

MARCH 2023

# **WATER CONSERVATION AND PEAK DEMAND MANAGEMENT**

NEBRASKA NATURAL RESOURCES COMMISSION  
WATER SUSTAINABILITY FUND (WSF) APPLICATION

**METROPOLITAN**  
UTILITIES DISTRICT

# NEBRASKA NATURAL RESOURCES COMMISSION

## Water Sustainability Fund

Application for Funding

Section A.

### ADMINISTRATIVE

**PROJECT NAME:** MUD Water Conservation and Peak Demand Management

**SPONSOR'S PRIMARY CONTACT INFORMATION (Not Consultant's)**

Sponsor Business Name: Metropolitan Utilities District

Sponsor Contact's Name: ~~Michael Koenig~~ Stephanie Henn

Sponsor Contact's Address: 7350 World Communications Dr.; Omaha, NE 68122-4041

Sponsor Contact's Phone: ~~402-980-9031~~ 402-504-7902

Sponsor Contact's Email: ~~Michael\_Koenig@MUDnebr.com~~ stephanie\_henn@mudnebr.com

1. **Funding** amount requested from the Water Sustainability Fund: Grant

**Grant** amount requested. \$250,000

- If requesting less than 60% cost share, what %? 49.9%

**If a loan is requested** amount requested. \$ N/A

- How many years repayment period? N/A
- Supply a complete year-by-year repayment schedule. N/A

2. **Neb. Rev. Stat. § 2-1507 (2)**

Are you applying for a **combined sewer overflow project**? YES  NO

**If yes:**

- Do you have a Long Term Control Plan that is currently approved by the Nebraska Department of Environmental Quality? **YES** **NO** **N/A**
- Attach a copy to your application. **N/A**
- What is the population served by your project? **N/A**
- Provide a demonstration of need. **N/A**
- **Do not complete the remainder of the application.**

3. **Permits Required/Obtained** Attach a copy of each that has been obtained. For those needed, but not yet obtained (box “**NO**” checked), 1.) State when you will apply for the permit, 2.) When you anticipate receiving the permit, and 3.) Your estimated cost to obtain the permit.

(N/A = Not applicable/not asking for cost share to obtain)  
 (Yes = See attached)  
 (No = Might need, don't have & are asking for 60% cost share to obtain)

G&P - T&E consultation (required)	<b>N/A</b> <input checked="" type="checkbox"/> Obtained: <b>YES</b> <input type="checkbox"/> <b>NO</b> <input type="checkbox"/>
DNR Surface Water Right	<b>N/A</b> <input checked="" type="checkbox"/> Obtained: <b>YES</b> <input type="checkbox"/> <b>NO</b> <input type="checkbox"/>
USACE (e.g., 404/other Permit)	<b>N/A</b> <input checked="" type="checkbox"/> Obtained: <b>YES</b> <input type="checkbox"/> <b>NO</b> <input type="checkbox"/>
FEMA (CLOMR)	<b>N/A</b> <input checked="" type="checkbox"/> Obtained: <b>YES</b> <input type="checkbox"/> <b>NO</b> <input type="checkbox"/>
Local Zoning/Construction	<b>N/A</b> <input checked="" type="checkbox"/> Obtained: <b>YES</b> <input type="checkbox"/> <b>NO</b> <input type="checkbox"/>
Cultural Resources Evaluation	<b>N/A</b> <input checked="" type="checkbox"/> Obtained: <b>YES</b> <input type="checkbox"/> <b>NO</b> <input type="checkbox"/>
Other (provide explanation below)	<b>N/A</b> <input type="checkbox"/> Obtained: <b>YES</b> <input checked="" type="checkbox"/> <b>NO</b> <input type="checkbox"/>

Per Nebraska Title 179, Chapter 7 for “Siting, Design and Construction of Public Water Systems,”<sup>1</sup> the state provides an option for utilities to pay for a three-year renewal program where the utility does not have to submit plans and specifications unless there are changes of “sanitary significance”. All improvements associated with this study fall under this three-year agreement.

<sup>1</sup> [TITLE 179 \(nebraska.gov\)](http://nebraska.gov)

#### 4. **Partnerships**

List each Partner / Co-sponsor, attach documentation of agreement:

**Papio-Missouri River Natural Resources District:** MUD is the largest supplier of municipal water services within this NRD. MUD coordinates with the P-MRNRD on annual groundwater withdrawals from their municipal wells located in Douglas, Saunders, and Sarpy Counties. This pumping is reported in the P-MRNRD's Integrated Management Plan (IMP) and Lower Platte River Basin annual report. Additionally, MUD supplies treated drinking water to P-MRNRD's Washington County Rural Water System which provides wholesale water to Fort Calhoun.

MUD and the Papio-Missouri River NRD are both part of the Lower Platte River Drought Consortium that meets quarterly to discuss drought impacts as part of the Lower Platte Drought Contingency Plan. A copy of that agreement is attached.

**University of Nebraska – Lincoln:** MUD has supported the UNL Extension, Master Gardeners and Village Pointe Sustainability Garden in west Omaha since the early 2000s. This is a wise water use flower garden in which the District provides funding for plants, signage, mulch, and other necessary resources. The District also promotes the project in newsletters and other communications. The District's education and outreach efforts with UNL will be augmented as part of the strategic communications activities in the proposed project.

**Habitat for Humanity of Omaha:** MUD partners with Habitat for Humanity of Omaha and other local agencies for water audit programs to update leaking or inefficient fixtures. Those collaborative efforts will continue through this project with a Water Loss Audit update and new leak loggers.

Identify the roles and responsibilities of each Partner / Co-sponsor involved in the proposed project regardless of whether each is an additional funding source.

None of the MUD partners listed will be providing funding for the proposed project.

**Papio-Missouri River Natural Resources District:** Deep coordination and regular communication with P-MRNRD will be vital to the successful delivery of the proposed project.

**University of Nebraska – Lincoln:** The District's education and outreach efforts with UNL will be augmented as part of the strategic communications activities in the proposed project.

**Habitat for Humanity of Omaha:** MUD's collaborative efforts with Habitat for Humanity of Omaha will continue through this project with a Water Loss Audit update and new leak loggers.

5. **Other Sources of Funding**

Identify the costs of the entire project, what costs each other source of funding will be applied to, and whether each of these other sources of funding is confirmed. If not, please identify those entities and list the date when confirmation is expected. Explain how you will implement the project if these sources are not obtained.

Approximately 50 percent of the funding is requested from the grant. The other 50 percent will be funded by the District from revenues from the District's ratepayers. Additionally, MUD has evaluated other potential sources of funding related to this work including the Bureau of Reclamation's WaterSMART Program. MUD is planning to submit an application for the WaterSMART Water Conservation Field Services Program. This application is due May 31, 2023. This program can fund up to \$100,000 per agreement within the geographic area of the Nebraska-Kansas Area Office.

6. **Overview**

In 1,000 words or less, provide a brief description of your project including the nature/purpose of the project and its objectives. Do not exceed one page!

Metropolitan Utilities District (MUD, or the District) provides drinking water to approximately 670,000 people, or to more than one-third of all Nebraskans. MUD owns and operates three water treatment plants – Florence, Platte West and Platte South – with a total treatment capacity of 318 million gallons per day (MGD). **Figure 1** displays MUD’s current service area. The community utilizes several water sources including the Missouri and Platte Rivers and the Dakota sandstone aquifer. MUD’s largest treatment plant, the Florence Water Treatment Plant (WTP), draws its supply from a surface water intake on the Missouri River. The other two treatment plants rely on groundwater.

The greatest water demands in the Omaha area occur in the morning during summer weekdays, particularly in July and August, due to lawn irrigation. MUD’s level of service criteria is to maintain water main pressures of at least 40 PSI during normal operations, but water pressure fluctuates during peak demand. In summer 2022, the District encountered difficulties meeting peak hour demands due to substantial water usage and peak hour demands reached 388 MGD.

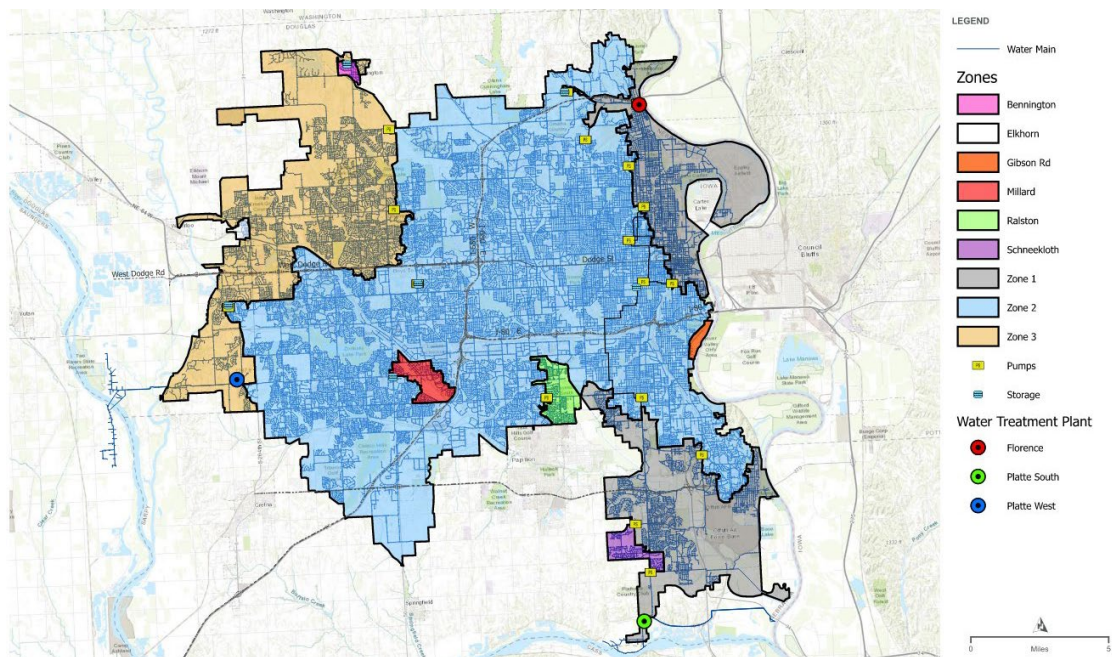
MUD anticipates continued growth in maximum day water demand over the next 25 years (e.g., from 180 MGD in 2020 to a projected 243 MGD in 2050), which only exacerbates these vulnerabilities. Without changes to customer behavior, the increases in the peak hour demands are anticipated to be even larger, with 2022’s peak hour demands growing to over 510 MGD by 2050. **Figure 2** shows the projected water demands within the District’s service area.

**Figure 3** shows how the demand fluctuates throughout the day. One of the key objectives of this study is to reduce and flatten the “peak” of the orange line by reducing total usage, shifting some of that usage to other times of the day, or by moving some demand from Monday/Wednesday/Friday to Tuesday/Thursday/Saturday. In the most recent peak season, M/W/F peaks were 70 MGD higher than the peak demands on T/Th/Sat.

MUD’s 2022 Water System Master Plan aims to develop a plan to resolve current deficiencies, reliably meet projected demands, proactively manage assets, and set up the District to improve drinking water sustainability and resiliency through the year 2050. The Master Plan proposes short- and long-term improvements to meet these goals. Several of these improvements are included in the proposed MUD Water Conservation and Peak Demand Management that is detailed in this grant application. Specifically, this project will include:

- **Measurement and Monitoring**, which includes purchasing devices on all meters that are 4” or larger to allow for assessment of customer diurnal and purchasing of leak loggers for improved leak detection.
- **Hydraulic Modeling**, which includes model updates from SETFlow data loggers and hydrant logger data.
- **Existing Program Assessment**, which includes identification and documentation of current conservation and peak demand management strategies and a program assessment of past program performance. The water loss audit will be updated with more accurate data and current strategies from the program will be assessed.
- **Conservation and Peak Demand Management Program Development and Planning**, which includes brainstorming and identification of new strategies, incentives, policies, and pilots. Additionally, the potential for stormwater reuse and rainwater harvesting for landscape use will be evaluated. Once new strategies and potential solutions are identified, an implementation plan will be consolidated.
- **Development of Dynamic Visualization Tools** to monitor progress toward newly established metrics including percentage of non-revenue water or water loss, peak hour factor, and number of customer meters with less than 40 PSI of pressure at any given time.
- **Stakeholder Engagement and Strategic Communications** to develop customer-facing videos and informational materials to show the benefits of water conservation and peak demand management.
- **Water Conservation and Peak Demand Management Report**, which will summarize the findings of previous activities and outline best practices and a roadmap for implementation.

