3		Milnor Channel	6/11/98	572	7.94	336	300	32	69	30	2.5	6.5	322	66	2.1	0.25	0.4
13005036CDD3		Milnor Channel	6/4/03	584	7.91	335	300	58	70.8	30	3.4	7.2	294	71.2	5.17	0.35	0.399
13005101AAA2	12274B	Milnor Channel	12/21/88	636	7.85	415	300	15	73	28	6.3	25	345	77	3.8	0.87	0.49
13005101AAA2	12274B	Milnor Channel	7/29/92	675	7.83	438	330	11	82	30	4.9	21	387	72	1.9	0.99	0.57
13005101AAA2	12274B	Milnor Channel	10/14/98	885	7.88	557	450	47	110	42	6.6	24	488	130	1.7	1.7	0.74
13005101AAA2	12274B	Milnor Channel	6/4/03	906	7.92	558	460	87	115	41.9	6.4	24.7	454	141	3.67	1.58	0.814
13005209DAA2	15302	Milnor Channel	8/31/05	1060	7.03	681	473	159	127	37.9	7.5	34.3	383	279	4.35	1.92	0.743
13005211ADA		Milnor Channel	6/17/98	1380	7.57	992	660	350	190	45	15	63	375	340	150	2.8	1.2
13005211ADA		Milnor Channel	6/5/03	1590	7.84	983	639	303	183	44.1	16.2	88.2	409	298	150	2.26	0.982
13005211ADD2		Milnor Channel	6/17/98	1490	7.41	1130	490	34	140	33	21	180	551	460	24	0.79	0.71
13005211ADD2		Milnor Channel	6/5/03	1680	7.73	1030	463	11	134	31	18.1	205	549	351	18.8	0.802	0.676
13005211DAA3		Milnor Channel	6/17/98	1650	7.38	1170	490		140	35	21	210	691	370	55	0.36	0.98
13005211DAA3		Milnor Channel	6/5/03	1780	8.14	1140	491		141	33.6	20.5	214	662	342	65.5	0.108	0.9
13005211DAA4		Milnor Channel	8/11/93	1520	7.48	1090	460	21	130	33	18	170	536	410	25	0.24	1
13005211DAA4		Milnor Channel	6/17/98	1480	7.35	1090	490	46	140	33	19	180	536	430	25	0.37	0.98
13005211DAA4		Milnor Channel	6/5/03	1590	7.94	1080	475	43	137	32.3	16.3	178	526	432	22.8	0.496	0.908
13005211DDA2		Milnor Channel	6/17/98	1420	7.66	1080	520	130	150	36	14	170	482	460	16	0.45	0.58
13005211DDA2		Milnor Channel	6/5/03	1610	8.03	1060	526	92	151	36	13.3	172	528	413	14.7	1.08	0.653
			Min	506	7.0	271	240	5	65	18	2	4	260	37	1	0.1	0.3
			Max	1870	8.2	1380	993	450	190	158	21	214	693	650	150	4.2	1.2
			Average	1235	7.7	849	558	187	128	58	11	68	468	325	18	1.2	0.6

Appendix III
Hankinson Aquifer
39 Samples

Location	Well_No	Aquifer	Date_Sampled	Lab_Conduct	Lab_pH	TDS_Calculated	Hardness	NCH	Calcium	Magnesium	Potassium	Sodium	Bicarbonate	Sulfate	Chloride	Iron	Manganese
13004931AAB2	13406B	Hankinson	8/30/94	3350	6.37	3050	2100	1500	410	250	34	140	728	1800	7.1	13	1.1
13004931AAB2	13406B	Hankinson	6/3/99	3410	6.83	3120	126		415	273	39.1	150	759	1860	8.89	15.5	1.19
13004931AAB2	13406B	Hankinson	6/16/99	3310	7.4	2980	2000	1400	390	250	32	150	693	1800	11	8.5	0.96
13004931AAB2	13406B	Hankinson	8/18/04	3510	7.59	3200	2060	1450	401	257	34.8	135	752	1990	10.6	10.4	1.17
13005001AAA3	12201C	Hankinson	10/25/88	1280	7.92	941	660	310	170	57	9.9	44	429	410	4.2	1.5	0.73
13005001AAA3	12201C	Hankinson	7/29/92	1290	7.89	955	650	300	170	55	9.3	42	430	430	2.5	2	0.69
13005001AAA3	12201C	Hankinson	6/11/98	2990	7.65	2550	1800	1400	470	150	19	73	458	1400	210	4.1	1.6
13005001AAA3	12201C	Hankinson	6/2/99	2970	6.83	2500	107		478	153	15.3	64.5	450	1360	200	11	1.62
13005001AAA3	12201C	Hankinson	6/4/03	3280	7.59	2660	2010	1650	527	169	13.9	58.9	442	1430	243	6.34	1.9
13005003AAA2	13409B	Hankinson	8/31/94	508	7.93	316	260	4	74	19	3.2	4.5	316	23	1.3	0.37	0.5
13005003AAA2	13409B	Hankinson	6/16/99	446	7.84	252	240	0	68	17	2.2	4	309	7.8		0.42	0.41
13005003AAA2	13409B	Hankinson	8/18/04	537	7.99	301	258	0	73.7	17.9	4.1	7.6	327	32.3	2.4	0.386	0.459
13005003AAB1		Hankinson	1/19/65	536	7.6	333	278	6	82	18	4.3	7.6	332	26	6	0.09	
13005006AAA2	13397B	Hankinson	8/31/94	586	8.05	366	310	3	97	16	2.6	6	373	28	1.2	0.07	0.76
13005006AAA2	13397B	Hankinson	6/16/99	555	7.9	317	290	0	93	15	2.1	6.5	376	14		0.23	0.69
13005006AAA2	13397B	Hankinson	8/18/04	572	7.99	337	310	6	98.9	15.2	3.3	7.1	369	25.9	2.83	0.137	0.714
13005008BAA2	13398B	Hankinson	8/31/94	716	8.05	467	380	130	100	31	2.1	3.5	307	140	7.8	0.13	0.87
13005008BAA2	13398B	Hankinson	6/16/99	701	7.76	459	370	160	100	30	1.6	3.5	261	180	13	0.26	0.83
13005008BAA2	13398B	Hankinson	8/18/04	582	7.79	356	307	92	81.8	25	2.3	<3	261	108	5.7	0.12	0.673
13005009AAD2	13399B	Hankinson	8/31/94	768	8.04	490	420	74	120	30	2.3	5	426	81	9.7	0.19	0.91
13005009AAD2	13399B	Hankinson	6/16/99	584	7.8	332	320	48	93	22	1.7	5	335	40	4.4	0.16	0.65
13005009AAD2	13399B	Hankinson	8/18/04	609	8	347	305	28	87.4	20.9	2.4	4.1	336	59.9	4.36	0.17	0.624
13005014DCD2	13490B	Hankinson	10/25/95	3790	7.57	3290	2300	1400	200	430	56	160	1030	1900	30	4.6	0.59
13005014DCD2	13490B	Hankinson	6/29/00	2880	7.93	2280	1500	820	140	290	42	140	888	1200	33	1.4	0.07
13005014DCD2	13490B	Hankinson	8/30/05	3090	7.81	2350	1600	743	131	309	48.7	170	1050	1140	32.2	2.08	0.08
13005024DDD2	13405B	Hankinson	8/30/94	876	7.91	604	490	200	140	35	1.6	4	355	190	26	0.64	0.87
13005024DDD2	13405B	Hankinson	6/16/99	983	7.62	647	560	260	160	39	1.2	2.5	369	230	30	0.92	0.92
13005024DDD2	13405B	Hankinson	8/18/04	990	7.74	642	545	237	150	41.2	2.6	3.9	374	218	39.5	1.19	0.919
13105027BDB		Hankinson	5/17/07	750	7.5	465	332	79	81.8	30.9	4.35	11.1	307	39.7	15.7	<0.05	0.025
13105027CDD2	13044B	Hankinson	9/3/92	449	7.81	285	240	0	67	18	2	2.5	308	7	4.3	0.1	0.53
13105027CDD2	13044B	Hankinson	8/18/93														
13105027CDD2	13044B	Hankinson	6/11/98	449	8.06	249	230	0	66	17	1.8	3	308	8.6		0.09	0.52
13105027CDD2	13044B	Hankinson	9/18/03	448	8.14	247	240	0	67	17.5	2.6	4.6	295	7.38	0.67	0.119	0.502
13105028CCC	15297	Hankinson	8/30/05	382	7.43	203	172	0	49.8	11.5	1.7	5.8	216	24.6	0.72	0.122	0.4
13105029CCC2	13396B	Hankinson	8/31/94	654	8.04	427	340	85	100	22	2.4	4.5	311	110	2.3	0.3	0.66
13105029CCC2	13396B	Hankinson	6/16/99	638	7.95	393	340	85	100	21	2	5.5	306	110	2.8	0.36	0.58
13105029CCC2	13396B	Hankinson	8/18/04	632	8.06	397	330	77	97.6	20.9	3.1	15.6	307	104	2.66	0.307	0.589
13105035BAA		Hankinson	5/17/07	499	7.44	309	223	0	62.6	16.1	3.72	11.2	320	10.4	0.6	1.15	0.411
13105035BAB		Hankinson	5/17/07	584	8.01	362	280	0	72.8	23.7	1.7	8	388	5.45	2.41	0.103	0.412
				382	6.4	203	107	0	50	12	1	3	216	5	1	0.07	0.03
				3790	8.1	3290	2300	1650	527	430	56	170	1050	1990	243	15.50	1.90
				1347	7.7	1047	665	349	165	85	11	40	437	488	28	2.39	0.73

