



APPENDIX WR2: WATER SUPPLY, TREATMENT, AND DISTRIBUTION PLAN

Water Supply, Treatment, & Distribution

This section describes the water supply and distribution system within the City of Hopkins. Much of the information herein is duplicated with the City's Water Supply Plan developed in 2017 to meet Minnesota Department of Natural Resources (DNR) requirements.

Water Supply & Usage

AREAS SERVED BY LOCAL WATER SUPPLY SYSTEMS

The City of Hopkins completed their 3rd generation Water Supply Plan in 2017 and the following data has been taken from that plan. The Water Supply Plan contains a summary of water demand, water storage and treatment, source water condition, water conservation, emergency preparedness, and the Capital Improvement Plan (CIP).

The City of Hopkins is a fully developed community without need for future utility extensions to serve new growth. Expansions of the City's water distribution system is triggered by redevelopments. The attached **Figure W-1** illustrates the layout of Hopkins' water distribution network and water supply infrastructure.

WATER TREATMENT

The City of Hopkins has two water treatment facilities, but one (the Moline Tower Treatment Facility) is not currently in service. The City's active Elmo Park Water Treatment Facility (WTF) was constructed in 1967 and has a capacity of 8.64 MGD. It is a gravity filtration system which also utilizes the addition of some common treatment chemicals to remove iron and manganese. Residual materials resulting from the treatment process are discharged to the sanitary sewer. Reclaim water is discharged to a sediment pond in front of the facility, which ultimately discharges to the City's storm sewer system. The Elmo Park WTF is served by wells 4 – 6. The average maximum day demand is approximately 4.03 MGD, yielding a surplus in treatment capacity of 4.61 MGD, which is sufficient for current demands. Table 7 indicates that the projected peak day demand will continue to increase as the population increases. By 2025, the projected peak day demand is 4.07 MGD, which is still less than the plant capacity. There is adequate treatment capacity for the next 10 – 15 years.

WATER STORAGE

Currently, the City of Hopkins has four (4) storage facilities totaling 3.20 million gallons of storage capacity as shown in **Table WT-1**. There are two elevated storage facilities and two ground storage facilities. The two elevated storage facilities have a combined total capacity of 2.2 million gallons while the two ground storage facilities have a combined capacity of 1.0 million gallons. Since there are pumps and a generator that can pump the water in the event of a power failure, the 1.0 million gallons in the reservoirs at the WTFs are included in the total storage capacity. AWWA recommends that the storage capacity should equal or exceed the average day demand. Based on the City's historic water usage demand (**Table WT-2**), the current storage capacity is adequate for current average day demands. Based on the projected future water usage and future average day projections (**Table WT-3**), by 2025, there is an estimated average day demand of 2.30 MGD, leaving a surplus storage capacity of 900,000 gallons. Looking at 2030, the projected average day demand is 2.33, yielding a surplus in storage of 873,000 gallons. There is adequate storage capacity for the City of Hopkins for the next 10 to 15 years and beyond.

The City has four storage facilities, as summarized in **Table WT-1** below. The locations of these facilities

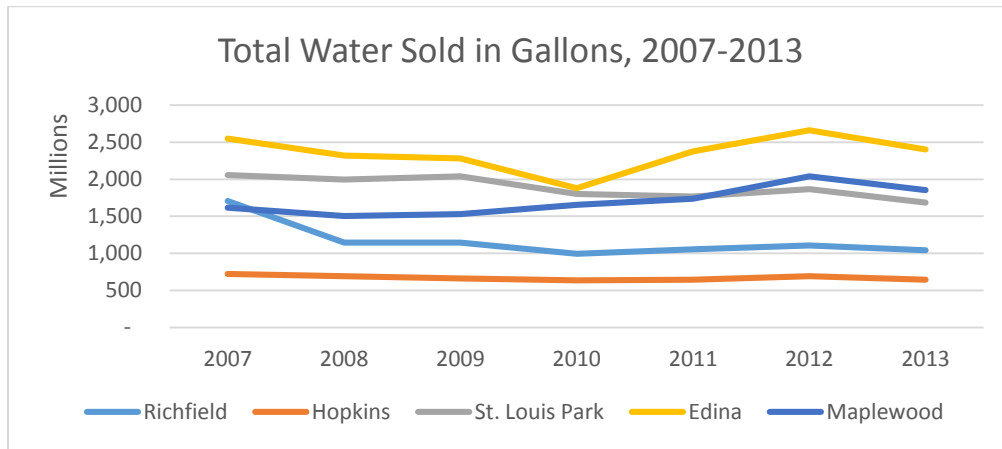
can be seen in **Figure W-1**.

