Village of Fredonia

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AGENDA

FREDONIA PUBLIC WORKS AND UTILITIES/TREE BOARD MEETING
MONDAY, AUGUST 15, 2022 – 6:00 PM
Fredonia Government Center – East Conference room
242 Fredonia Avenue, Fredonia, Wisconsin

THE FOLLOWING BUSINESS WILL BE BEFORE THE PUBLIC WORKS COMMITTEE FOR INITIATION, DISCUSSION, CONSIDERATION, DELIBERATION AND POSSIBLE FORMAL ACTION

OLDER EQUIPMENT WILL BE PARKED AT VILLAGE HALL FOR BOARD REVIEW FOR PLANNING AND BUDGETING PURPOSES

1. Call meeting to order
2. Approve minutes from June 16, 2022, Public Works and Utilities/Tree Board Committee meeting
3. Review report from Strand and Associates regarding the Water System Storage Capacity.
4. Power Assist Door at the Fire Department Community Room
5. North Milwaukee Street Drainage Improvements
6. 5-Year Capital Plan for Public Works
   a. Equipment Replacement Program
   b. Street and Utility Projects
7. Set monthly meeting date/time: 3rd Monday of the month at 6:00 PM
8. Items for future consideration
   a. Set next meeting date for August 22, 2022 at 6:00 PM
   b. Preliminary budgets: Public Works, Water and Sewer
   c. Identify projects for possible use of ARPA Funds
9. Adjourn

NOTICE IS HEREBY GIVEN that a majority of the Fredonia Village Board may attend this meeting in order to gather information about a subject over which they have decision-making responsibility.

UPON REASONABLE NOTICE, efforts will be made to accommodate the needs of disabled individuals through appropriate aids and services. For additional information or to request this service, contact the village clerk at 692-9125.

Public Works committee meeting 06/16/22 minutes.

1. CTO 5:30, present Don, John and Josh, also Roger and residents John Teschan and Cameron Bopp.
2. Minutes approved, motion by John, 2nd by Don, carried.
3. Change Order: Motion by John to recommend approval of $23,800 change order to install full curb, project cost to be $74,208, 2nd by Don, carried.
4. Street sign: Discussion. Motion by Josh to install "no outlet" sign, 2nd by John, carried.
5. Canopy: Motion by John to recommend installing a canopy over the N/E corner door of the FFD building addition for $3940 for safety reasons, 2nd by Josh, carried.
6. S. Wilson St. The contract with Payne & Dolan to mill and resurface S. Wilson St. has been increased by approximately $600 due to inflation.
7. Water tower: Motion by John to recommend hiring a Company to clean and remove mildew/algae growth on the exterior of the water tower, not to exceed $7,000, 2nd by Josh, carried. Roger to select lowest bid.
8. Sidewalks: Motion by Josh to recommend approval of sidewalk inspection report, 2nd by John, carried.
9. Sidewalk design: Motion by Josh to recommend approval of Trio Engineering LLC to design construction plans and preliminary cost estimates for extension of sidewalk on N. Milwaukee St. not to exceed $5,500, 2nd by John, carried.
10. Sewer backup policy: Motion by Josh to rely on our Ordinance as it exists without any changes or policy additions, 2nd by John, carried.
11. Compost Pile: Roger reported lower than required temperatures in the pile for a few samples. DNR recommendations are to add more moisture and turn piles more frequently to bring temperature up.
12. Outlet 1: Roger will draft and send letters to all "owners" of the outlet to inform them of their responsibility and liability concerning the dead trees.
13. Arbor Day: Date to be announced.
14. Construction Permits: Roger will prepare adjustments to Chapter 200-4. Building Construction Permits, to conform with our current practices and bring back to committee.
15. Future Items: None.
16. Motion to adjourn @ 6:50 by Josh, 2nd by John, carried.

DRAFT 07/15/2022

Report for
Village of Fredonia, Wisconsin

Water System Capacity Evaluation

Prepared by:

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July 2022

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SECTION 1
HISTORICAL AND PROJECTED DEMANDS

This section compiles historic demand information for the Village of Fredonia (Village) and projects future demands. The methodology used is a combination of a population-based methodology for residential use, and land use-based methodology for commercial and industrial use.

1.01 GENERAL

Water demand rate terminology used in this evaluation is defined as follows:

Average Day: The total volume of water pumped in a year divided by the number of days in the year.

Maximum Day: The day of the year on which the maximum amount of water is pumped. The maximum day normally occurs during a dry summer period when hydrants are being flushed. The maximum day demand represents the average hour of the maximum day.

Maximum Hour: The maximum rate of demand for any hour on the maximum day.

Fire Demand: Fire demand is an estimate of the amount of water required to fight a fire. This demand is generally specified as a rate of flow (in gallons per minute [gpm]) for a given time period (hours). The Insurance Services Office (ISO) has prepared a guide for determining fire demand. The fire demand is added to the maximum day demand to obtain the demand on a day that a major fire occurs. Fire demand greatly increases the volume of storage that must be available on the maximum day.

The estimation of future water demand is not precise. Future demand calculations are based off the projected land use within the Village as estimated by the Village's Director of Public Works. Undeveloped areas were assigned a future use and a build out year, and these uses were then assigned a corresponding demand. For residential areas, an estimated dwelling unit density and established population per household ratio were used to determine a population associated with new growth. A per capita demand trend was then applied to the new population growth. For all other areas, a usage rate per acre was assigned based on the standard values established in the 2007 Southeastern Wisconsin Regional Planning Commission (SEWRPC) *State-Of-The-Art of Water Supply Practices.*

The total demand was calculated by adding the future demand projections for each individual use category and applying a sales to pumpage ratio. Future maximum day demands were estimated by applying two maximum day factors based on historical trends. Two factors were used to reflect the differences in years where the Village experienced a large-scale water main break leading to a higher-than-normal day of maximum day. Because these events occurred frequently and the Village has expressed a desire to limit them in the future, two demand projection scenarios were run to determine the effects of limiting water main breaks on the necessary infrastructure improvements. Both the average day and maximum day demands are therefore impacted by the projection of the key ratios detailed in this evaluation.

Prudent operation of a water utility requires that system capacity always be in excess of system demands. Hence, recommended future improvements may be deferred until they become necessary, or they may have to be implemented sooner if demands increase at a rate faster than projected.

1.02 HISTORIC WATER USE AND TRENDS

A. Historic Water Usage

The historical water demands for the Village water system were obtained from data provided by the Village and annual reports for the water utility submitted to the Public Service Commission (PSC). Data from the past 24 years is summarized in Table 1.02-1. These trends will be applied to develop demand projections.

B. Utility Trends

1. Sales to Pumpage Ratio

Sales to pumpage ratio is defined as the total water volume metered at the point of use divided by that metered at the source including well outputs and purchased water. Figure 1.02-1 presents the sales to pumpage ratio over the past 24 years. The ratio has ranged between 72 and 96 percent with a five-year average of 85 percent. This ratio peaked at 96 percent in 2007 and has seen lower values then that time likely due to water main breaks. This study will assume the utility maintains an 85 percent ratio for future years through additional maintenance on aging water mains, which is also a PSC target action level. As the majority of the reported water loss over the past five years is due to leakages, and the Village has indicated there is no trend in the frequency of water main breaks, maintaining the current level of service should be obtainable by the utility.

Table 1.02-1 Historic Water Usage

Year	Water Sales (gallons)						Annual Pumpage	Average Day Pumpage	Maximum Day Pumpage	Maximum and Average Ratio	Sales and Pumpage Ratio
	Residential	Commercial	Industrial	Public	Multifamily	Total Sales					
1997	33,658,000	7,533,000	5,403,000	2,171,000		48,765,000	56,246,500	154,100	464,000	3.01	0.87
1998	35,911,000	8,122,000	6,043,000	3,321,000		53,397,000	60,374,650	165,410	648,000	3.92	0.88
1999	35,303,000	8,458,000	5,601,000	2,640,000		52,002,000	60,772,500	166,500	323,000	1.94	0.86
2000	34,986,000	9,495,000	6,088,000	1,842,000		52,411,000	62,393,100	170,940	398,000	2.33	0.84
2001	35,520,000	10,098,000	4,227,000	2,600,000		52,445,000	72,948,900	199,860	502,000	2.51	0.72
2002	38,961,000	11,048,000	3,058,000	3,629,000		56,696,000	67,094,300	183,820	363,000	1.97	0.85
2003	40,950,000	9,738,000	3,781,000	4,582,000		59,051,000	70,780,800	193,920	411,000	2.12	0.83
2004	39,953,000	8,193,000	4,753,000	3,522,000		56,421,000	66,170,850	181,290	673,000	3.71	0.85
2005	42,939,000	8,785,000	6,637,000	3,950,000		62,311,000	69,258,750	189,750	1,073,000	5.65	0.90
2006	39,679,000	7,746,000	6,499,000	3,858,000		57,782,000	64,035,600	175,440	440,000	2.51	0.90
2007	39,241,000	7,872,000	6,889,000	3,808,000		57,810,000	60,371,000	165,400	329,000	1.99	0.96
2008	37,970,000	8,192,000	8,415,000	4,096,000		58,673,000	62,126,650	170,210	382,000	2.24	0.94
2009	38,335,000	7,941,000	8,508,000	3,405,000		58,189,000	64,291,100	176,140	624,000	3.54	0.91
2010	36,564,000	7,358,000	10,642,000	3,194,000		57,758,000	62,141,250	170,250	254,000	1.49	0.93
2011	36,583,000	7,390,000	9,763,000	3,782,000		57,518,000	61,374,750	168,150	384,000	2.28	0.94
2012	39,944,000	7,771,000	10,627,000	3,367,000		61,709,000	65,878,850	180,490	388,000	2.15	0.94
2013	36,416,000	7,134,000	11,705,000	2,217,000		57,472,000	68,620,000	188,000	710,000	3.78	0.84
2014	36,980,000	7,164,000	10,883,000	2,771,000		57,798,000	65,199,950	178,630	624,000	3.49	0.89
2015	34,763,000	7,806,000	10,028,000	3,432,000		56,029,000	61,152,100	167,540	518,000	3.09	0.92
2016	33,458,000	7,118,000	11,229,000	3,922,000		55,727,000	73,003,650	200,010	338,000	1.69	0.76
2017	33,671,000	9,765,000	12,140,000	3,443,000		59,019,000	70,448,650	193,010	362,000	1.88	0.84
2018	34,074,000	8,240,000	11,680,000	3,484,000		57,478,000	67,032,250	183,650	564,000	3.07	0.86
2019	33,479,000	8,141,000	13,591,000	2,415,000		57,626,000	66,857,050	183,170	474,000	2.59	0.86
2020	34,365,000	2,509,000	11,556,000	1,197,000	5,226,000	54,853,000	63,426,000	173,770	733,000	4.22	0.86
2021	33,911,000	3,016,000	10,822,000	1,827,000	4,050,000	53,626,000	64,759,000	177,422	543,000	3.06	0.83

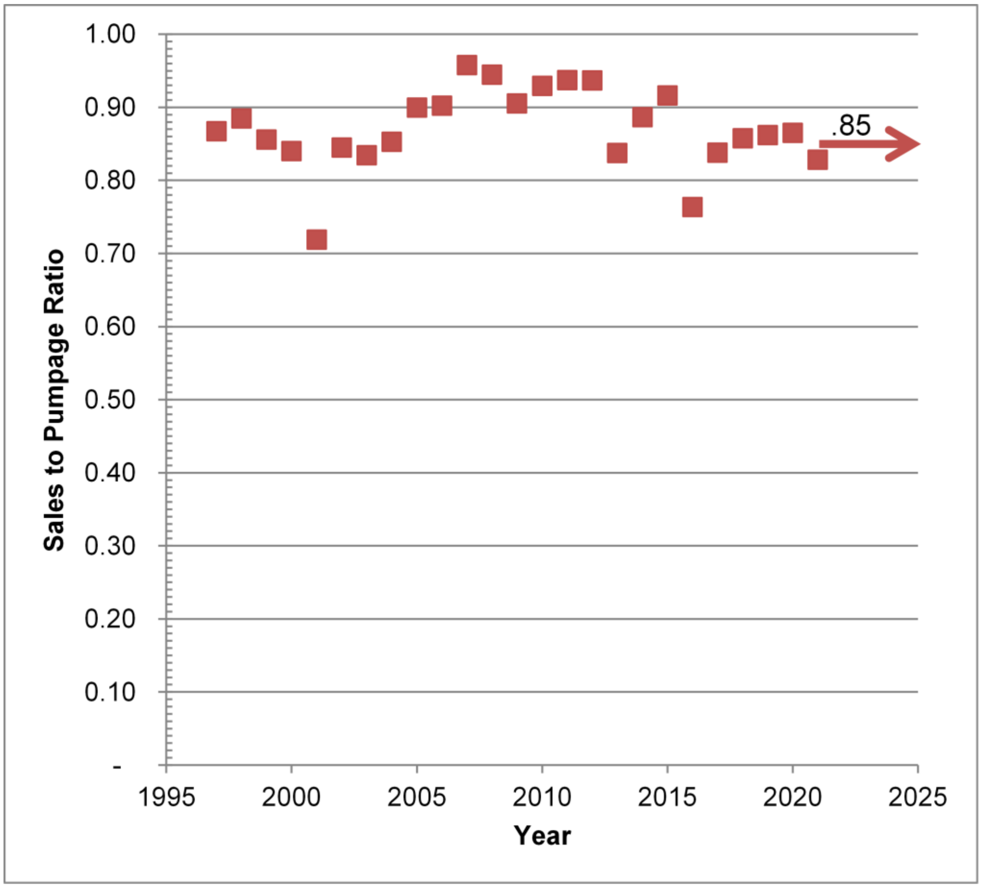


Figure 1.02-1 Sales to Pumpage Ratio

2. Maximum Day to Average Day Ratio

Maximum day to average day ratio is defined as the maximum total water pumped on one calendar day divided by the annual average day pumpage. Figure 1.02-2 shows the maximum to average day pumpage ratio for each year over the past 24 years. Values range from 1.49 to 5.65 with an average of 2.96. A large number of the maximum days were due to water main breaks and these maximums seemed to correlate with a higher-than-usual maximum to average day ratio. The Village has expressed a desire to lower the number of water main breaks in the future through water main replacement projects but acknowledges that water main replacements may take time. Therefore, two separate maximum to average day factors were used. A factor of 2.0 is used to project maximum days in years without a water main break and a factor of 3.5 was used to represent years with a large water main break.

