

COMPREHENSIVE WATER SYSTEM STUDY UPDATE

IN COORDINATION WITH 2040 COMPREHENSIVE PLAN UPDATE

CITY OF RAMSEY, MN

SEPTEMBER 2017

Submitted by:

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**COMPREHENSIVE WATER PLAN UPDATE
IN COORDINATION WITH
2040 COMPREHENSIVE PLAN UPDATE
CITY OF RAMSEY, MINNESOTA**

A. PURPOSE

The purpose for this report is to update the City's 2012 Comprehensive Water Plan based on current (2017) population and land use projections. The 2012 Comprehensive Water Plan included a plan for meeting the City's needs based on development projected within the City's 2030 Comprehensive Plan. The 2012 Comprehensive Water Plan outlined infrastructure needs and included an implementation schedule based on the anticipated development.

City staff has identified development which has occurred since the 2012 study was completed and has provided projections for development which is likely to occur in the next 23 years (Year 2040). This report evaluates the impact of the recent and projected development on the proposed schedule for water infrastructure implementation.

Typically water system improvements are funded through a combination of Water Availability Charges, trunk charges, and water usage fees. We have prepared one option for funding the water system which should be reviewed and discussed with the City's financial advisor prior to setting or adjusting any charges or fees.

B. SUMMARY OF INFRASTRUCTURE REVISIONS TO 2012 COMPREHENSIVE PLAN

Infrastructure expenditures were based on the City's Capital Improvement Plan for the years 2017 to 2020. We also identified several capital improvement projects which will need to be implemented between 2021 and 2040.

1. Water Distribution System

The water distribution system is depicted on Figure 1. Water wells, towers and existing and proposed water mains are shown on the graphic. A summary of revisions (when compared to the 2012 map) is as follows:

1. Removed both alternative Water Treatment Facility locations and related surface water pipes.
2. Updated the existing water main locations to match the current City water map.
3. Loop #1
 - a. Revised to reflect the Bowers Drive water main as a lateral main rather than a trunk facility.
 - b. Added a loop along Puma Street and Alpine Drive.
 - c. Added a water main on Riverdale Drive, west of Armstrong Boulevard to complete the loop in that area.
 - d. Removed the small loop east of Armstrong Boulevard on 142nd Avenue.
 - e. Revised the segment east of Armstrong Boulevard, on Riverdale Drive, from proposed to existing.
4. Loop #4 was revised to connect from one existing 12" main to another. The southern existing 12" pipe appears to have been installed since the 2012 report.

5. Loop #6 was added to the map. This is proposed work to be completed next summer. We have included a table depicting the costs of the improvements in the areas described at the back of this report.

2. Water Supply Wells and Storage

Development projections from 2012 indicated a new water supply capacity would be required by 2019. With the updated development data, new water supply is now projected to be required by 2022.

Construction of new wells in 2023 and 2028 will provide adequate capacity to the year 2040 based upon projected growth rates.

In order to determine a viable location for a new well, and potential for additional water supply options utilizing groundwater sources, a well location study should be undertaken beginning in 2017.

The following capital costs, presented in 2017 dollars, should be expected for the water system:

- A new water supply well and pumphouse in 2023 at \$1,500,000,
- A new water supply well and pumphouse in 2028 at \$1,500,000, and
- Water tower rehabilitation in 2030 at \$2,000,000.

Additionally, \$100,000 per year for the years 2021 through 2028 should be allocated for well service and pump maintenance.

Water tower 3 is anticipated to need rehabilitation in approximately 2030. Approximately \$2,000,000 will be required for this work.

3. Water Treatment Facility

In the 2012 report, a water treatment facility was identified as a means of water supply. This was intended to be a surface water treatment facility that drew raw water from the Mississippi River. Based on current discussions with regulatory agencies, there is the potential to provide more water to the system through the addition of wells. In the 2017 report, the treatment facility was removed.

A new treatment facility was added to the 2017 report to provide greater water quality than exists from the untreated well water current used in the City. The construction of the facility will depend on several factors, including: needs of business and industrial users, and acceptability of the water by residents of the community. The water treatment facility is depicted as being constructed in 2027 and 2028 at a cost of \$24,000,000. The actual timing of the construction of the facility is undetermined at this time.