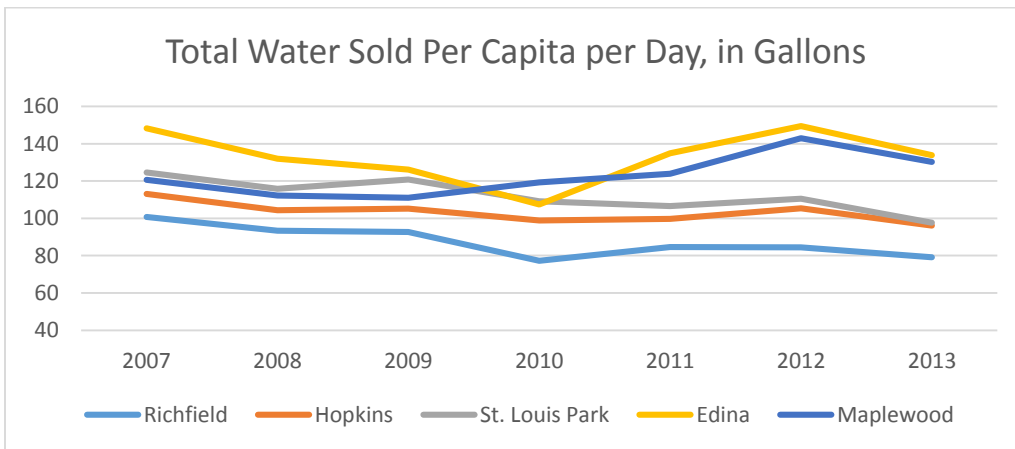
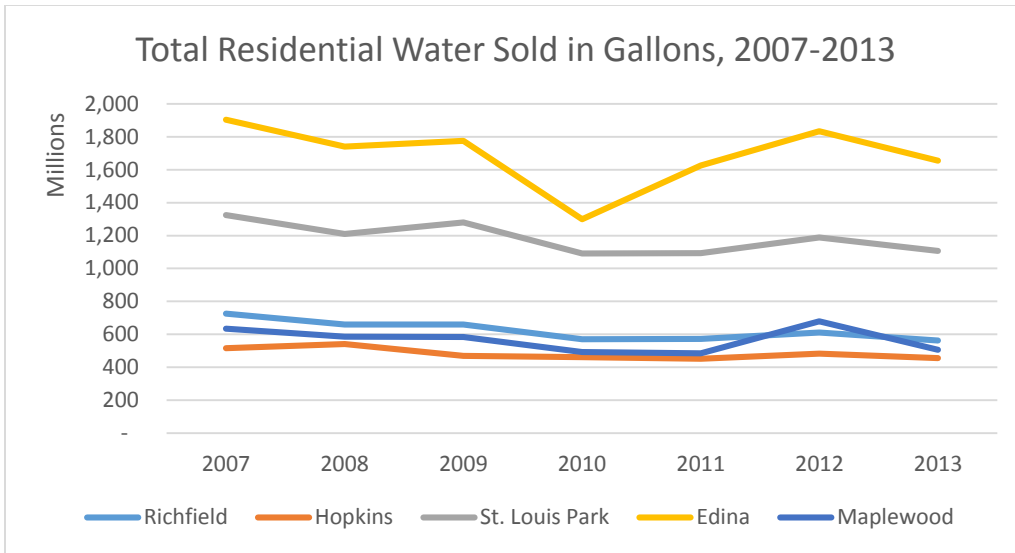
Table WT-1. Storage Capacity as of December 2017				
Structure Name	Type of Storage Structure	Year Constructed	Primary Material	Storage Capacity (Gallons)
Elmo Park WTF Clearwell	Ground storage	1967	Concrete	500,000
Blake Hill Tower	Elevated storage	1962	Steel	500,000
Moline WTF Clearwell*	Ground storage	1963	Concrete	1,700,000
Moline Tower*	Elevated storage	1963	Steel	500,000
Total	NA	NA	NA	3,200,000

*Note: The Moline storage tanks are combined into a single storage structure. The system has an electronically operated valve that transfers water from the high-pressure elevated tank to fill the lower pressure ground storage tank.