MUD is requesting \$250,000 from the Nebraska Resources Commission’s Water Sustainability Fund to support the above activities to ultimately improve the District’s water conservation, peak demand management, and sustainability efforts.



**Figure 1 - Existing Water Service Area**

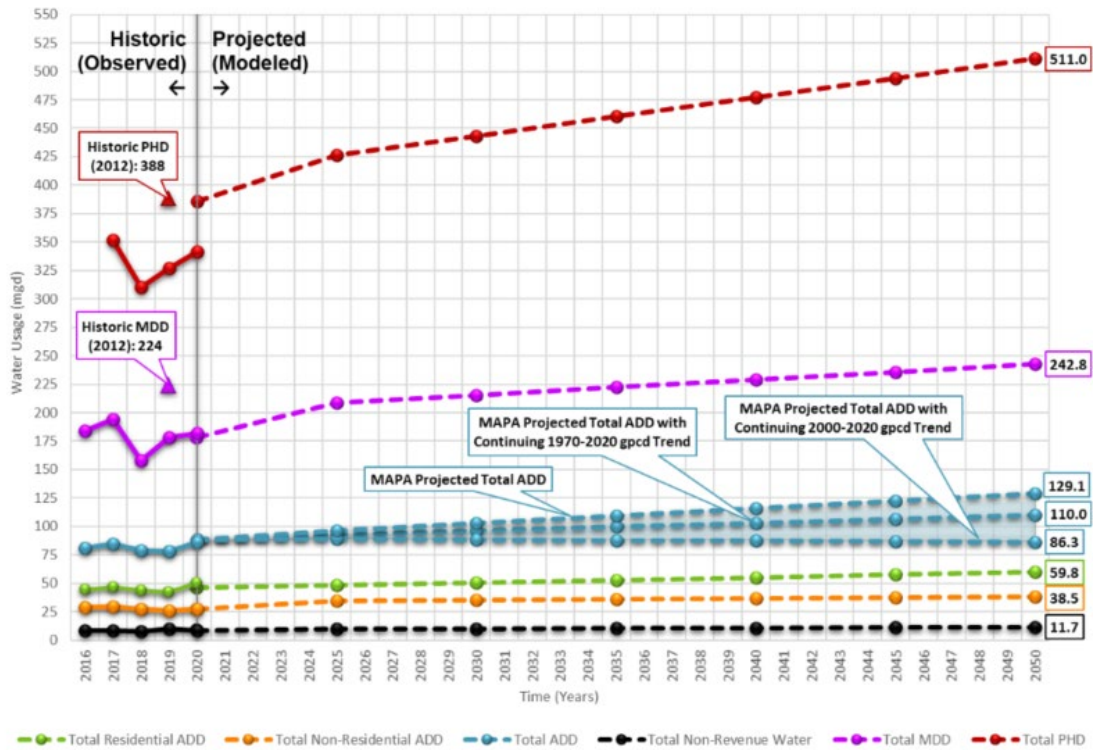


Figure 2 - Historical and Projected Water Usage to 2050

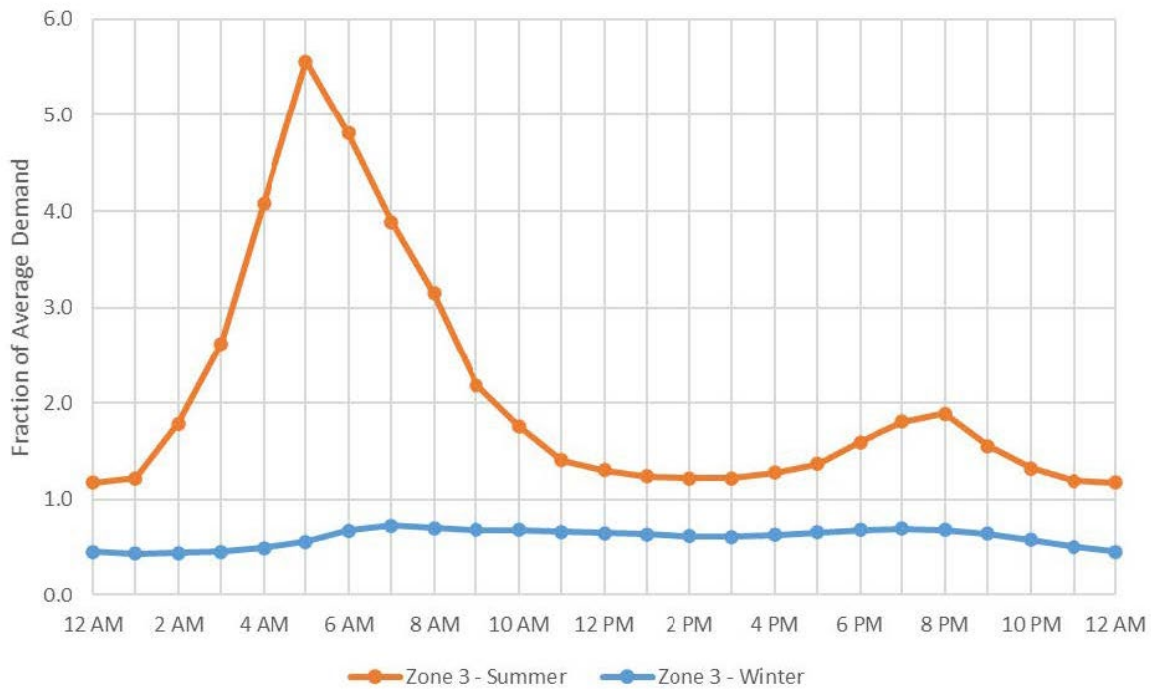


Figure 3 - Zone 3 Summer and Winter Diurnal Demand Patterns



7. **Project Tasks and Timeline**

Identify what activities will be conducted to complete the project, and the anticipated completion date.

**For multiyear projects** please list (using the following example):

- What activities (Tasks) are to be completed.
- An estimate of each Tasks expenditures/cost per year.
- Activities in years 4 through project completion under a single column.

**Table 1: Cost Summary**

Tasks	Year 1	Year 2	Year 3	Total \$ Amt.
Measurement and Monitoring	\$201,325			\$201,325
Hydraulic Modeling – Scenario Analysis & Assessment	\$25,300	\$16,000	\$14,500	\$55,800
Existing Program Assessment		\$32,500	\$17,500	\$50,000
Conservation and Peak Demand Management Program Development & Planning		\$56,000		\$56,000
Quantification of Benefits and Results	\$7,100	\$21,500	\$13,000	\$41,600
Stakeholder Engagement and Strategic Communications		\$54,000		\$54,000
Water Conservation and Peak Demand Management Report			\$16,000	\$16,000
Project Management	\$7,000	\$9,500	\$9,750	\$26,250
<b>Total</b>				\$500,975

8. **IMP**

Do you have an **Integrated Management Plan** in place, or have you initiated one? YES  NO  Sponsor is not an NRD

## Section B.

### DNR DIRECTOR'S FINDINGS

#### **Prove Engineering & Technical Feasibility**

(Applicant must demonstrate compliance with Title 261, CH 2 - 004)

1. Does your project include physical construction (defined as moving dirt, directing water, physically constructing something, or installing equipment)?

YES  NO

If you answered "YES" you must answer all questions in section 1.A.

If you answer "NO" you must answer all questions in section 1.B.

If "YES", it is considered mostly structural, so answer the following:

- 1.A.1 Insert a feasibility report to comply with Title 261, Chapter 2, including engineering and technical data; .
- 1.A.2 Describe the plan of development (004.01 A); N/A
- 1.A.3 Include a description of all field investigations made to substantiate the feasibility report (004.01 B); N/A
- 1.A.4 Provide maps, drawings, charts, tables, etc., used as a basis for the feasibility report (004.01 C); N/A
- 1.A.5 Describe any necessary water and/or land rights including pertinent water supply and water quality information (004.01 D); N/A
- 1.A.6 Discuss each component of the final plan (004.01 E); N/A
- 1.A.7 When applicable include the geologic investigation required for the project (004.01 E 1); N/A
- 1.A.8 When applicable include the hydrologic data investigation required for the project (004.01 E 2); N/A
- 1.A.9 When applicable include the criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria (004.01 E 3). N/A

If "NO", it is considered mostly non-structural, so answer the following:

- 1.B.1 Insert data necessary to establish technical feasibility (004.02);

Technical feasibility for the proposed project is detailed in the attached 2022 Water System Master Plan, and Addendum No. 1. The use of meters to measure water use is well documented and technically supported by several manufacturers. Flow meter accuracy is calibrated and then checked during setup. Flow meter data will be graphed and compared to temperature and precipitation data, hopefully providing an inverse statistical relationship that can help better predict water use and provide forecasts during drought periods.

The District has implemented leak loggers in the last few years and has had success identifying leaks, and staff are growing in their ability to analyze and utilize the information from the leak loggers.

#### 1.B.2 Discuss the plan of development (004.02 A);

During the three-year timeframe of this grant, approximately 115 new meter devices for assessing customer diurnal and approximately 90 leak loggers will be purchased for MUD's water service area. The estimated cost of each meter is \$435, and the estimated cost of each leak logger is \$1700. The WSF grant will reimburse some of these costs, and additional costs will be the responsibility of MUD. These new meters and leak loggers, in conjunction with updated hydraulic modeling, will be used to inform the other project activities, including programmatic assessments, conservation and peak demand management development and planning, and quantification of benefits and results.

**Figure 4** below shows the proposed schedule for the project by quarter and task.

- 1.B.3 Describe field or research investigations utilized to substantiate the project conception (004.02 B); In 2022 MUD released its Water System Master Plan, which presented recommended improvements for the MUD’s transmission and distribution facilities.
- 1.B.4 Describe any necessary water and/or land rights (004.02 C); No water rights or land rights are necessary for this project.
- 1.B.5 Discuss the anticipated effects, if any, of the project upon the development and/or operation of existing or envisioned structural measures including a brief description of any such measure (004.02 D). N/A

**Prove Economic Feasibility**  
 (Applicant must demonstrate compliance with Title 261, CH 2 - 005)

- 2. Provide evidence that there are no known means of accomplishing the same purpose or purposes more economically, by describing the next best alternative.

Task		2023		2024				2025			
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>100</b>	<b>Measurement and Monitoring Task</b>										
110	Purchasing of device on the meter to allow for assessment of customer diurnal										
120	Purchasing of leak loggers for leak detection										
130	Paddock DMA and Reduced Pressure Zone										

**Figure 4 - Proposed Project Schedule**

220	Model Updates from hydrant logger data in Task 120										
230	Model Updates from DMAs										
<b>300</b>	<b>Existing Program Assessment Task</b>										
310	Identification/Documentation of Current Conservation and Peak Demand Management Strategies										
320	Program Assessment: Assess past program performance and develop metrics										
330	Update Water Loss Audit; and Dive deeper with additional data										
340	Assessment of Current Strategies Summary TM from Year 1										
350	Assessment of Current and Newly Implemented Strategies Summary TM										
<b>400</b>	<b>Conservation and Peak Demand Management Program Development &amp; Planning</b>										
410	Brainstorming Workshop										
420	Identification of New Strategies/Incentives/Policies/Pilots										
430	Evaluate potential for stormwater reuse and/or rainwater harvesting for landscape use										
440	Implementation of Peak Demand Management and Conservation Strategies										
450	Assess potential for peak demand charge										
460	Assess potential for supply side alternatives such as ASR										
470	Implementation Plan Summary TM										
<b>500</b>	<b>Quantification of Benefits and Results</b>										
510	Develop dashboard for customer water usage										
520	Update digital dashboards w/ new data										
530	Quantification of Effectiveness of Strategies										
540	Quantification of Benefits and Monetary Savings										
550	Program Benefits Summary TM										
<b>600</b>	<b>Stakeholder Engagement and Strategic Communications</b>										
610	Development of POTENTIAL Customer facing video for website + commercial										
620	Development of public facing one-pager on benefits of peak demand management										
<b>700</b>	<b>Water Conservation and Peak Demand Management Report</b>										
<b>800</b>	<b>Project Management</b>										

The alternative to the peak demand management study is to build larger storage reservoirs and pump stations to meet the peak hour demands. For Pressure Zone 3 alone, this would require an 18 MG storage reservoir and 24 MGD pump station. By reducing the peak hour demands, the District can significantly reduce the required size of these facilities saving both capital costs and long term operations costs. The estimated costs for an 18 MG storage reservoir and 24 MGD pump station are:

- **At-grade storage (18 MG):** \$34,900,000
- **Pump Station (24 MGD):** \$9,450,000
- **Total Opinion of Probable Costs (OPC):** \$44,350,000

After implementing this study, it is reasonable to assume that the peak hour reductions will allow for the sizing of facilities to be as follows:

- **At-grade storage (10 MG):** \$20,700,000
- **Pump Station (10 MGD):** \$6,060,000
- **Total OPC:** \$26,760,000

It is anticipated that the \$250,000 grant, with a total estimated project cost of \$500,975, could be leveraged to save potentially several millions in capital costs, and an additional annual energy savings of approximately \$35,000. These savings could compound by benefits to other pressures zones including Pressure Zone 2, which is the largest in the system.

