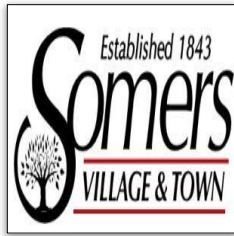


Village of Somers, Wisconsin

Water Conservation and Efficiency Plan



Prepared by:

BAXTER & WOODMAN
Consulting Engineers

www.baxterwoodman.com

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Village of Somers, Wisconsin Water Conservation and Efficiency Plan

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EXECUTIVE SUMMARY

Water conservation is a key factor in the Village of Somers long-term water supply strategy. This Water Conservation and Efficiency Plan (Plan) establishes a path for efficiency in water use and meeting the environmental standards of the Great Lakes-St. Lawrence River Basin Water Resources Compact. This plan follows the conservation targets outlined in AWWA M52 for a small reduction in current water use, targeting approximately 5-10 percent reduction over the next 5 to 10 years. The conservation measures laid out in this Plan include a 7 percent reduction in water use per residential equivalent (REU). The recommendations are consistent with the 20 year (2040) and ultimate buildout water saving goals.

The Village's water conservation goals include the following:

- Reduce the average day water use per resident equivalent unit (REU) by five percent from the 2019 value of 235 gallons per day per REU. The historical values are currently increasing.

The Village's objectives for achieving the above goal include the following:

- Comply with NR 852
- Align with the Southwestern Wisconsin Regional Planning Commission 2050 Regional Water Supply Plan
- Incorporate stakeholder and customer input in the evaluation
- Use the Alliance for Water Efficiency (AWE) Water Conservation Tracking Tool at least on an annual basis to estimate cost-effectiveness of conservation measures.

Long-term water conservation requires continuous evaluation of conservation measures combined with benefit-cost analysis. The Village has evaluated numerous conservation and efficiency measures (CEMs) using the Alliance for Water Efficiency (AWE) Conservation Tracking Tool. This tool is a water conservation calculator recommended by the Wisconsin Department of Natural Resources (WDNR). Using the tool resulted in a short list of potential CEMs for further evaluation. The AWE tool allows for a benefit-cost analysis was conducted to compare the costs and benefits of the implementation of each CEM. Benefits were estimated monetarily and in terms of volumes of water saved. CEMs that had neutral or positive benefit to cost ratios are marked as such in the report.

The recommended 5-year implementation plan includes the following elements: Expanded public education and information, additional customer water audits to design specific customer demand management strategies, and increasing program data gathering and monitoring to measure program effectiveness.

1. INTRODUCTION

1.1 Background

The Village of Somers (Village) was formed by the incorporation of part of the Town of Somers in 2015 and the annexation of part of the Town of Paris. The population in the Village is approximately 8,371 based on the U.S. Census Bureau’s July 1st estimates with approximately 1,186 metered customers (or approximately 3,000 people). The majority of Village residents have private wells but are expected to connect to the public water system and become Utility customers in the upcoming years. Figure 1 below shows a map of the Village boundaries and the subcontinental divide (Divide).

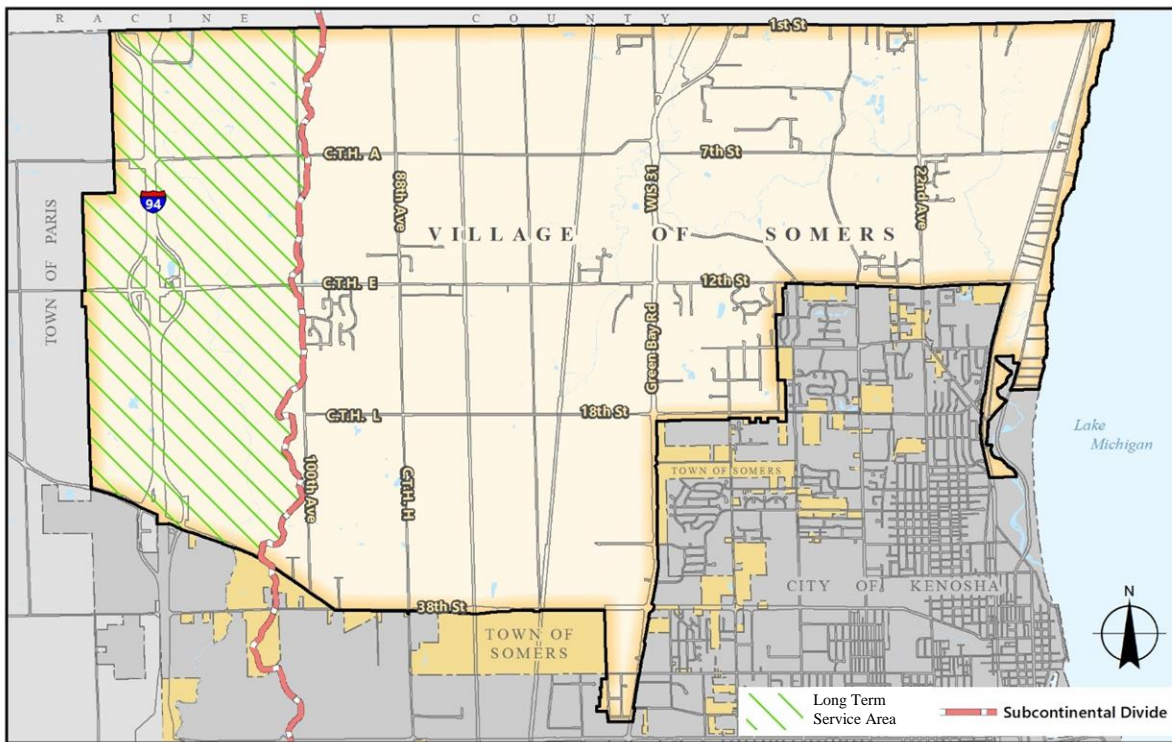


FIGURE 1: Map of Village Boundaries

Source: Kenosha County GIS and Village of Somers 2017 IGA

The Village owns and operates a municipal water and sewer system. KWU provides source water from Lake Michigan to the Village, who then returns all wastewater via the sanitary sewer system back to KWU for treatment and discharge to Lake Michigan. Currently, properties west of the Divide are unable to be served municipal water due to the Great Lakes-St. Lawrence River Basin Water Resources Compact. This plan is part of the Village’s request for permission to provide service west of the Divide with source water from Lake Michigan via the Straddling Community Water Diversion Application.

1.2 Water System

The Village’s existing system and meter locations are illustrated in Figure 2. Water mains exist primarily on the east side of the Village and as of 2018 the Village has 269,715 feet of water main, 1,186 meters, and 448 hydrants. Currently no water is being served to areas west of the Divide.

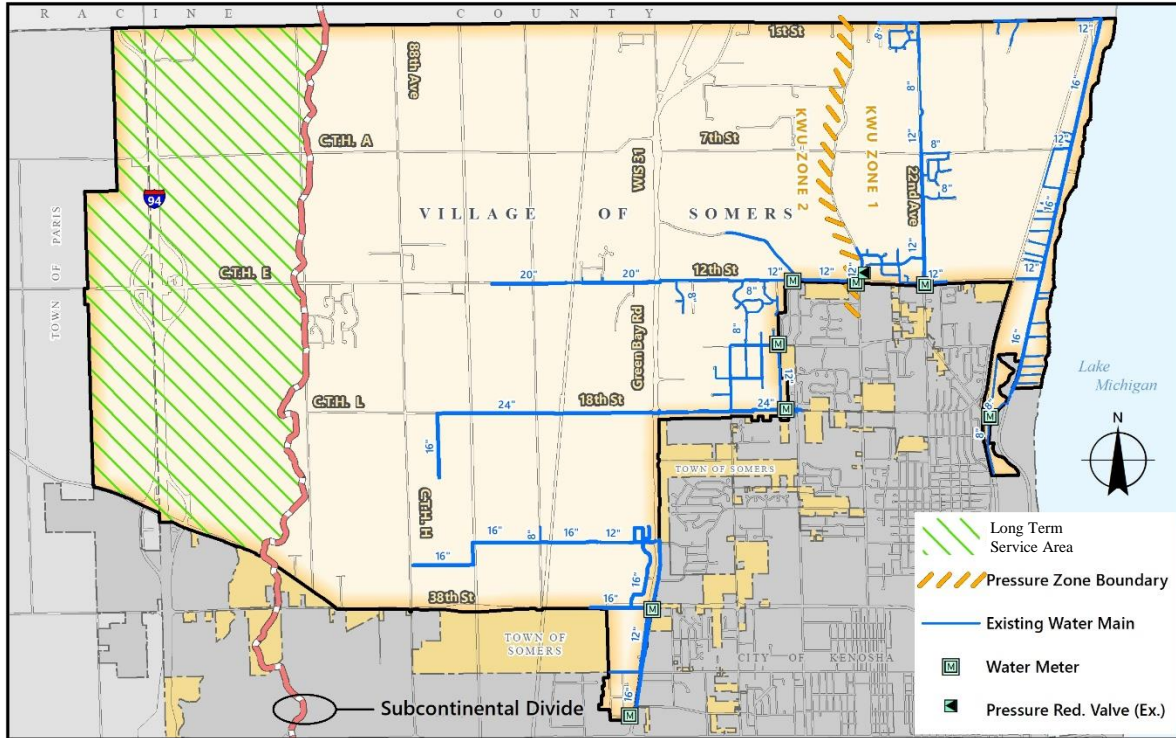


FIGURE 2: Existing Water Distribution Plan

Figure 3 shows the proposed ultimate water distribution plan. This Plan includes service to land within Village limits, areas east of the Divide not currently served, land west of the Divide with permission via the Diversion Application, and additional land within the Village growth area (currently Town of Paris). The Town of Paris land within the village growth area has been designated to be annexed to the Village in the future as part of the 2017 Intergovernmental Agreement (IGA).

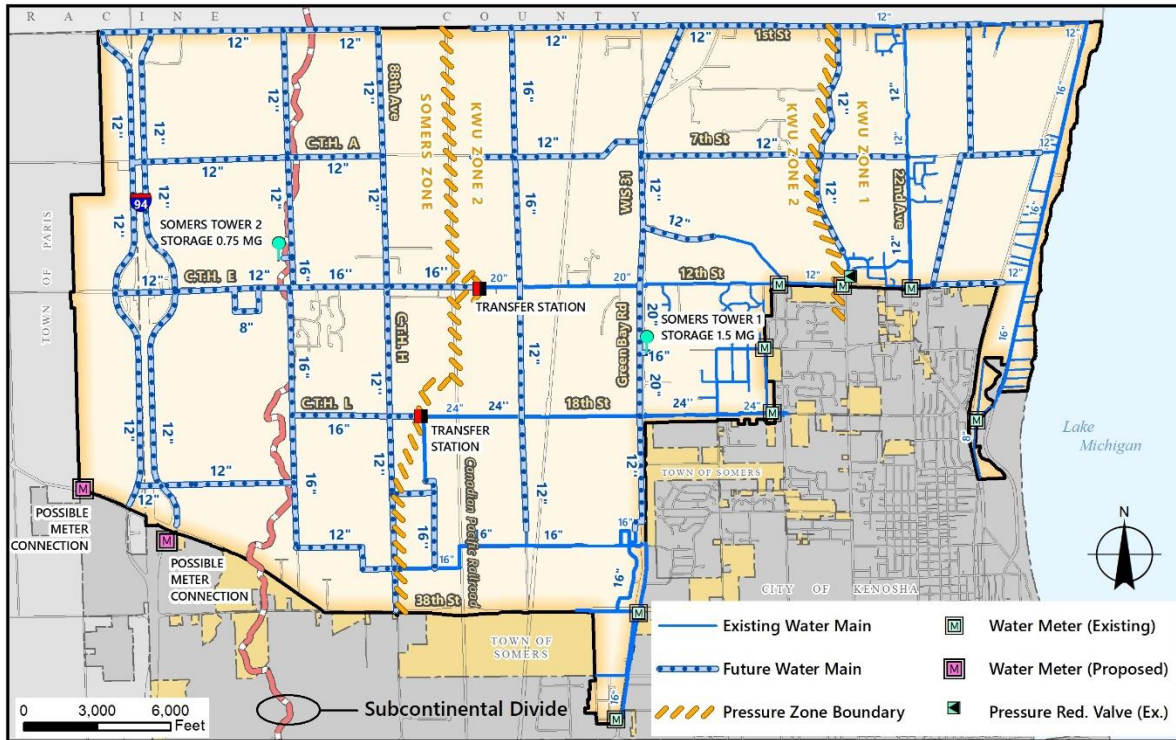


FIGURE 3: Proposed Ultimate Water Distribution Plan

Note: Local distribution mains are not shown.