Appendix III
Brightwood Aquifer
70 Samples

Location	Well_No	Aquifer	Date_Sampled	Lab_Conduct	Lab_pH	TDS_Calculated	Hardness	NCH	Calcium	Magnesium	Potassium	Sodium	Bicarbonate	Sulfate	Chloride	Iron	Manganese
12905003BBB	13040	Brightwood	9/2/92	1380	7.48	1040	760	370	210	58	8.9	39	479	450	7.3	1.7	0.52
12905003BBB	13040	Brightwood	8/18/93														
12905003BBB	13040	Brightwood	6/11/98	1380	7.59	992	700	300	190	55	7.4	39	491	450	7.1	1.1	0.52
12905003BBB	13040	Brightwood	9/18/03	1390	7.6	955	732	346	199	57	8.6	43.8	470	407	5.89	2.11	0.527
12905005BBB	3180	Brightwood	10/22/64	857	8.1	564	314	192	80	28	8.8	49	149	302	1	0.21	
12905005BBB	3180	Brightwood	7/26/73	1060	7.6	769	590	290	160	46	8.2	27	371	310	6.4	0.66	0.42
12905005BBB	3180	Brightwood	7/6/78	1090	7.6	748	560	250	170	33	5	27	383	290	4.8	0.16	0.36
12905005BBB	3180	Brightwood	7/29/92	1060	7.26	777	610	280	170	44	6.6	24	391	300	9.2	0.58	0.3
12905005BBB	3180	Brightwood	6/11/98	1080	7.72	765	600	240	170	43	5.3	21	445	300	4.9	1.3	0.34
12905005BBB	3180	Brightwood	9/18/03	1130	7.94	751	603	251	168	44.5	7.4	28.2	429	286	3.48	1.48	0.336
12905008DDD2	13421B	Brightwood	9/22/94	1480	7.99	1110	840	390	220	70	8.5	24	548	480	5.7	2.1	0.73
12905008DDD2	13421B	Brightwood	6/16/99	1490	7.68	1120	860	430	230	70	7	25	530	520	7.8	2.6	0.74
12905008DDD2	13421B	Brightwood	8/19/04	1580	7.54	1150	862	443	229	70.4	7.9	22.9	511	557	6.97	3.09	0.744
12905018CCC	13038	Brightwood	9/2/92	2020	7.2	1640	1200	740	310	97	12	64	528	860	10	0.05	0.52
12905018CCC	13038	Brightwood	8/18/93														
12905018CCC	13038	Brightwood	6/16/98	1920	7.49	1660	1200	730	310	96	12	71	541	890	13	3.3	0.47
12905018CCC	13038	Brightwood	9/18/03	2130	7.53	1610	1190	734	314	97.9	12	77.4	555	825	7.54	4.28	0.461
12905101AAA	13415	Brightwood	9/22/94	1030	7.78	746	630	270	170	49	6.6	16	435	260	3.1	0.06	0.55
12905101AAA	13415	Brightwood	6/16/99	1030	7.57	706	580	260	160	45	3.7	10	392	290	3.6	0.4	0.59
12905101AAA	13415	Brightwood	8/19/04	1220	7.93	838	651	258	178	50	5.4	10.8	478	354	1.94	0.951	0.681
12905101BBB	3181	Brightwood	10/28/64	882	8	613	425	263	85	52	9.4	27	198	318	2.5	0.31	
12905101BBB	3181	Brightwood	7/6/78	1170	7.6	841	670	330	190	48	5.7	21	415	340	4.3	0.63	0.52
12905101BBB	3181	Brightwood	8/25/83	1160	7.6	823	650	320	170	54	9	21	395	340	4.1	0.49	0.52
12905101BBB	3181	Brightwood	7/29/92	1160	7.29	848	660	310	180	52	7.8	22	430	340	1.6	1.2	0.45
12905101BBB	3181	Brightwood	6/11/98	1220	7.67	866	680	260	190	50	6.6	20	511	340	4.5	2	0.5
12905101BBB	3181	Brightwood	9/18/03	1260	7.79	857	692	302	189	53.3	8.4	23.2	475	344	3.23	2.49	0.529
12905108CCCS	13037	Brightwood	9/2/92	1310	7.28	957	670	290	190	48	10	43	465	400	7.9	0.03	0.62
12905108CCCS	13037	Brightwood	8/18/93														
12905108CCCS	13037	Brightwood	6/16/98	1200	7.62	921	670	290	190	48	9	44	469	390	6.5	1.4	0.66
12905108CCCS	13037	Brightwood	9/18/03	1350	7.76	939	692	321	196	49.2	9.8	45.8	452	406	7.41	1.58	0.704
12905110BBB	13416	Brightwood	9/22/94	1070	7.82	775	640	310	180	47	5.4	16	406	290	4.4	0.25	1.1
12905110BBB	13416	Brightwood	6/15/99	1050	7.66	741	630	330	180	45	3.8	13	371	310	4.1	0.41	1.1
12905110BBB	13416	Brightwood	8/19/04	1140	7.96	762	574	216	160	42.3	6.2	17.6	436	316	2.99	0.457	0.925
12905119ABAS	13422	Brightwood	9/22/94	1290	7.86	946	650	310	180	49	11	50	417	410	9.4	0.08	0.48
12905119ABAS	13422	Brightwood	6/15/99	1340	7.78	1000	710	370	200	51	9.8	57	412	470	9.6	0.8	0.55
12905119ABAS	13422	Brightwood	8/19/04	1400	8	970	630	256	176	46.1	9.5	53.2	455	451	7.9	1.1	0.511
12905121BBAS	15299	Brightwood	8/31/05	2260	6.94	1770	1180	759	309	100	10.5	67.8	519	1020	6.34	5	0.7
12905205DDAS	15298	Brightwood	8/31/05	706	7.33	407	296	11	87.2	19	5.5	22.4	346	97.5	2.77	0.322	0.555
12905214AAA	13494	Brightwood	10/25/95	788	7.4	508	330	36	91	24	8.3	44	353	160	4.9	0.28	0.51
12905214AAA	13494	Brightwood	6/29/00	692	7.75	432	350	60	100	24	5.7	24	352	100	3.8	0.15	0.64
12905214AAA	13494	Brightwood	8/31/05	827	7.86	527	399	125	116	26.4	6.3	25.5	333	183	3.27	0.105	0.756
12905219ABBS	13495	Brightwood	10/25/95	1090	7.32	729	330		96	22	9.5	120	437	250	14	0.14	0.76
13005027BBB2	3178	Brightwood	10/20/64	1030	7.6	699	515	183	112	57	9.6	35	405	261	3	0.32	
13005027BBB2	3178	Brightwood	7/26/73	900	7.6	598	470	180	92	58	4.6	15	357	220	4.2	0.58	0.56
13005027BBB2	3178	Brightwood	7/6/78	916	7.7	633	510	220	140	39	4.5	16	355	230	2.5	0.08	0.6
13005027BBB2	3178	Brightwood	7/29/92	930	7.23	668	540	250	150	41	4.8	16	354	250	3.3	0.32	0.41
13005027BBB2	3178	Brightwood	8/18/93														
13005027BBB2	3178	Brightwood	6/11/98	971	7.82	662	540	200	150	41	4	15	420	240	3.1	0.84	0.43
13005027BBB2	3178	Brightwood	6/4/03	969	8.04	621	517	211	141	40	5	13.9	373	231	3.8	0.743	0.428
13005028BBB	13041	Brightwood	9/2/92	621	7.67	404	340	63	91	27	5.1	2	336	83	2.2	0.21	0.35
13005028BBB	13041	Brightwood	8/18/93														
13005028BBB	13041	Brightwood	6/11/98	782	7.93	501	420	120	110	35	3.9	1.5	363	170		0.81	0.46
13005028BBB	13041	Brightwood	9/18/03	871	7.86	555	492	200	131	40	6.5	<3	356	195	1.61	1.16	0.523
13005028DDD	13414	Brightwood	6/16/99	907	7.62	622	520	210	140	41	4.3	14	376	230	6.6	0.21	0.47
13005028DDD	13414	Brightwood	8/19/04	975	8.05	640	499	168	131	41.6	5.2	12.8	403	246	2.81	0.409	0.447
13005029BBC	13402	Brightwood	8/31/94	1730	7.84	1340	910	490	200	99	14	71	509	660	9.1	2.1	0.31
13005029BBC	13402	Brightwood	6/16/99	1770	7.81	1380	940	520	210	100	15	79	507	710	14	2.1	0.27
13005029BBC	13402	Brightwood	9/18/03	1660	7.85	1180	875	472	193	95.3	12.6	65.5	492	563	8.42	2.99	0.257
13005122CBC	15301	Brightwood	8/30/05	2690	7.14	2040	851	462	202	84.2	15.2	288	476	1180	31.7	1.76	0.544
13005122CBC2	15301B	Brightwood	8/30/05	992	7.21	636	439	152	118	35.1	6.1	30.3	349	270	2.49	0.804	0.413
13005125BBB	13418	Brightwood	9/22/94	1550	7.87	1200	860	480	240	64	12	51	470	560	9.2	2.8	0.22
13005125BBB	13418	Brightwood	6/16/99	1550	7.57	1170	800	410	220	60	11	54	477	580	9.3	2.6	0.22
13005125BBB	13418	Brightwood	8/19/04	1570	7.72	1130	757	370	208	57.5	10.8	55.5	471	560	7.58	2.88	0.229
13005128DDC	13417	Brightwood	9/22/94	1660	7.8	1330	1000	680	290	72	12	45	420	660	7.6	0.47	0.48
13005128DDC	13417	Brightwood	6/15/99	1670	7.52	1300	950	600	270	68	9.1	48	428	680	13	0.69	0.46
13005128DDC	13417	Brightwood	8/19/04	1730	7.94	1320	929	525	267	63.6	9.8	55.3	493	669	6.95	1.53	0.444
13005135CCB	13039	Brightwood	2/9/92	979	7.4	663	550	150	150	42	7.2	13	482	180	4.4	0.9	0.64
13005135CCB	13039	Brightwood	8/18/93														
13005135CCB	13039	Brightwood	6/11/98	998	7.54	658	540	140	150	41	5.9	14	493	200	2.6	0.93	0.68
13005135CCB	13039	Brightwood	9/18/03	994	7.58	622	530	160	144	41.3	7.7	16.5	450	186	2.47	1.13	0.698
			Min	621	6.9	404	296	11.0	80	19	4	2	149	83	1.00	0.03	0.22
			Max	2690	8.1	2040	1200	759	314	100	15	288	555	1180	31.70	5.00	1.10
			Average	1252	7.7	902	661	315	177	53	8	38	428	397	6.15	1.17	0.53

