
**HYDROGEOLOGY OF THE
SHALLOW WATER TABLE AT
THE CITY OF DEVILS LAKE, NORTH DAKOTA**

by

Steve W. Pusc

**North Dakota Water Resources Investigation
Number 34
North Dakota State Water Commission
David Sprynczynatyk, State Engineer**

**Prepared by the
North Dakota State Water Commission
In cooperation with the
City of Devils Lake, North Dakota**



ND State Water Commission

1998

**HYDROGEOLOGY OF THE
SHALLOW WATER TABLE AT
THE CITY OF DEVILS LAKE, NORTH DAKOTA**

**North Dakota State Water Commission
Water Resources Investigation # 34**

by

**Steve W. Pusc, Hydrogeologist
North Dakota State Water Commission**

**Prepared by the
North Dakota State Water Commission
in Cooperation with the
City of Devils Lake, North Dakota**

1998

TABLE OF CONTENTS

	Page
INTRODUCTION	1
Location of study area	1
Purpose and Scope	2
Location numbering system.....	3
Previous Investigations	4
Acknowledgments	4
EXPLANATION OF DATA TABLES AND METHODS OF DATA COLLECTION	5
Records of test holes and wells	5
Lithologic logs of test holes and wells.....	5
Water levels in selected wells and ponds	7
HYDROGEOLOGY OF THE SHALLOW WATER TABLE	7
General Geology	7
Water Levels	8
SUMMARY AND CONCLUSIONS	10
REFERENCES	13

ILLUSTRATIONS

PLATES

Plate 1. Observation well and staff gage locations in the vicinity of the city of Devils Lake, North Dakota.....	(in Pocket)
Plate 2. Water level elevation of the shallow water table in the vicinity of the city of Devils Lake, 7/17/97	(in Pocket)
Plate 3. Depth to water in the vicinity of the city of Devils Lake, 7/17/97	(in Pocket)
Plate 4. Water level elevation of the shallow water table in the vicinity of the city of Devils Lake, 8/25/97	(in Pocket)
Plate 5. Depth to water in the vicinity of the city of Devils Lake, 8/25/97	(in Pocket)

FIGURES

Figure 1. Location of the Devils lake Basin	1
Figure 2. Location of the Devils Lake Study Area, see plate 1 for specific details.....	2
Figure 3. Location numbering system.....	3
Figure 4. Well construction diagram.....	6
Figure 5. Representative water levels of the shallow water table in the vicinity of the City of Devils Lake, North Dakota	9

TABLES

Table 1. Records of test holes, observation wells and staff gages.....	14
Table 2. Lithologic logs and well information	17
Table 3. Water levels is selected wells and staff gages.....	58
Table 4. Depth to water below land surface.....	74

INTRODUCTION

Since 1993, annual precipitation in the Devils Lake area has exceeded the long term average of 17 inches by approximately 6 inches. This above average precipitation resulted in increased runoff to area streams, lakes and wetlands and increased recharge to ground-water systems in the area. Problems and concerns resulting from high ground-water levels beneath and surrounding the city of Devils Lake prompted the city to request the North Dakota State Water Commission to construct monitoring wells in and around the City of Devils Lake for the purpose of preparing a water table map and to monitor ground-water level changes (Figures. 1, 2 and Plate 1).

Location of study area

The Devils Lake shallow water table investigation is located in the Devils Lake Basin in North Dakota (Figure 1). Specifically, the area underlies the city of Devils Lake and the area immediately surrounding the City as designated on Figure 2 and Plate 1.

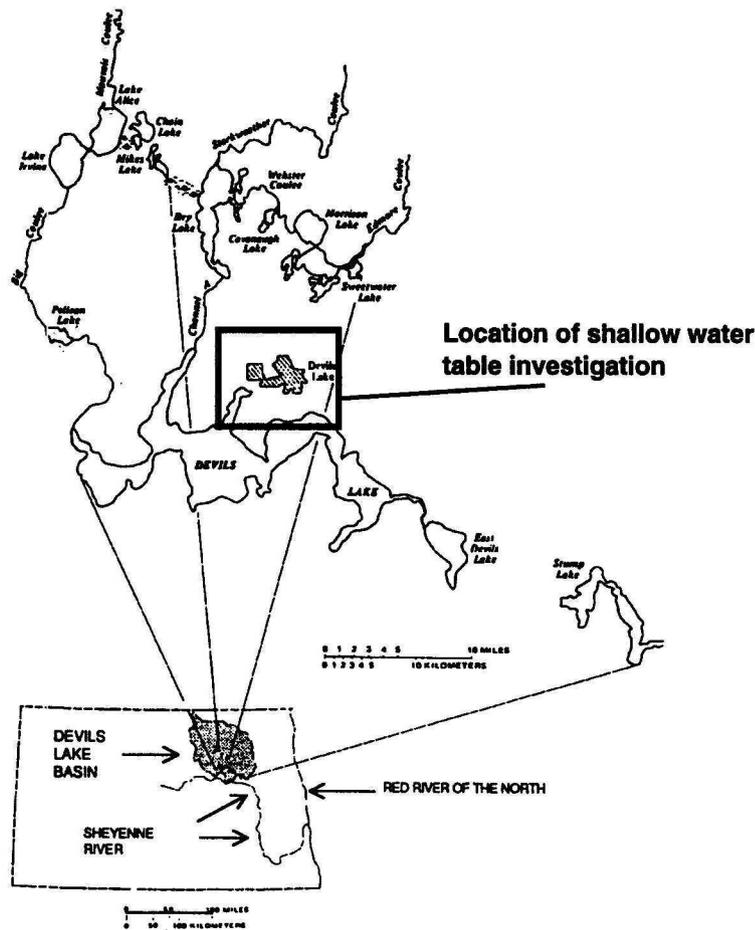


Figure 1. Location of the Devils lake Basin

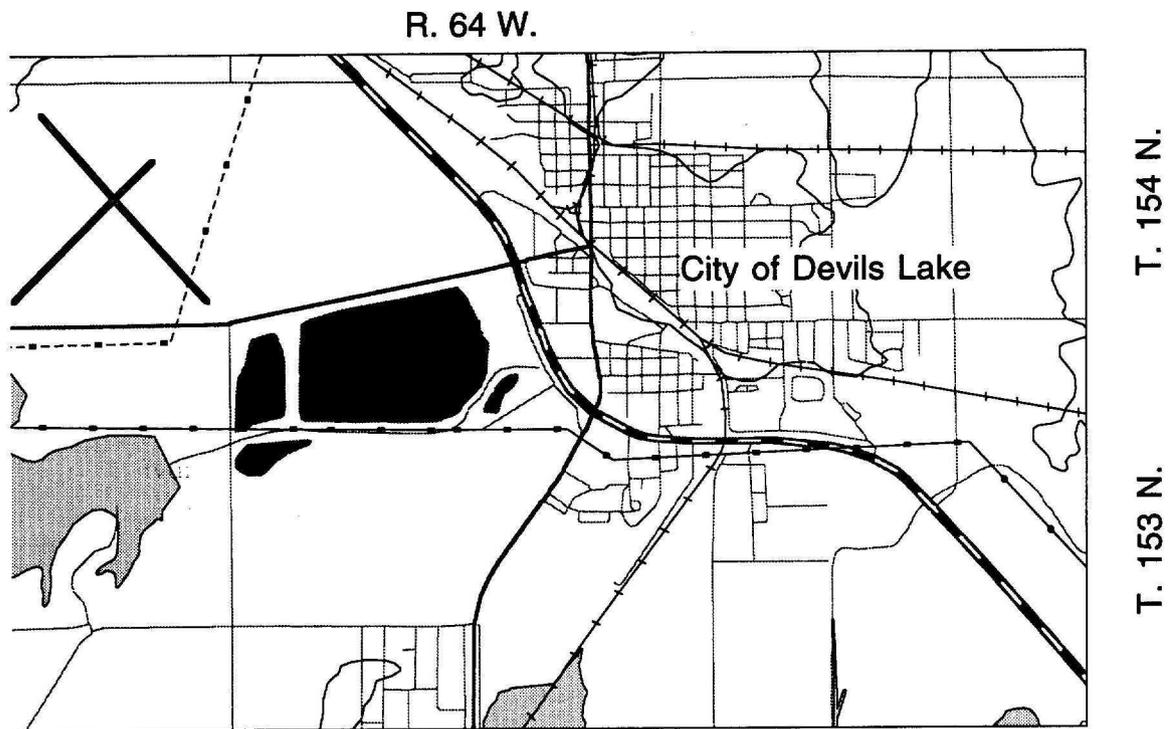


Figure 2. Location of the Devils Lake Study Area, see plate 1 for specific details

Purpose and Scope

The purpose of this investigation is to determine the depth to and configuration of the near surface ground-water flow system. The specific objectives are:

- determine the types of geologic materials in which the shallow water table occurs
- measure depth to water of the shallow water table, in and around the city of Devils Lake
- monitor water level fluctuations of the shallow water table
- measure elevations of standing water in surface water bodies in and around the city
- provide a report and map of the water table to the city

With this information, areas can be identified where water table control facilities may be needed to protect infrastructure.

Location numbering system

Wells and test holes presented on Plate 1 are numbered according to a system based on the location in the public land classification of the United States Bureau of Land Management (Figure. 3). The first numeral denotes the township north of a base line, the second numeral denotes the range west of the fifth principal meridian, and the third numeral denotes the section in which the well is located. Letters A, B, C, and D designate, respectively, the northeast, northwest, southwest, and southeast quarter section, quarter-quarter section, and quarter-quarter-quarter section (10 acre tract). For example, well 153-64-04ADD is in the SE1/4 SE1/4 NE1/4 Section 4, Township 153 North, Range 64 West (Figure. 3). Consecutive terminal numerals are added if more than one well is located in a 10-acre tract.

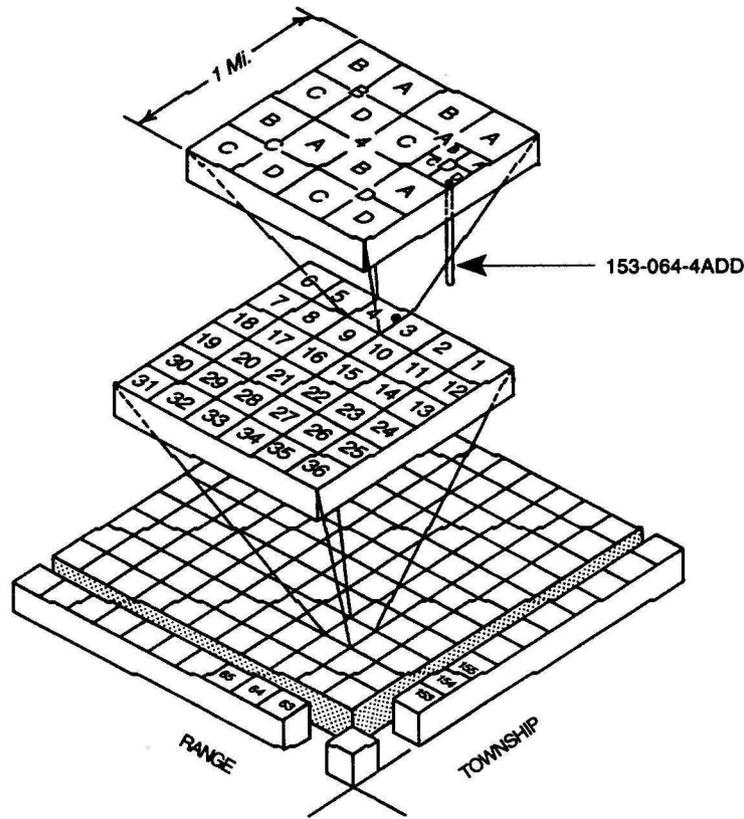


Figure 3. Location numbering system

Previous Investigations

Paulson and Akin (1964) described the ground-water resources of the Devils Lake area. The primary purpose of their investigation was to determine whether or not an adequate supply of potable water could be obtained from ground water in the region to serve the city of Devils Lake.

The North Dakota State Water Commission (NDSWC), in cooperation with the United States Geological Survey (USGS), the North Dakota Geological Survey (NDGS), and the Ramsey County Water Management District conducted a ground-water survey of Ramsey County. Part I, Geology, is a comprehensive investigation of the surficial geology and general discussion of the subsurface geology (Hobbs, 1987). Part II, Basic Data, includes an inventory of test holes, well logs, water level measurements and chemical analyses (Hutchinson, 1977). Part III, Ground-Water Resources, presents a general evaluation of the water yielding potential and chemical quality of water in the major bedrock, glacial drift and alluvial aquifers in Ramsey county (Hutchinson, 1980).

An investigation of the interaction of ground water with Devils Lake was conducted by the North Dakota State Water Commission and United States Geological Survey (Pusc, 1992 and Wiche, 1991). A number of the wells installed for Pusc, 1992 were incorporated into this investigation.

In 1992, the North Dakota State Water Commission and North Dakota Geological Survey conducted an investigation of the geologic and hydrogeologic conditions in the area of the city of Devils Lake waste water impoundments (Murphy and Pusc, 1992). Several of the wells installed for Murphy and Pusc, 1992 were also incorporated into this investigation.

Acknowledgments

The collection of data for this report was made possible by the cooperation of residents and officials of the city of Devils Lake, North Dakota who furnished essential information on wells, allowed the drilling of test holes on their property and permitted water level measurements. Particular recognition is due to Helen Carlson, of the city engineering department for her assistance throughout the project.

EXPLANATION OF DATA TABLES AND METHODS OF DATA COLLECTION

Records of test holes and wells

Prior to this investigation, numerous test holes were drilled in the Devils Lake Basin. Several of these test holes were completed as shallow observation wells. A number of existing observation wells were measured as part of this shallow water table investigation to allow better coverage of the area.

Hydrogeologic investigation of the area was accomplished by test drilling at 24 sites, installing 25 observation wells and measuring and recording depth to water in 51 observation wells. Additional data collected included measuring the level of 4 ponds and wetlands on the north and east edges of city of Devils Lake. Presented in Table 1 are the pertinent data for each well including: Location, Well Number, Water bearing unit, Land surface elevation, Date drilled, Total Depth, Top of Screen, Bottom of screen, Casing type, Diameter of casing, Measuring point height (height of casing above land surface) and Remarks.

Lithologic logs of test holes and wells

Test holes were drilled with a hydraulic forward rotary drill rig. Treated water from the city water system was used for the drilling fluid. Samples of the sediments were collected during drilling and described by the project Hydrogeologist. Lithologic logs of the test holes are presented in Table 2. Because of the fine grained nature of the sediments, bentonite did not need to be added to the drilling fluid. This provided representative formation samples and facilitated the development of the shallow observation wells.

The test holes were completed as observation wells by using 2 inch diameter polyvinyl chloride(PVC) screen and casing (Figure 4). The wells ranged from 10 to 35 feet deep. Generally, well screen 10 to 15 feet in length, with the appropriate length of casing attached above the screen, was installed in each test hole. Silica sand was then placed in the annular space around the well screen to approximately one foot above the top of the well screen (Figure 4). The annular space above the sand pack was then filled with high-solids bentonite grout or bentonite chips to land surface.

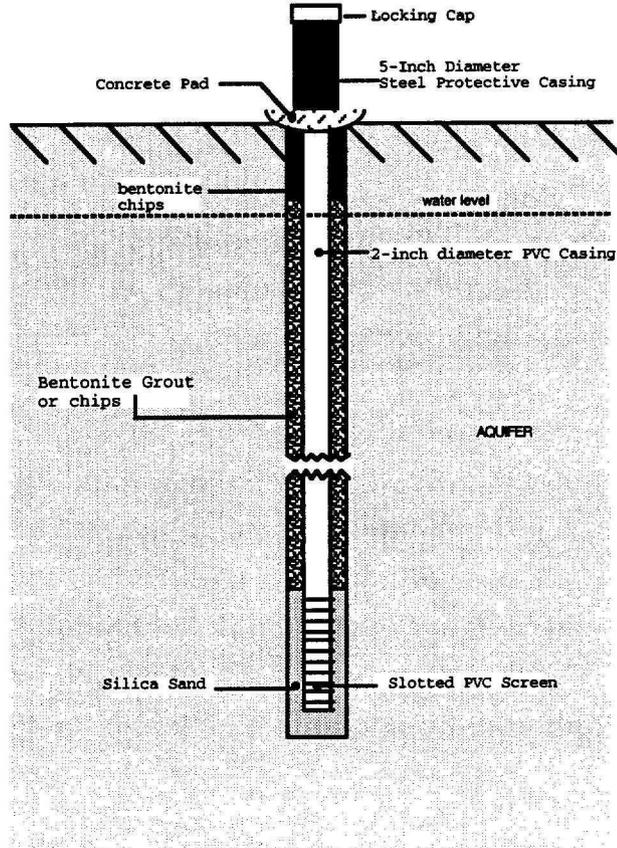


Figure 4. Well construction diagram

Water was then evacuated (bailed) from the observation well several times to insure that the well was functioning properly and that the water level represented the water table. Bailing was done using a manually operated bailer. Water level measurements were made before and after the well was bailed. This process of bailing and water level measurement occurred over a period of several days. Thereafter, the water level in the well was left to reach an equilibrium.

