

Protecting, Maintaining and improving the Health of All Minnesotans

Old Municipal Well Report for Maple Plain

PWSID: 1270021

MDH

April 2019



Minnesota Department of Health Environmental Health in Minnesota

MDH Public Water Supply Sources Report

PWSID: <u>1270021</u> PWS Name: Maple Plain PWS Type: Community PWS Status: Active

Public Water Supply Sources: Information from MNDWIS and CWI (sorted by Sample Point ID)

Source Type Codes: GW = Ground water; SW = Surface water; GUI = Ground water under influence

Location Source: MGS = digitized by the MN Geological Survey; * indicates imcomplete records

 O^* = duplicate in Old Municipal Well Data; \mathbf{R}^* = duplicate in MNDWIS PWS Sources Removed from Flow; \mathbf{S}^* = duplicate in

MNDWIS PWS Sources in Flow;

	MNDWIS PWS SOURCES IN FLOW													
	Source Info]	MNDWIS Data CWI Data						
Sample Point ID	Name	Туре	Availability	Status	Well No. (link to Well Log(s))	Location Info (link to Map)	Drill Year	Depth (in feet)	Case Depth (in feet)	Case Diam. (in inches)	Drill Date	Depth Completed (in feet)	Case Depth (in feet)	Case Diam. (in inches)
S01	Well #1	GW	Emergency	Active	<u>207090</u> O *	<u>04/06/1999</u> (R. Hoerr)	1939	418	238	10	11- 00- 1939	418	238	10
S02	Well #2	GW	Emergency	Out Long Term	<u>207407</u> O *	<u>04/06/1999</u> (R. Hoerr)	1959	435	241	16	10- 01- 1959	435	241	16
S03	Well #3	GW	Primary	Active	<u>112238</u> O *	<u>11/30/2016</u> (A. Djerrari)	1978	580	534	18	04- 20- 1978	534	534	18
S04	Well #4	GW	Primary	Active	<u>824078</u>	<u>3/13/2017</u> (<u>B.</u> <u>Bloomgren</u>)	2017	392	343	12	04- 13- 2017	392	343	12

MNDWIS and CWI data value discrepancies in preceding tables are shown in RED (0 or null values excepted).

Old Municipal Wells

The following tables show information on wells whose existence (or previous existence) has not yet been confirmed.

	OLD MUNICIPAL Well Data												
Well Search Reference	Name (s)	Unique Well Number	Drilled Depth (ft.)	Completed Depth (ft.)	Depth Cased (ft.)	Casing Diameter (in.)	Year Constructed	Construction Type	Year Out of Service	Sealing Record?	Year Sealed	Location Info	Comments
Well A	Well No. 1	<u>207090</u> <u>S</u> *	418		238	10	1939	Cable Tool/Bored				Pumping station in the north eastern part of town.	Emergency Active
Well B	Well No. 2	<u>207407</u> <mark>S*</mark>	435		241	16	1958	Cable Tool/Bored				Lots 6 and 7, Block 1, Original Plat	Emergency Out Long Term
Well C	Well No. 3	<u>112238</u> S*	404		333	24	1978	Cable Tool/Bored					Active
Databases Searched					Remarks								

	OL	D MUN	ICIPAL V	Vell Data					
Well Search Reference (s) Name Unique Drilled Well Depth Number (ft.) Depth (ft.)	Depth Cased (ft.)	Casing Diameter (in.)	Year Constructed	Construction Type	Year Out of Service	Sealing Record?	Year Sealed	Location Info	Comment
County Well Index (1-mile radius); MDH DWP Microfiche; MDH 1988-2002 Muni Well Inventory (1Suite); Biennial Report of the MN State Dairy and Food Commissioner- 1907; Minnesota Geological Survey City Well File Folders; MGS Bulletin (22, 27, 31, or 32); MDH DWP MNDWIS; MN Historical Soc Fire Underwriters Insp. Bureau (Fisher) historical map ; Sanborn Fire Insurance Maps; MDH WELLS									
Old Municipal Well Data Compiled By: Mara	Boula	anger Cor	npiled Date: 4	4/1/2019 2:12:	40 PM				

OLD MUNICIPAL Well Data - no RAW HYDRO data found.

Source: MN Dep't. of Health - 4/1/2019

Use of MDH Public Water Supply Sources Report

The report you have received shows three classes of Public Water Supply wells:

- In Use (actively used)
- Removed From Flow (for back-up or emergency use; may be disconnected from PWS)
- Old Municipal Wells (unused wells with no documented location, unique ID number, and/or well sealing record)

Old Municipal Wells are unsealed, abandoned wells. These wells pose a risk of contamination to existing wells and aquifers. According to State Well Code and under the terms of your Wellhead Protection Plan, your PWS may need to identify, locate, and properly seal Old Municipal Wells within your Drinking Water Supply Management Area, to current MDH standards.

While historical records may indicate that some of these wells were "capped", "abandoned", or "sealed" in the past, unless it can be shown that the sealing was performed to current standards, they may need to be located, cleaned out, and sealed properly with a well sealing record issued.

The report lists database references that were searched to compile the report. Under "Remarks" are notes and questions to help you with this process. State grant funding is available to help fund sealing of these old public water supply wells.

If you have questions, please talk to your MDH Planner or Hydrologist to address your PWS's specific issues. This report is not intended to be the "last word" on the status of Old Municipal Wells and your input will be critical in successfully finding and sealing these potential sources of contamination.

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Maple Plain

8126/40



MINNESOTA DEPARTMENT OF HEALTH Division of Sanitation

Report on the Water Supply Maple Plain, Minnesota February 26, 1943

Well A The public water supply for this village is obtained from a drilled well. The water is pumped directly into the distribution system while the overflow collects in an elevated steel tank.

Location of Source

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The well is located in a pumping station in the northeastern part of town. The ground is level and drains west through a culvert under the road in front of the pump station and thence north into the road ditch.

There is no source of contamination on this site near enough to be considered dangerous.

Well, Pump and Pumphouse

The well is drilled to a depth of 418 feet and is cased with a ten-inch iron pipe to 238 feet below ground level. From 238 feet to 402 feet the well consists of a 10-inch, and from 402 feet to 418 feet of an 8-inch, open drillhole.

The casing extends to a point 16 inches above the pumproom floor.

The normal water level in the well is 110 feet below the ground surface. A stratographic section of this well shows the following formations:

Formation		Th	ickness	Depth		
	Black Soil	2	feet	2	feet	
	Yellow Clay	13	feet	15	feet	
	Blue Clay	59	feet	74	feet	
	Blue Clay and Sand	86	feet	160	feet	
	Send and Gravel	13	feet	173	feet	
	Blue Clay	37	feet	210	feet	
	Fine Sand	13	fect	223	feet	

MINNESOTA DEPARTMENT OF HEALTH Division of Sanitation

Sanitation Rating of haple Plain Water Supply

Owner Village of Maple Flain Date November 26, 1946

4	Perfect Score	As Found	A5 Recommended	See Recommensation IL. In Attached Report
(A) Source				
Bacteriological sarety)	70	30		
Adequacy of treatment (4			
Physical quality		2		
Unemical quality	С. С	3		
EloLogical quality	2	2		
Adequacy of quantity		Z		
Sub-total	40	1		
Hazar adjustment factor deducted	0			
Total	4()	39	·	
(B) Prime Moving Equipment				
Well or intake	8	8		
Fumps		7		
Pining arrangement	Fi	5		
Reservoirs		7	1	
Fauipment housing	, 12	3		
Sub-total	<u>.</u>	· · · · · · · · · · · · · · · · · · ·	•••••	• • • • • • • • • • • • • • • • • • • •
Hazard adjustment factor deducted	Ő			
Total		30		
(C) Distribution System				
Street mains	ົວ	4		
Building services	2	2		
Plumbing	3	2		
Hydrants	Ì.	1		
Storage	4	4		
Pressure	2	2		
Tap-water quality	E	3		
Sub-total	<u>.0</u>			
Hezard adjustment factor deducted	0			
Total	20	18		·····
(U) Uperation and Operators				
Control of plant		4		
Condition of plant	Č.	5		
Training and experience	·····	ļ		
Sub-total	10			
Hazard aujustment factor deducted	()		į	
<u> </u>	10	<u> </u>		
GRAND TOTAL AND DATING	100	ac l		
UNANU IVIAL AND KAIING		1 90	LL	

