AGENDA
SHAKOPEE PUBLIC UTILITIES COMMISSION
REGULAR MEETING
OCTOBER 21, 2019

1. **Call to Order** at 5:00pm in the SPUC Service Center, 255 Sarazin Street.

2. **Approval of Minutes**

3. **Communications**

4. **Approve the Agenda**

5. **Approval of Consent Business**

6. **Bills: Approve Warrant List**

7. **Liaison Report**

8. **Reports: Water Items**
   - 8a) Water System Operations Report – Verbal
   - C=> 8b) Shakopee AUAR Area G – Map Update
   - 8c) Rahr Looping Project - Rock Removal Costs Settlement
   - 8d) Tower #8 Property Closing - Update
   - 8e) Right of Entry Agreement – Test Well at Tower #8 Site
   - 8f) Comprehensive Water System Plan - 2019 Supplement Final Draft

9. **Reports: Electric Items**
   - 9a) Electric System Operations Report – Verbal
   - 9b) MN Lineworkers Rodeo - Results

10. **Reports: Human Resources**
    - 10a) Compensation Sub Committee Recommendations
    - 10b) Resn. #1252 – Regulating Wage Ranges

11. **Reports: General**
    - C=> 11a) Financial Results – September 2019

12. **New Business**

13. **Adjourn to Work Session** – Transition/Succession Plan

14. **Reconvene to Regular Session**

15. **Tentative Dates for Upcoming Meetings**
    - Regular Meeting -- November 4
    - Mid Month Meeting -- November 18
    - Regular Meeting -- December 2
    - Mid Month Meeting -- December 16

16. **Adjourn** to 11/4/19 at the SPU Service Center, 255 Sarazin Street

MINUTES

OF THE

SHAKOPEE PUBLIC UTILITIES COMMISSION
(Regular Meeting)

President Joos called the regular session of the Shakopee Public Utilities Commission to order at the Shakopee Public Utilities meeting room at 5:00 P.M., October 7, 2019.

MEMBERS PRESENT: Commissioners Joos, Amundson, Meyer, Clay and Mocol. Also present, Liaison Lehman, Finance Director Schmid, Planning & Engineering Director Adams, Electric Superintendent Drent, Water Superintendent Schemel and Marketing/Customer Relations Director Walsh.

Motion by Amundson, seconded by Mocol to approve the minutes of the September 16, 2019 Commission meeting. Motion carried.

Under Communications, President Joos presented a letter from the Kissimmee Utility Authority thanking SPU for their willingness to assist during Hurricane Dorian. Even though the services were not needed, the SPU crew was stationed in Florida, if they were needed.

President Joos offered the agenda for approval.

Motion by Meyer, seconded by Clay to approve the agenda as presented. Motion carried.

Commissioner Clay asked that Item 9c: Lake City Mutual Aid Request be added to the Consent Agenda. President Joos asked that Item 11a: SPU Focus Newsletter be taken off of the Consent Agenda.

Motion by Clay, seconded by Meyer to approve the amended Consent Business agenda as presented. Motion carried.

President Joos stated that the Consent Items were: Item 8b: Quarterly Nitrate Results, Item 9c: Lake City Mutual Aid Request and Item 11b: Website Analytics – Quarterly Review.

The warrant listing for bills paid October 7, 2019 was presented.

Motion by Clay, seconded by Meyer to approve the warrant listing dated October 7, 2019 as presented. Motion carried.

Liaison Lehman stated there was no Liaison report.

Water Superintendent Schemel provided a report of current water operations. The Windermere Booster Station was put into service on October 1. The Contractor received a

$25,000 payment for achieving the early "in-service" date. With only a few hydrants left to flush, the entire water distribution has been completed.

Item 8b: Quarterly Nitrate Results was received under Consent Business.

Planning and Engineering Director Adams provided an update for the Comprehensive Water System Plan. The 2019 update will be completed now that the Shakopee AUAR is in a final draft form. The update will be brought forward for Commission approval once Staff reviews the Plan.

An update on the Rahr Looping Project rock removal costs was provided by Mr. Adams. As requested by the Commission, a meeting was held with the three parties involved in the payment dispute. Ryan Contracting firmly believes that are entitled to the entire amount, however stated that they would be amenable to a counter offer from SPU.

Motion by Mocol, seconded by Meyer to offer payment in the amount of $92,000 for the extra cost for significant rock removal with the Rahr Watermain Looping Project. Motion carried.

Electric Superintendent Drent provided a report of current electric operations. There were eight electric outages during the past two weeks. Of the eight, three were caused by squirrels, two by dig-ins and one from a directional bore. None were major outages. Construction updates were provided.

President Joos read the MMPA Board Meeting Public Summary for September 2019.

Item 9c: Lake City Mutual Aid Request was received under Consent Business.

President Joos thanked Staff for the SPU focus Newsletter for Autumn 2019. SPU will continue to provide quarterly newsletters.

Item 11b: Website Analytics – Quarterly Review was received under Consent Business.

The tentative commission meeting dates of October 21 and November 4 were noted.

Motion by Amundson, seconded by Clay to adjourn to the October 21, 2019 meeting. Motion carried.

Commission Secretary: John R. Crooks

8b

SHAKOPEE PUBLIC UTILITIES
MEMORANDUM

TO: John Crooks, Utilities Manager

FROM: Joseph D. Adams, Planning & Engineering Director

SUBJECT: Shakopee AUAR Area G – Map Update

DATE: October 17, 2019

ISSUE

Commission members requested that area G of the AUAR and Water Comp Plan Study be identified on a map, and its location verified.

BACKGROUND

See the attached map for reference.

DISCUSSION

Area G is the area already annexed into the City of Shakopee that is along 17th Avenue and east of County Road 15. Some of which is or was recently being developed for single family homes south of 17th Avenue and the area directly west of Jackson Elementary School that is proposed for mixed use of multi-family and commercial.

REQUESTED ACTION

None, this is an informational item.

Legend

AUAR Land Use

- Institution
- Mixed Residential
- Mixed Use Center
- Mixed Use Employment Center
- Open Space
- Park
- Railroad
- Rights-of-Way
- Suburban Edge Residential
- Suburban Residential
- Utilities
- Water

Land Use

Citywide Land Use

- Bussiness Park
- Commercial
- Entertainment
- High Density Residential?
- Industrial
- Institutional
- Medium Density Residential
- Mixed Use
- Open Space
- Parks
- Single Family

Chanhassen
Eden Prairie
Bloomington
Shakopee
Savage
Carver
Prior Lake
A
B
C
D
E
F
G

N

0 1,500 3,000 6,000 Feet

Path: F:\Projects\PTS\SHPUC\140940\4-prelim-dsgn-rpts_Reports_2019 Comp Water Plan Update\gis\MXD\Figure 4-1_Land Use Planning.mxd

Project Number: SHPUC 140940
Print Date: Print Date: 10/17/2019
Map by:
Projection:
Source:

Comprehensive Water Plan Update - 2019 Supplement
Shakopee Public Utilities
Shakopee, Minnesota

FIGURE 4-1
Future
Land Use Planning

8c

SHAKOPEE PUBLIC UTILITIES
MEMORANDUM

TO: John Crooks, Utilities Manager

FROM: Joseph D. Adams, Planning & Engineering Director

SUBJECT: Rahr Looping Project – Rock Removal Costs Settlement
For the Apgar Street and 2nd Avenue Water Main

DATE: October 17, 2019

ISSUE

Ryan Contracting was previously not willing to lower their contract cost per unit for the excess rock excavated for the water main installation.

BACKGROUND

Please see my previous memos dated October3, September 13 and August 1, 2019 for the background on this issue.

DISCUSSION

Per Commission direction a lump sum offer of $92,000 was extended to Ryan Contracting to resolve this issue. I'm pleased to report that the Commission's offer was accepted by the owner Tom Ryan with the provision that payment to close out the contract would have to be received by October 24th or he would revert back to his previous position.

WSB, Inc.'s John Powell prepared a change order, CO#2, that identified the amount of extra rock and the agreed upon value for payment purposes. CO#2 also included some miscellaneous costs that were not yet dealt with to date, but have been known to us for some time. These minor costs were not covered under the original or modified contract because they consist of City required traffic control and permitting fees and the restoration of the extended area of Apgar Street and 2nd Avenue south of the UPRR tracks that was disturbed to complete the water main connection. This connection on the south of the tracks was more complicated than the original design envisioned due to the actual arrangement of the water main, a fire hydrant lead and a private water service.

CO#2 was executed and full payment to close out the contract with Ryan has been made, including the aforementioned amount of $92,000 for the extra rock costs.

wsb

RAHR MALTING WATERMAIN EXTENSION
SHAKOPEE PUBLIC UTILITIES
PAY VOUCHER NO. 4 (FINAL)
October 15, 2019

ITEM	DESCRIPTION	UNITS	UNIT PRICE	CONTRACT QUANTITY	CONTRACT AMOUNT	QUANTITY THIS PAY VOUCHER	AMOUNT THIS PAY VOUCHER	QUANTITY TO DATE	AMOUNT TO DATE
Street Improvements									
1	MOBILIZATION	LS	$ 13,000.00	1	$ 13,000.00		$ -	1.00	$ 13,000.00
2	CLEARING AND GRUBBING	EA	$ 630.00	1	$ 630.00		$ -	0.00	$ -
3	REMOVE CURB & GUTTER	LF	$ 6.00	70	$ 420.00		$ -	110.00	$ 660.00
4	REMOVE BITUMINOUS PAVEMENT	SY	$ 6.00	588	$ 3,528.00		$ -	588.00	$ 3,528.00
5	SAWING BITUMINOUS PAVEMENT	LF	$ 6.00	158	$ 948.00		$ -	162.00	$ 972.00
6	SALVAGE & REINSTALL SIGN	EA	$ 1.00	1.0	$ 1.00		$ -	1.00	$ 1.00
7	TOPSOIL BORROW (CV)	CY	$ 49.00	21	$ 1,029.00		$ -	21.00	$ 1,029.00
8	SUBGRADE PREPARATION	SY	$ 3.00	588	$ 1,764.00		$ -	588.00	$ 1,764.00
9	STREET SWEEPER (WITH PICKUP BROOM)	HR	$ 182.00	3	$ 546.00		$ -	3.00	$ 546.00
10	WATER (DUST CONTROL)	GAL	$ 0.01	2000	$ 20.00		$ -	0.00	$ -
11	AGGREGATE BASE CLASS 5	TN	$ 37.00	252	$ 9,324.00		$ -	261.67	$ 9,681.79
12	BITUMINOUS MATERIAL FOR TACK COAT	GAL	$ 21.00	35	$ 735.00		$ -	65.00	$ 1,365.00
13	TYPE SP 12.5 WEARING COURSE MIX (2,B)	TN	$ 138.00	60	$ 8,280.00		$ -	79.55	$ 10,977.90
14	TYPE SP 12.5 NON WEAR COURSE MIX (2,B)	TN	$ 125.00	100	$ 12,500.00		$ -	86.63	$ 10,828.75
15	ADJUST MANHOLE CASTING	EA	$ 604.00	2	$ 1,208.00		$ -	2.00	$ 1,208.00
16	CONCRETE CURB & GUTTER DESIGN B618	LF	$ 51.00	70	$ 3,570.00		$ -	110.00	$ 5,610.00
17	TRAFFIC CONTROL	LS	$ 8,138.00	1	$ 8,138.00		$ -	1.00	$ 8,138.00
18	SALVAGE AND REINSTALL SIGN	EA	$ 1.00	1	$ 1.00		$ -	1.00	$ 1.00
19	STORM DRAIN INLET PROTECTION	EA	$ 61.00	6	$ 366.00		$ -	6.00	$ 366.00
20	FILTER LOG TYPE WOOD FIBER	LF	$ 4.00	489	$ 1,956.00		$ -	0.00	$ -
21	FILTER LOG TYPE ROCK LOG	LF	$ 4.00	40	$ 160.00		$ -	16.00	$ 64.00
22	TEMPORARY ROCK CONSTRUCTION ENTRANCE	LS	$ 363.00	1	$ 363.00		$ -	1.00	$ 363.00
23	SEEDING & SEED MIX 270 (INCL. FERTILIZER AND MULCH	SY	$ 6.00	67	$ 402.00		$ -	61.00	$ 366.00
24	SODDING TYPE LAWN	SY	$ 8.00	61	$ 488.00		$ -	0.00	$ -
25	HYDRAULIC SOIL STABILIZER TYPE 5	SY	$ 4.00	128	$ 512.00		$ -	0.00	$ -
26	24" SOLID LINE PAINT	LF	$ 19.00	21	$ 399.00		$ -	21.00	$ 399.00
27	4" BROKEN LINE PAINT	LF	$ 10.00	10	$ 100.00		$ -	20.00	$ 200.00
28	24" SOLID LINE EPOXY	LF	$ 24.00	21	$ 504.00		$ -	0.00	$ -
29	4" BROKEN LINE YELLOW-EPOXY	LF	$ 16.00	10	$ 160.00		$ -	0.00	$ -
Totals For Section Street Improvements:					$ 71,052.00		$ -		$ 71,068.44

Utilities									
30	REMOVE WATER MAIN	LF	$ 25.00	58	$ 1,450.00		$ -	58.00	$ 1,450.00
31	SALVAGE AND INSTALL HYDRANT AND VALVE	EA	$ 2,000.00	1	$ 2,000.00		$ -	1.00	$ 2,000.00
32	ABANDON WATER MAIN	LF	$ 15.00	80	$ 1,200.00		$ -	61.00	$ 915.00
33	ROCK EXCAVATION	CY	$ 180.00	80	$ 14,400.00		$ -	80.00	$ 14,400.00
34	DEWATERING	LS	$ 1.00	1	$ 1.00		$ -	1.00	$ 1.00
35	22" STEEL CASING PIPE (JACKED)	LF	$ 1,600.00	75	$ 120,000.00		$ -	81.00	$ 129,600.00
36	TEMPORARY WATER SERVICE	LS	$ 1.00	1	$ 1.00		$ -	1.00	$ 1.00
37	CONNECT TO EXISTING WATER MAIN	EA	$ 5,000.00	3	$ 15,000.00		$ -	3.00	$ 15,000.00
38	CONNECT TO EXISTING WATER SERVICE	EA	$ 1.00	1	$ 1.00		$ -	1.00	$ 1.00
39	INSTALL HYDRANT	EA	$ 7,000.00	1	$ 7,000.00		$ -	1.00	$ 7,000.00
40	1" CORPORATION STOP	EA	$ 500.00	1	$ 500.00		$ -	1.00	$ 500.00
41	6" GATE VALVE & BOX	EA	$ 2,500.00	1	$ 2,500.00		$ -	1.00	$ 2,500.00
42	8" GATE VALVE & BOX	EA	$ 2,900.00	2	$ 5,800.00		$ -	2.00	$ 5,800.00
43	1" CURB STOP & BOX	EA	$ 600.00	1	$ 600.00		$ -	1.00	$ 600.00
44	1" TYPE K COPPER PIPE	LF	$ 42.00	20	$ 840.00		$ -	13.00	$ 546.00
45	8" WATERMAIN DUCTILE IRON CL52	LF	$ 75.00	572	$ 42,900.00		$ -	572.00	$ 42,900.00
46	4" POLYSTYRENE INSULATION	SY	$ 49.00	12	$ 588.00		$ -	14.23	$ 697.27
47	DUCTILE IRON FITTINGS	LB	$ 8.00	881	$ 7,048.00		$ -	856.00	$ 6,848.00
48	UTILITY COORDINATION	LS	$ 1.00	1	$ 1.00		$ -	1.00	$ 1.00
	Totals For Section Utilities:				$ 221,830.00		$ -		$ 230,760.27
TOTAL CONTRACT					$ 292,882.00				
WORK COMPLETED PERIOD							$ -		
TOTAL WORK COMPLETED TO DATE									$ 301,828.71

SUBTOTAL-WORK COMPLETED		$ 301,828.71
RETAINAGE (RETAINAGE RELEASED DUE TO FINAL PAYMENT)		$ -
CHANGE ORDER NO. 2		$ 98,243.21
TOTAL PAYABLE TO DATE		$ 400,071.92
LESS PREVIOUS PAY REQUESTS	$ 304,991.20	
TOTAL AMOUNT PREVIOUSLY PAID		$ 304,991.20
AMOUNT DUE THIS PERIOD - THROUGH 10/15/2019 PAY REQUEST NO. 4 (FINAL)		$ 95,080.72

Approved By:

SHAKOPEE PUBLIC UTILITIES

10/15/19
Date

CFO

RYAN CONTRACTING COMPANY
26480 FRANCE AVENUE, ELKO NEW MARKET, MN 55020

10/15/19
Date

WSB

10.15.19
Date

* Check must be received by Ryan Contracting Co. by 10/24/19 in order for this amount to be agreed to.

WSB Project No. 014077-000

CHANGE ORDER NO. 2

RAHR MALTING WATERMAIN EXTENSION
SHAKOPEE PUBLIC UTILITIES
WSB PROJECT NO. 02143-020

10/15/2019

OWNER:

SHAKOPEE PUBLIC UTILITIES
255 SARAZIN STREET
SHAKOPEE, MN 55379

CONTRACTOR:

RYAN CONTRACTING CO.
26480 FRANCE AVENUE, PO BOX 246
ELKO NEW MARKET, MN 55020

YOU ARE DIRECTED TO MAKE THE FOLLOWING CHANGES IN THE CONTRACT DOCUMENT DESCRIPTION:

See attached for detail

CHANGE IN CONTRACT PRICE:

ORIGINAL CONTRACT PRICE:	$	215,171.00
PREVIOUS CHANGE ORDERS: NO. 1	$	77,711.00
CONTRACT PRICE PRIOR TO THIS CHANGE ORDER:	$	292,882.00
NET INCREASE OF THIS CHANGE ORDER:	$	98,243.21
CONTRACT PRICE WITH ALL APPROVED CHANGE ORDERS:	$	391,125.21

CHANGE IN CONTRACT TIME:

ORIGINAL CONTRACT COMPLETION:	6/30/2018
NET CHANGE FROM PREVIOUS CHANGE ORDERS:	9/1/2019
CONTRACT COMPLETION PRIOR TO THIS CHANGE ORDER:	9/1/2019
NET INCREASE CONTRACT COMPLETION WITH CHANGE ORDER:	NONE
CONTRACT COMPLETION WITH APPROVED CHANGE ORDERS:	9/1/2019

RECOMMENDED BY:

10.15.19
JOHN POWELL, PE, SENIOR PROJECT MANAGER

WSB
ENGINEER

APPROVED BY:

CFO
CONTRACTOR SIGNATURE

RYAN CONTRACTING CO.
CONTRACTOR

APPROVED BY:

SHAKOPEE PUBLIC UTILITIES

10/15/19
DATE

CHANGE ORDER NO. 2 DETAIL

RAHR MALTING WATERMAIN EXTENSION
SHAKOPEE PUBLIC UTILITIES
WSB PROJECT NO. 02143-020

10/15/2019

ADDED ITEMS

Item No.	Description	Unit		Price	Qty	Extended Amount
CO2-1	Additional traffic control required by the City of Shakopee	LS	$	2,003.21	1.00	$2,003.21
CO2-2	Common Excavation	CY	$	40.00	21.00	$840.00
CO2-3	Remove hydrant	EA	$	500.00	1.00	$500.00
CO2-4	Bollards	EA	$	550.00	4.00	$2,200.00
CO2-5	6" DIP	LF	$	100.00	7.00	$700.00
CO2-6	Rock excavation in excess of bid amount	LS	$	92,000.00	1.00	$92,000.00

TOTAL ADDED ITEMS CHANGE ORDER NO. 2 $98,243.21

agreed to as long as final payment is made to Ryan Contracting by 10/24/19.

TOTAL ADJUSTMENT TO ORIGINAL CONTRACT AMOUNT $98,243.21

8d

SHAKOPEE PUBLIC UTILITIES
MEMORANDUM

TO: John Crooks, Utilities Manager

FROM: Joseph D. Adams, Planning & Engineering Director

SUBJECT: Tower #8 Property Closing - Update

DATE: October 17, 2019

ISSUE

The purchase agreement requires the closing by December 1st.

BACKGROUND

The purchase is for just under seven (7) acres of land located to the west of the Windermere South Additions on the La Tour farm property. The site will be developed in 2020 with the construction of water tower #8 and potentially well #23.

DISCUSSION

We have received the deed to out lot G of WS 2nd Addition from DR Horton as promised. The title commitment for the combined parcel, to be known as lot 1, block 1 of La Tour Terrace should be done this week. The next step is to submit the final plat drawings for review. Scott County Surveyor review time is typically a month, so we are on track to close by the end of November.

REQUESTED ACTION

None at this time.

SHAKOPEE PUBLIC UTILITIES
MEMORANDUM

TO: John Crooks, Utilities Manager

FROM: Joseph D. Adams, Planning & Engineering Director

SUBJECT: Right of Entry Agreement – Test Well at Tower #8 Site

DATE: October 17, 2019

ISSUE

Staff has prepared and executed a Right of Entry Agreement with the Latour family partnership that will enable us early access to the site of Tank #8 for the purpose of drilling a test well.

BACKGROUND

A test well is planned at the site to ascertain the viability of a future water supply well(s). The test well is expected to cost approximately $55,500 to construct. It is expected to reveal the expected pumping capacity of a future water supply well and water samples taken will be analyzed to determine water quality and the expectation of water treatment requirements.

DISCUSSION

To assist staff and the Commission in future Capital Improvement Planning, completing a test well at the water tower site is now appropriate. The sellers are willing to allow us early access to the site for this purpose and the season's crop has been recently harvested.

REQUESTED ACTION

No Commission action is necessary at this time.

RIGHT OF ENTRY AGREEMENT

THIS RIGHT OF ENTRY AGREEMENT (this "Agreement") is made and entered into this ___ day of October, 2019, by and between LATOUR FARMS, L.P., a Minnesota limited partnership (the "Grantor"), and SHAKOPEE PUBLIC UTILITIES COMMISSION, a Minnesota municipal utility commission (the "Grantee").

WITNESSETH:

WHEREAS, the Grantor is the fee owner of certain real property legally described in Exhibit A (the "Premises"); and

WHEREAS, the Grantee desires to enter onto the Premises for the purpose of digging a test well and and any additional testing or investigation of the Premises related thereto.

NOW, THEREFORE, in consideration of the mutual promises of the parties made herein, the parties hereby agree as follows:

1. **Right of Entry**. The Grantor hereby authorizes the Grantee and its employees, agents, contractors, licensees or invitees to enter upon the Premises for the purposes set forth above, and the Grantee specifically agrees that its conduct shall be limited to those purposes only. The Grantee and its employees, agents, contractors, licensees or invitees shall conduct their activities on the Premises in an orderly and lawful manner, securing at their own expense all required permits and licenses.

2. **Term of Right of Entry**. The Grantee shall have the right to enter upon the Premises for the purposes described herein commencing on October 16, 2019 and terminating on December 31, 2019.

3. **Hold Harmless and Indemnity**. The Grantee agrees to pay and to protect, indemnify and save harmless the Grantor from and against any and all liabilities, damages, costs, expenses (including reasonable attorneys' fees), causes of action, suits, claims, demands or judgments of any nature whatsoever arising from any work or thing done by the Grantee or at its direction in, on, or about the Premises.

4. **Condition of Premises**. The Grantee, at its sole expense, agrees to keep the Premises in a safe condition; agrees not to make any improvements without the prior written approval of the Grantor; and agrees to restore the Premises to its original condition and replace any damaged improvements caused by its entry onto the Premises.

5. **Scope of Right of Entry**. The grant of the right of entry to the Grantee by the Grantor shall not be assignable and does not confer any estate, title or exclusive possessory rights in the Premises to the Grantee, and may be terminated upon five (5) days written notice by the Grantor to the Grantee; provided that the provisions of Section 3 hereof shall survive any termination of this Agreement.

6. **Notices**. All notices and demands required hereunder shall be in writing and shall be deemed given when personally delivered or sent by first class mail, addressed to the parties:

Grantor:	LATOUR FARMS, L.P. 1067 Tyler Street South Shakopee, MN 55379 Attention: John LaTour
with copies to:	DAVE BROWN REALTORS LLC 100 Fuller Street, #105 Shakopee, MN 55379 Attention: Dave Brown
and	Brekke, Clyborne & Ribich, L.L.C. 287 Marschall Road, Suite 201 Shakopee, MN 55379 Attention: Barbara J. Weckman Brekke
Grantee:	Shakopee Public Utilities Commission 255 Sarazin Street Shakopee, MN 55379 Attention: Joseph D. Adams
with copies to:	Shakopee Public Utilities Commission 255 Sarazin Street Shakopee, MN 55379 Attention: Lon Schemel
and	McGrann Shea Carnival Straughn & Lamb, Chartered 800 Nicollet Mail, Suite 2600 Minneapolis, MN 55402 Attention: Carla J. Pedersen

7. **Counterparts**. This Agreement may be executed in any number of counterparts, each of which is deemed an original and all of which together constitute one instrument.

8. **Governing Law**. This Agreement shall be governed by and construed in accordance with the laws of the State of Minnesota.

[The remainder of this page is intentionally left blank.]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first written above.

GRANTOR:

LATOUR FARMS, L.P.,
a Minnesota limited partnership

By _____
Its: Trustee

GRANTEE:

SHAKOPEE PUBLIC UTILITIES COMMISSION,
a Minnesota municipal utility commission

By _____
Its: UTILITIES MANAGER

[Signature Page to Right of Entry Agreement]

EXHIBIT A

Legal Description

That part of the South Half of the Southwest Quarter, Section 14, Township 115, Range 23, Scott County, Minnesota, described as:

Beginning at the northeast corner of said South Half; thence westerly along the north line of said South Half a distance of 1260.00 feet; thence southerly at right angles to the last described line a distance of 250.00 feet; thence easterly at right angles to the last described line a distance of 500.00 feet; thence northerly at right angles to the last described line a distance of 23.00 feet; thence easterly at right angles to the last described line a distance of 755.86 to the east line of said South Half; thence northerly along said east line 227.04 feet to the point of beginning.

SHAKOPEE PUBLIC UTILITIES
MEMORANDUM

TO: John Crooks, Utilities Manager

FROM: Joseph D. Adams, Planning & Engineering Director

SUBJECT: Comprehensive Water System Plan - 2019 Supplement Final Draft

DATE: October 17, 2019

ISSUE

The Comprehensive Water System Plan - 2019 Supplement Final Draft is now ready for Commission review.

BACKGROUND

Last year, the Utilities Commission received the 2018 Comprehensive Water System Plan as submitted by SEH, Inc. Since then, the City of Shakopee's 2040 Comprehensive Plan was revised from its draft form (that the 2018 Comprehensive Water Plan was based upon) and an Alternative Urban Area Review (AUAR) was ordered by the Met Council for the Jackson Township Annexation Area.

DISCUSSION

A 2019 Supplement to the Commission's Comprehensive Water System Plan has been drafted by Chad Katzenberger of SEH, Inc. that factors in the above information. Chad will present the 2019 Supplement to the Commission at their October 21st meeting.

It has been discussed that the 2019 Updated Comprehensive Water Plan will then be used in a financial analysis of the Commission's Water (Capacity) Connection Fund and Trunk Water Fund and their associated fees, the Water Capacity Charge (WCC) and the Trunk Water Charge (TWC), that are paid by new development and when applicable by projects resulting in increased water usage.

REQUESTED ACTION

After reviewing the 2019 Supplement it would be appropriate for the Commission to either accept the report and the recommendations contained within it, request more information or direct revisions to the report.

Comprehensive Water System Plan Update

Comprehensive Water Plan - 2019 Supplement

Shakopee, Minnesota

SHPUC 140940 | October 4, 2019

SEH

Building a Better World for All of Us®

Engineers | Architects | Planners | Scientists

Comprehensive Water System Plan Update

Comprehensive Water Plan - 2019 Supplement
Shakopee, Minnesota

SEH No. SHPUC 140940

October 4, 2019

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Chad T. Katzenberger, PE

Date: October 4, 2019 License No.: 46613

Short Elliott Hendrickson Inc.
3535 Vadnais Center Drive
St. Paul, MN 55110-5196
651.490.2000

SEH

Executive Summary

The purpose of this report is to provide information regarding the Shakopee PUC existing and anticipated water system conditions to aid in capital planning. This report serves as an update to the 2004 Comprehensive Water Plan Update, as population and water use projections have changed since 2004 projections. Existing water supplies, storage tanks and the distribution system were analyzed to establish the current conditions of the water system. Trends from historical water use data were used to determine projection estimates through the year 2040.