Each well was secured with a 5 inch diameter protective steel casing set in concrete (Figure 4). The bottom of the protective casing was set to a depth of approximately 2 feet below land surface and the top of the protective casing was slightly above the top of the 2 inch observation well casing. The protective casing was secured with a metal locking cap. Drill cuttings from the test hole were spread out and leveled, or disposed of in an acceptable manner.

Elevations were established for the top of the 2 inch diameter observation well and at land surface. The elevation at the top of the 2 inch diameter casing is the

reference for the ground-water level. Elevations were established to the third order accuracy using differential leveling and/or a global positioning system. Surveying was accomplished by State Water Commission personnel.

Water levels in selected wells and ponds

Water levels in each observation well were monitored using chalked steel tapes. Measurements were made biweekly for the first 3 months and then the wells were measured monthly (Table 3). Water levels were recorded after measurement and then stored in the State Water Commission relational data base. The depth to water presented in table 3 is from the top of the 2 inch observation well. Depth to water below land surface is presented in Figure 4.

In order to determine the relationship of surface water bodies to the water table, staff gages were set on selected ponds or sloughs located near the city. Elevations were also established for the staff gages. Staff gages were read when ground-water level measurements were made.

HYDROGEOLOGY OF THE SHALLOW WATER TABLE

General Geology

The city of Devils Lake is situated on a topographic high overlooking Creel Bay of Devils Lake. Test drilling conducted in the area indicates that the sediments beneath the city of Devils Lake consist primarily of a thin veneer of lake sediments generally consisting of low permeability clay. It is within this thin veneer of lake clay that the shallow water table occurs. Beneath the thin veneer of lake clay is a thin layer (10 to 20 feet) of low permeability glacial till. Occasionally, isolated stringers of sand and gravel occur within the veneer of lake clay and till. Both the lake clays and glacial till are very low in hydraulic conductivity. Freeze and Cherry, 1979 report that the hydraulic conductivity of lake clays and glacial till ranges from 10^{-6} to 10^{-11} cm/sec. Slug tests conducted for Murphy and Pusc, 1992, reported values in the 10^{-3} to 10^{-5} cm/sec. range. The slightly higher hydraulic conductivity values reported by Murphy and Pusc, 1992 are probably a result of testing the very shallow oxidized sediments of the shallow water table. Fractures in the upper weathered sediments will increase the hydraulic conductivity.

Test drilling in the area indicates that Shale of the Pierre Formation occurs beneath the lake clay and till. The fractured upper surface of the Pierre Formation is a source of marginal to poor quality water for many private wells in the area.

Water Levels

Presented in Plates 2 and 4 are the water level elevations for the July 17 and August 25 water level measurements. Presented in Plates 3 and 5 are the depths to water for the July 17 and August 25 measurements. These dates were selected because they represent the high and near low water levels recorded during the summer and fall of 1997. Hydrographs of water levels from representative wells in the area are presented in figure 5. These wells were selected because they represent a wide range of topographic settings within the area.

Depth to the shallow water table is a result of stratigraphy, land surface elevation, topographic setting and climate. Near Devils Lake, the July 17, 1997 water levels in the shallow water table were above land surface near the wastewater lagoons and in the shallow depressions north (Ruger Park) and east of town(Plate 3). In the south and southeast part of town, depth to water was only 1 to 2 feet below land surface (Plate 3). On high ground near downtown Devils Lake, depth to water on July 17, 1997 ranged from 7 to 10 feet below land surface.

On August 25, 1997, water levels had declined from the high in July(Plate 5 and figure 5). On August 25, depth to water ranged from approximately .2 feet below land surface around the wastewater lagoons, to greater than 10 feet below land surface near downtown Devils Lake. In the depression of Ruger Park, depth to water had declined to 4 to 7 feet below land surface. Note also that water levels in the shallow water table respond to the substantial precipitation events occurring in July and October, 1997. In fact, on the highlands north and east of the city, the shallow water table appears to respond more to local precipitation events than to the level of the lake (Figure 5).

Water levels in the shallow water table wells were generally higher than(Plates 2 and 4), and sloping towards the various depressions in the area. On the west side of

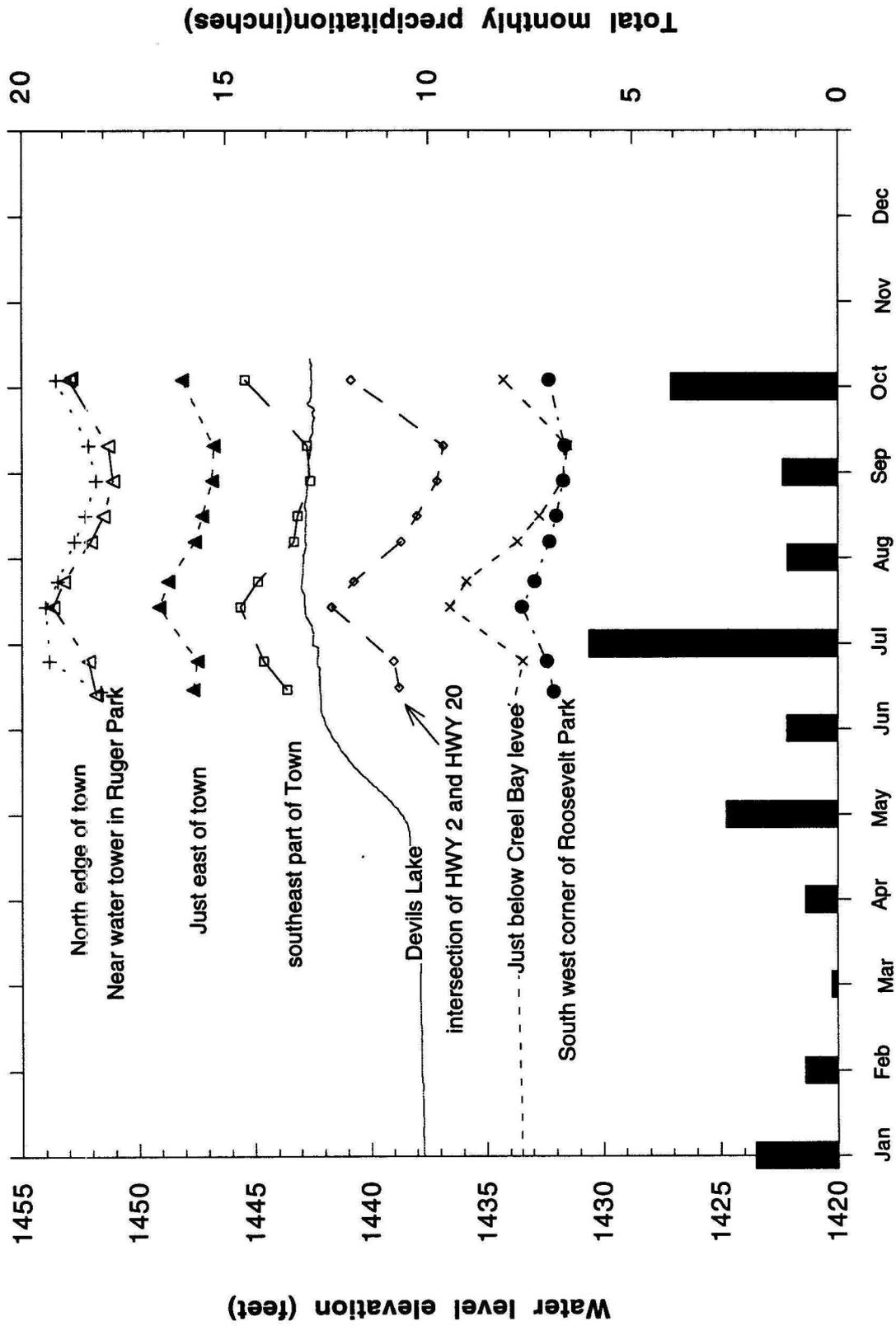
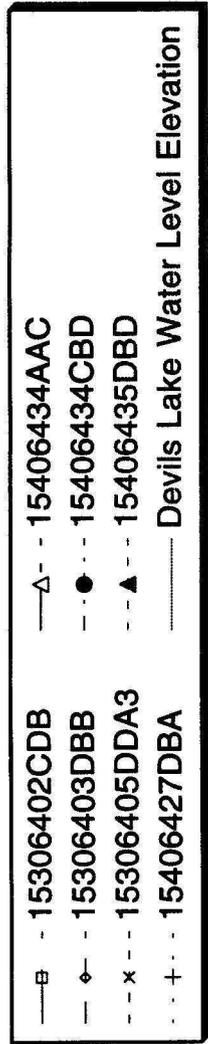


Figure 6. Representative water levels of the shallow water table in the vicinity of the City of Devils Lake, North Dakota

town, ground water was moving towards the Creel Bay depression of Devils Lake. Note however, that near the lake, ground water elevations are now lower than the lake level causing the potential for movement from the lake towards the ground water system. North of the city of Devils Lake, ground water was moving towards the lowlands containing Ruger park. East and southeast of town ground water was moving east/southeast towards the coulee/drainage ditch which borders the city. Water level elevations ranged from 1467 feet north of town to 1436 feet just below the Creel Bay levee(Devils Lake elevation was 1442.8). Basically, the shallow water tables in July and August of 1997 were subdued replicas of the land surface topography. The slope of the shallow water table varied from 1 foot/mile to as much as 22 feet/mile. Ground-water velocities based on the Darcy relationship ($V = KI/a$, Fetter, 1988) with $K = 1.3 \times 10^{-7}$ feet/day, a of .3 and $I = 1$ to 22 feet/mile are low, ranging from 7×10^{-7} to 3×10^{-8} feet/year. Thus, the low hydraulic conductivity of the clay and till in the vicinity of the city Devils Lake restricts ground-water movement. Based on the available water level record, ground water in the shallow water table circulates locally from the effects of precipitation, infiltration and evapotranspiration. The higher ground water levels, especially on the north and east parts of town are mainly due to increased precipitation and thus increased recharge.

Near Devils Lake, water levels in the shallow water table also fluctuate in response to the height of the lake(Figure 5). The long-term, slow adjustment in ground-water level to lake levels are a combined result of the increased recharge and an adjustment of the water table to a higher discharge area.

SUMMARY AND CONCLUSIONS

Recharge to the shallow water table occurs primarily from direct infiltration of precipitation and from surface runoff from adjacent upland areas of glacial sediment. Recharge to the shallow water table usually occurs in spring. The magnitude of the water level rise depends on the amount of recharge occurring at this time. The magnitude of the rise also depends on the nature of the sediments. Water levels fluctuations are greater in finer grained sediments(such as the lake clays and tills of this area). During the winter, snow accumulates and a frost zone develops. In the spring, snowmelt usually occurs before the frost zone dissipates. Surface runoff of

snowmelt temporarily accumulates in depressional areas and infiltrates after the frost zone dissipates.

Natural discharge primarily occurs in the summer months as a result of evapotranspiration of ground water directly from the upper surface of the shallow water table. Evapotranspiration occurs within depressional areas when the water table is at or near the land surface. When depth to the underlying water table is less than the combined height of capillary rise of water above the water table and the depth of the root-zone, the water table is coupled or interconnected with the land surface allowing for evapotranspirative discharge of ground water. The maximum rate of evapotranspiration occurs when the water table is at or above land surface and decreases with increasing depth of the water table below land surface. Typically, evapotranspiration ceases when the water table drops below 8 to 10 feet. Because the recorded depths to water in 1997 were very high, evapotranspiration was able to discharge considerable amounts of water from the shallow water table in the area. During the summer of 1997, between 2 to 5 feet of decline of the shallow water table was recorded as a result of evapotranspiration.

Precipitation during the months of October through May frequently results in spring recharge and elevated water-table elevations in the shallow water table. During the summer, water-table elevations usually decline due to evapotranspiration. However, significant precipitation events during the months of June through September can also result in recharge to the shallow water table. In fact, precipitation events in July and October of 1997 resulted in a 2 to 3 foot rise in the level of the shallow water table.

Near the Devils Lake, ground-water levels also respond to the level of the lake (in addition to recharge from precipitation and discharge from evapotranspiration). The ground-water level fluctuation is a combined response of water slowly moving from the lake towards the ground water system and from the higher discharge area elevation. The low hydraulic conductivity of the sediments occurring in the area however appears to be dampening the response and only the area very near the lake is effected by the higher lake levels. The longer the lake remains high, however the longer the effect of the higher discharge area will have. With enough time, water levels farther from the lake will be effected.

In 1997, water levels in the shallow water table wells were generally higher than and sloping towards the various depressions in the area. Basically, the shallow water table was a subdued replica of the land surface topography. On the west side of town, ground water was moving towards the Creel Bay depression of Devils Lake. Near Devils Lake, ground water elevations were lower than the level of Devils Lake causing the potential for movement from the lake towards the shallow water table. North of the city of Devils Lake, ground water was moving towards the lowlands containing Ruger park. East and southeast of the city, ground water was moving east/southeast towards the coulee/drainage ditch which borders the city. Water level elevations ranged from 1467 feet north of town to 1436 feet just below the Creel Bay levee (Devils Lake elevation was 1442.8). The low hydraulic conductivity of the clay and till in the vicinity of the city of Devils Lake, however, restricts ground-water movement. Based on the available water level record, ground water in the shallow water table mainly circulates locally from the effects of precipitation, infiltration and evapotranspiration. The higher ground-water levels, especially on the north and east parts of town, are mainly due to increased precipitation and thus increased recharge.

The low hydraulic conductivity of the sediments underlying and surrounding the City of Devils Lake restricts the potential for areally controlling the level of the water table by conventional subsurface drains. However, locally selective measures may be effective in controlling the water level around specific structures. Site specific testing would be needed to effectively evaluate the ground water conditions in a particular area.

REFERENCES

- Fetter, 1988, Applied Hydrogeology: Merrill Publishing Company, Columbus, Ohio
- Freeze R. A. and Cherry, J. A., 1979, Groundwater, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 07632, pp 55.
- Hickok, E. A. and Associates, 1986, Hydrogeological analyses, Devils Lake waste water disposal study for the city of Devils Lake, North Dakota final report: Eugene A. Hickok and Associates, 545 Indian Mound, Wayzata, Minnesota, 55391
- Hobbs, H.C., and Bluemle, J.P., 1987, Geology of Ramsey County, North Dakota: North Dakota Geological Survey Bulletin 71, part I, and North Dakota State Water Commission County Ground Water Studies 26, Part I, 69 p.
- Hutchinson, R.D, 1977, Ground-water basic data for Ramsey County North Dakota: North Dakota Geological Survey Bulletin 71, pt. II and North Dakota State Water Commission County Ground Water Studies 26, pt. II, 344 p.
- Hutchinson, R.D., and Klausling, R.L., 1980. Ground-water resources of Ramsey County North Dakota: North Dakota Geological Survey Bulletin 71, pt. III and North Dakota State Water Commission County Ground Water Studies 26, pt. III, 36 p.
- Murphy, E. C. and Pusc, S.W. 1992, The Geologic an Hydrogeologic conditions in the area adjacent to the Devils Lake Waste water Impoundments: North Dakota Geological Survey Report of Investigation No. 93
- Paulson, Q.F., and Akin, P.D., 1964, Ground-water resources of the Devils Lake area, Benson, Ramsey, and Eddy Counties, North Dakota: North Dakota State Water Commission Ground Water Studies no. 56, 211 p.
- Pusc, S.W., 1992, The interaction between ground water and a large terminal lake, Devils Lake, North Dakota, Basic Data: North Dakota State Water Commission Water Resources Investigation 12, 441 p.
- Pusc, S.W., 1993, The interaction between ground water and a large terminal lake, Devils Lake, North Dakota: North Dakota State Water Commission Water Resources Investigation 13, 95 p.
- Wiche, G.J., and Hoetzer, S.M., 1986A, Hydrology of the Devils Lake Basin, northeastern North Dakota: North Dakota State Water Commission Water-Resources Investigation 3, 86 p.
- Wiche, G.J., 1986B, Hydrologic and climatologic factors affecting water levels of Devils Lake, North Dakota: U.S. Geological Survey Water Resources Investigations Report 86-4320, 62 p.
- Wiche, G.J., 1991, Evaporation computed by energy-budget and mass transfer methods, with a section on water budget estimates, Devils Lake, North Dakota, 1986-1988, North Dakota State Water Commission Water Resources Investigations # 11
- Wiche, G.J., and Pusc, S.W., 1994, Hydrology of Devil Lake Area, North Dakota, North Dakota State Water Commission Water Resources Investigation 22, 24 p.

