MORONI CITY WATER CONSERVATION PLAN
2022

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August 2022

PREPARED BY:
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MORONI CITY

WATER CONSERVATION PLAN

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Contents

1.0 INTRODUCTION 3
2.0 SYSTEM PROFILE 3
2.1 WATER SUPPLY AND USE 4
3.0 WATER MEASUREMENT 6
4.0 WATER LOSS CONTROL 6
5.0 BILLING 7
6.0 WATER USE 7
7.0 CURRENT CONSERVATION PRACTICES 8
8.0 FUTURE CONSERVATION PRACTICES 9
9.0 IMPLEMENTATION SUMMARY 9

Appendix A: Service Area Map

1.0 INTRODUCTION

A water conservation plan is essential to successful water system management. The efficient use of water in systems and communities mitigates supply challenges, reduces expensive infrastructure costs, and creates opportunity for sustainable growth. In the State of Utah water conservation plans are required by S.B. 73-10-32 to be updated and submitted to the Utah Division of Water Resources every five years. This water conservation plan has been prepared to describe how water conservation programs and practices should play an important role in meeting our future water needs, as well as address the concerns of leaders and citizens of both Moroni City and the State of Utah. Moroni City's staff and City Council are committed to decreasing the City's per capita water use and meeting the goal of 405 gpcd by the year 2032. This goal represents a 1.6% decrease in gpcd per year for the next 10 years. This goal is based on meeting average indoor and outdoor water usage as estimated by the Division of Drinking Water.

2.0 SYSTEM PROFILE

Moroni City is located in central Sanpete County, in the second driest state in the nation. The City's 2020 population is approximately 1,606. Based on past census records and projected growth rates Moroni City will see an estimated annual growth rate of 2%. Providing water to meet the needs of its citizens has always been a top priority of city leaders and planners. As a result, a well-maintained and operated water system provides the citizens of Moroni with water when and where needed. Currently, the City's water system provides water to 511 residential, 18 commercial, 7 industrial, and 14 institutional (public) connections.

Table 2.1 City Culinary Connections

Category	Current Connections
Residential	511
Commercial	18
Industrial	7
Institutional	14
Agricultural	0

Moroni City has a secondary water system used for irrigation purposes. The City's irrigation system provides water to 460 residential, 3 institutional, and 3 agricultural connections. This water is used for watering lawns and gardens.

Table 2.2 City Irrigation Connections

Category	Current Connections
Residential	460
Commercial	0
Industrial	0
Institutional	3
Agricultural	3

2.1 WATER SUPPLY AND USE

Moroni City's water sources can be divided into culinary sources and secondary sources.

The culinary sources include three existing wells and an additional well under construction. The culinary water for the community comes from East Well #2 and West Well #3. East Well #2 has high nitrate concentration, but it is able to be used in the culinary system after blending with water from West Well #3. The New Well #4 has a safe yield of 820 gpm and has tested low in nitrates.

The secondary sources include Well #1, the Cemetery Well, and shares in the local irrigation companies. Well #1 has nitrate levels which are too high for culinary use, so it is used for secondary water. The secondary system consists of pressurized irrigation originating at a pond above town. The irrigation pond is supplied from Well #1, the Cemetery Well, and from excess ditch water from the local canal company. The City's culinary and secondary water sources are summarized below along with nitrate concentrations at wells.

Table 2.3 Moroni City Culinary Source Capacity Summary

Source	Source Capacity (gpm)
East Well #2	230
West Well #3	377
New Well #4**	820
Total	1427
(**Well under construction)	

Table 2.4 Moroni City Secondary Source Capacity Summary

Source	Source Capacity (gpm)
Well #1	200
Cemetery Well	100
Ditch Water *	200
Total	500
(*Ditch Water Varies Seasonally)	

Table 2.5 Nitrate Concentration at wells

Well	Nitrate Concentration (mg/L)
Well #1	11.27
East Well #2	10.12
West Well #3	1.24
New Well #4	0.80
Note: Red values indicate the concentrations that are above the maximum contaminant level for nitrate (10 mg/L)	

Moroni sits in Northern Sanpete Valley. The valley branches into a northeast branch and a northwest branch just north of Moroni similar to a "Y". The aquifers in this region flow down these two branches and merge underneath Moroni near the location of Wells #1 and #2. The confluence of the aquifers causes a stagnant groundwater zone near those wells.