2. WATER USE

2.1 Current Water Use

The Village’s public water system is regulated by the Public Service Commission of Wisconsin (PSC). Figure 4 illustrates the breakdown by customer sector for the Village with the largest percentage being residential use. Table 1 summarizes the 2018 water audit conducted using PSC Chapter 185 guidelines.

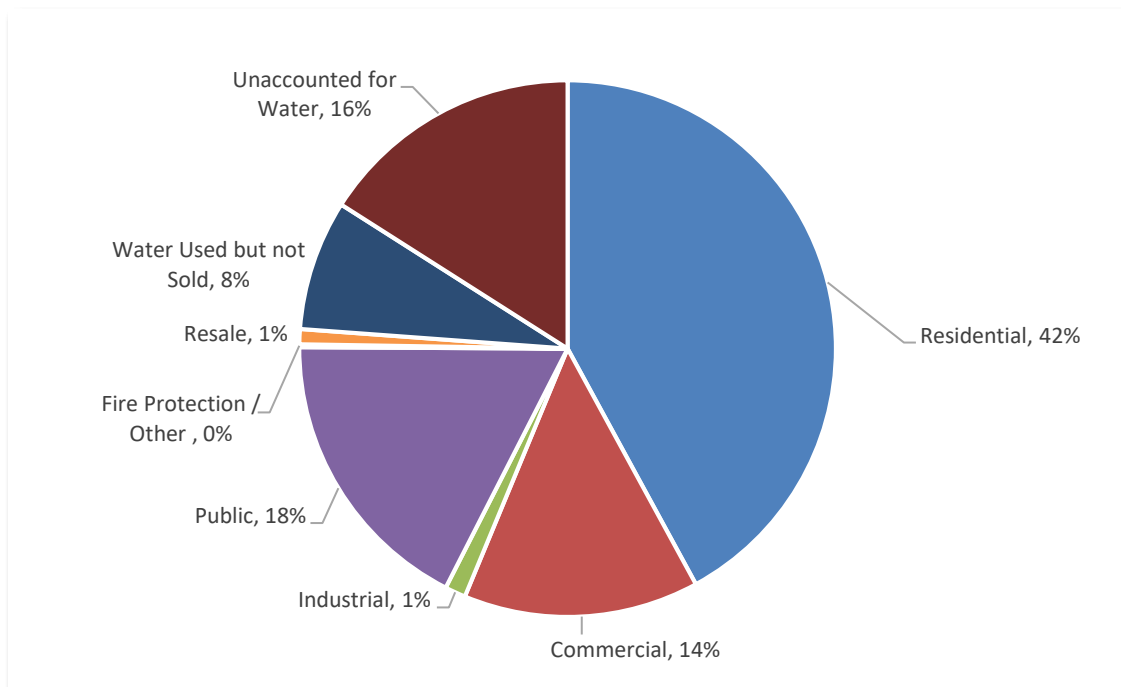


FIGURE 4: 2018 Water Use Summary

Source: 2018 Village of Somers Water Utility Annual PSC Report

TABLE 1
2018 Water Audit Summary

System Input Volume (Finished Water + Purchased Water) 188,400,000 gal	Authorized Consumption 158,293,000 gal	Billed Authorized Consumption 143,499,000 gal	Billed Metered Consumption (including water exported, wholesale sales) 143,499,000 gal	Revenue Water 143,499,000 gal	
		Unbilled Authorized Consumption 14,794,000 gal	Billed Unmetered Consumption (Bulk water sales, utility uses) 0 gal		Unbilled Metered Consumption 6,873,000 gal
			Unbilled Unmetered Consumption 7,921,000 gal		
	Water Losses 30,107,000 gal	Apparent Loss 459,000 gal	Unauthorized Consumption (Theft, uncontrolled hydrants, etc.) 459,000 gal	Non - Revenue Water 44,901,000 gal	
			Metering Inaccuracies (Customer, station meters) 0 gal		
			Data Handling Errors 0 gal		
		Real Losses 29,648,000 gal	Leakage on Transmission and Distribution Mains 1,823,000 gal		
			Leakage and Overflows at Utility's Storage Tanks 0 gal		
	Leakage on Service Connections (Up to point of customer meter) 27,825,000 gal				

2.2 Water Use Trends

Figure 5 illustrates the water usage by month for 2014 through 2018; the water use is relatively consistent with no major changes except seasonal use. The Village uses more water in the summer and less in the winter, which is typical of a utility with no large industrial users.

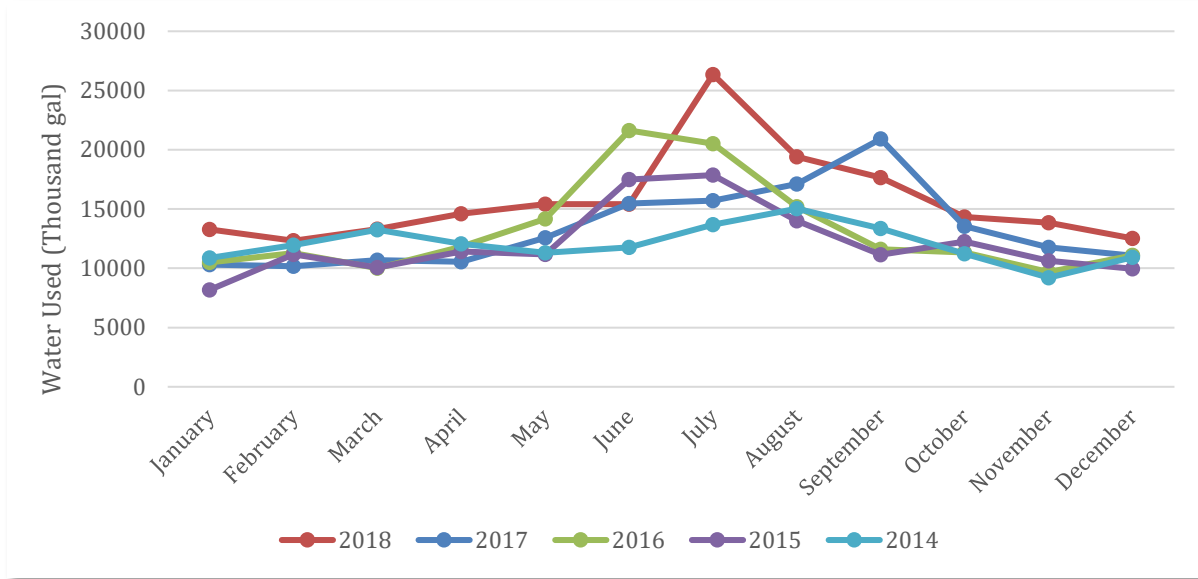


FIGURE 5: Seasonal Variation in Water Usage 2014-2018

Note: Based on metered water sales.

One means of tracking water use is by calculating the water use per Residential Equivalence Unit (REU). The REU metric is a means of expressing system usage in terms of an ‘equivalent residential unit’ or ‘typical home’. AWWA Manual M1 Principles of Water Rates, Fees, and Charges (Page 202, Table 28-2) summarizes typical equivalents and maximum meter flow rates. Within AWWA M1, maximum meter flow rates are referenced from AWWA M6. Appendix D contains a table from the Village of Somers Ordinance that identifies standard flow and REU for each meter size. The table in Appendix D and the PSC Annual Report summarizing the various meters in the Village were used to calculate the 2019 average day water use per REU, which was 235 gallons per day per REU for 2019. An example calculation is included in Appendix A. Average day water use per REU for the past 5 years is illustrated in Figure 6.

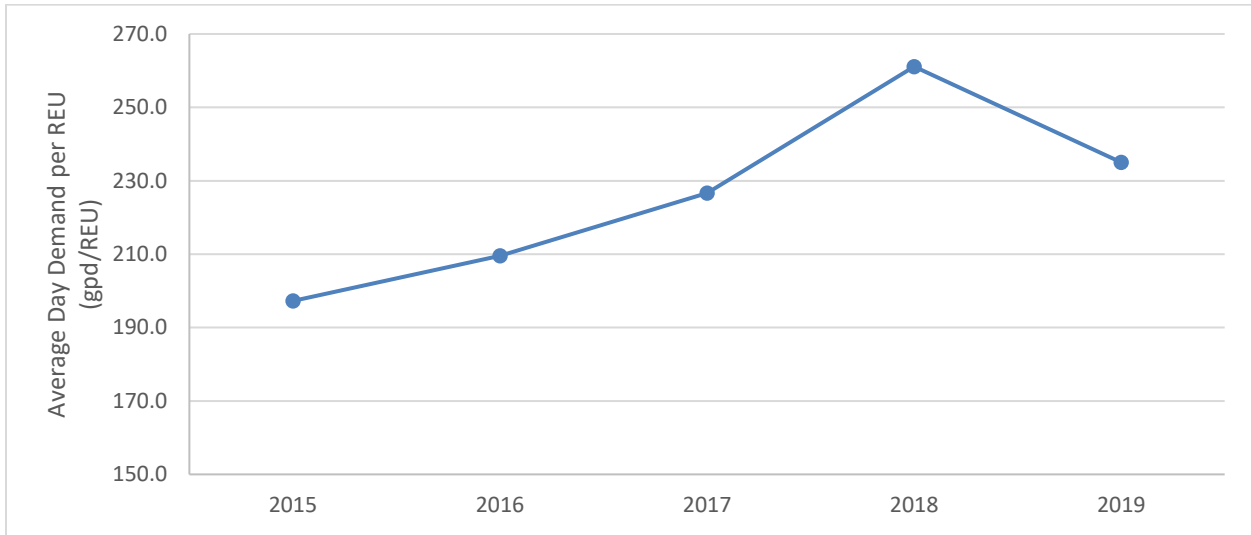


FIGURE 6: Average Day Water Use per REU 2015-2019

2.3 Projected Village Water Use

The projected population and water use of the Village is shown in Table 2. The projected average day water use at full build-out is projected to be 7.08 MGD. The associated maximum day water use is expected to be 12.0 MGD. For additional information on projected water use, see Chapter 5 of the Water Supply Service Area Plan.

TABLE 2

Projected Population and Water Demand

Year	Projected Village Population	Projected Percent of Population Served	Average Day Demand (MGD)
2019	8,371	47%	0.36
2020	8,867	47%	0.45
2030	15,759	54%	0.93
2040	28,010	70%	2.27
2050	49,816	100%	7.08

Source: See Appendix B and Appendix C for water use and population estimates.

