



Water Utility Master Plan
Mequon Water Utility
October 2023



October 3, 2023



Kristen Lundeen, P.E.
Director of Public Works / City Engineer
City of Mequon
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Mequon, WI 53092

Re: Water Utility Master Plan

Dear Kristen:

Thank you for the opportunity to perform the Water Utility's Master Plan for the City of Mequon. Our report contains sections detailing:

- Customer Assessment
- Water Demands
- Water Supply
- Assessment of Existing Distribution System
- Utility Fiscal Performance
- Key Principles
- Implementation Plan

The report is a result of our hands-on analysis and is intended to be used as a planning tool for management and staff.

Please contact us anytime if you have comments and input to the report.

Sincerely,
City Water, LLC

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Introduction

This Master Plan is intended to provide the Mequon Water Utility (MWU) with a 20-year guide to assist in all facets of utility management. The goal is to provide a document which will guide proactive decision making for policy, procedures, operational elements, annual budgeting, and capital improvement planning. This Master Plan is an update and expansion upon the prior Master Plan, which was completed in 2017 and had a more limited scope.

THE EXISTING WATER SYSTEM

The Mequon Water Utility (MWU) is owned by the City of Mequon and includes the Water Utility User Service Area as shown in Appendix A. The Water Utility User Service Area covers portions of Mequon including the Sewer Service Area (SSA) and the Ulao Creek Neighborhood, the Village of Bayside, and the Village of Thiensville. The Water Utility Commission designated a Water Utility User Service Area inside of which all properties meeting the requirements of the Water Connection Policy are required to connect. In 2023, the Water Utility User Service Area expanded to include a portion of the Village of River Hills. The MWU's water supply is purchased from the Milwaukee Water Works (MWW) and the North Shore Water Commission (NSWC).

HISTORY

In the late 1980's and early 1990's, the City of Mequon took over the developer-owned utility known as the LeMont Water Utility because ground water levels were dropping, and water mains were failing. The City made necessary infrastructure improvements and then sold the utility to Wisconsin Gas in 1998.

The initial source of supply for the system was the original groundwater wells of the LeMont Water Utility. However, Wisconsin Gas secured treated Lake Michigan water supply from MWW in 1999 and steadily added other subdivision water systems while also expanding service to Bayside in 1999 and Thiensville in 2002. Additional water supply was contracted with NSWC in 1999 to serve Bayside and supplement the Milwaukee supply in Mequon and Thiensville.

Significant growth occurred in the years 1998 to 2002, as shown in Figure 1, when approximately 25 water trusts in Mequon and Bayside connected to the system looking for a consistent water supply and reliable water quality. In those four years, the customer base increased by over 500%. Wisconsin Gas was purchased by Wisconsin Energy in 2002 and became known as We Energies. We Energies continued to connect existing subdivision systems and other properties that needed the treated Lake Michigan water until 2009 when they sold the system back to the City of Mequon. The City retained the voluntary connection policies practiced by the private utility and assumed all the water supply contracts.

Upon its acquisition, the City of Mequon established a Water Utility Advisory Committee. This committee established Administrative Rules, Water Utility Connection and Extension Rules, and Utility Governance Policies. The City also established Inter-Governmental Agreements with the Village of Bayside and the Village of Thiensville allowing the MWU to operate in their boundaries, and the transfer of delinquent bills to their respective tax rolls.

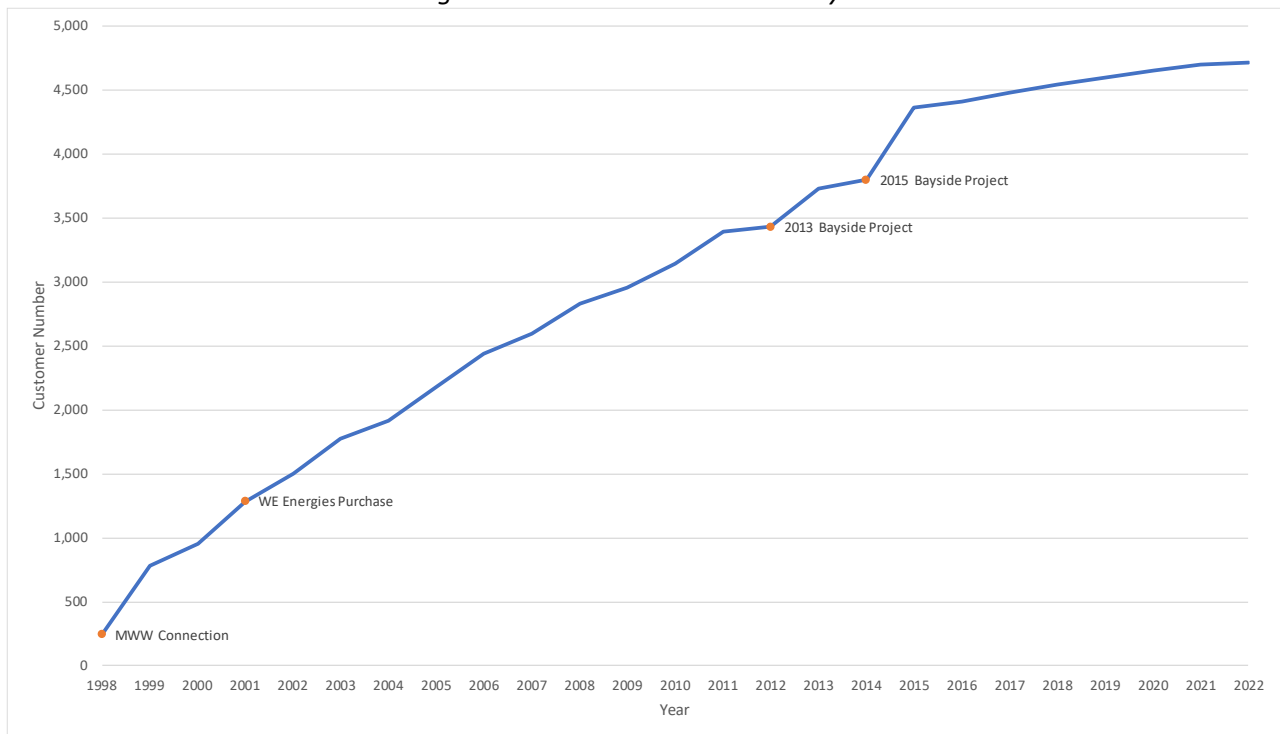
When the MWU was acquired by the City of Mequon, the City financed the purchase through the issuance of Revenue Bonds. The MWU restructured the initial bond in 2017 due to favorable interest rates, and the

original bond was retired in April of 2022. The current bonds (2017A Refunding Bonds) are scheduled to retire on May 1, 2029.

In the past 10 years, MWU has had several large expansion projects in the Village of Bayside. In 2013, approximately 170 residential customers joined the system and in 2015 approximately 500 residential customers joined. Since 2016, customer growth has remained steady due to continued expansion into new subdivision developments in the City’s Central Growth Area and On-Main Not Using (OMNU) customers opting to connect. OMNU customers are defined as customers who are along one of the MWU’s water main but who are not required to connect.

MWU has continued to grow and add customers. With growth came additional regulatory requirements. In Fiscal Year 2018, the MWU surpassed 4,000 customers and the Public Service Commission of Wisconsin (PSCW) required that the MWU transition from Class C to Class AB accounting. PSCW groups water utilities into class AB, C, or D categories based on the number of customers served. The reclassification was based on the continual expansion of the MWU. The main difference between the classes is reporting requirements – Class AB requires the most detailed annual reports and accounting. Figure 1 shows the history of customer growth experienced since 1998. The MWU has expanded to over 4,500 customers from the original 300 customers of the LeMont MWU.

Figure 1 – Customer Growth History



Customer Assessment

Using information gathered from the MWU billing system (MUNIS), Public Service Commission (PSC) annual reports, and historical mapping data, an evaluation of the existing customer base was conducted. Upon initial evaluation, the number of customers reported in the PSC annual reports varies from the number of customers within MUNIS. The difference is due to reporting requirements and how a “customer” is defined. The discrepancy between the PSC reports and utility billing systems is common amongst most utilities and is not unique to Mequon. Many billing systems have multiple methods to report customers, such as the number of accounts, number of meters, or number of billing services. One example of different reporting in Mequon is Homeowner Association (HOA) irrigation accounts. The irrigation system that waters the common areas is billed to the HOA, rather than individual customers within the subdivision. A single HOA account can consist of multiple meters (one account has 24 meters), so this could be either counted as one customer or 24 customers (meters). Variations in customer counts were found in MUNIS during a 2022 billing system audit. This audit discovered inconsistencies between customer classifications on the account and billing service. Any discrepancies were corrected at the end of the audit.

Some accounts do require multiple classifications. For example, a commercial account may have a meter for domestic usage (bathrooms, sinks, etc.) and a meter for irrigation. The overall account is classified by the owner (commercial) but each meter and billing service may have a separate classification (commercial or irrigation).

For consistency, customer counts used in this report were determined by defining each active meter service from MUNIS as one customer and customer classifications were determined using the classification on the billing service. This classification will be the standard classification for customers going forward for PSC reporting as well. Using each active meter service as a customer allows the most detail for analysis, as there is no incorrect or generalized grouping of meters together.

MUNIS did not contain active service accounts prior to 2007. Therefore, determining customer growth prior to 2007 is difficult as each account start is not listed. Instead, the installation and retirement dates for meters were used to evaluate the customer base prior to 2007. Tables 1-3 shown on the following page illustrate customers by class type (Residential, Commercial, Public Authority, Multi-family, and Irrigation), for each municipality (Mequon, Bayside, and Thiensville). Because the MWU is regulated by the PSC, all definitions referenced are based on PSC regulatory definitions. The PSC definitions are used to determine the classification of each metered billing service in MUNIS. The PSC customer definitions are presented below:

- Residential customers include customers taking service for residential or domestic purposes but does not include a multifamily customer.
- Commercial customers mean a business, not-for-profit organization, or other institution that provides goods or services and that takes service for non-residential purposes.
- Public Authority customers are comprised of a customer that is a department, agency, or entity of the local, state, or federal government, including a public school, college, or university.
- Multifamily customers consist of a customer taking service for a building that is intended primarily for residential purposes, has three or more dwelling units, and is served by a single water meter.

- Irrigation customers include the use of water to sustain crops, lawns, or landscapes, including water used on athletic fields, parks, and golf courses.

Consistency in reporting to the PSC definition is critical as it is needed for PSC reports. Appendix A illustrates the customer types, the customer municipality, and the year the customer was added to the MWU to show the growth of each municipality over the past 24 years.

Table 1 – 2022 Mequon Customers by Class

Class Type	Customers
Residential	2,852
Commercial	259
Irrigation	59
Multifamily	24
Public Authority	17

Table 2 – 2022 Bayside Customers by Class

Class Type	Customers
Residential	1,155
Commercial	15
Irrigation	0
Multifamily	8
Public Authority	3

Table 3 – 2022 Thiensville Customers by Class

Class Type	Customers
Residential	285
Commercial	28
Irrigation	0
Multifamily	8
Public Authority	3

Figure 2 illustrates the customer counts by customer class from 2022. Using the MWU’s customer counts from 2022, the residential equivalent units (REU) were determined by customer class. An REU is a unit of measure equivalent to the amount of water needed to supply the average residential dwelling unit. Once the base consumption for the REU was determined, water consumption per customer class was divided by the average water consumption per residential customer to get the number of REUs for each customer class. Each customer class REU was divided by the total number of REUs to calculate their percentage makeup of the MWU as shown in Figure 3. REUs are useful to analyze as it reduces every customer classification and definition to the same point and allows a general analysis of system supply and demand without needing customer classes.

For the purposes of this report, the REU referenced and used to normalize data was based on the past four years of residential averages. This resulted in an REU demand of 14,000 gallons per quarter. This is needed as it is used as the basis for comparing different types of water customers and to ensure that the MWU is meeting contractual requirements set by MWW as further explained in Section 4 – Water Supply.

As shown in Figure 2 and Figure 3, commercial customer counts make up approximately 6% of the MWU, but commercial REUs make up approximately 25% of the MWU. In other words, although commercial customers make up 6% of the MWU’s customers, the commercial class is consuming 25% of the water metered by the MWU. This information is presented as an illustration of the current customer base, but functionally has no impact. The Utility treats all customers equally, so the Utility assesses future supply and demand impacts based on REUs and not customer classifications.

Figure 2 – Customer Counts by Customer Classification (Entire MWU)

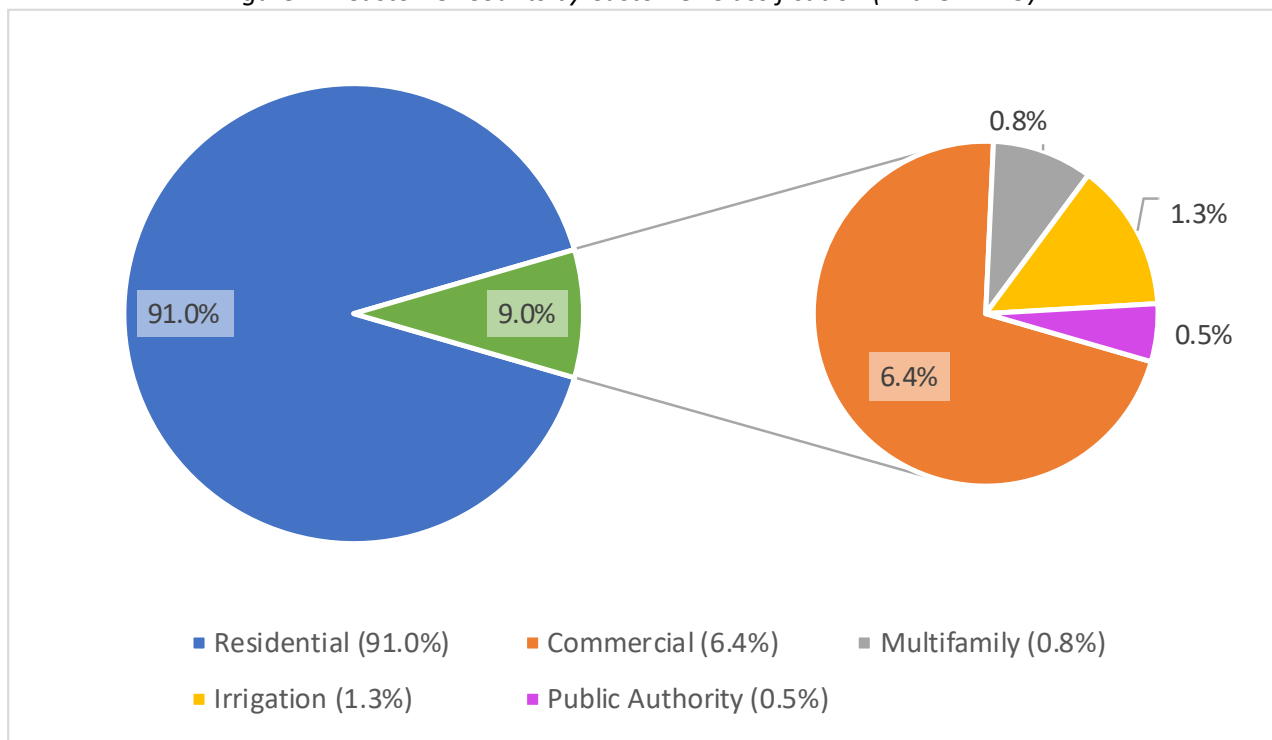
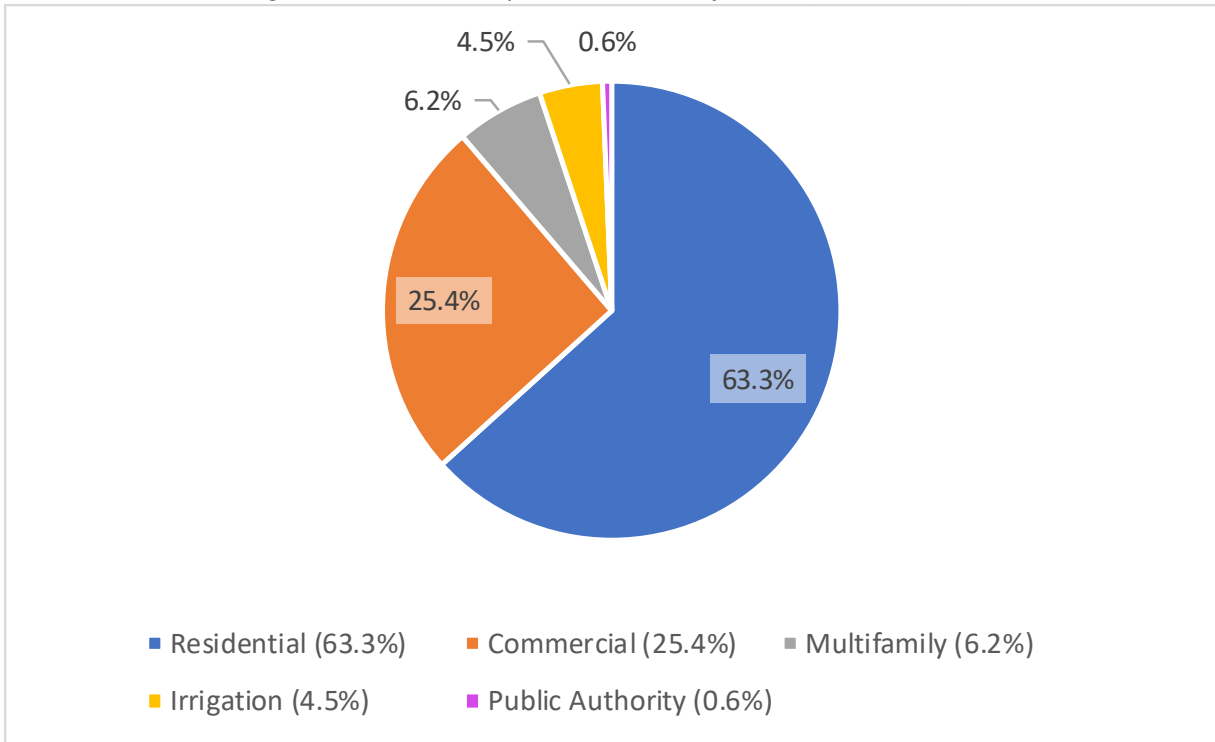


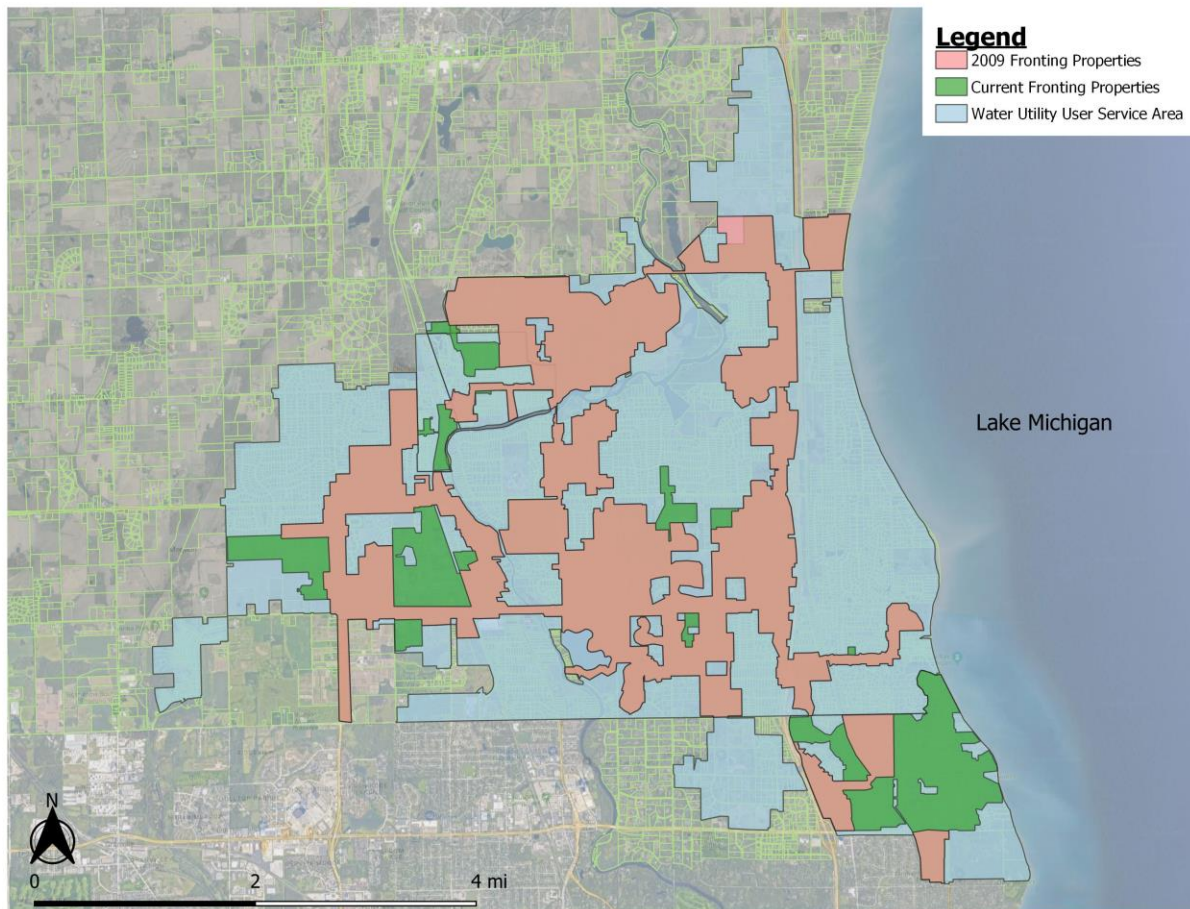
Figure 3 – 2022 REU by Customer Classification (Entire MWU)



WATER UTILITY USER SERVICE AREA DEVELOPMENT

As discussed, the initial Water Utility User Service Area started with the LeMont Water Utility service area. Wisconsin Gas and We Energies continued to expand the Water Utility User Service Area with each additional water trust that connected. Upon the City of Mequon's purchase of the MWU in 2009, the Water Utility User Service Area was established within the limits of the SSA, along with the Village of Thiensville and Village of Bayside. Figure 4 shows the limits of properties fronting water main at the time of the 2009 purchase by the City, the current fronting properties, and the current Water Utility User Service Area. In 2009, there were 5,400 acres fronting water main and currently there are 6,900 acres fronting water main. The Water Utility User Service Area includes 16,300 acres total. Further detail on the development of supply sources with Utility expansion is included in Section 4 – Water Supply.

Figure 4 - Water Utility User Service Area Development



ULTIMATE CUSTOMER BASE IN THE WATER UTILITY USER SERVICE AREA

The ultimate number of customers in the Water Utility User Service Area is based on the MWU's Water Connection Policy, the Water Utility User Service Area, and each municipality's zoning map. The Water Utility User Service Area is illustrated in Appendix A and includes all areas in which the MWU can service, including the areas that currently require a water main extension. The Water Utility User Service Area is map based, but not all properties within the boundary are currently MWU customers. This section analyzes the total number of potential customers within the area, or the ultimate REUs.

The next step to analyzing the potential customer base requires examining the area identified for service by the type or density of development that could connect to the MWU. Zoning designations were used over land use mapping because the zoning designations specifically define and regulate what kind of uses are allowed on specific parcels. Land use reflects the desired future development pattern in a given area.

Parcels with development that is already connected to MWU were classified as summarized in the previous section. Parcels that were not currently connected to the system and within the Water Utility User Service Area were assigned a customer classification based on the zoning designation (residential, commercial, industrial, etc.). Added to the existing customer base, this method was used to determine the total potential customers and customer types for the entire Water Utility User Service Area by REU. This assumes that properties within the existing Water Utility User Service Area would develop under the current zoning.

The total number of potential customers is categorized based on the Water Connection Policy definitions of *Requiring Main Extension (RME)*, *On Main Using (OMU)* or *On Main Not Using (OMNU)*. RME is defined as all customers that require a main extension to connect to the MWU. In other words, the property cannot be readily served by existing water infrastructure and would require the installation of additional water main in order to be served. OMU includes all customers that are currently connected to the MWU – the existing customer base. OMNU includes all customers that are along the MWU's water main but are not connected – the current potential customer base. As MWU is a voluntary utility, these properties may have originally developed with a private well or on a private water system and as the MWU expanded, water main was constructed adjacent to the property. For OMNU customers there is an opportunity to connect simply by installing a lateral to the property.

Table 4 shows the breakdown of REUs by the Water Connection Policy classifications for the ultimate service area. Note that only OMU includes irrigation, but RME and OMNU does not because the analysis for non-connected properties is based on each parcel's zoning. Irrigation is included for existing customers to account for the usage and REU count, but there is no zoning for the parcels that have irrigation.

Table 4 – Ultimate REU Base in the Water Utility User Service Area

Description	REU	Percent of Total
Requiring Main Extension	6,368	42.3%
On Main Not Using	1,899	12.6%
On Main Using	6,781	45.1%
Total	15,047	100.0%

Tables 5 through 7 illustrate each municipality’s ultimate customer base sorted by classification. Table 5 shows that 44.9% of the Mequon Service Area is connected to the MWU, and 11.8% is readily available to connect. Overall, 56.7% of the Mequon Service Area is along MWU water main.

Table 5 – Mequon REU Base by Class Type

Description	Class Type	REU	% by Class	% Total
Requiring Main Extension	Residential	4,174	38.1%	43.4%
	Commercial	519	4.7%	
	Multifamily	63	0.6%	
	Public Authority	0	0.0%	
On Main Not Using	Residential	559	5.1%	11.8%
	Commercial	674	6.1%	
	Multifamily	52	0.5%	
	Public Authority	4	0.0%	
On Main Using	Residential	2,852	26.0%	44.9%
	Commercial	1,479	13.5%	
	Multifamily	251	2.3%	
	Irrigation	302	2.8%	
	Public Authority	32	0.3%	

Table 6 shows that 24.6% of the Thiensville service area is connected to the MWU, and 15.8% is readily available to connect. Altogether, approximately 40% of the Thiensville service area is along MWU water main with approximately 60% requiring water main extension.

Table 6 – Thiensville REU Base by Class Type

Description	Class Type	REU	% by Class	% Total
Requiring Main Extension	Residential	471	21.7%	59.5%
	Commercial	360	16.6%	
	Multifamily	461	21.2%	
	Public Authority	0	0.0%	
On Main Not Using	Residential	145	6.7%	15.8%
	Commercial	166	7.6%	
	Multifamily	31	1.4%	
	Public Authority	2	0.1%	
On Main Using	Residential	285	13.1%	24.6%
	Commercial	160	7.4%	
	Multifamily	84	3.9%	
	Irrigation	0	0.0%	
	Public Authority	6	0.3%	

Table 7 shows that 69.4% of the Bayside Service Area is connected to the MWU, and 13.9% is readily available to connect. With only 16.7% requiring a water main extension, a large portion of the Bayside Service Area is along MWU water main.

Table 7 – Bayside REU Base by Class Type

Description	Class Type	REU	% by Class	% Total
Requiring Main Extension	Residential	217	11.3%	16.7%
	Commercial	103	5.4%	
	Multifamily	0	0.0%	
	Public Authority	0	0.0%	
On Main Not Using	Residential	226	11.8%	13.9%
	Commercial	40	2.1%	
	Multifamily	0	0.0%	
	Public Authority	0	0.0%	
On Main Using	Residential	1,155	60.3%	69.4%
	Commercial	86	4.5%	
	Multifamily	84	4.4%	
	Irrigation	0	0.0%	
	Public Authority	6	0.3%	

Overall, the MWU is serving 45% of REUs within the Water Utility User Service Area with approximately 13% of the ultimate growth readily available to connect (OMNU). Overall, MWU has main fronting around 58% of the ultimate customer base. Conversely, this indicates a large area (42%) within the Water Utility User Service Area that requires main extensions to give customers the option to connect. The breakdown for each community differs, with Bayside having water main available along parcel frontage for much more of the potential REU base compared to Mequon and Thiensville. A visual illustration of this breakdown is presented in Appendix B.

RIVER HILLS DEVELOPMENT

In early 2023, the Water Commission approved an intergovernmental agreement and water services agreement with the Village of River Hills. The proposed projects are planned to serve the University School of Milwaukee (USM), existing River Hills properties, and a future residential development. Based on the River Hills projected service area as presented in Appendix A, there will be 52 residential customers and 1 public authority customer (USM) who will connect as part of the initial project and are classified as OMU. There will be 37 residential customers classified as OMNU.

The REU for public authority was calculated using USM’s annual usage and dividing it by the average residential usage, equating to 145 REUs. Table 8 shows the breakdown of REU for the Village of River Hills.

Table 8 – River Hills Service Area REU Base

Description	REU	Percent of Total
Requiring Main Extension	65	21.7%
On Main Not Using	37	12.4%
On Main Using	197	65.9%
Total	299	100.0%

Water Demands

The water demand of the MWU is the total amount of water entering the system through the supply points. The demand is defined as one of two types: customer demand and non-revenue water (NRW). Customer demand is the volume of water used by customers, as measured by water passing through the customer meters, and makes up the majority of the system demand. NRW is the difference between the system demand and the customer demand, or the water entering the system that does not pass through customer meters. Every utility experiences NRW in the form of fire hydrant usage, main breaks, usage used in utility operations, and unknown background leakage.

CUSTOMER DEMAND

As mentioned previously, a major part of the customer base and customer demand analysis is the conversion of all customers to REUs, in order to better understand equivalent customer growth and demands. By definition, the conversion value of an REU will vary from year to year based on actual residential water demand and number of residential customers. In other words, one REU will always be one REU, but the usage attributed to an REU varies over time. This value is important in helping determine if the MWU is exceeding its operational capacity or contractual requirements/restrictions.

As discussed in Section 2 – Customer Assessment, the REU referenced and used to normalize data was based on an average of the past four years of residential water demand. The past four years of residential water demand averaged approximately 14,084 gallons per quarter. To calculate each customer class REU equivalent, their average demand per quarter was divided by 14,084 gallons as shown in Table 9.

Using the REU equivalent allows demand comparisons between various customer classes. For example, the average commercial customer uses 5.7x as much water as the average residential customer (5.7 : 1.0) while the average multifamily customer uses 1.85x as much water as the average commercial customer (10.5 : 5.7).

Table 9 – Average REU per Customer Class

Customer Class	Avg. Demand per Customer per Quarter (gal)	REU Equivalent
Residential	14,084	1.0
Commercial	80,402	5.7
Public Authority	26,694	1.9
Multifamily Residential	147,546	10.5
Irrigation	72,164	5.1

Table 10 shows the MWU On Main Using total REUs, customer demands and percent change in REUs. Future REUs were determined by the assumption of 1% annual MWU customer growth, along with one private trust (estimated 75 REUs) converting to municipal water every 5 years. The 1% annual MWU growth was based on the average MWU growth over the past 7 years. Customer demands were calculated by taking the estimated REUs and multiplying by an REU conversion factor of 14,084 gallons per quarter.

Table 10 – REUs and Customer Demands

Year	REU	Customer Demands (kgal)	Percent Change in REU
2017	6,344	377,211	
2018	6,469	363,891	2%
2019	6,608	352,488	2%
2020	6,686	399,588	1%
2021	6,754	406,464	1%
2022	6,781	386,380	0%
2023	6,849	385,775	1%
2025	6,990	393,710	2%
2030	7,425	418,204	6%
2035	7,883	444,015	6%
2040	8,364	471,117	6%

Based upon the average usage for River Hills, REUs and future demands were calculated. USM’s annual usage of 8.2 million gallons was divided by the REU average usage from the past four years to calculate its total REU of 145. Assuming USM’s usage stays consistent, and approximately 5 OMNU customers connect per year, the change in REUs and usage for River Hills was determined through 2030. At this point, all OMNU customers within the proposed River Hills service area would be connected. River Hills’ REU and demand projections are shown in Table 11.

Table 11 – River Hills Demands

Year	REU	Customer Demands (kgal)
2023	197	11,143
2025	207	11,709
2030	234	13,237
2035	234	13,237
2040	234	13,237

The REUs and water demands for the MWU On Main Using customers, including River Hills, are shown in Table 12.

Table 12 – REUs and Customer Demands – Includes River Hills

Year	REU	Customer Demands (kgal)	Percent Change in REU
2017	6,344	377,211	
2018	6,469	363,891	2%
2019	6,608	352,488	2%
2020	6,686	399,588	1%
2021	6,754	406,464	1%
2022	6,781	386,380	0%
2023	7,046	396,918	4%
2025	7,197	405,420	2%
2030	7,658	431,437	6%
2035	8,116	457,234	6%
2040	8,597	484,321	6%

NON-REVENUE WATER

Table 12 illustrates only customer demands. The second part of the system demand is NRW. As mentioned earlier, every utility produces a percentage of NRW from mandatory maintenance such as system treatment, hydrant flushing, dead-end flushing, fire protection, freezing prevention, and private fire testing. All NRW outside of system maintenance such as main breaks, service leaks, and hydrant/valve leaks are considered real losses. Based on 2021 data from the PSC annual report query tool, Class AB utilities have an average NRW of 17% and real losses of 13%. Class AB utilities are all utilities similar to the size of the MWU.

Because of real losses, the NRW in the MWU has increased in the past two years from 12% to 24%. In Q2 of 2022, a large system leak was identified and isolated, which greatly reduced the NRW in Q3 and Q4. Q1 and Q2 had NRW of around 28%, and once this leak was identified and resolved, the NRW decreased to 21% and 18% in Q3 and Q4. The estimated water loss from the leak was 19.4 million gallons which equates to \$36,500 of purchased water. In 2022, the 24% of NRW equated to 122.3 million gallons or \$233,500.

Table 13 shows historical and projected customer demand and NRW.