C. TRUNK WATER MAIN COSTS

Attached are updated cost estimates related to the water distribution system improvements, totaling \$6,574,097. These costs include 25% indirect costs such as administration, engineering, legal and financing. Additionally, we have included a 20% contingency for unforeseen improvements which may be required during the study period, for a total cost of \$7,888,916 in 2017 dollars.

The City's current Capital Improvement Plan was used to determine expenditures for the years 2017 to 2020. For the years 2021 to 2040, the above costs were spread evenly over the 20 year period, while being inflated at a rate of 3% per year.

D. DEVELOPMENTAL IMPACT ON COMPREHENSIVE WATER PLAN

Population and Growth

Actual and projected development within the City of Ramsey since the 2012 Comprehensive Water Plan was developed are summarized as follows:

- Connections from 2012-2015 are as follows:
 - 2012: 295
 - 2013: 164
 - 2014: 66
 - 2015: 258
 - Avg: 196

- Projected development is as follows:
 - 160 Residential Units/Year, (50% High Density)
 - 10 Commercial/Industrial Acres/Year
 - 567 Residential Units in NE Expansion Area

The development projections above are projected to occur from 2016 to 2040. The total projected number of new units to be served by the water system, after a high density unit adjustment of 0.7 per high density unit, is 3831 units. This represents an average of 160 units per year will be developed. The attached Table 1 provides a summary of both the 2012 comprehensive Water Plan population and water demand projected, and the updated projections based on new development information.

E. ANALYSIS

Our detailed analysis (depicted on a spreadsheet at the back of this report) provides an evaluation of the impact of development and proposed improvements on the current rate structure. The following assumptions were made for the analysis:

- Capital expenditures for 2017 to 2020 were taken from the City's current Capital Improvement Plan.
- Capital expenditures for the years 2021 to 2040 were based on assumptions described in Sections B and C above.
- Operating expenses of \$836,662 were used for 2017 and then inflated at a rate of 4% per year for the duration of the analysis period.
- Treatment facility operating expenses were assumed to begin in 2029 at an annual rate of \$1,000,000 per year and then inflated at 3% per year each year after 2029.
- Water usage rates of \$2.57/1,000 gallons for 2017 were used and then inflated at a rate of 2% per year after 2017.
- Water Availability Charges of \$1,236 were used for 2017 and then inflated at a rate of 2.5% per year after 2017.
- Trunk charges of \$1,720 were used for 2017 and then inflated at a rate of 2.5% per year after 2017.

Table 1
Population and Water Demand Projections
Ramsey, Minnesota
9/15/2017

2012 Comprehensive Water Plan

Year	2012	2016	2020	2025	2030	2035	2040
Service Area Population	11,434	14,961	18,669	22,519	26,029		
New Residential Customer Accounts	260	323	323	260	260		
People/Household	2.87	2.87	2.7	2.7	2.7		
Added Population	746	927	872	702	702		
End of Year Service Area Population	12,180	15,888	19,541	23,221	26,731		
Average Daily Water Demand (gpd)	1,827,030	2,383,236	2,931,206	3,483,221	4,009,721		
Maximum Day Water Demand (gpd)	5,481,090	7,149,708	8,793,617	10,449,662	12,029,162		

Update

Year	2012	2016	2020	2025	2030	2035	2040
Service Area Population	11,434	13,681	15,409	17,569	19,729	21,889	24,049
New Residential Customer Accounts	295	160	160	160	160	160	160
People/Household	2.87	2.70	2.70	2.70	2.70	2.70	2.70
Added Population	847	432	432	432	432	432	432
End of Year Service Area Population	12,281	14,113	15,841	18,001	20,161	22,321	24,481
Average Daily Water Demand	1,842,098	2,116,982	2,376,182	2,700,182	3,024,182	3,348,182	3,672,182
Maximum Day Water Demand	5,526,293	6,350,945	7,128,545	8,100,545	9,072,545	10,044,545	11,016,545

