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Public Groundwater Supplies in McHenry County

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Introduction

This publication presents all available information on production wells used for public groundwater supplies in McHenry County. Bulletin 60, which is divided by county into separate publications, supersedes Bulletin 40 and its Supplements 1 and 2.

The definition of public water supply as contained in the Environmental Protection Act of 1970 was used to determine those water systems and wells to be included. Systems and wells described furnish water for drinking or general domestic use in: 1) incorporated municipalities; 2) unincorporated communities where 10 or more separate lots or properties are being served or are intended to be served; 3) state-owned parks and memorials; and 4) state-owned educational, charitable, or penal institutions.

This report includes separate descriptions for groundwater supplies of 16 municipalities, 17 subdivisions, and 1 state park in McHenry County. These are preceded by brief summaries of the groundwater geology of the county and the development of groundwater sources for public use. An explanation of the format used in the descriptions is also given.

Acknowledgments. This report was prepared under the general direction of Dr. William C. Ackermann, Chief of the Illinois State Water Survey, and John B. Stall, Head of the Hydrology Section. Special thanks are given to R. T. Sasman, Hydrologist, who checked all of the data and reviewed the manuscript. Mrs. J. L. Ivens and Mrs. P. A. Motherway edited the manuscript, Mrs. Suzi O'Connor typed the camera-copy, and John W. Brother, Jr., prepared the illustrations. The chemical analyses, unless otherwise stated, were made by personnel of the Water Survey Chemistry Section under the supervision of Laurel M. Henley. The analyses made by personnel of the Illinois Environmental Protection Agency were under the supervision of Ira M. Markwood. Thanks are due M. L. Sargent of the Illinois State Geological Survey who prepared the generalized column of rock stratigraphic units and aquifers and, with R. D. Brower, reviewed the geological information in the manuscript. Grateful acknowledgment also is given to consulting engineers, well drillers, water superintendents, and municipal officials who have provided valuable information used in this report.

Geology

The geology of McHenry County is described in Illinois State Geological Survey Circular 198, *Groundwater Possibilities in Northeastern Illinois,* Circular 406, *Bedrock Aquifers of Northeastern Illinois,* Circular 438, *Geology for Planning in McHenry County,* Report of Investigation 218, *Cambrian and Ordovician Strata of Northeastern Illinois,* and in Illinois State Water Survey and State Geological Survey Cooperative Ground-Water Report 1, *Preliminary Report on Ground-Water Resources of the Chicago Region, Illinois.* The following brief discussion of geologic conditions in the county is taken largely from these publications. For a more detailed definition of the geology in this portion of the state, the reader is referred to the State Geological Survey which is located on the University of Illinois campus, Urbana.

The glacial drift deposits in McHenry County vary in thickness from about 50 ft in the southwestern part of the county to more than 450 ft in the northwest corner in the buried Troy Valley, an ancient northeast to southwest drainageway carved into the underlying bedrock. Sand and gravel deposits are present within the glacial drift and at most sites in the county offer possibilities for the development of moderate to large quantities of water (100 to 500 gpm) from individual wells. Within the buried Troy Valley system thick, extensive deposits of sand and gravel suitable

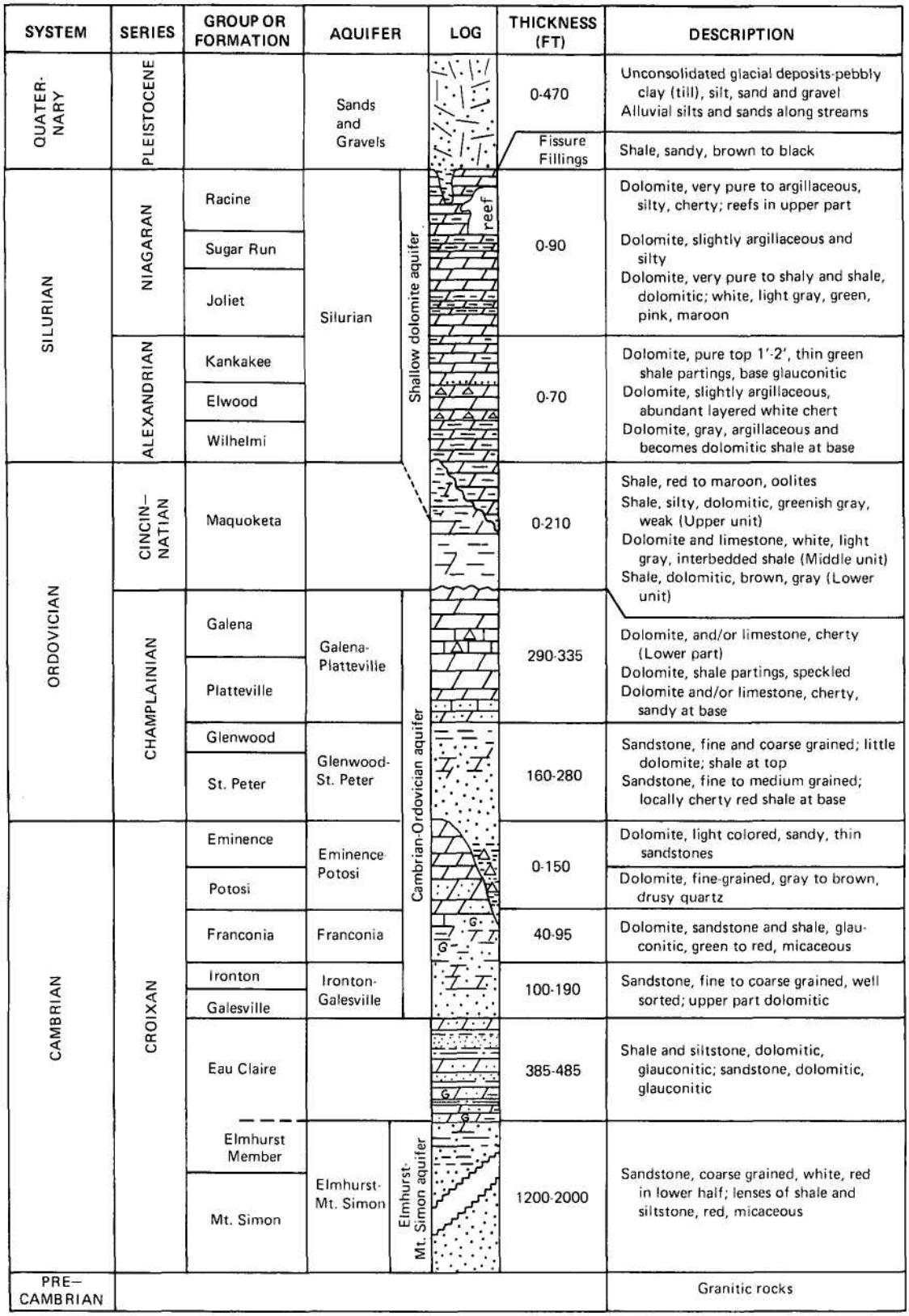

Figure 1. Generalized column of rock stratigraphic units and aquifers in McHenry County

(Prcpared by M. L. Sargent, Illinois State Geological Survey)

for obtaining large municipal and industrial water supplies are present. Shallow out wash deposits of water-bearing sand and gravel occur locally along the major drainageways and their tributaries and are potential sources for moderate to large water supplies.

Beneath the glacial deposits, the upper bedrock formations consist principally of beds of dolomite (a limestone-like rock), shale, and sandstone which dip easterly at about 10 ft per mile. The bedrock formations in McHenry County range in age from Silurian to Precambrian (see generalized stratigraphic sequence in figure 1).

The Silurian dolomite underlies the glacial drift in the northwest part of the county in the vicinity of Harvard and in much of the central and southeast areas near Woodstock, McHenry, and Crystal Lake (see figure 2). This unit is part of the geohydrologic system present throughout northeastern Illinois that is referred to as the shallow dolomite aquifer. These rocks are encountered at depths from about 50 to 300 ft and range in thickness from a featheredge where they have been eroded, and the underlying Maquoketa Group is exposed, to more than 100 ft in areas in the southeast portion of the county. The yield capability of the Silurian rocks depends primarily upon the number, size, and degree of interconnection of water-filled cracks and crevices within the rock that are penetrated by a well bore. In some areas the Silurian rocks directly underlie permeable deposits of water-bearing sand and gravel. Under such geohydrologic conditions, formation of solution cracks and crevices and free exchange of water from the glacial drift to the bedrock is maximized, thereby enhancing the yield capability of the Silurian aquifer.

The Maquoketa Group (Ordovician age) underlies the glacial drift in the north-central and southwestern areas and consists primarily of nonwater-bearing shales that separate the Silurian aquifer from deeper water-bearing units. These shales lie at depths from about 50 ft near the southwestern part of the county to more than 250 ft near the northeast corner of the county. The Maquoketa rocks are absent in small areas near the southwestern and northwestern parts of the county where they have eroded (exposing the underlying Galena-Platteville Dolomite) but average about 200 ft in thickness along the eastern edge of the county. The Maquoketa Group generally is not considered as a source for large municipal water supplies. However, locally, supplies adequate for small subdivisions and domestic use are obtained from minor systems of cracks and crevices in the more dolomitic parts of these rocks, usually in the upper middle portion of the group (see figure 1).

Below the Maquoketa Group occurs a thick sequence of hydrologically connected rocks that are referred to as the Cambrian-Ordovician aquifer in McHenry County. This aquifer system consists in downward order of the Galena-Platteville Dolomite, Glenwood-St. Peter Sandstone, Eminence-Potosi Dolomite, Franconia Formation, and Ironton-Galesville Sandstone.

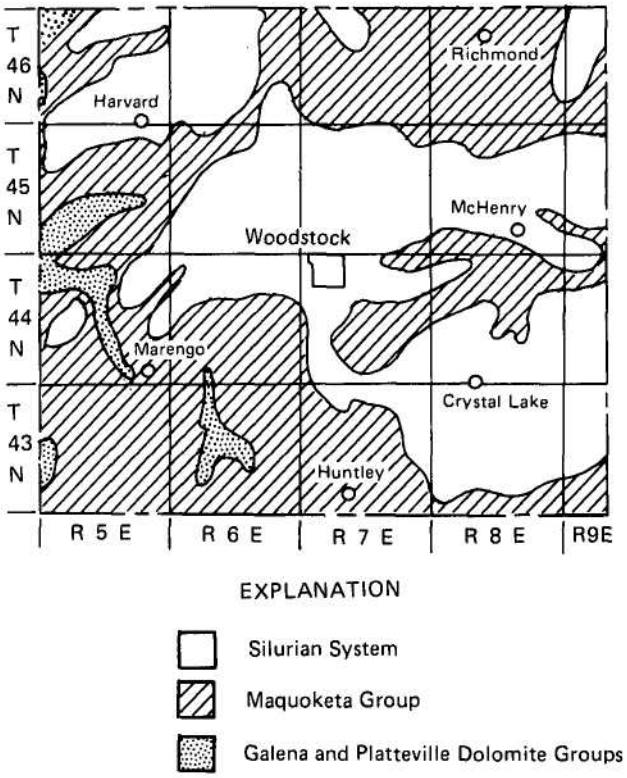

Figure 2. Areal geology of the bedrock surface

(Modified from Geologic Map of Illinois, Willman and others, 1967)

The Galena-Platteville Dolomite (Ordovician age) lies at depths from about 50 ft in the southwest portion of the county where exposed beneath the drift to over 600 ft near the northeast corner. It is relatively uniform in thickness throughout the county ranging from about 290 to 335 ft. Water from this dolomite is obtained from cracks and crevices so that the yield of individual wells depends primarily upon the number, size, and degree of interconnection of the crevices intersected by a well bore.

The Glenwood-St. Peter Sandstone (Ordovician age) lies below the Galena-Platteville Dolomite. This sandstone aquifer is encountered at depths from about 400 ft in the southwest corner of the county to approximately 900 ft near the northeast corner and ranges in thickness from 160 to 280 ft. It is estimated that the Galena-Platteville Dolomite and the Glenwood-St. Peter Sandstone formations produce about 15 percent of the total potential yield from the Cambrian-Ordovician aquifer system.

Below the Glenwood-St. Peter lie the Eminence-Potosi and Franconia Formations (Cambrian age) which consist of interbedded sandstones, shales, and dolomites. These units are encountered at depths greater than 650 ft in the southwest to about 1100 ft in the southeast and have total thicknesses varying from about 40 to 245 ft. The shales and dolomites yield small quantities of water, but the sandy parts of these formations may contribute moderate quantities of water to wells where they are not cased off by liners. It is estimated that these formations produce about 35 per-

cent of the total yield from the Cambrian-Ordovician aquifer system. However, wells tapping only these formations seldom are constructed.

The Ironton-Galesville Sandstone (Cambrian age) is the most consistently permeable and productive unit of the Cambrian-Ordovician aquifer in northeastern Illinois. In McHenry County it lies at depths of about 800 ft in the west-central area to about 1150 ft near the northeast corner and varies in thickness from about 100 to 190 ft. It is estimated that this unit produces about 50 percent of the total Cambrian-Ordovician aquifer yield.

Below the Ironton-Galesville Sandstone lies the Eau Claire Formation. The upper and middle parts of the Eau Claire are composed primarily of nonwater-bearing shales that separate the Cambrian-Ordovician aquifer from deeper water-bearing units. The Elmhurst Sandstone Member at the base of the Eau Claire Formation and the underlying Mt. Simon Sandstone are hydrologically connected and form the Elmhurst-Mt. Simon aquifer, the deepest fresh water aquifer in northern Illinois. In McHenry County, this aquifer lies at depths of about 1450 ft to more than 1700 ft and ranges in thickness from about 1200 ft in the northwest part to about 2000 ft in the southeast part of the county. Water wells usually penetrate only a few hundred feet into this aquifer because the quality of the water deteriorates with depth. Water obtained below an elevation of about 1300 ft below sea level is generally too highly mineralized for use.

Groundwater Development for Public Use

Groundwater is used as a source of public water supply at 16 municipalities, 17 subdivisions, and 1 state park in McHenry County. The locations of these supplies are shown in figure 3.

Sand and gravel deposits in the unconsolidated materials above bedrock are tapped by 26 public water systems in McHenry County as a source of all or part of their water supply. There are presently 43 production and standby wells, ranging in depth from 47 to 272 ft, tapping only the sand and gravel deposits. Their reported yields range from 15 to 1350 gpm depending primarily upon the type of well and the permeability, thickness, and areal extent of the sand and gravel unit tapped by each well. Production from these wells in 1973-1975 was estimated to be about 6,550,000 gpd.

The analyses of water from these wells show that the iron content ranges from 0.0 to 3.9 mg/l and the hardness from 204 to 512 mg/l. Treatment provided for these supplies is as follows: 18 chlorinate, 18 fluoridate, 1 softens, 3 treat for iron removal, 15 add poly phosphate to keep iron in solution, and 1 supply provides no treatment.

The upper bedrock units in McHenry County, the Silurian dolomite and the Maquoketa Formation, are tapped by 19 public water systems as a source of all or a portion of their water supply. There are presently 25 production and standby wells finished in these units (including three wells that also tap overlying sand and gravel deposits). They range in depth from 120 to 512 ft and are pumped at rates of 35 to 350 gpm. The yield of an individual well depends primarily on the thickness of the aquifer and the number, size, and degree of interconnection of the crevices intersected by a well bore. Withdrawals from the upper bedrock units in 1973-1975 were estimated to be about 695,000 gpd.

The analyses of water from wells tapping only the upper bedrock units show that the iron content ranges from 0.0 to 4.0 mg/1 and the hardness from 168 to 715 mg/1. Treatment provided at the 19 supply systems is as follows: 11 chlorinate, 7 fluoridate, 2 treat for iron removal, 5 add polyphosphate to keep iron in solution, and 2 provide no treatment.

Wells tapping various combinations of formations within the Cambrian-Ordovician aquifer are used at 4 public water systems as a source of water supply. There are presently 7 production wells, ranging in depth from 910 to 1400 ft, finished within the Cambrian-Ordovician aquifer system (including Crystal Lake Well No. 2 which was originally 2000 ft deep but measured to be 1218 ft in 1956). These wells are pumped at rates of 350 to 1250 gpm. Production from these wells in 1973-1975 was estimated to be about 2,225,000 gpd.

The analyses of water from these wells show the iron content to range from 0.0 to 2.0 mg/1 and the hardness from 184 to 241 mg/1. The barium content of water from 5 wells ranges from 4.0 to 19.7 mg/1. Water treatment for these supplies is as follows: 4 chlorinate, 2 add fluoride, 1 softens, 1 treats for iron removal, and 1 adds polyphosphate to keep iron in solution.

Throughout most of northeastern Illinois the Cambrian-Ordovician aquifer system has been overdeveloped resulting in marked declines in water levels of this aquifer. In McHenry County water levels have declined at an average rate of 5 ft per year for the period 1966-1971 and 6 ft per year for the period 1971-1975.

The Elmhurst-Mt. Simon aquifer system is presently not tapped as a source of supply for any public water system.

The total public supply pumpage from the aquifers in McHenry County for 1973-1975 was about 9,470,000 gpd. Of this total approximately 69 percent was obtained from sand and gravel aquifers, 7 percent from the Silurian dolomite and Maquoketa Formation, and 24 percent from combinations of formations within the Cambrian-Ordovician aquifer.

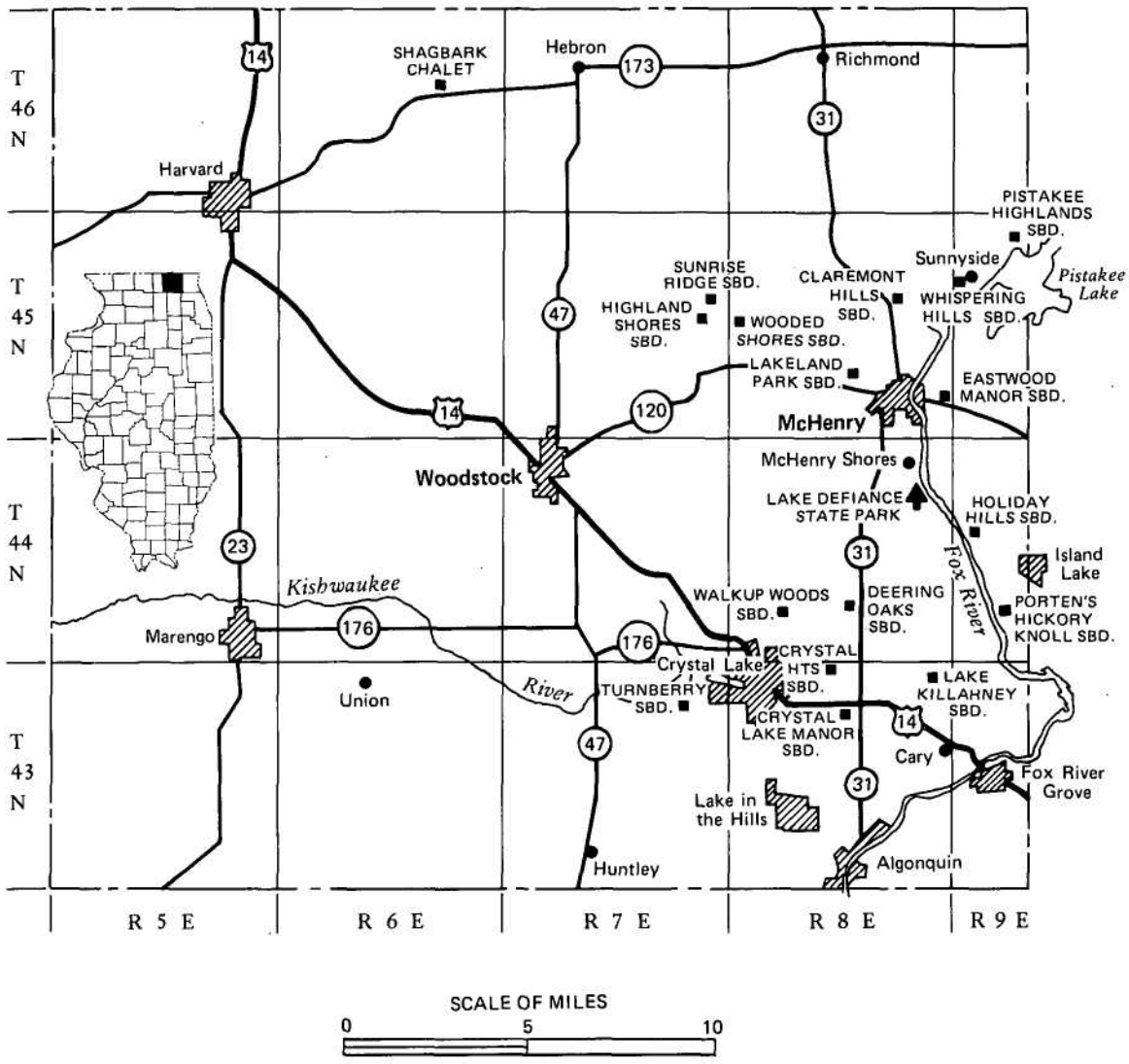

Figure 3. Location of public groundwater supply systems in McHenry County

Format

In this publication the descriptions of public groundwater supplies are presented in alphabetical order by place name.

At the beginning of each description the U.S. Census of population for 1970 is given for incorporated places. For unincorporated places, the population is estimated on the basis of the number of services or residential units and an assumed number of 3.5 persons per service.

The number of services and quantity of water distributed at each supply are given where available for the earliest and the latest reported values.

Individual production wells for each supply are described in the order of their construction. The description for each well includes the *aquifer or aquifers tapped, date drilled, depth, driller, legal location, elevation in feet above mean sea level, log, construction features, yield, pumping equipment, and chemical analyses.*

When available, sample study logs prepared by the Illinois State Geological Survey are presented. When these are not available, drillers logs are used as reported. Commonly used drillers terms such as clay, silt, or pebbly clay generally are synonymous with the glacial tills tabulated by the State Geological Survey. Similarly, limestones or dolomites reported by drillers usually are carbonate rocks which in most of Illinois are dolomitic in composition. When stating the bedrock aquifers tapped by a well, the sample study log provided by the State Geological Survey and the drillers casing record are used to determine the geohydrologic units open to the hole. If only a drillers log is available and the geohydrologic units cannot be determined readily, only the principal rock type as described by the driller is given (dolomite, sandstone, etc.).

The screen sizes given in this publication are for continuous

slot type screens unless stated otherwise. Slot sizes given indicate the width of the slot openings in thousandths of an inch. For example, a 20 slot screen has slot openings 0.020 in. wide and a 100 slot screen has slots 0.100 in. wide. Approximate equivalent slot openings for other types of screens are given in parentheses after the screen description.

Abbreviations Used

est ..... estimated
ft ..... foot (feet)
gal ..... gallon(s)
gpd ..... gallons per day
gpm ..... gallons per minute
HCl ..... hydrochloric acid
HTH ..... high test hypochlorite
hp ..... horsepower
hr ..... hour(s)
ID ..... inside diameter
in. ..... inch(es)
Lab. ..... laboratory
lb ..... pound (s)
me/l ..... milliequivalents per liter
mg/l ..... milligrams per liter
min ..... minute(s)
No.(s) ..... number(s)
OD ..... outside diameter
pc/l ..... picocuries per liter
qt ..... quart(s)
R ..... range
rpm ..... revolutions per minute
T ..... township
TDH ..... total dynamic head
Tr ..... trace

ALGONQUIN

The village of Algonquin (3515) installed a public water supply in 1895. An infiltration tile system and two wells (Nos, 2 and 3) are in use and another well (No. 1) is avail-able for emergency use. The village is divided by the Fox River but the distribution systems are connected by a main crossing under the river. In 1950 there were 425 services, all metered. In 1974 there were 1180 services, all metered; the average and maximum daily pumpages were 490,868 and 730,000 gpd, respectively. The water from the infiltration tile system and Well No. 1 is chlorinated and fluoridated; water from Well No. 2 is chlorinated and treated with poly-phosphate; and the water from Well No. 3 is aerated to remove methane gas, chlorinated, fluoridated, and treated with polyphosphate to keep iron in solution. The natural fluoride concentration in the water of Well No. 2 is adequate to satisfy state requirements.

An INFILTRATION TILE SYSTEM, finished in sand and gravel, was completed in 1895. The system is located on a hillside on the west side of the Fox River near Cermack and Pioneer Roads, approximately 2500 ft S and 750 ft W of the NE corner of Section 27, T43N, R8E. The land surface elevation at the tile system is approximately 800 ft.

Lines of 8-in. collecting tile were laid from 4 to 5 ft below land surface at the bottom of a steep hill which is about 60 ft high. Water is collected in shallow wells about 5 ft in diameter and depth and flows by gravity through collecting tiles to an underground collection basin from which it is pumped to the distribution system. In 1948, a large part of the collecting tile was dug up and cleaned. This reportedly resulted in a continuous flow greater than the demand at that time.

A partial analysis of a sample (Lab. No. 151005) collected November 18, 1959, showed the water to have a hardness of 370 mg/l, total jissolved minerals of 422 mg/l, and a trace of iron.

WELL NO. 1, finished in Silurian dolomite, was completed in January 1955 to a depth of 165 ft by Alvin Niemeyer, Huntley. This well is maintained for emergency use. The well is located about 10 ft south of the pumphpuse at the intersection of Cermack and Pioneer Roads, approximately 2515 ft S and 740 ft W of the NE corner of Section 27, T43N, R8E. The land surface elevation at the well is approximately 785 ft.

A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Top fill	8	8
Clay	115	123
Sand	10	133
Limestone	32	165

A 6-in. diameter hole was drilled to a depth of 165 ft. The well is cased with 6-in. pipe from 1 ft above a concrete slab to a depth of 135 ft.

In November 1957, the well reportedly produced 165 gpm for 4 hr with a drawdown of 45 ft from a nonpumping water level of 45 ft.

The pumping equipment presently installed consists of a 7 1/2-hp Sumo electric motor, a Sumo submersible pump set at 110 ft, rated at 200 gpm at about 100 ft TDH, and has 110 ft of 3-in. column pipe. The well is equipped with 110 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 02610) is for a water sample from the well collected November 2, 1971, after 15 min of pumping at 160 gpm.

WELL NO. 1, LABORATORY NO. 02610

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.0		Silica	SiO_2	17	
Manganese	Mn	0.0		Fluoride	F	0.2	0.01
Ammonium	NH_4	0.0		Boron	B	0.1	
Sodium	Na	9	0.39	Nitrate	NO_3	13.6	0.22
Potassium	K	2.4	0.06	Chloride	Cl	23	0.65
Calcium	Ca	88	4.39	Sulfate	SO_4	63	1.31
Magnesium	Mg	44	3.62	Alkalinity (as $CaCO_3$)		287	5.74
Barium	Ba	0.2		Hardness (as $CaCO_3$)		380 ✓	
Copper	Cu	0.0		Total dissolved minerals		440	
Cadmium	Cd	0.00		pH (as rec'd)	7.5		
Chromium	Cr	0.0		Radioactivity			
Lead	Pb	0.00		Alpha *pc/l*	0		
Mercury	Hg	<0.0005		±deviation	0		
Nickel	Ni	0.0		Beta *pc/l*	2		
Silver	Ag	0.0		±deviation	1		
Zinc	Zn	0.0					

WELL NO. 2, open to the Cambrian-Ordovician aquifer, was completed in May 1962 to a depth of 1255 ft (measured at 1243.5 ft in April 1973) by the Henry Boysen Co., Libertyville. The well is located on the east side of the river on the north side of Route 62 near Algonquin Shores Road, approximately 2150 ft S and 20 ft W of the NE corner of Section 34, T43N, R8E. The land surface elevation at the well is approximately 860 ft.

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Drift	197	197
Limestone	39	236
Shale and dolomite	188	424
Dolomite	313	737
Sandstone	43	780
Shale	30	810
Sand	153	963
Dolomite and shale	45	1008
Dolomite	37	1045
Sand	210	1255

A 12-in. diameter hole was drilled to a depth of 206 ft, reduced to 11.2 in. between 206 and 1008 ft, reduced to 10 in. between 1008 and 1079 ft, reduced to 8 in. between 1079 and 1250 ft, and finished 6 in. in diameter from 1250 to 1255 ft. The well is cased with 12-in. steel pipe from land surface to a depth of 206 ft and a 10.8-in. liner from 939.5 ft to a depth of 1008 ft.

A production test was conducted by the driller on May

24, 1962. After 12.5 hr of pumping at rates ranging from 195 to 483 gpm, the final drawdown was 170 ft from a nonpumping water level of 266 ft below land surface. One hr after pumping was stopped, the water level had recovered to 328 ft.

A production test was conducted by the Layne-Western Co., Aurora, on April 16, 1973. After 3.8 hr of pumping at rates of 160 to 375 gpm, the final drawdown was 242 ft from a nonpumping water level of 330 ft below land surface.

The pumping equipment presently installed consists of a 75-hp General Electric motor, a 10-in., 17-stage Layne submersible pump (No. 71221) set at 645 ft, rated at 350 gpm at about 680 ft TDH, and has 645 ft of 5-in. column pipe. The well is equipped with 645 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 02611) is for a water sample from the well collected November 2, 1971, after 30 min of pumping at 300 gpm. The barium content on a subsequent check was 7 mg/l.

WELL NO. 2, LABORATORY NO. 02611

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.05	0.00	Silica	SiO_2	11	
Manganese	Mn	0.0		Fluoride	F	1.0	0.05
Ammonium	NH_4	0.4	0.22	Boron	B	0.4	
Sodium	Na	40	1.74	Nitrate	NO_3	0.0	
Potassium	K	6.2	0.16	Chloride	Cl	5.4	0.15
Calcium	Ca	52	2.59	Sulfate	SO_4	0	
Magnesium	Mg	21	1.73	Alkalinity (as $CaCO_3$)		294	5.88
				Hardness (as $CaCO_3$)		204	
Barium	Ba	4	0.06	Total dissolved			
Copper	Cu	0.0		minerals		310	
Cadmium	Cd	0.00		pH (as rec'd)	7.5		
Chromium	Cr	0.0		Radioactivity			
Lead	Pb	0.00		Alpha *pc/l*	7		
Mercury	Hg	< 0.0005		±deviation	2		
Nickel	Ni	0.0		Beta *pc/l*	14		
Silver	Ag	0.0		±deviation	3		
Zinc	Zn	0.0					

In November 1968, a test hole was drilled to a depth of 188 ft by the Layne-Western Co., Aurora. The hole was located near the center of Section 33, T43N, R8E.

WELL NO. 3, finished in sand and gravel, was completed in April 1970 to a depth of 188.8 ft by the Layne-Western Co., Aurora. The well is located about 1300 ft west of the intersection of Circle and Skyline Drives, approximately 40 ft S and 2265 ft W of the NE corner of Section 33, T43N, R8E. The land surface elevation at the well is approximately 870 ft.

A 34-in. diameter hole was drilled to a depth of 15 ft and finished 30 in. in diameter from 15 to 188.8 ft. The well is cased with 10-in. pipe from land surface to a depth of 168.8 ft followed by 20 ft of 10-in. No. 7 (0.055 in.) Layne stainless steel shutter screen. The annulus between the bore hole and the casing-screen assembly is filled with concrete from 0 to 15 ft, with pit run sand from 15 to 148 ft, and with No. 2 Muscatine gravel from 148 to 188.8 ft. A drillers log of Well No. 3 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Black top soil	1	1
Brown sandy clay	4	5
Medium to coarse sand and gravel	9.4	14.4
Brownish gray silty clay, gravel intermixed, boulders	2.6	17
Fine to gravel	21	38
Beige colored sandy clay, gravel intermixed, boulders	121	159
Fine to medium gravel	3	162
Beige colored sandy clay, gravel intermixed	7	169
Fine to medium to coarse gravel, few boulders	7	176
Fine to medium sand, some small gravel	6	182
Medium to coarse gravel, boulders	6.8	188.8
Bedrock below		

A production test was conducted by the driller on April 21-22, 1970. After 12.5 hr of pumping at a rate of 305 gpm, the drawdown was 59.7 ft from a nonpumping water level of 97.5 ft below land surface. At 12.5 hr, the pump broke suction and the production was reduced to rates ranging from 240 to 104 gpm for the remaining 16 hr of the test.

In March 1972, the nonpumping water level was reported to be 99 ft.

The pumping equipment presently installed is a Peerless pump set at 170 ft, rated at 300 gpm at about 250 ft TDH, and powered by a 30-hp vertical Holloshaft electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B110066) is for a water sample from the well collected April 2, 1974, after 30 min of pumping at 150 gpm. Methane gas was apparent when a previous sample was collected.