APPENDIX IV
WATER CHEMISTRY ANALYSES

Appendix IV. Chemical analyses for water samples collected in the Hankinson area

Location	SI	Date	SiO2	Fe	Mn	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	F	NO3	B	TDS	CaCO3	NCH	Cond
130-049-01DDB	0-20	1/1/62		0.6						288	0	1494	335		305			1820		
130-049-03BAB	0-0	9/17/53		0.9		108	39	195	8.5	348		945	8	0.2	4.4			429		
130-049-08DCB	0-0	10/18/53		1.5		187	46	50	27	508		113	50	0.2	119			654		
130-049-09ABB	0-0	9/17/53		4		97	67	192	11	567	27	616	55	0.1	4.2			516		
130-049-10BB	63-69	7/13/94	31.7	4.38	0.083	120	60.8	964	11.8	430		1900	367	0.55	0.06		3640	32		
130-049-11AAA	0-0	6/25/81	31	0.06	0	49	24	23	11	210	0	95	6.8	0.2	1	0.13	344	220	48	528
130-049-11AAA	0-0	2/24/84	7.5	0.05	0.01	31	8.5	8.5	4.6	104	0	23	1.9	0.2	17	0.01	153	110	28	262
130-049-11AAA	0-0	3/14/85	8.7	0.04	0.11	44	20	12	12	97	0	130	11	0.1	18	0.04	304	190	113	490
130-049-11AAA	0-0	3/26/86	11	0.04	0.06	50	21	14	11	132	0	130	6.4	0.1	9.4	0.06	318	210	100	510
130-049-15BCA	0-0	9/17/53				170	73	75	3.2	380		405	28	0.5	108			726		
130-049-18CBC	164-189	7/18/06		4.73	0.137	247	230	171	17.8	628	<1	1370	18.1	0.31	0.09		1820	1560	1050	2830
130-049-18CBC	164-189	8/29/06		3.99	0.114	229	219	185	19.8	642	<1	1300	17.1	0.22	0.13		1790	1470	951	2550
130-049-18CBC	164-189	8/29/06		3.99	0.12	231	220	183	19.8	632	<1	1320	18	0.29	<0.09		1790	1480	968	2500
130-049-18CBC	164-189	8/30/06		4.02	0.115	232	226	187	20.5	634	<1	1330	17.5	0.27	0.09		1790	1510	994	2450
130-049-18CBC	164-189	8/30/06		3.92	0.12	226	225	187	20.4	642	<1	1330	17.5	0.25	0.09		1790	1490	968	2440
130-049-18CBC	164-189	8/31/06		3.86	0.11	221	225	194	21.1	640	<1	1300	17.1	0.28	0.09		1790	1480	957	2450
130-049-18CBC	164-189	9/1/06		3.91	0.11	225	228	194	21.7	639	<1	1340	19.7	0.22	0.09		1790	1500	980	2530
130-049-18CBC	164-189	9/5/06		3.63	0.105	214	227	188	20.4	645	<1	1350	17.9	0.263	<0.09	0.751	1800	1470	944	2400
130-049-18CBC	164-189	9/7/06		4.33	0.11	214	225	186	20.1	643	<1	1350	18	0.27	<0.09	0.754	1800	1460	937	2360
130-049-18CCC	198-203	10/25/88	29	2.5	0.16	260	210	170	21	619	0	1400	21	0.3	3.9	0.62	2420	1500	1000	2890
130-049-18CCC	198-203	7/30/92	28	2.8	0.14	250	220	160	22	655	0	1400	16	0.3	8.3	0.55	2430	1500	990	2840
130-049-20ABA	0-0	9/24/53		1		91	37	155	9.2	555		454	68	0.3	3.4			379		
130-049-21CCB	0-0	9/24/53		1		69	32	205	9	607		417	96	0.3	2.5			305		
130-049-24DCC	198-203	8/9/89	26	0.19	0.15	130	49	320	12	317	0	900	62	0.5	1	1	1660	530	270	2830
130-049-24DCC	198-203	1/1/92	28	1.4	0.13	130	49	330	11	325	0	870	59	0.4	8.9	0.89	1650	530	260	2120
130-049-24DCC	198-203	8/18/93																		2090
130-049-24DCC	198-203	6/10/98		1.7	0.14	130	48	320	11	338	0	880	61	0.5	0.1		1620	520	250	2230
130-049-24DCC	198-203	6/4/03	38.7	2.02	0.491	142	73.1	74.3	17.5	325	<1	421	104	0.115	<0.09		994	656	389	1375
130-049-24DDD	226-229	8/25/81	30	1.3	0.15	110	60	310	12	376	0	740	94	0.4	1	0.43	1540	520	210	2350
130-049-24DDD	226-229	8/9/89	28	1.2	0.13	110	50	290	11	360	0	730	78	0.5	1	0.88	1480	480	190	2340