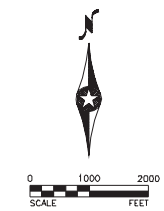
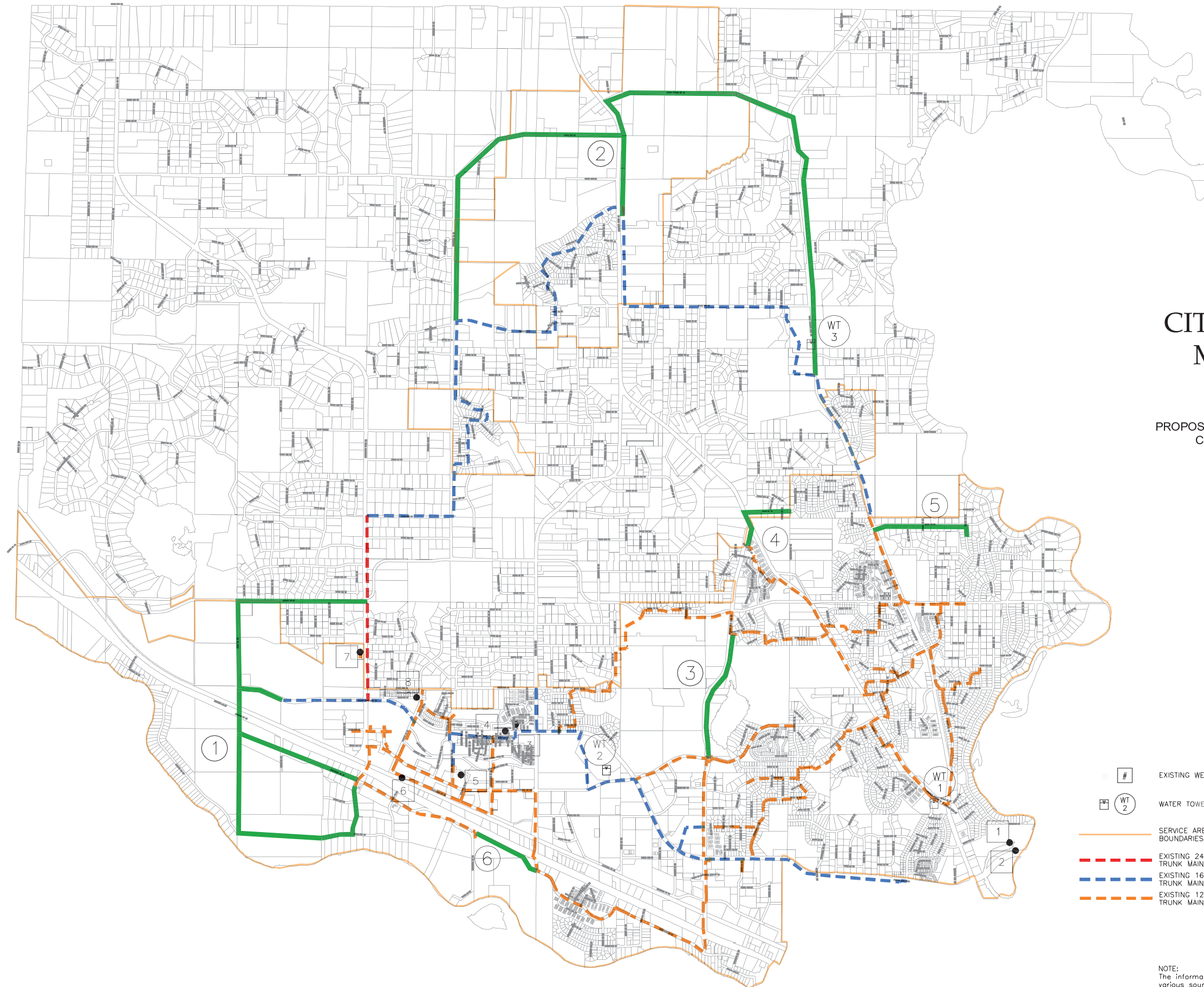
2040 MUSA - Water System Loop Improvements (2021-2040)

Loop	LOCATION	SIZE (IN.)	LENGTH (FT.)	COST PER FOOT*	COST
<u>1</u>	Southwest Loop	12"	19,000	\$124	\$2,352,313
		3,000 LF Constructed in 2017		TOTAL LOOP 1	\$2,352,313
<u>2</u>	North Central Loop	12"	28,000	\$124	\$3,466,567
				TOTAL LOOP 2	\$3,466,567
<u>3</u>	County Road 57	12"	4,100	INCLUDED IN YEAR 2020 OF CIP	
<u>4</u>	CSAH 5/157TH AVE NW	12"	2,700	\$124	\$334,276
				TOTAL LOOP 4	\$334,276
<u>5</u>	158TH LANE NW	12"	3,400	\$124	\$420,940
				TOTAL LOOP 5	\$420,940
<u>6</u>	RIVERDALE BOULEVARD	12"	2,300	INCLUDED IN YEAR 2017 OF CIP	
				SUB-TOTAL	\$6,574,097
				20% CONTINGENCIES FOR UNFORSEEN IMPROVEMENTS	\$1,314,819
				TOTAL IMPROVEMENT COSTS	\$7,888,916
				AVERAGE YEAR FOR 20 YEARS (2017 DOLLARS)	\$394,446
				INFLATED AT 3% PER YEAR TO YEAR 2021	\$443,952