The water from Wells #1 and #2 have levels of nitrate above the maximum contaminant level (MCL) of 10 mg/L. Nitrate mainly caused by dissolved nitrogen in ground water and is considered a non-adsorbed solute. This means that the nitrate moves with the groundwater with no transformation and little or no retardation. The nitrate is very mobile in groundwater because of this. Nitrate occurs naturally in groundwater from nitrate sources on the land surface, in the soil zone, in shallow subsoil zones, or from contact with rock formation such as pitchblende.

The nitrate levels in Wells #1 and #2 indicate that nitrate sources exist near the wells. The stagnant groundwater zone from the "Y" in the aquifer system cause the nitrate to stay near Wells #1 and #2. This causes the water near Wells #1 and #2 to have a higher concentration of nitrates then other areas in the valley.

The aquifer properties in the area were studied during the well siting study for New Well #4. Aquifer properties describe the ability of a groundwater system to transmit and store water. The distribution of the properties of the valley-filled aquifer varies by location within the area studied. The transmissivity of the valley-filled aquifer ranges from 300 to 2,800 feet/day (Sunrise, 1999) in the Moroni area.

A step-drawndown test was conducted on New Well #4 on May 9th, 2022. The well was under artesian conditions before the pumping test started. Four different pumping rates were evaluated: 520, 570, 980, and 1,300 gpm. The pump test was limited by the equipment. It is likely the well could produce more than 1,300 gpm if a larger casing was used in the same area. A constant rate test was conducted on New Well #4 on May 10th and 11th. The 24-hour pumping test was conducted at 1,230 gpm, which was the maximum capacity of the pump and motor. The drawdown was measured at 147.7 feet.

The test pumping data for New Well #4 indicated that the aquifer could support additional source capacity. It is assumed that if future growth requires additional source capacity that a larger well could be constructed in the vicinity of New Well #4 and could produce more than 1,300 gpm.

Moroni City has 1503.45 acre-feet per year (ac-ft) of water rights, as summarized below.

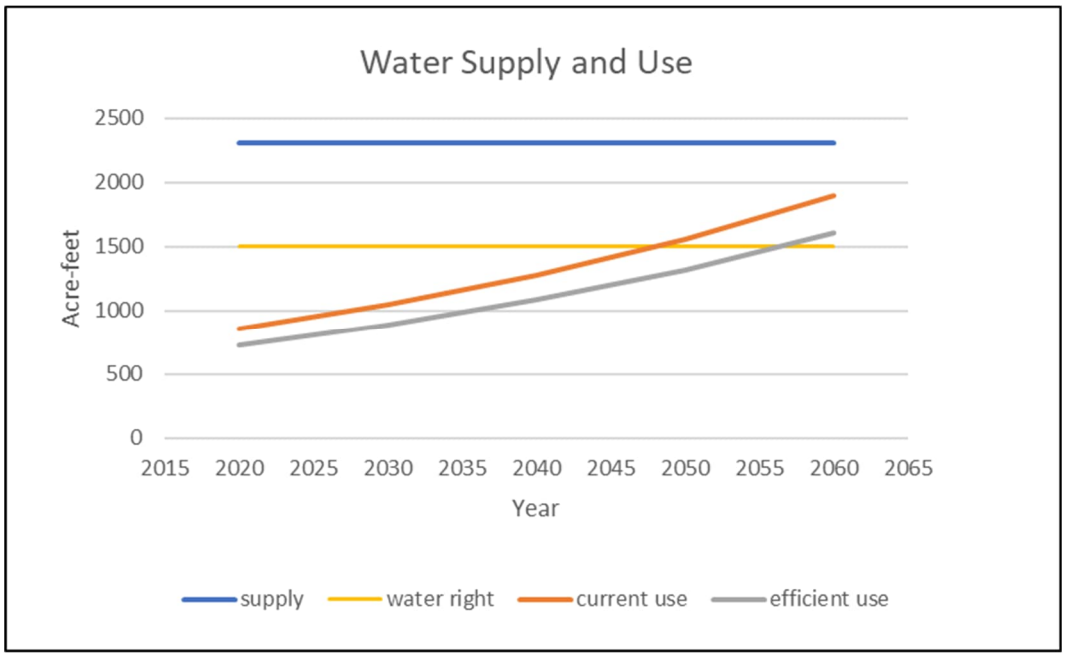
Table 2.6 Moroni City Source Summary

Moroni City Source Summary					
	W.R.#	Source	Total Divertable (cfs)	Total Divertable (ac-ft/yr)	type
1	65-273	Underground Water Well	1	723.98	Municipal
2	65-1704	Underground Water Well	0.26	191.23	Municipal
3	65-2252	Underground Water Well	0.75	542.99	Municipal
4	65-3232	Unnamed Spring	0.06	45.25	Municipal
		Total	2.07	1503.45	

The following graph shows the City's reliable supply and water right for the next 40 years compared to the amount of water the city will use with its current gpcd and its target gpcd. With the reduction in use, in 2060 the

city will need approximately 280 ac-ft less per year than it would need at the projected current use rate at that time.