WELL NO. 3, LABORATORY NO. B110066

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	2.9		Silica	SiO_2	22	
Manganese	Mn	0.05		Fluoride	F	0.6	0.03
Ammonium	NH_4	9.3	0.52	Boron	B	0.4	
Sodium	Na	53	2.31	Nitrate	NO_3	0.0	
Potassium	K	2.8	0.07	Chloride	Cl	2	0.06
Calcium	Ca	65	3.24	Sulfate	SO_4	10	0.21
Magnesium	Mg	27	2.22	Alkalinity (as $CaCO_3$)		392	7.84
Arsenic	As	0.00					
Barium	Ba	0.1		Hardness (as $CaCO_3$)		273	5.46
Copper	Cu	0.00					
Cadmium	Cd	0.00		Total dissolved			
Chromium	Cr	0.00		minerals		392	
Lead	Pb	0.00					
Mercury	Hg	0.0000		pH (as rec'd)	7.5		
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*	0.3		
Silver	Ag	0.00		±deviation	1.7		
Cyanide	CN	0.00		Beta *pc/l*	1.4		
Zinc	Zn	0.01		±deviation	2.2		

CARY

The village of Cary (4358) installed a public water supply in 1913. Two wells (Nos. 3 and 4) are in use. In 1951 there were 230 services, all metered; the average and maximum daily pumpages were 40,000 and 70,000 gpd, respectively. In 1973 there were 1100 services, all metered; the average and maximum daily pumpages were 504,820 and 750,000 gpd, respectively. Water from Well No. 3 is chlorinated. aerated, filtered, and fluoridated, and the water from Well No. 4 is prechlorinated, aerated, filtered, and postchlorinated. The natural fluoride concentration in the water of Well No. 4 is adequate to satisfy state requirements.

WELL NO. 1, finished in Silurian dolomite, was completed in 1913 to a depth of 300 ft. This well has been out of use since 1962 because of a high iron content. The well is located at the rear of the old village hall on the north side of U.S. Highway 14, approximately 1200 ft S and 400 ft W of the NE corner of Section 13, T43N, R8E. The land surface elevation at the well is approximately 810 ft.

A drillers log of Well No. 1 follows:

Strata	Thickness (ft)	Depth (ft)
Drift	154	154
Limestone	146	300

A 10-in. diameter hole was drilled to a depth of 300 ft. The well is cased with 10-in. pipe from 0.1 ft above the pumphouse floor to a depth of 154 ft.

Upon completion, after pumping at a rate of 110 gpm for 30 hr from a nonpumping water level of 12 ft below land surface, air was drawn into the pump cylinder which had been set at a depth of 80 ft.

On November 8, 1922, after a 12-hr idle period, the well reportedly produced 118 gpm for 3 hr with a drawdown of 52 ft from a nonpumping water level of 22 ft. The water level recovered to 28 ft after pumping was stopped for 2.4 hr.

On April 10, 1940, after a 2-day idle period, and on July 3, 1947, after a 30-min idle period, the nonpumping water levels were reported to be 28 and 30 ft, respectively.

The pumping equipment presently installed consists of a 7 1/2-hp 1750 rpm U.S. electric motor (No. 653429), a 6-in., 14-stage Aurora turbine pump (No. 39523) set at 150 ft, rated at 100 gpm at about 180 ft TDH, and has 150 ft of 4-in. column pipe. The well is equipped with 150 ft of airline.

A partial analysis of a sample (Lab. No. 155187) collected June 27, 1961, showed the water to have a hardness of 288 mg/l, total dissolved minerals of 330 mg/l, and an iron content of 0.4 mg/l.

WELL NO. 2 (formerly Bowman Dairy Co. well), finished in Silurian dolomite, was completed in 1924 to a depth of 300 ft, and was rehabilitated when connected to the village supply in 1950. This well was abandoned and capped prior to October 1965. The well is located near the intersection of Crystal St. and Borden Ave., approximately 650 ft S and 1150 ft W of the NE corner of Section 13, T43N, R8E. The land surface elevation at the well is approximately 810 ft.

The well is cased with 8-in. pipe from 1 ft above the pumphouse floor to a depth of about 168 ft.

In September 1958, the well reportedly produced at full pumping capacity (about 75 gpm) with a drawdown of about 28 ft.

A mineral analysis of a sample (Lab. No. 146281) collected April 11, 1958, showed the water to have a hardness of 206 mg/1, total dissolved minerals of 450 mg/1, and an iron content of 0.4 mg/l.

WELL NO. 3 (formerly Curtiss Farms well), finished in sand and gravel, was completed in November 1956 to a depth of 155 ft by the Layne-Western Co., Aurora. The well is located on Commons Road 2 blocks south of Briargate Road, approximately 1300 ft N and 1300 ft E of the SW corner of Section 13, T43N, R8E. The land surface elevation at the well is approximately 875 ft.

A drillers log of Well No. 3 follows:

Strata	Thickness (ft)	Depth (ft)
Soil	1	1
Brown clay	2	3
Gravel and boulders	22	25
Clay with sand and boulders	67	92
Fine sand with clay streaks	46	138
Coarse sand and gravel	17	155

A 30-in. diameter hole was drilled to a depth of 155 ft. The well is cased with 12-in. pipe from 3 ft above land surface to a depth of 140 ft followed by 15 ft of 12-in. No. 5 (0.105 in.) Layne stainless steel shutter screen. The annulus between the bore hole and the casing-screen assembly is filled with clay cuttings from 0 to 90 ft and with 25 cubic yards of gravel from 90 to 155 ft.

Upon completion, the well reportedly produced 500 gpm for 10 hr with a drawdown of 55 ft from a nonpumping water level of 84 ft below the pump base.

On May 17, 1971, the driller reported the nonpumping water level to be 80.2 ft.

The pumping equipment presently installed consists of a 50-hp 1765 rpm Westinghouse electric motor (Serial No. 1-51V450), a 10-in., 6-stage Layne turbine pump (Serial No. 36309) set at 135 ft, rated at 500 gpm at about 244 ft head, and has 135 ft of 6-in. column pipe. A 10-ft section of 6-in. suction pipe is attached to the pump intake. The well is equipped with 135 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B0022583) is for a water sample from the well collected May 26, 1972, after 2 hr of pumping at 500 gpm. The iron content has been greater on previous samples.

WELL NO. 3, LABORATORY NO. B0022583

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.0		Silica	SiO_2	18	
Manganese	Mn	0.0		Fluoride	F	0.4	0.02
Ammonium	NH_4	0.5	0.03	Boron	B	0.3	
Sodium	Na	10	0.44	Nitrate	NO_3	0.0	
Potassium	K	1	0.03	Chloride	Cl	18	0.51
Calcium	Ca	76	3.79	Sulfate	SO_4	75	1.56
Magnesium	Mg	41	3.37	Alkalinity (as $CaCO_3$)		268	5.36
				Hardness (as $CaCO_3$)		356	
Barium	Ba	0.0		Total dissolved minerals		450	
Copper	Cu	0.0					
Cadmium	Cd	0.00		pH (as rec'd)	7.5		
Chromium	Cr	0.0		Radioactivity			
Lead	Pb	0.00		Alpha *pc/l*	1.1		
Mercury	Hg	< 0.0005		± deviation	1.7		
Nickel	Ni	0.0		Beta *pc/l*	0.1		
Silver	Ag	0.0		± deviation	1.1		
Zinc	Zn	0.0					

WELL NO. 4, open to the Ironton-Galesville Sandstone, was completed in January 1964 to a depth of 1345 ft by L. Cliff Neely, Batavia. The well is located on Three Oaks Road west of First St. across from the high school, approximately 2400 ft N and 1000 ft W of the SE corner of Section 12, T43N, R8E. The land surface elevation at the well is approximately 855 ft.

A 20-in. diameter hole was drilled to a depth of 210 ft, reduced to 16 in. between 210 and 1005 ft, and finished 12 in. in diameter from 1005 to 1345 ft. The well is cased with 20-in. pipe from land surface to a depth of 210 ft, 16-in. pipe from land surface to a depth of 1005 ft (cemented in), and 12-in. pipe from 1005 ft to a depth of 1140 ft.

Upon completion, the well reportedly produced 400 gpm for 3 hr with a drawdown of 215 ft from a nonpumping water level of 340 ft.

On November 8, 1971, the nonpumping water level was reported to be 415 ft.

The pumping equipment presently installed is a 10-in., 13-stage Layne submersible pump set at 700 ft, rated at 500 gpm at about 660 ft TDH, and powered by a 125-hp General Electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B0022584) is for a water sample from the well collected May 26, 1972, after 4 hr of pumping at 500 gpm.

WELL NO. 4, LABORATORY NO. B0022584

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.0		Silica	SiO_2	8.0	
Manganese	Mn	0.0		Fluoride	F	0.7	0.04
Ammonium	NH_4	0.4	0.02	Boron	B	0.32	
Sodium	Na	18	0.78	Nitrate	NO_3	0.0	
Potassium	K	6.5	0.17	Chloride	Cl	3	0.08
Calcium	Ca	50	2.50	Sulfate	SO_4	0	
Magnesium	Mg	24	1.97	Alkalinity (as $CaCO_3$)		250	5.00
				Hardness (as $CaCO_3$)		214	
Barium	Ba	2.5		Total dissolved minerals		290	
Copper	Cu	0.01					
Cadmium	Cd	0.00		pH (as rec'd)	7.4		
Chromium	Cr	0.0		Radioactivity			
Lead	Pb	0.00		Alpha *pc/l*	4.4		
Mercury	Hg	< 0.0005		± deviation	2.1		
Nickel	Ni	0.0		Beta *pc/l*	0.6		
Silver	Ag	0.0		± deviation	1.0		
Zinc	Zn	0.0					

CLAREMONT HILLS SUBDIVISION

Claremont Hills Subdivision (est. 248), located 1 mile . west of Johnsburg, installed a public water supply in 1970. The water system is owned and operated by the Eastwood Manor Water Co. One well is in use. In 1974 there were 71 services, all metered; the average and maximum daily pumpages were 15,000 and 22,000 gpd, respectively. The water is chlorinated and fluoridated.

WELL NO. 1, finished in Silurian dolomite, was completed in July 1970 to a depth of 290 ft by Clarence B. Neely, Elgin. The well is located at 3708 Garfield St., approximately 1850 ft S and 1950 ft E of the NW corner of Section 14, T45N, R8E. The land surface elevation at the well is approximately 832 ft.

A 6-in. diameter hole was drilled to a depth of 290 ft. The well is cased with 6-in. pipe from 2 ft above land surface to a depth of 185 ft.

Upon completion, the well reportedly produced 165 gpm for 60 hr with a drawdown of 110 ft from a nonpumping water level of 60 ft below land surface.

The pumping equipment presently installed is a Red Jacket submersible pump set at 220 ft, rated at 1 30 gpm, and powered by a 20-hp Red Jacket electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B21675) is for a water sample from the well collected October 30, 1972, after 2 hr of pumping at 130 gpm.

WELL NO. 1, LABORATORY NO. B21675

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.30	0.01	Silica	SiO_2	24	
Manganese	Mn	0.00		Fluoride	F	0.4	0.02
Ammonium	NH_4	0.5	0.03	Boron	B	0.25	
Sodium	Na	30	1.30	Nitrate	NO_3	0.0	
Potassium	K	1.8	0.05	Chloride	Cl	3	0.08
Calcium	Ca	42	2.10	Sulfate	SO_4	10	0.21
Magnesium	Mg	32	2.63	Alkalinity (as $CaCO_3$)		278	5.56
Arsenic	As	0.00		Hardness (as $CaCO_3$)		236	
Barium	Ba	0.15		Total dissolved minerals		295	
Copper	Cu	0.00					
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00		pH (as rec'd)	7.8		
Mercury	Hg	0.0000		Radioactivity			
Nickel	Ni	0.0		Alpha *pc/l*	0.0		
Selenium	Se	0.00		± deviation	0.8		
Silver	Ag	0.003		Beta *pc/l*	4.5		
Zinc	Zn	0.00		± deviation	1.5		

CRYSTAL HEIGHTS SUBDIVISION

Crystal Heights Subdivision (est. 110), located 0.5 mile east of Crystal Lake, installed a public water supply in 1922. The water system is owned and operated by the Crystal Heights Association. One well is in use. In 1956 there were 32 services, none metered. In 1973 there were 34 services, none metered; the average and maximum daily pumpages were 6300 and 6500 gpd, respectively. The water is chlorinated and fluoridated.

WELL NO. 1, finished in dolomite, was constructed in 1922 to a depth of 178 ft, and deepened in 1943 by Joseph Huemann, McHenry, to a reported depth of 278 ft. The well is located at the south end of Kent St., approximately 750 ft S and 2900 ft E of the NW corner of Section 4, T43N, R8E. The land surface elevation at the well is approximately 940 ft.

The well is cased with 6-in. pipe from 0.2 ft above the concrete floor of a well pit to a depth of 198 ft and 4.5-in. pipe from 198 ft to a depth of 230 ft.

In 1956, the well reportedly produced 88 gpm with a drawdown of 9 ft from a nonpumping water level of 110 ft.

The pumping equipment presently installed is a Red Jacket submersible pump powered by a 7 1/2-hp electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B108507) is for a water sample from the well collected March 20, 1973, after 30 min of pumping at 100 gpm.

WELL NO. 1, LABORATORY NO. B108507

		mg/l	me/l			mg/l	me/l
Iron	Fe	1.0		Silica	SiO_2	17	
Manganese	Mn	0.03		Fluoride	F	0.5	0.03
Ammonium	NH_4	0.4	0.02	Boron	B	0.15	
Sodium	Na	19	0.83	Nitrate	NO_3	3.5	0.06
Potassium	K	1.5	0.04	Chloride	Cl	46	1.30
Calcium	Ca	90	4.49	Sulfate	SO_4	105	2.18
Magnesium	Mg	50	4.12	Alkalinity (as $CaCO_3$)		330	6.60
Arsenic	As	0.00		Hardness (as $CaCO_3$)		430	
Barium	Ba	0.0					
Copper	Cu	0.00		Total dissolved minerals		508	
Cadmium	Cd	0.00					
Chromium	Cr	0.00		pH (as rec'd)		8.0	
Lead	Pb	0.00		Radioactivity			
Mercury	Hg	0.0000		Alpha *pc/l*		1.6	
Nickel	Ni	0.0		±deviation		1.7	
Selenium	Se	0.00		Beta *pc/l*		11.3	
Silver	Ag	0.00		±deviation		2.8	
Zinc	Zn	0.12					

CRYSTAL LAKE

The city of Crystal Lake (14,541) installed a public water supply in 1913. This city was consolidated with the village of North Crystal Lake in 1914, which had installed a public water supply in 1898. Four wells (Nos. 2, 6, 7, and 8) are in use and two other wells (Nos. 1 and 3) are available for emergency use. In 1951 there were 1500 services, all metered; the average and maximum daily pumpages were 500,000 and 750,000 gpd, respectively. In 1973 there were about 4000 services, all metered; the average and maximum daily pumpages in 1972 were 1,612,290 and 2,263,000 gpd, respectively. The water is softened. chlorinated, and fluoridated; in addition, Well No. 6 is equipped with a sand remover, and Well No. 7 is aerated and filtered.

A dug well (former North Crystal Lake well) was completed in 1898 to a depth of 64 ft and located on Beardsley St. east of Main St. The well was 3 ft in diameter and curbed with brick below a 5-ft deep pit. This well was in use until 1913 when it was abandoned. On November 19, 1923, the nonpumping water level was 7 ft. The well was filled and covered by a concrete floor.

WELL NO. 1 (former North Crystal Lake well), finished in Silurian dolomite, was completed in 1910 to a depth of 280 ft. This well is available for emergency use. The well is located on Beardsley St. east of Main St. in the rear of the firehouse, approximately 1200 ft N and 150 ft E of the SW corner of Section 33, T44N, R8E. The land surface elevation at the well is approximately 925 ft.

The well is cased with 10-in. pipe from 1.2 ft above the pump station floor to a depth of 260 ft.

On October 23, 1913, the nonpumping water level was reported to be 80 ft below land surface.

A production test was conducted by the State Water Survey on June 12, 1940. After 3.5 hr of pumping at a rate of 300 gpm, the drawdown was 30.0 ft from a nonpumping water level of 98.5 ft below the pump base. The rate was then increased to 400 gpm and after 4 hr the drawdown was 55.0 ft. After another hour at an increased rate of 445 gpm, the drawdown was 66.5 ft.

The nonpumping water level below the pump base on March 17, 1947, and May 24, 1947, was reported to be 105 ft.

On July 3, 1947, the well reportedly produced 415 gpm for 1 hr with a drawdown of 46 ft from a nonpumping water level of 107 ft below the pump base.

Nonpumping water levels below the pump base were reported to be 130 ft in March 1957 and 118 ft on December 10,1965.

The pumping equipment presently installed consists of a 40-hp 1800 rpm U.S. electric motor, a 10-in., 7-stage American Well Works turbine pump (Shop No. 63609) set at 180 ft, rated at 350 gpm at about 299 ft head, and has 180 ft

of 6-in. column pipe. The well is equipped with 180 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. C008023) is for a water sample from the well collected April 21, 1975, after 1.5 hr of pumping at 250 gpm.

WELL NO. 1, LABORATORY NO. C008023

		mg/l	me/l			mg/l	me/l
Iron	Fe	1.1		Silica	SiO_2	19.0	
Manganese	Mn	0.04		Fluoride	F	0.5	0.03
Ammonium	NH_4	0.58	0.03	Boron	B	0.2	
Sodium	Na	15	0.65	Nitrate	NO_3	0.4	0.01
Potassium	K	1.6	0.04	Chloride	Cl	36	1.02
Calcium	Ca	88	4.39	Sulfate	SO_4	89	1.85
Magnesium	Mg	48	3.95	Alkalinity (as $CaCO_3$)		312	6.24
Arsenic	As	0.000					
Barium	Ba	0.0		Hardness (as $CaCO_3$)		419	8.38
Copper	Cu	0.00					
Cadmium	Cd	0.00		Total dissolved			
Chromium	Cr	0.00		minerals		516	
Lead	Pb	0.00					
Mercury	Hg	0.0000		pH (as rec'd)		7.6	
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*		0.5	
Silver	Ag	0.00		± deviation		1.8	
Cyanide	CN	0.00		Beta *pc/l*		4.1	
Zinc	Zn	0.00		± deviation		2.0	

A dug well (initial Crystal Lake supply) was completed in 1913 to a depth of 32 ft. This well was abandoned in 1943 and sealed in 1949. The well was located in the city park about 115 ft southwest of Virginia St. and 85 ft northeast of King St., approximately 2500 ft S and 500 ft W of the NE corner of Section 6, T43N, R8E. The top of this 8-ft diameter well was in the basement of the city building which was about 15.5 ft below land surface. The well was curbed with concrete blocks laid with open joints.

Upon completion, the nonpumping water level was about 17 ft below land surface.

On November 13, 1922, after a 2.5-hr idle period, the well reportedly produced 225 gpm for 2 hr with a drawdown of 7.0 ft from a nonpumping water level of 21.1 ft below land surface.

A production test was conducted by the State Water Survey on October 23, 1925. After 1.1 hr of pumping at rates of 466 to 300 gpm, the drawdown was 7.00 ft from a nonpumping water level of 21.90 ft below land surface. Pumping was then continued at a rate of 300 gpm for an additional 1.5 hr with a final drawdown of 7.85 ft.

On July 3, 1947, the nonpumping water level was 19.5 ft below land surface.

WELL NO. 2, originally open to the Cambrian-Ordovician aquifer (except for the Glenwood-St. Peter Sandstone) and the Elmhurst-Mt. Simon aquifer, was completed in July 1930 to a depth of 2000 ft (reported to be 1218 ft deep in 1956) by the W. L. Thorne Co., Des Plaines. The well is located at the corner of Franklin and College Sts., approximately 1080 ft S and 2450 ft W of the NE corner of Section 5, T43N, R8E. The land surface elevation at the well is approximately 917 ft.

A correlated drillers log and reinterpreted sample study of Well No. 2 furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
QUATERNARY SYSTEM		
Pleistocene Series		
"Glacial drift"	225	225
"Sand and gravel, silty, water bearing"	6	231
SILURIAN SYSTEM		
Niagaran-Alexandrian Series		
Dolomite; "Limestone, very little water"	66	297
ORDOVICIAN SYSTEM		
Maquoketa Group		
Shale and limestone	145	442
Galena-Platteville Dolomite Group	333	775
Ancell Group		
Glenwood Formation		
Shale, dolomite, and sandstone	45	820
St. Peter Sandstone	112	932
CAMBRIAN SYSTEM		
Eminence-Potosi Dolomite		
Dolomite, thin, sandstone beds	148	1080
Franconia Formation		
Sandstone, dolomitic, glauconitic, silty	60	1140
Ironton-Galesville Sandstone	150	1290
Eau Claire Formation		
Sandstone and siltstone, glauconitic	485	1775
Mt. Simon Sandstone	225	2000

A 20-in. diameter hole was drilled to a depth of 234 ft, reduced to 16 in. between 234 and 248 ft, reduced to 12 in. between 248 and 569 ft, reduced to 10 in. between 569 and 964 ft, and finished 8 in. in diameter from 964 to 2000 ft. The well is cased with 20-in. pipe from 0.2 ft above the pumphouse floor to a depth of 234 ft, 16-in. pipe from 205 ft to a depth of 242.5 ft, 10-in. pipe from 235 ft to a depth of 569 ft, and an 8-in. liner from 748 ft to a depth of 964 ft.

Upon completion, the well reportedly produced 318 gpm with a drawdown of 69 ft from a nonpumping water level of 200 ft below land surface.

Nonpumping water levels below the pump base were reported as follows: 23 3 ft on July 20, 1943; 236 ft on November 8, 1944; and 249 ft on July 5, 1945.

A production test was conducted on September 29-30, 1947, by representatives of the city, the State Water Survey, the American Well Works, and Baxter, Nelson, and Woodman, Consulting Engineers. After 4.2 hr of pumping at rates of 230 to 305 gpm, the drawdown was 77 ft from a nonpumping water level of 276 ft below the pump base.

In October-November 1952, Dowell, Inc., rehabilitated this well by directional shooting between the depths of 1088 and 1300 ft and acidized with 3000 gal of 15 percent HC1. The well was sounded at a depth of 1978.5 ft at this time. On November 13, 1952, after this work, the well was pumped for 12 hr at 388 gpm with a drawdown of 79 ft from a nonpumping water level of 269 ft.

In April 1956, the well reportedly produced 400 gpm for 4 hr with a drawdown of 85 ft from a nonpumping water level of 295 ft below the pump base.

Nonpumping water levels below the pump base were reported as follows: 293.5 ft on March 13, 1957; 324 ft on October 29, 1959; and 388 ft on October 27, 1961.

The pumping equipment presently installed consists of a 100-hp 1750 rpm Byron Jackson electric motor, a 10-in., 18-stage Byron Jackson submersible turbine pump (Model No. 101BH, Serial No. 372901) set at 704 ft, rated at 400 gpm at about 680 ft TDH, and has 704 ft of 6-in. column pipe.

A partial analysis of a sample (Lab. No. 188639) collected May 9, 1972, after pumping for 45 min at 200 gpm, showed the water to have a hardness of 216 mg/l, total dissolved minerals of 280 mg/1, and an iron content of 0.2 mg/1. The barium content in this sample was 5.7 mg/1.

Prior to the construction of Well No. 3, a test hole, located 15 ft north, was completed in June 1948 to a depth of 228 ft by the Milaeger Well and Pump Co., Milwaukee, Wis. A test well, 44 ft deep, was completed at this site and cased with 10-in. pipe from land surface to a depth of 33 ft and 8-in. pipe from 1.7 ft above land surface to a depth of 34 ft followed by 10 ft of 6-in. slotted pipe.

A production test was conducted on June 14-15, 1948, by representatives of the driller, the State Water Survey, and Baxter, Nelson, and Woodman, Consulting Engineers. After 18.2 hr of pumping at rates of 50 to 293 gpm, the drawdown was 17.5 ft from a nonpumping water level of 16.1 ft below land surface.

WELL NO. 3, finished in sand and gravel, was completed in July 1948 to a depth of 45 ft (effective depth) by the Milaeger Well and Pump Co., Milwaukee, Wis. This well is available for emergency use. The well is located in McCormick Park under the elevated tank, approximately 2340 ft S and 570 ft W of the NE corner of Section 6, T43N, R8E. The land surface elevation at the well is approximately 900 ft.

A drillers log of Well No. 3 follows:

The well is cased with 18-in. outer pipe from land surface

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil and clay	5	5
Hardpan and gravel	10	15
Hardpan, sand, and gravel	5	20
Hardpan, showing more gravel	5	25
Almost all sand and gravel	5	30
Sand and gravel	5	35
Coarse sand and gravel	10	45
Blue clay	3	48

to a depth of 30 ft and 12-in. inner pipe from 1.4 ft above land surface to a depth of 3 3 ft. The screen assembly consists of 10-in. blank pipe from 29.5 to 35 ft, No. 180 slot Johnson Everdur screen from 35 to 45 ft, and 10-in. blank pipe from 45 to 48 ft. The annular space between the 18-and 12-in. casings is filled with cement grout.

A production test using one observation well was conducted on July 23-26, 1948, by representatives of the driller, the State Water Survey, and the consulting engineer. After 57.8 hr of pumping at rates ranging from 36 to 269 gpm, the drawdown was 17.8 ft from a nonpumping water level of 17.8 ft below land surface. Twenty min after pumping was stopped, the water level had recovered to 18.8 ft.

After the well was treated with Calgon in July 1955, it reportedly produced 260 gpm with a drawdown of 8 ft from a nonpumping water level of 32 ft below land surface.

The pumping equipment presently installed is an Aurora turbine pump set at 35 ft, rated at 250 gpm at about 120 ft head, and powered by a 15-hp 1800 rpm U.S. electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. C008024) is for a water sample from the well collected April 21, 1975, after 1.8 hr of pumping at 250 gpm.

WELL NO. 3, LABORATORY NO. C008024

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	2.4		Silica	SiO_2	14.0	
Manganese	Mn	0.10		Fluoride	F	0.2	0.01
Ammonium	NH_4	0.27	0.02	Boron	B	0.1	
Sodium	Na	34	1.48	Nitrate	NO_3	0.7	0.01
Potassium	K	7.2	0.18	Chloride	Cl	85	2.40
Calcium	Ca	100	4.99	Sulfate	SO_4	72	1.50
Magnesium	Mg	45	3.70	Alkalinity (as $CaCO_3$)		316	6.32
Arsenic	As	0.000					
Barium	Ba	0.1		Hardness (as $CaCO_3$)		439	8.78
Copper	Cu	0.01					
Cadmium	Cd	0.00		Total dissolved minerals		608	
Chromium	Cr	0.00					
Lead	Pb	0.00					
Mercury	Hg	0.0000		pH (as rec'd)	7.5		
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*	1.8		
Silver	Ag	0.00		±deviation	2.6		
Cyanide	CN	0.00		Beta *pc/l*	10.8		
Zinc	Zn	0.24		±deviation	2.9		

WELL NO. 4, finished in sand and gravel, was completed in 1948 to a depth of 47 ft (effective depth) by the Milaeger Well and Pump Co., Milwaukee, Wis. This well was abandoned and sealed in 1973. The well was located in McCormick Park near Virginia and King Sts., approximately 2500 ft S and 400 ft W of the NE corner of Section 6, T43N, R8E. The land surface elevation at the well is approximately 900 ft.

The well was cased with 18-in. pipe from the bottom of an 8-ft deep pit to a depth of 15 ft, and a 10-in. pipe from the bottom of an 8-ft deep pit to a depth of 39 ft followed by 10-in. No. 100 slot Johnson screen from 39 to 47 ft and blank pipe from 47 to 57 ft. The annulus between the 18-and 10-in. casings was filled with cement grout.

A partial analysis of a sample (Lab. No. 115978) collected September 30, 1948, showed the water to have a hardness of 396 mg/1, total dissolved minerals of 450 mg/1, and an iron content of 1.2 mg/1.

WELL NO. 5, open to the Cambrian-Ordovician aquifer, was completed in July 1952 to an original depth of 1355 ft by the Milaeger Well and Pump Co., Milwaukee, Wis. In December 1962, the well was reported to be bridged at 861 ft; in February 1963, the well was filled and plugged at 371 ft; and then abandoned and filled between August and November 1963. The well was located in the northeastern part of the city about 1 mile northeast of Well No. 2, approximately 400 ft N and 2100 ft E of the SW corner of Section 33, T44N, R8E. The land surface elevation at the well is approximately 930 ft.

A drillers log and summary sample study of Well No. 5 furnished by the State Geological Survey follows:

Strata	Thickness (ft)	Depth (ft)
Gravel and boulders	8	8
Gravel	7	15
Sand	6	21
Sand, yellow	9	30
Gravel	16	46
Sand and gravel	35	81
Clay and gravel	9	90
Red sand, coarse	22	112
Sand	3	115
Red clay mixed with gravel	115	230
Sand, gray	15	245
Gray clay	35	280
Red clay and gravel mixed	5	285
Gravel	19	304
Lime, gray hard	11	315
Lime, gray	15	330
Lime	20	350
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Group		
Dolomite, slightly cherty, light brownish-gray to light greenish-gray, fine to coarse; some shale at base, light greenish-gray, weak	35	385
Dolomite, cherty, light brownish-gray, some greenish, fine to medium, pyritic; some chert is black speckled	35	420
Dolomite, cherty, light grayish-brown, some greenish, fine to coarse; dolomite, light gray, dark gray mottled, black speckled, fine to medium	35	455
Dolomite, argillaceous, grayish-brown to light gray, trace of pink, fine to very coarse; little shale, tan to brown, brittle, pyritic. Shale increases toward base	66	521
Galena Group		
Dolomite, buff, fine to medium, crystalline; few pieces chert	104	625
Dolomite, as above; little dolomite, light gray to grayish-buff, black speckled; few reddish-brown argillaceous partings	25	650
Dolomite, grayish-buff to buff, fine to medium, few dark gray specks; trace of chert	80	730
No samples	15	745
Platteville Group		
Grand Detour Formation		
Dolomite, grayish-buff, little gray, very fine to fine; trace of chert	50	795
Dolomite, light brownish-gray, very fine, dense	10	805
Miffin Formation		
Dolomite, buff, very fine, dense; few red specks and reddish-brown argillaceous partings; trace of chert; dolomite becomes finely crystalline toward base	20	825
Pecatonica Dolomite		
Dolomite, grayish-brown, fine to medium; sandy at base	17	842
Ancell Group		
Glenwood Formation		
Sandstone, very fine; shale, sandy, light green, weak	3	845
Sandstone, white to light gray, fine and coarse, poorly sorted, friable; dolomite, sandy, light green to light grayish-brown, very fine	40	885
Sandstone, silty, argillaceous, fine and coarse, poorly sorted, friable; dolomite, sandy, light green; trace of chert	15	900
St. Peter Sandstone		
Sandstone, light yellowish-gray, medium, friable, rounded	15	915
Sandstone, silty, white to light yellowish-gray, fine, friable	15	930
Sandstone, white to yellowish-orange, medium, friable, rounded	50	980
Sandstone, slightly silty, light yellowish-gray, fine to medium, friable	25	1005
Sandstone, silty, fine, friable	20	1025
Sandstone, light yellowish-orange, medium, friable, rounded	30	1055
Kress Member		
Sandstone, pink, medium, friable; chert, white, oolitic; some free oolites, coarse, rounded	20	1075
Sandstone, red, medium, friable; quartz; little shale, silty, purple and light blue	10	1085
CAMBRIAN SYSTEM		
Croixan Series		
Potosi Dolomite		
Dolomite, slightly sandy, light pinkish-gray, fine, slightly glauconitic	10	1095
Dolomite, slightly sandy, yellowish-gray to pinkish-gray, fine, glauconitic	15	1110
Franconia Formation		
Shale, dolomitic, sandy, pink, red, light green, weak	5	1115
Sandstone, light gray, fine to medium, friable, glauconitic; dolomite, sandy, pinkish-buff, fine; shale, red, green, brittle	5	1120
Dolomite, very sandy, pinkish-buff, some red, fine glauconitic; sandstone; shale, red, pink, weak	5	1125
Sandstone, silty, dolomitic, pinkish-brown, fine, friable, glauconitic; shale, pink to red, weak to brittle; some dolomite, sandy, pinkish-buff, fine	40	1165
Shale, silty, sandy, dolomitic, pink, red, green, weak	7	1172
Ironton Sandstone		
Mooseheart Member		
Sandstone, slightly dolomitic, light gray, coarse, friable	3	1175
Sandstone, very slightly dolomitic, grayish-orange, medium, friable, poorly sorted	10	1185
Sandstone, light yellowish-gray, medium, friable, poorly sorted	10	1195
Marywood Member		
Sandstone, light yellowish-gray to pinkish-buff, medium, moderately sorted, friable	30	1225
Fox Valley Member		
Sandstone, slightly dolomitic, pinkish-buff, medium, poorly sorted, friable, maximum grain size 1.0 mm; little dolomite, pink	15	1240
Buelter Member		
Sandstone, light yellowish-gray to pinkish-brown, medium, moderately sorted; little sandstone, dolomitic, pink, fine at 1285 to 1290 ft	60	1300
Galesville Sandstone		
Sandstone, light pinkish-buff, fine, friable	30	1330
Sandstone, pinkish-buff, fine to medium, friable; little sandstone, dolomitic, pink, fine, firm	10	1340
Sandstone, slightly silty, pinkish-buff, fine	15	1355

A partial record indicated the hole to be 12 in. in diameter between 304 and 530 ft and 10 in. from 530 to 1355 ft. The well was cased with 16-in. pipe from 1.5 ft above the pumphouse floor to a depth of 20 ft (cemented in), 12-in. ID pipe from land surface to a depth of 304 ft, and a 10-in. liner from 422 to 530 ft.