* INCLUDES 25% INDIRECT COST

Table 2
Water Utility Rate Impact Summary
City of Ramsey, Minnesota
9/15/2017

	Actual 2016	Projected / Actual 2017	Projected 2018	Projected 2019	Projected 2020	Projected 2021	Projected 2022	Projected 2023	Projected 2024	Projected 2025	Projected 2026	Projected 2027	Projected 2028	Projected 2029	Projected 2030	Projected 2035	Projected 2040
Beginning Balance		\$ 18,440,114	\$ 18,249,021	\$ 17,702,048	\$ 19,553,332	\$ 20,635,777	\$ 22,190,135	\$ 23,779,713	\$ 23,704,661	\$ 25,339,597	\$ 27,009,720	\$ 28,876,172	\$ 18,784,291	\$ 6,426,591	\$ 7,126,392	\$ 7,072,941	\$ 9,587,285
Water System Revenue																	
New Customers		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Annual Water Sales (gallons/year)		994,500,000	1,006,500,000	1,018,500,000	1,030,500,000	1,042,500,000	1,054,500,000	1,066,500,000	1,078,500,000	1,090,500,000	1,102,500,000	1,114,500,000	1,126,500,000	1,138,500,000	1,150,500,000	1,210,500,000	1,270,500,000
Water Rates (\$/1000 gallons) (Inflated at 2% per year)		\$ 2.57	2.62	2.67	2.73	2.78	2.84	2.89	2.95	3.01	3.07	3.13	3.20	3.26	3.32	3.67	4.05
Water Availability Charge (WAC) (\$/connection) (Inflated at 2.5% per year)		\$ 1,236	1,267	1,299	1,331	1,364	1,398	1,433	1,469	1,506	1,544	1,582	1,622	1,662	1,704	1,928	2,181
Connection/Trunk Charge (\$/connection) (Inflated at 2.5% per year)		\$ 1,720	1,763	1,807	1,852	1,899	1,946	1,995	2,045	2,096	2,148	2,202	2,257	2,313	2,371	2,683	3,035
Water Rate Revenue (Inflated at 2.5% per year)		\$ 2,087,443	\$ 2,139,629	\$ 2,193,120	\$ 2,247,948	\$ 2,304,146	\$ 2,361,750	\$ 2,420,794	\$ 2,481,314	\$ 2,543,347	\$ 2,606,930	\$ 2,672,104	\$ 2,738,906	\$ 2,807,379	\$ 2,877,563	\$ 3,255,699	\$ 3,683,524
WAC Revenue		\$ 197,760	\$ 202,704	\$ 207,772	\$ 212,966	\$ 218,290	\$ 223,747	\$ 229,341	\$ 235,074	\$ 240,951	\$ 246,975	\$ 253,150	\$ 259,478	\$ 265,965	\$ 272,614	\$ 308,438	\$ 348,969
Trunk Revenue		\$ 290,575	\$ 294,230	\$ 297,976	\$ 301,816	\$ 305,752	\$ 309,787	\$ 313,922	\$ 318,161	\$ 322,506	\$ 326,951	\$ 331,496	\$ 336,041	\$ 340,586	\$ 345,131	\$ 379,366	\$ 425,621
Interest Earnings		\$ 184,401	\$ 273,735	\$ 265,531	\$ 293,300	\$ 309,537	\$ 332,852	\$ 356,696	\$ 380,540	\$ 404,384	\$ 428,228	\$ 452,072	\$ 475,916	\$ 499,760	\$ 523,604	\$ 588,448	\$ 653,292
Total Water System Revenue		\$ 2,760,179	\$ 2,910,298	\$ 2,964,398	\$ 3,056,030	\$ 3,137,726	\$ 3,228,136	\$ 3,320,753	\$ 3,390,119	\$ 3,486,897	\$ 3,602,738	\$ 3,710,675	\$ 3,641,235	\$ 3,539,856	\$ 3,636,440	\$ 4,099,449	\$ 4,661,924
Water Utility Expenses - Capital Improvement Projects																	
Miscellaneous Projects																	
Fire Station #1 Extension of Water					\$ 55,000												
County Radio Station (3 -Year Funding)		\$ 1,700															
Public Works Campus			\$ 1,715,750														
3/4 Ton Truck				\$ 43,000													