3. Document all sources and report all **costs** and **benefit data** using current data, (commodity prices, recreation benefit prices, and wildlife prices as prescribed by the Director) using both dollar values and other units of measurement when appropriate (environmental, social, cultural, data improvement, etc.). The period of analysis for economic feasibility studies is the project life. ([Title 261, CH 2 - 005](#)).

The project will allow for the following benefits:

1. **Capital Cost Savings from Reduced Peak Hour Demands:** The peak demand management study will result in a potential capital cost savings of several million in Pressure Zone 3 (estimated \$17.6 million in savings). There are potential savings for Pressure Zone 2 as well.
2. **Annual operational savings from lower peak hour demands:** Annual energy savings are estimated to be \$35,000 for Pressure Zone 3 from a reduction in electricity usage because energy used to pump the water is stored within a water tower, so water does not need to be re-pumped to pressurize the system. Peak electrical demand will be reduced because pumps can run slowly over the course of a day to fill the tower rather than need to ramp up at a moment's notice to meet the system's instantaneous water demands. Annual energy savings for Pressure Zone 2 have not been estimated but are expected to be larger than those for Pressure Zone 3.

3. **Reduced Groundwater Depletions:** The additional metering and leak loggers are expected to reduce the District’s current non-revenue water totals by 10 percent (from 2025’s estimate of 9.9 MGD to 8.9 MGD), which would save approximately 360 million gallons annually.
4. **Enhanced Flexibility:** Additionally, the reduction in peak hour demands will allow the District to have the *flexibility* to meet more of the demand from the Florence WTP (which takes water from the Missouri River as a surface water source) as opposed to being forced to maximize the capacity of the Platte South and Platte West WTPs (which are both dependent on the state’s groundwater). This could further enhance the District’s ability to reduce aquifer depletions in future years.
5. **Increased system monitoring and metering:** The proposed project would include activities to purchase new metering devices and leak loggers, as well as updates to hydraulic models, which will enable more detailed and accurate water loss audits and analyses to be conducted.

3.A Describe any relevant cost information including, but not limited to the engineering and inspection costs, capital construction costs, annual operation and maintenance costs, and replacement costs. Cost information shall also include the estimated construction period as well as the estimated project life (005.01).

Relevant project cost information is detailed in **Table 1** and the timeline for completion of each element of the project is detailed in **Figure 4**. The project is estimated to be completed in three years with a total estimated cost of \$500,975.

3.B Only primary tangible benefits may be counted in providing the monetary benefit information and shall be displayed by year for the project life. In a multi-purpose project, estimate benefits for each purpose, by year, for the life of the project. Describe intangible or secondary benefits (if any) separately. In a case where there is no generally accepted method for calculation of primary tangible benefits describe how the project will increase water sustainability, in a way that justifies economic feasibility of the project such that the finding can be approved by the Director and the Commission (005.02).c

A summary of the quantified benefits are included in the response to question 3 and in **Table 2** below. The enhanced flexibility and increased system monitoring benefits were not quantified because they cannot be measured or realized until fully implemented.

**Table 2: Benefits Summary**

Benefits	Savings Amount	Occurrence
Operational Savings from Pump cost reductions	\$35,000	Annual
Capital Cost Savings	Up to \$17.6 million	One-Time
Reduction in Main Breaks	16,000	Annual
Reduction in water loss	360 million gallons	Annual

3.C Present all cost and benefit data in a table to indicate the annual cash flow for the life of the project (005.03).

**Table 3: Cash Flow Summary**

Calendar Year	Activity	Costs	Benefits	Notes
2024	Measurement and Monitoring	\$201,325		
	Hydraulic Modeling Updates	\$25,300		
	Quantification of Benefits and Results	\$7,100		
	Project Management	\$7,000		
	Costs subtotal:	\$240,725		
	Water loss reductions		\$ -	
	Main break reductions		\$ -	
	Benefits subtotal:		\$ -	Benefits in year one are mostly qualitative.
2025	Hydraulic Modeling Updates	\$16,000		
	Existing Program Assessment	\$32,500		
	Conservation and Peak Demand Management Program Development & Planning	\$56,000		
	Quantification of Benefits and Results	\$21,500		
	Stakeholder Engagement and Strategic Communications	\$54,000		
	Project Management	\$9,500		
	Costs subtotal:	\$189,500		
	Water loss reductions		\$ -	
	Main break reductions		\$ -	
	Benefits subtotal:		\$ -	Benefits in year two are difficult to accurately quantify.
2026	Hydraulic Modeling Updates	\$14,500		
	Existing Program Assessment	\$17,500		
	Quantification of Benefits and Results	\$13,000		
	Water Conservation and Peak Demand Management Report	\$16,000		
	Project Management	\$9,750		
	Costs subtotal:	\$70,750		
	Operational savings from pump cost reductions		\$35,000	Annual savings
	Capital cost savings		Up to \$17,600,000	One-time savings
	Water loss reductions		\$ -	360 million gallons annually
	Main break reductions		\$ -	16,000 fewer main breaks annually

	Benefits subtotal:	Up to \$17,635,000	
	<b>Total:</b>	<b>\$500,975</b>	<b>Up to \$17,635,000</b>
			Benefits and savings will continue to increase every year.

- 3.D In the case of projects for which there is no generally accepted method for calculation of primary tangible benefits and if the project will increase water sustainability, demonstrate the economic feasibility of such proposal by such method as the Director and the Commission deem appropriate (005.04). (For example, show costs of and describe the next best alternative.) **N/A**

**Prove Financial Feasibility**

(Applicant must demonstrate compliance with Title 261, CH 2 - 006)

4. Provide evidence that sufficient funds are available to complete the proposal.

MUD’s annual capital budget for FY 2023 is approximately \$120 million<sup>2</sup>. Compared to the proposed project cost estimate of \$500,975, the MUD’s annual capital budget greatly exceeds the project expenditures. If the project receives WSF funding, the remaining project activities will be included in the next budget cycle.

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace).

Metropolitan Utilities District includes operations and maintenance costs into annual budgets.

6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal. **N/A**

7. Describe how the plan of development minimizes impacts on the natural environment (i.e. timing vs nesting/migration, etc.).

The Project will reduce the peak pumpage required to pressurize the system as pumps will be able to run slowly over the course of a day to fill the tower rather than ramping up to meet instantaneous water demands. This will reduce aquifer depletion by avoiding peak demand withdrawals from MUD’s public water supply wells. This will occur along the Platte River at the Platte West and South well fields. The depletion of these wells has a direct effect on whether or not the Platte River are gaining or losing reaches. This impact was documented in 2018 USGS publication, Groundwater movement and interaction with surface water near the confluence of the Platte and Elkhorn rivers, Nebraska, 2016-18<sup>3</sup>.

<sup>2</sup> [approved board docs 120722.pdf \(mudomaha.com\)](#) (Page 48 for annual projected spending for water utility)

<sup>3</sup> <https://www.usgs.gov/publications/groundwater-movement-and-interaction-surface-water-near-confluence-platte-and-elkhorn>



Some areas of the P-MRNRD in the Lower Platte Basin are habitats to three federally listed endangered species, and P-MRNRD has made substantial efforts to promote wildlife habitat improvement. The proposed project will aid regional NRD efforts to meet its obligation under the instream flow appropriation permit granted to the Nebraska Game and Parks Commission for the central and lower Platte River on June 26, 1998.

8. Explain how you are qualified, responsible and legally capable of carrying out the project for which you are seeking funds.

MUD derives its authority for this project under Neb. Rev. Stat. 14-2101. Below is an excerpt from MUD's Water Rules<sup>4</sup>:

*“These Rules and Regulations are made by authority of Neb. Rev. Stat. 14-2101 et seq which provide, in part that the board of directors shall also have authority to make such rules and regulations for the conduct of the utilities controlled and operated by the metropolitan utilities district and the use and measurement of water or natural gas supplied by the district as it may deem proper, including the authority to cut off any natural gas or water service for nonpayment, for non-maintenance of the pipes and plumbing connected with the supply main, or for noncompliance on the part of any natural gas or water user with the rules and regulations adopted by the board for the conduct of its business and affairs and that the board of directors of a metropolitan utilities district is hereby empowered to (1) adopt all necessary rules and regulations for the operation and conducting of the business and affairs of its natural gas and water utilities for the purpose of supplying gas for heat and power purposes for public and private use and for the purpose of supplying water for domestic, mechanical, public, and fire purposes and (2) fix the prices to be charged therefor. The District delivers water to customers at the water mains installed by the District in public streets and on private property when a proper easement is obtained from the owner of said private property.*

*The mains are owned by the District and are under its exclusive control. All pipes, appurtenances and fixtures, except for the meter, from the main in the street to and into the owner's premises are installed by and paid for by him, are his property, and the owner is responsible for their maintenance and care. Water meters are installed by the District but are purchased by and are the property of the owner. Normal repair of meters is made by the Utilities District without charge.”*

---

<sup>4</sup> [Water-Rules-2022.pdf \(mudomaha.com\)](#)

9. Explain how your project considers plans and programs of the state and resources development plans of the political subdivisions of the state.

MUD has two induced groundwater recharge surface water permits, each with an associated municipal groundwater transfer permit, for each of its two wellfields: A-17310 and A-10538 in the south wellfield: A-17318 and A-17356 in the west wellfield. This project could reduce the chances that the water rights in these wellfields would have to be enforced.

This project make Omaha's water supply more resilient to drought, which has historically depleted Nebraska's renewable water supply and negatively impacted agricultural irrigation.

10. Are land rights necessary to complete your project? YES  NO

**If yes:**

- 10.A Provide a complete listing of all lands involved in the project. N/A
- 10.B Attach proof of ownership for each easements, rights-of-way and fee title currently held. N/A
- 10.C Provide assurance that you can hold or can acquire title to all lands not currently held. N/A
11. Identify how you possess all necessary authority to undertake or participate in the project.

The District's Water Rules<sup>5</sup> are made by authority of Neb. Rev. Stat. 14-2101 et seq which provide, in part that the board of directors shall also have authority to make such rules and regulations for the conduct of the utilities controlled and operated by the metropolitan utilities district and the use and measurement of water.

Part 12 of the District's Water Rules states that the District "... shall establish a water conservation plan for the purpose of encouraging water conservation ..." This was adopted in May of 2005.

12. Identify the probable consequences (environmental and ecological) that may result if the project is or is not completed. No negative environmental or ecological consequences are expected to result from the implementation of the project. There will be some positive outcomes from the project including energy conservation, decreased water losses, and reduced groundwater depletion.

**Energy Conservation:** Energy used to pump the water is stored within a water tower, so water does not need to be re-pumped to pressurize the system. Peak electrical

---

<sup>5</sup> [Water-Rules-2022.pdf](http://Water-Rules-2022.pdf) ([mudomaha.com](http://mudomaha.com))

demand will be reduced because pumps can run slowly over the course of a day to fill the tower rather than need to ramp up at a moment's notice to meet the systems instantaneous water demands.