Historic Water Demand & Projected Water Use

Hopkins has the lowest water use among comparable and neighboring cities. Hopkins’s water use has gradually decreased since 2007. Residential water use is higher than commercial/industrial water use. The following charts show the amount of water sold in Hopkins compared to other communities.





The historic water demand in the City of Hopkins is shown in **Table WT-2**. This table quantifies the volume of water pumped and used for all purposes.

Table WT-2. Historic Water Demand															
Year	Pop. Served	Total Connections	Residential Water Delivered (MG)	C/I/I Water Delivered (MG)	Water used for Non-essential	Wholesale Deliveries (MG)	Total Water Delivered (MG)	Total Water Pumped (MG)	Water Supplier Services	Percent Unmetered/Unaccounted	Average Daily Demand (MGD)	Max. Daily Demand (MGD)	Date of Max. Demand	Residential Per Capita Demand (GPCD)	Total per capita Demand (GPCD)
2005	17,367	3,126	490	148	0.0	0	638	919	0.0	30.6%	2.52	4.85	7/17/2005	77.3	145.0
2006	17,363	3,552	563	152	0.0	0	715	955	0.0	25.1%	2.62	4.50	7/7/2006	88.8	150.7
2007	17,360	3,914	516	207	0.0	0	723	921	0.0	21.5%	2.52	4.58	7/3/2007	81.5	145.3
2008	17,300	3,562	541	151	0.0	0	692	842	0.0	17.8%	2.31	3.80	7/16/2008	85.6	133.3
2009	17,350	3,556	469	195	0.0	0	664	813	0.0	18.4%	2.23	4.00	7/12/2009	74.0	128.4
2010	17,145	3,559	461	174	0.0	0	635	794	0.0	20.1%	2.18	3.74	8/28/2010	73.7	126.9
2011	17,145	3,723	452	146	46.7	0	644	820	0.0	21.4%	2.25	3.67	6/30/2011	72.2	131.0
2012	17,591	3,660	482	208	0.0	0	690	772	0.0	10.6%	2.11	4.65	9/3/2012	75.1	120.2
2013	17,591	3,682	456	148	41.6	0	645	818	0.0	21.0%	2.24	3.72	9/24/2013	71.0	127.3
2014	17,590	3,660	436	208	0.0	0	644	813	0.0	20.8%	2.23	3.73	7/30/2014	67.9	126.6
2015	18,971	3,606	435	185	0.0	0	620	734	0.0	15.6%	2.01	3.55	6/29/2015	62.8	106.0
2016	19,227	3,566	425	182	0.0	0	614	760	7.0	19.3%	2.08	3.54	7/14/2016	60.6	108.3
Avg. 2010-2016	17,894	3,637	450	178	13	0	642	787	1.0	18.4%	2.16	3.80	N/A	69.0	120.9

MG – Million Gallons **MGD** – Million Gallons per Day **GPCD** – Gallons per Capita per Day

The historical total per capita demand from 2011 through 2016 of 120 gallons per capita per day (gpcd) was used to make water demand projections through 2040. Based on historical trends in per capita demand and future population projections, it is acceptable to use 120 gpcd through 2040. The reason 2011 through 2016 data was used is that the City has implemented water conservation measures over the last several years and the per capita demand reflects those efforts. It is important to consider these water conservation measures when making projections as they can help make accurate projections with regards to the City’s plan of conserving water and reducing per capita demands. Commercial and industrial development was accounted for by using the historical demands to make projections. It is assumed that the rate at which commercial and industrial water usage increases will remain the same as the historical demands.

Table WT-3 illustrated the total projected water demand in the City of Hopkins. These water demand projections are based on historical usage trends and the anticipated increase in population through 2040 per the Metropolitan Council forecasts. The projections assume that the projected service population will equal the projected total population. As shown in the table, the population is projected to remain constant until 2022 where the Metropolitan Council until which time the City has a projected population of 19,000 people. Subsequent years are based on linear interpolation between 2020 and 2030 projections.