The existing Shakopee PUC water system includes groundwater wells, storage tanks, and distribution facilities. This report evaluates each category to determine existing and projected water usage.

Existing Facilities Include:

- Eighteen groundwater wells that pump water from the Prairie du Chien-Jordan Sandstone aquifer. Combined the wells have a total supply capacity of 24.4 million gallons a day (MGD) and a reliable supply capacity of 20.3 MGD.
- Four elevated storage tanks with a total storage capacity of 4.25 million gallons (MG).
- Three ground storage tanks with a total storage capacity of 7.0 MG.
- Four pumping stations that supply water to four different pressure zones within the system.

Water facilities are often designed to meet maximum day demands. Historical data shows that over the last 10 years maximum day demands ranged from 9.94 to 16.26. The maximum day demands are often impacted by seasonal conditions such as dry and hot summers, land use patterns and population.

Population projections indicate a large increase in population by the year 2040. This is partially due to the annexation of Jackson Township into the Shakopee City limits. Projected maximum daily demands indicate that additional water supplies and interconnections between pressure zones will be needed to meet future maximum day demands.

Recommended Improvements Include:

- Construction of additional supply wells No. 22, No. 23 & No. 24.
- Upgrading Well No. 9 Booster Station with a flow control value to allow water to move from First High Zone to Normal Zone.
- Construction of a 750,000 gallon elevated storage tank be constructed in the western portion of the Second High Pressure Zone
- A 250,000 gallon elevated storage tank be constructed in the central portion of the Second High Pressure Zone
- Construction of new booster station facility to provide redundant water transfer between the Normal pressure zone and 1st High Pressure Zone utilizing booster pumping and pressure reducing flow control.
- Trunk water main construction and other water distribution features to accommodate water system expansion and development.

Contents

Contents (continued)

List of Tables

List of Figures

List of Appendices

s:\pf\s\shpuc\140940\4-prelim-dsgn-rpts_reports_2019 comp water plan update\comprehensive water system plan update – 2019 supplement.docx

Comprehensive Water System Plan Update

Comprehensive Water Plan - 2019 Supplement

Prepared for Shakopee Public Utilities Commission

1 Introduction

In the year 2018, Shakopee Public Utilities (SPUC) completed a comprehensive water system evaluation which was summarized in the 2018 Comprehensive Water System Plan, published September 13, 2018. Since this system evaluation was published, the City of Shakopee has been making progress on the City's overall Comprehensive Plan. Through this process, new population projections have been developed and anticipated land use mapping has been developed. More specifically, an AUAR (Alternative Urban Areawide Review) has been in process to evaluate the development of areas along the western edge of the City that will be annexed into Shakopee from Jackson Township. The AUAR development has resulted in updated land use estimated that can be used to inform water demand estimates and projections. In addition, new population forecasts can be utilized to project corresponding water use growth.

In a similar fashion to the 2018 plan, present and future water needs of the SPUC water system have been evaluated, and recommendations made concerning improvements necessary to maintain an adequate level of water service. Current and future water needs were evaluated over a planning period extending to the year 2040. This report will serve as a plan to guide future expansion and redevelopment of the water system.

1.1 Scope

The primary purpose of this report is to update the previous 2018 plan in light of new planning information. In general, work completed in the previous report that is still valid will remain unchanged. Below is a summary of the outlined scope items that this plan supplement intends on addressing.

1. **Provide Updated Water System Demand Projections:** In conjunction with new population forecasts and land use projections, anticipated water system demand projections can be updated with new supporting data.
2. **Complement The City of Shakopee 2040 Comprehensive Plan:** Update of water use projections from data generated though the City's comprehensive planning process will help assure that the projected growth will be served by a reliable water supply.
3. **Update Projected Water System Facility Needs**: In light of water use forecast changes, the required facilities to support the growth are reviewed and developed to meet the projected need.
4. **Update Cost Estimates for Projected Water Facilities:** Updated costs for proposed facilities are provided to help guide future financial decisions.
5. **Support Water Connection Fee Study:** A parallel study will be conducted to develop recommended water system fees for future water system users. The foundation of these fees is related to the costs of the required water system facilities. This study will be the first step to inform that process.

As noted in the 2018 water system plan, water needs change with time, and municipal water system planning is a continuous function. Therefore, the longer term projections and improvements discussed in this report should be reviewed, re-evaluated and modified as necessary, to assure the adequacy of future planning efforts. Proper future planning will help assure that system expansion is coordinated and constructed in the most effective manner.

2 Existing Water System

A summary of the existing water system is summarized in the 2018 comprehensive water system plan. In short, the SPUC water system has grown to include seven storage tanks, 18 groundwater supply wells and four pumping stations. The system utilizes four pressure zones: the Normal Zone, First High Zone, East Zone and the Second High Zone. The East Zone has the same hydraulic grade line as the Second High Zone. The Second High Zone is also separated out into separate sections. The separation is due to how development has occurred with respect to the elevation of the landscape.

3 Population & Community Growth

This section summarizes the planning assumptions made regarding future service area characteristics for SPUC water service area. Since 2018, new population projections and land use information is available, below is a summary of the new data which will be utilized for this report.

3.1 Population Forecast

There is generally a close relationship between a community's population and total water consumption volumes. Future water sales can be expected to generally reflect future changes in service area population. Similarly, commercial, public, and industrial water consumption will also tend to vary proportionally.

The City's estimated population in 2018 was 41,506 according to the State of Minnesota Demographer. Table 3-1 below summarizes projected future population of the City as provided from the City's 2040 Comprehensive Plan. These population projections will inform the future water use projections

Table 3-1 – Projected Population Data

Year	Population	Annual Growth Rate (%)
2020	47,800	1.7%
2025	51,850	1.7%
2030	55,900	1.6%
2035	59,250	1.2%
2040	62,600	1.1%

Source: City of Shakopee 2040 Comprehensive Plan

Projections noted above indicate SPUC's service area total population is expected to increase to approximately 62,600 people by the year 2040. For this study, in calculating per capita water use, it is estimated that approximately 3,000 people are served by private wells in rural residential areas. It is assumed that as the boundaries of the City grow and rural areas are annexed, a similar percentage of residents (7%) may remain on private wells through the planning period. As a result, future water users are expected to grow at a rate similar to the population growth.

4 Water Requirements

This section updates water use history with current information and provides for new water use projections based on new population data.

4.1 Water Consumption History

As previously completed in the Water Comprehensive Plan, an analysis was made of past water consumption characteristics by reviewing annual pumpage and water sales records for the period from 2000 to 2018. Average and maximum day water consumption during this period, together with the amount of water sold in each customer category, was analyzed. Projections of future water requirements are based on the results of this analysis, coupled with estimates of population and community growth.

4.2 Water Demands By Customer Category

A historical summary of utility customers served is provided in Table 4-2. Residential customers, over the past five years, have accounted for 60 percent of the SPUC's sales while commercial and Industrial customers have accounted for 40 percent of the sales.

Table 4-1 – Historical Water Use

Year	Estimated City Population	Estimated Water Service Population	Average Day (AD) Water Pumped (MGD)	Maximum Day (MD) Water Pumped (MGD)	MD:AD Ratio	AD Per Capita Water Use (gpd)	MD Per Capita Water Use (gpd)
2007	33,022	30,020	5.56	14.68	2.64	185	489
2008	33,748	30,748	5.09	13.59	2.67	165	442
2009	34,525	31,525	5.12	12.83	2.51	162	407
2010	37,366	34,366	4.71	10.62	2.26	137	309
2011	38,000	35,000	4.81	10.80	2.25	137	309
2012	**38,730**	**35,730**	**5.87**	**16.26**	**2.77**	**164**	**455**
2013	39,167	36,167	4.94	13.38	2.71	137	370
2014	39,448	36,448	4.59	10.88	2.37	126	298
2015	39,981	36,981	4.52	9.94	2.20	122	269
2016	40,743	37,743	4.74	11.58	2.44	126	307
2017	41,125	38,125	4.87	13.23	2.71	128	347
2018	41,506	38,506	5.05	10.57	2.09	131	275
5 Year Average			**4.79**	**11.48**	**2.40**	**128**	**301**
Maximum			*5.87*	*16.26*	*2.77*	*185*	*489*

Service Population = City population less 3,000+ rural residential residents on private wells.

Source: DNR Water Use Records, State demographer

Table 4-2 – Historical Average Water Sales by Customer Class

Year	Water Sold			Water Pumped	
	Average Day Residential Water Sold (MGD)	Average Day Commercial-Industrial Water Sold (MGD)	Total Average Day Water Sold (MGD)	Average Day Water Pumped (MGD)	Unmetered & Unaccounted Water (%)
2007	3.11	2.10	5.21	5.56	6.3%
2008	2.94	1.88	4.82	5.09	5.2%
2009	3.09	1.82	4.92	5.12	3.9%
2010	2.68	1.72	4.40	4.71	6.5%
2011	2.81	1.80	4.61	4.81	4.1%
2012	**3.25**	**2.06**	**5.31**	**5.87**	**9.5%**
2013	2.85	1.78	4.66	4.94	5.7%
2014	2.64	1.63	4.31	4.59	6.1%
2015	2.50	1.68	4.22	4.52	6.8%
2016	2.68	1.76	4.48	4.74	5.6%
2017	2.50	1.80	4.31	4.83	4.6%
2018	2.67	1.88	4.54	5.05	5.1%
5-Year Average	**2.63**	**1.76**	**4.41**	**4.76**	**5.4%**
% of Total	**59%**	**41%**	**100%**		

Source: DNR Water Use Records, City Records

4.3 Per Capita Usage

Historical per capita water use, including 2017 and 2018 production years is summarized below.

Table 4-3 – Historical Per Capita Water Use by Customer Class

Year	Sales			Water Pumped	
	Residential Daily Per Capita Water Use (gpcd)	Commercial-Industrial Daily Per Capita Water Use (gpcd)	Total Average Day Water Sold (gpcd)	Total Average Day Water Pumped (gpcd)	Total Maximum Day Water Pumped (gpcd)
2007	103	70	174	185	489
2008	96	61	157	165	442
2009	98	58	156	162	407
2010	78	50	128	137	309
2011	80	52	132	137	309
2012	**91**	**58**	**149**	**164**	**455**
2013	79	49	128	137	370
2014	72	45	117	126	298
2015	68	45	113	122	269
2016	71	47	118	126	307
2017	66	47	113	128	347
2018	69	49	118	131	275
5-Year Average	**71**	**47**	**118**	**128**	**301**
% of Total	**60%**	**40%**	**100%**		
Per capita water use accounts for 3,000 residents not connected to municipal water.					

Source: DNR Water Use Records, City Records

4.4 Water Consumption & Pumpage Projections

Population growth, development, customer water needs, conservation, and climate all affect future water needs. This section provides a projection of water needs to the year 2040 based on these factors. One projection is based on anticipated population growth and conservation. A second projection is based on buildout of all service areas, which represents ultimate system demand potential.

4.4.1 System Wide Water Needs Projections

4.4.1.1 Projected Water Use By Population

Table 4-4 summarizes the population based water needs projections for current water use in a drought year. Projects were solely based on the values from year 2012, as 2012 represents a hot and dry year when the system would be stressed for water. With the assumptions shown in the table, by 2040, SPUC could experience a maximum day demand of 25.0 mgd if year 2040 were a drought year. Table 4-5 summarizes the same data and tabulates it in a simple format.

Table 4-4 – Future Water Needs Projections

Demand Type	Year	2020	2030	2040
	City Population	*47,800*	*55,900*	*62,600*
	Service Population	*44,311*	*51,819*	*58,030*
	Current Practices for Drought Year (Based on Drought Year 2012)			
	Assumption	Demand (MGD)		
Residential	91 gpcd	4.03	4.72	5.28
Non-Residential				
Largest Customers	0.72 MGD	0.72	0.72	0.72
Other Population Based	35 gpcd	1.67	1.95	2.18
Average Day Sales		*6.42*	*7.38*	*8.18*
Unnaccounted Water	9.5%	0.68	0.78	0.86
Projected Average Day Demand		**7.1**	**8.2**	**9.1**
Projected Maximum Day Demand	**277%**	**19.6**	**22.6**	**25.0**

Previously estimated per capita use applied to anticipated service population.

Table 4-5 – Projected Water Use – By Population

Year	Population	Projected (AD)	Maximum Day (MD) Water Pumped (MGD)
2020	47,800	7.1	19.6
2025	51,850	7.6	21.1
2030	55,900	8.2	22.6
2035	59,250	8.6	23.8
2040	62,600	9.0	25.0

4.4.1.2 Projected Water Use By Pressure Zone (Population Based Projection)

Similar to the system wide water needs projection, each supply service area was projected for its individual water needs. This analysis was based on population and also by land use. Historical water use billing data from meters was used to estimate water use in each pressure zone. Then, existing and planned land use was determined for each pressure zone and was used to allocate demands based on land area.

The planned pressure zones are shown in Figure 6-1. The pressure zones were shaped in a manner consistent with utility planning, also in a way where zones could be reasonably connected by water mains.

Table 4-6 – Summary of Water Needs Projections per Service Zone

Zone	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Portion of Total Demand
2020			
Main Zone	5.00	13.86	70.6%
1st High Zone	1.69	4.67	23.8%
2nd High Zone Central	0.09	0.25	1.3%
2nd High Zone West	0.27	0.75	3.8%
2nd High Zone East	0.08	0.22	1.1%
Total	**7.1**	**19.6**	**100%**
2030			
Main Zone	5.37	14.87	65.9%
1st High Zone	1.91	5.29	23.4%
2nd High Zone Central	0.14	0.38	1.7%
2nd High Zone West	0.67	1.85	8.2%
2nd High Zone East	0.11	0.30	1.3%
Total	**8.1**	**22.6**	**100%**
2040			
Main Zone	5.63	15.60	62.4%
1st High Zone	2.09	5.79	23.1%
2nd High Zone Central	0.18	0.50	2.0%
2nd High Zone West	1.03	2.87	11.5%
2nd High Zone East	0.13	0.37	1.5%
Total	**9.0**	**25.0**	**100%**

4.4.1.3 Projected Water Use By Future Land Use

Due to the uncertainty with population growth projections and water use projections, it is useful to estimate future water system demands from multiple perspectives to find a range of potential outcomes. In addition to the population-based method used in the previous section, projected land uses were also examined for this plan, and water demands projected based on an assumed unit demand per area for varying land uses.

Results of the land used base water demand projections are presented in Table 4-7. The time at which this expected development occurs will be strongly dependent on market forces, therefore the yearly water use projections provide a reasonable estimate of planning period demand while the land use projections help to understand the total ultimate water system needs independent of time.

Apart from anticipated population growth, SPUC must be aware of all future potential water needs as development occurs and the City expands into new areas. The potential for future development exists as the City expands and grows to the south and west. The City of Shakopee plans to annex portions of the Jackson Township which have been outlined in the City's 2040 Comprehensive Plan and Jackson Township AUAR. Understanding the potential water needs for these areas is imperative for proper City and utility planning. Water use needs specifically for the AUAR study area are outlined in Appendix B and then fully tabulated in the overall land use water projections shown in table 4-7. The hypothetical water needs for these areas are represented in Table 4-7. Based on drought year 2012, average day water demand with full buildout could reach a potential 9.0 MGD, with a maximum day demand of approximately 25 MGD (ratio of 2.77). The development of this parallel land use based water use projection revealed estimated demands that are in line with the population based water use projections.

Table 4-7 – Projected Water Ultimate Consumption By Land Use

Land Use1	Existing Acres	Full Buildout Acres1	Estimated 2012 AD Water Use (gpd/acre)	Estimated 2012 AD Water Use (MGD)	Projected Full Buildout AD Water Use (MGD)	Projected Full Buildout MD Water Use (MGD)
Existing City Limits						
Residential						
Low Density Residential	2,644	7,118	540	1.43	3.84	10.64
Medium Density Residential	517	621	2,000	1.03	1.24	3.44
High Density Residential	88	94	5,400	0.47	0.51	1.40
Non-Residential						
Business Park	108	129	675	0.07	0.09	0.24
Commercial	547	625	675	0.37	0.42	1.17
Entertainment	356	543	500	0.18	0.27	0.75
Industrial	1,136	1,541	675	0.77	1.04	2.88
Institutional	344	368	675	0.23	0.25	0.69
Mix Use	68	99	675	0.05	0.07	0.19
Open Space	124	1,700	0	0.00	0.00	0.00
Parks	222	483	100	0.02	0.05	0.13
Existing City Limits Total	**6,153**	**13,322**	--	4.62	**7.8**	**21.5**
AUAR Study Area (Jackson Township) - See Appendix B					**AD**	**MD**
Area A					0.118	0.33
Area B					0.269	0.74
Area C					0.124	0.34
Area D					0.219	0.61
Area E					0.031	0.09
Area F					0.000	0.00
Area G					0.053	0.15
Total AUAR Study Area					**0.81**	**2.25**
Additional Sections of Jackson Township					**AD**	**MD**
Area E					0.209	0.58
Area F					0.238	0.66
Total AUAR Study Area					**0.45**	**1.24**
Total Ultimate Water Use					**9.0**	**25.0**
*Estimates based on typical historical usage						

1. 20 percent of future areas assumed to be streets and open areas. Calculated by [(Future - Existing) x 0.8] + Existing.

4.5 Potential Expansion Area – Louisville Township

As part of the overall comprehensive plan effort, a preliminary high level estimate of additional water needs for the Louisville Township was completed. Though this area is not included in the near term plan, it is important to understand the implications of demand if this area was to develop. This sections will provide a brief analysis of Louisville Township ultimate demand potential.

The potential **developable area** of expansion in the township comprises **6,400 acres**. The Township includes an additional 2,900 acres of wetlands which are not assumed to be developable. The following assumptions will be used for this analysis:

1. Development Assumed: Single family residential with ½ acre lots (Low Density Residential).
2. 80 percent of the developable area will be developed as single family residential. 20 percent will be roads or undevelopable.
3. Demand Load of 540 gpd/acre from Table 4-7.
4. MD:AD ratio of 2.77 from Table 4-7.

With the above assumptions, the potential service area in the Louisville Township could add an additional average day demand of 2.8 mgd with a maximum day demand of 7.7 mgd at full buildout. These volumes are not included in any other analysis in this water comprehensive plan up to this point, nor are they included in any other analysis or recommendation in this report.

5 Water System Evaluation

In the previous comprehensive water plan, the water system was evaluated in regards to numerous system criteria. In light of the updated water system demands, the system has been re-evaluated to provide for an updated set of recommended alternatives.

5.1 Water Supply Sources and Water Quality

A summary of water supply quality concerns was outlined in the previous Water Comprehensive Plan. The recommendation for addressing water quality concerns developed in this plan are based on previous water treatment studies as well as recent water quality trends. Some new information has been developed with regards to water quality assessments for this supplement. However, in the future there may be emerging issues at both existing and new well sites related to water quality.

In summary, the Utility utilizes three different aquifers as the water source for their public water supply. These aquifers are the Prairie du Chien-Jordan Sandstone, Franconia-Ironton-Galesville bedrock, and Mt. Simon/Hinckley bedrock.

In the Shakopee area the Prairie du Chien-Jordan sandstone aquifer is close to the ground surface and is soft in structure. Wells constructed in this area have removed sandstone surrounding the well to prevent large quantities of sand from entering the well with the water.

Prairie du Chien-Jordan sandstone aquifer

The Prairie du Chien-Jordan sandstone aquifer supplies a significant quantity of water to the City's water system, and is expected to provide the majority of the water in the future. Wells No. 4 - No. 9, No. 11 - No. 13, No. 15- No. 17 and No. 20, No. 21 utilize water from the Prairie du Chien-Jordan sandstone aquifer.

Tunnel City-Wonewoc
Wells No. 2 and No. 14 utilize water from the Tunnel City-Wonewoc aquifer. This aquifer also supplied water to Well No. 1 before it was abandoned and sealed.

Mt. Simon
Wells No. 3 and No. 10 utilize water from the Mt. Simon aquifer. This aquifer also supplied water to Well No. 1 before it was abandoned and sealed. Portions of Well No.3 also access portions of the St. Lawrence aquifer.

5.1.1 Water Supply Challenges

Water use restrictions have been placed on the Mt. Simon/Hinckley bedrock aquifer. These restrictions only allow usage of the Mt. Simon/Hinckley bedrock aquifer when there is no alternate water supply available, and the water may only be used for drinking water purposes. Wells No. 3 and No. 10 are supplied with water from this aquifer. Well No. 10 has low nitrate concentrations and was established to dilute the moderate levels of nitrates in water from Wells No. 6 and No. 7.

Multiple aquifer wells are wells that utilize water from multiple aquifers. These types of wells are no longer allowed to be constructed in Minnesota because of the increased potential for spreading contamination to multiple aquifers. Well No. 3 is a multiple aquifer well and was once supplied with water from all three aquifers. Eventually the Prairie du Chien-Jordan sandstone aquifer was cased off due to the large quantity of sand that was entering into No. 3. Well No. 2 was also a multiple aquifer well that received water from all three aquifers. Two of the aquifers have been cased off and it currently only receive water from the Tunnel City-Wonewoc aquifer.

5.1.2 Water Quality

Health Concerns
Under existing operating conditions the system receives their drinking water from eighteen groundwater wells. At each well house chlorine and fluoride are added to the water for disinfection and public health purposes. The City monitors their wells to insure they stay in compliance with the National Primary Drinking Water Regulations (NPDWRs), National Secondary Drinking Water Regulations (NSDWRs) and other water quality standards. Water from these wells is considered a good quality, however, there are some elements present in the water which require monitoring.

Well No. 10 has a history of containing moderate concentrations of nitrate, radon and radium 226/228. SPUC has been proactive in monitoring all regulated contaminate levels. Data collected has revealed that these levels have been steadily dropping over time. The Utility will continue to sample and monitor water production wells to ensure they are staying under the NPDWR MCLs.

Well No.3, which is not currently operated, has had a history of containing radionuclides, most recent monitoring levels have been at 5.8 pCi/L for Radium 226 and 5.7 pCI/L for Radium 228 with a gross alpha level of 9.9 pCi/L. This well is available to the SPUC water system for emergency purposes only.

Aesthetics

The Utility also monitors the aesthetic conditions of the water they are supplying related to NSDWRs. EPA believes that if these contaminants are present in water at levels above these standards, the contaminants may cause the water to appear cloudy or colored, or to taste or smell bad. This may cause a great number of people to stop using water from their public water system even though the water is actually safe to drink. Secondary standards are set to give public water systems some guidance on removing these chemicals to levels that are below what most people will find to be noticeable, and are not legally enforceable.

The problems associated with NSDWRs include:

- Aesthetic effects — undesirable tastes or odors;
- Cosmetic effects — effects which do not damage the body but are still undesirable
- Technical effects — damage to water equipment or reduced effectiveness of treatment for other contaminants

Monitoring indicates that total hardness is the most common nuisance for NSDWSs. Impacts from total hardness can be offset by implementing hardness removal at the well house, which ultimately may be very costly or the addition of an in-home water softener.

A few of the wells also had moderate levels of manganese. Manganese is associated with aesthetic issues which include taste and water coloring. SPUC is currently able to successfully addresses the aesthetic issues related to manganese through chemical treatment (sequestration with polyphosphate).

5.1.3 Potential Water Treatment Needs

Historically, the SPUC water system wells have not required more advanced water treatment beyond simple chemical feed (disinfection, sequestration). However, there is the potential for more advanced water treatment needs in the future. These potential needs are described further in the sections below.

5.1.3.1 Nitrate Removal

Wells No. 5 historically been the most problematic wells related to water quality with monitored levels ranging from 6.3 – 7.7 mg/L. The EPA has set the MCL at 10 mg/L. SPUC has managed the use of this well by blending water pumped from this well with Well No.4 which has a monitored level of nitrate ranging from 2.8 – 6.3 mg/L. Both wells have been trending downward with regards to monitored nitrate levels. However, if levels in these wells eventually rise or the enforceable MCL is lowered, decisions will need to be made with regard to the use of Well No.5. Given its importance to the SPUC water system as a primary water producer, water treatment for the removal of nitrate may be needed. Budget numbers are presented later in this report, set aside to address potential future water treatment needs related to nitrate removal.

5.1.3.2 Iron & Manganese Treatment

In general the existing SPUC water production wells have minimal levels of iron and manganese. As noted earlier in this re[ort, the EPA does not enforce these secondary MCLs as they are established as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. These contaminants are not considered to present a risk to human health at the secondary levels. The secondary MCL for iron is 0.3 mg/L and 0.05 mg/L for manganese.

5.1.3.2.1 Iron

Only two of SPUC's existing wells have monitored iron levels (see Appendix A) above the secondary standard for iron. Well No.14, with iron levels of 0.63 mg/L is not run on a regular basis as it is available for emergency use. Additionally, when this well is operated, the water is blended with water from Well No.12 or Well No.13 which have very low levels of iron. This allows for the water to be combined to produce a finished water effluent with very minimal iron concentration Later in this report, it is noted that Well No.14 is still utilized in the reliable supply capacity analysis. It is assumed that it would be a suitable backup for a short period of time if another well were to be out of operation.

Well No.10 has iron levels at 0.42 mg/L. This well is considered a peaking well, meaning it is used sparingly, and is only operated to supplement large water use days. Additionally, when this well is operated it is blended with water from either Well No.6 or Well No.7. This type of well use management limits the use of the wells that contain iron, though they are still available to supplement quantity shortages during large water use days. Even with elevated iron levels, the iron content in these wells is relatively low, and at levels that can be managed by limiting well use and chemical treatment (sequestration with a polyphosphate) and blending with other low iron concentration wells.

5.1.3.2.2 Manganese

Manganese does not have an enforceable MCL, but the Minnesota Department of Health (MDH) has issued a health-based value of 0.1 mg/L. "Infants less than 1 year old are more sensitive to manganese and it is recommended that they only drink water, or water mixed with formula, that is 0.1 mg/L or less to avoid negative health effects," per the Health Risk Assessment Unit at MDH. MDH also suggest that adults and older children should drink water with less than 0.3 mg/L to prevent negative health effects. The 0.3 mg/L limit is a health advisory set by the EPA. Health-based values can serve as a guideline for goals in regards to use management of the wells. The presence of manganese in the SPU wells will be considered moving forward in light of the information above.

In regards to manganese, Well No.15 at 0.092 mg/L and Well No. 12 at 0.08 mg/L are the only wells that currently have moderate levels of Manganese. **None of the existing wells exceed the health advisory limit** for Manganese. These wells are used on a somewhat regular basis, but more sparingly than the more favorable wells. As the water system expands west, there has been an indication that potential future well sites may have elevated levels of manganese. If long terms water supply facilities were to be located at one of these well sites, with elevated manganese levels above the MCL, it is recommended that a filtration plant be constructed to remove the manganese. Budget numbers are presented later in this report, set aside to address potential future water treatment needs related to manganese removal.

5.2 Total System Reliable Supply Capacity

The reliable supply capacity of a water system is the total available delivery rate with the largest pumping unit(s) out of service. The reliable supply capacity is less than the total supply capacity because well and other supply pumps must be periodically taken out of service for maintenance. These water supply pumps can be off-line for periods of several days to several weeks, depending on the nature of the maintenance being performed. For a system as large as Shakopee with 18 high capacity wells, it is somewhat likely for two wells to be offline at the same time, comprising approximately 10 percent of the total supply capacity. Because of this, system wide well supply requirements will assume that the SPUC water supply system should be capable of meeting maximum day demands with the Utilities' largest two wells out of service.

The current reliable water supply capacity is given in Table 5-1. Under present operating conditions, the existing wells have a combined total capacity of about 24.4 MGD when operating 24 hours per day. However, the reliable capacity of the supply wells is approximately 20.3 MGD with the two highest yielding wells out of service. The availability of this reliable supply capacity assumes that there will be no significant declines or changes in the water supply capacity over the next 20 years.

To determine if SPUC should plan for additional supply, the demands of the system can be compared to supply capacity. The projected drought-year average day and maximum day demands are set against total and reliable supply capacities in Figure 5-1. The results in Figure 5-1 indicated a potential need for approximately **4.0 – 5.0 MGD** or more in reliable supply capacity to meet projected water system demand growth. This would equate to roughly three new wells. The suggested location for these wells on a zone by zone basis is discussed later in this section. It should also be noted that future demands are estimated projections (not records) and thus should be re-evaluated frequently (every five years ±) as water use trends can change over time.