Table 13 – Customer Demand and Non-Revenue Water

Year	Customer Demand (kgal)	Non-Revenue Water (kgal)	Non Revenue Water (%)
2017	377,211	46,273	11%
2018	363,891	54,486	13%
2019	352,488	68,083	16%
2020	399,588	52,236	12%
2021	406,464	81,534	17%
2022	386,380	122,413	24%
2023	396,918	93,104	19%
2025	405,420	60,580	13%
2030	431,437	58,832	12%
2035	457,234	56,512	11%
2040	484,321	53,813	10%

*kgal = thousands of gallons

SYSTEM DEMAND

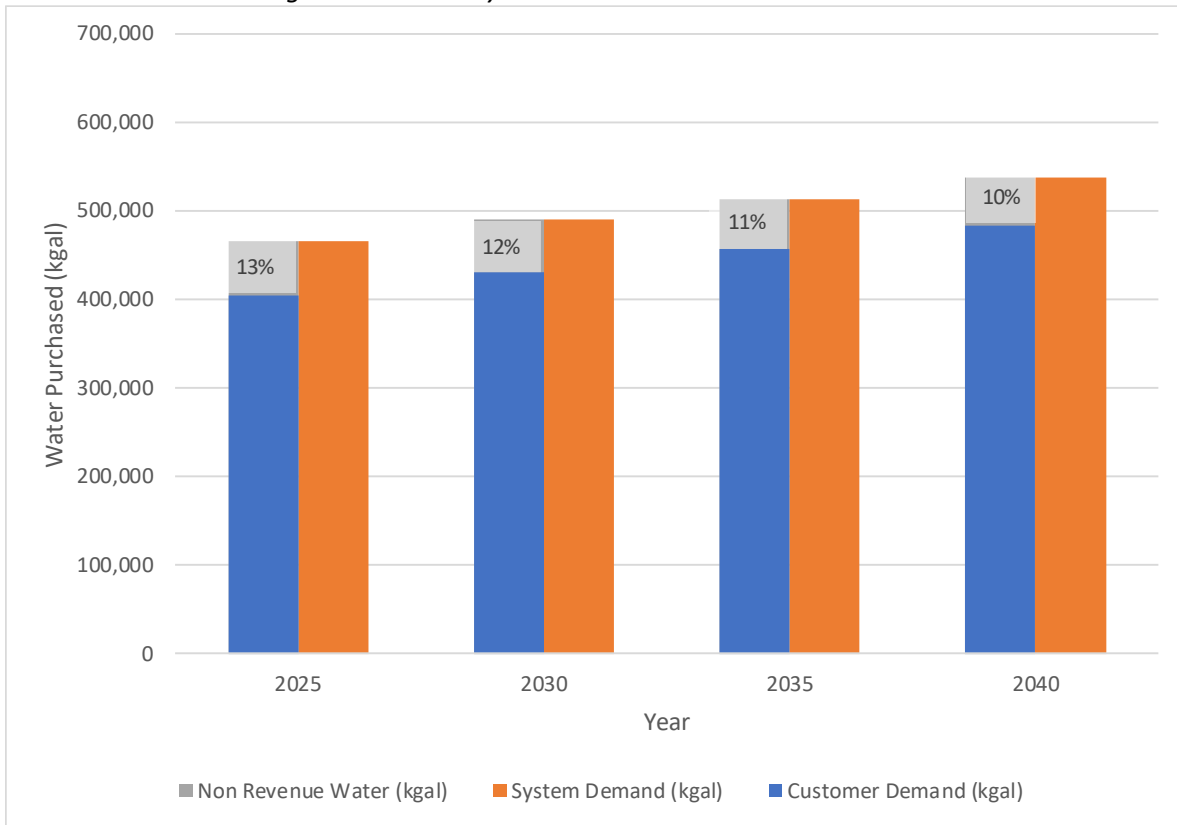
Table 14 shows historical and projected demand of the system which is equal to the customer demand plus the NRW.

Table 14 – System Demand

Year	System Demand (kgal)
2017	423,484
2018	418,377
2019	420,571
2020	451,824
2021	487,998
2022	508,793
2023	490,022
2025	466,000
2030	490,269
2035	513,746
2040	538,134

Figure 5 illustrates the decreasing trend in NRW, or the difference between water sold by the MWU to customers and water purchased by the MWU from MWW and NSWC. This decreasing trend is the result of increased water loss surveys and corrective action by the MWU. A water loss survey includes complete water audits and leak surveys for the water distribution system on a regular basis. MWU is currently looking at all quarterly data and billing to more consistently monitor the NRW and locate leaks more efficiently.

Figure 5 – Future System Demand vs Customer Demand



As indicated, Table 14 on the preceding page represents annual system demand. System demand varies constantly, as each customer has a different usage pattern. Standard industry practice has the MWU determine the average day demand, maximum day demand, peak hour system demand, and the maximum-to-average day ratio. The average day demand is the average daily water usage throughout the year, while the maximum day demand represents the highest amount of daily water used throughout the year. Peak hour is the highest hourly usage throughout the year. These values are important when estimating annual distribution losses, considering the MWU’s operating capacity and possible future additional supply connections as further evaluated in the next part, Section 4 – Water Supply. The average-to-maximum day ratio is part of the equation that contributes to the establishment of the wholesale water rates charged by MWW.

To determine future maximum day conditions, the average maximum day-to-average day ratio (M:A ratio) had to be calculated. This was calculated by taking the maximum day demands divided by the average day demands over the past 6 years. The peak hour was determined by converting the maximum day demands to gallons per minute and multiplying by two, which is the industry standard peak hour to maximum day ratio. The M:A ratio varies year-by-year based on differing customer demands, dry summers versus wet summers, or the amount and size of main breaks or leaks that occur throughout the MWU. Table 15 illustrates the historic and future system demand average day, maximum day, and peak hour. Note that with decreasing NRW, the average day and maximum day demands will decrease from 2023 to 2025.

Table 15 – Daily Demands

Year	Avg Day (MGD)*	Max Day (MGD)	Ratio	Peak Hour (GPM)*
2017	1.160	1.751	1.509	2,432
2018	1.146	2.039	1.779	2,832
2019	1.152	2.005	1.740	2,785
2020	1.234	2.534	2.053	3,519
2021	1.337	2.398	1.794	3,331
2022	1.394	2.328	1.670	3,233
2023	1.343	2.383	1.775	3,310
2025	1.277	2.266	1.775	3,147
2030	1.343	2.384	1.775	3,311
2035	1.408	2.498	1.775	3,470
2040	1.474	2.617	1.775	3,635

*MGD = million gallons per day

*GPM = gallons per minute

Water Supply

The MWU is supplied by two major water suppliers, the MWW and the NSWC. The portion of the Water Utility User Service Area served by each supplier is shown in Appendix C. The water source for each supplier is Lake Michigan. The suppliers use traditional surface water treatment as required under the Safe Drinking Water Act, with added protection for microorganisms as required under the Environmental Protection Agency (EPA) and Wisconsin Department of Natural Resources (WDNR) surface water treatment rules.

The original source of supply for the MWU was MWW. When Wisconsin Gas purchased the Lemont Utility from the City of Mequon, the contract required that Wisconsin Gas transport treated Lake Michigan water to the City as a water supply. The closest source of supply was MWW at the Intersection of North County Line Road and West Wauwatosa Road. As the MWU expanded, it was asked to serve the Village of Bayside. The closest source of supply was the NSWC via the Village of Fox Point. As the MWU grew, the opportunity arose to connect the Bayside system with the Mequon system, providing all customers with redundancy of supply, additional capacity for the combined systems, and price competition between the suppliers. Eventually a booster station was built on the interconnecting main allowing for the free flow of water throughout the MWU system from either supplier.

Capacities for these two suppliers are governed by the contracts with each supplier and are controlled largely by the distribution system capacities at the respective location of supply.

The MWU had several wells that served as emergency back-up supply. The emergency supply wells were gradually abandoned by the MWU in consent with DNR well-abandonment requests. Each well was abandoned in accordance with WDNR code requirements. The wells were acquired as the MWU connected community well systems as customers. The MWU abandoned several of the small wells as the community systems were acquired, but the larger capacity wells were abandoned after the MWU connected the NSWC and MWW-supplied portions of the system. At this time the wells were no longer needed as the interconnecting booster station provided full redundancy of the surface water supply.

Removing the wells also provided water quality benefits. Ground water typically has elevated levels of iron, which when mixed with a chlorinated surface water system resulted in orange/rusty color water. The color was caused by chlorine in the surface water supply oxidizing the existing iron in the groundwater supply.

Without the wells in service, additional emergency back-up supply is available at reservoirs as shown in Table 16 with a list of the pumping facilities for the MWU illustrated in Table 17.

Table 16 – Reservoirs, Standpipes and Elevated Tanks

Facility Name	Type	Active	Capacity (gal)	Elevation Difference (ft)
Mequon Business Park Reservoir	Reservoir	No	200,000	10
Mequon Business Park Tower	Elevated Tank	No	500,000	163
Ville Du Park Well #5	Reservoir	Yes	80,000	10
Whitman Place	Reservoir	Yes	100,000	10

Table 17 – Pumping and Power Equipment

Identification	Type	Active	Capacity (GPM)	Horsepower (HP)	Year Installed
MBP Booster #1	Standby	No	500	30	1991
MBP Booster #2	Booster		500	30	1991
MBP Booster #3	Booster		1000	60	1991
Mequon #5C	Booster	Yes	350	30	1994
Mequon #5D	Booster	Yes	250	50	1994
Port Road Booster #1	Booster	Yes	800	40	2008
Port ERoad Booster #2	Booster	Yes	800	40	2008
Villa Du Parc #1 River Road	Booster	Yes	300	20	1978
Villa Du Park #2 River Road	Booster	Yes	300	20	1978

MILWAUKEE WATER WORKS

Supply from MWW comes from the Florist Pressure District. Pressure districts are common in larger water utilities, as the topography of a community can cause extreme (high or low) pressures without the utilization of separate districts. As an example, the MWU has three separate pressure districts, West, Central, and South. These districts will be explored further in the Distribution Assessment. The Florist Pressure District is supplied by a booster pump station located near North 76th Street and Florist Avenue. At this location there are two water storage reservoirs with 12 million gallons of storage capacity each. MWW feeds the distribution system of the Florist District with nine pumps that are supplied electricity from three different electric feeds. The combination of multiple pumps, electric feeds, and multiple reservoirs provides a very robust and redundant source of supply. The actual connection point to MWW is a 12-inch diameter water main in North Wauwatosa Road at West County Line Road. This water main then supplies the MWU 16-inch diameter water main via two meters in a wholesale meter vault.

Per the 1999 contract with the MWW, the supply at West Wauwatosa Road and North County Line Road (MWW – Wauwatosa) is capable of providing at least 1,500 GPM (2 MGD). Based on operating experience, this supply point has provided as much as 2,900 GPM (4.2 MGD). To this point there have been no issues or consequences to exceeding the contract values.

The 1999 contract provides for a second supply point at North Granville Road and North County Line Road, with a similar capacity as the first supply point. In 2012, the MWU had preliminary discussions with MWW about the second supply point, with discussions renewing in 2022. A formal request was granted to the MWU to relocate the second supply point to West County Line Road and North Swan Road in conjunction

with the Swan Ridge Farms Development. The development required water, and the MWU would eventually need a second connection to MWW – as identified in the 2017 master plan. Leveraging the development to install the meter pit and extend water main north to their project boundary reduces the capital costs for the MWU in the future. By partnering with the developer and paying for Betterment of Service (oversizing) of this supply point, the MWU can benefit every customer of the utility. Moving the connection point from Granville to Swan reduced the distance of the transmission main to the MWU by one mile. This contract modification for the second point of connection was approved by the City of Milwaukee Public Works Committee on March 8, 2023, and approved by the City of Milwaukee Common Council on March 21, 2023. The contract modification also set the estimated maximum flow rate at the second connection to 2.16 MGD (1,500 GPM). The amendment language also indicates that MWW will provide “Unlimited, uninterrupted service of standard quality water.”

PARCEL DEVELOPMENT ANALYSIS

Parcels within the Water Utility User Service Area that are served by water purchased from MWW were analyzed to determine if they were developed pre- or post-1999. The 1999 contract with MWW included language that limits new development customers. The City of Milwaukee wanted to ensure that the expansion of the MWU would be for the benefit of existing Mequon residents, yet limit unchecked expansion of new development in the community. As such, there is a clause that indicates that the maximum amount of any new development on the system be limited to 20 percent of houses that were built after 1998. For this analysis, a developed parcel is a parcel in which a building was constructed.

To determine the number of pre- and post-1999 customers on developed parcels, current active meters were plotted on a map using coordinates from the meter reading system. Using historical aerials from the Mequon GIS mapping system, the closest date to when each parcel of land was developed could be determined. Figure 6 illustrates an example of the analysis of parcels developed pre- and post-1999 on the 1995 aerial. All points represent current MWU customers. Green points represent customers on parcels that were developed during or before 1995, and the blue dots represent customers on parcels that were not yet developed. Using aerials from different years, parcel development dates were able to be confirmed as either pre- or post-1999.

Figure 6 – Water Utility User Service Area Development Pre- and Post-1999

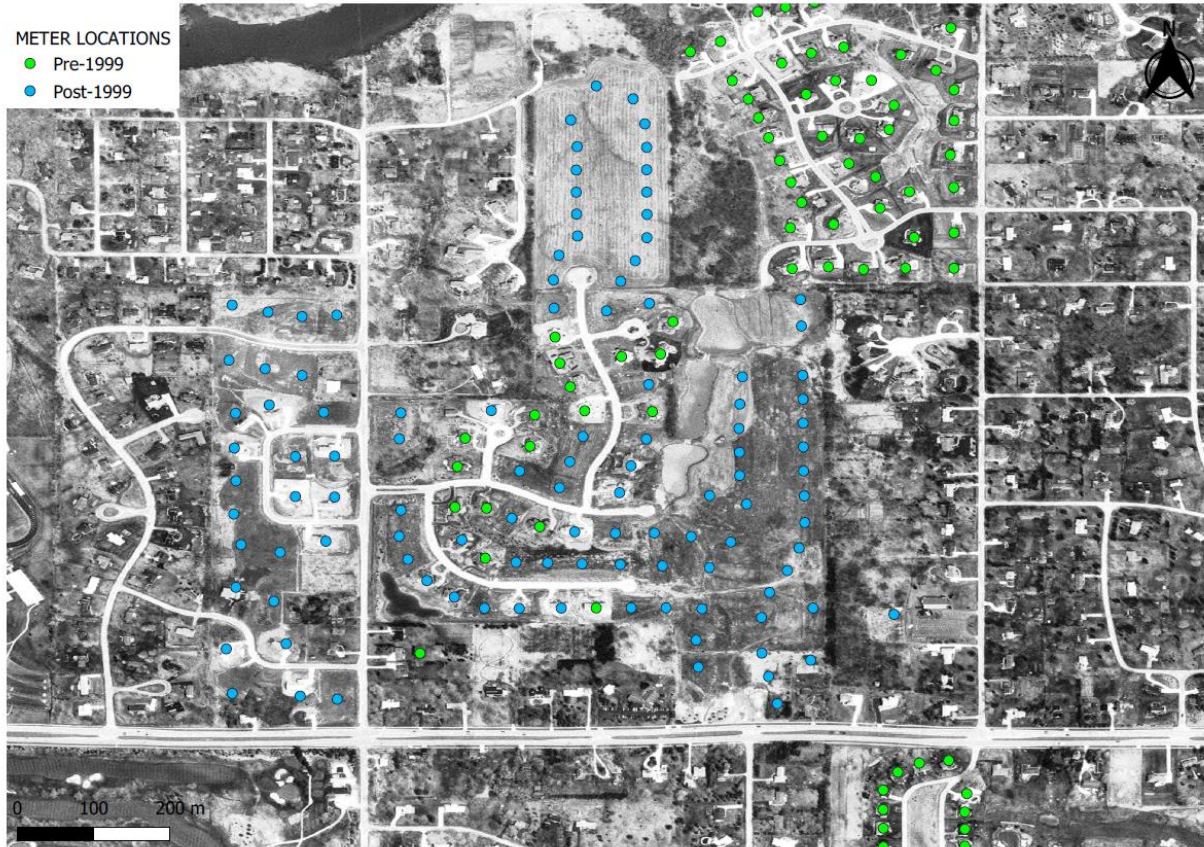


Figure 7 and Figure 8 illustrate the percentage breakdown of the current customer base by pre- and post-1999 development as both customer counts and REUs. Note that Figure 7 and Figure 8 only include areas of the MWU serviced by water purchased from MWW (Mequon and Thiensville).

Figure 7 – Customers’ Properties Development Dates

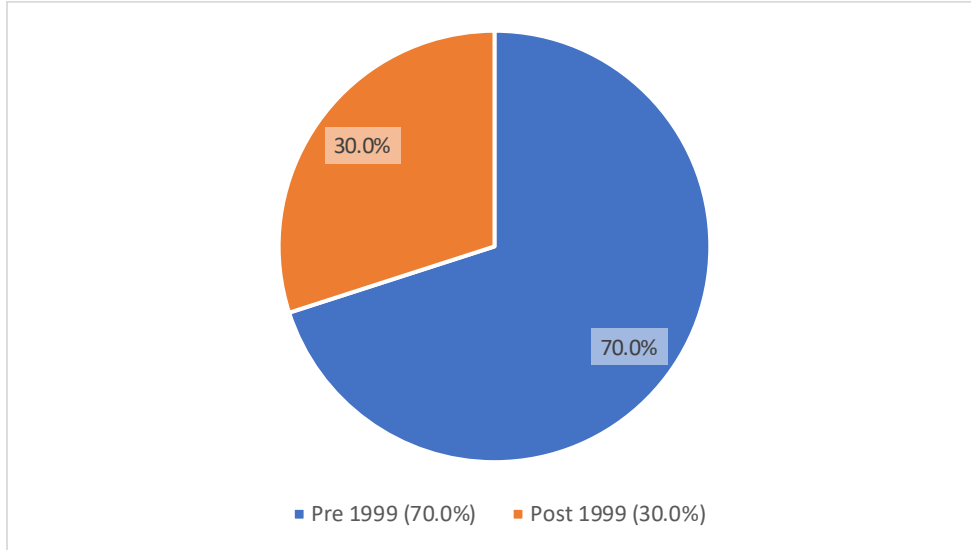
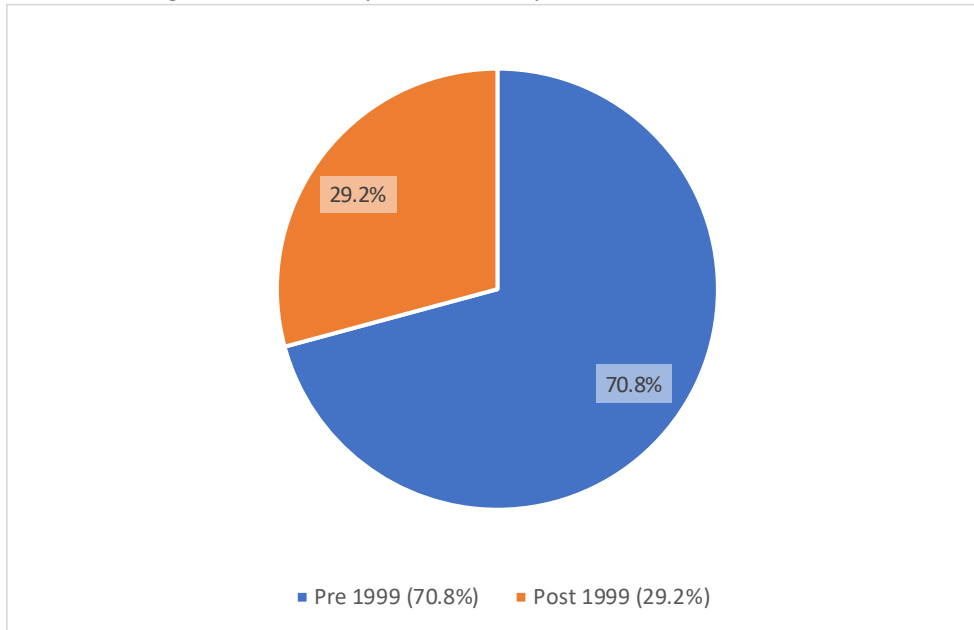


Figure 8 – REU Properties Development Pre- and Post-1999



Currently, the area served by MWW is approximately 29-30% new development. When including the area served by NSWC (Village of Bayside), approximately 23% of the overall MWU is new development. Based on the contract language and the pre- and post-1999 analysis completed in the Customer Assessment, the MWU currently exceeds the 20 percent development requirement.

SUPPLY ANALYSIS

Using invoices from MWW and operational hourly data, the average day, maximum day, and maximum-to-average day ratios were determined and are shown in Table 18. As previously explained in Table 12, the average day value is the average daily water usage for the year, while the maximum day value represents the highest amount of daily water used throughout the year. Peak hour is the highest hourly usage throughout the year. The peak hour demand was estimated using the industry standard ratio of 2:1 peak hour to max day. This data is useful when looking at contractual agreements with MWW and water supply capacities. As shown in Table 18, for Thiensville and Mequon, the maximum day provided by MWW was at its highest in 2020. This was due to a large main break in the system. Furthermore, the MWU's current peak hour has exceeded the contract, and the maximum day is close to exceedance.

Table 18 – MWW Supply to Mequon/Thiensville

Year	Average Day (MGD)	Maximum Day (MGD)	Ratio	Peak Hour (GPM)
2017	0.930	1.490	1.60	2,069
2018	0.914	1.722	1.88	2,392
2019	0.923	1.708	1.85	2,372
2020	1.005	2.141	2.13	2,974
2021	1.094	2.069	1.89	2,874
2022	1.154	1.997	1.73	2,774

In the last 5 years, MWW's efforts to obtain water rate increases has affected satellite wholesale communities. The Wisconsin Public Service Commission (PSC) has worked with the wholesale communities to moderate these MWW requests. In early 2023, the PSC approved and decided on the next wholesale water rate increase. The MWU's wholesale water rates increased by 6.74%. At the May 9, 2023 Mequon Water Utility Commission meeting, the Commission authorized an increase of purchased water costs onto customers through a Purchased Water Adjustment Clause (PWAC). The PWAC is a streamlined rate case that wholesale water communities can utilize in order to pass the increased costs from suppliers onto customers. The impact of the PWAC is estimated to be an increase of \$1.67 in billed water costs to the average residential customer per quarter.

NORTH SHORE WATER COMMISSION SUPPLY

Supply from NSWC comes from two supply points that are a part of the Fox Point Pressure District. The NSWC treats Lake Michigan water at the treatment plant at Bender Road located west of I-43. The NSWC plant supplies approximately 7 million gallons of finished water storage via the Fox Point water distribution system to the MWU distribution network from four (4) below grade clear well pumps. The NSWC also can use pumps and storage at the Village of Fox Point and Village of Whitefish Bay to augment this supply.

The first supply point, constructed in 1998, is at East Dean Road and North Greenvale Road at the border between Fox Point and Bayside (NSWC – Greenvale). Originally, this supplied the Pelham Heath subdivision in Bayside and a few properties along East Brown Deer Road in Bayside. In 2015, this supply location was interconnected with the rest of the NSWC-supplied portion of the system. Because this supply point must flow through Fox Point to reach Mequon's system, a wheeling charge is paid by the MWU. The wheeling charge is to compensate the Village of Fox Point for the use of their distribution system to supply the MWU with water.

The second supply point, constructed in 1999, is on North Port Washington Road and West Brown Deer Road (NSWC – Port Washington). This was originally constructed to serve the senior housing on North

Port Washington Road. However, as the Bayside distribution system continued to grow, this became the primary supply point from the NSWC.

Per the 1999 contract with NSWC that was subsequently amended in 2009, the aggregated maximum supply that can be provided by NSWC is 1,833 gallons per minute (2.0 MGD). Based on operating experience, NSWC can provide significantly more capacity. In 2019, a fire at the White Oaks Apartment and the efforts to combat it caused an abnormally high maximum day and peak hour demands. The NSWC’s supply to the MWU is shown in Table 19.

Table 19 – NSWC Supply to Mequon Water Utility/Bayside

Year	Average Day (MGD)	Maximum Day (MGD)	Ratio	Peak Hour (GPM)
2017	0.230	0.360	1.57	500
2018	0.232	0.378	1.63	525
2019	0.229	1.293	5.65	1,796
2020	0.230	0.400	1.74	556
2021	0.243	0.354	1.46	492
2022	0.240	0.520	2.17	722

The NSWC supply is connected to the MWU via a booster pump station along North Port Washington Road north of County Line Road. This booster station consists of pressure transducers which monitor pressure in each district, two pumps which add pressure to pump water into Mequon from Bayside and two variable frequency drives which vary the pump speeds to maintain exact pressure. This booster station is necessary because of pressure differences between the two suppliers and will be discussed further in the Distribution Assessment.

POTENTIAL SUPPLY

Per WDNR codes and reasonable water system design standards, a water system should be able to meet the maximum day demands even with its largest supply source out of service. The NR 811.26 excerpt regarding this standard is shown below.

NR 811.26 Number of pumping units. All pumping stations for systems using either groundwater or surface water shall meet the following requirements:

- (1) There shall be 2 or more pumping units, with each unit capable of supplying the peak demand. The department may approve exceptions under sub. (2), if additional pumping stations which can meet the peak demand are available or if the department determines that there will be a sufficient volume of storage available between pumping periods to allow for necessary repairs. Depending on the type and size of the water system, a sufficient volume of storage may include elevated storage, ground storage fitted with high-lift pumps and auxiliary power, and pressure tank storage. If only 2 units are provided, each unit shall be capable of supplying the peak demand. If more than 2 units are installed, the total number of units shall have sufficient capacity so that if any one pump is taken out of service, the remaining pumps are capable of supplying the peak demand.*

The capacity of any utility with the largest supply source out of service is termed the firm water supply capacity. The largest single supply connection of the MWU is the MWW connection at Wauwatosa Road. The firm water supply capacity would therefore be the NSWC supply, which is contractually determined at 3.00 MGD.

Each supplier’s contract and operating capacity is shown below in Table 20. The table does not include the second Milwaukee connection at Swan Road and County Line Road, as this connection is not yet established and connected to the distribution system. A firm water supply capacity of 3.0 MGD equates to a flowrate of 2,083 GPM. While the average day and maximum day demands shown in Table 15 are less than the firm water supply capacity, the peak hour flows exceed the contractual values.

Table 20 – Water Supply Capacity

Source	Contract Capacity (MGD)	Operating Capacity (MGD)
MWW – Wauwatosa	2.10	3.20
NSWC – Greenvale	1.00	1.00
NSWC – Port Washington	2.00	2.00
Subtotal	5.10	6.20
<i>Largest supply out of service</i>	<i>-2.10</i>	<i>-3.20</i>
Firm Capacity	3.00	3.00

SUPPLY VS POTENTIAL CUSTOMER BASE

The existing firm capacity is sufficient to meet the average and maximum day demand of the current potential customer base referenced in the Customer Assessment. Table 21 shows the average day and maximum day demand for the three categories of customer (OMU, OMNU, and RME). The total current potential customer base (OMU and OMNU) maximum day system demand is estimated at 2.378 MGD. The current potential customer base accounts for 80% of the firm capacity.

Table 21 – Firm Capacity Analysis

Description	REU	Avg Day (MGD)	Max Day (MGD)
On Main Using	6,781	1.047	1.858
On Main Not Using	1,899	0.293	0.520
Requires Main Extension	6,368	0.983	1.745

At the current firm capacity of 3.00 MGD, the number of REU’s that can be serviced at maximum day demand is 10,950. This represents a 26% increase over the current potential customer base.

The ultimate REU customer base (OMU, OMNU, and RME) system demand of the Water Utility User Service Area is estimated at 4.123 MGD using current REU values. The ultimate REU base system demand of the MWU exceeds the current firm capacity by 1.123 MGD or 37%.

SECOND MILWAUKEE CONNECTION

Because of the contractual limit and increased system demands, the MWU began to explore options to increase the supply. As mentioned above, on March 8, 2023, MWW approved the relocation of the second MWW connection point to Swan Road and County Line Road. The City recently entered into a Development Agreement with the developer of Swan Ridge Farms subdivision, which will develop existing agricultural land into a single-family subdivision. As part of the development agreement, the Developer will install the second MWW connection and oversize the water main through the subdivision with the MWU compensating the developer for a portion of the costs. At the end of the project, the second MWW connection will be established and a water main sized to serve the Utility will be routed to around 1,300 feet south of the intersection of North Swan Road and West Donges Bay Road.

To complete the system loop and interconnect the second supply point with the existing system, the MWU would need to install the remaining 6,300 feet (1.3 miles) of large diameter water main. Completing the

second supply point with MWW will increase the firm capacity of the MWU from 3.0 MGD to 5.16 MGD. This increased firm capacity would be sufficient to supply the ultimate REU customer base of the Water Utility User Service Area average and maximum day demand. Connecting the second MWW supply point at North Swan Road will also provide firm capacity that can meet the projected peak hour demand until 2040.

ADDITIONAL NORTH SHORE WATER COMMISSION SUPPLY

The existing contract with NSWC limits the supply to 3 MGD. While this has been adequate, more supply could be obtained from NSWC. Pump and operational improvements by NSWC may allow this capacity to be increased to approximately 4 or 5 million gallons per day.

The MWU purchases water as a wholesale customer, not as an equity member of NSWC. An equity member owns capital in the NSWC treatment plant, and therefore receives water at a reduced cost as compared to a wholesale or retail customer. Whitefish Bay, Glendale, and Fox Point purchase water from NSWC as equity members which is a lower price than the wholesale customer rate. The MWU may seek an upgrade to the NSWC contract to either upgrade the capacity as a wholesale customer or perhaps become an equity member. Equity members or owners of NSWC are provided a seat on the Board of Water Commission, receive water at cost, and provide direction to the Staff of the Commission for water treatment, finances, and system improvements. While an appealing option for lower water rates, becoming an equity member would require a significant financial expenditure in order to invest in the treatment plant.

While the firm water supply capacity of NSWC is sufficient to meet the system demand, the distribution hydraulics would most likely limit the ability to supply the entire MWU on a long-term basis. This restriction will be discussed in Section 5 - Distribution System Assessment.

NEW WATER TREATMENT PLANT

In 2012, the MWU, Village of Grafton, and City of Cedarburg joined together to hire CH2M Hill and study water supplies in the region to meet long-term water supply needs. The study evaluated all available supplies including wells, existing Lake Michigan suppliers, and building a new Lake Michigan water treatment plant. The study also examined alternative models to deliver and own the treatment plant. The 2012 study ranked a new water treatment plant as the best option but did not rule out the other options.

In 2017, Grafton and Cedarburg were contacted regarding an update for the shared treatment plant. Both Grafton and Cedarburg are planning on continuing to utilize their existing groundwater supplies, which are considered adequate. If a new water treatment plant progressed, Mequon would most likely be the sole community contributing to the design, construction, and costs.

Designing and building a water treatment plant and other needed transmission mains requires a large capital expenditure. As will be mentioned in the Financial Analysis, the MWU is unable to borrow any additional money until the initial bonds from the MWU purchase are retired. This limitation would restrict the MWU's ability to build and/or contribute to a shared water treatment plant in the near future.

A full financial analysis would need to be completed to determine the potential return on investment of building and operating a treatment plant compared to continuing to purchase water from NSWC and MWW. The water quality between purchasing from wholesale suppliers and operating a treatment plant would likely be very similar as the overall water source would be Lake Michigan. With construction of a new treatment plan however, the MWU would be able to take advantage of new treatment techniques for emerging contaminants.

Distribution System Assessment

EXISTING INFRASTRUCTURE

The MWU's distribution system contains approximately 96 miles of water main ranging in diameter from 6 inches to 16 inches. The system also contains 1,456 main valves, two pressure reducing stations, one booster station, 1,171 fire hydrants, 1,171 hydrant auxiliary valves, 2,991 service laterals, 2,991 curb stop valves, and 45 air release assemblies. Table 22 shows the quantities of the MWU's existing infrastructure, and efforts are ongoing to ensure consistency between PSC reporting and the MWU Geographic Information System (GIS) database records.

Table 22 – Existing Infrastructure

Existing Infrastructure	Quantity	Units
Water Mains	505,393	LF
Valves	1,456	EA
Hydrants	1,171	EA
Meters	4,700	EA
Master Meter Facilities	3	EA
Air Relief Assemblies	45	EA
Lateral and Curb Stops	3,020	EA
Storage Facilities	4	EA
Booster Pumps	9	EA

WATER MAIN

Table 23 shows current PSC Annual Report footage by pipe size and material. The MWU standard is to install water mains with a plastic material, either PVC or High-Density Polyethylene (HDPE). The majority of pipe installed in the distribution system is PVC. HDPE is installed only when construction methods require a trenchless installation.

Table 23 – Water Main Quantity by Pipe Material

Size (in)	Pipe Material (LF)			Total
	Plastic	Metal	Unknown - Does Not Contain Lead	
4	4,287		2,082	6,369
6	68,870	8,222	13,716	90,808
8	236,302	3,617	891	240,810
10	8,965			8,965
12	85,136	3,443	71	88,650
16	62,795		6,996	69,791
Total	466,355	15,282	23,756	505,393

Approximately 3% of iron pipe (cast iron or ductile iron) in the system is either located in older systems inherited by the MWU or in fire hydrant leads that were installed intentionally for hydrant stability. Any new ductile iron fittings and pipe installed is polyethylene wrapped to protect from corrosion. The inherited iron pipe will eventually need to be replaced as corrosion spots are identified. In 2020, the MWU

replaced a stretch of cast iron pipe with new PVC on North Range Line Court in conjunction with the City's roadway project. The MWU has not experienced many main breaks on these iron mains, so there has not been a program to regularly replace metal water mains.

Table 22 and Table 23 show data from the latest PSC report. These numbers are significantly different than the footage of main and material drawn in GIS. This number has not been correctly reported to the PSC. PSC reports have been populated by adding or subtracting new additions or replacements to the prior year's PSC report data. At some point in the past, the PSC report data diverged from the amounts shown in the GIS system. It is recommended that the updated GIS system be used to report the correct length of water main to the PSC.

VALVES

Main valves are critical to allow water main segments to be isolated in the case of a main break, while hydrant auxiliary valves allow hydrants to be maintained and repaired without shutting down customers. Main valves are located near hydrants and intersections to provide maximum operation flexibility. Most main and hydrant auxiliary valves are modern resilient wedge valves with corrosion resistant bolts and polyethylene wrap and are in very good condition. However, older valves were not corrosion protected and will need to be eventually replaced. This should be done in coordination with paving projects or as corrosion and packing leaks are identified. By coordinating with paving projects, the MWU will not have to excavate a newly paved road or excavate and patch that which might soon be replaced. This is the most cost-efficient solution for the MWU as it avoids the cost of street repairs associated with fixing them outside of street relays.

Best management practices (BMPs) suggest that main valves are checked and operated at least every 3 years. In the last several years, operation staff have not been meeting this quota, which requires approximately 500 main valves to be exercised yearly. The annual quota has not been met as this type of BMP requires the use of a valve turner and the availability of an operator to operate the valve turner. By prioritizing and scheduling other uses of the valve turner, availability will be provided to meet the annual quota. As the MWU continues to expand, the number of valves requiring annual exercising will increase.

BMPs suggest that hydrant auxiliary valves are checked and operated every 3-6 years. In the last several years, operation staff have not been meeting this quota, which requires approximately 200 hydrant valves to be exercised yearly using a valve turner. By prioritizing and scheduling other uses of the valve turner and creating a set schedule that includes both main valves and hydrant auxiliary valves, availability will be provided to meet the annual quota. Again, this number will increase as the MWU continues to expand.

This past year, City Water, the contract operator of MWU, hired an additional engineer that has been completing new construction inspections, giving operators more time and availability to perform daily operations, such as the operation of valves.

HYDRANTS

There are 1,171 fire hydrants in the system, primarily for fire protection. Secondly, fire hydrants give the MWU an access point for flushing and maintenance of the water distribution system. Most of the MWU's fire hydrants are either Kennedy (34%), Clow (19%), and Waterous (18%) brand. The remaining 29% of hydrant brands are mostly from inherited hydrants that are harder to operate and should be eventually replaced. Standardizing on these few select brands reduces the amount of repair parts the MWU needs to keep on hand for hydrant repairs. Current MWU standards require new hydrants to be either Waterous or Mueller brands.

Best management practices suggest that hydrants are checked and operated at least every two years. Summer staff exercise and operate the hydrants, and they have been meeting the yearly quota of approximately 650 hydrant inspections. This number continues to increase as the system continues to expand.

METERS

The MWU owns over 4,700 customer meters in the system which measure water usage for billing purposes. The MWU uses positive displacement water meters due to their high accuracy. Positive displacement meters contain mechanical parts that are displaced as water flows through the meter's main chamber. This displacement registers the volume as it exits the chamber.

Water meters one (1) inch or less are scheduled for replacement every 20 years. The MWU has a meter replacement program in place that recommends approximately 240 meters to be replaced each year. On average, this annual quota has been met. Larger meters are tested based on the PSC testing schedule. Meters sized one-and-a-half (1.5) and two (2) inches should be tested every four (4) years, three (3) and four (4) inch meters should be tested every two (2) years and six (6) inch meters or larger should be tested every year. While the MWU uses a contractor for larger meter testing, the MWU owns all meters throughout the system. These meters are currently meeting the PSC required testing schedule.