Naple Plain 10199

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MINNESOTA DEPARTMENT OF MEALTH DIVISION OF WATER SUPPLY AND PLUNBING

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	Owner	•	Date	Marine 115	70
			_ Dave	1992 - 2014 - 199	<u> </u>
		Perfect. Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A)	Source				
	Sanitary Safety				
	Adequacy of treatment	30	. 50	30	
	Physical quality	2			
	Chemical quality	4	2	2	
	Biological quality	2	5	4	I Iron Regovel Plant
	Adequacy of quality	2	<u>ئە</u>	4	
	Sub-total	40		· · · · · · · · · · · · · · · · · · ·	a an
1	azard adjustment factor deducted	Ö			
	Total	40	30	tn -	and the second
	where the second se				
(B)	Prime Moving Fauipment				
,	Well or intake	8		in the second	
	Pumps	7	8	8	
	Piping arrangement	5	E	di d	
4 - 2 4 - 2	Reservoirs	7			
	Equipment housing	3			
•••••	Sub-total	30			
19	lazard adjustment factor deducted	0			
	Total	30	20	20	· · · · · · · · · · · · · · · · · · ·
(C)	Distribution System				
	Street mains	5			
	Building services	2		1 	
	Plumbing	3	2	2.5	Recommendation No.1
	Hydrants	1	1 7	1	
	Storage	4	7	λ - λ	
	Pressure	2	2	2	
	Tap water quality	3			
	Sub-total	20			
	lazard adjustment factor deducted	0			
	Total	20	26	13.4	
(n)	Aperation and Approx				
νD1.	Control of system	5	1		
	Condition of avatom	5	4	4	
ć	Training and experience	2	3	3	
	TIGITINE and experience	<i></i>			
	Sub-total	10			
1	lazara adjustment factor deducted	10			
	ТОТЯГ	LU 10	1 G -	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	主任 にほんかい かいしちれい しゃんか 発生がらる

Grade A: 20 and upward - high Jegree of safety. Grade B: 85 to 89 - moderately high degree of safety. Grade C: 80 to 84 - moderately safe - improvement needed. Grade D: 70 to 79 - low degree of safety - improvement urgent. Grade E: 69 and lower - very dangerous condition, emergency measures recommended.

	Constation Dating of	Munici	Inal		
	Sanitation Rating of				water Supply
	Owner Maple Plain		_ Date	March 29, 1	.949
					. <u></u>
ä		Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
``	Sanitary Safety	80	20	20	
	Adequacy of treatment	30	30	30	
	Physical quality	2	2	2	
	Chemical quality	4	3		
	Biological quality	2			
	Adequacy of quantity	2	+		
	Hazard adjustment factor deducted	чU Ü			
	Total	40	39	39	······································
	, ,			1 1	
	(B) Prime Moving Equipment	0	e		
	Well or intake Pumps	8 7		07	
	Piping arrangement	5	-	L S	
	Reservoirs	7	1 7	1.7	
	Equipment housing	3	3	3	
	Sub-total	30			
	Hazard adjustment factor deducted	0		+	
	Total	-30	30	30	· · · · · · · · · · · · · · · · · · ·
((C) Distribution System		1		
	Street mains	5	1 1	4	
	Building services	2	2	2	
	Plumbing	3	1	2支	
	Hydrants	1	1 1		
	Dreggire	4 9		4	
	Tap water quality	23			
	Sub-total	<u>.</u>	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·
	Hazard adjustment factor deducted	0			
-	Total	20	17	18호	
	(D) Operation and Assessment				
	Control of system	5	1.		,
	Condition of system	3	4		
	Training and experience	2 ່	ĺí	í	
•••••	Sub-total	10			
	Hazard adjustment factor deducted	0			
	Total	10	8	8	
499 - C				T	

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MINNESOTA DEPARTMENT OF HEALTH DIVISION OF WATER SUPPLY AND PLUMBING

Sanitation Rating of Maple Plain Water Supply

Owner Municipal Date January 11, 1950

-	····		- <u>r</u>		<u>.</u>
if⊷*. •		Perfect Score	As Found	Ås Recommended	See Recommendation No. In Attached Report
	(A) Source				
	Sanitary Safety	30	30	20	
	Adequacy of treatment]	00		0	
	Physical quality	2	2	2	
	Chemical quality	4	3	3	
	Biological quality	2	2	2	
	Adequacy of quantity	2	2	2	<u> </u>
	Sub-total	40			
	Hazard adjustment factor deducted	0			
	Total	40	39	39	
	(B) Prime Moving Equipment				
	Well or intake	8	8	8	
	Pumps	7	5	7	a
	Piping arrangement	5	5	l f	-
	Reservoirs	7	7	7	
	Equipment housing	3	3	3	
	Sub-total	······································	·		
	Hazand adjustment faster deducted	50			
	Total	30	28	30	
	(C) Distribution System				
	Street mains	5	1.	1.	
	Building services	2	2	4 2	
	Plumbing	2	1	22	b
	Hydrants	ĩ	1	1 1	0
	Storage	4	j,	Ţ,	
	Pressure	ŝ	2	2	
	Tap water quality	3	3	3	
	Sub-total	20	1		
	Hazard adjustment factor deducted	0			
	Total	20	17	181	
	(D) Operation and Operators		1		
	Control of system	5	4	<u>ь</u>	
	Condition of system	3	3	3	
	Training and experience	2	ī	2	Attend Dept. water
	Sub-total	10	+		
	Hazard adjustment factor deducted	Ō			
	Total	10	8	9	
				1	

