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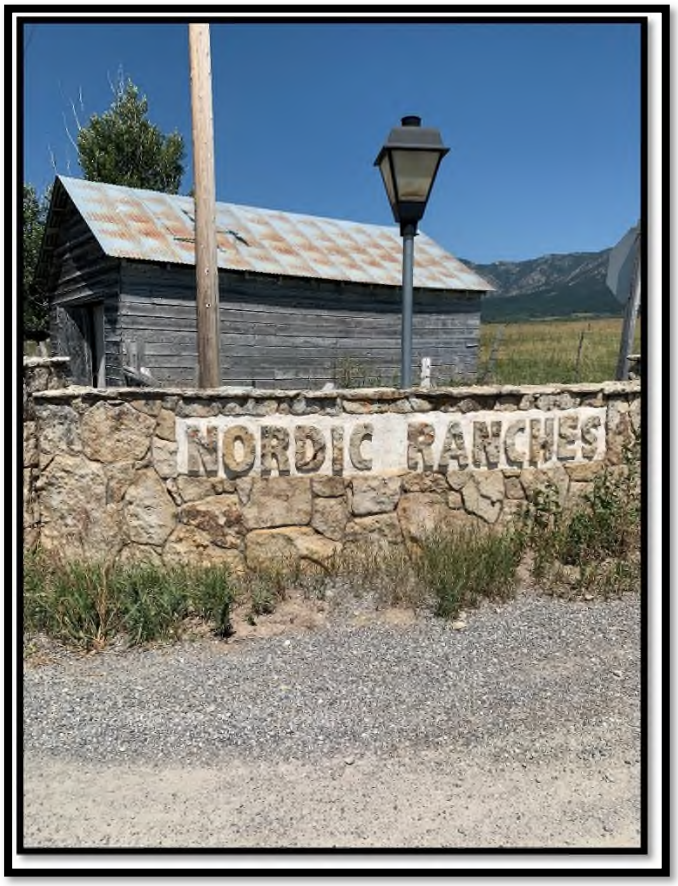
NORDIC RANCHES WATER MASTER PLAN, LEVEL I

Executive Summary

August 2022



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1.0 Project History and Overview

The Nordic Ranches Community Water and Sewer District (NRCWSD) was formed in 2020 for the purpose of some legal authority and to acquire this study through the Wyoming Water Development Commission (WWDC). The intention of NRCWSD was to gather information about the water system that currently operates in the community. Nordic Ranches Water LLC (NRW), is the owner and operator of the private water system that is the subject of this study. NRW began the development of the water system in the 1980's and has updated/extended its system as growth and development occurred. It was decided, in early 2021, with the NRCWSD and WWDC that a level I study of the system would provide the NRCWSD and NRW with a current understanding of the water system and a guide for the future.

In general, the overall status of the water system is in a relatively good condition. This is primarily due to the age of the infrastructure (5-40 years) and the regulations associated with the construction time frame such as those from the Wyoming Department of Environmental Quality. The water system is governed/regulated as well by the Wyoming Public Service Commission as it is a private utility company. As with many municipalities and water systems in Wyoming, limited resources have put a constraint on the development or action of a replacement plan for water systems. Recently the NRW raised its user rates to accommodate the increased costs of operation as well as to begin building a reserve for system upgrades, repair and replacement. This master plan can help by providing a guide for the NRCWSD and NRW in maintaining and updating the water infrastructure for current conditions and for the future.

The system serves approximately 173 service tap connections serving a present population of approximately 628.

2.0 Study Area

The NRCWSD is located in northwestern Wyoming in Lincoln County. The District is approximately 11 miles North of Thayne, WY and 6 miles South of Alpine, WY along the East side of Wyoming Highway 89.