There are five (5) wholesale meters split between the three (3) supply points identified in Section 4 – Water Supply. Wholesale meters are owned by MWU's suppliers such as MWW and NSWC. The wholesale meters are tested annually by either MWW or NSWC with assistance from MWU staff. The wholesale meter vaults are owned and maintained by the MWU.

AIR RELIEF ASSEMBLIES

Air relief assemblies provide flushing points to prevent air buildup, which can cause increased friction loss and flow reductions. Air build-up can also cause rust and corrosion which weakens the pipes. High points in water mains are locations susceptible to air build up, as air is less dense than water. Standard utility practice requires hydrants at high points, which serve as the flushing device, but this is not always practical. Examples of some installation points are at every river crossing, interstate crossing, dead ends without hydrants, or high points in between fire hydrants. Currently there are 45 identified air reliefs in the system.

Best management practices suggest these are operated annually to flush out any air buildup. In the last several years, operations staff have not been meeting this goal. In 2022, a sizable system leak was found on an air relief that had not been operated or inspected for over 2 years. The MWU has created an annual air relief flushing program to meet this best management practice.

LATERAL AND CURB STOPS

A water service lateral is the pipe that provides water from the water main to a home or business. Table 22 shows the number of service laterals and curb stop valves report to the PSC in 2021. Given that the total number of MWU customers is over 4,500, the number of laterals and curb stops reported to the PSC is incorrect. It is recommended that the number of service laterals and curb stops throughout the distribution system be verified and reported correctly for the 2023 PSC report.

The majority of the 3,020 service laterals reported to PSC are either HDPE plastic or copper, corresponding to the smaller diameter services (2-inch and smaller). Larger diameter services (3-inch and larger) are typically PVC plastic or ductile iron. Almost all copper services were inherited from private water trusts during connection and are largely found on PVC mains. This is a potential corrosion concern and is a target and priority for operation staff leak surveys. If a leak is found, the lateral is replaced with HDPE. All new service laterals are HDPE plastic. HDPE plastic is used for service laterals because they will not corrode or suffer mineral build-up, nor will they contribute dissolved metals into drinking water.

Curb stop valves are located at or near the property line on the service lateral. They are used to shut off the service lateral for interior plumbing work or emergencies. They also delineate the public and private portions of the lateral. The MWU owns the portion of the lateral from the main up to and including the curb stop. The property owner owns the lateral from the curb stop into the home. Wisconsin State Code requires that property owners protect the curb stop box for MWU access. However, landscapers and incidental construction - like driveways or sidewalks - sometimes damage these access points and the curb stop valve is then not accessible. When this occurs, the MWU must excavate around the curb stop valve to remove and replace it. To help avoid this costly procedure, the MWU locates the curb stop and paints it blue for easy visibility during any known construction project. It is of further importance that homeowners and landscapers who are consistently working around these locations remain aware of their placement.

STORAGE FACILITIES

The MWU owns four (4) water storage facilities within the distribution system. Water storage facilities provide short duration supply capacity to maintain system pressures during an emergency or high flow situation. The MWU has two operational ground storage reservoirs, one at the Whitman Place pumping station and one at the Ville du Parc (Marseilles) pumping station. These two facilities are fairly small by normal MWU design and provide minimal benefit to the system. The MWU also owns two storage reservoirs at the Mequon Business Park that are currently not in use. One facility is a ground storage reservoir and the other is an elevated tank.

The main difference between ground storage reservoirs and elevated tanks relates to how water is stored. Water stored in a ground storage tank loses its pressure when it is stored. They require pumps to repressurize the water so it can enter the distribution system. Elevated tanks do not require pumps, as the water is stored above ground by over 100 feet (elevated). This aerial storage provides the pressure to the water as it reenters the system.

WHITMAN PLACE

The Whitman Place Reservoir is 100,000 gallons. The reservoir is located in Whitman Place Subdivision (near West Donges Bay Road and North Grasslyn Road) and was part of the original LeMont Water Utility. The reservoir was most recently inspected in 2019 and was found to be in good condition. Inspections are required every 5 years – the next inspection will be in 2024. The reservoir is filled from the distribution system via a control valve and is pumped once per day to freshen the water in the reservoir. Pumping is timed for the peak hours of the day, or it can be pumped if pressure gauges indicate a system emergency.

The Whitman Place pumping controls and building are aging and either need investment or to be abandoned.

VILLE DU PARC

The Ville du Parc Reservoir is 80,000 gallons. The reservoir is located near River Road and Marseilles Drive and was part of the original Ville du Parc Water Trust. The reservoir was most recently inspected in 2019 and was found to be in fair condition. Inspections are required every 5 years – the next inspection is scheduled for 2024. It is operated in a similar fashion as the Whitman Place Reservoir. The Ville du Parc Reservoir building and controls are in poor condition and need investment or to be abandoned.

Although the total capacity for the Ville du Parc Reservoir is 80,000 gallons, only 28,000 gallons are pumped and refreshed daily based on the current set points. The maximum capacity of 80,000 gallons is based solely on reservoir dimensions. In practice, the reservoir's maximum level is set at 8' (10' is maximum). As currently operated, only around 65,000 gallons are stored in the reservoir. This volume is lessened further by minimum depth requirements for proper pump operation – the reservoir cannot be pumped dry. Therefore, the actual system storage provided by the Ville du Parc Reservoir as currently operated is significantly less than the maximum of 80,000 gallons, and less than 65,000 gallons.

OTHERS

The MWU also owns two storage reservoirs at the Mequon Business Park that are currently not in use. The MWU acquired both facilities as part of the Mequon Business Park acquisition in 2013.

There is a 250,000 gallon ground storage reservoir and a 500,000 gallon elevated storage tank. The ground storage reservoir is larger than Whitman Place but needs significant investment to upgrade the facility. The ground storage reservoir would need additional piping, booster pump modifications, and the pump controls upgraded for the facility to be able to meet the operational characteristics of the Mequon distribution system.

The 500,000 gallon elevated storage tank potentially requires significant upgrades before it could be placed into service. Based on system hydraulics, a study would need to be performed to determine the operational hydraulic range and how to control the fill and drain cycles. Before being placed into operation, an inspection would be required to identify any maintenance issues. Potential issues with placing the elevated storage tank online include:

- Internal and external painting
- Reorganization of cell tower equipment
- Control valve modifications
- Upgrade in SCADA equipment

BOOSTER PUMPS

As identified in Table 22, there are nine (9) booster pumps within the system. Booster pumps boost pressure thus improving flow rate. These are needed as Mequon is divided into different pressure zones. The booster pumps will turn on when additional pressure is needed in the distribution system.

Pumps at the two ground storage reservoirs are operated on a regular basis with the reservoir drain cycle. The booster pumps at the Port Washington Road interconnect are run infrequently, but are a critical part of the distribution system. In a scenario whereby the system cannot be supplied through the MWW connection, these two pumps are the only method of supplying water to the Mequon portion of the system. In the past several years, the station has operated in this capacity twice, providing domestic flow

throughout the system. Because of their importance, the MWU continues to operate these pumps monthly to ensure they will work during an emergency situation. An annual generator test is planned as part of routine operations at this location. Staff is scheduled to conduct this test at the end of 2023 and each year thereafter.

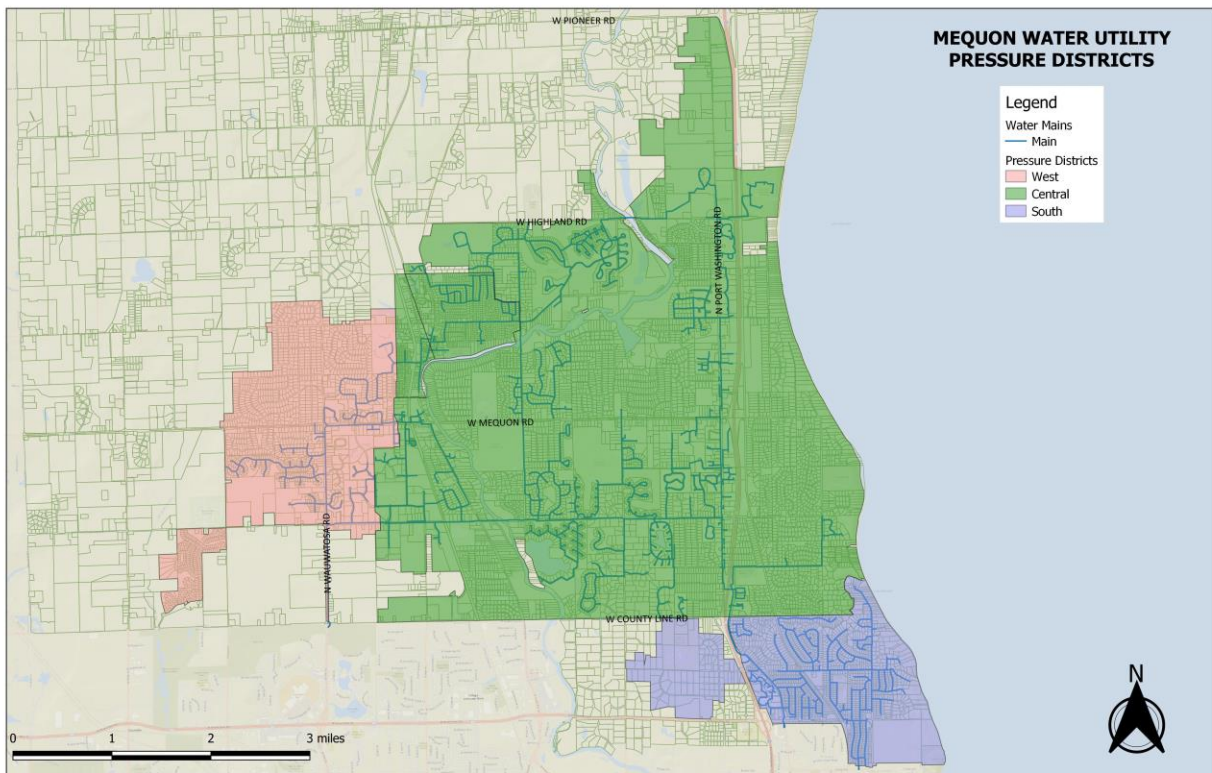
HYDRAULIC WATER MODEL

BACKGROUND

There are three pressure zones in the distribution system as shown in Figure 9.

- West pressure zone – serves the west side of Mequon and operates on the MWW west pressure system. West pressure zone is restricted by the pressure reducing stations located on Donges Bay Road (west of the Business Park), on Buntrock Avenue (by Wisconsin Lutheran Seminary), and on Mequon Road (in front of the Public Safety building). Pressures in the district range from 50-100 psi.
- Central pressure zone – serves the majority of MWU customers in the City of Mequon, and all of the customers in the Village of Thiensville. Pressures in the district range from 50-90 psi.
- South pressure zone – serves MWU customers in the Village of Bayside distribution system. Pressures in the district range from 40-70 psi.

Figure 9 – System Pressure Districts



These different zones exist due to the varied land elevations in the system and due to the different pressures provided by water suppliers. The pressure districts provide boundaries between different hydraulic grade lines throughout the system. Hydraulic grade line is the absolute measure of the energy of the water in the pipe and is based on sea level elevation. Because of the sea level reference, hydraulic

grade line offers a method to compare pressures at locations with different elevations. On a pressurized pipe system, the hydraulic grade line is the elevation water would rise to in a small vertical tube connected to the pipe.

The majority of water supplied to the West and Central pressure zones is from the MWW connection. This is because MWW supplies Mequon and Thiensville, and these areas take up a majority of the West and Central pressure zones. The water supplied to the South pressure zone is from the NSWC connection because NSWC supplies Bayside, and Bayside takes up a majority of the South pressure zone. There is a pressure booster station located along Port Washington Road that can supply water from NSWC into the Central and West pressure zones. The booster station is used during maximum day demand conditions or when there is an emergency in the Central pressure zone such as a fire.

ANALYSIS

The MWU’s supply and distribution system is modeled in detail using computer hydraulic water modeling software. Hydraulic water modeling helps to evaluate system pressures and determine where pressures may be deficient and under what conditions. This helps verify where pressure zones may need to be added or modified. During normal operations, this model is updated to include new system expansions and developments. However, as part of the master plan analysis, updated water consumption demands were included in the model. These updated water consumption demands were distributed based on meter locations, customer classifications, and REUs.

The base scenario of the hydraulic water model is the maximum day demand condition. This ensures the system is sized appropriately to meet maximum customer demand. The required minimum system pressure of 35 psi (pounds per square inch) is achieved throughout the distribution system. Results of the maximum day pressure analysis can be found in Appendix D.

The maximum day scenario is also used to determine the available fire flow throughout the system. Water usage for fire demand is a vital consideration in the design of a water supply and distribution system. Fire demand varies greatly from domestic usage in that an extremely large quantity of water is required from a single demand point in a very short time. Because of the extreme rate of usage during an emergency situation, fire demands frequently govern design. WDNR code for available fire flow from a distribution hydrant is a minimum of 500 GPM (gallons per minute).

The Insurance Services Office (ISO) recommends that a system the size of Mequon’s be capable of delivering a fire demand of 1,000 GPM to 3,500 GPM for varying durations depending on the rate of demand. Table 24 shows the fire flows used for the evaluation of the Mequon distribution system. The ability of the City’s water system to meet fire demand is one of the three major components which are used to determine a rating for insurance. The other two components are building/fire codes and characteristics of the fire department. Each is used almost equally in determining an overall City rating.

Table 24 – Recommended Fire Flows

Category	Required Fire Flow (GPM)	Duration (hrs)
WDNR code 811	500	
Residential	1000	2
Commercial / Industrial	3500	3
Institutional / Public	3500	3

The available fire flow analysis was conducted during the maximum day demand condition with MWW, and with NSWC supply connections open. During this analysis, the booster pumping stations are not operating, so reasonably conservative conditions are represented. Results of the available fire flow analysis can be found in Appendix D.

The MWU system meets the WDNR code requirement of 500 GPM for available fire flow, however there are areas in the system that do not meet the recommended ISO fire flows without booster pump operation. The only external requirement the MWU must meet is WDNR code. ISO fire flows are recommendations and goals to achieve, but there are no penalties or violations for not meeting ISO standards.

The highest priority system loop is the second Milwaukee connection loop. This loop would connect water main from the north end of the Swan Ridge Farms Development to water main at Donges Bay Road and Wauwatosa Road. Other system loops can be prioritized as funding becomes available or further expansion of the MWU makes other alternative loops more desirable.

Note that the MWU requires that all new development contributing infrastructure to the public system be rated to meet ISO fire flows unless granted an exemption. This may require new developments to install larger mains than necessary to only meet WDNR fire flow requirements.

WATER QUALITY

The MWU strives to follow guidelines and recommendations set forth by the Partnership for Safe Water program (PSW). The Partnership for Safe Water is comprised of six drinking water organizations: American Water Works Association (AWWA), Association of Metropolitan Water Agencies (AMWA), Association of State Drinking Water Administrators (ASDWA), National Association of Water Companies (NAWC), US Environmental Protection Agency (USEPA), and Water Research Foundation (WRF). This is a voluntary program that provides utilities and other water agencies with tools to assess the performance of distribution systems and develop plans to improve performance beyond proposed regulatory levels. The MWU is not an official partner or member of the program but is unofficially following the guidelines.

One of the key parts of the PSW program is collecting disinfectant (chlorine) residual data. Chlorine residuals are an important factor in drinking water as they act as an important safeguard against the risk of bacteria and viruses. Over the past three years, staff has been collecting chlorine residuals at various locations around the distribution system on a weekly basis. PSW sets a goal that 95% of all the routine samples should be greater than 0.5 mg/L and less than 4.0 mg/L for chlorine with no consecutive individual samples reading less than 0.2 mg/L. Beginning in 2024, staff proposes to reduce sampling in the winter and spring to monthly monitoring but continue weekly monitoring in the summer. This is due to chlorine residuals decreasing more greatly in the summer months, requiring extra monitoring. Staff has also collected sufficient data over the past several years to provide an adequate baseline for monitoring.

Figure 10 and Figure 11 show the average collected data from the past three years for Mequon and Bayside. Residuals were aggregated by which wholesale supplier feeds the portion of the system the sample was collected from. In general, NSWC water has a higher chlorine residual entering and throughout the distribution system compared to MWW. This can be attributed to several items: NSWC treats the water with a higher chlorine dose, and the distribution system is more geographically condensed within Bayside.

Throughout the water distribution system, the chlorine residuals in MWW-supplied portions have fallen below the target chlorine residual of 0.5 mg/L multiple times in the past several years. Residuals trend lower in summer and fall months as the water temperature increases. Although there is annual hydrant flushing performed throughout the system, this does not create a long-term solution to keep chlorine levels above the 0.5 mg/L goal. It is recommended that additional studies or analysis be performed to develop a solution to the lower residuals throughout the system. Potential solutions include increased manual flushing, automatic flushing devices in critical areas, or a chloramine booster station.

Figure 10 – Mequon Chlorine Residuals

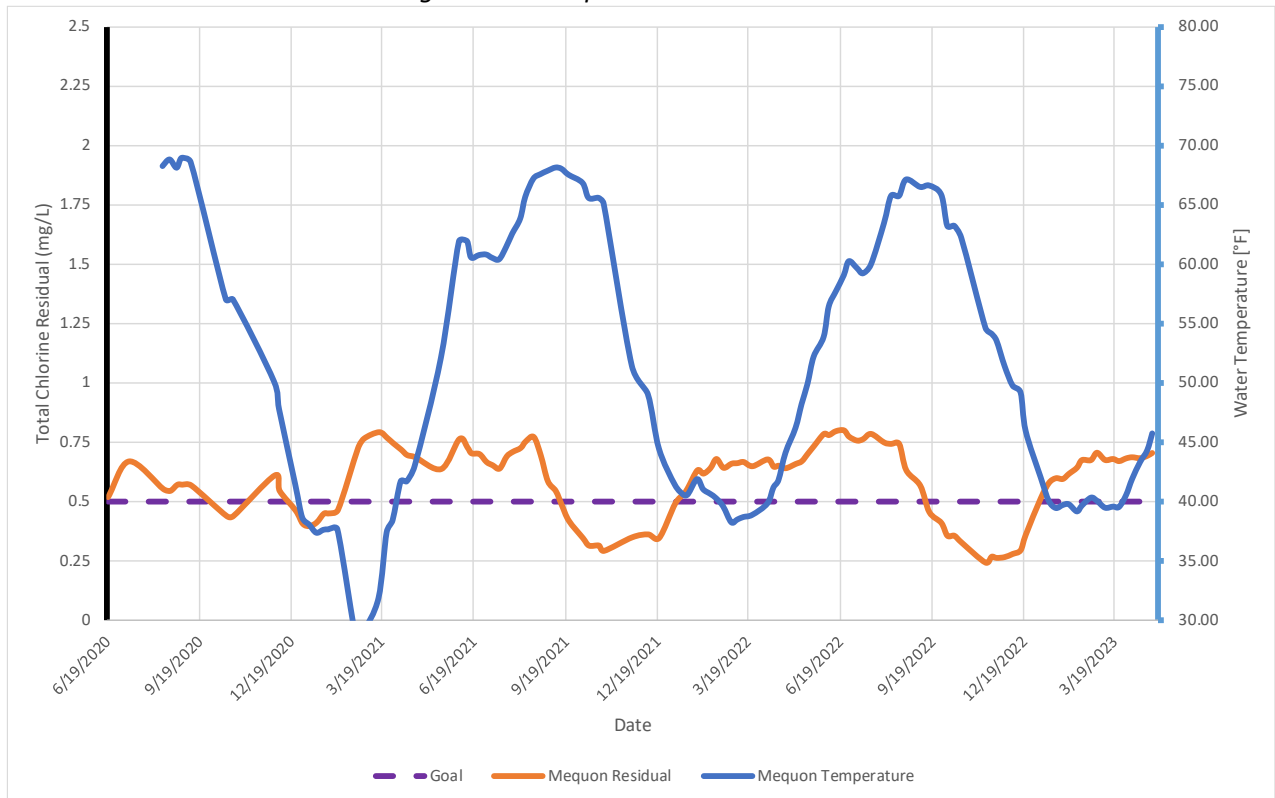
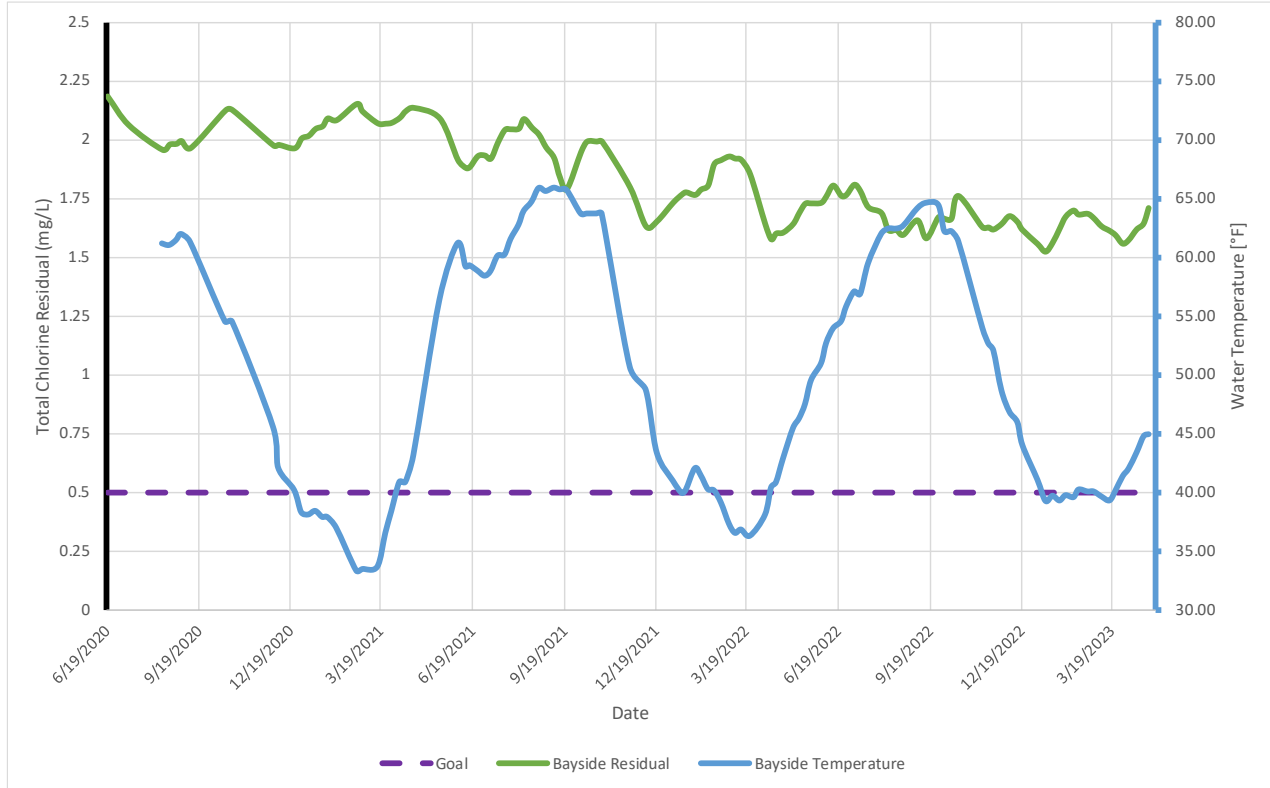


Figure 11 – Bayside Chlorine Residuals



Besides water temperature, the age of water in the distribution system can potentially indicate lower chlorine residual areas. The residual itself degrades based on several factors, including water temperature and biological demand, but both processes require time. Therefore, the hydraulic model was utilized to simulate water age. In general, the longer water is in the distribution system, the lower the chlorine residual. Therefore, a water age simulation allows staff to better understand the potential problem residual areas. These areas are then focused on for additional flushing to raise the chlorine residual to the goal of 0.5 mg/L. Results from the water age model can be found in Appendix D.

In general, the model identified locations that staff has already determined as areas to perform routine dead-end flushing. However, there were some additional areas that were not on maintenance lists and will be added going forward. This includes areas in which the water age is older than 120 hours according to the hydraulic water model.

It is critical to note that these goals and metrics are meant to provide the highest water quality water to MWU customers. Increased water age and decreased chlorine residuals does not mean that the water is unsafe to use or consume. Instead, it means that conditions exist that are more likely to promote bacteriological growth that could make the water unsafe or promote corrosion on metal materials. MWU staff follows all required bacteriological sampling and have not had any unsafe samples since 2015. The analysis and goals are meant to promote an optimized distribution system to lessen any potential chance of an unsafe water condition occurring.

Utility Financial Performance

Although MWU finances are completely separate from the general levy and Sewer Utility funds, MWU must follow the City of Mequon's Financial Policies. As a public water utility, MWU is also regulated by the PSC and is required to complete an annual report that details information on utility finances and other operational information. Because of this requirement, financial analysis of the MWU is best completed against the PSC accounting and reporting requirements. Key portions of the PSC annual report are revenues, operation and maintenance expenses, capital investments, depreciation expenses, payment in lieu of taxes (PILOT), and rate of return (ROR).

- **Revenues:** Revenues are the income the MWU makes through billing customers for water usage and connections. The fees charged to customers are a mixture of fixed fees (public fire protection and general service charges) and variable fees (volumetric charges). Other water revenues include late payment penalties, rents from Water Utility property, and other miscellaneous income. Rates are determined by the PSC and are found in the rate tariff on file with PSC and included in Appendix E.
- **Operation and Maintenance (O&M) Expenses:** These expenses are the recurring expenses incurred by the MWU in the normal operation and maintenance of the system. This includes the cost of purchased water from MWW and NSWC, labor costs for employees, and material costs for repairs.
- **Capital Investments:** Capital investments are an expense to install or replace infrastructure in the MWU. A capitalization policy determines when expenses are considered O&M or capital investment. In general, capital investments are for items with a service life of more than one year, the dollar amount is significant, it is used primarily for providing MWU service, and it can be considered a distinct unit of property. This includes water mains, valves, hydrants, meters, pumps, and major pieces of equipment.
- **Depreciation Expense:** Depreciation is the allocation of the cost of capital investment over the service life of the capital asset. This is a non-cash expense in the sense that no money is spent – this is a paper expense that allows Utilities to account for the eventual replacement of the capital asset at its end of life. Each capital investment (e.g., mains, hydrants, services, etc.) are depreciated at differing rates based on their respective lifespan. Overall, utilities accumulate depreciation at an overall composite rate of 2.00% – 2.50%.
- **Payment in Lieu of Taxes (PILOT):** Wisconsin Statutes Section 66.0811(2) authorizes municipalities to levy a tax equivalent against public utilities. This payment sends money from Water Utility generated revenues back to the municipal general fund. The payment amount is based on each year's current total MWU capital investment, municipal assessment ratio, and net local and school tax rate. This is equivalent to property taxes paid by landowners but is applied to the infrastructure owned by the MWU. A PILOT payment is reasonable when the customer base served by the Utility is the same as the municipal tax base, as every tax payer/utility customer pays a similar share. This is not the case for the Mequon Water Utility; the Utility includes customers outside the municipal tax base (Bayside, River Hills, and Thiensville) and there are taxpayers that are not utility customers. The City of Mequon authorized a \$0 tax equivalent on October 14, 2008, as part of the purchase of the MWU from WE Energies.
- **Rate of Return:** The benchmark rate of return is calculated by the PSC weekly based on a three-month rolling average of municipal bond rates. At the time of this report's completion, the

benchmark ROR was 6.10%. The PSC allows utilities to earn more revenue than expenses based on the benchmark ROR. These increased earnings are intended to help address future capital investment needs, unforeseen operating needs, and maintain confidence in Utilities’ financial integrity without resulting in excessive customer rates.

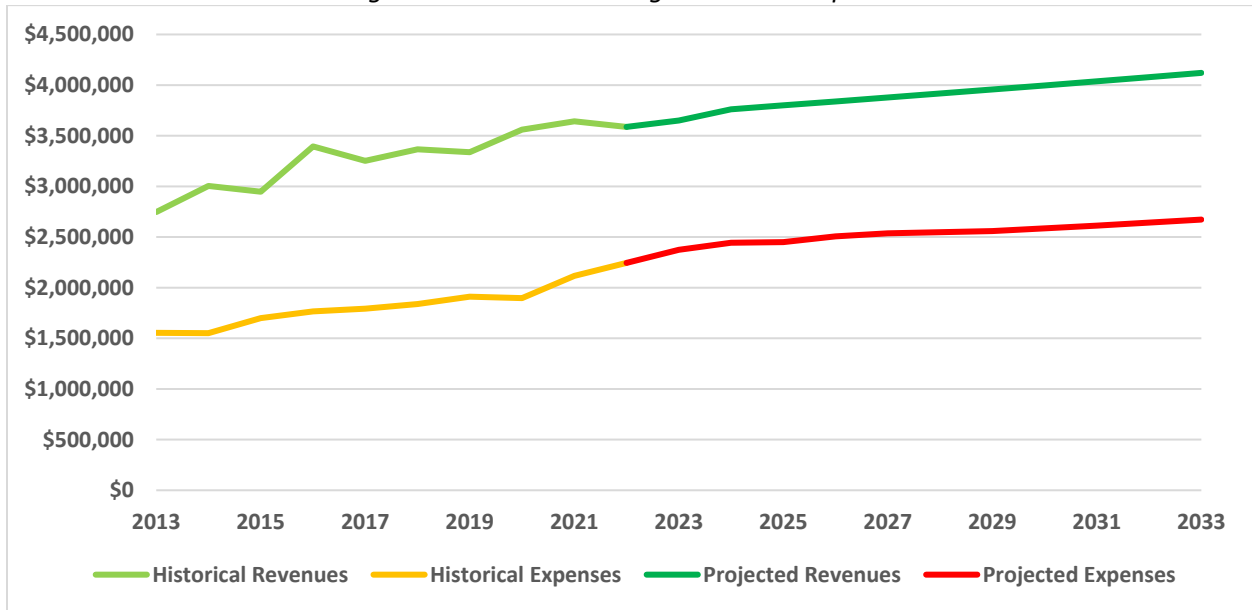
A financial model was assembled that shows the past 10 years (2013-2022) of PSC reports and that projects future (2023-2032) financial information based on recent averages, utility budgets, and capital investment plans. Besides the key portions listed above, the financial analysis of the MWU also included debt information and projecting future cash flows.

The full 10-year financial model is included in Appendix E. Several key highlights are presented below.

REVENUE AND EXPENSES

Overall, the revenue and expenses of the MWU are projected to grow at a similar rate to the past several years. Future revenue was estimated using the projected customer demands from the Section 3 – Water Demands and applying current rates. Expenses were estimated using standard inflationary adjustments and calculating future depreciation based on expected capital investments. Figure 12 shows historical and future revenues and expenses based on the PSC System of Accounts. The MWU is forecasted to maintain a sizable net operating income, which is the difference between revenue and expenses. Net operating income is used to fund additional capital projects and maintain MWU reserves.

Figure 12 - PSC Accounting Revenue & Expenses



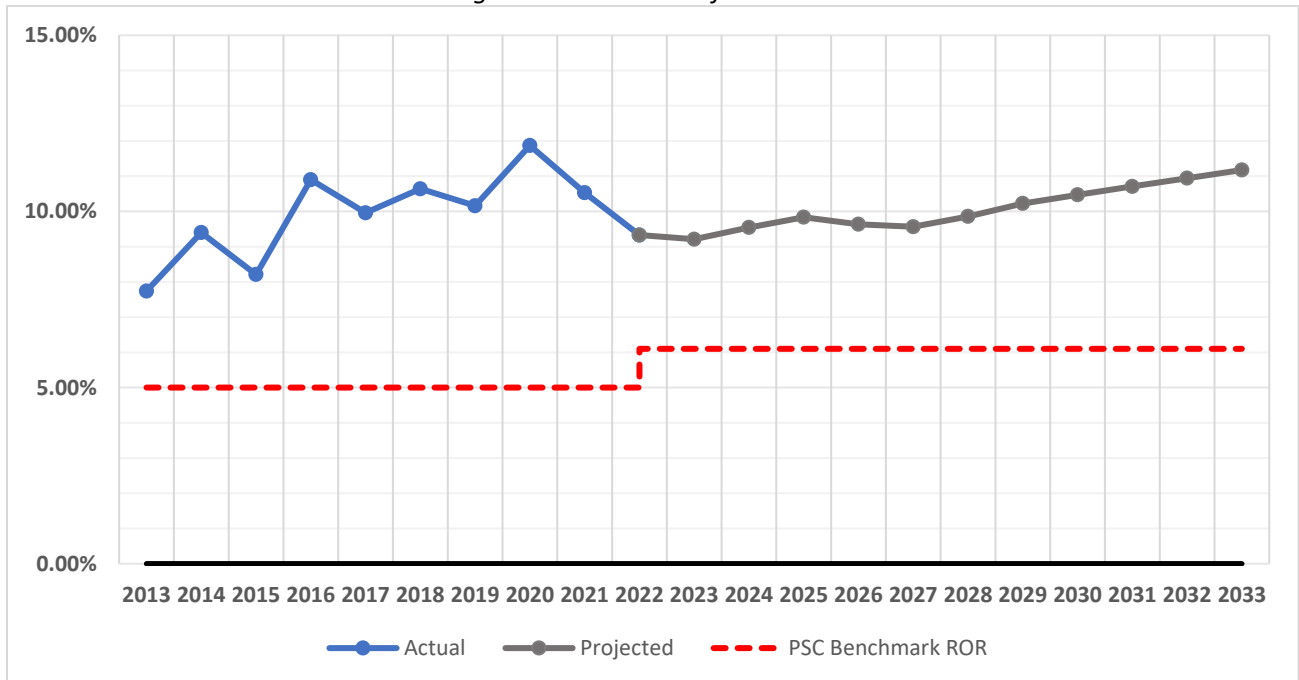
RATE OF RETURN

The ROR is the first measure the MWU uses to assess its financial health. Historically, the MWU has experienced rates of return well above the PSC benchmark. This trend is predicted to continue moving forward as shown in Figure 13. The two main portions of the ROR calculation are net operating income (NOI) and net capital investment (NCI).

$$ROR = \frac{NOI}{NCI} = \frac{NOI}{Plant\ Value - Accumulated\ Depreciation}$$

Steady utility growth contributes to both NOI and NCI. More growth leads to more customers, which increases revenue and NOI. However, the growth requires utility infrastructure (e.g., mains, hydrants, services, etc.), which increases the plant value and NCI. In general, the MWU should remain in excellent financial health based on the ROR and should remain well above the PSC benchmark.

