



Lincoln-Pipestone Rural Water System Bonding Request Information

Holland Water Source (BIOTTTA):

Holland previously used reverse osmosis (RO) and conventional pressure filter treatment processes in parallel. Because of discharge permit requirements, the RO process was discontinued at Holland. The pressure filters continue to run and supply water to distribution, but the role of the Holland Water Source was significantly diminished in 2019 with the termination of the Holland RO treatment process and the advent of the Lewis and Clark Water Source connection.

Currently there are eight wells in the Holland well field. Total wellfield capacity is 2,525 gpm and firm capacity is 2,025 gpm. Pumping rate from each well and maximum historic nitrate level are as follows:

Well #	Flow Rate (gpm)	Maximum Nitrate Level (ppm)
1	400	9.88
2	100	10.26
3	325	9.34
4	225	16.3
5	300	25.8
6	175	11.41
7	500	16.77
8	500	19.87

[Note: yellow highlighted wells are currently set as primary production wells. Grey highlighted wells are supplementary production wells (turned on only during high demand periods). All other wells not highlighted are not placed into production due to extremely high nitrate levels.]

Nitrate levels in each of the eight wells varied considerably in the period since the wells were constructed. Wells #4, #5, #7, and #8 exhibit the highest nitrate levels and usually received treatment in the RO process. Use of these wells is discontinued until a new method for nitrate removal is devised. The remaining wells (#1, #2, #3 and #6) are lower in nitrates, but are higher in iron and manganese, and usually receive treatment for iron and manganese removal. Because nitrate levels in the low nitrate wells (#1, #2, #3 and #6) at times exceed the 10 ppm maximum contaminant limit, these wells were



blended with the water from the RO treated wells in order to consistently produce a final product acceptably low in nitrates. Without RO treatment to remove nitrates, plant operators monitor nitrate levels in the plant discharge closely to ensure that the nitrate MCL of 10 ppm is not exceeded.

Lincoln-Pipestone Rural Water System completed a pilot project in 2013 that demonstrated the effectiveness of the BIOTTTA method in removing nitrates from groundwater. They successfully purified water with 20 ppm of nitrates to 0 ppm. This was performed on their wells with the highest nitrate content at the Holland/North Holland water source.

This process is done by pumping raw water from the ground, identifying the needed bacteria that already exists in the water (In this case nitrogen-fixing bacteria) and then providing a food source for the bacteria to grow and flourish. The bacteria do their role by converting nitrates into nitrogen gas which then simply disperses into the atmosphere. This process has been used in Europe for a number of years and is becoming more prevalent in the US.

This \$4,000,000 bonding allocation would cover half of the cost of the new treatment method and will allow LPRW to remedy serious vulnerabilities in our system while preventing the need to construct a new wastewater treatment facility that could cost in excess of \$25,000,000.

Burr Water Treatment Plant (WTP) Improvements:

Lime-softening Contact Basin:

Consideration was given to proposing a second, redundant contact basin at the proposed Dawson-Boyd WTP in the event one basin fails or for use during routine maintenance. It was determined that a redundant contact basin is more advantageous at the Burr WTP than the Dawson-Boyd WTP. Due to their respective locations in the LPRW system, Burr can serve the entire area which will be served by Dawson-Boyd, but Dawson-Boyd can serve only a portion of the area currently served by Burr. Therefore, construction of a redundant contact basin is proposed at the Burr WTP and not at the Dawson-Boyd WTP.



Burr WTP Storage:

The Burr WTP has a 500,000-gallon clearwell. The geometry of the clearwell and the location of the HSP intake provides 297,850 gallons of effective storage to the south and east service areas. An additional 127,650 gallons of storage is available to the east service area only, for a total effective storage volume of 425,500 gallons. At a maximum treatment capacity of 1,600 gpm, the effective clearwell storage allows about 4.5 hours of WTP downtime when operating at maximum capacity. A design best practice is to maintain at least 6 hours of clearwell storage. There are two main reasons for desiring at least 6 hours of clearwell storage. The first reason is to allow enough available downtime for routine maintenance, cleaning, and backwashing. A second reason is to minimize the required number of startup and shutdown cycles, providing flow equalization that allows the lime softening operation to produce water over a longer period. This provides a more consistent and higher water quality for LPRW's customers. Adding a new ground storage reservoir at the Burr site would grant the Burr WTP more flexibility for being out of service. The advantage is that a new GSR at the Burr WTP gives LPRW additional storage capacity which increases available downtime and provides more flow equalization.

This water source is crucial to the LPRW system, and the aging infrastructure here puts the source's reliability into question. If this treatment facility went down for maintenance or due to a system failure, it could potentially lead to shortages over one-third of our system, and also negate the redundancy measures we have taken with the new Dawson-Boyd water source.