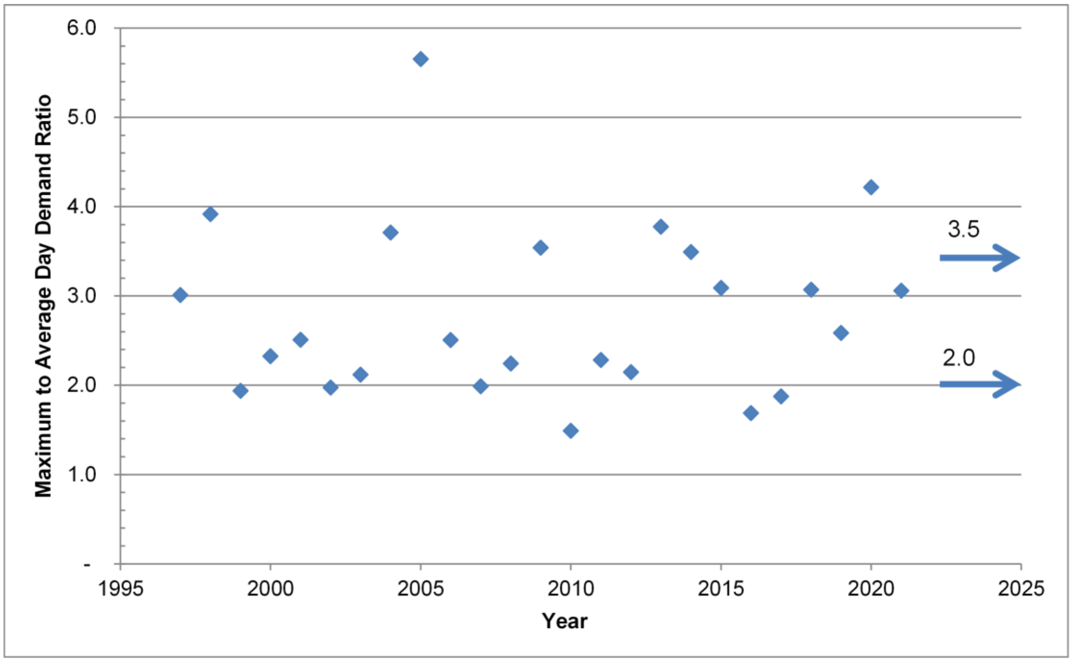


Figure 1.02-2 Maximum to Average Day Pumpage

3. Residential Sales Per Capita

Figure 1.02-3 shows the residential water sales per capita within the Village over the past 20 years. Per capita demand is calculated by dividing the total residential sales by the estimated service population within the Village. The service population is estimated as the number of residential meters reported each year in the PSC Annual Report by the Village's current number of persons per household rate of 2.52 (obtained from the United States [US] Census Bureau). The general trend is slowly declining over the duration of the time period. The ten year average of 51 gallons per capita per day (gpcd) will be used for the purpose of projecting residential water use.

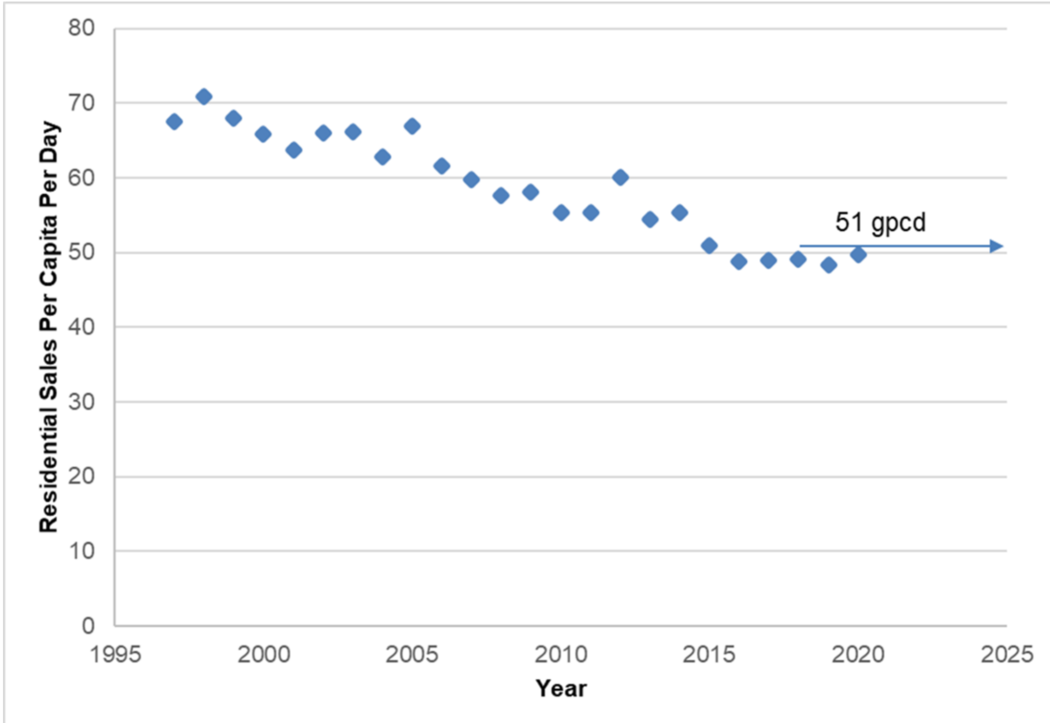
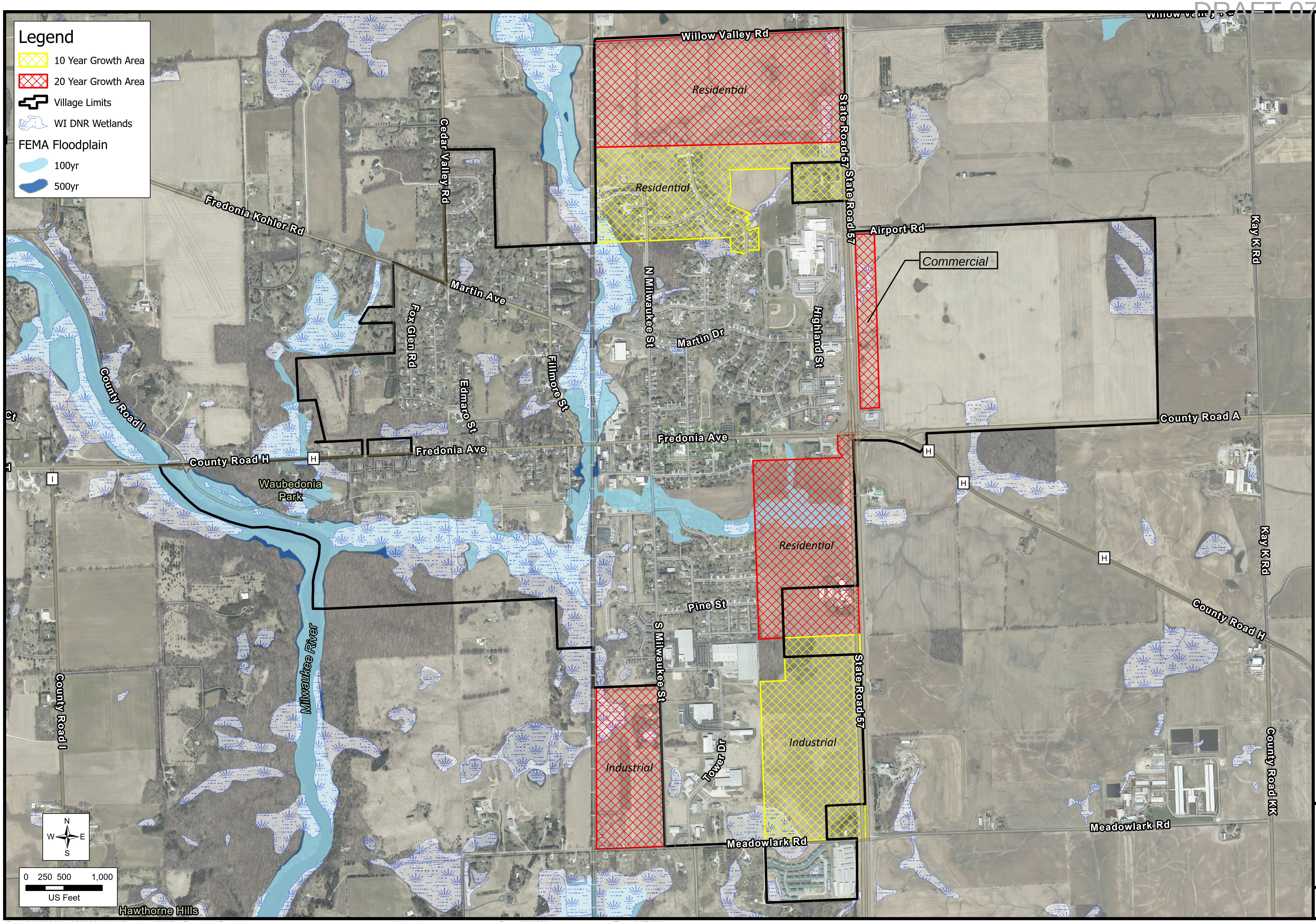


Figure 1.02-3 Residential Sales Per Capita

1.03 WATER SERVICE AREA GROWTH

Figure 1.03-1 shows a land use map prepared from information presented by the Village's Public Works Director with designated areas of future growth. This projection represents the projected growth areas and labels them by their intended future use, and the time frame that the development is estimated to occur by. All new growth is expected to connect to the Village's water service.

Table 1.03-1 summarizes the areas and their classification, water demand rate in gallons per acre per day (gal/ac/day), total water sales, and planning period for development. Residential usage rate was determined by multiplying Village's current number of persons per household rate of 2.52 by the anticipated housing density of three dwelling units per acre provided by the Village for future residential areas to obtain a population density per acre. The residential population growth is then multiplied by the average per capita water demand described in Subsection 1.02 of 51 gpcd to obtain a gal/ac/day value for residential use. Commercial and Industrial water demand rates were estimated by taking the from SEWRPC recommended gal/ac/day values for each land use type, 500 gal/ac/day for commercial and 1,500 gal/ac/day for industrial, and multiplying by the projected growth acreage for each plan year.



FURTURE PROJECTIONS MAP

WATER SYSTEM CAPACITY EVALUATION
VILLAGE OF FREDONIA
OZAUKEE COUNTY, WISCONSIN

STRAND ASSOCIATES®

FIGURE 1.03-1
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Area	Developable Acreage	Classification	Water Demand Rate (gal/ac/day)	Total Water Sales (gpd)	Planning Period (years)
1	105	Residential	386	40,478	20
2	71	Residential	386	27,194	10
3	61	Residential	386	23,343	20
4	72	Industrial	1,500	107,367	10
5	37	Industrial	1,500	55,191	20
6	14	Commercial	500	6,914	20

Note: gpd=gallons per day

Table 1.03-1 Growth Area Demand Increases

1.04 PROJECTED DEMANDS

A. Present Day

Present day demands will be considered as the demands from the most recent PSC annual water report that has been filed as of the initial draft of this study, which is from the year 2021. These demands are expected to provide a representative view of present day demands for use when comparing demands to available supply.