Nonpumping water levels were reported as follows: 295 ft below the pump base on March 13, 1957; 274 ft below the pump base on October 1, 1957; 285 ft below the pump base on November 7, 1958; and 307 ft on January 4, 1963.

A partial analysis of a sample (Lab. No. 159777) collected March 18, 1963, showed the water to have a hardness of 340 mg/l, total dissolved minerals of 424 mg/l, and an iron content of 0.6 mg/1. Hydrogen sulfide was apparent on previous samples.

WELL NO. 6, open to the Ironton-Galesville Sandstone, was completed in June 1963 to a depth of 1295 ft by the Layne-Western Co., Aurora. The well is located at Highland Ave. and Golf Road, approximately 25 ft N and 1975 ft W of the SE corner of Section 6, T43N, R8E. The land surface elevation at the well is approximately 892 ft.

A drillers log of Well No. 6 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Black top soil	2	2
Gravel and sand	3	5
Mud and gravel	5	10
Mud	10	20
Mud and rocks	50	70
Clay	60	130
Gravel	20	150
Gravel and clay	30	180
Gray broken limestone	40	220
Medium gray limestone	45	265
Red rock	3	268
Medium gray limestone	57	325
Limestone and shale	15	340
Medium gray limestone	10	350
Limestone and shale	5	355
Medium gray limestone	35	390
Medium gray limestone and shale	10	400
Soft gray shale	33	433
Hard gray limestone	17	450
Brown limestone	120	570
Hard gray limestone	85	655
Hard brown limestone	5	660
Gray limestone	95	755
Hard sandstone	20	775
Hard limestone	20	795
Shale	1	796
Hard sandstone	169	965
Hard pink sandstone	5	970
Red shale	3	973
Hard limestone	1	974
Red shale	6	980
Sandy shale	25	1005
Limestone and shale	8	1013
Hard limestone	22	1035
Cemented limestone and red shale	5	1040
Red shale	20	1060
Red sandstone	40	1100
Hard white sandstone	20	1120
Medium white sandstone	45	1165
Hard white sandstone	10	1175
Medium white sandstone	10	1185
Hard white sandstone	15	1200
Medium white sandstone	5	1205
Hard white sandstone	5	1210
Medium white sandstone	25	1235
Hard white sandstone	15	1250
Red and green shale	4	1254
Hard limestone, shale, and sand	6	1260
Medium sandstone	5	1265
Sandstone and shale	5	1270
Green shale	5	1275
Gray shale	5	1280
Green shale	15	1295

A 24-in. diameter hole was drilled to a depth of 222 ft, reduced to 22 in. between 222 and 446 ft, reduced to 19.2 in. between 446 and 1030 ft, and finished 15.2 in. in diameter from 1030 to 1295 ft. The well is cased with 24-in. pipe from land surface to a depth of 222 ft and 16-in. pipe from land surface to a depth of 1023 ft (cemented in).

A production test was conducted before shooting by the driller on June 13, 1963. The nonpumping water level was reported to be 337 ft below land surface and the well was pumped at rates of 250 to 200 gpm for 3.5 hr with a pumping water level below the 600-ft airline.

After the well was shot with five 50-lb shots of 100 percent gelatin at 1240, 1205, 1170, 1135, and 1100 ft, a production test was conducted by the driller on July 5-6, 1963. After 20.9 hr of pumping at rates ranging from 599 to 726 gpm, the final drawdown was 267 ft from a nonpumping water level of 315 ft below land surface. The water level recovered to 332 ft after pumping was stopped for 3.2 hr.

In May 1965, it was reported that this well was pumping sand and a Dorr Oliver sand remover had been installed.

In August 1973, the Layne-Western Co. reported that this well was cleaned to the original depth when the new pump was installed.

The pumping equipment presently installed consists of a 350-hp Byron Jackson electric motor, a 12-in., 11-stage Byron Jackson submersible pump set at 731 ft, rated at 1000 gpm at about 900 ft TDH, and has 731 ft of 10-in. column pipe. The well is equipped with 731 ft of airline.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. C001054) of a sample collected August 4, 1975, after pumping for 1 hr at 795 gpm, showed the water to have a hardness of 200 mg/1, total dissolved minerals of 274 mg/1, and an iron content of 0.1 mg/1. The barium content in this sample was 10.1 mg/1.

WELL NO. 7, open to the Franconia Formation and the Ironton-Galesville Sandstone, was completed in June 1964 to a depth of 1400 ft by the Wehling Well Works, Beecher. The well is located at Poplar and Morgan Sts., approximately 375 ft N and 2250 ft E of the SW corner of Section 33, T44N, R8E. The land surface elevation at the well is approximately 930 ft.

A drillers log of Well No. 7 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Sand and gravel	10	10
Gravel	23	33
Gravel, red clay	33	66
Gravel, sand, and red clay	47	113
Red clay and gravel	117	230
Sand and gravel	3	233
Sand	4	237
Clay	4	241
Sand	4	245
Mud	10	255
Clay and mud	35	290
Lime and mud	3	293

Strata (continued)	Thickness (ft)	Depth (ft)
Lime	63	356
Shale	16	372
Lime and shale	56	428
Shale	12	440
Lime and shale	59	499
Shale	30	529
Lime	84	613
Lime and gypsum	54	667
Sandy lime	4	671
Lime and gypsum	23	694
Lime	154	848
Lime and shale	4	852
Sand, shale, and lime	36	888
Sand	158	1046
Sand and red rock	26	1072
Shale	10	1082
Lime and gypsum	13	1095
Lime	25	1120
Lime and shale	88	1208
Sand	127	1335
Shale, sand, and shells	28	1363
Lime and shale	20	1383
Shale and shells	17	1400

A 24-in. diameter hole was drilled to a depth of 307 ft, reduced to 22.5 in. between 307 and 530 ft, reduced to 21 in. between 530 and 901 ft, reduced to 19.5 in. between 901 and 1100 ft, and finished 15 in. in diameter from 1100 to 1400 ft. The well is cased with 24-in. pipe from land surface to a depth of 307 ft, 22-in. pipe from 352 ft to a depth of 529 ft, and 16-in. pipe from land surface to a depth of 1100 ft (cemented in).

Before testing, the well was shot with 80 qt of liquid nitroglycerin at the following depths: 1320 to 1305 ft, 1280 to 1270 ft, 1270 to 1255 ft, 1255 to 1240 ft, and 1240 to 1225 ft.

A production test was conducted by the driller on June 8, 1964. After 2.5 hr of pumping at 440 gpm, the drawdown was 61 ft from a nonpumping water level of 374 ft. Pumping was continued for 2.5 hr at a rate of 750 gpm with a final drawdown of 88 ft.

In April 1973, this well was cleaned out to the original depth of 1400 ft. A production test was conducted by the Layne-Western Co., Aurora, on May 3, 1973. After pumping at 1260 gpm, the drawdown was 105 ft from a nonpumping water level of 450 ft.

The pumping equipment presently installed consists of a 250-hp Byron Jackson electric motor, a 12-in., 8-stage Byron Jackson submersible pump (No. 651 C0071) set at 702 ft, rated at 1250 gpm, and has 702 ft of 8-in. column pipe. The well is equipped with 700 ft of airline.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. C001052) of a sample collected August 4, 1975, after pumping for 2 hr at 815 gpm, showed the water to have a hardness of 214 mg/l, total dissolved minerals of 318 mg/1, and an iron content of 0.1 mg/1. The barium content in this sample was 12.1 mg/1. Hydrogen sulfide was apparent on a previous sample.

WELL NO. 8, open to the Eminence-Potosi Dolomite, the Franconia Formation, and the Ironton-Galesville Sandstone, was completed in March 1973 to a depth of 1300 ft by the J. P. Miller Artesian Well Co., Brookfield. The well is located on Virginia Road, approximately 1550 ft N and 710 ft W of the SE corner of Section 8, T43N, R8E. The land surface elevation at the well is approximately 900 ft. A drillers log of Well No. 8 follows:

Strata	Thickness (ft)	Depth (ft)
Top soil	3.5	3.5
Sand and gravel	1.5	5
Gravel and boulders	45	50
Gravel and boulders with a lot of sand	25	75
Sand and gravel	45	120
Sand and gravel some clay	5	125
Gravel and clay	20	145
Gray clay	5	150
Clay	5	155
Clay with coarse sandy gravel	60	215
Clay with slight amount lime	5	220
Lime with shaly gravel	5	225
Lots of lime with broken sand, shale and gravel	20	245
Lime	10	255
Gray and brownish lime	25	280
Gray and brownish lime with slight amount shale	5	285
Broken lime with shale and some sand	5	290
Lime, shale and some dolomite	10	300
Lime	5	305
Lime with some green shale	25	330
Shaly lime with dolomite	10	340
Very fine grained sand with a lot of white lime and bluish shale	5	345
Hard lime	25	370
Some charcoal colored shale and hard lime	5	375
Calcareous sandy lime with a lot of shale	10	385
Brownish gray lime	5	390
Brownish gray lime with calcareous shale	40	430
Charcoal colored shale	20	450
Charcoal colored shale with slight amount lime	5	455
Charcoal colored shale, quite a lot of lime	5	460
Brownish gray lime	65	525
Light brownish and gray lime	75	600
Gray lime with light brownish tint, some dolomite	40	640
Gray lime specked with bluish green shale and dolomite	55	695
Gray lime with bluish green shale and fine grained white sand	45	740
Gray lime with some brown shale	10	750
Gray lime with bluish green shale specks of brown shale	20	770
Broken lime, shale and some sand	5	775
Lots of sand with some lime and shale broken	50	825
White sand	70	895
Lots of lime and dolomite with some white sand	5	900
Gray lime with dolomite and white sand	5	905
Mostly all sand with some dolomite and lime	5	910
White sand	30	940
Sandy lime	25	965
Mostly lime with some sand	10	975
Gray lime	10	985
Gray lime with quite a lot of sand	20	1005
Lots of sandy lime with dolomite	10	1015
Lime and chert	5	1020
Sandy lime with dolomite, brown shale	5	1025
White sand specked with gray lime and brown shale	5	1030
Calcareous sand with specks brown shale	5	1035
Mostly all sand with some lime	5	1040
Sandy lime	25	1065
White sand	105	1170
White sand specked with dolomite	5	1175
White sand	25	1200
White sand specked with dolomite	75	1275
Reddish white sand specked with dolomite	20	1295
Bluish green, red shale with slight amount sandy lime	5	1300

A 30-in. diameter hole was drilled to a depth of 16 ft, reduced to 29 in. between 16 and 256 ft, reduced to 24 in.

between 256 and 946 ft, and finished 19.2 in. in diameter from 946 to 1300 ft. The well is cased with 30-in. pipe from land surface to a depth of 16 ft, 26-in. OD pipe from land surface to a depth of 256 ft (cemented in), and 20-in. OD pipe from land surface to a depth of 946 ft (cemented in).

A production test was conducted by the driller on March 21-22, 1973. After 24.8 hr of pumping at rates ranging from 1000 to 1875 gpm, the final drawdown was 203 ft from a nonpumping water level of 424 ft.

The pumping equipment presently installed is a 13-in., 10-stage Byron Jackson submersible pump set at 754 ft, rated at 1500 gpm, and powered by a 450-hp 1775 rpm Byron Jackson electric motor.

The following mineral analysis (Lab. No. 199053) is for a water sample from the well collected July 2, 1975, after pumping for 1 hr at 1500 gpm.

WELL NO. 8, LABORATORY NO. 199053

		mg/l	me/l			mg/l	me/l
Iron (total)	Fe	0.2		Silica	SiO_2	7.6	
Manganese	Mn	0.00		Fluoride	F	0.6	
Ammonium	NH_4	0.4	0.02	Boron	B	0.1	
Sodium	Na	17.4	0.76	Nitrate	NO_3	0.0	0.00
Potassium	K	8.7	0.22	Chloride	Cl	0	0.00
Calcium	Ca	49.6	2.48	Sulfate	SO_4	1.6	0.03
Magnesium	Mg	26.8	2.20	Alkalinity (as $CaCO_3$)		276	5.52
Strontium	Sr	2.4	0.05	*Hardness (as $CaCO_3$)*		234	4.68
Barium	Ba	18		Total dissolved minerals		296	
Copper	Cu	0.00		pH (in lab)		7.6	
Cadmium	Cd	0.00		Turbidity		2	
Chromium	Cr	0.00		Color		0	
Lead	Pb	<0.05		Odor		0	
Lithium	Li	0.01		Temp. (reported)		58.1F	
Nickel	Ni	< 0.05					
Zinc	Zn	0.00					

CRYSTAL LAKE MANOR SUBDIVISION

Crystal Lake Manor Subdivision (est. 1200), located 1.5 miles southeast of Crystal Lake, installed a public water supply in 1954. The water system is owned and operated by the Northern Illinois Utilities, Inc. Two wells are in use. In 1961 there were 200 services, all metered;the average and maximum daily pumpages were 31,950 and 36,000 gpd, respectively. In 1974 there were 293 services, all metered; the average and maximum daily pumpages were 50,000 and 75,000 gpd, respectively. The water is chlorinated and treated with polyphosphate to keep iron in solution. The water from Well No. 2 is fluoridated and the natural fluoride concentration in the water of Well No. 1 is adequate to satisfy state requirements.

WELL NO. 1, open to the Silurian dolomite and the Maquoketa Group, was completed in 1954 to a depth of 512 ft by N. H. Geltz, Aurora. The well is located at Drive-In Lane and Oak St., approximately 1200 ft S and 625 ft E of the NW corner of Section 10, T43N, R8E. The land surface elevation at the well is approximately 915 ft.

A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Soil	10	10
Boulders and gravel	50	60
Sand and gravel	70	130
Clay and gravel	18	148
Fine sand	20	168
Sandy clay with gravel	95	263
Sand and gravel	8	271
Lime	68	339
Lime with green shale	71	410
Gray shale	5	415
Lime with shale	69	484
Brown shale	28	512

A 10-in. diameter hole was drilled to a depth of 512 ft. The well is cased with 10-in. pipe from 0.3 ft above the pumphouse floor to a depth of 271 ft.

Upon completion, the well reportedly produced 70 gpm for 4 hr with a drawdown of 100 ft from a nonpumping water level of 140 ft below land surface.

In 1973, the nonpumping water level was reported to be 140 ft.

The pumping equipment presently installed is a submersible pump set at 370 ft, and powered by a 10-hp electric motor.

The following mineral analysis (Lab. No. 195668) is for a water sample from the well collected May 13, 1974, after pumping continuously at 74 gpm.

WELL NO. 1, LABORATORY NO. 195668

		mg/l	me/l			mg/l	me/l
Iron (total)	Fe	0.1		Silica	SiO_2	10.8	
Manganese	Mn	0.00		Fluoride	F	4.4	
Ammonium	NH_4	0.3	0.02	Boron	B	1.0	
Sodium	Na	131	5.70	Nitrate	NO_3	0.3	0.00
Potassium	K	4.6	0.12	Chloride	Cl	4	0.11
Calcium	Ca	25.6	1.28	Sulfate	SO_4	12.3	0.26
Magnesium	Mg	12.6	1.04	Alkalinity (as $CaCO_3$)		376	7.52
Strontium	Sr	0.73	0.02	Hardness (as $CaCO_3$)		116	2.32
Barium	Ba	<0.1		Total dissolved minerals		441	
Copper	Cu	0.00		Turbidity		0	
Cadmium	Cd	0.00		Color		0	
Chromium	Cr	0.00		Odor		0	
Lead	Pb	<0.05		Temp. (reported)		54F	
Lithium	Li	0.02					
Nickel	Ni	<0.05					
Zinc	Zn	0.00					

WELL NO. 2, finished in sand and gravel, was completed, in April 1961 to a depth of 271 ft by Stanley Bros., West Chicago. The well is located about 50 ft north of Well No. 1, approximately 1150 ft S and 625 ft E of the NW corner of Section 10, T43N, R8E. The land surface elevation at the well is approximately 915 ft.

An 8-in. diameter hole was drilled to a depth of 271 ft. The well is cased with 8-in. pipe from 2 ft above land surface to a depth of 263 ft followed by 2 ft of blank pipe on top of a 6-ft length of No. 30 slot screen. The top of the well casing is equipped with a pitless adapter.

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The pumping equipment presently installed is a Red Jacket submersible pump set at 168 ft, rated at 65 gpm, and powered by a 10-hp electric motor.

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Soil and fill	10	10
Gravel	50	60
Sand and gravel	70	130
Clay and gravel	18	148
Sand	20	168
Sandy clay gravel	95	263
Sand and gravel	8	271

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B100696) is for a water sample from the well collected July 19, 1973, after pumping at 65 gpm.

WELL NO. 2, LABORATORY NO. B100696

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.30		Silica	SiO_2	19	
Manganese	Mn	0.00		Fluoride	F	0.5	0.03
Ammonium	NH_4	0.6	0.03	Boron	B	0.3	
Sodium	Na	13.5	0.59	Nitrate	NO_3	0.0	0.00
Potassium	K	1.6	0.04	Chloride	Cl	8	0.23
Calcium	Ca	61	3.04	Sulfate	SO_4	25	0.52
Magnesium	Mg	36	2.96	Alkalinity (as $CaCO_3$)		290	5.80
Arsenic	As	0.00		Hardness (as $CaCO_3$)		300	6.00
Barium	Ba	0.1		Total dissolved minerals		340	
Copper	Cu	0.00					
Cadmium	Cd	0.00		pH (as rec'd)	7.8		
Chromium	Cr	0.00		Radioactivity			
Lead	Pb	0.00		Alpha *pc/l*	0.2		
Mercury	Hg	0.0000		± deviation	1.0		
Nickel	Ni	0.0		Beta *pc/l*	0.0		
Selenium	Se	0.00		± deviation	1.3		
Silver	Ag	0.00					
Zinc	Zn	0.00					

DEERING OAKS SUBDIVISION

Deering Oaks Subdivision (est. 75), located 1 mile northeast of Crystal Lake, installed a public water supply in 1942. The water system is owned and operated by the Deering Oaks Estates Association. Two wells are in use. In 1973 there were 19 services, none metered; the estimated average and maximum daily pumpages were 6000 and 6500 gpd, respectively. The water is not treated.

WELL NO. 1, finished in Silurian dolomite, was completed in 1946 to a depth of 280 ft by J. H. Huemann, McHenry. The well is located at 5011 Deering Oaks Lane, approximately 1650 ft N and 300 ft E of the SW corner of Section 27, T44N, R8E. The land surface elevation at the well is approximately 915 ft.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B32679) is for a water sample from the well collected February 17, 1976, after 30 min of pumping at 40-60 gpm.

WELL NO. 1, LABORATORY NO. B32679

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.8		Silica	SiO_2	19	
Manganese	Mn	0.02		Fluoride	F	0.2	0.01
Ammonium	NH_4	0.1	0.01	Boron	B	0.0	
Sodium	Na	5	0.22	Nitrate	NO_3	0.0	0.00
Potassium	K	1.4	0.04	Chloride	Cl	12	0.34
Calcium	Ca	90	4.49	Sulfate	SO_4	120	2.50
Magnesium	Mg	46	3.79	Alkalinity (as $CaCO_3$)		290	5.80
Arsenic	As	0.00		Hardness (as $CaCO_3$)		414	8.28
Barium	Ba	0.1		Total dissolved minerals		467	
Copper	Cu	0.00					
Cadmium	Cd	0.00		pH (as rec'd)	8.0		
Chromium	Cr	0.00		Radioactivity			
Lead	Pb	0.01		Alpha *pc/l*	0.0		
Mercury	Hg	0.0000		± deviation	0.0		
Nickel	Ni	0.0		Beta *pc/l*	3.7		
Selenium	Se	0.00		± deviation	1.6		
Silver	Ag	0.00					
Cyanide	CN	0.00					
Zinc	Zn	0.0					

A 6-in. diameter hole was drilled to a depth of 280 ft. The well is cased with 6-in. pipe from within a 10-ft deep well pit to a depth of 275 ft.

The pumping equipment presently installed is a Red Jacket submersible pump (Model 500) powered by a 5-hp Red Jacket electric motor.

WELL NO. 2, finished in sand and gravel, was completed in 1954 to a depth of 178 ft and in 1965, this well was rehabilitated by J. H. Huemann, McHenry. The well is located at 4920 Shady Oaks Lane, approximately 2475 ft N and 600 ft E of the SW corner of Section 27, T44N, R8E. The land surface elevation at the well is approximately 880 ft.

A 6-in. diameter hole was drilled to a depth of 178 ft. The well is cased with 6-in. pipe from 0.8 ft above the concrete floor of a 10-ft deep pit to an unknown depth.

The pumping equipment presently installed is a Red Jacket submersible pump (Model 500KL-18D) rated at 40 gpm, and powered by a 5-hp Red Jacket electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 03105) is for a water sample from the well collected November 5, 1971, after 30 min of pumping at about 50 gpm.

WELL NO. 2, LABORATORY NO. 03105

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.4	0.01	Silica	SiO_2	17	
Manganese	Mn	0.0		Fluoride	F	0.2	0.01
Ammonium	NH_4	0.06	0.00	Boron	B	0.0	
Sodium	Na	4.8	0.21	Nitrate	NO_3	0.0	
Potassium	K	1.2	0.03	Chloride	Cl	14	0.40
Calcium	Ca	88	4.39	Sulfate	SO_4	112	2.33
Magnesium	Mg	44	3.62	Alkalinity (as $CaCO_3$)		272	5.44
Barium	Ba	0.2		Hardness (as $CaCO_3$)		400	
Copper	Cu	0.0		Total dissolved minerals		470	
Cadmium	Cd	0.00					
Chromium	Cr	0.0		pH (as rec'd)	7.8		
Lead	Pb	0.00		Radioactivity			
Mercury	Hg	< 0.0005		Alpha *pc/l*	0		
Nickel	Ni	0.0		± deviation	1		
Silver	Ag	0.0		Beta *pc/l*	1		
Zinc	Zn	0.03		± deviation	1		

EASTWOOD MANOR SUBDIVISION

Eastwood Manor Subdivision (est. 588), located 1 mile east of McHenry, installed a public water supply in 1955. The water system is owned and operated by the Eastwood Manor Water Co. One well (No. 2) is in use and another well (No. 1) is available for emergency use. In 1961 there were 120 services, all meteredjthe average and maximum daily pumpages were 23,940 and 33,300 gpd, respectively. In 1973 there were 168 services, all metered, the average and maximum daily pumpages were 55,000 and 83,000 gpd, respectively. The water is fluoridated.

WELL NO. 1, finished in Silurian dolomite, was completed in August 1955 to a depth of 180 ft by Joseph Huemann & Sons, McHenry. This well is available for emergency use. The well is located adjacent to the elevated tank at the south edge of the subdivision about a block from Route 120, approximately 250 ft N and 900 ft W of the SE corner of Section 25, T45N, R8E. The land surface elevation at the well is approximately 770 ft.

A correlated drillers log of Well No. 1 furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
PLEISTOCENE SYSTEM		
Top soil	8	8
Stones and gravel (dry)	36	44
Clay	118	162
Hardpan	6	168
SILURIAN SYSTEM		
Limestone	12	180

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 02694) is for a water sample from the well collected November 9,1971, after 4 hr of pumping at 125 gpm.

WELL NO. 1, LABORATORY NO. 02694

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.2	0.01	Silica	SiO_2	20	
Manganese	Mn	0.0		Fluoride	F	0.35	0.02
Ammonium	NH_4	0.5	0.03	*Boron*	B	0.1	
Sodium	Na	4.7	0.20	Nitrate	NO_3	0	
Potassium	K	0.9	0.02	Chloride	Cl	4.5	0.13
Calcium	Ca	67.2	3.35	Sulfate	SO_4	29	0.60
Magnesium	Mg	40	3.29	Alkalinity (as $CaCO_3$)		284	5.68
				Hardness (as $CaCO_3$)		328	
Barium	Ba	0.5		Total dissolved minerals		363	
Copper	Cu	0.0					
Cadmium	Cd	0.00		pH (as rec'd)		7.6	
Chromium	Cr	0.0		Radioactivity			
Lead	Pb	0.00		Alpha *pc/l*		0	
Mercury	Hg	< 0.0005		± deviation		1	
Nickel	Ni	0.0		Beta *pc/l*		0	
Silver	Ag	0.0		± deviation		0	
Zinc	Zn	0.0					

An 8-in. diameter hole was drilled to a depth of 180 ft. The well is cased with 8-in. pipe from 0.7 ft above the pumphouse floor to a depth of 168 ft.

Upon completion, the driller reported pumping for 10 hr at a rate of 100 gpm with a drawdown of 40 ft from a nonpumping water level of 42 ft below the top of the casing.

The pumping equipment presently installed consists of a 7 1/2-hp Reda electric motor, a 4-in. Reda submersible pump (Model No. 61054, Serial No. 5-5813) set at 160 ft, rated at 100 gpm, and has 160 ft of 3-in. column pipe.

WELL NO. 2, finished in sand and gravel and Silurian dolomite, was completed in October 1972 to a depth of 220 ft by Joseph Huemann & Sons, McHenry. The well is located at 2507 West Lincoln Road, approximately 2550 ft N and 2350 ft W of the SE corner of Section 25, T45N, R8E. The land surface elevation at the well is approximately 758 ft.

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil	5	5
Clay	5	10
Gravel	45	55
Sand and clay	12	67
Hardpan	21	88
Gravel	17	105
Limestone, very hard (very little water)	115	220

A 12-in. diameter hole was drilled to a depth of 105 ft and finished 10 in. in diameter from 105 to 220 ft. The well is equipped with a 12-in. diameter Baker pitless adapter from 1.5 ft above land surface and cased with 12-in. pipe to a depth of 90 ft followed by 15 ft of 12-in. No. 50 slot Johnson stainless steel screen.

Upon completion, the well reportedly produced 350 gpm for about 2 weeks with a drawdown of about 65 ft from a nonpumping water level about 15 ft below land surface.

The pumping equipment presently installed is a 4-stage Red Jacket submersible pump (Model No. 1-3006-R4-4T8) set at 85 ft, rated at 360 gpm at about 220 ft TDH, and powered by a 30-hp Red Jacket electric motor.

The following mineral analysis (Lab. No. 195671) is for a water sample from the well collected May 14, 1974, after 5 min of pumping at 345 gpm.

WELL NO. 2, LABORATORY NO. 195671

		mg/l	*me/l*			*mg/l*	*me/l*
Iron (total)	Fe	0.8		Silica	SiO_2	16.4	
Manganese	Mn	0.00		Fluoride	F	0.4	
Ammonium	NH_4	0.0	0.00	Boron	B	0.0	
Sodium	Na	7.1	0.31	Nitrate	NO_3	0.3	Tr
Potassium	K	2.0	0.05	Chloride	Cl	12	0.34
Calcium	Ca	72.8	3.63	Sulfate	SO_4	47.9	1.00
Magnesium	Mg	34.2	2.81	Alkalinity (as $CaCO_3$)		272	5.44
Strontium	Sr	0.15					
Barium	Ba	< 0.1		Hardness (as $CaCO_3$)		322	6.44
Copper	Cu	0.00		Total dissolved minerals		382	
Cadmium	Cd	0.00					
Chromium	Cr	0.00		Turbidity		2	
Lead	Pb	< 0.05		Color		0	
Lithium	Li	0.00		Odor		0	
Nickel	Ni	< 0.05		Temp. (reported)		53.5F	
Zinc	Zn	0.00					

FOX RIVER GROVE

The village of Fox River Grove (2245) installed a public water supply in 1928. Two wells are in use. In 1949 there were 360 services, all metered; the average and maximum daily pumpages were 75,000 and 100,000 gpd, respectively. In 1975 there were 625 seryices, all metered; the average and maximum daily pumpages were 257,284 and 385,000 gpd, respectively. The water is fluoridated, treated with sodium hydroxide and potassium permanganate, filtered, and chlorinated.

WELL NO. 1, finished in Silurian dolomite, was completed in February 1928 to a depth of 140 ft by the W. L. Thorne Co., Des Plaines. The well is located at the intersection of Beach Way Road and River St., approximately 250 ft N and 1650 ft W of the SE corner of Section 18, T43N, R9E. The land surface elevation at the well is approximately 745 ft.

A sample study log of Well No. 1 furnished by the State Geological Survey follows:

A 13-in. diameter hole was drilled to a depth of 102 ft and

Strata	*Thickness (ft)*	*Depth (ft)*
PLEISTOCENE SYSTEM		
Clay, silty, calcareous, light brown	6	6
Gravel, clayey, yellow-brown, calcareous, pebbles of dolomite, chert, and igneous rock	9	15
Sand, calcareous, gray, fine, subangular	20	35
Till, calcareous, pink, pebbly	50	85
Till, calcareous, gray, pebbly	10	95
Gravel, calcareous, clayey, gray, pebbles of dolomite, chert, and igneous rock	7	102
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, light gray, very fine grained, compact	18	120
Dolomite, sandy, light gray and greenish, very fine grained, compact	10	130
Dolomite, cherty, light gray, very fine grained	10	140

finished 12 in. in diameter from 102 to 140 ft. The well is cased with 13-in. OD pipe from 2 ft above the pump-house floor to a depth of 102 ft.

Upon completion, several production tests were made indicating that the well would produce from 165 to 228 gpm with drawdowns of 19 to 25 ft from a nonpumping water level of about 6 ft below the top of the well.

On July 1, 1947, after a 3-hr idle period, the well reportedly produced 250 gpm for 30 min with a drawdown of 23 ft from a nonpumping water level of 9 ft below the pump base.

In November 1957, the nonpumping water level was reported to be 3 ft.

On May 18, 1970, the well reportedly produced 350 gpm with a drawdown of 35 ft from a nonpumping water level of 10 ft.

The pumping equipment presently installed consists of a 20-hp U.S. electric motor, an 8-in., 7-stage American Well Works turbine pump (Shop No. 77577) set at 80 ft, rated at 350 gpm, and has 80 ft of 5-in column pipe. A 10-ft section of 5-in. suction pipe is attached to the pump intake. The well is equipped with 80 ft of airline. .

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 01628) of a sample collected September 20, 1971, after pumping for 30 min at 350 gpm, showed the water to have a hardness of 648 mg/l, total dissolved minerals of 840 mg/1, and an iron content of 0.75 mg/l.

WELL NO. 2, finished in Silurian dolomite, was completed in September 1956 to a depth of 120 ft by the Layne-Western Co., Aurora. The well is located about 150 ft east of Well No. 1, approximately 250 ft N and 1494 ft W of the SE corner of Section 18, T43N, R9E. The land surface elevation at the well is approximately 740 ft.

A sample study summary log of Well No. 2 furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
PLEISTOCENE SERIES		
Soil, dark brown	3	3
Silt, sandy, brown	5	8
Gravel, very sandy, granule	22	30
Sand, very gravelly	5	35
Till, gravelly, reddish brown	55	90
Gravel, sandy, silty, granular to medium	12	102
SILURIAN SYSTEM		
Dolomite, white to buff, very fine to medium	8	110
No sample	10	120

A 10-in. diameter hole was drilled to a depth of 120 ft. The well is cased with 10-in. wrought iron pipe from 1.5 ft above the pump station floor to a depth of 101 ft.

Upon completion, the well reportedly produced 320 gpm for 9 hr with a drawdown of 35 ft from a nonpumping water level of 17 ft below the top of the casing.

On April 10, 1958, after pumping at 300 gpm, the drawdown was 23 ft from a nonpumping water level of 9 ft.

On May 18, 1970, the well reportedly produced 300 gpm with a drawdown of 19 ft from a nonpumping water level of 16 ft.

The pumping equipment presently installed consists of a 20-hp 1800 rpm U.S. electric motor (Serial No. 2484974), an 8-in., 8-stage Layne turbine pump (No. 36028) set at 80 ft, rated at 300 gpm at about 220 ft head, and has 80 ft of 5-in. column pipe. A 10-ft section of 6-in. suction pipe is attached to the pump intake. The well is equipped with 82 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 01629) is for a water sample from the well collected September 20, 1971, after 1 hr of pumping at 300 gpm.