Table 1. Records of test holes, observation wells and staff gages

EXPLANATION: WBU, water bearing unit, L.S., Land surface, TD, Total depth, TS top of screen, BS, bottom of screen, D, Diameter of well, MP, measuring point

Location	Well No	WBU	L.S.Elev	Date Drilled	TD	TS	BS	Casing	D	MP	Remarks
15306402AAC	13669	Sand	1452.36	6/11/97	20	5	15	PVC	2	1.66	Behind Elks, southeast corner of lot
15306402BBD	13676	Clay	1458.77	6/12/97	35	20	30	PVC	2	2.25	Just west of county yard, along fence
15306402CDB	13675	Clay	1447.73	6/12/97	20	5	15	PVC	2	1.73	Take 10th ave. South to 15 st., go east to dead end, north east corner
15306402DBB	13673	Clay	1444.96	6/11/97	20	5	15	PVC	2	1.86	along HWY 2
15306403BBD	13662	Clay	1432.06	6/10/97	20	5	15	PVC	2	1.69	by city pumping station, north of Walmart
15306403DBB	13674	Clay	1442.87	6/12/97	20	5	15	PVC	2	2.00	Southwest corner of Greater Dakota homes lot
15306404BBB	11913	Pierre Shale	1443.13	9/30/86	30	23	28	PVC	2	1.91	Northwest of lagoons
15306404CAA1	NDGS #2	Sand	1428.56	5/24/88	25	19.5	24.5	PVC	2	1.65	NDGS #2 WEST WELL
15306404CAA2	NDGS #3	Till	1428.54	5/24/88	13	8	13	PVC	2	0.47	NDGS #3 EAST WELL
15306404CAA3	12075A	Pierre Shale	1428.61	5/24/88	80	73	78	PVC	2	1.96	FIRST WELL S OF NDGS WELLS
15306404CAA4	12075B	Pierre Shale	1428.68	5/24/88	40	34	39	PVC	2	1.94	SOUTHWEST WELL
15306404DCC1	NDGS #4	Silt	1428.01	5/24/88	25	19	24	PVC	2	1.62	WEST WELL
15306404DCC2	NDGS #5	Lake Clay	1428.05	5/24/88	13	8	13	PVC	2	1.35	EAST WELL
15306404DCC3	12076A	Pierre Shale	1428.03	5/24/88	130	120	125	PVC	2	2.46	FIRST WELL SE NDGS WELL
15306404DCC4	12076B	Sand	1428.08	5/24/88	95	80	85	PVC	2	1.89	SOUTH WELL
15306405DDA1	12072A	Pierre Shale	1437.17	5/23/88	80	73.2	78.2	PVC	2	2.27	EAST WELL
15306405DDA2	12072B	Pierre Shale	1437.18	5/23/88	40	35	40	PVC	2	2.03	MIDDLE WELL
15306405DDA3	12072C	Till	1437.28	5/23/88	10	5	10	PVC	2	2.14	WEST WELL
15306409ABD1	12077A	Pierre Shale	1443.41	5/24/88	134	125	130	PVC	1.25	1.49	WEST WELL
15306409ABD2	12077B	Gravel	1443.43	5/26/88	100	85	90	PVC	2	1.57	MIDDLE WELL
15306409ABD3	12077C	Lake Clay	1443.39	5/26/88	15	10	15	PVC	2	2.22	EAST WELL
15306409BAD1	12073A	Pierre Shale	1443.41	5/24/88	100	93	98	PVC	2	1.49	EAST WELL
15306409BAD2	12073B	Gravel	1443.43	5/24/88	50	43	48	PVC	2	1.57	MIDDLE WELL
15306409BAD3	12073C	Lake Clay	1443.39	5/24/88	15	10	15	PVC	2	2.22	WEST WELL

Location	Well No	WBU	L S Elev	Date Drilled	TD	TS	BS	Casing	D	M P	Remarks
15306409BBC1	12074A	Pierre Shale	1439.69	5/24/88	100	92	97	PVC	2	2.99	WEST WELL
15306409BBC2	12074B	Sand	1439.72	5/24/88	67	58	63	PVC	2	1.30	MIDDLE WELL
15306409BBC3	12074C	Till	1439.72	5/24/88	15	10	15	PVC	2	2.18	EAST WELL
15306410ABB	13665	Clay / Bedrock	1468.72	6/11/97	34	20	30	PVC	2	2.23	Take gravel road that is just to the west of TSC, travel south to city water storage facility
15306410BBC1	11911	Till	1438.62	9/30/86	20	8	18	PVC	2	1.64	NORTH WELL
15306410BBC2	12082A	Pierre Shale	1438.55	6/2/88	70	64	69	PVC	2	1.86	SOUTH WELL
15306412DDA	11912	Till	1467	9/30/86	40	33	38	PVC	2	1.60	along HWY 2
15406427CAC	13664	Clay	1469.87	6/11/97	35	20	30	PVC	2	1.72	North of College, take far north entrance, north of college shop.
15406427CCB	13658	Clay	1457.82	6/10/97	20	5	15	PVC	2	1.71	along 14th st.
15406427DBA	13657	Clay	1453.92	6/10/97	20	5	15	PVC	2	1.90	at end of Lincoln ave. east side of road
15406427DCA	staff gage										175 feet west of Apartment building 1623 5th ave.
15406429ADD	11914	Till	1456.6	9/30/86	30	22.5	27.5	PVC	2	2.50	along HWY 2
15406432CDD	13663	Clay	1440.67	6/11/93	34	20	30	PVC	2	1.69	2 miles west of Devils Lake, along Hwy. 19 at city shop building
15406434AAAB1	13655A	Pierre Shale	1453.32	6/10/97	130	113	123	PVC	2	1.65	WEST WELL
15406434AAAB2	13655B	Clay	1453.33	6/10/97	20	5	15	PVC	2	1.56	EAST WELL
15406434AAC	13652	Clay	1454.78	6/9/97	20	3	13	PVC	2	1.73	Just south of north water tower
15406434ABBD	13656	Clay	1453.11	6/10/97	20	5	15	PVC	2	-0.22	south west corner of Sweetwater school yard, corner of 2nd ave. and 12th st.
15406434BBBD	13659	Clay	1453.65	6/10/97	20	5	15	PVC	2	1.86	northeast of white building in old railroad yard
15406434CBD	13661	Sand	1439.09	6/10/97	20	9	19	PVC	2	1.94	south west corner of Roosevelt Park, between outfield fence and corner of Hwy2 and Hwy 19
15406434DCB	13660	Sand	1459.48	6/10/97	35	20	30	PVC	2	1.73	along RR tracks behind old city water storage tank(grass on roof), behind taco Johns on hill

Location	Well No	WBU	LS Elev	Date Drilled	TD	TS	BS	Casing	D	M P	Remarks
15406435AAD	13672	Clay	1449.34	6/11/97	20	5	15	PVC	2	1.82	North of tracks
15406435BAA	13654	Sand	1456.07	6/9/97	40	18	23	PVC	2	1.78	northeast corner of Ruger Park
15406435BAD	13653	Clay	1457.64	6/9/97	20	8.5	18.5	PVC	2	1.87	Southeast corner of Ruger Park, north of RR tracks
15406435BAD2	staff gage										Southwest pond, Ruger Park, 360 feet Northwest of 35 BAD
15406435BBB	staff gage										Pond Ruger Park, Located 120 feet east of the Northeast corner of Parks Dept. shed
15406435CAD	staff gage										400 feet west of the intersection of 5th st. and 14 ave.
15406435CDA	13666	Clay	1459.17	6/11/97	35	20	30	PVC	2	-0.02	Northeast corner of school grounds,, north of tennis courts, southwest of trees.
15406435DBD	13667	Clay	1448.08	6/11/97	20	5	15	PVC	2	1.82	southeast of Lutheran Home, at dead end
15406435DCD	13668	Clay	1450.17	6/11/97	20	5	15	PVC	2	1.57	Across gravel road from brown house
15406435DDA	13671	Clay	1448.43	6/11/97	20	5	15	PVC	2	1.65	along trees
15406435DDD	13670	Clay	1449.16	6/11/97	20	5	15	PVC	2	1.77	west of drainage ditch

TABLE 2. Lithologic logs and well information

153-064-02AAC

NDSWC 13669

Date Completed: 6/11/97 Purpose: Observation Well
 L.S. Elevation (ft): Well Type: 2" PVC
 Depth Drilled (ft): 20 Aquifer: Sand Sediments
 Screened Interval (ft): 5-15 Source:

Completion Info:

Remarks: Behind Elks, southeast corner of lot

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, oxidized, Lake clays	1-7
SAND & GRAVEL	oxidized	7-9
SAND & GRAVEL	mostly shale, well rounded to subrounded	9-20

153-064-02BBD

NDSWC 13676

Date Completed: 6/12/97 Purpose: Observation Well
 L.S. Elevation (ft): Well Type: 2" PVC
 Depth Drilled (ft): 35 Aquifer: Clay Sediments
 Screened Interval (ft): 20-30 Source:

Completion Info:

Remarks: Just west of county yard, along fence

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, silty, sandy, with pebbles, oxidized	1-19
CLAY	brownish black to gray, silty	19-22
CLAY	olive gray, silty, sandy with pebbles, till, sand and gravel layer from 29-30 feet	22-35

153-064-02CDB

NDSWC 13675

Date Completed: 6/12/97 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 20 Aquifer: Clay Sediments
Screened Interval (ft): 5-15 Source:

Completion Info:

Remarks: Take 10th ave. South to 15 st., go east to dead end,
north east corner

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	1 foot of topsoil then into fill material, whitish gray	0-3
CLAY	clay, yellowish brown, very silty, oxidized lake sediments	3-16
CLAY	olive gray, silty, sandy with pebbles, till	16-20

153-064-02DBB

NDSWC 13673

Date Completed: 6/11/97 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 20 Aquifer: Clay Sediments
Screened Interval (ft): 5-15 Source:

Completion Info:

Remarks: along HWY 2

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, sticky plastic oxidized lake sediments	1-9
CLAY	clay, yellowish brown, silty sandy with pebbles, oxidized till	9-16
CLAY	olive gray, silty sandy with pebbles, till	16-20

153-064-03BBD

NDSWC 13662

Date Completed:	6/10/97	Purpose:	Observation Well
L.S. Elevation (ft):		Well Type:	2" PVC
Depth Drilled (ft):	20	Aquifer:	Clay Sediments
Screened Interval (ft):	5-15	Source:	

Completion Info:

Remarks: by city pumping station, north of Walmart

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, silty, oxidized	1-5
SAND & GRAVEL	oxidized	5-6
CLAY	olive gray, silty, sandy, till	6-16
CLAY	grayish white, bedrock?	16-20

153-064-03DBB

NDSWC 13674

Date Completed: 6/12/97 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 20 Aquifer: Clay Sediments
Screened Interval (ft): 5-15 Source:

Completion Info:

Remarks: Southwest corner of Greater Dakota homes lot

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	whitish gray, sticky	1-4
CLAY	yellowish brown, iron stained, silty sandy with pebbles, oxidized till	4-8
CLAY	very silty, sandy, lake sediments	8-17
CLAY	olive gray, lake sediments	17-20

153-064-04BBB

NDSWC 11913

Date Completed: 9/30/86 Purpose:
L.S. Elevation (ft): 1443.13 Well Type: 2" PVC
Depth Drilled (ft): 30 Aquifer: Pierre Shale
Screened Interval (ft): 23-28 Source:

Completion Info:

Remarks: SWC #11913

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	whitish gray, plastic, cohesive, drills smooth	1-6
CLAY	yellowish brown, oxidized, plastic, drills smooth	6-13
CLAY	yellowish brown, silty, sandy with pebbles, oxidized till	13-23
SHALE	hard, black, mixed with olive gray to black clays, Pierre shale	23-30

153-064-04CAA1

NDSWC NDGS #2

Date Completed: 0/0 Purpose:
L.S. Elevation (ft): 1428.56 Well Type: 2" PVC
Depth Drilled (ft): 25 Aquifer: Sand Sediments
Screened Interval (ft): 19.5-24.5 Source:

Completion Info:

Remarks: NDGS #2 WEST WELL

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown to gray, gypsum crystals, laminated	1-10
TILL	yellowish brown, gray, pebbles, sandy mottled	10-11
TILL	gray brown, not sandy	11-13
TILL	gray, reduced, very sandy, silt from 15 to 15.5 feet and sand from 16 to 16.3 feet	13-16.3
TILL	gray clayey	16.3-20
SAND	gray, fine	20-21
SILT	gray	21-23
TILL	gray with pebbles	23-23.2
SILT	gray with pebbles	23.2-25

153-064-04CAA2

NDSWC NDGS #3

Date Completed: 0/0 Purpose:
L.S. Elevation (ft): 1428.54 Well Type: 2" PVC
Depth Drilled (ft): 13 Aquifer: Till
Screened Interval (ft): 8-13 Source:

Completion Info:

Remarks: NDGS #3 EAST WELL

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY		1-10
TILL		10-13

153-064-04CAA3

NDSWC 12075A

Date Completed: 5/24/88 Purpose:
L.S. Elevation (ft): 1428.61 Well Type: 2" PVC
Depth Drilled (ft): 80 Aquifer: Pierre Shale
Screened Interval (ft): 73-78 Source:

Completion Info:

Remarks: FIRST WELL S OF NDGS WELLS

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, greasy, iron stained, oxidized, lake clays	1-9
CLAY	yellowish brown, silty with pebbles, interbedded with very fine sand and silt, till	9-12
CLAY	as above, olive gray till, interbedded with sand and gravel	12-32
CLAY	olive gray to black, greasy, lake clays mixed with bedrock shale	32-35
SHALE	black brittle, chatters when drilled	35-80

153-064-04CAA4

NDSWC 12075B

Date Completed: 5/24/88 Purpose:
L.S. Elevation (ft): 1428.68 Well Type: 2" PVC
Depth Drilled (ft): 40 Aquifer: Pierre Shale
Screened Interval (ft): 34-39 Source:

Completion Info:

Remarks: SOUTHWEST WELL

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, oxidized lake clays	1-12
CLAY	yellowish brown, silty, sandy with pebbles, till	12-16
CLAY	olive gray, silty, sandy with pebbles, till	16-21
SAND	fine to coarse, mostly shale	21-27
CLAY	olive gray till as above	27-32
SHALE	black, brittle, chatters when drilled	32-40

153-064-04DCC1

NDSWC NDGS #4

Date Completed: 0/0 Purpose:
L.S. Elevation (ft): 1428.01 Well Type: 2" PVC
Depth Drilled (ft): 25 Aquifer: Silt Sediments
Screened Interval (ft): 19-24 Source:

Completion Info:

Remarks: NDGS #4 WEST WELL

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	light brown to gray, laminated	1-13
SILT	gray reduced	13-14
TILL	gray with pebbles	14-15
SAND	gray, medium to fine grained, quartz, subangular to subrounded, coarse shale pebbles	15-15.5
SILT	gray, sandy, fining downward to 16 feet, then coarser	15.6-25

153-064-04DCC2

NDSWC NDGS #5

Date Completed: 0/0 Purpose:
L.S. Elevation (ft): 1428.05 Well Type: 2" PVC
Depth Drilled (ft): 13 Aquifer: Lake Clay Sed.
Screened Interval (ft): 8-13 Source:

Completion Info:

Remarks: NDGS #5 EAST WELL

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	light brown to gray, laminated, few stains, lake clays	1-12

153-064-04DCC3

NDSWC 12076A

Date Completed: 5/24/88 Purpose:
L.S. Elevation (ft): 1428.03 Well Type: 2" PVC
Depth Drilled (ft): 130 Aquifer: Pierre Shale
Screened Interval (ft): 120-125 Source:

Completion Info:

Remarks: FIRST WELL SE NDGS WELL

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, oxidized, sticky, plastic, lake clays	1-12
CLAY	as above, olive gray	12-17
SAND	and gravel, mostly shale, well rounded to subrounded, very fine to coarse sand, mostly fine to medium, 10 % gravel	17-28
CLAY	olive gray, silty, sandy with pebbles, till	28-36
SHALE	black brittle, angular, drill choppy	36-45
CLAY	olive gray, gravel and rocks, till	45-69
GRAVEL	interbedded with till	69-81
SAND	well rounded to subrounded, very fine to coarse sand	81-87
GRAVEL	sandy, coarse sand to pea gravel, mostly shale, well rounded to subrounded, caving and taking water	87-107
SHALE	black, brittle, Pierre shale	107-108
CLAY	black, mostly shale, drills smooth and slow tight	108-120

153-064-04DCC3 continued

SHALE	black, brittle, drills choppy as if fractured (Pierre shale)	120-125
CLAY	black, mostly, drills smooth and slow	125-130

153-064-04DCC4

NDSWC 12076B

Date Completed:	5/24/88	Purpose:	
L.S. Elevation (ft):	1428.08	Well Type:	2" PVC
Depth Drilled (ft):	95	Aquifer:	Sand Sediments
Screened Interval (ft):	80-85	Source:	