Figure 2.1 Water Supply and Use



3.0 WATER MEASUREMENT

The city currently has manual read master meters at the spring and wells that track how much water is entering the culinary water system. These meters are read once a month in order to keep an accurate and current view of how well the city is doing with conservation and leak prevention.

Water flowing into the irrigation pond above Moroni is gauged by estimating the flow rate and the amount of time it is allowed to flow and then calculating the amount of water that has entered the pond. There is also an irrigation well, which is metered, that pumps into the irrigation pond. From the irrigation pond the water enters the pressurized irrigation system. Connections within the irrigation system are not metered.

Each connection within the Moroni culinary water system is metered and tracked with a radio read residential meter. Using radio read meters allows the city to track high-water users more accurately and read the individual meters more frequently. The residential meters are maintained by the city maintenance crew. Meters are monitored each month for leaks. It is expected that each meter will be replaced at least once every 20 years to maintain accuracy that might be lost from aging. The water operator is in charge of keeping records on how old each meter in the system is, as well as any repairs and replacements that occur.

4.0 WATER LOSS CONTROL

Tracking and preventing water loss is very important to Moroni City. The city uses the system of master meters and residential meters to keep track of how much water is being lost through leaks each month. This is done by simply subtracting the water being used through residential meters from the total water coming in through the master meters. The city also takes a proactive approach every time a leak is located. The city has a maintenance crew that has the responsibility of finding and fixing leaks as quickly as possible.

5.0 BILLING

Moroni City uses a tiered system for culinary water rates to incentivize residents to reduce water use. The culinary fee schedule breaks down rates based on the type of connection. The fee schedule for culinary water is shown in Table 5.1. The city also charges fees for secondary irrigation. The secondary fee schedule is based on the number of shares. The secondary irrigation fee schedule is shown in Table 5.2.

Table 5.1 City Culinary Water Fee Schedule

Culinary Water Fee Schedule		
Type of Connection	Amount of Water	Rate/1,000gal
Residential	0-1,000 gallons	$14.00
	1,000-8,000 gallons	$4.50
	8,000-12,000 gallons	$5.00
	12,000-17,000 gallons	$5.50
	17,000-22,000 gallons	$6.00
Agricultural	0-1,000 gallons	$14.00
	1,000 gallons and up	$2.50