1. Average Day

The 2021 average day demand is 177,422 gallons, or 123 gpm.

2. Maximum Day

The 2021 maximum day demand is 543,000 gallons or 377 gpm.

B. Projected Demands

The overall demands are summarized in Table 1.04-1 and are shown relative to historic trends in Figure 1.04-1. Future demands were calculated by applying the sales to pumpage ratio, and maximum to average day ratios to the growth area demands as listed in Table 1.03-1 and adding these to present day demands. The future projections have been broken down into two categories, the Low Water Main Break Trend and High Water Main Break Trend, based on the two averages to maximum day ratios as previously stated.

	Average Day Demand		Low Water Main Break Trend Maximum Day Demand		High Water Main Break Trend Maximum Day Demand	
Year	gpm	Gallons	Gpm	Gallons	gpm	Gallons
2021*	123	177,422	377	543,000	377	543,000
2031	233	336,000	467	672,000	817	1,176,000
2041	336	484,000	672	968,000	1,176	1,694,000

*As 2021 data shows, actual water usage it is not necessarily representative of either trend and is used as the starting point for all future usage trends.

Table 1.04-1 Summary of Projected Water Demands by Year

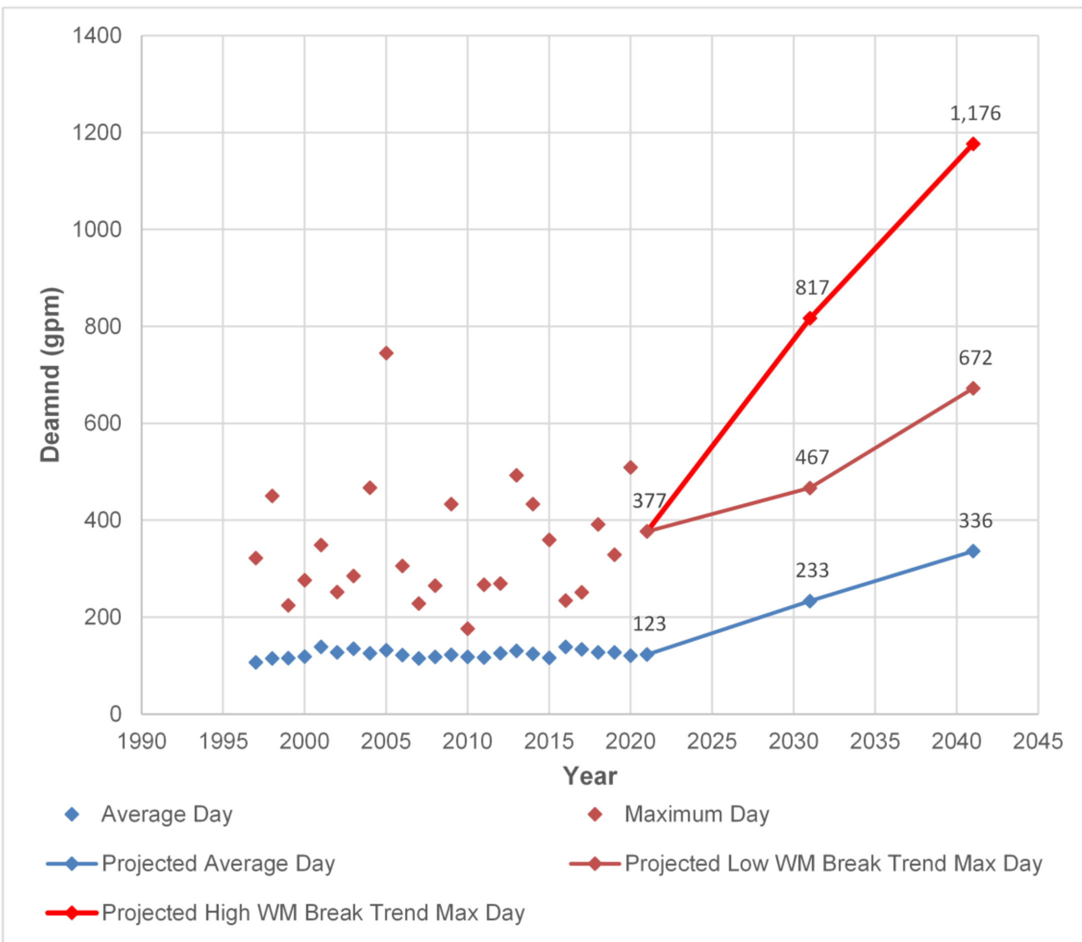


Figure 1.04-1 Projected Water Demands

C. Fire Flow Demand

In addition to meeting domestic water requirements, the water system is relied upon to provide water for fire protection purposes. For present and future demand conditions, a basic fire flow of 2,500 gpm for a two-hour duration will be used as identified by the Village in previous planning documents.

SECTION 2
ADDITIONAL REQUIRED CAPACITY

This section presents calculations that analyze the system's ability to satisfy the maximum day demand and maximum day demands with fire flow. Sections 2.01 through 2.05 use Strand's standard engineering practice. Section 2.06 presents both the Wisconsin Department of Natural Resources (WDNR) and PSC of Wisconsin methodology typically used in their reviews. These agencies typically use their own methodology to check the reasonableness of the engineer's recommendations.

2.01 GENERAL

Except for fire flow demands, days of maximum demand can and do occur on several days in succession. As a result, water withdrawn from storage during any one maximum day must be replaced before the following day to ensure an adequate supply of water for the next day. Therefore, total demand on the maximum day determines the minimum amount of source water that must be supplied. It is recommended that the system be designed to meet maximum day demand with the largest supply pumping unit out of service. The amount of water that can be supplied to the system with its largest pumping unit out of service is referred to as the "firm supply."

Firm supply for the Village is currently limited to the production value of the lesser of the two wellhouses that supply the Village's water system. These values are shown in Table 2.01-1. Because the wellhouses pump directly to a ground storage reservoir, then rely on a booster pump to pressurize this water and move it into the system, firm capacity is also limited by the capacity of the booster pumps. Because of this, firm supply is equal to the pumping capacity of this booster pump, which is less than either of the Village's well pumps, of 350 gpm.

Well Facility	Well Capacity (gpm)	Booster Capacity (gpm)	Station Capacity (gpm)
Well No. 1	460	350	350
Well No. 2	500	415	415
Total Capacity	960*	765	**765**
Firm Capacity	460*	350	**350**

*Current well capacities exceed current booster pump capacities which limits the total and firm capacity of the station.

Table 2.01-1 Village Well Capacity–Existing Facilities

In general, the hourly demand fluctuation on the maximum day can be met by withdrawal from elevated storage, pumping from ground-level storage (if available), extra well capacity, or a combination of these factors. Therefore, hourly demands on the maximum day determine the storage capacity necessary to supplement a pumped supply if this supply just equals the average hour of the maximum day demand.

If the capacity just equals the average hour maximum day demand, then the amount of storage required would be equal to fire requirements plus peak storage demands. Water withdrawn from storage to meet fire demand need not be replaced the same day or the day following the fire. However, it is advisable to replenish the storage as soon as possible as diminished quantities of water leaves the system at an elevated level of risk.

2.02 2021 CAPACITY

In evaluating the supply and storage capacities, maximum day demands are used to determine the minimum amount of firm supply the Village should have online to satisfy demands. The maximum day plus fire demands will be used to evaluate storage capacity. Available storage will be determined by taking the total storage volume and subtracting the volume needed to account for cumulative peak hourly demands. Peak hourly demands are found by multiplying the maximum day demand's hourly rate by curve factors to replicate daily demand fluctuation. An additional 15 percent of the tank's total volume is unusable storage based on tank operations. The Village currently operates one, 300,000-gallon elevated storage tank as its only means of elevated storage. The two 40,000-gallon belowgrade reservoirs at each well are not considered useable because the capacity of the booster pumps is less than the capacity of the well (meaning that the volume of ground storage does not improve the output capacity of the station). Therefore, the effective storage capacity of the Village is assumed to be 255,000-gallons.

A. 2021 Maximum Day

Figure 2.02-1 shows the 2021 maximum day demands. A standard American Water Works Association diurnal curve was implemented to estimate hourly demand fluctuation. Hourly demand in excess of the firm well supply capacity must come from storage. The diurnal curve indicates that approximately 96,500 gallons of storage (chart area above the firm supply line) was required on the maximum day to satisfy hourly demands.

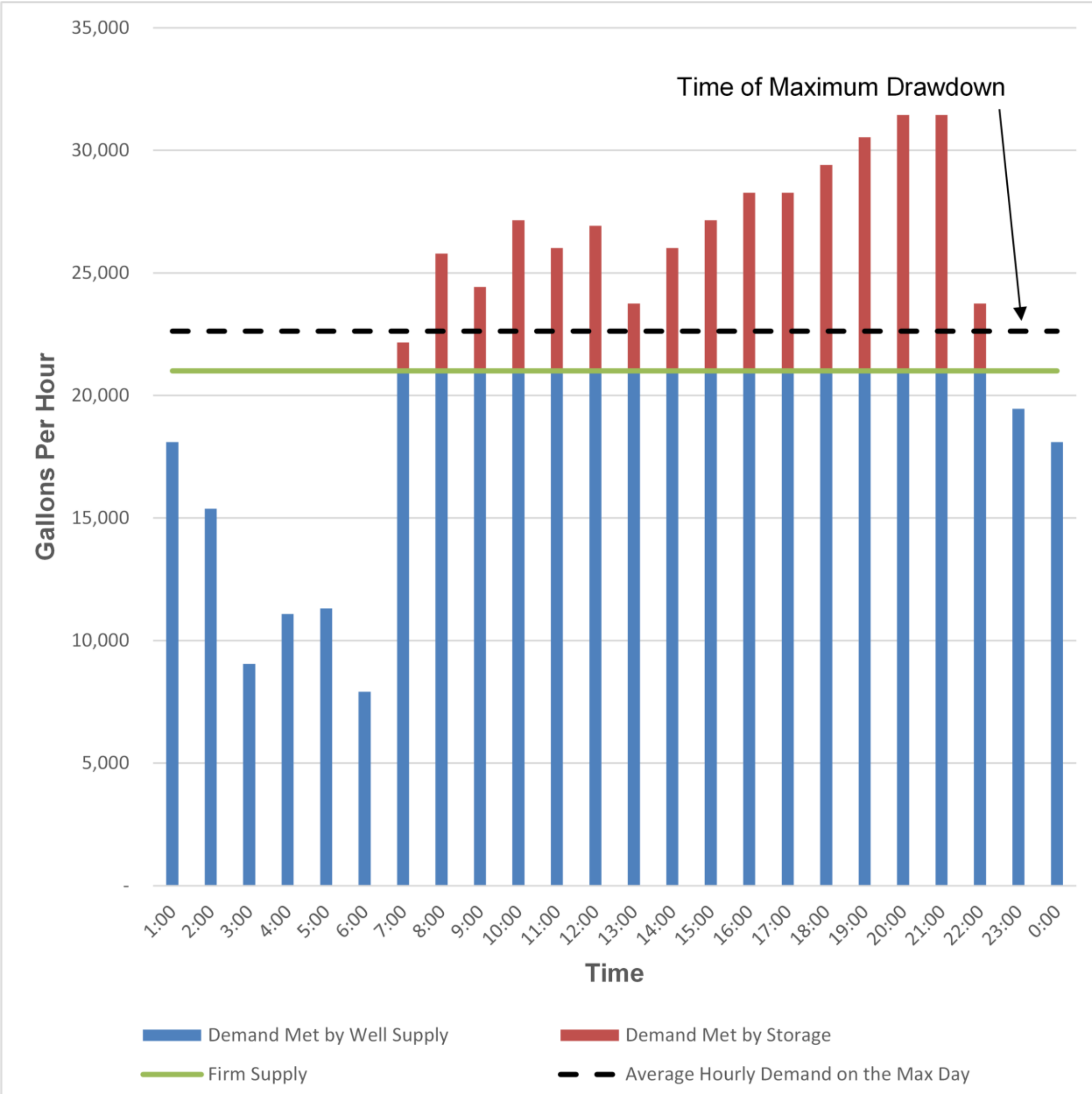


Figure 2.02-1 2021 Maximum Day Demand Hourly Trend

Table 2.02-1 shows the results of the maximum day in 2021. The utility is currently in need of additional supply but has adequate storage to meet peak hourly demands on the maximum day. Since the current maximum day demand exceeds the firm supply capacity, the system is currently vulnerable to storage depletion if multiple maximum days were to occur in a row and a well or booster pump were out of service.