WELL NO. 2, LABORATORY NO. 01629

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.5	0.02	Silica	SiO_2	21	
Manganese	Mn	0.0		Fluoride	F	0.15	0.01
Ammonium	NH_4	0.1	0.01	Nitrate	NO_3	0.0	
Sodium	Na	34	1.48	Chloride	Cl	56	1.58
Potassium	K	2.2	0.06	Sulfate	SO_4	245	5.10
Calcium	Ca	149	7.42	Alkalinity (as $CaCO_3$)		400	8.0
Magnesium	Mg	76	6.25	Hardness (as $CaCO_3$)		696	
Barium	Ba	0.15		Total dissolved minerals		907	
Copper	Cu	0.0		pH (as rec'd)	7.0		
Cadmium	Cd	0.0		Radioactivity			
Chromium	Cr	0.0		Alpha *pc/l*	1		
Lead	Pb	0.00		±deviation	1		
Mercury	Hg	< 0.0005		Beta *pc/l*	1		
Nickel	Ni	0.0		±deviation	3		
Silver	Ag	0.0					

HARVARD

The city of Harvard (5177) installed a public water supply in 1892. Four wells (Nos. 3,4, 5, and 6) are in use. In 1949 there were 1100 services; the average and maximum daily pumpages were 185,000 and 300,000 gpd, respectively. In 1974 there were 2200 services, all metered; the average and maximum daily pumpages were 734,913 and 1,100,000 gpd, respectively. The water is chlorinated and fluoridated.

WELL NO. 1, open to the Ironton-Galesville Sandstone and the Eau Claire Formation, was completed in 1892 to a depth of 1600 ft. This well was abandoned in 1963 and capped about 1971. The well was located in the main pumping station at 501 Ayer St., approximately 650 ft N and 2200 ft E of the SW corner of Section 35, T46N, R5E. The land surface elevation at the well is approximately 925 ft.

A 10-in. diameter hole was drilled to a depth of 150 ft, reduced to 8 in. between 150 and 300 ft, and finished 6 in. in diameter from 300 to 1600 ft. The well was cased with 10-in. pipe to a depth of 150 ft, 6-in. pipe to a depth of 178 ft, 5-in. pipe to a depth of 418 ft, and 4-in. pipe to a depth of 1074 ft.

On July 8, 1914, the nonpumping water level was reported to be about 20 ft below land surface and when pumping with a cylinder setting of 115 ft, the plunger pump frequently broke suction.

On August 18, 1922, the well reportedly produced 315 gpm with a drawdown of 210 ft from a nonpumping water level of 33 ft below the pumphouse floor.

A mineral analysis of a sample (Lab. No. 48603) collected November 6, 1922, showed the water to have a hardness of 424 mg/l, total dissolved minerals of 512 mg/l, and an iron content of 0.4 mg/1.

WELL NO. 2, finished in the Glenwood-St. Peter Sandstone, was completed in 1913 to a depth of 742 ft by C. D. Acley, Walworth, Wis. This well was abandoned in 1929, and in 1944 the casing was cut off below land surface and the well was plugged with concrete. The well was located about 53 ft south of Metzen St., and 150 ft west of Ayer St., about 27 ft north of Well No. 1, approximately 677 ft N and 2200 ft E of the SW corner of Section 3 5, T46N, . R5E. The land surface elevation at the well is approximately 925 ft.

An 8-in. diameter hole was drilled to a depth of 156 ft and finished 6 in. in diameter from 156 to 742 ft. The casing record is not available.

Upon completion, the production rate was reported to be 150 gpm and the pumping water level was 176 ft below land surface.

On November 11, 1922, after 4 hr of pumping at a rate of 290 gpm in Well No. 1, the water level in Well No. 2 was lowered from a depth of about 45 ft to a depth of 109 ft.

WELL NO. 3, finished in sand and gravel, was completed in 1929 to a depth of 71 ft by the Fairbanks-Morse Co. The well is located about 100 ft south of the main pumping station, approximately 550 ft N and 2150 ft E of the SW corner of Section 35, T46N, R5E. The land surface elevation at the well is approximately 925 ft. A drillers log of Well No. 3 follows:

A 48-in. diameter hole was drilled to a depth of 30 ft,

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil	43	43
Gravel	28	71
Rock below		

reduced to 45 in. between 30 and 42 ft, and finished 42 in. in diameter from 42 to 71 ft. The well is cased with 32-in. steel pipe from land surface to a depth of 32 ft and 14-in. pipe from 0.7 ft above land surface to a depth of 56 ft followed by 15 ft of 16-in. porcelain enameled cast iron screen. The annulus between the bore hole and 32-in. casing is filled with cement from 0 to 32 ft, and the annulus between the 32- and 14-in. casings and between the bore hole and casing-screen assembly is filled with selected gravel from 0 to 71 ft.

Upon completion, the nonpumping water level was reported to be 15 ft below land surface and the well produced 550 gpm. The production rate slowly increased to 600 gpm after the well was placed in service.

On May 19, 1938, after production had decreased, the well reportedly produced 600 gpm for less than 15 min and the water was drawn down to the bottom of the suction pipe at a depth of 68 ft from a nonpumping water level of 15 ft below the top of the well.

On August 13, 1946, Dowell, Inc. acidized this well after the production had dropped to less than half of its original capacity. After acidizing, a production in excess of 500 gpm was obtained.

In October 1950 and May 1952, this well was again acidized but the results are not available.

On February 23, 1954, the well reportedly produced 358 gpm with a drawdown of 45 ft from a nonpumping water level of 18ft.

The pumping equipment presently installed consists of a 40-hp electric motor, an 8-in., 3-stage Fairbanks-Morse turbine pump rated at 500 gpm, and has 60 ft of 8-in. column pipe.

A partial analysis of a sample (Lab. No. 179607) collected September 18, 1969, after pumping for 1 hr at 250 gpm, showed the water to have a hardness of 512 mg/1, total dissolved minerals of 629 rng/l, and an iron content of 0.1 mg/1.

WELL NO. 4, finished in sand and gravel, was completed in April 1946 to a depth of 69 ft by the Layne-Western Co., Aurora. The well is located at the south end of Ayer St. about one-half block south of the main pumping station, approximately 100 ft N and 2100 ft E of the SW corner of Section 35, T46N, R5E. The land surface elevation at the

well is approximately 920 ft.

A drillers log of Well No. 4 follows:

Strata	Thickness (ft)	Depth (ft)
Fill	3	3
Yellow clay	8	11
Gravel	1	12
Hardpan and boulders	33	45
Sand and gravel	22	67
Sand, gravel, and clay	2	69
Clay below		

A 60-in. diameter hole was drilled to a depth of 20 ft and finished 42 in. in diameter from 20 to 69 ft. The well is cased with 38-in. pipe from 0.5 ft above land surface to a depth of 46 ft, 26-in. pipe from 1 ft above land surface to a depth of 49 ft followed by 20 ft of 26-in. bronze shutter screen. The annulus between the 38- and 26-in. casings and between the bore hole and screen is filled with pea gravel from 0 to 69 ft.

Upon completion, the well reportedly produced from 200 to 383 gpm for 1.9 hr with a drawdown of 30 ft from a nonpumping water level of 17 ft below land surface.

After the well was placed in service, the rate of production dropped to 275 gpm. The well was acidized by Dowell, Inc., on November 23, 1946, and the rate of production was increased to 375 gpm.

On February 23, 1954, after pumping at a rate of 169 gpm, the drawdown was 28 ft from a nonpumping water level of 17 ft. The well was then acidized with 1500 gal HCl on March 22, 1954. On March 26, 1954, the well reportedly produced 226 gpm.

This well was acidized again in February 1957 after the discharge rate had dropped to a range from 180 to 200 gpm. A production test was then conducted on February 13, 1957, and the well was pumped at a rate of 280 gpm for 4 hr. When Well No. 3 was pumping, the capacity dropped to 200 gpm.

In 1973, it was reported that the well was producing at a rate of 100 to 110 gpm.

The pumping equipment presently installed is a 12-in., 3-stage American Well Works turbine pump set at 52 ft, rated at 425 gpm at about 65 ft TDH, and powered by a 10-hp 1160 rpm General Electric motor.

A partial analysis of a sample (Lab. No. 179608) col lected September 18, 1969, after pumping for 1 hr at 150 gpm, showed the water to have a hardness of 418 mg/l, total dissolved minerals of 477 mg/1, and an iron content of 0.9 mg/1.

Prior to the construction of Well No. 5, three test holes were drilled in 1957 by the J. P. Miller Artesian Well Co., Brookfield, to depths ranging from 60 to 94 ft. Eight additional test holes were drilled in 1958 by the Layne-Western Co., Aurora, to depths ranging from 86 to 118 ft.

WELL NO. 5, finished in sand and gravel, was completed in May 1958 to a depth of 68 ft by the J. P. Miller Artesian Well Co., Brookfield. The well is located adjacent to the main pumping station on Ayer St., approximately 650 ft N and 2300 ft E of the SW corner of Section 35, T46N, R5E. The land surface elevation at the well is approximately 925 ft.

A drillers log of Well No. 5 follows:

Strata	Thickness (ft)	Depth (ft)
Top soil and clay fill	5	5
Gravel and boulders	7	12
Gray clay	8	20
Sand and gravel	10	30
Clay and boulders	15	45
Sand and gravel (silty 69 to 70 ft)	25	70

A 60-in. diameter hole was drilled to a depth of 68 ft. The well is cased with 20-in. OD steel pipe from 0.7 ft above the pump station floor to a depth of 48 ft followed by 20 ft of 20-in. No. 65 slot Cater stainless steel screen. The annulus between the bore hole and casing-screen assembly is filled with cement from 0 to 20 ft, with clay and aqua-gel from 20 to 32 ft, and with gravel from 32 to 68 ft.

Upon completion, the driller reported that the well produced 400 gpm for 6 hr with a drawdown of 29.6 ft from a nonpumping water level of 15.4 ft below the pump base.

The pumping equipment presently installed consists of a 15-hp 1750 rpm Westinghouse electric motor, a 10-in., 2-stage Layne turbine pump (No. 39198) set at 60 ft, rated at 450 gpm at about 70 ft TDH, and has 60 ft of 6-in. column pipe. The well is equipped with 60 ft of airline. In April 1971, the pump was pulled, and a new strainer and column pipe were installed.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B108230) is for a water sample from the well collected March 14, 1973, after 1 hr of pumping at 500 gpm.

WELL NO. 5, LABORATORY NO. B108230

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.36	0.01	Silica	SiO_2	16	
Manganese	Mn	0.15	0.00	Fluoride	F	0.2	0.01
Ammonium	NH_4	0		Boron	B	0.10	
Sodium	Na	23.5	1.02	Nitrate	NO_3	7.9	0.13
Potassium	K	1.6	0.04	Chloride	Cl	46	1.30
Calcium	Ca	115	5.79	Sulfate	SO_4	110	2.29
Magnesium	Mg	52	4.27	Alkalinity (as $CaCO_3$)		372	7.44
Arsenic	As	0.00		Hardness (as $CaCO_3$)		503	
Barium	Ba	0.0					
Copper	Cu	0.00		Total dissolved minerals		635	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00		pH (as rec'd)	8.2		
Mercury	Hg	0.0000		Radioactivity			
Nickel	Ni	0.0		Alpha *pc/l*	3.8		
Selenium	Se	0.00		± deviation	2.6		
Silver	Ag	0.00		Beta *pc/l*	6.7		
Zinc	Zn	0.00		± deviation	2.7		

WELL NO. 6, finished in sand and gravel, was completed in July 1963 to an effective depth of 197 ft by Harry C. Neely, Elburn. The well is located on the northeast edge of town next to the municipal swimming pool, approximately

1699 ft S and 1775 ft E of the NW corner of Section 36, T46N, R5E. The land surface elevation at the well is approximately 1005 ft.

A drillers log of Well No. 6 follows:

Strata	Thickness (ft)	Depth (ft)
Clay	32	32
Sand	6	38
Clay, stones, and fine sand	26	64
Sand and clay	16	80
Boulder	1	81
Sand and clay	7	88
Sand	6	94
Clay and stones	5	99
Boulder	16	115
Medium sand	5	120
Coarse sand	10	130
Fine gravel (boulder at 131 and 133 ft)	4	134
Coarse gravel	17	151
Clay	29	180
Coarse gravel	17	197
Clay below		

A 12-in. diameter hole was drilled to a depth of 199 ft. The well is cased with 12-in. pipe from 2 ft above land surface to a depth of 131 ft, 12-in. Johnson screen from 131 ft to a depth of 154.7 ft, 10-in. pipe from 154.7 to 185 ft, 12-in. Johnson screen from 185 to 197 ft, and 12-in. pipe from 197 to 199 ft. The upper screen consists of 5 ft of No. 60 slot followed by 18.7 ft of No. 150 slot and the bottom screen consists of 12 ft of No. 150 slot.

A production test was conducted by the driller on July 27, 1963. After 7.5 hr of pumping at rates of 305 to 896 gpm, the final drawdown was 28.8 ft from a nonpumping water level of 93.0 ft below land surface.

The pumping equipment presently installed consists of a 50-hp 1800 rpm U.S. electric motor, a 10-in., 5-stage Layne vertical turbine pump (No. 65282) set at 120 ft, rated at 600 gpm at about 243 ft head, and has 120 ft of 8-in. column pipe. The well is equipped with 120 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B108233) is for a water sample from the well collected March 14, 1973, after 2 hr of pumping. Hydrogen sulfide has been apparent when previous samples were collected.

WELL NO. 6, LABORATORY NO. B108233

		mg/l	me/l			mg/l	me/l
Iron	Fe	2.1	0.08	Silica	SiO_2	22	
Manganese	Mn	0.01		Fluoride	F	0.6	0.03
Ammonium	NH_4	1.2	0.07	Boron	B	0.12	
Sodium	Na	12.4	0.54	Nitrate	NO_3	0	
Potassium	K	1.1	0.03	Chloride	Cl	5	0.14
Calcium	Ca	76	3.79	Sulfate	SO_4	17	0.35
Magnesium	Mg	41.5	3.41	Alkalinity (as $CaCO_3$)		362	7.24
Arsenic	As	0.00		Hardness (as $CaCO_3$)		360	
Barium	Ba	0.0					
Copper	Cu	0.04		Total dissolved minerals		396	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00		pH (as rec'd)		8.3	
Mercury	Hg	0.0000		Radioactivity			
Nickel	Ni	0.0		Alpha *pc/l*		0.9	
Selenium	Se	0.00		±deviation		1.2	
Silver	Ag	0.00		Beta *pc/l*		9.0	
Zinc	Zn	0.00		±deviation		2.3	

HEBRON

The village of Hebron (781) installed a public water supply in 1905. One well (No. 3) is in use and another well (No. 2) is available for emergency use. In 1949 there were 280 services, 10 unmetered; the average and maximum daily pumpages were 70,000 and 85,000 gpd, respectively. In 1973 there were 370 services, all metered; the average and maximum daily pumpages were 250,000 and 300,000 gpd, respectively. The water is chlorinated and fluoridated, and the water from Well No. 3 is also treated with polyphosphate to keep iron in solution.

WELL NO. 1, finished in sand and gravel, was completed in 1904 to a depth of 269.4 ft by J. W. Miller, Genoa, Wis. This well was abandoned in 1973. The well is located next to the pressure tank in the main pumping station on Western Ave. just north of the railroad tracks, approximately 300 ft N and 280 ft W of the SE corner of Section 8, T46N, R7E. The land surface elevation at the well is approximately 930 ft.

The well is cased with 8-in. pipe from land surface to a depth of 173.2 ft and 6-in. pipe from 155.5 ft to a depth of 258.4 ft followed by 11 ft (16 ft overall length) of 6-in. brass screen.

Upon completion, the nonpumping water level was reported to be 61 ft below land surface.

On July 15, 1963, the nonpumping water level was reported to be 68 ft.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 02297) of a sample collected October 19, 1971, after pumping for 24 hr at 290 gpm, showed the water to have a hardness of 284 mg/l, total dissolved minerals of 290 mg/1, and an iron content of 0.45 mg/1.

WELL NO. 2, finished in sand and gravel, was completed in April 1948 to a depth of 266 ft by A. Bottlemy Well Drillers, Alden. This well is available for emergency use. The well is located in the west room of the pumping station about 15 ft west of Well No. 1, approximately 300 ft N and 295 ft W of the SE corner of Section 8, T46N, R7E. The land surface elevation at the well is approximately 930 ft.

A drillers log of Well No. 2 follows:

Strata	Thickness (ft)	Depth (ft)
Top soil and clay	5	5
Sand and gravel	35	40
Sand	10	50
Blue clay	13	63
Sand and gravel	70	133
Blue clay	38	171
Clay and sand	61	232
Sand and gravel	8	240
Clay and gravel	7	247
Gravel and sand	20	267

The well is cased with 8-in pipe from 1.5 ft above the pumphouse floor to a depth of 256 ft followed by 10 ft of 8-in. red brass screen.

In June 1951 and July 1963, the nonpumping water levels were reported to be 75 and 67 ft, respectively.

The pumping equipment presently installed is a Fairbanks-Morse turbine pump (No. SJ1293) rated at 225 gpm, and powered by a 15-hp 1745 rpm General Electric motor (No. 5K326D203).

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 02298) is for a water sample from the well collected October 19, 1971, after 24 hr of pumping at 240 gpm.

WELL NO. 2, LABORATORY NO. 02298

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.6	0.02	Silica	SiO_2	13	
Manganese	Mn	0.0		Fluoride	F	0.4	0.02
Ammonium	NH_4	0.9	0.05	Boron	B	0.1	
Sodium	Na	16	0.70	Nitrate	NO_3	0.9	0.01
Potassium	K	0.7	0.02	Chloride	Cl	3.5	0.10
Calcium	Ca	57.6	2.87	Sulfate	SO_4	9	0.19
Magnesium	Mg	33	2.71	Alkalinity (as $CaCO_3$)		292	5.84
				Hardness (as $CaCO_3$)		272	
Barium	Ba	0.0		Total dissolved minerals		315	
Copper	Cu	0.0					
Cadmium	Cd	0.00					
Chromium	Cr	0.0		pH (as rec'd)	7.7		
Lead	Pb	0.00		Radioactivity			
Mercury	Hg	<0.0005		Alpha *pc/l*	0		
Nickel	Ni	0.0		±deviation	0		
Silver	Ag	0.0		Beta *pc/l*	0		
Zinc	Zn	0.02		±deviation	0		

WELL NO. 3, finished in sand and gravel, was completed in June 1972 to a depth of 278 ft (effective depth 245 ft) by Harry C. Neely, Elburn. The well is located in an alley south of 12119 West Western Ave., approximately 100 ft N and 380 ft W of the SE corner of Section 8, T46N, R7E. The land surface elevation at the well is approximately 920 ft.

An 18-in. diameter hole was drilled to a depth of 278 ft. The well is equipped with a 12-in. casing from 3 ft above land surface to a depth of 108 ft, 12-in. screen from 108 ft to a depth of 129 ft, 12-in. casing from 129 ft to a depth of 182 ft, 12-in. screen from 182 ft to a depth of 189 ft, 12-in. casing from 189 ft to a depth of 235 ft, 12-in. screen from 235 ft to a depth of 245 ft, and 12-in. casing from 245 ft to a depth of 278 ft. The screen sections are all No. 40 slot Johnson stainless steel. The annulus between the bore hole and casing-screen assembly is filled with cement from 0 to 80 ft, with clay and bentonite from 80 to 105 ft, and with natural pack gravel from 105 to 278 ft.

A production test was conducted by the driller on June 22, 1972. After 8.2 hr of pumping at rates ranging from 340 to 495 gpm, the final drawdown was 31 ft from a non-pumping water level of 33 ft below the top of the casing. Five min after pumping was stopped, the water level had recovered to 35 ft.

The pumping equipment presently installed is a Sta-Rite submersible pump set at 95 ft, rated at 500 gpm, and powered by a 30-hp Sta-Rite electric motor.

A drillers log of Well No. 3 follows:

Strata	Thickness (ft)	Depth (ft)
Brown clay	6	6
Medium gravel and some brown clay	39	45
Blue clay	12	57
Sand	23	80
Sand and fine gravel	56	136
Blue clay	96	232
Blue clay and fine gravel	40	272
Green shale	6	278

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B102559) is for a water sample from the well collected September 10, 1973, after 30 min of pumping at 480 gpm.

WELL NO. 3, LABORATORY NO. B102559

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.00		Silica	SiO_2	19	
Manganese	Mn	0.00		Fluoride	F	0.2	0.01
Ammonium	NH_4	0.5	0.03	Boron	B	0.9	
Sodium	Na	37	1.61	Nitrate	NO_3	33	0.53
Potassium	K	2.7	0.07	Chloride	Cl	83	2.34
Calcium	Ca	112	5.59	Sulfate	SO_4	64	1.33
Magnesium	Mg	47	3.87	Alkalinity (as $CaCO_3$)		344	6.88
Arsenic	As	0.00		Hardness (as $CaCO_3$)		472	9.44
Barium	Ba	0.0		Total dissolved minerals		662	
Copper	Cu	0.00					
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00		pH (as rec'd)	8.0		
Mercury	Hg	0.0000		Radioactivity			
Nickel	Ni	0.0		Alpha *pc/l*	0.0		
Selenium	Se	0.00		±deviation	0.0		
Silver	Ag	0.00		Beta *pc/l*	0.0		
Zinc	Zn	0.00		±deviation	0.0		

HIGHLAND SHORES SUBDIVISION

Highland Shores Subdivision (est. 1421), located 1 mile southwest of Wonder Lake, installed a public water supply in 1952. The water system is owned and operated by the Northern Illinois Utilities. Two wells are in use. This supply is cross connected with the Sunrise Ridge Subdivision. In 1955 there were 180 services. In 1975 there were 406 services, all metered; the average and maximum daily pumpages were 49,315 and 74,000 gpd, respectively. The water

is chlorinated and treated with polyphosphate to keep iron in solution; in addition the water from Well No. 2 is fluoridated.

WELL NO. 1, finished in sand and gravel, was completed in June 1952 to a depth of 220 ft by C. L. Wertz, Antioch. The well is located on Shady Lane, about 3 blocks west of the lake, approximately 1900 ft N and 1500 ft E of the SW corner of Section 13, T45N, R7E. The land surface elevation at the well is approximately 890 ft.

A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil and clay	10	10
Gravel	48	58
Clay and sand	62	120
Sand, some water 70 ft (dirty)	6	126
Red clay	19	145
Gravel clean 70 ft	3	148
Gray clay, some gravel	62	210
Gravel	10	220

A 6-in. diameter hole was drilled to a depth of 220 ft. The well is cased with 6-in. pipe from 2.5 ft above the pump-house floor to a depth of 210 ft followed by 10 ft of screen.

Upon completion, the nonpumping water level was reported to be 50 ft below land surface and the well produced 40 gpm.

The pumping equipment presently installed is a Sta-Rite submersible pump rated at 145 gpm at about 400 ft TDH, and powered by a 10-hp electric motor.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B111518) of a sample collected June 15, 1973, after pumping for 30 min at 145 gpm, showed the water to have a hardness of 300 mg/1, total dissolved minerals of 321 mg/1, and an iron content of 0.75 mg/1.

WELL NO. 2, finished in sand and gravel, was completed in April 1956 to a depth of 260 ft by C. L. Wertz, Antioch. The well is located on Memory Lane adjacent to the elevated tank about 6 blocks west of the lake, approximately 1650 ft N and 150 ft W of the SE corner of Section 14, T45N, R7E. The land surface elevation at the well is approximately 925 ft.

An 8-in. diameter hole was drilled to a depth of 260 ft. The well is cased with 8-in. pipe from 1.7 ft above the pump-house floor to a depth of 248 ft followed by 12 ft of 8-in. No. 15 slot Johnson Everdur screen.

On October 28, 1964, the well reportedly produced 150 gpm for 0.2 hr with a drawdown of 58 ft from a nonpumping water level of 61 ft below land surface.

The pumping equipment presently installed is a Red Jacket submersible pump set at 120 ft, rated at 240 gpm, and powered by a 15-hp U.S. electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B100774) is for a water sample from the well collected July 24, 1973.

WELL NO. 2, LABORATORY NO. B100774

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.48		Silica	SiO_2	19	
Manganese	Mn	0.14		Fluoride	F	0.3	0.02
Ammonium	NH_4	0.2	0.01	Boron	B	0.3	
Sodium	Na	5.0	0.22	Nitrate	NO_3	0.0	0.00
Potassium	K	1.2	0.03	Chloride	Cl	3	0.08
Calcium	Ca	70	3.49	Sulfate	SO_4	38	0.79
Magnesium	Mg	36	2.96	Alkalinity (as $CaCO_3$)		286	5.72
Arsenic	As	0.00		Hardness (as $CaCO_3$)		323	6.46
Barium	Ba	0.0					
Copper	Cu	0.00		Total dissolved minerals		349	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00		pH (as rec'd)		7.7	
Mercury	Hg	0.0000		Radioactivity			
Nickel	Ni	0.0		Alpha *pc/l*		1.5	
Selenium	Se	0.00		±deviation		1.6	
Silver	Ag	0.00		Beta *pc/l*		0.0	
Zinc	Zn	0.03		±deviation		1.3	

HOLIDAY HILLS SUBDIVISION

Holiday Hills Subdivision (est. 634), located 1 mile northwest of Island Lake, installed a public water supply in 1956. The water system is owned and operated by the Community Service Corp. One well (No. 2) is in use and another well (No. 1) is available for emergency use. In 1958 there were 73 services. In 1975 there were 181 services, all metered; the average and maximum daily pumpages were 40,775 and 60,000 gpd, respectively. The water from Well No. 2 is chlorinated, fluoridated, and treated with polyphosphate to keep iron in solution.

WELL NO. 1, finished in sand and gravel, was completed in February 1956 to a depth of 103 ft by Joseph Huemann, McHenry. This well is maintained for emergency use. The well is located at the intersection of Sunset Drive and Driftwood Ave., approximately 1700 ft S and 1500 ft W of the NE corner of Section 18, T44N, R9E. The land surface elevation at the well is approximately 750 ft. A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Clay	3	3
Yellow gravel	37	40
Sandy clay	51	91
Sandy silt	4	95
Clean gravel	8	103

A 6-in. diameter hole was drilled to a depth of 103 ft. The well is cased with 6-in. galvanized pipe from 2 ft above the pumphouse floor to a depth of 103 ft.

In April 1956, the well reportedly produced 60 gpm for 24 hr with a drawdown of 19 ft from a nonpumping water level of 22 ft below land surface.

The pumping equipment presently installed is a 13-stage Deming turbine pump (Serial No. MT5673) set at 63 ft, rated at 80 gpm, and powered by a 5-hp 3600 rpm U.S. electric motor (Serial No. 2421639).

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B0018164) of a sample collected May 10, 1972, after pumping for 30 min, showed the water to have a hardness of 312 mg/1, total dissolved minerals of 400 mg/1, and an iron content of 1.05 mg/1.

WELL NO. 2, finished in sand and gravel, was completed in July 1958 to a depth of 108 ft by the Henry Boysen Co., Libertyville. The well is located 12 ft south of Well No. 1, approximately 1712 ft S and 1500 ft W of the NE corner of Section 18, T44N, R9E. The land surface elevation at the well is approximately 750 ft.

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil	6	6
Gravel	34	40
Sand with clay	50	90
Gravel	8	98
Sand and gravel	10	108

A 12-in. diameter hole was drilled to a depth of 108 ft. The well is cased with 10-in. pipe from 2 ft above the pumphouse floor to a depth of 93 ft followed by 15 ft of 6-in. No. 14 slot Cook screen.

The pumping equipment presently installed is an 8-in., 10-stage Byron Jackson turbine pump (Type OKH, Serial No. 357006) set at 87 ft, rated at 275 gpm at about 195 ft TDH, and powered by a 20-hp 1760 rpm U.S. electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 02688) is for a water sample from the well collected November 9, 1971, after 30 min of pumping at 230 gpm.

WELL NO. 2, LABORATORY NO. 02688

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.7	0.02	Silica	SiO_2	23	
Manganese	Mn	0.0		Fluoride	F	0.3	0.02
Ammonium	NH_4	0.3	0.01	Boron	B	0.0	
Sodium	Na	5.2	0.23	Nitrate	NO_3	0	
Potassium	K	0.9	0.02	Chloride	Cl	9.0	0.25
Calcium	Ca	84.8	4.23	Sulfate	SO_4	28	0.58
Magnesium	Mg	44	3.62	Alkalinity (as $CaCO_3$)		340	6.80
				Hardness (as $CaCO_3$)		392	
Barium	Ba	0.3		Total dissolved minerals		443	
Copper	Cu	0.0					
Cadmium	Cd	0.00		pH (as rec'd)	7.4		
Chromium	Cr	0.0		Radioactivity			
Lead	Pb	0.00		Alpha *pc/l*	0		
Mercury	Hg	<0.0005		±deviation	1		
Nickel	Ni	0.0		Beta *pc/l*	3		
Silver	Ag	0.0		±deviation	2		
Zinc	Zn	0.0					

HUNTLEY

The village of Huntley (1432) installed a public water supply in 1903. One well (No. 5) is in use and two other wells (Nos. 3 and 4) are available for emergency use. In 1950 there were 200 services, 180 were metered; the average and maximum daily pumpages were 40,000 and 80,000 gpd, respectively. In 1975 there were 600 services, all metered; the average and maximum daily pumpages were 301,938. and 500,000 gpd, respectively. The water from Well No. 5 is chlorinated, fluoridated, and treated with polyphosphate to keep iron in solution.

WELL NO. 1, finished in sand and gravel, was completed to a depth of 74.2 ft. This well was abandoned and capped in 1947. The well was located south of Main St. and west of Railroad St., approximately 306 ft S and 1800 ft E of the NW corner of Section 33, T43N, R7E. The land surface elevation at the well is approximately 889 ft.

The well was cased with 6-in. pipe to an unknown depth. In 1921 this well was cleaned and a new screen was installed.

WELL NO. 2, finished in sand and gravel, was completed to a depth of 74 ft. This well was abandoned and capped in 1954. The well was located about 6 ft north of Well No. 1, approximately 300 ft S and 1800 ft E of the NW corner of Section 33, T43N, R7E. The land surface elevation at the well is approximately 889 ft.

The well was cased with 6-in. steel pipe from above the floor of a 6-ft deep pit to a depth of 64 ft followed by 10 ft of screen. In 1921 the well was cleaned and a new screen was installed and in 1935 the screen was cleaned and reinstalled.

WELL NO. 3, finished in sand and gravel, was originally constructed to a depth of 69 ft, and then the well was deepened in May 1947 to a depth of 74 ft by W. R. Boetsch & Son, Crystal Lake. This well is available for emergency use. The well is located at the foot of the elevated tank just south of the business district, approximately 290 ft S and 1775 ft E of the NW corner of Section 33, T43N, R7E. The land surface elevation at the well is approximately 890 ft.

A 10-in. diameter hole was drilled to a depth of 74 ft. The well is cased with 10-in. ID pipe from 0.9 ft above the pumphouse floor to a depth of 54 ft followed by 20 ft of screen. In 1921 the well was cleaned and a new screen was installed and in 1935 the screen was cleaned and reinstalled.

In May 1947, W. R. Boetsch & Son, Crystal Lake, pulled the sand screen, cleaned and deepened the well about 5 ft, and reinserted a screen.

On July 17, 1947, the well reportedly produced 100 gpm for 6 hr with a drawdown of 3.0 ft from a nonpumping water

level of 23.3 ft below land surface.

The pumping equipment presently installed consists of a 5-hp 1800 rpm U.S. electric motor (Serial No. 2679408), a 6-in., 11-stage Aurora turbine pump (No. 11687) set at 50 ft, rated at 100 gpm at about 140 ft TDH, and has 50 ft of 4-in. column pipe. The well is equipped with 50 ft of airline.

A mineral analysis of a sample (Lab. No. 111119) collected July 17, 1947, after pumping for 6 hr at 100 gpm, showed the water to have a hardness of 395 mg/l, total dissolved minerals of 447 mg/1, and an iron content of 1.3 mg/1.

Prior to the construction of Well No. 4, a test well (No. 1-53), finished in sand and gravel, was completed in November 1953 to a depth of 76 ft by the Layne-Western Co., Aurora. The test well was located under the elevated tank on Woodstock St., approximately 250 ft S and 1800 ft E of the NW corner of Section 33, T43N, R7E.

A sample study summary log of Test Well No. 1-53 furnished by the State Geological Survey follows:

Strata	Thickness (ft)	Depth (ft)
PLEISTOCENE SERIES		
Soil, brown	5	5
Till, very gravelly, sandy	20	25
Sand, very gravelly, medium to very coarse	10	35
Gravel, very sandy, granular	27.5	62.5
Sand, very gravelly, medium to very coarse	2.5	65
Sand, silty, very fine to coarse	5	70
Sand, gravelly, medium to very coarse	6	76

WELL NO. 4, finished in sand and gravel, was completed in November 1953 to a depth of 63 ft (measured in 1974 at 61 ft deep) by the Layne-Western Co., Aurora. This well is available for emergency use. The well is located under the elevated tan 50 ft west of the test well, approximately 250 ft S and 1750 ft E of the NW corner of Section 33, T43N, R7E. The land surface elevation at the well is approximately 889 ft.