**Decreased Water Losses:** The proposed project would include activities to purchase new metering devices and leak loggers, as well as updates to hydraulic models, which will enable more detailed and accurate water loss audits and analyses to be conducted.

**Reduced Groundwater Depletions:** The additional metering and leak loggers are expected to reduce the District's current non-revenue water totals by 10 percent (from 2025's estimate of 9.9 MGD to 8.9 MGD), which would save approximately 360 million gallons annually. Additionally, the reduction in peak hour demands would allow the District to have the flexibility to meet more of the demand from the Florence WTP (which takes water from the Missouri River as a surface water source) as opposed to being forced to maximize the capacity of the Platte South and Platte West WTPs (which are both dependent on the state's groundwater). This could further enhance the District's ability to reduce aquifer depletions in future years.

## Section C.

### NRC SCORING

In the NRC's scoring process, points will be given to each project in ranking the projects, with the total number of points determining the final project ranking list.

The following 15 criteria constitute the items for which points will be assigned. Point assignments will be 0, 2, 4, or 6 for items 1 through 8; and 0, 1, 2, or 3 for items 9 through 15. Two additional points will be awarded to projects that address issues determined by the NRC to be the result of a federal mandate.

#### **Notes:**

- The responses to one criterion *will not* be considered in the scoring of other criteria. Repeat references as needed to support documentation in each criterion as appropriate. The 15 categories are specified by statute and will be used to create scoring matrixes which will ultimately determine which projects receive funding.
- There is a total of 69 possible points, plus two bonus points. The potential number of points awarded for each criteria are noted above. Once points are assigned, they will be added to determine a final score. The scores will determine ranking.
- The Commission recommends providing the requested information and the requests are not intended to limit the information an applicant may provide. An applicant should include additional information that is believed will assist the Commission in understanding a proposal so that it can be awarded the points to which it is entitled.

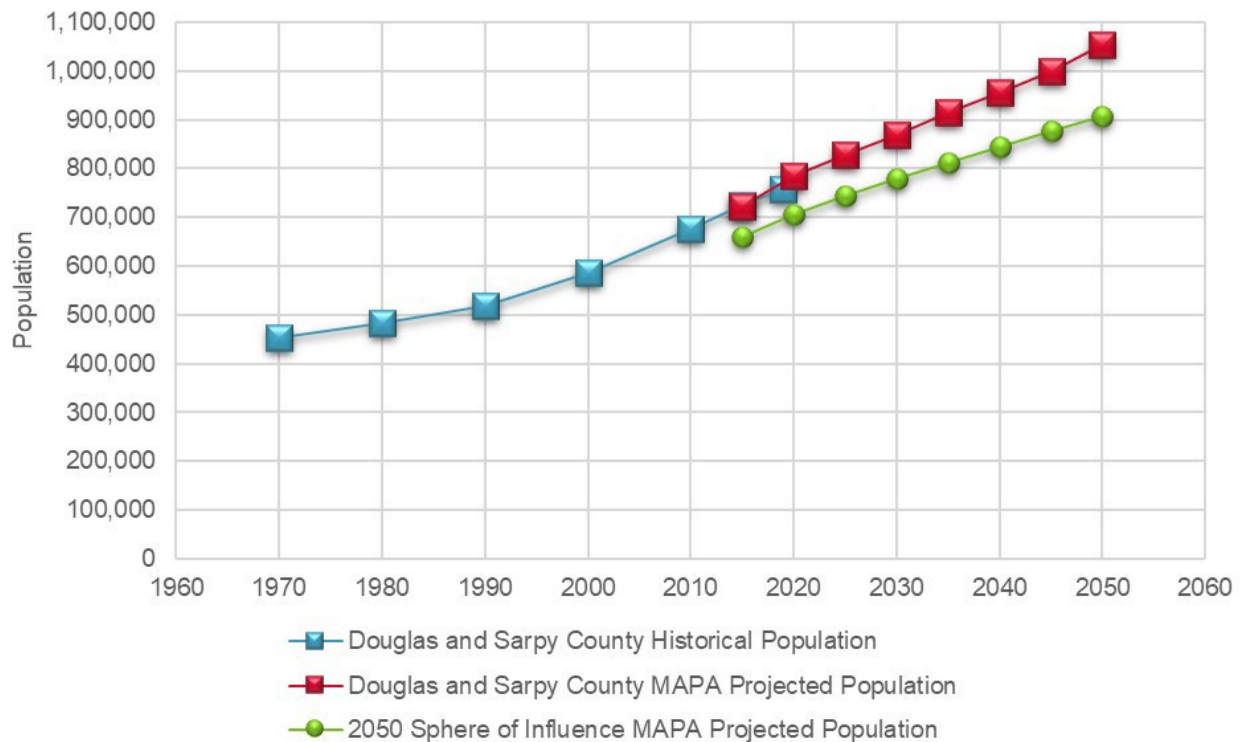
Complete any of the following (15) criteria which apply to your project. Your response will be reviewed and scored by the NRC. Place an N/A (not applicable) in any that do not apply, an N/A will automatically be placed in any response fields left blank.

1. Remediates or mitigates threats to drinking water;
  - Describe the specific threats to drinking water the project will address.
  - Identify whose drinking water, how many people are affected, how will project remediate or mitigate.
  - Provide a history of issues and tried solutions.
  - Provide detail regarding long-range impacts if issues are not resolved.

The District serves drinking water to more than 222,000 customers in Omaha, Bellevue, Bennington, Carter Lake, La Vista, Ralston, Waterloo and the Papio-Missouri Natural Resources District (which supplies water to Fort Calhoun). In total, the District estimates

that it serves a population of approximately 670,000. The three water treatment facilities, which obtain water from several surface and groundwater sources, and the water distribution system can supply more than 318 MGD of potable water. The Florence WTP has a peak capacity of 158 MGD, nearly 50 percent of the total treatment capacity of the entire MUD water system.

The peak hour demand is the water demand during the hour with the highest system demands. The peak hour demand is used to evaluate distribution system pressure, velocity, and head loss in addition to storage equalization needs. The greatest water demands in the Omaha area occur in the summer during weekday mornings, particularly in July and August, due to lawn irrigation. MUD's level of service criterion is to maintain water main pressures of at least 40 PSI during normal operations, but water pressure fluctuates during peak demand. In summer 2022, the District encountered difficulties meeting peak hour demands due to substantial water usage. The District's challenges are compounded as significant growth in water demand is anticipated over the next 25 years due to population growth.



**Figure 5** - Historical and Projected Combined Douglas and Sarpy County Population

In particular, Pressure Zone 3, which serves the rapidly developing northwest Omaha area, sees some of the highest peak hour demands. The summer and winter patterns for Zone 3, shown in **Figure 6**, indicate that the peak hour factor in Zone 3 is approximately 5.6. As the population grows, the District is more vulnerable to low pressures and reduced reliability across the system.