3. CONSERVATION AND EFFICIENCY MEASURES

3.1 Goals

The Village has set the following goals to improve water conservation and efficiency: educate consumers on the benefits of water conservation and reduce average day water use per REU by five percent.

3.2 Conservation and Efficiency Measures

The conservation tiers from NR 852 and associated conservation measures are described below.

3.2.1 Water Use Audits

CEM #	Description	Required Elements in NR 852
PWS-1	Water Use Audit	Perform a water use audit and prepare written documentation of the audit results using the process outlined in one of the following: 1. Public water systems regulated by the Public Service Commission shall follow the water audit procedures indicated in ch. PSC 185. 2. Public water systems not regulated by the Public Service Commission shall submit water audit results with the water conservation plan required in s. NR 852.07.

The Village currently conducts an annual water audit in accordance with PSC 185. The Utility monitors its customer water sales during its regular quarterly billing cycle and compares these sales to wholesale water purchased from the Kenosha Water Utility. The Utility performs investigations when water loss approaches 15 percent of the volume purchased from KWU.

All customers are metered. Meters smaller than two inches are tested upon request of the customer but no less than once every 10 years. Meters larger than two inches are tested every two years. Ensuring all meters are correctly calibrated allows the Village to collect accurate data for water usage, identify leaks in the system, and minimize non-revenue water. The Utility may consider using the AWWA Water Audit software (version 5.0) to identify target areas for additional leak detection.

3.2.2 Leak Detection and Repair Program

CEM #	Description	Required Elements in NR 852
PWS-2	Leak Detection and Repair Program	Prepare a written program to control system losses in accordance with one of the following: 1. Public water systems regulated by the Public Service Commission shall follow the procedures indicated in ch. PSC 185 regarding system losses. 2. If a public water system is not regulated by the Public Service Commission has 1,000 or more service connections and system

CEM #	Description	Required Elements in NR 852
		losses greater than 15%, or has fewer than 1,000 service connections and system losses greater than 25%, the public water system shall complete a survey of leaks using one of the available technical methods and complete a corrective action plan.

The Village complies with system loss procedures in PSC 185. The Utility experiences approximately 5 water main breaks per year. Historically, unaccounted for water is approximately 12% of the purchased volume. In 2018 it was 16%; however, the majority of the breaks were in the Sheridan Road area. The Village intends to replace the water mains that are fed from Sheridan Road in 2020 and is in the planning phase to replace several miles of 1960’s cast iron pipe along Sheridan Road. The Village has applied for a loan from the Safe Drinking Water Loan Program to assist in replacing these water mains. When these replacements are complete, all water mains served in the KWU Zone 1 will be less than 15 years old and the volume of unaccounted for water should decrease.

3.2.3 Information and Education Outreach

CEM #	Description	Required Elements in NR 852
PWS-3	Information and Education Outreach	<ol style="list-style-type: none"> 1. Provide information to employees and customers regarding water conservation and water use efficiency. Include all of the following items: reasons water conservation is necessary, consequences of not conserving water, and actions needed to achieve the water conservation goals of the community. Provide information and education in an effective format to customers and employees specific to landscape watering practices. Public water systems regulated by the Public Service Commission shall follow the Utility billing procedures indicated in ch. PSC 185. 2. Develop and deliver a training plan to educate and train employees on the implementation of water conservation and efficiency measures at public water system facilities. Information and education materials shall be made available to the department.

The Village’s water conservation goals and AWE tool results will be shared with the residents on the Village website. This website includes resources for residents, educators, and contractors to learn more about water conservation, high efficiency plumbing fixtures, unaccounted for water, and the water system in general. This measure has been implemented by the village and the information can be found at the following link: <https://www.somers.org/news/2021/07/23/water-conservation/>.

In addition, the Village can partner with its largest water user, UW-Parkside, to educate college students and staff on water conservation and reuse techniques.

3.2.4 Performing Source Measurement

CEM #	Description	Required Elements in NR 852
PWS-4	Source Measurement	Measure or estimate all water withdrawals monthly or more frequently to allow for identifying and understanding variability in water use over time. Public water systems regulated by the Public Service Commission shall follow the metering requirements provided in ch. PSC 185.

KWU bills the Village for source water and wastewater and the Village bills their residents on a quarterly basis. The data will be plotted and compared to determine discrepancies. KWU regularly tests and recalibrates the Somers master supply meters on an annual basis. Additional steps may include comparing water sales and wastewater pumped from individual drainage basins.

3.2.5 Distribution System Pressure Management

CEM #	Description	Required Elements in NR 852
PWS-R1	Distribution System Pressure Management	Analyze distribution system pressure management to identify opportunities to reduce water use and minimize plumbing fixture leaks.

The Village’s distribution system is operated to meet the standards of NR 811.70. The Village does not have pumping facilities at this time. Water pressure will be monitored at three locations: 1) Fire Station No. 2 in KWU Zone 1, Pike Creek Sewage Lift Station in KWU Zone 2, and the discharge line of the Water Transfer Station on 18th Street serving the Somers Zone. All pressure data will be recorded and transmitted to the Utility’s SCADA system.

3.2.6 Residential Demand Management Program

CEM #	Description	Required Elements in NR 852
PWS-R2	Residential Demand Management Program	Establish and publicize a program to complete residential customer water use audits and leak surveys upon customer request based on high or aberrant water use. In developing the program, a waiver of liability and written permission from the customer may be needed.

A future meter reading system will be used to detect abnormal usage at each metering site so that the customer can be made aware of problems, such as a running toilet, before receiving their monthly bill. The village will consider implementing residential low-flow showerhead rebates for single family homes. The rebate would consist of a \$20 rebate for residents who purchase and install a WaterSense showerhead in their home. In addition, the Village will implement a voluntary lawn sprinkling restriction that residents can participate in to further support the conservation efforts. Finally, the village currently maintains a program for residents to contact the Village Clerk if the quarterly water bill is higher than expected. The Clerk will notify the water department who will

provide staff to perform in-home inspections to determine any potential for leaks. More information for these programs are available on the Village website at the following link: <https://www.somers.org/news/2021/07/23/water-conservation/>.

3.2.7 Commercial and Industrial Demand Management Program

CEM #	Description	Required Elements in NR 852
PWS-R3	Commercial and Industrial Demand Management Program	Establish and publicize a program to complete commercial and industrial customer water use audits and leak surveys upon customer request based on high or aberrant water use. In developing the program, a waiver of liability and written permission from the customer may be needed.

The Village currently has few industrial customers, but is projecting a large increase as final build-out is reached. In the meantime, conservation measures can be directed towards commercial and industrial customers similar to the residential program. Information on water conservation best practices will be provided to all commercial and industrial customers. Recommended best practices include automatic sprinkler systems and high-efficiency toilets. The village will consider implementing rebates for commercial valve-type ultra-low-flush toilets in commercial or industrial buildings. The rebate would consist of a \$100 rebate for customers who purchase and install a new WaterSense ultra-low-flush toilet in their business. Finally, the village maintains a program for commercial and industrial customers to contact the Village Clerk if the quarterly water bill is higher than expected. The Clerk will notify the water department who will provide staff to perform on-site inspections to determine any potential for leaks at the commercial or industrial facility. More information for these programs are available on the Village website at the following link: <https://www.somers.org/news/2021/07/23/water-conservation/>.

3.2.8 Water Reuse

CEM #	Description	Required Elements in NR 852
PWS-R4	Water Reuse	Conduct a technical assessment to evaluate the feasibility of water reuse in the operation of the facility. Implement water reuse projects identified by the assessment and allowed under current state law.

At this time, the village does not utilize water in facility operations and no current opportunities for water reuse are available.

3.3 AWE Tool Results

The Village of Somers falls under the Tier 3 water conservation requirements, which includes evaluation of additional CEM's. The Alliance for Water Efficiency maintains the Water Conservation Tracking Tool to assist in the evaluation of water savings, costs, and benefits of additional CEM's required for Tier 3 water conservation. This tool provided the Village with a standard for comparison of water savings and benefit-cost (B/C) ratios. For a complete summary of inputs and results from the software, see Appendix E.

The expected cost of implementation, water savings, and start year of each CEM are shown in Table 3. The results of the tool are shown in Table 4. B/C ratios greater than one indicates greater benefit than cost, and a B/C lower than one indicates greater cost than benefit. Net Present Value (NPV) indicates the estimated present savings (positive value) or cost (negative value) of implementing each CEM. All CEMs studied in this report have positive B/C ratios. The basis for evaluating the cost savings for each CEM is the wholesale cost of water purchased from the KWU, which is estimated at \$2,312 initially and assumed a nominal 2% annual increase over the life of the project.

TABLE 3
AWE Conservation Tracking Tool Input Information

CEM #	Description	User Class	Start Year	Initial Cost	Yearly Cost	Water Savings (MGY)
PWS-R1	Distribution System Pressure Management	Utility-wide	2023	\$20,000	\$0	1.1
PWS-R2	WaterSense Showerhead Rebates	Multi-Family	2023	\$1,000	\$1,500	1.3
		Single-Family	2023	\$1,000	\$1,500	1.4
	High-Efficiency Toilet Rebates	Multi-Family	2023	\$1,000	\$3,000	3.3
		Single-Family	2023	\$1,000	\$3,000	3.3
	Voluntary Lawn Sprinkling Restrictions	Single Family	2021	\$1,000	\$0	0.7
PWS-R3	CII Valve-Type Ultra-low-flush Toilet Rebates	Commercial & Industrial	2021	\$1,000	\$600	0.7

TABLE 4
AWE Conservation Tracking Tool Output Information

CEM #	Description	User Class	NPV (\$)	B/C Ratio	Lifetime Water Savings (MG)
PWS-R1	Distribution System Pressure Management	Utility-wide	\$43,853	3.4	27
PWS-R2	WaterSense Showerhead Rebates	Multi-Family	\$3,055	1.1	14
		Single-Family	\$327	1.0	15
	High-Efficiency Toilet Rebates	Multi-Family	\$93,590	2.3	42
		Single-Family	\$26,376	1.4	71
	Voluntary Lawn Sprinkling Restrictions	Single Family	\$37,781	41.8	17
PWS-R3	CII Valve-Type Ultra-low-flush Toilet Rebates	Commercial & Industrial	\$12,276	1.9	11
Total Conservation Activities			\$217,258	1.9	196

It is intuitive to implement the CEMs with the highest B/C ratio first, however, changes in technology may allow easier implementation of measures with lower B/C ratios. The net reduction to the Village’s 2019 water use per REU was calculated at approximately 11.8 MGY of water conserved. The reduction to the Village’s 2019 water use per residential equivalence unit of 235 gpd per REU (Chapter 2) is expected to be 7 percent based on the calculations below.

Percent Reduction to 2018 Water User per REU

2019 Volume Purchased	174.0	MGY
2019 Total REU's	2,027.8	REU
<u>2019 Water Use per REU</u>	<u>235</u>	<u>gpd/REU</u>
Less Volume Conserved	11.8	MGY
<u>Water Use per REU</u>	<u>219</u>	<u>gpd/REU</u>
<u>Percent Reduction</u>	<u>7%</u>	

The a schedule for implementing the cost effective conservation measures will be prepared after a year of data is obtained following the Sheridan Road utility project scheduled for completion October, 2021. A formalized schedule for implementing these measures will be provided in the 2023 update to this plan following the Village’s current Rate Case with the PSC.

3.4 Benchmarking Progress

Data collection will continue at all customer meters and water service meters from KWU. The water conservation plan should be reviewed annually against the required PSC reporting. A formal update of the plan should accompany an authority to construct or rate increase greater than five percent.