A drillers log of Well No. 4 follows:

Strata	Thickness (ft)	Depth (ft)
Till	1	1
Natural and black fill	2	3
Blue clay and boulders	37	40
Coarse gravel and boulders	23	63

A 34-in. diameter hole was drilled to a depth of 63 ft. The well is cased with 12-in. pipe from 1.7 ft above the pump-house floor to a depth of 53 ft followed by 10 ft of 12-in. No. 8 (0.030 in.) Layne bronze shutter screen. The annulus between the bore hole and casing-screen assembly is filled with clay fill from 0 to 28 ft and with 11.5 yards of pea gravel and coarse sand from 28 to 63 ft.

A production test was conducted on November 11-12, 1953, by representatives of the driller, the State Water Survey, and Baxter and Woodman, Consulting Engineers. After 24 hr of pumping at rates of 219 to 323 gpm, the final drawdown was 10.0 ft from a nonpumping water level of 21.0 ft below land surface. Forty-two min after pumping was stopped, the water level had recovered to 25.8 ft. Well No. 2 was pumping during the first part of the test.

In September 1975, the nonpumping water level was reported to be 22 ft.

The pumping equipment presently installed consists of a 20-hp General Electric motor, an 8-in., 7-stage Johnston turbine pump set at 40 ft, rated at 250 gpm at about 200 ft TDH, and has 40 ft of 6-in. column pipe. A 5-ft section of 6-in. suction pipe is attached to the pump intake. The well is equipped with 40 ft of airline.

A partial analysis of a sample (Lab. No. 148164) collected November 7, 1958, after pumping for 5 min, showed the water to have a hardness of 440 mg/1, total dissolved minerals of 437 mg/1, and an iron content of 1.4 mg/1.

WELL NO. 5, finished in sand and gravel, was completed in October 1969 to a depth of 95 ft by the J. P. Miller Artesian Well Co., Brookfield. The well is located by the new elevated tank north of the village on the east side of Route 47, approximately 1865 ft S and 1535 ft E of the NW corner of Section 28, T43N, R7E. The land surface elevation at the well is approximately 900 ft.

A drillers log of Well No. 5 follows:

Strata	Thickness (ft)	Depth (ft)
Clay	20	20
Gravel	5	25
Blue clay	50	75
Sand and gravel	20	95

A 36-in. diameter hole was drilled to a depth of 95 ft. The well is cased with 12-in. pipe from land surface to a depth of 80 ft followed by 15 ft of 12-in. No. 50 slot Johnson stainless steel screen. The annulus between the bore hole and casing-screen assembly is filled with cement grout from 0 to 20 ft, with impervious fill from 20 to 50 ft, and with No. 2 Northern gravel from 50 to 95 ft.

Upon completion, the well reportedly produced 600 gpm for 24 hr with a drawdown of 30 ft from a nonpumping water level of 29 ft below land surface.

In January 1973, this well was treated with 1000 gal of acid by the Layne-Western Co., Aurora. After acidizing, the well reportedly produced 488 gpm with a drawdown of 41 ft from a nonpumping water level of 27 ft.

The pumping equipment presently installed consists of a 40-hp 1800 rpm U.S. Holloshaft electric motor (Serial No. RR-800-00-170-CR2023853), a 10-in., 4-stage Layne vertical turbine pump (Serial No. 62834) set at 70 ft, rated at 600 gpm at about 200 ft TDH, and has 70 ft of 8-in. column pipe. The well is equipped with 70 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B18268) is for a water sample from the well collected October 21, 1975, after 3.5 hr of pumping at 400 gpm.

WELL NO. 5, LABORATORY NO. B18268

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.4		Silica	SiO_2	17	
Manganese	Mn	0.13		Fluoride	F	0.3	0.02
Ammonium	NH_4	0.1	0.01	Boron	B	0.1	
Sodium	Na	11	0.48	Nitrate	NO_3	0.8	0.01
Potassium	K	1.8	0.05	Chloride	Cl	20	0.56
Calcium	Ca	100	4.99	Sulfate	SO_4	83	1.73
Magnesium	Mg	54	4.44	Alkalinity (as $CaCO_3$)		386	7.72
Arsenic	As	0.00					
Barium	Ba	0.1		Hardness (as $CaCO_3$)		471	9.42
Copper	Cu	0.00					
Cadmium	Cd	0.00		Total dissolved minerals		532	
Chromium	Cr	0.00					
Lead	Pb	0.00					
Mercury	Hg	0.0000		pH (as rec'd)	8.3		
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*	1.6		
Silver	Ag	0.00		± deviation	1.7		
Cyanide	CN	0.01		Beta *pc/l*	4.2		
Zinc	Zn	0.0		± deviation	2.0		

ISLAND LAKE

The village of Island Lake (1973) installed a public water supply in 1940. This village also extends into Lake County and two of the wells are located there. The water system is owned and operated by the Island Lake Water Co. Three wells (Nos. 1, 2, and 3) are in use. In 1952 there were 450 services, 350 were metered. In 1973 there were 580 services, all metered; the average and maximum daily pumpages were 47,022 and 70,000 gpd, respectively. The water is chlorinated and fluoridated.

WELL NO. 1 (Well 19-U), finished in sand and gravel, was completed in July 1940 to a depth of 116 ft (effective depth 115 ft) by Henry Boysen, Jr., Libertyville. The well is located at the corner of Midway and Fairfield Drives, approximately 1130 ft N and 190 ft E of the SW corner of Section 21, T44N, R9E, Lake County. The land surface elevation at the well is approximately 770 ft.

A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Yellow stoney gravel	40	40
Dirty gravel and sand	51	91
Gravel and sand	25	116

A 10-in. diameter hole was drilled to a depth of 116 ft. The well is cased with 10-in. wrought iron pipe from 1.2 ft above the floor of a 12-ft deep pit to a depth of 92 ft followed by 24 ft of 9.6-in. Cook screen. The screened section from top to bottom consists of 5 ft of No. 60 slot, 10 ft of No. 14 slot, and 8 ft of No. 40 slot with 1 ft of blank section at the bottom.

Upon completion, the well reportedly produced 503 gpm for 8 hr with a drawdown of 11 ft from a nonpumping water level of 29 ft below land surface.

On October 27, 1959, the nonpumping water level was reported to be 26 ft below land surface.

The well was acidized in 1960 by the Dow Chemical Co. and the yield was reportedly improved from 115 to 435 gpm.

On May 20, 1963, the nonpumping water level was reported to be 30 ft.

The pumping equipment presently installed consists of a 20-hp 1800 rpm U.S. electric motor, an 8-in., 11-stage Aurora turbine pump (No. 69213) set at 90 ft, rated at 200 gpm at about 250 ft TDH, and has 90 ft of 5-in. column pipe. The well is equipped with 90 ft of airline.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. C004680) of a sample collected December 18, 1973, after pumping for 30 min at 300 gpm, showed the water to have a hardness of 397 mg/1, total dissolved minerals of 466 mg/1, and an iron content of 1.4 mg/1.

WELL NO. 2 (Well K-9), finished in sand and gravel, was completed in June 1945 to a depth of 95 ft (reported in March 1960 at 92 ft deep) by Henry Boysen, Jr., Libertyville. The well is located at the corner of Eastway and Forest Drives, approximately 1385 ft S and 1255 ft E of the NW corner of Section 21, T44N, R9E, Lake County. The land surface elevation at the well is approximately 770 ft.

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Gravel	36	36
Sand	48	84
Gravel	11	95

An 8-in. diameter hole was drilled to a depth of 95 ft. The well is cased with 8-in. steel pipe from 1 ft above land surface to a depth of 84 ft followed by 11 ft (10 ft slotted) of 8-in. No. 14 slot Cook red brass screen.

Upon completion, after pumping for 2 days, the well reportedly produced 280 gpm with a drawdown of 16 ft from

a nonpumping water level of 9 ft below land surface.

This well was acidized in March 1960 by the J. P. Miller Artesian Well Co., Brookfield, and the yield was reportedly improved from 75 to 450 gpm. A production test was conducted by the J. P. Miller Artesian Well Co., on March 7, 1960. After 4 hr of pumping at rates of 110 to 360 gpm, the final drawdown was 21 ft from a nonpumping water level of 19 ft below land surface.

On May 20, 1963, the nonpumping water level was reported to be 10 ft.

The pumping equipment presently installed consists of a 15-hp 1800 rpm U.S. electric motor, a 7-in., 11-stage Byron Jackson turbine pump (No. C315645) set at 70 ft, rated at 200 gpm at about 188 ft TDH, and has 70 ft of 4-in. column pipe. A 10-ft section of 4-in. suction pipe is attached to the pump intake.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. C004679) of a sample collected December 18, 1973, after pumping for 30 min at 200 gpm, showed the water to have a hardness of 365 mg/l, total dissolved minerals of 430 mg/1, and an iron content of 1.3 mg/1.

WELL NO. 3 (Well A-6), finished in sand and gravel, was completed in July 1940 to a depth of 190 ft by Henry Boysen, Jr., Libertyville, and rebuilt in 1954 to a depth of 122 ft by W. R. Boetsch & Son, Crystal Lake. This well was returned to service in July 1969 after being out of use for 10 years. The well is located at the north intersection of Highland and Hillside Drives, approximately 1835 ft S and 685 ft W of the NE corner of Section 20, T44N, R9E, McHenry County. The land surface elevation at the well is approximately 760 ft.

A correlated drillers log of Well No. 3 furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
PLEISTOCENE SYSTEM		
Yellow stony gravel	20	20
Stony gravel and sand	67	87
Stone, gravel, and sand	68	155
Red clay	15	170
SILURIAN SYSTEM		
Niagaran Series		
Rock	20	190

A 4.5-in. diameter hole was originally drilled to a depth of 190 ft. When rebuilt in 1954, the hole was reamed to 8 in. in diameter to a depth of 122 ft. The well is cased with 8-in. pipe from above land surface to a depth of 112 ft and equipped with 12 ft (10 ft exposed) of 7.5-in. No. 14 slot Cook screen. The top of the casing is equipped with a pitless adapter.

Upon completion in 1940 at the 190-ft depth, the well reportedly produced 10 gpm for 8 hr with a drawdown of 40 ft from a nonpumping water level of 70 ft below land surface.

After rehabilitation in 1954, the well reportedly produced 75 gpm for 48 hr with a drawdown of 50 ft from a nonpumping water level of 24 ft.

The pumping equipment presently installed is a Fairbanks-Morse submersible pump set at 94 ft, rated at 100 gpm, and powered by a 30-hp Fairbanks-Morse electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 02932) is for a water sample from the well collected November 22, 1971.

WELL NO. 3, LABORATORY NO. 02932

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.15	0.00	Silica	SiO_2	23	
Manganese	Mn	0.0		Fluoride	F	0.3	0.02
Ammonium	NH_4	0.4	0.02	Boron	B	0.0	
Sodium	Na	7.5	0.33	Nitrate	NO_3	0.0	0
Potassium	K	1.2	0.03	Chloride	Cl	7.1	0.20
Calcium	Ca	96	4.79	Sulfate	SO_4	44	0.92
Magnesium	Mg	45	3.70	Alkalinity (as $CaCO_3$)		376	7.52
				Hardness (as $CaCO_3$)		420	
Barium	Ba	0.0		Total dissolved minerals		444	
Copper	Cu	0.0					
Cadmium	Cd	0.00		pH (as rec'd)		8.1	
Chromium	Cr	0.0		Radioactivity			
Lead	Pb	0.00		Alpha *pc/l*		0	
Mercury	Hg	<0.0005		±deviation		0	
Nickel	Ni	0.0		Beta *pc/l*		3	
Silver	Ag	0.0		±deviation		2	
Zinc	Zn	0.0					

WELL NO. 4, open to the Silurian dolomite and the Cambrian-Ordovician aquifer, was completed in July 1957 to a depth of 1233 ft by the Milaeger Well and Pump Co., Milwaukee, Wis. This well has been disconnected since 1959 because of high sulfur content. The well is located on U.S. Route 176 next to the elevated storage tank, approximately 1200 ft N and 450 ft W of the SE corner of Section 20, T44N, R9E, McHenry County. The land surface elevation at the well is approximately 775 ft.

A correlated drillers log of Well No. 4 furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
QUATERNARY SYSTEM		
Pleistocene Series		
"Glacial drift"	175	175
SILURIAN SYSTEM		
"Niagaran-Alexandrian"	185	360
ORDOVICIAN SYSTEM		
Maquoketa Group		
"Maquoketa"	105	465
Galena-Platteville Group		
"Platteville"	275	740
Glenwood-St. Peter Sandstone		
"Glenwood shale" (includes some of St. Peter Sandstone)	160	900
"St. Peter Sandstone"	100	1000
CAMBRIAN SYSTEM		
Franconia Formation		
"Franconian"	55	1055
Ironton-Galesville Sandstone		
"Galesville sandstone"	178	1233

A 12-in. diameter hole was drilled to a depth of 465 ft and finished 10 in. in diameter from 465 to 1233 ft. The well is cased with 12-in. drive pipe from 0.7 ft above the pumphouse floor to a depth of 175 ft and a 10-in. steel liner from 360 to 460 ft (cemented in).

A production test was conducted by the driller on July

1-2, 1957. After 16 hr of pumping at rates of 192 to 317 gpm, the drawdown was 159 ft from a nonpumping water level of 136 ft below the top of the casing. The pump broke suction after an additional 2.6 hr of pumping at 429 gpm. Pumping was then reduced to rates of 307 to 351 gpm for the final 3.9 hr of pumping. Two min after pumping was stopped, the water level had recovered to 203 ft and after 24 hr the well had recovered to 168 ft.

On July 24, 1959, after 20 min of pumping at a rate of 300 gpm, the drawdown was 75 ft from a nonpumping water level of 227 ft.

The pumping equipment presently installed consists of a 60-hp 1760 rpm Louis Allis electric motor (Type OGX, No. 2381057), a 10-in., 12-stage Byron Jackson turbine pump (No. 344228) set at 340 ft, rated at 300 gpm at about 480 ft TDH, and has 340 ft of 5-in. column pipe. The well is equipped with 340 ft of airline.

A mineral analysis of a sample (Lab. No. 150133) collected July 23, 1959, after pumping for 20 min at 300 gpm, showed the water to have a hardness of 244 mg/l, total dissolved minerals of 335 mg/1, and an iron content of 0.2 mg/1. Hydrogen sulfide gas also was apparent when this sample was collected.

LAKE DEFIANCE STATE PARK

Lake Defiance State Park (formerly called McHenry Dam State Park), located 1.5 miles southeast of McHenry, installed a public water supply in 1953. One well (No. 2) serves the park ranger's mobile home, maintenance garage, concession stand, rest rooms, and three drinking fountains. The average pumpage during the summer months is esti- mated to be about 225 gpd. The water is treated with polyphosphate to keep iron in solution.

WELL NO. 1, finished in sand and gravel, was completed in June 1953 to a depth of 20 ft by a park maintenance worker. This well was abandoned, capped, and covered over with dirt prior to 1964. The well was located on the east side of the river at the picnic area about 10 ft east from a light pole in the park, approximately 1850 ft S and 2000 ft E of the NW corner of Section 12, T44N, R8E. The land surface elevation at the well is approximately 740 ft.

The well was cased with 4-in. protective outer pipe from 0.3 ft above the pump base to an unknown depth and 1-in. drive pipe from approximately 0.8 ft above the pump base to an unknown depth. The annular space between the two pipes was filled with gravel.

WELL NO. 2, finished in sand and gravel, was completed in October 1958 to a depth of 47 ft by J. H. Huemann & Sons, McHenry. The well is located 15 ft northeast of the maintenance garage and 60 ft from the river on a lot occupied by the park ranger's mobile home, approximately 1600 ft S and 2000 ft E of the NW corner of Section 12, T44N, R8E. The land surface elevation at the well is approximately 740 ft.

A 6-in. diameter hole was drilled to a depth of 47 ft. The well is cased with 6-in. pipe from 0.7 ft above land surface to a depth of 47 ft. The top of the casing is equipped with a pitless adapter.

A production test was conducted on April 8, 1959, by representatives of the driller, the State Water Survey, and the Illinois Division of Architecture and Engineering. After 3 hr of pumping at a rate of 43 gpm, the drawdown was 3 ft from a nonpumping water level of 9 ft below the top of the casing.

In 1964, after 6 hr of pumping at a rate of 20 gpm, the drawdown was 4 ft.

The pumping equipment presently installed is a Reda submersible pump set at 40 ft, rated at 15 gpm, and powered by a 3/4-hp Reda electric motor.

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil	4	4
Dirty sand and gravel	20	24
Clay and stones	20	44
Clean gravel	3	47

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 03368) is for a water sample from the well collected December 20, 1971, after 30 min of pumping at 15 gpm.

WELL NO. 2, LABORATORY NO. 03368

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	1.2	0.04	Silica	SiO_2	18	
Manganese	Mn	0.0		Fluoride	F	0.2	0.01
Ammonium	NH_4	0.0		Boron	B	0.0	
Sodium	Na	25	1.09	Nitrate	NO_3	0.4	0.01
Potassium	K	2	0.05	Chloride	Cl	40	1.13
Calcium	Ca	101	5.04	Sulfate	SO_4	9	0.19
Magnesium	Mg	50	4.11	Alkalinity (as $CaCO_3$)		400	8.00
				Hardness (as $CaCO_3$)		444	
Barium	Ba	0.0		Total dissolved minerals		515	
Copper	Cu	0.0					
Cadmium	Cd	0.00		pH (as rec'd)		7.3	
Chromium	Cr	0.0		Radioactivity			
Lead	Pb	0.0		Alpha *pc/l*		1	
Mercury	Hg	< 0.0005		± deviation		1	
Nickel	Ni	0.0		Beta *pc/l*		1	
Silver	Ag	0.0		± deviation		3	
Zinc	Zn	0.2					

LAKE IN THE HILLS

The village of Lake in the Hills (3240) installed a public water supply in 1947. The water system is owned and operated by the Lake in the Hills Water Co. One well (No. 5) is in use and three wells (Nos. 1, 2, and 4) are available for emergency use. In 1952 there were 380 services; the estimated average daily pumpage was 30,000 gpd. In 1974 there were 1400 services, all metered; the average and maximum daily pumpages were 241,910 and 360,000 gpd, respectively. The water from Well No. 5 is chlorinated. The natural fluoride concentration in the water from Well No. 5 is adequate to satisfy state requirements.

WELL NO. 1, open to the Silurian dolomite and Maquoketa Formation, was completed in June 1948 to a depth of 257 ft by Stanley Bros., Wayne. This well is available for emergency use. The well is located at 6 Wander Way Drive, approximately 2480 ft S and 2330 ft W of the NE corner of Section 29, T43N, R8E. The land surface elevation at the well is approximately 895 ft.

The well is cased with 10-in. pipe from 0.2 ft above the pumphouse floor to an unknown depth.

On May 28-29, 1954, the well reportedly produced 100 gpm for 24 hr with a drawdown of 35 ft from a nonpumping water level of 60 ft below the pump base.

The pumping equipment presently installed is a 21-stage Red Jacket submersible pump rated at 150 gpm, and powered by a 15-hp Franklin electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 03803) is for a water sample from the well collected January 24, 1972, after 30 min of pumping at 85 gpm.

WELL NO. 1, LABORATORY NO. 03803

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.2	0.01	Silica	SiO_2	17	
Manganese	Mn	0.0		Fluoride	F	0.6	0.03
Ammonium	NH_4	5.1	0.28	Boron	B	0.15	
Sodium	Na	29	1.26	Nitrate	NO_3	0.0	
Potassium	K	2.0	0.05	Chloride	Cl	5.0	0.14
Calcium	Ca	66	3.29	Sulfate	SO_4	27	0.56
Magnesium	Mg	32	2.63	Alkalinity (as $CaCO_3$)		332	6.64
				Hardness (as $CaCO_3$)		304	
Barium	Ba	0.0		Total dissolved minerals		342	
Copper	Cu	0.0					
Cadmium	Cd	0.00					
Chromium	Cr	0.0		pH (as rec'd)	7.5		
Lead	Pb	0.00		Radioactivity			
Mercury	Hg	<0.0005		Alpha *pc/l*	0		
Nickel	Ni	0.0		±deviation	1		
Silver	Ag	0.0		Beta *pc/l*	1		
Zinc	Zn	0.0		±deviation	2		

WELL NO. 2, open to the Silurian dolomite and Maquoketa Formation, was completed in December 1948 to a depth of 327 ft by M. G. Ferguson, Chicago, and reportedly deepened in September 1952 to a depth of about 347 ft (measured in May 1954 at 321.3 ft deep). This well is available for emergency use. The well is located at 1116 Birch St., approximately 1500 ft N and 2070 ft W of the SE corner of Section 20, T43N, R8E. The land surface elevation at the well is approximately 870 ft.

The well is cased with 10-in. pipe from 0.5 ft above the pumphouse floor to an unknown depth.

On May 28, 1954, the well reportedly produced 100 gpm for 1 hr with a drawdown of 40 ft from a nonpumping water level of 60 ft below the pump base.

The pumping equipment presently installed is a Red Jacket submersible pump (Model 6M6) rated at 100 gpm, and powered by a 10-hp Franklin electric motor.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 03804) of a sample collected January 24, 1972, after pumping for 30 min at 110 gpm, showed the water to have a hardness of 356 mg/l, total dissolved minerals of 396 mg/1, and an iron content of 0.4 mg/1.

WELL NO. 3, finished in sand and gravel, was completed in 1928 to a reported depth of 186 ft (reported to be about 160 ft deep in 1973). This well is not in use. The well is located at the corner of Lincoln Drive and Washington St., approximately 1600 ft S and 1230 ft E of the NW corner of Section 20, T43N, R8E. The land surface elevation at the well is approximately 860 ft.

The well is cased with 5-in. pipe from 0.5 ft above the pumphouse floor to an unknown depth.

In June 1952, the nonpumping water level was reported to be 68 ft.

The pumping equipment presently installed is a Sta-Rite submersible pump (No. SP10D2) set at 155 ft, rated at 15 gpm, and powered by a 3/4-hp 3450 rpm Franklin electric motor.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 03805) of a sample collected January 24, 1972, after pumping for 30 min at 15 gpm, showed the water to have a hardness of 3 52 mg/1, total dissolved minerals of 390 mg/1, and an iron content of 0.2 mg/1.

WELL NO. 4, finished in sand and gravel, was completed in September 1954 to a depth of 114 ft by N. H. Geltz, Aurora. This well is available for emergency use. The well is located in the southeast portion of the village 20 ft behind the pumphouse on Algonquin Drive, approximately 1400 ft S and 2200 ft E of the NW corner of Section 28, T43N, R8E. The land surface elevation at the well is approximately 800 ft.

A sample study log of Well No. 4 furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
PLEISTOCENE SERIES		
Wisconsin stage		
Till, sandy, silty, dark reddish brown	10	10
Till, sandy, silty, reddish brown	20	30
Till, sandy, silty, brown	45	75
Sand, fine to medium, slightly silty	10	85
Sand, medium to coarse, clean, some gravel	10	95
Peat, sandy, silty, dark brown to black	5	100
Sand, poorly sorted, clean	5	105
Sand, medium to coarse, some gravel	8	113
SILURIAN SYSTEM		
Dolomite, fine grained, white to gray	1	114

A 10-in. diameter hole was drilled to a depth of 114 ft. The well is cased with 10-in. wrought steel pipe from land surface to a depth of 113 ft. From 103 to 113 ft the casing was perforated opposite the sand and gravel formation.

Upon completion, the well was reported to have an artesian flow at a rate of 25 gpm. The present flow rate is 18 gpm.

The pumping equipment presently installed is a rented Red Jacket pump set at 60 ft, rated at 40 gpm, and powered by a 3-hp electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. C004705) is for a water sample from the well collected December 18, 1973, while free flowing at a rate of 22 gpm.

WELL NO. 4, LABORATORY NO. C004705

		mg/l	me/l			mg/l	me/l
Iron	Fe	1.1		Silica	SiO_2	16	
Manganese	Mn	0.00		Fluoride	F	0.5	0.03
Ammonium	NH_4	2.2	0.12	Boron	B	0.2	
Sodium	Na	11	0.48	Nitrate	NO_3	0.1	0.00
Potassium	K	1.5	0.04	Chloride	Cl	5	0.14
Calcium	Ca	60	2.99	Sulfate	SO_4	24	0.50
Magnesium	Mg	29	2.39	Alkalinity (as $CaCO_3$)		282	5.64
Arsenic	As	0.00					
Barium	Ba	0.0		Hardness (as $CaCO_3$)		271	5.42
Copper	Cu	0.00					
Cadmium	Cd	0.00		Total dissolved minerals		324	
Chromium	Cr	0.00					
Lead	Pb	0.00					
Mercury	Hg	0.0000		pH (as rec'd)		7.9	
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*		0.3	
Silver	Ag	0.00		±deviation		0.6	
Cyanide	CN	0.00		Beta *pc/l*		0.0	
Zinc	Zn	0.00		±deviation		0.0	

WELL NO. 5, open to the Galena-Platteville Dolomite and Glenwood-St. Peter Sandstone, was completed in December 1972 to a depth of 910 ft by the Boetsch Water Supply Co., Crystal Lake. The well is located near Well No. 2 at 1116 Birch St., approximately 1530 ft N and 2000 ft W of the SE corner of Section 20, T43N, R8E. The land surface elevation at the well is approximately 870 ft.

A drillers log of Well No. 5 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil	2	2
Brown clay	2	4
Sand and gravel	24	28
Gray stoney clay	32	60
Pink stoney clay	132	192
Shale and shell rock	5	197
Solid limestone	48	245
Broken rock and shale	35	280
Soft gray green shale	65	345
Broken rock and shale	50	395
Brown shale	13	408
Galena limestone	137	545
Soft white limestone	55	600
Hard gray shale and rock	70	670
Platteville shale	117	787
St. Peter sandstone	93	880
Brown sandstone	30	910

A 17.5-in. diameter hole was drilled to a depth of 425 ft and finished 12 in. in diameter from 425 to 910 ft. The well is equipped with a Baker Monitor pitless adapter from 1.5 ft above land surface and cased with 12-in. pipe to a depth of 425 ft (cemented in).

A production test was conducted by the driller on February 5, 1973. After 2 hr of pumping at rates ranging from 402 to 421 gpm, the drawdown was 155 ft from a nonpumping water level of 280 ft below the top of the casing. Fifteen min after pumping was stopped, the water level had recovered to 335 ft.

The pumping equipment presently installed is a 10-in., 11-stage Byron Jackson submersible pump set at 550 ft, rated at 400 gpm at about 500 ft TDH, and powered by a 100-hp Byron Jackson electric motor.

The following mineral analysis (Lab. No. 190992) made in February 1973 is for a water sample from the well collected after 6 hr of pumping at 402 gpm.

WELL NO. 5, LABORATORY NO. 190992

		mg/l	me/l			mg/l	me/l
Iron (total)	Fe	0.1		Silica	SiO_2	8.1	
Manganese	Mn	0.00		Fluoride	F	1.6	
Ammonium	NH_4	1.8	0.10	Boron	B	0.9	
Sodium	Na	50.0	2.18	Nitrate	NO_3	0.0	0.00
Potassium	K	14.3	0.37	Chloride	Cl	2	0.06
Calcium	Ca	42.8	2.14	Sulfate	SO_4	5.1	0.11
Magnesium	Mg	18.7	1.54	Alkalinity (as $CaCO_3$)		304	6.08
Strontium	Sr	1.60	0.04				
Barium	Ba	<0.1		Hardness (as $CaCO_3$)		184	3.68
Copper	Cu	0.02					
Cadmium	Cd	0.00		Total dissolved minerals		334	
Chromium	Cr	0.00					
Lead	Pb	<0.05					
Lithium	Li	0.02		Turbidity	Tr		
Nickel	Ni	<0.05		Color	0		
Zinc	Zn	0.00		Odor	0		

LAKE KILLARNEY SUBDIVISION

Lake Killarney Subdivision (est. 840), located 1.5 miles north of Cary, installed a public water supply in 1959. The water system is owned and operated by the Killarney Water Co. One well (No. 2) is in use and another well (No. 1) is available for emergency use. In 1973 there were 240 services, all metered; the average and maximum daily pumpages were 48.000 and 72,000 gpd, respectively. The water from Well No. 2 is treated with polyphosphate to keep iron jn solution, fluoridated, and hypochlorinated. WELL NO. 1 (former Silver Lake-Oakwood Hills Subdivision well), finished in dolomite and shale, was constructed to a depth of 225 ft by William Boetsch, Crystal Lake, and

deepened in 1953 to a depth of 335 ft by Henry Boysen, Libertyville. This well is available for emergency use. The well is located one block east of Silver Lake Road near the corner of Walnut Drive and Pheasant Trail at 6700 Pheasant Trail, approximately 2300 ft N and 2150 ft W of the SE corner of Section 1, T43N, R8E. The land surface elevation at the well is approximately 840 ft.

The well is cased with 10-in. pipe from 1.7 ft above the pumphouse floor to a depth of 20 ft and 6-in. pipe from land surface to an unknown depth. The annular opening between the casings is cement grouted from 0 to 20 ft.

The pumping equipment presently installed is a 19-stage Byron Jackson turbine pump (Model No. 00KH, Serial No. LAW-C280689) set at 150 ft, rated at 100 gpm at about 251 ft head, and powered by a 10-hp 1800 rpm U.S. electric motor (Serial No. 952892).

WELL NO. 2 (Lake Killarney well), finished in Silurian dolomite, was completed in June 1960 to a.depth of 250 ft by the Henry Boysen Co., Libertyville. The well is located near the west end of the main street at Kiliarney and Lakewood Drives, approximately 2600 ft N and 100 ft E of the SW corner of Section 1, T43N, R8E. The land surface elevation at the well is approximately 830 ft.

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil	2	2
Mucky sand	181	183
Limestone	60	243
Shale	7	250

A 6-in. diameter hole was drilled to a depth of 250 ft. The well is cased with 6-in. pipe from 2 ft above the pumphouse floor to a depth of 183 ft.

Upon completion, the well reportedly produced 130 gpm for 8 hr with a drawdown of 120 ft from a nonpumping water level of 10 ft below land surface.

On October 28, 1964, the nonpumping water level was reported to be 10.14 ft below land surface.

The pumping equipment presently installed is a Red Jacket submersible pump rated at about 180 gpm, and powered by a 15-hp 3950 rpm Franklin electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B21676) is for a water sample from the well collected November 1, 1972, after 15 min of pumping at 150 gpm.

WELL NO. 2, LABORATORY NO. B21676

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	1.8	0.06	Silica	SiO_2	19	0.40
Manganese	Mn	0.03	0.00	Fluoride	F	0.2	0.01
Ammonium	NH_4	0.0		Boron	B	0.05	
Sodium	Na	3	0.13	Nitrate	NO_3	0.0	
Potassium	K	1.3	0.03	Chloride	Cl	5	0.14
Calcium	Ca	90	4.49	Sulfate	SO_4	85	1.77
Magnesium	Mg	40	3.29	Alkalinity (as $CaCO_3$)		280	5.60
Arsenic	As	0.00		Hardness (as $CaCO_3$)		389	
Barium	Ba	0.00					
Copper	Cu	0.00		Total dissolved minerals		424	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.04		pH (as rec'd)		7.7	
Mercury	Hg	0.0000		Radioactivity			
Nickel	Ni	0.0		Alpha *pc/l*		0.7	
Selenium	Se	0.00		±deviation		1.4	
Silver	Ag	0.004		Beta *pc/l*		4.8	
Zinc	Zn	0.55		±deviation		2.1	

LAKELAND PARK SUBDIVISION

Lakeland Park Subdivision (est. 2100), located 0.5 mile northwest of McHenry, installed a public water supply in 1953. The water system is owned and operated by the Ladd Enterprises, Inc. One well (No. 2) is in use and another well (No. 1) is available for emergency use. In 1955 there were 133 services, none metered. In 1971 there were 570 services, none metered; the average daily pumpage was 172,082 gpd. The water from Well No. 2 is fluoridated.

WELL NO. 1, finished in sand and gravel, was completed in 1954 to a depth of 86 ft by E. Wertz & Sons, Antioch. This well is available for emergency use. The well is located on Meadow Lane about 3 blocks north of Route 120, approximately 1000 ft S and 1600 ft E of the NW corner of Section 27, T45N, R8E. The land surface elevation at the well is approximately 758 ft.

The well is cased with 8-in. pipe from 3 ft above the pumphouse floor to a depth of 86 ft.

In August 1970, the nonpumping water level was reported to be 5 ft.

The pumping equipment presently installed is a Red Jacket submersible pump set at 20 ft, and powered by a 7 1/2-hp electric motor.

A mineral analysis made by the Illino is Environmental Protection Agency (Lab. No. C008538) of a sample collected June 6, 1974, after pumping for 1 hr, showed the water to have a hardness of 412 mg/l, total dissolved minerals of 502 mg/l, and an iron content of 2.0 mg/1.