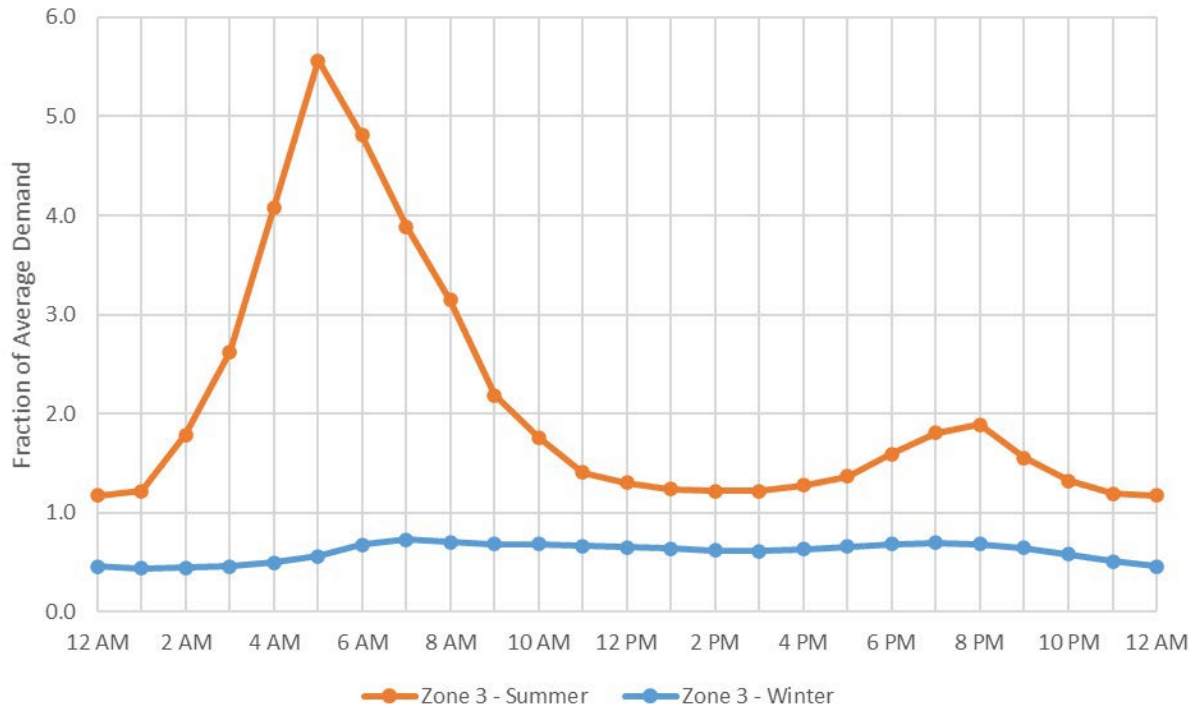


Figure 6 - Zone 3 Summer and Winter diurnal Demand Patterns

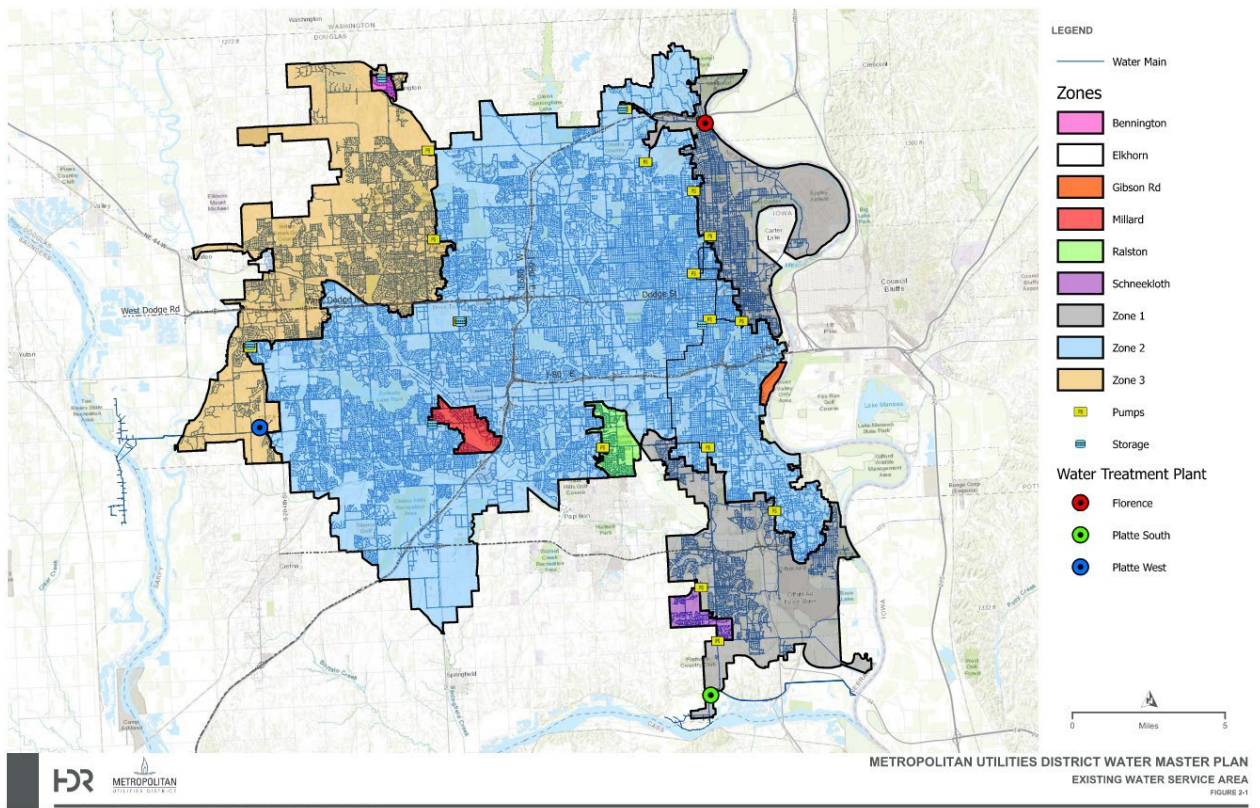
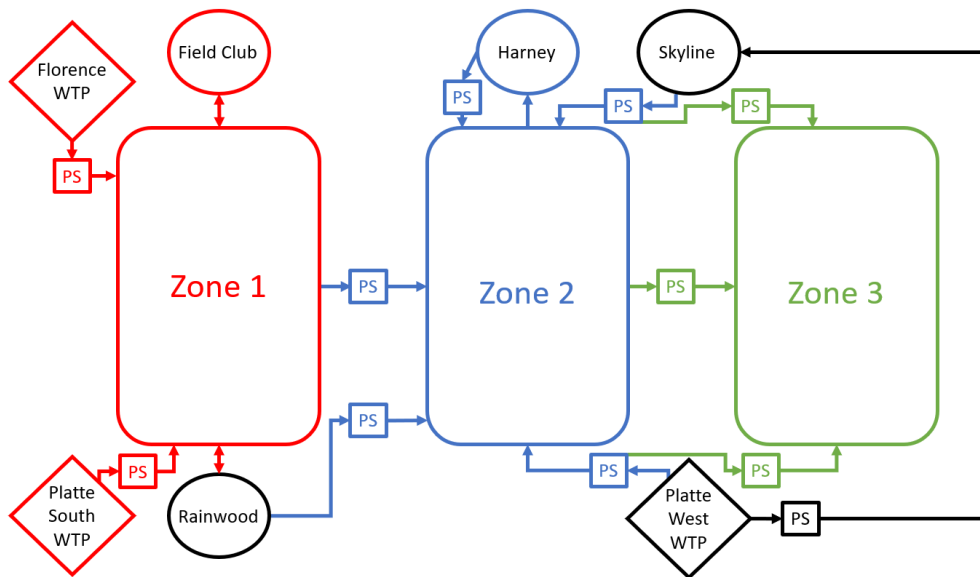


Figure 7 - Existing Water Service Area

With the potential for other climate-related emergencies to impact water supply, and given future water demand projections, the District is working to address the potential vulnerabilities and threats to the region’s water supply. This includes developing a Water System Master Plan (Master Plan) to identify strategies for resolving current deficiencies, reliably meeting projected demands, proactively managing assets, and bolstering the District’s water supply. Near-term improvements (i.e., 2025) and long-term improvements (i.e., 2050) were identified to meet the anticipated water supply and demand. The Master Plan was also updated to further define water supply vulnerabilities after the water demand challenges in the summer of 2022.

Through this planning, it was determined that water storage would be necessary in Zone 3 to serve the future demands at the District’s desired level of service. MUD conducted an evaluation to compare the life cycle costs of an elevated tank versus an at-grade reservoir in Zone 3. It was concluded that a peak demand management strategy to reduce the peak hour factor from 5.6 to 4.5 would resolve the water demand challenges encountered previously and potentially generate up to \$17.6 million in capital cost savings. Reducing the peak hour factor would also generate \$35,000 in annual energy savings, and these cost savings could be passed on to customers through lower rates. **Figure 8** shows the pumpage schematic for the Pressure Zones. Zones 2 and 3 can receive pumped water from Platte West WTP, Skyline Reservoir, and the 132nd and Harney Basins (see blue and green pumped flows from these locations), and Zone 1 received pumped water from Florence WTP and Platte South WTP.



**Figure 8** - Pressure Zone Pumpage Schematic

Water Loss Audits have been conducted annually; however, the data available is limited and does not allow for detailed water loss analysis. The proposed project would include activities to purchase new metering devices and leak loggers, as well as updates to hydraulic models, which would enable more detailed and accurate water loss audits and

analyses to be conducted. The additional metering and leak loggers are expected to reduce the District's current non-revenue water totals by 10 percent (from 2025's estimate of 9.9 MGD to 8.9 MGD), which would save approximately 360 million gallons annually. Additionally, the reduction in peak hour demands would allow the District the flexibility to meet more of the demand from the Florence WTP (which takes water from the Missouri River as a surface water source) as opposed to being forced to maximize the Platte South and Platte West WTPs capacity (which are both dependent on the state's groundwater). This could further enhance the District's ability to reduce aquifer depletions in future years.

These new peak demand management and conservation strategies would help reduce stress on the system and increase reliability for customers. This will ensure the District has more operational flexibility to provide adequate water pressures across the system, ultimately improving resiliency. Additionally, the peak demand management and conservation strategy would reduce peak pumpage and MUD's reliance on groundwater pumpage in the summer months.

If these vulnerabilities and threats are not addressed, the District would need to pursue more expensive and time-consuming alternatives, such as installing new above-ground tanks and collector wells. Otherwise, projected water demand increases could incapacitate the District's water distribution system and severely impact Omaha's water services. This project represents a forward-thinking, cost-effective, and sustainable solution to improve the region's water supply resiliency.

This project is a crucial piece of MUD's long-term vision and plan to sustainably and reliably deliver high-quality drinking water to hundreds of thousands of customer-owners in the Omaha metropolitan area and will lay the groundwork for all future improvements. For example, other cost savings and efficiencies identified in the Master Plan cannot be realized until new peak demand management strategies are implemented and their effectiveness is assessed. Upon completion of the project, the District will have a comprehensive Water Conservation and Peak Demand Management Report which will inform future infrastructure improvements and updates to the Master Plan.

2. Meets the goals and objectives of an approved integrated management plan or ground water management plan;
  - Identify the specific plan that is being referenced including date, who issued it and whether it is an IMP or GW management plan.
  - Provide the history of work completed to achieve the goals of this plan.
  - List which goals and objectives of the management plan the project provides benefits for and how the project provides those benefits.

The Papio-Missouri River NRD 2014 Voluntary Integrated Management Plan (IMP) covers all areas in Douglas, Sarpy, and Washington Counties that are tributary to the Platte and Elkhorn River watersheds. This area includes the groundwater well fields for MUD's Platte West and Platte South drinking water treatment plants. P-MRNRD



initiated water management planning voluntarily in partnership with the Nebraska Department of Natural Resources (NDNR) to manage P-MRNRD's hydrologically connected portions and to achieve and sustain a long-term balance between water uses and water supplies.

The IMP lays out four goals and corresponding objectives, developed by P-MRNRD and NDNR in consultation with the Stakeholder Advisory Committee, to be implemented simultaneously. The goals and objectives outlined in the IMP that the proposed MUD Water Conservation and Peak Demand Management project meets are as follows.

**Goal 1: Develop and implement water use policies and practices that contribute to the protection of existing surface and groundwater uses while allowing for future water development.**

The project would help the District implement more efficient and sustainable water use practices for agricultural, municipal, industrial, and recreational purposes. Not only would current conservation and peak demand management strategies be evaluated for their effectiveness, but these evaluations would be used to identify, develop, and implement new metrics and strategies for even greater efficiencies. When the current MUD Master Plan is updated in 2027, the success of these new strategies would be evaluated and prioritized accordingly. Successful peak demand management strategies would also generate significant cost savings and reduce the District's projected water storage needs, allowing ratepayers to realize additional savings. The additional metering and leak loggers are expected to reduce the District's current non-revenue water totals by 10 percent (from 2025's estimate of 9.9 MGD to 8.9 MGD), which would save approximately 360 million gallons annually. Additionally, the reduction in peak hour demands would allow the District the flexibility to meet more of the demand from the Florence WTP (which takes water from the Missouri River as a surface water source) as opposed to being forced to maximize the Platte South and Platte West WTPs capacity (which are both dependent on the state's groundwater). This could further enhance the District's ability to reduce aquifer depletions in future years.

**Goal 2: Develop and maintain a water supply and use inventory based on the best available data and analysis.**

The project would help the District develop a more sophisticated understanding of water demand and usage data, enabling more detailed and accurate analyses. Through the purchase of new meter devices to assess customer diurnal demand and new leak loggers for improved leak detection, the project would allow the District to update a number of hydraulic models with improved accuracy. These would ultimately be used to develop an online dashboard for usage data, giving customers greater access to, and awareness of, their water usage. The new leak loggers would also help with updates to the annual Water Loss Audit by providing more detailed and accurate data collection.

**Goal 3: Develop and implement water use educational programs that encourage conservation and effective water use.**

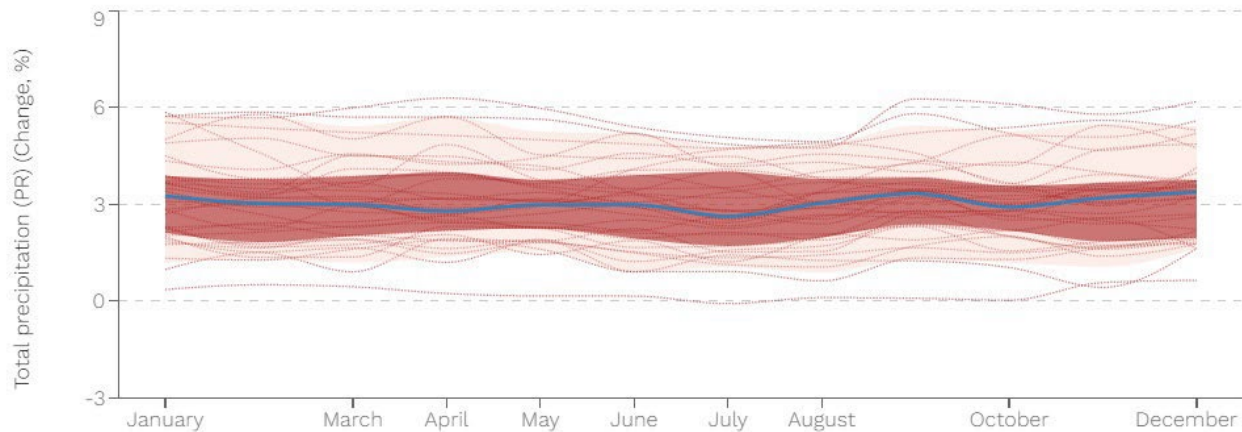
The project would encourage water conservation and effective water use. While the project would improve the District's approach to water conservation and peak demand

management, customer participation with these efforts is crucial. New tools and incentives, such as customer-facing digital dashboards for water usage or rate discounts, would encourage customers to practice wise water use regularly. Additionally, in the first half of 2024, the proposed project would include an extensive stakeholder engagement and strategic communications campaign to educate customers and community members about system improvements and peak demand management strategies. MUD plans to communicate progress to customers and stakeholders throughout the project. These efforts would complement existing education and outreach efforts the District is engaged in, such as the UNL Extension, Master Gardeners program.

**Goal 4: Work collectively with upstream NRDs and other relevant organizations to develop a water management plan for the Platte River Basin that maintains a balance between current and future water supplies and demands.**

The project would help maintain a stronger balance between current and future water supplies and demands. New system improvements and water management strategies are necessary to accommodate the rapidly growing population and future water demands. This would also generate upstream benefits for irrigators, such as the Lincoln Water System, to mitigate the potential need to cease surface water irrigation when downstream water level triggers reach a certain threshold.

Climate and precipitation projections and trends from the 2022 Climate Change Assessment, prepared by the Nebraska State Climate Office, were used to develop the MUD Master Plan in consideration of the IMP goals. The report found that while temperature projections remain rather consistent through the peak water use season, with the annual mean temperature increasing 5.4°F by approximately 2050, precipitation projections and trends tend to show much more variation. Interannual variability between climate project models showed a range between a 28.6 percent decrease and a 33.1 percent increase in total precipitation, with the period between June and August seeing a 4.7 percent decrease in median total precipitation by mid-century (**Figure 9**). This projected decrease in the hotter summer months is important to consider for future water management concerns.