MINNESOTA DEPARTMENT OF HEALTH DIVISION OF WATER SUPPLY AND PLUMBING

Sanitation Rating of <u>Maple Plain</u> Water Supply

_ · · • • 4	Owner Municipal Date May 10, 1951								
	· • • • • • • • •	4.r.	_	5.4.					
the second		Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report				
	(A) Source								
	Adequacy of treatment	30	30	30					
	Physical quality	2	2	2					
	Chemical quality	4	3	3					
	Biological quality	2	2	2					
	Adequacy of quantity	2	2	2					
•	Sub-total	40							
_	Hazard adjustment factor deducted	0							
-	Total	40	39	39					
	(B) Prime Moving Equipment								
	(D) frime noving courpoint	A	8	8					
	Dimne	- 7	ן ג	7	а				
	Pining arrangement	5	र्	5	ш. С				
	Reservoirs	7	7	7					
	Nouipment housing	3							
-	Sub-total	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	+	·					
<i>.</i>	Hazand adjustment factor deducted	0	1						
	Total		28	30					
-									
	(C) Distribution System	e	1						
	Street mains	5	4	4					
	Dullding services	2	2		L				
	Frund ing	נ		42	D				
	Preseure	4 9		4 2					
	Tan water quality	د ح		2	-				
-	Sub-total	200	+2	······					
	Uprove adjustment factor deducted	20	1						
-	Total	20	17	185					
-		~~~	<u> </u>						
	(D) uperation and uperators	5							
	Condition of system	2							
	Training and experience	ວ ໑	د ا		Attend Dept water Schoo				
-	Training and experience	بر میں جنوب	<u>۲</u>	۷	Attenu pept, na ter senet				
	Sub-total	10							
-	Hazard adjustment factor deducted	<u> </u>	<u> </u>	<u> </u>					
5	Total	10	8	9					

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DIVISION OF MUNICIPAL WATER SUPPLY

Sanitation Rating of Maple Flain Water Supply

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Owner Hunicipal Date January 31, 1952

<u>د</u>	٤.	Perfect Score	* As Found	As Recominended	See"Recommendiation Ho." In Attached Report
-					
	(A) Source				
	Sanitary Safety	7(30	30	
	Adequacy of treatment J	30		1 50	
	Physical quality	2	2	2	
	Chemical quality	4	3	3	
	Biological quality	2	2	2	
	Adequacy of quantity	2	2	Z Z	
	Sub-total	40			
	liazard adjustment factor deducted	O			
-	Total	40	39	39	
	(B) Prime Moving Equipment			0	
	Vell or intake	8	8	3	
	Fumps Bining oppongement	7			a.
	Reservoirs	5		2	
	Reviewent housing	(7			
			· · · · · · · · · · · · · · · · · · ·	ر	
		30			
•	Dazard adjustment factor deducted	30	20	30	
-	10021	<u>-</u>			
	(C) Distribution System				
	Street mains	5	4	4	
	Building services	2	2	2	
	Plumbing	3	1	22	Ь
	Hydrants				
	Storage	4	4	4	
	Tressure Ten water quality	<u>د</u> ۲		2	
	Tap water quartey	0	·····›	}?	
	Sub-total	20			
-	Hazard adjustment factor deducted	0			
	Total	20	17	182	
	(D) Operation and Operators				
	Control of system	ß	2	2	
	Condition of system	2	2	2	
	Operator qualifications	5	4	5	
		10			
	Hazard adjustment factor deducted	0			
	Total	10	R		
	GRAND TOTAL AND RATING	100	02	061	
			<u> </u>	1 142	L

Sanitation Safety Rating	of Ma	aple Plai	n	Water Capity
Date	Januery	r 29, 195	3	
L	Perfect Score	As Foună-	As Kacommonded	See Recommendation % in Attached Report
(A) Sauraa				
(A) Source Sanitary Safety Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3	3	
Biological quality	2	2	2	
Adequacy of quantity	4			
Sub-total	40			
Hazard adjustment factor deducted	40	30		<u> </u>
10041	<u> </u>			
(B) Prime Moving Equipment				
Well or intake	8	8	8	
Pumps	7	7	1 7	
Piping arrangement	5	5	5	
Reservoirs Fauinment housing	7	2	3	
Sub total	3			
	30			
Hazard adjustment factor deducted	0	20	20	······································
Total	30	30		
(C) Distribution System				
Street mains	5	l 1.	<u>ь</u>	
Building services	2	2	2	
Plumbing	3	1	21	а
Hydrants	1	ī	1	~
Storage	4	1	1	
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	17	185	
(D) Operation and Operators				
Control of system	α	_		
Condition of system	2	2	2	
Operator qualifications	≂ 5			
4 1	-	1 4		

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Section of Hunicipal Water Supply

Sanitation Safety Rating of Maple Plain ______Water Supply

Rect Score As See Recommendation No. Ås. E und Recommended In Attached Report (A) Source Sanitary Safety 20 20 20 Adequacy of treatment Bacteriological Quality 10 10 10 Physical quality 2 2 2 4 3 3 Chemical quality 2 Biological quality 2 2 2 Adequacy of quantity 2 2 Sub-total 40 Hazard adjustment factor deducted 0 40 Total 39 39 (B) Prime Moving Equipment Well or intake 8 8 8 Pumps 7 7 7 57 5 7 5 Piping arrangement Reservoirs 7 3 3 Equipment housing 3 Sub-total 30 Hazard adjustment factor deducted 0 30 Total 36 30 (C) Distribution System 14 Street mains 5 Ŀ Building services 2 2 2 23 З Plumbing 1 a 1 1 Hydrants 1 1; Storage 4 15 Pressure 2 2 2 3 3 Tap water quality 3 Sub-total 20 Hazard adjustment factor deducted 0 181 Total 20 17 (D) Operation and Operators Control of system 3 2 2 2 Condition of system 2 2

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Ls.

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Operator qualifications

Date Sectomber 21, 1954

Section of Municipal Water Supply

Sanitation Safety Rating of <u>Muple Plain</u>Water Supply

Date_____September 8, 1955____

	Perfect Scoro	Found	Recommended	Jee Rerinmendation No. In Attached Report
	••••••••••••••••••••••••••••••••••••••			
(A) Source	4 •			
Sanitary Safety	20	20	20	
Adequacy of treatment \int		20	20	
Bacteriological Quality	1.0	10	01	
Physical quality	2	2	2	
Chemical quality	4	2	-	
Biological quality	8	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40		· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • • • • • • • •
Hazard adjustment factor deducted	0			
<u> </u>	40	20	20	
(B) Prime Moving Equipment		-		
Well or intake	8	9	0	
Pumps	7	0	0	
Pining arrangement	Б			
Reservoirs	. 0 7	>	5	
Equipment housing	2	7	7	
Sub total	70	3	3	
Under a structure to the start of the start	30			
hazara aajustment lactor deducted	0			
'l'otal	30			
(C) Distribution System				
Street mains	Б			
Building services	5	4	4	
Dulluing Services Diumbing	5 7	2	2	
Fiund ing	3	1	22	a
Ayurants Storage	L	1	1 1	
	4	4	4	
Ter weter suglitu	ے 1	2	2	
Tap water quarting	3			
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	17	182	
(D) Operation and Operators				
Control of system	3			
Condition of system	2		2	
Operator qualifications	5	2		
Sub-total	10	4		
oqu-cotar i	TO			

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Section of Municipal Water Supply

Sanitation Safety Rating (1 Maple Plain

Water Supply

January 9, 1957

	· · · · · · · · · · · · · · · • • • • •	r		
	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3	3	
Biological quality	2	1	2	
Adequacy of quantity	2	1	2	Ъ
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	37	39	
(D) Prime Moving Equipment	C	8	8	
Well or intake	8	7	7	
Pumps Dining oppongement	7 R			
Piping arrangement	о п			
Fauipment housing	7 7	3	2	
	U 70	ļ		
Sub-total	30			
Hazard adjustment factor deducted	0	20	20	
lotal	30	0	30	
(C) Distribution System				
Street mains	5	1	·],	
Building services	2	2	2	
Plumbing	3	1	2불	a
Hydrants	1	- 1	1	
Storage	4	4	4	
Pressure -	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	17	18 1	
(D) Operation and Operators	-	2		
Condition of system	3	2	2	
Operator qualifications	2 5	ے ا	с с	Attend water ash
operator quarriteations	J	4	2	AULENG WATER SChoo

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Minnesota Department of Health District VI Minneapolis Minnesota

Report on Investigation of Municipal Mator Supply Maple Plain, Munusota March 7, 1932