Completion Info:
Remarks: SOUTH WELL

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, oxidized and iron stained, lake clays	1-8
GRAVEL	oxidized, mostly shale	8-11
CLAY	olive gray , silty	11-16
SAND	and gravel, 80 shale	16-28
CLAY	olive gray, sticky, greasy	28-42
CLAY	olive gray till	42-82
SAND	and gravel, mostly shale, well rounded to subrounded	82-95

153-064-05DDA1

NDSWC 12072A

Date Completed: 5/23/88 Purpose:
L.S. Elevation (ft): 1437.17 Well Type: 2" PVC
Depth Drilled (ft): 80 Aquifer: Pierre Shale
Screened Interval (ft): 73.2-78.2 Source:

Completion Info:

Remarks: EAST WELL

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, iron stained, oxidized, silty, sandy with pebbles, some lignites, till	1-11
GRAVEL	mostly shale	11-12
CLAY	oxidized till as above	12-16
CLAY	yellowish brown, very fine sand	18-20
CLAY	olive gray, very sandy (very fine)	20-23

153-064-05DDA2

NDSWC 12072B

Date Completed: 5/23/88 Purpose:
L.S. Elevation (ft): 1437.18 Well Type: 2" PVC
Depth Drilled (ft): 40 Aquifer: Pierre Shale
Screened Interval (ft): 35-40 Source:

Completion Info:

Remarks: MIDDLE WELL

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, silty sandy with pebbles, iron stained, oxidized, till	1-18
SAND	very fine, clayey, yellowish brown, oxidized,	18-20
SAND	very fine, olive gray, clayey, silty, bedrock sand?	20-24
CLAY	olive gray, silty sandy with pebbles, till	24-26
CLAY	gray to black, lots of shale, very fine sand and silt, Bedrock	26-36
SHALE	gray to black with bedrock clays, Bedrock, Pierre shale	36-40

153-064-05DDA3

NDSWC 12072C

Date Completed: 5/23/88 Purpose:
L.S. Elevation (ft): 1437.28 Well Type: 2" PVC
Depth Drilled (ft): 10 Aquifer: Till
Screened Interval (ft): 5-10 Source:

Completion Info:

Remarks: WEST WELL

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, iron stained, silty, sandy with pebbles, till	1-10

153-064-09ABD1

NDSWC 12077A

Date Completed: 5/24/88 Purpose:
L.S. Elevation (ft): 1443.41 Well Type: 1.25" PVC
Depth Drilled (ft): 134 Aquifer: Pierre Shale
Screened Interval (ft): 125-130 Source:

Completion Info:

Remarks: WEST WELL #12077A

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, oxidized, silty, very sandy with shale pebbles, till	1-16
SAND	fine to coarse, mostly shale	16-22
CLAY	silty, olive gray	22-24
SAND	very fine to fine, silty	24-34
CLAY	silty, sandy with pebbles, some rocks, till	34-78
GRAVEL	90 % shale, sandy, well rounded to subrounded	78-82
CLAY	olive gray, silty, very sandy till	82-84
GRAVEL	sandy, 80 % shale, well rounded to subrounded	84-91
SHALE	gray to black, fractured, angular cuttings, brittle, drills choppy, interbedded with gray, silty clays	91-103
CLAY	olive gray, rocky till as above	103-110
CLAY	silty, olive gray, drills smooth	110-121
SHALE	black, brittle, angular cuttings, drills slightly choppy, some bentonite clay mixed in	121-134

153-064-09ABD2

NDSWC 12077B

Date Completed: 5/26/88 Purpose:
L.S. Elevation (ft): 1443.43 Well Type: 2" PVC
Depth Drilled (ft): 100 Aquifer: Gravel Sediments
Screened Interval (ft): 85-90 Source:

Completion Info:
Remarks: MIDDLE WELL #12077B

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, silty, sandy with pebbles, oxidized till	1-4
CLAY	yellowish brown, silty, plastic	4-9
SAND	very fine to fine, 80 % shale	9-11
CLAY	yellowish brown, silty, lake clays	11-16
CLAY	as above, more sandy	16-20
CLAY	olive gray, sandy	20-24
CLAY	as above, interbedded with very fine sand	24-31
CLAY	olive gray till	31-71
GRAVEL	sandy, 80 % shale	71-72
CLAY	olive gray till	72-74
GRAVEL	sandy, 80 % shale, 10 % carbonates, 10 % igneous, well rounded to subrounded, taking water, rocky	74-98
CLAY	till as above, rocky	98-100

153-064-09ABD3

NDSWC 12077C

Date Completed: 5/26/88 Purpose:
L.S. Elevation (ft): 1443.39 Well Type: 2" PVC
Depth Drilled (ft): 15 Aquifer: Lake Clay Sed.
Screened Interval (ft): 10-15 Source:

Completion Info:

Remarks: EAST WELL #12077C

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, very sandy with pebbles, oxidized till	1-7
SAND	oxidized	7-11
CLAY	silty, yellowish brown, oxidized	11-12
CLAY	olive gray, silty, sandy with pebbles, till	12-15

153-064-09BAD1

NDSWC 12073A

Date Completed: 5/24/88 Purpose:
L.S. Elevation (ft): 1443.41 Well Type: 2" PVC
Depth Drilled (ft): 100 Aquifer: Pierre Shale
Screened Interval (ft): 93-98 Source:

Completion Info:

Remarks: EAST WELL #SWC12073A

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	light gray, very sandy	1-3
CLAY	yellowish brown, oxidized, very fine sand in clay, lake clays	3-14
CLAY	olive gray, very fine sand, lake clays, more sandy at 17 feet	14-17
SAND	very fine, some clay, olive gray	17-25
CLAY	silty, sandy, olive gray, pebbles to rocks, till	25-42
SAND	fine to coarse, mostly shale, well rounded to subrounded	42-47
CLAY	olive gray, silty	47-54
SHALE	gray to black, brittle, drills choppy, shales are angular, occasional chunk of whitish gray sandstone/siltstone	54-100

153-064-09BAD2

NDSWC 12073B

Date Completed: 5/24/88 Purpose:
L.S. Elevation (ft): 1443.43 Well Type: 2" PVC
Depth Drilled (ft): 50 Aquifer: Gravel Sediments
Screened Interval (ft): 43-48 Source:

Completion Info:

Remarks: MIDDLE WELL SWC#1207

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	whitish gray, silty	1-3
CLAY	silty, very fine sand, yellowish brown, iron stained, Lake Clays	3-16
CLAY	olive gray, silty, sandy, Lake Clays	16-28
CLAY	olive gray, silty, sandy with pebbles, till, abundant gravel	28-42
GRAVEL	sandy, well rounded to subrounded, 60 % shale, drills choppy and fast	42-50

153-064-09BAD3

NDSWC 12073C

Date Completed: 5/24/88 Purpose:
L.S. Elevation (ft): 1443.39 Well Type: 2" PVC
Depth Drilled (ft): 15 Aquifer: Lake Clay Sed.
Screened Interval (ft): 10-15 Source:

Completion Info:

Remarks: WEST WELL SWC#12073C

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, silty, sandy with pebbles, till	1-3
CLAY	very fine sand, silty, yellowish brown, oxidized lake clays	3-15

153-064-09BBC1

NDSWC 12074A

Date Completed: 5/24/88 Purpose:
L.S. Elevation (ft): 1439.69 Well Type: 2" PVC
Depth Drilled (ft): 100 Aquifer: Pierre Shale
Screened Interval (ft): 92-97 Source:

Completion Info:

Remarks: WEST WELL SWC#12074A

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, silty, with very fine sand, oxidized lake clays	1-4
CLAY	yellowish brown, iron stained, silty sandy with pebbles, oxidized	4-19
CLAY	olive gray, silty, sandy with pebbles, poorly sorted, rocky, till	19-55
CLAY	olive gray very sandy	55-58
SHALE	gray to black, gravels, 50 % angular shale and 50 % well rounded to subrounded gravel, mostly shale gravels, some bentonite chunks	58-67
SHALE	black, brittle, angular, drills choppy, Pierre Shale	67-100

153-064-09BBC2

NDSWC 12074B

Date Completed: 5/24/88 Purpose:
L.S. Elevation (ft): 1439.72 Well Type: 2" PVC
Depth Drilled (ft): 67 Aquifer: Sand Sediments
Screened Interval (ft): 58-63 Source:

Completion Info:

Remarks: MIDDLE WELL SWC#12074

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, oxidized, iron stained, silty, Lake Clays	1-3
CLAY	yellowish brown, silty, sandy with pebbles, oxidized till	3-20
CLAY	olive gray, silty, sandy with pebbles, 80 % shale	20-57
SAND	very fine to fine, some gravel, 80 % shale, well rounded to subrounded	57-67

153-064-09BBC3

NDSWC 12074C

Date Completed: 5/24/88 Purpose:
L.S. Elevation (ft): 1439.72 Well Type: 2" PVC
Depth Drilled (ft): 15 Aquifer: Till
Screened Interval (ft): 10-15 Source:

Completion Info:

Remarks: EAST WELL SWC#12074C

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, oxidized	1-4
CLAY	yellowish brown, silty, sandy with pebbles, till	4-15

153-064-10ABB

NDSWC 13665

Date Completed:	6/11/97	Purpose:	Observation Well
L.S. Elevation (ft):		Well Type:	2" PVC
Depth Drilled (ft):	34	Aquifer:	Clay Sediments/ Bedrock
Screened Interval (ft):	20-30	Source:	

Completion Info:

Remarks: Take gravel road that is just to the west of TSC, travel south to city water storage facility, well is south of trees

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, silty, sandy with pebbles, oxidized till	1-20
CLAY	black, brittle, bedrock?	20-31
CLAY	olive gray, silty, sandy	31-34

153-064-10BBC1

NDSWC 11911

Date Completed:	9/30/86	Purpose:	Observation Well
L.S. Elevation (ft):	1438.62	Well Type:	2" PVC
Depth Drilled (ft):	20	Aquifer:	Till
Screened Interval (ft):	8-18	Source:	

Completion Info:

Remarks: SWC #11911. WELL 15306410BBC WAS OMITTED; NEW LOCATION IS BBC1.

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	light gray, plastic, cohesive, Lake Clays	1-5
CLAY	yellowish brown, silty, plastic, Lake Clays	5-11
CLAY	olive grey, slightly silty, plastic, Lake Clays	11-12
SAND	oxidized, mostly shale, very fine to coarse sand, well rounded to subrounded	12-13
CLAY	olive gray, silty sandy very few pebbles, may be till	13-20

153-064-10BBC2

NDSWC 12082A

Date Completed: 6/2/88 Purpose: Observation Well
L.S. Elevation (ft): 1438.55 Well Type: 2" PVC
Depth Drilled (ft): 70 Aquifer: Pierre Shale
Screened Interval (ft): 64-69 Source:

Completion Info:

Remarks: SOUTH WELL SWC#12082 Records checked in 1993 no evidence of this well ever being sampled. Attempt to sample in 1993.

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, plastic, cohesive, Lake Clays	1-10
CLAY	as above, olive gray	10-12
CLAY	olive gray, silty, sandy with pebbles, till	12-62
SHALE	black, brittle, drills choppy, some greasy black clays, Pierre Shale, bedrock	62-70

154-064-27CAC

NDSWC 13664

Date Completed: 6/11/97 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 35 Aquifer: Clay Sediments
Screened Interval (ft): 20-30 Source:

Completion Info:

Remarks: North of College, take far north entrance, north of college shop.

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, iron stained, oxidized	1-3
GRAVEL	oxidized	3-9
CLAY	yellowish brown, silty, oxidized	9-20
SAND & GRAVEL	oxidized	20-24
CLAY	yellowish brown, silty	24-27
CLAY	olive gray, silty, sandy with pebbles, till	27-35

154-064-27CCB

NDSWC 13658

Date Completed: 6/10/97 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 20 Aquifer: Clay Sediments
Screened Interval (ft): 5-15 Source:

Completion Info:

Remarks: along 14th st.

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, oxidized, silty sandy with pebbles, till, sand and gravel layer from 6-8 feet	1-20

154-064-27DBA

NDSWC 13657

Date Completed: 6/10/97 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 20 Aquifer: Clay Sediments
Screened Interval (ft): 5-15 Source:

Completion Info:

Remarks: at end of Lincoln ave. east side of road

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, slightly silty, greasy, oxidized lake sediments	1-6
CLAY	yellowish brown, silty, sandy with pebbles, oxidized till	6-14
CLAY	olive gray, silty sandy with pebbles, till	14-20

154-064-27DCA

NDSWC

Date Completed: 00/00/00 Purpose: Staff Gauge
L.S. Elevation (ft): Well Type: 0" Surface Stage
and Sample Site
Depth Drilled (ft): 0 Aquifer: Surface Water
Screened Interval (ft): 0-0 Source:

Completion Info:

Remarks: 175 feet west of Apartment building 1623 5th ave.

Lithologic Log

Unit	Description	Depth (ft)
------	-------------	------------

154-064-32CDD

NDSWC 13663

Date Completed: 6/11/93 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 34 Aquifer: Clay Sediments
Screened Interval (ft): 20-30 Source:

Completion Info:

Remarks: 2 miles west of Devils Lake, along Hwy. 19 at city
shop building

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	whitish gray	1-3
CLAY	yellowish brown, silty oxidized	3-5
CLAY	yellowish brown, silty	5-16
CLAY	yellowish brown, silty sandy with pebbles, oxidized till	16-21
CLAY	olive gray, silty, very sandy with pebbles, till	21-34

154-064-34AAAB1

NDSWC 13655A

Date Completed: 6/10/97 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 130 Aquifer: Pierre Shale
Screened Interval (ft): 113-123 Source:

Completion Info:

Remarks: West well

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, oxidized, silty, sandy	1-6
CLAY	yellowish brown, oxidized	6-12
CLAY	yellowish brown, silty, sandy with pebbles, oxidized	12-16
CLAY	olive gray, silty, sandy with pebbles	16-32
SAND & GRAVEL		32-35
CLAY	as above, till	35-42
CLAY	olive gray, silty, lake sediments	42-52
CLAY	olive gray till	52-66
SAND & GRAVEL		66-67
CLAY	olive gray, silty, sandy	67-113
SHALE	black, drills choppy, some gravel mixed in or caving from above	113-130

154-064-34AAAB2

NDSWC 13655B

Date Completed:	6/10/97	Purpose:	Observation Well
L.S. Elevation (ft):		Well Type:	2" PVC
Depth Drilled (ft):	20	Aquifer:	Clay Sediments
Screened Interval (ft):	5-15	Source:	

Completion Info:

Remarks: East well

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
		0-0
		0-0
		0-0
		0-0
		0-0
CLAY	black sticky	1-4
CLAY	yellowish brown, silty, oxidized	4-6
CLAY	yellowish brown, oxidized	6-11
CLAY	yellowish brown, silty, sandy with pebbles, oxidized till	11-16

154-064-34AAC

NDSWC 13652

Date Completed: 6/9/97 Purpose: Observation Well
 L.S. Elevation (ft): Well Type: 2" PVC
 Depth Drilled (ft): 20 Aquifer: Clay Sediments
 Screened Interval (ft): 3-13 Source:

Completion Info:

Remarks: Just south of north water tower

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-0.5
FILL	gravel, clay, concrete	0.5-4
CLAY	yellowish brown, silty, oxidized	4-8
CLAY	yellowish brown, very sticky, iron stained, oxidized	8-14
CLAY	olive gray, silty, sandy with pebbles	14-20

154-064-34ABBD

NDSWC 13656

Date Completed: 6/10/97 Purpose: Observation Well
 L.S. Elevation (ft): Well Type: 2" PVC
 Depth Drilled (ft): 20 Aquifer: Clay Sediments
 Screened Interval (ft): 5-15 Source:

Completion Info:

Remarks: south west corner of Sweetwater school yard, corner of 2nd ave. and 12th st.