Figure 5-1
Historical & Projected Demands
Versus Total & Reliable Supply Capacity

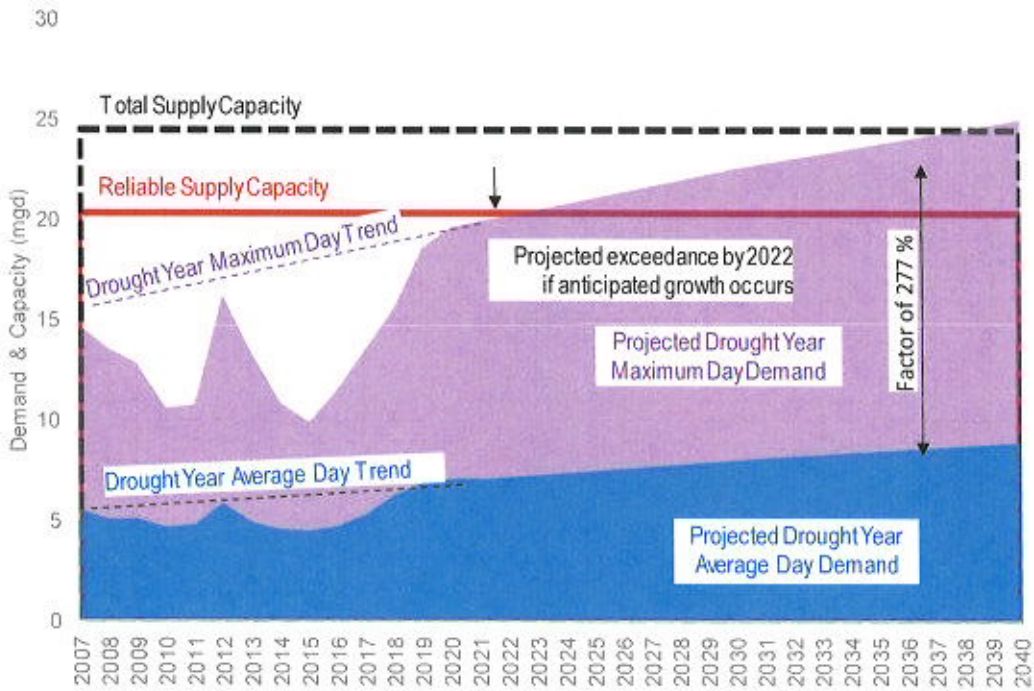


Table 5-1 – Existing Water Production Wells

Well Name	Pressure Zone	Unique Well Number	Normal Operational Capacity (gpm)	Allowed Pumping Time per Day (Hours)	Daily Capacity (MGD)
Well No.2	Normal	206803	300	24	0.4
Well No.3	Normal	205978	825	Emergency	1.2
Well No.4	Normal	206854	715	24	1.0
Well No.5	Normal	206855	850	24	1.2
Well No.6	Normal	180922	1,175	24	1.7
Well No.7	Normal	415975	1,100	24	1.6
Well No.8	Normal	500657	1,100	24	1.6
Well No.9	Normal	554214	1,050	24	1.5
Well No.10	Normal	578948	1,125	24	1.6
Well No.11	Normal	611084	1,000	24	1.4
Well No.12	1st High	626775	810	24	1.2
Well No.13	1st High	674456	1,036	24	1.5
*Well No.14	1st High	694904	381	24	0.5
Well No.15	Normal	694921	1,150	24	1.7
Well No.16	Normal	731139	1,450	24	2.1
Well No.17	Normal	731140	1,400	24	2.0
Well No.20	1st High	722624	1,142	24	1.6
Well No.21	1st High	722625	1,175	24	1.7
Total			**17,784**	--	**24.4**
Two Highest Yielding Wells (Well No. 16 & 17)					**4.1**
Firm Capacity (Minus Two Wells)					**20.3**

Shakopee does not have any water treatment

*Well No.14 is only operated if needed and is factored into the firm capacity analysis.

Source: City Records

5.3 Reliable Pumping Capacity & Storage

The previous comprehensive water plan developed sizing criteria for reliable pumping capacity. This supplement updates that analysis in relation to revised projected water demands.

To determine the water supply and storage needs of a community, average daily demands, peak demands, and emergency needs must be considered. In the sections below, calculations are used to determine future water supply and storage volume requirements for the SPUC water system. Water storage facilities should be capable of supplying the desired rate of fire flow for the required length of time during peak demands when the water system is already impacted by other uses and with the largest supply pump out of service.

The calculations below assume that maximum day demands are occurring on the system, storage volume is reduced by peak demands greater than firm supply pumping rate (i.e. equalization storage is expended). For purposes of this analysis, it is assumed that the "firm capacity" of the water supply wells and booster pumps (largest pump out of service) is capable of supplying maximum day demands.

Because there are multiple pressure zones in the SPUC water system, served by elevated storage, it is important to evaluate the needs of each zone separately. The previous calculations were revisited in light of new demand projections. The result of these updated calculations are updated in the tables below.

5.3.1 Total System Pumping and Storage

The previous Water Comprehensive Plan evaluated the total water system storage needs as well as each individual pressure zone. The plan did not identify any total water system storage needs, meaning when analyzed as a complete system, additional storage is not recommended. Rather each individual pressure zone needs to be analyze for storage needs within that zone. To determine the water storage needs of a community, average daily demands, peak demands, and emergency needs must be considered. The storage tanks of the water system are listed in Table 5-2. The volumes in Table 5-2 are compared to the projected storage needs within each pressure zone. The documented calculations for the System are included in Appendix A, with a summary of the results documented below.

Table 5-2 – Existing Water Storage Facilities

Facility Name	Capacity (gal)	Useable Volume (gal)	Overflow Elev.	Headrange (ft)	Construction Style
Main Zone					
Tank 1	2,000,000	2,000,000	933.0	43.0	Stand Pipe
Tank 2	250,000	250,000	933.0	24.0	Pedestal Sphere
Tank 3	1,500,000	1,500,000	933.0	35.0	Hydropillar
Tank 5	2,500,000	2,000,000	933.0	35.0	Ground
Tank 6	2,500,000	2,000,000	933.0	35.0	Ground
1st High Zone					
Tank 4	500,000	500,000	1015.0	28.0	Pedestal Spheroid
Tank 7	2,500,000	2,000,000	1015.0	34.5	Ground
Total	**11,750,000**	**10,250,000**			

5.3.2 Individual Pressure Storage Analysis Summary

Appendix C contains the revised supply and storage calculation. Water pumping/transfer needs as well as water storage needs were calculated for each pressure zone. In essence, each pressure zone was analyzed individually in relation to water pumping and storage needs. For example, if a pressure zone is short on transfer/pumping capacity, it is feasible that it can "borrow" water from a neighboring zone via gravity(see main zone calculations below). The primary purpose of the summarized calculations below is to assure that each pressure zone has sufficient storage capacity as well as supply capacity whether it be an internal zone supply well or pumping station.

Table 5-3 – Summary of Future Water Storage Needs - By Pressure Zone

	Main	1st High	*2nd High Central	*2nd High Zone West	Combined 2nd High	2nd High Zone East
Existing Firm Pump Cap. (MGD)	12.8	7.8	1.4	1.4	4.3	1.4
Existing Storage Volume MG)	6.8	2.5	-	-	-	-
2020 Planning Period						
Assumed Firm Pump Cap. (MGD)**	15.8	4.9	1.4	1.4	4.3	1.4
Average Day Demand (MGD)	5.0	1.7	0.09	0.27	0.4	0.08
Max Day Demand (MGD)	13.9	4.7	0.25	0.75	1.0	0.22
Additional Storage Recommended (MG)	-	-	**0.2**	**0.5**	**0.6**	**N/A**
2040 Planning Period						
Assumed Firm Pump Cap. (MGD)**	15.8	4.9	1.4	4.3	5.8	1.4
Average Day Demand (MGD)	5.6	2.1	0.2	1.0	1.2	0.13
Max Day Demand (MGD)	15.6	5.8	0.5	2.9	3.4	0.37
Additional Storage Recommended (MG)	-	-	**0.3**	**1.1**	**1.0**	**N/A**

*The long term water system plan includes the connection of the 2nd High Central and West zones to form the Combined second high zone, which will influence redundancy and water storage requirements.

**Assumed firm pump capacity accounts for additional supply sources added to zone in the future.

See Appendix C for storage calculations

5.3.3 Pressure Zone Pumping/Transfer Analysis

This section summarizes the pumping capacity needs of each pressure zone as they relate to both supply and inter-zone pumping. While the total supply section determines the adequacy of supply at a total system level, this section aims to assure each pressure zone can move water internally to satisfy the system demand from either an internal supply source or through transfer of water from a neighboring zone. An individual pressure zone analysis for pumping capacity is included in Tale 5-4 below. The table below summarizes the assumed firm pumping capacities for each pressure zone including unit wells and booster pumping station units which deliver water to water demand within each pressure zone.

Table 5-4 – Summary of Interzone Pumping/Transfer Needs

	Main	1st High	2nd High Central	2nd High Zone West	Combined 2nd High (C+W)	2nd High Zone East
Existing Firm Pump Cap. (MGD)	15.8	4.9	1.4	1.4	4.3	1.4
2020 Planning Period						
Max Day Demand (MGD)	13.9	4.7	0.1	0.7	0.8	0.3
Pumping/Transfer Surplus/Shortfall	1.9	0.2	1.4	0.7	3.5	1.2
Additional Transfer/Pumping Recommended (MGD)	0	0	0	0	0	0
2040 Planning Period						
Max Day Demand (MGD)	15.6	5.8	0.3	2.9	3.2	0.4
Pumping/Transfer Surplus/Shorfall	0.2	-0.9	1.1	-1.4	1.1	1.0
Additional Transfer/Pumping Recommended (MGD)	**0**	**0.9**	**0**	**1.4**	**0**	**0**

Table Notes: Negative value indicates supply shortfall, Interzone Supply/Pumping Recommended represents water that would need to flow from a higher elevation zone.

5.4 Water Distribution System Analysis

The previous water system plan provided a comprehensive review of the water distribution system through the use of a calibrated water distribution system model. The assessment of the existing water system is still valid in light of this update. Information revealed through this prior analysis will be accounted for in the recommended improvements section.

6 Recommended Improvements

With updated water use projections and new ultimate land use planning information, the recommended short and long term water system improvement recommendations have been revisited and summarized below. Many of the improvements previously identified have been confirmed and a more exhaustive list of improvements has been developed.

The purpose of this section of the report is to review and recommend facility improvement priorities for the water system moving forward. With growth of the City, and therefore the water system expected during the next planning period, additional water system to facilities should be planned for so that all customers receive exceptional water service. As previously mentioned, the new growth and expansion of the water system is expected to occur in the western portions of the first and second high pressure zones. While it is impossible to know exactly how the area will grow in terms of specific users and road alignment, some general estimates in relation to future land-use can be made and facilities planned for based on these assumptions.

The ultimate water system planning map, presented in Figure 6-1 represents a guiding document for the growth and expansion of the water supply, distribution and storage systems. Expansion of the water system in a manner as outlined in this document will help to assure that exceptional and robust water system is provided to all customers in the future.

This section will provide recommendations to remediate deficiencies and to prepare the system for future growth. A map of planned improvements is shown in Figure 6-1 and will be reference throughout this section.

6.1 Supply Improvements

A community's water supply capacity is sized to meet maximum day demands reliably. The industry standard is to provide enough pumping capacity to meet the maximum day demand rate with the largest two pumps out of service (i.e. firm capacity). Current well supply capacity in Shakopee is 24.4 MGD, and the firm pumping capacity is 20.3 MGD. Maximum day demands reached a peak of 16.3 MGD in 2012. That rate has fluctuated since then, but could reach that level during an extreme drought year.

Based upon the peak demand projections in Table 4-4 and the well analysis discussed in section 5.2, it is estimated that projected maximum daily demand may exceed firm/reliable well supply capacity. For that reason, additional capacity is recommended in the future. The previous section of this report identified the need for approximately **4.0 – 5.0 MGD** or more in reliable supply capacity to meet projected water system demand growth through the 2040 planning period

Before recommendations on supply can be made, regulations regarding supply must be first reviewed. The requirements of Minnesota state code apply, as well as any special requirements placed upon Shakopee. There is a concern in the Eastern portions of the City regarding the influence of groundwater drawdown on the nearby Fen wetland. While working with the Minnesota Department of Natural Resources (DNR), it has become apparent that the construction of any new wells east of the easternmost well in the City will not be permitted. Thus, new well construction is not permissible east of County Road 83, and no future wells will be planned east of Well 5.

A deficiency in overall water supply capacity was shown to be possible in Figure 5-1. The system has 18 wells in total. It is not unreasonable to assume that up to two wells may be offline at a time, as in Figure 5-1. Supply calculations completed in Appendix C show that both the Normal Zone and/or the First High Zone could have a supply deficiency in the coming years, depending on growth.

A cost effective solution to dealing with the firm capacity in separate pressure zones is to provide water supply sources which benefit multiple pressure zones. As development occurs and when the firm capacity of the system is exceeded by the maximum day demand, It is recommended that the City construct additional supply wells which are capable of serving multiple pressure zones.

6.1.1 New Water Production Wells

Figure 6-1 shows potential locations for up to four future wells. Long term, it is anticipated that three new wells may be needed to satisfy water demands across the entire system. Previous analysis showed that the Normal and 1st high pressure zones may eventually have supply deficits. Additionally, it is beneficial to have supply sources in each of the major pressure zones to reduce dependency on booster stations and support diverse redundant operation. In regards to potential well location, SPUC has identified multiple potential well sites which could all be feasible site options. When considering overall system redundancy and system zone transfer, it would be beneficial to locate the long term wells in growing zones that are absent of supply (2nd High West) or the Normal or 1st high pressure zones.

Well No.22

The construction of new well No.22 next to existing will No.3 provides for an option to gain additional capacity beyond the new well. As noted previously in the report, existing Well No.3 is not operated due to subpar water quality associated with Radionuclides. The construction of a new water production well would allow water from the new well to be blended with water from Well No.3 and producing an effluent that meets the primary drinking water standards. By constructing such a well, the capacity of Well No.3 could then be utilized to reduce the need for additional supply. Additionally, the construction of this well would not require an additional building and the new well could be piped into Pump house 3, becoming a joint facility to facilitate blending and chemical addition.

Well No.23 + Well No.24

Well No.23 and Well No.24, would be located in the Second High Zone (West) and would work in conjunction with a new water tower serving the Second High Zone. These wells would normally serve the Second High Zone, but due to their location in a higher pressure zone, they could also easily feed water to the lower pressure zones by gravity. Additionally, the construction of these wells near each other would allow for them to share a common pump house facility.

Additional well sites

SPUC has additional potential well sites to facilitate the construction of new wells if needed. Well No. 18 and Well No.19 have potential sites located in the vicinity of the Shakopee Soccer Association soccer fields. Additional reserve well sites include the Church Addition and Wood Duck Trail near tank No.7. Though these sites are not identified in the current planning period, they may be needed if development patterns change or of existing wells fail and additional supply is required.

6.1.2 Existing Well Maintenance

6.1.2.1 Pump House Reconstruction

Maintaining existing facilities will reduce the need for additional wells as existing facilities can be optimized. SPUC has been proactive about maintenance and restoration of ageing facilities. Currently the pump house that serves Well No.2 and Well No.8 is in need of major upgrades. This upgrade will require the complete razing of the existing building which includes electrical and control equipment, metering, chemicals and chemical feed equipment. The completion of this work will require the existing facility to be taken offline for about a year which will make these wells unavailable for use. The upgrade and modernization of this facility is much needed due to the limited size of the existing facility and antiquated equipment within the building. Since Wells No.2 and No.8 will need to be taken offline to complete this work, it is recommended to have a new water supply source be online and available to replace the lost capacity.

Additionally, the pump house that serves Well No. 4 and Well No.5 will eventually need rehabilitation and replacement, though there are not near term plans, it can be assumed that this work will be completed during the current 20 year planning period.

6.1.2.2 Production Well Maintenance

At existing well locations where the aquifer produces good well capacity and acceptable water quality, as the well declines in capacity and condition it should be rehabilitated and returned to normal service to take advantage of the investment of surrounding transmission capacity. Wells in this category should be identified by future well assessments that are outside the scope of this study.

6.2 Interzone Transfer Improvements

6.2.1 East Zone – Riverview Booster Station - Online

The East Zone is planned to be raised to the hydraulic grade line of the Second High Zone. In order to accomplish this, the East Zone would need a booster station. A future booster station containing two 1,000 gpm pumps was shown to be suitable for the East Zone. This booster station is now online. – This facility is now online and operational.

6.2.2 East Zone – Secondary Booster Station

It was previously thought that the East pressure zone may someday be served by an elevated water storage tank. However recent land use trends indicate that total connections in this area may be limited, therefore will be served by a booster station long term. Because of this it is recommended that a second redundant booster station be constructed to boost system pressure to this zone in the event of the failure of the primary booster station. While the primary station is being designed and constructed with two 1,000 gpm service pumps, to account for fire protection, it would be reasonable to design the secondary station on a smaller scale to accommodate typical system demands. Therefore a small scale booster station with two 100 gpm pumps is recommended. Such a station is small enough that it could be installed in a below grade vault or small flip top enclosure. Construction of a secondary booster station would allow the pressure zone to be supplied with water from two different entry points which would aid in system redundancy and water circulation.

6.2.3 Windermere Booster Station - Online

The Second High West Zone is planned to be constructed with the same hydraulic grade line of the Second High Central Zone. In order to accomplish this, the Second High West Zone would need a booster station, which is currently underway. A booster station containing two 1,000 gpm pumps was shown to be suitable for the Second High Central Zone. This Station will be going online soon. – This facility is now online and operational.

6.2.4 Upgrade Well 9 Booster Station with Flow Control Valve

The City currently owns a booster station at Well 9 which moves water from the Normal Zone to the First High Zone. It is recommended that a flow control valve be added to the Well 9 booster station to allow water to move from the First High Zone to the Normal Zone. This will allow for operational flexibility as needed to control water flow from zone to zone. Without this improvement, water could still be moved from zone to zone, through PRV's or manual valve operation, however, the flow rate could not be controlled nor the volume of water accounted for.

6.2.5 Church Addition Booster Station

Long range planning indicates that only a few more wells will be needed to accommodate future growth through the 2040 planning period. With this in mind, a focus on system redundancy can be a long term goal. If the Utility were to lose the ability to safely operate multiple wells in the 1st High Zone, additional water transfer ability from the Normal Zone would be beneficial. The interzone transfer/pumping analysis revealed a potential 0.9 mgd supply shortfall if a well was taken offline. While a portion o this shortfall could be accommodated by pumping from the main pressure zone through the well No.9 booster station, a second booster feed into this pressure zone would be beneficial. The Utility currently owns a portion of property near the Church Addition Development. Since this site borders the Normal and 1st high pressure zones, it would be a prime site to serve a multiple purpose function of two direction water transfer. Such a facility would supplement emergency water supplies to the 1st high zone by the addition of a high service booster pump and interconnecting water main. In a like manner, the facility would provide emergency water supplies to the Normal pressure zone via of pressure-reducing/pressure-sustaining control valve to allow water to flow from the 1st High Zone to the Normal Zone.

While there is not a short term need for this facility, as the high pressures zones expand, and water supply is needed, the investment in multifunction water supply and transfer facilities will help SPUC to maintain a high level of service. The need for this facility is decreased if additional wells are placed in the higher pressures zones as system pumping redundancy would be accomplished with these wells.

6.2.6 Highway 169 West Return Flow Valve

Highway 169 bisects the existing water system and acts as a barrier between pressure zones, with limited crossings. To increase redundancy in the system, connections between pressure zones would promote the ability to move water between the Normal Zone and the First High Zone. While not an immediate need, if development leads to the construction of a trunk water main crossing highway 169, it is recommended that a Pressure Reducing Valve (PRV) with flow control capabilities be installed along the zone boundary. This would allow for a controlled amount of flow to be transferred from the First High Zone to the Normal Zone. This crossing would add redundancy to the system as growth occurs to the west, and the controlled flow valve would assist the Normal Zone in case two wells were offline in the Normal Pressure Zone.

6.3 Water Quality Improvements

6.3.1 Nitrate Removal

As previously mentioned in the report, SPUC is currently successfully managing nitrate levels through the use of water blending with other wells with low nitrate levels. Nonetheless, for the purposes of this report, a nitrate removal plant is being budgeted if the need for the plant becomes a reality. For the estimate, a 3.0 MGD plant is assumed, capable of treating water from two typical SPUC wells concurrently.

6.3.2 Manganese Filtration

The emergence of manganese as a potential water quality issue in new and existing wells has presented the possibility of the need for a manganese (&iron) filtration plant. As new water sources are pursued in the South and western parts of the City (Expansion areas) early indications have revealed the potential for manganese to be present in the water. As a result, a filtration plant is budgeted to address potential iron and manganese issues. A 3.0 MGD plant, capable of treating water from two typical SPUC wells is presented as a budgetary placeholder.

6.3.3 Unidirectional Flushing

Unidirectional Water Main Flushing (UDF) has been gaining popularity across the water industry to help improve the effectiveness of flushing. Standard water main flushing has traditionally been considered an effective method to help clean water distribution system piping to help reduce unwanted tastes, odors or discolorations of the water, and to improve chlorine residual. UDF, a more sequential and planned activity, provides greater cleaning of pipes and uses less water than traditional flushing. The main goal of UDF implementation is to isolate sections of pipe by closing specific valves and opening specific hydrants sequentially, which assures optimal flushing velocity is achieved throughout the entire water distribution system. Sustaining a minimum flow velocity of 5 fps in a water main is key to effectively scouring the main to deliver desired flushing results.

UDF plan is a proven effective tool for maintaining water distribution water quality. A UDF plan can reduce water quality complaints, improve taste and odor, increase disinfectant residuals, improve hydraulic capacity, and reduce levels of biological growth within the water distribution system. The UDF plan improves flushing effectiveness by increasing flushing velocity. Higher velocities allow for scouring of the water main which more effectively removes sediments such as iron, manganese, sand, rust, and other mineral deposits that can accumulate within the water mains.

Given the desire to deliver high quality water, the SPUC water system may benefit from the development of a UDF program. Over time, minerals and sediment can build up in water mains. Traditional flushing may not always properly scour mains and may stir up sediment, leading to water quality complaints. The development and implementation of a UDF program will help to keep distribution system piping clean to provide high quality water. Given the development of the update computer water system model and advanced GIS mapping, these tool cam be leveraged to provide an effective, low cost water distributions quality investment.

6.4 Storage Improvements

The need for water storage was summarized in great detail within the previous report. This supplement reviews previous findings and produces consistent recommendations. Since the last publication, SPUC has moved forward with the option to build the 750,000 gallon tank in the 2nd High West zone to meet near and long term storage needs in the 2nd high zone.

Much of the future population growth is expected to occur in the second high pressure zone. As this pressure zone grows, so will the water that is demanded. Standalone water booster stations will be capable of serving these areas for a time, however, as the system grows, additional elevated water storage tanks will need to be added to these pressures zones. The west and central portions of the second high pressure zone are expected to see the first sustained growth and expansion. Currently these portions of the second high pressure zone are not connected, it is unknown as to when they may eventually connect since it will depend on system development and growth. The water storage analysis previously completed in this report indicated that ultimately 1,000,000 gallons of elevated water storage should be added to the water system and the second high pressure zone to sustain and support ultimate water system demand projections. Currently developers are active in the western portions of the second type pressure zone, with potential water tower sites now being discussed. With current developments now underway, the natural choice for the construction of a storage tank would be in this area to serve in new customers. It may not be prudent to place all of the 1,000,000 gallons of needed water storage at one location. Since a water tank best serves customers within a reasonable proximity depending on connected trunk water main, a single tank placed in the west would not be well positioned to serve the central portion of the second high pressure zone. Therefore it is ultimately recommended that two elevated water tanks be constructed with in the second high-pressure zone (West and central)

6.4.1.1 Construct 250,000 & 750,000 Gallon Elevated Tank for Second High Zone(s)

The section above documented the case and need for water storage to serve the Second high pressure zone. With initial development anticipated to be concentrated in the Western portions of the Second high pressure zone, there would be the option to construct a 750,000 gallon tank at this location and a 250,000 gallon tank at the Central location. With this rational, one tank will be suitable to serve a large portion of the development built out. As long term development plans become clearer, and the central part of the second high zone is connected to the west, the proposed second water tower size can be reevaluated. The construction of the first 750,000 gallon water tower will initially benefit the western portions of the second high zone as well as the first high zone as it will suppler flows via inter-zone flow through PRV stations.

6.5 Water Main Improvements

As development progresses into the expansion areas, a trunk water main system must be constructed to deliver adequate flows for various conditions including emergency fire flow. A trunk water main is defined as a pipe sized such that it can supply water for nearby users as well as serve a greater function by transporting water across the system to meet the demands of the extended water system. The majority of trunk water main improvements identified are outside of the existing service area and should be constructed as development occurs and road improvements are constructed. Figure 6-1 presented the proposed preliminary routing of trunk water mains to serve future development areas. Actual main routing will depend on a variety of local factors as individual projects progress. This map should be seen as a recommendation for the general hydraulic capacity of the distribution system as it is extended to serve new development. Generally speaking, the trunk main layout is comprised of a gridded network of 16-inch and 12-inch diameter water mains. In addition Figure 6-1 shows some key water main improvements to the existing system piping. Some improvements were for system reliability and others were for fire protection. This section will review each existing system improvement in greater detail.

As stated above, the improvements presented in Figure 6-1 represent a conceptual plan for potential long term water system improvements to improve and expand the hydraulic capacity of the water distribution system. These improvements are presented to improve flow capacity, increase system reliability and support long term community development and growth. Although the local knowledge of development patterns was utilized in the preparation of the trunk water main plan, as a conceptual plan, the actual size and location of the improvements will depend upon future planning efforts and the circumstances at the time of the improvement are implemented and may not follow exactly as shown in the figure.

6.5.1 Trunk Water Main Infill

In addition to trunk water main to be constructed in expansion area, there are some section of existing trunk water main backbones that are still in need of final infill. These sections of water main are also outlined in figure 6-1.

6.5.2 Ultimate Trunk Water Main Grid

As development progresses into the expansion areas, a trunk water main system must be constructed to deliver adequate flows for various conditions including emergency fire flow. A trunk water main is defined as a pipe sized such that it can supply water for nearby users as well as serve a greater function by transporting water across the system to meet the demands of the extended water system. The majority of trunk water main improvements identified are outside of the existing service area and should be constructed as development occurs and road improvements are constructed. Figure 6-1 presented the proposed preliminary routing of trunk water mains to serve future development areas. Actual main routing will depend on a variety of local factors as individual projects progress. This map should be seen as a recommendation for the general hydraulic capacity of the distribution system as it is extended to serve new development. Generally speaking, the trunk main layout is comprised of a gridded network of 12-inch water mains (1/2 mile spacing) with some 16-inch main sized for transmission capacity. Where more defined development is in progress, 8-inch water main grids on a tighter installation scale are also included.

In Figure 6-1, a proposed trunk water main layout has been drawn, with 12-inch loops helping to balance the future water system by allowing large volumes of water to flow between supply, storage, and points of use. These trunk main loops will be required to effectively transport water to the extremities of the proposed expansion areas. Looping is recommended wherever possible to minimize dead-ends in the water system.

Dead-ends, or branched water systems are less reliable since water must come from one direction. This forces the utility to shut off water to some customers during repairs or maintenance. In addition, larger head losses (or pressure losses) are experienced on dead-ends than on looped systems. This can limit available flow rates during fire protection activities.

6.6 System Planning

Figure 6-1 illustrates the water system master plan to meet current and projected water system needs through the 2040 planning period. As mentioned previously, these improvements are intended to correct existing deficiencies as well as meet the needs for future growth and development. To demonstrate the effectiveness of the recommended improvements, Figures 6-2 and 6-3 illustrate the anticipated maximum day demand pressures and maximum day fire flows, respectively, with the recommended improvements under projected 2040 demands conditions.