Date of last investigation - September 8, 1955

Rating at last investigation - 94

Changes since last investigation - Well B

A second well has been added to the system. This well, located on lots 6 and 7, Block 1, Original Flat, village of Maple Flain, is a lo-inch well drilled to a depth of 435 feet and provided with 241 feet of casing. The reported log of the well is as follows:

	Depth (ft.)	Thickness (ft.)		
Clay	0 - 21 4	214		
Sandstone (dirty)	214 - 229			
Grey shale	228 - 243			
Green sandy shale	243 - 250			
Red shale	250 - 255			
Green sandy shale	255 - 265			
Shale (hard)	265 - 285			
Alternate layers of green				
shale and sandstone	285 - 365			
White sandstone	365 - 428			
Shale & sandstone	429 - 435			
	Clay Sandstone (dirty) Grey shale Green sandy shale Red shale Green sandy shale Shale (hard) Alternate layers of green shale and sandstone White sandstone Shale & sandstone	Clay (-214) Sandstone (dirty) $214 - 228$ Grey shale $228 - 243$ Green sandy shale $243 - 250$ Red shale $250 - 255$ Green sandy shale $255 - 265$ Shale (hard) $265 - 285$ Alternate layers of green shale and sandstone $285 - 365$ White sandstone $365 - 428$ Shale & sandstone $428 - 435$		

Water is drawn from the well by means of a water-lubricated vertical turbine pump which is rated at approximately 350 gallons per minute and powered by a 30 horsepower electric motor. The static water level is reported to be approximately 119 feet and the draw down 68 feet at a pumping rate of 400 gallons per minute. The well is provided with properly constructed and screened casing and discharge vants. The pumphouse is constructed with the floor entirely above grade. The floor drain, constructed of extra-heavy cast-iron pipe, discharges to a gravel

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4-17-62

Section of Water Supply and General Engineering

Sanitation Safety Rating of Maple Plain Municipal Nater Supply

Perfect As As See Recommendation No. Score Found Recommended In Attached Report (A) Source Sanitary Safety 20 20 20 Adequacy of treatment Bacteriological Quality 10 10 10 Physical quality 2 2 2 Chemical quality 4 3 3 2 Biological quality 1 2 1 Adequacy of quantity 2 2 Sub-total 40 Hazard adjustment factor deducted 0 40 Total 38 39 (B) Prime Moving Equipment Well or intake 8 8 3 7 Pumps 7 7 Piping arrangement 5 5 5 7 Reservoirs 7 7 Equipment housing 3 2 3 2 Sub-total 30 Hazard adjustment factor deducted 0 Total 30 20 20 (C) Distribution System Street mains 5 4 4 Building services 2 1.5 1.5 Plumbing 3 2.5 2.5 Hydrants 1 1 1 Storage 4 4 4 2 Pressure 2 2 Tap water quality 3 2 3 Coliform free sample Sub-total 20 0 Hazard adjustment factor deducted Total 20 17 18 (D) Operation and Operators Control of system 3 1 2 3 Condition of system 2 2 2 Operator qualifications 5 4 5 Sub-tot

Date_____March 7, 1962

Section of Water Supply and General Engineering

Sanitation Safety Rating of <u>Caple Plain Annicipal</u> Nater Supply

Date____January 10, 1965

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety Adequacy of treatment	20	20	20	
Bacteriological Quality Physical quality Charical quality	10 2	10 2	10 2	
Biological quality Adequacy of quantity	4 2 2	S 22 S	3 52 5	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	39	39	
(B) Prime Moving Equipment				
Well or intake		8	3	
Pumps Pining arrangement	5	7	7	
Reservoirs	7	5	5	
Equipment housing	, 3		2	0
Sub-total	30			•••••
Hazard adjustment factor deducted	0			
Total	30	29	.30	
(C) Distribution System	r			
Street mains Building convisoo	5	4	4	
Plumbing	ی ج	1.5	1.5	
Hydrants	1	2.5	2.5	
Storage	4		1	
Pressure	2	4	4	
Tap water quality	3		2	
Sub-total	20	<u> </u> 3		
Hazard adjustment factor deducted	0			
Total	20	10	10	
(D) Operation and Operators Control of system Condition of system Operator qualifications	3 2 5	1 2	2	1 6 3
		1		<u>A</u>

Section of Water Supply and General Engineering

Sanitation Safety Rating of Maple Plain Municipal _____Water Supply

Date____September 9, 1964

	Perfact Sçîre	A3 Found	As Recommended	See Recommendation Hd. In Attaches Report
(A) Source	•			
Sanitary Safety	20	20	20	
Adequacy of treatment ∫	0	20	20	
Bacteriological Quality	1.0	10	10	
Physical quality	2	2	2	
Chemical quality	4	3	3	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40			· · · · · · · · · · · · · · · · · · ·
Hazard adjustment factor deducted	Ð			
Total	40	39	39	
(D) Prime Moving Equipment				
Well or intake	8	8	8	
Fumps	7	7	7	
Piping arrangement	5	5	5	
Reservoirs Feuiestate beuging	7	7	7	
Equipment nousing	ى ى	2	3	2
Sub-total	30			
Hazard adjustment factor deducted	0	 		
Total	30	29	30	
(C) Distribution Sustan			8	
(C) Distribution System	Б			
Building convices	0	4	4	
Dlumbing	24 73	1.5	, 1.5	
Hudronto	1	2.5	2.5	
Storage	L A			
Dressure	2	4	4	
Tan water quality	دی ح	2	· 2	
		5	. J	
	20			
Hazard adjustment factor deducted	0			
Total	20	18	18	
(D) Operation and Operators				
Control of eveter	12	· ·	0	1 0 0
Condition of system	2			1 0 3
Operator qualifications	5		2	4
operator quarriteations		3	Ç	
Sub-total ;	10			

Section of Water Supply and General Engineering

Sanitation Safety Rating of Maple Plain Municipal Nater Supply

Date September 9, 1964

	Saifeel Score	Found	As Recommended	Jee Recommendation No. In Attached Report
(A) Source				
Sanitary Safety	20	20	20	
Adequacy of treatment]				
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3	3	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	39	39	
(P) Prime Maulas Fruissest				
(D) Prime Moving Equipment	0		~	
Well or intake	8	8	8	
Pumps Diaina anno anno 1	. 7	7	7	
Piping arrangement	5	5	5	
Reservoirs	7	7	7	
Equipment housing	3	2	3	2
Sub-total	30			
Hazard adjustment factor deducted	0			
Tctal	30	29	30	
(C) Distribution System				
(C) Distribution System	5		4	
Building convisoo	່ ເ	4	4	
Durining Services	۲ 7	1.5	1.5	
F Luiid Ing	с 1	2.5	2.5	
Ayurants Storago	L	L	1	
Dressure	. **	4	4	
Teressure Tere water evolity	· 3	2	2	
Tap water quality	ى ى	3	3	
Sub-total	20			
Hazard adjustment factor deducted	<u> </u>			
Total	20	18	18	
(D) Operation and Operators				
Control of system	α	, , ,	0	1 8 0
Condition of system	9		2	103
Operator qualifications:	20 5	2	2	
operator quattrications	ں 	3	C	4
Sub-total,	10			

Section of Water Supply and General Engineering

Sanitation Safety Rating of Maple Plain Municipal Mater Supply

Date August 25, 1969

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	Perfect Store	لام Found	As Recommended	See Recommendatión No. In Attached Report
(1) -				
(A) Source				
Sanitary Salety	20	20	20	
Adequacy of treatment]				
Bacteriological Quality	10	10	10	
Physical quality	2	5	2	
Chemical quality	4	3	3	
Biological quality	2	2	2	
Adequacy of quantity		2	2	· · · · · · · · · · · · · · · · · · ·
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	39	39	
(B) Prime Moving Equipment	-	l g	8	
well or intake	8	0	0	
Pumps	7	6	6	
Piping arrangement	5		2	
Reservoirs	7		(7	
Equipment nousing	3	2	2	
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30		30	
(C) Distribution System	-			
Street mains	5	4	4	
Building services	2	1.5	1.5	
Plumoing	3	2.5	2.5	
Hydrants	1	1	1	
Storage	4	4	4	
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	18	18	
(D) Operation and Operators				
(D) operation and operators	7	,		5
Condition of system	3			2
Ononaton qualifications	2			7
operator qualifications	C	3	2	>
Sub-total	10			