Appendix IV. Chemical analyses for water samples collected in the Hankinson area

130-049-24DDD	226-229	7/30/92	28	1.3	0.11	110	51	290	9.9	372	0	710	77	0.5	11	0.74	1470	480	180	1905
130-049-24DDD	226-229	8/18/93																		1822
130-049-24DDD	226-229	6/10/98		0.99	0.16	110	50	280	10	365	0	720	77	0.5	0.1		1430	480	180	1991
130-049-24DDD	226-229	6/4/03	32.5	0.995	0.132	111	49.6	289	9.3	372	<1	666	72.5	0.26	<0.09		1380	482	176	1854
130-049-26DCC	0-0	7/13/94	29.2	4.04	0.185	226	67.9	349	13	289		1480	30.7	0.29	0.06		2310	49		
130-049-26DCDC	81-84	8/25/81	30	0.12	0.15	110	45	340	15	421	0	740	71	0.3	1	0.25	1560	460	110	2100
130-049-26DCDC	81-84	8/9/89	30	0.04	0.19	100	37	310	13	388	0	730	49	0.4	1	1.1	1460	400	84	2220
130-049-26DCDC	81-84	7/30/92	26	0.32	0.16	98	36	320	13	388	0	740	50	0.4	9.6	0.94	1490	390	75	1965
130-049-26DCDC	81-84	8/18/93																		1756
130-049-26DCDC	81-84	6/10/98		0.72	0.18	92	36	320	11	366	0	730	53	0.3	0.1		1430	380	61	2130
130-049-26DCDC	81-84	6/4/03	30.4	0.273	0.182	87.1	36.1	325	10.8	378	<1	702	53.2	0.31	<0.09		1400	366	55	1889
130-049-29BCC	27-31	7/20/94	29.8	3.05	1.46	89.8	12.8	7.3	2.3	330		41		0.28	0.08		321	16		
130-049-29BCC	27-31	6/8/99	34	1.78	1.5	94.8	14	6.6	2.7	357		47.6	1.6				345	17		
130-049-29BCC	27-31	9/23/99	32	1.75	1.59	100	14.8	6.8	2.7	324		48.9	1.49				336	18		
130-049-30ADD	36-42	7/20/94	29.3	0.528	0.971	72.6	11.1	3.2	2.5	258		28	10.3	0.15	0.07		257	13		
130-049-30ADD	36-42	6/7/99	30.7	0.327	0.883	61.8	9.5	1.7	2.6	245		15.2	1.95				216	11		
130-049-31AAB2	28-33	8/30/94	27	13	1.1	410	250	140	34	728	0	1800	7.1	0.2	3.9	0.24	3050	2100	1500	2770
130-049-31AAB2	28-33	6/3/99	34.9	15.5	1.19	415	273	150	39.1	759		1860	8.89	0.15	0.02		3120	126		
130-049-31AAB2	28-33	6/16/99		8.5	0.96	390	250	150	32	693	0	1800	11	0.1	0.1		2980	2000	1400	3190
130-049-31AAB2	28-33	8/18/04	29.1	10.4	1.17	401	257	135	34.8	752	<1	1990	10.6	0.16	0.09		3200	2060	1450	3370
130-049-36DCC	79-84	9/2/92	22	0.63	0.28	200	71	290	15	342	0	1100	22	0.4	3.3	0.94	1890	790	510	2510
130-049-36DCC	79-84	8/18/93																		2320
130-049-36DCC	79-84	7/13/94	56.9	10.3	0.815	293	96	286	14.2	342		1270	26.9	0.3	0.37		2160	66		
130-049-36DCC	79-84	6/10/98		2.6	0.23	220	78	310	14	350	0	1300	22	0.3	0.1		2120	870	580	2620
130-049-36DCC	79-84	6/4/03	31.9	3.16	0.219	208	74.5	308	12.5	332	<1	1190	21.8	0.31	0.09		1980	827	555	2390
130-050-01AAA2	209-214	10/25/88	26	0.05	0.13	47	26	180	6.1	480	0	210	17	0.6	1	0.73	751	220	0	1140
130-050-01AAA2	209-214	7/29/92	26	0.05	0.32	49	26	180	6.1	511	0	200	14	0.6	6.4	0.65	761	230	0	1045
130-050-01AAA2	209-214	8/17/93																		775

Appendix IV. Chemical analyses for water samples collected in the Hankinson area

130-050-01AAA2	209-214	6/11/98		0.18	0.05	48	26	180	4.9	500	0	240	14	0.5	0.1		760	230	0	1161
130-050-01AAA2	209-214	6/4/03	31.5	0.168	0.026	50.5	27.2	204	4.8	452	2	299	12.3	0.565	<0.09		824	238	0	1207
130-050-01AAA2	209-214	7/17/07		0.299	0.032	48	25.6	183	5	460	<1	265	10.6	0.53	<0.09	0	769	225	0	1192
130-050-01AAA3	67-72	10/25/88	30	1.5	0.73	170	57	44	9.9	429	0	410	4.2	0.2	2	0.17	941	660	310	1273
130-050-01AAA3	67-72	7/29/92	29	2	0.69	170	55	42	9.3	430	0	430	2.5	0.2	2.5	0.14	955	650	300	1233
130-050-01AAA3	67-72	8/17/93																		1199
130-050-01AAA3	67-72	6/11/98		4.1	1.6	470	150	73	19	458	0	1400	210	0.2	0.1		2550	1800	1400	2840
130-050-01AAA3	67-72	6/2/99	56	11	1.62	478	153	64.5	15.3	450		1360	200	0.2	0.18		2500	107		
130-050-01AAA3	67-72	6/4/03	33.2	6.34	1.9	527	169	58.9	13.9	442	<1	1430	243	0.18	0.13		2660	2010	1650	2910
130-050-01AAA3	67-72	7/17/07		6.38	1.64	497	156	60	15	537	<1	1300	196	0.17	<0.09	0	1950	1880	1450	2960
130-050-01AAA4	0-0	6/12/07		0.571	0.031	49.6	26.3	181	4.92	461	<1	250	12.3	0.555	<0.09	0.831	750	232	0	1162
130-050-01BBA	0-0	6/12/07		10.4	0.124	161	150	123	16	613	<1	808	12.8	0.266	0.18	0.556	1320	1020	519	2050
130-050-01CBB	0-0	6/12/07		0.593	0.577	107	37.4	32.7	6.39	335	<1	231	2.01	0.258	<0.09	0.122	566	421	146	882
130-050-02BAB	0-67	9/25/53		0.2		77	26	42	11	328		258	11		18			300		
130-050-02BAB	0-67	6/12/07		1.63	0.503	71.9	22.1	4.1	2.8	298	<1	37.1	0.7	0.252	0.13	<0.050	325	271	25	510
130-050-02BBC	0-0	10/13/54		0.8		77	15	6.5		322			4	0.3				256		
130-050-02CAA	0-0	9/24/53				58	20	6	1	254		41		0.3	9			225		
130-050-02CCA2	0-0	9/24/53		0.4		74	28	19	6	280	16	100		0.2	11			301		
130-050-02CCA2	0-0	9/25/53				80	26	35	6.8	246	32	987	11		19			308		
130-050-03AAA2	38-43	8/31/94	33	0.37	0.5	74	19	4.5	3.2	316	0	23	1.3	0.2	0.6	0.04	316	260	4	500
130-050-03AAA2	38-43	6/16/99		0.42	0.41	68	17	4	2.2	309	0	7.8	0	0.2	0.1		252	240	0	420
130-050-03AAA2	38-43	8/18/04	29.5	0.386	0.459	73.7	17.9	7.6	4.1	327	<1	32.3	2.4	0.246	<0.09		301	258	0	521
130-050-03AAB	20-30	7/2/97	41.1	5.59	0.593	97.7	25.4	2.7	2.9	354		50	11.7	0.2			367	20		
130-050-03AAB	20-30	6/9/99	33.4	1.03	0.595	88.1	22	2.7	2.3	356		29.3	10.2				332	18		
130-050-03AAB1	0-68	1/19/65	24	0.09		82	18	7.6	4.3	332	0	26	6	0.3	1.5	0.35	333	278	6	
130-050-03AAB2	0-0	6/12/07		0.201	0.506	80.2	18.6	3.3	2.77	322	<1	14.9	0.81	0.238	0.13	<0.050	331	277	12	515
130-050-03CABC	0-0	6/12/07		0.458	0.464	68.6	13.8	<3	2.62	259	<1	23.5	2.73	0.187	0.13	<0.050	275	228	15	430
130-050-03CBA2	0-0	9/24/53		1.6		99	44	9	4	451		30	40	0.2	2			430		
130-050-04ACD	0-0	9/25/53				51	20	2.5	1	228	26	21		0.1	1.2			212		
130-050-05ADA	0-0	12/14/53				87	20	4	1	247		37	35	0.2	15			300		