APPENDIX

A - Sample Calculation

B - Historical Population

C - Historical Water Use

D - Standard REU by Meter Size - Village Ordinance Appendix "C"

E - AWE Conservation Tool Inputs & Results

Calculate Residential Equivalent Units

$$\text{Number of Meters} * \text{REU Ratio} = \text{REU}$$

$$686 \text{ meters} * 1 = 686 \text{ REU}$$

Meter Size	Number of Meters*	REU Ratio**	REU
5/8	674	1	674
3/4	242	1	242
1	162	1.67	271
1 1/2	50	3.33	167
2	39	6.67	260
3	13	16	208
4	3	28	84
6	2	61.3	123
10	0	167	0
Total	1,185		2,028

Calculate Average Day Water Use per REU

$$\text{Water Use}/\text{REU} = \frac{\text{Average Day Water Use}}{\text{Total REU}}$$

$$\text{Average Day Water Use} = \frac{\text{Total Water Purchased}}{365 \text{ days}}$$

$$\text{Total Water Purchased} = 173,956,000 \text{ gallons}^*$$

$$\frac{173,956,000 \text{ gal}}{365 \text{ days}} = 476,592 \text{ gpd}$$

$$\frac{476,592 \text{ gpd}}{2,028 \text{ REU}} = 235 \text{ gpd}/\text{REU}$$

* From Village of Somers Water Utility Annual Report 2019

** The REU Ratio was calculated by summing the number of meters multiplied by their respective Residential Equivalence Unit per the Village of Somers Ordinance (Appendix D).

Historical Population

Historical population data obtained from the Wisconsin Department of Administration (DOA) for the entire Village (and Town) of Somers is summarized in the table below. The Village of Somers partially incorporated in 2015 (fully in 2016). The estimated historical population for the entire Village is summarized below and calculated by subtracting the average population in the Town from 2006 through 2015 from the Town’s annual DOA Population estimate.

Year	Town of Somers DOA Population	Village of Somers Population	Estimated Historical Village of Somers Population ²
2006	9,389	-	8,148
2007	9,361	-	8,120
2008	9,452	-	8,211
2009	9,516	-	8,275
2010	9,597 ¹	-	8,356
2011	9,517	-	8,276
2012	9,463	-	8,222
2013	9,369	-	8,128
2014	9,512	-	8,271
2015	9,514	-	8,273
2016	1,234	8,462	8,462
2017	1,225	8,615	8,615
2018	1,255	8,827	8,827
2019	1,252	8,371 ³	8,371

Footnote:

¹ Population data from the 2010 Census was used in place of the DOA population Projection.

² Data prior to 2015 was estimated by subtracting the average town DOA population estimates for 2016 to 2019 from the total town and village DOA population estimate. Data after 2015 is the Village of Somers DOA population estimate.

³ Data for 2019 was obtained from the DOA’s estimate for the Village of Somers in July 2019.

Future Land Use and Projected Population

The projected population of the entire Village of Somers was estimated using future residential type land use acreage and assumptions for residents per acre for each type of land use. The following table summarizes the assumptions used in this report.

Assumptions	Low to Medium Density	Medium Density	High Density	Mixed Use
Units per Acre of Residential Land Use (Assumed)	2	3	10	1.5
2018 Average Persons Per Household	2.57 Persons per household Source: Based on U.S. Census Bureau Quick Facts for the Village of Somers 2018			

The table below summarizes the total developable area by 2050 Land Use within the entire Village of Somers. Note, developable land excludes floodplains and assumes that 70% of a parcel will be developable in the future due to roads, natural areas, etc.

2050 Land Use	Area (acres)	Units / Acre	Total Estimated Units	Calculated Population
Low to Medium Density	1,633	2	3,266	8,393
Medium Density	4,303	3	12,909	33,177
High Density	298	10	2,979	7,658
Mixed Use	153	1.5	229	588
Total Population (2050)				49,816

Projected Population/Account Growth

A constant growth rate was used to estimate future village population and population served between 2019 and 2050. The growth rates vary by customer sector and are generally higher than typical growth rates in other municipalities. In 2020 a multifamily development was constructed that added 29 units to the Village. The development has already reached near maximum capacity with renters. Additional multifamily developments are currently under review or in the planning stage and are scheduled for construction late 2021. Therefore, the growth rates selected for the purpose of estimating intermediate populations between 2019 and 2050 are consistent with the current trend in the Village.

The table below summarizes the projected Village population, population served, residential and multifamily accounts, and the average daily water use (MGD) every 5 years over the planning period.

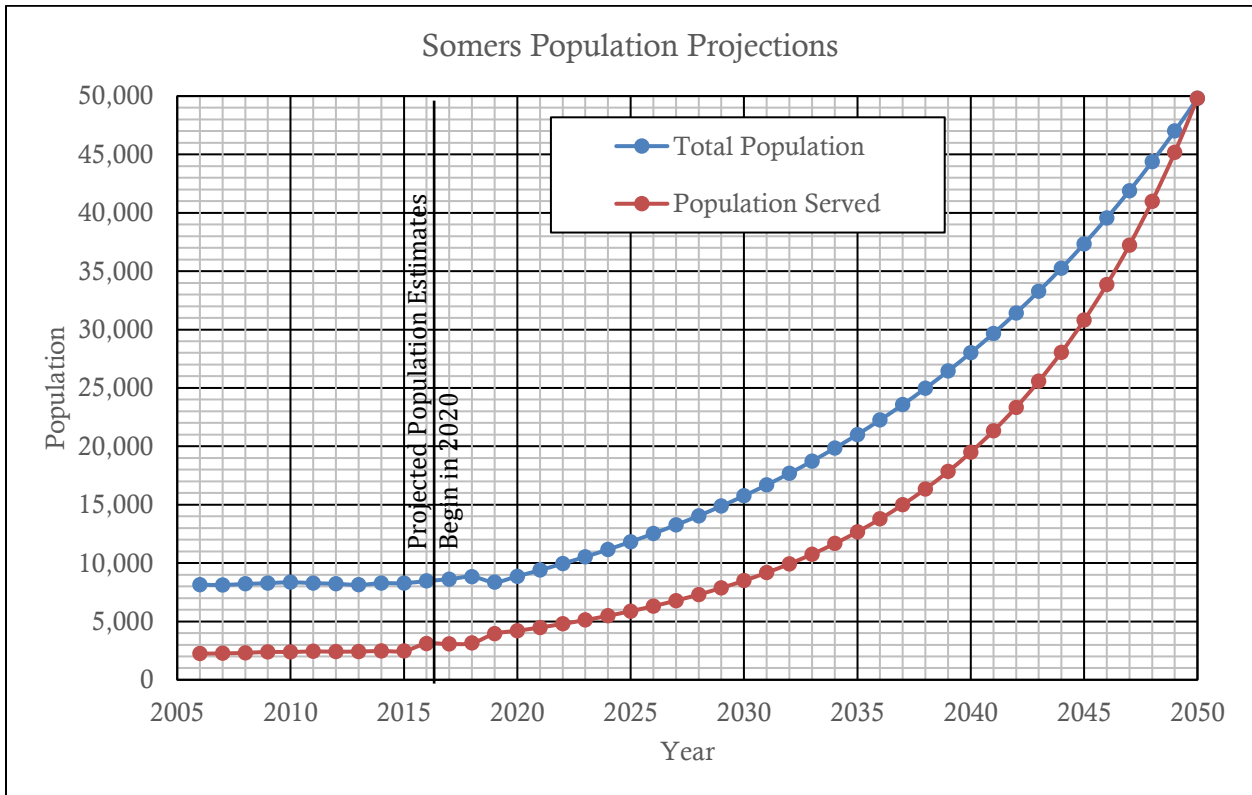
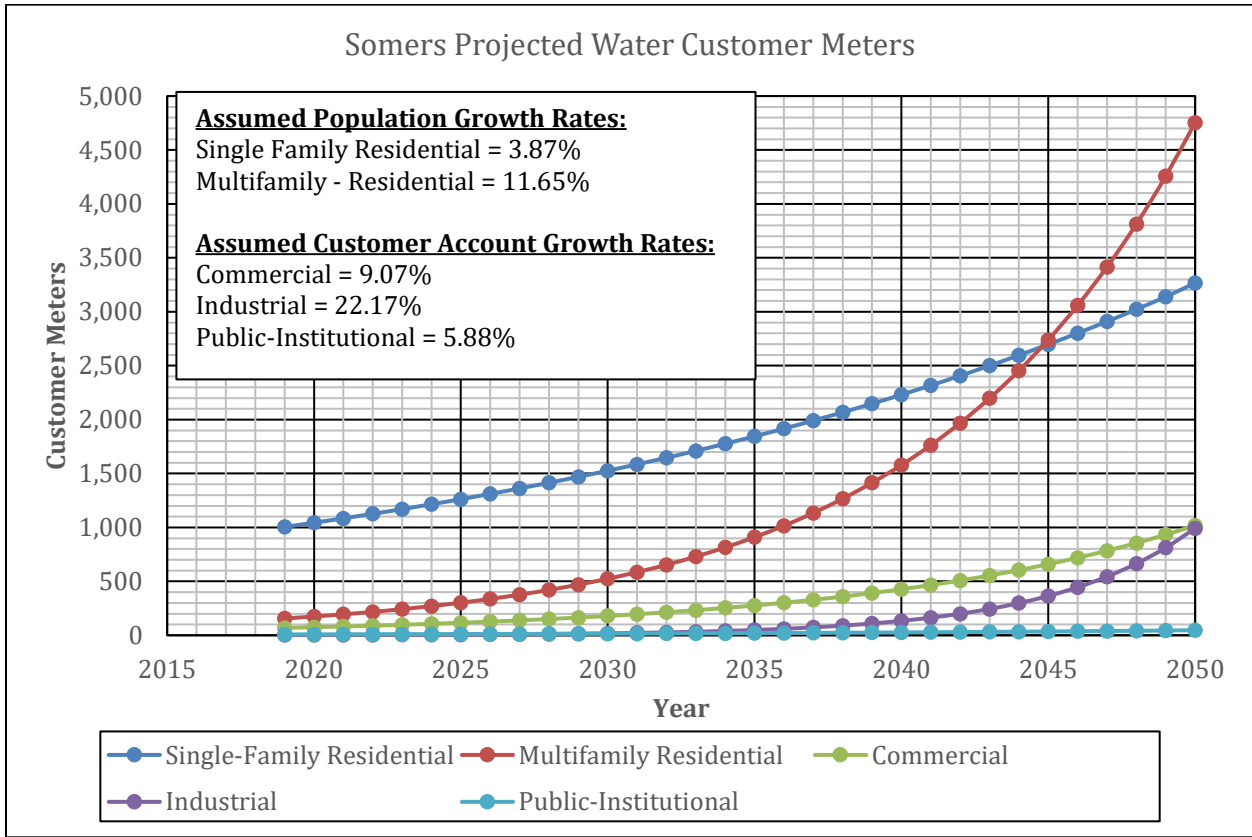
Year	Projected Village Population	Residential Customers Served (Meters) ¹	Multifamily Customers Served (Meters) ²	Population Served	% of Total Population Served	Average Day Demand (MGD) ³
2019	8,371	1,005	156	3,942	47%	0.36
2020	8,867	1,044	174	4,200	47%	0.45
2025	11,821	1,262	302	5,877	50%	0.63
2030	15,759	1,526	524	8,491	54%	0.93
2035	21,010	1,845	910	12,670	60%	1.42
2040	28,010	2,231	1,579	19,489	70%	2.27
2045	37,343	2,697	2,740	30,801	82%	3.88
2050	49,816	3,266	4,754	49,816	100%	7.08

Footnotes:

¹ 2.57 people per housing unit per the U.S. Census Bureau 2018 Statistics for the Village of Somers.