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Section of Water Supply and General Engineering

Sanitation Safety Rating of Maple Plain Municipal Mater Supply

Date January 20, 1971

4 •	Perfect Score	As Found	As Recommended	Sec Recommendation No. In Attached Report
(A) Source				
Sanitary Safety Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	2	2	
Adequacy of quantity	2 2	2	2	
Sub-total	40		 	
Hazard adjustment factor deducted	0			
Total	40	39	39	
(B) Prime Moving Equipment				
Well or intake	8	8	8	
Pumps	7	7	7	
Piping arrangement	5	5	5	
Keservoirs Fauirment housing	7 ~		3	
Sub-total	30	ļ		
Hazard adjustment factor deducted	0			
Total	30	30	30	

(C) Distribution System	_	4	і , Ц	
Street mains Building convices	5	1.5	1.5	
Plumbing	ي ح	2.5	2.5	
Hydrants	1	1	1	
Storage	4	4	4	
Pressure	2	2	2	
Tap water quality	3	3	ز ز	
Sub-total	20			
Hazard adjustment factor deducted	0	. <u> </u>		
Total	20	18	18	
(D) Operation and Operators				
Control of system	3	1	3	1 & 2
Condition of system	2	2	2	
operator qualifications	5	ځ ا	5	
Sub-total	10			

Section of Water Supply and General Engineering

Date_____March-21,-1973

	" Perstat Score	As Found	* ⁴ .s Recommended	See Recommendation No. In Arreached Report
(A) Source]	1		1
Sanitary Safety	20	20	20	
Adequacy of treatment]			10	
Bacteriological Quality	10		10	
Physical quality	2	2	2	
Chemical quality	4	3	3	
Biological quality	2	2	2	
Adequacy of quantity	8	2	2	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	39	39	
(D) Prime Moving Equipment		2	8	
Well or intake	8	0	0	
Pumps Dining announcet	7		/ 5	
Piping arrangement	5		2	
Reservoirs	7			
Equipment nousing	3	ر ب	>	
Sub-total	30			
Hazard adjustment factor deducted	0			
Total				
(C) Distribution Sustan				
Street maine	5	4	l4	
Building convisoo	- J	1.5	1.5	
Duituing Services	۲ 7	2.5	2.5	
riumuing Hydronto	ט ן	1	1	
Storage		4	4	
	4		2	
Top water avality	ی ۲	3	3	
Tap water quality	3			
	20			
Hazard adjustment factor deducted	0	<u> </u>		
Total	20	18	18	
(D) Operation and Operators				
Control of system	3	1	3	7
Condition of system	2		2	-
Operator qualifications	5	4	5	2
Sub-total	10	<u>.</u>		
ouv-volat	10	1	1	

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Section of Water Supply and General Engineering

Sanitation Safety Rating of <u>Maple Plain Municipal</u> Water Supply

Date_____March-21,-1973

, ,	Fërfect Score	As Found	Recommended	Cee Raccamend≞tion No. In Attached Report
(A) Source Sanitary Safety Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3	3	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40		39	
(B) Prime Moving Equipment				
Well or intake	ß	8	8	
Pumps	7	7	7	
Piping arrangement	5	5	5	
Reservoirs	7	7	7	
Equipment housing	3	3	3	
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	30	30	
(C) Distribution System	E	<u>ь</u>	Li li	
Building convices	о 0	1.5	1.5	
Dunding Services	4	2.5	2.5	
Hydrente	ن ۱	1	1	
Storage	1	- - - -	4	
Pressure	2	2	2	
Tap water quality	3	3	3	
	20			
Hazard adjustment factor deducted	0			
Total	20	18	18	
(D) Uperation and Operators	0		7	3
Condition of system	3	1	シ	T
Operator qualifications	23	2	2	2
operator quartifications	ن 	4	2	۲
Sub-total	10	ł		

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						RE	POR	TON	1 IN	VES	TIG	ATIC	ON C	OF PUBLI	IC WA	TER SI	JPPI	LY				
Name of Water	Supp	lγ																PWS IC	D Number			
Maple 1	Pla	in	Mu	nic	cip	al	Wa	itei	e S	up	ply	7						1	270021			
Street																,		Teleph	one Numbers:			
<u>City H</u>	<u>all</u>														- 1			- Ciri	u. 470	1-11	23	
City	- 4													State	Zip (Code .			y. <u> </u>	ملم <u>کے ک</u>	<u>6.</u> V Io	
<u>Maple</u>	<u>P1a</u>	in									1 Die	•=====		MN	55	359		Enc	aineer:			
Uepper	• ~											M	~		·			Oth	ner:			
Water Superinte	1.11 Podeo	t								C	l	<u>I''l</u> icatio	et	Plant Class	<u>LLdN</u> sificatu			IT				
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Other Operator	5	enț		er.	<u> </u>					c	lassif	icatio	n	Plant Type	<u> </u>				Plumbing Permi	$\frac{1}{1}$ its and		
Roger	- Mev	en									Т	ר		Con	רדוו חזר	itv			Inspections Rec	auired		
Roger	i C y	C1									Ŧ			Date of Pr	evious	Survey			Date of Survey		Yes	
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														July	/ 24	, 19	79		October	<u>28</u>	, 19	980
City Engineer	h.a.	1/				د	۸ -				/ T	`	_		_ \							
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	lome	Park							J Hot	el/M	otel					L.	J Ca	mpgrou	nd			
	y Ton	'n							Res	ort						Ĺ] Ho	using D	evelopment			
🖵 Institutio	n							L	Res	taura	nt					L	Jot	her				
Population Serv	ed							Se	rvice	Con	necti	ons					Sto	orage Ca	apacity:			
1,	400										47	75	(1)	ead-0))		_{(L)	st Sepa	rately)			
Design Capacity	(gal/	day)	0					A	erage	e Dai	ly Pro	oduct	tion	(gal/day)				50,0	00 gal.e	elev	ated	3
⊥, 	300	, UL	10								200	1,0	<u></u>		• • • • • •		-		0			
Emergency Cap		(gai/c	lay)					Н	ghest	t Dail	y Pro 550	oducti C C	ion (∩∩	gal/day)			To	+al+5 ∩	000 σ=1	lon	-	
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Source Name	Sou	Ava	Disi	Aera	l on the second	Sedi		Stab	Soft	Tast	Amr.	n -	Ť	Year	asir	Casi	Scre	Vell	Nate Bear	Stat	Drav	Ē
										<u>-</u>	<u> </u>		<u> </u>	<u>ŕ</u>					Franconi	a		VT
A Well #:	<u>1 G</u>	E	ļ	ļ			ļ							1939				418	Dresbach	1		17
B Well #:	2 G	P	Dc	A٤			FI					Va		1958	16	241		435	Dresbach	1119	65	35
																			Franconi	.a		ΫT
<u>Well #</u> :	<u>s G</u>	<u> P</u>										Va		1978	24	633		404	Presbach	<u>µ120</u>	34	39
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Section of Water Supply and General Engineering

Sanitation Safety Rating of Maple Plain Municipal Water Supply

Date____October 28, 1980

 	Pr-fest Score	As found	Recommended	Ste Recommundation No. In Attached Report
(A) Source				
Sanitary Safety 🔍	20	20	20	
Adequacy of treatment \int	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3	3	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	39	39	
(P) prime Venime Faultanet		1		
(D) Prime Moving Equipment	0	0	0	
Pumpe	0 7	7	8	
Pining arrangement	5	5		1
Reservoirs	7	7	7	
Equipment housing	3	3	3	
Sub-total	30	·····		
Hazard adjustment factor deducted	0			
Total	30	30	30	
(C) Distribution System			•	
Street mains	5	5	5	
Building services	2	1 7 5		
Plumbing	2 3	2 5	25	
Hydrants	1	1	2.0	2
Storage	4	2.5	4	3.4.5
Pressure	2	2	2	0,,,0
Tap water quality	3	3	3	
	20	17.5	19	
Hazard adjustment factor deducted	0	-1		2
Total	20	16.5	19	
(D) Operation and Operators				
Control of system	3	0.5	3	6,7,8,9,10,11
Condition of system	2	2	2	
Operator qualifications	5	3	5	12
	10			

ELEVENTH BIENNIAL REPORT

OF THE

Minnesota *State Dairy and Food Commissioner

TRANSMITTED TO THE LEGISLATURE

1907

1907 HARBISON & SMITH CO. MINNEAPOLIS



GOODHUE COUNTY.

Name of Creamery,	Shipping	Station.	Namo	of Secretary Manager.	Postoffice	Address.	Name of Buttermaker,	Postoffice Add	lress.
ine Island Creamery Co orth Star orth Star orth Creamery umbrota Creamery dwing, A. G. Swanson oscoe Butter and Cheese Association. Castedo Creamery Co offer Creek Co-operative Dairy Assn kyberg Co-operative Creamery Assn kyberg Co-operative Creamery Assn funced a Creamery	Pine Islan Kenyon Welch Cannon F Goodhue Zumbrota Cannon F Goodhue Skyberg Forest Mil Zumbrota	d alls	C. H. Chris, Frank A. J. E. G. E. G. A. G. F. S. A. V. F. J.	Levit Talle Boothryd Hammer Hammer Swanson Romnen Stone Anderson White	Pine Isla Kenyon Welch Cannon F Zumbrota Redwing Roscoe Cannon F Goodhue, Skyberg	nd Yalls Yalls, R. 1. R. 5.	W. Bumgardner M. M. Hjesmstad S. Nelson A. F. Peehl F. W. Meen A. R. Meen A. Swanson Knute Nelson J. Bloomquist F. Jacobson H. H. Lunnow	Pine Island. Kenyon. Welch, Cannon Falls. Goodhue. Zumbrota. Red Wing. Roscoe. Cannon Falls. Cannon Falls. Skyberg.	R. 4.