**Figure 9** - Annual cycle of Total Precipitation Change (%) for Central North America under the most likely climate model. The dotted lines represent model runs and the solid line represents the median.

The 2021 WSF Grant Application 5316 for the P-MRNRD Groundwater Quantity Monitoring project also helped achieve the IMP's goals to develop and maintain a water supply and use inventory based on the best available data and analysis. The purpose of the project is to monitor available water supplies and demands through monitoring data and relationships in ground and surface water modeling. This involved installing new flow meters on irrigation wells throughout the P-MRNRD's IMP area and developing an online reporting tool for customers to submit their annual water use. National Weather Service growing season rainfall data was also obtained to track precipitation against water use to project future water use. The project was awarded \$243,000 and is planned to be completed by June 2024. This project used some of the same activities and strategies that are planned for the proposed project, and any lessons learned would be applied to achieve greater efficiencies.

Other efforts to date include education programs and workshops for wise water use and conservation, such as the wise water use flower garden at the Village Pointe Shopping Center.

3. Contributes to water sustainability goals by increasing aquifer recharge, reducing aquifer depletion, or increasing streamflow;

List the following information that is applicable:

- The location, area and amount of recharge;
- The location, area and amount that aquifer depletion will be reduced;
- The reach, amount and timing of increased streamflow. Describe how the project will meet these objectives and what the source of the water is;
- Provide a detailed listing of cross basin benefits, if any.

The proposed project would improve water sustainability goals by reducing aquifer depletion through a variety of methods. Aquifer depletion would be reduced by avoiding peak demand withdrawals from MUD's public water supply wells. This would occur

along the Platte River at the Platte West and South well fields. The depletion of these wells has a direct effect on whether the Platte River is gaining or losing reaches. This impact was documented in the 2018 USGS publication, “Groundwater movement and interaction with surface water near the confluence of the Platte and Elkhorn rivers, Nebraska, 2016–18.”<sup>6</sup>

Non-revenue water demand for Planning Year 2025 is estimated at 9.9 MGD on an average day basis for the entire year. If additional leak loggers are implemented, and strategies to balance demand are utilized, a minimum 10 percent reduction in aquifer depletion is likely achievable. This reduction would generate a benefit of approximately 1 MGD, or more than 360 million gallons per year. New peak demand management strategies could also reduce peak pumpage from the aquifer at a given time, but they would likely not significantly influence the depletions on its own.

Average day demand for Planning Year 2025 is estimated at approximately 83 MGD. If public outreach can reduce this consumption by 1 percent, this would result in almost a 1 MGD reduction, saving over 300 million gallons annually.

The peak demand management strategies would reduce the rate of withdrawals from the aquifer during the summer months but may not impact total usage volumes directly. However, the additional metering and leak loggers are expected to reduce the District’s current non-revenue water totals by 10 percent (from the 2025 estimate of 9.9 MGD to 8.9 MGD), which would save approximately 360 million gallons annually. Additionally, the reduction in peak hour demands would allow the District to have the flexibility to meet more of the demand from the Florence WTP (which takes water from the Missouri River as a surface water source), as opposed to being forced to maximize the capacity of the Platte South and Platte West WTPs (which are both dependent on the state’s groundwater). This could further enhance the District’s ability to reduce aquifer depletions in future years.

4. Contributes to multiple water supply goals, including, but not limited to, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources;
  - List the goals the project provides benefits.
  - Describe how the project will provide these benefits
  - Provide a long range forecast of the expected benefits this project could have versus continuing on current path.

The District takes pride in its public water system and long-range planning, which allows it to serve customers’ needs in the metro Omaha area. Recognizing that water is a precious resource, the District has a Water Conservation Plan to promote wise water use through public education programs, rate structure, and operating plans, and to

---

<sup>6</sup> <https://www.usgs.gov/publications/groundwater-movement-and-interaction-surface-water-near-confluence-platte-and-elkhorn>

assure customers receive safe water in sufficient quantity and quality to serve their needs.

MUD's public education plan promotes overall wise water use and encourages water conservation during peak usage periods. The plan reaches residential, commercial, and industrial customers; school-aged children; government officials; and regulators. The District also uses a combination of seasonal and inclining block rates, which encourage conservation and are designed to recover the cost of providing service. In 1979, the District implemented both seasonal and inclining block rates.

The water conservation plan has been successful in that customers have responded with reduced water use. After normalizing for weather variables, there is a downward trend in water consumption over the last 40 years. Some decreases in water use are intentional (i.e., driven by customer actions) and other changes are unintentional. Customers are actively changing water use habits in all sectors due to current social consciousness and increasing water and sewer rates. In some situations, sewer rates may be more of a factor in decreasing water use than the water rates. Unintentional water use changes include replacing water fixtures and appliances with more efficient equipment and smaller-sized families.

The proposed water conservation and peak demand management project would further these goals through more efficient water usage across the District. Improved hydraulic models, more accurate data collection equipment, and more detailed metrics enable the district to make more informed decisions around water conservation efforts. For example, the additional metering and leak loggers are expected to reduce the District's current non-revenue water totals by 10 percent (from 2025's estimate of 9.9 MGD to 8.9 MGD), which would save approximately 360 million gallons annually. The annual reductions are expected to grow, allowing the benefits to grow and compound over time. Even a 1 percent improvement every year would compound to significant long-range savings.

Additionally, extensive stakeholder engagement and strategic communication are planned for the first half of 2024. While these efforts have already proven successful, more targeted and larger scale communications, such as customer-facing videos and commercials, would lead to more effective communication regarding wise water use and water conservation in the summer.

Lastly, the reduced water loss has the potential to increase stream flows in the Platte River would could provide ecosystem benefits to species in the Lower Platte River.

5. Maximizes the beneficial use of Nebraska's water resources for the benefit of the state's residents;
  - Describe how the project will maximize the increased beneficial use of Nebraska's water resources.
  - Describe the beneficial uses that will be reduced, if any.

- Describe how the project provides a beneficial impact to the state's residents.

The proposed project would bolster the District's (and the broader P-MRNRD's) capacity to manage fluctuations in water demand and greater conserve Nebraska's water resources. This includes ensuring that the public is also aware of what they can and should do to use water resources more efficiently. This project would also improve the accuracy and detail of data collection to ensure that important water-related information is provided to all residential, commercial, and industrial customers in a timely and reliable manner. The Missouri and Platte Rivers and the Dakota sandstone aquifer are precious resources in Nebraska and provide drinking water to hundreds of thousands in the Omaha metro area, and the District is committed to its safe, responsible, and sustainable use.

The additional metering and leak loggers are expected to reduce the District's non-revenue water totals by 10 percent (from 2025's estimate of 9.9 MGD to 8.9 MGD), which would save approximately 360 million gallons annually. Additionally, the reduction in peak hour demands would allow the District to have the flexibility to meet more of the demand from the Florence WTP (which takes water from the Missouri River as a surface water source) as opposed to being forced to maximize the capacity of the Platte South and Platte West WTPs (which are both dependent on the state's groundwater). This could further enhance the District's ability to reduce aquifer depletions in future years.

MUD has two induced groundwater recharge surface water permits, each with an associated municipal groundwater transfer permit, for each of its two wellfields: A-17310 and A-10538 in the south wellfield: A-17318 and A-17356 in the west wellfield. This project could reduce the chances that the water rights in these wellfields would have to be enforced.

#### 6. Is cost-effective;

- List the estimated construction costs, O/M costs, land and water acquisition costs, alternative options, value of benefits gained.
- Compare these costs to other methods of achieving the same benefits.
- List the costs of the project.
- Describe how it is a cost effective project or alternative.

The District would generate substantial cost savings across the system by successfully implementing new conservation and peak demand management strategies, as outlined in the proposed project (up to approximately \$17.6 million in capital cost savings and \$35,000 in energy savings if the peak hour factor is reduced), which would pass savings to ratepayers. Additionally, the project presents a future-conscious and proactive solution to current water demand challenges that would mitigate the need for more expensive remedies in the future. Alternative solutions to address peak hour demand challenges and projected demand increases—such as the installation of new elevated storage tanks and pump stations—would cost tens of millions of dollars more with fewer system-wide resiliency improvements. See **Table 4** for costs by task and year.

**Table 4: Cost by Task and Year**

Tasks	Year 1	Year 2	Year 3
Measurement and Monitoring	\$201,325		
Hydraulic Modeling – Scenario Analysis & Assessment	\$25,300	\$16,000	\$14,500
Existing Program Assessment		\$32,500	\$17,500
Conservation and Peak Demand Management Program Development & Planning		\$56,000	
Quantification of Benefits and Results	\$7,000	\$21,500	\$13,000
Stakeholder Engagement and Strategic Communications		\$54,000	
Water Conservation and Peak Demand Management Report			\$16,000
Project Management	\$7,000	\$9,500	\$9,750
<b>Total</b>	<b>\$240,725</b>	<b>\$189,500</b>	<b>\$70,750</b>

7. Helps the state meet its obligations under interstate compacts, decrees, or other state contracts or agreements or federal law;

- Identify the interstate compact, decree, state contract or agreement or federal law.
- Describe how the project will help the state meet its obligations under compacts, decrees, state contracts or agreements or federal law.
- Describe current deficiencies and document how the project will reduce deficiencies.

In addition to helping meet P-MRNRD’s IMP and Groundwater Management Plan (GMP) obligations, the project would also help the state meet federal Safe Drinking Water Act (SDWA), Endangered Species Act, and National Environmental Policy Act (NEPA) obligations.

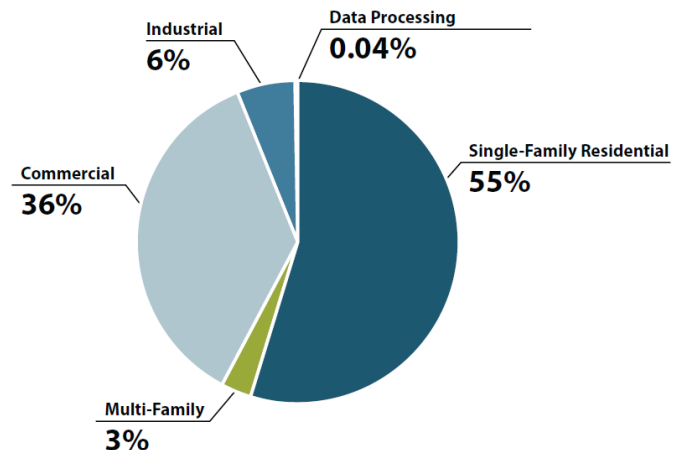
Some P-MRNRD areas in the Lower Platte Basin are habitats to three federally listed endangered species, and P-MRNRD has made substantial efforts to promote wildlife habitat improvement. The proposed project would aid regional NRD efforts to meet its obligation under the instream flow appropriation permit granted to the Nebraska Game and Parks Commission for the central and lower Platte River on June 26, 1998.

The effectiveness of other alternative actions, such as the installation of new water storage tanks and pump stations, were evaluated as part of the MUD Master Plan. This project would allow the District to better monitor and measure surface water and groundwater data to inform other improvements and use Omaha’s water resources more effectively, avoiding the need for costly, near-term improvements. These data-driven and cost-effective improvements would improve MUD’s resilience to climate-related risks, such as extreme heat or drought, through responsible and sustainable water management—ultimately benefiting streamflows in the Platte and Missouri Rivers and aligning with the goals of the Lower Platte River Drought Contingency Plan, which was completed in October 2019. Additionally, increased flows in the Platte, especially during drought, reduce the chances of Omaha using their authority under Nebraska Revised Statute 46-233 for “induced groundwater recharge,” which could cause irrigators upstream of the Omaha wellfields to cease surface water irrigation when water level triggers reach a certain threshold.