The recommended improvement plan to serve the future service area has been developed as a tool to guide SPUC in the siting and sizing of future system improvements. While the plan may represent the current planned expansion of the SPUC system, future changes in land use, water demands, or customer characteristics could substantially alter the implementation of the plan. For this reason, it is recommended that the plan be periodically reviewed and updated using area planning information to reflect the most current projections of SPUC service area growth and development.

The improvement plan is a guidance document that details existing conditions and recommendations for the future. The plan is based on future conditions as perceived in 2017. As time progresses, additional information will become available and events will shape the development of the SPUC service area. The plan must be dynamic in response; it should be studied and used but also adjusted to conform to the changes and knowledge that will come with time. Updates should be made on a regular basis, probably every five to ten years.

7 Capital Improvements Plan

One of the main objectives of this study was to develop a long-range Capital Improvement Plan (CIP) for water system facilities. The CIP provides information on the anticipated cost and timing of future water supply, storage and distribution improvements.

The previous section summarizes the recommended water system improvements anticipated throughout the planning period. This section summarizes the recommended water system improvements and presents a proposed Water Utility capital improvements program. The recommended Capital Improvements Plan prioritizes system improvements and provides a schedule for the timing of construction. Budget cost estimates for each improvement are also summarized.

7.1 Supply

Based upon the current and projected water system needs, additional wells will be required to provide reliable supply capacity for current and future water demands. While near term water system demands can supplied by current well capacities, additional wells will be required to support growth and development. Three new wells are identified to support water system growth and replace aging wells through the 2040 planning period.

7.2 Treatment

Two potential treatment plants, an iron and manganese plant as well as a nitrate plant are budgeted as place holders in the event that water quality declines in the existing wells, or if subpar water quality exists at new and proposed well sites.

7.3 Storage

The current water system is supported by robust water storage volumes, however as the water system grows into the Second High pressure zone, elevated water storage should be added to the system in this zone to support system operation and provide the type of water service that is similar to the other pressure zones. Historically, it has been a practice to add elevated storage to a pressure zone when the number of users connected approaches 250 homes. With commercial and residential development now occurring in the Wester portions of the second high pressure zone, planning for the next elevated water tank should begin now. A second tank in the second high pressure zone will be eventually needed depending on development for a total of 1, 000,000 gallons of water storage in the second high pressure zone.

7.4 Water Booster Stations and Flow Control

Movement of water between the pressure zones is important from a redundancy standpoint. As new wells are added throughout the system, a demand to move the supplied water from zone to zone will be required. As a result a series of booster stations are planned to move water from the lower service zones to higher zones. In a similar fashion, flow control valves located at the booster station facilities are beneficial to move water in a controlled fashion from the higher zones to lower zones.

7.5 Distribution

Figure 6-1 is the proposed SPUC 2040 Water System Master Plan. The figure illustrates recommended improvements to the existing distribution system to serve the current service area. The improvements have been recommended to strengthen the existing water distribution network, and support system expansion into future service areas. The Figure also shows how long range trunk water mains might be installed. Trunk main looping should be a priority in the expansion of the service area and in water main replacement projects. The proposed layout of trunk water mains in this report would provide water supply and fire protection capabilities to existing and projected service areas. In addition, recommended trunk mains will connect water supply and storage facilities with points of use on the system.

7.6 CIP Costs

The table below provides a high level summary of short and long range water system facility capital costs. These costs are based on recent projected history an anticipated system growth.

Table 7-1 – Proposed Water System Improvements – Through 2040

Type	Improvement	Planning Period	Estimated Cost
Supply	Well No.22 - Well, Pump & Connection W/ Well No.3	2020-2025	$1,400,000
Supply	Well No.23 - Well, Pump, Building and Connections	2025-2030	$3,000,000
Supply	Well No.24 - Well, Pump, Connections	2035-2040	$1,400,000
Transfer	Church Addition Booster Station	TBD	$2,600,000
Transfer	Secondary East Booster Station	TBD	$550,000
Transfer	Well No.9 Flow Control Valve Upgrades	2025-2030	$175,000
Transfer	HWY 169 Flow Control Station	TBD	$350,000
Storage	West 2nd High 750K Tank	2020-2025	$2,700,000
Storage	Central 2nd High 250 K Tank	2030-2035	$1,700,000
Treatment	3.0 MGD Nitrate Removal Plant	TBD	$9,500,000
Treatment	3.0 MGD Manganese Filtration Plant	TBD	$9,100,000

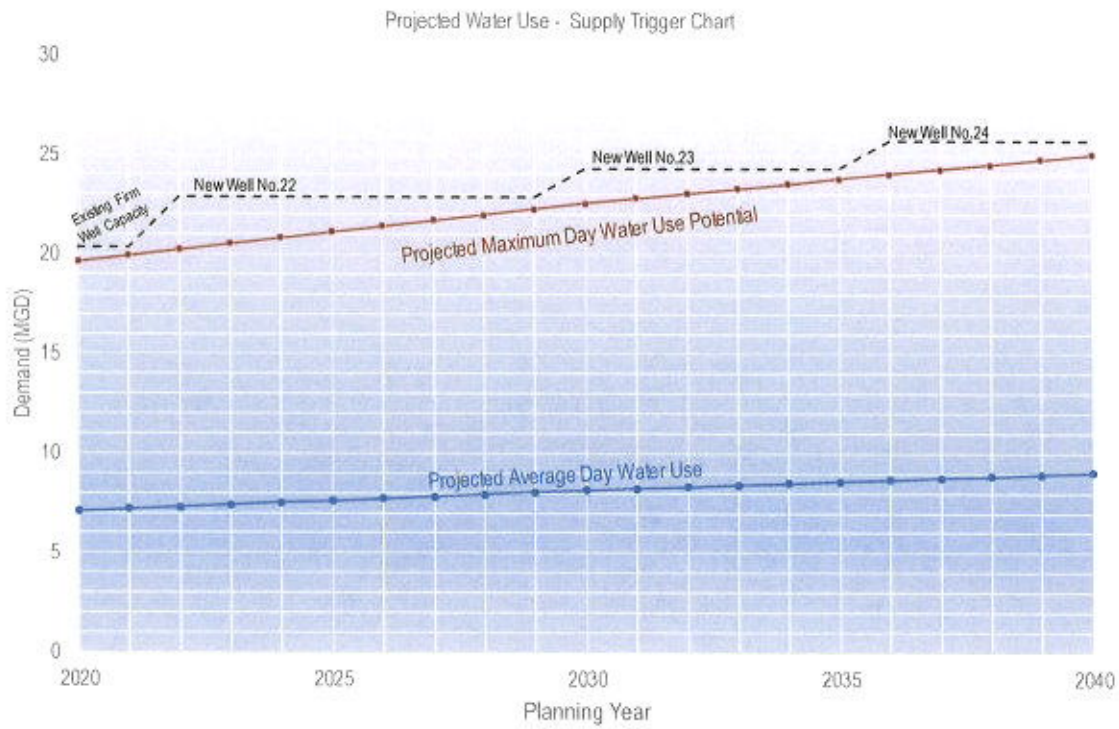
Type	Improvement	Quantity	Unit	Price	Planning Period	Estimated Cost
Distribution	Upsize 6 to 8-Inch Main	28,700	LF	$12	TBD	$351,000
Distribution	Upsize 6 to 12-Inch Trunk Main	144,600	LF	$48	TBD	$6,897,000
Distribution	Upsize 6 to 16-Inch Trunk Main	12,600	LF	$92	TBD	$1,159,000
Distribution	Upsize 8 to 12-Inch Trunk Main	27,600	LF	$35	TBD	$979,000
Distribution	Upsize 8 to 16-Inch Trunk Main	2,700	LF	$80	TBD	$215,000
Distribution	Zone Boundary PRV's	7	EA	$85,000	TBD	$595,000
Distribution	Highway Crossing / Casing	500	LF	$700	TBD	$350,000

7.7 Trigger Chart

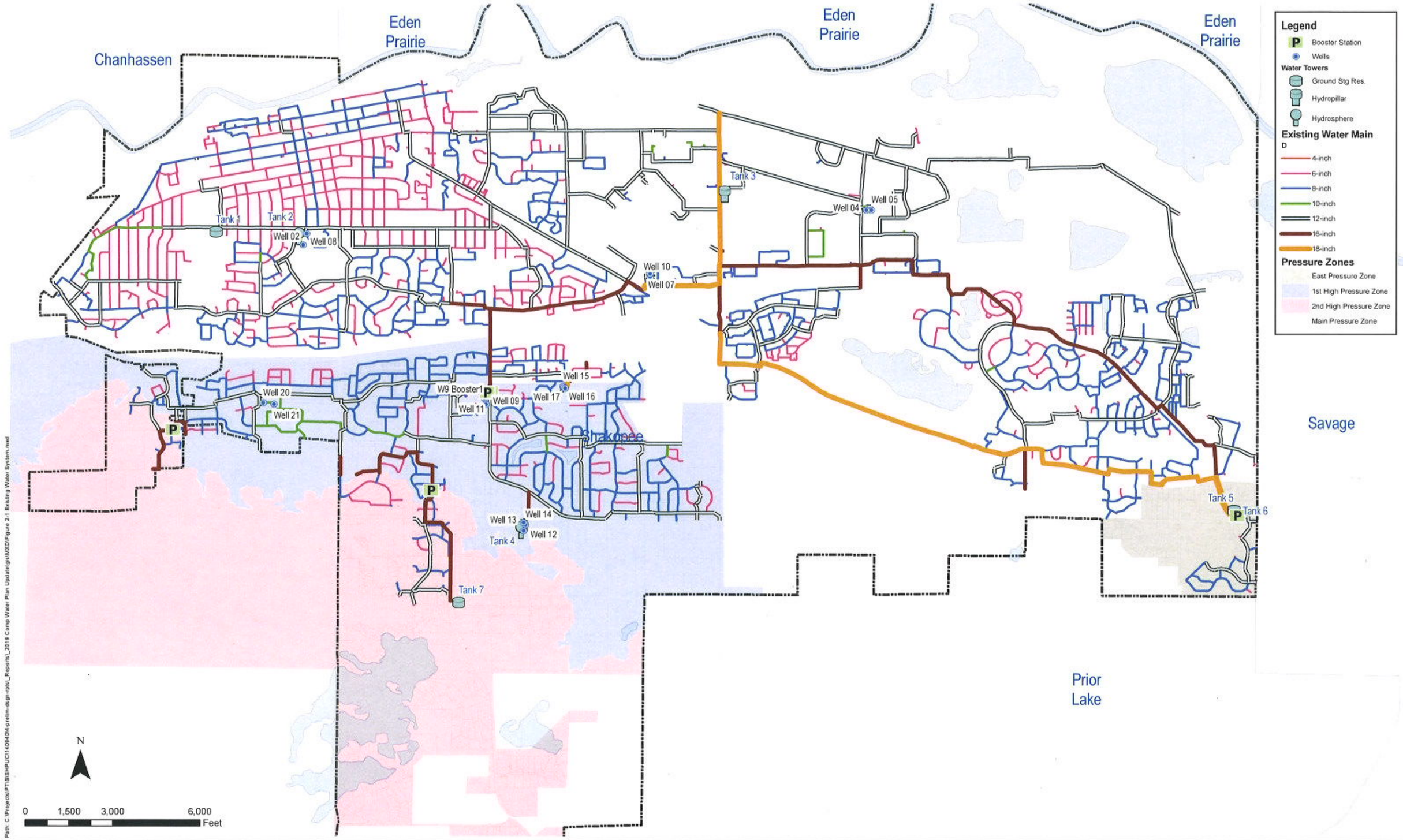
The timing of future water improvements will be influenced by a number of parameters. Items such as development pressure in specific areas, aging facilities and/or facilities which are undersized, availability of funds, etc. all play a role in the timing of future improvements.

Because of the factors involved, it is difficult to accurately predict the timing of future improvements, especially those which may occur far into the future.

A trigger chart is presented in below, which correlates well and storage improvements to system demands. Future capital improvement planning can thus be tied to actual system demands and the timeline adjusted as necessary.



Figures



Path: C:\Projects\PTI\SI\SHPUC\140940\4-prelim-dsgn-rpts_Reports_2019 Comp Water Plan Update\gis\MXD\Figure 2-1 Existing Water System.mxd

Project Number: SHPUC 140940
Print Date: Print Date: 10/7/2019
Map by:
Projection:
Source:

Comprehensive Water Plan Update - 2019 Supplement

Shakopee Public Utilities
Shakopee, Minnesota

FIGURE 2-1
Existing Water System Model Map

Legend

AUAR Land Use

- Institution
- Mixed Residential
- Mixed Use Center
- Mixed Use Employment Center
- Open Space
- Park
- Railroad
- Rights-of-Way
- Suburban Edge Residential
- Suburban Residential
- Utilities
- Water

Land Use

Citywide Land Use

- Bussiness Park
- Commercial
- Entertainment
- High Density Residential?
- Industrial
- Institutional
- Medium Density Residential
- Mixed Use
- Open Space
- Parks
- Single Family

Chanhassen

Eden Prairie

Bloomington

Shakopee

Savage

Carver

Prior Lake

A

B

C

D

E

F

G

N

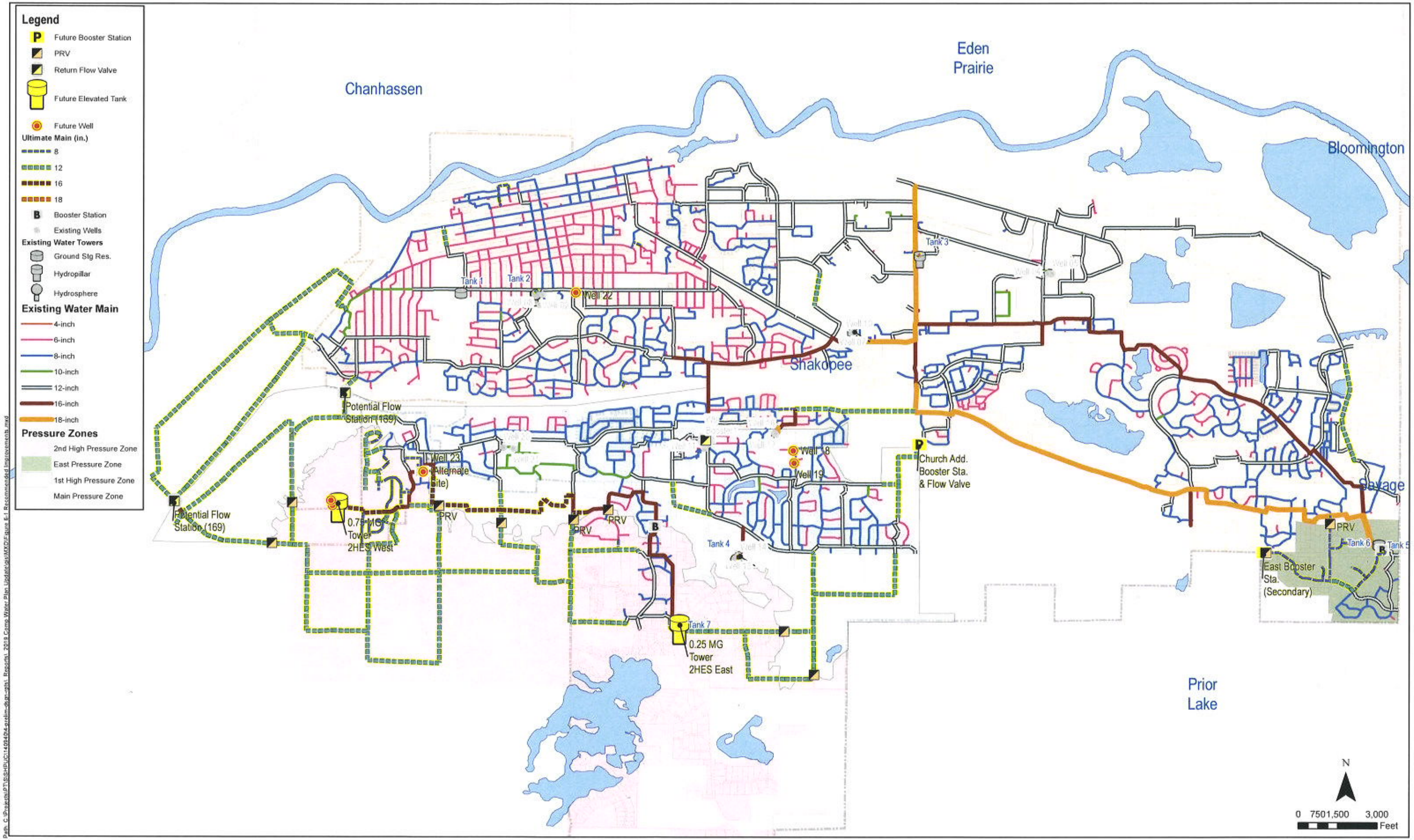
0 1,500 3,000 6,000 Feet

Path: F:\Projects\PTS\SHPUC\140940\4-prelim-dsgn-rpts_Reports_2019 Comp Water Plan Update\mxd\Figure 4-1_Land Use Planning.mxd

Project Number: SHPUC 140940
Print Date: Print Date: 10/17/2019
Map by:
Projection:
Source:

Comprehensive Water Plan Update - 2019 Supplement
Shakopee Public Utilities
Shakopee, Minnesota

FIGURE 4-1
Future
Land Use Planning



Project Number: SHPUC 140940
Print Date: Print Date: 10/7/2019
Map by:
Projection:
Source:

Comprehensive Water Plan Update - 2019 Supplement

Shakopee Public Utilities
Shakopee, Minnesota

FIGURE 6-1

Proposed 2040 Water System Improvements

Chanhassen

Eden Prairie

Chaska

Shakopee

Savage

Prior Lake

Tank 1

Tank 2

Tank 3

Tank 4

Tank 5

Tank 6

Legend

Ultimate Pipe

Ultimate Main (in.)

- 8
- 12
- 16
- 18

Future Facilities

Type

- Future Booster Station
- PRV
- Return Flow Valve
- Future Elevated Tank
- Future Well

ULT_MD_P.P

- <40
- 40-45
- 45-50
- 50-55
- 55-60
- 60-65
- 65-70
- 70-75
- 75-80
- 80+

0 1,500 3,000 6,000 Feet

Path: C:\Projects\PTMS\SHPUC\140940\4-prelim-design\rpts_Reports_2019 Comp Water Plan Update\gis\MXD\Figure 6-2 Future Pressure.mxd

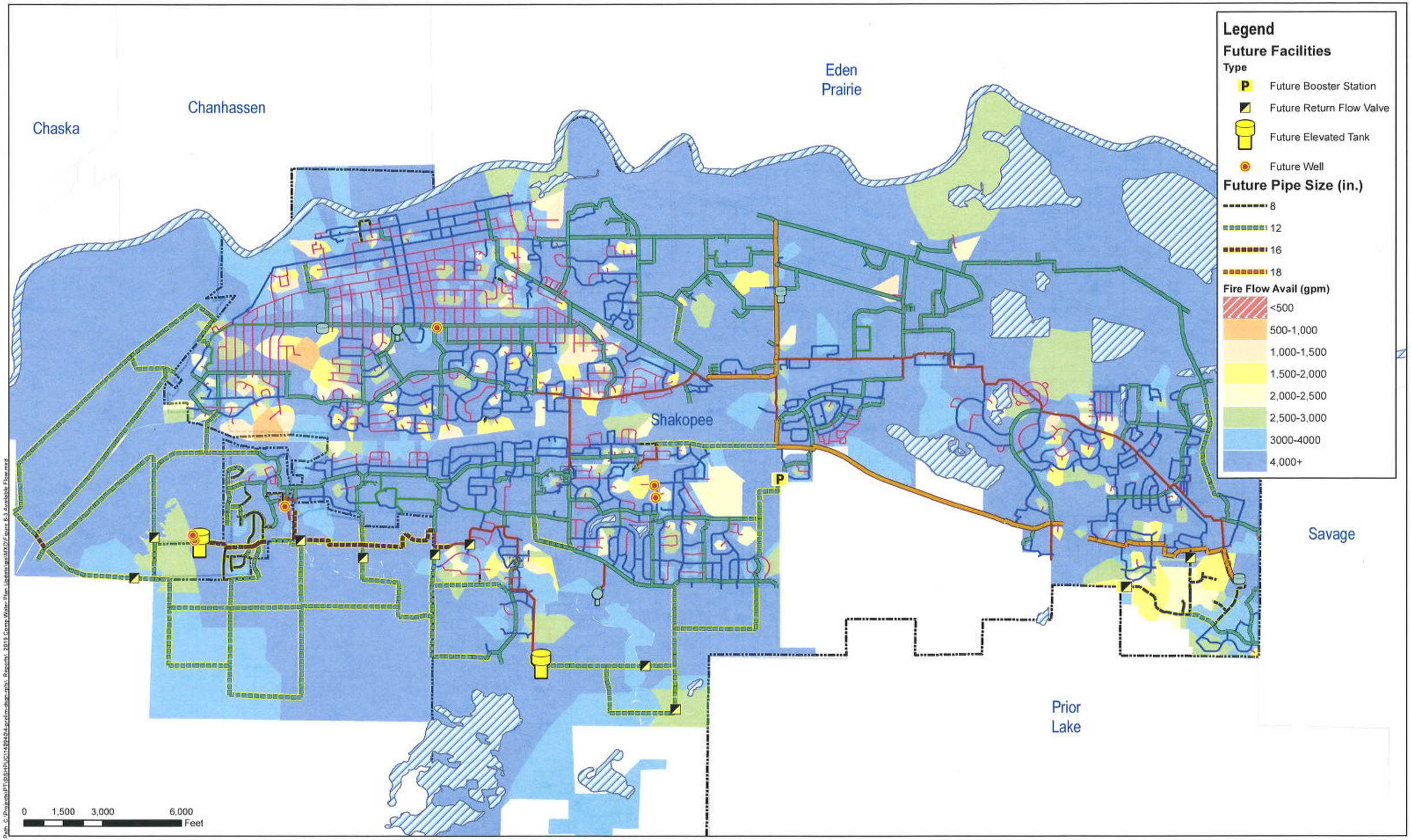
Project Number: SHPUC 140940
Print Date: Print Date: 10/7/2019
Map by:
Projection:
Source:

SEH

Comprehensive Water Plan Update - 2019 Supplement

Shakopee Public Utilities
Shakopee, Minnesota

FIGURE 6-2
2040 Water System
Static Pressures



Project Number: SHPUC 140940
Print Date: Print Date: 10/7/2019
Map by:
Projection:
Source:

Comprehensive Water Plan Update - 2019 Supplement

Shakopee Public Utilities
Shakopee, Minnesota

FIGURE 6-3
2040 Water System
Calc. Availale Fire Flow

Appendix A

Water Quality Data

2019 Mineral Analysis

	Well 2		Well 8			Well 20		Well 21			Well 15		Well 16		Well 17			Well 4		Well 5		
	Result	Unit	Result	Unit	Blend	Result	Unit	Result	Unit	Blend	Result	Unit	Result	Unit	Result	Unit	Blend	Result	Unit	Result	Unit	Blend
Copper	< 0.005	mg/L	< 0.005	mg/L		< 0.005	mg/L	< 0.005	mg/L		< 0.01	mg/L	0.005	mg/L	< 0.005	mg/L		< 0.005	mg/L	< 0.005	mg/L	
Arsenic	< 0.5	µg/L	< 0.5	µg/L		< 0.5	µg/L	< 0.5	µg/L		< 0.5	µg/L	< 0.5	µg/L	< 0.5	µg/L		< 0.5	µg/L	< 0.5	µg/L	
Chloride	37.10	mg/L	48.20	mg/L	42.65	34.20	mg/L	36.20	mg/L	35.20	43.50	mg/L	51.70	mg/L	43.00	mg/L	46.07	155.00	mg/L	72.70	mg/L	113.8
Iron	< 0.03	mg/L	< 0.03	mg/L		< 0.03	mg/L	< 0.03	mg/L		< 0.015	mg/L	< 0.015	mg/L	< 0.03	mg/L		< 0.015	mg/L	< 0.015	mg/L	
Manganese	< 0.005	mg/L	< 0.005	mg/L		< 0.005	mg/L	< 0.005	mg/L		0.118	mg/L	< 0.005	mg/L	0.036	mg/L	0.077	< 0.005	mg/L	< 0.005	mg/L	
Sulfate		mg/L		mg/L			mg/L		mg/L			mg/L		mg/L		mg/L			mg/L		mg/L	
Alkalinity, Total*	266	mg/L	261	mg/L	264	214	mg/L	259	mg/L	237	279	mg/L	299	mg/L	295	mg/L	291.00	259	mg/L	240	mg/L	25
Calcium	73.70	mg/L	76.80	mg/L	75.25	62.70	mg/L	73.60	mg/L	68.15	82.20	mg/L	95.40	mg/L	82.90	mg/L	86.83	83.40	mg/L	105.00	mg/L	94.2
Magnesium	32.60	mg/L	34.40	mg/L	33.50	22.70	mg/L	30.00	mg/L	26.35	35.40	mg/L	38.40	mg/L	38.50	mg/L	37.43	29.60	mg/L	34.70	mg/L	32.1
Sodium	14.70	mg/L	15.30	mg/L	15.00	12.40	mg/L	12.20	mg/L	12.30	17.30	mg/L	17.90	mg/L	16.00	mg/L	17.07	26.70	mg/L	54.00	mg/L	40.3
Zinc	< 0.01	mg/L	< 0.01	mg/L		< 0.01	mg/L	< 0.01	mg/L		< 0.01	mg/L	< 0.01	mg/L	< 0.01	mg/L		< 0.01	mg/L	< 0.01	mg/L	
Hardness, Total	318	mg/L	333	mg/L	326	250	mg/L	307	mg/L	279	351	mg/L	396	mg/L	366	mg/L	371	330	mg/L	405	mg/L	36

	Well 9		Well 11		
	Result	Unit	Result	Unit	Blend
Copper	< 0.005	mg/L	< 0.005	mg/L	
Arsenic	< 0.5	µg/L	< 0.5	µg/L	
Chloride	63.60	mg/L	42.10	mg/L	52.85
Iron	< 0.015	mg/L	< 0.015	mg/L	
Manganese	< 0.005	mg/L	< 0.005	mg/L	
Sulfate		mg/L		mg/L	
Alkalinity, Total*	329	mg/L	338	mg/L	334
Calcium	97.90	mg/L	95.00	mg/L	96.45
Magnesium	43.00	mg/L	43.20	mg/L	43.10
Sodium	18.20	mg/L	14.70	mg/L	16.45
Zinc	< 0.01	mg/L	< 0.01	mg/L	
Hardness, Total	422	mg/L	415	mg/L	419

CD - 1

	Well 6		Well 7		Well 10		
	Result	Unit	Result	Unit	Result	Unit	Blend
	< 0.005	mg/L	< 0.01	mg/L	< 0.005	mg/L	
	< 0.5	µg/L	< 0.5	µg/L	1.95	µg/L	
	76.30	mg/L	124.00	mg/L	12.10	mg/L	70.80
	< 0.03	mg/L	< 0.015	mg/L	0.417	mg/L	
	0.026	mg/L	< 0.005	mg/L	0.006	mg/L	0.012
		mg/L		mg/L		mg/L	
	256	mg/L	262	mg/L	200	mg/L	239.33
	73.80	mg/L	85.40	mg/L	42.80	mg/L	67.33
	32.60	mg/L	36.60	mg/L	16.80	mg/L	28.67
	32.60	mg/L	56.30	mg/L	24.90	mg/L	37.93
	< 0.01	mg/L	< 0.01	mg/L	< 0.01	mg/L	0.01
	319	mg/L	364	mg/L	176	mg/L	286
					2.10	pCi/L	
					4.10	pCi/L	
					280.00	pCi/L	

Radium 226
Radium 228
Radon 222

CD - 2

	Well 12		Well 13		Well 14		
	Result	Unit	Result	Unit	Result	Unit	Blend
	< 0.01	mg/L	< 0.01	mg/L	< 0.005	mg/L	
	< 0.5	µg/L	< 0.5	µg/L	18.40	µg/L	
	14.00	mg/L	21.40	mg/L	< 3.00	mg/L	12.80
	< 0.015	mg/L	< 0.015	mg/L	0.63	mg/L	
	0.08	mg/L	0.01	mg/L	0.03	mg/L	0.041
		mg/L		mg/L		mg/L	
	323	mg/L	329	mg/L	289	mg/L	313.67
	83.30	mg/L	85.60	mg/L	78.60	mg/L	82.50
	40.00	mg/L	41.80	mg/L	28.60	mg/L	36.80
	8.42	mg/L	10.50	mg/L	8.16	mg/L	9.03
	< 0.01	mg/L	< 0.01	mg/L	< 0.01	mg/L	0.01
	373	mg/L	386	mg/L	314	mg/L	358
					2.70	pCi/L	
					4.50	pCi/L	
					274.00	pCi/L	

Radium 226
Radium 228
Radon 222

Well 14 is emergency run only. When pumped, it pumps to waste and not into the distribution system.