			GRAN	T COUNTY.					

Elbow	Lake	Elbow L	ake	*****************		an a	
Ashby	Creamery Co	Ashby	G. T.	Hoff Ashby	A. M.	Olson Ashby	
Herma	n'	Herman					

HENNEPIN COUNTY.

Flour City Creamery Co	Minneapolis	J. L. Aakar	1500 E. Franklin Av.	Swan Hanson 1500 E. Franklin Av.
Minneapolls Milk Co	Minneapolis	A. R. Rihuke	900 S. 6th St., Mpls	N. O. Bendickson 211 8th Av. N. E.
Rice County Creamory Co. E. P. Brown	Minneapolis		60 0th St Male	Pohit Hinging 69 9th St. Main
Plymouth Dairy Co	Minneapolis	J. Anderson	421 Plymouth Ave	J. Anderson 421 Plymouth Ave.
Independence Co-operative Creamery	Maple Plain	C. D. Ingersoll Chas. Soley	Maple Plain R 1.	C. D. Ingersoll Maple Plain.
New Model Creamery	St. Bonifacius	Felix Logelin	St. Bonifacius	Geo. Logelin St. Bonifacius.
Maple Leaf	Minneapolis	C. Zieberth	Osseo	O. ZieberthOsseo.
Plymouth Milk Co	Minneapolis	N. C. Strand	Mpls	
Minnesota Creamery Co	Minneapolis	J. A. Berg	Mpls.	
North Minneapolls Milk Co	Minneapolis	T O Omald	Dagang	
Seven Corners Milk Co	Minneapolis	J. G. Owald	Rogers	

"(Google

ELEVENTH ANNUAL REPORT



The Hydrologic Cycle. It has been estimated that a drop of water evaporated from the ocean rains five times before it gets back to the sea. (After National Resources Board Report.) UNIVERSITY OF MINNESOTA MINNESOTA GEOLOGICAL SURVEY WILLIAM H. EMMONS, DIRECTOR

BULLETIN 31

THE GEOLOGY AND UNDERGROUND WATERS OF SOUTHERN MINNESOTA

 $\mathbf{B}\mathbf{Y}$

GEORGE A. THIEL



MINNEAPOLIS · 1944 THE UNIVERSITY OF MINNESOTA PRESS

UNDERGROUND WATERS OF SOUTHERN MINNESOTA 216

The figures for hardness in Table 52 are not a true reflection of the character of the water in the formations indicated. In some wells that reach the Dresbach and Hinckley sandstone the water from higher formations is not completely shut off. However, from a study of analyses of water from carefully cased wells, it is safe to conclude that the water in the formations from the St. Peter to the Dresbach inclusive is of about the same hardness. The Hinckley sandstone, however, contains water with only about half as much temporary hardness, or about the same amount as the water in the Mississippi River. The iron content of artesian water taken from any subsurface stratum is much greater than that of Mississippi River water.

The temperature of artesian water varies with depth. As the earth is penetrated the temperature rises slowly, so that deep artesian water is usually warmer than that from shallow wells. This fact should be kept in mind when wells are drilled to obtain water for air-conditioning plants. The water in wells of moderate depth, such as those in the Jordan and the St. Peter sandstones, has a temperature from 45° to 50° F., whereas the water in the Hinckley sandstone is at a temperature of about 55°F.

Osseo

The village of Osseo uses about 4 million gallons of water annually. It obtains the water for its public supply system from a well 10 inches in diameter and 537 feet deep. The well penetrates more than 200 feet of St. Lawrence and Franconia shales, silts, and sandstone, but the chief source of water is the glacial drift, which is 300 feet thick in this vicinity. The static level is about 30 feet below the surface. (See accompanying section.)

Osseo Village Well. Elevation 892 ft.

		рЕртн (feet)	THICKNE (feet)
Drift	Unclassified	0-300	300
St. Lawrence and Franconia	Shales and sandstone	300-537	237-

HOPKINS

The well at Hopkins used for all municipal purposes is 16 inches in diameter and 820 feet deep. Its surface elevation is 920 feet above sea level, and the static water level is about 65 feet below the surface. The estimated annual consumption is about 35 million gallons. The subsurface geologic succession is given in the accompanying section.

Village	Well	at	Hopkins
---------	------	----	---------

		DEPTH (feet)	THICKNESS (feet)
Drift Platteville St. Peter	Unclassified Limestone Sandstone Shale Sandstone	$\begin{array}{c} 0-95\\ 95-120\\ 120-210\\ 210-235\\ 235-270 \end{array}$	95 25 150

HENNEPIN COUNTY

		(feet)	(feet)
Shakopee-Oneota	Dolomite	270-390	120
Jordan	Sandstone	390 - 470	80,
St. Lawrence	Shale and dolomite	470 - 535	65
Franconia	Shale and sandstone	535 - 660	125
Dresbach	Sandstone and shale	660-820	160
Sector Contract of the sector			

ROBBINSDALE

The village of Robbinsdale obtains water for its public supply system from a well 16 inches in diameter and 636 feet deep, drilled in 1937. The surface elevation is approximately 900 feet above sea level, and the well terminates in the lower part of the Franconia formation. The static water level is about 30 feet below the surface. When pumped at the rate of 800 gallons per minute the well has a drawdown of approximately 5 feet.

WAYZATA

The village of Wayzata formerly obtained its water from an artesian well that tapped the Jordan sandstone. Ownership of this well was transferred to the county, and it is now one of the group of seven largecapacity wells used for pumping water into Lake Minnetonka.

The present supply of water for the village is taken from a well 154 feet deep, which terminates in the glacial drift. Its static level is 70 feet below the surface. When pumped at the rate of 860 gallons per minute it has a drawdown of $4 \frac{1}{2}$ feet, and when the rate of pumping is increased to 1180 gallons per minute the drawdown is 5 1/2 feet below the static level.

LORETTO

The village of Loretto does not have a public well. The formations penetrated by the deep well at the railroad station are shown in the accompanying section.

Well at Soo Line Station, Loretto. Elevation 995 ft.

		DEPTH (feet)	THICKNESS (feet)
Drift	Sand and gravel	0 - 70	
	Hardpan	70 - 110	
	Blue clay	110-170	170
Jordan	Sandstone	170 - 260	90
St. Lawrence and	Red shale	260-290	
lower formations	White sand	290-312	
	Red shale	312 - 335	
	White sand	335 - 340	
	Gray shale	340 - 390	
	Blue shale	390 - 420	
	Gray shale	420 - 440	
	Green shale	440 - 525	
	Sandstone	525 - 596	336+

MAPLE PLAIN

The village of Maple Plain is located north of the western end of Lake Minnetonka, in the western part of the county, where the glacial drift is

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more than 200 feet thick. The public water supply is pumped from a well 10 inches in diameter and 418 feet deep. The static level is 114 feet below the surface. When pumped at the rate of 175 gallons per minute the well has a drawdown of 12 feet. The geological formations penetrated are shown in the accompanying section.

Village Well at Maple Plain. Elevation 1025 ft. Drilled 1939.*

		DEPTH	THICKNESS
		(feet)	(feet)
Glacial drift	Loam soil	0–2	2
	Yellow clay	2 - 15	13
	Blue clay	15 - 74	59
	Blue clay and sand	74 - 160	86
	Sand and gravel	160-173	13
	Blue clay	173-210	37
	Fine sand	210-223	13
	Fine sand and gravel	223-234	11
Franconia	Green shale	234-242	8
	Sandstone, hard	242-250	8
	Sandstone and shale	250-300	50
	Green shale	300-311	11
	Sandstone, various colors	311-334	23
	Shale	334338	4
	Sandstone	338-362	24
	Shale	362-365	3
	Sandstone, brown	365-388	23
Dresbach	Sandstone, grav	388-418	. 30

* Logs of other wells near the village are given in Bulletin 27, Minnesota Geological Survey.