8. Reduces threats to property damage or protects critical infrastructure that consists of the physical assets, systems, and networks vital to the state or the United States such that their incapacitation would have a debilitating effect on public security or public health and safety;
  - Identify the property that the project is intended to reduce threats to.
  - Describe and quantify reductions in threats to critical infrastructure provided by the project and how the infrastructure is vital to Nebraska or the United States.
  - Identify the potential value of cost savings resulting from completion of the project.
  - Describe the benefits for public security, public health and safety.

Past water usage data shows that the majority of MUD’s water demand—nearly 60 percent—is residential demand, with commercial demand making up another 36 percent.

**Figure 6** shows the total water demand breakdown by customer type.



**Figure 10** - Average Metered Water Use by Customer Type

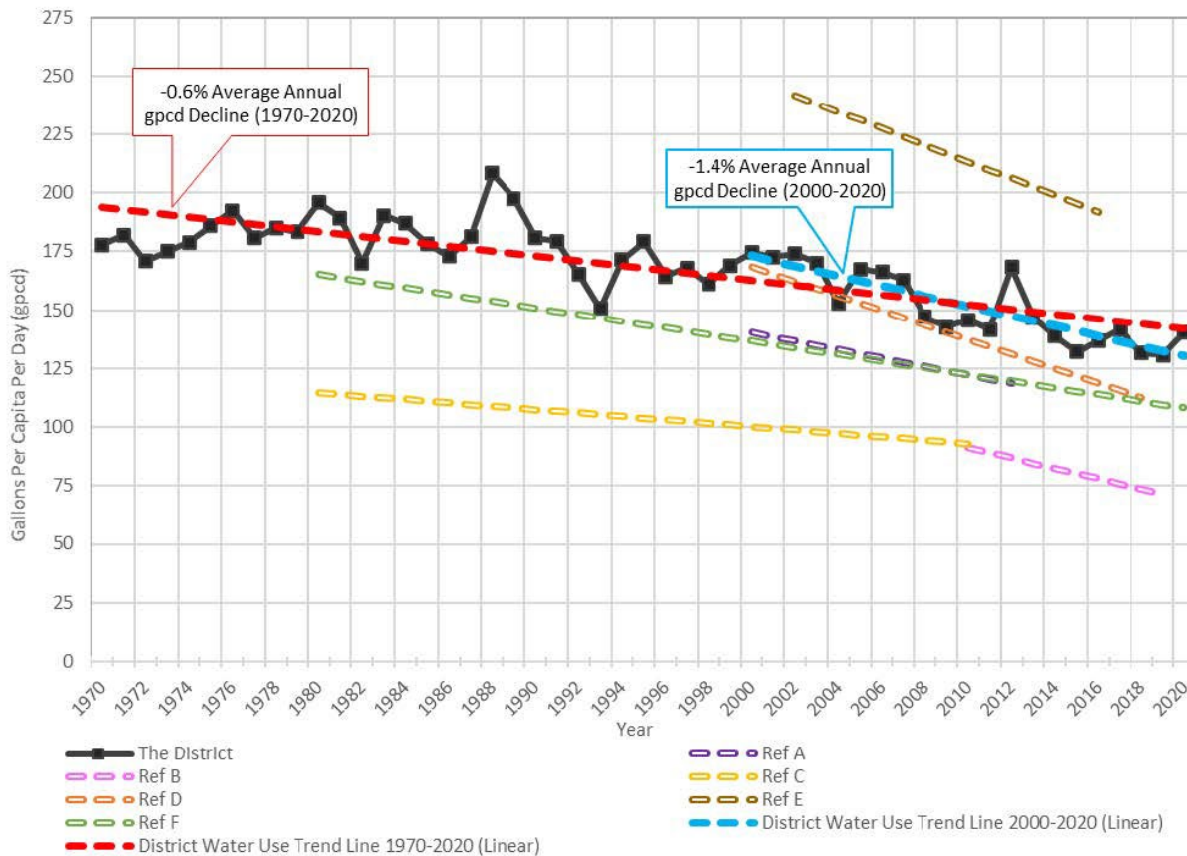
While average water use per person is declining, likely due to more customer awareness of water conservation efforts and increasing retail water costs, the total water demand continues to increase because of growing demand from new developments and population growth.

Fluctuations in the maximum pressure and flow that the system can deliver may occur when peak hour water demands cannot be met. These pressure fluctuations have the



potential to stir up sediment buildup in pipes, which may pose adverse impacts to public health, public safety, and property.

The District has already made some progress in reducing per capita water usage, but there are other peer utilities in the region with much lower usage. Because other utilities have lower usage, and with the right technology and program in place, the District can reasonably assume that further reductions are not only feasible but probable. **Figure 11** shows the comparison of these trends over the last 50 years, with the red-dashed line indicating the District's water use trends between 1970-2020. This trend has not only continued, but the reduction in water use is accelerating in recent decades.



**Figure 11 - Water Use Trends in the District and Peer Utilities 1970–2020**

Beyond general health and safety benefits that come with a more sustainable water distribution network, the District's planning for this project involved extensive asset management risk assessments. The potential risks due to utility asset failure are determined through their Consequence of Failure (CoF), which refers to an asset's relative criticality in the event of failure, and Likelihood of Failure (LoF), which refers to the relative likelihood that an asset will fail. CoF and LoF consider a variety of factors, such as the asset's size, its proximity to critical infrastructure, and the number of customers that depend on it. The combined LoF and CoF scores for each asset make up its total risk score, and the most critical assets in a system are prioritized for upgrades or repairs.

The quality of these risk assessments and the subsequent prioritization of system improvements are highly dependent on the asset inventory's accuracy and completeness. This project's efforts to improve system monitoring and measuring efforts through improved leak detection and more accurate hydraulic models would help generate a more accurate and complete asset inventory. The District would be able to assign more accurate CoF and LoF determinations to assets throughout the system, reducing threats to critical infrastructure. The proposed project offers a cost-effective way to improve the District's asset management risk assessments in the long-term and ensure that all future system improvements are determined with the most accurate and reliable data available. Ultimately, this would mitigate risk to WTPs, pump stations, mains, and water services for over 200,000 people. The proposed project is intended to reduce threats to all municipal and industrial uses.

MUD has two induced groundwater recharge surface water permits, each with an associated municipal groundwater transfer permit, for each of its two wellfields: A-17310 and A-10538 in the south wellfield: A-17318 and A-17356 in the west wellfield. This project could reduce the chances that the water rights in these wellfields would have to be enforced

#### 9. Improves water quality;

- Describe what quality issue(s) is/are to be improved.
- Describe and quantify how the project improves water quality, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
- Describe other possible solutions to remedy this issue.
- Describe the history of the water quality issue including previous attempts to remedy the problem and the results obtained.

By reducing the peak hour demands, the District can reduce the required storage in the system and also reduce the water age, which has numerous water quality benefits, including higher chlorine residual, reduced corrosion, less disinfection by-product formation, less nitrification, less microbial growth, and better taste, color, and odor.

With less pumping required, more of the water used by the District will come from the Missouri River and not from the public water supply wells near the Platte River. The District can lessen the effects of nitrates and uranium contamination in the source water and decrease the amount of water supply being depleted from the aquifer by using water from the river. In the alternative approach of adding more groundwater supply wells, the strain on the aquifer systems would be better distributed so as to reduce nitrate levels and corresponding uranium leaching.

The District's service population is expected to grow from approximately 660,000 to 910,000 by 2050. Past water usage data shows that residential usage makes up nearly

60 percent of the District's demand. Figure 5 details the average water use by customer type for 2016–2020.

10. Has utilized all available funding resources of the local jurisdiction to support the program, project, or activity;

- Identify the local jurisdiction that supports the project.
- List current property tax levy, valuations, or other sources of revenue for the sponsoring entity.
- List other funding sources for the project.

As the proposed project's primary sponsor, the District would fund the remaining 50.1 percent, or approximately \$251,000, over the next 3 fiscal years. The District is also planning to submit an application for the Bureau of Reclamation's WaterSMART Water Conservation Field Services Program, which could fund an additional \$100,000 for the project.

11. Has a local jurisdiction with plans in place that support sustainable water use;

- List the local jurisdiction and identify specific plans being referenced that are in place to support sustainable water use.
- Provide the history of work completed to achieve the goals of these plans.
- List which goals and objectives this project will provide benefits for and how this project supports or contributes to those plans.
- Describe and quantify how the project supports sustainable water use, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
- List all stakeholders involved in project.
- Identify who benefits from this project.

### **Papio-Missouri River NRD Voluntary IMP and Groundwater Management Plan**

P-MRNRD has primary local jurisdiction for the proposed project, and the 2014 P-MRNRD Voluntary IMP that supports sustainable water use has been discussed at length in Section C, Question 2. In summary, the proposed project meets the IMP's following goals and objectives:

- **Goal 1) Develop and implement water use policies and practices that contribute to the protection of existing surface and groundwater uses while allowing for future water development.**
  - **Objectives:** Utilize existing policies, manage invasive vegetation, and evaluate conjunctive management projects.
  - The proposed project would help the District implement more efficient and sustainable water use practices for agricultural, municipal, industrial, and recreational purposes.
- **Goal 2) Develop and maintain a water supply and use inventory based on the best available data and analysis.**

- Objectives: Develop and implement data gathering, monitoring, and evaluation and coordinate with water suppliers.
- The proposed project would help the District develop a more sophisticated understanding of water demand and usage data, enabling more detailed and accurate analyses.
- **Goal 3) Develop and implement water use educational programs that encourage conservation and effective water use.**
  - Objectives: Promote water use education, conservation, and reuse.
  - The proposed project would encourage water conservation and effective water use through water conservation, peak demand management best practices, and improved data transparency.
- **Goal 4) Work with upstream NRDs and other relevant organizations to collectively develop a water management plan for the Platte River Basin that maintains a balance between current and future water supplies and demands.**
  - Objectives: Participate in Lower Platte Basin water management, evaluate conjunctive management alternatives, evaluate additional water resource supplies, and maintain stream flows to protect and maintain public water supply.
  - The proposed project would help maintain a stronger balance between current and future water supplies and demands.

In addition to the P-MRNRD Voluntary IMP, the P-MRNRD Groundwater Management Plan (GWMP) was adopted on February 8, 2018. The rules and regulations are current as of March 1, 2018. Both were issued by P-MRNRD and approved by NDNR. Specific goals and objectives within the GWMP that would be achieved or assisted by this project include:

- **“The District’s goal is to maintain the existing conditions of its groundwater reservoir quantity and quality – forever.”**
  - The proposed project would make improvements across the District’s water distribution system, both operationally and strategically, that would make the system more resilient to current and future water demand challenges, reduce water loss, and encourage more efficient water use. The project improvements would ensure that MUD continues to utilize existing groundwater resources responsibly and sustainably.
- **Plan Definition – water use is sustainable when it promotes healthy watersheds and aquifers, improves water quality, protects water supplies through BMPs, and manages surface and groundwater resources conjunctively to protect the ability of future generations to meet their needs.”**
  - Objectives: Water conservation, policies, and procedures; BMPs; wellhead protection; fertilizer management; water quality monitoring; and cost-share programs.

- The proposed project would benefit watershed health and function through more efficient water resource use, promote safer and more sustainable use of the Dakota sandstone aquifer, generate water quality benefits by reducing required water storage in the system and reducing water age, and leverage a range of new water conservation and peak demand management best practices to improve surface and groundwater resource management.

P-MRNRD also partners in various plans, including the Lower Platte Basin Water Management Plan, the Lower Platte River Consortium, and the Lower Platte River Drought Contingency Plan.

### **Lower Platte Basin Coalition – Basin Wide Water Management Plan**

The Lower Platte River Basin's water resources are managed by NDNR and seven NRDs: Lower Platte South NRD, Lower Platte North NRD, P-MRNRD, Lower Loup NRD, Lower Elkhorn NRD, Upper Elkhorn NRD, and Upper Loup NRD. These entities entered a cooperative coalition to develop the Lower Platte River Basin Water Management Plan, which was adopted in October 2017<sup>7</sup>. The plan sets out to provide guidance and a framework to the coalition for best water use policies and practices, assist in the development and maintenance of water supplies, and provide consistency and information for incorporation into individual NRD IMPs.