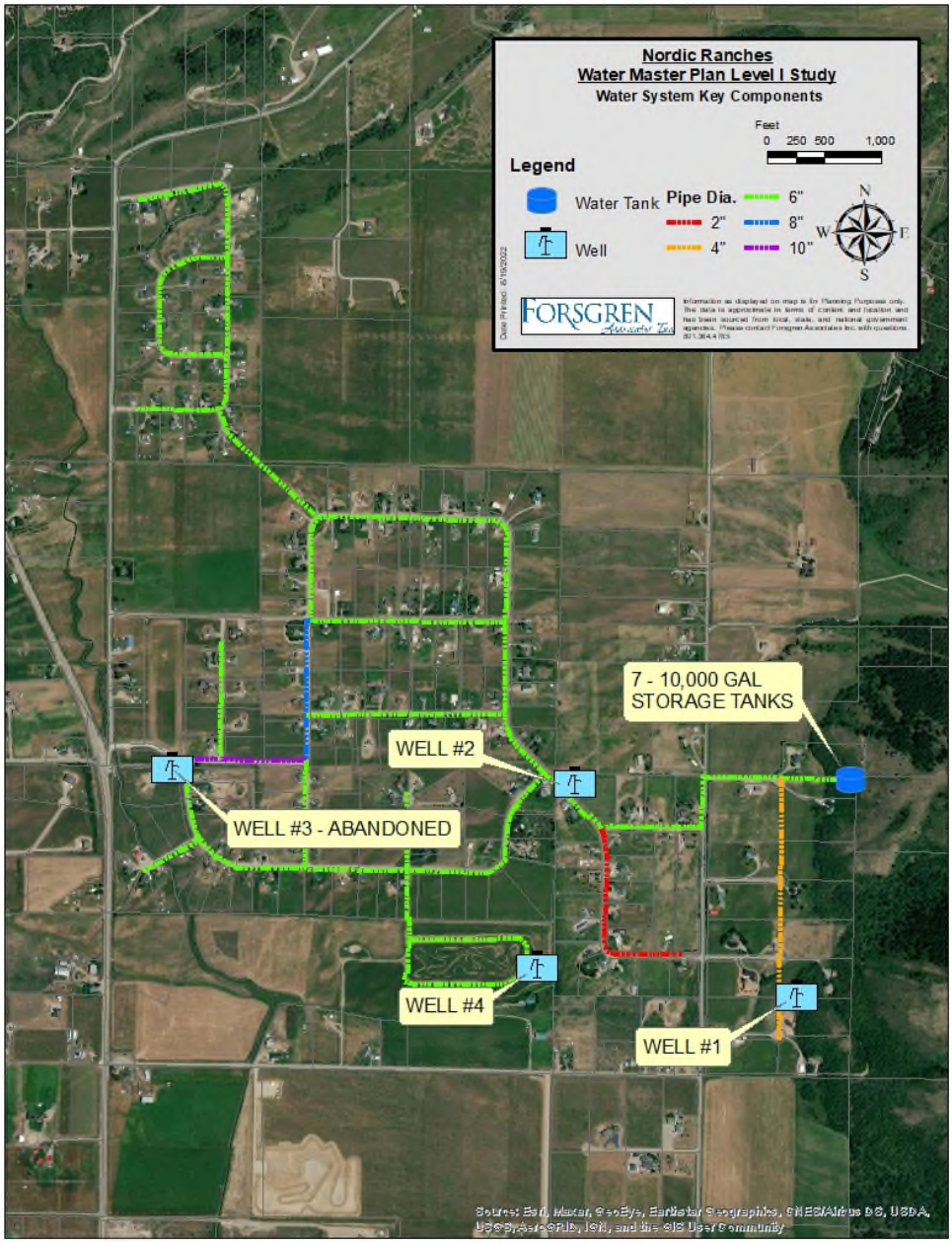

Figure ES.1 – Nordic Ranches System Map

3.0 Master Plan Objectives

This Master Plan's objectives included first analyzing current and forecasted water system supply and demands, storage, assessing (through onsite investigation) the condition of existing system components, and hydraulic modeling. Based on these objectives the analysis, priorities, lifecycles, and cost estimates were established and contained herein.

3.1 Present and Forecasted Population Served

According to the 2020 Wyoming Census Data, the Population and Housing Units By Census Block spreadsheet was used to determine the existing estimated population of 628 for Nordic Ranches. Utilizing the 2010-2040 Wyoming EAD Population Forecast for Lincoln County, the water system is forecasted to see an increase in population to 769 by the year 2051.

3.2 Water User Rates

The Nordic Ranches water system has a tiered rate schedule for water supply fees and base rates for service connection fees. The tiered rate system for water supply is primarily based upon usage (in gallons). Tables ES.1 and ES.2 below show the existing user rates and connection fees respectively.