COUNTY WELLS AT LAKE MINNETONKA

Following the drought years of 1933–35. Hennepin County officials ordered a number of artesian wells drilled (Figure 42), from which water was pumped and allowed to flow into Lake Minnetonka, in an attempt to raise the water in the lake to the level of pre-drought years (Figure 41). The logs of the new wells are shown in Figure 43. The log of well 6 is given elsewhere. Well 6 was formerly the village well at Wayzata. When all the wells were completed they yielded more than 15 million gallons per day. They were pumped almost continuously for approximately two years. Several were pumped for more than three years. The dates of completion of the wells and the fluctuations of the water levels are shown in Figure 43. Each well showed a steep initial drawdown during the first few months of operation, followed by slight fluctuations such as characterize the curves for wells 1 and 2 (Figure 44) during 1939 and 1940. The cumulative effect of the pumping of additional large-capacity wells is shown by the gradual depression of the water level in wells 1 and 2 as wells 3, 5, and 7 were completed and put into operation. (Wells 4 and 6 are not included in Figure 44.) At the beginning of 1939 the water in well 2 stood at about 820 feet above sea level, and by June 1941 it was depressed to 802 feet. Well 1 shows a similar trend. However, when pumping operations were stopped for several months during the summer



FIGURE 41. — Graphs of hydrological elements. showing computed annual evaporation from lakes and reservoirs, recorded annual precipitation, and computed evaporation minus recorded precipitation for the Minneapolis area. (Compiled by A. F. Meyer and published by the Minnesota Resources Commission, 1942.)

well is shown in Figure 42. Observations from March 6, 1940 to June 1, 1943 are given in Table 53.

TABLE 53. - Showing the Effect of the Seven County Wells on PILOT WELL 5 AT ORONO, LAKE MINNETONKA. ELEVATION 932.6 FT.*

Date	Elevation Static Water Level	Other County Pumps in Operation
March 6, 1940	897.80	All numping
March 28, 1941	896.90	All pumping
July 7, 1941	904.70	None pumping
February 5, 1942	898.60	No. 1 not pumping
April 1, 1942	899.60	No. 1 not pumping
June 9, 1942	909.80	None pumping
August 6, 1942	910.80	None pumping
December 21, 1942	912.30	None pumping
June 1, 1943	913.60	None pumping

* Data from the county engineer's office.

HENNEPIN COUNTY

of 1941, all water levels rose to approximately the same static levels observed when the wells were drilled. Pumping during the winter of 1941-42 again depressed the water surface. All the wells were shut off in April 1942. Observations made in June 1943 showed that the static level in all the wells was as high as or higher than when the wells were drilled.

Precipitation and pumping have now brought the level of Lake Minnetonka to above that of the dam at Gray's Bay, where the crest of the outlet dam is 929.4 feet above sea level. The total precipitation in the area of Minneapolis during 1941 was 27.00 inches, and in 1942, 30.56 inches. The mean annual precipitation is 27.00 inches.

The influence of the seven large-capacity pumps of the Lake Minnetonka wells on the regional static water level is shown by their effect on Pilot Well 5 at Orono, which is nearly two miles from well 1. The location of this

207090	County F	Unique Well Number County Hennepin				DEPARTMENT OF HEALTH Entry Date 1991/08/24
	207090 Quad			WE	LL AN	D BORING RECORD Update Date 2014/08/18
	Quad Id 1210			N	IINNESO	TA STATUTES CHAPTER 1031 Received Date
Well Name MAPLE P	LAIN 1	ell A				Well Depth Depth Completed Date Well Completed
118 24 W	r Section S	Subsection DCCBCB	Field Located Elevation	1025 0	00 ft .	418.00 ft 418.00 ft 1939/11/00
	2- 1			1020.0		Drillhole
well address	IVIAI					Angle
MAPLE PLAIN		MN	55359	CI	nanged	Drilling Method Cable Tool
contact address	CIT	Y OF MAPLE	PLAIN			Drilling Fluid Well Hydrofractured? YES NO
		• • • •				From ft. to
MAPLE PLAIN		MN	55359			Use community supply(municipal)
						Casing Type Steel (black or Iow Drive Shoe? YES NO Hole Diameter (in.)
						Diameter 10 Depth 238 <u>10.0(</u> To <u>402.0</u>
						$\frac{10.00}{10.00} \text{ in. from } 0.00 \text{ to } 238.00 \text{ ft.} \qquad \text{lbs/ft} \qquad \frac{8.00}{10.00} \text{ To } \frac{418.0}{10.00} \text{ Ibs/ft} \qquad \frac{10.00}{10.00} \text{ To } \frac{10.00}{10.00} \text{ ft.}$
Description		Color	Hardness	From	To (ft)	
		BLACK	Than an icoso	0	2	
		YELLOW		2	15	
CLAY		BLUE	<u> </u>	15	74	Screen No Open Hole(ft.) From 238.C to 418.0
CLAY AND SAND		BLUE	<u> </u>	74	160	Маке Туре
SAND AND GRAVEL			<u> </u>	160	173	Diamter Slot Length Set
CLAY		BLUE	<u> </u>	173	210	
FINE SAND			<u> </u>	210	223	
FINE SAND AND GRA	VEL			223	234	
SHALE		GREEN		234	242	
HARD SANDROCK V	ARIOUS CO	VARIED		242	250	Chatia Water Loval
SANDROCK AND SH	ALE .			250	300	Static water Level 114 00 ft. land surface Date measured 1939/11/00
SHALE		GREEN		300	311	Pumping Level (below land surface)
SANDROCK VARIOUS	S COLORS	VARIED		311	334	141.00 ft. after 5.00 hrs. pumpting g.p.m.
SHALE				334	338	Wellhead Completion
SANDROCK				338	362	Pitless adapter manufacturer Model
SHALE				362	365	Casing Protection 12 in. above grade
SANDROCK				365	369	At-grate (Environmental Wells and Borings ONLY) Basement offset
SANDROCK				369	416	Grouting Information Well grouted? YES NO 🖌 NOT SPECIFIED
SANDROCK W/TRAC	E OF SHAL	1		416	418	
						Nearest Known Source of Contamination
						feetDirectionType
						Well disinfected upon completion? YES NO
						Not Installed Date Installed
						Manufacture's name
						Model number HP 30.00 Volts
						Length of drop pipe Material Capacity g.p.m
						Abandoned Wells
Remarks					-	Does property have any not in use and not sealed well(s)? YES NO
	27-2006 FC	DR ST. LAWR	ENCE-FRAN	CONIA	ر ا	Variance
CALIPER LOGGED 4-	526.					Was a variance granted from the MDH for this well?
CALIPER LOGGED 4- STUDY. M.G.S. NO. 4						Well Contractor Cerfication
CALIPER LOGGED 4- STUDY. M.G.S. NO. 4						Popper Max Well Co. 27246
CALIPER LOGGED 4 STUDY. M.G.S. NO. 4						
CALIPER LOGGED 4 STUDY. M.G.S. NO. 4						License Business Name Lic. or Reg No.
First Bedrock CSTL		Aquifer	Tunnel City-Wo	newoc	4.00 5	License Business Name Lic. or Reg No.

Unique Well Number	County ⊦	lennepin		MINI	NESOTA	A DEPARTMENT OF HEALTH Entry Date 1991/08/24
207407	Quad R Quad Id 1	ockford 21C		WEI	LL AN	ND BORING RECORDUpdate Date2014/08/18DTA STATUTES CHAPTER 1031Received Date
Well Name MAPLE PLA	JN 2 W	ell B				Well Depth Completed Date Well Completed
Township Range Dir S	Section S	ubsection	Field Located	MDH	~ *	435.00 ft 435.00 ft 1959/10/01
118 24 W	24	CDDDCA	Elevation	1035.0	0 π.	
1620 MARIE AV	MAF	PLE PLAIN 2				Angle
MAPLE PLAIN		MN	55359	Cł	nanged	Drilling Method Cable Tool
contact address	CIT	Y OF MAPLE	PLAIN		5	
	0.1					
MAPLE PLAIN		MN	55359			Use community supply(municipal)
						Casing Type Steel (black or low Drive Shoe? YES NO Hole Diameter (in.)
						Diameter 16 Depth 241
						16.00 in from 0.00 to 241.00 ft lbs/ft
Description		Color		From	To (ft)	
			Haroness		10 (IL.) 40	-
		CRAV		40	40	-
	VEL			40 105	165	Screen No Open Hole(ft.) From 241.C to 435.0
		YELLOW	SOFT	165	170	Make Type
				170	214	Diamter Slot Length Set
				214	214	4
				274	220	-
SHALE		GRAY		228	243	-
GREEN SANDY SHALE		GREEN		243	250	-