Table WT-3. Projected Annual Water Demand					
Year	Projected Total Population ⁽¹⁾	Projected Population Served	Projected Total Per Capita Water Demand (GPCD)	Projected Average Daily Demand (MGD)	Projected Maximum Daily Demand (MGD) ⁽²⁾
2016	19,000	19,000	120	2.28	4.03
2017	19,000	19,000	120	2.28	4.03
2018	19,000	19,000	120	2.28	4.03
2019	19,000	19,000	120	2.28	4.03
2020	19,000	19,000	120	2.28	4.03
2021	19,000	19,000	120	2.28	4.03
2022	19,000	19,000	120	2.28	4.03
2023	19,050	19,050	120	2.28	4.05
2024	19,100	19,100	120	2.29	4.06
2025	19,150	19,150	120	2.30	4.07
2030	19,400	19,400	120	2.33	4.12
2040	19,900	19,900	120	2.39	4.23

¹ Total Population Projections based on Metropolitan Council (2016 population estimate is from MN State Demographer)

² Peaking Factor based on historical data

GPCD – Gallons per Capita per Day

MGD – Million Gallons per Day

The projected average day demand was calculated by multiplying the projected total per capita demand of 120 gpcd by the projected service area population. The projected average day demand shows a constant demand through 2022 because it is assumed the population will remain constant. The 2016 population estimate from the MN State demographer was 19,000 while the Metropolitan Council predicts the population for Hopkins will reach 19,000 sometime after 2022. As the population increases and the per capita demand remains constant, the average day demand will slightly increase. By 2040, a projected average day demand of 2.39 MGD is expected.

The projected maximum day demand was calculated by multiplying the average day demand by a peaking factor. The peaking factor used to calculate the projected maximum day demand is the average historical peaking factor from 2005 through 2016 of 1.77. This peaking factor was used to project maximum day demands up to 2040. By 2040, a maximum day demand of 4.23 MGD is projected.

WATER SOURCE QUALITY AND QUANTITY MONITORING

Table WT-4. Information About Water Source Quality and Quantity Monitoring					
MN Unique Well # or Surface Water ID	Aquifer Name	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
204573 Well 1	Dresbach-Shakopee	Production Well	<input checked="" type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input checked="" type="checkbox"/> daily <input checked="" type="checkbox"/> monthly <input type="checkbox"/> quarterly <input checked="" type="checkbox"/> annually	<input type="checkbox"/> SCADA <input checked="" type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
204068 Well 4	Jordan-Shakopee	Production Well	<input checked="" type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input checked="" type="checkbox"/> daily <input checked="" type="checkbox"/> monthly <input type="checkbox"/> quarterly <input checked="" type="checkbox"/> annually	<input type="checkbox"/> SCADA <input checked="" type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
204570 Well 5	Jordan-Shakopee	Production Well	<input checked="" type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input checked="" type="checkbox"/> daily <input checked="" type="checkbox"/> monthly <input type="checkbox"/> quarterly <input checked="" type="checkbox"/> annually	<input type="checkbox"/> SCADA <input checked="" type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
112228 Well 6	Jordan-Shakopee	Production Well	<input checked="" type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input checked="" type="checkbox"/> daily <input checked="" type="checkbox"/> monthly <input type="checkbox"/> quarterly <input checked="" type="checkbox"/> annually	<input type="checkbox"/> SCADA <input checked="" type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge

Water Conservation

In Hopkins, the average water usage has been progressively decreasing. For residential use, the number of gallons per person per day of water usage has dropped from 80 gallons in 2005-2010, to 68 gallons in 2011-2016. Additionally, the average *total* water usage has decreased from 138 gallons per person per day in 2005-2010 to 120 gallons in 2011-2016.

The Minnesota Department of Natural Resources, and perhaps the Metropolitan Council, are anticipated to intensify restrictions on water usage in the future to reduce the burden that is currently being placed on the aquifers. Continuation of existing water conservation policies and encouraging reductions in water usage will be beneficial moving forward.

Goal: Conserve water resources by continuing education and incentive programs to ensure the city has adequate water supply to meet the long term needs of the citizens.

Policies:

- Identify and promote water conservation strategies through coordination and outreach with private landowners, developers, citizens, and other local governments.
- Raise water conservation awareness through strategically placing educational signage at decision-making points, such as faucets, showers, and water fountains.
- Encourage the use of drought-tolerant plantings, promote irrigation systems that utilize reclaimed water, and incentivize systems that collect rain water for reuse.
- Meter or otherwise estimate water usage for system maintenance/management and work to identify leaks or wasted water in the system.