WELL NO. 2, finished in sand and gravel, was completed in 1956 to a depth of 85 ft by Henry Boysen, Libertyville. The well is located about 3 blocks east of Well No. 1, approximately 1150 ft S and 2300 ft E of the NW corner of Section 27, T45N, R8E. The land surface elevation at the well is approximately 757 ft.

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Clay	7	7
Sand	3	10
Clay	10	20
Gravel	40	60
Sand	8	68
Sand and gravel	17	85

A 12-in. diameter hole was drilled to a depth of 85 ft. The well is cased with 12-in. pipe from 0.8 ft above the pumphouse floor to a depth of 71 ft followed by 14 ft of 12-in. No. 14 slot Cook screen.

When the well was being developed in 1956, a quantity of acid was introduced by the driller, following which the yield rate was 146 gpm.

On May 23, 1958, the well was reported to flow above land surface.

The pumping equipment presently installed is a Red Jacket submersible pump powered by a 20-hp electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 02681) is for a water sample from the well collected November 3, 1971, after 30 min of pumping at 3.5 gpm.

WELL NO. 2, LABORATORY NO. 02681

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.37	0.01	Silica	SiO_2	22	
Manganese	Mn	0.05	0.00	Fluoride	F	0.2	0.01
Ammonium	NH_4	0.3	0.02	Boron	B	0.0	
Sodium	Na	19	0.83	Nitrate	NO_3	0	
Potassium	K	1.6	0.04	Chloride	Cl	16	0.45
Calcium	Ca	91	4.54	Sulfate	SO_4	60	1.25
Magnesium	Mg	45	3.70	Alkalinity (as $CaCO_3$)		340	6.80
Barium	Ba	0.15		Hardness (as $CaCO_3$)		416	
Copper	Cu	0.0		Total dissolved minerals		470	
Cadmium	Cd	0.00					
Chromium	Cr	0.0					
Lead	Pb	0.00					
Mercury	Hg	<0.0005		Radioactivity			
Nickel	Ni	0.0		Alpha pc/l	0		
Silver	Ag	0.0		±deviation	0		
Zinc	Zn	0.0		Beta pc/l	3		
				±deviation	2		

McHENRY

The city of McHenry (6772) installed a public water supply in 1897. Two wells (Nos. 2 and 3) are in use and two other wells (Nos. 1 and 4) are available for emergency use. In 1949 there were 500 services, all metered. In 1975 there were 1700 services, all metered; in 1974 the average and maximum daily pumpages were 858,000 and 1,200,000 gpd, respectively. The water from Well Nos. 2 and 3 is filtered, treated with soda ash and polyphosphate to keep iron in solution, chlorinated, and discharged to a clear well where it is treated with sodium fluoride.

The first well, finished in sand and gravel, was completed at a depth of about 70 ft. This well was eventually abandoned due to the decreased yield by an infiltration of sand blocking the gravel formation. The well was located near the south bank of Boone Creek about 370 ft north of the intersection of Elgin and Waukegan Roads, approximately 400 ft N and 2600 ft W of the SE corner of Section 26, T45N, R8E. The land surface elevation at the well is approximately 750 ft. The well was cased with 6-in. pipe. Water flowed into the collecting reservoir at the top of the well.

The second well, finished in sand and gravel, was completed to a depth of about 70 ft. This well was abandoned in 1926. The well was located 25 ft west of the first well. The well was cased with 6-in. pipe. Flowing water was obtained and piped to the reservoir. On November 20, 1923, the flow from the first two wells was estimated at a rate of 65 gpm.

The third well, finished in sand and gravel, was completed in 1925 to a depth of 70 ft. This well was never used because of insufficient yield. The well was located about 35 ft southwest of the first well and cased with 6-in. pipe.

The fourth well, finished in sand and gravel, was completed about 1925 to a depth of about 70 ft. This well was abandoned in 1938. The well was located about 15 ft east of the first well and cased with 8-in. pipe. Flowing water was obtained and piped to the reservoir.

The fifth well was completed in 1938 to a depth of 160 ft by Joseph H. Huemann & Sons, McHenry. This well was never used. The well was located about 35 ft northwest of the first well. It was cased with 12-in. pipe to a depth of 96 ft. During a test of this well, the production was approximately 100 gpm.

WELL NO. 1, finished in sand and gravel, was completed in September 1938 to a depth of 82 ft by the Kelly Well Co., Grand Island, Neb. This well is used only in periods of high demands. The well is located 50 ft north of the city hall on Green St., approximately 400 ft N and 2500 ft E of the SW corner of Section 26, T45N, R8E. The land surface elevation at the well is approximately 755 ft.

A drillers log of Well No. 1 follows:

Strata	Thickness (ft)	Depth (ft)
Top soil, clay	5	5
Sand and gravel	5	10
Clay, gravel stones	11	21
Hardpan	2	23
Sand, gravel stones	11	34
Hardpan	1	35
Sand, gravel and clay	15	50
Muddy sand and gravel	16	66
Sand and gravel	3.5	69.5
Clay, sand and gravel	3.5	73
Sand	2	75
Sand and gravel	4.5	79.5
Blue clay	2.5	82
Rock		

A 34-in. diameter hole was drilled to a depth of 82 ft. The well is cased with 24-in. OD by 18-in. ID concrete pipe from the top of the pump foundation block to a depth of 57.8 ft. A perforated concrete screen of the same size extends from 57.8 to 81.3 ft and a concrete plug extends to 82 ft. The annulus between the bore hole and casing-screen assembly is filled with clay from 0 to 23 ft and with gravel from 23 to 82 ft.

On July 7, 1947, after a 20-min idle period, the well reportedly produced 400 gpm for 35 min with a drawdown of 25 ft from a nonpumping water level of 9 ft below the pump base.

The pumping equipment presently installed consists of a 25-hp 1800 rpm U.S. electric motor, a 10-in., 5-stage American Well Works turbine pump (Shop No. 61963) set at 60 ft, rated at 400 gpm at about 100 ft head, and has 60 ft of 6-in. column pipe. A 10-ft section of 6-in. suction pipe is attached to the pump intake. The well is equipped with 60 ft of airline.

A mineral analysis of a sample (Lab. No. 110958) collected July 7, 1947, after pumping for 35 min at 400 gpm, showed the water to have a hardness of 344 mg/l, total dissolved minerals of 373 mg/1, and an iron content of 0.1 mg/1. Hydrogen sulfide also was apparent when this sample was collected.

WELL NO. 2, finished in sand and gravel, was completed in July 1960 to a depth of 60 ft by the J. P. Miller Artesian Well Co., Brookfield. The well is located in the main pumping station on South Green St., approximately 200 ft N and 2500 ft E of the SW corner of Section 35, T45N, R8E. The land surface elevation at the well is approximately 768 ft.

A drillers log of Well No. 2 follows:

A 42-in. diameter hole was drilled to a depth of 60 ft. The well is cased with 16-in. steel pipe from 0.8 ft above the pump station floor to a depth of 40 ft followed by 20 ft of 16-in. No. 125 slot Cater stainless steel screen. The annulus between the bore hole and the casing-screen assembly is filled with concrete from 0 to 15 ft, with sand and bentonite from 15 to 20 ft, and with gravel from 20 to 60 ft.

Strata	*Thickness (ft)*	*Depth (ft)*
Clay	10	10
Gravel	50	60

Upon completion, the well reportedly produced 800 gpm for 24 hr with a drawdown of 21.5 ft from a nonpumping water level of 11.0 ft below the top of the casing.

The following mineral analysis (Lab. No. 195904) is for a water sample from the well collected June 10, 1974.

WELL NO. 2, LABORATORY NO. 195904

		mg/l	*me/l*			*mg/l*	*me/l*
Iron (total)	Fe	1.9		Silica	SiO_2	13.3	
Manganese	Mn	0.08		Fluoride	F	0.2	
Ammonium	NH_4	0.1	0.01	Boron	B	0.1	
Sodium	Na	23.7	1.03	Nitrate	NO_3	1.5	0.02
Potassium	K	1.8	0.05	Chloride	Cl	49	1.38
Calcium	Ca	111.2	5.55	Sulfate	SO_4	116.6	2.43
Magnesium	Mg	47.8	3.93	Alkalinity (as $CaCO_3$)		344	6.88
Strontium	Sr	0.24	0.01				
Barium	Ba	<0.1		Hardness (as $CaCO_3$)		474	9.48
Copper	Cu	0.00		Total dissolved minerals		582	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	<0.05		Turbidity		13	
Lithium	Li	0.01		Color		0	
Nickel	Ni	<0.05		Odor		0	
Zinc	Zn	0.00		Temp. (reported)		50F	

A production test was conducted by the driller on April 2, 1969. After pumping at a rate of 605 gpm, the drawdown was 3 ft from a nonpumping water level of 27 ft. The well was then acidized and the well reportedly produced 1015 gpm with a drawdown of 6 ft from a nonpumping water level of 27 ft.

The pumping equipment presently installed is an American Well Works turbine pump (Serial No. 83278) set at 43 ft, rated at 800 gpm at about 65 ft head, and powered by a 25-hp 1200 rpm U.S. electric motor (Serial No. 3095850).

WELL NO. 3, open to the sand and gravel and dolomite, was completed in July 1968 to a depth of 185 ft by Joseph Huemann & Sons, McHenry. The well is located 20 ft west of Well No. 2, approximately 200 ft N and 2480 ft E of the SW corner of Section 35, T45N, R8E. The land surface elevation at the well is approximately 766 ft.

A drillers log of Well No. 3 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil	10	10
Sand and gravel, dry	30	40
Coarse gravel and boulders	20	60
Hardpan and clay	54	114
Sand and gravel	15	129
Limestone	56	185

A 12-in. diameter hole was drilled to a depth of 129 ft and cased with 12-in. pipe from 1 ft above land surface to a depth of 114 ft followed by 15 ft of 12-in. No. 60 slot Johnson stainless steel screen. The well was finished with a 10-in. diameter hole from 129 to 185 ft. The top of the well casing is equipped with a pitless adapter.

Nonpumping water levels were reported to be 21 ft below land surface on June 24, 1970, and 25 ft on August 3, 1973.

The pumping equipment presently installed consists of a 20-hp 3450 rpm Red Jacket electric motor, a Red Jacket submersible pump set at 175 ft, rated at 275 gpm, and has 168 ft of 5-in. column pipe. The well is equipped with 175 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 02443) is for a water sample from the well collected October 26, 1971, after 6 hr of pumping at 330 gpm.

WELL NO. 3, LABORATORY NO. 02443

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.7	0.02	Silica	SiO_2	21	
Manganese	Mn	0.0		Fluoride	F	0.57	0.03
Ammonium	NH_4	0.5	0.03	Boron	B	0.3	
Sodium	Na	25	1.09	Nitrate	NO_3	0	
Potassium	K	1.9	0.05	Chloride	Cl	2.0	0.06
Calcium	Ca	57	2.84	Sulfate	SO_4	1	0.02
Magnesium	Mg	31	2.55	Alkalinity (as $CaCO_3$)		294	5.98
				Hardness (as $CaCO_3$)		260	
Barium	Ba	0.0		Total dissolved minerals		310	
Copper	Cu	0.0					
Cadmium	Cd	0.00		pH (as rec'd)		7.8	
Chromium	Cr	0.0		Radioactivity			
Lead	Pb	0.00		Alpha *pc/l*		1	
Mercury	Hg	<0.0005		±deviation		1	
Nickel	Ni	0.0		Beta *pc/l*		2	
Silver	Ag	0.0		±deviation		1	
Zinc	Zn	0.0					

WELL NO. 4 (former Country Club Estates Subdivision well), finished in dolomite, was completed in September 1956 to a depth of 185 ft by Joseph Huemann & Sons, McHenry. This well is available for emergency use. The well is located at 3401 Fairway Drive, approximately 1000 ft N and 1700 ft W of the SE corner of Section 35, T45N, R8E. The land surface elevation at the well is approximately 792 ft.

A 6-in. diameter hole was drilled to a depth of 185 ft. The well is cased with 6-in. pipe to a depth of 164 ft. The top of the casing is equipped with a pitless adapter.

The pumping equipment presently installed is a Red Jacket submersible pump set at about 120 ft, rated at 40 V gpm, and powered by a 5-hp U.S. electric motor.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 02873) of a sample collected November 17, 1971, after pumping for 4 hr, showed the water to have a hardness of 284 mg/l, total dissolved minerals of 348 mg/1, and an iron content of 0.35 mg/1.

WELL NO. 5, finished in sand and gravel, was completed in May 1974 to a depth of 94.5 ft by the J. P. Miller Artesian Well Co., Brookfield. As of February 1976, this well was not in service. The well is located 200 ft south and 50 ft west of the end of Beach Road, approximately 1450 ft N and 125 ft E of the SW corner of Section 27, T45N, R8E. The land surface elevation at the well is approximately 760 ft.

A drillers log of Well No. 5 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Peat and fill	5	5
Clay with sand and gravel	33	38
Fine sand and silt	34	72
Fine sand to coarse gravel	23	95

A 36-in. diameter hole was drilled to a depth of 39.5 ft and finished 30 in. in diameter from 39.5 to 95 ft. The well is cased with 30-in. OD pipe from 2.5 ft above land surface to a depth of 39.3 ft and 14-in. OD pipe from 4 ft above land surface to a depth of 69.5 ft followed by 25 ft of 14-in. No. 50 slot Cook stainless steel screen. The annulus between the bore hole and 30-in. casing is filled with cement grout from 0 to 39.3 ft and the annulus between the 30- and 14-in. casings and between the bore hole and casing-screen assembly is filled with flint gravel from 0 to 95 ft.

A production test was conducted by the driller on May 17, 1974. After 12 hr of pumping at a rate of 500 gpm, the drawdown was 58 ft from a nonpumping water level of 1 ft above land surface. Ten min after pumping was stopped, the water level had recovered to 5 ft below land surface.

McHENRY SHORES

The village of McHenry Shores (520) installed a public water supply in 1954. The water system is owned and operated by the McHenry Shores Water Co. Two wells are in use. In 1961 there were 115 services, all metered. In 1971 there were 200 services, all metered; the average daily pumpage in 1975 was 53,300 gpd. The water is chlorinated, fluoridated, and treated with polyphosphate to keep iron in solution.

WELL NO. 1, open to the Maquoketa Group, was completed in 1954 to a depth of 180 ft by the Bacon Well Co., McHenry. The well is located near the intersection of Broadway and Still Hill Drives, approximately 1200 ft N and 250 ft W of the SE corner of Section 2, T44N, R8E. The land surface elevation at the well is approximately 760 ft.

A 6-in. diameter hole was drilled to a depth of 180 ft. The well is cased with 6-in. pipe from 2 ft above the pump-house floor to a depth of 140 ft.

In 1957, the well reportedly produced 60 gpm for 8 hr with a drawdown of 10 ft from a nonpumping water level of 20 ft below the pump base.

The pumping equipment presently installed is a Reda submersible pump powered by a 3-hp 3450 rpm Reda electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 03957) is for a water sample from the well collected January 29, 1972. WELL NO. 1, LABORATORY NO. 03957

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	1.0	0.04	Silica	SiO_2	13.5	
Manganese	Mn	0.0		Fluoride	F	0.8	0.04
Ammonium	NH_4	0.8	0.04	Boron	B	0.3	
Sodium	Na	23.5	1.02	Nitrate	NO_3	0.0	
Potassium	K	0.9	0.02	Chloride	Cl	0.5	0.01
Calcium	Ca	40	2.00	Sulfate	SO_4	0	
Magnesium	Mg	28	2.30	Alkalinity (as $CaCO_3$)		260	5.20
				Hardness (as $CaCO_3$)		212	
Barium	Ba	0.0		Total dissolved minerals		212	
Copper	Cu	0.0					
Cadmium	Cd	0.00					
Chromium	Cr	0.0		pH (as rec'd)	7.7		
Lead	Pb	0.00		Radioactivity			
Mercury	Hg	< 0.0005		Alpha *pc/l*	0		
Nickel	Ni	0.0		± deviation	1		
Silver	Ag	0.0		Beta *pc/l*	0		
Zinc	Zn	0.05		± deviation	1		

WELL NO. 2, finished in sand and gravel, was completed in May 1957 to a depth of 135 ft by Charles Wertz, Antioch. The well is located near the intersection of Terrace Drive and Hilltop Blvd., approximately 200 ft N and 1250 ft W of the SE corner of Section 2, T44N, R8E. The land surface elevation at the well is approximately 785 ft.

An 8-in. diameter hole was drilled to a depth of 135 ft. The well is cased with 8-in. pipe from 1 ft above the pump-

house floor to a depth of 124 ft followed by 11 ft of 8-in. No. 25 slot Johnson Everdur screen.

Upon completion, the well reportedly produced 200 gpm for 8 hr with a drawdown of 15 ft from a nonpumping water level of 40 ft.

In 1965, the pump started to pump air, so the well was acidized, and the pump lowered from 80 to 110 ft.

The pumping equipment presently installed is a 6-in., 5-stage Sta-Rite turbine pump (Model No. 6MoH5STG, Serial No. 016499) set at 110 ft, rated at 90 gpm, and powered by a 15-hp 3600 rpm U.S. electric motor (Serial No. 2545739).

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil and brown clay	18	18
Clay and gravel	22	40
Mushy sand and clay	30	70
Hard gravel and clay	28	98
Fine dirty sand	12	110
Fine sand clean	10	120
Clean coarse gravel	15	135

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 03956) is for a water sample from the well collected January 29, 1972.

WELL NO. 2, LABORATORY NO. 03956

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	3.0	0.11	Silica	SiO_2	14.5	
Manganese	Mn	0.0		Fluoride	F	0.8	0.04
Ammonium	NH_4	0.5	0.03	Boron	B	0.3	
Sodium	Na	24		Nitrate	NO_3	0.0	
Potassium	K	1.0	0.03	Chloride	Cl	1.0	0.03
Calcium	Ca	40	2.00	Sulfate	SO_4	0	
Magnesium	Mg	27.5	2.26	Alkalinity (as $CaCO_3$)		256	5.12
Barium	Ba	0.0		Hardness (as $CaCO_3$)		204	
Copper	Cu	0.0		Total dissolved minerals		230	
Cadmium	Cd	0.00		pH (as rec'd)		7.7	
Chromium	Cr	0.0		Radioactivity			
Lead	Pb	0.00		Alpha *pc/l*		1	
Mercury	Hg	<0.0005		±deviation		1	
Nickel	Ni	0.0		Beta *pc/l*		0	
Silver	Ag	0.0		±deviation		1	
Zinc	Zn	0.0					

MARENGO

The city of Marengo (4235) installed a public water supply in 1893. Two wells (Nos. 4 and 5) are in use. This supply is also cross connected with the Arnold Engineering Co. well. In 1949 there were 700 services; the average daily pumpage was 300,000 gpd. In 1973 there were 1177 services, all metered; the average and maximum daily pumpages were 390,000 and 780,000 gpd, respectively. The water is fluoridated.

WELL NO. 1, finished in sand and gravel, was completed in 1893 to a depth of 15 ft. This well was abandoned and filled to the land surface in 1938. The well was located at the northeast corner of Telegraph Road and State St., approximately 57 ft N and 70 ft E of the SW corner of Section 25, T44N, R5E. The land surface elevation at the well is approximately 810 ft.

A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Black soil and clay	3	3
Sand and gravel	12	15

A 20-ft diameter hole was dug to a depth of 15 ft. The well was lined with brick and concrete (1.5 ft thickness) from 1.5 ft above land surface to a depth of 15 ft.

A production test using three observation wells was conducted by the Randolph-Perkins Co., Chicago, on May 27, 1924. After 6.6 hr of pumping at rates of 154 to 171 gpm, the final pumping level was 12.89 ft.

A second production test using three observation wells was conducted on November 12-13, 1924. After 9.5 hr of pumping at rates of 150 to 157 gpm, the final drawdown was 6.19 ft from a nonpumping water level of 7.00 ft below land surface.

WELL NO. 2, finished in sand and gravel, was completed in 1925 to a depth of 21 ft (measured in July 1947 at 20.6 ft deep). This well was abandoned and filled in 1962. The well was located about 70 ft northeast of Well No. 1, approximately 100 ft N and 130 ft E of the SW corner of Section 25, T44N, R5E. The land surface elevation at the well is approximately 810 ft.

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Black soil and clay	3	3
Sand and gravel	18	21

A 25-ft diameter hole was dug to a depth of 21 ft. The well was lined with brick and concrete (1 ft in thickness) from 1 ft above land surface to a depth of 21 ft. This well was originally connected to Well No. 1 by a 4-in. pipe laid about 15 ft below land surface.

In August 1946, following a period of drought, the water level was lowered to the bottom of the well after pumping at a rate of 450 gpm for 1 hr. After a 15-min idle period, the water level recovered to its normal level.

On July 15, 1947, the well reportedly produced 150 gpm for 3 hr with a drawdown of 4.4 ft from a nonpumping water level of 7.3 ft below land surface.

A mineral analysis of a sample (Lab. No. 111091) collected July 15, 1947, after pumping for 3 hr at 150 gpm, showed the water to have a hardness of 378 mg/l, total dissolved minerals of 412 mg/1, and an iron content of 0.2 mg/1.

WELL NO. 3 (formerly Borden Milk Co. well), open to the Cambrian-Ordovician aquifer, was completed in May 1951 to a depth of 1028 ft by the Varner Well and Pump Co., Dubuque, Iowa. This well is not in use because of a pump failure and a high hydrogen sulfide. The well is located on North Sponable St. south of West Railroad St., approximately 960 ft S and 1540 ft W of the NE corner of Section 35, T44N, R5E. The land surface elevation at the well is approximately 817 ft.

A correlated sample study log of Well No. 3 furnished by the State Geological Survey follows:

A partial record shows that a 17.2-in. diameter hole was drilled between the depths of 181.5 and 538 ft, and finished 12 in. in diameter from 538 to 1028 ft. The well is cased with 20-in. ID pipe from 4 ft below land surface to a depth of 70 ft, 18-in. OD pipe from land surface to a depth of 182 ft, and 12-in. OD pipe from 2 ft above land surface to a depth of 538 ft (cemented in).

Strata	Thickness (ft)	Depth (ft)
QUATERNARY SYSTEM		
Pleistocene Series		
Till and outwash	190	190
ORDOVICIAN SYSTEM		
Galena Dolomite Group	185	375
Platteville Dolomite Group	110	485
Ancell Group		
Glenwood Formation	155	640
St. Peter Sandstone	65	705
CAMBRIAN SYSTEM		
Eminence Dolomite	25	730
Potosi Dolomite	60	790
Franconia Formation	75	865
Ironton Sandstone	90	955
Galesville Sandstone	65	1020
Eau Claire Formation	8	1028

On May 1, 1951, after 4 hr of pumping at a rate of 508 gpm, the drawdown was 109 ft from a nonpumping water level of 90 ft below the top of the casing.

On April 30, 1958, the well reportedly produced 300 gpm for 10 min with a drawdown of 61 ft from a nonpumping water level of 116 ft below the pump base.

On February 10, 1976, the well reportedly produced 500 gpm for 4 hr with a drawdown of 1 3 3 ft from a nonpumping water level of 145 ft.

The pumping equipment presently installed consists of a 50-hp 1760 rpm Louis Allis electric motor (No. 2366144), a Layne and Bowler turbine pump (No. 23294) set at 270 ft, and has 270 ft of column pipe. The well is equipped with 270 ft of airline.

A partial analysis of a sample (Lab. No. 201080) collected February 10, 1976, after pumping for 4 hr at 500 gpm, showed the water to have a hardness of 352 mg/l, total dissolved minerals of 373 mg/1, and an iron content of 0.8 mg/1. Hydrogen sulfide also was apparent when the sample was collected.

WELL NO. 4, finished in sand and gravel, was completed in January 1962 to a depth of 100 ft by the J. P. Miller Artesian Well Co., Brookfield. The well is located on the northeast corner of the intersection of Routes 23 and 176, approximately 40 ft N and 95 ft E of the SW corner of Section 25, T44N, R5E. The land surface elevation at the well is approximately 805 ft.

A drillers log of Well No. 4 follows:

Strata	Thickness (ft)	Depth (ft)
Top soil	2	2
Sand	20	22
Sand and gravel	10	32
Sand and clay	28	60
Clay	5	65
Sand, gravel, and boulders	35	100

A 30-in. diameter hole was drilled to a depth of 100 ft. The well is cased with 12-in. pipe from land surface to a depth of 75 ft followed by 25 ft of 12-in. No. 90 slot Cook stainless steel screen. The top of the well casing is equipped with a 16-in. diameter pitless adapter. The annulus between the bore hole and casing-screen assembly is filled with sand and bentonite from 0 to 50 ft and with gravel from 50 to 100 ft.

A production test was conducted by the driller on January 4-5, 1962. After 23.1 hr of pumping at rates of 400 to 1000 gpm, the drawdown was 49 ft from a nonpumping water level of 3 ft below land surface.

The pumping equipment presently installed consists of a 40-hp 1750 rpm Byron Jackson electric motor, a 10-in., 5-stage. Byron Jackson submersible pump set at 65 ft, rated at 500 gpm at about 210 ft head, and has 60 ft of 6-in. column pipe. The well is equipped with 65 ft of airline.

A partial analysis of a sample (Lab. No. 201081) collected February 10, 1976, after pumping for 0.3 hr at 400 gpm, showed the water to have a hardness of 416 mg/l, total dissolved minerals of 484 mg/1, and an iron content of 2.6. mg/l.

WELL NO. 5, finished in sand and gravel, was completed in March 1962 to a depth of 85 ft by the J. P. Miller Artesian Well Co., Brookfield. The well is located on Prospect St. about 2 blocks south of Route 176, approximately 1200 ft S and 2200 ft W of the NE corner of Section 36, T44N, R5E. The land surface elevation at the well is approximately 810 ft.

A drillers log of Well No. 5 follows:

Strata	Thickness (ft)	Depth (ft)
Top soil	5	5
Sand	10	15
Gravel	70	85

A 30-in. diameter hole was drilled to a depth of 85 ft. The well is cased with 12-in. wrought iron pipe from within a concrete foundation block to a depth of 60 ft followed by 25 ft of 12-in. No. 40 slot Cook screen. The annulus between the bore hole and casing-screen assembly is filled with sand and bentonite from 0 to 50 ft and with silica gravel from 50 to 85 ft.

A production test was conducted by the driller on March 9, 1962. After 15 hr of pumping at rates of 350 to 1010 gpm, the final drawdown was 47 ft from a nonpumping water level of 6 ft below the top of the casing.

On January 17, 1975, the nonpumping water level was reported to be 18 ft.

The pumping equipment presently installed consists of a 40-hp 1750 rpm U.S. Holloshaft electric motor, a 10-in., 5-stage Byron Jackson turbine pump set at 40 ft, rated at 500 gpm at about 210 ft head, and has 40 ft of 6-in. column pipe. The well is equipped with 40 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B120113) is for a water sample from the well collected January 6, 1975, after 1 hr of pumping at 530 gpm.

WELL NO. 5, LABORATORY NO. B120113

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.6		Silica	SiO_2	13	
Manganese	Mn	0.2		Fluoride	F	0.1	0.00
Ammonium	NH_4	0.1	0.01	Boron	B	0.1	
Sodium	Na	19	0.83	Nitrate	NO_3	3.3	0.05
Potassium	K	2.3	0.06	Chloride	Cl	60	1.69
Calcium	Ca	89	4.44	Sulfate	SO_4	70	1.46
Magnesium	Mg	41	3.37	Alkalinity (as $CaCO_3$)		288	5.76
Arsenic	As	0.00		Hardness (as $CaCO_3$)		390	7.80
Barium	Ba	0.1		Total dissolved minerals		441	
Copper	Cu	0.00					
Cadmium	Cd	0.00		pH (as rec'd)		7.6	
Chromium	Cr	0.00		Radioactivity			
Lead	Pb	0.00		Alpha *pc/l*		1.4	
Mercury	Hg	0.0003		±deviation		1.9	
Nickel	Ni	0.0		Beta *pc/l*		0.3	
Selenium	Se	0.00		±deviation		1.9	
Silver	Ag	0.00					
Cyanide	CN	0.00					
Zinc	Zn	0.0					

PISTAKEE HIGHLANDS SUBDIVISION

Pistakee Highlands Subdivision (est. 1630), located 0.5 mile northeast of Sunnyside, installed a public water supply in 1954. The water system is owned and operated by the Pistakee Highlands Water Co. of Utilities, Inc. One well (No. 2) is in use and another well (No. 1) is maintained for emergency use. This supply is cross connected with the Whispering Hills Water Co. In 1955 there were 90 services, all metered. In 1973 there were 480 services, all metered; the estimated average and maximum daily pumpages were 63,000 and 95,000 gpd, respectively. The water is chlorinated and treated with polyphosphate to keep iron in solution.

WELL NO. 1, finished in sand and gravel, was completed in September 1954 to a depth of 93 ft by Joseph Huemann & Sons, McHenry. This well is maintained for emergency use. The well is located in the pumphouse at 5509 Highland Drive, approximately 2300 ft N and 1820 ft W of the SE corner of Section 5, T45N, R9E. The land surface elevation at the well is approximately 780 ft.

A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Sand and gravel	27	27
Red clay and stones	9	36
Clay	19	55
Sandy clay	6	61
Clay and stones	7	68
Sticky sand	19	87
Gravel	6	93

A 12-in. diameter hole was drilled to a depth of 93 ft. The well is cased with 12-in. pipe from 1.2 ft above the pumphouse floor to a depth of 83 ft followed by 10 ft of 12-in. No. 18 slot Johnson Everdur stainless steel screen.

Upon completion, the well reportedly produced 250 gpm for 12 hr with a drawdown of 10 ft from a nonpumping water level of 43 ft below the pump base.

Nonpumping water levels were reported to be 44 ft in February 1961, and 41.80 ft below land surface on October 23, 1964.

The pumping equipment presently installed is a Deming submersible pump set at 80 ft, rated at 50 gpm, and powered by a 25-hp 3600 rpm U.S. electric motor (Model No. A132520-2, Serial No. 1316715).

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 03539) is for a water sample from the well collected December 30, 1971, after 30 min of pumping.

WELL NO. 1, LABORATORY NO. 03539

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.1	0.00	Silica	SiO_2	24	
Manganese	Mn	0.0		Fluoride	F	0.4	0.02
Ammonium	NH_4	0.0		Boron	B	0.0	
Sodium	Na	11.4	0.50	Nitrate	NO_3	0.0	
Potassium	K	0.9	0.02	Chloride	Cl	7.5	0.21
Calcium	Ca	72	3.59	Sulfate	SO_4	55	1.14
Magnesium	Mg	44	3.62	Alkalinity (as $CaCO_3$)		296	5.92
Barium	Ba	0.0		Hardness (as $CaCO_3$)		356	
Copper	Cu	0.0		Total dissolved minerals		380	
Cadmium	Cd	0.00					
Chromium	Cr	0.0		pH (as rec'd)		7.7	
Lead	Pb	0.00		Radioactivity			
Mercury	Hg	<0.0005		Alpha *pc/l*		0	
Nickel	Ni	0.0		±deviation		1	
Silver	Ag	0.0		Beta *pc/l*		0	
Zinc	Zn	0.0		±deviation		2	

WELL NO. 2, finished in sand and gravel, was completed in September 1956 to a depth of 202 ft by Joseph Huemann & Sons, McHenry. The well is located outside the pumping station at 5509 Highland Drive, approximately 2320 ft N and 1800 ft W of the SE corner of Section 5, T45N, R9E. The land surface elevation at the well is approximately 782 ft.

A drillers log of Well No. 2 follows:

Strata	Thickness (ft)	Depth (ft)
Dry sand	25	25
Sandy clay	15	40
Blue clay	21	61
Sandy clay	25	86
Hardpan	11	97
Clay	84	181
Sand and gravel	14	195
Gravel and silt	7	202

An 8-in. diameter hole was drilled to a depth of 202 ft. The well is cased with 8-in. pipe to a depth of 185 ft followed by 17 ft of 8-in. No. 18 slot Johnson Everdur stainless steel screen. The top of the well casing is equipped with a pitless adapter.

Upon completion, the driller reported that when pumping at 270 gpm, the drawdown was 10 ft from a nonpumping water level of 47 ft below land surface.

A production test was conducted by the driller on September 16, 1965, after the well was treated with three carboys of acid plus Weltone. After 3.8 hr of pumping at rates of 108 to 300 gpm, the final drawdown was 73 ft from a nonpumping water level of 35 ft below land surface.

The pumping equipment presently installed is a Red Jacket submersible pump set at 126 ft, and powered by a 25-hp 3460 rpm Franklin electric motor (Model No. 236106-2901, Serial No. AS608).

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B108509) is for a water sample from the well collected March 21, 1973, after 15 min of pumping at 200 gpm.

