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MORONI CITY
80 SOUTH 200 WEST
PO BOX 780
MORONI, UT 84646

Subject: Irrigation System Analysis – Draft Review

Dear Mayor Bailey,

Sunrise Engineering was asked to complete a brief analysis of the existing irrigation system to determine if additional connections to the system are feasible. We conducted a review of Moroni City's Irrigation system for water rights, storage, and source capacity. Information from Moroni City and the Division of Water Rights from 2020 to 2023 was used for this analysis.

Each of the three categories above were evaluated based on requirements from the Division of Drinking Water, Division of Water Rights irrigation duty, and actual system usage. Some assumptions have been made while analyzing the existing usage. A leakage factor of 10% and evaporation has been applied to the metered amounts of water entering the storage ponds.

There are currently 472 irrigation customers, but there are about 515 irrigation risers. Some of the customers have multiple risers. 515 connections were used as the basis for our calculations.

Water Rights

The city has 1,503 acre feet of municipal water rights that is used in both the culinary and secondary water systems. The city also has 226 irrigation shares. Using the Division of Drinking Water standards to determine the amount of water right required for your existing culinary system, approximately 500 acre feet is required to meet the needs of the existing system. This assumes outdoor watering is being provided by the irrigation system for all properties that have an irrigation connection. The amount of water right required for the irrigation system is approximately 230 to 420 acre feet, leaving approximately 815 to 1,000 acre feet of excess water right. Irrigation water rights were determined using 210 days annually.

Storage

The minimum amount of water storage for secondary systems is not regulated by any agency. The amount of storage can be determined by the system supplier. Moroni City has between 6.5 and 7.4 million gallons of storage between the three existing ponds. This is approximately 9 to 12 days of storage if all the ponds were full based on historical usage.

Source

Source capacity is not regulated by any agency as long as the water used does not exceed your water rights. Actual flows vary based on supply and actual usage data won't be available until the secondary metering is completed. However, the available source appears to be the most limiting factor for adding connections to the system. The estimated source surplus is 0 to 110 gallons per minute (gpm) during low-flow summer conditions, which can support 0, 50 or 133 more Equivalent Residential Units (ERU's).

System Condition

It is understood the existing distribution system may be reaching the end of its design life expectancy. There are many repairs to the piping system being conducted each year. Most of the piping in the system is over 50 years old and may not be able to support additional demand. It is recommended that the city prepare a capital facilities plan that further evaluates the existing distribution system, and identifies recommended improvements, phasing and costs.

Sincerely,



Trenton Brown

ATTACHMENT – CALCULATION TABLES

System Summary

System Part	Method used			System Excess
	Div. Drinking Water	Water Rights Irrigation Duty	Actual Values	
Water Rights Required	230 ac-ft	420 ac-ft	330 ac-ft	815 to 1000 ac-ft
Source Required	470 gpm	1080 gpm	535 gpm	0 to 110 gpm
Storage Required	-	-	-	-
Actual Available Water Rights + Irr. Shares	1,729 ac-ft			
Actual Available Storage	6.5 to 7.4 million gal			
Actual Available Source	580-810 gpm			

System Flows

Month	Total Gallons Inflow	Irr Usage	Est. Evaporation	Loss to Leaks (10%)
Jan	0	NA	0	0
Feb	0	NA	0	0
Mar	523,000	345,000	126,000	52,000
Apr	7,279,000	6,224,000	327,000	728,000
May	18,152,000	15,891,000	446,000	1,815,000
Jun	28,003,000	24,641,000	561,000	2,800,000
Jul	24,552,000	21,044,000	1,053,000	2,455,000
Aug	21,732,000	18,884,000	675,000	2,173,000
Sep	20,137,000	17,596,000	528,000	2,014,000
Oct	4,456,000	3,725,000	285,000	446,000
Nov	0	NA	0	0
Dec	0	NA	0	0
Total (gal)	125,000,000	108,400,000	4,000,000	12,500,000
Total (ac-ft)	384	333	12	38

Available Water Rights

Water Rights (Municipal Use)		Flow	
W.R. #	Source	cfs	Ac-Ft.
Moroni City			
65-1704	Moroni City Municipal U.G Well	1.00	191.23
65-2252	Moroni City Municipal U.G Well	0.75	542.99
65-273	Moroni City Municipal U.G Well	1.00	723.98
65-3232	Unnamed Spring	0.06	45.30
Total Town Water Rights		2.81	1503.50
Municipal Water Rights Remaining for Irrigation			
	M & M Irrigation Shares		67.00
	Moroni Irrigation Shares		159.00
Total Irrigation Shares		0.00	226.00

Available Storage

Storage Structures	Storage
Upper Pond	4,500,000
Middle Pond	1,100,000
Lower Pond	1,800,000
Total Existing Storage Capacity	
	7,400,000

Moroni Secondary Water Sources

Sources	CFS	gpm
Wells		
Well #1	0.45	200
Well #2	0.51	230
Other Sources		
M&M Irrigation*	0.14	62
Moroni Irrigation*	0.21	92
Source Total =	1.30	584

*Minimum Flow Value Used