	Capacity	2021 Maximum Day	
		Demand	Excess (Deficit)
Firm Well Capacity Analysis	350 gpm	377 gpm	(27 gpm)
Storage Capacity Analysis	255,000 gallons	96,500 gallons	158,500 gallons

Table 2.02-1 2021 Maximum Day Well Supply and Storage Capacity Analysis

B. 2021 Maximum Day Plus Fire

The total amount of water available to supply the maximum day plus fire demand is equal to the firm supply capacity plus the flow available from storage. The flow available from storage is equal to the lowest amount of volume of water remaining after the peak hourly demands on the maximum day demands were removed and normal levels of water fluctuation. As outlined in the previous subsection, the stations do not have capacity to meet the maximum daily requirement so there is an additional volume of storage that will be removed from the tank when estimating fire flow conditions. The calculation of the firefighting capacity on the 2021 maximum day is shown in Table 2.02-2. The rate of elevated storage capacity is estimated to be the effective volume of the tank minus the storage required to satisfy hourly demands divided evenly over the duration of a fire event (120 minutes). This does not necessarily reflect how water would be used in the event of an actual fire event but provides an approximation of the volume necessary to meet the fire flow demand. Demands and negative values are shown in parentheses.

	Flow (gpm)
Maximum Day Demand	(377)
Fire Demand	(2,500)
Firm Well Station Capacity	350
Elevated Storage Capacity (distributed over two hours)	1,321
Deficit	(1,206)

Table 2.02-2 2021 Maximum Day Plus Fire Storage Capacity Calculation

Therefore, the system has a shortfall of 1,206 gpm over 120 minutes (or 144,744-gallons of storage) for meeting the 2021 maximum day plus fire demands. Note that existing ground storage at each well facility is not considered as available to the system because the booster pump capacity at each station is less than the well capacity at each station.

2.03 2031 CAPACITY

The 2031 maximum day capacity analysis will assume that the Village has increased the booster pump capacity at both well stations since the existing station capacity is already insufficient for the present year and demands will increase. The improved capacity of each station reflects improved booster pump capacity in order to allow the well pump capacity to be matched and allow the storage at each facility to be pumped out evenly over a two-hour fire event. The resulting new firm capacity is shown in Table 2.03-1.

Well Facility	Well Capacity (gpm)	Booster Capacity (gpm)	Station Capacity (gpm) (two-hour duration)
Well No. 1	460	700	700
Well No. 2	500	750	750
Total Capacity	960*	1,450	1,450
Firm Capacity	460*	700	700

*Well capacity is considered the reliable amount of water that the facility can supply to the system over multiple days. Station capacity represents the amount of water that the facility can supply over a short duration, inclusive of station storage.

Table 2.03-1 Village Well Capacity with Booster Station Improvements at Each Well Station

During a fire event, the booster pumps will operate at a higher capacity than the well pumps with the excess capacity coming from the ground storage reservoirs. Because of this, over a short duration the capacity of the system increases. This capacity would only serve for the duration of the Village's selected fire event of two hours, after which time the storage reservoirs will be depleted and the Village will operate at its well capacity.

A. 2031 Maximum Day

Figure 2.03-1 shows the 2031 maximum day demands using both a low and high water main break trend. The diurnal curve indicates storage demands of 94,000 gallons and 521,000 gallons respectively for the low and high water main break trends to satisfy hourly demands, assuming the Village has increased its booster pump capacity.

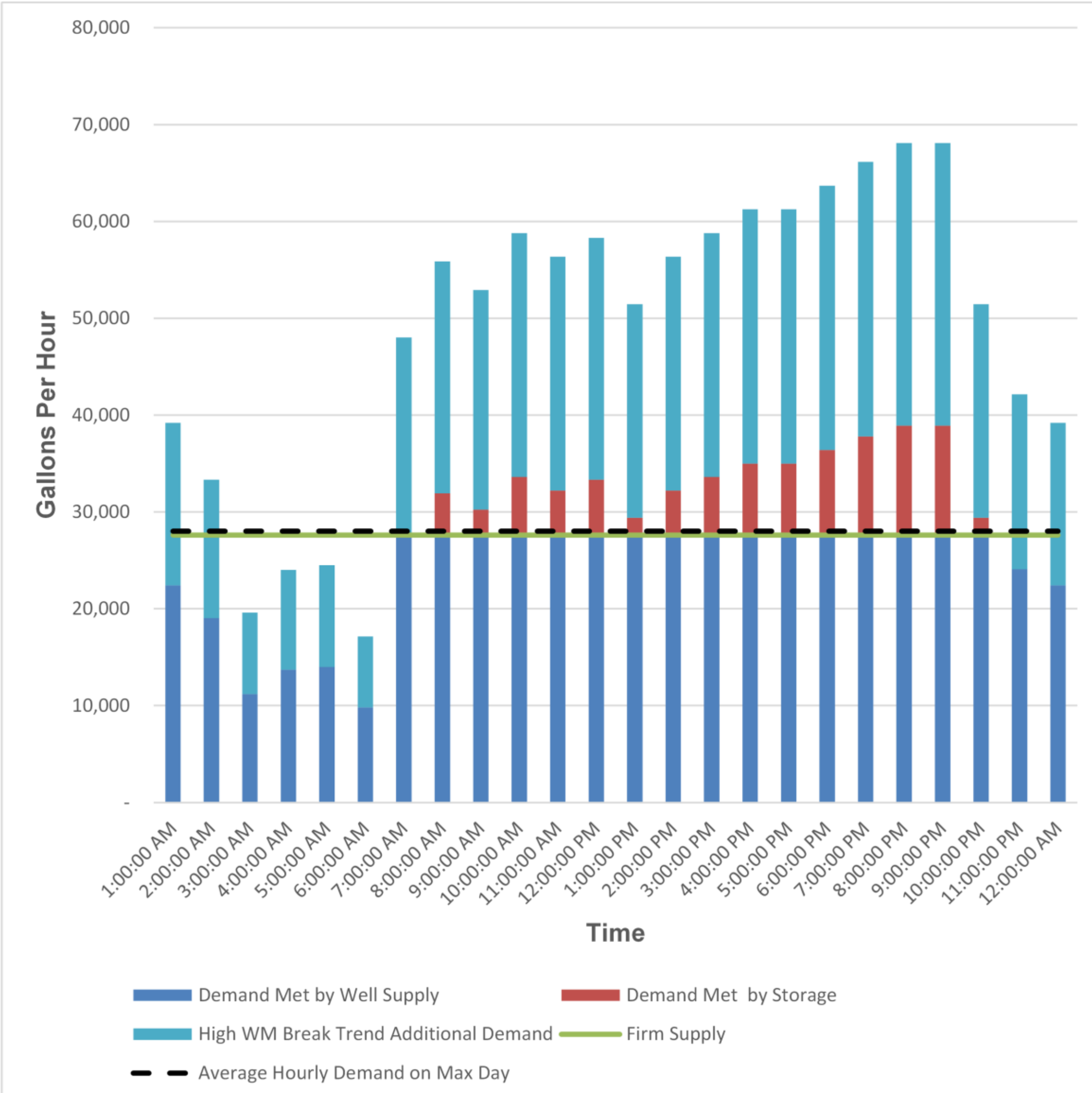


Figure 2.03-1 2031 Maximum Day Demand Hourly Trend

Table 2.03-2 shows the results of the analysis when considering the maximum day demand with both the low and high water main break trend. Assuming additional booster pump capacity is added to satisfy maximum day demands, the Village is projected to have adequate storage for peak hourly demands assuming the Village meets its goal of following the low water main break trend.

	Capacity	Low Water Main Break Trend		High Water Main Break Trend	
		Demand	Excess (Deficit)	Demand	Excess (Deficit)
Firm Well Capacity Analysis*	460 gpm	467 gpm	(7) gpm	817 gpm	(357) gpm
Storage Capacity Analysis*	255,000 gallons	94,000 gallons	161,000 gallons	521,000 gallons	(266,000) gallons

*Capacity analysis assumes the Village has made the immediate improvements to both booster pumps to a level exceeding the well which makes the full well supply available to the system.

Table 2.03-2 2031 Maximum Day Well Supply and Storage Capacity Analysis

B. 2031 Maximum Day Plus Fire

The ability of the system to fight a fire on the 2031 maximum day is shown in Table 2.03-3. This table follows the previously described assumptions of both the fire event and the increased available flow during a fire event due to the additional booster pumps. With the existing 300,000-gallon tank, the system lacks sufficient storage to provide fire protection.

	Low Water Main Break Trend (gpm)	High Water Main Break Trend
Maximum Day Demand	(467)	(817)
Fire Demand	(2,500)	(2,500)
Station Capacity*	700	700
Elevated Storage Capacity (distributed over 2 hours)	1,342	(83)
Deficit*	(947)	(2,700)

*Capacity analysis assumes the Village has improved both booster pumps to a level exceeding the well pumps by 2031.

Table 2.03-3 2031 Maximum Day Plus Fire Storage Capacity Calculation

Therefore, the system has a shortfall of 947 gpm over 120 minutes (or 114,000 gallons of storage) for meeting the 2031 maximum day plus fire demands assuming the Village meets its goal of following the low water main break trend. If the Village were not to meet this goal, the system would have a shortfall of 2,700 gpm over 120 minutes (or 334,000 gallons of storage).

2.04 2041 CAPACITY

Table 2.04-1 indicates that the Village will be short of firm well supply capacity by the 2041 maximum day in both the low and high water main break trend. Therefore, additional well supply capacity is recommended and will be used throughout the 2041 maximum day demand analysis.

	Capacity	Low Water Main Break Trend		High Water Main Break Trend	
		Demand	Excess (Deficit)	Demand	Excess (Deficit)
Firm Well Capacity Analysis*	460 gpm	672 gpm	(212) gpm	1,176 gpm	(716) gpm
Storage Capacity Analysis*	255,000 gallons	341,000 gallons	(86,000) gallons	1,032,000 gallons	(777,000) gallons

*Capacity analysis assumes the Village has improved both booster pumps to a level exceeding the well pumps by 2031 which makes the existing ground storage volume available to the system for 2041.

Table 2.04-1 2041 Maximum Day Well Supply and Storage Capacity Analysis with 2031 Booster Pump Improvements

The Village must increase well supply before 2041 because well supply is not meeting the projected maximum day demand. The following analysis will assume that the Village adds a third well supply source by 2041 that is similar in nature to the existing wells with a capacity of 460 gpm. The resulting new supply capacities are summarized in Table 2.04-2.

Well Facility	Well Capacity (gpm)	Booster Capacity (gpm)	Station Capacity (gpm) (two-hour duration)
Well No. 1	460	700	700
Well No. 2	500	750	750
New Well No. 3	*460*	*NA*	*460*
Total Capacity	1,420*	1,450	1,910
Firm Capacity	920*	700	1,160

*Well capacity is considered the reliable amount of water that the facility can supply to the system over multiple days. Station capacity represents the amount of water that the facility can supply over a short duration, inclusive of station storage. It is assumed that a new well source is added to satisfy 2041 maximum day demands.

Table 2.04-2 Village Well Capacity with 2041 Improvements

A. 2041 Maximum Day

Figure 2.04-1 shows the 2041 maximum day demands using both a low and high water main break trend. The diurnal curve indicates 2,000 gallons and 473,000 gallons of storage volume are required respectively for the low and high water main break trends on the maximum day to satisfy hourly demands. This assumes the Village has increased its booster pump capacity and added a new Well No. 3 facility, which also reduces the amount of storage required to satisfy peak hourly demands on the maximum day.