	MCL
Copper	1.3
Arsenic	10
Chloride	N/A
Iron	N/A
Manganese	N/A
Sulfate	N/A
Alkalinity, Total*	N/A
Calcium	N/A
Magnesium	N/A
Sodium	N/A
Zinc	N/A
Hardness, Total	N/A

* as CaCO3
< indicates below detection limit for the test method.

Averages System Wide

Chloride	51.65
Sulfate	
Alkalinity	276.35
Calcium	81.06
Magnesium	34.05
Sodium	21.19
Hardness	342.65
grains	20

Averages by Zone

	Normal	1HES	2HES
Chloride	64.11	21.76	
Sulfate			
Alkalinity	273.67	282.8	
Calcium	82.86	76.76	
Magnesium	34.65	32.62	
Sodium	25.72	10.34	
Hardness	349.58	326	
grains	20	19	

Alkalinity is a measure of the ability of a solution to neutralize acid without changing the pH. It both controls and maintains water pH. Carbonate **hardness** is measured in degrees (dKH), parts per million of calcium carbonate (ppm $CaCo_3$), or milliequivalents per liter (meq/L).

Unit Analogies

Parts per Million
1 inch in 16 miles
1 minute in 2 years
1 second in 11.5 days

Parts per Billion (µg/L)
1 second in 32 years
4 drops in 50,000 gallons
6 people to the population of the earth

Parts per Trillion
1/2 drop in 6 million gallons
1 square inch in 250 square miles
1 second in 32,000 years

Proposed As Consent Item

8b

SHAKOPEE PUBLIC UTILITIES COMMISSION

"Lighting the Way - Yesterday, Today and Beyond"

MEMORANDUM

TO: John R. Crooks, Utilities Manager

FROM: Lon R. Schemel, Water Superintendent

SUBJECT: Nitrate Results Update -- Advisory

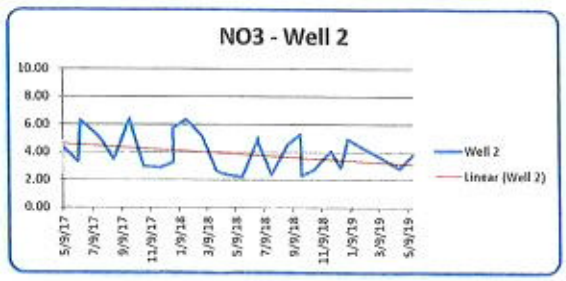
DATE: June 24, 2019

Attached are the latest nitrate test results for the wells. The analyses provided are for the prior 2 years of data collected with trend graphs.

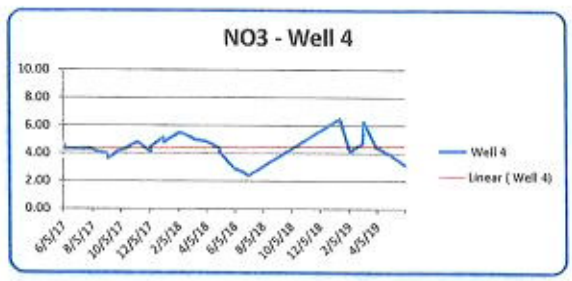
Post Office Box 470 ◆ 255 Sarazin Street ◆ Shakopee, Minnesota 55379-0470
(952) 445-1988 ◆ (952) 445-7767
www.shakopeeutilities.com

Shakopee Public Utilities Commission
Water Department
Nitrate Results
Reported in mg/L

Location	Sample Collected	Results Received	Results	Lab	Run Time
2	5/9/17	5/25/17	4.33	MVTL	168 hrs prior
2	6/8/17	6/28/17	3.30	MDH	168 hrs prior
2	6/8/17	7/27/17	3.40	MDH	
2	6/13/17	6/20/17	6.28	MVTL	192 hrs prior
2	7/25/17	8/1/17	5.00	MVTL	192 hrs prior
2	8/22/17	8/28/17	3.50	MVTL	168 hrs prior
2	9/26/17	10/4/17	6.42	MVTL	168 hrs prior
2	9/26/17	10/20/17	6.30	MDH	
2	10/24/17	11/17/17	3.00	MVTL	168 hrs prior
2	11/28/17	12/11/17	2.90	MVTL	168 hrs prior
2	12/26/17	1/9/18	3.28	MVTL	168 hrs prior
2	12/26/17	2/20/18	5.70	MDH	
2	1/23/18	2/20/18	6.32	MVTL	168 hrs prior
2	2/27/18	3/9/18	5.14	MVTL	168 hrs prior
2	3/27/18	5/31/18	2.70	MDH	
2	4/3/18	4/10/18	2.55	MVTL	168 hrs prior
2	4/24/18	5/9/18	2.37	MVTL	168 hrs prior
2	5/22/18	5/31/18	2.21	MVTL	168 hrs prior
2	5/22/18	6/14/18	2.20	MDH	
2	6/26/18	7/2/18	5.07	MVTL	312 hrs prior
2	6/26/18	8/17/18	4.70	MDH	
2	7/24/18	8/17/18	2.41	MVTL	264 hrs prior
2	8/28/18	10/15/18	4.57	MVTL	168 hrs prior
2	9/25/18	10/15/18	5.30	MVTL	168 hrs prior
2	9/26/18	10/15/18	2.30	MDH	
2	10/23/18	11/7/18	2.76	MVTL	168 hrs prior
2	11/27/18	12/5/18	4.12	MVTL	168 hrs prior
2	12/18/18	12/26/18	2.89	MVTL	168 hrs prior
2	12/18/18	1/14/19	2.90	MDH	
2	1/2/19	1/14/19	4.97	MVTL	168 hrs prior
2	4/23/19	5/1/19	2.84	MVTL	168 hrs prior
2	4/23/19	5/17/19	2.90	MDH	
2	5/21/19	5/29/19	3.83	MVTL	168 hrs prior



Location	Sample Collected	Results Received	Results	Lab	Run Time
4	6/5/17	7/27/17	4.60	MDH	
4	6/8/17	6/14/17	4.33	MVTL	168 hrs prior
4	7/5/17	7/20/17	4.35	MVTL	168 hrs prior
4	8/1/17	8/7/17	4.35	MVTL	168 hrs prior
4	8/14/17	10/20/17	4.10	MDH	
4	9/5/17	9/26/17	3.99	MVTL	168 hrs prior
4	9/5/17	9/26/17	3.60	MDH	
4	10/3/17	10/20/17	4.29	MVTL	168 hrs prior
4	10/3/17	11/17/17	4.20	MDH	
4	11/7/17	3/2/18	4.83	MVTL	168 hrs prior
4	12/5/17	12/22/17	4.12	MVTL	192 hrs prior
4	12/5/17	1/8/18	4.50	MDH	
4	1/2/18	1/16/18	5.15	MVTL	168 hrs prior
4	1/2/18	2/20/18	4.80	MDH	
4	2/6/18	2/20/18	5.50	MVTL	168 hrs prior
4	3/6/18	3/26/18	5.09	MVTL	168 hrs prior
4	3/6/18	3/26/18	5.00	MDH	
4	4/3/18	4/10/18	4.89	MVTL	168 hrs prior
4	5/1/18	5/9/18	4.40	MVTL	168 hrs prior
4	5/1/18	6/26/18	4.10	MDH	
4	6/5/18	6/14/18	2.80	MVTL	168 hrs prior
4	6/5/18	7/18/18	2.90	MDH	
4	7/3/18	11/19/18	2.40	MDH	168 hrs prior
4	1/15/19	1/29/19	5.50	MVTL	168 hrs prior
4	2/5/19	2/12/19	4.16	MVTL	168 hrs prior
4	3/5/19	3/14/19	4.76	MVTL	168 hrs prior
4	3/5/19	3/29/19	4.80	MDH	
4	3/7/19	3/25/19	6.30	MDH	168 hrs prior
4	4/2/19	4/11/19	4.48	MVTL	168 hrs prior
4	5/7/19	5/14/19	3.82	MVTL	168 hrs prior
4	6/4/19	6/21/19	3.14	MVTL	168 hrs prior

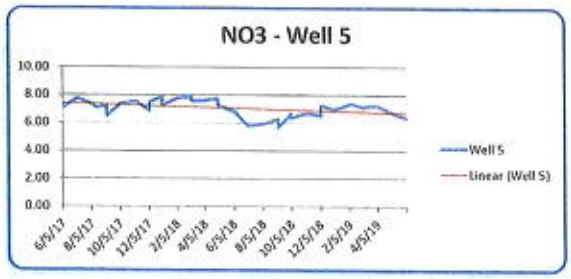


MVTL = Minnesota Valley Testing Laboratories
MDH = Minnesota Department of Health
TCWC = Twin City Water Clinic

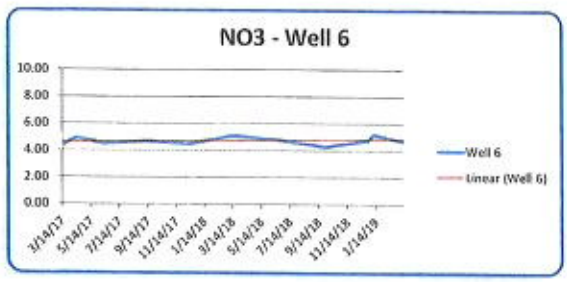
Run times will represent the well being in step 1 for one week (168 hrs)

Shakopee Public Utilities Commission
Water Department
Nitrate Results
Reported in mg/L

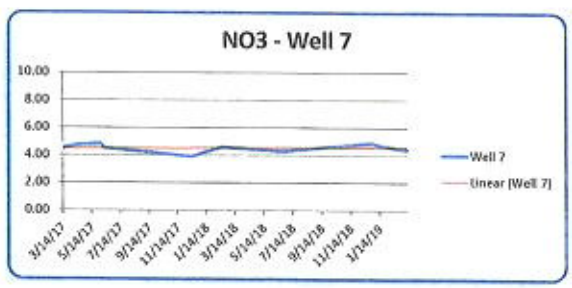
Location	Sample Collected	Results Received	Results	Lab	Run Time
5	6/5/17	7/27/17	7.40	MDH	
5	6/8/17	6/14/17	7.12	MVTL	168 hrs prior
5	7/5/17	7/20/17	7.74	MVTL	168 hrs prior
5	8/1/17	8/7/17	7.40	MVTL	168 hrs prior
5	8/14/17	10/20/17	7.10	MDH	
5	9/5/17	9/26/17	7.27	MVTL	168 hrs prior
5	9/5/17	9/26/17	6.50	MDH	
5	10/3/17	10/20/17	7.33	MVTL	168 hrs prior
5	10/3/17	11/17/17	7.40	MDH	
5	11/7/17	3/2/18	7.57	MVTL	168 hrs prior
5	12/5/17	12/22/17	6.89	MVTL	192 hrs prior
5	12/5/17	1/8/18	7.50	MDH	
5	1/2/18	1/16/18	7.88	MVTL	168 hrs prior
5	1/2/18	2/20/18	7.30	MDH	
5	2/6/18	2/20/18	7.80	MVTL	168 hrs prior
5	3/6/18	3/28/18	7.84	MVTL	168 hrs prior
5	3/6/18	3/26/18	7.60	MDH	
5	4/3/18	4/10/18	7.62	MVTL	168 hrs prior
5	5/1/18	5/9/18	7.75	MVTL	168 hrs prior
5	5/1/18	6/26/18	7.30	MDH	
5	6/5/18	6/14/18	6.83	MVTL	168 hrs prior
5	6/5/18	7/18/18	6.80	MDH	
5	7/3/18	11/19/18	5.80	MDH	
5	8/7/18	8/20/18	5.99	MVTL	168 hrs prior
5	9/4/18	10/15/18	6.32	MVTL	168 hrs prior
5	9/4/18	10/15/18	5.70	MDH	
5	10/2/18	10/15/18	6.67	MVTL	168 hrs prior
5	10/2/18	11/19/18	6.40	MDH	
5	11/6/18	11/19/18	6.74	MVTL	168 hrs prior
5	12/4/18	12/11/18	6.55	MVTL	168 hrs prior
5	12/4/18	12/26/18	7.30	MDH	
5	1/2/19	1/14/19	7.01	MVTL	168 hrs prior
5	1/2/19	3/4/19	7.00	MDH	
5	2/5/19	2/12/19	7.42	MVTL	168 hrs prior
5	3/5/19	3/14/19	7.16	MVTL	168 hrs prior
5	3/5/19	3/29/19	7.20	MDH	
5	4/2/19	4/11/19	7.29	MVTL	168 hrs prior
5	5/7/19	5/14/19	6.73	MVTL	168 hrs prior
5	6/4/19	6/21/19	6.38	MVTL	168 hrs prior



Location	Sample Collected	Results Received	Results	Lab	Run Time
6	3/14/17	4/24/17	4.40	MDH	168 hrs prior
6	4/11/17	4/17/17	4.94	MVTL	168 hrs prior
6	6/8/17	7/27/17	4.50	MDH	168 hrs prior
6	9/12/17	10/20/17	4.70	MDH	168 hrs prior
6	12/12/17	1/8/18	4.50	MDH	168 hrs prior
6	3/13/18	4/10/18	5.10	MDH	168 hrs prior
6	6/19/18	7/18/18	4.80	MDH	456 hrs prior
6	9/26/18	10/15/18	4.30	MDH	192 hrs prior
6	12/27/18	2/5/19	4.80	MDH	168 hrs prior
6	1/8/19	1/14/19	5.21	MVTL	168 hrs prior
6	3/12/19	3/29/19	4.70	MDH	168 hrs prior



Location	Sample Collected	Results Received	Results	Lab	Run Time
7	3/14/17	4/24/17	4.50	MDH	168 hrs prior
7	4/11/17	4/17/17	4.74	MVTL	168 hrs prior
7	6/1/17	7/27/17	4.80	MDH	168 hrs prior
7	6/8/17	7/27/17	4.50	MDH	168 hrs prior
7	9/12/17	10/3/17	4.20	MDH	168 hrs prior
7	12/12/17	1/8/18	3.90	MDH	168 hrs prior
7	2/13/18	3/26/18	4.60	MDH	168 hrs prior
7	6/19/18	7/18/18	4.30	MDH	456 hrs prior
7	9/18/18	10/15/18	4.60	MDH	216 hrs prior
7	12/27/18	2/5/19	4.90	MDH	168 hrs prior
7	1/8/19	1/14/19	4.78	MVTL	168 hrs prior
7	3/12/19	3/29/19	4.40	MDH	168 hrs prior

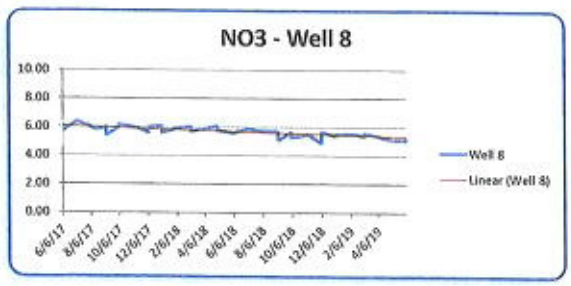


MVTL = Minnesota Valley Testing Laboratories
MDH = Minnesota Department of Health
TCHC = Twin City Water Clinic

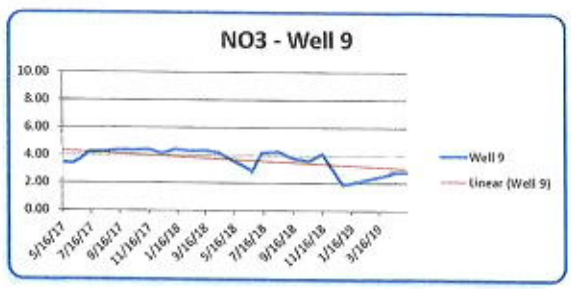
Run times will represent the well being in step 1 for one week (168 hrs)

Shakopee Public Utilities Commission
Water Department
Nitrate Results
Reported in mg/L

Location	Sample Collected	Results Received	Results	Lab	Run Time
8	6/6/17	6/14/17	5.71	MVTL	168 hrs prior
8	6/8/17	7/27/17	5.80	MDH	168 hrs prior
8	7/5/17	7/20/17	6.36	MVTL	144 hrs prior
8	8/1/17	8/7/17	6.03	MVTL	216 hrs prior
8	8/14/17	10/20/17	5.80	MDH	
8	9/5/17	9/26/17	5.98	MVTL	216 hrs prior
8	9/5/17	9/26/17	5.40	MDH	
8	10/3/17	10/20/17	6.00	MVTL	168 hrs prior
8	10/3/17	11/17/17	6.20	MDH	
8	11/7/17	3/2/18	5.97	MVTL	168 hrs prior
8	12/5/17	12/22/17	5.61	MVTL	192 hrs prior
8	12/5/17	1/8/18	6.00	MDH	
8	1/2/18	1/16/18	6.07	MVTL	168 hrs prior
8	1/2/18	2/20/18	5.60	MDH	
8	2/6/18	2/20/18	5.94	MVTL	168 hrs prior
8	3/6/18	3/26/18	6.03	MVTL	168 hrs prior
8	3/6/18	3/26/18	5.70	MDH	
8	4/3/18	4/10/18	5.88	MVTL	168 hrs prior
8	5/1/18	5/9/18	6.08	MVTL	168 hrs prior
8	5/1/18	6/26/18	5.80	MDH	
8	6/5/18	6/14/18	5.59	MVTL	168 hrs prior
8	6/5/18	7/18/18	5.60	MDH	
8	7/3/18	11/19/18	5.90	MDH	
8	8/7/18	8/20/18	5.72	MVTL	168 hrs prior
8	9/4/18	10/15/18	5.72	MVTL	168 hrs prior
8	9/4/18	10/15/18	5.10	MDH	
8	10/2/18	10/15/18	5.65	MVTL	168 hrs prior
8	10/2/18	11/19/18	5.30	MDH	
8	11/6/18	11/19/18	5.51	MVTL	168 hrs prior
8	12/4/18	12/11/18	4.89	MVTL	168 hrs prior
8	12/4/18	12/26/18	5.70	MDH	
8	1/2/19	1/14/19	5.41	MVTL	168 hrs prior
8	1/2/19	3/4/19	5.50	MDH	
8	2/5/19	2/12/19	5.58	MVTL	168 hrs prior
8	3/5/19	3/14/19	5.41	MVTL	168 hrs prior
8	3/5/19	3/29/19	5.60	MDH	
8	4/2/19	4/11/19	5.40	MVTL	168 hrs prior
8	5/7/19	5/14/19	5.13	MVTL	168 hrs prior
8	6/4/19	6/21/19	5.12	MVTL	168 hrs prior



Location	Sample Collected	Results Received	Results	Lab	Run Time
9	5/16/17	5/25/17	3.47	MVTL	168 hrs prior
9	6/5/17	6/28/17	3.40	MDH	168 hrs prior
9	6/20/17	6/27/17	3.69	MVTL	168 hrs prior
9	7/11/17	7/20/17	4.23	MVTL	144 hrs prior
9	8/8/17	8/14/17	4.27	MVTL	168 hrs prior
9	9/12/17	9/26/17	4.40	MVTL	132 hrs prior
9	10/10/17	10/20/17	4.38	MVTL	144 hrs prior
9	11/14/17	11/21/17	4.43	MVTL	168 hrs prior
9	12/12/17	12/22/17	4.14	MVTL	168 hrs prior
9	1/9/18	1/16/18	4.45	MVTL	168 hrs prior
9	2/13/18	2/20/18	4.33	MVTL	168 hrs prior
9	3/13/18	3/26/18	4.36	MVTL	168 hrs prior
9	4/10/18	4/18/18	4.23	MVTL	168 hrs prior
9	6/19/18	6/26/18	2.92	MVTL	98 hrs prior
9	6/19/18	7/18/18	2.80	MDH	
9	7/10/18	7/18/18	4.20	MVTL	240 hrs prior
9	8/14/18	8/20/18	4.29	MVTL	168 hrs prior
9	9/11/18	10/15/18	3.83	MVTL	168 hrs prior
9	10/16/18	11/7/18	3.61	MVTL	168 hrs prior
9	11/13/18	11/29/18	4.15	MVTL	168 hrs prior
9	12/27/18	1/14/19	1.87	MVTL	168 hrs prior
9	4/9/19	4/16/19	2.69	MVTL	168 hrs prior
9	4/9/19	5/1/19	2.80	MDH	
9	5/14/19	5/20/19	2.82	MVTL	168 hrs prior

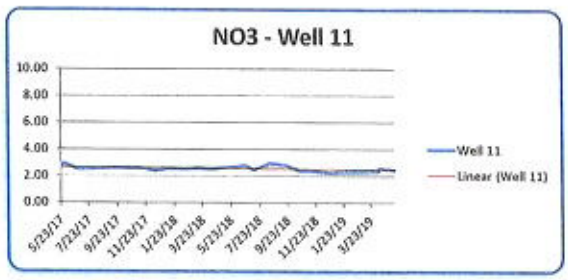


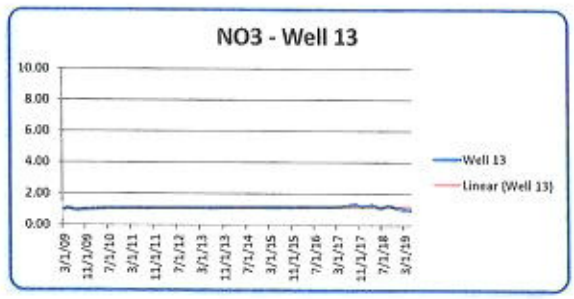
MVTL = Minnesota Valley Testing Laboratories
MDH = Minnesota Department of Health
TCWC = Twin City Water Clinic

Run times will represent the well being in step 1 for one week (168 hrs)

Shakopee Public Utilities Commission
Water Department
Nitrate Results
Reported in mg/L

Location	Sample Collected	Results Received		Results	Lab	Run Time
10	4/17/12	4/20/12	<	1.00	TCWC	158 hrs prior
10	1/21/14	1/29/14	<	1.00	TCWC	144 hrs prior
10	3/25/14	4/1/14		3.61	MVTL	96 hrs prior
10	4/23/14	5/7/14	<	0.20	MVTL	24 hrs prior
10	4/23/14	6/16/14	<	0.05	MDH	*
10	6/16/15	6/26/15	<	0.05	MVTL	144 hrs prior
10	4/11/17	4/17/17	<	0.05	MVTL	168 hrs prior
10	1/8/19	1/14/19	<	0.05	MVTL	168 hrs prior
11	5/23/17	5/30/17		2.83	MVTL	168 hrs prior
11	6/1/17	6/15/17		2.90	MDH	192 hrs prior
11	6/27/17	7/5/17		2.50	MVTL	168 hrs prior
11	7/11/17	7/20/17		2.50	MVTL	168 hrs prior
11	8/8/17	8/14/17		2.55	MVTL	168 hrs prior
11	9/12/17	9/26/17		2.62	MVTL	168 hrs prior
11	10/10/17	10/20/17		2.61	MVTL	144 hrs prior
11	11/14/17	11/21/17		2.57	MVTL	168 hrs prior
11	12/12/17	12/22/17		2.39	MVTL	168 hrs prior
11	1/9/18	1/16/18		2.57	MVTL	168 hrs prior
11	2/13/18	2/20/18		2.54	MVTL	168 hrs prior
11	3/13/18	3/26/18		2.59	MVTL	168 hrs prior
11	4/10/18	4/18/18		2.53	MVTL	168 hrs prior
11	6/22/18	7/18/18		2.80	MDH	24 hrs prior
11	7/10/18	7/18/18		2.48	MVTL	24 hrs prior
11	8/14/18	8/20/18		2.95	MVTL	168 hrs prior
11	9/18/18	10/15/18		2.83	MVTL	168 hrs prior
11	10/16/18	11/7/18		2.45	MVTL	168 hrs prior
11	11/13/18	11/20/18		2.41	MVTL	168 hrs prior
11	12/27/18	1/14/19		2.25	MVTL	168 hrs prior
11	1/8/19	1/14/19		2.31	MVTL	168 hrs prior
11	4/9/19	4/16/19		2.40	MVTL	168 hrs prior
11	4/9/19	5/1/19		2.60	MDH	
11	5/14/19	5/20/19		2.48	MVTL	168 hrs prior
12	4/11/17	4/17/17		0.92	MVTL	168 hrs prior
12	9/5/17	9/26/17		0.72	MVTL	168 hrs prior
12	12/5/17	12/22/17		0.72	MVTL	168 hrs prior
12	9/4/18	10/15/18		0.62	MVTL	168 hrs prior
12	12/4/18	12/11/18		0.58	MVTL	144 hrs prior
12	3/5/19	3/14/19		0.68	MVTL	168 hrs prior
12	5/28/19	6/6/19		0.53	MVTL	
13	3/12/09	3/26/09		0.96	MVTL	48 hrs prior
13	4/14/09	4/27/09		1.10	MVTL	60 hrs prior
13	8/4/09	8/12/09		0.90	MVTL	1013 hrs prior
13	9/24/09	10/5/09		0.98	MVTL	51 hrs prior
13	7/14/10	7/27/10		1.07	MVTL	42 hrs prior
13	3/11/11	3/16/11		1.08	MVTL	100 hrs prior
13	4/11/17	4/17/17		1.19	MVTL	48 hrs prior
13	9/5/17	9/26/17		1.35	MVTL	128 hrs prior
13	12/5/17	12/22/17		1.20	MVTL	168 hrs prior
13	3/6/18	3/26/18		1.32	MVTL	168 hrs prior
13	6/5/18	6/14/18		1.11	MVTL	24 hrs prior
13	9/4/18	10/15/18		1.28	MVTL	168 hrs prior
13	12/4/18	12/11/18		1.08	MVTL	168 hrs prior
13	3/5/19	3/14/19		0.98	MVTL	168 hrs prior
13	5/28/19	6/6/19		0.95	MVTL	168 hrs prior
14	4/23/14	6/16/14	<	0.05	MDH	*
14	4/11/17	4/17/17	<	0.05	MVTL	20 hrs prior
14	9/5/17	9/26/17	<	0.05	MVTL	24 hrs prior
14	12/5/17	12/22/17	<	0.05	MVTL	168 hrs prior
14	3/6/18	3/26/18	<	0.05	MVTL	168 hrs prior
14	6/5/18	6/14/18	<	0.05	MVTL	24 hrs prior



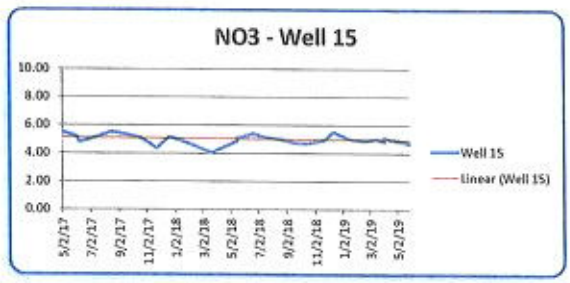


MVTL = Minnesota Valley Testing Laboratories
MDH = Minnesota Department of Health
TCWC = Twin City Water Clinic

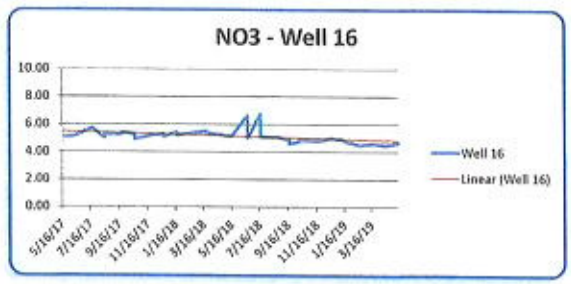
Run times will represent the well being in step 1 for one week (168 hrs)

Shakopee Public Utilities Commission
Water Department
Nitrate Results
Reported in mg/L