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	black	1-3
CLAY	yellowish brown, oxidized, silty, sandy with pebbles	3-13
CLAY	olive gray, silty, sandy with pebbles, till	13-20

154-064-34BBD

NDSWC 13659

Date Completed: 6/10/97 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 20 Aquifer: Clay Sediments
Screened Interval (ft): 5-15 Source:

Completion Info:

Remarks: northeast of white building in old railroad yard

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, silty, sandy with pebbles, till	1-12
CLAY	olive gray, silty, sandy	12-20

154-064-34CBD

NDSWC 13661

Date Completed: 6/10/97 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 20 Aquifer: Sand Sediments
Screened Interval (ft): 9-19 Source:

Completion Info:

Remarks: south west corner of Roosevelt Park, between
outfield fence and corner of Hwy2 and Hwy 19

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown oxidized	1-12
CLAY	yellowish brown, silty, sandy with pebbles	12-15
SAND & GRAVEL	oxidized	15-20

154-064-34DCB

NDSWC 13660

Date Completed: 6/10/97 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 35 Aquifer: Sand Sediments
Screened Interval (ft): 20-30 Source:

Completion Info:

Remarks: along rr tracks behind old city water storage tank (grass on roof), behind taco johns on hill

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL/FILL L		0-1
FILL		1-7
CLAY	yellowish brown, silty, sandy with pebbles, oxidized till	7-26
GRAVEL	sandy, well rounded to subrounded, oxidized, iron stained	26-30
CLAY	olive gray, silty sandy	30-35

154-064-35AAD

NDSWC 13672

Date Completed:	6/11/97	Purpose:	Observation Well
L.S. Elevation (ft):		Well Type:	2" PVC
Depth Drilled (ft):	20	Aquifer:	Clay Sediments
Screened Interval (ft):	5-15	Source:	

Completion Info:

Remarks: North of tracks

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, oxidized lake sediments	1-7
CLAY	olive gray, Lake sediments	7-9
CLAY	gray, silty, sandy, till	9-12
SAND & GRAVEL	layered with till	12-15
CLAY	olive gray, silty, sandy, till	15-18
SAND & GRAVEL		18-20

154-064-35BAA

NDSWC 13654

Date Completed: 6/9/97 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 40 Aquifer: Sand Sediments
Screened Interval (ft): 18-23 Source:

Completion Info:

Remarks: northeast corner of Ruger Park

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, silty, sandy with pebbles, oxidized	1-5
SAND	oxidized, medium to coarse sand	5-16
SAND	fine to medium	16-26
SAND & GRAVEL	medium to very coarse sand to fine gravel	26-37
CLAY	gray, silty	37-40

154-064-35BAD

NDSWC 13653

Date Completed:	6/9/97	Purpose:	Observation Well
L.S. Elevation (ft):		Well Type:	2" PVC
Depth Drilled (ft):	20	Aquifer:	Clay Sediments
Screened Interval (ft):	8.5-18.5	Source:	

Completion Info:

Remarks: Southeast corner of Ruger Park, north of RR tracks

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, silty, sandy with pebbles, iron stained, oxidized	1-5
SAND	silty, oxidized	5-9
CLAY	yellowish brown, oxidized, silty, sandy	9-16
CLAY	gray, slightly silty	16-20

154-064-35BAD2

NDSWC

Date Completed:	00/00/00	Purpose:	Staff Gauge
L.S. Elevation (ft):		Well Type:	0" Surface Stage and Sample Site
Depth Drilled (ft):	0	Aquifer:	Surface Water
Screened Interval (ft):	0-0	Source:	

Completion Info:

Remarks: Southwest pond, Ruger Park, 360 feet Northwest of 35 BAD

Lithologic Log

Unit	Description	Depth (ft)
------	-------------	------------

154-064-35BBB

NDSWC

Date Completed: 00/00/00 Purpose: Staff Gauge
L.S. Elevation (ft): Well Type: 0" Surface Stage
and Sample Site
Depth Drilled (ft): 0 Aquifer: Surface Water
Screened Interval (ft): 0-0 Source:

Completion Info:

Remarks: Pond Ruger Park, Located 120 feet east of the
Northeast corner of Parks Dept. shed

Lithologic Log

Unit	Description	Depth (ft)
------	-------------	------------

154-064-35CAD

NDSWC

Date Completed: 00/00/00 Purpose: Staff Gauge
L.S. Elevation (ft): Well Type: 0" Surface Stage
and Sample Site
Depth Drilled (ft): 0 Aquifer: Surface Water
Screened Interval (ft): 0-0 Source:

Completion Info:

Remarks: 400 feet west of the intersection of 5th st. and 14
ave.

Lithologic Log

Unit	Description	Depth (ft)
------	-------------	------------

154-064-35CDA

NDSWC 13666

Date Completed: 6/11/97 Purpose: Observation Well
L.S. Elevation (ft): 1459.17 Well Type: 2" PVC
Depth Drilled (ft): 35 Aquifer: Clay Sediments
Screened Interval (ft): 20-30 Source:

Completion Info:

Remarks: Northeast corner of school grounds,, north of tennis courts, southwest of trees.

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, silty, oxidized with pebbles	1-19
CLAY	olive gray, silty, sandy with pebbles, till	19-21
SAND & GRAVEL	mostly shale	21-29
CLAY	olive gray, silty, sandy with pebbles	29-35

154-064-35DBD

NDSWC 13667

Date Completed: 6/11/97 Purpose: Observation Well
L.S. Elevation (ft): Well Type: 2" PVC
Depth Drilled (ft): 20 Aquifer: Clay Sediments
Screened Interval (ft): 5-15 Source:

Completion Info:

Remarks: southeast of Lutheran Home, at dead end

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, silty	1-7
CLAY	olive gray, sticky	7-20

154-064-35DCD

NDSWC 13668

Date Completed: 6/11/97 Purpose: Observation Well
L.S. Elevation (ft): 1450.17 Well Type: 2" PVC
Depth Drilled (ft): 20 Aquifer: Clay Sediments
Screened Interval (ft): 5-15 Source:

Completion Info:

Remarks: Across gravel road from brown house

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, sticky, oxidized lake sediments	1-9
CLAY	olive gray, lake sediments	9-12
CLAY	olive gray, silty, sandy with pebbles, till	12-20

154-064-35DDA

NDSWC 13671

Date Completed: 6/11/97 Purpose: Observation Well
L.S. Elevation (ft): 1448.43 Well Type: 2" PVC
Depth Drilled (ft): 20 Aquifer: Clay Sediments
Screened Interval (ft): 5-15 Source:

Completion Info:

Remarks:

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	blackish, very sticky	1-3
CLAY	yellowish brown, sticky, lake sediments	3-12
CLAY	olive gray, sticky, Lake sediments	12-20

154-064-35DDD

NDSWC 13670

Date Completed:	6/11/97	Purpose:	Observation Well
L.S. Elevation (ft):		Well Type:	2" PVC
Depth Drilled (ft):	20	Aquifer:	Clay Sediments
Screened Interval (ft):	5-15	Source:	

Completion Info:
Remarks:

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL		0-1
CLAY	yellowish brown, oxidized lake sediments	1-7
CLAY	yellowish brown, silty, sandy with pebbles, oxidized till	7-10
SAND & GRAVEL		10-13
CLAY	olive gray, silty, sandy with pebbles, till	13-20

Table 3. Water levels in selected wells and staff gages

(Depth to water is from the top of the MP(measuring point), depth to water below land surface is presented in table 4.)

153-064-04BBB			MP Elev (msl,ft)=1445.04		
Pierre Shale			SI (ft.)=23-28		
Date	Depth to Water, (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
10/01/86	8.80	1436.24	08/03/88	13.27	1431.77
10/15/86	10.75	1434.29	09/06/88	13.72	1431.32
10/22/86	10.98	1434.06	10/12/88	14.37	1430.67
10/23/86	12.36	1432.68	11/09/88	14.53	1430.51
10/28/86	11.21	1433.83	12/15/88	15.06	1429.98
10/29/86	12.18	1432.86			
			05/11/89	16.06	1428.98
01/07/87	12.16	1432.88	06/16/89	15.52	1429.52
04/01/87	13.22	1431.82	08/09/89	15.49	1429.55
05/12/87	12.42	1432.62	10/11/89	14.66	1430.38
06/17/87	11.36	1433.68	12/19/89	15.34	1429.70
07/14/87	11.18	1433.86			
08/11/87	10.67	1434.37	04/17/90	17.44	1427.60
09/09/87	10.88	1434.16	06/14/90	16.02	1429.02
10/16/87	11.28	1433.76	09/06/90	13.96	1431.08
11/10/87	11.69	1433.35	10/31/90	14.00	1431.04
12/09/87	12.07	1432.97			
			07/28/97	12.20	1432.84
01/19/88	12.94	1432.10	08/14/97	12.17	1432.87
03/31/88	12.48	1432.56	08/25/97	12.32	1432.72
05/06/88	14.28	1430.76	09/09/97	12.56	1432.48
06/04/88	13.72	1431.32	09/24/97	12.61	1432.43
07/07/88	13.15	1431.89			

153-064-04CAA1			MP Elev (msl,ft)=1430.21		
Sand Sediments			SI (ft.)=19.5-24.5		
Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/16/88	11.38	1418.83			
06/22/88	12.26	1417.95	05/12/89	6.85	1423.36
06/29/88	12.10	1418.11			
07/19/88	10.45	1419.76	07/28/97	2.63	1427.58
08/03/88	9.44	1420.77	08/14/97	3.78	1426.43
09/07/88	7.04	1423.17	08/25/97	4.20	1426.01
10/11/88	7.84	1422.37	09/09/97	4.62	1425.59
11/09/88	10.39	1419.82	09/24/97	4.95	1425.26

153-064-04CAA2

MP Elev (msl,ft)=1429.01

Till

SI (ft.)=8-13

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/16/88	2.29	1426.72			
06/22/88	2.34	1426.67	05/12/89	3.72	1425.29
06/29/88	2.59	1426.42			
07/19/88	2.62	1426.39	07/28/97	<<	<<
08/03/88	2.96	1426.05	08/14/97	0.28	1428.73
09/07/88	3.60	1425.41	08/25/97	0.64	1428.37
10/11/88	4.18	1424.83	09/09/97	1.13	1427.88
11/09/88	4.40	1424.61	09/24/97	1.45	1427.56

153-064-04CAA3

MP Elev (msl,ft)=1430.57

Pierre Shale

SI (ft.)=73-78

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	1.98	1428.59			
06/16/88	2.02	1428.55	05/12/89	3.97	1426.60
06/22/88	2.08	1428.49			
07/19/88	2.50	1428.07	07/28/97	<<	<<
08/03/88	2.78	1427.79	08/14/97	<<	<<
09/07/88	3.44	1427.13	08/25/97	<<	<<
10/11/88	3.87	1426.70	09/09/97	0.20	1430.37
11/09/88	4.04	1426.53	09/24/97	0.13	1430.44

153-064-04CAA4

MP Elev (msl,ft)=1430.62

Pierre Shale

SI (ft.)=34-39

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	1.44	1429.18			
06/16/88	2.53	1428.09	05/12/89	4.27	1426.35
06/22/88	2.48	1428.14			
07/19/88	2.87	1427.75	07/28/97	0.95	1429.67
08/03/88	3.15	1427.47	08/14/97	1.43	1429.19
09/07/88	3.84	1426.78	08/25/97	1.61	1429.01
10/11/88	4.30	1426.32	09/09/97	1.89	1428.73
11/09/88	4.48	1426.14	09/24/97	2.40	1428.22

153-064-04DCC1

MP Elev (msl,ft)=1429.63

Silt Sediments

SI (ft.)=19-24

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/16/88	4.65	1424.98			
06/22/88	5.19	1424.44	04/17/90	4.56	1425.07
06/29/88	5.60	1424.03			
07/08/88	3.08	1426.55	06/24/97	2.23	1427.40
07/19/88	5.35	1424.28	07/17/97	2.22	1427.41
08/03/88	6.26	1423.37	07/28/97	2.41	1427.22
09/07/88	7.01	1422.62	08/14/97	5.35	1424.28
10/11/88	6.54	1423.09	08/25/97	5.78	1423.85
11/09/88	5.93	1423.70	09/09/97	6.11	1423.52
			09/24/97	5.85	1423.78
05/12/89	3.32	1426.31			

153-064-04DCC2

MP Elev (msl,ft)=1429.4

Lake Clay Sed.

SI (ft.)=8-13

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/16/88	4.05	1425.35			
06/22/88	4.45	1424.95	04/17/90	4.24	1425.16
06/29/88	5.03	1424.37			
07/08/88	2.66	1426.74	06/24/97	1.25	1428.15
07/19/88	4.91	1424.49	07/17/97	1.05	1428.35
08/03/88	5.75	1423.65	07/28/97	1.50	1427.90
09/07/88	6.55	1422.85	08/14/97	3.91	1425.49
10/11/88	6.10	1423.30	08/25/97	4.26	1425.14
11/09/88	5.45	1423.95	09/09/97	4.82	1424.58
			09/24/97	4.40	1425.00
05/12/89	2.16	1427.24			

153-064-04DCC3

MP Elev (msl,ft)=1430.49

Pierre Shale

SI (ft.)=120-125

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	41.70	1388.79			
06/16/88	48.97	1381.52	04/17/90	6.77	1423.72
06/22/88	34.70	1395.79			
07/08/88	13.18	1417.31	06/24/97	1.19	1429.30
07/19/88	7.60	1422.89	07/17/97	0.06	1430.43
08/03/88	7.11	1423.38	07/28/97	0.04	1430.45
09/07/88	7.22	1423.27	08/14/97	0.54	1429.95
10/11/88	6.73	1423.76	08/25/97	0.59	1429.90
11/09/88	6.26	1424.23	09/09/97	0.94	1429.55
			09/24/97	0.98	1429.51
05/12/89	6.16	1424.33			

153-064-04DCC4

MP Elev (msl,ft)=1429.97

Sand Sediments

SI (ft.)=80-85

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	4.66	1425.31			
06/16/88	3.73	1426.24	04/17/90	6.06	1423.91
06/22/88	5.34	1424.63			
07/08/88	5.09	1424.88	06/24/97	0.62	1429.35
07/19/88	5.71	1424.26	07/17/97	<<	<<
08/03/88	6.41	1423.56	07/28/97	<<	<<
09/07/88	6.54	1423.43	08/14/97	<<	<<
10/11/88	6.07	1423.90	08/25/97	0.00	1429.96
11/09/88	4.53	1425.44	09/09/97	0.37	1429.60
			09/24/97	0.40	1429.57
05/12/89	5.47	1424.50			

153-064-05DDA1

MP Elev (msl,ft)=1439.44

Pierre Shale

SI (ft.)=73.2-78.2

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	9.96	1429.48	05/12/89	12.17	1427.27
06/15/88	10.05	1429.39			
06/22/88	10.19	1429.25	04/17/90	14.21	1425.23
07/08/88	10.18	1429.26			
07/19/88	10.63	1428.81	06/04/97	7.36	1432.08
08/03/88	10.86	1428.58	06/24/97	7.80	1431.64
09/07/88	11.73	1427.71	07/17/97	6.78	1432.66
10/12/88	12.47	1426.97	07/28/97	6.76	1432.68
11/09/88	12.65	1426.79	08/14/97	7.25	1432.19
12/16/88	12.81	1426.63	08/25/97	7.62	1431.82
			09/09/97	8.14	1431.30
03/17/89	13.56	1425.88	09/24/97	8.41	1431.03
04/19/89	13.26	1426.18			

153-064-05DDA2

MP Elev (msl,ft)=1439.21

Pierre Shale

SI (ft.)=35-40

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	8.55	1430.66	05/12/89	11.76	1427.45
06/15/88	8.75	1430.46			
06/22/88	9.12	1430.09	04/17/90	13.84	1425.37
07/08/88	9.56	1429.65			
07/19/88	9.64	1429.57	06/04/97	5.48	1433.73
08/03/88	10.27	1428.94	06/24/97	6.53	1432.68
09/07/88	11.09	1428.12	07/17/97	3.12	1436.09
10/12/88	12.15	1427.06	07/28/97	3.93	1435.28
11/09/88	12.47	1426.74	08/14/97	5.71	1433.50
12/16/88	12.89	1426.32	08/25/97	6.50	1432.71
			09/09/97	7.42	1431.79
03/17/89	13.44	1425.77	09/24/97	7.73	1431.48
04/19/89	12.69	1426.52			

153-064-05DDA3

MP Elev (msl,ft)=1439.42

Till

SI (ft.)=5-10

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	8.49	1430.93			
06/15/88	8.88	1430.54	06/04/97	5.52	1433.90
06/22/88	8.97	1430.45	06/24/97	5.98	1433.44
06/29/88	9.66	1429.76	07/17/97	2.84	1436.58
07/08/88	9.76	1429.66	07/28/97	3.55	1435.87
07/19/88	9.70	1429.72	08/14/97	5.75	1433.67
08/03/88	10.44	1428.98	08/25/97	6.69	1432.73
09/07/88	11.32	1428.10	09/09/97	7.68	1431.74
			09/24/97	7.89	1431.53
05/12/89	12.09	1427.33			

153-064-09ABD1

MP Elev (msl,ft)=1444.9

Pierre Shale

SI (ft.)=125-130

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	17.10	1427.80			
06/16/88	16.74	1428.16	04/17/90	18.63	1426.27
06/22/88	17.77	1427.13			
07/08/88	17.67	1427.23	06/02/97	11.76	1433.14
07/19/88	18.20	1426.70	06/24/97	12.75	1432.15
08/03/88	19.10	1425.80	07/17/97	11.60	1433.30
09/07/88	18.08	1426.82	07/28/97	11.46	1433.44
10/11/88	18.48	1426.42	08/14/97	11.86	1433.04
11/09/88	17.93	1426.97	08/25/97	11.92	1432.98
			09/09/97	12.20	1432.70
05/12/89	18.00	1426.90	09/24/97	12.32	1432.58

153-064-09ABD2

MP Elev (msl,ft)=1445

Gravel Sediments

SI (ft.)=85-90

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	17.34	1427.66			
06/16/88	17.37	1427.63	04/17/90	18.80	1426.20
06/22/88	17.94	1427.06			
07/08/88	17.82	1427.18	06/02/97	8.86	1436.14
07/19/88	18.50	1426.50	06/24/97	12.82	1432.18
08/03/88	19.26	1425.74	07/17/97	11.55	1433.45
09/07/88	19.32	1425.68	07/28/97	11.56	1433.44
10/11/88	18.93	1426.07	08/14/97	12.02	1432.98
11/09/88	19.06	1425.94	08/25/97	12.05	1432.95
			09/09/97	12.42	1432.58
05/12/89	18.28	1426.72	09/24/97	12.48	1432.52

153-064-09ABD3

MP Elev (msl,ft)=1445.61

Lake Clay Sed.