Figure 13 - PSC Rate of Return

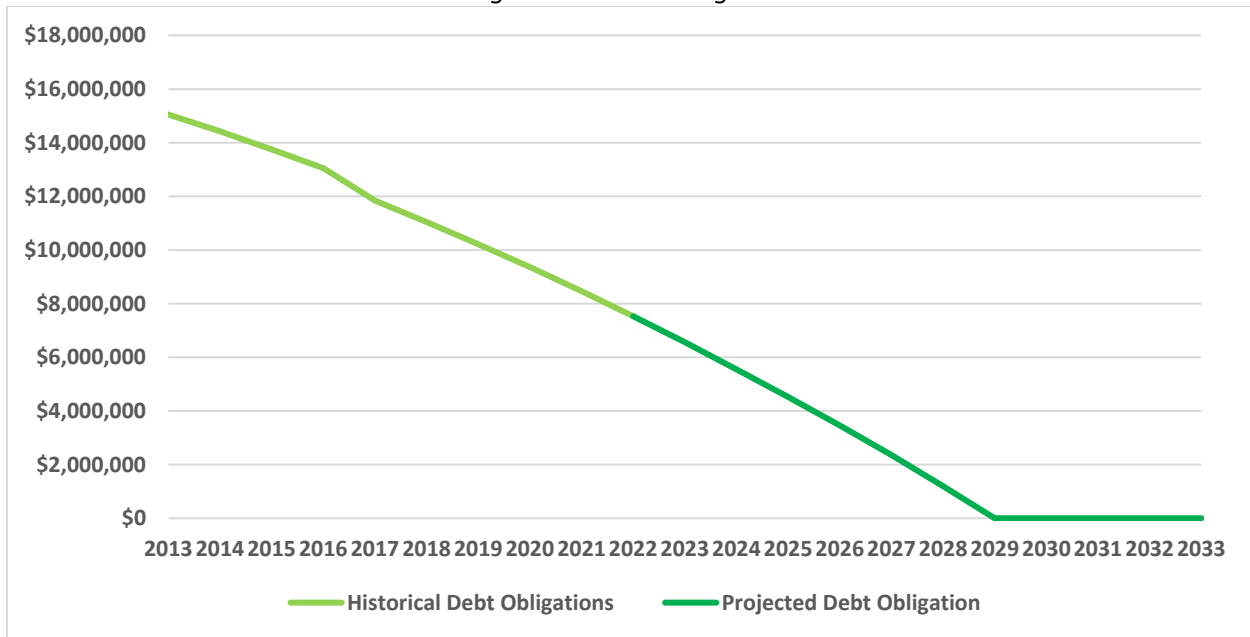


DEBT OBLIGATION

As mentioned in the Introduction, the MWU was purchased using bonds in 2009. As part of the purchase and organization of the MWU, further borrowing or bonding could not be completed until the initial bonds were retired. In 2017, favorable interest rates led to a refinancing of the debt obligation, and a portion of the initial 2009 bonds were retired in 2022. However, there is still over \$7.5 million in outstanding debt as part of the refinancing. Figure 14 shows the debt obligation for the MWU.

Steady growth in the number of MWU customers has led to an improved financial position for MWU. As shown in Figure 14, regular bond principal payments have reduced the bond obligation to \$8.465 million at the end of 2021.

Figure 14 - Debt Obligation

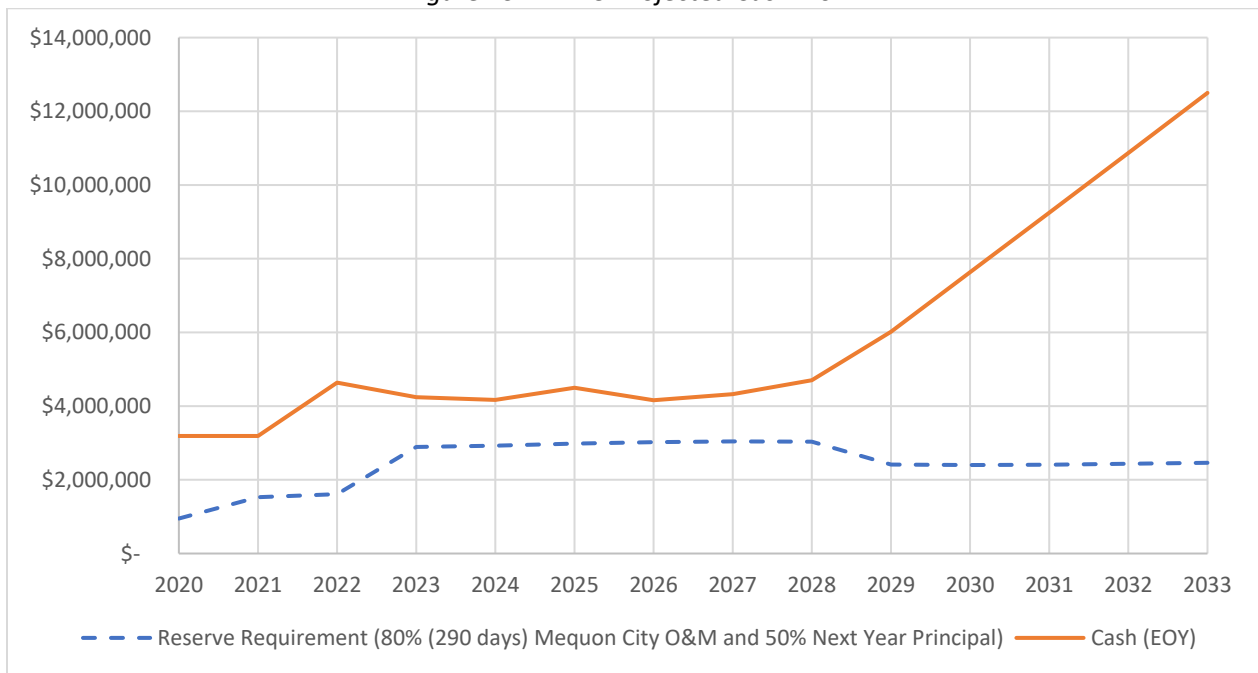


Once the refunded bonds are paid off in 2029, the MWU will be able to borrow additional money if required for infrastructure projects.

CASH FLOW

The second measure that is critical for determining the MWU’s financial health is cash flow. Cash flow is a measure of how much cash the MWU brought in or spent in total over a period of time. The cash flow for MWU takes into account other expenditures that PSC operating expenses does not – mainly capital expenditures. Figure 15 illustrates the estimated cash flow of the MWU until 2033. The dashed line indicates required levels of cash based on utility bond covenants and operating requirements. The MWU is required to keep 50% of the next year’s principal payment and 80% of the budgeted Operation and Maintenance expenses in reserve. Any cash above the reserve requirements is considered undesignated and can be spent on capital improvements or other projects.

Figure 15 - MWU Projected Cash Flow



At current capital project spending levels, the undesignated cash on hand is estimated to remain at over \$1 million. Once the refinanced bonds are paid off in 2029, the MWU’s cash flow will begin to increase greatly, as the expenditure for principal is eliminated. This coincides with the reduction of the reserve requirements, as the MWU will no longer need to reserve money to cover principal and interest payments.

RATES

The PSC also regulates and determines MWU’s rates. The current MWU rates can be found on the Utility Tariff on file with the PSC. The PSC determines rates based on an assessment of each utility’s current financial health, expected revenues, and expected expenses. If the MWU desired to change its rates, the Utility would have to file a rate case application with the PSC – Utility and City staff, commissions, or councils cannot determine the rates. The PSC also ensures that all customers are billed equally – there is only a single set of approved rates that apply to every customer classification.

The PSC determines if a Utility is eligible for a rate increase based on its ROR calculation. Because MWU is currently exceeding the benchmark ROR, the PSC would not authorize a rate increase. The PSC also authorizes rate increases if there is a significant capital expenditure that requires PSC approval and would cause a significant increase in expenses over the current spending. Because MWU is a voluntary utility

and all new infrastructure is contributed capital, it is very unlikely that there would be any capital project that would trigger a need for a rate increase.

The average residential customer pays rates for three (3) billing items: a volumetric water usage fee, a fixed public fire protection fee, and a fixed water base fee. A brief description of the fees and their purpose is below:

- Water Base Fee - a fixed charge based on the size of the water meter. It pays for installation, repair, maintenance, and reading of water meters, billing, and customer service.
- Public Fire Protection Fee - a fixed charge based on the size of the water meter. It covers the cost of installing water mains to handle fire flow demands and the maintenance of fire hydrants.
- Volumetric Water Usage Fee - a variable charge based on the amount of water used that pays for purchasing water from wholesale suppliers and pumping facilities.

In total, the average residential customer who uses approximately 12,500 per quarter would be billed for \$62.04 per quarter.

Key Principles

In the late 1980's and early 1990's the City of Mequon and Village of Thiensville were experiencing a water supply shortage. The vast majority of the wells in town were located in a shallow aquifer called the "Thiensville Dolomite". This aquifer is shallow and small in terms of area. This made the aquifer very susceptible to drought and demand. A professor at the University of Wisconsin-Milwaukee, Douglas Cherkauer, studied the water levels in Mequon and Thiensville at that time.

Based on well drawdown, Dr. Cherkauer estimated that there were only about 25 years of water left in the aquifer at the current demand rate. As such, the City of Mequon began looking for an alternate source of water for the City. In 1998, the Common Council sold the original Lemont Water Utility to the Wisconsin Gas Company, as long as Wisconsin Gas agreed to provide treated Lake Michigan water for the MWU.

Wisconsin Gas negotiated a contract with MWW and brought treated Lake Michigan water to utility customers, and over the course of the next 11 years, removed 2,900 homes from the local groundwater supply. In 2009, the City of Mequon passed a referendum in order to purchase the utility back from We Energies. In order to pass the referendum, the City decided that they would make the MWU voluntary. The vast majority of the City (over 75%) was on either a private well or a community well. To reassure these residents that they would not be forced to connect to the utility once the City acquired it, there was specific language indicating that any home that existed prior to the City purchasing the utility would be a voluntary customer.

After the City of Mequon purchased the utility in 2009, the MWU formed a Water Advisory Committee to develop key principles to direct the MWU in accordance with the referendum language and apply solid utility business principles. This was necessary because all other municipal utilities in the State of Wisconsin mandate connection and use assessment powers. The key principles identified by the Water Advisory Committee are listed below along with an assessment of each principle.

1. No property on which a habitable building was located when the MWU was acquired by the City of Mequon shall be required by the MWU to connect to the MWU system.
This principle is addressed in both Municipal Ordinance Section 86-10c and the Utility's Water Connection Policy, established in 2022. No properties that were developed prior to the MWU inception have been required to connect unless mandated by other key principles.
2. Connection to the MWU is not required for the following:
 - A. Owner or tenant of property on which is located habitable building improvements and which is not a MWU user/customer as of the day prior to the day on which title to the Mequon Water Utility assets vest in the City of Mequon.
 - B. Properties outside of City of Mequon's Sanitary Sewer Service Area and outside of the Ulao Creek Neighborhood.
 - C. For properties within the Ulao Creek Neighborhood: No existing owner or tenant of property on which is located habitable building improvements and which is not a MWU user/customer as of the day prior to the day on which Water Connection Policy is adopted, shall be required to connect to the MWU at any time.
The Water Connection Policy mimics this principle with language in both Section I and IV.
3. Connection to the MWU is required for new construction of habitable building improvements within the City of Mequon Sanitary Sewer Service Area and/or the Ulao Creek Neighborhood.

Section III of the water connection policy explicitly copies the language of Principle 3.

4. A Water Trust may request connection to the MWU in accordance with Customer Connection Rule (CCR) Section B.4(a).

The water trust connection policy is addressed in the Customer Connection Rules (CCR) on file with the PSC and incorporated into the MWU Tariff. Section B.4 covers the requirements and process by which a water trust may connect to the system. These procedures are also repeated in the Water Connection Policy, established on April 12, 2022.

5. No property shall be charged any fees during any period of time when building improvements on the property were not connected to the MWU system.

Key principle 5 is addressed within the MWU Tariff on file with the PSC. Schedule MG-1 of the tariff does not allow the MWU to bill non-customers standard water service fees. The only charges that would be applicable would be if non-customers utilized the bulk water fill station and would then be charged under Schedule BW-1 of the tariff.

6. The MWU should be self-sustaining, and the MWU should not pay the City any dividends or make payments lieu of taxes (PILOT).

The MWU has been self-sustaining and has not paid the City any dividends or PILOT. The zero-dollar tax equivalent was authorized on October 14, 2008, via common council resolution.

7. A new on-main customer should bear a fair share of the cost of existing system-wide facilities used to serve that customer (facilities which are also used jointly by other concurrent and future customers, e.g., supply mains and mains that abut the property from which water is, or may in the future be, supplied to other properties).

The cost to connect is defined in the Customer Connection Rules in the tariff. A part of the cost to the connect is the Local Delivery Main Cost and System Costs. These costs are defined in Tables 2 and 3 of the CCR. Both tables on file in the tariff are based on outdated information (2015 and 2013 respectively). Both charges should be recalculated at a minimum of every 2 years to reflect the expanding nature of the MWU and to ensure that correct fees are assessed.

8. A new off-main customer should bear the costs of the main extension necessary to serve that specific customer. The costs incurred in excess of the costs required to serve that customer (e.g., where a main extension will extend along several properties to reach the new customer) should be allocated in a way that considers both the new customer and other potential customers.

The CCR allows for new off-main customers to enter into a refund agreement, which specifies the amount of refund due to the new customer if additional customers connect to the new local delivery main extension. The limit for refund agreements is 10-years.

9. The MWU should bear the costs of upsizing the main and making other improvements beyond and in addition to the facilities necessary to serve the specific customer, (e.g., installing a 10-inch main to provide capacity to serve future downstream customers when an 8-inch main would be sufficient to serve the specific new customer, looping or reinforcing the system, etc.)

In practice, the Water Service Agreements or Developer Agreements address any compensation from the MWU to the new customer or developer if the MWU desires to upsize infrastructure. Neither the Water Connection Policy nor the CCR includes language relating to this compensation. Future amendments to the Water Connection Policy could include language addressing this circumstance.

10. Every new customer, on-main or off-main, should bear the cost, as determined by the MWU, for facilities installed by the MWU specifically to serve that customer, (e.g., street lateral and curb stop). The new customer shall contract for, have installed per City of Mequon Standard Specifications for Land Development (SSLD), pay for, and maintain facilities downstream of the curb stop, (e.g., private lateral, interior building piping, etc.)

The Water Connection Policy indicates in Section VI.B that property owners are responsible for both the cost of the public and private plumbing portion. Current practice has the property owners

contract with a plumber to install and pay for both portions of the service to simplify scheduling and coordinating efforts.

11. The MWU should encourage (through financing arrangements and marketing) new customer connections, especially on-main customer connections, (e.g., water table deterioration, water quality, fire protection).

Historically, the MWU did not market connection to the system and would only respond to potential customer questions and requests. Current MWU staff regularly responds to new connection requests from potential customers (both OMNU and RME). The MWU does not and has not pursued a marketing campaign to attract new customers. The MWU could send letters out annually to OMNU customers to inform these individuals regarding the potential for the connection to the MWU. OMNU customers require the least amount of effort to connect, as the local delivery main is already installed and available, typically along the frontage of the parcel. The CCR currently allows all new customers (excluding developers and water trusts) to pay any connection charge over time at reasonable interest rates.

12. A customer who did not connect initially to a main extension abutting his property should not gain an advantage by waiting to connect.

The requirement of a connection charge that covers the local delivery main and the system cost ensures that delaying connection to the system does not benefit the customer. Regardless of the time of connection, the connection fee is still required.

13. The methodology and unit costs used to calculate costs will be published by the MWU and updated from time-to-time as needed.

All documents referenced are publicly available and are filed electronically with either the PSC or the City. Items within the documents relating to costs or calculations are infrequently updated. These items should be updated on a regular schedule and the schedule should be included in each document.

Implementation Plan

The intention of the Master Plan is to provide an assessment of the current state of the MWU and analyze demands on the system to prepare for potential growth and maintenance of the system. Development of an implementation plan will include recommendations on how to address critical future needs identified in the Master Plan. The Implementation Plan will include and summarize recommendations from the sections above and will also assess the recommendations from the prior 2017 Master Plan. Although the Implementation Plan includes annual expenses, project pricing is too volatile to include within. Instead, projects will flow through to budget exhibits and include expenses that are updated on an annual basis.

ACCOMPLISHMENTS SINCE 2017

Before looking at recommendations for future projects and/or initiatives, there have been several accomplishments since the 2017 Master Plan was finalized. One of the most significant accomplishments was the completion of a critical system loop on Buntrock Ave, which eliminated a multi-mile dead end in the Village of Thiensville. This system loop also provided redundancy and backup to the Utility's river crossings in the event of a catastrophic failure.

Other items that have been initiated or completed since 2017 included the annual meter change program, annual infrastructure replacement, the connection revenue credit update, and the negotiation of the second connection with MWW. The annual meter change program was recommended in the 2017 Master Plan and was started in 2018. This program aims to replace approximately 5% of the meters and radios in the Utility annually to stay in compliance with PSC regulations and ensure fair and accurate billing for customers. The ongoing infrastructure replacement addresses failing hydrants and valves that are identified during the annual maintenance programs. Finally, the negotiation of the second connection with MWW sets the Utility up for future expansion in the Central Growth area and will provide critical redundancy and backup once the associated system looping is completed.

CUSTOMER ASSESSMENT

REPORTING

During the customer assessment in 2022, it was discovered that the PSC report filing was inconsistent with the billing system. The MWU should establish procedures or steps to ensure PSC reports are compiled and reported in similar methods year-to-year. Staff is beginning to compile procedures and will finalize this during the filing of the 2023 PSC annual report to ensure consistency moving forward.

UPDATES

Several of the tables and figures in the Customer Assessment provide benchmarks and data for assessing MWU growth and development. These items should be updated annually to provide metrics for the MWU. Important items include Figure 7 – Customers' Properties Development Dates, Figure 8 – REU Properties Development Pre- and Post-1999, and Table 4 – Ultimate REU Base in the Water Utility User Service Area.

WATER DEMANDS

RESIDENTIAL EQUIVALENCY UNIT (REU) CALCULATION

The REU value is important to normalize data between customer classes. The master plan calculated the REU value based on a 4-year average of residential customers and usage. The MWU plans to update the

REU yearly as part of the budget process using a moving, or rolling, 4-year residential average. This will assist with holistic utility assessment and calculating commercial connection charges.

NON-REVENUE WATER

As identified in Section 3 – Water Demands, NRW has greatly increased over the past several years. It is the goal of the MWU to decrease this number and obtain 10% NRW by 2040. The MWU is already pursuing a plan to contract a specialized firm to perform a leak survey of the system to identify locations of concern for repair. Leak surveys use acoustic microphones on valves, hydrants, and curb stops to pinpoint exact locations of suspected leaks. Besides this initial survey, the MWU plans to perform routine surveys over portions of the system. The MWU strives to survey the system every 5 years.

MWU staff will also look at quarterly billing from each supplier, to help generally identify which portion of the system needs to be addressed and assessed for leaks. MWU staff track and update water accountability quarterly. Updating the spreadsheet after each billing cycle will give more NRW data than the annual PSC report and allow staff to react to NRW trends more quickly.

While the MWU anticipates an initial sharp decrease in the NRW as a function of these efforts - once the major leaks are identified, any further NRW efforts become impacted by diminishing returns.

To further lower the NRW, the MWU is also looking at all customers that may have connected to the MWU but not installed a meter. This scenario is considered unauthorized water usage and is equivalent to theft. MWU staff will verify existing locations shown as having a lateral but not connected have the lateral shut off. Through this process, the MWU will be able to determine if any properties are connected to the system without being billed appropriately.

DAILY DEMANDS

The MWU plans to update the daily demand table annually. The average day, maximum day, and peak hour data is required for any rate case that MWW performs and also provides information regarding the total system demand. Updating these numbers annually allows the MWU to better estimate future demand for both budget and operations.

WATER SUPPLY

MILWAUKEE WATER WORKS

The 2017 Master Plan Identified MWW as the preferred option for a second connection. The Water Utility Commission approved this and MWU staff have proceeded with this recommendation in conjunction with the Swan Ridge Farms Development. The second connection will be located at North Swan Road and West County Line Road.

The original contract with MWW required that the customer base could not exceed 20% new development based on the original contract year. The current MWU makeup has exceeded this contract requirement, however MWW has not required or requested documentation on this item. It is recommended that the MWU continue to track this metric internally on an annual basis. The current administration at MWW appears to value any water purchased regardless of the location of the consumption (within MWW or outside).

NORTH SHORE WATER COMMISSION

The 2017 Master Plan identified consideration of becoming an equity member of NSWC for potentially reducing the wholesale water rate from NSWC. To become an equity member, the MWU would be

required to purchase a portion of the equity ownership of NSWC through capital investment. Since 2017, no additional effort has been exerted towards investigating this option. With the second MWW connection and meter pit in process, entering into an equity membership with NSWC for a lower rate and increased supply has become less desirable. The MWU may consider an equity partnership as an option if MWW rates approach NSWC in the future.

NEW WATER TREATMENT PLANT

The 2017 Master Plan identified constructing a new water treatment plant as a potential alternative to supplement existing water supplies. This treatment plant could also provide slightly better water quality with new treatment technologies that could address emerging contaminants such as PFAS.

Since 2017, no further work has been done on exploring this option. MWW is already testing for PFAS and other contaminants and the results have been below any regulatory limit. Completing the second connection also reduces the potential need for a treatment plant, as the second MWW connection is projected to supply additional capacity to meet future demands.

DISTRIBUTION SYSTEM ASSESSMENT

EXISTING INFRASTRUCTURE

WATER MAIN

In Section 5 – Distribution Assessment, it was identified that the methodology for PSC reporting of water mains is inconsistent with the GIS system. It is recommended that the discrepancies between the two sources be rectified, and that corrections be made in the 2023 PSC report.

The MWU plans to continue to monitor the frequency and locations of main breaks and make determinations if and when water main replacements are necessary. The MWU plans to continue to coordinate with the Public Works Department and relay any metal main, regardless of main break history, prior to the road project for cost efficiencies.

VALVES

The MWU staff has not been meeting industry best management practices regarding valve exercising and maintenance. Main valves should be exercised every three years and hydrant valves exercised every six years. The MWU is already in the process of developing a valve exercising program that assigns annual goals and mapping for target metrics.

The MWU also replaces valves as they fail from corroded bolts and age as was identified and addressed in the 2017 Master Plan. The current annual valve replacement funding has been set at \$30,000. The MWU plans to replace inoperable or failing valves based on the notes and data from the exercising program. If more valves are failing than can be replaced or repaired at current funding levels, the MWU plans to allocate more funding to this capital account.

HYDRANTS

The MWU has been meeting the best management practices regarding hydrant flushing and exercising. The MWU also replaces hydrants as they fail from age or damage. The current annual hydrant replacement funding has been set at \$30,000. The MWU plans to replace inoperable or damaged hydrants based on the notes and data from the exercising program. If more hydrants are failing than can be replaced or repaired at current funding levels, the MWU staff will allocate additional funding in future budgets.

METERS

The 2017 Master Plan recommended the MWU conduct a meter replacement study to determine the optimum replacement schedule and meter reading system moving forward. The MWU conducted a meter replacement study and began to systematically replace meters in 2018. The MWU is currently meeting the recommendations and replacement schedule proposed in the 2018 Meter Study. Meter replacements are an ongoing task for the MWU, and staff plans to coordinate with meter and radio vendors to ensure the equipment purchased and installed meets the MWU's needs.

AIR RELIEF VALVES

Best management practices recommend air relief valves are operated annually. The MWU has not met this goal in recent years. The MWU plans to develop an air relief maintenance program to ensure valves are operated yearly and inspected for failures.

LATERAL AND CURB STOPS

The 2017 Master Plan noted that around 40% of the MWU service lines were copper. Copper services are susceptible to corrosion which can create pinhole leaks. As part of the NRW leak survey recommended in Section 3 – Water Demands, leaking laterals should be replaced as identified.

There is a large difference between the number of laterals reported on the annual PSC report, compared to the actual number of customers. The GIS also has sections of the system without any laterals or curb stops drawn. MWU staff plans to update GIS to match the existing system and then use the GIS to populate the PSC report moving forward. Maintaining an accurate database of services is important for tracking new customer connections, service materials, and providing information for other metrics.

STORAGE FACILITIES

The 2017 Master Plan recommended actions to bring the 500,000-gallon elevated tank into operation. Once in operation, the 2017 Plan recommended abandoning the existing ground storage reservoirs at Whitman Place, Ville du Parc, and the Mequon Business Park. The planned second MWW connection changes the supply situation of the MWU from the 2017 evaluation. A comprehensive system storage analysis and study is recommended to determine what is the optimal long-term storage solution. Given the hydraulically inefficient location of the current elevated tank and size, it may be more effective for the MWU to abandon the existing tank and construct a new elevated storage tank in a more hydraulically advantageous part of the system.

BOOSTER PUMPS

As identified in Section 5 – Distribution System Assessment, the existing booster pumps at the booster station interconnecting the NSWC and MWW supplied portions of the system are run infrequently. MWU plans to regularly exercise these pumps. MWU staff has requested a quote to program the SCADA and modify coding to automatically turn these pumps on once a week. The MWU plans to perform an annual generator test at the booster station to replicate a power outage and emergency scenario.

The booster pumps at Whitman Place and Ville du Parc should also be evaluated during the system storage study. Depending on the results of the storage study, these pumps may need replacement or repair to ensure continued operation.

HYDRAULIC WATER MODEL

The hydraulic water model is continuously updated with new developments and main extensions. This is done to ensure that the modeled maximum day is reflective of current system demands. The MWU plans to perform calibrating fire flow tests every five years, especially in areas with metal mains. This ensures the model is accurately modeling friction losses in areas susceptible to corrosion and metal deposits.

The hydraulic model will also be utilized to prioritize distribution system looping. Unless developer funded, distribution system looping is funded out of the MWU's capital budget for Betterment of Service. Ranking projects based on the additional system fire flow or number of customers that benefit from redundancy is the best method to ensure that MWU funds benefit the greatest number of customers. The highest priority system loop is connecting the second MWW connection, as it will provide additional firm capacity to meet maximum day demand into the 2040's.

WATER QUALITY

The MWU continues to monitor chlorine residuals throughout the system and increase flushing in low residual areas. Staff will investigate methods to increase residuals in problem areas throughout the system. Potential solutions include increased manual flushing, automatic flushing devices, or a chloramine booster station. A chloramine booster station is the most expensive capital option and requires additional operation and maintenance expenses but could potentially offer the most benefit to the entire MWW-served portion of the system. Staff will use the existing hydraulic model to help estimate the impacts of a chloramine booster station.

The MWU follows the principles of the Partnership for Safe Water. If the MWU does not wish to become an official member of the Partnership, there is still guidance documentation available. This provides goals and standards for the MWU to achieve above and beyond regulatory requirements.

UTILITY FINANCIAL PERFORMANCE

The MWU is very healthy financially. The 10-year analysis performed with this master plan projects a strong rate of return and cash flow based on the estimated MWU growth. Because the 10-year analysis is modeled after the regulatory PSC annual report, the financial model will be updated yearly with the prior year reported data. This will allow the MWU to continually forecast the upcoming 10 years and provide guidance for any needed rate increases or funding for large projects.

The retirement of existing bonds in 2029 presents a unique opportunity for the MWU to reduce rates. The current rate of return is above the PSC benchmark and provides sufficient cash flow for capital projects and bond obligations. Without any bond payments required, the needed cash is reduced. Given the relatively young nature of the MWU and infrastructure makeup (no main replacement program or large capital outlays), the MWU may be able to reduce rates for customers while still maintaining its strong financial position. As 2029 gets closer, the financial model can be used to model a rate reduction and its impacts on rate of return and cash flow.

The MWU should also investigate modifying the reserve requirements. The current reserve requires 80% of the operation and maintenance expenses as determined by the City of Mequon budgeting process. There are two items that can be considered.

First, the MWU will consider lowering the 80% requirement to 50% of the annual expenses. Unlike a municipality that relies on a tax levy, MWU collects revenue quarterly through the billing process. There are no natural benchmarks for this indicator although the higher the number, the more protected the MWU is against revenue shocks. Generally, utilities should aim to maintain several months' worth of cash on hand, and at the very least exceed the length of the billing period. Maintaining a reserve of 50% expenses still covers two quarterly billing cycles.

Secondly, the MWU could adjust the reserve requirement calculation to include only operational and maintenance cash expenses. The current calculation includes depreciation expenses, which is a non-cash

expense. In 2023, the depreciation expense was budgeted at \$670,000. Including depreciation in the reserve requirement results in an additional \$536,000 held in reserve for a non-cash expense.

KEY PRINCIPLES

In general, the MWU is meeting the intent of the key principles identified by the Water Advisory Committee. One area worthy of additional consideration is principle #11, which encourages new customer connections. The MWU plans to develop an annual marketing campaign to attract ONMU customer, as the infrastructure to serve them already exists. The MWU should also reevaluate its Customer Connection Rules, specifically the revenue credit. The MWU is in a healthy financial position, so increasing the revenue credit may incentivize new customers to connect.

IMPLEMENTATION CHART

Table 25 shows a summary of the recommendations above and the frequency of assessment or completion. Table 25 is a draft version and is intended to serve as the basis of items to be included in an annual report for MWU.

Table 25 – Implementation Chart

Recommendation	As Needed	Quarterly	Annually	5 Year	Other
Customer Assessment					
Reporting			X		
Updates			X		
Water Demands					
REU Calculation			X		
Non-Revenue Water		X	X	X	
Daily Demands			X		
Water Supply					
Milwaukee Water Works			X		
North Shore Water Commission					X
New Water Treatment Plant					X
Distribution System Assessment					
Water Main	X				
Valves	X		X		
Hydrants	X		X		
Meters	X		X		
Air Relief Valves			X		
Lateral and Curb Stops	X				
Storage Facilities					X
Booster Pumps			X		
Hydraulic Water Model	X			X	
Water Quality					X
Utility Financial Performance		X	X		X
Key Principles			X	X	

Appendix A: Water Utility User Service Area

Table A-1: MWU Customer Development

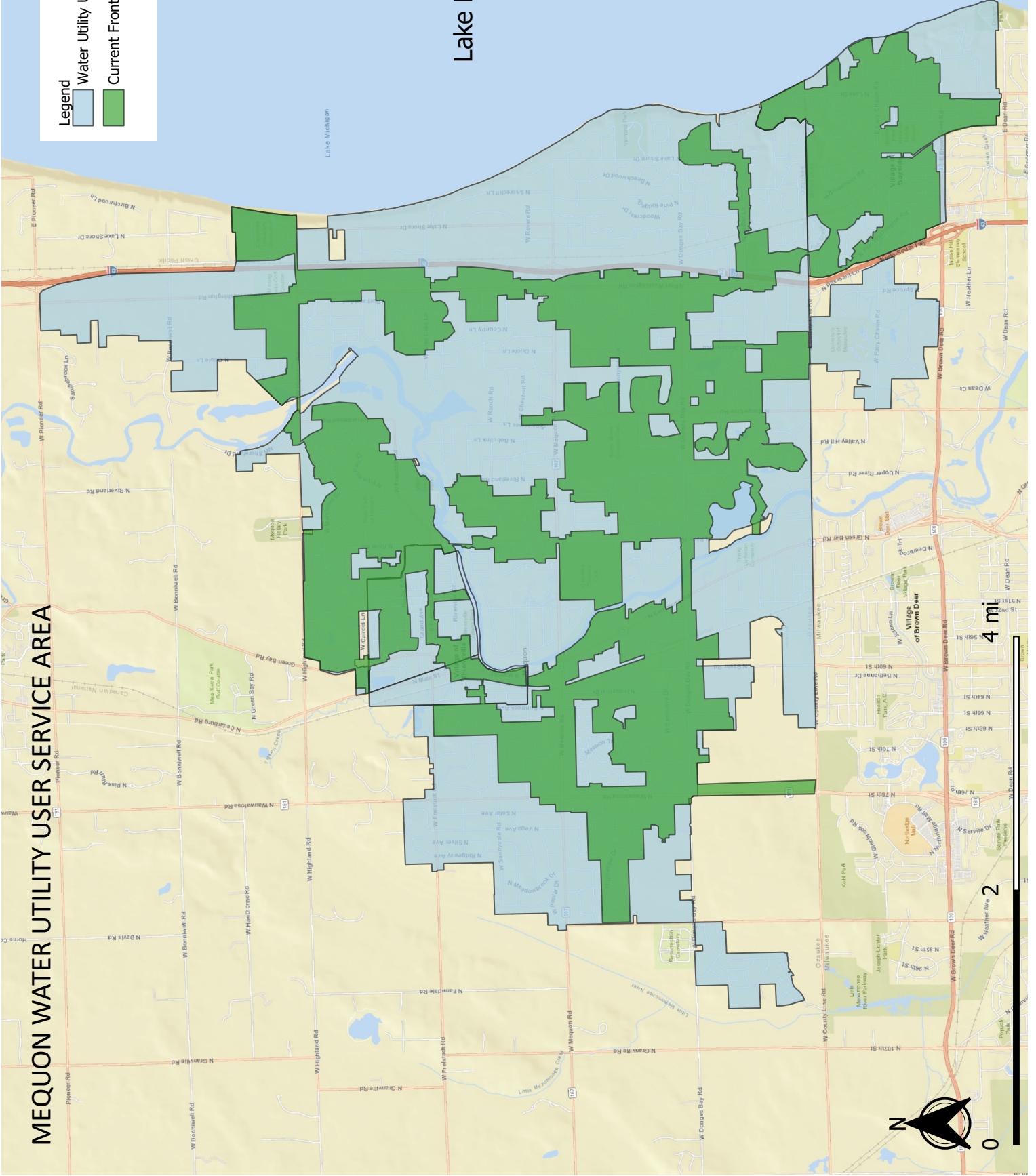
Year	Mequon					Bayside					Thiensville					Connections Added	Total	Percent Growth
	Res	C	Irr	MF	PA	Res	C	Irr	MF	PA	Res	C	Irr	MF	PA			
1998	242	2														244	244	
1999	711	4				65	1									537	781	220.1%
2000	854	25		2		75	1									176	957	22.5%
2001	1,058	43	48	2		125	4		5							328	1,285	34.3%
2002	1,242	55	48	7		139	4		6					1		217	1,502	16.9%
2003	1,430	64	50	7		152	5		6		50	1		5	3	271	1,773	18.0%
2004	1,555	73	51	7		157	6		7		54	1		5	3	146	1,919	8.2%
2005	1,691	83	52	7		261	10		8		57	1		8	3	262	2,181	13.7%
2006	1,841	92	53	7		355	10		8		58	1		8	3	255	2,436	11.7%
2007	1,947	111	54	8		376	10		8		63	6		8	3	158	2,594	6.5%
2008	2,093	168	54	8	10	391	10		8		72	7		8	3	238	2,832	9.2%
2009	2,197	181	55	8	10	400	10		8		72	7		8	3	127	2,959	4.5%
2010	2,338	193	56	8	17	422	10		8		73	7		8	3	184	3,143	6.2%
2011	2,473	203	56	13	17	435	10		8		163	7		8	3	253	3,396	8.0%
2012	2,491	212	57	13	17	436	10		8	3	164	7		8	3	33	3,429	1.0%
2013	2,522	216	58	15	17	600	14		8	3	259	8		8	3	302	3,731	8.8%
2014	2,568	221	58	15	17	614	14		8	3	260	8		8	3	66	3,797	1.8%
2015	2,598	226	58	16	17	1,129	15		8	3	265	17		8	3	566	4,363	14.9%
2016	2,623	231	59	16	17	1,135	15		8	3	267	24		8	3	46	4,409	1.1%
2017	2,686	235	59	16	17	1,138	15		8	3	269	25		8	3	73	4,482	1.7%
2018	2,730	242	59	19	17	1,141	15		8	3	270	26		8	3	59	4,541	1.3%
2019	2,768	248	59	24	17	1,145	15		8	3	275	27		8	3	59	4,600	1.3%
2020	2,813	253	59	24	17	1,147	15		8	3	277	27		8	3	54	4,654	1.2%
2021	2,844	257	59	24	17	1,150	15		8	3	282	28		8	3	44	4,698	0.9%
2022	2,852	259	59	24	17	1,155	15		8	3	285	28		8	3	18	4,716	0.4%