Table ES.1 Nordic Ranches Water Usage Fees

2019 – Current Residential Water User Fees					
Gallons Used Minimum	Gallons Used Maximum	Base Rate	Cost per 1,000 Gallons Over Minimum	Minimum Cost	Maximum Cost
0	10000	$ 78.39	$ -	$ 78.39	$ 78.39
10001	20000	$ 78.39	$ 1.60	$ 78.39	$ 99.19
20001	40000	$ 78.39	$ 2.20	$ 99.19	$ 143.19
60000	+	$ 78.39	$ 2.20	$ 143.19	+

Table ES.2 Nordic Ranches Water Additional Rates

Nordic Ranches, LLC Additional Rates			
Fee Type	Direct Cost	Occurrence	Notes
Connection Fee	$ 4,000.00	One Time	3/4" Connection
Facilities Charge	$ 12.00	Monthly	Lots in the system service limits not connected to the system
Disconnect Fee	$ 100.00	One Time	Per Each
Reconnect Fee	$ 75.00	One Time	Per Each
Transfer Fee	$ 250.00	One Time	Per Each

3.3 Water Supply Sources – Nordic Ranches Wells

The Nordic Ranches water system obtains water from three (3) water supply wells (Well #1, Well #2, Well #4). A fourth well (Well #3) was drilled for the water system but was plugged and abandoned, presumably because of water quality issues. Well #1 was put into production in 1984, Well #2 in 1994 and Well #4 in 2007. These wells are located throughout the serviceable area of the water system and supply water to the storage tanks through the transmission/distribution system.

3.4 System Storage

The water system is currently served by seven (7) 10,000 gallon water storage tanks. These tanks are located east of the system and provide the pressure control for the system. Three tanks were originally constructed in 1994, one tank installed in 1999 and the remaining three tanks were installed in 2008. Each tank is of similar design and construction, horizontal steel cylinder, buried, and are connected through piping. Though there are seven tanks, due to the piping configuration between the tanks, they act as a single tank on a float system.

3.5 Transmission Lines

The water supply from the wells fills the storage tanks through a series of three 4”- 6” transmission lines. These transmission lines are not purely dedicated to transmission but are also connected to the distribution piping of the system.

3.6 Distribution System

The system’s distribution system consists of approximately 36,400 feet of 2” to 10” PVC waterlines. From the distribution system, water services are metered by ¾” residential service connections.

3.7 Pressure Zones

Currently there is only one (1) pressure zone in the system which is controlled by tank water levels. Apart from well production, the system operates as a gravity feed system. As a result, no PRVs (pressure relief/control valves) are used within the system to control pressures. Based off of the hydraulic modeling the operation of the system in this fashion best fits the geographic nature of the system.

3.8 Existing and Future Per Capita Consumption

The water system experienced a usage Average Day Demand (ADD), Winter ADD, Summer ADD, Maximum Day Demand (MDD) and Peak Hour Demand (PHD) over the years 2016 thru 2021 as shown of Table ES.3. For this study only metered usage reports were provided by the system owner, no production metered records were available.

Table ES.3 Current Demands – Metered Usage

	Average Day Demand (ADD)	ADD Winter	ADD Summer	MDD (2 * ADD Summer)	PHD (1.93* MDD)
GPD	**61,237.54**	**23,068.26**	**69,719.60**	**139,439.19**	
GPM	**42.53**	**16.02**	**48.42**	**96.83**	**186.89**
GPDPC 2020	**353.97**	**133.34**	**403.00**	**806.01**	

Future demand estimates on the system for the year 2051 are shown in Table ES.4.

Table ES.4 Future Demands (year 2051)

	Average Day Demand (ADD)	ADD Winter	ADD Summer	MDD (2 * ADD Summer)	PHD (1.93* MDD)
GPDPC 2020	**353.97**	**133.34**	**403.00**	**806.01**	
Capita 2051	**212**	**212**	**212**	**212**	
GPD	**75,042.53**	**28,268.62**	**85,436.73**	**170,873.46**	
GPM	**52.11**	**19.63**	**59.33**	**118.66**	**229.02**

3.9 Water Rights

Water Rights Conclusions – The water rights of all three of the system's wells are not complete or adjudicated. A review of the SEO on-line permit database found that water production reports have been submitted to the SEO for 2002 to 2006, 2008 to 2012, and 2014. Production data from Well No. 4 was not provided in 2011. Water levels were included in annual reports to the SEO in 2004, 2006, 2008 to 2012, and 2014. No data has been submitted to SEO since 2014. **The water system should complete the adjudication process for the wells and ensure that the system is in compliance with the Conditions and Limitations for the permits.**

4.0 Recommended System Improvements and Priorities

The basis of the water system analysis was to evaluate the condition of the water system as a whole and in terms of main system components. In general, the system performs adequately for the present and future demands of Nordic Ranches but there are issues regarding future system storage, source water rights, well upgrades, water age, infrastructure age and operations. To address these concerns in the system, several methods were evaluated separately and in various combinations to produce recommendations for a more reliable water system. Tables ES.5 and ES.6 show the recommended and conditionally recommended prioritized improvements for the system.