Utility Truck		\$ 25,000	\$ 23,500														
Water Supply & Treatment Improvements																	
Renovate Pump House #3			\$ 60,000														
Construct Well & Pumphouse #9					\$ 75,000		\$ 1,700,000										
Well #1 Rehabilitation		\$ 38,000	\$ 41,000	\$ 44,000	\$ 47,000												
Emergency Supply for Well #3		\$ 115,000															
Well Location Study		\$ 75,000															
Water Treatment Facility - 10 MGD Groundwater											\$ 12,000,000	\$ 12,000,000					
Water Storage Improvements																	
Refurbish Water Tower #1		\$ 1,300,000															
Refurbish Water Tower #2			\$ 700,000														
Maintain Water Tower #3				\$ 75,000													
Distribution System Improvements																	
River Pines Lift Station Water Connection					\$ 20,000												
Distribution System Maintenance Improvements																	
Watermain Looping Bunker Lake Blvd.					\$ 340,000												
Watermain Looping Sunfish Lake Blvd.					\$ 450,000												
Watermain Looping Ramsey Blvd to Traprock		\$ 129,250															
Watermain Bunker Lake Boulevard - Business Park		\$ 162,842															
Watermain Puma Street - Business Park		\$ 220,226															
2021 through 2040 Projected Improvements																	
Distribution System					\$ 443,952	\$ 457,271	\$ 470,989	\$ 485,118	\$ 499,672	\$ 514,662	\$ 530,102	\$ 546,005	\$ 562,385	\$ 579,257	\$ 671,517	\$ 778,473	
Construct Well & Pumphouse #10											\$ 2,138,641						
Storage Tower 3 Rehabilitation														\$ 3,025,179			
Well Service and Pump Maintenance (8 wells)					\$ 115,927	\$ 119,405	\$ 122,987	\$ 126,677	\$ 130,477	\$ 134,391	\$ 138,423	\$ 142,576					
Subtotal- Capital Expenses		\$ 2,067,018	\$ 2,540,250	\$ 162,000	\$ 987,000	\$ 559,879	\$ 576,675	\$ 2,293,976	\$ 611,795	\$ 630,149	\$ 649,053	\$ 12,668,525	\$ 14,827,222	\$ 562,385	\$ 3,604,436	\$ 671,517	\$ 778,473
Operational Expenses																	
Operating Expense- Distribution and Administration (Inflated at 4% per year)		\$ 836,662	\$ 870,128	\$ 904,934	\$ 941,131	\$ 978,776	\$ 1,017,927	\$ 1,058,644	\$ 1,100,990	\$ 1,145,030	\$ 1,190,831	\$ 1,238,464	\$ 1,288,003	\$ 1,339,523	\$ 1,393,104	\$ 1,694,924	\$ 2,062,134
Operating Expense- Treatment (Inflated at 3% per year)													\$ 1,000,000	\$ 1,030,000	\$ 1,194,052	\$ 1,384,234	
Subtotal- Operating Expense		\$ 836,662	\$ 870,128	\$ 904,934	\$ 941,131	\$ 978,776	\$ 1,017,927	\$ 1,058,644	\$ 1,100,990	\$ 1,145,030	\$ 1,190,831	\$ 1,238,464	\$ 1,288,003	\$ 2,339,523	\$ 2,423,104	\$ 2,888,976	\$ 3,446,368
Total Annual Expenses		\$ 2,903,680	\$ 3,410,378	\$ 1,066,934	\$ 1,928,131	\$ 1,538,655	\$ 1,594,603	\$ 3,352,620	\$ 1,712,785	\$ 1,775,178	\$ 1,839,884	\$ 13,906,989	\$ 16,115,224	\$ 2,901,908	\$ 6,027,539	\$ 3,560,493	\$ 4,224,840
Finance Adjustments																	