*Res = residential C = commercial Irr = irrigation MF = multifamily PA = public authority

MEQUON WATER UTILITY USER SERVICE AREA

- Legend**
- Water Utility User Service Area
 - Current Fronting Properties

Lake Michigan



Appendix B: Ultimate Customer Base



2 mi

1

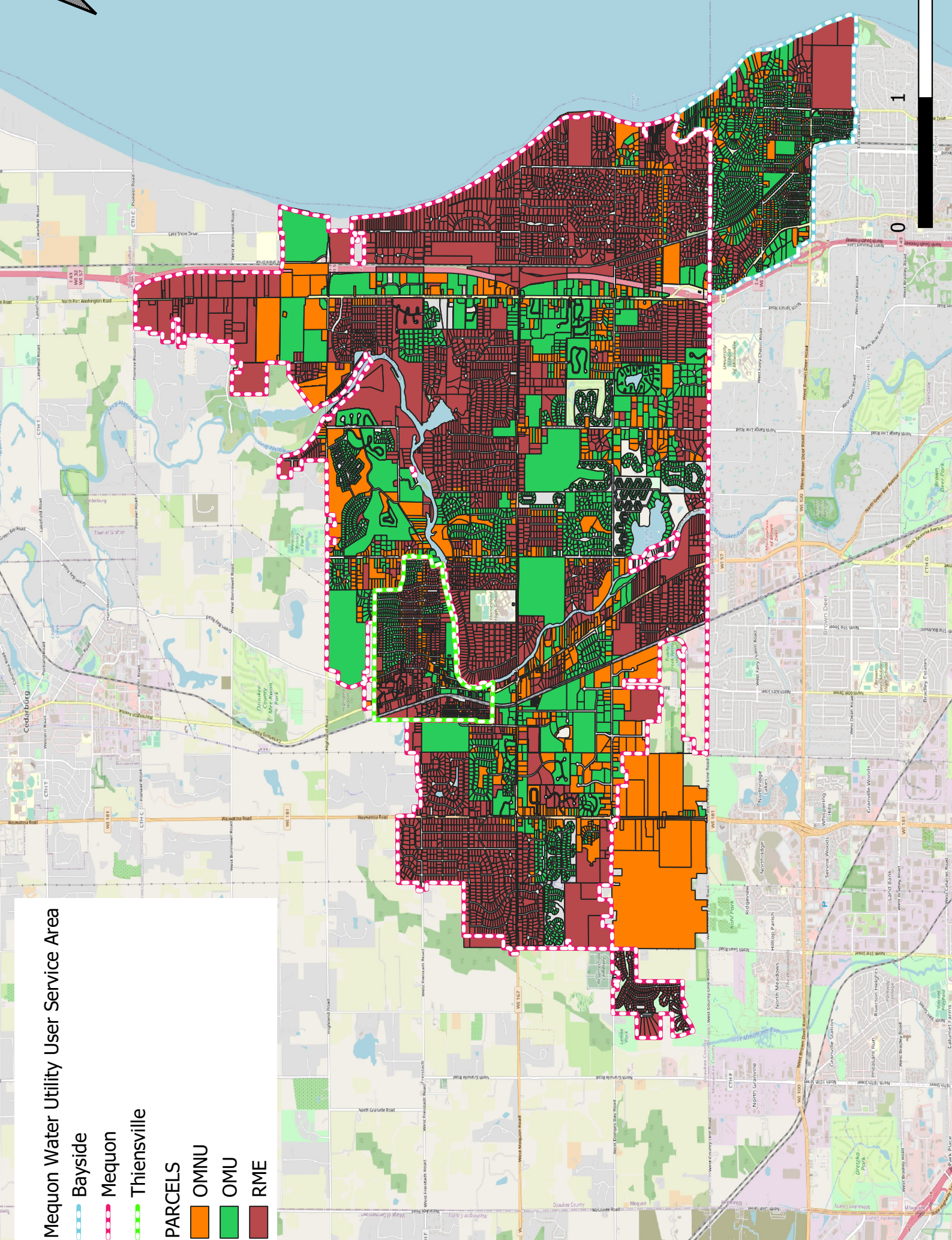
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Mequon Water Utility User Service Area

- Bayside
- Mequon
- Thiensville

PARCELS

- OMNU
- OMU
- RME



Appendix C: Water Supply

MEQUON WATER UTILITY SOURCE OF SUPPLY

Legend

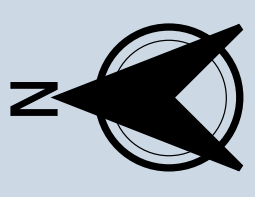
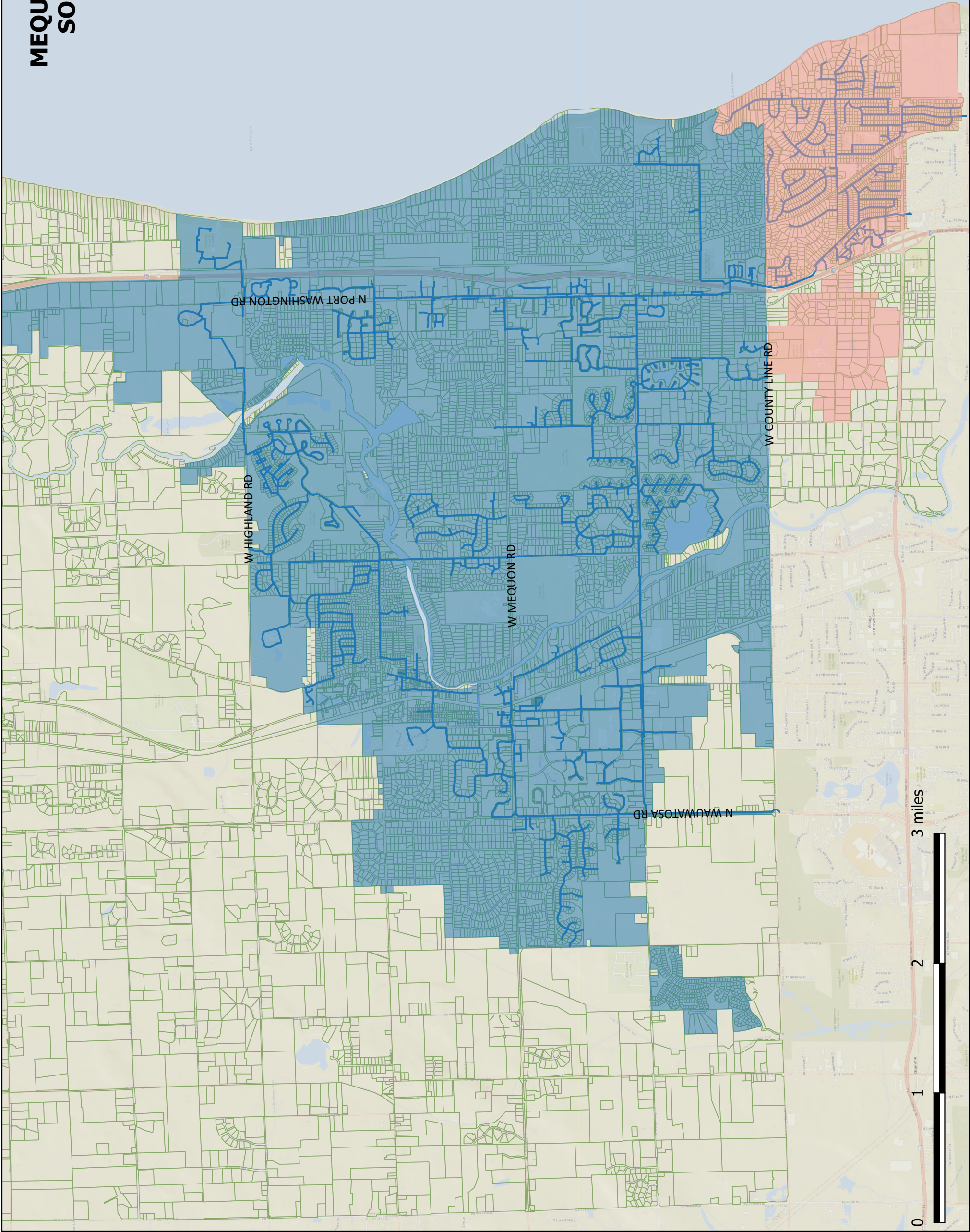
Water Mains

— Main

Source of Supply

MWW

NSWC



0 1 2 3 miles

Appendix D: Hydraulic Water Model Results

AVAILABLE FIRE FLOW

Legend

Available Fire Flow (gpm)

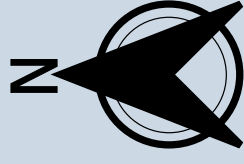
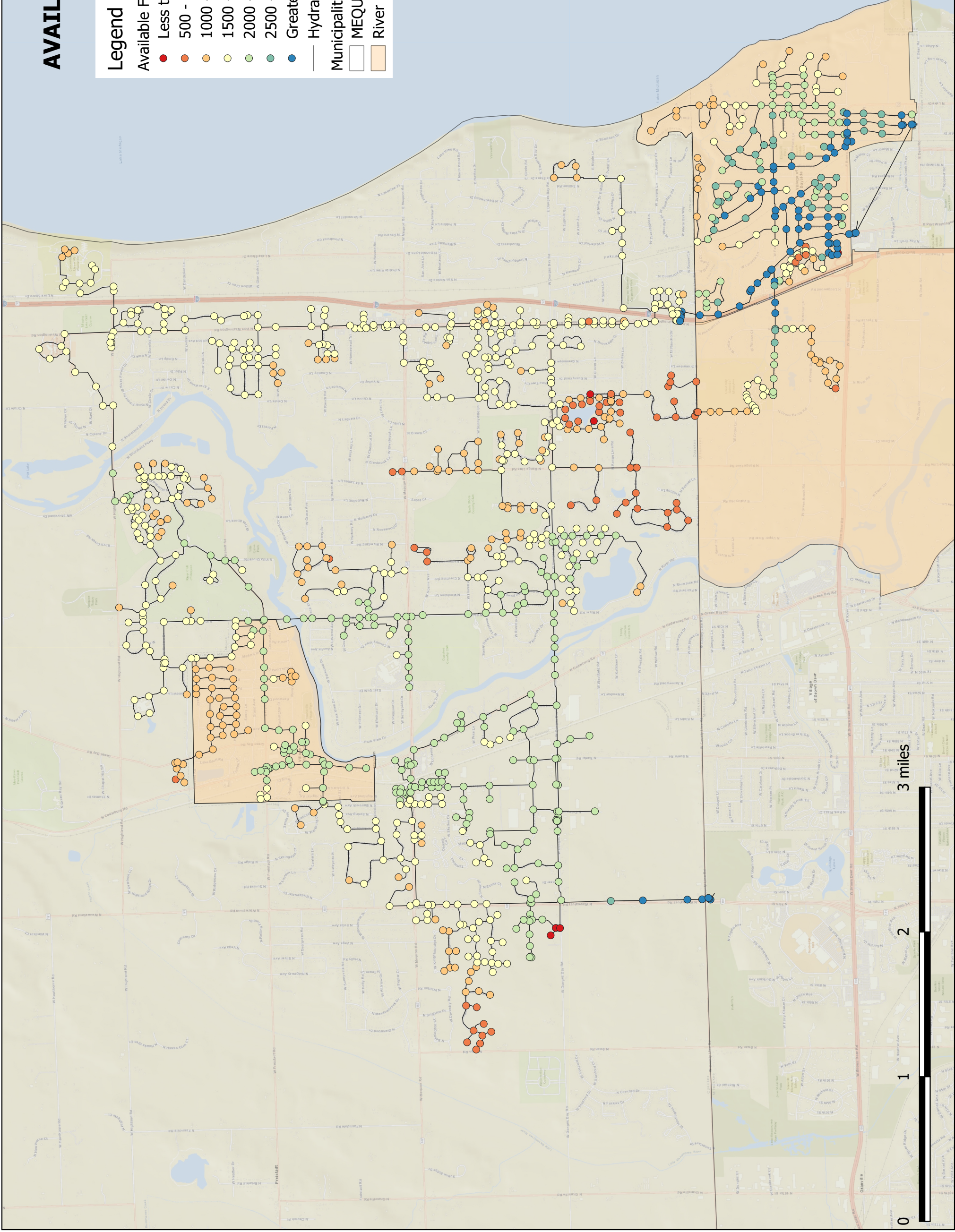
- Less than 500
- 500 - 1000
- 1000 - 1500
- 1500 - 2000
- 2000 - 2500
- 2500 - 3000
- Greater than 3000

— Hydraulic Model Pipes

Municipalities

□ MEQUON

□ River Hills, Bayside, and Thiensville



3 miles

2

1

0

MAXIMUM DAY PRESSURES

Legend

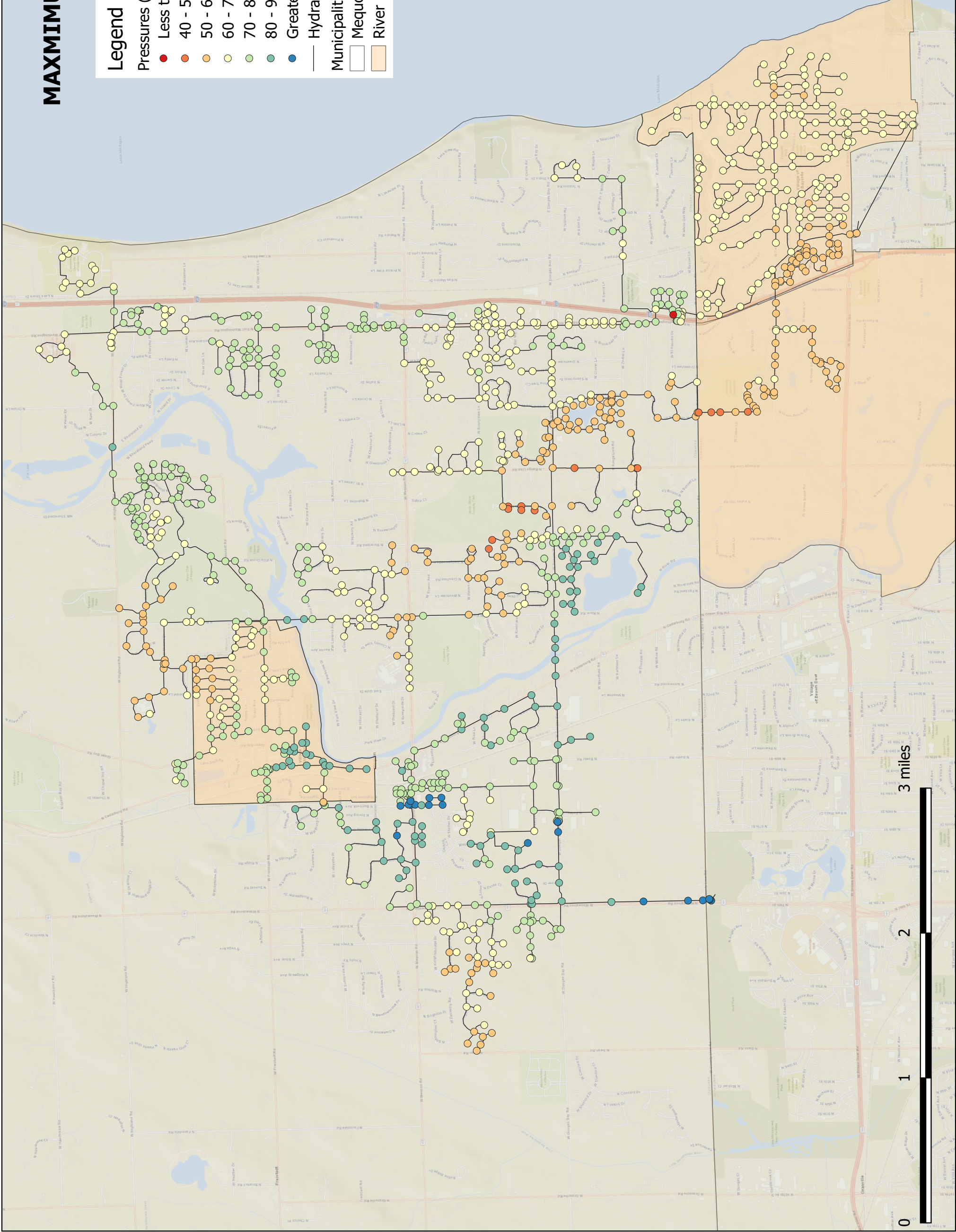
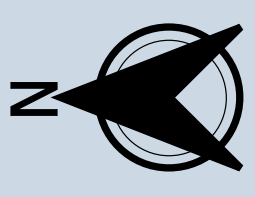
Pressures (psi)

- Less than 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- Greater than 90

- Hydraulic Model Pipes

Municipalities

- Mequon
- River Hills, Bayside, and Thiensville



3 miles

2

1

0

SYSTEM WATER AGE

Legend

System Water Age (hours)

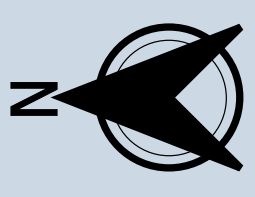
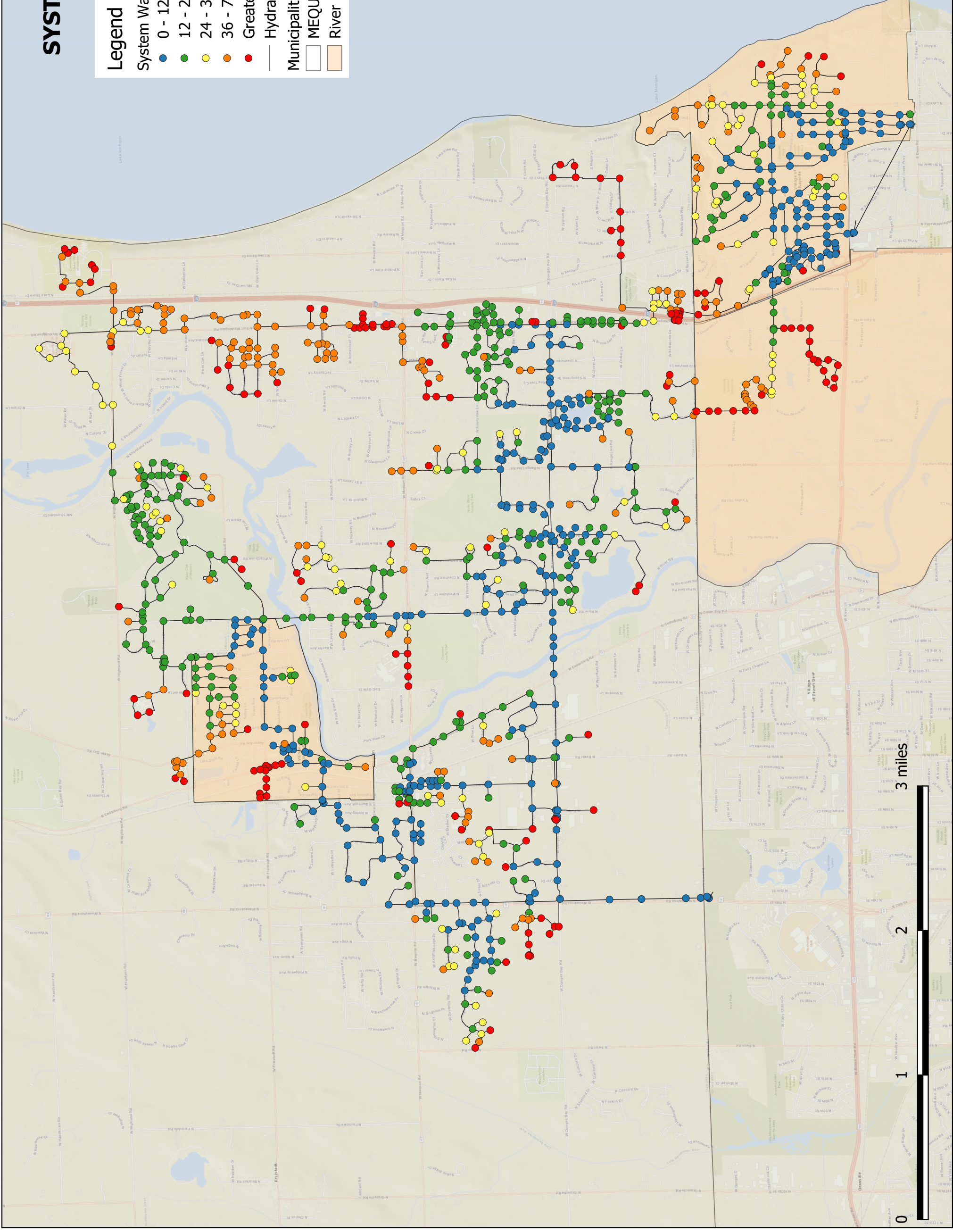
- 0 - 12
- 12 - 24
- 24 - 36
- 36 - 72
- Greater than 72

— Hydraulic Model Pipes

Municipalities

MEQUON

River Hills, Bayside, and Thiensville



3 miles

2

1

0

Appendix E: Utility Financial Performance

Part 1: Utility 10-Year Financial Model

Part 2: Current Utility Tariff and Operating Rules

Appendix E, Part 1: Utility 10-Year Financial Model

Acct No.	ITEM	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
	WATER TREATMENT EXPENSES											
640	Operation Supervision and Engineering	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
641	Chemicals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
642	Operation and Labor Expenses	\$ -	\$ 1,000	\$ 1,010	\$ 1,020	\$ 1,030	\$ 1,041	\$ 1,051	\$ 1,062	\$ 1,072	\$ 1,083	\$ 1,094
643	Miscellaneous Expenses	\$ -	\$ 3,600	\$ 3,600	\$ 3,600	\$ 3,600	\$ 3,600	\$ 3,600	\$ 3,600	\$ 3,600	\$ 3,600	\$ 3,600
644	Rents	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
650	Maintenance Supervision and Engineering	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
651	Maintenance of Structures and Improvements	\$ -	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000
652	Maintenance of Water Treatment Equipment	\$ -	\$ 4,500	\$ 4,500	\$ 4,500	\$ 4,500	\$ 4,500	\$ 4,500	\$ 4,500	\$ 4,500	\$ 4,500	\$ 4,500
	TRANS & DISTRIBUTION EXPENSES											
660	Operation Supervision and Engineering	\$ 62,143	\$ 64,007	\$ 65,928	\$ 67,905	\$ 69,942	\$ 72,041	\$ 74,202	\$ 76,428	\$ 78,721	\$ 81,083	\$ 83,515
661	Storage Facilities Expenses	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500
662	Transmission and Distribution Expenses	\$ 173,000	\$ 174,730	\$ 176,477	\$ 178,242	\$ 180,024	\$ 181,825	\$ 183,643	\$ 185,479	\$ 187,334	\$ 189,208	\$ 191,100
663	Meter Expenses	\$ 41,000	\$ 41,000	\$ 41,000	\$ 41,000	\$ 41,000	\$ 41,000	\$ 41,000	\$ 41,000	\$ 41,000	\$ 41,000	\$ 41,000
664	Customer Installations Expenses	\$ 22,500	\$ 22,500	\$ 22,500	\$ 22,500	\$ 22,500	\$ 22,500	\$ 22,500	\$ 22,500	\$ 22,500	\$ 22,500	\$ 22,500
665	Miscellaneous Expenses	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000
666	Rents	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
670	Maintenance Supervision and Engineering	\$ 26,400	\$ 26,400	\$ 26,400	\$ 26,400	\$ 26,400	\$ 26,400	\$ 26,400	\$ 26,400	\$ 26,400	\$ 26,400	\$ 26,400
671	Maintenance of Structures and Improvements	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
672	Maintenance of Dist. Reservoirs and Standpipes	\$ 25,000	\$ 25,000	\$ 25,000	\$ 25,000	\$ 25,000	\$ 25,000	\$ 25,000	\$ 25,000	\$ 25,000	\$ 25,000	\$ 25,000
673	Maintenance of Transmission and Distr. Mains	\$ 86,165	\$ 86,165	\$ 86,165	\$ 86,165	\$ 86,165	\$ 86,165	\$ 86,165	\$ 86,165	\$ 86,165	\$ 86,165	\$ 86,165
675	Maintenance of Services	\$ 70,000	\$ 72,800	\$ 75,712	\$ 78,740	\$ 81,890	\$ 85,166	\$ 88,572	\$ 92,115	\$ 95,800	\$ 99,632	\$ 103,617
676	Maintenance of Meters	\$ 4,600	\$ 4,830	\$ 5,072	\$ 5,325	\$ 5,591	\$ 5,871	\$ 6,164	\$ 6,473	\$ 6,796	\$ 7,136	\$ 7,493
677	Maintenance of Hydrants	\$ 36,000	\$ 37,800	\$ 39,690	\$ 41,675	\$ 43,758	\$ 45,946	\$ 48,243	\$ 50,656	\$ 53,188	\$ 55,848	\$ 58,640
678	Maintenance of Miscellaneous Plant	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	CUSTOMER ACCOUNTS EXPENSES											
901	Supervision	\$ 72,843	\$ 72,843	\$ 72,843	\$ 72,843	\$ 72,843	\$ 72,843	\$ 72,843	\$ 72,843	\$ 72,843	\$ 72,843	\$ 72,843
902	Meter Reading Labor	\$ 16,930	\$ 17,438	\$ 17,961	\$ 18,500	\$ 19,055	\$ 19,627	\$ 20,215	\$ 20,822	\$ 21,446	\$ 22,090	\$ 22,753
903	Customer Records and Collection Expenses	\$ 49,586	\$ 51,074	\$ 52,606	\$ 54,184	\$ 55,809	\$ 57,484	\$ 59,208	\$ 60,985	\$ 62,814	\$ 64,698	\$ 66,639
904	Uncollectible Accounts	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
905	Miscellaneous Customer Accounts Expenses	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
906	Customer Service and Information Expenses	\$ 7,920	\$ 7,920	\$ 7,920	\$ 7,920	\$ 7,920	\$ 7,920	\$ 7,920	\$ 7,920	\$ 7,920	\$ 7,920	\$ 7,920
	SALES EXPENSES											
910	Sales Expenses	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1	\$ 2	\$ 3
	ADMIN. AND GENERAL EXPENSES											
920	Administrative and General Salaries	\$ 102,024	\$ 104,575	\$ 107,189	\$ 109,869	\$ 112,615	\$ 115,431	\$ 118,317	\$ 121,274	\$ 124,306	\$ 127,414	\$ 130,599
921	Office Supplies and Expenses	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
922	Administrative Expenses Transferred -- Credit	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
923	Outside Services Employed	\$ 13,900	\$ 13,900	\$ 13,900	\$ 13,900	\$ 13,900	\$ 13,900	\$ 13,900	\$ 13,900	\$ 13,900	\$ 13,900	\$ 13,900
924	Property Insurance	\$ 4,200	\$ 4,200	\$ 4,200	\$ 4,200	\$ 4,200	\$ 4,200	\$ 4,200	\$ 4,200	\$ 4,200	\$ 4,200	\$ 4,200
925	Injuries and Damages	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
926	Employee Pensions and Benefits	\$ 36,428	\$ 36,974	\$ 37,529	\$ 38,092	\$ 38,663	\$ 39,243	\$ 39,832	\$ 40,429	\$ 41,036	\$ 41,651	\$ 42,276
928	Regulatory Commission Expenses	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000
929	Duplicate Charges -- Credit	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
930	Miscellaneous General Expenses	\$ 38,960	\$ 38,960	\$ 38,960	\$ 38,960	\$ 38,960	\$ 38,960	\$ 38,960	\$ 38,960	\$ 38,960	\$ 38,960	\$ 38,960
931	Rents	\$ 19,862	\$ 20,061	\$ 20,261	\$ 20,464	\$ 20,668	\$ 20,875	\$ 21,084	\$ 21,295	\$ 21,508	\$ 21,723	\$ 21,940
932	Maintenance of General Plant	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	TOTAL OPER. & MAINT. EXPENSES	\$ 1,938,601	\$ 2,052,530	\$ 2,061,936	\$ 2,081,775	\$ 2,102,094	\$ 2,122,910	\$ 2,144,238	\$ 2,166,098	\$ 2,188,508	\$ 2,211,486	\$ 2,235,052

Appendix E, Part 2: Current Utility Tariff and Operating Rules

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Purchased Water Adjustment Clause

Mequon Municipal Water Utility (utility) may apply a purchased water adjustment clause (PWAC) to its water rates set forth under Schedules F-1 and Mg-1 to reflect an increase or decrease in the rates charged by its wholesale water supplier(s), Milwaukee Water Works (wholesaler) and North Shore Water Commission (wholesaler), **and only when the wholesaler’s rates are adjusted through the conventional rate case process.** Adjustments under this PWAC that result in an increase cannot be effective until the utility has filed the PWAC application with the Public Service Commission (Commission), the utility provides notice to its customers of such change in rates, and the Commission holds a public hearing and authorizes the rate adjustments in a Final Decision.

Calculation of Adjusted Quarterly Public Fire Protection Service Charges - - - F-1

$$C = Z \times (1 + P_1 + P_2)$$

$$P_1 = (N_1 - B_1) / T$$

$$P_2 = (N_2 - B_2) / T$$

Where: C = Adjusted Schedule F-1 quarterly retail service charges rounded up to the nearest cent.

Z = Current Schedule F-1 quarterly retail service charges.

P₁ = Adjustment factor (Milwaukee Water Works) rounded up to the nearest hundredth of a percent, which is four places past the decimal point (.XXXX).

N₁ = New Milwaukee Water Works quarterly wholesale public fire protection service charge.

B₁ = Current Milwaukee Water Works quarterly wholesale public fire protection service charge.

T = Total quarterly dollar revenue from quarterly retail service charges per Schedule F-1.

P₂ = Adjustment factor (North Shore Water Commission) rounded up to the nearest hundredth of a percent, which is four places past the decimal point (.XXXX).

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Purchased Water Adjustment Clause

N_2 = New North Shore Water Commission quarterly wholesale public fire protection service charge.

B_2 = Current North Shore Water Commission quarterly wholesale public fire protection service charge.

Calculation of Adjusted Quarterly Service Charges - - - Mg-1

$$C = Z \times (1 + P_1 + P_2)$$

$$P_1 = (N_1 - B_1) / T$$

$$P_2 = (N_2 - B_2) / T$$

Where: C = Adjusted Schedule Mg-1 quarterly retail service charges rounded up to the nearest cent.

Z = Current Schedule Mg-1 quarterly retail service charges.

P_1 = Adjustment factor (Milwaukee Water Works) rounded up to the nearest hundredth of a percent, which is four places past the decimal point (.XXXX).

N_1 = New Milwaukee Water Works quarterly wholesale service charge.

B_1 = Current Milwaukee Water Works quarterly wholesale service charge.

T = Total quarterly dollar revenue from quarterly retail service charges per Schedule Mg-1.

P_2 = Adjustment factor (North Shore Water Commission) rounded up to the nearest hundredth of a percent, which is four places past the decimal point (.XXXX).

N_2 = New North Shore Water Commission quarterly wholesale service charge.

B_2 = Current North Shore Water Commission quarterly wholesale service charge.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Purchased Water Adjustment Clause

Commodity Charge Adjustment - - - Mg-1

$$AVBR = VBR + A_1 + A_2$$

$$A_1 = (N_1 - B_1) \times MWW / (MWW + NSWC)$$

$$A_2 = (N_2 - B_2) \times NSWC / (MWW + NSWC)$$

Where: AVBR = Adjusted Schedule Mg-1 retail volume block rates rounded up to the nearest cent.

VBR = Current Schedule Mg-1 retail volume block rates.

A₁ = New Milwaukee Water Works wholesale volume rate less the current Milwaukee Water Works wholesale volume rate. (If converting from CCF to Mgal, multiply the CCF by 1.3369.)

N₁ = New Milwaukee Water Works wholesale volume rate.

B₁ = Current Milwaukee Water Works wholesale volume rate.

MWW = Most recent 12-month volume of purchased water from Milwaukee Water Works.

NSWC = Most recent 12-month volume of purchased water from North Shore Water Commission.

A₂ = New North Shore Water Commission wholesale volume rate less the current North Shore Water Commission wholesale volume rate. (If converting from CCF to Mgal, multiply the CCF by 1.3369.)

N₂ = New North Shore Water Commission wholesale volume rate.

B₂ = Current North Shore Water Commission wholesale volume rate.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Public Fire Protection Service

Public fire protection service shall include the use of hydrants for fire protection service only and such quantities of water as may be demanded for the purpose of extinguishing fires within the service area. This service shall also include water used for testing equipment and training personnel. For all other purposes, the metered or other rates set forth, or as may be filed with the Public Service Commission shall apply.

Under Wis. Stat. § 196.03(3)(b), the municipality has chosen to have the utility bill the retail general service customers for public fire protection service.

Quarterly Public Fire Protection Service Charges:

5/8 - inch meter:	\$ 30.29	3 - inch meter:	\$ 454.38
3/4 - inch meter:	\$ 45.47	4 - inch meter:	\$ 757.30
1 - inch meter:	\$ 75.88	6 - inch meter:	\$ 1,514.59
1 1/4 - inch meter:	\$ 112.06	8 - inch meter:	\$ 2,423.05
1 1/2 - inch meter:	\$ 151.47	10 - inch meter:	\$ 3,634.73
2 - inch meter:	\$ 242.51	12 - inch meter:	\$ 4,846.11

Customers who are provided service under Schedules Mg-1, Ug-1, or Sg-1 shall also be subject to the charges in this schedule according to the size of their primary meter.

Billing: Same as Schedule Mg-1.

RATE FILE

Sheet No. 1 of 1

Schedule No. Upf-1

Amendment No. 09

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Private Fire Protection Service - Unmetered

This service shall consist of permanent or continuous unmetered connections to the main for the purpose of supplying water to private fire protection systems such as automatic sprinkler systems, standpipes, and private hydrants. This service shall also include reasonable quantities of water used for testing check valves and other backflow prevention devices.

Quarterly Private Fire Protection Service Demand Charges:

2 - inch or smaller connection - \$	34.08
3 - inch connection - \$	63.90
4 - inch connection - \$	106.50
6 - inch connection - \$	213.00
8 - inch connection - \$	340.80
10 - inch connection - \$	511.20
12 - inch connection - \$	681.60
14 - inch connection - \$	852.00
16 - inch connection - \$	1,022.40

Billing: Same as Schedule Mg-1.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

General Service - Metered

Quarterly Service Charges:

5/8 - inch meter:	\$ 31.31	3 - inch meter:	\$ 274.31
3/4 - inch meter:	\$ 41.15	4 - inch meter:	\$ 393.59
1 - inch meter:	\$ 64.70	6 - inch meter:	\$ 629.14
1 1/4 - inch meter:	\$ 89.46	8 - inch meter:	\$ 980.97
1 1/2 - inch meter:	\$ 119.27	10 - inch meter:	\$ 1,469.97
2 - inch meter:	\$ 178.90	12 - inch meter:	\$ 1,958.96

Plus Volume Charges:

First	150,000	gallons used each quarter:	\$5.17 per 1,000 gallons
Next	350,000	gallons used each quarter:	\$4.87 per 1,000 gallons
Over	500,000	gallons used each quarter:	\$4.37 per 1,000 gallons

Billing: Bills for water service are rendered quarterly and become due and payable upon issuance following the period for which service is rendered. A late payment charge of 1 percent per month will be added to bills not paid within 20 days of issuance. This late payment charge will be applied to the total unpaid balance for utility service, including unpaid late payment charges. The late payment charge is applicable to all customers. The utility customer may be given a written notice that the bill is overdue no sooner than 20 days after the bill is issued. Unless payment or satisfactory arrangement for payment is made within the next 10 days, service may be disconnected pursuant to Wis. Adm. Code ch. PSC 185.