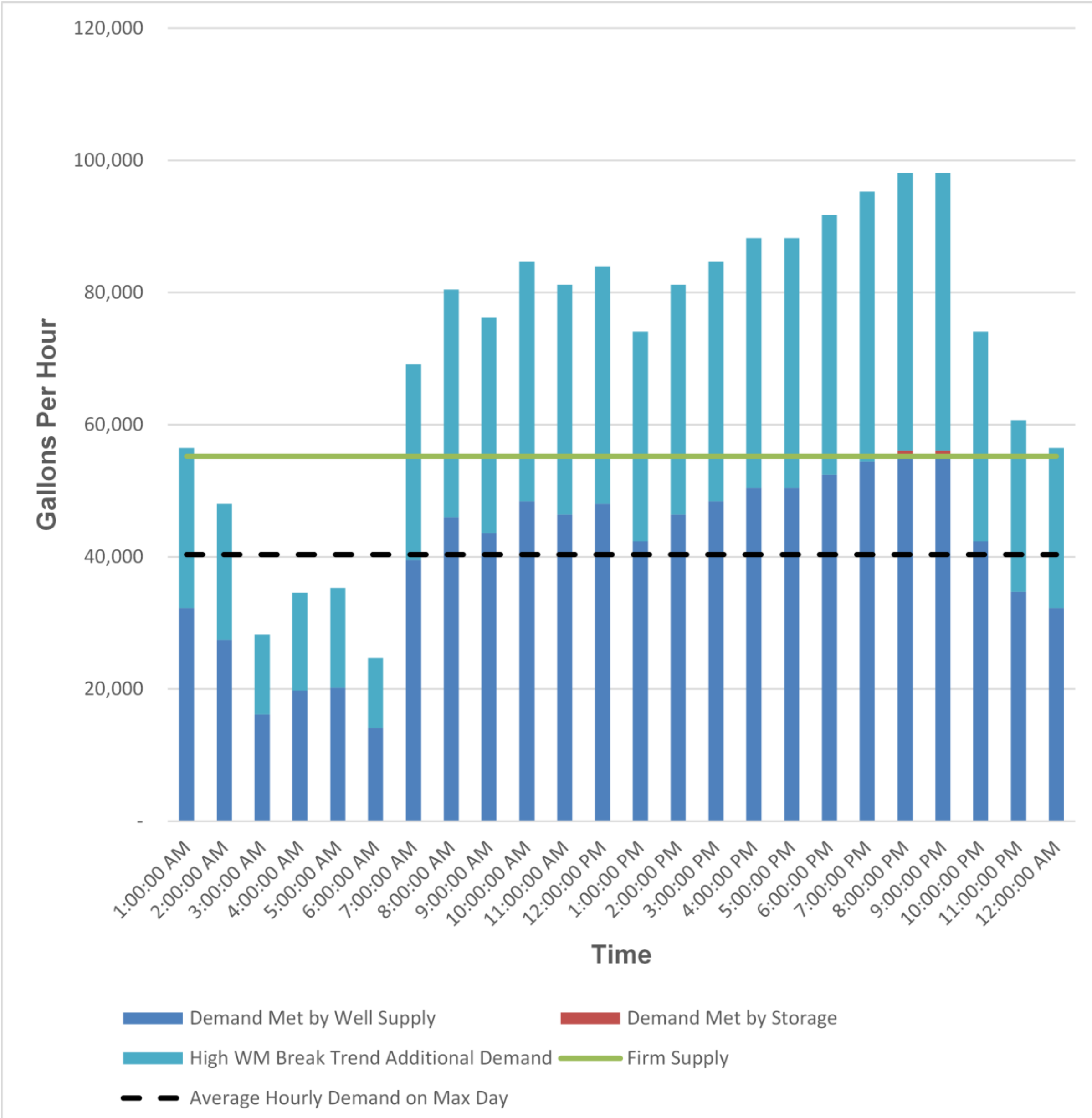


Figure 2.04-1 2041 Maximum Day Demand Hourly Trend with Additional Well Supply

Table 2.04-3 shows the well and storage demands and excess/deficit for the 2041 maximum day. Assuming the same diurnal trends throughout the day as the previous design year, the resulting total volume of peak demands required to be satisfied from storage are 2,000 and 473,000 gallons respectively for the low and high water main break trends.

	Capacity	Low Water Main Break Trend		High Water Main Break Trend	
		Demand	Excess	Demand	Excess
Firm Well Capacity Analysis*	920 gpm	672 gpm	248 gpm	1,176 gpm	(-256) gpm
Storage Capacity Analysis	255,000 gallons	2,000 gallons	253,000 gallons	473,000 gallons	(218,000) gallons

*Capacity analysis assumes the Village has improved both booster pumps to a level exceeding the well pumps by 2041, and has implemented an additional 460-gpm facility

Table 2.04-3 2041 Maximum Day Well Supply and Storage Capacity Analysis with Booster Pump Improvements and Additional Well Supply

B. <u>2041 Maximum Day Plus Fire</u>

The ability of the system to fight a fire on the 2041 maximum day is shown in Table 2.04-4. Firm well capacity is a combination of the booster pump capacity of the two existing wells and the proposed Well No. 3 which is assumed to pump directly into the system. With the existing 300,000-gallon tank, the system has sufficient storage to provide fire protection for the low water main break trend demand, but not the high water main break trend. This underscores the importance of addressing water main breaks in order to manage the system's ability to satisfy maximum day demands.

	Low Water Main Break Trend (gpm)	High Water Main Break Trend
Maximum Day	(672)	(1,176)
Fire Demand	(2,500)	(2,500)
Station Capacity*	1,160	1,160
Elevated Storage Capacity (distributed over two hours)*	2,111	1,351
Excess (Deficit)*	99	(1,376)

*Capacity analysis assumes the Village has improved both booster pumps to a level exceeding the well pumps by 2041 and an additional 460-gpm facility being built.

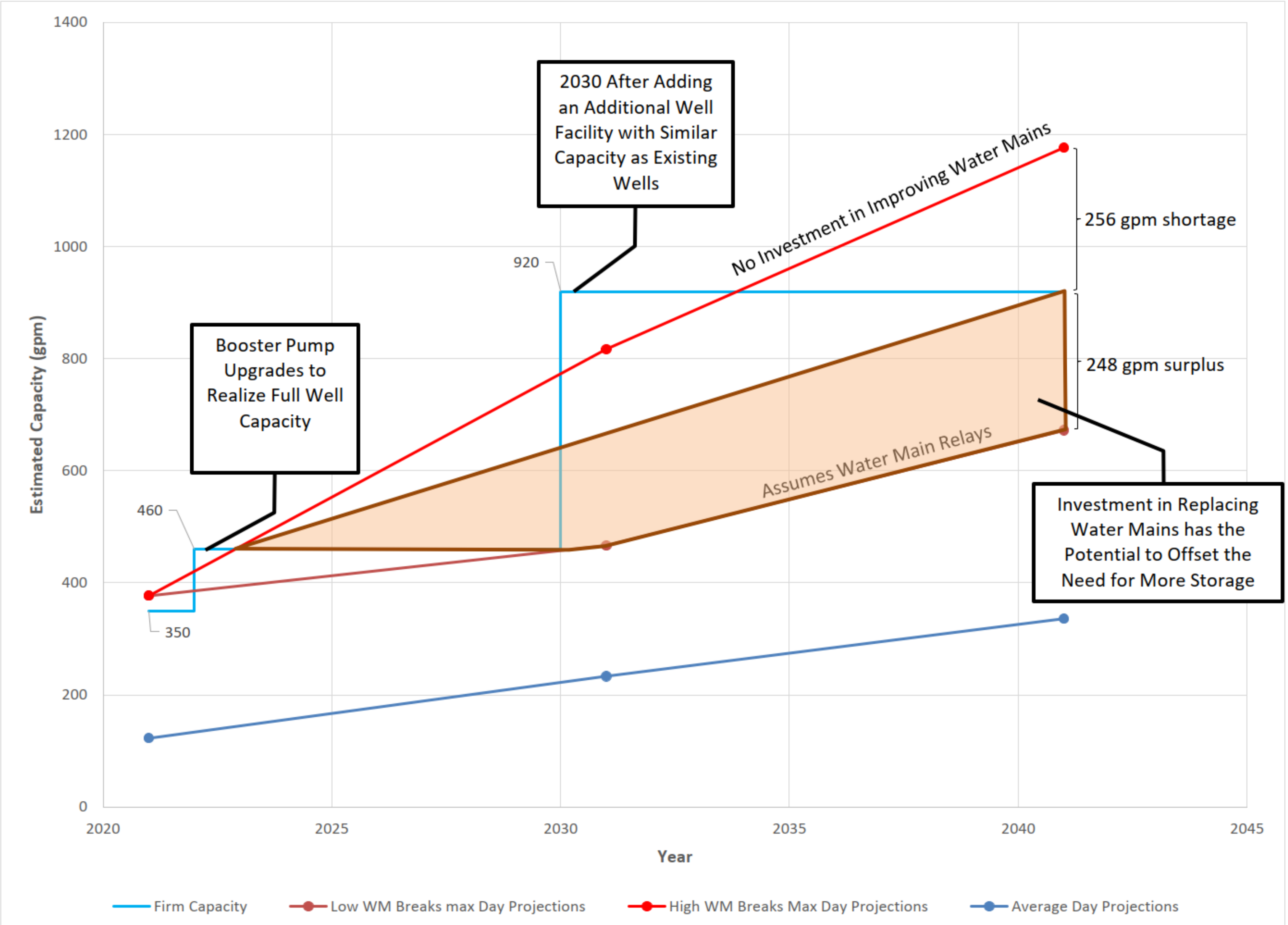
Table 2.04-4 2041 Maximum Day Plus Fire Storage Capacity Calculation

Therefore, the system has an excess of 99-gpm over 120 minutes (or 11,880 gallons of storage) for meeting the 2041 maximum day plus fire demands assuming the Village meets its goal of following the low water main break trend and makes supply capacity improvements as noted.

2.05 SUMMARY OF ADDITIONAL REQUIRED CAPACITY

Figure 2.05-1 summarizes the analysis of the current year and 2031 and 2041 demands and the capacity improvements assumed to be added to satisfy those demands. This analysis underscores the importance of investing in failing water mains in order to control maximum day demand which limits the amount of additional well and storage supply improvements needed.

Figure 2.05-1 Well Capacity Evaluation



2.06 SYSTEM CAPACITY ANALYSIS USING REGULATORY AGENCY METHODOLOGY

The WDNR and PSC each use their own simplified methodology when reviewing a water system or planned improvements to this system. These equations are generally used to gage the reasonableness of the engineer's more in-depth analysis.

A. WDNR Supply Capacity Estimation

The WDNR method for estimating source capacity is outlined in the *Guidance for Municipal Drinking Water System Source Capacity Determination*. This process is used to determine if a utility has an adequate amount of source capacity during WDNR sanitary surveys. This considers two different supply cases for comparison with the utility's average and maximum day demands. Maximum day demands are compared to the utility's source capacity with the largest source out of service and all other sources operating for 18 hours a day. Average day demands are compared to the utility's source capacity with the largest source out of service and all other sources operating for 12 hours a day. If either of those conditions cannot be met, the utility is deemed to have inadequate source capacity. This method does not consider fluctuation in demand throughout the day as these additional needs are anticipated to be met by storage.

Figure 2.06-1 shows a summary of the different design year estimations compared to WDNR projected demands. Based on this methodology, the Village currently has a deficit on well supply on the maximum day and will have a deficit in well supply on the average day before the year 2030.

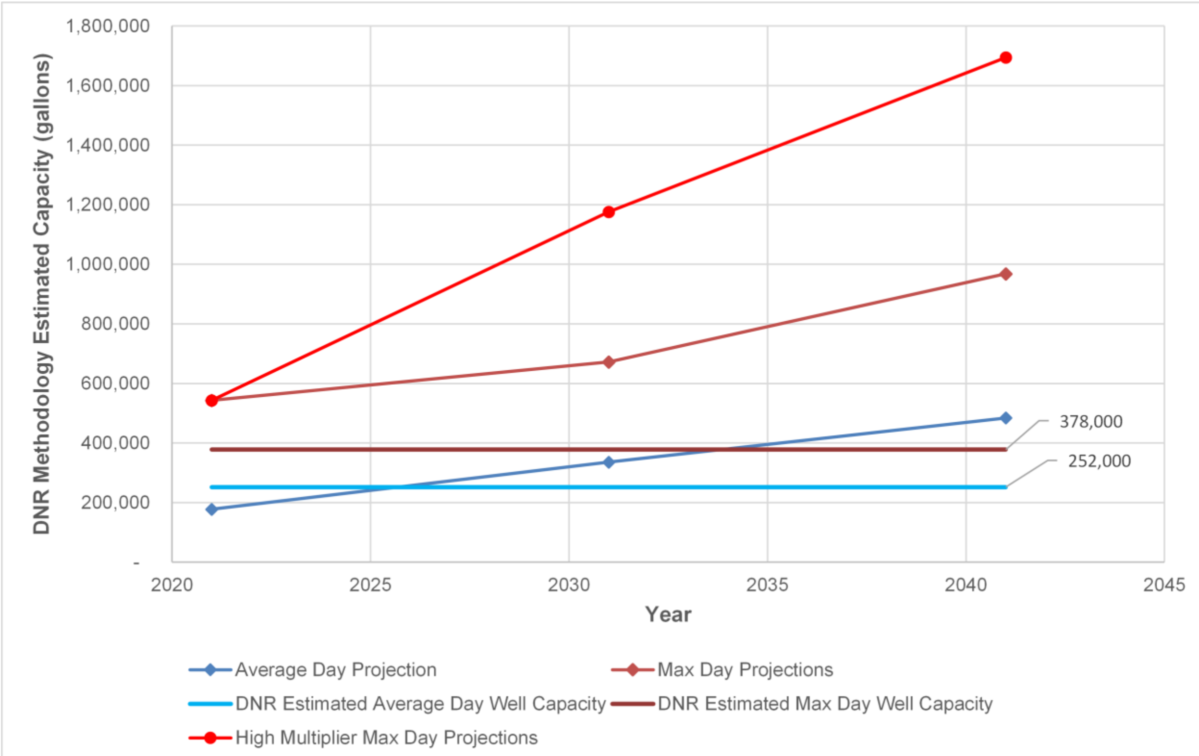


Figure 2.06-1 Well Capacity Evaluation, WDNR Methodology

This exercise was repeated with the implementation of the booster pump improvement occurring immediately, and the additional facility being implemented in 2030. The results of this are shown in Figure 2.06-2.