WELL NO. 2, LABORATORY NO. B108509

		mg/l	me/l			mg/l	me/l
Iron	Fe	1.4		Silica	SiO_2	20	
Manganese	Mn	0.04		Fluoride	F	0.4	0.02
Ammonium	NH_4	0	0.00	Boron	B	0.10	
Sodium	Na	10	0.44	Nitrate	NO_3	0	0.00
Potassium	K	1.0	0.02	Chloride	Cl	8	0.22
Calcium	Ca	73	3.64	Sulfate	SO_4	55	1.14
Magnesium	Mg	39	3.21	Alkalinity (as $CaCO_3$)		304	6.08
Arsenic	As	0.00		Hardness (as $CaCO_3$)		342	
Barium	Ba	0.0		Total dissolved minerals		377	
Copper	Cu	0.00		pH (as rec'd)		8.1	
Cadmium	Cd	0.00		Radioactivity			
Chromium	Cr	0.00		Alpha *pc/l*		1.2	
Lead	Pb	0.00		±deviation		1.2	
Mercury	Hg	0.0000		Beta *pc/l*		10.6	
Nickel	Ni	0.0		±deviation		2.3	
Selenium	Se	0.00					
Silver	Ag	0.00					
Zinc	Zn	0.01					

PORTEN'S HICKORY KNOLL SUBDIVISION

Porten's Hickory Knoll Subdivision (est. 105), located 1 mile southwest of Island Lake, installed a public water supply in 1948. The water system is owned and operated by the Nunda Utility Co. One well is in use. In 1973 there were 36 services, none metered; the average and maximum daily pumpages were 8443 and 12,500 gpd, respectively. The water is not treated. The natural fluoride concentration in the water is adequate to satisfy state requirements.

WELL NO. 1, finished in Silurian dolomite, was completed in 1948 to a depth of 189 ft by the Boetsch Water Supply Co., Crystal Lake. The well is located at 713 West Peter St., approximately 2550 ft N and 1500 ft E of the SW corner of Section 29, T44N, R9E. The land surface elevation at the well is approximately 760 ft.

The well is cased with 8-in. galvanized pipe from above land surface to a depth of 170 ft. The top of the well casing is equipped with a pitless adapter.

The pumping equipment presently installed is an Aermotor submersible pump set at 147 ft, rated at 35 gpm, and powered by a 2-hp 3450 rpm Franklin electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 06147) is for a water sample from the well collected February 23, 1972, after 6 hr of pumping at 35 gpm.

WELL NO. 1, LABORATORY NO. 06147

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.4	0.01	Silica	SiO_2	15.8	
Manganese	Mn	0.1	0.00	Fluoride	F	0.8	0.04
Ammonium	NH_4	1.3	0.07	Boron	B	0.5	
Sodium	Na	53.5	2.33	Nitrate	NO_3	0	
Potassium	K	2.7	0.07	Chloride	Cl	7	0.20
Calcium	Ca	28.8	1.44	Sulfate	SO_4	0	
Magnesium	Mg	26.3	2.16	Alkalinity (as $CaCO_3$)		280	5.60
				Hardness (as $CaCO_3$)		172	
Barium	Ba	0.0		Total dissolved minerals		312	
Copper	Cu	0.0		pH (as rec'd)		7.9	
Cadmium	Cd	0.00		Radioactivity			
Chromium	Cr	0.0		Alpha *pc/l*		0	
Lead	Pb	0.00		±deviation		1	
Mercury	Hg	< 0.0005		Beta *pc/l*		2	
Nickel	Ni	0.0		±deviation		1	
Zinc	Zn	0.0					

RICHMOND

The village of Richmond (1153) installed a public water supply in 1928. Two wells are in use. In 1949 there were 175 services, all metered; the average daily pumpage was 40,000 gpd. In 1974 there were 425 services, all metered; the estimated average and maximum daily pumpages were 110,000 and 165,000 gpd, respectively. The water is chlo-

rinated, aerated, filtered, and fluoridated.

WELL NO. 1, open to sand and gravel and dolomite, was completed in April 1927 to a depth of 170 ft by the W. L. Thorne Co., Des Plaines. The well is located in the main pumping station behind the village hall at Broadway and Main Sts., approximately 1100 ft N and 2400 ft W of the SE corner of Section 9, T46N, R8E. The land surface elevation at the well is approximately 818 ft.

A correlated drillers log of Well No. 1 furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
PLEISTOCENE SYSTEM		
Clay and gravel, water at 30 ft	40	40
Gravel, black	10	50
Clay	25	75
Clay and gravel	5	80
Sand	15	95
Sand and gravel	25	120
Clay	10	130
No record	15	145
Sand and gravel, dirty	5	150
Sand and gravel with clay	5	155
Sand and gravel	5	160
Limestone	5	165
Sand and clay	5	170

Initially, the 10-in. well was drilled to a depth of 176 ft and finished in the underlying bedrock. The lower 6 to 7 ft of the hole was backfilled with cobbles. The well was initially cased with 10-in. pipe from 3 ft above land surface to a depth of 163 ft. A 17-hr production test indicated the maximum yield was only 100 gpm with a drawdown of 75 ft. The casing was then cut at a depth of 120 ft below land surface and 15 ft (14 ft exposed) of No. 16 slot Cook screen was placed between the depths of 105 and 120 ft opposite the sand and gravel formation.

A second production test was conducted after installation of the screen on April 29-30, 1927. After 36 hr of pumping at rates ranging from 100 to 264 gpm, the maximum drawdown was 30.3 ft from a nonpumping water level of 9.4 ft. below land surface. Twenty min after pumping was stopped, full recovery was observed.

On July 8, 1947, after a 2-hr idle period, the well reportedly produced 150 gpm for 1 hr with a drawdown of 42 ft from a nonpumping water level of 23 ft below the pump base.

This well was acidized in January 1964 because the pump was breaking suction. The yield was reportedly increased 25 gpm and the pumping level was 18 ft above the screen.

The well was again acidized in November 1968 and the yield was reported to be more than 200 gpm.

The pumping equipment presently installed consists of a 15-hp 1700 rpm U.S. electric motor (Serial No. 166304), a 7-in., 11-stage American Well Works turbine pump (Shop No. 61819) set at 90 ft, rated at 150 gpm at about 220 ft head, and has 90 ft of 4.5-in. column pipe. A 10-ft section of 5-in. suction pipe is attached to the pump intake. The well is equipped with 90 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B22637) is for a water sample from the well collected December 2, 1975, after 30 min of pumping at 200 gpm.

WELL NO. 1, LABORATORY NO. B22637

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	1.2		Silica	SiO_2	19	
Manganese	Mn	0.05		Fluoride	F	0.3	0.02
Ammonium	NH_4	0.71	0.04	Boron	B	0.2	
Sodium	Na	10	0.44	Nitrate	NO_3	0.44	0.01
Potassium	K	1.1	0.03	Chloride	Cl	2.3	0.06
Calcium	Ca	58	2.89	Sulfate	SO_4	7.0	0.15
Magnesium	Mg	34	2.80	Alkalinity (as $CaCO_3$)		302	6.04
Arsenic	As	0.01					
Barium	Ba	0.1		Hardness (as $CaCO_3$)		284	5.68
Copper	Cu	0.00					
Cadmium	Cd	0.00		Total dissolved minerals		330	
Chromium	Cr	0.00					
Lead	Pb	0.00					
Mercury	Hg	0.0000		pH (as rec'd)		8.3	
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*		0.0	
Silver	Ag	0.00		± deviation		0.0	
Cyanide	CN	0.00		Beta *pc/l*		0.5	
Zinc	Zn	0.0		± deviation		1.2	

WELL NO. 2, finished in sand and gravel, was completed in April 1956 to a depth of 144 ft by the J. P. Miller Artesian Well Co., Brookfield. The well is located under the elevated tank on the east side of Illinois Route 31, approximately 1600 ft S and 2400 ft W of the NE corner of Section 9, T46N, R8E. The land surface elevation at the well is approximately 832 ft.

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Fill	5	5
Fine sandy clay	5	10
Red sticky clay	10	20
Blue sticky clay and boulders	20	40
Medium and fine clean gravel	10	50
Large gravel and large granite boulders	11	61
Fine silty sand	19	80
Coarse sand	25	105
Red clay	1	106
Coarse sand	4	110
Fine sand	10	120
Very fine sand	10	130
Good coarse sand	5	135
Coarse sand, pea gravel and boulders	10	145
Bottom on gravel and clay	1	146

A 30-in. diameter hole was drilled to a depth of 146 ft. The well is cased with 12-in. black pipe from 3 ft above land surface to a depth of 116 ft followed by 28 ft of 12-in. No. 45 slot Cook red brass screen. The annulus between the bore hole and casing-screen assembly is filled with torpedo sand and bentonite with 10 lb of HTH from 0 to 96 ft and with No. 30 silica gravel from 96 to 146 ft.

A production test was conducted on April 16-17, 1956, by representatives of the driller, the village, the State Water Survey, and Baxter and Woodman, Consulting Engineers. After 27 hr of pumping at rates of 78 to 300 gpm, the final drawdown was 50.2 ft from a nonpumping water level of 26.0 ft below land surface. Ten min after pumping was stopped,

the water level had recovered to 31.8 ft.

On May 23, 1958, the well reportedly produced ±300 gpm for 5 min with a drawdown of 54 ft from a nonpumping water level of 27 ft.

The pumping equipment presently installed consists of a 25-hp 1800 rpm U.S. electric motor (No. 1052526), an 8-in., 8-stage Layne turbine pump (No. 36033) set at 100 ft, rated at 300 gpm at about 220 ft TDH, and has 100 ft of 5-in. column pipe. A 10-ft section of 6-in. suction pipe is attached to the pump intake. The well is equipped with 100 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B22636) is for a water sample from the well collected December 2, 1975, after 30 min of pumping at 250 gpm.

WELL NO. 2, LABORATORY NO. B22636

		mg/l	me/l			mg/l	me/l
Iron	Fe	1.6		Silica	SiO_2	19	
Manganese	Mn	0.05		Fluoride	F	0.3	0.02
Ammonium	NH_4	0.35	0.02	Boron	B	0.1	
Sodium	Na	6.0	0.26	Nitrate	NO_3	0.22	0.00
Potassium	K	1.0	0.03	Chloride	Cl	16	0.45
Calcium	Ca	87	4.34	Sulfate	SO_4	57	1.19
Magnesium	Mg	44	3.62	Alkalinity (as $CaCO_3$)		334	6.68
Arsenic	As	0.00					
Barium	Ba	0.1		Hardness (as $CaCO_3$)		398	7.96
Copper	Cu	0.00					
Cadmium	Cd	0.00		Total dissolved minerals		450	
Chromium	Cr	0.00					
Lead	Pb	0.00					
Mercury	Hg	0.0000		pH (as rec'd)		8.1	
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*		1.0	
Silver	Ag	0.00		±deviation		1.5	
Cyanide	CN	0.00		Beta *pc/l*		4.3	
Zinc	Zn	0.0		±deviation		1.8	

SHAGBARK CHALET CONDOMINIUMS

Shagbark Chalet Condominiums (est. 14), located 0.2 mile northeast of Alden, installed a public water supply in 1971. The water system is owned and operated by Shagbark, Inc. One well is in use. In 1975 there were 6 services, none metered; the average and maximum daily pumpages were 840 to 1260 gpd, respectively. The water is treated with polyphosphate to keep iron in solution.

WELL NO. 1, finished in sand and gravel, was completed in October 1964 to a depth of 128 ft by the J. P. Miller Artesian Well Co., Brookfield. The well is located north of Route 173 near the lake, approximately 2450 ft N and 350 ft E of the SW corner of Section 14, T46N, R6E. The land surface elevation at the well is approximately 950 ft.

An 11-in. diameter hole was drilled to a depth of 130 ft. The well is equipped with a 6-in. pitless adapter from 1.5 ft above land surface and cased with 6-in. pipe to a depth of 108 ft followed by 20 ft of Houston stainless steel screen. The screened section consists of 10 ft of 6-in. No. 80 slot followed by 10 ft of 5-in. No. 80 slot. The annulus between the bore hole and casing-screen assembly is filled with impervious fill and cuttings from 0 to 70 ft and with gravel from 70 to 130 ft.

Upon completion, the well reportedly produced 220 gpm for 2 hr with a drawdown of 22 ft from a nonpumping water level of 18.5 ft below land surface.

The pumping equipment presently installed is a Sumo submersible pump set at 58 ft, rated at 50 gpm at about 174 ft TDH, and powered by a 5-hp Sumo electric motor. The well is equipped with 58 ft of airline.

A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Loam, clay, sand and gravel	5	5
Gravel, sand, boulders	15	20
Sandy gravel, clay with gravel	70	90
Clay	20	110
Fine gravel	20	130

SUNNYSIDE

The village of Sunnyside (367) installed a public water supply in 1942. The water system is owned and operated by the Sunnyside Water Co. of Utilities, Inc. One well is in use. This supply is cross connected with the Whispering Hills Water Co. In 1961 there were 65 services, none metered; the estimated average daily pumpage was 10,000 gpd. In 1973 there were 77 services, none metered; the estimated average and maximum daily pumpages were 15,330 and 23,000 gpd, respectively. The water is hypochlorinated.

WELL NO. 1, finished in Silurian dolomite, was completed in 1942 to a depth of 250 ft by Joseph Huemann & Sons, McHenry. The well is located on the south side of Lake View St. east of Sunset St., approximately 850 ft N and 3500 ft E of the SW corner of Section 7, T45N, R9E.

The land surface elevation at the well is approximately 800 ft.

The well is cased with 6-in. pipe from 0.3 ft above the pumphouse floor to a depth of 190 ft.

In July 1955, the well reportedly produced 32 gpm for 24 hr with a drawdown of 19 ft from a nonpumping water level of 6 ft below the top of the casing.

The pumping equipment presently installed is a Red Jacket submersible pump set at 180 ft, rated at 3 3 gpm, and powered by a 2-hp Red Jacket electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B104264) is for a water sample from the well collected November 13, 1972, after 30 min of pumping.

WELL NO. 1, LABORATORY NO. B104264

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.36	0.01	Silica	SiO_2	19	
Manganese	Mn	0.01	0.00	Fluoride	F	0.5	0.03
Ammonium	NH_4	0.3	0.02	Nitrate	NO_3	0	0
Sodium	Na	16	0.70	Chloride	Cl	1	0.03
Potassium	K	1.4	0.04	Sulfate	SO_4	0	0
Calcium	Ca	63	3.14	Alkalinity (as $CaCO_3$)		326	6.52
Magnesium	Mg	35	2.88				
Arsenic	As	0.00		Hardness (as $CaCO_3$)		301	
Barium	Ba	0.1					
Copper	Cu	0.03		Total dissolved minerals		330	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00		pH (as rec'd)		8.2	
Mercury	Hg	0.0000		Radioactivity			
Nickel	Ni	0.0		Alpha *pc/l*		1.1	
Selenium	Se	0.00		± deviation		1.4	
Silver	Ag	0.00		Beta *pc/l*		6.9	
Zinc	Zn	0.0		± deviation		1.9	

SUNRISE RIDGE SUBDIVISION

Sunrise Ridge Subdivision (est. 710), located 1 mile west of Wonder Lake, installed a public water supply in 1955. The water system is owned and operated by the Wonder Lake Water Co. One well is in use. This supply is cross connected with Highland Shores Subdivision. In 1961 there were 84 services, all metered; the average daily pumpage in 1960 was 4085 gpd. In 1975 there were 203 services, all metered; the average and maximum daily pumpages were 27,400 and 40,000 gpd, respectively. The water is chlo-rinated, fluoridated, and treated with polyphosphate to keep iron in solution.

WELL NO. 1, finished in sand and gravel, was completed in December 1955 to a depth of 180 ft by C. L. Wertz, Antioch. The well is located on the northeast corner of Westwood Drive and Alden Road, approximately 2300 ft Sand 2300 ft E of the NW corner of Section 13, T45N, R7E. The land surface elevation at the well is approximately 870 ft.

A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil and gravel	40	40
Red clay	70	110
Gray clay	57	167
Sand and gravel	13	180

An 8-in. diameter hole was drilled to a depth of 180 ft. The well is cased with 8-in. pipe from 2.5 ft above the pumphouse floor to a depth of 170 ft followed by 10 ft of 8-in. No. 30 slot Johnson screen.

Upon completion, the well reportedly produced 200 gpm with a drawdown of 8 ft from a nonpumping water level of 35 ft.

The pumping equipment presently installed is a Jacuzzi turbine pump set at 60 ft, rated at 250 gpm, and powered by a 10-hp 3600 rpm electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B101272) is for a water sample from the well collected August 7, 1973 after 10 min of pumping at 250 gpm.

WELL NO. 1, LABORATORY NO. B101272

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.85		Silica	SiO_2	22	
Manganese	Mn	0.10		Fluoride	F	0.3	0.02
Ammonium	NH_4	0.1	0.01	Boron	B	0.4	
Sodium	Na	4	0.17	Nitrate	NO_3	0.0	0.00
Potassium	K	1.2	0.03	Chloride	Cl	3	0.08
Calcium	Ca	66	3.29	Sulfate	SO_4	18	0.37
Magnesium	Mg	33	2.72	Alkalinity (as $CaCO_3$)		300	6.00
Arsenic	As	0.00		Hardness (as $CaCO_3$)		301	6.02
Barium	Ba	0.0					
Copper	Cu	0.00		Total dissolved minerals		338	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00		pH (as rec'd)		8.0	
Mercury	Hg	0.0000		Radioactivity			
Nickel	Ni	0.0		Alpha *pc/l*		0.4	
Selenium	Se	0.00		± deviation		1.1	
Silver	Ag	0.00		Beta *pc/l*		0.0	
Zinc	Zn	0.00		± deviation		1.2	

TURNBERRY SUBDIVISION

Turnberry Subdivision (est. 30), located 1.5 miles southwest of Lakewood, installed a public water supply in 1973. The water system is owned and operated by Turnberry Utilities, Inc. One well is in use. In 1975 there were 10

services; the 1973 average and maximum daily pumpages were 2700 and 4000 gpd, respectively. The water is chlorinated. The natural fluoride concentration in the water is adequate to satisfy state requirements.

WELL NO. 1, finished in dolomite, was completed in March 1971 to a depth of 395 ft by Joseph Huemann & Sons, ' McHenry. The well is located about 35 ft southwest of the base of the elevated tank just east of the entrance to Turnberry Country Club, approximately 1800 ft S and 2700 ft E of the NW corner of Section 11, T43N, R7E. The land surface elevation at the well is approximately 920 ft.

The well is cased with 12-in. black pipe to an unknown depth and the hole was finished 12 in. in diameter to the bottom. The top of the well casing is equipped with a Monitor pitless adapter.

A drillers log of Well No. 1 follows:

Strata	Thickness (ft)	Depth (ft)
Clay	10	10
Gravel	30	40
Hardpan	172	212
Limestone	8	220
Blue shale	5	225
Gray shale	105	330
Limestone	65	395

Upon completion, the well reportedly produced 400 gpm for 12 hr with a drawdown of 60 ft from a nonpumping water level of 88 ft below land surface.

The pumping equipment presently installed is a Red Jacket submersible pump set at 252 ft, rated at 450 gpm, and powered by a 50-hp electric motor.

The following mineral analysis (Lab. No. 195667) is for a water sample from the well collected May 14, 1974.

WELL NO. 1, LABORATORY NO. 195667

		mg/l	me/l			mg/l	me/l
Iron (total)	Fe	0.2		Silica	SiO_2	7.7	
Manganese	Mn	0.03		Fluoride	F	3.0	
Ammonium	NH_4	0.1	0.01	Boron	B	1.5	
Sodium	Na	169	7.35	Nitrate	NO_3	0.5	0.01
Potassium	K	2.5	0.06	Chloride	Cl	6	0.17
Calcium	Ca	2.7	0.13	Sulfate	SO_4	1.2	0.02
Magnesium	Mg	1.2	0.10	Alkalinity (as $CaCO_3$)		366	7.32
Strontium	Sr	0.12		Hardness (as $CaCO_3$)		11	0.23
Barium	Ba	<0.1		Total dissolved minerals		432	
Copper	Cu	0.06					
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	<0.05		Turbidity		1	
Lithium	Li	0.03		Color		0	
Nickel	Ni	<0.05		Odor		0	
Zinc	Zn	0.00		Temp. (reported)		53F	

UNION

The village of Union (529) installed a public water supply in 1912. One well (No. 3) is in use and another well (No. 2) is available for emergency use. In 1949 there were 125 services, none metered; the average daily pumpage was 30,000 gpd. In 1975 there were 150 services, none metered; the average and maximum daily pumpages were 96,737 and 145,000 gpd, respectively. The water from Well No. 2 is not treated. The water from Well No. 3 is chlorinated, fluoridated, and treated with polyphosphate to keep iron in solution.

WELL NO. 1, finished in sand and gravel, was completed in 1912 to a depth of 16 ft (measured 18.4 ft in 1928). This well was abandoned in 1935 and filled in between 1938 and 1947. The well was located about 45 ft south of Clark St. and 120 ft west of Wayne St., approximately 1550 ft S and 2500 ft E of the NW corner of Section 4, T43N, R6E. The land surface elevation at the well is approximately 835 ft.

A 10-ft diameter hole was dug to the bottom and walled with brick laid in cement mortar.

Nonpumping water levels varied seasonally from about 6 to 12 ft below land surface.

On September 7, 1938, after a short pumping period, the rate of inflow to the well was measured to be about 90 gpm.

WELL NO. 2, finished in dolomite in the Maquoketa Group, was completed in 1934 to a depth of 192 ft by P. E. Millis, Byron. This well is maintained for emergency use. The well is located in the pumping station at 17603 Clark St. east of North Main St., approximately 1600 ft S and 2500 ft E of the NW corner of Section 4, T43N, R6E. The land surface elevation at the well is approximately 835 ft.

A summary sample study log of Well No. 2 furnished by the State Geological Survey follows:

Strata	Thickness (ft)	Depth (ft)
PLEISTOCENE SYSTEM		
Wisconsin stage		
Gravel, sandy, oxidized, brown	5	5
Gravel, up to 1/2 in., sandy	5	10
Gravel, granular, sandy	5	15
Gravel, up to 1/4 in., sandy	15	30
Gravel, granular	5	35
Till, calcareous, maroon (Marengo)	30	65
Till, calcareous, pinkish-gray, tan	5	70
Quartzitic fragments, boulder	2	72
Till, as above	48	120
Same, gravelly	10	130
Illinoian (?) stage		
Till, calcareous, light brown	15	145
ORDOVICIAN SYSTEM		
Maquoketa shale		
Shale, light greenish-gray	5	150
Dolomite, crystalline, pyritic, white	40	190

The well is cased with 12-in. pipe from land surface to a depth of 150 ft.

In September 1955, after pumping at a rate of 74 gpm, the drawdown was 23.3 ft from a nonpumping water level' of 47.5 ft.

In July 1958, the well reportedly produced 150 gpm for 6 min with a drawdown of 86 ft from a nonpumping water level of 50 ft below the pump base.

The pumping equipment presently installed consists of a 10-hp U.S. electric motor, an 8-in., 5-stage Layne turbine pump set at 150 ft, rated at 150 gpm at about 150 ft TDH, and has 150 ft of 5-in. column pipe. A 10-ft section of 4-in. suction pipe is attached to the pump intake.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. C006008) is for a water sample from the well collected February 5, 1976, after 15 min of pumping at 150 gpm. The iron content has been as low as 0.1 on a previous analysis.

WELL NO. 2, LABORATORY NO. C006008

		mg/l	me/l			mg/l	me/l
Iron	Fe	4.3		Silica	SiO_2	9.5	
Manganese	Mn	0.01		Fluoride	F	0.6	0.03
Ammonium	NH_4	0.98	0.05	Boron	B	0.7	
Sodium	Na	26	1.13	Nitrate	NO_3	0.6	0.01
Potassium	K	5.8	0.15	Chloride	Cl	2	0.06
Calcium	Ca	38	1.90	Sulfate	SO_4	0	0.00
Magnesium	Mg	26	2.14	Alkalinity (as $CaCO_3$)		276	5.52
Arsenic	As	0.000					
Barium	Ba	0.3		Hardness (as $CaCO_3$)		209	4.18
Copper	Cu	0.02					
Cadmium	Cd	0.00		Total dissolved minerals		276	
Chromium	Cr	0.00					
Lead	Pb	0.01					
Mercury	Hg	0.0000		pH (as rec'd)		8.1	
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*		1.6	
Silver	Ag	0.00		±deviation		1.0	
Cyanide	CN	0.00		Beta *pc/l*		8.6	
Zinc	Zn	0.01		±deviation		1.6	

WELL NO. 3, finished in sand and gravel, was completed in March 1962 to a depth of 80 ft by the J. P. Miller Artesian Well Co., Brookfield. The well is located on the east side of Main St. 4 blocks north of the business district, approximately 500 ft S and 2200 ft E of the NW corner of Section 4, T43N, R6E. The land surface elevation at the well is approximately 832 ft.

A drillers log of Well No. 3 follows:

Strata	Thickness (ft)	Depth (ft)
Top soil	3	3
Sand	12	15
Sand and gravel	65	80

A 30-in. diameter hole was drilled to a depth of 80 ft. The well is cased with 12-in. wrought iron pipe from land surface to a depth of 60 ft followed by 20 ft of 12-in. No. 90 slot Cook stainless steel screen. The annulus between the bore hole and the casing-screen assembly is filled with clay and bentonite from 0 to 50 ft and with gravel from 50 to 80 ft.

Upon completion, the well reportedly produced 350 gpm for 3 hr with a drawdown of 4 ft from a nonpumping water level of 6 ft below the top of the casing.

In July 1969, after 10 min of pumping at a rate of 450 gpm, the drawdown was 3 ft from a nonpumping water level of 10 ft.

In 1970, the nonpumping water level was reported to be 20 ft.

The pumping equipment presently installed is a 10-in., 5-stage Byron Jackson oil-lubricated turbine pump (Serial No. 700229, Size 10 GL-5-STG) set at 40 ft, rated at 350 gpm at about 200 ft head, and powered by a 30-hp 1800 rpm U.S. electric motor (Serial No. 3385012).

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. C006009) is for a water sample from the well collected February 5, 1976, after 1 hr of pumping at 450 gpm. Hydrogen sulfide has been apparent on previous samples.

WELL NO. 3, LABORATORY NO. C006009

		mg/l	me/l			mg/l	me/l
Iron	Fe	2.1		Silica	SiO_2	12.0	
Manganese	Mn	0.08		Fluoride	F	0.4	0.02
Ammonium	NH_4	0.58	0.03	Boron	B	0.4	
Sodium	Na	18	0.78	Nitrate	NO_3	1.3	0.02
Potassium	K	2.6	0.07	Chloride	Cl	32	0.90
Calcium	Ca	84	4.19	Sulfate	SO_4	75	1.56
Magnesium	Mg	40	3.29	Alkalinity (as $CaCO_3$)		302	6.04
Arsenic	As	0.002					
Barium	Ba	0.1		Hardness (as $CaCO_3$)		378	7.56
Copper	Cu	0.00					
Cadmium	Cd	0.00		Total dissolved minerals		428	
Chromium	Cr	0.00					
Lead	Pb	0.00					
Mercury	Hg	0.0000		pH (as rec'd)		7.8	
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*		0.2	
Silver	Ag	0.00		±deviation		0.8	
Cyanide	CN	0.00		Beta *pc/l*		4.0	
Zinc	Zn	0.01		±deviation		1.7	

WALKUP WOODS SUBDIVISION

Walkup Woods Subdivision (est. 385), located 1 mile north of Crystal Lake, installed a public water supply in 1959. The water system is owned and operated by the Walkup Woods Water Co. of Utilities, Inc., and also furnishes water to Walkup Highlands and Upland Acres Subdivisions. One well (No. 1) is in use and another well (No. 2) is available for emergency use. In 1960 there were 20 services, few metered. In 1973 there were 90 services, all metered;the average and maximum daily pumpages were 66,000 and 75,000 gpd, respectively. The water is chlorinated and treated with polyphosphate to keep iron in solution.

WELL NO. 1, finished in sand and gravel, was completed in November 1956 to a depth of 272 ft by the Henry Boysen Co., Libertyville. The well is located at the end of Field Court, approximately 1225 ft N and 1290 ft E of the SW corner of Section 29, T44N, R8E. The land surface elevation

at the well is approximately 930 ft.

An 8-in. diameter hole was drilled to a depth of 272 ft. The well is cased with 8-in. pipe from 0.7 ft above the pump-house floor to a depth of 264 ft followed by 8 ft of 8-in. No. 14 slot Cook screen.

The pumping equipment presently installed consists of a 15-hp 1750 rpm U.S. electric motor (No. 2535840), a 7.6-in., 12-stage Byron Jackson turbine pump set at 190 ft, rated at 100 gpm at about 267 ft head, and has 190 ft of 4-in. column pipe. A 10-ft section of 4-in. suction pipe is attached to the pump intake. The well is equipped with 190 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 03831) is for a water sample from the well collected January 31, 1972, after 15 min of pumping. An explosion in the pumphouse in 1968 indicated methane gas was present in the well water.

WELL NO. 1, LABORATORY NO. 03831

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.9	0.03	Silica	SiO_2	16	
Manganese	Mn	0.0		Fluoride	F	0.7	0.04
Ammonium	NH_4	0.9	0.05	Boron	B	0.2	
Sodium	Na	28	1.22	Nitrate	NO_3	0.0	
Potassium	K	1.1	0.03	Chloride	Cl	3.2	0.09
Calcium	Ca	46	2.30	Sulfate	SO_4	0	
Magnesium	Mg	35	2.88	Alkalinity (as $CaCO_3$)		300	6.00
				Hardness (as $CaCO_3$)		256	
Barium	Ba	0.0		Total dissolved minerals		295	
Copper	Cu	0.0		pH (as rec'd)		7.5	
Cadmium	Cd	0.00		Radioactivity			
Chromium	Cr	0.0		Alpha *pc/l*		0	
Lead	Pb	0.00		± deviation		1	
Mercury	Hg	< 0.0005		Beta *pc/l*		0	
Nickel	Ni	0.00		± deviation		1	
Silver	Ag	0.0					
Zinc	Zn	0.0					

WELL NO. 2, finished in Silurian dolomite, was completed in August 1972 to a depth of 325 ft by Joseph Huemann & Sons, McHenry. This well is available for emergency use. The well is located at the end of Field Court about 129 ft northeast of Well No. 1, approximately 1350 ft N and 1300 ft E of the SW corner of Section 29, T44N, R8E. The land surface elevation at the well is approximately 930 ft.

An 8.6-in. diameter hole was drilled to a depth of 325 ft. The well is cased with 8-in. ID pipe from 1.5 ft above land surface to a depth of 276 ft. The top of the well casing is equipped with a Monitor pitless adapter.

Upon completion, the well reportedly produced 300 gpm for 8 hr with a drawdown of 60 ft from a nonpumping water level of 110 ft.

The pumping equipment presently installed consists of a 20-hp electric motor, a 4-stage Red Jacket submersible pump set at 189 ft, rated at 225 gpm, and has 189 ft of 3-in. column pipe.

The following mineral analysis (Lab. No. 191284) is for a water sample from the well collected February 26, 1973, after 5 min of pumping at 200 gpm.

WELL NO. 2, LABORATORY NO. 191284

		mg/l	me/l			mg/l	me/l
Iron (total)	Fe	3.9		Silica	SiO_2	13.3	
Manganese	Mn	0.03		Fluoride	F	0.7	
Ammonium	NH_4	0.5	0.03	Boron	B	0.2	
Sodium	Na	36.2	1.57	Nitrate	NO_3	0.9	0.01
Potassium	K	1.4	0.04	Chloride	Cl	4	0.11
Calcium	Ca	39.6	1.98	Sulfate	SO_4	1.6	0.03
Magnesium	Mg	27.5	2.26	Alkalinity (as $CaCO_3$)		286	5.72
Strontium	Sr	1.46	0.03	Hardness (as $CaCO_3$)		212	4.24
Barium	Ba	< 0.1		Total dissolved minerals		300	
Copper	Cu	0.00					
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	< 0.05		Turbidity		21	
Lithium	Li	0.00		Color		0	
Nickel	Ni	< 0.05		Odor		0	
Zinc	Zn	0.84	0.03	pH (in Lab.)		8.0	

WHISPERING HILLS SUBDIVISION

Whispering Hills Subdivision (formerly Sunnyside Estates Subdivision) (est. 2180), located just west of Sunnyside, installed a public water supply in 1942. The water system is owned and operated by the Whispering Hills Water Co. of Utilities, Inc. Two wells (Nos. 1 and 2) are in use. This supply is cross connected with Pistakee Highlands Subdivision and Sunnyside public water supplies. In 1973 there were 625 services, all metered; the estimated average and maximum daily pumpages were 117,208 and 175,000 gpd, respectively. The water from Well No. 1, serving Whispering Hills and Pistakee Terrace, is chlorinated, and the natural fluoride concentration in the water is adequate to satisfy state requirements. The water from Well No. 2, serving Sunnyside Estates, is chlorinated.