Combined Metering: Volumetric meter readings will be combined for billing if the utility for its own convenience places more than one meter on a single water service lateral. Multiple meters placed for the purpose of identifying water not discharged into the sanitary sewer are not considered for utility convenience and shall not be combined for billing. This requirement does not preclude the utility from combining readings when metering configurations support such an approach. Meter readings from individually metered separate service laterals shall not be combined for billing purposes.

RATE FILE

Sheet No. 1 of 1

Schedule No. OC-1

Amendment No. 09

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Other Charges

Non-Sufficient Funds Charge: The utility shall assess a \$25.00 charge when a payment rendered for utility service is returned for non-sufficient funds. This charge may not be in addition to, but may be inclusive of, other non-sufficient funds charges when the payment was for multiple services.

Billing: Same as Schedule Mg-1.

RATE FILE

Sheet No. 1 of 1

Schedule No. Mpa-1

Amendment No. 09

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Public Service

Metered Service

Water used by the City of Mequon on an intermittent basis for flushing sewers, street washing, flooding skating rinks, drinking fountains, etc., shall be metered and billed according to the rates set forth in Schedule Mg-1.

Unmetered Service

Where it is impossible to meter the service, the utility shall estimate the volume of water used based on the pressure, size of opening, and the period of time the water is used. The estimated quantity shall be billed at the volumetric rates set forth in Schedule Mg-1, excluding any service charges.

Billing: Same as Schedule Mg-1.

RATE FILE

Sheet No. 1 of 1

Schedule No. Ug-1

Amendment No. 09

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

General Water Service - Unmetered

Service may be supplied temporarily on an unmetered basis where the utility cannot immediately install a water meter, including water used for construction. Unmetered service shall be billed the amount that would be charged to a metered residential customer using 16,000 gallons of water per quarter under Schedule Mg-1, including the service charge for a 5/8-inch meter. If the utility determines that actual usage exceeds 16,000 gallons of water per quarter, an additional charge for the estimated excess usage shall be made according to the rates under Schedule Mg-1.

This schedule applies only to customers with a 1-inch or smaller service connection. For customers with a larger service connection, the utility shall install a temporary meter and charges shall be based on the rates set forth under Schedule Mg-1.

Billing: Same as Schedule Mg-1.

RATE FILE

Sheet No. 1 of 1

Schedule No. Sg-1

Amendment No. 09

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Seasonal Service

Seasonal customers are general service customers who voluntarily request disconnection of water service and who resume service at the same location within 12 months of the disconnection, unless service has been provided to another customer at that location in the intervening period. The utility shall bill seasonal customers the applicable service charges under Schedule Mg-1 year-round, including the period of temporary disconnection.

Seasonal service shall include customers taking service under Schedule Mg-1 or Schedule Ug-1.

Upon reconnection, the utility shall apply a charge under Schedule R-1 and require payment of any unpaid charges under this schedule.

Billing: Same as Schedule Mg-1, unless the utility and customer agree to an alternative payment schedule for the period of voluntary disconnection.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Bulk Water

All bulk water supplied from the water system through hydrants or other connections shall be metered or estimated by the utility. Utility personnel or a party approved by the utility shall supervise the delivery of water.

Bulk water sales are:

- A. Water supplied by tank trucks or from hydrants for the purpose of extinguishing fires outside the utility's service area;
- B. Water supplied by tank trucks or from hydrants for purposes other than extinguishing fires, such as water used for irrigation or filling swimming pools; or,
- C. Water supplied from hydrants or other temporary connections for general service type applications, except that Schedule UG-1 applies for water supplied for construction purposes.

A service charge of \$50.00 and a charge for the volume of water used shall be billed to the party using the water. The volumetric charge shall be calculated using the highest volumetric rate for residential customers under Schedule Mg-1. In addition, for meters that are assigned to bulk water customers for more than 7 days, the applicable service charge in Schedule Mg-1 will apply after the first 7 days.

The water utility may require a reasonable deposit for the temporary use of its equipment under this and other rate schedules. The deposit(s) collected shall be refunded upon return of the utility's equipment. Damaged or lost equipment shall be repaired or replaced at the customer's expense.

Billing: Same as Schedule Mg-1.

RATE FILE

Sheet No. 1 of 1

Schedule No. R-1

Amendment No. 09

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Reconnection Charges

The utility shall assess a charge to reconnect a customer, which includes reinstalling a meter and turning on the valve at the curb stop, if necessary. A utility may not assess a charge for disconnecting a customer.

During normal business hours:	\$50.00
After normal business hours:	\$75.00

Billing: Same as Schedule Mg-1.

RATE FILE

Sheet No. 1 of 1

Schedule No. Cz-1

Amendment No. 09

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Lateral Installation Charge

The utility shall charge a customer for the actual cost of installing a water service lateral from the main through curb stop and box if these costs are not contributed as part of a subdivision development or otherwise recovered under Wis. Stats. Chapter 66.

Billing: Same as Schedule Mg-1.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Utility Operating Rules

Compliance with Rules

All persons now receiving water service from this water utility, or who may request service in the future, shall be considered as having agreed to be bound by the rules and regulations as filed with the Public Service Commission of Wisconsin.

Establishment of Service

Application for water service may be made in writing on a form furnished by the water utility. The application will contain the legal description of the property to be served, the name of the owner, the exact use to be made of the service, and the size of the service lateral and meter desired. Note particularly any special refrigeration, fire protection, or water-consuming air-conditioning equipment.

Service will be furnished only if (1) the premises have a frontage on a properly platted street or public strip in which a cast iron or other long-life water main has been laid, or where the property owner has agreed to and complied with the provisions of the water utility's filed main extension rule, (2) the property owner has installed or agrees to install a service lateral from the curb stop to the point of use that is not less than 6 feet below the surface of an established or proposed grade and meets the water utility's specifications, and (3) the premises have adequate piping beyond the metering point.

The owner of a multi-unit dwelling has the option of being served by individual metered water service to each unit. The owner, by selecting this option, is required to provide interior plumbing and meter settings to enable individual metered service to each unit and individual disconnection without affecting service to other units. Each meter and meter connection will be treated as a separate water utility account for the purpose of the filed rules and regulations.

No division of the water service lateral to any lot or parcel of land shall be made for the extension and independent metering of the supply to an adjoining lot or parcel of land. Except for duplexes, no division of a water service lateral shall be made at the curb for separate supplies for two or more separate premises having frontage on any street or public service strip, whether owned by the same or different parties. Duplexes may be served by one lateral provided (1) individual metered service and disconnection is provided and (2) it is permitted by local ordinance.

Buildings used in the same business, located on the same parcel, and served by a single lateral may have the customer's water supply piping installed to a central point so that volume can be metered in one place.

The water utility may withhold approval of any application where full information of the purpose of such supply is not clearly indicated and set forth by the applicant property owner.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Utility Operating Rules

Reconnection of Service

Where the water utility has disconnected service at the customer's request, a reconnection charge shall be made when the customer requests reconnection of service. See Schedule R-1 for the applicable rate.

A reconnection charge shall also be required from customers whose services are disconnected (shut off at curb stop box) because of nonpayment of bills when due. See Schedule R-1 for the applicable rate.

If reconnection is requested for the same location by any member of the same household, or, if a place of business, by any partner of the same business, it shall be considered as the same customer.

Temporary Metered Service, Meter, and Deposits

An applicant for temporary water service on a metered basis shall make and maintain a monetary deposit for each meter installed as security for payment for use of water and for such other charges which may arise from the use of the supply. A charge shall be made for setting the valve and furnishing and setting the meter. See Schedule BW-1 for the applicable rate.

Water for Construction

When water is requested for construction purposes or for filling tanks or other such uses, an application shall be made to the water utility, in writing, giving a statement of the amount of construction work to be done or the size of the tank to be filled, etc. Payment for the water for construction may be required in advance at the scheduled rates. The service lateral must be installed into the building before water can be used. No connection with the service lateral at the curb shall be made without special permission from the water utility. In no case will any employee of the water utility turn on water for construction work unless the contractor has obtained permission from the water utility.

Customers shall not allow contractors, masons, or other persons to take unmetered water from their premises without permission from the water utility. Any customer failing to comply with this provision may have water service discontinued and will be responsible for the cost of the estimated volume of water used.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Utility Operating Rules

Use of Hydrants

In cases where no other supply is available, permission may be granted by the water utility to use a hydrant. No hydrant shall be used until the proper meter and valve are installed. In no case shall any valve be installed or moved except by an employee of the water utility.

Before a valve is set, payment must be made for its setting and for the water to be used at the scheduled rates. Where applicable, see Schedule BW-1 for deposits and charges. Upon completing the use of the hydrant, the customer must notify the water utility to that effect.

Operation of Valves and Hydrants and Unauthorized Use of Water - Penalty

Any person who shall, without authority of the water utility, allow contractors, masons, or other unauthorized persons to take water from their premises, operate any valve connected with the street or supply mains, or open any fire hydrant connected with the distribution system, except for the purpose of extinguishing fire, or who shall wantonly damage or impair the same, shall be subject to a fine as provided by municipal ordinance. Utility permission for the use of hydrants applies only to such hydrants that are designated for the specific use.

Refunds of Monetary Deposits

All money deposited as security for payment of charges arising from the use of temporary water service on a metered basis, or for the return of a hydrant valve and fixtures if the water is used on an unmetered basis, will be refunded to the depositor on the termination of the use of water, the payment of all charges levied against the depositor, and the return of the water utility's equipment.

Service Laterals

No water service lateral shall be laid through any trench having cinders, rubbish, rock or gravel fill, or any other material which may cause injury to or disintegration of the service lateral, unless adequate means of protection are provided by sand filling or such other insulation as may be approved by the water utility. Service laterals passing through curb or retaining walls shall be adequately safeguarded by provision of a channel space or pipe casing not less than twice the diameter of the service connection. The space between the service lateral and the channel or pipe casing shall be filled and lightly caulked with an oakum, mastic cement, or other resilient material and made impervious to moisture.

In backfilling the pipe trench, the service lateral must be protected against injury by carefully hand tamping the ground filling around the pipe. There should be at least 6 inches of ground filling over the pipe, and it should be free from hard lumps, rocks, stones, or other injurious material.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Utility Operating Rules

Service Laterals (continued)

All water service laterals shall be of undiminished size from the street main into the point of meter placement. Beyond the meter outlet valve, the piping shall be sized and proportioned to provide, on all floors, at all times, an equitable distribution of the water supply for the greatest probable number of fixtures or appliances operating simultaneously.

Replacement and Repair of Service Laterals

The service lateral from the main to and through the curb stop will be maintained and kept in repair and, when worn out, replaced at the expense of the water utility. The property owner shall maintain the service lateral from the curb stop to the point of use.

If an owner fails to repair a leaking or broken service lateral from the curb to the point of metering or use within such time as may appear reasonable to the water utility after notification has been served on the owner by the water utility, the water will be shut off and will not be turned on again until the repairs have been completed.

Abandonment of Service

If a property owner changes the use of a property currently receiving water service such that water service will no longer be needed in the future, the water utility may require the abandonment of the water service at the water main. In such case, the property owner may be responsible for all removal and/or repair costs, including the water main and the utility portion of the water service lateral.

Charges for Water Wasted Due to Leaks

See Wis. Admin. Code § PSC 185.35.

Thawing Frozen Service Laterals

See Wis. Admin. Code § PSC 185.88.

Curb Stop Boxes

The curb stop box is the property of the water utility. The water utility is responsible for its repair and maintenance. This includes maintaining, through adjustment, the curb stop box at an appropriate grade level where no direct action by the property owner or occupant has contributed to an elevation problem. The property owner is responsible for protecting the curb stop box from situations that could obstruct access to it or unduly expose it to harm. The water utility shall not be liable for failure to locate the curb stop box and shut off the water in case of a leak on the owner's premises.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Utility Operating Rules

Installation of Meters

Meters will be owned, furnished, and installed by the water utility or a utility-approved contractor and are not to be disconnected or tampered with by the customer. All meters shall be so located that they shall be protected from obstructions and permit ready access for reading, inspection, and servicing, such location to be designated or approved by the water utility. All piping within the building must be supplied by the owner. Where additional meters are desired by the owner, the owner shall pay for all piping. Where applicable, see Schedule Am-1 for rates.

Repairs to Meters

Meters will be repaired by the water utility, and the cost of such repairs caused by ordinary wear and tear will be borne by the water utility.

Repair of any damage to a meter resulting from the carelessness of the owner of the premises, owner's agent, or tenant, or from the negligence of any one of them to properly secure and protect same, including any damage that may result from allowing a water meter to become frozen or to be damaged from the presence of hot water or steam in the meter, shall be paid for by the customer or the owner of the premises.

Service Piping for Meter Settings

Where the original service piping is installed for a new metered customer, where existing service piping is changed for the customer's convenience, or where a new meter is installed for an existing unmetered customer, the owner of the premises at his/her expense shall provide a suitable location and the proper connections for the meter. The meter setting and associated plumbing shall comply with the water utility's standards. The water utility should be consulted as to the type and size of the meter setting.

Turning on Water

The water may only be turned on for a customer by an authorized employee of the water utility. Plumbers may turn the water on to test their work, but upon completion must leave the water turned off.

Sprinkling Restrictions and Emergency Water Conditions

Where the municipality has a policy regarding sprinkling restrictions and/or emergency water conditions, failure to comply with such may result in disconnection of service.

See Wis. Admin. Code § PSC 185.37.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Utility Operating Rules

Failure to Read Meters

Where the water utility is unable to read a meter, the fact will be plainly indicated on the bill, and either an estimated bill will be computed or the minimum charge applied. The difference shall be adjusted when the meter is again read, that is, the bill for the succeeding billing period will be computed with the gallons or cubic feet in each block of the rate schedule doubled, and credit will be given on that bill for the amount of the bill paid the preceding period. Only in unusual cases shall more than three consecutive estimated or minimum bills be rendered.

If the meter is damaged (see Surreptitious Use of Water) or fails to operate, the bill will be based on the average use during the past year, unless there is some reason why the use is not normal. If the average use cannot be properly determined, the bill will be estimated by some equitable method.

See Wis. Admin. Code § PSC 185.33.

Complaint Meter Tests

See Wis. Admin. Code § PSC 185.77.

Inspection of Premises

During reasonable hours, any officer or authorized employee of the water utility shall have the right of access to the premises supplied with service for the purpose of inspection or for the enforcement of the water utility's rules and regulations. Whenever appropriate, the water utility will make a systematic inspection of all unmetered water taps for the purpose of checking waste and unnecessary use of water.

See Wis. Stat. § 196.171.

Vacation of Premises

When premises are to be vacated, the water utility shall be notified, in writing, at once, so that it may remove the meter and shut off the water supply at the curb stop. The owner of the premises shall be liable for prosecution for any damage to the water utility's property. See "Abandonment of Service" in Schedule X-1 for further information.

Deposits for Residential Service

See Wis. Admin. Code § PSC 185.36.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Utility Operating Rules

Deposits for Nonresidential Service

See Wis. Admin. Code § PSC 185.361.

Deferred Payment Agreement

See Wis. Admin. Code § PSC 185.38.

Dispute Procedures

See Wis. Admin. Code § PSC 185.39.

Disconnection and Refusal of Service

See Wis. Admin. Code § PSC 185.37.

The following is an example of a disconnection notice that the utility may use to provide the required notice to customers.

DISCONNECTION NOTICE

Dear Customer:

The bill enclosed with this notice includes your current charge for water utility service and your previous unpaid balance.

You have 10 days to pay the water utility service arrears or your service is subject to disconnection.

If you fail to pay the service arrears or fail to contact us within the 10 days allowed to make reasonable deferred payment arrangement or other suitable arrangement, we will proceed with disconnection action.

To avoid the inconvenience of service interruption and an additional charge of (amount) for reconnection, we urge you to pay the full arrears IMMEDIATELY AT ONE OF OUR OFFICES.

If you have entered into a Deferred Payment Agreement with us and have failed to make the deferred payments you agreed to, your service will be subject to disconnection unless you pay the entire amount due within 10 days.

If you have a reason for delaying the payment, call us and explain the situation.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Utility Operating Rules

Disconnection and Refusal of Service (continued)

DISCONNECTION NOTICE (continued)

PLEASE CALL THIS TELEPHONE NUMBER, (telephone number), IMMEDIATELY IF:

1. You dispute the notice of delinquent account.
2. You have a question about your water utility service arrears.
3. You are unable to pay the full amount of the bill and are willing to enter into a deferred payment agreement with us.
4. There are any circumstances you think should be taken into consideration before service is discontinued.
5. Any resident is seriously ill.

Illness Provision: If there is an existing medical emergency in your home and you furnish the water utility with a statement signed by either a licensed Wisconsin physician or a public health official, we will delay disconnection of service up to 21 days. The statement must identify the medical emergency and specify the period of time during which disconnection will aggravate the existing emergency.

Deferred Payment Agreements: If you are a residential customer and you are unable to pay the full amount of the water utility service arrears on your bill, you may contact the water utility to discuss arrangements to pay the arrears over an extended period of time.

This time payment agreement will require:

1. Payment of a reasonable amount at the time the agreement is made.
2. Payment of the remainder of the outstanding balance in monthly installments over a reasonable length of time.
3. Payment of all future water utility service bills in full by the due date.

In any situation where you are unable to resolve billing disputes or disputes about the grounds for proposed disconnection through contacts with our water utility, you may make an appeal to the Public Service Commission of Wisconsin by calling (800) 225-7729.

(WATER UTILITY NAME)

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Utility Operating Rules

Collection of Overdue Bills

An amount owed by the customer may be levied as a tax as provided in Wis. Stat. § 66.0809.

Surreptitious Use of Water

When the water utility has reasonable evidence that a person is obtaining water, in whole or in part, by means of devices or methods used to stop or interfere with the proper metering of the water utility service being delivered, the water utility reserves the right to estimate and present immediately a bill for unmetered service as a result of such interference, and such bill shall be payable subject to a 24-hour disconnection of service. If the water utility disconnects the service for any such reason, the water utility will reconnect the service upon the following conditions:

- A. The customer will be required to deposit with the water utility an amount sufficient to guarantee the payment of the bills for water utility service.
- B. The customer will be required to pay the water utility for any and all damages to water utility equipment resulting from such interference with the metering.
- C. The customer must further agree to comply with reasonable requirements to protect the water utility against further losses.

See Wis. Stat. §§ 98.26 and 943.20.

Repairs to Mains

The water utility reserves the right to shut off the water supply in the mains temporarily to make repairs, alterations, or additions to the plant or system. When the circumstances will permit, the water utility will give notification, by newspaper publication or otherwise, of the discontinuance of the water supply. No credit will be allowed to customers for such temporary suspension of the water supply.

See Wis. Admin. Code § PSC 185.87.

Duty of Water Utility with Respect to Safety of the Public

It shall be the duty of the water utility to see that all open ditches for water mains, hydrants, and service laterals are properly guarded to prevent accident to any person or vehicle, and at night there shall be displayed proper signal lighting to insure the safety of the public.

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Utility Operating Rules

Handling Water Mains and Service Laterals in Excavation Trenches

Contractors must call Digger’s Hotline and ensure a location is done to establish the existence and location of all water mains and service laterals as provided in Wis. Stat. § 182.0175. Where water mains or service laterals have been removed, cut, or damaged during trench excavation, the contractors must, at their own expense, cause them to be replaced or repaired at once. Contractors must not shut off the water service laterals to any customer for a period exceeding 6 hours.

Protective Devices

- A. Protective Devices in General: The owner or occupant of every premise receiving water supply shall apply and maintain suitable means of protection of the premise supply and all appliances against damage arising in any manner from the use of the water supply, variation of water pressure, or any interruption of water supply. Particularly, such owner or occupant must protect water-cooled compressors for refrigeration systems by means of high and/or low pressure safety cutout devices. There shall likewise be provided means for the prevention of the transmission of water ram or noise of operation of any valve or appliance through the piping of their own or adjacent premises.

- B. Relief Valves: On all "closed systems" (i.e., systems having a check valve, pressure regulator, reducing valve, water filter, or softener), an effective pressure relief valve shall be installed at or near the top of the hot water tank or at the hot water distribution pipe connection to the tank. No stop valve shall be placed between the hot water tank and the relief valve or on the drain pipe. See applicable plumbing codes.

- C. Air Chambers: An air chamber or approved shock absorber shall be installed at the terminus of each riser, fixture branch, or hydraulic elevator main for the prevention of undue water hammer. The air chamber shall be sized in conformance with local plumbing codes. Where possible, the air chamber should be provided at its base with a valve for water drainage and replenishment of air.

Cross-Connections

Every person owning or occupying a premise receiving municipal water supply shall maintain such municipal water supply free from any connection, either of a direct or of an indirect nature, with a water supply from a foreign source or of any manner of connection with any fixture or appliance whereby water from a foreign supply or the waste from any fixture, appliance, or waste or soil pipe may flow or be siphoned or pumped into the piping of the municipal water system.

See Wis. Admin. Code § NR 811.09.

RATE FILE

Sheet No. 1 of 1

Schedule No. X-2

Amendment No. 09

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Main Extension Rule

Please refer to the utility's Customer Connection Rules on file with the Commission.

RATE FILE

Sheet No. 1 of 1

Schedule No. X-3

Amendment No. 09

Public Service Commission of Wisconsin

Mequon Municipal Water Utility

Water Main Installations in Platted Subdivisions

Please refer to the utility's Customer Connection Rules on file with the Commission.

July 2010

Mequon Water Utility
Customer Connection Rules
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Mequon Water Utility

Customer Connection Rules

A. General Purpose

These rules for connecting Customers to the Mequon Water Utility are designed to guide Customers and Mequon Water Utility staff in connecting new Customers fairly and equitably.

These rules are designed to be as transparent as possible. The calculation of the Connection Charge a new Water Utility Customer will be required to pay for connecting to the water system will consider both the costs of constructing new water facilities and the use of existing System Facilities as well as the revenues expected from both the Person applying for water service and potential New Customers.

For administrative simplicity and Customer understanding, the Connection Charge assessed a New Customer will be calculated using Standard Costs and Standard Revenues where applicable. Standard Costs are an average, over time, of actual costs incurred to serve a Customer of similar type and size, adjusted to reflect projected changes in those costs for the current year. Because the cost of mains can vary significantly, the Utility will decide in its judgment whether or not to use Standard Costs. Further explanation can be found in the definitions, calculation worksheets, and the examples and tables found in the Appendices to these rules.

Experience shows that strict application of these rules will fit the vast majority of situations. However, there will be a few unique situations where strict application of these rules, in the judgment of the Utility, will produce results that are unfair either to the New Customer or existing Customers. In such situations the Utility reserves the right to use its judgment to arrive at a result that will be fair and equitable to the New Customer as well as existing Customers.

B. Residential Customer Connections

The following are the types of residential Customer connections covered by these rules:

- On-Main
- Off-Main
- New Development (Residential)
- Residential Water Trust, Existing Common Well System

(1) On-Main

(a) *General.* The Utility will provide service to an On-Main residential New Customer, provided the New Customer pays the Connection Charge determined by the Utility. Generally, the Utility will install facilities in the public right-of-way to the New Customer's lot line, and the new Customer will be responsible for installing required facilities that meet the Utility's specifications from the outlet of the Curb Stop, normally at the lot line, to and throughout the building. However, the Utility will install the Meter.

(b) *Facilities.* An On-Main residential New Customer will require new facilities to enable the Utility to provide service. See Illustration 1. These facilities will be installed by the Utility or installed by the Customer, as set out below. A New Customer also makes use of existing System Facilities.

1. Facilities Installed By The Utility

- Street Lateral, including appurtenances such as the tap connecting to the Local Delivery Main, valves and Curb Stop
- Meter

2. Existing Facilities Used By The Customer

- Local Delivery Main
- System Facilities, including Supply Mains, meter pits, pump stations, main over-sizing, and storage facilities

3. Facilities Installed By The Customer

- Private Lateral, including valves
- Interior Piping, including plumbing ready for installing the Meter and disconnecting the existing source of water, typically a private well

(c) Cost Calculation

1. Facilities Installed By The Utility

The cost of new facilities included in the Connection Charge for an On-Main residential New Customer will be standardized and shall include the following:

- Standard Street Lateral Cost. Current year Standard Street Lateral Costs can be found in Table 1.
- The Utility shall install the minimum size Meter that it determines to be necessary to provide adequate and reliable service, the cost of which is embedded in the water rates the New Customer will pay and is not included in the Connection Charge.

If, in the judgment of the Utility, the Utility does not have sufficient Customers of similar size and usage or sufficient recent cost history for the facilities to be installed to enable it to calculate an accurate Standard Cost, then the Connection Charge will include the actual installed cost of the facilities.

2. Existing Facilities Used By The Customer

The cost of existing facilities included in the Connection Charge for an On-Main residential New Customer will be standardized and shall include the following:

- Standard Local Delivery Main Cost. Current year Standard Local Delivery Main Costs can be found in Table 2. However, if the Local Delivery Main is subject to a Refund Agreement, the Local Delivery Main Cost will be as stated in the Refund Agreement.
- Standard System Cost. Current year Standard System Cost can be found in Table 3.

3. Facilities Installed By The Customer

An On-Main residential New Customer is responsible for arranging and paying for the installation of facilities required to connect the building to the Utility water system and to physically disconnect the building from its previous source of water. These include the following.

- Private Lateral, including valves
- Interior Piping, including plumbing ready for installing the Meter and disconnecting the existing source of water, typically a private well

(d) Customer Responsibilities With Respect To Water Facilities

The Customer is responsible for maintaining and ensuring access to the Curb Stop and other water facilities on the Customer's property.

(e) Revenue Credit. An On-Main residential New Customer shall be entitled to a Revenue Credit to offset part or all of the Connection Charge. This credit reflects the capital costs and other Fixed Costs of System Facilities that are embedded in the water rates the new Customer will pay. In no event shall the Revenue Credit exceed the Connection Charge.

The Standard Revenue Credit can be expressed in the following formula.

Present Value of the incremental net revenue expected from the Customer for ten (10) years using a discount rate determined by the Water Utility, where Incremental revenue is the estimated gross revenue less the variable cost for water, meter reading, billing, and other incremental operating costs associated with serving a Customer.

The Standard Revenue Credit can be found in Table 4.

(f) Refund Agreement. The Local Delivery Main to which an On-Main residential New Customer connects may be subject to a Refund Agreement specifying the cost of the Local Delivery Main to be used in calculating the Connection Charge for a New Customer. In no event shall the Refund Agreement provide for a Connection Charge payable by an additional New Customer in excess of the Connection Charge a New Customer would pay if a new Local Delivery Main were required to serve the New Customer.

(g) Calculation of Connection Charge. The sum total Connection Charge to be paid by an On-Main residential New Customer to the Utility, less the Revenue Credit, can be expressed in the following formula.

Connection Charge = Street Lateral Cost + Local Delivery Main Cost or the amount specified in the Refund Agreement, if applicable + System Costs – Revenue Credit

(2) Off-Main

(a) General. The Utility will provide service to an Off-Main residential New Customer, provided the new Customer pays the Connection Charge determined by the Utility. Generally, the Utility will install facilities in the public right-of-way to the New Customer's lot line, and the New Customer will be responsible for installing required facilities that meet the Utility's specifications from the outlet of the Curb Stop, normally at the lot line, to and throughout the building. However, the Utility will install the Meter.

(b) Facilities. An Off-Main residential New Customer will require new facilities to enable the Utility to provide service. See Illustration 2. These facilities will be installed by the Utility or installed by the Customer, as set out below. A New Customer also makes use of existing System Facilities.

1. Facilities Installed By The Utility

- Local Delivery Main. The Utility will install an extension to a Local Delivery Main adequate to serve the water demands and fire flow needs of that Customer. The extension of a Local Delivery Main varies from project to project for a number of reasons, such as the water demands, fire flow needs, diameter of the pipe, construction conditions, the number of feet that have to be bored, the extent of ground restoration required, and other factors. The Utility will select the best route from where the existing water system ends to where the Customer is located. A public right-of-way available to lay the Local Delivery Main is required unless the Utility has determined that an easement will be sufficient.

The size of the extension to a Local Delivery Main shall be determined by the Utility. The Utility maintains a computer model of its water system to determine standard pipe sizing. In cases where a fire hydrant is required, the minimum diameter is 8 inches, except for an extension to a Local Delivery Main of 500 feet or less in a cul-de-sac, where a 6-inch main may be adequate.

- Street Lateral, including appurtenances such as the tap connecting to the Local Delivery Main, valves and Curb Stop
- Meter

2. Existing Facilities Used By The Customer

- System Facilities, including Supply Mains, meter pits, pump stations, main over-sizing, and storage facilities

3. Facilities Installed By The Customer

- Private Lateral, including valves
- Interior Piping, including plumbing ready for installing the Meter and disconnecting the existing source of water, typically a private well

(c) Cost Calculation.

1. Facilities Installed By The Utility

The cost of new facilities included in the Connection Charge for an Off-Main residential New Customer will be standardized and shall include the following:

- Standard Local Delivery Main Cost. If the Utility desires to install a larger diameter main, the Utility will pay the over-sizing cost. The Local Main Cost included in the Connection Charge is as follows.
- If the extension of a Local Delivery Main is 1,000 feet or less, the Utility will estimate the Standard Local Delivery Main Cost based on recent bids it received for Local Delivery Mains of the same size. The Utility will then provide the Customer with a not-to-exceed price for the extension of the Local Delivery Main. See Table 5.
- If the extension of a Local Delivery Main exceeds 1,000 feet, the Utility will conduct a preliminary engineering study to estimate the actual cost of the extension of the Local Delivery Main. The Utility will then provide the Customer with a not-to-exceed price for the extension of the Local Delivery Main. The Customer will be charged for the preliminary engineering study.
- If, for an extension of a Local Delivery Main exceeding 1,000 feet, after the Utility has performed a preliminary engineering study and provided the Customer with a not-to-exceed cost, the Customer desires a construction bid to determine the cost of the extension of the Local Delivery Main, the Utility will bid the Local Delivery Main extension project, and the Customer will be charged the price stated in the accepted bid. The Customer will also be charged the cost of the bidding process, which includes the costs of bid preparation through bid acceptance.
- Standard Street Lateral Cost. Current year Standard Street Lateral Costs can be found in Table 1.
- The Utility shall install the minimum size Meter that it determines to be necessary to provide adequate and reliable service, the cost of which is embedded in the water rates the New Customer will pay and is not included in the Connection Charge.

If, in the judgment of the Utility, the Utility does not have sufficient Customers of similar size and usage or sufficient recent cost history for the facilities to be installed to enable it to calculate an accurate Standard Cost, then the Connection Charge will include the actual installed cost of the facilities.

2. Existing Facilities Used By The Customer

The cost of existing facilities included in the Connection Charge for an Off-Main residential New Customer will be standardized and shall include the following:

- Standard System Cost. Current year Standard System Cost can be found in Table 3.

3. Facilities Installed By The Customer

An Off-Main residential New Customer is responsible for arranging and paying for the installation of facilities required to connect the building to the Utility water system and to physically disconnect the building from its previous source of water. These include the following.

- Private Lateral, including valves
- Interior Piping, including plumbing ready for installing the Meter and disconnecting the existing source of water, typically a private well

(d) Customer Responsibilities With Respect To Water Facilities

The Customer is responsible for maintaining and ensuring access to the Curb Stop and other water facilities on the Customer's property.

(e) Revenue Credit. An Off-Main residential New Customer shall be entitled to a Revenue Credit to offset all or part of the Connection Charge. This credit reflects the capital costs and other Fixed Costs of System Facilities that are embedded in the water rates the New Customer will pay. In no event shall the Revenue Credit exceed the Connection Charge.

The Standard Revenue Credit can be expressed in the following formula.

Present Value of the incremental net revenue expected from the Customer for ten (10) years using a discount rate determined by the Water Utility, where Incremental revenue is the estimated gross revenue less the variable cost for water, meter reading, billing, and other incremental operating costs associated with serving a Customer.

The Standard Revenue Credit can be found in Table 4.

(f) Additional New Customer Credit/Refund Agreement. The Standard Local Delivery Main Cost is included in the Connection Charge payable by an Off-Main residential New Customer. The Utility shall calculate an Additional New Customer Credit based on the number of additional New Customers the Utility estimates, in its judgment, are likely to connect to the Local Delivery Main Extension during the succeeding ten (10) years. The Connection Charge will be reduced by the amount of the Additional New Customer Credit, which will be calculated by multiplying the average cost per REU of the Local Delivery Main Extension times the number of REU's the Utility estimates will connect to that section of main during the succeeding ten (10) years. The original Customer will receive no further refunds or charges, regardless of the number of New Customers who ultimately connect to the Local Delivery Main Extension.

In lieu of an Additional New Customer Credit, the Utility and the Customer may enter into a Refund Agreement specifying the amount of refund due to the New Customer if additional New Customers connect to the Local Delivery Main Extension within the succeeding ten (10) years. In no event shall the Refund Agreement provide for a Connection Charge payable by an additional New Customer in excess of the Connection Charge a New Customer would pay if no Refund Agreement were in place.

(g) Calculation of Connection Charge. The sum total Connection Charge to be paid by an Off-Main residential New Customer to the Utility, less the Revenue Credit, can be expressed in the following formula.

$$\text{Connection Charge} = \text{Local Main Extension Cost} + \text{Street Lateral Cost} + \text{System Costs} - \text{Revenue Credit} - \text{Additional New Customer Credit, if applicable}$$

(3) New Development (Residential)

(a) General. When a Developer builds a new residential Development, the Developer must design and build the water distribution system to Utility specifications. The Developer will then contribute that water distribution system in the public right-of-way or easement to the Utility. The Developer will also compensate the Utility for inspection, computer modeling, engineering review, operational and laboratory testing, meter testing, administrative, and legal costs related to connecting the Development to the Utility's water system as provided in the Development Agreement or Water Service Application.

The Utility will provide service to a Development, provided the Developer has installed a water distribution system to Utility specifications and has contributed that system to the Utility. Generally, the Utility will accept contribution of the Developer's water distribution system in the public right-of-way or easement. The Utility may, in its discretion, accept water distribution facilities located in private easements. The New Customer will be responsible for facilities that the Developer installed from the outlet of the Curb Stop, normally at the lot line, to and throughout the building. However, the Utility will install the Meters.

(b) Customer Connections. New Customers in a Development will not have to pay Connection Charges to the Utility.

(c) Facilities. A new Development will require facilities to enable the Utility to provide service. These facilities will be installed by the Utility or installed by the Developer or builder, as set out below.

1. Facilities Installed By The Utility

- Connecting Main, unless the Development Agreement provides that the Developer will install the Connecting Main and contribute it to the Utility. The Utility will install a Connecting Main adequate to serve that water demands and fire flow needs of the new Development. Connecting Main varies from project to project for a number of reasons, such as the diameter of the pipe, construction conditions, the number of feet that have to be bored, the extent of ground restoration required, and other factors. Water demands and fire flow needs of the Development are also taken into account. The Utility will select, in its judgment, the best route from where the existing water system ends to the Development. A public right-of-way available to lay the Connecting Main is required unless the Utility determines that an easement will be sufficient.

The size of the Connecting Main shall be determined by the Utility. The Utility maintains a computer model of the water system to determine standard pipe sizing.