The proposed project would help achieve the following Lower Platte River Basin Coalition (LPBC) Basin Wide Water Management Plan goals and objectives :

- **Goal 1) Develop and maintain a water supply and use inventory based on the best available data and analysis.**
  - **Objectives:** Develop and maintain a better understanding of basin-wide inflows/outflows, project changes to water inventory due to changes in population and land use, evaluate potential effects on water inventory, refine the extent of hydrologically connected water resources, evaluate variations in water inventory due to climate cycles, and monitor current and future water demands in the basin.
  - The proposed project would help the District develop a more sophisticated understanding of water demand and usage data, enabling more detailed and accurate analyses. Through the purchase of new meter devices to assess customer diurnal demand and new leak loggers for improved leak detection, the project would allow the District to update numerous hydraulic models with improved accuracy. New peak demand management strategies would help reduce stress on the system and

---

<sup>7</sup> <https://dnr.nebraska.gov/water-planning/lower-platte-basin-wide-plan>

increase reliability for customers, given significant population growth projections over the next 25 years. Additionally, the peak demand management and conservation strategy would reduce peak pumpage and the District's reliance on groundwater pumpage in summer months.

- **Goal 2) Implement a water management plan for the Basin that maintains a balance between current and future water supplies and demands.**
  - Objectives: Collaborate with state and local governments to identify at least three opportunities to augment water supplies, monitor instream flow needs to foster a more sophisticated understanding, and evaluate options for Basin water banking methodologies.
  - The proposed project would recognize projected water demand increases due to population growth and current water supply and demand challenges to develop best management practices. This is backed by improved monitoring and water loss detection through improved equipment and updated hydraulic modeling. The project also leverages state-led climate change studies to better understand potential threats to future drinking water and water demand projects.
- **Goal 3) Develop and implement water use policies and practices that contribute to the protection of existing surface and groundwater uses while allowing for future water development.**
  - Objectives: Identify available water storage opportunities, develop policies to address impacts on stream flows from uses outside of management control, and expand public water supply education programs to encourage water conservation measures.
  - The MUD Master Plan identified and evaluated new water storage opportunities and determined that the proposed project would be a more effective way to avoid costly new storage infrastructure while efficiently leveraging existing water storage resources. New water storage opportunities have been identified and can be considered at a later date, if necessary. Additionally, new tools and incentives, such as customer-facing digital dashboards for water usage or rate discounts, would encourage customers to practice wise water use regularly. In the first half of 2024, the proposed project would include an extensive stakeholder engagement and strategic communications campaign to educate customers and community members about system improvements and peak demand management strategies. The District plans to communicate progress to customers and stakeholders through the project's duration. These efforts would complement existing education and outreach efforts.

This project would help implement multiple water supply goals, including agricultural uses, municipal and industrial uses, water resource conservation, and water resource preservation, as listed in both NRDs' IMPs and GWMPs.

### **Lower Platte River Consortium**

The Lower Platte River Consortium is an agreement entered into by NeDNR, Lower Platte South NRD, Lower Platte North NRD, P-MRNRD, the City of Lincoln, and MUD to study long-term water supplies available to the lower sub-basin for enhancing streamflows and aquifer storage to support sustainable public water systems. The agreement clarified responsibilities, authorities and powers granted to each party to achieve the stated purpose of the Consortium. The Consortium is attached to this application for reference.

### **Lower Platte Drought Contingency Plan**

- **Drought Monitoring and Vulnerability Assessment:** Collection of groundwater use data would enhance monitored groundwater level assessments and allow for an improved vulnerability assessment of what those groundwater levels mean in terms of flash or long-term drought conditions.
- **Drought Mitigation Measures:** Water quantity use data would greatly improve the accuracy of evaluations for proposed drought mitigation measures in LPNNRD and P-MRNRD. Future groundwater modeling would play an important role in the accurate assessment of these potential projects.

Finally, the District has its own Water Conservation Plan to promote system-wide conservation efforts and education.

### **MUD Water Conservation Plan**

The District's Water Conservation Plan promotes wise water use through public education programs, rate structures, and operating plans and assures that customers receive safe water in sufficient quantity and quality to serve their needs. This public education plan promotes the overall wise use of water and encourages water conservation during peak usage periods. The plan reaches residential, commercial, and industrial customers; school-aged children; government officials; and regulators. This project would bolster public education and outreach efforts.

The District uses a combination of seasonal and inclining block rates, which encourage conservation, are designed to recover the cost of providing service, and have been proven successful. The District also promotes transparency in billing to lower water use, which would be further expanded through the proposed project's customer-facing water use portal.

12. Addresses a statewide problem or issue;

- List the issues or problems addressed by the project and why they should be considered statewide.
- Describe how the project will address each issue and/or problem.
- Describe the total number of people and/or total number of acres that would receive benefits.
- Identify the benefit, to the state, this project would provide.

Bringing the District’s hydraulic modeling up to date and improving the equipment used in data collection will help facilitate proactive water management strategies to mitigate leakage and service interruptions for customers and also prevent hydrologically connected areas from being deemed fully appropriated by the State.

Given the projected temperature increases and summertime precipitation decreases in the central US by 2050, as noted in the 2022 Climate Change Assessment by the Nebraska State Climate Office, the State will face notable climate-related challenges and potential drought over the next few decades. Ensuring that MUD is prepared to meet projected water demands and supplies, and opening the door for other conservation and peak demand management strategies to be employed throughout the state, is critical. This project would also make Omaha’s water supply more resilient to drought, which has historically depleted Nebraska’s renewable water supply and negatively impacted agricultural irrigation.

In addition, MUD has two induced groundwater recharge surface water permits, each with an associated municipal groundwater transfer permit, for each of its two wellfields: A-17310 and A-10538 in the south wellfield: A-17318 and A-17356 in the west wellfield. This project could reduce the chances that the water rights in these wellfields would have to be enforced

13. Contributes to the state’s ability to leverage state dollars with local or federal government partners or other partners to maximize the use of its resources;

- List other funding sources or other partners, and the amount each will contribute, in a funding matrix.
- Describe how each source of funding is made available if the project is funded.
- Provide a copy or evidence of each commitment, for each separate source, of match dollars and funding partners.
- Describe how you will proceed if other funding sources do not come through.

The total project cost is estimated to be \$500,975, and the District is currently the only project sponsor. The District is evaluating the potential for additional sponsors, including federal grants, such as a Bureau of Reclamation (BoR) WaterSMART Grant. The WaterSMART Grant would provide a maximum of \$100,000 to support project activities. **Table 5** details the funding sources by year, assuming the District is awarded \$250,000 from WSF and \$100,000 from BoR.



**Table 5: Project Funding Breakdown by Year**

Funding Source	Year 1	Year 2	Year 3	Total
MUD Cost Share	\$110,000.00	\$100,000.00	\$40,000.00	\$250,000
BoR Grant Cost Share	\$40,000.00	\$40,000.00	\$20,000.00	\$100,000.00
WSF Grant	\$90,725.00	\$49,500.00	\$10,750.00	\$150,975
<b>Total</b>	<b>\$240,725</b>	<b>\$189,500</b>	<b>\$70,750</b>	<b>\$500,975</b>

14. Contributes to watershed health and function;

- Describe how the project will contribute to watershed health and function in detail and list all of the watersheds affected.

A plentiful, safe, and sustainable surface/groundwater supply is a critical component of a healthy watershed. Ensuring that the District is using our water resources efficiently, and effectively managing how and when water is used, is essential to maintaining a healthy watershed. This requires a collaborative effort across all hydrologically connected water resources in the Omaha metro area, and P-MRNRD is an active partner in these efforts. P-MRNRD has an approved IMP that supports the implementation and goals of the proposed MUD Water Conservation and Peak Demand Management project.

Updated hydraulic modeling and more advanced leak logging equipment would provide information to enhance integrated water management in the future and reduce water losses across the system. This would directly benefit watershed health and function through more efficient water resource use. Better informed water management decisions regarding the use of surface water and groundwater resources will also promote watershed health. The primary watersheds that would benefit from this project are the Dakota sandstone aquifer and the Platte River and Missouri River tributaries.

15. Uses objectives described in the annual report and plan of work for the state water planning and review process issued by the department.

- Identify the date of the Annual Report utilized.
- List any and all objectives of the Annual Report intended to be met by the project
- Explain how the project meets each objective.

**NDNR Annual Report to the Legislature and Plan of Work – 2022**

NDNR completed the 2021–2022 Annual Report to the Legislature and Plan of Work.<sup>8</sup> Five of the six department goals identified in the Annual Plan of Work would be addressed through this project. They include:

**Goal 1) Establish strong state leadership, involvement, and support for science-based decision making that is necessary to sustain state and local water management outcomes.**

The proposed project would use up-to-date national climate and precipitation data, State climate change studies, and new water usage equipment to make data-driven, science-backed water management decisions that benefit local water resource sustainability. As one of the largest water utilities in the state, the District is leading the effort to promote sound water conservation and management efforts.

**Goal 2) Provide high quality products and services through the performance of our duties in the areas of floodplain management, flood mitigation planning, dam safety, and survey to promote the safety of all Nebraskans.**

While the proposed project provides some public health and safety benefits to Omaha, discussed earlier, the project is not focused on floodplain management or flood mitigation.

**Goal 3) Develop and implement customized and decentralized water management plans established through collaboration with local Natural Resource Districts and stakeholders that provide for long-term sustainability of the state’s water resources.**

The proposed project highlights the District’s partnership with P-MRNRD and its commitment to the approved Voluntary IMP to improve Nebraska’s water sustainability. The project would help the District implement more efficient and sustainable water use practices, develop a more sophisticated understanding of water demand and usage, encourage water conservation and effective water use, and maintain a strong balance between current and future water supplies and demands, as aligned with the goals in the P-MRNRD Voluntary IMP. The District also has other partnerships with UNL and Habitat for Humanity to support wise water use and conservation education.

**Goal 4) Encourage strong public engagement with multiple constituents and stakeholder groups in planning and implementing activities to ensure that local and state needs are addressed.**

The proposed project includes an extensive stakeholder engagement and strategic communications campaign to educate customers and community members of system improvements and peak demand management strategies. MUD plans to communicate progress to customers and stakeholders throughout the project. These efforts complement existing education and outreach efforts the District is engaged in, such as the UNL Extension, Master Gardeners program.

---

<sup>8</sup> <https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/about/publications/annualreport2022FINAL.pdf>

**Goal 5) Protect existing water uses through collaborative investments in water resource projects, planning, administration, and permitting of surface water rights and the registration of groundwater wells.**

The proposed project highlights strong collaboration and would help achieve mutual water sustainability goals for a multitude of organizations to improve water services for Omaha metro customer-owners. The District has dedicated partners throughout the region that support water conservation and sustainability efforts, such as through wise water use education and efficient water management strategies, and this project would help achieve their water sustainability and resiliency goals. The District would continue to collaborate regularly with P-MRNRD on all matters related to water management, conservation, and sustainability, both as a result of this project and as a guiding principle.

**Goal 6) Provide agency-wide services and support in the areas of information technology and transparent data sharing, business process improvement, public information, and administration of state-aid funds in conjunction with the NRC.**

The proposed project would support the advancement of the District's technology and data collection capabilities through the purchase of new leak detection and meter devices, as well as updated hydraulic models. Additionally, the project would maintain transparent data sharing through a new digital dashboard for customers to view real-time water usage—encouraging customers to practice wise water use regularly. As part of the Master Plan, the District would also produce an Information Technology Strategic Plan to integrate technology into existing utility practices, and the efforts outlined in the proposed project would support these future initiatives.

16. Federal Mandate Bonus. If you believe that your project is designed to meet the requirements of a federal mandate which furthers the goals of the WSF, then:

- Describe the federal mandate.
- Provide documentary evidence of the federal mandate.
- Describe how the project meets the requirements of the federal mandate.
- Describe the relationship between the federal mandate and how the project furthers the goals of water sustainability.

As a public water system, the MUD must comply with the Safe Drinking Water Act (SDWA), United States Code 42 § 300f. This project will allow MUD to more efficiently and reliably supply safe drinking water to the ratepayers of MUD for public use in compliance with the SDWA.

This project furthers the goals of water sustainability by making Omaha's water supply more resilient to drought, which has historically depleted Nebraska's renewable water supply and negatively impacted agricultural irrigation.