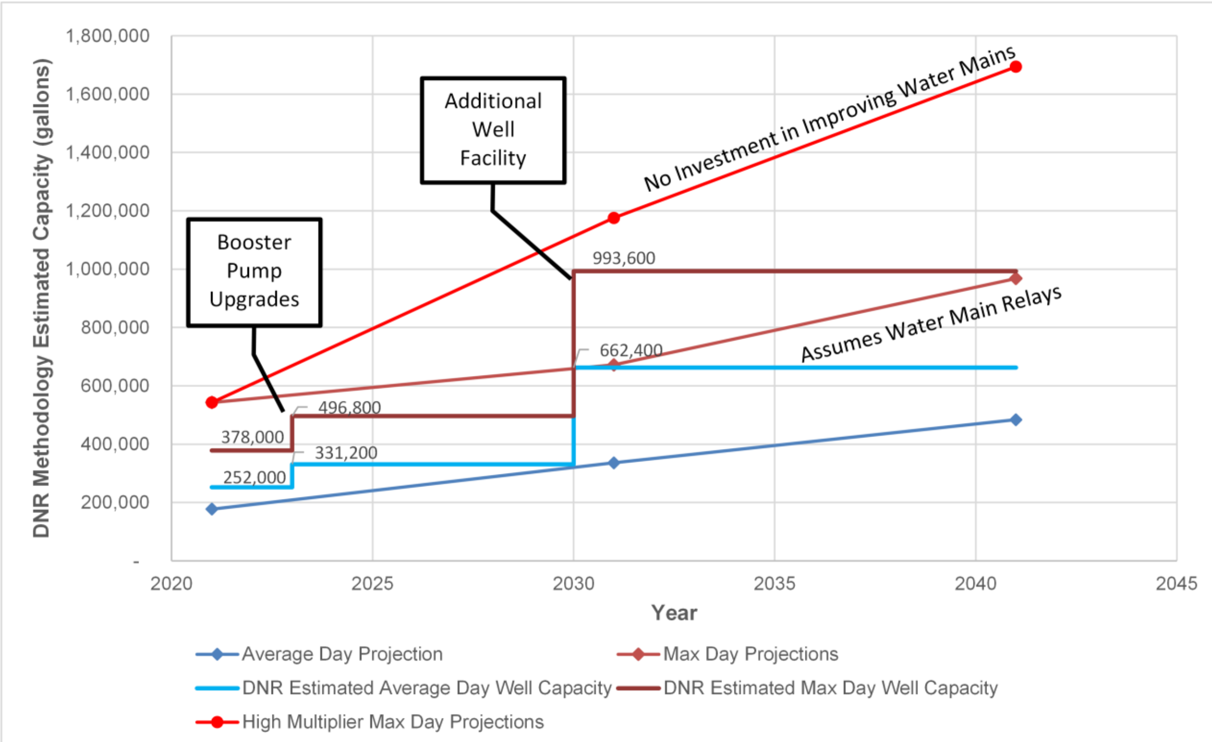


Figure 2.06-2 Well Capacity Evaluation, WDNR Methodology with System Improvements

B. PSC Spare Capacity Equation

The PSC typically expects an analysis of storage capacity as part of the construction authorization process used to evaluate proposed supply and storage projects. Specifically, equations 3 and 4 from the publication *How Much Water Supply Capacity Should a Public Water System Have* from the Wisconsin Water Association, spring 2013. are shown in Table 2.06-1. The PSC uses these equations as a factor in determining how much spare capacity a utility has. Spare capacity is a combination of both the supply and storage capacity within a system. A negative value of spare capacity indicates a storage shortage within the utility. The lower result of the two equations is deemed to be the spare capacity of the utility. As equation 3 yields a lower value, this represents the spare capacity within the Village.

These results were extrapolated over the duration of the fire event to yield a volume of spare capacity rather than a rate. While these values can aid in the sizing of future storage projects, spare capacity deficit does not directly correlate to the volume of additional storage needed. Adding additional storage equal to the deficit defined by either of the two equations will still yield a shortage of storage capacity. When factoring in unusable storage space in tanks, adding storage capacity in addition to the projected deficit will need to be built to provide enough capacity for the system.

$$(3)\ SC = FWC + \frac{ES}{T*60} - F - \frac{R+MD}{24*60}$$

$$(4) SC = FWC + \frac{ES}{60} - F - \frac{R+MH*60}{60}$$

Item	Unit	2021	2031		2041	
			Low Water Main Break Multiplier	High Water Main Break Multiplier	Low Water Main Break Multiplier	High Water Main Break Multiplier
Firm Well Capacity (FWC)	gpm	350	350	350	350	350
Elevated Storage (ES) (85% total)	gallons	255,000	255,000	255,000	255,000	255,000
Reserve (R)	gallons	45000	45,000	45,000	45,000	45,000
Fire Demand (F)	gpm	2,500	2,500	2,500	2,500	2,500
Fire Demand Duration (T)	hours	2	2	2	2	2
Maximum Day Demand (MD)	gallons	543,000	672,000	1,176,000	968,000	1,694,000
Maximum Hour Demand (MH)	gpm	377	467	817	672	1,176
SC Equation 3	**gpm**	**(433)**	**(523)**	**(873)**	**(728)**	**(1,233)**
SC Equation 4	gpm	973	883	533	678	174

Note: SC=Spare Capacity

Table 2.06-1 Spare Capacity, PSC Equations, No Improvements

The system currently shows a deficit in spare capacity. While these equations are primarily used determining if the system has adequate storage capacity for a fire event, spare capacity deficits can be made up by either increasing the well capacity or storage capacity. In the case of the Village, since a shortage of well supply has already been identified, the spare capacity estimation should be done with the anticipated system improvements before determining the need for additional capacity.

The exercise was again repeated with the previously mentioned improvements. The results are shown in Table 2.06-2. The additional improvements show that while the Village will decrease the deficit of spare capacity, there may still be a need to increase the storage capacity by the year 2041. As Table 2.06-2 shows there is a wide range of potential outcomes for 2041 spare capacity. At this time making any decisions on the need and sizing for 2041 storage is not prudent as future changes in demand and water use trends will dictate the storage requirements.

Item	Unit	2021	2031		2041	
			Low Water Main Break Multiplier	High Water Main Break Multiplier	Low Water Main Break Multiplier	High Water Main Break Multiplier
FWC	gpm	350	920	920	920	920
ES (85% total)	gallons	255,000	255,000	255,000	255,000	255,000
R	gallons	45000	45,000	45,000	60,000	60,000
F	gpm	2,500	2,500	2,500	2,500	2,500
T	hours	2	2	2	2	2
MD	gallons	543,000	672,000	1,176,000	968,000	1,694,000
MH	gpm	377	467	817	672	1,176
SC Equation 3	**gpm**	**(433)**	**47**	**(303)**	**(169)**	**(673)**
SC Equation 4	gpm	973	1,453	1,103	998	494

Table 2.06-2 Spare Capacity, PSC Equations with 2031 and 2041 Improvements

As Table 2.06-2 shows, the difference in the result from equation 3 to equation 4 is wide ranging. Because of the simplicity of the equations and the wide range of the results, this analysis would likely be interpreted to generally validate the more thorough engineering analysis presented earlier in this section.

SECTION 3
RECOMMENDATIONS

3.01 BOOSTER PUMP UPGRADES–IMMEDIATE IMPROVEMENT

Both wells feed directly into ground level storage reservoirs, then rely on booster pumps to enter the distribution system. Each well station currently has booster pumps that operate at rates lower than the well pump capabilities. This minimizes the usefulness of the reservoirs and effectively prohibits the Village from using them at times of high demands because of their filling rates from the wells are greater than the rate they can be pumped into the system. Increasing the size of both booster pumps would increase the system's capacity to meet high demand events. To better use the reservoir's storage volumes, the booster pumps should be sized in a way that will allow them to drain the effective capacity of each reservoir over the duration of a two-hour fire event, plus the additional recharge from the well pumps. The sizing of each well booster is shown in Table 3.01-1. To account for fluctuations in reservoir level and unusable storage, only 85 percent of the tank's volume is assumed to be available when calculating the booster pump capacity.

Well	Well Pump Capacity (gpm)	Effective Reservoir Capacity (gallons)	Tank Drainage Rate (gpm)	Maximum effective booster pump size	Recommended Booster Pump Size (gpm)
1	460	34,000	283	743	700
2	500	34,000	283	783	750

Note: Booster pump capacity improvements are needed immediately to address a deficit in the ability of the firm supply to satisfy current maximum day demands.

Table 3.01-1 Booster Pump Sizing

Increasing booster pump sizes increases both the firm's projected well capacity, and the utility's availability to provide fire protection. Implementing booster pumps at both facilities should be the Village's first priority for improvement, with the booster pump at Well No. 2 being of secondary importance.

The Village has also indicated that the existing ground storage reservoir has spalling concrete. During the time that the Village is upgrading the booster pumps it should repair the damaged areas to the reservoir in order to increase the effective lifespan, since this storage volume is needed throughout the 20-year planning period.

The Opinion of Probable Construction Cost (OPCC) for this option is $430,000, including a 30 percent contingency. A breakdown of the OPCC is shown in Table 3.01-2. This OPCC allots a certain amount of money for general facility renovations such as windows, painting, heating, ventilation, and air conditioning improvements, security, or chemical feed improvements that may need to occur at either well house. Without performing a more in-depth review of each facility, it is difficult to determine the exact work that would be necessary to implement larger pumps in each station.

Item	Cost
Well No. 1 Equipment	$100,00
Well No. 1 Facility Improvements	$50,000
Well No. 1 Storage Facility Repairs	$30,000
Well No. 2 Equipment	$100,000
Well No. 2 Facility Improvements	$50,000
Subtotal	$330,000
Engineering and Contingency	$100,000
Total	$430,000

Table 3.01-2 Booster Pump Improvements OPCC

3.02 NEW WELL FACILITY–2030 IMPROVEMENT

A new well facility will be required to meet growth related demands projected deficit by 2031, assuming the Village makes needed investments in water main relays to control maximum day demands. Without the investment in water mains, the additional well facility could be needed as soon as 2024 according to the analysis shown in Figure 2.05-1. The proposed facility is assumed to match the capacity of the existing Well No. 1. The Village could consider waiting until 2030 to bring a new well into service, provided the booster pumps at each well facility are replaced as previously described and demands follow the projected trend. In order to meet that goal, the Village should consider beginning the process of adding a well three years before the estimated date of need as that is an approximate duration for implementing a new well house from the initial planning effort to having an operational well. Table 3.02-1 shows the firm's capacity following the implementation of the facility.

Well Facility	Well Capacity (gpm)	Booster Capacity (gpm)	Station Capacity (gpm)
Well No. 1	460	700	460
Well No. 2	500	750	500
Well No. 3	460	-	460
		Total Capacity:	1,420
		Firm Capacity:	960
		Fire Flow Capacity	1,160

Note: A new well facility will be needed when the Village adds 83 gpm (120,000 gpd) of maximum day demands. This is anticipated to be needed by 2030 if the Village addresses leaky water mains or could be required as soon as 2024 if water main leaks persist.

Table 3.02-1 Proposed Village Well Capacity After Adding a New Well

Development of a new well facility including well drilling, facility design, and facility construction has an OPCC of $2,865,000 based on similar projects. A breakdown of this OPCC is shown in Table 3.02-2. Factors such as well drilling depth, water treatment requirements, and facility design options may increase or decrease this cost.

Item	Cost
Well Drilling	$500,000
Well and Treatment Facility Building	$1,250,000
Electrical and Controls	$200,000
Site Work	$100,000
Subtotal	$2,050,000
Engineering and Contingency	$815,000
Total	$2,865,000

Table 3.02-2 Well No. 3 OPCC

3.03 STORAGE

Timing depends on water main investments and the ability to control the maximum day demands. Additional storage can take the form of either ground storage or elevated storage. Either could be built in conjunction with the additional well facility or as an additional project at a later time. The size and style of storage should be determined when the need is better defined.

Ground level storage and booster pumps could be implemented in much the same way as they are in the existing well houses. Additionally, ground or belowground reservoirs can be implemented in neighborhoods and other residential areas with a much lower profile than elevated storage. This would provide additional capacity to meet consumer demands and fire flow but would rely on booster pumps to maintain pressures rather than gravity.

Elevated storage tanks come in multiple styles, but elevated spheroid tanks are typically most economical at the range of size the Village will need. The proposed elevated storage tank would be sized in accordance with the projected deficit in storage after the well facility is completed in 2030 and would have a high water elevation to match the existing tower. This would allow the Village to operate both towers in the same pressure zone and have a source of elevated storage available whenever either tower needs to be drained for inspections or repairs in order to maintain system pressure and buffer demands. Additional lifecycle costs would be necessary such as tank repainting approximately every 20 years.