² 3.39 units per multifamily meter calculated by total multifamily acreage and units per acre.

³ Average day demand was estimated from the number of accounts projected for each year based on growth rate. See 'Somers Projected Water Customer Meters' figure on page 3 of this document.



VILLAGE OF SOMERS - WATER SALES AND PUMPAGE HISTORY

Year	Annual Water Sales (MGY)							Total Sales (MGY)	Total Pumpage (MGY)	Non-Revenue Water		Percent Pumpage Metered	Percent Accounted For	
	Residential	Commercial		Industrial	Public	Multifamily	Other Water			Sales for	Authorized			Water Losses
	Metered	Metered	Unmetered	Metered	Metered	Residential	Sales			Resales	Uses (MGY)			(MGY)
2006	50.96	37.20	23.09	0.00	19.36		0.00	0.52	131.13	145.60	0.03	14.44	90.1%	90.1%
2007	59.94	40.53	0.05	0.00	32.81		0.31	0.01	133.64	163.94	28.44	1.86	81.5%	98.9%
2008	56.81	40.24	0.05	0.00	25.96		0.13	0.16	123.34	154.88	30.78	0.77	79.6%	99.5%
2009	54.02	43.54	0.00	0.00	28.52		3.32	4.32	133.72	152.16	0.00	18.44	87.9%	87.9%
2010	68.09	61.00	0.00	0.00	17.17		0.00	1.04	147.30	163.12	1.35	14.47	90.3%	91.1%
2011	53.58	54.43	0.00	0.00	37.51		0.00	0.87	146.38	162.97	11.34	5.25	89.8%	96.8%
2012	60.29	66.13	0.00	0.00	25.79		0.00	1.65	153.86	179.70	0.39	25.46	85.6%	85.8%
2013	50.76	61.25	0.00	0.00	37.21		0.00	1.13	150.34	145.19	0.35	(5.50)	103.5%	103.8%
2014	45.35	44.36	0.00	0.00	38.36		0.00	1.12	129.19	144.67	0.17	15.32	89.3%	89.4%
2015	47.51	43.81	0.00	0.00	33.17		0.14	1.35	125.97	145.37	0.16	19.24	86.7%	86.8%
2016	52.70	46.54	0.00	0.00	36.12		1.89	1.63	138.87	158.84	0.92	19.05	87.4%	88.0%
2017	48.38	36.05	0.00	1.19	33.23	13.00	0.24	1.73	133.82	159.88	0.92	25.14	83.7%	84.3%
2018	49.46	26.73	0.00	2.36	33.12	29.79	0.33	1.71	143.50	188.40	14.79	30.11	76.2%	84.0%
2019	47.19	16.66	0.00	0.69	30.58	34.57	0.26	1.22	131.17	173.96	11.55	31.50	75.4%	82.0%

Maximum value in each category=

Notes:	<p>From 2000 to 2007, "Authorized System Uses" included estimated water used in flushing or used in water treatment/production/quality/maintenance, and unaccounted water as well as losses. In 2008, PSC reports were updated to document estimates of Water Loss due to main, service, and hydrant leaks/breaks. Prior to 2014, Multifamily Residential was reported as Commercial. Data for 2007, 2008, was altered due to clerical error in data entry. The data appears to be off by one decimal place and has been corrected in this table (12.34 MGY total sales should actually be 123.4 MGY in total sales). Data for 2013 appears to contain errors in data entry and sales volume versus non-revenue water does not add up correctly.</p>
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HISTORICAL NUMBER OF CUSTOMERS SERVED

Year	Number of Customers					Total
	Residential	Commercial	Industrial	Public	Multifamily Residential ¹	
2006	870	116	0	12	-	998
2007	880	109	0	14	-	1,003
2008	896	111	0	15	-	1,022
2009	929	130	0	16	-	1,075
2010	925	141	0	18	-	1,084
2011	946	128	0	17	-	1,091
2012	936	120	0	16	-	1,072
2013	943	120	0	16	-	1,079
2014	960	207	0	9	0	1,176
2015	959	205	0	9	0	1,173
2016	1,206	212	0	9	0	1,427
2017	967	152	2	8	66	1,195
2018	992	157	2	8	68	1,227
2019	1,005	69	2	8	156	1,240

Footnote:

¹ Prior to 2014, Multifamily Residential was reported as a part of Commercial.

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Maximum value in each category=

HISTORICAL PER CAPITA CONSUMPTION

Year	Total Population ¹	Population Served ²	Gallons per Capita per Day						Total
			Residential	Commercial	Industrial	Public	Multifamily Residential ³	Non-Revenue Water Use	
2006	8148	2,236	62.4	45.6	0.0	23.7	-	17.7	149
2007	8120	2,262	72.6	49.1	0.0	39.7	-	36.7	198
2008	8211	2,303	67.6	47.9	0.0	30.9	-	37.5	184
2009	8275	2,388	62.0	50.0	0.0	32.7	-	21.2	166
2010	8356	2,377	78.5	70.3	0.0	19.8	-	18.2	187
2011	8276	2,431	60.4	61.3	0.0	42.3	-	18.7	183
2012	8222	2,406	68.7	75.3	0.0	29.4	-	29.4	203
2013	8128	2,424	57.4	69.2	0.0	42.1	-	(5.8)	163
2014	8271	2,467	50.4	49.3	0.0	42.6	-	17.2	159
2015	8273	2,465	52.8	48.7	0.0	36.9	-	21.6	160
2016	8462	3,099	46.6	41.1	0.0	31.9	-	17.7	137
2017	8615	3,060	53.3	32.3	1.1	29.7	62.0	23.3	202
2018	8827	3,142	53.2	23.3	2.1	28.9	137.9	39.2	284
2019	8371	3,942	50.1	11.6	0.5	21.3	69.7	29.9	183
Average			59.7	48.2	0.3	32.3	89.8	23.0	193.3

Footnotes:

¹ Total population for the Village of Somers was estimated between 2006 and 2016 when the Village incorporated. The estimated Village population between 2006 and 2015 was estimated by subtracting the average Town population in 2016 through 2019 from the Town population between 2006 and 2015. Population data sources include Wisconsin Department of Administration and the United States Census Bureau for census years.

² Population served was estimated using residential and multi family customer meters multiplied by the average persons per household of 2.57. A weighted average of 3.39 units per multifamily account was assumed. Per Capita water use for residential and multifamily residential was estimated based on their respective population served for 2017 through 2019.

³ Prior to 2014, Multifamily Residential was reported as a part of Commercial.

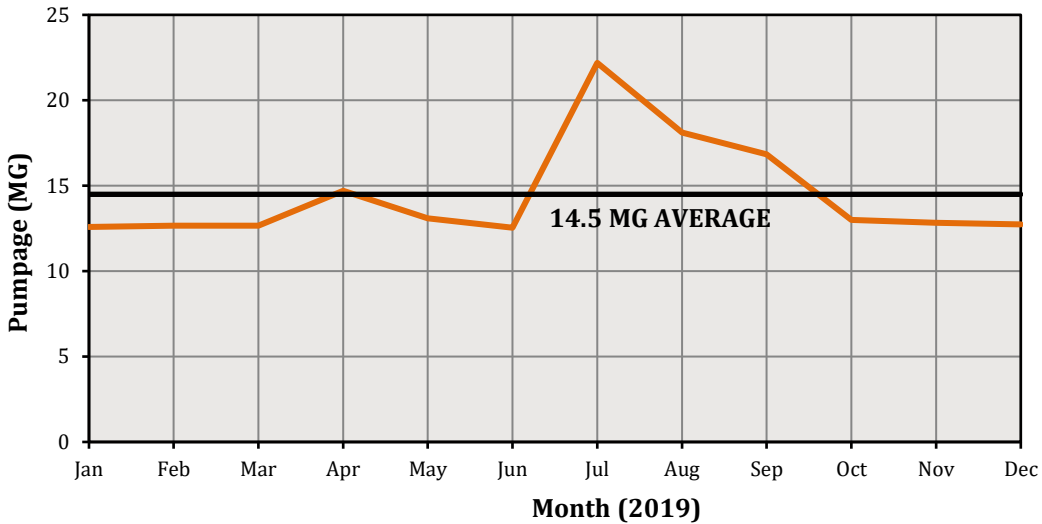
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Maximum Value =

2019 SEASONAL PUMPAGE VARIATIONS

Month	Monthly Pumpage (MG)	Percentage of Total Pumpage	Percentage of Average Pumpage
January	12.59	7.2%	86.9%
February	12.67	7.3%	87.4%
March	12.67	7.3%	87.4%
April	14.70	8.4%	101.4%
May	13.09	7.5%	90.3%
June	12.54	7.2%	86.5%
July	22.19	12.8%	153.1%
August	18.12	10.4%	125.0%
September	16.84	9.7%	116.2%
October	12.99	7.5%	89.6%
November	12.83	7.4%	88.5%
December	12.74	7.3%	87.9%
Total	173.96	100.0%	

2019 Seasonal Pumpage Variation
Village of Somers, Wisconsin



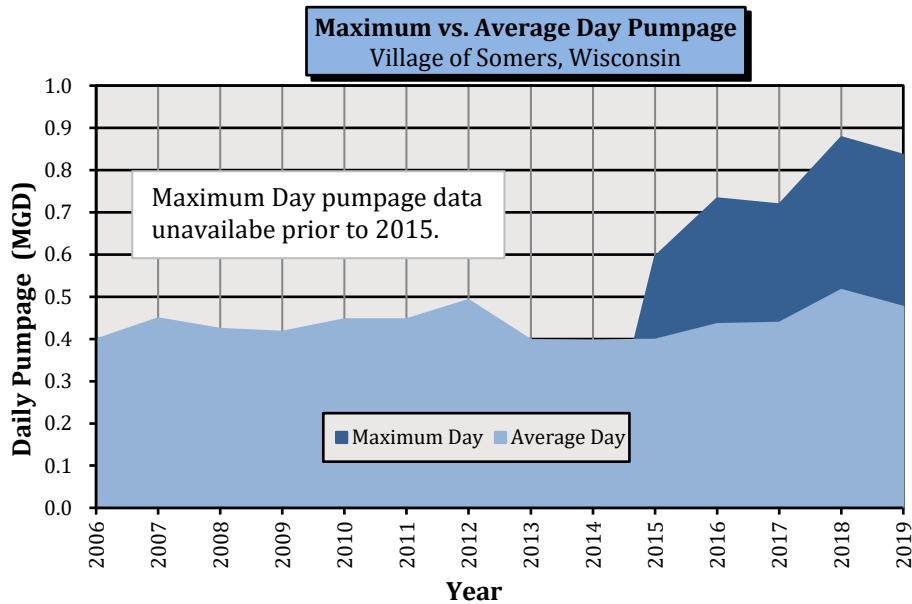
DAILY PUMPAGE VARIATIONS

Year	Average Day Pumpage (MGD)	Maximum Day Pumpage (MGD)	Date of Maximum Day	Ratio of Maximum to Average Day
2006	0.40	-		0.00
2007	0.45	-		0.00
2008	0.42	-		0.00
2009	0.42	-		0.00
2010	0.45	-		0.00
2011	0.45	-		0.00
2012	0.49	-		0.00
2013	0.40	-		0.00
2014	0.40	-		0.00
2015	0.40	0.60	15 October	1.49
2016	0.44	0.73	29 July	1.68
2017	0.44	0.72	15 November	1.64
2018	0.52	0.88	15 July	1.70
2019	0.48	0.84	15 October	1.75

Note

No data was available prior to 2015 for maximum daily pumpage. Note only 2018 daily maximum was not due to a water main break or hydrant flushing. Therefore, a maximum day ratio of 1.70 times average day demand was selected for the purposes of this report.