Table 5.2 City Secondary Water Fee Schedule

Secondary Water Fee Schedule	
Number of Shares	Rate/0.5 Share
0.5	$20.00

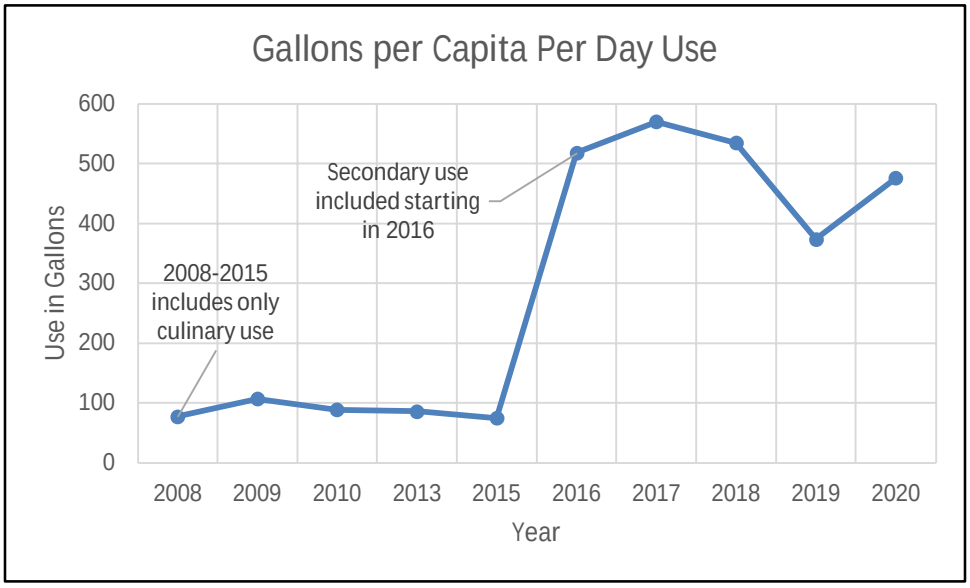
6.0 WATER USE

The new regional goal for Sanpete County is 321 gpcd, a reduction of 20% by 2030. As of 2020 our water usage was 70.02 gpcd for culinary, an estimated 406.01 gpcd for secondary, and 476.03 gpcd total. Below are charts and graphs showing current water usage and gpcd for Moroni City including both culinary and secondary water usage. It is noted that the secondary usage is simply estimated by dividing the total annual estimated usage by the current population on the system. As can be seen in Figure 6.1 the city has data for both culinary and secondary water usage for the last 5 years. Since that time the gpcd has held a downward trend. We as a city council are proud that our efforts as a city have seen a payoff these past few years. We hope to continue to see progress in the future.

Table 6.1 Current GPCD by Use

	Culinary	Secondary	Total
Residential	44.48	365.41	409.89
Commercial	2.8	0	2.8
Industrial	1.71	0	1.71
Instituitional	21.03	20.3	41.33
Agricultural	0	20.3	20.3
Total	70.02	406.01	476.03

Figure 6.1 GPCD Water Efficiency Progress



7.0 CURRENT CONSERVATION PRACTICES

COORDINATION WITH STAFF

Moroni City has a full-time maintenance crew that manages the culinary and secondary water systems. They are in charge of detecting and fixing leaks, as well as updating the city council during council meetings on water use and conservation.

WATER SCHEDULE

In an effort to conserve water Moroni City has implemented a watering schedule for residents to follow during the summer months. This schedule has been posted in public areas throughout the city as well as on our website at https://moronicity.org/2021-water-schedule/. The schedule offers each resident a chance to water outside for two hours five days a week. The city has been split into four quadrants that are each allowed to water outside Tuesday through Saturday at alternating two-hour time slots. There is no outside watering allowed on Sunday, or Monday, or any day between the hours of 10:00 am and 4:00 pm. Schools churches, and businesses are allowed to water Tuesday through Saturday from midnight to 2:00 am.

With the increased attention given to water conservation the city has made this watering schedule mandatory for all residents. Water users will receive a warning on their first offense and a citation and fine for following offenses.

PUBLIC EDUCATION AND OUTREACH

A major factor in conserving water within a community is to educate residents about the ongoing water issues. Moroni currently sends out flow newsletters and water conservation information to our customers in order to keep them up to date on the issues that currently affect our community water supply.

8.0 FUTURE CONSERVATION PRACTICES

REBATES

Moroni City is located within the Central Utah Water Conservancy District (CUWCD) which offers two different rebates for customers. The first is a toilet replacement rebate. If a customer replaces their old toilet with a new Watersense-labeled toilet they receive $100. Since toilets use more water than any other indoor fixture replacing them is an easy way to conserve water.

The other rebate is for smart controllers. Smart controllers reduce water waste by automatically adjusting how often and how long a landscape is watered based on local weather and landscape conditions. When a resident purchases an eligible Watersense-labeled smart controller they will receive $75.

Information on these rebates can be found at https://cuwcd.com/rebates.html#gsc.tab=0 and will be sent out to customers with the water and flow newsletters to inform them of these incentives to reduce water waste.

METERING

The city intends to pursue funding opportunities to install water meters on all secondary water connections. This is intended to improve the management and control of the system and to inform users, and the city, of their water usage as well as to encourage water conservation.

XERISCAPE

Moroni plans to consider adjusting development standards to limit green space in new developments and encourage use of natural vegetation and xeriscape. One of the highest water use activities is watering grass and other vegetation. Encouraging the use of natural vegetation or xeriscape will reduce the need for watering. Part of this change will be to update city construction standards, including road typical sections calling out for drought resistant or native plants within city rights-of-way. Moroni will annually evaluate the progress made to reach this goal, with the intent that the successful measurement will be the implementation of new city construction standards.