SI (ft.)=10-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	13.13	1432.48			
06/16/88	13.37	1432.24	04/17/90	16.26	1429.35
06/22/88	13.56	1432.05			
06/29/88	13.46	1432.15	06/02/97	6.88	1438.73
07/08/88	13.68	1431.93	06/24/97	9.28	1436.33
07/19/88	14.11	1431.50	07/17/97	7.57	1438.04
08/03/88	14.35	1431.26	07/28/97	8.84	1436.77
09/07/88	14.94	1430.67	08/14/97	10.04	1435.57
10/11/88	15.26	1430.35	08/25/97	10.59	1435.02
11/09/88	15.34	1430.27	09/09/97	11.19	1434.42
			09/24/97	11.58	1434.03
05/12/89	12.69	1432.92			

153-064-09BAD1

MP Elev (msl,ft)=1444.9

Pierre Shale

SI (ft.)=93-98

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	13.85	1431.05	05/12/89	15.92	1428.98
06/15/88	13.91	1430.99			
06/22/88	14.17	1430.73	04/17/90	18.48	1426.42
07/08/88	14.55	1430.35			
07/19/88	14.80	1430.10	06/02/97	11.81	1433.09
08/03/88	15.44	1429.46	06/24/97	11.16	1433.74
09/07/88	16.22	1428.68	07/17/97	9.51	1435.39
10/12/88	15.55	1429.35	07/28/97	9.29	1435.61
11/09/88	16.45	1428.45	08/14/97	9.92	1434.98
12/16/88	16.43	1428.47	08/25/97	10.44	1434.46
			09/09/97	10.99	1433.91
03/17/89	17.24	1427.66	09/24/97	11.33	1433.57
04/19/89	16.73	1428.17			

153-064-09BAD2

MP Elev (msl,ft)=1445

Gravel Sediments

SI (ft.)=43-48

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	13.38	1431.62	05/12/89	15.25	1429.75
06/15/88	13.68	1431.32			
06/22/88	13.82	1431.18	04/17/90	17.88	1427.12
07/08/88	13.85	1431.15			
07/19/88	14.30	1430.70	06/04/97	9.05	1435.95
08/03/88	14.79	1430.21	06/24/97	10.19	1434.81
09/07/88	15.43	1429.57	07/17/97	8.54	1436.46
10/12/88	16.07	1428.93	07/28/97	8.93	1436.07
11/09/88	16.19	1428.81	08/14/97	9.88	1435.12
12/16/88	16.64	1428.36	08/25/97	10.43	1434.57
			09/09/97	11.13	1433.87
03/17/89	16.77	1428.23	09/24/97	11.50	1433.50
04/19/89	16.25	1428.75			

153-064-09BAD3

MP Elev (msl,ft)=1445.61

Lake Clay Sed.

SI (ft.)=10-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	14.01	1431.60	04/19/89	16.90	1428.71
06/15/88	14.25	1431.36	05/12/89	15.97	1429.64
06/22/88	14.52	1431.09			
06/29/88	14.40	1431.21	06/04/97	7.98	1437.63
07/08/88	14.43	1431.18	06/24/97	10.39	1435.22
07/19/88	14.90	1430.71	07/17/97	8.36	1437.25
08/03/88	15.28	1430.33	07/28/97	9.59	1436.02
09/07/88	15.68	1429.93	08/14/97	10.65	1434.96
10/11/88	15.73	1429.88	08/25/97	11.38	1434.23
11/09/88	16.83	1428.78	09/09/97	12.03	1433.58
			09/24/97	12.33	1433.28

153-064-09BBC1

MP Elev (msl,ft)=1442.68

Pierre Shale

SI (ft.)=92-97

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	11.90	1430.78	05/12/89	11.07	1431.61
06/15/88	12.15	1430.53			
06/22/88	12.24	1430.44	04/17/90	16.38	1426.30
07/08/88	12.22	1430.46			
07/19/88	12.83	1429.85	06/04/97	11.94	1430.74
08/03/88	13.24	1429.44	06/24/97	10.46	1432.22
09/07/88	14.22	1428.46	07/17/97	10.19	1432.49
10/12/88	14.57	1428.11	07/28/97	10.18	1432.50
11/09/88	14.67	1428.01	08/14/97	10.28	1432.40
12/16/88	14.68	1428.00	08/25/97	10.43	1432.25
			09/09/97	10.65	1432.03
04/19/89	14.88	1427.80	09/24/97	10.83	1431.85

153-064-09BBC2

MP Elev (msl,ft)=1441.02

Sand Sediments

SI (ft.)=58-63

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	7.97	1433.05	05/12/89	11.07	1429.95
06/15/88	8.02	1433.00			
06/22/88	8.27	1432.75	04/17/90	13.65	1427.37
07/08/88	8.06	1432.96			
07/19/88	8.60	1432.42	06/04/97	3.50	1437.52
08/03/88	9.07	1431.95	06/24/97	3.91	1437.11
09/07/88	10.17	1430.85	07/17/97	3.02	1438.00
10/12/88	10.94	1430.08	07/28/97	2.58	1438.44
11/09/88	11.12	1429.90	08/14/97	2.98	1438.04
12/16/88	11.33	1429.69	08/25/97	3.56	1437.46
			09/09/97	4.24	1436.78
04/19/89	11.82	1429.20	09/24/97	4.76	1436.26

153-064-09BBC3

MP Elev (msl,ft)=1441.9

Till

SI (ft.)=10-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	8.57	1433.33	05/12/89	7.32	1434.58
06/15/88	9.15	1432.75			
06/22/88	9.55	1432.35	04/17/90	13.32	1428.58
06/29/88	9.82	1432.08			
07/08/88	10.24	1431.66	06/04/97	4.58	1437.32
07/19/88	10.70	1431.20	06/24/97	6.19	1435.71
08/03/88	11.40	1430.50	07/17/97	3.32	1438.58
09/07/88	12.40	1429.50	07/28/97	4.82	1437.08
10/12/88	13.58	1428.32	08/14/97	5.98	1435.92
11/09/88	13.74	1428.16	08/25/97	6.78	1435.12
12/16/88	14.22	1427.68	09/09/97	7.66	1434.24
			09/24/97	8.00	1433.90

153-064-10BBC1

MP Elev (msl,ft)=1440.26

Till

SI (ft.)=8-18

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
10/02/86	3.04	1437.22	04/17/91	9.78	1430.48
10/14/86	4.07	1436.19	06/10/91	8.67	1431.59
10/20/86	4.26	1436.00	07/10/91	10.27	1429.99
			08/06/91	9.04	1431.22
01/08/87	5.54	1434.72	09/13/91	7.92	1432.34
04/01/87	4.11	1436.15	10/08/91	6.66	1433.60
05/11/87	5.50	1434.76	11/21/91	5.69	1434.57
06/16/87	6.42	1433.84			
07/14/87	6.35	1433.91	04/09/92	6.01	1434.25
08/06/87	5.86	1434.40	07/01/92	6.97	1433.29
08/11/87	6.34	1433.92	08/24/92	8.08	1432.18
09/09/87	7.09	1433.17	12/16/92	8.20	1432.06
10/15/87	7.24	1433.02			
11/10/87	7.37	1432.89	03/25/93	8.15	1432.11
12/08/87	7.35	1432.91	06/21/93	5.89	1434.37
			08/23/93	4.87	1435.39
01/19/88	8.04	1432.22			
03/31/88	8.00	1432.26	04/12/94	6.08	1434.18
05/06/88	6.84	1433.42	07/15/94	4.76	1435.50
06/02/88	7.54	1432.72	10/11/94	5.92	1434.34
07/09/88	8.10	1432.16			
08/04/88	8.92	1431.34	05/04/95	3.45	1436.81
09/09/88	9.56	1430.70	06/07/95	5.19	1435.07
10/13/88	9.89	1430.37	07/13/95	5.29	1434.97
11/09/88	9.88	1430.38	10/13/95	7.52	1432.74
12/15/88	9.89	1430.37			
04/16/90	10.08	1430.18	04/26/96	6.95	1433.31
05/16/90	9.30	1430.96	09/12/96	6.60	1433.66
06/13/90	8.68	1431.58			
07/10/90	8.10	1432.16	06/04/97	5.28	1434.98
07/11/90	8.10	1432.16	06/24/97	5.63	1434.63
08/09/90	8.50	1431.76	07/16/97	3.30	1436.96
09/07/90	9.05	1431.21	07/17/97	3.49	1436.77
10/02/90	9.40	1430.86	07/28/97	4.65	1435.61
10/31/90	9.38	1430.88	08/14/97	6.09	1434.17
11/28/90	9.43	1430.83	08/25/97	6.35	1433.91
			09/09/97	6.81	1433.45
			09/24/97	6.88	1433.38

153-064-10BBC2

MP Elev (msl, ft)=1440.41

Pierre Shale

SI (ft.)=64-69

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/08/88	8.05	1432.36	08/06/91	7.31	1433.10
06/15/88	9.39	1431.02	09/13/91	9.80	1430.61
06/22/88	9.54	1430.87	10/08/91	8.61	1431.80
07/06/88	9.53	1430.88	11/21/91	7.87	1432.54
07/19/88	9.93	1430.48			
08/03/88	10.45	1429.96	04/09/92	7.86	1432.55
09/07/88	11.08	1429.33	07/01/92	8.46	1431.95
10/12/88	11.64	1428.77	08/24/92	9.60	1430.81
11/09/88	11.58	1428.83	12/16/92	9.50	1430.91
12/16/88	11.67	1428.74			
			03/25/93	9.63	1430.78
03/17/89	11.84	1428.57	06/21/93	7.65	1432.76
04/19/89	10.80	1429.61	08/23/93	5.69	1434.72
05/12/89	10.26	1430.15			
06/15/89	11.36	1429.05	04/12/94	7.30	1433.11
07/13/89	11.22	1429.19	07/15/94	5.21	1435.20
08/08/89	12.35	1428.06	10/11/94	6.72	1433.69
09/12/89	12.23	1428.18			
10/12/89	12.30	1428.11	05/04/95	4.34	1436.07
12/20/89	11.93	1428.48	06/07/95	5.27	1435.14
			07/13/95	6.18	1434.23
02/07/90	12.06	1428.35	10/13/95	7.99	1432.42
04/16/90	12.19	1428.22			
05/16/90	11.64	1428.77	04/26/96	7.68	1432.73
06/13/90	11.16	1429.25	09/12/96	6.86	1433.55
07/10/90	10.55	1429.86			
07/11/90	10.55	1429.86	06/04/97	5.19	1435.22
08/09/90	10.65	1429.76	06/24/97	6.21	1434.20
09/07/90	11.15	1429.26	07/16/97	3.70	1436.71
10/02/90	11.46	1428.95	07/17/97	16.65	1423.76
10/31/90	11.47	1428.94	07/28/97	5.10	1435.31
11/28/90	11.43	1428.98	08/14/97	6.11	1434.30
			08/25/97	6.30	1434.11
04/17/91	11.79	1428.62	09/09/97	6.79	1433.62
06/10/91	11.09	1429.32	09/24/97	7.01	1433.40
07/10/91	7.77	1432.64			

153-064-12DDA

MP Elev (msl,ft)=1468.6

Till

SI (ft.)=33-38

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
10/01/86	20.18	1448.42	05/06/88	26.17	1442.43
10/14/86	20.32	1448.28	06/02/88	26.31	1442.29
10/21/86	20.22	1448.38	07/08/88	26.35	1442.25
10/22/86	20.28	1448.32	08/03/88	26.16	1442.44
10/29/86	20.49	1448.11	09/09/88	26.25	1442.35
10/30/86	20.36	1448.24	10/13/88	27.10	1441.50
			11/10/88	27.30	1441.30
01/07/87	21.63	1446.97	12/15/88	28.30	1440.30
04/01/87	22.79	1445.81			
05/11/87	20.37	1448.23	06/15/89	29.85	1438.75
06/16/87	18.96	1449.64	08/08/89	29.60	1439.00
07/14/87	19.02	1449.58	10/12/89	29.95	1438.65
08/05/87	18.66	1449.94	12/20/89	31.06	1437.54
08/10/87	19.01	1449.59			
09/09/87	19.39	1449.21	04/17/90	32.40	1436.20
10/15/87	20.45	1448.15	06/13/90	32.36	1436.24
11/10/87	21.48	1447.12	09/06/90	31.30	1437.30
12/08/87	21.92	1446.68	10/31/90	31.24	1437.36
01/19/88	23.61	1444.99	09/09/97	16.39	1452.21
03/31/88	25.91	1442.69	09/24/97	16.80	1451.80

154-064-29ADD

MP Elev (msl,ft)=1459.1

Till

SI (ft.)=22.5-27.5

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
10/01/86	5.38	1453.72	08/03/88	8.98	1450.12
10/15/86	5.32	1453.78	09/06/88	9.67	1449.43
10/20/86	5.47	1453.63	10/12/88	10.73	1448.37
			11/09/88	11.08	1448.02
01/07/87	6.69	1452.41	12/15/88	11.54	1447.56
04/01/87	4.29	1454.81			
05/12/87	4.09	1455.01	05/11/89	9.70	1449.40
06/17/87	4.56	1454.54	06/16/89	9.32	1449.78
07/14/87	5.01	1454.09	08/09/89	10.57	1448.53
08/11/87	4.90	1454.20	10/11/89	11.44	1447.66
09/10/87	5.71	1453.39	12/19/89	12.40	1446.70
10/16/87	6.40	1452.70			
11/10/87	7.09	1452.01	04/17/90	13.27	1445.83
12/09/87	7.37	1451.73	06/14/90	11.23	1447.87
			09/06/90	10.38	1448.72
01/19/88	8.36	1450.74	10/31/90	11.26	1447.84
03/31/88	8.42	1450.68			
05/06/88	7.55	1451.55	09/09/97	6.23	1452.87
06/03/88	7.25	1451.85	09/24/97	6.22	1452.88
07/07/88	8.09	1451.01			

154-064-34AAC MP Elev (msl,ft)=1456.51
Clay Sediments SI (ft.)=3-13

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/10/97	4.69	1451.82	08/14/97	4.47	1452.04
06/24/97	4.37	1452.14	08/25/97	5.01	1451.50
07/17/97	2.84	1453.67	09/09/97	5.41	1451.10
07/28/97	3.30	1453.21	09/24/97	5.23	1451.28

154-064-35BAA MP Elev (msl,ft)=1457.85
Sand Sediments SI (ft.)=18-23

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/10/97	9.69	1448.16	08/14/97	6.60	1451.25
06/24/97	6.43	1451.42	08/25/97	6.97	1450.88
07/17/97	5.44	1452.41	09/09/97	7.37	1450.48
07/28/97	5.83	1452.02	09/24/97	7.38	1450.47

154-064-35BAD MP Elev (msl,ft)=1459.51
Clay Sediments SI (ft.)=8.5-18.5

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/10/97	6.56	1452.95	08/14/97	9.73	1449.78
06/24/97	10.07	1449.44	08/25/97	10.09	1449.42
07/17/97	7.53	1451.98	09/09/97	10.41	1449.10
07/28/97	8.67	1450.84	09/24/97	10.46	1449.05

154-064-34AAAB1 MP Elev (msl,ft)=1454.97
Pierre Shale SI (ft.)=113-123

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/11/97	27.52	1427.45	08/14/97	5.14	1449.83
06/24/97	5.92	1449.05	08/25/97	5.43	1449.54
07/17/97	5.37	1449.60	09/09/97	4.98	1449.99
07/28/97	5.25	1449.72	09/24/97	4.86	1450.11

154-064-34AAAB2 MP Elev (msl,ft)=1454.89
Clay Sediments SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/11/97	5.41	1449.48	08/14/97	4.77	1450.12
06/24/97	5.50	1449.39	08/25/97	5.08	1449.81
07/17/97	3.13	1451.76	09/09/97	5.91	1448.98
07/28/97	4.12	1450.77	09/24/97	6.02	1448.87

154-064-34ABBD MP Elev (msl,ft)=1452.89
Clay Sediments SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/11/97	6.93	1445.96	08/14/97	4.65	1448.24
06/24/97	4.75	1448.14	08/25/97	5.23	1447.66
07/17/97	2.21	1450.68	09/09/97	5.74	1447.15
07/28/97	3.47	1449.42	09/24/97	6.01	1446.88