Table 3.02-1 shows the difference in storage volume necessary to meet the storage requirements for the Village if it were to follow either the low water main break or high water main break trend. Storage deficit is calculated based on previously shown methodology involving the demand of water during fire events. The minimum storage requirement assumes that 85-percent of the storage volume is unusable or unavailable at the time of the high demand event.

	2041 Maximum Day Demand (gpm)	Fire Flow (gpm)	Firm Well Capacity (gpm)	Supply From Storage	Storage Excess (Deficit) (gpm)	Storage Excess (Deficit) (gallons)	Minimum Storage Required (gallons)
Low Water Main Break Trend	(672)	(2,500)	1,160	2,111	99	NA	NA
High Water Main Break Trend	(1,176)	(2,500)	1,160	(1,814)	(4,330)	(519,600)	(611,000)

Note: Additional storage capacity may not be required in the next 20 years if the Village invests in replacing leaky water mains. With no investment in leaky water mains, new storage could be needed as soon as 2033. The Village should conduct another capacity analysis as part of the well facility project recommended in the previous section to better understand the timing.

Table 3.03-1 Estimated Storage Requirement

3.04 WATER MAIN RELAY

Begin an annual program as soon as reasonably possible. The capacity evaluation indicates that the Village’s ability to control the maximum day demands by replacing failing water mains has a significant impact on the timing of the need for new well supply and new storage. Figure 2.05-1 indicates that the high maximum day demand projection associated with water main breaks could result in the need for a new well facility six years sooner than otherwise required.

Because fire events are assumed to happen on the maximum day, reducing the average to maximum day ratio will have a great impact on the size of storage needed. Investing in water main relays that will limit the number of main breaks and allow the Village to maintain the low water main break trend may result in a decrease in storage size of as much as 700,000 gallons based on standard tank sizes.

The Village should plan to undertake a pipeline prioritization plan to coordinate what will likely be a multi-year approach to the relay of failing water mains. This plan would summarize the location, length, and diameter of mains that need replacement and would prioritize them according to condition, consequence of failure related to points of interest or potential extent of service disruptions, and coordination with other planned capital projects to maximize the efficiency of Village funds. This effort could also be conducted in conjunction with a hydraulic water model update to confirm whether pipes should be replaced with the same diameter, should be upsized to improve fire flow availability based on land use, or if additional strategies are needed to address areas of low pressure.

SECTION 4
FUNDING STRATEGIES

4.01 FUNDING STRATEGIES, GENERALLY

This section describes, generally, funding strategies that are common to water system projects that are available to the Village. These strategies may not be comprehensive, and the Village should discuss funding with its municipal financial advisor. Some funding strategies also have policy implications that should be discussed with the Village Attorney and elected officials. Four strategies will be presented and discussed in this section: water rates, impact fees, reserve capacity assessments, and tax increment financing (TIF).

4.02 WATER RATES

Water rates in Wisconsin are regulated by the PSC. The PSC is charged with overseeing water utility finances and recognizes that capital projects can have a significant impact on a utility. Therefore, certain "reviewable" projects require a construction authorization (CA) process through the PSC. This process is regulated by Wisconsin State Statute § 196.49 and Wisconsin Administrative Code § PSC 184.03. The CA application requires an estimate of the impact to water rates using the following calculation. This calculation is used simply to estimate rates and does not necessarily reflect what the actual rates would be if the PSC requires a Conventional Rate Case ([CRC], or "full rate case").

$$Estimated\ \%\ increase\ in\ rates =$$

$$\frac{0.13*(Utility\ Financed\ Project\ Cost)+0.03*(Contributed\ Financed\ Project\ Cost)}{Annual\ Sales\ of\ Water} * 100\%$$

In this equation, the Utility Financed Project Cost is the portion funded by the utility, whereas the Contributed Financed Project Cost is the portion funded through special assessments, impact fees, reserve capacity assessments, TIF, or other sources.

The PSC will issue orders in a CA and it may include a requirement to conduct a full rate case as a result of the project. A CA will likely be required for the new well facility and new storage. A CA may be required for the recommended booster facility improvements since the purpose of the project is to increase capacity. However, a consultation with the WDNR and PSC is recommended to fully understand the agency requirements.

Water main relays are generally not reviewable by PSC unless there is 3 miles or more of water main that is 8-inch-diameter or greater. Should the Village decide to fund water main relays through rates, it may want to reach out to PSC for a consultation to consider a full rate case to fund the projects. Otherwise, the PSC will review the Village's annual reports and will require a CRC once the annual revenues or rates of return fall below the agencies' target thresholds.

4.03 IMPACT FEES

Impact fees, sometimes generically referred to as "connection fees", are intended to capture the cost of water facilities that are required to serve new development. For example, the new well facility is being recommended in order support demands associated with new growth. The Village could create an impact fee that would distribute the project cost across new connections, and charge the incremental fee to each new connection. One advantage of impact fees is that they are due in full at the time the building permit is issued. This can provide the Village with the funds a relatively quick fashion compared to a special assessment, which allows for the collection of funds over a long period of time. Impact fees are governed by State Statute §66.0617. The PSC treats impact fees as "contributed" finance cost.

The disadvantage that other communities have citied include the following:

1. Impact fees for water projects must be spent within eight years from the initial collection of the fee or the fee must be returned. This can be extended three years if the Village files for a hardship.

2. Impact fee accounting is very strict which requires additional administrative effort.

3. Impact fee law is frequently reviewed and scrutinized by the legislature. Changes in rules could lead to complications.

4. Impact fees require a high degree of confidence that the targeted development that causes the impact will actually occur within the timeframe of the Village's financing of the project. For example, if the Village were to construct the well but new development did not occur, then the Village is exposed to financial risk.

Eligible facilities that can be funded using impact fees are the capital costs to construct, expand, or improve public facility projects. The public facilities defined by the statute include highways, traffic control, sewerage, stormwater, water, park, solid waste and recycling, fire protection, law enforcement, emergency medical, and libraries. Facilities required to address or correct existing deficiencies are not eligible.

Therefore, the new well and storage facilities would be eligible for an impact fee mechanism. The booster station improvements could qualify subject to input from the Village Attorney. Water main relays to address failing water mains would not be eligible.

Procedural requirements are as follows:

1. Prepare a needs assessment report for the public facilities that includes the following:

    a. An inventory of existing public facilities, including an identification of existing deficiencies in the quantity or quality of those public facilities for which it is anticipated that an impact fee may be imposed.

b. An identification of the new public facilities or improvements and expansions of existing public facilities that will be required because of new development. This identification shall be based upon an explicitly identified level of service and standards (i.e., equivalent meters, equivalent connections, etc.).

c. A detailed estimate of the capital costs of providing the new public facilities or improvements and extensions previously mentioned, including an estimate of the effect of imposing impact fees on the affordability of housing within the municipality.

2. Hold a public hearing on the proposed impact fee ordinance or amendment. The public facilities assessment must be available for public inspection and copying at least 20 days before the hearing.

4.04 RESERVE CAPACITY ASSESSMENT (RCA)

A RCA is also commonly referred to as a “connection fee” but is different from an impact fee in critical ways. An RCA is actually a special assessment and is governed by State Statute §66.0703. The advantages to an RCA include the following.

1. Special assessments can be used to pay for both existing deficiencies and new infrastructure.

2. Special assessments can be paid over a long period of time and do not have to be collected at the time of building permit issuance. This is helpful if existing structures are connecting to the utility for the first time and are expected to share in the project cost.

3. Special assessments do not have the eight-year expenditure requirement as impact fees.

4. Special assessment law has been consistently upheld by the courts with less challenges compared to impact fees.

5. If needed, special assessments could be levied without regard to whether or not the property connects to the utility. This may provide a more reliable source of revenue to pay for the project.

6. Accounting requirements are less burdensome to admirative staff than impact fees.

A potential disadvantage of a RCA is that new development may also be provided the option to pay overtime. Typically, the assessment is not levied until a connection is made. The assessment amount could then be paid by the property owner over a duration of time.

The well and storage facilities could be levied as an RCA. The booster pumps could potentially be levied as an RCA but should be discussed with the Village Attorney. Water main relays could be done by special assessment, without naming it an RCA specifically. However, that policy decision should be discussed by the Village Board.

Procedural requirements are as follows:

1. Prepare a report for the special assessment that includes the following:

    a. Preliminary or final plans and specifications for the project.

    b. An estimate of the entire cost of the proposed work or improvement.

    c. An estimate of the assessment amount for each parcel affected.

    d. A statement as to the benefit of each property and if the assessment is imposed using the police powers. Note that the assessment method must be on a fair and equitable basis in that similarly situated properties must be treated similarly. The typical assessment methods are by equivalent meters, equivalent connections, square footage, area, or others.

2. A preliminary resolution of the governing body must be made.

3. Notices of the assessment must be mailed to affected properties and a public hearing shall commence not less than ten (nor more than 40) days after publication.

4. The governing body acts on a final resolution to approve, disapprove or modify the assessment.

4.05 TAX INCREMENT FINANCE (TIF)

TIF is a tool governed by Wisconsin Statutes §66.1105. Standard TIF "mixed-use" districts (Tax Increment Districts) have a 20-year term that allows the Village to collect the incremental tax revenue related to improved properties (i.e., new development or redevelopment) and fund necessary projects and public improvements. A blighted TID can allow a municipality to collect incremental tax revenue for up to 27 years. The project must satisfy the "but for" test, which means the development would not be able to be realized but for the projects being implemented. For example, if the Village needs to add a new well or storage facility to satisfy demands from development, then the "but for" test is satisfied.

Municipal utility projects funded through TIF can include projects outside of the geographic boundaries a specific TID. For example, if a well is necessary to satisfy new development demands from activity within the TID, the municipality can place that well outside of the TID as long as the TID is served by the new facility.

The well, booster pump, and storage projects recommended are each eligible to be funded through TIF. While State Statutes limit the number of times that a TID boundary can be amended, there is no limit to the number of times that the TID project plan can be amended. Therefore, the Village's existing TID project plan could be amended to include these projects.

TIF laws are complex and should be discussed with the Village's Municipal Finance Advisor.

PROPOSAL #54297

AUTOMATIC ENTRANCES OF WI, INC.

1712 PARAMOUNT COURT
WAUKESHA, WI 53186
(262) 549-8600 1-800-776-7122
FAX (262) 549-8604
WI BCR #1107117

PROPOSAL SUBMITTED TO Village of Fredonia	PHONE 262-483-0275	DATE June 28, 2022
STREET P.O. Box 159	JOB NAME Fire Dept. Community Room	
CITY, STATE AND ZIP CODE Fredonia, WI 53021	JOB LOCATION 201 S. Milwaukee St.	
ATTENTION. Roger Strohm	Fredonia, WI	

WE HEREBY SUBMIT SPECIFICATIONS AND ESTIMATES FOR:

Exterior Door

Material and labor to install (1) Stanley Magic Force automatic door operator on an existing door. Finish to be clear anodized.

The door will be activated for entry and exit via 4 1/2" wall-mtd. radio-controlled push plates.

Option #1: **Add $3,030.00** to the below price to automate the existing interior door with the same material quoted above.

Material Included:

(1)	313852	Stanley Magic Force Operator including header, control box and arm
(1)	10RD900	Receiver – 900 Frequency
(2)	CE-635-BSM	4 1/2" Push Plates with Surface Boxes
(2)	10TD900PB	Transmitters – 900 Frequency

Price includes material, freight, installation, applicable taxes and a (1) year warranty on parts and labor.

Work by Others:

(A) 115VAC 5AMP to the operator header

WE PROPOSE hereby to furnish material and labor - complete in accordance with above specifications for the sum of:

Three Thousand Fifty--Dollars $3,050.00

Payment to be made as follows: Net 30 Days

All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Owner to carry fire, tornado and other necessary insurance. Our workers are fully covered by Workmen's Compensation Insurance. Our proposal is pre-qualified based on acceptance of the coverages included in our standard insurance package. The cost of additional coverages, if available would be in addition to our proposal.

Authorized Signature Tim Doughman-AK
Tim Doughman – Direct Sales Manager

Note: This proposal may be withdrawn by us if not accepted within 30 days.