Appendix IV. Chemical analyses for water samples collected in the Hankinson area

130-050-06AAA2	58-63	8/31/94	30	0.07	0.76	97	16	6	2.6	373	0	28	1.2	0.2	0.1	0.05	366	310	3	622
130-050-06AAA2	58-63	6/16/99		0.23	0.69	93	15	6.5	2.1	376	0	14	0	0.1	0.1		317	290	0	517
130-050-06AAA2	58-63	8/18/04	30.2	0.137	0.714	98.9	15.2	7.1	3.3	369	<1	25.9	2.83	0.136	<0.09		337	310	6	550
130-050-07AAA	40-50	6/12/07		1.47	0.68	92.9	20.3	5	3.61	332	<1	38.8	6.83	0.177	0.13	<0.050	383	316	42	601
130-050-08ADA	0-0	11/23/53				160	59	9.5	4	753	5	282	42		4			632		
130-050-08ADA2	38-43	8/30/05	29	0.149	0.658	65.8	18.3	4	2.3	285	<1	37.3	1.11	0.271	<0.09	<0.050	271	240	5	475
130-050-08BAA	138-143	8/31/94	30	0.01	0.16	72	19	94	12	408	0	130	3.8	0.3	2.7	0.58	566	260	0	797
130-050-08BAA	138-143	6/16/99		0.11	0.16	71	18	91	11	420	0	110	4.9	0.2	0.1		513	250	0	816
130-050-08BAA	138-143	8/18/04	31	0.01	0.196	75.6	19.4	96.4	11	419	<1	118	3.93	0.272	<0.09		533	269	0	832
130-050-08BAA2	45-50	8/31/94	30	0.13	0.87	100	31	3.5	2.1	307	0	140	7.8	0.3	0.1	0.03	467	380	130	676
130-050-08BAA2	45-50	6/16/99		0.26	0.83	100	30	3.5	1.6	261	0	180	13	0.3	0.1		459	370	160	698
130-050-08BAA2	45-50	8/18/04	30	0.12	0.673	81.8	25	<3	2.3	261	<1	108	5.7	0.309	0.09		356	307	92	561
130-050-08BAB	0-0	10/6/53		11		99	57	88	4	434	37	225			1.9			484		
130-050-09AAD	138-143	8/31/94	29	0.26	0.33	130	50	24	8.2	409	0	240	0.9	0.3	2.1	0.13	686	530	200	916
130-050-09AAD	138-143	6/16/99		0.75	0.26	130	48	19	6.1	426	0	240	5.1	0.3	0.1		660	520	170	974
130-050-09AAD	138-143	8/18/04	28.9	0.971	0.275	123	46	18.1	7.1	422	<1	240	1.76	0.276	<0.09		646	497	150	975
130-050-09AAD2	35-40	8/31/94	30	0.19	0.91	120	30	5	2.3	426	0	81	9.7	0.2	0.2	0.03	490	420	74	702
130-050-09AAD2	35-40	6/16/99		0.16	0.65	93	22	5	1.7	335	0	40	4.4	0.2	0.1		332	320	48	559
130-050-09AAD2	35-40	8/18/04	28.1	0.17	0.624	87.4	20.9	4.1	2.4	336	<1	59.9	4.36	0.216	<0.09		347	305	28	592
130-050-10CCC	98-103	8/31/94	29	1.8	0.29	140	47	18	6.8	431	0	250	1.1	0.3	0.8	0.11	707	540	190	963
130-050-10CCC	98-103	6/16/99		1.8	0.25	140	46	16	5.3	418	0	250	1.8	0.2	0.1		667	540	200	999
130-050-10CCC	98-103	8/18/04	29.6	1.39	0.271	133	48.1	15.6	6.5	420	<1	243	1.72	0.265	0.22		657	530	186	978
130-050-10DCC	0-150	1/9/07		1.47	0.307	132	36.5	13.8	5	402	<1	231	3.31	0.224	<0.09	0.126	626	480	150	992
130-050-10DCC	0-150	1/10/07		1.62	0.317	135	37.7	13.4	4.99	412	<1	228	2.56	0.23	<0.09	0.128	626	493	154	990
130-050-10DCC	0-150	1/11/07		1.61	0.314	135	37.5	13.3	5.04	409	<1	228	2.28	0.292	<0.09	0.152	620	492	156	980
130-050-10DCC	0-150	1/12/07		1.64	0.315	135	37.5	13.1	4.86	408	<1	228	2.63	0.427	<0.09	0.132	620	492	157	985
130-050-10DCC	0-150	1/15/07		1.66	0.319	137	37.8	13	4.87	405	<1	229	2.33	0.213	<0.09	0.155	626	498	165	978
130-050-10DCC	0-150	1/16/07		1.66	0.315	135	37.8	13.1	4.89	412	<1	234	2.22	0.219	<0.09	0.128	626	493	154	982
130-050-10DDD1	108-118	6/13/07		1.37	0.324	138	38.7	15.2	6.44	415	<1	208	2.11	0.222	0.13	0.122	603	504	163	937
130-050-10DDD2	40-50	6/13/07		1.13	0.404	131	37.5	13.7	6.4	406	<1	192	1.92	0.237	0.13	0.119	575	482	148	896

Appendix IV. Chemical analyses for water samples collected in the Hankinson area

130-050-11CAC	0-0	10/6/53		1.2		210	90	23	7	422		480	59	0.2	2.5			894			
130-050-11CBBB	0-0	7/18/06		0.06	<0.01	68.6	68.3	24	11.4	293	<1	256	9.37	0.238	0.44		572	453	212	905	
130-050-11DDC	0-0	10/25/53				126	62	40	9.8	498		248		0.1	11			568			
130-050-11DDC	0-0	10/26/53		0.2		142	47	42	11	468		258	11		18			546			
130-050-13	0-0	00/00/00	32	1.4	0.1	147	98	49		544		398	8		6.6		1094	770			
130-050-13A	0-0	6/27/21	37	1.2		189	86			410		453	72		33		1207	825			
130-050-13ACD	0-0	11/19/53		0.7		280	182	120	24	623		1073	96	0.2	3.5			1450			
130-050-13B	0-0	6/27/21	35	2.4		121	60			459		334	12		2.4		884	548			
130-050-13BBB	0-0	11/19/53		1.2		174	145	120	20	624		794	25	0.2	1.7			1030			
130-050-13BCB1	0-0	11/18/53		0.2		46	91	70	22	376	48	337	11	0.2	1.3			500			
130-050-13BDB	0-0	11/18/53				366	206	144	90	496		1040	28	0.2	4.4			1760			
130-050-13BDD	0-0	11/24/53				154	174	120	25	663	38	819	16		3.4			1100			
130-050-13CDA2	0-0	11/19/54				77	50	50	11	400	22	664	110	0.2	8.8			397			
130-050-13DDA	0-0	11/19/53		0.5		116	27	240	3.5	429	26	87	11	0.2	1.3			402			
130-050-14ADD	0-0	6/22/55		10		140	122	78	14	561		499			0.3			852			
130-050-14BBB	0-0	7/13/06		0.059	0.055	71.8	67	22.7	10.8	293	<1	260	8.68	0.212	0.18		578	455	215	910	
130-050-14DCD	125-130	10/25/95		0.48	0.08	140	110	48	18	546	0	460	8.4	0.2	1		1060	800	350	1280	
130-050-14DCD	125-130	6/29/00		0.74	0.12	150	110	44	15	585	0	440	6.7	0.3	0.1		1050	830	350	1417	
130-050-14DCD	125-130	8/30/05	31.9	3.44	0.108	179	141	56.1	16.5	617	<1	688	8.95	0.192	<0.09		1400	1030	523	1798	
130-050-14DCD2	48-53	10/25/95		4.6	0.59	200	430	160	56	1030	0	1900	30	0.2	1		3290	2300	1400	2580	
130-050-14DCD2	48-53	6/29/00		1.4	0.07	140	290	140	42	888	0	1200	33	0.4	0.1		2280	1500	820	2720	
130-050-14DCD2	48-53	8/30/05	30.6	2.08	0.08	131	309	170	48.7	1050	<1	1140	32.2	0.26	<0.09		2350	1600	743	2740	
130-050-14DDD	0-0	11/3/53		0.3		105	140	85	5.8	541		556	11	0.2	19			836			
130-050-14DDD	0-0	11/4/53		4.4		131	230	100	35	728		871	14		37			1280			
130-050-15BBB	0-0	6/12/07		2.07	0.318	132	37.5	13.5	5.69	377	<1	195	7.07	0.229	0.13	0.104	574	484	174	898	
130-050-15BBC	0-0	6/12/07		0.291	0.475	76.5	24.8	<3	2.54	295	<1	50.9	6.02	0.191	0.18	<0.050	352	293	50	548	
130-050-15DAC	0-60	6/12/07		0.126	0.752	167	101	36.8	35.7	548	<1	424	69.8	0.22	0.13	0.267	1040	833	384	1606	
130-050-15DAC2	0-190	6/12/07		1.27	0.133	123	77.7	62.9	15.5	618	<1	238	7.29	0.218	0.13	0.39	812	627	120	1258	
130-050-16AABD	0-0	6/12/07		0.055	0.596	92	23.8	<3	2.48	284	<1	65.5	28.3	0.149	0.13	<0.050	399	328	94	623	