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APPENDIX "C"

(1) **Amount-Residential Users.** The Developer or individual residential users shall pay a sanitary sewer connection fee to the Village Clerk/Treasurer for each installation in the amount of Two Thousand Eight Hundred (\$2,800.00) Dollars at the time of application for the connection permit for a single-family residential dwelling or the first unit of a multi-family residential building and Two Thousand (\$2,000.00) Dollars for the second unit and One Thousand Six Hundred (\$1,600.00) Dollars for the third and each subsequent unit in multi-family buildings.

(2) **Amount-Non-Residential Users.** The Developer or owner shall pay to the Village Clerk/Treasurer as a condition of approval by the Village Board of a final plat, site plan, certified survey map, planned unit development or condominium plat a sanitary sewer connection fee of Two Thousand Eight (\$2,800.00) Dollars multiplied by the residential equivalency unit (REU) ratio for the applicable water meter size and type from the table set forth below for each buildable lot or unit included in the final plat, site plan, certified survey map, planned unit development or condominium plat. The total sanitary sewer connection fee attributable to each buildable lot or unit within the proposed non-residential use development shall be payable upon the issuance of a building permit, unless otherwise agreed by the Village and the Developer by written Development Agreement.

Meter Size (Inches)	Meter Type	AWWA Standards Flow (GPM)	REU Ratio
¾" or less	Displacement	15	1.0
1	Displacement	25	1.7
1½	Displacement	50	3.3
2	Displacement	80	5.3
2	Compound	80	5.3
2	Turbine	100	6.7
3	Compound	160	10.7
3	Turbine	240	16.0
4	Compound	250	16.7
4	Turbine	420	28.0
6	Compound	500	33.3
6	Turbine	920	61.3
8	Compound	800	53.3
8	Turbine	1600	106.7
10	Compound	1150	76.7
10	Turbine	2500	166.7

Note: Input data was provided to the Village by Baxter & Woodman, Inc. (B&W) to assist in setting up the tool for analysis. The Village then provided results from the tool to B&W to respond to the Department of Natural Resources address comments on evaluating additional conservation measures.

Section 1 – Common Assumptions

Population, Housing, and Account Forecasts

Population & Housing	2019	2020	2025	2030	2035	2040	2045	2050
Population	3,942	4,200	5,877	8,491	12,670	19,489	30,801	49,816
Single Family Dwelling Units	1,005	1,044	1,262	1,526	1,845	2,231	2,697	3,266
Multi Family Dwelling Units	156	174	302	524	910	1,579	2,740	4,754

Number of Accounts

Single Family	1,005	1,044	1,262	1,526	1,845	2,231	2,697	3,266
Multi Family	156	174	302	524	910	1,579	2,740	4,754
Commercial	69	75	116	179	277	427	660	1,018
Industrial	2	2	7	18	49	134	365	992
Institutional	8	8	11	15	20	27	35	47
Not in use								
Not in use								
Not in use								
Not in use								

Financial Assumptions

Dollar Base Year	2021
Annual Inflation Rate	2.0%
Nominal Interest Rate	4.0%

Utility Rates in 2019

Customer Class	Average Class Rate (2021 Dollars)				Annual Rate of Increase			
	Water (\$/Thou Gal)	Sewer (\$/Thou Gal)	Electricity (\$/KWh)	Gas (\$/Therm)	Water Rates (%/Yr)	Sewer Rates (%/Yr)	Electric Rates (%/Yr)	Gas Rates (%/Yr)
Single Family	\$8.67	\$0.00	\$0.00	\$0.00	2.0%	0.0%	0.0%	0.0%
Multi Family	\$5.73	\$0.00	\$0.00	\$0.00	2.0%	0.0%	0.0%	0.0%
Commercial	\$6.16	\$0.00	\$0.00	\$0.00	2.0%	0.0%	0.0%	0.0%
Industrial	\$6.21	\$0.00	\$0.00	\$0.00	2.0%	0.0%	0.0%	0.0%
Institutional	\$5.06	\$0.00	\$0.00	\$0.00	0.0%	0.0%	0.0%	0.0%

Information Needed to Calculate Water/Energy Savings from Plumbing/Appliance Standards

	Single Family	Multi Family
Persons per household	2.57	2.57
Full Baths/Dwelling Unit	1.46	1.10
Half Baths/Dwelling Unit	0.56	0.14
Dwelling Units in 1994	3,000	0

Population in 1990	1,500
--------------------	-------

Information Needed to Calculate Water Savings for Landscape Measures in Library

Reference ET	in/yr	83.59
Avg Annual Rainfall	in/yr	40.00
Effective Rainfall	%	25%

Landscape Water Requirement Coefficient (K _L)		
Turf	% of ET ₀	80%
Other than turf	% of ET ₀	0%

		Residential	Non Residential
Avg Landscape Area Per Site	ft ²	14,500	29,000
Avg Turf Area (% of Total)	%	100%	100%
Avg Irrigation Efficiency (%)	%	50%	50%

		Residential	Non Residential
Irrigation Requirement			
Turf Area	in/ft ² /yr	114	114
Other	in/ft ² /yr	0	0

		Residential	Non Residential
Avg Landscape Water Use Per Site			
Turf Area	Gal/Yr	1,028,055	2,056,111
Other	Gal/Yr	0	0
Total	Gal/Yr	1,028,055	2,056,111

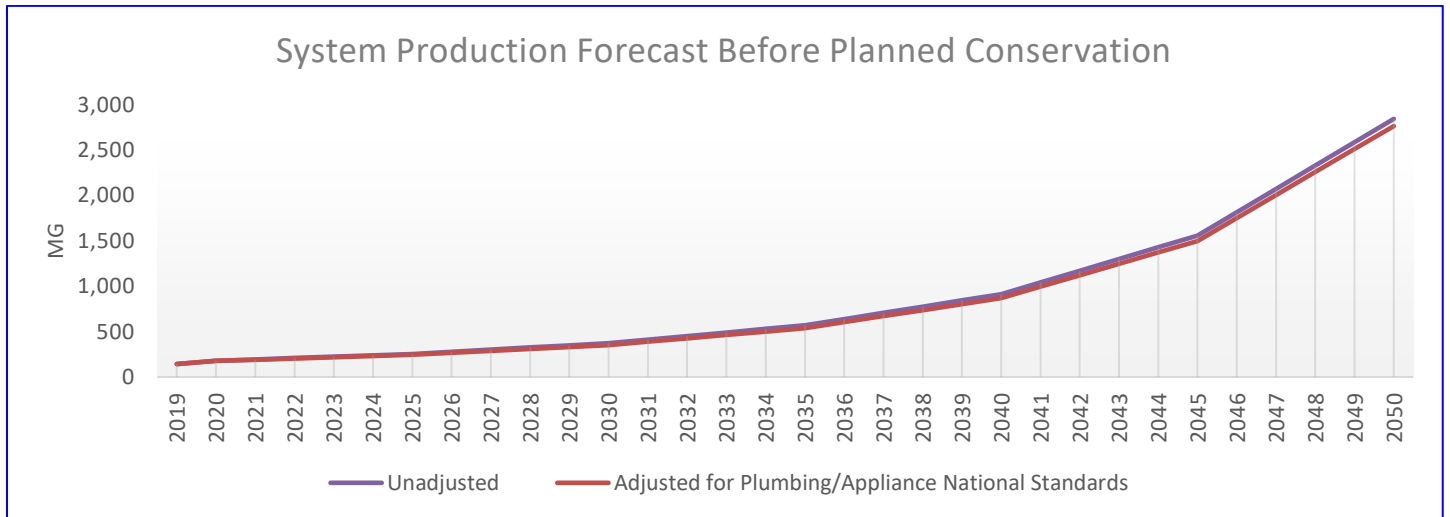
Section 2 – Specify Demands

Peak Demand Season

	Begin Date	End Date	Peak Days	% of Year
Peak Demand Season	1-Jul	1-Oct	92	25%

Baseline Demand Forecast

Annual Sales	Units	2019	2020	2025	2030	2035	2040	2045	2050	Peak Season % of Annual
Single Family	MG	47	69	83	100	121	146	177	214	44%
Multi Family	MG	35	39	67	117	203	351	610	1,050	44%
Commercial	MG	17	18	28	43	67	103	159	246	44%
Industrial	MG	1	2	6	16	44	119	324	881	44%
Institutional	MG	31	35	47	62	83	110	146	195	44%
Not in use	MG									
Not in use	MG									
Not in use	MG									
Not in use	MG									
Total Sales	MG	130	163	231	338	517	830	1,416	2,586	44%
System Loss*	MG	12.90	16.30	23.10	33.80	51.70	83.00	141.60	258.60	44%
System Production	MG	143	179	254	372	569	913	1,558	2,844	44%



Adjust Baseline Demand Forecast for Future Effects of Plumbing/Appliance Standards

Adjust demand forecast for future effects of plumbing/appliance standards?

Yes

Section 3 – Enter Utility Avoided Costs

Tracking Tool Utility Avoided Cost Calculator

Water and Wastewater System Variable Costs (2021 Dollars)

	Water		Wastewater	
	\$/MG	Nominal Increase (%/yr)	\$/MG	Nominal Increase (%/yr)
Water purchase	\$2,312	2.0%	NA	NA
Energy	\$0	0.0%	\$0	0.0%
Chemicals	\$0	0.0%	\$0	0.0%
Other variable cost	\$0	0.0%	\$0	0.0%
Total	\$2,312	2.0%	\$0	0.0%

Water System Capacity Requirements

Maximum forecasted peak season daily use	MGD	13.2
Existing peak season system delivery capacity	MGD	13.2
Capacity shortfall	MGD	0.0
Year capacity shortfall occurs	Yr	2050

<-Enter your system's current peak season delivery capacity. The value you enter must be equal to or larger than 0 MGD.