Acceptance of Proposal -
The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Signature ______________________

Date of Acceptance: ______________________

PROJECTS BY DEPARTMENT

						Cost by Year					
Department	Project	Department		2022	2023	2024	2025	2026	2027	Total	Likely to be Borrowed
Fire Department	Overhang over Fire Department Engine Bay Service Door	Fire Department		$ -	$ 5,000	$ -	$ -	$ -	$ -	$ 5,000	Not Borrowed
Fire Department	Pumper Truck Lease	Fire Department		$ 68,300	$ 68,300	$ 68,300	$ 68,300	$ 68,300	$ 68,300	$ 341,500	Borrowed
Parks	Lawn Mower	Parks		$ -	$ 20,000	$ -	$ -	$ -	$ -	$ 20,000	Not Borrowed
Parks	Freedom Park- monument sign	Parks		$ -	$ 10,000	$ -	$ -	$ -	$ -	$ 10,000	Not Borrowed
Parks	Freedom Park - playground equipment	Parks		$ -	$ -	$ 100,000	$ -	$ -	$ -	$ 100,000	Borrowed
Parks	Freedom Park bathroom	Parks		$ -	$ 40,000	$ -	$ -	$ -	$ -	$ 40,000	Not Borrowed
Parks	Firemen's Park - path/bridge	Parks		$ -	$ 30,000	$ -	$ -	$ -	$ -	$ 30,000	Not Borrowed
Parks	Stoney Creek Park - permanent ice rink	Parks		$ -	$ 10,000	$ -	$ -	$ -	$ -	$ 10,000	Not Borrowed
Parks	Stoney Creek Park - repave the lot	Parks		$ -	$ -	$ 20,000	$ -	$ -	$ -	$ 20,000	Not Borrowed
Parks	Marie Kraus Bathroom	Parks		$ -	$ 15,000	$ -	$ -	$ -	$ -	$ 15,000	Not Borrowed
Parks	Marie Kraus bathroom Oak Park	Parks		$ -	$ -	$ -	$ -	$ 15,000	$ -	$ 15,000	Not Borrowed
Parks	Disc Golf bridges	Parks		$ -	$ -	$ 90,000	$ -	$ -	$ -	$ 90,000	Not Borrowed
Public Works	New Garage Doors at the Tower Building	Public Works		$ -	$ 6,460	$ -	$ -	$ -	$ -	$ 6,460	Not Borrowed
Public Works	New Garage Door at old shop	Public Works		$ -	$ -	$ 15,000	$ -	$ -	$ -	$ 15,000	Not Borrowed
Public Works	Pickup Truck with dump body	Public Works		$ -	$ -	$ 80,000	$ -	$ -	$ -	$ 80,000	Not Borrowed
Public Works	Washington Avenue - curb & gutter, pavement, storm, sidewalk	Public Works		$ -	$ 63,000	$ -	$ -	$ -	$ -	$ 63,000	Borrowed
Public Works	Wisconsin Street - curb & gutter, pavement, storm, sidewalk	Public Works		$ -	$ -	$ 140,000	$ -	$ -	$ -	$ 140,000	Borrowed
Public Works	Wheeler Avenue - curb & gutter, pavement, storm, sidewalk	Public Works		$ -	$ -	$ -	$ -	$ -	$ 140,000	$ -	Borrowed
Public Works	Meadowbrook Drive - curb & gutter, pavement, storm, sidewalk	Public Works		$ -	$ -	$ -	$ -	$ 250,000	$ -	$ 250,000	Borrowed
Public Works	Martin Drive(west of Fillmore) curb& gutter, pavement,	Public Works		$ -	$ -	$ -	$ 240,000	$ -	$ -	$ 240,000	Borrowed
Public Works	Fillmore Street improvements at Fredonia Ave	Public Works		$ -	$ 50,000	$ -	$ -	$ -	$ -	$ 50,000	Borrowed
Public Works	Fillmore Street Sidewalk south portion	Public Works		$ -	$ 16,000	$ -	$ -	$ -	$ -	$ 16,000	Not Borrowed
Public Works	Meadowbrook/Wheeler Culvert	Public Works		$ -	$ 75,000	$ -	$ -	$ -	$ -	$ 75,000	Not Borrowed
Public Works	N. Milwaukee Street sidewalk south of Martin	Public Works		$ -	$ -	$ 12,000	$ -	$ -	$ -	$ 12,000	Not Borrowed
Public Works	Highland Drive sidewalk	Public Works		$ -	$ 10,500	$ -	$ -	$ -	$ -	$ 10,500	Not Borrowed
Public Works	N Milwaukee Street north of Martin sidewalk	Public Works		$ -	$ -	$ 39,650	$ -	$ -	$ -	$ 39,650	Not Borrowed
Public Works	Fillmore Street Sidewalk North portion	Public Works		$ -	$ -	$ -	$ 35,000	$ -	$ -	$ 35,000	Not Borrowed
Public Works	S. Milwaukee St sidewalk	Public Works		$ -	$ -	$ -	$ -	$ 4,000	$ -	$ 4,000	Not Borrowed
Public Works	Meadowbrook sidewalk	Public Works		$ -	$ -	$ -	$ -	$ 22,500	$ -	$ 22,500	Not Borrowed
Sewer Utility	Washington Avenue - Sewer	Sewer Utility		$ -	$ 40,000	$ -	$ -	$ -	$ -	$ 40,000	Borrowed
Sewer Utility	Wisconsin Street - Sewer	Sewer Utility		$ -	$ -	$ 65,000	$ -	$ -	$ -	$ 65,000	Borrowed
Sewer Utility	Wheeler Avenue - Sewer	Sewer Utility		$ -	$ -	$ -	$ -	$ -	$ 30,000	$ -	Borrowed
Sewer Utility	Meadowbrook Drive - Sewer	Sewer Utility		$ -	$ -	$ -	$ -	$ 60,000	$ -	$ 60,000	Borrowed
Sewer Utility	Martin Drive sewer	Sewer Utility		$ -	$ -	$ -	$ 115,000	$ -	$ -	$ 115,000	Borrowed
Sewer Utility	Filmore Street water at Fredonia Ave	Sewer Utility		$ -	$ 25,000	$ -	$ -	$ -	$ -	$ 25,000	Borrowed
Sewer Utility	WWTP upgrades (design and construction)	Sewer Utility		$ -	$ -	$ -	$ 1,750,000	$ -	$ -	$ 1,750,000	Borrowed
0	0	0		$ -	$ -	$ -	$ -	$ -	$ -	$ -	0
Water Utility	Washington Avenue - water	Water Utility		$ -	$ 60,000	$ -	$ -	$ -	$ -	$ 60,000	Borrowed
Water Utility	Wisconsin Street - water	Water Utility		$ -	$ -	$ 55,000	$ -	$ -	$ -	$ 55,000	Borrowed
Water Utility	Wheeler Avenue - water	Water Utility		$ -	$ -	$ -	$ -	$ -	$ 105,000	$ -	Borrowed
Water Utility	Meadowbrook Drive - water	Water Utility		$ -	$ -	$ -	$ -	$ -	$ -	$ -	Borrowed
Water Utility	Martin Drive water	Water Utility		$ -	$ -	$ -	$ 130,000	$ -	$ -	$ 130,000	Borrowed

PROJECTS BY DEPARTMENT

Department	Project	Department		2022	2023	2024	2025	2026	2027	Total	Likely to be Borrowed
Water Utility	Fillmore Street Sewer at Fredonia Avenue	Water Utility		$ -	$ 22,500	$ -	$ -	$ -	$ -	$ 22,500	Borrowed
Water Utility	Booster Pump Upgrades	Water Utility		$ -	$ -	$ 430,000	$ -	$ -	$ -	$ 430,000	Borrowed
	TOTAL		$ -	$ 68,300	$ 566,760	$ 1,114,950	$ 2,338,300	$ 419,800	$ 343,300	$ 4,508,110	
	TOTAL BORROWED COST			$ 68,300	$ 328,800	$ 428,300	$ 2,303,300	$ 378,300	$ 343,300	$ 3,507,000	
	TOTAL TO BE FUNDED FROM CAPITAL BUDGET			$ -	$ 237,960	$ 686,650	$ 35,000	$ 41,500	$ -	$ 1,001,110	
	BORROWED PRINCIPAL & INTEREST PAYMENT (20 YEARS AT 3%)			$ (4,591)	$ (22,101)	$ (28,788)	$ (154,818)	$ (25,428)	$ (23,075)		
	TOTAL P&E PAYMENTS			$ (4,591)	$ (26,691)	$ (55,480)	$ (210,298)	$ (235,725)	$ (258,801)		

PROJECTS BY DEPARTMENT

Department	Project	Department		2022	2023	2024	2025	2026	2027	Total	Likely to be Borrowed
Fire Department		**Fire Department**									
	TOTAL		$ -	$ 68,300	$ 73,300	$ 68,300	$ 68,300	$ 68,300	$ 68,300	$ 346,500	
	TOTAL BORROWED COST			$ 68,300	$ 68,300	$ 68,300	$ 68,300	$ 68,300	$ 68,300	$ 341,500	
	TOTAL TO BE FUNDED FROM CAPITAL BUDGET			$ -	$ 5,000	$ -	$ -	$ -		$ 5,000	
	BORROWED PRINCIPAL & INTEREST PAYMENT (20 YEARS AT 3%)			$ (4,591)	$ (4,591)	$ (4,591)	$ (4,591)	$ (4,591)	$ (4,591)		
	TOTAL P&E PAYMENTS			$ (4,591)	$ (9,182)	$ (13,772)	$ (18,363)	$ (22,954)	$ (27,545)		
Parks		**Parks**									
	TOTAL		$ -	$ -	$ 125,000	$ 210,000	$ -	$ 15,000	$ -	$ 350,000	
	TOTAL BORROWED COST			$ -	$ -	$ 100,000	$ -	$ -	$ -	$ 100,000	
	TOTAL TO BE FUNDED FROM CAPITAL BUDGET			$ -	$ 125,000	$ 110,000	$ -	$ 15,000	$ -	$ 250,000	
	BORROWED PRINCIPAL & INTEREST PAYMENT (20 YEARS AT 3%)			$ -	$ -	$ (6,722)	$ -	$ -	$ -		
	TOTAL P&E PAYMENTS			$ -	$ -	$ (6,722)	$ (6,722)	$ (6,722)	$ (6,722)		
Public Works		**Public Works**									
	TOTAL		$ -	$ -	$ 220,960	$ 286,650	$ 275,000	$ 276,500	$ 140,000	$ 1,059,110	
	TOTAL BORROWED COST			$ -	$ 113,000	$ 140,000	$ 240,000	$ 250,000	$ 140,000	$ 743,000	
	TOTAL TO BE FUNDED FROM CAPITAL BUDGET			$ -	$ 107,960	$ 146,650	$ 35,000	$ 26,500	$ -	$ 316,110	
	BORROWED PRINCIPAL & INTEREST PAYMENT (20 YEARS AT 3%)			$ -	$ (7,595)	$ (9,410)	$ (16,132)	$ (16,804)	$ (9,410)		
	TOTAL P&E PAYMENTS			$ -	$ (7,595)	$ (17,006)	$ (33,137)	$ (49,941)	$ (59,351)		
Sewer Utility		**Sewer Utility**									
	TOTAL		$ -	$ -	$ 65,000	$ 65,000	$ 1,865,000	$ 60,000	$ 30,000	$ 2,055,000	
	TOTAL BORROWED COST			$ -	$ 65,000	$ 65,000	$ 1,865,000	$ 60,000	$ 30,000	$ 2,055,000	
	TOTAL TO BE FUNDED FROM CAPITAL BUDGET			$ -	$ -	$ -	$ -	$ -	$ -	$ -	
	BORROWED PRINCIPAL & INTEREST PAYMENT (20 YEARS AT 3%)			$ -	$ (4,369)	$ (4,369)	$ (125,357)	$ (4,033)	$ (2,016)		
	TOTAL P&E PAYMENTS			$ -	$ (4,369)	$ (8,738)	$ (134,095)	$ (138,128)	$ (140,145)		
	Rate increase **for capital expense** instead of borrowing (based on 2022 forecasted expenses not including depreciation($700,489). It also doesn't include engineering design expense of $130,000			0%	9%	9%	266%	9%	4%		
Water Utility		**Water Utility**									
	TOTAL		$ -	$ -	$ 82,500	$ 485,000	$ 130,000	$ -	$ 105,000	$ 697,500	
	TOTAL BORROWED COST			$ -	$ 82,500	$ 485,000	$ 130,000	$ -	$ 105,000	$ 697,500	
	TOTAL TO BE FUNDED FROM CAPITAL BUDGET			$ -	$ -	$ -	$ -	$ -	$ -	$ -	
	BORROWED PRINCIPAL & INTEREST PAYMENT (20 YEARS AT 3%)			$ -	$ (5,545)	$ (32,600)	$ (8,738)	$ -	$ (7,058)		
	TOTAL P&E PAYMENTS			$ -	$ (5,545)	$ (38,145)	$ (46,883)	$ (46,883)	$ (53,941)		

PROJECTS BY DEPARTMENT

Department	Project	Department		2022	2023	2024	2025	2026	2027	Total	Likely to be Borrowed
	Rate increase **for capital expense** instead of borrowing (based on 2022 forecasted expenses including depreciation($453,302).			0%	18%	91%	13%	0%	9%		
	Approx. rate increase for borrowing money (based on 2022 forecasted expenses including depreciation($453,302).			0%	1%	7%	2%	0%	2%		