Appendix IV. Chemical analyses for water samples collected in the Hankinson area

130-050-16AAC	0-0	6/12/07		0.471	0.343	82	27.9	<3	1.62	299	<1	42	24.7	0.132	0.13	<0.0 50	383	320	74	595
130-050-16AAD	88-98	6/13/07		2.3	0.327	142	43.9	15.9	7.16	416	<1	236	1.74	0.234	0.13	0.144	639	536	194	991
130-050-16AADA	0-0	6/12/07		0.991	0.36	80.4	26.2	7.6	3.9	287	<1	92.1	2.46	0.212	0.13	0.065	380	309	72	595
130-050-16ABB	0-0	6/12/07		0.255	0.923	141	35.5	41.5	5.89	325	<1	121	161	0.114	<0.09	0.061	732	499	231	1140
130-050-16ABB1	120-130	6/13/07		1.65	0.251	127	45.5	17.7	7.2	402	<1	215	1.74	0.263	0.13	0.125	611	505	175	950
130-050-16ABB2	58-78	6/13/07		<0.05	0.429	84.7	20	9.5	6.66	309	<1	68.5	2.39	0.238	0.27	0.078	378	294	39	585
130-050-16BAB	48-58	6/13/07		0.339	0.667	105	34.1	9.9	6.44	419	<1	92.7	1.65	0.303	<0.09	0.096	485	403	58	759
130-050-16BBA	49-54	8/30/05	29.9	0.395	0.55	112	38.9	16.8	5.9	408	<1	192	1.93	0.258	<0.09	0.101	571	440	105	874
130-050-17DDD	50-60	10/20/64	21	3.2		78	107	38	13	260	0	497	4	0.3	0	0	889	635	422	
130-050-17DDD	50-60	7/6/78	28	0.2	0.31	150	120	42	7.2	579	0	480	7	0.2	1	0.29	1120	880	400	1600
130-050-17DDD	50-60	8/25/83	30	0.87	0.36	160	120	41	14	544	0	540	5.4	0.3	1	0.2	1180	890	450	1660
130-050-17DDD	50-60	7/29/92	28	1.6	0.33	140	110	40	13	613	0	450	7.5	0.2	2.1	0.21	1090	800	300	1426
130-050-17DDD	50-60	8/18/93																		1298
130-050-17DDD	50-60	6/11/98		0.97	0.68	130	140	36	14	582	0	520	8.6	0.3	0.1		1140	900	420	1545
130-050-17DDD	50-60	6/4/03	31.9	0.784	0.585	113	118	43.1	14.4	554	<1	424	5.7	0.303	<0.09		993	768	315	1312
130-050-17DDD	50-60	7/23/03	31	1.07	0.73	137	158	62.6	18.7	693	<1	650	8.06	0.292			1360	993	426	
130-050-18DDC	0-0	10/1/53		1.2		202	96	60	14	985		534	25		2.4			902		
130-050-18DDD	98-103	8/31/94	29	2.8	0.3	150	97	34	15	529	0	450	6	0.2	0.2	0.21	1050	770	340	1322
130-050-18DDD	98-103	6/16/99		3.2	0.28	160	93	30	13	532	0	470	8.8	0.2	0.1		1040	780	350	1426
130-050-18DDD	98-103	8/19/04	30.1	4.24	0.31	165	97.7	31.6	13.6	532	<1	491	7.53	0.228	<0.09		1070	815	379	1486
130-050-19BAA	0-0	10/7/53		3		188	106	105	15	974		751	21		1.7			904		
130-050-21DDA	80-90	9/18/53				165	40	14	4	647	40	183	11		1.9			577		
130-050-22DCD	58-63	10/25/95		0.33	0.43	150	51	73	10	435	0	450	8.9	0.2	1		959	590	230	1195
130-050-22DCD	58-63	6/29/00		0.88	0.48	170	47	33	6.9	389	0	360	4.2	0.3	0.1		815	620	300	1104
130-050-22DCD	58-63	8/30/05	31.6	1.26	0.404	157	44.6	34.2	6.8	410	<1	332	3.62	0.22	<0.09		782	576	239	1090
130-050-22DDD	0-0	9/17/53		0.2		151	57	42	7.2	901		286	8		1.7			610		
130-050-24ACC	0-0	11/26/53				147	210	120	13	465	20	1090	11		2.4			1230		

Appendix IV. Chemical analyses for water samples collected in the Hankinson area

130-050-24BBB	0-0	9/18/53		1.5		87	44	16	3.8	821		131		0.2	0.8			398		
130-050-24DDD	138-143	8/30/94	30	2.3	0.21	230	110	74	20	586	0	740	6.1	0.2	4.5	0.33	1510	1000	550	1718
130-050-24DDD	138-143	6/16/99		2.2	0.17	230	110	75	20	584	0	750	9.1	0.2	0.1		1480	1000	550	1890
130-050-24DDD	138-143	8/18/04	29	3.1	0.215	212	106	74.2	17.1	576	<1	732	7.01	0.202	0.4		1430	966	495	1847
130-050-24DDD2	48-53	8/30/94	31	0.64	0.87	140	35	4	1.6	355	0	190	26	0.1	0.1	0.03	604	490	200	1357
130-050-24DDD2	48-53	6/16/99		0.92	0.92	160	39	2.5	1.2	369	0	230	30	0.1	0.1		647	560	260	994
130-050-24DDD2	48-53	8/18/04	28.9	1.19	0.919	150	41.2	3.9	2.6	374	<1	218	39.5	0.062	<0.09		642	545	237	958
130-050-26BCD	0-0	9/23/53		1		151	54	23	6.5	932		293	11		2			600		
130-050-26CBB	68-73	10/25/95		0.21	0.33	150	45	30	7.3	458	0	290	5.6	0.2	1		756	560	180	967
130-050-26CCD	0-0	9/23/53				155	47	24	7.2	918		279	11		1.9			581		
130-050-27A	0-0	6/27/21	38	0.6		130	42			403		193	2				647	497		
130-050-27BBB	0-0	9/23/53		0.2		127	52	16	5.2	675	53	251			0.9			534		
130-050-27BBB2	90-100	10/20/64	22	0.32		112	57	35	9.6	405	0	261	3	0.4	0	0	699	515	183	
130-050-27BBB2	90-100	7/26/73	26	0.58	0.56	92	58	15	4.6	357	0	220	4.2	0.2	1	0	598	470	180	
130-050-27BBB2	90-100	7/6/78	24	0.08	0.6	140	39	16	4.5	355	0	230	2.5	0.1	1	0.1	633	510	220	930
130-050-27BBB2	90-100	7/29/92	28	0.32	0.41	150	41	16	4.8	354	0	250	3.3	0.2	0	0.1	668	540	250	948
130-050-27BBB2	90-100	8/18/93																		951
130-050-27BBB2	90-100	6/11/98		0.84	0.43	150	41	15	4	420	0	240	3.1	0.2	0.1		662	540	200	1119
130-050-27BBB2	90-100	6/4/03	31.4	0.743	0.428	141	40	13.9	5	373	<1	231	3.8	0.174	<0.09		621	517	211	896
130-050-28BBB	63-68	9/2/92	27	0.21	0.35	91	27	2	5.1	336	0	83	2.2	0.1	0	0.05	404	340	63	656
130-050-28BBB	63-68	8/18/93																		524
130-050-28BBB	63-68	6/11/98		0.81	0.46	110	35	1.5	3.9	363	0	170	0	0.1	0.1		501	420	120	785
130-050-28BBB	63-68	9/18/03	29.3	1.16	0.523	131	40	<3	6.5	356	<1	195	1.61	0.06	0.09		555	492	200	783
130-050-28DDD	178-183	6/16/99		0.21	0.47	140	41	14	4.3	376	0	230	6.6	0.1	0.1		622	520	210	934
130-050-28DDD	178-183	8/19/04	26.2	0.409	0.447	131	41.6	12.8	5.2	403	<1	246	2.81	0.154	<0.09		640	499	168	952
130-050-29BBC	158-163	8/31/94	29	2.1	0.31	200	99	71	14	509	0	660	9.1	0.2	3	0.31	1340	910	490	1502
130-050-29BBC	158-163	6/16/99		2.1	0.27	210	100	79	15	507	0	710	14	0.2	0.1		1380	940	520	1778
130-050-29BBC	158-163	9/18/03	31.3	2.99	0.257	193	95.3	65.5	12.6	492	<1	563	8.42	0.19	0.09		1180	875	472	1258