9.0 IMPLEMENTATION SUMMARY

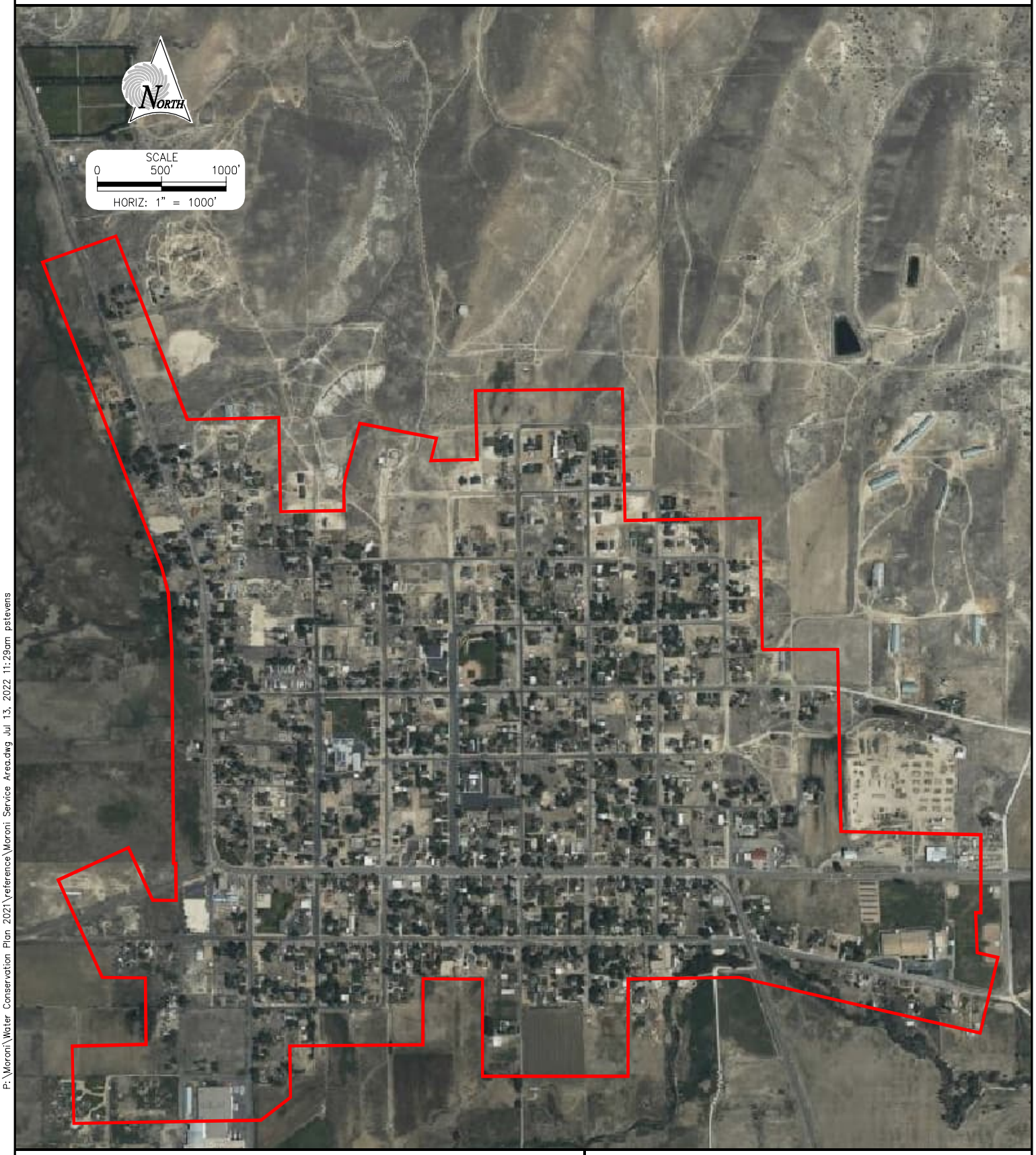
Moroni City's council and staff are committed to reaching our water conservation goals including decreasing the Cities per capita water use to 405 gpcd by the year 2030 which represents a 1.6% reduction in gpcd per year over the next 10 years. It will be the responsibility of the maintenance crew and city council to enact the projects and practices laid out in this plan. This plan will also be updated and resubmitted to the Utah Division of Water Resources in 2027. When this plan is resubmitted in 2027 Moroni's per capita water use should be 439 gpcd. Whether the city reaches this benchmark in 2027 will determine the further conservation practices Moroni will need to implement to reach our overall goal in 2030.

For further questions regarding this plan and the implementation thereof please contact Moroni City at (435)-436-8359, or at 80 South 200 West, Moroni, Utah 84646.

APPENDIX A

SERVICE AREA MAP

MORONI CITY



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SERVICE AREA MAP

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