- Meters

2. Facilities Installed By The Developer

- Local Delivery Main.
- Street Lateral, including appurtenances such as the tap connecting to the Local Delivery Main, valves and Curb Stop

3. Facilities Installed By The Developer or Builder

- Private Laterals, including valves
- Interior Piping, including plumbing ready for installing the Meters and disconnecting the existing source of water, typically a private well

(d) Cost Calculation.

1. Facilities Installed By The Utility

The cost of new facilities included in the Connection Charge to a Developer for a new residential Development shall include the following:

Standard Connecting Main. If the Utility desires to install a larger diameter Connecting Main, the Utility will pay the over-sizing cost. Current year Connecting Main Costs can be found in Table 5.

- The Development Agreement may specify that the Developer will install and pay for the Connecting Main.
- The Utility shall install the minimum size meters that it determines to be necessary to provide adequate and reliable service, the cost of which are embedded in the water rates the New Customer will pay and are not included in the Connection Charge.

If, in the judgment of the Utility, the Utility does not have sufficient Customers of similar size and usage or sufficient recent cost history for the facilities to be installed to enable it to calculate an accurate Standard Cost, then the Connection Charge will include the actual installed cost of the facilities.

2. Facilities Installed By The Developer

The Developer is responsible for arranging and paying for the installation of new facilities required to connect the existing and planned buildings to the Utility water system and to physically disconnect any existing building from its previous source of water. These include the following.

- Local Delivery Main. If the Utility desires to have a larger diameter main, the Utility will pay the over-sizing cost.
- Street Lateral, including appurtenances such as Local Delivery Main connection tap, valves and Curb Stop
- Any other facilities specified in the Development Agreement

3. Facilities Installed By The Developer, Builder or Customer

The Developer, Builder or Customer is responsible for arranging and paying for the installation of new facilities required to connect the existing and planned buildings to the Utility water system and to physically disconnect the building from the previous source of water. These include the following.

- Private Laterals, including valves
- Interior Piping, including plumbing ready for installing the Meters and disconnecting the existing source of water, typically a private well

(e) Customer Responsibilities With Respect To Water Facilities

The Customer is responsible for maintaining and ensuring access to the Curb Stop and other water facilities on the Customer's property.

(f) Revenue Credit. Neither the Developer nor a New Customer connecting to a Developer-contributed water system shall be entitled to a Revenue Credit.

(g) Additional New Customer Credit/Refund Agreement. The Standard Connecting Main Cost is included in the Connection Charge payable by a Developer. The Utility shall calculate an Additional New Customer Credit based on the number of additional new Customers the Utility estimates, in its judgment, are likely to connect to the Connecting Main during the succeeding ten (10) years. The Connection Charge will be reduced by the amount of the Additional New Customer Credit, which will be calculated by multiplying the average cost per REU of the Connecting Main Extension times the number of REU's the Utility estimates will connect to that section of main during the succeeding ten (10) years. The Developer will receive no further refunds or charges, regardless of the number of New Customers who ultimately connect to the Connecting Main.

In lieu of an Additional New Customer Credit, the Utility and the Developer may enter into a Refund Agreement specifying the amount of refund due to the Developer if additional New Customers connect to the Connecting Main within the succeeding ten (10) years. In no event shall the Refund Agreement provide for a Connection Charge payable by an additional New Customer in excess of the Connection Charge a New Customer would pay if no Refund Agreement were in place.

(h) *Calculation of Connection Charge.* The Connection Charge is separate and apart from the requirement that they contribute the Local Delivery Main, Street Lateral and appurtenances that comprise its water system to the Utility. The sum total Connection Charge to be paid by the Developer of a residential Development to the Utility can be expressed in the following formula.

$\text{Connection Charge} = \text{Connecting Main Cost} - \text{Additional New Customer Credit, if applicable}$

(4) *Water Trusts (Existing Common Well Systems)*

(a) *General.* The Utility will provide service to all residential New Customers served by a Water Trust, provided the Water Trust pays the Connection Charge determined by the Utility. Generally, the Water Trust will be responsible for installing required facilities that meet the Utility's specifications, and the Utility will accept a contribution of those facilities in the public right-of-way. The Utility may, in its discretion, accept facilities located in private easements. Either the Water Trust or property owner will be responsible for facilities from the outlet of the Curb Stop, normally at the lot line, to and throughout the building. However, the Utility will install the meter.

The Connection Charge for Water Trusts vary due to the condition of the Water Trust pipe system, the feet of Connecting Main required to connect the Water Trust to the Utility's system, and the number of Customers who are members of the Water Trust.

The Utility will conduct a review of the Water Trust facilities to be contributed to the Utility and determine what replacements, repairs and upgrades are necessary to make the facilities meet Utility standards. The cost to bring these facilities to Utility standards, if to be paid by the Utility, shall be included in the Connection Charge. The Water Trust By-Laws or other governing instruments determine how the Connection Charge paid by the Water Trust will be apportioned among the members of the Water Trust.

(b) *Facilities*. A Water Trust may require new, repaired or upgraded facilities to enable the Utility to provide service to the member of the Water Trust. See Illustration 3. These facilities will be installed by the Utility or installed by the Water Trust, as set out below. A Water Trust also makes use of existing System Facilities.

1. *Facilities Installed, Repaired Or Upgraded By The Utility Unless The Agreement Between The Utility And The Water Trust (The Water Trust Connection Agreement) Provides That The Water Trust Will Install, Repair Or Upgrade And Pay For The Facilities*

- Connecting Main. The Utility will install a Connecting Main adequate to serve that water demands and fire flow needs of the Water Trust. Connecting Main varies from project to project for a number of reasons, such as the diameter of the pipe, construction conditions, the number of feet that have to be bored, the extent of ground restoration required, and other factors. Water demands and fire flow needs of the Water Trust are also taken into account. The Utility will select, in its judgment, the best route from where the existing water system ends to the Water Trust water system. A public right-of-way available to lay the Connecting Main is required unless the Utility determines that an easement will be sufficient.

The size of the Connecting Main shall be determined by the Utility. The Utility maintains a computer model of the water system to determine standard pipe sizing.

- Local Delivery Main. The Utility will install a Local Delivery Main adequate to serve that water demands and fire flow needs of the Water Trust. The size of the Local Delivery Main shall be determined by the Utility. The Utility maintains a computer model of its water system to determine standard pipe sizing. In cases where a fire hydrant is required the minimum diameter is 8 inches, except for a Local Delivery Main Extension of 500 feet or less in cul-de-sacs, where a 6-inch main may be adequate.
- Street Laterals, including appurtenances such as the tap connecting to the Local Delivery Main, valves and Curb Stop
- Meters

2. *Existing Facilities Used By The Water Trust*

- System Facilities, including Supply Mains, meter pits, pump stations, main over-sizing, and storage facilities

3. Facilities Installed By The Water Trust Unless The Water Trust Connection Agreement Provides That The Utility Will Install And Pay For These Facilities

- Private Lateral, including valves, meeting the Utility’s specifications
- Interior Piping, including plumbing ready for installing the Meter and disconnecting the existing source of water, typically a private well
- Abandonment of existing wells or permitting to use the wells for irrigation only

(c) Cost Calculation.

1. Facilities Installed, Repaired Or Upgraded By The Utility Unless The Agreement Between The Utility And The Water Trust Provides That The Water Trust Will Install, Repair Or Upgrade And Pay For The Facilities

The Connection Charge shall include the costs incurred by the Utility to install, repair or upgrade the Water Trust distribution system contributed to the Utility if the Utility determines in its judgment that the age and condition of the system facilities necessitate that work. If the Utility determines that the Water Trust distribution system meets Utility Standards, or if the Utility and the Water Trust agree that the Water Trust will install, repair or upgrade the Water Trust distribution system to Utility standards, no replacement, upgrade or repair charge shall be included in the Connection Charge. The cost of new facilities included in the Connection Charge for a Water Trust will be standardized and shall include the following:

- Standard Connecting Main. If the Utility desires to install a larger diameter Connecting Main, the Utility will pay the over-sizing cost. Current year Connecting Main Costs can be found in Table 5.

The Water Trust Connection Agreement may specify that the Water Trust will install the Connecting Main.

- If the Utility decides, in its judgment, to replace the Local Delivery Main, the Connection Charge will include the Standard Local Delivery Main Cost. If the Utility desires to install a larger diameter Main, the Utility will pay the over-sizing cost.
- If the extension of a Local Delivery Main is 1,000 feet or less, the Utility will estimate the Standard Local Delivery Main Cost based on recent bids it received for Local Delivery Mains of the same size. The Utility will then provide the Water Trust with a not-to-exceed price for the extension of the Local Delivery Main. See Table 5.

- If the extension of a Local Delivery Main exceeds 1,000 feet, the Utility will conduct a preliminary engineering study to estimate the actual cost of the extension of the Local Delivery Main. The Utility will then provide the Water Trust with a not-to-exceed price for the extension of the Local Delivery Main. The Water Trust will be charged for the preliminary engineering study.
- If, for an extension of a Local Delivery Main exceeding 1,000 feet, after the Utility has performed a preliminary engineering study and provided the Water Trust with a not-to-exceed cost, the Water Trust desires a construction bid to determine the cost of the extension of the Local Delivery Main, the Utility will bid the Local Delivery Main extension project, and the Water Trust will be charged the price stated in the accepted bid. The Water Trust will also be charged the cost of the bidding process, which includes the costs of bid preparation through bid acceptance.
- If the Utility decides, in its judgment, to replace a Street Lateral, the Connection Charge will include the Standard Street Lateral Cost. Current year Standard Street Lateral Costs can be found in Table 1.
- The Utility shall install the minimum size Meters that it determines to be necessary to provide adequate and reliable service, the costs of which are embedded in the water rates the New Customers will pay and are not included in the Connection Charge.

If, in the judgment of the Utility, the Utility does not have sufficient Customers of similar size and usage or sufficient recent cost history for the facilities to be installed to enable it to calculate an accurate Standard Cost, then the Connection Charge will include the actual installed cost of the facilities.

2. Existing Facilities Used By The Water Trust

The cost of existing facilities included in the Connection Charge for New Customers served by a Water Trust will be standardized and shall include the following.

- Standard System Cost. Current year Standard System Cost can be found in Table 3.

3. Facilities Installed By The Water Trust or Customer

The Water Trust, or New Customer if so provided in the Water Trust Connection Agreement, is responsible for arranging and paying for the installation of new facilities required to connect the buildings to the Utility water system and to physically disconnect the buildings from their previous source of water. These include the following.

- Private Lateral cost, including valves
- Interior Piping cost, including plumbing ready for installing the Meter and disconnecting the existing source of water, typically a private well
- Abandonment of existing wells or permitting to use the wells for irrigation only

(d) Customer Responsibilities With Respect To Water Facilities

The Customer is responsible for maintaining and ensuring access to the Curb Stop and other water facilities on the Customer's property.

(e) Revenue Credit. A Water Trust shall be entitled to a Revenue Credit to offset all or part of the Connection Charge. This credit reflects the capital costs and other Fixed Costs of System Facilities that are embedded in the water rates the new Customers will pay. In no event shall the Revenue Credit exceed the Connection Charge.

The Revenue Credit can be expressed in the following formula.

Present Value of the incremental net revenue expected from the Customer for ten (10) years using a discount rate determined by the Water Utility, which incremental revenue is the estimated gross revenue less the variable cost for water, meter reading, billing, and other incremental operating costs associated with serving a Customer.

The Standard Revenue Credit can be found in Table 4.

(f) *Additional New Customer Credit.* The Connecting Main Cost and Local Distribution Main Extension Cost, if applicable, are included in the Connection Charge payable by a Water Trust. The Utility shall calculate an Additional New Customer Credit based on the number of additional new Customers the Utility estimates, in its judgment, are likely to connect to the Connecting Main and/or the Local Delivery Main Extension during the succeeding ten (10) years. The Connection Charge will be reduced by the amount of the Additional New Customer Credit, which will be calculated by multiplying the average cost per REU of the Connecting Main Extension and Local Distribution Main Extension times the number of REU's the Utility estimates will connect to those sections of main during the succeeding ten (10) years. The Water Trust will receive no further refunds or charges, regardless of the number of New Customers who ultimately connect to the Connecting Main Extension or Local Delivery Main Extension.

(g) *Calculation of Connection Charge.* The sum total Connection Charge to be paid to the Utility by a Water Trust, less the Revenue Credit, can be expressed in the following formula. The Connection Charge is separate and apart from the costs borne directly by the Water Trust as specified in the Water Trust Connection Agreement.

Connection Charge = Connecting Main Cost + System Costs + Local Delivery Main Extension Cost (if any) + Street Lateral Cost (if any) – Revenue Credit – Additional New Customer Credits, if any + Upgrade Costs, if any

C. Commercial Customer Connections

The following are the types of commercial Customer connections covered by these rules:

- On-Main
- Off-Main
- Commercial or Industrial Development
- Commercial Water Trusts

(1) *General.* The Utility will provide service to a commercial New Customer, provided the New Customer pays the Connection Charge determined by the Utility. Commercial Customers are often unique in their water requirements or their location. Accordingly, a commercial New Customer will pay a standardized Connection Charge or will pay the actual cost of the facilities installed to serve the Customer, plus System Costs, as determined by the Utility in its judgment. The Connection Charge will vary depending on a number of factors, such as whether the commercial New Customer is On-Main or Off-Main and the Customer's fire protection requirements.

If the Local Delivery Main has existing capacity to serve the commercial New Customer, the following On-Main rules will apply. If the Local Delivery Main does not have existing capacity to serve the commercial New Customer, the Off-Main rules will apply.

(2) *On-Main*

(a) *General.* The Utility will provide service to a On-Main commercial New Customer, provided the New Customer pays the Connection Charge determined by the Utility. Generally, the Utility will install facilities in the public right-of-way to the New Customer's lot line, and the New Customer will be responsible for installing required facilities that meet the Utility's specifications from the outlet of the Curb Stop at the lot line to and into the building. However, the Utility will install the meter.

If the Local Delivery Main does not have the capacity to serve the new commercial Customer, the Off-Main rules will apply.

(b) *Facilities.* An On-Main commercial New Customer will require new facilities to enable the Utility to provide service. See Figure 3. These facilities will be installed by the Utility or installed by the Customer, as set out below. A new On-Main commercial Customer also makes use of existing System Facilities.

1. Facilities Installed By The Utility

- Street Lateral, including appurtenances such as the tap connecting to the Local Delivery Main, valves and Curb Stop
- Meter

2. Existing Facilities Used By The Customer

- Local Delivery Main
- System Facilities, including Supply Mains, meter pits, pump stations, main over-sizing, and storage facilities

3. Facilities Installed By The Customer

- Private Lateral, including valves
- Interior Piping, including plumbing ready for installing the Meter and disconnecting the existing source of water, typically a private well

(c) Cost Calculation.

1. Facilities Installed By The Utility

The cost of new facilities included in the Connection Charge for a new On-Main commercial Customer will be standardized, if possible, and shall include the following:

- Standard Street Lateral Cost. Current year Standard Street Lateral costs can be found in Table 1.
- The Utility shall install the minimum size meter that it determines to be necessary to provide adequate and reliable service, the cost of which is embedded in the water rates the New Customer will pay and is not included in the Connection Charge.

If, in the judgment of the Utility, the Utility does not have sufficient Customers of similar size and usage or sufficient recent cost history for the facilities to be installed to enable it to calculate an accurate Standard Cost, then the Connection Charge will include the actual installed cost of the facilities.

2. Existing Facilities Used By The Customer

The cost of existing facilities included in the Connection Charge for a new On-Main commercial Customer will be standardized and shall include the following:

- Standard Local Delivery Main Cost. Current year Standard Local Delivery Mains Cost can be found in Table 2. However, if the Local Delivery Main is subject to a Refund Agreement, the Local Delivery Main Cost will be as stated in the Refund Agreement.
- Standard System Cost. Current year Standard System Cost can be found in Table 3.

3. Facilities Installed By The Customer

An On-Main commercial New Customer is responsible for arranging and paying for the installation of facilities required to connect the building to the Utility water system and to physically disconnect the building from its previous source of water. These include the following.

- Private Lateral cost, including valves
- Interior Piping, including plumbing ready for installing the Meter and disconnecting the existing source of water, typically a private well

(d) Customer Responsibilities With Respect To Water Facilities

The Customer is responsible for maintaining and ensuring access to the Curb Stop and other water facilities on the Customer's property.

(e) Revenue Credit. A new On-Main commercial Customer shall be entitled to a Revenue Credit to offset part or all of the Connection Charge. This credit reflects the payment of capital costs and other System Costs that are embedded in the water rates the new Customer will pay. In no event shall the Revenue Credit exceed the Connection Charge.

The Standard Revenue Credit can be expressed in the formula below.

Present Value of the incremental net revenue expected from the Customer for ten (10) years using a discount rate determined by the Water Utility, where Incremental revenue is the estimated gross revenue less the variable cost for water, meter reading, billing, and other incremental operating costs associated with serving a Customer.

The Standard Revenue Credit for Customers of similar types and sizes can be found in Table 4.

(f) Refund Agreement. The Local Delivery Main to which an On-Main commercial New Customer connects may be subject to a Refund Agreement specifying the cost of the Local Delivery Main to be used in calculating the Connection Charge for a New Customer. In no event shall the Refund Agreement provide for a Connection Charge payable by an additional New Customer in excess of the Connection Charge a New Customer would pay if a new Local Delivery Main were required to serve the New Customer.

(g) Calculation of Connection Charge. The sum total Connection Charge to be paid by an On-Main commercial New Customer to the Utility, less the Revenue Credit, can be expressed in the formula below.

$$\text{Connection Charge} = \text{Street Lateral Cost} + \text{Local Delivery Main Cost or the amount specified in a Refund Agreement, if applicable} + \text{System Costs} - \text{Revenue Credit}$$

(3) Off-Main

(a) General. The Utility will provide service to an Off-Main commercial New Customer, provided the new Customer pays the Connection Charge determined by the Utility. Generally, the Utility will install facilities in the public right-of-way to the New Customer's lot line, and the New Customer will be responsible for installing required facilities that meet the Utility's specifications from the outlet of the Curb Stop, normally at the lot line, to and throughout the building. However, the Utility will install the Meter.

(b) Facilities. An Off-Main commercial New Customer will require new facilities to enable the Utility to provide service. These facilities will be installed by the Utility or installed by the Customer, as set out below. An Off-Main commercial New Customer also makes use of existing System Facilities.

1. Facilities Installed By The Utility

- Connecting Main, if necessary, or unless the Water Service Agreement provides that the New Customer will install the Connecting Main and contribute it to the Utility. The Utility will install a Connecting Main adequate to serve the water demands and fire flow needs of the Water Trust. Connecting Main varies from project to project for a number of reasons, such as the diameter of the pipe, construction conditions, the number of feet that have to be bored, the extent of ground restoration required, and other factors. Water demands and fire flow needs of the New Customer are also taken into account. The Utility will select, in its judgment, the best route from where the existing water system ends to the New Customer. A public right-of-way available to lay the Connecting Main is required unless the Utility determines that an easement will be sufficient.

The size of the Connecting Main shall be determined by the Utility. The Utility maintains a computer model of the water system to determine standard pipe sizing.

- Local Delivery Main. The Utility will install an extension to a Local Delivery Main adequate to serve the water demands and fire flow needs of that Customer. The extension of a Local Delivery Main varies from project to project for a number of reasons, such as the water demands, fire flow needs, diameter of the pipe, construction conditions, the number of feet that have to be bored, the extent of ground restoration required, and other factors. The Utility will select the best route from where the existing water system ends to where the Customer is located. A public right-of-way available to lay the Local Delivery Main is required unless the Utility has determined that an easement will be sufficient.

The size of the extension to a Local Delivery Main shall be determined by the Utility. The Utility maintains a computer model of its water system to determine standard pipe sizing. In cases where a fire hydrant is required, the minimum diameter is 8 inches, except for an extension to a Local Delivery Main of 500 feet or less in a cul-de-sac, where a 6-inch main may be adequate.

- Street Lateral, including appurtenances such as the tap connecting to the Local Delivery Main, valves and Curb Stop
- Meter

2. Existing Facilities Used By The Customer

- System Facilities, including supply mains, meter pits, pump stations, main over-sizing, and storage facilities

3. Facilities Installed By The Customer

- Private Lateral, including valves
- Interior Piping, including plumbing ready for installing the Meter and disconnecting the existing source of water, typically a private well

(c) Cost Calculation.

1. Facilities Installed By The Utility

The cost of new facilities included in the Connection Charge for a new Off-Main commercial Customer will be standardized, if possible, and shall include the following:

- Standard Connecting Main Cost. If the Utility desires to install a larger diameter Connecting Main, the Utility will pay the over-sizing cost. Current year Standard Connecting Main Costs can be found in Table 5.
- Standard Local Delivery Main Cost. If the Utility desires to install a larger diameter main, the Utility will pay the over-sizing cost. The Standard Local Main Cost included in the Connection Charge is as follows.
- If the extension of a Local Delivery Main is 1,000 feet or less, the Utility will estimate the Standard Local Delivery Main Cost based on recent bids it received for Local Delivery Mains of the same size. The Utility will then provide the Customer with a not-to-exceed price for the extension of the Local Delivery Main. See Table 5.
- If the extension of a Local Delivery Main exceeds 1,000 feet, the Utility will conduct a preliminary engineering study to estimate the actual cost of the extension of the Local Delivery Main. The Utility will then provide the Customer with a not-to-exceed price for the extension of the Local Delivery Main. The Customer will be charged for the preliminary engineering study.
- If, for an extension of a Local Delivery Main exceeding 1,000 feet, after the Utility has performed a preliminary engineering study and provided the Customer with a not-to-exceed cost, the Customer desires a construction bid to determine the cost of the extension of the Local Delivery Main, the Utility will bid the Local Delivery Main extension project, and the Customer will be charged the price stated in the accepted bid. The Customer will also be charged the cost of the bidding process, which includes the costs of bid preparation through bid acceptance.

- Standard Street Lateral Cost. Current year Standard Street Lateral Costs can be found in Table 1.
- The Utility shall install the minimum size meter that it determines to be necessary to provide adequate and reliable service, the cost of which is embedded in the water rates the New Customer will pay and is not included in the Connection Charge.

If, in the judgment of the Utility, the Utility does not have sufficient Customers of similar size and usage or sufficient recent cost history for the facilities to be installed to be able to calculate an accurate Standard Cost, then the Connection Charge will include the actual installed cost of the facilities.

2. Existing Facilities Used By The Customer

The cost of existing facilities included in the Connection Charge for a new Off-Main commercial Customer will be standardized and shall be calculated as follows:

- Standard System Cost. Current year Standard System Cost can be found in Table 3.

3. Facilities Installed By The Customer

A new On-Main commercial Customer is responsible for arranging and paying for the installation of facilities required to connect the building to the Utility water system and to physically disconnect the building from its previous source of water. These include the following.

- Private Lateral cost, including valves
- Interior Piping cost, including plumbing ready for installing the Meter and disconnecting the existing source of water, typically a private well

(d) Customer Responsibilities With Respect To Water Facilities

The Customer is responsible for maintaining and ensuring access to the Curb Stop and other water facilities on the Customer's property.

(e) Revenue Credit. An Off-Main commercial New Customer shall be entitled to a Revenue Credit to offset all or part of the Connection Cost. This credit reflects the capital costs and other Fixed Costs of System Facilities that are embedded in the water rates the new Customer will pay. In no event shall the Revenue Credit exceed the Connection Charge.

The Revenue Credit can be expressed in the formula below.

Present Value of the incremental net revenue expected from the Customer for ten (10) years using a discount rate determined by the Water Utility, where Incremental revenue is the estimated gross revenue less the variable cost for water, meter reading, billing, and other incremental operating costs associated with serving a Customer.

The Standard Revenue Credit can be found in Table 4.

(f) Refund Agreement/Additional New Customer Credit. The Standard Local Delivery Main Cost is included in the Connection Charge payable by an Off-Main commercial New Customer. The Utility shall calculate an Additional New Customer Credit based on the number of additional New Customers the Utility estimates, in its judgment, are likely to connect to the Local Delivery Main Extension during the succeeding ten (10) years. The Connection Charge will be reduced by the amount of the Additional New Customer Credit, which will be calculated by multiplying the average cost per REU of the Local Delivery Main Extension times the number of REU's the Utility estimates will connect to that section of main during the succeeding ten (10) years. The original Customer will receive no further refunds or charges, regardless of the number of New Customers who ultimately connect to the Local Delivery Main Extension.

In lieu of an Additional New Customer Credit, the Utility and the Customer may enter into a Refund Agreement specifying the amount of refund due to the New Customer if additional New Customers connect to the Local Delivery Main Extension within the succeeding ten (10) years. In no event shall the Refund Agreement provide for a Connection Charge payable by an additional New Customer in excess of the Connection Charge a New Customer would pay if no Refund Agreement were in place.

(g) Calculation of Connection Charge. The sum total of costs to be paid by a new Off-Main commercial Customer to the Utility, less the Revenue Credit, can be expressed in the formula below.

Connection Charge = Local Main Extension Cost + Street Lateral Cost + System Costs – Revenue Credit - Additional Customer Credit, if applicable

(4) New Development

(a) General. When a Developer builds a new commercial Development, the Developer must design and build the water distribution system to Utility specifications. The Developer will then contribute that water distribution system in the public right-of-way or easement to the Utility. The Developer will also compensate the Utility for inspection, computer modeling, engineering review, operational and laboratory testing, meter testing, administrative, and legal costs related to connecting the Development to the Utility's water system as provided in the Development Agreement or Water Service Application.

The Utility will provide service to a commercial New Customer in a Development, provided the Developer has installed a water distribution system to Utility specifications and has contributed that system to the Utility. Generally, the Utility will accept contribution of the Developer's water distribution system in the public right-of-way or easement. The Utility may, in its discretion, accept water distribution facilities located in private easements. The New Customer will be responsible for facilities that the Developer installed from the outlet of the Curb Stop, normally at the lot line, to and throughout the building. However, the Utility will install the Meters.

(b) Customer Connections. New Customers in a Development will not have to pay Connection Charges to the Utility.

(c) Facilities. A new Development will require facilities to enable the Utility to provide service. See Illustration 3. These facilities will be installed by the Utility or installed by the Developer or builder, as set out below.

1. Facilities Installed By The Utility

- Connecting Main, unless the Development Agreement provides that the Developer will install the Connecting Main and contribute it to the Utility. The Utility will install a Connecting Main adequate to serve that water demands and fire flow needs of the new Development. Connecting Main varies from project to project for a number of reasons, such as the diameter of the pipe, construction conditions, the number of feet that have to be bored, the extent of ground restoration required, and other factors. Water demands and fire flow needs of the Development are also taken into account. The Utility will select, in its judgment, the best route from where the existing water system ends to the Development. A public right-of-way available to lay the Connecting Main is required unless the Utility determines that an easement will be sufficient.

The size of the Connecting Main shall be determined by the Utility. The Utility maintains a computer model of the water system to determine standard pipe sizing.

- Meters

2. Facilities Installed By The Developer

- Local Delivery Main.
- Street Lateral, including appurtenances such as the tap connecting to the Local Delivery Main, valves and Curb Stop

3. Facilities Installed By The Developer or Builder

- Private Laterals, including valves
- Interior Piping, including plumbing ready for installing the Meters and disconnecting the existing source of water, typically a private well

(d) Cost Calculation.

1. Facilities Installed By The Utility

The cost of new facilities included in the Connection Charge to a Developer for a new residential Development shall be include the following:

- Standard Connecting Main. If the Utility desires to install a larger diameter Connecting Main, the Utility will pay the over-sizing cost. Current year Connecting Main Costs can be found in Table 5.
- The Development Agreement may specify that the Developer will install and pay for the Connecting Main.
- The Utility shall install the minimum size meters that it determines to be necessary to provide adequate and reliable service, the cost of which are embedded in the water rates the New Customer will pay and are not included in the Connection Charge.

If, in the judgment of the Utility, the Utility does not have sufficient Customers of similar size and usage or sufficient recent cost history for the facilities to be installed to enable it to calculate an accurate Standard Cost, then the Connection Charge will include the actual installed cost of the facilities.

2. Facilities Installed By The Developer

The Developer is responsible for arranging and paying for the installation of new facilities required to connect the existing and planned buildings to the Utility water system and to physically disconnect any existing building from its previous source of water. These include the following.

- Local Delivery Main. If the Utility desires to have a larger diameter main, the Utility will pay the over-sizing cost.

- Street Lateral, including appurtenances such as Local Delivery Main connection tap, valves and Curb Stop
- Any other facilities specified in the Development Agreement

3. Facilities Installed By The Developer, Builder or Customer

The Developer, Builder or Customer is responsible for arranging and paying for the installation of new facilities required to connect the existing and planned buildings to the Utility water system and to physically disconnect the building from the previous source of water. These include the following.

- Private Laterals, including valves
- Interior Piping, including plumbing ready for installing the Meters and disconnecting the existing source of water, typically a private well

(e) Customer Responsibilities With Respect To Water Facilities

The Customer is responsible for maintaining and ensuring access to the Curb Stop and other water facilities on the Customer's property.

(f) Revenue Credit. Neither the Developer nor a Customer connecting to a Developer-contributed water system shall be entitled to a Revenue Credit.

(g) Additional New Customer Credit/Refund Agreement. The Connecting Main Cost is included in the Connection Charge payable by a Developer. The Utility shall calculate an Additional New Customer Credit based on the number of additional new Customers the Utility estimates, in its judgment, are likely to connect to the Connecting Main during the succeeding ten (10) years. The Connection Charge will be reduced by the amount of the Additional New Customer Credit, which will be calculated by multiplying the average cost per REU of the Connecting Main Extension times the number of REU's the Utility estimates will connect to that section of main during the succeeding ten (10) years. The Developer will receive no further refunds or charges, regardless of the number of New Customers who ultimately connect to the Connecting Main.

In lieu of an Additional New Customer Credit, the Utility and the Developer may enter into a Refund Agreement specifying the amount of refund due to the Developer if additional New Customers connect to the Connecting Main within the succeeding ten (10) years. In no event shall the Refund Agreement provide for a Connection Charge payable by an additional New Customer in excess of the Connection Charge a New Customer would pay if no Refund Agreement were in place.

(h) Calculation of Connection Charge. The Connection Charge is separate and apart from the requirement that the developer contribute the Local Delivery Main, Street Lateral and appurtenances that comprise its water system to the Utility. The sum total Connection Charge to be paid by the Developer of a commercial Development to the Utility can be expressed in the following formula.

$$\text{Connection Charge} = \text{Connecting Main Cost} - \text{Additional New Customer Credit, if applicable}$$

(5) Water Trusts (Existing Common Well Systems)

(a) General. The Utility will provide service to all New Customers served by a Water Trust, provided the Water Trust pays the Connection Charge determined by the Utility. Generally, the Water Trust will be responsible for installing required facilities that meet the Utility's specifications, and the Utility will accept a contribution of those facilities in the public right-of-way. The Utility may, in its discretion, accept facilities located in private easements. Either the Water Trust or property owner will be responsible for facilities from the outlet of the Curb Stop, normally at the lot line, to and throughout the building. However, the Utility will install the meter.

The Connection Charge for Water Trusts vary due to the condition of the Water Trust pipe system, the feet of Connecting Main required to connect the Water Trust to the Utility's system, and the number of Customers who are members of the Water Trust.

The Utility will conduct a review of the Water Trust facilities to be contributed to the Utility and determine what replacements, repairs and upgrades are necessary to make the facilities meet Utility standards. The cost to bring these facilities to Utility standards, if to be paid by the Utility, shall be included in the Connection Charge. The Water Trust By-Laws or other governing instruments determine how the Connection Charge paid by the Water Trust will be apportioned among the members of the Water Trust.

(b) Facilities. A Water Trust may be required to provide new, repaired or upgraded facilities to enable the Utility to provide service to the members of the Water Trust. These facilities will be installed by the Utility or installed by the Water Trust, as set out below. A Water Trust also makes use of existing System Facilities.

1. Facilities Installed, Repaired Or Upgraded By The Utility Unless The Agreement Between The Utility And The Water Trust (The Water Trust Connection Agreement) Provides That The Water Trust Will Install, Repair Or Upgrade And Pay For The Facilities

- Connecting Main. The Utility will install a Connecting Main adequate to serve that water demands and fire flow needs of the Water Trust. Connecting Main varies from project to project for a number of reasons, such as the diameter of the pipe, construction conditions, the number of feet that have to be bored, the extent of ground restoration required, and other factors. Water demands and fire flow needs of the Water Trust are also taken into account. The Utility will select, in its judgment, the best route from where the existing water system ends to the Water Trust water system. A public right-of-way available to lay the Connecting Main is required unless the Utility determines that an easement will be sufficient.

The size of the Connecting Main shall be determined by the Utility. The Utility maintains a computer model of the water system to determine standard pipe sizing.

- Local Delivery Main. The Utility will install a Local Delivery Main adequate to serve that water demands and fire flow needs of the Water Trust. The size of the Local Delivery Main shall be determined by the Utility. The Utility maintains a computer model of its water system to determine standard pipe sizing. In cases where a fire hydrant is required the minimum diameter is 8 inches, except for a Local Delivery Main Extension of 500 feet or less in cul-de-sacs, where a 6-inch main may be adequate.
- Street Laterals, including appurtenances such as the tap connecting to the Local Delivery Main, valves and Curb Stop
- Meters

2. Existing Facilities Used By The Water Trust

- System Facilities, including Supply Mains, meter pits, pump stations, main over-sizing, and storage facilities

3. Facilities Installed By The Water Trust Unless The Water Trust Connection Agreement Provides That The Utility Will Install And Pay For These Facilities

- Private Lateral, including valves, meeting the Utility's specifications
- Interior Piping, including plumbing ready for installing the Meter and disconnecting the existing source of water, typically a private well
- Abandonment of existing wells or permitting to use the wells for irrigation only

(c) Cost Calculation.1. Facilities Installed, Repaired Or Upgraded By The Utility Unless The Agreement Between The Utility And The Water Trust Provides That The Water Trust Will Install, Repair Or Upgrade And Pay For The Facilities

The Connection Charge shall include the costs incurred by the Utility to install, repair or upgrade the Water Trust distribution system contributed to the Utility if the Utility determines in its judgment that the age and condition of the system facilities necessitate that work. If the Utility determines that the Water Trust distribution system meets Utility Standards, or if the Utility and the Water Trust agree that the Water Trust will install, repair or upgrade the Water Trust distribution system to Utility standards, no replacement, upgrade or repair charge shall be included in the Connection Charge. The cost of new facilities included in the Connection Charge for a Water Trust will be standardized and shall include the following:

- Standard Connecting Main. If the Utility desires to install a larger diameter Connecting Main, the Utility will pay the over-sizing cost. Current year Connecting Main Costs can be found in Table 5.

The Water Trust Connection Agreement may specify that the Water Trust will install the Connecting Main.

- If the Utility decides, in its judgment, to replace the Local Delivery Main, the Connection Charge will include the Standard Local Delivery Main Cost. If the Utility desires to install a larger diameter Main, the Utility will pay the over-sizing cost.
- If the extension of a Local Delivery Main is 1,000 feet or less, the Utility will estimate the Standard Local Delivery Main Cost based on recent bids it received for Local Delivery Mains of the same size. The Utility will then provide the Water Trust with a not-to-exceed price for the extension of the Local Delivery Main. See Table 5.
- If the extension of a Local Delivery Main exceeds 1,000 feet, the Utility will conduct a preliminary engineering study to estimate the actual cost of the extension of the Local Delivery Main. The Utility will then provide the Water Trust with a not-to-exceed price for the extension of the Local Delivery Main. The Water Trust will be charged for the preliminary engineering study.