Appendix IV. Chemical analyses for water samples collected in the Hankinson area

130-050-36ABB	0-0	9/23/53		50		200	123	70	14	1110		707	11		208			1010		
130-050-36CDD2	178-183	10/25/88	27	0.05	0.7	170	53	87	13	362	0	500	12	0.3	4	0.46	1050	640	350	1440
130-050-36CDD2	178-183	7/30/92	29	0.26	0.46	170	52	82	14	380	0	480	7.7	0.2	3.1	0.41	1030	640	330	1362
130-050-36CDD2	178-183	8/18/93																		1375
130-050-36CDD2	178-183	6/11/98		1.3	0.17	170	51	82	11	415	0	500	11	0.2	0.1		1030	630	290	1323
130-050-36CDD2	178-183	6/4/03	33.1	1.05	0.145	173	54	93.6	11	431	<1	468	10.6	0.19	0.09		1020	655	301	1388
130-050-36CDD3	32-37	10/25/88	29	0.22	0.37	65	29	7.5	3.7	328	0	65	3.5	0.4	1	0.08	367	280	13	546
130-050-36CDD3	32-37	7/30/92	28	0.28	0.37	70	30	8.5	3.1	327	0	58	1.5	0.4	0.6	0.07	362	300	30	547
130-050-36CDD3	32-37	8/18/93																		549
130-050-36CDD3	32-37	6/11/98		0.25	0.4	69	30	6.5	2.5	322	0	66	2.1	0.4	0.1		336	300	32	558
130-050-36CDD3	32-37	6/4/03	32.6	0.35	0.399	70.8	30	7.2	3.4	294	<1	71.2	5.17	0.395	<0.09		335	300	58	574
130-051-01AAA2	18-23	12/21/88	29	0.87	0.49	73	28	25	6.3	345	0	77	3.8	0.2	1.1	0.06	415	300	15	669
130-051-01AAA2	18-23	7/29/92	28	0.99	0.57	82	30	21	4.9	387	0	72	1.9	0.2	5	0.03	438	330	11	651
130-051-01AAA2	18-23	10/14/98		1.7	0.74	110	42	24	6.6	488	0	130	1.7	0.2	0.1		557	450	47	811
130-051-01AAA2	18-23	6/4/03	31	1.58	0.814	115	41.9	24.7	6.4	454	<1	141	3.67	0.175	<0.09		558	460	87	838
130-051-22CBC	145-150	8/30/05	28.1	1.76	0.544	202	84.2	288	15.2	476	<1	1180	31.7	0.25	<0.09	0.987	2040	851	462	2480
130-051-22CBC2	78-83	8/30/05	28.2	0.804	0.413	118	35.1	30.3	6.1	349	<1	270	2.49	0.304	<0.09	0.117	636	439	152	938
130-051-25BBB	158-163	9/22/94	27	2.8	0.22	240	64	51	12	470	0	560	9.2	0.1	4.5	0.32	1200	860	480	1406
130-051-25BBB	158-163	6/16/99		2.6	0.22	220	60	54	11	477	0	580	9.3	0.2	0.1		1170	800	410	1540
130-051-25BBB	158-163	8/19/04	27.6	2.88	0.229	208	57.5	55.5	10.8	471	<1	560	7.58	0.198	<0.09		1130	757	370	1498
130-051-25CDB	0-74	7/22/64	23	0.64		181	30	25	9	407	0	296	3.9	0.5	0	0	769	575	242	
130-051-28DDC	98-103	9/22/94	27	0.47	0.48	290	72	45	12	420	0	660	7.6	0.1	5	0.27	1330	1000	680	1522
130-051-28DDC	98-103	6/15/99		0.69	0.46	270	68	48	9.1	428	0	680	13	0.2	0.1		1300	950	600	1757
130-051-28DDC	98-103	8/19/04	28.4	1.53	0.444	267	63.6	55.3	9.8	493	<1	669	6.95	0.18	<0.09		1320	929	525	1644
130-051-35CCB	79-84	2/9/92	28	0.9	0.64	150	42	13	7.2	482	0	180	4.4	0.2	0	0.11	663	550	150	959
130-051-35CCB	79-84	8/18/93																		911
130-051-35CCB	79-84	6/11/98		0.93	0.68	150	41	14	5.9	493	0	200	2.6	0.2	0.1		658	540	140	976