Increment of peak season capacity to be added by 2054	MGD	0.0	Use model's estimate
Estimated cost of new capacity (2021 dollars)	\$/MGD		

Enter Forecast of Other Avoided Costs of Reduced Water Demands Not Counted Elsewhere (2021 Dollars)

Season	Units	2019	2020	2025	2030	2035	2040	2045	2050	2045-2050 Ann Grwth %
Peak Season	\$/MG									0.0%
Off Peak Season	\$/MG									0.0%
Average	\$/MG	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0%

Section 4 - Define Activities

Activity ID	Activity Name	Class	Savings, Per Unit (gpy)	Savings, Annual Rate of Decay (%)	Savings, Peak Period (% of Annual Savings)	Savings, Useful Life (yrs)	Savings, Participant Free Riders (% of Participants)	Utility Costs, Year Denominated	Utility Costs, Initial Fixed (\$)	Utility Costs, Initial Variable (\$/unit)	Utility Costs, Years of Follow-up (yrs)	Utility Costs, Follow-up Fixed (\$/yr)	Utility Costs, Follow-up Variable (\$/unit/yr)	Participant Costs, Year Denominated	Participant Costs, Initial (\$)	Participant Costs, Years of On-going (yrs)	Participant Costs, On-going (\$/Yr)	Participant Savings, Sewer (gpy)	Participant Savings, Gas (Therms/Gal)	Participant Savings, Electricity (KWh/Gal)	Plumbing Code, Year Effective	Plumbing Code, Unit Savings (gpy)	Plumbing Code, Natural Replacement Rate NRR (%)
1	Pressure Management	Utility	180,000	5%	50%	10	0%	2021	\$20,000.00					2016	\$0.00	0	\$0.00	0.00	0.0000	0.0000	0	0	0.00%
2	Residential Surveys, MF	Multi Family	4,015	20%	25%	5	0%	2021	\$3,000.00	\$1,000.00				2014	\$0.00	0	\$0.00	4,015.00	0.0024	0.0000	0	0	0.00%
3	Residential Surveys, SF	Single Family	12,373	20%	68%	5	0%	2021	\$3,000.00	\$500.00				2014	\$0.00	0	\$0.00	4,949.20	0.0010	0.0000	0	0	0.00%
4	Residential LF Showerhead, SF	Single Family	2,062	0%	25%	25	0%	2021	\$1,000.00	\$30.00				2021	\$30.00	0	\$0.00	2,062.00	0.0048	0.0000	1994	2062.25	12.00%
5	Residential LF Showerhead, MF	Multi Family	1,898	0%	25%	25	0%	2021	\$1,000.00	\$30.00				2021	\$30.00	0	\$0.00	1,898.00	0.0048	0.0000	1994	1898	12.00%
6	Residential HE Toilets, SF	Single Family	9,667	0%	25%	25	0%	2014	\$1,000.00	\$120.00				2014	\$111.00	0	\$0.00	9,667.25	0.0000	0.0000	1994	7859.551534	4.00%
7	Residential HE Toilets, MF	Multi Family	9,667	0%	25%	25	0%	2014	\$1,000.00	\$120.00				2014	\$111.00	0	\$0.00	20,267.33	0.0000	0.0000	1994	16477.50313	4.00%
8	CII Valve-Type ULFT Rebate	Commercial	10,585	0%	25%	25	23%	2021	\$1,000.00	\$120.00				2021	\$350.00	0	\$0.00	10,585.00	0.0000	0.0000	1994	10585	4.00%
9	Voluntary Sprinkling Restrictions, SF	Single Family	18,080	0%	70%	10	0%	2021	\$1,000.00	\$0.00				2014	\$0.00	10	\$277.50	0.00	0.0000	0.0000	0	0	0.00%
10	Residential 4.0 Washer, MF Common Area	Multi Family	30,000	0%	25%	8	0%	2021	\$2,000.00	\$500.00				2021	\$500.00	0	\$0.00	30,000.00	0.0035	0.0036	2011	21000	12.50%

Section 5 – Enter Annual Activity

Enter Annual Conservation Activity

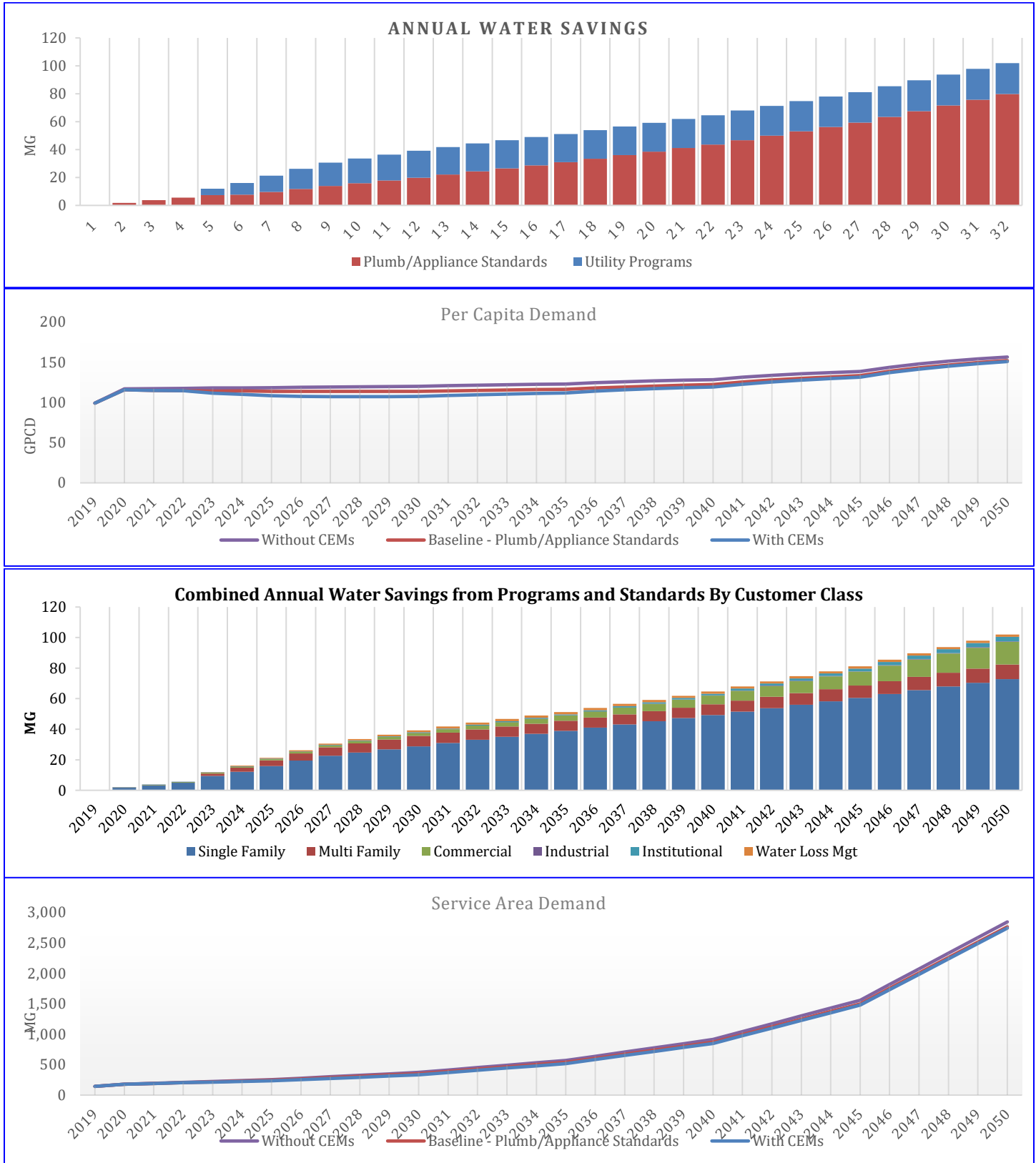
Activity ID	Class	Activity Name	2019	2020	2021	2022	2023
1	Utility	Pressure Management					1
2	Multi Family	Residential Surveys, MF					200
3	Single Family	Residential Surveys, SF					200
4	Single Family	Residential LF Showerhead, SF					50
5	Multi Family	Residential LF Showerhead, MF					50
6	Single Family	Residential HE Toilets, SF					25
7	Multi Family	Residential HE Toilets, MF					25
8	Commercial	CII Valve-Type ULFT Rebate					5
9	Single Family	Voluntary Sprinkling Restrictions, SF					5
10	Multi Family	Residential 4.0 Washer, MF Common Area					10

Annual Program Overhead Cost (2021 dollars)	2019	2020	2021	2022	2023
Enter additional program cost not included in activity definitions					25000

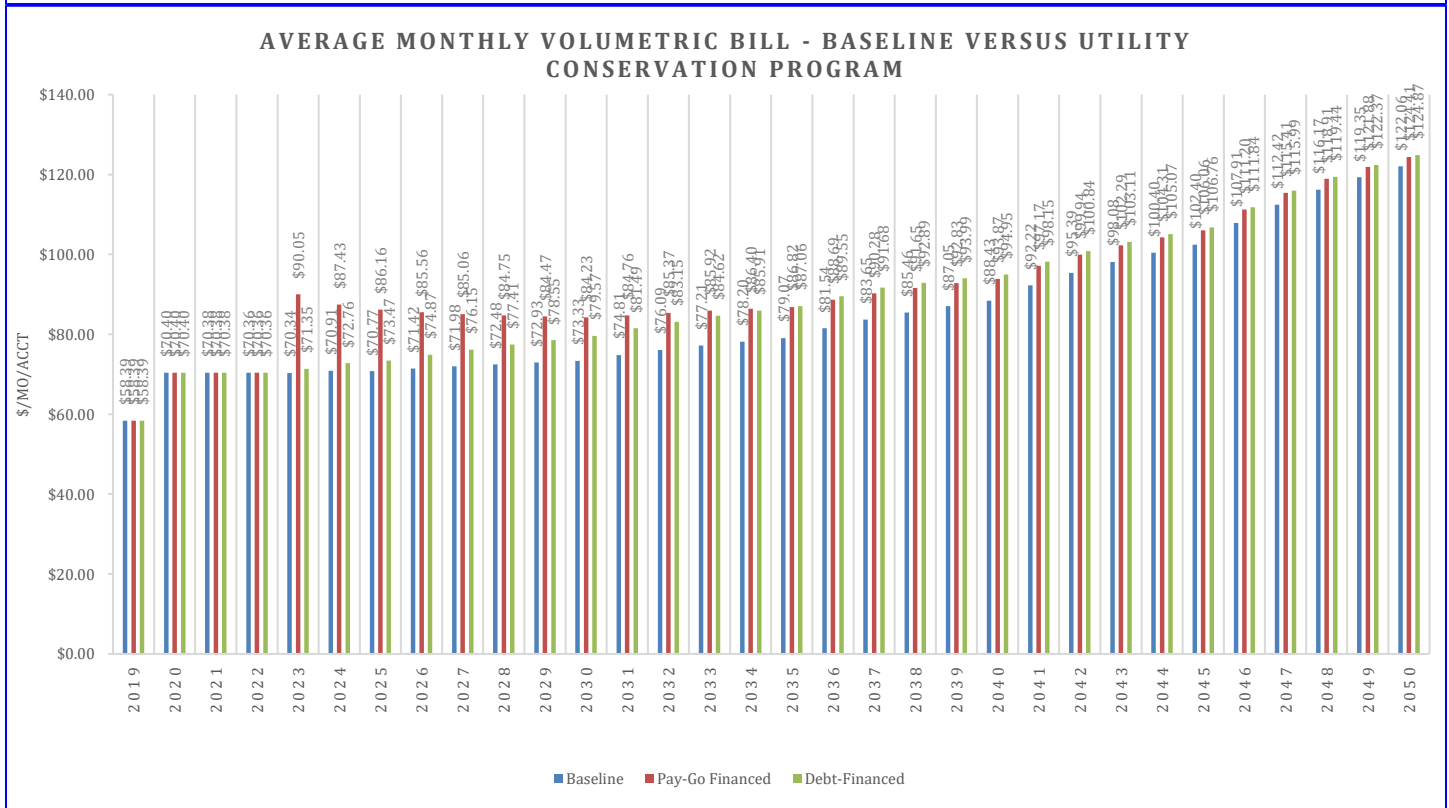
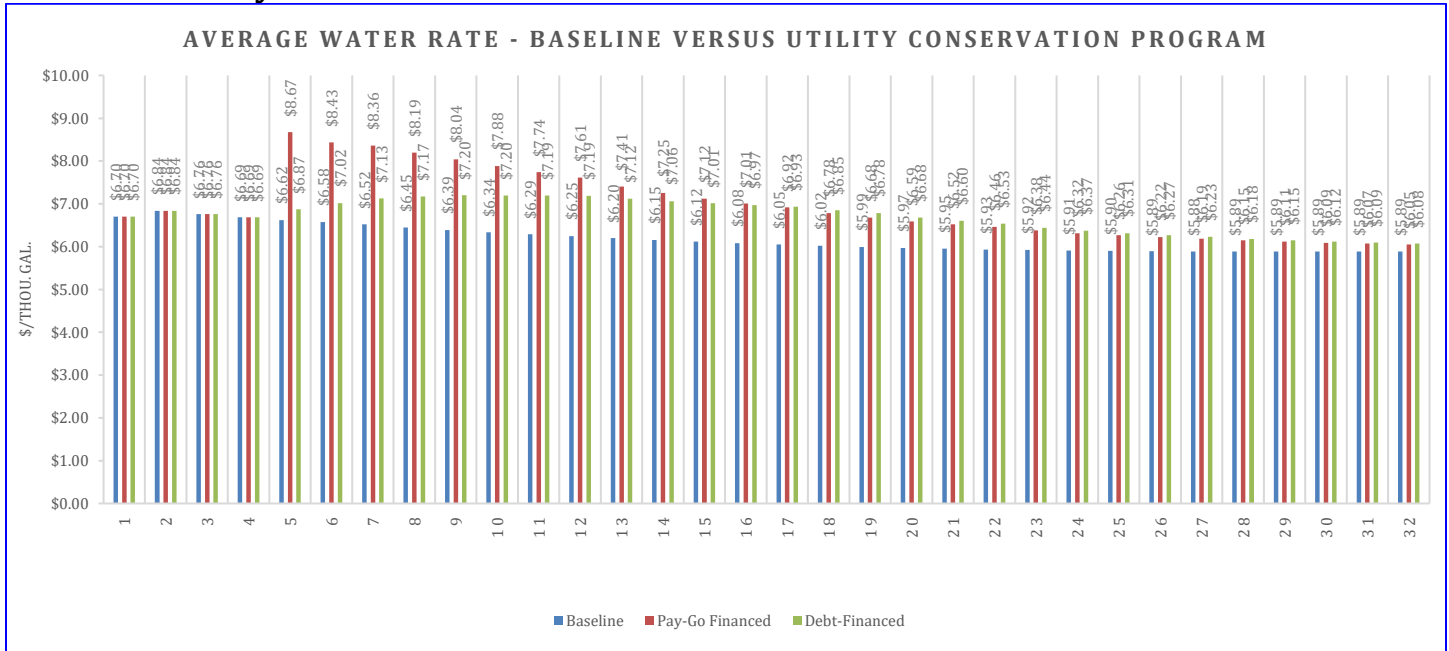
Section 6 – Enter GHG Emission Factor