RED SHALE		RFD		250	255	-
GREEN SANDY SHALE		GREEN	<u> </u>	255	265	Static Water Level (Multiple SWL)
			HARD	265	285	123.50 tt. land surface Date measured 1900/00/17
GREEN SHALE AND SA	NDSTON	GREEN		285	364	102.00 ft offer bro pumpting 630.00 d.p.m
GREEN SHALE AND SA		GREEN		364	365	Wellhead Completion
WHITE SANDSTONE		WHITE		365	428	Pitless adapter manufacturer Model
SHALE AND SANDSTO	NE			428	435	Casing Protection
			I	-		At-grate (Environmental Wells and Borings ONLY) Basement offset
						Grouting Information Well grouted? YES NO V NOT SPECIFIED
						Norrest Known Downes of Our tanking the
						foot Direction Type
						Well disinfected upon completion? YES NO
						Pump
						Not Installed Date Installed
						Manufacture's name PEERLESS
						HP 3U.UU Volts 220
						Type
Pomarks						Abandoned Wells
DETONATED 8 SHOTS		IG 124 LBS	OF 75 PER CI	ENT		Does property have any not in use and not sealed well(s)? YES NO
GELATINE. GAMMA LO	GGED 4-	7-1993. MAPI	E PLAIN MUI	NI #2 MI	P=1.5	
PUMPAGE LEST 400 G	PM-BEEC	KE SHOOTII	NG 630 GPM-	AFTER		Was a variance granted from the MDH for this well?
						Well Contractor Cerfication
						Tri-state Well Co. 27118
		· ·-				License Business Name Lic. or Reg No.
First Bedrock CTCG Last Strat CECR		Aquifer Depth to F	Iunnel City-Wo Bedrock	newoc 22	6.00 f t	BERTTHIAUME,M
County Well Index v.5	REPO	RT	Printed on	4/1/201)	Name of Driller Date HE-01205-07 (Rev. 2/99)

Unique Well Number	County Hennepin MINNESOTA DEPARTMENT OF HEALTH Entry Date 1991/08/24					
112238	Quad R	Rockford		WE	LL AN	D BORING RECORD Update Date 2016/11/30
	Quad Id 1	21C		Ι	MINNESO	TA STATUTES CHAPTER 1031 Received Date
Well Name MAPLE PL	AIN 3 W	ell C				Well Depth Depth Completed Date Well Completed
Township Range Dir	Section S	ubsection	Field Locate	d MDH	. .	580.00 ft 534.00 ft 1978/04/20
118 24 VV	24	CCCACD	Elevation	1020.0	ο π.	
well address	MAF	PLE PLAIN 3				Drillhole Angle
MAPLE PLAIN		MN	55359	С	hanged	Drilling Method Cable Tool
contact address	CITY	Y OF MAPLE	PLAIN			Drilling Fluid Well Hydrofractured? YES NO
		MANI	55240			From ft. to
		IVIIN	55549			Use community supply(municipal)
						Casing Type Steel (black or ION Drive Shoe? YES 🗸 NO Hole Diameter (in.)
						Diameter 18 Depth 534 24.0(To 534.0
						<u>30.00</u> in from 0.00 to <u>59.00 ft</u> <u>Ibs/ft</u> <u>18.0(To 580.0</u>
Description		Color	Llandnasa	From	To (64.)	$\frac{24.00}{18.00} \text{ in from } 0.00 \text{ to } 533.00 \text{ ft} \qquad \text{lbs/ft}$
Description		Color	Hardness	From	10 (π.)	
				0	30	
		BLUE		30	57	Screen Yes Open Hole(ft.) From 534.C to 580.0
		BLUE		57	162	Make Type
GRAVEL				162	166	Diamter Slot Length Set
CLAY		BLUE	 	166	284	
HARD-PACKED GRAV	EL		HARD	284	286	
HARD PACKED GRAV	EL		HARD	286	290	
SAND, SHALE, AND LI	ME			290	299	
SHALE STICKY				299	312	
SAND, SHALE, AND LI	ME			312	335	Static Water Level (Multiple SWL)
SHALEY SANDROCK				335	342	108.70 ft. land surface Date measured 1988/06/17
SHALEY, SANDROCK				342	393	Pumping Level (below land surface)
SHALEY, SANDROCK				393	469	220.00 ft. after hrs. pumpting 650.00 g.p.m.
EAU CLAIRE-MT. SIMO	ON TRANS	GRAY	SOFT	469	475	Wellhead Completion
EAU CLAIRE-MT. SIMO	ON TRANS	GRAY	SOFT	475	515	Pitless adapter manufacturer Model
MT. SIMON		WHITE	SOFT	515	580	Casing Protection 12 in. above grade
						At-grate (Environmental Wells and Borings ONLY) Basement offset
						Grouting Information Well grouted? ✓ YES NO NOT SPECIFIED
						Material neat cement From 0.0 To 60.0 ft. 0.00
						Material neat cement From 0.0 To 534.0 ft. 36.00 Cubic yards
						Nearest Known Source of Contamination
						feet Direction Type
						Well disinfected upon completion? IV YES NO
						Not Installed Date Installed 1994/00/07
						Manufacture's name JOHNSTON
						Model number TK-61554A HP 125.00 Volts 240
						Length of drop pipe 280.(Material S Capacity 650 g.p.m
						Type Turbine
Remarks						Abandoned Wells
GAMMA LOGGED 5-1	3-1993 & 7	-14-1993 AF		PACK		
DEEPENED. IN 1994 SO	oreen WA 0. 3619. Cl	JTTING FRC	אוז טווב WEI M 450-570 F1	L WAS	E	Was a variance granted from the MDH for this well?
PLAIN MUNI #3 MP=2	2.25 WELL (GRAVEL PA	CKED HAS 70	FT. OF		Well Contractor Cerfication
SCREEN AND 60 FT. (≺ PIPE.				Bergerson-Caswell 27058
						License Rusiness Name
First Bedrock CTCG		Aquifer	Mt.Simon			LICENSE DUSINESS NAME LIC. OF KEG NO.
Last Strat CMTS		Depth to	Bedrock	28	36.00 ft.	
County Well Index v.5	REPO	RT	Printed on	4/1/201	.9	Name of Driller Date HE-01205-07 (Rev. 2/99)

Unique Well Number	County ⊢	lennepin		MIN	NESOTA	DEPARTMENT OF HEALTH Entry Date 2017/03/13
824078	Quad R	Rockford		WE	LL AN	D BORING RECORD Update Date 2018/07/05
024070	Quad Id 1	21C		Λ	MINNESO	TA STATUTES CHAPTER 1031 Received Date
Well Name MAPLE PLA	AIN 4					Well Depth Depth Completed Date Well Completed
Township Range Dir	Section S	ubsection	Field Located	MGS	00 f	392 00 ft 392 00 ft 2017/04/13
118 24 VV	24	CUCADB		1021.0	<i>μ</i> π.	
well address 1655 PIONEER AV	MAF	PLE PLAIN 4				Angle
MAPLE PLAIN		MN	55369			Drilling Method Dual Rotary
contact address CITY OF MAPLE PLAIN						
5050 INDEPENDENCE						
MAPLE PLAIN	MN	55369			Use community supply(municipal)	
					Casing Type Steel (black or low Drive Shoe? VES NO Hole Diameter (in.)	
					Diameter 12 Depth 343 17.0(To 392.0	
					18.00 in. from 0.00 to 321.00 ft lbs/ft	
	Calar	I	F	T . (64.)	$\frac{12.00}{100}$ in from 0.00 to $\frac{343.00}{100}$ ft lbs/ft	
Description			Hardness	From	10 (ft.)	
LOAM/CLAY		BLK/YEL		0	5	
CLAY		YELLOW		5	15	Screen No Open Hole(ft.) From 343.0 to 392.0
CLAY W/FINE GRAVEL		GRAY		15	270	Make Type
MED SAND				270	280	Diamter Slot Length Set
FINE GRAVEL WITH SAND				280	285	
				285	295	
FINE SAND W/GRAVEL				295	205	•
				300	305	
SAND/COARSE GRAVEL				214	215	
				215	225	Static Water Level
CEMENTED SHALE & SANDSTO		GRN/TAN		325	320	104.00 ft. land surface Date measured 2017/03/22
CEMENTED SHALE & SANDSTO				320	335	Pumping Level (below land surface)
SHALE AND SANDSTONE		GRN/TAN		335	340	170.00 ft. after 24.00 nrs. pumpting 1000.00 g.p.m.
SHALE		GREEN		340	343	velinead Completion
SHALE		GRN/BLK		343	345	Casing Protection 12 in. above grade
SANDSTONE		TAN	MEDIUM	345	350	At-grate (Environmental Wells and Borings ONLY) Basement offset
SANDSTONE		GRAY	MEDIUM	350	365	Grouting Information Well grouted? VES NO NOT SPECIFIED
SANDSTONE		GRAY	MED-HRD	365	370	Material neat cement From To 343.0 ft. 14.50 Cubic yards
SANDSTONE		GRAY	MEDIUM	370	385	
SHALE AND SANDSTONE		GRN/TAN	MEDIUM	385	390	
SHALE		GREEN	MEDIUM	390	392	
		1				
						Nearest Known Source of Contamination
Remarks GAMMA AND MULTI TOOL LOGGED 3-13-2017. M.G.S. NO. 5661. LOGGED FOR COUNTY ATLAS. DRILLERS: BUTCH GAUNSTAD & JASON JOHNSON.					feetDirectionType	
					Well disinfected upon completion? ✓ YES NO	
					✓ Not Installed Date Installed	
					Manufacture's name	
						Model number HP Volts
					Length of drop pipe Material Capacityg.p.m	
					Abandoned Wells	
						Does property have any not in use and not sealed well(s)? YES V NO
					Variance	
					Was a variance granted from the MDH for this well?	
					Well Contractor Cerfication	
					Mark J Traut Wells, Inc. 1404	
					License Business Name Lic. or Reg No.	
First Bedrock CTCG Aquifer Wonewoc Sandstone Last Strat CWOC Depth to Bedrock 315 00 ft					SEE REMARKS	
County Well Index v.5	REPO	RT	Printed on	4/1/201	9	Name of Driller Date HE-01205-07 (Rev. 2/99)