Appendix IV. Chemical analyses for water samples collected in the Hankinson area

130-051-35CCB	79-84	9/18/03	30.7	1.13	0.698	144	41.3	16.5	7.7	450	<1	186	2.47	0.19	<0.09		622	530	160	780
131-049-05BBB	0-126	7/22/64	24	1.7		128	52	405	48	354	0	950	146	0.7	3	0.4	1930	535	245	
131-049-10CDD	178-183	9/3/92	28	0.37	0.11	53	21	530	12	345	0	850	180	1.2	11	1.4	1860	220	0	2760
131-049-10CDD	178-183	8/17/93																		2610
131-049-10CDD	178-183	6/10/98		0.52	0.13	53	20	520	12	334	0	880	190	1.1	0.1		1840	210	59	2800
131-049-10CDD	178-183	6/3/03	31.3	0.524	0.103	51.8	20	546	10.1	337	<1	758	162	0.98	<0.09		1720	212	0	2680
131-049-19BBB3	87-92	10/26/88	27	0.24	0.08	50	19	140	5.8	286	0	260	51	0.7	4.2	0.62	700	200	0	1003
131-049-19BBB3	87-92	7/29/92	24	0.54	0.44	50	13	35	9.2	217	0	62	26	0.2	4.3	0.17	332	180	1	501
131-049-19BBB3	87-92	8/17/93																		425
131-049-19BBB3	87-92	6/11/98		0.18	0.35	55	17	120	7.6	248	0	250	51	0.4	0.1		624	210	4	930
131-049-19BBB3	87-92	6/4/03	30.7	0.233	0.263	56.2	19.6	128	5.6	246	<1	262	41.8	0.493	<0.09		636	221	18	953
131-049-24AAA	258-263	10/26/88	25	0.45	0.21	110	45	300	12	336	0	730	88	0.5	8.4	0.92	1490	460	180	2130
131-049-24AAA	258-263	7/29/92	28	0.85	0.23	110	38	300	11	364	0	640	140	0.6	7	0.97	1460	430	130	2320
131-049-34ABA	0-120	7/22/64	22	0.22		116	39	250	19	262	0	658	88	0.6	4	0.5	1320	450	235	
131-050-20ACB	0-50	6/11/07		0.155	0.675	83.2	17.7	<3	1.64	267	<1	65.3	1.96	0.152	<0.09	<0.050	334	281	61	483
131-050-20DAC	0-45	6/11/07		0.252	0.489	73.6	16.4	4.9	3.69	268	<1	48.4	1.33	0.162	<0.09	<0.050	311	251	30	519
131-050-21BAD	0-0	6/12/07		0.205	0.279	64.2	13.3	19.3	5.8	257	<1	53.1	2.63	0.186	0.22	0.143	316	215	3	492
131-050-21DAC	0-75	7/22/64	26	0.12		55	12	31	8.6	244	0	63	1	0.4	0	0	317	186	0	
131-050-21DAC2	0-0	6/12/07		0.164	0.386	60.7	12.2	31.5	7.2	239	<1	83.1	2.23	0.23	<0.09	0.186	336	202	5	522
131-050-22CAA	0-0	6/12/07		<0.05	0.012	74	15.2	3.3	2.46	263	<1	29.3	3.78	0.884	0.13	<0.050	300	248	31	464
131-050-22DDC	0-180	6/12/07		1.39	0.126	120	59.6	209	10.8	388	<1	628	58.5	0.467	6.82	0.838	1160	545	227	1792
131-050-23DAA	208-218	6/13/07		2.91	0.122	83.6	20.7	126	9.39	318	<1	295	14.1	0.316	0.13	0.737	688	294	32	1074
131-050-25AAD	0-0	6/13/07		3.15	0.076	117	48.7	144	9.98	424	<1	455	14	0.346	0.35	0.747	924	493	145	1434
131-050-25BAB	0-0	6/13/07		1.51	0.07	89.2	31.1	164	8.82	397	<1	374	17.2	0.392	0.13	0.827	837	351	24	1304
131-050-26ABD	0-0	6/13/07		1.28	0.07	99.5	27.3	92.7	9.58	383	<1	253	6.38	0.276	0.13	0.614	663	361	46	1033
131-050-26BAB	169-175	6/13/07		0.379	0.077	54.2	14.5	173	8.81	394	<1	233	23.3	0.499	0.8	0.957	713	195	0	1101
131-050-26CDD	0-0	6/13/07		3.1	0.852	113	32.8	10.3	5.52	391	<1	76.7	15.1	0.244	0.13	0.086	485	417	96	763
131-050-27BDB	0-0	5/17/07		<0.05	0.025	81.8	30.9	11.1	4.35	307	<1	39.7	15.7	0.235	95.6	0	465	332	79	577

Appendix IV. Chemical analyses for water samples collected in the Hankinson area

131-050-27CCC	50-50	6/11/07		0.102	0.386	61.1	12.4	3.1	3.39	230	<1	25.2	0.74	0.23	0.18	<0.050	257	204	14	395
131-050-27CDC	40-50	6/11/07		0.093	0.356	55.3	11.2	9.4	4.74	236	<1	12.2	0.65	0.227	<0.09	0.062	247	184	0	381
131-050-27CDD2	39-44	9/3/92	31	0.1	0.53	67	18	2.5	2	308	0	7	4.3	0.2	0	0.04	285	240	0	678
131-050-27CDD2	39-44	8/18/93																		437
131-050-27CDD2	39-44	6/11/98		0.09	0.52	66	17	3	1.8	308	0	8.6	0	0.2	0.1		249	230	0	522
131-050-27CDD2	39-44	9/18/03	32.9	0.119	0.502	67	17.5	4.6	2.6	295	<1	7.38	0.67	0.18	0.09		247	240	0	410
131-050-28BAA	0-12	6/11/07		<0.05	0.031	182	112	127	15.2	568	<1	463	194	0.62	34.8	0.614	1340	916	451	2070
131-050-28CCC	53-58	8/30/05	28	0.122	0.4	49.8	11.5	5.8	1.7	216	<1	24.6	0.72	0.213	<0.09	<0.050	203	172	0	356
131-050-29CCC2	33-38	8/31/94	31	0.3	0.66	100	22	4.5	2.4	311	0	110	2.3	0.1	0.3	0.04	427	340	85	624
131-050-29CCC2	33-38	6/16/99		0.36	0.58	100	21	5.5	2	306	0	110	2.8	0.1	0.1		393	340	85	618
131-050-29CCC2	33-38	8/18/04	31.3	0.307	0.589	97.6	20.9	15.6	3.1	307	<1	104	2.66	0.099	0.22		397	330	77	608
131-050-30BAA	0-0	6/12/07		0.719	0.472	79.1	19	7.7	2.23	275	<1	60.9	3.86	0.324	<0.09	0.057	338	276	49	529
131-050-31BBC	0-0	9/25/53				62	32	3.2	2.5	266	8	49	11	0.2	52			285		
131-050-31BBC2	0-0	6/12/07		0.589	0.69	108	39	9.5	2.91	407	<1	97	13.9	0.166	<0.09	<0.050	502	430	96	784
131-050-32BCD2	0-0	6/11/07		0.321	0.77	88.7	15.5	4.6	3.05	337	<1	20.9	0.97	0.112	0.13	<0.050	345	286	8	534
131-050-32CAA3	0-0	6/11/07		0.409	0.402	69.3	14.1	13.6	5.85	319	<1	13	0.66	0.158	0.13	0.083	316	231	0	491
131-050-32CAD	95-100	6/11/07		0.663	0.671	61.1	13.2	<3	1.81	242	<1	18.4	0.64	0.245	0.13	<0.050	257	207	7	399
131-050-34ABB	0-0	6/13/07		0.151	0.42	59.4	13.5	4.4	4.2	257	<1	9.57	0.56	0.21	<0.09	<0.050	260	204	0	403
131-050-34DDD	0-0	11/19/53				51	23	8	4.2	280	16	21		0.2	1.1			223		
131-050-35BAA	0-0	5/17/07		1.15	0.411	62.6	16.1	11.2	3.72	320	<1	10.4	0.6	0.218	0.22	0	309	223	0	560
131-050-35BAB	0-0	5/17/07		0.103	0.412	72.8	23.7	8	1.7	388	<1	5.45	2.41	0.228	0.8	0	362	280	0	570
131-050-35DCA	0-0	9/25/53		0.3		61	24	6	2	336		10		0.3	0.9			253		
131-050-35DCC	0-0	6/12/07		0.916	0.575	92.3	27	7.9	3.98	317	<1	76.7	15.9	0.285	0.44	<0.050	419	342	81	652
131-051-11DDD5	205-210	8/11/93	26	2.7	0.44	180	63	440	22	160	0	950	440	0.4	2.2	1.5	2210	710	580	3170
131-051-15CCB	0-45	7/22/64	28	0.15		199	56	66	20	518	0	439	5	0.3	4.5	0	1090	725	300	
131-051-22CCC2	143-148	8/11/93	31	0.08	0.04	45	20	150	35	496	0	150	28	1.5	3.7	1	709	200	0	1050
131-051-22CCC3	50-55	8/1/93	44	0.78	1.3	230	54	130	15	536	0	650	11	0.1	7.8	0.47	1410	800	360	1767

Appendix IV. Chemical analyses for water samples collected in the Hankinson area

131-051-23BBB2	271-276	8/11/93	26	0.04	0.01	24	7	290	20	665	14	61	100	1.4	0.5	1.3	873	89	0	1391
131-051-23BBB2	271-276	8/31/94	29	0.47	0.06	15	4	340	4.3	706	8	50	120	1.5	5.3	1.6	927	54	0	1353
131-051-23BBB2	271-276	6/15/99		0.4	0.06	13	4	300	3.3	722	2	56	110	1.5	0.2		846	49	0	1468
131-051-23BBB2	271-276	8/18/04	28.8	0.502	0.076	19.9	6.8	360	4.1	693	13	56.1	124	1.61	0.18		926	78	0	1412
131-051-23BBB3	142-147	8/11/93	29	0.35	0.19	83	25	160	13	580	0	170	31	0.2	4.2	0.88	803	310	0	1176
131-051-23BBB4	57-62	8/11/93	45	0.61	0.6	140	37	54	15	447	0	260	5.9	0.2	4.6	0.19	783	500	140	1074
131-051-23BBB5	16-26	8/11/93	29	0.02	0.02	63	28	3	1.6	313	0	21	4.8	0.2	7.2	0.03	312	270	16	480
131-051-31DBA	0-760	7/22/64	6.9	0.88		12	6.1	990	18	478	0	1180	443	6.7	12	2.7	2910	55	0	