Location	Sample Collected	Results Received	Results	Lab	Run Time
15	5/2/17	5/10/17	5.50	MVTL	144 hrs prior
15	6/1/17	6/15/17	5.20	MDH	168 hrs prior
15	6/6/17	6/14/17	4.80	MVTL	168 hrs prior
15	7/18/17	7/24/17	5.20	MVTL	168 hrs prior
15	8/15/17	8/21/17	5.54	MVTL	168 hrs prior
15	9/19/17	9/26/17	5.32	MVTL	168 hrs prior
15	10/17/17	11/17/17	5.10	MVTL	168 hrs prior
15	11/21/17	12/11/17	4.36	MVTL	168 hrs prior
15	12/19/17	12/27/17	5.17	MVTL	192 hrs prior
15	1/16/18	2/20/18	4.88	MVTL	168 hrs prior
15	3/20/18	3/27/18	4.04	MVTL	168 hrs prior
15	5/15/18	5/31/18	4.88	MVTL	168 hrs prior
15	5/15/18	5/31/18	5.10	MDH	
15	6/19/18	6/26/18	5.40	MVTL	408 hrs prior
15	7/17/18	8/17/18	5.16	MVTL	120 hrs prior
15	8/21/18	10/15/18	5.02	MVTL	168 hrs prior
15	9/18/18	10/15/18	4.76	MVTL	168 hrs prior
15	10/16/18	11/7/18	4.74	MVTL	168 hrs prior
15	11/20/18	11/29/18	4.98	MVTL	168 hrs prior
15	12/11/18	12/21/18	5.54	MVTL	168 hrs prior
15	1/15/19	1/29/19	5.05	MVTL	168 hrs prior
15	2/19/19	3/4/19	4.91	MVTL	168 hrs prior
15	3/15/19	3/25/19	5.05	MVTL	168 hrs prior
15	4/2/19	4/11/19	4.87	MVTL	168 hrs prior
15	4/2/19	5/1/19	5.10	MDH	
15	5/7/19	5/14/19	4.89	MVTL	168 hrs prior
15	5/28/19	6/6/19	4.70	MVTL	168 hrs prior



Location	Sample Collected	Results Received	Results	Lab	Run Time
16	5/16/17	5/25/17	5.07	MVTL	168 hrs prior
16	6/8/17	7/27/17	5.10	MDH	168 hrs prior
16	7/18/17	7/24/17	5.72	MVTL	168 hrs prior
16	8/14/17	10/20/17	5.00	MDH	
16	8/15/17	8/21/17	5.28	MVTL	168 hrs prior
16	9/19/17	9/26/17	5.25	MVTL	168 hrs prior
16	9/19/17	10/20/17	5.40	MDH	
16	10/17/17	11/17/17	5.29	MVTL	168 hrs prior
16	10/17/17	3/9/18	4.90	MDH	
16	11/21/17	12/11/17	5.21	MVTL	168 hrs prior
16	12/19/17	12/27/17	5.29	MVTL	192 hrs prior
16	12/19/17	2/20/18	5.10	MDH	
16	1/16/18	2/20/18	5.44	MVTL	168 hrs prior
16	1/16/18	3/9/18	5.20	MDH	
16	3/20/18	3/27/18	5.53	MVTL	168 hrs prior
16	3/20/18	5/31/18	5.40	MDH	
16	5/15/18	5/31/18	5.14	MVTL	168 hrs prior
16	5/15/18	6/26/18	5.20	MDH	
16	6/19/18	6/26/18	6.65	MVTL	408 hrs prior
16	6/19/18	7/18/18	5.00	MDH	
16	7/17/18	8/17/18	6.76	MVTL	408 hrs prior
16	7/17/18	11/19/18	5.10	MDH	
16	9/18/18	10/15/18	4.67	MVTL	168 hrs prior
16	9/18/18	10/15/18	4.60	MDH	
16	10/9/18	10/15/18	4.79	MVTL	168 hrs prior
16	10/9/18	11/19/18	4.90	MDH	
16	8/21/18	10/15/18	5.09	MVTL	192 hrs prior
16	11/20/18	11/29/18	4.81	MVTL	168 hrs prior
16	12/18/18	12/26/18	5.06	MVTL	192 hrs prior
16	12/18/18	1/14/19	5.00	MDH	
16	1/15/19	1/29/19	4.90	MVTL	168 hrs prior
16	1/15/19	3/4/19	4.80	MDH	
16	2/19/19	3/4/19	4.51	MVTL	168 hrs prior
16	3/19/19	3/25/19	4.63	MVTL	168 hrs prior
16	3/19/19	4/4/19	4.60	MDH	
16	4/16/19	4/23/19	4.50	MVTL	168 hrs prior
16	5/14/19	5/20/19	4.68	MVTL	168 hrs prior

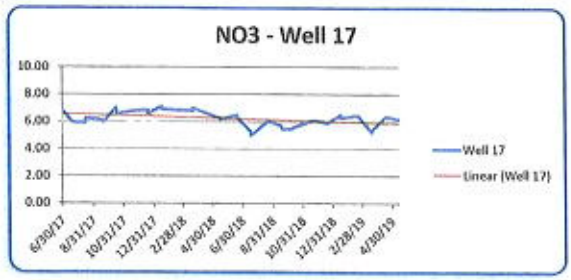


MVTL = Minnesota Valley Testing Laboratories
MDH = Minnesota Department of Health
TCWC = Twin City Water Clinic

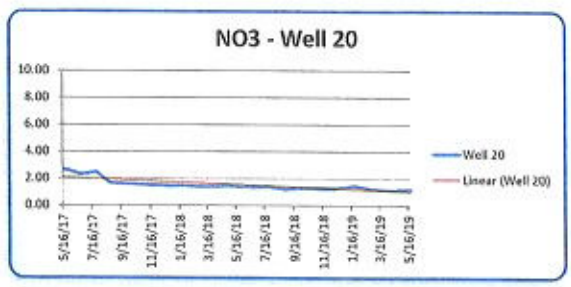
Run times will represent the well being in step 1 for one week (168 hrs)

Shakopee Public Utilities Commission
Water Department
Nitrate Results
Reported in mg/L

Location	Sample Collected	Results Received	Results	Lab	Run Time
17	6/30/17	7/27/17	6.80	MDH	168 hrs prior
17	7/18/17	7/24/17	5.97	MVTL	168 hrs prior
17	8/14/17	10/20/17	5.90	MDH	
17	8/15/17	8/21/17	6.27	MVTL	168 hrs prior
17	9/19/17	9/26/17	6.13	MVTL	168 hrs prior
17	9/19/17	10/20/17	6.00	MDH	
17	10/17/17	11/17/17	7.06	MVTL	168 hrs prior
17	10/17/17	3/9/18	6.60	MDH	
17	11/21/17	12/11/17	6.79	MVTL	168 hrs prior
17	12/19/17	12/27/17	6.85	MVTL	192 hrs prior
17	12/19/17	2/20/18	6.60	MDH	
17	1/16/18	2/20/18	7.12	MVTL	168 hrs prior
17	1/16/18	3/9/18	6.90	MDH	
17	3/20/18	5/31/18	6.80	MDH	
17	3/20/18	3/27/18	7.00	MVTL	168 hrs prior
17	5/15/18	5/31/18	6.27	MVTL	168 hrs prior
17	5/15/18	6/26/18	6.20	MDH	
17	6/19/18	6/26/18	6.52	MVTL	408 hrs prior
17	6/19/18	7/18/18	6.30	MDH	
17	7/17/18	8/17/18	5.30	MVTL	408 hrs prior
17	7/17/18	11/19/18	5.00	MDH	
17	8/21/18	10/15/18	6.10	MVTL	168 hrs prior
17	9/18/18	10/15/18	5.70	MVTL	168 hrs prior
17	9/18/18	10/15/18	5.50	MDH	
17	10/9/18	10/15/18	5.50	MVTL	168 hrs prior
17	10/9/18	11/19/18	5.60	MDH	
17	11/20/18	11/29/18	6.13	MVTL	168 hrs prior
17	12/18/18	12/26/18	5.97	MVTL	168 hrs prior
17	12/18/18	1/14/19	5.90	MDH	
17	1/15/19	1/29/19	6.56	MVTL	168 hrs prior
17	1/15/19	3/4/19	6.30	MDH	
17	2/19/19	3/4/19	6.49	MVTL	168 hrs prior
17	3/19/19	3/25/19	5.25	MVTL	168 hrs prior
17	3/19/19	4/4/19	5.40	MDH	
17	4/16/19	4/23/19	6.40	MVTL	168 hrs prior
17	5/14/19	5/20/19	6.19	MVTL	168 hrs prior



Location	Sample Collected	Results Received	Results	Lab	Run Time
20	5/16/17	5/25/17	2.68	MVTL	168 hrs prior
20	6/5/17	6/28/17	2.50	MDH	144 hrs prior
20	6/20/17	6/27/17	2.30	MVTL	168 hrs prior
20	7/25/17	8/1/17	2.49	MVTL	144 hrs prior
20	8/22/17	8/28/17	1.67	MVTL	192 hrs prior
20	9/26/17	10/4/17	1.61	MVTL	168 hrs prior
20	10/24/17	11/17/17	1.56	MVTL	168 hrs prior
20	11/28/17	12/11/17	1.51	MVTL	168 hrs prior
20	12/26/17	1/9/18	1.46	MVTL	168 hrs prior
20	1/23/18	2/20/18	1.51	MVTL	168 hrs prior
20	2/27/18	3/9/18	1.41	MVTL	168 hrs prior
20	3/27/18	4/10/18	1.43	MVTL	168 hrs prior
20	4/24/18	5/9/18	1.49	MVTL	168 hrs prior
20	5/22/18	5/31/18	1.42	MVTL	168 hrs prior
20	5/22/18	6/14/18	1.40	MDH	
20	6/26/18	7/2/18	1.39	MVTL	72 hrs prior
20	7/24/18	8/17/18	1.42	MVTL	576 hrs prior
20	8/28/18	10/15/18	1.24	MVTL	192 hrs prior
20	9/25/18	10/15/18	1.30	MVTL	168 hrs prior
20	10/23/18	11/7/18	1.30	MVTL	216 hrs prior
20	12/11/18	12/21/18	1.29	MVTL	168 hrs prior
20	1/22/19	2/5/19	1.49	MVTL	168 hrs prior
20	2/26/19	3/6/19	1.25	MVTL	168 hrs prior
20	3/26/19	4/1/19	1.18	MVTL	168 hrs prior
20	4/23/19	5/1/19	1.15	MVTL	168 hrs prior
20	4/23/19	5/17/19	1.20	MDH	
20	5/21/19	5/29/19	1.21	MVTL	168 hrs prior

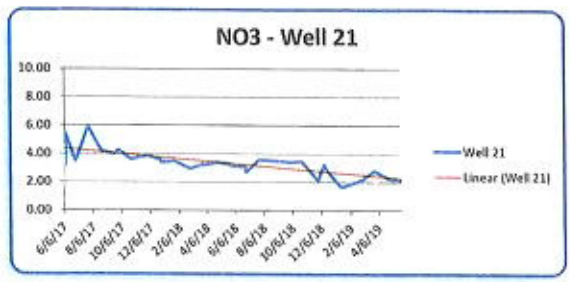


MVTL = Minnesota Valley Testing Laboratories
MDH = Minnesota Department of Health
TCWC = Twin City Water Clinic

Run times will represent the well being in step 1 for one week (168 hrs)

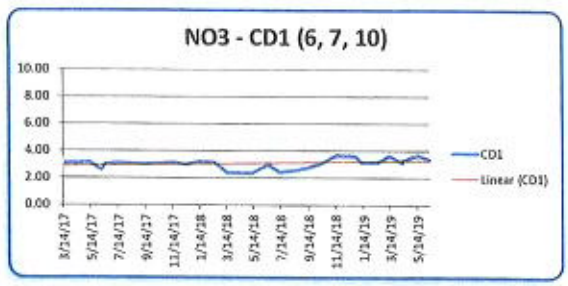
Shakopee Public Utilities Commission
Water Department
Nitrate Results
Reported in mg/L

Location	Sample Collected	Results Received	Results	Lab	Run Time
21	6/6/17	6/28/17	3.20	MDH	144 hrs prior
21	6/6/17	7/27/17	5.50	MDH	
21	6/27/17	7/5/17	3.48	MVTL	168 hrs prior
21	7/25/17	8/1/17	5.90	MVTL	144 hrs prior
21	8/22/17	8/28/17	4.18	MVTL	192 hrs prior
21	9/19/17	10/20/17	4.00	MDH	
21	9/26/17	10/4/17	4.29	MVTL	168 hrs prior
21	10/24/17	11/17/17	3.61	MVTL	168 hrs prior
21	11/28/17	12/11/17	3.90	MVTL	168 hrs prior
21	12/26/17	1/9/18	3.58	MVTL	168 hrs prior
21	12/26/17	2/20/18	3.40	MDH	
21	1/23/18	2/20/18	3.49	MVTL	168 hrs prior
21	2/27/18	3/9/18	2.95	MVTL	168 hrs prior
21	3/27/18	4/10/18	3.28	MVTL	168 hrs prior
21	3/27/18	5/31/18	3.20	MDH	
21	4/24/18	5/9/18	3.40	MVTL	168 hrs prior
21	5/22/18	5/31/18	3.30	MVTL	168 hrs prior
21	5/22/18	6/14/18	3.20	MDH	
21	6/26/18	7/2/18	3.07	MVTL	240 hrs prior
21	6/26/18	8/17/18	2.70	MDH	
21	7/24/18	8/17/18	3.60	MVTL	576 hrs prior
21	8/28/18	10/15/18	3.64	MVTL	168 hrs prior
21	9/25/18	10/15/18	3.45	MVTL	216 hrs prior
21	9/26/18	10/15/18	3.40	MDH	
21	10/23/18	11/7/18	3.49	MVTL	168 hrs prior
21	11/27/18	12/5/18	2.13	MVTL	192 hrs prior
21	12/11/18	12/21/18	3.28	MVTL	168 hrs prior
21	12/11/18	1/14/19	3.10	MDH	
21	1/15/19	1/29/19	1.65	MVTL	168 hrs prior
21	2/26/19	3/6/19	2.13	MVTL	168 hrs prior
21	3/26/19	4/1/19	2.82	MVTL	168 hrs prior
21	4/23/19	5/1/19	2.31	MVTL	168 hrs prior
21	4/23/19	5/17/19	2.30	MDH	
21	5/21/19	5/29/19	2.12	MVTL	168 hrs prior



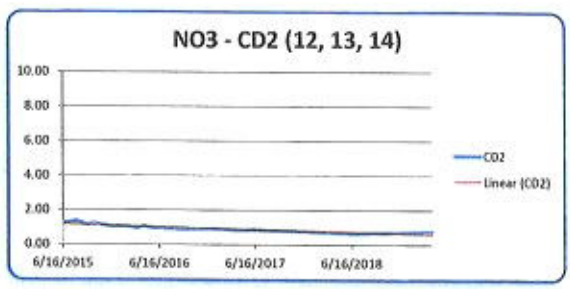
Combined Discharge - Wells 6-7-10

CD 1	3/14/17	3/23/17	3.11	MVTL	168 hrs prior
CD 1	4/11/17	4/17/17	3.11	MVTL	120 hrs prior
CD 1	5/9/17	5/25/17	3.19	MVTL	212 hrs prior
CD 1	6/5/17	6/28/17	2.60	MDH	168 hrs prior
CD 1	6/13/17	6/20/17	3.03	MVTL	168 hrs prior
CD 1	7/11/17	7/20/17	3.12	MVTL	168 hrs prior
CD 1	8/8/17	8/14/17	3.08	MVTL	168 hrs prior
CD 1	9/12/17	9/26/17	3.03	MVTL	168 hrs prior
CD 1	10/10/17	10/20/17	3.09	MVTL	168 hrs prior
CD 1	11/14/17	11/21/17	3.16	MVTL	168 hrs prior
CD 1	12/12/17	12/22/17	3.00	MVTL	168 hrs prior
CD 1	1/9/18	1/16/18	3.23	MVTL	168 hrs prior
CD 1	2/13/18	2/20/18	3.18	MVTL	168 hrs prior
CD 1	3/13/18	3/26/18	2.42	MVTL	168 hrs prior
CD 1	5/8/18	5/31/18	2.36	MVTL	168 hrs prior
CD 1	6/19/18	6/26/18	3.05	MVTL	168 hrs prior
CD 1	6/19/18	7/18/18	2.90	MDH	
CD 1	7/10/18	7/18/18	2.46	MVTL	240 hrs prior
CD 1	8/14/18	8/20/18	2.59	MVTL	168 hrs prior
CD 1	9/11/18	10/15/18	2.78	MVTL	168 hrs prior
CD 1	10/9/18	10/15/18	3.06	MVTL	168 hrs prior
CD 1	11/13/18	11/29/18	3.68	MVTL	168 hrs prior
CD 1	12/27/18	1/14/19	3.63	MVTL	168 hrs prior
CD 1	1/8/19	1/14/19	3.19	MVTL	168 hrs prior
CD 1	2/12/19	2/22/19	3.16	MVTL	168 hrs prior
CD 1	3/12/19	3/18/19	3.67	MVTL	168 hrs prior
CD 1	4/9/19	4/16/19	3.13	MVTL	168 hrs prior
CD 1	4/9/19	5/1/19	3.30	MDH	
CD 1	5/14/19	5/20/19	3.69	MVTL	168 hrs prior
CD 1	6/11/19	6/21/19	3.37	MVTL	168 hrs prior



Combined Discharge - Wells 12-13-14

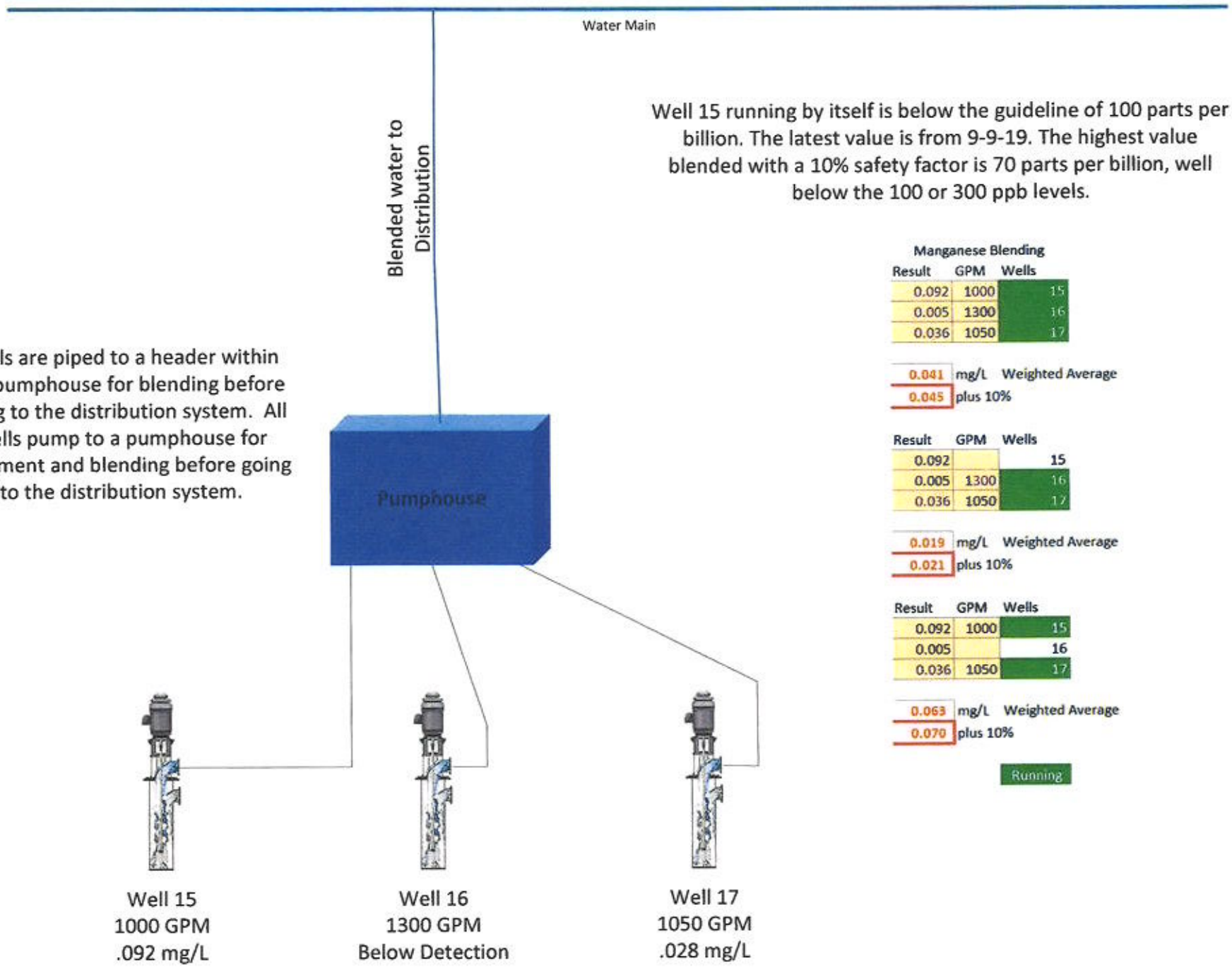
CD 2	6/16/2015	6/25/2015	1.26	MVTL	126 hrs prior
CD 2	8/4/2015	8/10/2015	1.35	MVTL	168 hrs prior
CD 2	9/15/2015	9/22/2015	1.15	MVTL	144 hrs prior
CD 2	10/6/2015	10/14/2015	1.25	MVTL	208 hrs prior
CD 2	12/22/2015	12/30/2015	1.03	MVTL	168 hrs prior
CD 2	1/5/2016	1/13/2016	1.08	MVTL	192 hrs prior
CD 2	2/23/2016	2/29/2016	1.03	MVTL	208 hrs prior
CD 2	3/22/2016	3/28/2016	0.96	MVTL	288 hrs prior
CD 2	4/12/2016	4/19/2016	1.07	MVTL	120 hrs prior
CD 2	5/10/2016	5/16/2016	0.98	MVTL	165 hrs prior
CD 2	5/10/2016	6/2/2016	0.97	MDH	
CD 2	7/12/2016	7/18/2016	0.93	MVTL	170 hrs prior
CD 2	10/11/2016	10/17/2016	0.87	MVTL	168 hrs prior
CD 2	11/8/2016	11/17/2016	0.91	MVTL	168 hrs prior
CD 2	1/10/2017	1/20/2017	0.92	MVTL	216 hrs prior
CD 2	4/11/2017	4/17/2017	0.85	MVTL	144 hrs prior
CD 2	6/8/2017	6/28/2017	0.86	MDH	144 hrs prior
CD 2	6/22/2018	7/18/2018	0.67	MDH	528 hrs prior
CD 2	4/16/2019	5/1/2019	0.78	MDH	165 hrs prior



MVTL = Minnesota Valley Testing Laboratories
MDH = Minnesota Department of Health
TCHC = Twin City Water Clinic

Run times will represent the well being in step 1 for one week (168 hrs)

Wellfield Manganese Levels



Wells are piped to a header within the pumphouse for blending before going to the distribution system. All wells pump to a pumphouse for treatment and blending before going to the distribution system.

Well 15 running by itself is below the guideline of 100 parts per billion. The latest value is from 9-9-19. The highest value blended with a 10% safety factor is 70 parts per billion, well below the 100 or 300 ppb levels.

Manganese Blending

Result	GPM	Wells
0.092	1000	15
0.005	1300	16
0.036	1050	17

0.041 mg/L Weighted Average
0.045 plus 10%

Result	GPM	Wells
0.092		15
0.005	1300	16
0.036	1050	17

0.019 mg/L Weighted Average
0.021 plus 10%

Result	GPM	Wells
0.092	1000	15
0.005		16
0.036	1050	17

0.063 mg/L Weighted Average
0.070 plus 10%

Running

Appendix B

AUAR Water Use Projections

SEH

Building a Better World for All of Us®

MEMORANDUM

TO: Shakopee Public Utilities

FROM: Chad T. Katzenberger

DATE: August 19, 2019

RE: Jackson Township AUAR – Water System Demand Projections
SEH No. SHPUC 140940 14.00

BACKGROUND

This memo provides an estimate of projected water use for the land area to be developed in the identified AUAR Study area. Land use projections and study area information was provided by the City of Shakopee and SRF Consulting Group in August of 2019. Additional, per capita water use figures developed as part of SPUC's 2018 Compressive water plan were utilized for residential water use projections. The land use areas contained in the AUAR are broken down into seven sub-districts and represent anticipated development through the year 2040. The demand projections presented in this memo represent the expected Average Daily and Maximum Daily municipal water demand potential for the AUAR study area.

PROPOSED LAND USE & DEMAND PROJETIONS

A breakdown of projected land use for the AUAR study area was provided by the City of Shakopee, included in attachment A. This information includes land use development characteristics, developable acreage and other applicable information such as commercial building square footage. This information was then applied to the water use projection calculations provided in Attachment B.