Minimal data entered in this section. Not used.

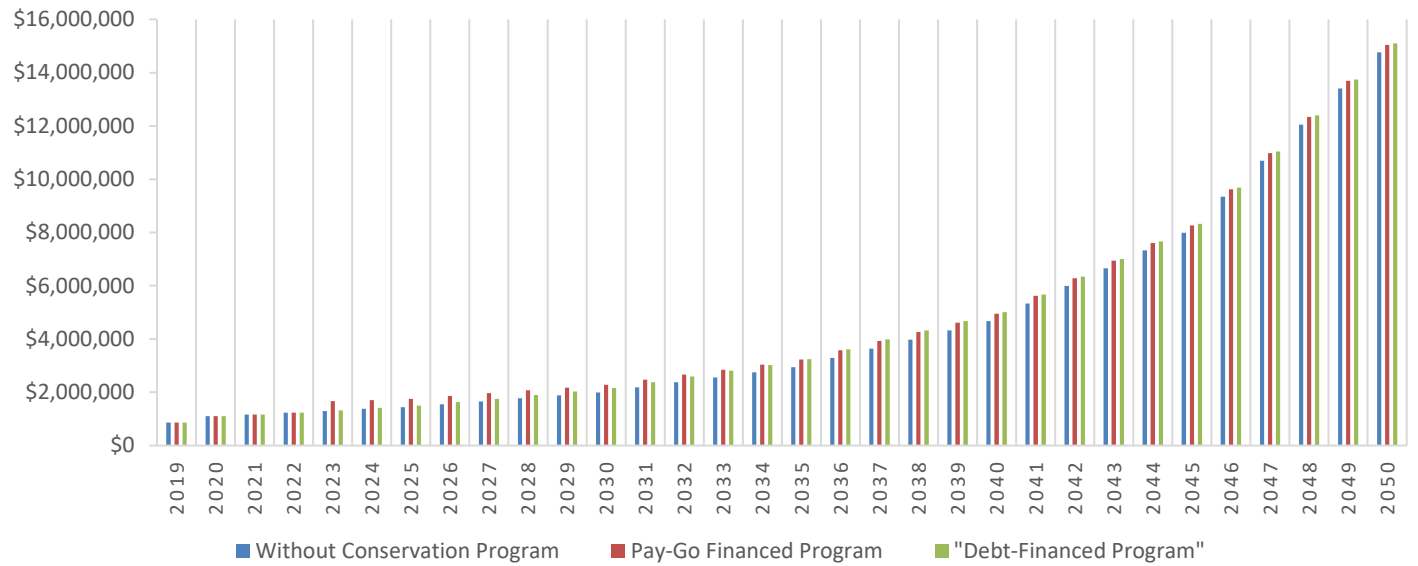
Results - Water Savings Summary



Results - Utility Revenues and Rates

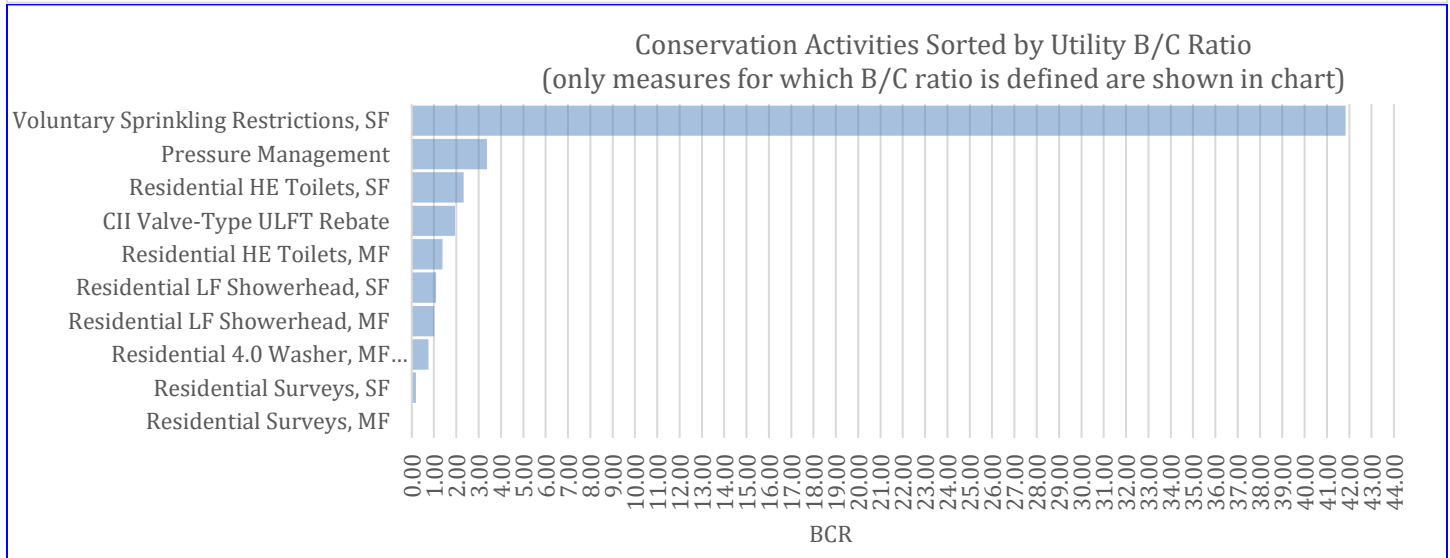
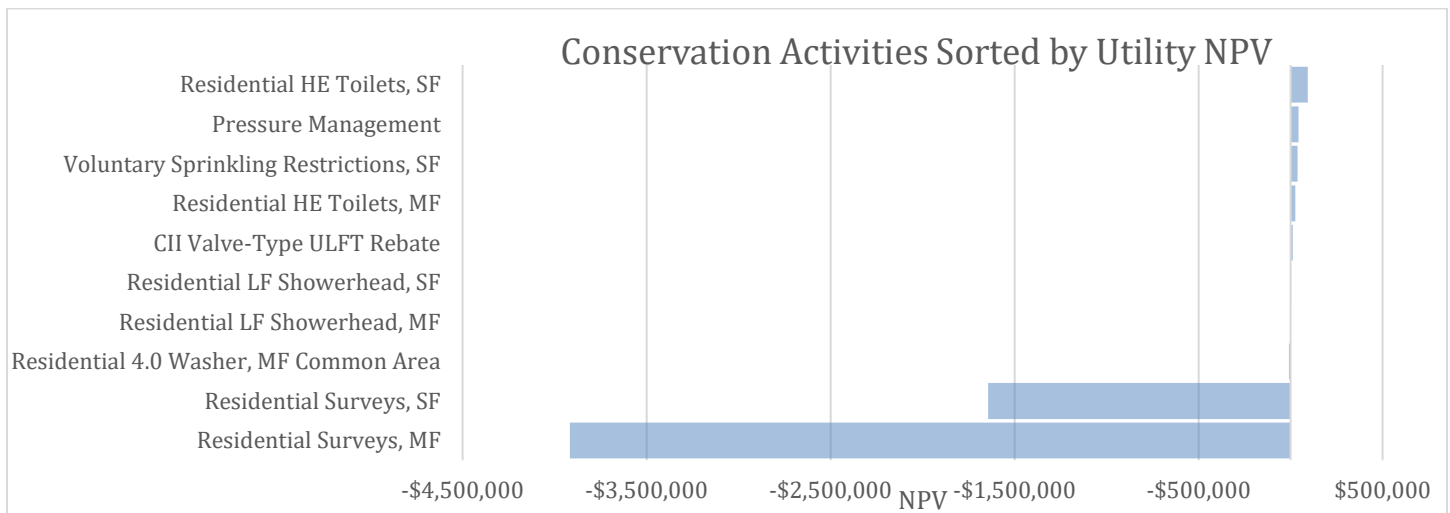


Annual Volumetric Revenue Requirement- Baseline Versus Utility Conservation Program



Results - Utility Revenues and Rates

Class	Activity Name	NPV (\$)	B/C Ratio
Utility	Pressure Management	\$ 43,853	3.4
Multi Family	Residential Surveys, MF	(\$ (3,916,428)	0.0
Single Family	Residential Surveys, SF	(\$ (1,644,078)	0.2
Single Family	Residential LF Showerhead, SF	\$ 3,055	1.1
Multi Family	Residential LF Showerhead, MF	\$ 327	1.0
Single Family	Residential HE Toilets, SF	\$ 93,590	2.3
Multi Family	Residential HE Toilets, MF	\$ 26,376	1.4
Commercial	CII Valve-Type ULFT Rebate	\$ 12,276	1.9
Single Family	Voluntary Sprinkling Restrictions, SF	\$ 37,781	41.8
Multi Family	Residential 4.0 Washer, MF Common Area	(\$ (8,959)	0.8
Subtotal Conservation Activities		(\$ (5,352,208)	0.2
Total With Program Overhead		(\$ (5,856,691)	0.1



Results – Water Loss Comparison