- If, for an extension of a Local Delivery Main exceeding 1,000 feet, after the Utility has performed a preliminary engineering study and provided the Water Trust with a not-to-exceed cost, the Water Trust desires a construction bid to determine the cost of the extension of the Local Delivery Main, the Utility will bid the Local Delivery Main extension project, and the Water Trust will be charged the price stated in the accepted bid. The Water Trust will also be charged the cost of the bidding process, which includes the costs of bid preparation through bid acceptance.
- If the Utility decides, in its judgment, to replace a Street Lateral, the Connection Charge will include the Standard Street Lateral Cost. Current year Standard Street Lateral Costs can be found in Table 1.
- The Utility shall install the minimum size Meters that it determines to be necessary to provide adequate and reliable service, the costs of which are embedded in the water rates the New Customers will pay and are not included in the Connection Charge.

If, in the judgment of the Utility, the Utility does not have sufficient Customers of similar size and usage or sufficient recent cost history for the facilities to be installed to enable it to calculate an accurate Standard Cost, then the Connection Charge will include the actual installed cost of the facilities.

2. Existing Facilities Used By The Water Trust

The cost of existing facilities included in the Connection Charge for New Customers served by a Water Trust will be standardized and shall include the following.

- Standard System Cost. Current year Standard System Cost can be found in Table 3.

3. Facilities Installed By The Water Trust or Customer

The Water Trust, or New Customer if so provided in the Water Trust Connection Agreement, is responsible for arranging and paying for the installation of new facilities required to connect the buildings to the Utility water system and to physically disconnect the buildings from their previous source of water. These include the following.

- Private Lateral cost, including valves
- Interior Piping cost, including plumbing ready for installing the Meter and disconnecting the existing source of water, typically a private well
- Abandonment of existing wells or permitting to use the wells for irrigation only

(d) Customer Responsibilities With Respect To Water Facilities

The Customer is responsible for maintaining and ensuring access to the Curb Stop and other water facilities on the Customer's property.

(e) Revenue Credit. A Water Trust shall be entitled to a Revenue Credit to offset all or part of the Connection Charge. This credit reflects the capital costs and other Fixed Costs of System Facilities that are embedded in the water rates the new Customers will pay. In no event shall the Revenue Credit exceed the Connection Charge.

The Revenue Credit can be expressed in the following formula.

Present Value of the incremental net revenue expected from the Customer for ten (10) years using a discount rate determined by the Water Utility, which incremental revenue is the estimated gross revenue less the variable cost for water, meter reading, billing, and other incremental operating costs associated with serving a Customer.

The Standard Revenue Credit can be found in Table 4.

(f) *Additional New Customer Credit.* The Connecting Main Cost and Local Distribution Main Extension Cost, if applicable, are included in the Connection Charge payable by a Water Trust. The Utility shall calculate an Additional New Customer Credit based on the number of additional new Customers the Utility estimates, in its judgment, are likely to connect to the Connecting Main and/or the Local Delivery Main Extension during the succeeding ten (10) years. The Connection Charge will be reduced by the amount of the Additional New Customer Credit, which will be calculated by multiplying the average cost per REU of the Connecting Main Extension and Local Distribution Main Extension times the number of REU's the Utility estimates will connect to those sections of main during the succeeding ten (10) years. The Water Trust will receive no further refunds or charges, regardless of the number of New Customers who ultimately connect to the Connecting Main Extension or Local Delivery Main Extension.

(g) *Calculation of Connection Charge.* The sum total Connection Charge to be paid to the Utility by a Water Trust, less the Revenue Credit, can be expressed in the following formula. The Connection Charge is separate and apart from the costs borne directly by the Water Trust as specified in the Water Trust Connection Agreement.

<p>Connection Charge = Connecting Main Cost + System Costs + Local Delivery Main Extension Cost, if any + Street Lateral Cost, if any – Revenue Credit – Additional New Customer Credits, if any + Upgrade Costs, if any</p>
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Payment Options

The Utility shall offer payment options to all New Customers, excluding Developers and Water Trust system Customers, to allow them to pay the Connection Charge over time at reasonable interest rates. The New Customer must sign a waiver of assessment to enable the Utility to include unpaid, past due amounts on the Customer's property tax bill. Furthermore, if the property is not located within the City of Mequon, there must be in place an intergovernmental agreement between the City of Mequon and the municipality in which the property is located permitting that municipality to special assess the property and honor the waiver of assessment. The maximum term shall be five (5) years. The interest rate on unpaid balances shall be the rate at which the Utility determines it can currently borrow money, plus 100 basis points. Customers are free to pay in full at any time without penalty and are free to secure their own financing. The Utility reserves the right to include unpaid, past due amounts on the property tax bill for the succeeding year.

Private Well Use/Abandonment

Whenever a New Customer connects to the Utility water system, that Customer must physically disconnect the Customer's previous source of water, typically a private or community well, from the Utility's water system. State law requires this to ensure that the Utility's water will not be contaminated by backflows of well water.

If a New Customer desires to continue to use the Customer's well for lawn or garden irrigation, the Customer must obtain a permit from the City of Mequon. However, the well must be physically disconnected from the Utility's water system. If the Customer desires to abandon the well, the Customer must cap the wellhead as required by the City of Mequon and/or Department of Natural Resources.

May 14, 2010

Mequon Water Utility Advisory Committee

Definitions

Additional New Customer Credit	A credit calculated by the Utility based upon the number of additional New Customers the Utility estimates are likely to connect to the Local Delivery Main Extension or Connecting Main. A Refund Agreement may be used in lieu of an Additional New Customer Credit to offset, in part or full, the Connection Charge. The Additional New Customer Credit will be calculated by multiplying the average cost per REU of the Main Extension or Connecting Main times the number of REU's the Utility estimates will connect to the new Main during the succeeding ten (10) years.
Connecting Main	New main connecting an existing main to another main, typically to a Developer Local Delivery Main or Water Trust system
Connection Charge	A payment required of a New Customer as a condition to connecting to the Utility's water system. The Connection Charge is designed to fairly reflect the cost of new facilities installed to serve that customer; existing facilities that will be used by that Customer and system-wide facilities that benefit the New Customer, and the rates (and revenues) the New Customer will pay the Utility.
Contributed Main	Local Delivery Mains installed by a Developer or by a Water Trust. When the subdivision or Water Trust connects to the Utility water system and the Local Delivery Mains are determined by the Utility to be suitable for use by the Utility, the Utility will accept a contribution of these Local Delivery Mains and will operate and

	maintain these mains as a part of its water system. The Utility will not reimburse any portion of the cost or value of any Contributed Main.
Curb Stop/Curb Box See Stop Box	A valve normally located at the lot line where water supplying a given property can be turned on and off. This is the demarcation point to separate the Street Lateral from the Private Lateral. The Curb Stop/Curb Box and valve are owned and maintained by the Utility. The Customer is responsible for protecting and providing clear access to the Curb Stop/Curb Box.
Customer	See New Customer. It is the Person responsible for paying the bills for water service.
Developer	A Person who constructs a Development.
Development	A number of significant water-using buildings or structures added to a parcel or parcels of real estate. The buildings or structures may be used for residential, commercial, industrial, or institutional purposes and may encompass a single lot, multiple lots, or a subdivision.
Developer Water System	A water system in a new Development which has been installed by a Developer to Utility specifications pursuant to a Development Agreement and which system has been contributed to the Utility.
Development Agreement	An agreement between the City of Mequon and a Developer which details, among other things, the public improvements the Developer must install, including a water system, as a condition of the approval of the new Development.
Discount Rate	A compound interest factor used to determine the net present value of a stream of future cash flows. The Discount Rate is the interest rate selected by the Utility to use in the Revenue Credit formula.
Embedded Capital Cost	Embedded Capital Costs represent the total cost of all assets necessary for acquiring, delivering and maintaining a supply of water. Embedded costs are costs incurred in the past which allow the Utility to deliver water in the present, <i>e.g.</i> , capital cost of supply and distribution infrastructure, such as Supply Mains, Public Mains, Valves and Meters.
Fixed Costs	The costs incurred by the Utility that do not vary with Customer

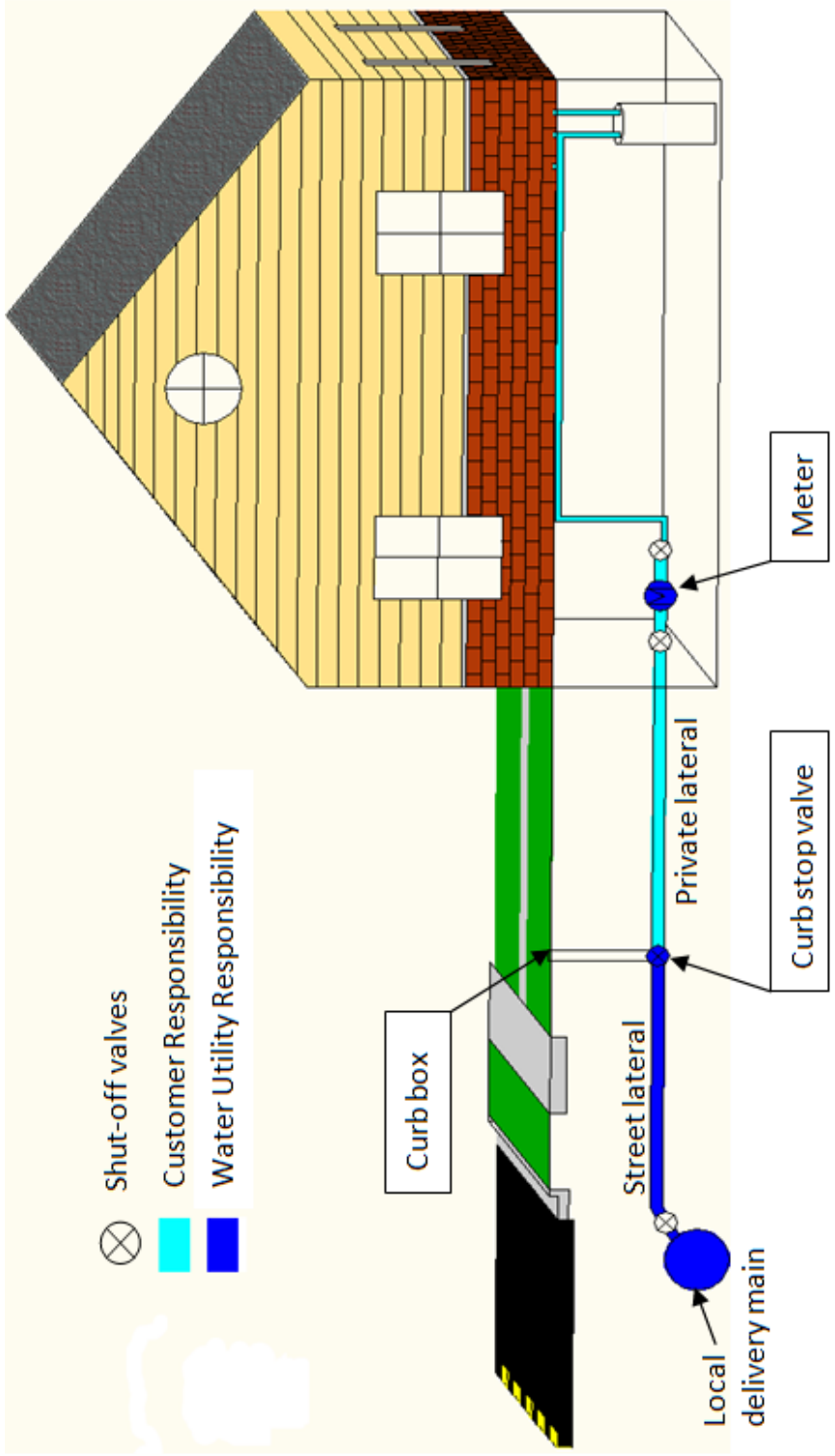
	water usage, <i>e.g.</i> , office rent, depreciation, office payroll, regulatory expense, computer hardware and software.
Gross Revenue	Total amount billed quarterly to a Customer for its water service, including fixed charges and charges for the amount of water used.
Habitable Building/Structure	A building or structure that is occupied, or could receive an occupancy permit without further improvements that would require obtaining a building permit.
Incremental Revenue	Gross Revenue less Variable Costs for water, meter reading, billing, and other incremental operating costs associated with the addition of a customer.
Interior Piping (<i>aka</i> Interior House Piping or House Piping)	The pipes and valves that are installed inside a building to deliver water from the Meter outlet to the water-using equipment, <i>e.g.</i> , sinks, lavatories, washing machines, etc. This includes the piping and valves on either side of the water Meter and plumbing ready for installing the Meter. This Interior Piping is owned and maintained by the Customer.
Local Delivery Main	The pipe in the street or right-of-way or easement that delivers water to a number of abutting properties. This includes existing mains, main extensions, and new mains. This pipe is owned and maintained by the Utility.
Meter	The device that measures water consumption. The Meter is installed, owned and maintained by the Utility.
New Customer	One or more Persons who apply, singularly in the case of one New Customer and jointly in the case of more than one New Customer, to connect to the Water Utility system. After water service is initiated, it is the person responsible for paying the bills for water service. See Customer.
Non-Standard	Any situation where, in the Utility's judgment, the use of Standard Costs would not fully compensate the Utility's actual materials and construction costs.
Off-Main	A property that does not abut a Local Delivery Main.
On-Main	A property that abuts a Local Delivery Main.
Person	An individual, group of individuals, corporation, association, institution or organization that has legal standing to enter into

	binding contracts and agreements.
Present Value/Net Present Value	The value today of a future payment, or stream of future payments, discounted at some appropriate Discount Rate.
Private Lateral	The pipe that connects at the Curb Stop on one end and the Meter at the other end. This pipe is owned and maintained by the Customer. The pipe must meet Utility specifications.
Refund Agreement	An agreement between the Utility and a New Customer whereby the Utility agrees to refund a specified portion of the Local Delivery Main Extension Cost or Connecting Main Cost included in the Connection Charge if additional Customers connect to that Main Extension or Connecting Main within the succeeding ten (10) years.
Residential Equivalent Unit (REU)	The quantity of water a typical residential customer would use in one (1) year. Example: If a typical customer used 72,000 gallons of water a year, 72,000 gallons would constitute one (1) REU. In some commercial and industrial REU calculations, the REU calculation can include estimated revenue to be provided by the customer, so that private fire protection charges can be incorporated.
Revenue Credit	A credit calculated by the Utility pursuant to published criteria to partially offset the Connection Charge. The Revenue Credit reflects the payment of Capital Costs and other Fixed Costs that are embedded in the water rates the New Customer will pay. Revenue Credits will be calculated using REU's as a basis.
Standard Connecting Main Cost	The average per-foot cost, over time, of mains of the same size, adjusted for projected changes in that cost for the current year. The Utility shall calculate and publish Standard Connecting Main Cost annually.
Standard Cost	The estimated installed cost of any facilities typically required to serve a similar New Customer absent any other factors that influence the size or cost of the facilities actually installed, including soil and construction conditions. See Standard Size. Standard Costs are determined by the Utility annually based on the average cost of Standard Size facilities for the past year, adjusted for projected changes in cost for the current year. Standard Costs are published and used in the calculation of the Connection Charge unless the Utility determines in its judgment that using Standard

	Costs will create an unfair result.
Standard Local Delivery Main Cost	The depreciated capital cost of existing Local Delivery Mains calculated on a Residential Equivalent Usage (REU) basis. Standard Local Delivery Main Cost is determined by the Utility every year based on the average per-foot cost, over time, of Local Delivery Mains of the same size, adjusted for projected changes in that cost for the current year. The Utility shall calculate and publish Standard Local Delivery Main Costs annually.
Standard Size	The minimum size of any facilities typically required to serve a similar New Customer absent any other factors that influence the size of the facilities actually installed.
Standard Street Lateral Cost	The average cost, over time, of laterals of the same size, adjusted for projected changes in that cost for the current year. The average cost will include short-side and long-side laterals as well as laterals in streets of differing widths. The Utility shall calculate and publish Standard Street Lateral Cost annually.
Standard System Cost	The depreciated capital cost of the water system facilities, such as Supply Mains, meter pits, pump stations, main over-sizing, meters, and storage facilities, typically required to serve similar Customers divided by the number of Customers, calculated on a Residential Equivalent Unit (REU) basis. The Utility shall calculate and publish Standard System Cost annually.
Stop Box	See Curb Stop/Curb Box.
Street Lateral	The pipe that connects the Local Delivery Main to the Curb Stop. This pipe is owned and maintained by the Utility.
Supply Main	The pipe that receives water from the sellers of water (the City of Milwaukee and the North Shore Water Commission) and which connects to the Local Delivery Mains that serve the Customers.
System Costs	The cost of system facilities or infrastructure that benefit all Customers. These include such things as Supply Mains, meter pits, pump stations, main over-sizing, Meters, and storage facilities typically required to serve Customers.
System Facilities	Water infrastructure that benefits all customers. System Facilities include Supply Mains, meter pits, pump stations, main over-sizing, and storage facilities.

Utility/Water Utility	The City of Mequon Water Utility.
Variable Costs	The costs incurred by the Utility that vary up or down according to the number of Customers or Customer usage, <i>e.g.</i> , quantity of water consumed, billing costs, meter reading costs.
Water Trust	An existing Development where water is provided to a number of buildings or structures from one or more shared sources, typically shared water wells. These water systems differ from Developer Water Systems in two important respects. Water Trust systems: (1) are existing facilities, and (2) may not have been constructed to the Utility's specifications.
Water Trust Connection Agreement	An agreement between the City of Mequon and a Water Trust which details, among other things, the terms and conditions which the Water Trust must meet to be connected to the Utility water system. The agreement will specify that the Water Trust is responsible for paying the Connection Charge to the Utility.

Figure 1 - On-Main Residential Connection



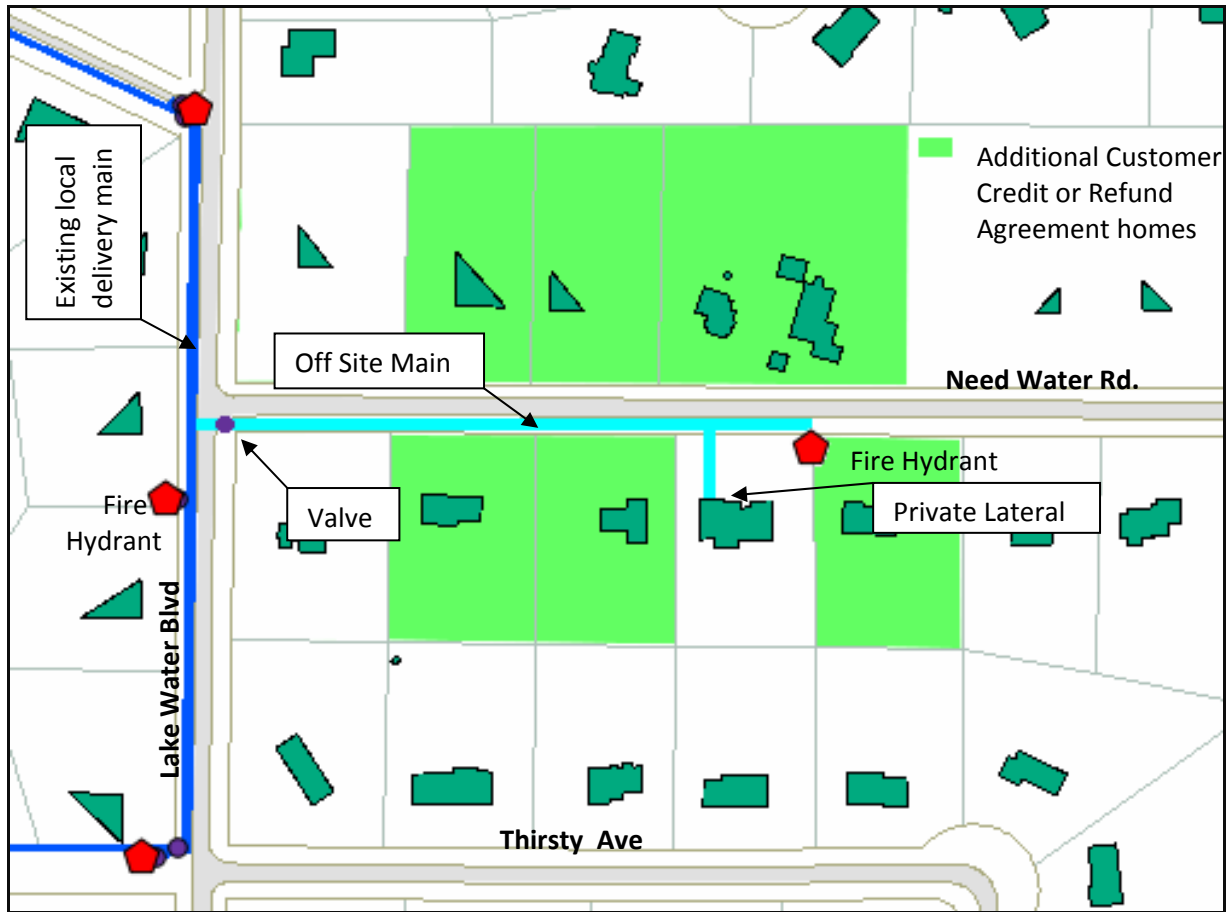


Figure 2- Off Main Residential Connection

Commercial On-Main Facility

Figure 3

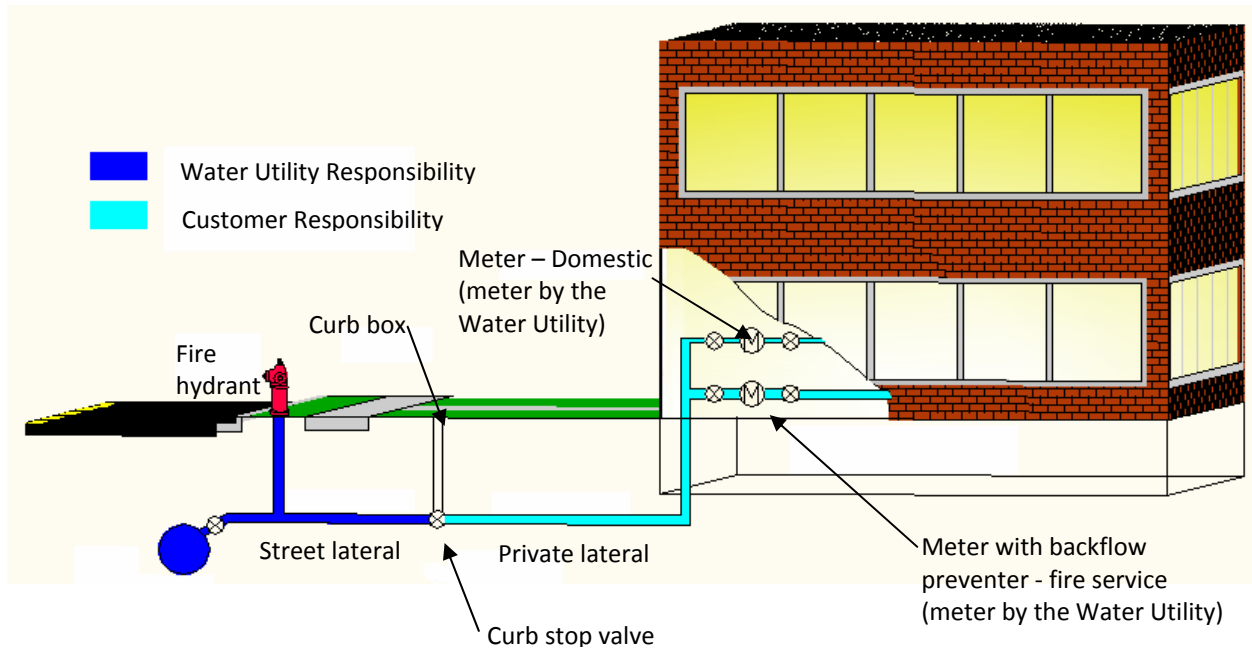


Table 1

Standard Street Lateral Costs

<u>Size</u>	<u>Cost</u>
1 1/4 inch	\$1,700
1 1/2 inch	\$2,000
2 inch	\$2,800
4 inch	\$4,100
6 inch	\$7,200

Table 2
Standard Local Delivery Main Cost

	<u>2015</u>
Total Transmission & Distribution Main Depreciated Capital from PSC Report	\$13,723,899
Minus Oversize and Transmission Main Depreciated Capital	\$2,928,604
Local Delivery Main Depreciated Capital	\$10,795,295
No. of REU's in System	4500
Local Delivery Main/REU	\$2,398.95

Table 3
Standard System Costs

(Based on 2013 PSC report)

System Capital (With Accumulated Depreciation) Costs

Intangible Plant	\$0
Source of Supply	\$215,707
Pumping	\$814,830
Treatment	\$0
Reservoirs	\$67,919
Transmission Main	\$2,928,604
General Plant	\$402,909
	\$4,429,969
Estimated REU's	4500
System cost per REU	\$1,080.48

Table 4
Standard Revenue Credit

Due to borrowing difficulty and cash flow issue, the Revenue Credit will be reduced to equal the System Cost in 2015.

Table 5
Standard Local Delivery Main Extension and Connecting Main Costs
 (applies to non-developer main extensions of 1,000 feet or less)

Bid Items	Cost per foot		
	Low	Med	High
Water main - spoil backfill			
6-inch	\$30	\$40	\$50
8-inch	\$35	\$45	\$55
12-inch	\$55	\$60	\$70
16-inch	\$70	\$80	\$90
Water main - granular backfill			
6-inch	\$45	\$50	\$60
8-inch	\$50	\$55	\$65
12-inch	\$70	\$80	\$90
16-inch	\$85	\$90	\$100
Water main - Slurry backfill			
6-inch	\$75	\$80	\$90
8-inch	\$80	\$85	\$95
12-inch	\$100	\$110	\$120
16-inch	\$115	\$120	\$130
Water main - Directionally Drilled			
6-inch	\$60	\$70	\$80
8-inch	\$65	\$75	\$85
12-inch	\$85	\$95	\$100
16-inch	\$145	\$160	\$175
Water main - Bore and Jack			
6-inch	\$225	\$250	\$275
8-inch	\$250	\$275	\$325
12-inch	\$275	\$300	\$340
16-inch	\$325	\$375	\$425
Restoration*			
Turf	\$3	\$4	\$5
Asphalt roadway	\$40	\$45	\$55
Asphalt driveway	\$30	\$45	\$55
Concrete roadway	\$37	\$45	\$53
Concrete driveway	\$18	\$20	\$30
Sidewalk	\$20	\$25	\$30
Gravel shoulder	\$5	\$10	\$15
Concrete Curb and Gutter	\$30	\$35	\$40
Erosion Mat	\$1	\$2	\$4
Heavy Duty Erosion Mat	\$2	\$3	\$5
Erosion Control			
Silt fence	\$1	\$2	\$3

Bid Items	Cost per Each		
	Low	Med	High
Hydrant assembly	\$3,200	\$3,800	\$4,500
Valve & valve box			
6-inch	\$1,000	\$1,300	\$1,700
8-inch	\$1,300	\$1,600	\$2,000
12-inch	\$2,000	\$2,500	\$3,000
16-inch	\$2,500	\$3,000	\$4,000
Erosion Control			
Sediment logs	\$200	\$225	\$250
Hay Bales	\$10	\$15	\$25
Connection to existing main			
6-inch main	\$2,000	\$2,500	\$2,750
8-inch main	\$2,200	\$3,000	\$3,500
10-inch main	\$2,400	\$3,300	\$4,000
12-inch main	\$2,750	\$3,500	\$4,500
16-inch main	\$3,000	\$3,750	\$5,000

* based on a 6' wide trench width

Appendix F: Utility System Projections

Figure F-1: Residential Equivalence Units (REU's)

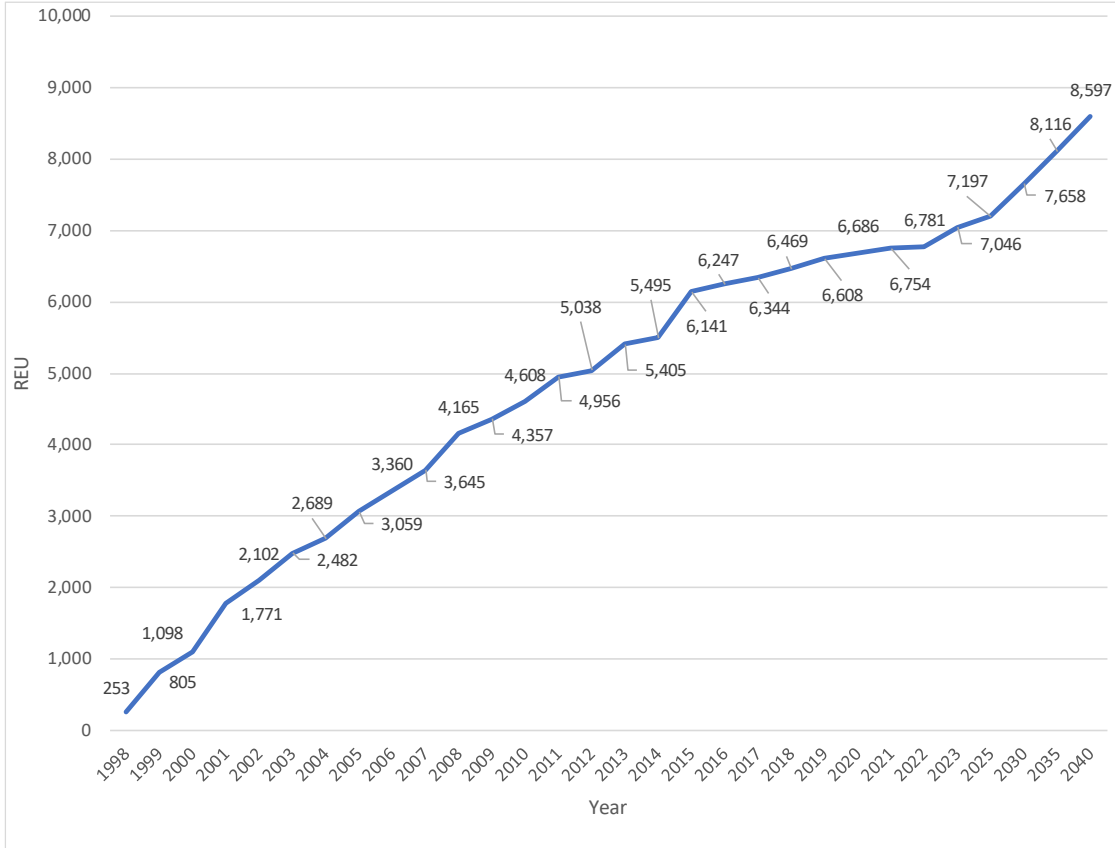


Figure F-2: Average Day Water Demand

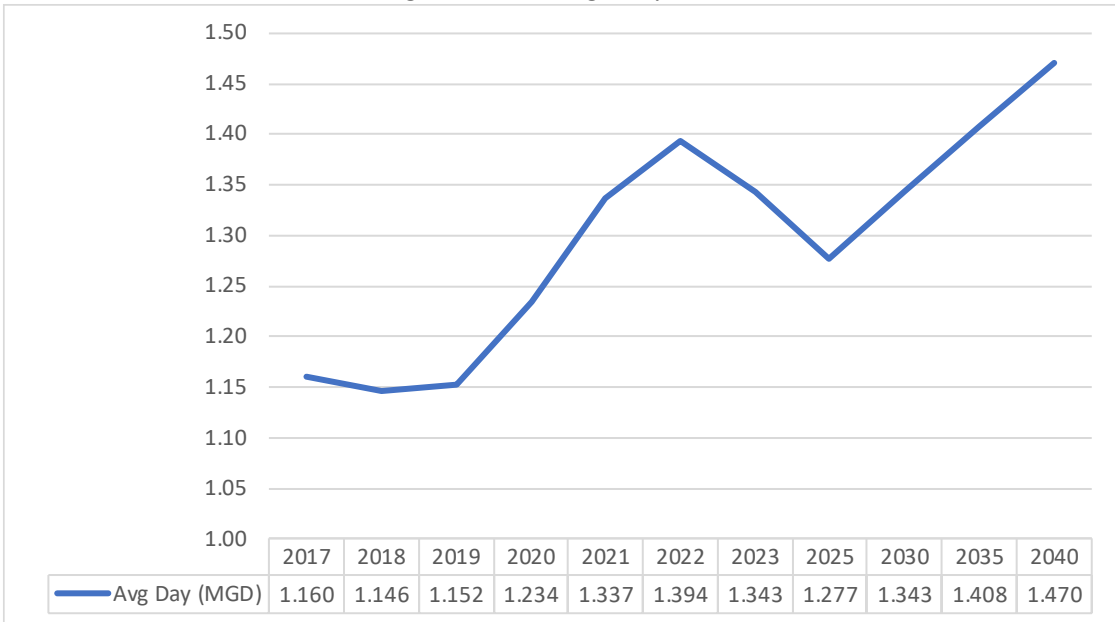


Figure F-3: Maximum Day Demand

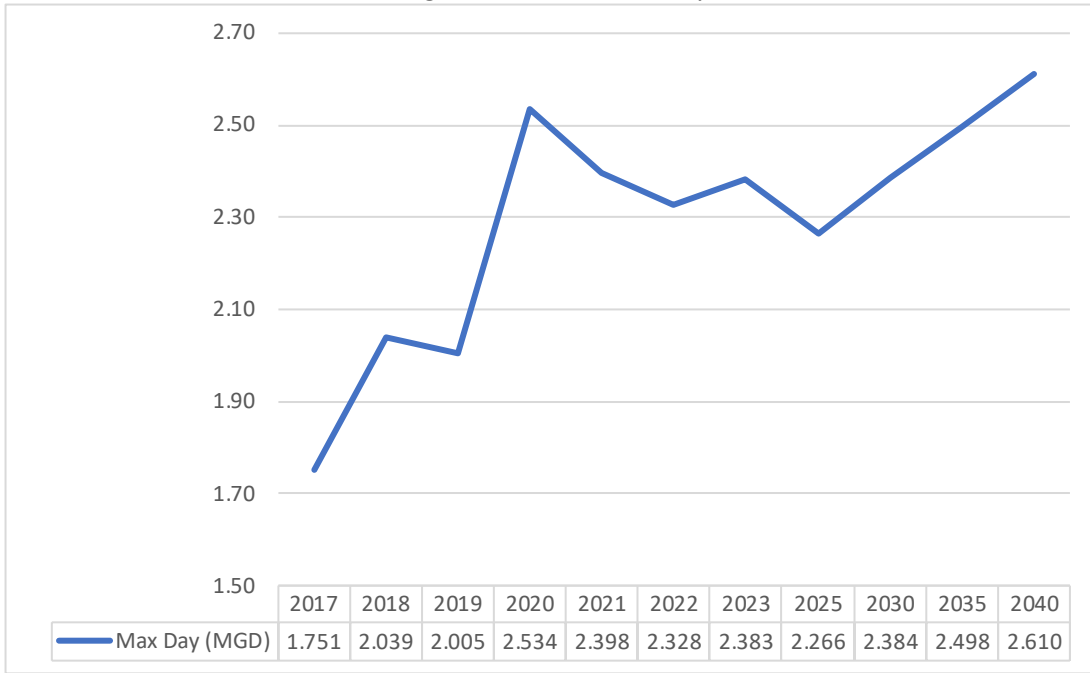


Figure F-4: Peak Hour Water Demand