PROJECTED WATER SYSTEM DEMAND

Results of the land used base water demand projections are presented in Attachment B. The time at which this expected development occurs will be strongly dependent on market forces. These water use projections are based on anticipated land use and help to understand the total ultimate water system needs, independent of time. Assuming total build out of the AUAR study area, the study area has a projected **Average Daily Demand** of **1.2 MGD** (Million Gallons per Day) and a **Maximum Daily Demand** of **3.4 MGD**

SUMMARY

The information documented above provides for a reasonable estimate of future water system demands. These demands can be updated further as additional development information is available.

ctk
Attachment
c: Miles Jensen, SEH
s:\pt\s\shpuc\140940\4-prelim-dsgn-rpts_reports_2019 comp water plan update\auar water use\m-2019 auar water use esimate.docx

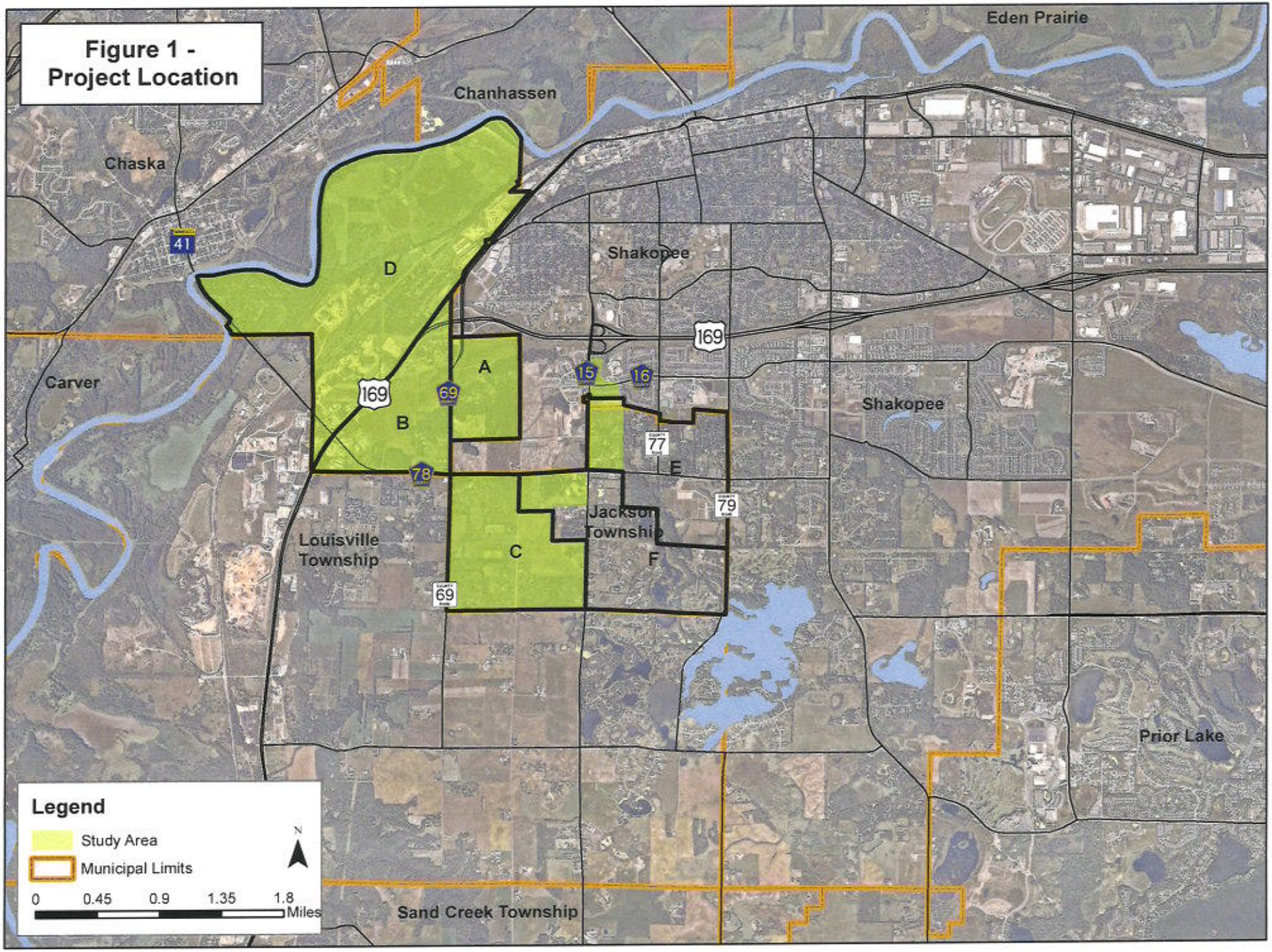


Figure 1 -
Project Location
Eden Prairie
Chanhassen
Chaska
Shakopee
Carver
Shakopee
Louisville
Township
Jackson
Township
Prior Lake
Sand Creek Township
A
B
C
D
E
F
41
169
69
15
16
77
78
79
Legend
Study Area
Municipal Limits
N
0
0.45
0.9
1.35
1.8
Miles

Attachment A
Jackson Township AUAR Development Area

Sub Area	2040 Land Use	Acres	Res. Units (EA)	N'Hood Retail (SF)	HWY Retail (SF)	Office (SF)	W-house (SF)	Mfg. (SF)
A	Mixed Residential	22	91	81,991				
A	Mixed Use Center	38			594,646	84,091		
A	Mixed Use Employment Center	25	31		41,706	159,240	90,994	90,994
A	Suburban Edge Residential	0						
A	Suburban Residential	67	161					
B	Mixed Residential	47	165	219,195				
B	Mixed Use Center	45			691,370	97,769		
B	Mixed Use Employment Center	214	257		350,955	1,340,008	765,719	765,719
B	Suburban Edge Residential	0						
B	Suburban Residential	0						
C	Mixed Residential	18	64	83486				
C	Mixed Use Center	0						
C	Mixed Use Employment Center	0						
C	Suburban Edge Residential	300	120					
C	Suburban Residential	166	266					
D	Mixed Residential	0						
D	Mixed Use Center	34			523,795	74,072		
D	Mixed Use Employment Center	247			212,672	1,353,369	1,082,695	1,082,695
D	Suburban Edge Residential	0						
D	Suburban Residential	57	230					
E	Mixed Residential	3	11	15007				
E	Mixed Use Center	0						
E	Mixed Use Employment Center	0						
E	Suburban Edge Residential	14	6					
E	Suburban Residential	48	96					
F	Mixed Residential	0						
F	Mixed Use Center	0						
F	Mixed Use Employment Center	0						
F	Suburban Edge Residential	0						
F	Suburban Residential	0						
G	Mixed Residential	0						
G	Mixed Use Center	10	156		112,122			
G	Mixed Use Employment Center	0						
G	Suburban Edge Residential	0						
G	Suburban Residential	10	28					

Data provided by the City of Shakopee 8/6/2019

Attachment B
Future Water Supply Needs - AUAR Area

Sub Area	2040 Land Use	Acres	Res. Units (EA)	N'Hood Retail (SF)	HWY Retail (SF)	Office (SF)	W-house (SF)	Mfg. (SF)	Avg. Day Demand (gpd)
A	Mixed Residential	22	91	81,991					**31,827**
A	Mixed Use Center	38			594,646	84,091			**62,421**
A	Mixed Use Employment Center	25	31		41,706	159,240	90,994	90,994	**37,821**
A	Suburban Residential	67	161						**43,277**
B	Mixed Residential	47	165	219,195					**64,044**
B	Mixed Use Center	45			691,370	97,769			**72,574**
B	Mixed Use Employment Center	214	257		350,955	1,340,008	765,719	765,719	**317,227**
C	Mixed Residential	18	64	83486					**24,703**
C	Suburban Edge Residential	300	120						**32,256**
C	Suburban Residential	166	266						**71,501**
D	Mixed Use Center	34			523,795	74,072			**54,984**
D	Mixed Use Employment Center	247			212,672	1,353,369	1,082,695	1,082,695	**267,452**
D	Suburban Residential	57	230						**61,824**
E	Mixed Residential	3	11	15007					**4,305**
E	Suburban Edge Residential	14	6						**1,613**
E	Suburban Residential	48	96						**25,805**
G	Mixed Use Center	10	156		112,122				**52,005**
G	Suburban Residential	10	28						**7,526**
		Totals	**1,682**	**399,679**	**2,527,266**	**3,108,549**	**1,939,408**	**1,939,408**	**1,230,000**
								***Maximum Day Demand (2.77 Multiplier)**	**3,410,000**

Demand Assumptions		
**Persons per housing unit	3.2	persons
*Residential per capita AD water use	84	gpc/d
Retail water Use	0.090	gpd/sf
Office Water Use	0.107	gpd/sf
Warehouse	0.039	gpd/sf
Manufacturing	0.056	gpd/sf

*Based on SPUC 2012 Historical Data (dry year)

**Figure provided by City of Shakopee

Non-Residential Water Use Figures Estimated from Met Council SAC City Determination Worksheet

Appendix C

Water Supply and Storage Calculations

Table C-2
Supply Capacity into Normal Zone

Well Name	Pressure Zone	Unique Well Number	Normal Operational Capacity (gpm)	Allowed Pumping Time per Day (Hours)	Daily Capacity (MGD)
Well No.2	Normal	206803	300	24	0.43
Well No.3	Normal	205978	Emergency		
Well No.4	Normal	206854	716	24	1.03
Well No.5	Normal	206855	850	24	1.22
Well No.6	Normal	180922	1,175	24	1.69
Well No.7	Normal	415975	1,100	24	1.58
Well No.8	Normal	500657	1,100	24	1.58
Well No.9	Normal	554214	1,050	24	1.51
Well No.10	Normal	578948	1,125	24	1.62
Well No.11	Normal	611084	1,000	24	1.44
Well No.15	Normal	694921	1,150	24	1.66
Well No.16	Normal	731139	1,450	24	2.09
Well No.17	Normal	731140	1,400	24	2.02
		Total	**12,416**	**--**	**17.88**
				Highest Yielding Well (Well No. 16)	**2.09**
				Firm Capacity (Minus Well No. 16)	**15.79**

Table Notes:

Source: City Records

Table C-1
Pumping Capacity & Storage Analysis for Entire System

	Design Demand Year		
Pumping Capacity Analysis	2020	2030	2040
Maximum Day Demand (mgd)[1]	19.6	22.6	25.0
Average Day Demand	7.1	8.1	9.0
	20.3	20.3	20.3
Recommended Storage Volume			
Maximum Day Equalization Volume (gallons)[4]	2,940,000	3,390,000	3,750,000
Fire Protection Volume (gallons)[5]	630,000	630,000	630,000
Reserve Volume (1/2 of Average Day)	3,542,000	4,075,000	4,516,000
Recommended Total Volume (gallons)	*7,112,000*	*8,095,000*	*8,896,000*
Existing Storage & Pumping Volume			
Surplus Firm Pump Volume (gallons)[7]	90,000	(280,000)	(590,000)
Tank 1	1,000,000	1,000,000	1,000,000
Tank 2	250,000	250,000	250,000
Tank 3	1,500,000	1,500,000	1,500,000
Tank 4	500,000	500,000	500,000
Tank 5	2,000,000	2,000,000	2,000,000
Tank 6	2,000,000	2,000,000	2,000,000
Tank 7	2,000,000	2,000,000	2,000,000
Total Existing Volume Available (gallons)	*9,250,000*	*9,250,000*	*9,250,000*
Water Storage Mass Balance	2,138,000	1,155,000	354,000
Additional Storage Recommended (gallons)	**None**	**None**	**None**

1. Additional firm pumping capacity may be recommended if the maximum day demand exceeds the existing firm pumping capacity.
2. Maximum Day Equalization Volume is the projected maximum volume depletion during the peak hours of the maximum day assuming the pumping rate into the service zone is equal to the maximum day demand rate. Typical residential dirunal curves were assumed with a peaking factor of 1.65.
3. Fire Protection storage was calcuated based on one fire of 3,500 gpm for 3 hours.
4. Reserve Volume is recommended to provide supply in event of a power outage
5. Surplus Firm Pump Volume is the difference between maximum day demand and Firm Pumping Capacity which is available to supplement fire protection for 3 hours.

S:\PT\S\shpuc\140940\4-prelim-dsgn-rpts_Reports_2019 Comp Water Plan Update\[2019 Supply & Storag.xlsx]C-1 TStorage

Table C-3
Supply & Storage Analysis for Main Zone Dependencies

	Design Demand Year		
Pumping Capacity Analysis	2020	2030	2040
Maximum Day Demand (mgd)[1]	13.86	14.87	15.60
Average Day Demand (mgd)	5.00	5.37	5.63
Existing Firm Supply Capacity (mgd)[2]	15.79	15.79	15.79
Firm Supply and/or Interzone Transfer Capacity Mass Balance (mgd)[3]	**1.93**	**0.92**	**0.19**
Recommended Storage Volume			
Maximum Day Equalization Volume (gallons)[4]	2,080,000	2,230,000	2,340,000
Reserve Storage (1/2 AD)	2,502,000	2,685,000	2,816,000
Fire Protection Volume (gallons)[5]	630,000	630,000	630,000
Preliminary Recommended Total Volume (gallons)	*5,212,000*	*5,545,000*	*5,786,000*
Existing Storage & Pumping Volume			
Surplus Firm Pump Volume (gallons)[7]	240,000	110,000	20,000
Tank 1	1,000,000	1,000,000	1,000,000
Tank 2	250,000	250,000	250,000
Tank 3	1,500,000	1,500,000	1,500,000
Tank 5	2,000,000	2,000,000	2,000,000
Tank 6	2,000,000	2,000,000	2,000,000
Total Existing Volume Available (gallons)	*6,750,000*	*6,750,000*	*6,750,000*
Storage or Pumping Volume Mass Balance (gallons)[3]	**1,538,000**	**1,205,000**	**964,000**
Additional Storage Recommended (gallons)	**None**	**None**	**None**

1. Includes Normal Zone and East Zone
2. See Table 5-1
3. A positive value represents a surplus. A negative valve represents a deficiency.
4. Maximum Day Equalization Volume is the projected maximum volume depletion during the peak hours of the maximum day assuming the pumping rate into the service zone is equal to the maximum day demand rate. Typical residential diurnal curves were assumed with a peaking factor of 1.65.
5. Fire Protection storage was calculated based on one fire of 3,500 gpm for 3 hours.
6. Surplus Firm Pump Volume is the difference between maximum day demand and Firm Pumping Capacity which is available to supplement fire protection for 3 hours.

S:\PT\S\shpuc\140940\4-prelim-dsgn-rpts_Reports_2019 Comp Water Plan Update\[2019 Supply & Storag.xlsx]C-3 MStg

Table C-4

Supply Capacity into First High Zone

Well/Supply Name	Unique Well Number	Normal Operational Capacity (gpm)	Allowed Pumping Time per Day (Hours)	Daily Capacity (MGD)
Well No.12	626775	810	24	1.17
Well No.13	674456	1,036	24	1.49
Well No.14	694904	381	24	0.55
Well No.20	722624	1,142	24	1.64
Well No.21	722625	1,175	24	1.69
	Total	**4,544**	**--**	**6.54**
			Highest Yielding Well (Well No. 21)	**1.69**
			Firm Capacity (Minus Well No. 21)	**4.85**

Table Notes:

Source: City Records

Table C-5
Supply & Storage Analysis for 1st High Zone Dependencies

	Design Demand Year		
Pumping Capacity Analysis	2020	2030	2040
Maximum Day Demand (mgd)[1]	4.67	5.29	5.79
Average Day Demand (mgd)	1.69	1.91	2.09
Existing Firm Supply Capacity (mgd)[2]	4.85	4.85	4.85
Firm Supply and/or Interzone Transfer Capacity Mass Balance (mgd)[3]	**0.18**	**-0.43**	**-0.93**
Recommended Storage Volume			
Maximum Day Equalization Volume (gallons)[4]	700,000	790,000	870,000
Reserve Storage (1/2 AD)	843,000	954,000	1,044,000
Fire Protection Volume (gallons)[5]	630,000	630,000	630,000
Recommended Total Volume (gallons)	*2,153,000*	*2,374,000*	*2,544,000*
Existing Storage & Pumping Volume			
Surplus Firm Pump Volume (gallons)[6]	20,000	(50,000)	(120,000)
Tank 4	500,000	500,000	500,000
Tank 7	2,000,000	2,000,000	2,000,000
Total Existing Volume Available (gallons)	*2,500,000*	*2,500,000*	*2,500,000*
Storage or Pumping Volume Mass Balance (gallons)[3]	**347,000**	**126,000**	**-44,000**

1. Includes First High and both Second High Zones.
2. See Table 5-1.
3. A positive value represents a surplus. A negative valve represents a deficiency.
4. Maximum Day Equalization Volume is the projected maximum volume depletion during the peak hours of the maximum day assuming the pumping rate into the service zone is equal to the maximum day demand rate. Typical residential diurnal curves were assumed with a peaking factor of 1.65.
5. Fire Protection storage was calculated based on one fire of 3,500 gpm for 3 hours.
6. Surplus Firm Pump Volume is the difference between maximum day demand and Firm Pumping Capacity which is available to supplement fire protection for 3 hours.

S:\PT\S\shpuc\140940\4-prelim-dsgn-rpts_Reports_2019 Comp Water Plan Update\[2019 Supply & Storag.xlsx]C-5 1stHStg

Table C-6

Pumping Capacity into 2nd High Central Zone

Pump Name	Normal Operational Capacity (gpm)	Daily Capacity (MGD)
Valley Creek 1	1,000	1.44
Valley Creek 2	1,000	1.44
Total	**2,000**	**2.88**
	Largest Pump	**1.44**
	Firm Capacity (Largest Pump)	**1.44**

Table Notes: Shakopee does not have any water treatment.

Source: City Records

Table C-7
Supply & Storage Analysis for 2nd High Central Zone

	Design Demand Year		
Pumping Capacity Analysis	2020	2030	2040
Maximum Day Demand (mgd)[1]	0.25	0.38	0.50
Average Day Demand (mgd)	0.09	0.14	0.18
Existing Firm Supply Capacity (mgd)[2]	1.44	1.44	1.44
Firm Supply and/or Interzone Transfer Capacity Mass Balance (mgd)[3]	**1.19**	**1.06**	**0.94**
Recommended Storage Volume			
Maximum Day Equalization Volume (gallons)[4]	40,000	60,000	70,000
Reserve Storage (1/2 AD)	44,000	68,000	90,000
Fire Protection Volume (gallons)[5]	300,000	300,000	300,000
Recommended Total Volume (gallons)	*234,000*	*298,000*	*340,000*
Existing Storage & Pumping Volume			
Surplus Firm Pump Volume (gallons)[6]	150,000	130,000	120,000
No Storage			
Total Existing Volume Available (gallons)	*0*	*0*	*0*
Storage or Pumping Volume Mass Balance (gallons)[3]	**-234,000**	**-298,000**	**-340,000**

1. See Table 4-6
2. See Table 5-1.
3. A positive value represents a surplus. A negative valve represents a deficiency.
4. Maximum Day Equalization Volume is the projected maximum volume depletion during the peak hours of the maximum day assuming the pumping rate into the service zone is equal to the maximum day demand rate. Typical residential diurnal curves were assumed with a peaking factor of 1.65.
5. Fire Protection storage was calculated based on one fire of 2,500 gpm for 2 hours.
6. Surplus Firm Pump Volume is the difference between maximum day demand and Firm Pumping Capacity which is available to supplement fire protection for 3 hours.

S:\PT\S\shpuc\140940\4-prelim-dsgn-rpts_Reports_2019 Comp Water Plan Update\[2019 Supply & Storag.xlsx]C-7 2ndHCStg

Table C-8

Pumping Capacity into 2nd High West Zone

Pump Name	Normal Operational Capacity (gpm)	Daily Capacity (MGD)
Windermere 1	1,000	1.44
Windermere 2	1,000	1.44
Total	**2,000**	**2.88**
	Largest Pump	**1.44**
	Firm Capacity (Largest Pump)	**1.44**

Table Notes:

Source: City Records

Table C-9
Supply & Storage Analysis for 2nd High West Zone

	Design Demand Year		
Pumping Capacity Analysis	2020	2030	2040
Maximum Day Demand (mgd)[1]	0.75	1.85	2.87
Average Day Demand (mgd)	0.27	0.67	1.03
Existing Firm Supply Capacity (mgd)[2]	1.44	1.44	4.32
Firm Supply and/or Interzone Transfer Capacity Mass Balance (mgd)[3]	**0.69**	**-0.41**	**1.45**
Recommended Storage Volume			
Maximum Day Equalization Volume (gallons)[4]	110,000	280,000	430,000
Reserve Storage (1/2 AD)	134,000	334,000	517,000
Fire Protection Volume (gallons)[5]	300,000	300,000	300,000
Recommended Total Volume (gallons)	*454,000*	*914,000*	*1,065,000*
Existing Storage & Pumping Volume			
Surplus Firm Pump Volume (gallons)[6]	90,000	(51,000)	182,000
No Storage			
Total Existing Volume Available (gallons)	*0*	*0*	*0*
Storage or Pumping Volume Mass Balance (gallons)[3]	**-454,000**	**-914,000**	**-1,065,000**

1. See Table 4-6
2. Assumes addition of booster stations and supply wells
3. A positive value represents a surplus. A negative valve represents a deficiency.
4. Maximum Day Equalization Volume is the projected maximum volume depletion during the peak hours of the maximum day assuming the pumping rate into the service zone is equal to the maximum day demand rate. Typical residential diurnal curves were assumed with a peaking factor of 1.65.
5. Fire Protection storage was calculated based on one fire of 2,500 gpm for 2 hours.
6. Surplus Firm Pump Volume is the difference between maximum day demand and Firm Pumping Capacity which is available to supplement fire protection for 3 hours.

S:\PT\S\shpuc\140940\4-prelim-dsgn-rpts_Reports_2019 Comp Water Plan Update\[2019 Supply & Storag.xlsx]C-9 2ndHWStg

Table C-10
Supply & Storage Analysis for 2nd High West + Central Zones

	Design Demand Year		
Pumping Capacity Analysis	2020	2030	2040
Maximum Day Demand (mgd)[1]	0.99	2.23	3.36
Average Day Demand (mgd)	0.36	0.80	1.21
Existing Firm Supply Capacity (mgd)[2]	1.44	2.88	5.76
Firm Supply and/or Interzone Transfer Capacity Mass Balance (mgd)[3]	**0.45**	**0.65**	**2.40**
Recommended Storage Volume			
Maximum Day Equalization Volume (gallons)[4]	150,000	330,000	500,000
Reserve Storage (1/2 AD)	179,000	402,000	607,000
Fire Protection Volume (gallons)[5]	300,000	240,000	240,000
Recommended Total Volume (gallons)	*569,000*	*891,000*	*1,048,000*
Existing Storage & Pumping Volume			
Surplus Firm Pump Volume (gallons)[6] No Storage	60,000	81,000	299,000
Total Existing Volume Available (gallons)	*0*	*0*	*0*
Storage or Pumping Volume Mass Balance (gallons)[3]	**-569,000**	**-891,000**	**-1,048,000**

1. See Table 4-6
2. Assumes addition of booster stations and supply wells
3. A positive value represents a surplus. A negative valve represents a deficiency.
4. Maximum Day Equalization Volume is the projected maximum volume depletion during the peak hours of the maximum day assuming the pumping rate into the service zone is equal to the maximum day demand rate. Typical residential diurnal curves were assumed with a peaking factor of 1.65.
5. Fire Protection storage was calculated based on one fire of 2,500 gpm for 2 hours.
6. Surplus Firm Pump Volume is the difference between maximum day demand and Firm Pumping Capacity which is available to supplement fire protection for 3 hours.

S:\PT\S\shpuc\140940\4-prelim-dsgn-rpts_Reports_2019 Comp Water Plan Update\[2019 Supply & Storag.xlsx]C-10 2ndH W+C Stg

Table C-11

Pumping Capacity into East Zone

Pump Name	Normal Operational Capacity (gpm)	Daily Capacity (MGD)
River View 1	1,000	1.44
River View 2	1,000	1.44
Total	**2,000**	**2.88**
	Largest Pump	**1.44**
	Firm Capacity (Largest Pump)	**1.44**

Table Notes:

Source: City Records

Table C-12
Supply & Storage Analysis for East Zone

	Design Demand Year		
Pumping Capacity Analysis	2020	2030	2040
Maximum Day Demand (mgd)[1]	0.22	0.30	0.37
Existing Firm Supply Capacity (mgd)[2]	1.44	1.44	1.44
Firm Supply and/or Interzone Transfer Capacity Mass Balance (mgd)[3]	**1.22**	**1.14**	**1.07**
Recommended Storage Volume			
Maximum Day Equalization Volume (gallons)[4]	30,000	50,000	60,000
Fire Protection Volume (gallons)[5]	180,000	180,000	180,000
Recommended Total Volume (gallons)	*60,000*	*90,000*	*110,000*
Existing Storage & Pumping Volume			
Surplus Firm Pump Volume (gallons)[7] No Storage	150,000	140,000	130,000
Total Existing Volume Available (gallons)	*150,000*	*140,000*	*130,000*
Storage or Pumping Volume Mass Balance (gallons)[3]	**90,000**	**50,000**	**20,000**

1. See Table 4-6
2. One pump offline
3. A positive value represents a surplus. A negative valve represents a deficiency.
4. Maximum Day Equalization Volume is the projected maximum volume depletion during the peak hours of the maximum day assuming the pumping rate into the service zone is equal to the maximum day demand rate. Typical residential diurnal curves were assumed with a peaking factor of 1.65.
5. Fire Protection storage was calculated based on one fire of 1,500 gpm for 2 hours.
6. Surplus Firm Pump Volume is the difference between maximum day demand and Firm Pumping Capacity which is available to supplement fire protection for 3 hours.

S:\PT\S\shpuc\140940\4-prelim-dsgn-rpts_Reports_2019 Comp Water Plan Update\[2019 Supply & Storag.xlsx]C-12 2ndHeastStg

Building a Better World for All of Us®

Sustainable buildings, sound infrastructure, safe transportation systems, clean water, renewable energy and a balanced environment. Building a Better World for All of Us communicates a companywide commitment to act in the best interests of our clients and the world around us.

We're confident in our ability to balance these requirements.

SEH

9b

SHAKOPEE PUBLIC UTILITIES

"Lighting the Way – Yesterday, Today and Beyond"

October 17, 2019

TO: John Crooks, Utilities Manager

FROM: Greg Drent, Electric Superintendent

Subject: MMUA MN Rodeo 2019 Update and Results

MMUA held its third annual Minnesota Lineworkers Rodeo on Tuesday October 15, 2019 in Marshall, MN. Eight SPU employees participated in the rodeo. Mike Enright, Justin Rotert, Jamie VonBank, and Matt Griebel participated in the Journeyman events. SPU apprentices were represented by Matt Kahle, Tyler Hanson, Tyler O'Brien and Grant Friendshuh.

The Minnesota Lineworkers Rodeo is different from the APPA rodeo as all the events are individual. There are no team events. The climbers competed in three different events: Obstacle Course, Hurt Man Rescue and Single Phase Conductor Tie In. Awards are given in each event and an overall champion. Shakopee Public Utilities results are as follows:

Journeyman Events

Hurtman Rescue
Mike Enright 1st

Obstacle Course
Jamie VonBank 4th

Single Phase Tie In
Mike Enright 1st
Jamie VonBank 5th

Overall
Jamie VonBank 2nd

Apprentice Events

Hurtman Rescue
Tyler Hanson 2nd
Matt Kahle 3rd
Tyler O'Brien 4th

Obstacle Course
Tyler Hanson 1st
Matt Kahle 5th

Single Phase Tie In
Tyler Hanson 2st
Matt Kahle 3rd

Overall
Tyler Hanson 2nd
Matt Kahle 3nd
Tyler O'Brien 5th

Awards are given to the top three competitors in each event. SPU received ten awards for being in the top three. We wanted to thank Mr. Crooks and the Commissioners for the opportunity to represent SPU at the rodeo events throughout the year.

Post Office Box 470 • 255 Sarazin Street • Shakopee, Minnesota 55379-0470
(952) 445-1988 • Fax (952) 445-7767 • www.spucweb.com

Reliable Public Power Provider

10a

SHAKOPEE PUBLIC UTILITIES

"Lighting the Way – Yesterday, Today and Beyond"

October 15, 2019

TO: John Crooks, Utilities Manager

FROM: Renee Schmid, Director of Finance and Administration

SUBJECT: 2020 Wage and Compensation Planning Assumptions

The Compensation Sub-Committee met on 2020 Wages and Compensation Planning. Sub-Committee members included Commissioner Meyer, and Commissioner Amundson. Staff members included Utilities Manager, John Crooks and Finance and Administration Director, Renee Schmid.

The following amounts are proposed for the 2020 Operating Budget and Wages.

1. A provision for increase in wage ranges of 3.0% at a cost of $139,188.

2. Include a provision of $96,982 or 2.1% of base pay in the 2020 Operating Budget for wage increases to cover adjustments for movements within ranges.

3. Include a provision of $108,192 or 1.3% of base pay in the 2020 Operating Budget to fill three authorized position previously left unfilled. The following positions are included in this provision:

   - Water Operator Apprentice as of 4/1/2020 at a cost of $41,568 (annualized cost of $55,424)
   - Engineering Technician as of 3/2/20 at a cost of $57,070 (annualized cost of $68,484)
   - Engineering Summer Help at a cost of $9,554

4. Include a provision of $64,301 or 1.4% of base pay in the 2020 Operating Budget to fund competitive pay market adjustments in the electric department. Beginning in 2017 and into 2019, wages for electric lineman positions have been increasing at nearby utilities, including electric cooperatives, investor owned utilities, and municipal utilities. SPU has experienced staff attrition as well as some aggressive recruitment activities by such utilities. Staff spent time reviewing salary survey data from a number of sources and is recommending some adjustments in wages ranges within the electric department to remain competitive. Staff also reviewed how SPU ranked for journeyman top of range wages at Chaska, Elk River, North St. Paul, Brainerd, and Moorhead. SPU was at the #1 position in 2017 and had fallen to #4 by 2019.