The recommended improvements from the Level I Study are prioritized and presented as follows in Tables ES.5 and ES.6.

Table ES.5 – Recommended System Improvements

Priority	Description	Notes
1	**Source Water Rights (7.1.1)**	***NRW should complete the water rights for Wells #1, #2 & #4.***
2	**Well Improvements (7.1.1)**	***Minor updates to well house piping and control systems.***
3	**Water Loss Program (7.1.3)**	***The Implementation of a water loss program will allow NRW to better understand loss in the system, maintain more accurate records and develop priorities for system replacement/repair.***
4	**GIS System (7.1.4)**	***The implementation of a GIS based data collection system will help improve accurate data collection, maintain records and prioritize operations.***
5	**Valve Inspection Program (7.1.2)**	***Annual inspection and operation of all valves in the system. This will help ensure operability and help prioritize valving needs.***
6	**Valve Replacement Program (7.1.2)**	***In conjunction with priorities 4 & 5 above, establish the needs of the system to replace/add additional valving for operational considerations.***
7	**New 100K Gallon Steel Expandable Storage Tank (7.1.5)**	***When the system demands force additional storage capacity as stated in Section 6.4. NRW should consider the installation of a 100,000 gallon steel storage tank designed to accommodate an expansion to a 200,000 gallon tank.***

Table ES.6 – Recommended Conditional System Improvements

Priority	Description	Notes
1C	**Storage Flushing (7.1.6)**	***Should the system begin to experience the effects of water age related issues a weekly flush/drain of one (1) tank (tanks sequentially rotated weekly) will greatly reduce the water age in the tanks and overall system.***
2C	**System Flushing (7.1.6)**	***Should the system begin to experience the effects of water age related issues a a 7,500 gallon weekly hydrant flush (0.25 hrs @ 500 gpm) will reduce the distribution systems water age.***
3C	**New 200K Concrete Storage Tank (7.1.5)**	***Should the system begin to provide fire flow capacities additional storage will be required to accommodate required fire flow storage. A 200K gallon tank is sized to accommodate the projected build-out demands of the system as well as fire flow storage.***
4C	**Distribution System Upgrades (7.1.2)**	***Should the system begin to provide fire flow capacities, distribution system upgrades will be required to meet Wyoming DEQ Standards for fire protection including line sizing and looping.***
5C	**Hydrant Replacement Program (7.1.2)**	***Should the system provide fire flow protections, it is recommended that NRW replace existing hydrants (as they break/become inoperable) with a single hydrant type. This will allow for less on-hand repair parts as the hydrant system become more homogenized.***

5.0 Rate Impacts / Financial Capacity

Project costs (reflective of estimated 2022 construction costs with engineering and inflation), and rate payer impacts based on assumed funding scenarios are summarized in Table ES.7. Project loan payments are broken down by monthly cost per existing connection to determine the average potential rate impact. As the current owner of the Nordic Ranches water system is a private company, there is no availability for public funding scenarios. The table below assumes that all project funds would be provided by a SBA/CoBank Loan and would be completed in 2024. The construction costs of a 100,000 gallon storage tank to replace the existing system storage and accommodate system development is anticipated to be covered by the owner/developer of the system with no impact to system user rates.

Table ES.7 – Project Rate Impacts

Item #	Description	Estimated Project Cost	ASSUMED FUNDING SOURCE		Monthly Cost per Ratepayer *(Based on 173 current users)*
			SBA/CoBank Loan (6%, 20 years)	Annual Loan Payment	
7	New 100K Gallon Steel Expandable Storage Tank	$901,200	$901,200	$78,571	$0.00*
3C	New 200K Concrete Storage Tank (Fire Suppression)	$966,600	$966,600	$84,273	$40.59
4C	Distribution System Upgrades (Fire Suppression)	$2,421,600	$2,421,600	$211,126	$101.70