Trunk Charges Returned per John Peterson's agreement (thru 2025)		\$ (144,375)	\$ (144,375)	\$ (144,375)	\$ (144,375)	\$ (144,375)	\$ (144,375)	\$ (144,375)	\$ (144,375)	\$ (144,375)							
PW Land/Building - Internal Loan 2009-2028 @2%		\$ 34,930	\$ 35,629	\$ 36,341	\$ 37,068	\$ 37,810	\$ 38,566	\$ 39,337	\$ 40,124	\$ 40,926	\$ 41,745	\$ 42,580	\$ 54,436				
Internal Loan to offset Muni Center Debt beginning year 2011-2030@2%		\$ 61,853	\$ 61,853	\$ 61,853	\$ 61,853	\$ 61,853	\$ 61,853	\$ 61,853	\$ 61,853	\$ 61,853	\$ 61,853	\$ 61,853	\$ 61,853	\$ 61,853	\$ 61,853		
Internal Loan for RTC Land Purchase- 10 yr@2% when land sold																	
Net Finance Adjustments		\$ (47,592)	\$ (46,893)	\$ (46,181)	\$ (45,454)	\$ (44,712)	\$ (43,956)	\$ (43,185)	\$ (42,398)	\$ (41,596)	\$ 103,598	\$ 104,433	\$ 116,289	\$ 61,853	\$ 61,853		
Water System Working Capital Balance																	
Total Annual Expenses		\$ 2,903,680	\$ 3,410,378	\$ 1,066,934	\$ 1,928,131	\$ 1,538,655	\$ 1,594,603	\$ 3,352,620	\$ 1,712,785	\$ 1,775,178	\$ 1,839,884	\$ 13,906,989	\$ 16,115,224	\$ 2,901,908	\$ 6,027,539	\$ 3,560,493	\$ 4,224,840
Total System revenue		\$ 2,712,587	\$ 2,863,405	\$ 2,918,217	\$ 3,010,576	\$ 3,093,014	\$ 3,184,180	\$ 3,277,568	\$ 3,347,721	\$ 3,445,301	\$ 3,706,336	\$ 3,815,108	\$ 3,757,524	\$ 3,601,709	\$ 3,698,293	\$ 4,099,449	\$ 4,661,924
Net Income (loss)		\$ (191,093)	\$ (546,973)	\$ 1,851,284	\$ 1,082,445	\$ 1,554,358	\$ 1,589,578	\$ (75,052)	\$ 1,634,936	\$ 1,670,123	\$ 1,866,452	\$ (10,091,881)	\$ (12,357,700)	\$ 699,801	\$ (2,329,247)	\$ 538,956	\$ 437,084
Beginning Water Working Capital Balance		\$ 18,440,114	\$ 18,249,021	\$ 17,702,048	\$ 19,553,332	\$ 20,635,777	\$ 22,190,135	\$ 23,779,713	\$ 23,704,661	\$ 25,339,597	\$ 27,009,720	\$ 28,876,172	\$ 18,784,291	\$ 6,426,591	\$ 7,126,392	\$ 7,072,941	\$ 9,587,285
Remaining Working Capital Balance		\$ 18,440,114	\$ 18,249,021	\$ 17,702,048	\$ 19,553,332	\$ 20,635,777	\$ 22,190,135	\$ 23,779,713	\$ 23,704,661	\$ 25,339,597	\$ 27,009,720	\$ 28,876,172	\$ 18,784,291	\$ 6,426,591	\$ 7,126,392	\$ 4,797,145	\$ 10,024,369



CITY OF RAMSEY MINNESOTA

FIGURE 1

PROPOSED WATER SYSTEM IMPROVEMENTS
COMPREHENSIVE WATER PLAN
SEPTEMBER 2017

LEGEND

	EXISTING WELL		12" PROPOSED WATERMAIN
	WATER TOWER	LOOP	LOCATION
	SERVICE AREA BOUNDARIES	①	SOUTHWEST LOOP
	EXISTING 24" TRUNK MAIN	②	NORTH CENTRAL LOOP
	EXISTING 16" TRUNK MAIN	③	COUNTY ROAD 57
	EXISTING 12" TRUNK MAIN	④	CSAH 5/157th AVE NW
		⑤	158th LANE NW
		⑥	RIVERDALE BOULEVARD

NOTE:
The information for this map was obtained from various sources of existing maps, construction plans, and City records, some of which were prepared by others. While this information is believed to be reliable Bolton & Menk, Inc. is not responsible for its accuracy nor for errors or omissions which may have been incorporated into this document as a result.