5. It should be noted that this operating budget proposal leaves three positions unfilled from fully authorized staffing levels for a total of $77,639 or 1.5% of the total base pay budget. The following positions are planned to remain unfilled in 2020:

   - Engineering Coordinator

- Summer Help – Electric
- Summer Help – Water

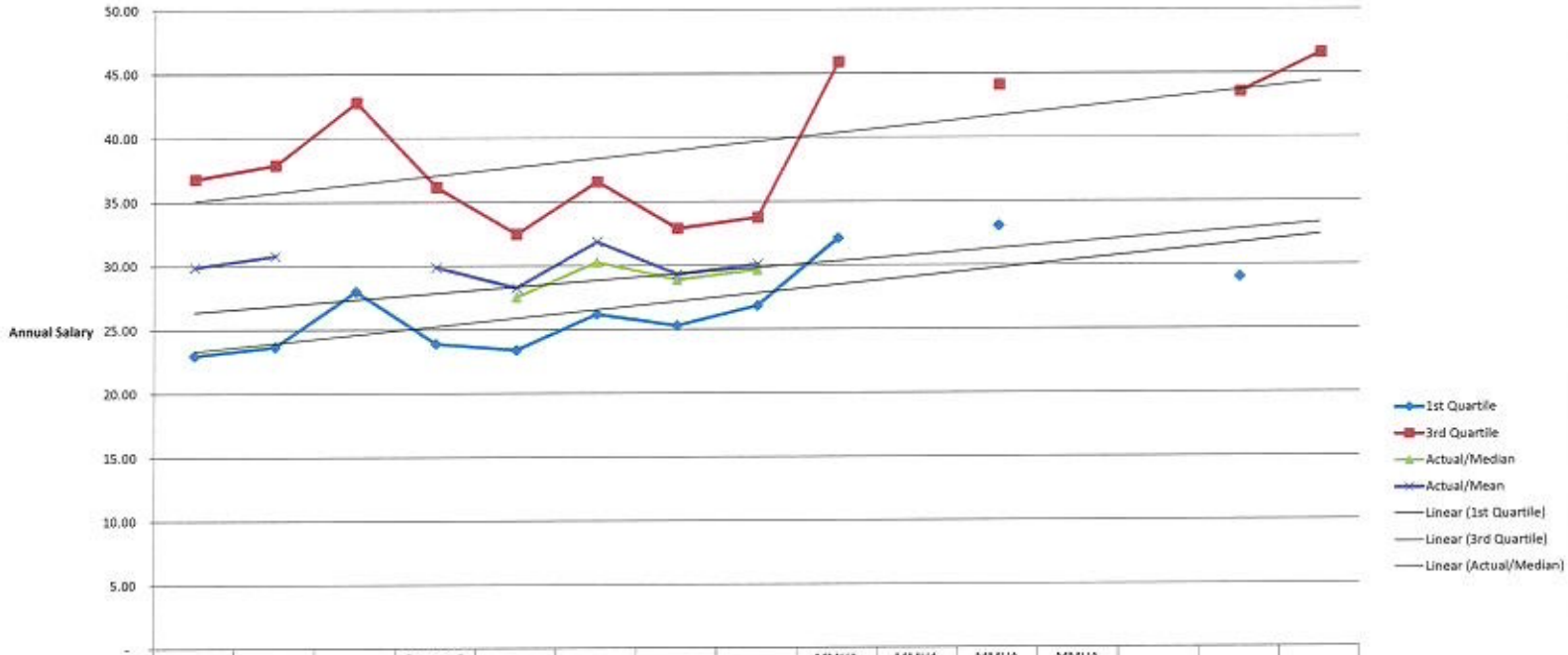
Conclusion:

On October 15th, 2019 a consensus by the Compensation Sub-committee was reached on all the above figures. The Compensation Committee recommends adoption of the 2020 Wage and Compensation Planning Assumptions as outlined above.

Requested Commission Action:

- Approve 2020 Wage and Compensation Planning Assumptions and adopt Resolution #1252, a resolution regulating wage ranges.

Wage Survey Trend - Lineman Apprentice



	SPU 2019 Range Minimum / Maximum	SPU 2020 Range Minimum / Maximum with 3% increase	SPU 2020 Range Minimum / Maximum with Mkt Increase Adjust	Proposed 2020 Revised Range Minimum / Maximum with 80%/121% of Mean	APPA May 2019 National	APPA May 2019 Revenue $50m - $100m	APPA May 2019 Customers 10,000 - 20,000	APPA May 2019 North Central >$15m Revenue	MMUA 2019 Salary Survey - Revenue $40.4 - range of employee pay Elk River	MMUA 2019 Salary Survey - Revenue $56.9 - range of employee pay Owatonna	MMUA 2019 Salary Survey - Revenue $51.1 - range of employee pay Moorhead	MMUA 2019 Salary Survey - Revenue $158.6 - range of employee pay Rochester	MVEC 2019	Chaska 2019	Chaska 2020 - Estimated at 1.7%
	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice	Lineman-Apprentice
1st Quartile	22.98	23.67	27.99	23.90	23.40	26.19	25.28	26.84	32.13		33.07			29.02	
3rd Quartile	36.79	37.89	42.77	36.15	32.46	36.56	32.87	33.73	45.90		44.09			43.53	46.58
Actual/Median					27.54	30.26	28.86	29.65							
Actual/Mean	29.89	30.78		29.88	28.26	31.86	29.30	30.08							

Survey Source

RESOLUTION #1252

RESOLUTION REGULATING WAGE RANGES

BE IT RESOLVED BY THE SHAKOPEE PUBLIC UTILITIES COMMISSION in meeting duly assembled on October 21, 2019, that the Shakopee Public Utilities Commission does hereby amend Resolution #1212 and affirm wage ranges in accordance with the rates in "Appendix A" to this Resolution.

BE IT FURTHER RESOLVED that said wage ranges are to become effective from and after January 1st, 2020 as applicable.

BE IT FURTHER RESOLVED, that all things necessary to carry out the terms and purpose of this Resolution are hereby authorized and performed.

Passed in regular session of the Shakopee Public Utilities Commission, this 21st day of October, 2019.

Commission President: Terrance Joos

ATTEST:

Commission Secretary: John R. Crooks

RESOLUTION #1252

RESOLUTION REGULATING WAGE RANGES

BE IT RESOLVED BY THE SHAKOPEE PUBLIC UTILITIES COMMISSION in meeting duly assembled on October 21, 2019, that the Shakopee Public Utilities Commission does hereby amend Resolution #1212 and affirm wage ranges in accordance with the rates in "Appendix A" to this Resolution.

BE IT FURTHER RESOLVED that said wage ranges are to become effective from and after January 1st, 2020 as applicable.

BE IT FURTHER RESOLVED, that all things necessary to carry out the terms and purpose of this Resolution are hereby authorized and performed.

Passed in regular session of the Shakopee Public Utilities Commission, this 21st day of October, 2019.

_____

Commission President: Terrance Joos

ATTEST:

_____

Commission Secretary: John R. Crooks

11a

SHAKOPEE PUBLIC UTILITIES

"Lighting the Way – Yesterday, Today and Beyond"

October 15, 2019

TO: John Crooks

CC: Joe Adams
Sherri Anderson
Greg Drent
Lon Schemel
Sharon Walsh
Kelley Willemssen

FROM: Renee Schmid, Director of Finance and Administration

SUBJECT: Financial Results for September, 2019

The following Financial Statements are attached for your review and approval.

Month to Date & Year to Date Financial Results – September, 2019

- Combined Statement of Revenue & Expense and Net Assets – Electric, Water and Total Utility
- Electric Operating Revenue & Expense Detail
- Water Operating Revenue & Expense Detail

Key items to note:

Month to Date Results – September, 2019

- Total Utility Operating Revenues for the month of September totaled $5.6 million and were unfavorable to budget by $0.8 million or 13.1%. Electric revenues were unfavorable to budget by $670k or 11.9% driven by lower than plan energy sales in all revenue groups. Water revenues were also unfavorable to budget by $170k or 21.4% due to lower than plan sales in all revenue groups. To date, 2019 has delivered one of the highest recorded annual amounts of precipitation which is impacting sales revenues.
- Total operating expenses were $4.3 million and were favorable to budget by $217k or 4.8%. Purchased power costs which totaled $3.3 million and were $42k or 1.3% lower than budget for the month. Total Operating Expense for electric including purchased power totaled $3.9 million and was favorable to budget by $157k or 3.8% due to lower than plan purchased power costs of $42k, lower than plan operation and maintenance expenses of $18k, lower than plan energy conservation expense of $14k, and lower than plan administrative and general expense of $86k due to timing of expenses. Total Operating Expense for Water totaled $357k and was favorable to budget by $60k or 14.3% due to lower than plan operation and maintenance expense of $26k, and lower than plan administrative general and depreciation expenses of $33k.

- Total Utility Operating Income was $1.3 million and was $624k unfavorable to budget due to lower than plan operating revenues of $840k and was partially offset by lower than plan operating expenses of $217k.
- Total Utility Non-Operating Revenue was $144k and was favorable to budget by $78k driven by higher than plan investment income of $66k, and higher than plan rental and miscellaneous income of $11k.
- Capital Contributions for the month of September totaled $97k and were unfavorable to budget by $163k due to lower than plan collection of water connection fees of $150k, lower than plan collection of trunk water fees of $30k, and were partially offset by higher than plan paid in capital and meter fees of $17k.
- Transfers to the City of Shakopee totaled $210k and were very slightly lower than budget for the month by 0.1%.
- Change in Net Position was $1.3 million and was unfavorable to budget by $0.7 million primarily due to lower than plan operating income of $624k, lower than plan capital contributions of $163k, that was partially offset by higher than plan non-operating revenues of $78k.
- Electric usage billed to customers in September was 41,036,980 kWh, a decrease of 3.5% from August usage billed at 42,526,699 kWh.
- Water usage billed to customers in September was 197.9 million gallons, an increase of 2.8% from August usage billed at 192.5 million gallons.

Year to Date Financial Results – September, 2019

- Total Utility Operating Revenue year to date September was $41.9 million and was unfavorable to budget by $1.8 million or 4.2%. Electric operating revenues totaled $38.1 million and were unfavorable to budget by $1.5 million or 3.9% driven by lower than plan energy sales in the residential and industrial groups and lower than plan power cost adjustment revenues in all revenue groups due to lower than plan purchased power costs per kWh. Average cost of purchased power per kWh year to date is 1.2% lower than plan at 7.691 cents/kwh versus planned costs of 7.783 cents/kwh. Water operating revenues totaled $3.8 million and were unfavorable to budget by $307k or 7.4% driven by lower than plan sales volumes in all revenue groups. Record levels of precipitation in 2019 are resulting in lower water consumption by our customers.
- Total Utility Operating Expenses year to date September were $37.0 million and were favorable to budget by $2.2 million or 5.7% primarily due to lower than plan purchased power costs of $1.2 million due to lower sales and lower costs/kwh, timing of expenditures in energy conservation of $122k, administrative and general expense of $647k of which $309k is in outside services for projects and employee benefits expense of $268k due to timing, operations and maintenance expense in electric and water of $230k due to timing, and depreciation expense of $7k. Total Operating Expense for electric including purchased power was $33.5 million and was favorable to budget by $2.0 million or 5.5%. Total Operating Expense for Water was $3.5 million and was also favorable to budget by $0.3 million or 7.3%.
- Total Utility Operating Income was $4.9 million and was favorable to budget by $0.4 million driven by lower than plan operating expenses of $2.2 million and partially offset by lower than planned operating revenues of $1.8 million.

- Total Utility Non-Operating Income was $1.6 million and was favorable to budget by $0.8 million due to higher than planned investment income of $0.7 million, higher than plan rental and miscellaneous income of $29k, a $78k net gain on the sale of electric vehicles and equipment, and lower than plan interest expense on customer deposits of $8k.
- YTD Capital Contributions were $4.0 million and are favorable to budget by $1.7 million due to collection of water connection fees of $1.6 million.
- Municipal contributions to the City of Shakopee totaled $1.9 million year to date and are lower than plan by $3k or 0.2%. The actual estimated payment throughout the year is based on prior year results and will be trued up at the end of the year.
- YTD Change in Net Position is $8.6 million and is favorable to budget by $2.9 million reflecting higher than plan net operating income, higher than plan capital contributions, and higher than plan non-operating revenues.

SHAKOPEE PUBLIC UTILITIES

MONTH TO DATE FINANCIAL RESULTS

SEPTEMBER 2019

SHAKOPEE PUBLIC UTILITIES
"Lighting the Way – Yesterday, Today and Beyond"

SHAKOPEE PUBLIC UTILITIES
COMBINED STATEMENT OF REVENUES, EXPENSES AND CHANGES IN FUND NET POSITION

	Month to Date Actual - September 2019			Month to Date Budget - September 2019			Electric		Water		Total Utility	
							MTD Actual v. Budget B/(W)		MTD Actual v. Budget B/(W)		MTD Actual v. Budget B/(W)	
	Electric	Water	Total Utility	Electric	Water	Total Utility	$	%	$	%	$	%
OPERATING REVENUES	$ 4,971,100	627,197	5,598,297	5,641,235	797,495	6,438,730	(670,135)	-11.9%	(170,298)	-21.4%	(840,433)	-13.1%
OPERATING EXPENSES						-						
Operation, Customer and Administrative	3,734,663	219,879	3,954,543	3,895,159	275,375	4,170,534	160,495	4.1%	55,496	20.2%	215,991	5.2%
Depreciation	206,071	136,914	342,985	202,651	141,094	343,745	(3,420)	-1.7%	4,180	3.0%	760	0.2%
Amortization of Plant Acquisition	-	-	-	-	-	-	-	0.0%	-	-	-	0.0%
Total Operating Expenses	3,940,734	356,793	4,297,527	4,097,810	416,469	4,514,279	157,076	3.8%	59,676	14.3%	216,752	4.8%
Operating Income	1,030,366	270,404	1,300,770	1,543,425	381,026	1,924,451	(513,059)	-33.2%	(110,622)	-29.0%	(623,681)	-32.4%
NON-OPERATING REVENUE (EXPENSE)												
Rental and Miscellaneous	29,053	1,254	30,306	16,968	2,105	19,073	12,085	71.2%	(851)	-40.4%	11,233	58.9%
Interdepartment Rent from Water	7,500	-	7,500	7,500		7,500	-	0.0%	-	-	-	0.0%
Investment Income	72,056	39,294	111,350	26,983	18,126	45,109	45,073	167.0%	21,167	116.8%	66,241	146.8%
Interest Expense	(5,324)	(203)	(5,527)	(6,327)	(162)	(6,489)	1,003	15.9%	(42)	-25.7%	962	14.8%
Amortization of Debt Issuance Costs and Loss on Refunding	-	-	-	-	-	-	-	#DIV/0!	-	-	-	#DIV/0!
Gain/(Loss) on the Disposition of Property	-	-	-	-	-	-	-	-	-	-	-	0.0%
Total Non-Operating Revenue (Expense)	103,285	40,344	143,629	45,124	20,070	65,193	58,161	128.9%	20,275	101.0%	78,436	120.3%
Income Before Contributions and Transfers	1,133,651	310,748	1,444,399	1,588,549	401,096	1,989,644	(454,898)	-28.6%	(90,347)	-22.5%	(545,245)	-27.4%
CAPITAL CONTRIBUTIONS	10,432	86,914	97,346	-	260,029	260,029	10,432	-	(173,115)	-66.6%	(162,683)	-62.6%
TRANSFER TO MUNICIPALITY	(119,125)	(91,000)	(210,125)	(120,539)	(89,882)	(210,420)	1,414	1.2%	(1,118)	-1.2%	296	0.1%
CHANGE IN NET POSITION	$ 1,024,958	306,662	1,331,620	1,468,010	571,243	2,039,253	(443,052)	-30.2%	(264,581)	-46.3%	(707,633)	-34.7%

SHAKOPEE PUBLIC UTILITIES
ELECTRIC OPERATING REVENUE AND EXPENSE

	MTD Actual September 2019	MTD Budget September 2019	MTD Actual v. Budget Better/(Worse) $	MTD Actual v. Budget Better/(Worse) %
OPERATING REVENUES				
Sales of Electricity				
Residential	$ 1,768,897	2,030,471	(261,574)	-12.9%
Commercial and Industrial	3,096,861	3,503,341	(406,480)	-11.6%
Uncollectible accounts	-	-	-	-
Total Sales of Electricity	4,865,758	5,533,812	(668,054)	-12.1%
Forfeited Discounts	25,555	21,498	4,057	18.9%
Free service to the City of Shakopee	7,125	7,002	123	1.8%
Conservation program	72,663	78,923	(6,260)	-7.9%
Total Operating Revenues	4,971,100	5,641,235	(670,135)	-11.9%
OPERATING EXPENSES				
Operations and Maintenance				
Purchased power	3,282,224	3,323,801	41,578	1.3%
Distribution operation expenses	40,659	39,408	(1,251)	-3.2%
Distribution system maintenance	42,384	61,384	19,000	31.0%
Maintenance of general plant	26,490	27,396	906	3.3%
Total Operation and Maintenance	3,391,757	3,451,990	60,233	1.7%
Customer Accounts				
Meter Reading	9,493	10,979	1,486	13.5%
Customer records and collection	45,483	43,775	(1,708)	-3.9%
Energy conservation	48,414	62,382	13,968	22.4%
Total Customer Accounts	103,390	117,136	13,746	11.7%
Administrative and General				
Administrative and general salaries	55,307	57,362	2,054	3.6%
Office supplies and expense	8,199	18,853	10,654	56.5%
Outside services employed	750	36,989	36,239	98.0%
Insurance	11,838	14,963	3,125	20.9%
Employee Benefits	140,014	165,159	25,145	15.2%
Miscellaneous general	23,409	32,708	9,299	28.4%
Total Administrative and General	239,516	326,033	86,516	26.5%
Total Operation, Customer, & Admin Expenses	3,734,663	3,895,159	160,495	4.1%
Depreciation	206,071	202,651	(3,420)	-1.7%
Amortization of plant acquisition	-	-	-	0.0%
Total Operating Expenses	$ 3,940,734	4,097,810	157,076	3.8%
OPERATING INCOME	$ 1,030,366	1,543,425	(513,059)	-33.2%

SHAKOPEE PUBLIC UTILITIES
WATER OPERATING REVENUE AND EXPENSE

	MTD Actual September 2019	MTD Budget September 2019	MTD Actual v. Budget Better/(Worse) $	%
OPERATING REVENUES				
Sales of Water	$ 623,473	795,591	(172,118)	-21.6%
Forfeited Discounts	3,724	1,905	1,820	95.5%
Uncollectible accounts	-	-	-	-
Total Operating Revenues	627,197	797,495	(170,298)	-21.4%
OPERATING EXPENSES				
Operations and Maintenance				
Pumping and distribution operation	53,306	43,902	(9,404)	-21.4%
Pumping and distribution maintenance	6,381	39,937	33,556	84.0%
Power for pumping	25,515	26,001	486	1.9%
Maintenance of general plant	3,299	4,683	1,383	29.5%
Total Operation and Maintenance	88,501	114,523	26,021	22.7%
Customer Accounts				
Meter Reading	5,111	5,784	673	11.6%
Customer records and collection	12,194	12,148	(46)	-0.4%
Energy conservation	-	-	-	-
Total Customer Accounts	17,305	17,932	627	3.5%
Administrative and General				
Administrative and general salaries	33,026	37,906	4,880	12.9%
Office supplies and expense	3,304	5,766	2,462	42.7%
Outside services employed	2,446	16,411	13,966	85.1%
Insurance	3,946	4,988	1,042	20.9%
Employee Benefits	52,065	59,681	7,616	12.8%
Miscellaneous general	19,286	18,170	(1,116)	-6.1%
Total Administrative and General	114,073	142,921	28,848	20.2%
Total Operation, Customer, & Admin Expenses	219,879	275,375	55,496	20.2%
Depreciation	136,914	141,094	4,180	3.0%
Amortization of plant acquisition	-	-	-	-
Total Operating Expenses	356,793	416,469	59,676	14.3%
OPERATING INCOME	$ 270,404	381,026	(110,622)	-29.0%

SHAKOPEE PUBLIC UTILITIES

YEAR TO DATE FINANCIAL RESULTS

SEPTEMBER 2019

SHAKOPEE PUBLIC UTILITIES

"Lighting the Way – Yesterday, Today and Beyond"

SHAKOPEE PUBLIC UTILITIES
COMBINED STATEMENT OF REVENUES, EXPENSES AND CHANGES IN FUND NET POSITION

	Year to Date Actual - September 2019			Year to Date Budget - September 2019			Electric		Water		Total Utility	
	Electric	Water	Total Utility	Electric	Water	Total Utility	YTD Actual v. Budget B/(W) $	%	YTD Actual v. Budget B/(W) $	%	YTD Actual v. Budget B/(W) $	%
OPERATING REVENUES	$ 38,062,644	3,820,523	41,883,166	39,598,130	4,127,716	43,725,846	(1,535,486)	-3.9%	(307,193)	-7.4%	(1,842,679)	-4.2%
OPERATING EXPENSES						-						
Operation, Customer and Administrative	31,616,304	2,279,169	33,895,474	33,613,239	2,516,854	36,130,093	1,996,935	5.9%	237,684	9.4%	2,234,619	6.2%
Depreciation	1,854,639	1,232,223	3,086,862	1,823,863	1,269,843	3,093,705	(30,776)	-1.7%	37,619	3.0%	6,844	0.2%
Amortization of Plant Acquisition	-	-	-	-	-	-	-	0.0%	-	-	-	0.0%
Total Operating Expenses	33,470,943	3,511,393	36,982,336	35,437,102	3,786,696	39,223,798	1,966,159	5.5%	275,304	7.3%	2,241,463	5.7%
Operating Income	4,591,701	309,130	4,900,831	4,161,028	341,020	4,502,048	430,673	10.4%	(31,889)	-9.4%	398,783	8.9%
NON-OPERATING REVENUE (EXPENSE)												
Rental and Miscellaneous	157,511	202,843	360,354	152,712	178,457	331,169	4,799	3.1%	24,386	13.7%	29,185	8.8%
Interdepartment Rent from Water	67,500	-	67,500	67,500		67,500	-	0.0%	-	-	-	0.0%
Investment Income	794,259	342,236	1,136,495	242,844	163,138	405,983	551,415	227.1%	179,097	109.8%	730,512	179.9%
Interest Expense	(48,629)	(1,664)	(50,293)	(56,944)	(1,456)	(58,400)	8,315	14.6%	(208)	-14.3%	8,107	13.9%
Amortization of Debt Issuance Costs and Loss on Refunding	-	-	-	-	-	-	-	#DIV/0!	-	0.0%	-	#DIV/0!
Gain/(Loss) on the Disposition of Property	78,093	-	78,093	-	-	-	78,093	0.0%	-	-	78,093	-
Total Non-Operating Revenue (Expense)	1,048,735	543,414	1,592,150	406,112	340,139	746,252	642,623	158.2%	203,275	59.8%	845,898	113.4%
Income Before Contributions and Transfers	5,640,436	852,544	6,492,980	4,567,140	681,159	5,248,299	1,073,296	23.5%	171,385	25.2%	1,244,681	23.7%
CAPITAL CONTRIBUTIONS	65,047	3,940,071	4,005,118	-	2,340,261	2,340,261	65,047	-	1,599,810	68.4%	1,664,857	71.1%
MUNICIPAL CONTRIBUTION	(1,071,462)	(818,969)	(1,890,431)	(1,084,851)	(808,934)	(1,893,784)	13,389	1.2%	(10,035)	-1.2%	3,353	0.2%
CHANGE IN NET POSITION	$ 4,634,021	3,973,646	8,607,667	3,482,290	2,212,486	5,694,776	1,151,731	33.1%	1,761,160	79.6%	2,912,891	51.2%

SHAKOPEE PUBLIC UTILITIES
ELECTRIC OPERATING REVENUE AND EXPENSE

	YTD Actual September 2019	YTD Budget September 2019	YTD Actual v. Budget Better/(Worse) $	YTD Actual v. Budget Better/(Worse) %
OPERATING REVENUES				
Sales of Electricity				
Residential	$ 13,383,809	14,162,020	(778,211)	-5.5%
Commercial and Industrial	23,834,563	24,601,973	(767,410)	-3.1%
Uncollectible accounts	-	-	-	#DIV/0!
Total Sales of Electricity	37,218,372	38,763,994	(1,545,621)	-4.0%
Forfeited Discounts	225,167	193,484	31,684	16.4%
Free service to the City of Shakopee	64,121	63,014	1,106	1.8%
Conservation program	554,984	577,639	(22,655)	-3.9%
Total Operating Revenues	38,062,644	39,598,130	(1,535,486)	-3.9%
OPERATING EXPENSES				
Operations and Maintenance				
Purchased power	27,119,906	28,355,599	1,235,693	4.4%
Distribution operation expenses	316,738	354,675	37,938	10.7%
Distribution system maintenance	411,642	552,456	140,814	25.5%
Maintenance of general plant	240,489	246,564	6,075	2.5%
Total Operation and Maintenance	28,088,775	29,509,294	1,420,519	4.8%
Customer Accounts				
Meter Reading	93,618	98,811	5,193	5.3%
Customer records and collection	426,797	393,976	(32,822)	-8.3%
Energy conservation	439,623	561,439	121,816	21.7%
Total Customer Accounts	960,038	1,054,226	94,187	8.9%
Administrative and General				
Administrative and general salaries	506,823	516,254	9,430	1.8%
Office supplies and expense	142,502	169,673	27,172	16.0%
Outside services employed	110,062	332,902	222,840	66.9%
Insurance	106,543	134,668	28,125	20.9%
Employee Benefits	1,409,988	1,601,855	191,867	12.0%
Miscellaneous general	291,574	294,368	2,794	0.9%
Total Administrative and General	2,567,491	3,049,719	482,228	15.8%
Total Operation, Customer, & Admin Expenses	31,616,304	33,613,239	1,996,935	5.9%
Depreciation	1,854,639	1,823,863	(30,776)	-1.7%
Amortization of plant acquisition	-	-	-	0.0%
Total Operating Expenses	$ 33,470,943	35,437,102	1,966,159	5.5%
OPERATING INCOME	$ 4,591,701	4,161,028	430,673	10.4%

SHAKOPEE PUBLIC UTILITIES
WATER OPERATING REVENUE AND EXPENSE

	YTD Actual September 2019	YTD Budget September 2019	YTD Actual v. Budget Better/(Worse) $	%
OPERATING REVENUES				
Sales of Water	$ 3,784,720	4,110,574	(325,854)	-7.9%
Forfeited Discounts	35,801	17,141	18,660	108.9%
Uncollectible accounts	1	-	1	#DIV/0!
Total Operating Revenues	3,820,523	4,127,716	(307,193)	-7.4%
OPERATING EXPENSES				
Operations and Maintenance				
Pumping and distribution operation	388,175	395,116	6,941	1.8%
Pumping and distribution maintenance	309,323	359,434	50,110	13.9%
Power for pumping	227,996	234,012	6,016	2.6%
Maintenance of general plant	60,174	42,143	(18,031)	-42.8%
Total Operation and Maintenance	985,668	1,030,704	45,036	4.4%
Customer Accounts				
Meter Reading	50,875	52,056	1,181	2.3%
Customer records and collection	119,020	109,330	(9,690)	-8.9%
Energy conservation	-	-	-	-
Total Customer Accounts	169,895	161,386	(8,509)	-5.3%
Administrative and General				
Administrative and general salaries	321,489	341,150	19,661	5.8%
Office supplies and expense	51,284	51,893	609	1.2%
Outside services employed	61,899	147,700	85,801	58.1%
Insurance	35,514	44,889	9,375	20.9%
Employee Benefits	499,100	575,604	76,505	13.3%
Miscellaneous general	154,321	163,527	9,205	5.6%
Total Administrative and General	1,123,607	1,324,764	201,157	15.2%
Total Operation, Customer, & Admin Expenses	2,279,169	2,516,854	237,684	9.4%
Depreciation	1,232,223	1,269,843	37,619	3.0%
Amortization of plant acquisition	-	-	-	-
Total Operating Expenses	$ 3,511,393	3,786,696	275,304	7.3%
OPERATING INCOME	$ 309,130	341,020	(31,889)	-9.4%

SHAKOPEE PUBLIC UTILITIES
MEMORANDUM

TO: SHAKOPEE PUBLIC UTILITIES COMMISSION

FROM: JOHN R. CROOKS, UTILITIES MANAGER

SUBJECT: TRANSITION/SUCCESSION PLAN – NEXT STEPS

DATE: OCTOBER 16, 2019

In continuing the work started by Martini and Associates, the commission is at the next phase in the development of the plan.

Martini and Associates took the Board through the development stages of the Utilities Manager's responsibilities and how they may have changed in the past ten years. Defining core issues the next Utilities Manager will be expected to be able to address as well as required background and experience in the water and electric industries were also defined.

This information was collected from both the SPU Commission and SPU Directors. Renee Schmid then developed behavioral anchors to be incorporated into the Utilities Manager's job description.

We are now ready for the next phase in the transition plan and have asked Scott Morrell, consultant with Rebar Leadership to conduct a work session with the Commission and define issues with our organization and leadership of SPU.

Attached to this memo is the outline that will be used by Mr. Morrell for the work session scheduled to be held directly after the October 21 Commission meeting.

Transition/Succession Plan Development

October 21, 2019

ORGANIZATION

1. Where do you see the future of the organization?

    a. Do you see the next 5-10 years similar to the present?
    b. Do you see the next 5-10 years different from where the organization presently operates?
    c. Other?
    d. What next steps can be taken?

LEADERSHIP

1. What type of leadership qualities is the Commission looking for?

    a. When it comes time to find a successor for the Utilities Manager, what are you seeking in a new candidate?
    b. What timeline issues are you concerned about when planning for a future new Utilities Manager?
    c. Will you look for a status quo or transformative leader?
    d. Will you focus on internal candidates and /or external candidates
    e. What other issues need to be put on the table at this time?
    f. What next steps can be taken?