WELL NO. 1, finished in Silurian dolomite, was completed in February 1959 to a depth of 303 ft by Joseph Huemann & Sons, McHenry. The well is located at 1 300 West Jasper Road, approximately 1000 ft S and 1050 ft W of the NE corner of Section 7, T45N, R9E. The land surface elevation at the well is approximately 823 ft.

A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil	4	4
Clay and boulders	64	68
Blue clay	173	241
Boulders	7	248
Hardpan	23	271
Limestone	32	303

A 12-in. diameter hole was drilled to a depth of 243 ft and finished 8 in. in diameter from 243 to 303 ft. The well is cased with 12-in. pipe from 0.8 ft above the pump-house floor to a depth of 243 ft and 8-in. pipe from 243 to 271 ft.

Upon completion, the well reportedly produced 220 gpm

for 36 hr with a drawdown of 76 ft from a nonpumping water level of 70 ft.

On October 23, 1964, the well reportedly produced 180 gpm with a drawdown of 89.00 ft from a nonpumping water level of 90.30 ft below land surface.

On April 7, 1970, the nonpumping water level was reported to be 85 ft.

The pumping equipment presently installed is a Red Jacket submersible pump powered by a 25-hp 3450 rpm Franklin prefilled electric motor (Model No. X2361062900, Serial No. AH8999).

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B101953) is for a water sample from the well collected August 24, 1973, after 30 min of pumping at 200 gpm.

WELL NO. 1, LABORATORY NO. B101953

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.12		Silica	SiO_2	18	
Manganese	Mn	0.00		Fluoride	F	0.9	0.05
Ammonium	NH_4	0.3	0.02	Boron	B	0.4	
Sodium	Na	30	1.30	Nitrate	NO_3	0.0	0.00
Potassium	K	1.3	0.03	Chloride	Cl	1	0.03
Calcium	Ca	33	1.65	Sulfate	SO_4	0	0.00
Magnesium	Mg	26	2.14	Alkalinity (as $CaCO_3$)		242	4.84
Arsenic	As	0.00		Hardness (as $CaCO_3$)		189	3.78
Barium	Ba	0.0					
Copper	Cu	0.00		Total dissolved minerals		271	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00		pH (as rec'd)		8.1	
Mercury	Hg	0.0000		Radioactivity			
Nickel	Ni	0.0		Alpha *pc/l*		2.2	
Selenium	Se	0.00		± deviation		1.7	
Silver	Ag	0.00		Beta *pc/l*		8.5	
Zinc	Zn	0.01		± deviation		1.8	

WELL NO. 2, finished in Silurian dolomite, was completed in February 1955 to a depth of 294 ft by Joseph Huemann & Sons, McHenry. The well is located at 2007 Indian Ridge Road, approximately 2150 ft N and 250 ft E of the SW corner of Section 7, T45N, R9E. The land surface elevation at the well is approximately 853 ft.

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Top soil	3	3
Clay	153	156
Sand	17	173
Clay	73	246
Limestone	48	294

A 12-in. diameter hole was drilled to a depth of 294 ft. The well is cased with 12-in. pipe from 0.4 ft above the pumphouse floor to a depth of 252 ft.

Upon completion, the well reportedly produced 40 gpm for 12 hr with a drawdown of 66 ft from a nonpumping water level of 84 ft below land surface.

On October 23, 1964, and April 7, 1970, the nonpumping water levels were reported to be 101.35 and 80 ft, respectively

The pumping equipment presently installed is a Reda submersible pump powered by an electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B108510) is for a water sample from the well collected March 21, 1973, after 15 min of pumping.

WELL NO. 2, LABORATORY NO. B108510

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.46	0.02	Silica	SiO_2	20	
Manganese	Mn	0.00	0.00	Fluoride	F	0.50	0.03
Ammonium	NH_4	0.30	0.02	Boron	B	0.12	
Sodium	Na	12	0.52	Nitrate	NO_3	0.00	0.00
Potassium	K	1.20	0.03	Chloride	Cl	1.00	0.03
Calcium	Ca	58	2.89	Sulfate	SO_4	10	0.21
Magnesium	Mg	38	3.12	Alkalinity (as $CaCO_3$)		312	6.24
Arsenic	As	0.00		Hardness (as $CaCO_3$)		301	6.02
Barium	Ba	0.1					
Copper	Cu	0.02		Total dissolved minerals		319	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00		pH (as rec'd)		8.2	
Mercury	Hg	0.0000		Radioactivity			
Nickel	Ni	0.0		Alpha *pc/l*		1.0	
Selenium	Se	0.00		± deviation		1.1	
Silver	Ag	0.00		Beta *pc/l*		4.8	
Zinc	Zn	0.07		± deviation		1.8	

WELL NO. 3, finished in Silurian dolomite, was completed in June 1974 to a depth of 255 ft by Joseph Huemann & Sons, McHenry. As of February 1976, this well was not in service. The well is located on the west side of Wilmot Road at the junction of Hayden Drive about 0.2 mile southwest of Well No. 1, approximately 2450 ft S and 1800 ft W of the NE corner of Section 7, T45N, R9E. The land surface elevation at the well is approximately 772 ft.

A drillers log of Well No. 3 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Sand	55	55
Clay	25	80
Clay and gravel mixed	50	130
Sticky blue clay	45	175
Gray clay	9	184
Gravel	4	188
Limestone	67	255

A 12-in. diameter hole was drilled to a depth of 255 ft. The well is equipped with a 12-in. diameter pitless adapter from 1.5 ft above land surface and cased with 12-in. pipe to a depth of 189 ft.

Upon completion, the well reportedly produced 330 gpm with a drawdown of 171 ft from a nonpumping water level of 18 ft.

The pumping equipment presently installed is a Red Jacket submersible pump set at 189 ft, rated at 290 gpm at about 242 ft TDH, and powered by a 25-hp Red Jacket electric motor.

WOODED SHORES SUBDIVISION

Wooded Shores Subdivision (est. 750), located about 1 mile south of Wonder Lake, installed a public water supply in 1934. The water system is owned and operated by the Northern Illinois Utilities, Inc. One well (No. 2) is in use and another well (No. 1) is available for emergency use. In 1956 there were 75 services, none metered. In 1975 there were 179 services, all metered; the average and maximum daily pumpages were 38,356 and 58,000 gpd, respectively. The water from Well No. 2 is chlorinated and treated with polyphosphate to keep iron in solution. The natural fluoride concentration in the water is adequate to satisfy state requirements.

WELL NO. 1, finished in sand and gravel, was completed in 1934 to a depth of 87 ft by Art Wertz, Antioch. This well is available for emergency use. The well is located about 300 ft east of the lake at Wooded Shores and Lake Shore Drives, approximately 1150 ft N and 900 ft E of the SW corner of Section 18, T45N, R8E. The land surface elevation at the well is approximately 820 ft.

A 6-in. diameter hole was drilled to a depth of 87 ft. The well is cased with 6-in. pipe from 0.7 ft above the pumphouse floor to a depth of 87 ft.

In October 1956, when pumping at a rate of 32 gpm, the drawdown was 10 ft from a nonpumping water level of 4 ft.

The pumping equipment presently installed is a Sta-Rite submersible pump set at 80 ft, rated at 60 gpm, and powered by a 5-hp electric motor.

A partial analysis of a sample (Lab. No. 148175) collected October 28, 1958, after pumping at 32 gpm, showed the water to have a hardness of 490 mg/l, total dissolved minerals of 521 mg/l, and a trace of iron.

WELL NO. 2 (formerly Oakwood Shores Subdivision well), finished in sand and gravel, was completed in November 1959 to a depth of 222 ft by Art Wertz, Antioch. The well is located on Northwood Drive near the elevated tank on lot 9, block 1, approximately 1200 ft N and 1600 ft W of the SE corner of Section 18, T45N, R8E. The land surface elevation at the well is approximately 880 ft.

An 8-in. diameter hole was drilled to a depth of 230 ft. The well is cased with 8-in. steel pipe from 2 ft above land surface to a depth of 215 ft followed by 7 ft of 8-in. No. 20 slot Johnson Everdur screen. The top of the well casing is sealed by a pitless adapter.

A production test was conducted on November 16, 1959, by representatives of the driller, the State Water Survey, and subdivision officials. After 1 hr of pumping at a rate of 250 gpm, the drawdown was 16 ft from a nonpumping water level of 68 ft below land surface.

The pumping equipment presently installed consists of a 15-hp electric motor, a 4-in., 6-stage Myers submersible pump set at 130 ft, rated at 198 gpm at about 100 ft TDH, and has 130 ft of 3-in. column pipe.

A drillers log of Well No. 2 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Yellow clay	4	4
Yellow clay and gravel	31	35
Soft red clay	15	50
Soft red clay and gravel	20	70
Hard red clay and gravel mix	90	160
Sandy gray clay	25	185
Dirty gray sand, some water	7	192
Red sand and gravel mixed, some water	5	197
Red sand and gravel, clean	28	225
Dirty fine sand and some stones	5	230
Limestone below		

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B108231) is for a water sample from the well collected March 14, 1973, after 35 min of pumping at 220 gpm. Methane gas has been reported in this well.

WELL NO. 2, LABORATORY NO. B108231

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	1.7	0.06	Silica	SiO_2	15	
Manganese	Mn	0.00		Fluoride	F	0.8	0.04
Ammonium	NH_4	1.2	0.07	Boron	B	0.20	
Sodium	Na	30.4	1.32	Nitrate	NO_3	0	0
Potassium	K	1.6	0.04	Chloride	Cl	1	0.03
Calcium	Ca	45	2.25	Sulfate	SO_4	0	0
Magnesium	Mg	28.5	2.34	Alkalinity (as $CaCO_3$)		296	5.92
Arsenic	As	0.00		Hardness (as $CaCO_3$)		229	
Barium	Ba	0.0		Total dissolved minerals		293	
Copper	Cu	0.00					
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00		pH (as rec'd)	8.4		
Mercury	Hg	0.0000		Radioactivity			
Nickel	Ni	0.0		Alpha *pc/l*	0.7		
Selenium	Se	0.00		±deviation	1.0		
Silver	Ag	0.00		Beta *pc/l*	4.9		
Zinc	Zn	0.00		±deviation	1.8		

WOODSTOCK

The city of Woodstock (10,226) installed a public water supply in 1894. Six wells (Nos. 1 and 3-7) are in use. In 1950 there were 2088 services, all metered. In 1974 there were 3270 services, all metered; the average daily pumpage was 2,772,000 gpd. The water from Well Nos. 1, 3, and 4 is lime softened, filtered, and chlorinated. The water from Well Nos. 5, 6, and 7 is aerated, filtered, zeolite softened, fluoridated, and chlorinated.

The initial supply was obtained from a well completed in 1894 to a depth of 1014 ft. A second well was con-

structed in 1900 to a depth of 956 ft and deepened in 1908 to a depth of 2079 ft. A third well was completed in 1908 to a reported depth of 1191 ft. These wells were abandoned and sealed in 1921. These three wells, drilled by the J. P. Miller Artesian Well Co., Brookfield, were located at the pumping station at the southwest intersection of First and Wheeler Sts. Their combined production in 1911 was reported to be 400 gpm.

A partial record shows that the first well, open to the Cambrian-Ordovician aquifer, was cased with 12-in. pipe from land surface to a depth of 183 ft, 8-in. pipe from 163 to 212 ft, and 6.2-in. pipe from 200 to 350 ft. A 6-in. diameter hole was drilled from 350 ft to an unknown depth where caving rock was encountered and a 5-in. liner (length not recorded) installed. The well was completed as a 5-in. hole to the bottom at a depth of 1014 ft.

The second well, open to the Cambrian-Ordovician and the Elmhurst-Mt. Simon aquifers, was cased with 10-in. pipe from land surface to a depth of 209 ft and 8-in. pipe to a depth of 250 ft. An 8-in. hole extended to a depth of 327 ft and a 7-in. liner was placed between depths of 320 and 327 ft opposite caving shale. A 7-in. hole was then drilled from 327 to 983 ft where a 5.2-ih. liner was installed (length not recorded). The well was completed as a 5.1-in. hole to the bottom at a depth of 2079 ft.

A correlated drillers log of the second well furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
QUATERNARY SYSTEM		
Pleistocene Series		
Glacial till and outwash, "Clay, sand, and gravel"	209.3	209.3
SILURIAN SYSTEM		
Niagaran-Alexandrian Series		
Dolomite, "Limestone"	65.7	275
ORDOVICIAN SYSTEM		
Maquoketa Group		
Brainard Shale, "Shale"	34	309
Ft. Atkinson Limestone, "Limestone"	81	390
Scales Shale, "Shale"	30	420
Galena-Platteville Group		
Dolomite, "Limestone"	335	755
Ancell Group		
Glenwood Formation		
Sandy dolomite, "Limestone, sandy"	41	796
St. Peter Sandstone, "Sandstone, hard"	201	997
Kress Member, "Shale or marl, red" (lower 62 ft of the St. Peter Sandstone)		997
CAMBRIAN SYSTEM		
Potosi Dolomite, Franconia Formation, and Ironton-Galesville Sandstone; "Limestone, sandy"	207	1204
Eau Claire Formation		
"Sandstone and shale"	48	1252
"Limestone and shale"	70	1322
"Sandstone"	74	1396
"Limestone"	181	1577
"Limestone and sandstone"	9	1586
"Limestone"	17	1603
Mt. Simon Sandstone		
"Sandstone, red"	207	1810
"Sandstone, hard"	3	1813
"Shale, sandy"	209	2022
"Sandstone, hard"	17	2039
"Limestone"	33	2072
"Sandstone"	7	2079

The third well, open to the Cambrian-Ordovician aquifer, was cased with 10-in. pipe from land surface to a depth of 209 ft, 8.2-in. pipe from 218 to 253 ft, and 7-in. pipe from 259 to 327 ft. A 7-in. hole was drilled to 409 ft and a 6.2-in. hole to 972 ft. A 5.2-in. liner was placed between the depths of 912 and 972 ft. The well was completed as a 5-in. hole to the bottom at a depth of 1191 ft.

Two wells, finished in sand and gravel, were drilled in 1912 on the north side of McHenry Ave. about 1 mile northeast of the first three wells. The wells were spaced about 15 ft apart and were 85 ft deep. They were cased with 10-in. pipe and equipped with Cook screens 18 ft long. In 1914 their combined production was reported to be 500,000 gpd. These wells furnished a part of the supply until December 1920. They were abandoned in 1921 because of a reduction in their productive capacities and because of plunger pump difficulties caused by infiltration of fine sand through the screens.

WELL NO. 1, finished in sand and gravel, was completed in February 1921 to a depth of 196 ft by the Layne & Bowler Co., Chicago. The well is located at the southwest corner of First and Wheeler Sts., approximately 2800 ft S and 850 ft E of the NW corner of Section 5, T44N, R7E. The land surface elevation at the well is approximately 915 ft.

A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Sand and gravel mixed with clay	20	20
Sand and boulders mixed with clay	20	40
Sand and clay	30	70
Hard sand and clay	8	78
Coarse sand and clay	22	100
Sand and gravel	35	135
Coarse sand to boulders	15	150
Gumbo	7	157
Gravel and boulders	35	192
Boulders	4	196
Rock below		

A 30-in. diameter hole was drilled to a depth of 146 ft and finished 13 in. in diameter from 146 to 196 ft. The well is cased with 24-in. pipe from land surface to a depth of 95.8 ft, 24-in. No. 6 (0.080 in.) Layne shutter screen from 95.8 ft to a depth of 100.8 ft, 24-in. pipe from 100.8 ft to a depth of 110.8 ft, 24-in. No. 6 (0.080 in.) Layne shutter screen from 110.8 ft to a depth of 135.8 ft, 24-in. perforated pipe from 135.8 ft to a depth of 145.8 ft, 13-in. pipe from 130 ft to a depth of 147.6 ft, 13-in. No. 6 (0.080 in.) Layne shutter screen from 147.6 ft to a depth of 196 ft, and a No. 6 (0.080 in.) shutter plug 12 in. by 10 in. by 60 in. in the bottom of the screen. The annulus between the 30-in. hole and the 24-in. casing-screen assembly is filled with 0.5-to 1-in. diameter gravel from an unknown depth to 146 ft.

A production test was conducted on February 4, 1921, by representatives of the city and the driller. After 10 hr of pumping at rates of 769 to 588 gpm, the maximum drawdown was 37.7 ft from a nonpumping water level of 49.5 ft below land surface.

The pumping equipment presently installed consists of a 50-hp 1170 rpm Westinghouse electric motor, a 12-in., 6-stage Layne turbine pump (No. 7234) set at 115 ft, rated at 1000 gpm at about 135 ft head, and has 115 ft of 8-in. column pipe. The well is equipped with 115 ft of airline.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 04899) of a sample collected April 17, 1972, after pumping continuously at 1000 gpm, showed the water to have a hardness of 380 mg/1, total dissolved minerals of 352 mg/1, and an iron content of 0.8 mg/1.

WELL NO. 2, finished in sand and gravel, was completed in January 1921 to a depth of 206.7 ft by the Layne & Bowler Co., Chicago. This well is not in use. The well is located in the rear of the Eltra Corp. offices at the southwest corner of First and Wheeler Sts., approximately 2900 ft S and 850 ft E of the NW corner of Section 5, T44N, R7E. The land surface elevation at the well is approximately 915 ft.

A drillers log of Well No. 2 follows:

A 30-in. diameter hole was drilled to a depth of 166 ft

Strata	*Thickness (ft)*	*Depth (ft)*
Cinders and sand	4	4
Sand and boulders	50	54
Clay and boulders	24	78
Sand	9	87
Clay and boulders	25	112
Sand and gravel	28	140
Clay and boulders	2	142
Fine sand	12	154
Clay	3	157
Coarse sand	5	162
Clay	4	166
Fine sand	5	171
Clay	7	178
Gravel	3	191
Clay	6	197
Gravel and sand	9	206
Rock below		

and finished 1 3 in. in diameter from 166 to 206.7 ft. The well is cased with 24-in. pipe from 1.5 ft above land surface to a depth of 107.7 ft, 24-in. No. 6 (0.080 in.) Layne shutter screen from 107.7 ft to a depth of 112.6 ft, 24-in. pipe from 112.6 ft to a depth of 122.3 ft, 24-in. No. 6 (0.080 in.) Layne shutter screen from 122.3 ft to a depth of 141.8 ft, 24-in. pipe from 141.8 ft to a depth of 161.3 ft, 24-in. No. 6 (0.080 in.) Layne shutter screen from 161.3 ft to a depth of 166.2 ft, 13-in. pipe from 158 ft to a depth of 167.8 ft, 13-in. No. 6 (0.080 in.) Layne shutter screen from 167.8 ft to a depth of 206.7 ft, and a No. 6 (0.080 in.) shutter plug 12 in. by 10 in. by 60 in. in the bottom of the screen. The annulus between the 30-in. hole and the 24-in. casing-screen assembly is filled with 0.5-to 1-in. diameter gravel from an unknown depth to 166.2 ft.

A production test was conducted on January 6, 1921, by representatives of the city and the driller. After 10.2 hr of pumping at rates ranging from 925 to 846 gpm, the final drawdown was 39.6 ft from a nonpumping water level of 49.5 ft below land surface.

In 1945, the well reportedly produced 1000 and 850 gpm with drawdowns of 46 and 44 ft, respectively, from a nonpumping water level of 57 ft below the pump base.

The pumping equipment presently installed is a 12-in., 6-stage Layne turbine pump set at 125 ft, and rated at 800 gpm at about 156 ft TDH.

A mineral analysis of a sample (Lab. No. 73954) collected December 12, 1933, showed the water to have a hardness of 361 mg/1, total dissolved minerals of 367 mg/1, and an iron content of 1.2 mg/1.

WELL NO. 3, finished in sand and gravel, was completed in August 1939 to a depth of 198 ft by the Layne-Western Co., Aurora. The well is located about 125 ft southeast of Well No. 2, approximately 3000 ft S and 900 ft E of the NW corner of Section 5, T44N, R7E. The land surface elevation at the well is approximately 915 ft.

A correlated drillers log of Well No. 3 furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
PLEISTOCENE SYSTEM		
Cinders and fill	9	9
Sand and gravel, yellow	13	22
Sand, gravel, and clay	36	58
Gravel	7	65
Clay, gravel, and boulders	83	148
Sand, gravel, and boulders	50	198

A 36-in. diameter hole was drilled to a depth of 150 ft and finished 30 in. in diameter from 150 to 198 ft. The well is cased with 30-in. outer pipe from 2 ft above land surface to a depth of 150 ft and 18-in. inner pipe from 2 ft above land surface to a depth of 148 ft followed by 50 ft of 18-in. Layne shutter screen. The annulus between the 30-in. hole and the 18-in. casing-screen assembly is filled with 27.5 yards of gravel.

Upon completion, the well reportedly produced 1440 gpm for 30 hr with a drawdown of 68 ft from a nonpumping water level of 55 ft below land surface.

On September 6, 1939, after 6 hr of pumping at a rate of 1175 gpm, the pumping water level was 91 ft below land surface. On September 7, 1939, the nonpumping water level was reported to be 56.5 ft after a 1.5-hr idle period.

In 1945, the nonpumping water level was reported to be 57 ft below the pump base.

In 1958, after a noticeable reduction in yield, the well was acidized. The results are not available.

The pumping equipment presently installed is a 15-in., 5-stage Layne turbine pump set at 180 ft, rated at 1 350 gpm at about 165 ft TDH, and powered by a 75-hp Westinghouse electric motor.

A mineral analysis of a sample (Lab. No. 111019) collected July 10, 1947, after pumping for 23 hr at 1100 gpm, showed the water to have a hardness of 369 mg/1, total dissolved minerals of 382 mg/1, and an iron content of 1.3 mg/1.

WELL NO. 4, finished in sand and gravel, was completed in November 1948 to a depth of 205 ft by the Layne-Western

Co., Aurora. The well is located about 125 ft northwest of Well No. 1, approximately 2700 ft S and 800 ft E of the NW corner of Section 5, T44N, R7E. The land surface elevation at the well is approximately 915 ft. A drillers log of Well No. 4 follows:

Strata	Thickness (ft)	Depth (ft)
Fill	5	5
Hard sand, clay, and boulders	35	40
Sandy clay	6	46
Fine gravel	2	48
Hardpan	50	98
Hard clay and boulders	38	136
Hard sandy clay and boulders	6	142
Clay and boulders	7	149
Sandy clay and boulders	9	158
Hard sandy clay and rock	14	172
Sand, gravel, and clay	5	177
Cemented sand	6	183
Rock and gravel	11	194
Sand and gravel	9.5	203.5
Gravel and clay	1	204.5
Blue clay	1	205.5

A 36-in. diameter hole was drilled to a depth of 205.5 ft. The well is cased with 30-in. pipe from land surface to a depth of 170 ft, and 18-in. pipe from land surface to a depth of 165 ft followed by 40 ft of 18-in. No. 5 (0.105 in.) Layne Armco iron shutter screen. The annulus between the bore hole and the 18-in. casing-screen assembly is filled with gravel.

Upon completion, the well reportedly produced 1016 gpm with a drawdown of 58 ft from a nonpumping water level of 73 ft below the pump base.

In January 1958, the nonpumping water level was reported to be 76 ft below the pump base.

The pumping equipment presently installed consists of a 75-hp 1800 rpm General Electric motor, a 12-in., 3-stage Layne turbine pump (No. 19350) set at 180 ft, rated at 1000 gpm at about 183 ft TDH, and has 180 ft of 10-in. column pipe. The well is equipped with 180 ft of airline.

Prior to the construction of Well Nos. 5 and 6, at least 25 test holes were drilled in 1959 and 1960 in the vicinity of the city. Charles M. Hayes, Champaign, drilled 6 holes ranging in depth from 60 to 247 ft. The Layne-Western Co., Aurora, drilled at least 19 holes ranging in depth from 176 to 222 ft.

WELL NO. 5, finished in sand and gravel, was completed in September 1960 to a depth of 189 ft by the Layne-Western Co., Aurora. The well is located about 1300 ft east of Route 47 near Maple Ave., approximately 1400 ft N and 1500 ft W of the SE corner of Section 32, T45N, R7E. The land surface elevation at the well is approximately 886 ft.

A drillers log of Well No. 5 follows:

Strata	Thickness (ft)	Depth (ft)
Black top soil	1	1
Gray and yellow clay, jointed	2	3
Yellow soil and gravel	2	5
Yellow clay	1	6
Gray sandy clay	9	15
Gray sand to coarse gravel	31	46
Gray fine sand, some gravel and streaks of clay	4	50
Gray sandy clay	8	58
Gray fine sand to coarse gravel	17	75
Reddish brown sandy clay	11	86
Brown fine sand	4	90
Reddish brown sandy clay	16	106
Brown fine to coarse sand	5	111
Gray clay	2	113
Gray sand and gravel	2	115
Soft brownish gravel and clay	19	134
Brown and gray fine sand to medium gravel	55	189
Limestone below		

A 34-in. diameter hole was drilled to a depth of 189 ft. The well is equipped with a pitless adapter from land surface to a depth of 4 ft and cased with 12-in. standard pipe from 4 ft below land surface to a depth of 139 ft followed by 50 ft of 12-in. No. 8 (0.030 in.) Layne stainless steel shutter screen. The annulus between the bore hole and the casing-screen assembly is filled with clay from 0 to 5 ft, with concrete from 5 to 19 ft, with sand fill from 19 to 99 ft, and with 41 tons of gravel from 99 to 189 ft.

A production test using six observation wells was conducted on September 19-22, 1960, by representatives of the driller, the city, and the Stanley Engineering Co. After 69 hr of pumping at a rate of 1043 gpm, the maximum drawdown was 27.64 ft from a nonpumping water level of 22.18 ft. One hr after pumping was stopped, the water level had recovered to 26.59 ft.

The pumping equipment presently installed is a Layne submersible pump set at 120 ft, rated at 1000 gpm at about 90 ft head, and powered by a 30-hp U.S. electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. 04898) is for a water sample from the well collected April 17, 1972, after pumping continuously at 900 gpm.

WELL NO. 5, LABORATORY NO. 04898

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.9	0.03	Silica	SiO_2	21	
Manganese	Mn	0.0		Fluoride	F	0.5	0.03
Ammonium	NH_4	1.3	0.07	Boron	B	0.25	
Sodium	Na	7	0.30	Nitrate	NO_3	0.0	
Potassium	K	0.8	0.02	Chloride	Cl	5	0.14
Calcium	Ca	88	4.39	Sulfate	SO_4	35	0.73
Magnesium	Mg	45	3.70	Alkalinity (as $CaCO_3$)		356	7.12
				Hardness (as $CaCO_3$)		396	
Barium	Ba	0.0		Total dissolved minerals		372	
Copper	Cu	0.0					
Cadmium	Cd	0.00					
Chromium	Cr	0.0		pH (as rec'd)	7.3		
Lead	Pb	0.0		Radioactivity			
Mercury	Hg	<0.0005		Alpha *pc/l*	1		
Nickel	Ni	0.0		±deviation	1		
Silver	Ag	0.0		Beta *pc/l*	0		
Zinc	Zn	0.0		±deviation	1		

WELL NO. 6, finished in sand and gravel, was completed in October 1960 to a depth of 192.5 ft by the Layne-Western Co., Aurora. The well is located 80 ft northwest of the new water treatment plant, approximately 1400 ft N and 2400 ft W of the SE corner of Section 32, T45N, R7E. The land surface elevation at the well is approximately 892 ft.

A drillers log of Well No. 6 follows:

Strata	Thickness (ft)	Depth (ft)
Brown silty soil	4	4
Yellow clayey silt	8	12
Yellow silty sand and gravel	4	16
Yellow sandy silt, gravel embedded	6	22
Gray sandy silty clay, gravel embedded	11	33
Gray fine sand to coarse gravel	31	64
Gray sand and gravel, streaks of clay	8	72
Gray clay	3	75
Gray fine sand to medium gravel, streaks of clay	4	79
Gray to brown sandy gravelly clay	33	112
Gray fine sand to coarse gravel	17.5	129.5
Gray to green silt	10.5	140
Silty gray fine sand to coarse sand	7	147
Gray silt	3	150
Brown fine to coarse sand and boulders	30	180
Gray sand to coarse gravel	12.5	192.5
White limestone		

A 34-in. diameter hole was drilled to a depth of 192.5 ft. The well is equipped with a pitless adapter from land surface to a depth of 4 ft and cased with 12-in. inner pipe from 4 ft below land surface to a depth of 114.5 ft, 12-in. No. 8 (0.030 in.) Layne stainless steel shutter screen from 114.5 ft to a depth of 129.5 ft, 12-in. pipe from 129.5 ft to a depth of 152.5 ft, and 12-in. No. 8 (0.030 in.) Layne stainless steel shutter screen from 152.5 ft to a depth of 192.5 ft. The annulus between the bore hole and the casing-screen assembly is filled with clay from 0 to 5 ft, with concrete from 5 to 19 ft, with sand from 19 to 79 ft, and with 66 tons of No. 1 Muscatine gravel from 79 to 192.5 ft.

A production test using one observation well was conducted by the driller on October 25, 1960. After 12.1 hr of pumping at rates ranging from 1022 to 1059 gpm, the final drawdown was 10 ft from a nonpumping water level of 26 ft below land surface.

The pumping equipment presently installed is a Layne submersible pump set at 95 ft, rated at 1000 gpm at about 110 ft head, and powered by a 40-hp U.S. electric motor. The well is equipped with 110 ft of airline.

A partial analysis of a sample (Lab. No. 153521) made in November 1960, showed the water to have a hardness of 309 mg/l, total dissolved minerals of 333 mg/l, and an iron content of 0.4 mg/l.

WELL NO. 7, finished in sand and gravel, was completed in May 1961 to a depth of 114 ft by the Layne-Western Co., Aurora. The well is located northeast of the new treatment plant at 540 Birch Road about 1 block north of St. Joseph Road, approximately 2600 ft N and 1700 ft W of the SE corner of Section 32, T45N, R7E. The land surface elevation at the well is approximately 890 ft.

A 34-in. diameter hole was drilled to a depth of 114 ft. A drillers log of Well No. 7 follows:

Strata	Thickness (ft)	Depth (ft)
Top soil	1	1
Soft silty, jointed yellow clay and boulders	3	4
Hard yellow clay, boulders	4	8
Hard blue clay, boulders	11	19
Fine to coarse sand, gravel, and boulders	31	50
Soft sticky gray clay, boulders embedded	14	64
Gray fine sand, gravel, and boulders	11	75
Hard brownish clay, boulders	23	98
Very coarse sand, gravel, and large boulders	16	114

The well is equipped with a pitless adapter from land surface to a depth of 4 ft, and cased with 12-in. pipe from 4 ft below land surface to a depth of 29 ft, 12-in. No. 6 (0.080 in.) Layne shutter screen from 29 ft to a depth of 49 ft, 12-in. pipe from 49 ft to a depth of 99 ft, and 12-in. No. 6 (0.080 in.) Layne shutter screen from 99 ft to a depth of 114 ft. The annulus between the bore hole and the casing-screen assembly is filled with clay from 0 to 5 ft, with concrete from 5 to 19 ft, and with 65 tons of gravel from 19 to 114 ft.

A production test using two observation wells was conducted by the driller on May 2, 1961. After 12.1 hr of pumping at a rate of 1022 gpm, the final drawdown was 4.84 ft from a nonpumping water level of 17.58 ft.

The pumping equipment presently installed is a Lyane submersible oil-lubricated turbine pump set at 94 ft, rated at 1000 gpm at about 110 ft head, and powered by a 40-hp 1750 rpm U.S. electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B107951) is for a water sample from the well collected March 7, 1973, after 4 hr of pumping at 900 gpm.

WELL NO. 7, LABORATORY NO. B107951

		mg/l	me/l			mg/l	me/l
Iron	Fe	3.9	0.14	Silica	SiO_2	19	
Manganese	Mn	0.14	0.00	Fluoride	F	0.3	0.02
Ammonium	NH_4	0.8	0.04	Boron	B	0.00	
Sodium	Na	11.0	0.48	Nitrate	NO_3	0	
Potassium	K	1.6	0.04	Chloride	Cl	25	0.70
Calcium	Ca	118	5.89	Sulfate	SO_4	130	2.70
Magnesium	Mg	49	4.03	Alkalinity (as $CaCO_3$)		352	7.04
Arsenic	As	0.00		Hardness (as $CaCO_3$)		496	
Barium	Ba	0.0					
Copper	Cu	0.00		Total dissolved minerals		614	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00		pH (as rec'd)	7.7		
Mercury	Hg	0.0000		Radioactivity			
Nickel	Ni	0.0		Alpha *pc/l*	0.0		
Selenium	Se	0.00		±deviation	1.0		
Silver	Ag	0.00		Beta *pc/l*	9.8		
Zinc	Zn	0.00		±deviation	2.9		

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