154-064-27DBA

MP Elev (msl,ft)=1455.82

Clay Sediments

SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/11/97	4.22	1451.60	08/14/97	3.07	1452.75
06/24/97	2.00	1453.82	08/25/97	3.54	1452.28
07/17/97	1.82	1454.00	09/09/97	4.00	1451.82
07/28/97	2.36	1453.46	09/24/97	3.68	1452.14

154-064-27CCE

MP Elev (msl,ft)=1459.53

Clay Sediments

SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/11/97	9.50	1450.03	08/14/97	7.79	1451.74
06/24/97	9.80	1449.73	08/25/97	8.36	1451.17
07/17/97	6.71	1452.82	09/09/97	8.88	1450.65
07/28/97	7.09	1452.44	09/24/97	9.07	1450.46

154-064-34BBD

MP Elev (msl,ft)=1455.51

Clay Sediments

SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/11/97	8.47	1447.04	08/14/97	6.90	1448.61
06/24/97	8.86	1446.65	08/25/97	7.48	1448.03
07/17/97	6.44	1449.07	09/09/97	8.00	1447.51
07/28/97	6.20	1449.31	09/24/97	8.44	1447.07

154-064-34DCE

MP Elev (msl,ft)=1461.21

Sand Sediments

SI (ft.)=20-30

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/11/97	12.49	1448.72	08/14/97	10.24	1450.97
06/24/97	12.69	1448.52	08/25/97	11.15	1450.06
07/17/97	9.27	1451.94	09/09/97	11.77	1449.44
07/28/97	9.81	1451.40	09/24/97	11.93	1449.28

154-064-34CBD

MP Elev (msl,ft)=1441.03

Sand Sediments

SI (ft.)=9-19

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/11/97	8.92	1432.11	08/14/97	8.72	1432.31
06/24/97	8.62	1432.41	08/25/97	9.02	1432.01
07/17/97	7.54	1433.49	09/09/97	9.33	1431.70
07/28/97	8.09	1432.94	09/24/97	9.38	1431.65

153-064-03BBD

MP Elev (msl,ft)=1433.75

Clay Sediments

SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/11/97	9.01	1424.74	08/14/97	8.56	1425.19
06/24/97	7.94	1425.81	08/25/97	9.29	1424.46
07/17/97	6.45	1427.30	09/09/97	9.95	1423.80
07/28/97	7.01	1426.74	09/24/97	9.43	1424.32

154-064-32CDD MP Elev (msl,ft)=1442.36
Clay Sediments SI (ft.)=20-30

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	8.65	1433.71	08/14/97	8.41	1433.95
06/24/97	8.78	1433.58	08/25/97	8.84	1433.52
07/17/97	7.83	1434.53	09/09/97	9.23	1433.13
07/28/97	7.81	1434.55	09/24/97	9.46	1432.90

154-064-27CAC MP Elev (msl,ft)=1471.59
Clay Sediments SI (ft.)=20-30

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	5.70	1465.89	08/14/97	6.87	1464.72
06/24/97	5.79	1465.80	08/25/97	7.80	1463.79
07/17/97	4.49	1467.10	09/09/97	8.66	1462.93
07/28/97	5.62	1465.97	09/24/97	9.06	1462.53

153-064-10ABB MP Elev (msl,ft)=1470.95
Clay Sediments/ Bedrock SI (ft.)=20-30

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	15.15	1455.80	08/14/97	13.34	1457.61
06/24/97	12.24	1458.71	08/25/97	14.48	1456.47
07/17/97	11.37	1459.58	09/09/97	15.52	1455.43
07/28/97	12.19	1458.76	09/24/97	15.96	1454.99

154-064-35CDA MP Elev (msl,ft)=1459.15
Clay Sediments SI (ft.)=20-30

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	10.59	1448.56	08/14/97	5.62	1453.53
06/24/97	6.00	1453.15	08/25/97	6.03	1453.12
07/17/97	5.35	1453.80	09/09/97	6.66	1452.49
07/28/97	5.24	1453.91	09/24/97	6.97	1452.18

154-064-35DBD MP Elev (msl,ft)=1449.9
Clay Sediments SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	2.26	1447.64	08/14/97	2.32	1447.58
06/24/97	2.43	1447.47	08/25/97	2.65	1447.25
07/17/97	0.79	1449.11	09/09/97	3.09	1446.81
07/28/97	1.19	1448.71	09/24/97	3.16	1446.74

154-064-35DCD MP Elev (msl,ft)=1451.74
Clay Sediments SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	3.37	1448.37	08/14/97	3.56	1448.18
06/24/97	2.41	1449.33	08/25/97	3.77	1447.97
07/17/97	2.16	1449.58	09/09/97	4.10	1447.64
07/28/97	2.71	1449.03	09/24/97	3.99	1447.75

153-064-02AAC

MP Elev (msl,ft)=1454.02

Sand Sediments

SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	12.53	1441.49	08/14/97	12.64	1441.38
06/24/97	12.29	1441.73	08/25/97	12.85	1441.17
07/17/97	11.05	1442.97	09/09/97	12.99	1441.03
07/28/97	11.84	1442.18	09/24/97	12.99	1441.03

154-064-35DDI

MP Elev (msl,ft)=1450.93

Clay Sediments

SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	7.29	1443.64	08/14/97	7.53	1443.40
06/24/97	7.93	1443.00	08/25/97	7.97	1442.96
07/17/97	6.33	1444.60	09/09/97	8.26	1442.67
07/28/97	7.03	1443.90	09/24/97	8.46	1442.47

154-064-35DDA

MP Elev (msl,ft)=1450.08

Clay Sediments

SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	6.25	1443.83	08/14/97	6.83	1443.25
06/24/97	6.55	1443.53	08/25/97	7.25	1442.83
07/17/97	3.80	1446.28	09/09/97	7.62	1442.46
07/28/97	5.66	1444.42	09/24/97	7.77	1442.31

154-064-35AAD

MP Elev (msl,ft)=1451.16

Clay Sediments

SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	5.57	1445.59	08/14/97	5.34	1445.82
06/24/97	5.77	1445.39	08/25/97	6.09	1445.07
07/17/97	1.80	1449.36	09/09/97	6.83	1444.33
07/28/97	3.27	1447.89	09/24/97	6.97	1444.19

153-064-02DBB

MP Elev (msl,ft)=1446.82

Clay Sediments

SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	5.25	1441.57	08/14/97	5.84	1440.98
06/24/97	2.59	1444.23	08/25/97	5.21	1441.61
07/17/97	2.61	1444.21	09/09/97	5.32	1441.50
07/28/97	3.08	1443.74	09/24/97	3.69	1443.13

153-064-03DBB MP Elev (msl,ft)=1444.87
Clay Sediments SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/13/97	6.08	1438.79	08/14/97	6.19	1438.68
06/24/97	5.87	1439.00	08/25/97	6.89	1437.98
07/17/97	3.18	1441.69	09/09/97	7.75	1437.12
07/28/97	4.15	1440.72	09/24/97	8.03	1436.84

153-064-02CDB MP Elev (msl,ft)=1449.46
Clay Sediments SI (ft.)=5-15

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	5.85	1443.61	08/14/97	6.16	1443.30
06/24/97	4.84	1444.62	08/25/97	6.32	1443.14
07/17/97	3.85	1445.61	09/09/97	6.86	1442.60
07/28/97	4.59	1444.87	09/24/97	6.74	1442.72

153-064-02BBD MP Elev (msl,ft)=1461.02
Clay Sediments SI (ft.)=20-30

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
06/12/97	10.94	1450.08	08/14/97	10.70	1450.32
06/24/97	11.10	1449.92	08/25/97	11.23	1449.79
07/17/97	10.32	1450.70	09/09/97	11.75	1449.27
07/28/97	10.34	1450.68	09/24/97	12.08	1448.94

154-064-35CAD MP Elev (msl,ft)=0
Surface Water SI (ft.)=0-0

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
07/17/97	1.18	-1.18	08/25/97	0.62	-0.62
07/28/97	1.10	-1.10	09/09/97	0.48	-0.48
08/14/97	0.68	-0.68	09/24/97	0.60	-0.60

154-064-35BAD2 MP Elev (msl,ft)=0
Surface Water SI (ft.)=0-0

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
07/17/97	2.52	-2.52	08/25/97	1.26	-1.26
07/28/97	2.08	-2.08	09/09/97	1.08	-1.08
08/14/97	1.36	-1.36	09/24/97	1.04	-1.04

154-064-35BBB MP Elev (msl,ft)=0
Surface Water SI (ft.)=0-0

Date	Depth to Water (ft)	WL Elev (msl, ft)	Date	Depth to Water (ft)	WL Elev (msl, ft)
07/17/97	3.08	-3.08	08/25/97	1.24	-1.24
07/28/97	2.58	-2.58	09/09/97	0.94	-0.94
08/14/97	1.46	-1.46	09/24/97	0.87	-0.87

154-064-27DCA MP Elev (msl,ft)=0
Surface Water SI (ft.)=0-0

Date	Depth to Water (ft)	WL Elev (msl, ft)
07/17/97	1.94	-1.94
07/28/97	1.90	-1.90
08/14/97	1.56	-1.56

Date	Depth to Water (ft)	WL Elev (msl, ft)
08/25/97	1.48	-1.48
09/09/97	1.32	-1.32
09/24/97	1.38	-1.38

Table 4. Depth to water below land surface

A (-)sign means that the water level is above land surface

Location	Date Measured	Land Surface Elev	Depth from LS
15306402AAC	6/12/97	1452.36	10.87
	6/24/97		10.63
	7/17/97		9.39
	7/28/97		10.18
	8/14/97		10.98
	8/25/97		11.19
	9/9/97		11.33
	9/24/97		11.33
	15306402BBB		6/12/97
6/24/97		8.85	
7/17/97		8.07	
7/28/97		8.09	
8/14/97		8.45	
8/25/97		8.98	
9/9/97		9.50	
9/24/97		9.83	
15306402CDB		6/12/97	1447.73
	6/24/97	3.11	
	7/17/97	2.12	
	7/28/97	2.86	
	8/14/97	4.43	
	8/25/97	4.59	
	9/9/97	5.13	
	9/24/97	5.01	
	15306402DBB	6/12/97	
6/24/97		0.73	
7/17/97		0.75	
7/28/97		1.22	
8/14/97		3.98	
8/25/97		3.35	
9/9/97		3.46	
9/24/97		1.83	
15306403BBB		6/11/97	1432.06
	6/24/97	6.25	
	7/17/97	4.76	
	7/28/97	5.32	
	8/14/97	6.87	
	8/25/97	7.60	
15306403DBB	9/9/97	1442.87	8.26
	9/24/97		7.74
	6/13/97		4.08
	6/24/97		3.87
	7/17/97		1.18
	7/28/97		2.15
15306403DBB	8/14/97	1442.87	4.19
	8/25/97		4.89
	9/9/97		5.75
15306403DBB	9/24/97	1442.87	6.03
	10/1/86		6.89
15306404BBB	10/15/86	1443.13	8.84
	10/22/86		9.07
	10/23/86		10.45
	10/28/86		9.30

Location	Date Measured	Land Surface Elev	Depth from LS
15306404BBB	10/29/86		10.27
	1/7/87		10.25
	4/1/87		11.31
	5/12/87		10.51
	6/17/87		9.45
	7/14/87		9.27
	8/11/87		8.76
	9/9/87		8.97
	10/16/87		9.37
	11/10/87		9.78
	12/9/87		10.16
	1/19/88		11.03
	3/31/88		10.57
	5/6/88		12.37
	6/4/88		11.81
	7/7/88		11.24
	8/3/88		11.36
	9/6/88		11.81
	10/12/88		12.46
	11/9/88		12.62
	12/15/88		13.15
	5/11/89		14.15
	6/16/89		13.61
	8/9/89		13.58
	10/11/89		12.75
	12/19/89		13.43
	4/17/90		15.53
	6/14/90		14.11
	9/6/90		12.05
	10/31/90		12.09
	7/28/97		10.29
	8/14/97		10.26
8/25/97		10.41	
9/9/97		10.65	
9/24/97		10.70	
15306404CAA1	6/16/88	1428.56	9.73
	6/22/88		10.61
	6/29/88		10.45
	7/19/88		8.80
	8/3/88		7.79
	9/7/88		5.39
	10/11/88		6.19
15306404CAA1	11/9/88		8.74
	5/12/89		5.20
	7/28/97		0.98
	8/14/97		2.13
	8/25/97		2.55
	9/9/97		2.97
	9/24/97		3.30
15306404CAA2	6/16/88	1428.54	1.82
	6/22/88		1.87
	6/29/88		2.12
	7/19/88		2.15
	8/3/88		2.49
	9/7/88		3.13
	10/11/88		3.71

Location	Date Measured	Land Surface Elev	Depth from LS	
15306404CAA2	11/9/88		3.93	
	5/12/89		3.25	
	7/28/97		flowing	
	8/14/97		-0.19	
	8/25/97		0.17	
	9/9/97		0.66	
	9/24/97		0.98	
	15306404CAA3	6/8/88	1428.61	0.02
		6/16/88		0.06
6/22/88			0.12	
7/19/88			0.54	
8/3/88			0.82	
9/7/88			1.48	
10/11/88			1.91	
11/9/88			2.08	
5/12/89			2.01	
7/28/97			flowing	
8/14/97			flowing	
8/25/97			flowing	
9/9/97			-1.76	
9/24/97			-1.83	
15306404CAA4		6/8/88	1428.68	-0.50
	6/16/88		0.59	
	6/22/88		0.54	
	7/19/88		0.93	
	8/3/88		1.21	
	9/7/88		1.90	
	10/11/88		2.36	
	11/9/88		2.54	
	5/12/89		2.33	
	7/28/97		-0.99	
	8/14/97		-0.51	
	8/25/97		-0.33	
	9/9/97		-0.05	
	9/24/97		0.46	
	15306404DCC1	6/16/88	1428.01	3.03
6/22/88			3.57	
6/29/88			3.98	
7/8/88			1.46	
7/19/88			3.73	
8/3/88			4.64	
9/7/88			5.39	
10/11/88			4.92	
11/9/88			4.31	
5/12/89			1.70	
4/17/90			2.94	
6/24/97			0.61	
7/17/97			0.60	
7/28/97			0.79	
8/14/97			3.73	
8/25/97		4.16		
9/9/97		4.49		
9/24/97		4.23		
15306404DCC2	6/16/88	1428.05	2.70	
	6/22/88		3.10	
	6/29/88		3.68	

Location	Date Measured	Land Surface Elev	Depth from LS
15306404DCC2	7/8/88		1.31
	7/19/88		3.56
	8/3/88		4.40
	9/7/88		5.20
	10/11/88		4.75
	11/9/88		4.10
	5/12/89		0.81
	4/17/90		2.89
	6/24/97		-0.10
	7/17/97		-0.30
	7/28/97		0.15
	8/14/97		2.56
	8/25/97		2.91
	9/9/97		3.47
9/24/97		3.05	
15306404DCC3	6/8/88	1428.03	39.24
	6/16/88		46.51
	6/22/88		32.24
	7/8/88		10.72
	7/19/88		5.14
	8/3/88		4.65
	9/7/88		4.76
	10/11/88		4.27
	11/9/88		3.80
	5/12/89		3.70
	4/17/90		4.31
	6/24/97		-1.27
	7/17/97		-2.40
	7/28/97		-2.42
8/14/97		-1.92	
8/25/97		-1.87	
9/9/97		-1.52	
9/24/97		-1.48	
15306404DCC4	6/8/88	1428.08	2.77
	6/16/88		1.84
	6/22/88		3.45
	7/8/88		3.20
	7/19/88		3.82
	8/3/88		4.52
	9/7/88		4.65
	10/11/88		4.18
	11/9/88		2.64
	5/12/89		3.58
	4/17/90		4.17
	6/24/97		-1.27
	7/17/97		flowing
	7/28/97		flowing
8/14/97		flowing	
8/25/97		-1.89	
9/9/97		-1.52	
9/24/97		-1.49	
15306405DDA1	6/8/88	1437.17	7.69
	6/15/88		7.78
	6/22/88		7.92
	7/8/88		7.91
	7/19/88		8.36

Location	Date Measured	Land Surface Elev	Depth from LS
15306405DDA1	8/3/88		8.59
	9/7/88		9.46
	10/12/88		10.20
	11/9/88		10.38
	12/16/88		10.54
	3/17/89		11.29
	4/19/89		10.99
	5/12/89		9.90
	4/17/90		11.94
	6/4/97		5.09
	6/24/97		5.53
	7/17/97		4.51
	7/28/97		4.49
	8/14/97		4.98
	8/25/97		5.35
	9/9/97		5.87
	9/24/97		6.14
15306405DDA2	6/8/88	1437.18	6.52
	6/15/88		6.72
	6/22/88		7.09
	7/8/88		7.53
	7/19/88		7.61
	8/3/88		8.24
	9/7/88		9.06
	10/12/88		10.12
	11/9/88		10.44
	12/16/88		10.86
	3/17/89		11.41
	4/19/89		10.66
	5/12/89		9.73
	4/17/90		11.81
	6/4/97		3.45
	6/24/97		4.50
	7/17/97		1.09
7/28/97		1.90	
8/14/97		3.68	
8/25/97		4.47	
9/9/97		5.39	
9/24/97		5.70	
15306405DDA3	6/8/88	1437.28	6.35
	6/15/88		6.74
	6/22/88		6.83
	6/29/88		7.52
	7/8/88		7.62
	7/19/88		7.56
	8/3/88		8.30
	9/7/88		9.18
	5/12/89		9.95
	6/4/97		3.38
	6/24/97		3.84
	7/17/97		0.70
	7/28/97		1.41
	8/14/97		3.61
	8/25/97		4.55
	9/9/97		5.54
	9/24/97		5.75