This \$2,500,000 bonding allocation would allow us to maintain needed redundancy across parts of our system, while keeping rates affordable for our constituents.

System Storage and Transmission:

Ivanhoe Elevated Tank Delivery:

LPRW has difficulty delivering enough water to the Ivanhoe Elevated Tank to keep up with peak demand. During peak demand, the water level slowly drops despite LPRW's current efforts to fill it. LPRW has come dangerously close to emptying the tank which would result in depressurization of the system. Ideally, the system would be able to satisfy its peak day demands with 20 hours or less of pumping time in a day. This allows for some station downtime and a factor of safety in case a new record peak day



is observed. The Ivanhoe Elevated Tank is served from the Burr water source via the Hendricks Elevated Tank.

Green Valley/Vallers Water Tower Storage:

The Cities of Dawson, Clarkfield, Hanley Falls, Wood Lake, and Belview have expressed interest in receiving water from LPRW. However, it is likely that only 2-3 of those cities would connect to LPRW immediately. The Cities of Madison, Cottonwood, and Delhi have also discussed purchasing water from LPRW now or in the future. Rural users in Lac Qui Parle, Yellow Medicine, and Redwood Counties have also expressed interest in rural water service. New transmission pipelines and storage are needed to connect cities and areas of new water service to the Dawson-Boyd Water Source. A new water tower between the two sources becomes extremely useful in that it could be fill from both sources (existing Burr source and the new Dawson-Boyd source); providing advanced operational ability and redundancy.

This section of the proposed bonding package will allow us to connect new cities and individuals to our system by increasing our storage and transmission capabilities. While water sources and treatment are often at the forefront of discussions around water access, transmission of that water is equally as important. As our system expands and more communities express their desire to connect, we are quickly reaching the limits of our transmission capacity. The topography of Southwestern Minnesota is such that elevation must be taken into account. While water storage helps us better prepare for peak hours, elevated storage tanks also allow us to transfer water across vast distances and over difficult terrain. Additionally, these transmission limitations are exacerbated during times of drought when it becomes increasingly important that LPRW retains the ability to transmit water across our system to areas that may be impacted.

This \$5,000,000 allocation will allow us to meet the appropriate storage availability for the demands of our system and fulfill the impending requests for water service in the northern portions of our system which currently has a moratorium on all new or expanding users and municipalities.

New System Office:

Lincoln-Pipestone Rural Water System currently operates out of an old house in Lake Benton which has been modified to serve as a business office. The building does not function well as a system office. LPRW has security concerns regarding the current

office including fire safety and protection in an active shooter scenario. The board room is used for weekly staff meetings, monthly construction meetings, monthly board meetings, and other gatherings. There is only one exit from the board room, which is a hazard when large groups meet in the room. There is no barrier between the front door and the receptionist's desk or a route for the receptionist to flee from an angry customer who may enter the building. At the moment, some of our system supervisors have resorted to working out of their trucks because there is not ample space for them in our office. Other issues with the current office include, but are not limited to:

- The building was not designed as a business office which creates efficiency problems. Some offices are on the ground floor and some offices are on the second story.
- There is no good space for file storage which is important for any business office, especially a utility office.
- The ground floor is ADA compliant for handicapped visitors, but the second floor is not ADA compliant.
- The building does not lend itself as a pleasant environment to the ever-growing number of employees, customers, or other visitors.
- The system SCADA server and main computer is housed in a room on the ground floor. The SCADA room recently experienced water ingress when condensation leaked from the upstairs furnace. Ideally the SCADA equipment would be stored in a secure room where there is no risk of water ingress, and in a controlled environment.
- The building is not set up well for modern networking equipment including videoconferencing capabilities.
- The building HVAC system does not meet new MDH guidelines for minimizing the spread of infectious diseases.

Currently, the primary system equipment/materials storage and maintenance facility is at LPRW's Verdi Pump Station and Reservoir site about 7 miles southwest of Lake Benton. As a water utility, LPRW regularly orders and receives shipments of construction materials, etc. The Verdi site is in a remote location and deliveries are frequently made to the Lake Benton office which need to be sent to Verdi. Ideally, LPRW would operate with adjacent system office and storage facility in an accessible location to reduce the number of delivery mix-ups and allow LPRW to maintain inventory more easily. Having a centralized location for parts and materials allows for efficient operation, inventory control and cost effectiveness.



The City of Lake Benton has generously gifted LPRW 15 acres of land within the city limits so that we can build a new office to accommodate our growing operation and stay local. We are one of the largest employers in town, and do our best to contribute to the community. This \$1,350,000 bonding allocation will allow LPRW to stay in this community, utilize their generous donation of land and continue to grow to optimize our operations for those who need clean water throughout Southwestern Minnesota.