Location	Date Measured	Land Surface Elev	Depth from LS
15306409ABD1	6/8/88	1443.41	15.61
	6/16/88		15.25
	6/22/88		16.28
	7/8/88		16.18
	7/19/88		16.71
	8/3/88		17.61
	9/7/88		16.59
	10/11/88		16.99
	11/9/88		16.44
	5/12/89		16.51
	4/17/90		17.14
	6/2/97		10.27
	6/24/97		11.26
	7/17/97		10.11
	7/28/97		9.97
	8/14/97		10.37
	8/25/97		10.43
	9/9/97		10.71
	9/24/97		10.83
	15306409ABD2		6/8/88
6/16/88		15.80	
6/22/88		16.37	
7/8/88		16.25	
7/19/88		16.93	
8/3/88		17.69	
9/7/88		17.75	
10/11/88		17.36	
11/9/88		17.49	
5/12/89		16.71	
4/17/90		17.23	
6/2/97		7.29	
6/24/97		11.25	
7/17/97		9.98	
7/28/97		9.99	
8/14/97		10.45	
8/25/97		10.48	
9/9/97		10.85	
9/24/97		10.91	
15306409ABD3		6/8/88	1443.39
	6/16/88	11.15	
	6/22/88	11.34	
	6/29/88	11.24	
	7/8/88	11.46	
	7/19/88	11.89	
	8/3/88	12.13	
	9/7/88	12.72	
	10/11/88	13.04	
	11/9/88	13.12	
	5/12/89	10.47	
	4/17/90	14.04	
	6/2/97	4.66	
	6/24/97	7.06	
	7/17/97	5.35	
	7/28/97	6.62	
	8/14/97	7.82	
	8/25/97	8.37	

Location	Date Measured	Land Surface Elev	Depth from LS
15306409ABD3	9/9/97		8.97
	9/24/97		9.36
15306409BAD1	6/8/88	1443.41	12.36
	6/15/88		12.42
	6/22/88		12.68
	7/8/88		13.06
	7/19/88		13.31
	8/3/88		13.95
	9/7/88		14.73
	10/12/88		14.06
	11/9/88		14.96
	12/16/88		14.94
	3/17/89		15.75
	4/19/89		15.24
	5/12/89		14.43
	4/17/90		16.99
	6/2/97		10.32
	6/24/97		9.67
	7/17/97		8.02
	7/28/97		7.80
	8/14/97		8.43
	8/25/97		8.95
9/9/97		9.50	
9/24/97		9.84	
15306409BAD2	6/8/88	1443.43	11.81
	6/15/88		12.11
	6/22/88		12.25
	7/8/88		12.28
	7/19/88		12.73
	8/3/88		13.22
	9/7/88		13.86
	10/12/88		14.50
	11/9/88		14.62
	12/16/88		15.07
	3/17/89		15.20
	4/19/89		14.68
	5/12/89		13.68
	4/17/90		16.31
	6/4/97		7.48
	6/24/97		8.62
	7/17/97		6.97
	7/28/97		7.36
	8/14/97		8.31
	8/25/97		8.86
9/9/97		9.56	
9/24/97		9.93	
15306409BAD3	6/8/88	1443.39	11.79
	6/15/88		12.03
	6/22/88		12.30
	6/29/88		12.18
	7/8/88		12.21
	7/19/88		12.68
	8/3/88		13.06
	9/7/88		13.46
	10/11/88		13.51
	11/9/88		14.61

Location	Date Measured	Land Surface Elev	Depth from LS
15306409BAD3	4/19/89		14.68
	5/12/89		13.75
	6/4/97		5.76
	6/24/97		8.17
	7/17/97		6.14
	7/28/97		7.37
	8/14/97		8.43
	8/25/97		9.16
	9/9/97		9.81
	9/24/97		10.11
15306409BBC1	6/8/88	1439.69	8.91
	6/15/88		9.16
	6/22/88		9.25
	7/8/88		9.23
	7/19/88		9.84
	8/3/88		10.25
	9/7/88		11.23
	10/12/88		11.58
	11/9/88		11.68
	12/16/88		11.69
	4/19/89		11.89
	5/12/89		8.08
	4/17/90		13.39
	6/4/97		8.95
	6/24/97		7.47
	7/17/97		7.20
	7/28/97		7.19
	8/14/97		7.29
	8/25/97		7.44
	9/9/97		7.66
9/24/97		7.84	
15306409BBC2	6/8/88	1439.72	6.67
	6/15/88		6.72
	6/22/88		6.97
	7/8/88		6.76
	7/19/88		7.30
	8/3/88		7.77
	9/7/88		8.87
	10/12/88		9.64
	11/9/88		9.82
	12/16/88		10.03
	4/19/89		10.52
	5/12/89		9.77
	4/17/90		12.35
	6/4/97		2.20
	6/24/97		2.61
	7/17/97		1.72
	7/28/97		1.28
	8/14/97		1.68
	8/25/97		2.26
	9/9/97		2.94
9/24/97		3.46	
15306409BBC3	6/8/88	1439.72	6.39
	6/15/88		6.97
	6/22/88		7.37
	6/29/88		7.64

Location	Date Measured	Land Surface Elev	Depth from LS
15306409BBC3	7/8/88		8.06
	7/19/88		8.52
	8/3/88		9.22
	9/7/88		10.22
	10/12/88		11.40
	11/9/88		11.56
	12/16/88		12.04
	5/12/89		5.14
	4/17/90		11.14
	6/4/97		2.40
	6/24/97		4.01
	7/17/97		1.14
	7/28/97		2.64
	8/14/97		3.80
	8/25/97		4.60
	9/9/97		5.48
9/24/97		5.82	
15306410ABB	6/12/97	1468.72	12.92
	6/24/97		10.01
	7/17/97		9.14
	7/28/97		9.96
	8/14/97		11.11
	8/25/97		12.25
15306410BBC1	9/9/97		13.29
	9/24/97		13.73
	10/2/86	1438.62	1.40
	10/14/86		2.43
	10/20/86		2.62
	1/8/87		3.90
	4/1/87		2.47
	5/11/87		3.86
	6/16/87		4.78
	7/14/87		4.71
	8/6/87		4.22
	8/11/87		4.70
	9/9/87		5.45
	10/15/87		5.60
	11/10/87		5.73
	12/8/87		5.71
	1/19/88		6.40
	3/31/88		6.36
	5/6/88		5.20
	6/2/88		5.90
7/9/88		6.46	
8/4/88		7.28	
9/9/88		7.92	
10/13/88		8.25	
11/9/88		8.24	
12/15/88		8.25	
4/16/90		8.44	
5/16/90		7.66	
6/13/90		7.04	
7/10/90		6.46	
7/11/90		6.46	
8/9/90		6.86	
9/7/90		7.41	

Location	Date Measured	Land Surface Elev	Depth from LS
15306410BBC1	10/2/90		7.76
	10/31/90		7.74
	11/28/90		7.79
	4/17/91		8.14
	6/10/91		7.03
	7/10/91		8.63
	8/6/91		7.40
	9/13/91		6.28
	10/8/91		5.02
	11/21/91		4.05
	4/9/92		4.37
	7/1/92		5.33
	8/24/92		6.44
	12/16/92		6.56
	3/25/93		6.51
	6/21/93		4.25
	8/23/93		3.23
	4/12/94		4.44
	7/15/94		3.12
	10/11/94		4.28
	5/4/95		1.81
	6/7/95		3.55
	7/13/95		3.65
	10/13/95		5.88
	4/26/96		5.31
	9/12/96		4.96
	6/4/97		3.64
	6/24/97		3.99
	7/16/97		1.66
	7/17/97		1.85
	7/28/97		3.01
	8/14/97		4.45
	8/25/97		4.71
9/9/97		5.17	
9/24/97		5.24	
15306410BBC2	6/8/88	1438.55	6.19
	6/15/88		7.53
	6/22/88		7.68
	7/6/88		7.67
	7/19/88		8.07
	8/3/88		8.59
	9/7/88		9.22
	10/12/88		9.78
	11/9/88		9.72
	12/16/88		9.81
	3/17/89		9.98
	4/19/89		8.94
	5/12/89		8.40
	6/15/89		9.50
	7/13/89		9.36
	8/8/89		10.49
	9/12/89		10.37
10/12/89		10.44	
12/20/89		10.07	
2/7/90		10.20	
4/16/90		10.33	

Location	Date Measured	Land Surface Elev	Depth from LS
15306410BBC2	5/16/90		9.78
	6/13/90		9.30
	7/10/90		8.69
	7/11/90		8.69
	8/9/90		8.79
	9/7/90		9.29
	10/2/90		9.60
	10/31/90		9.61
	11/28/90		9.57
	4/17/91		9.93
	6/10/91		9.23
	7/10/91		5.91
	8/6/91		5.45
	9/13/91		7.94
	10/8/91		6.75
	11/21/91		6.01
	4/9/92		6.00
	7/1/92		6.60
	8/24/92		7.74
	12/16/92		7.64
	3/25/93		7.77
	6/21/93		5.79
	8/23/93		3.83
	4/12/94		5.44
	7/15/94		3.35
	10/11/94		4.86
	5/4/95		2.48
	6/7/95		3.41
	7/13/95		4.32
	10/13/95		6.13
	4/26/96		5.82
	9/12/96		5.00
	6/4/97		3.33
	6/24/97		4.35
	7/16/97		1.84
	7/17/97		14.79
	7/28/97		3.24
	8/14/97		4.25
	8/25/97		4.44
	9/9/97		4.93
9/24/97		5.15	
15306412DDA	10/1/86	1467	18.58
	10/14/86		18.72
	10/21/86		18.62
	10/22/86		18.68
	10/29/86		18.89
	10/30/86		18.76
	1/7/87		20.03
	4/1/87		21.19
	5/11/87		18.77
	6/16/87		17.36
	7/14/87		17.42
	8/5/87		17.06
	8/10/87		17.41
	9/9/87		17.79
10/15/87		18.85	

Location	Date Measured	Land Surface Elev	Depth from LS
15306412DDA	11/10/87		19.88
	12/8/87		20.32
	1/19/88		22.01
	3/31/88		24.31
	5/6/88		24.57
	6/2/88		24.71
	7/8/88		24.75
	8/3/88		24.56
	9/9/88		24.65
	10/13/88		25.50
	11/10/88		25.70
	12/15/88		26.70
	6/15/89		28.25
	8/8/89		28.00
	10/12/89		28.35
	12/20/89		29.46
	4/17/90		30.80
	6/13/90		30.76
	9/6/90		29.70
	10/31/90		29.64
15406427CAC	9/9/97		14.79
	9/24/97		15.20
	6/12/97	1469.87	3.98
	6/24/97		4.07
	7/17/97		2.77
	7/28/97		3.90
	8/14/97		5.15
	8/25/97		6.08
	9/9/97		6.94
	9/24/97		7.34
15406427CCB	6/11/97	1457.82	7.79
	6/24/97		8.09
	7/17/97		5.00
	7/28/97		5.38
	8/14/97		6.08
	8/25/97		6.65
	9/9/97		7.17
	9/24/97		7.36
15406427DBA	6/11/97	1453.92	2.32
	6/24/97		0.10
	7/17/97		-0.08
	7/28/97		0.46
	8/14/97		1.17
	8/25/97		1.64
	9/9/97		2.10
	9/24/97		1.78
15406429ADD	10/1/86	1456.6	2.88
	10/15/86		2.82
	10/20/86		2.97
	1/7/87		4.19
	4/1/87		1.79
	5/12/87		1.59
	6/17/87		2.06
	7/14/87		2.51
	8/11/87		2.40
	9/10/87		3.21

Location	Date Measured	Land Surface Elev	Depth from LS
15406429ADD	10/16/87		3.90
	11/10/87		4.59
	12/9/87		4.87
	1/19/88		5.86
	3/31/88		5.92
	5/6/88		5.05
	6/3/88		4.75
	7/7/88		5.59
	8/3/88		6.48
	9/6/88		7.17
	10/12/88		8.23
	11/9/88		8.58
	12/15/88		9.04
	5/11/89		7.20
	6/16/89		6.82
	8/9/89		8.07
	10/11/89		8.94
	12/19/89		9.90
	4/17/90		10.77
	6/14/90		8.73
	9/6/90		7.88
	10/31/90		8.76
	9/9/97		3.73
9/24/97		3.72	
15406432CDD	6/12/97	1440.67	6.96
	6/24/97		7.09
	7/17/97		6.14
	7/28/97		6.12
	8/14/97		6.72
	8/25/97		7.15
	9/9/97		7.54
	9/24/97		7.77
15406434AAAB1	6/11/97	1453.32	
	6/24/97		4.27
	7/17/97		3.72
	7/28/97		3.60
	8/14/97		3.49
	8/25/97		3.78
15406434AAAB2	9/9/97		3.33
	9/24/97		3.21
	6/11/97	1453.33	3.85
	6/24/97		3.94
	7/17/97		1.57
	7/28/97		2.56
15406434AAC	8/14/97		3.21
	8/25/97		3.52
	9/9/97		4.35
	9/24/97		4.46
	6/10/97	1454.78	2.96
	6/24/97		2.64
	7/17/97		1.11
	7/28/97		1.57
8/14/97		2.74	
8/25/97		3.28	
9/9/97		3.68	
9/24/97		3.50	

Location	Date Measured	Land Surface Elev	Depth from LS
15406434ABBD	6/11/97	1453.11	7.15
	6/24/97		4.97
	7/17/97		2.43
	7/28/97		3.69
	8/14/97		4.87
	8/25/97		5.45
	9/9/97		5.96
	9/24/97		6.23
	15406434BBD		6/11/97
6/24/97		7.00	
7/17/97		4.58	
7/28/97		4.34	
8/14/97		5.04	
8/25/97		5.62	
9/9/97		6.14	
9/24/97		6.58	
15406434CBD		6/11/97	1439.09
	6/24/97	6.68	
	7/17/97	5.60	
	7/28/97	6.15	
	8/14/97	6.78	
	8/25/97	7.08	
	9/9/97	7.39	
	9/24/97	7.44	
	15406434DCB	6/11/97	
6/24/97		10.96	
7/17/97		7.54	
7/28/97		8.08	
8/14/97		8.51	
8/25/97		9.42	
9/9/97		10.04	
9/24/97		10.20	
15406435AAD		6/12/97	1449.34
	6/24/97	3.95	
	7/17/97	-0.02	
	7/28/97	1.45	
	8/14/97	3.52	
	8/25/97	4.27	
	9/9/97	5.01	
	9/24/97	5.15	
	15406435BAA	6/10/97	
6/24/97		4.65	
7/17/97		3.66	
7/28/97		4.05	
8/14/97		4.82	
8/25/97		5.19	
9/9/97		5.59	
9/24/97		5.60	
15406435BAD		6/10/97	1457.64
	6/24/97	8.20	
	7/17/97	5.66	
	7/28/97	6.80	
	8/14/97	7.86	
	8/25/97	8.22	
	9/9/97	8.54	
	9/24/97	8.59	

Location	Date Measured	Land Surface Elev	Depth from LS
15406435CDA	6/12/97	1459.17	10.61
	6/24/97		6.02
	7/17/97		5.37
	7/28/97		5.26
	8/14/97		5.64
	8/25/97		6.05
	9/9/97		6.68
	9/24/97		6.99
	15406435DBD		6/12/97
6/24/97		0.61	
7/17/97		-1.03	
7/28/97		-0.63	
8/14/97		0.50	
8/25/97		0.83	
9/9/97		1.27	
9/24/97		1.34	
15406435DCD		6/12/97	1450.17
	6/24/97	0.84	
	7/17/97	0.59	
	7/28/97	1.14	
	8/14/97	1.99	
	8/25/97	2.20	
	9/9/97	2.53	
	9/24/97	2.42	
	15406435DDA	6/12/97	
6/24/97		4.90	
7/17/97		2.15	
7/28/97		4.01	
8/14/97		5.18	
8/25/97		5.60	
9/9/97		5.97	
9/24/97		6.12	
15406435DDD		6/12/97	1449.16
	6/24/97	6.16	
	7/17/97	4.56	
	7/28/97	5.26	
	8/14/97	5.76	
	8/25/97	6.20	
	9/9/97	6.49	
	9/24/97	6.69	