

RATTLESNAKE RIDGE WATER DISTRICT

QUALIFIED INFRASTRUCTURE IMPROVEMENT PLAN

PURPOSE

On July 12, 2024, the Public Service Commission of Kentucky (“Commission”) issued an Order in Case No. 2024-00176 directing Rattlesnake Ridge Water District (“RRWD”) to prepare an Qualified Infrastructure Improvement Plan (QIIP), including a comprehensive unaccounted-for water loss reduction plan that establishes priorities and a time schedule for eliminating each source of unaccounted-for water loss and provides a detailed spending plan for the proceeds of a surcharge.

BACKGROUND

RRWD was established in 1961 but did not commence operations until 1983. The existing system consists of approximately 700 miles of water mains of various sizes with 11 distribution water storage tanks and 10 booster pump stations that serve approximately 4,030 customers in Carter, Elliott, Lawrence, and Morgan Counties. The topography of Carter and its surrounding counties is mountainous with narrow valleys that follow state and county roads. The differences in elevations range from 600 feet in elevation in the valleys to over 1,200 feet on the ridge tops. These divergent elevations are reflective in the 10 pressure zones using 11 tanks to provide service to its customers. The RRWD produces all of its water at their Water Treatment Plant located along Grayson Lake.

RRWD has experienced higher than desired water loss in the last decade ranging from 59% to 65% of total water produced and introduced into RRWD’s distribution system. In April of 2020 RRWD entered into an agreement with Bluegrass Engineering, PLLC for their Phase 12 Water System Improvements Project. This project was directed toward combating water loss. The project consisted of replacing approximately 4,030 water meters with new radio read meters, installation of 9 zone meters, replacement of approximately 700 service lines from main to meter, and the replacement of approximately 15,000 L.F. of 2”, 3”, and 4” water mains. This project helped reduce RRWD’s annual water loss from ~60% to ~28%.

CAPITAL IMPROVEMENTS FOR WATER LOSS COMPLETED PROJECTS

RRWD recently complete their Phase 12 Water System Improvements Project aimed at reducing water loss in their distribution system. RRWD had an abundance of existing water meters that would read slow and in some cases not read at all. The district replaced approximately 4,000 customer meters and replaced their larger 1” and above wholesale meters. RRWD also replaced approximately 750 service lines from water main to meter to a more reliable material. 9 zone meters were installed throughout the system to help the district locate areas where there may be leaks. This project was an overall success in reducing water loss. RRWD’s water loss went from ~60% to ~28% and lower.

CAPITAL IMPROVEMENTS FOR WATER LOSS FUTURE PROJECTS

RRWD's service area is mountainous with narrow valleys that follow state and county roads. The differences in elevations range from 600 feet above sea level to over 1,200 feet above sea level. Due to the difference in elevations, RRWD operates on a higher Hydraulic Grade Line (HGL), which leads to high water pressures in the valleys where most of the customers are located. When RRWD has a leak or break in these high pressure zones they lose water at a faster rate. RRWD proposes to install Pressure Reducing Valves where hydraulically applicable in order to reduce some of the high pressure areas as well as decrease the amount of water lost to breaks and leaks.

RRWD has approximately 700 miles of water mains of various sizes. With the amount of water mains that RRWD has in the ground, finding leaks and breaks can become difficult. The difficulty increases with a lack of valves in the system due to not being able to properly isolate the system. This leads to an increase in water loss due to the fact it takes more time to locate and isolate a leak or break. Installing additional valves within the distribution system will lead to time and water saved when looking for and repairing leaks and breaks.

As part of the Phase 12 Water System Improvements Project, RRWD installed 9 zone meters at the introductory point of each pressure zone. These zone meters allow RRWD to collect data daily to establish normal usage metrics within that pressure zone. RRWD also has each customer account associated with their respective pressure zone. With the new zone meter readings and having all accounts sortable based upon pressure zone, usage within a pressure zone could be calculated and monitored to help detect a possible source of water loss. Due to RRWD distribution mains being approximately 700 miles long, the 9 zone meters installed are not enough to help find leaks and breaks within a timely manner. Additional zone meters should be installed in each pressure zone in order to better isolate leaks and breaks, which will lead to the reduction of total water lost in the system.

Leak detection equipment such as manual listening devices (ground microphone, listening stick) and acoustic noise loggers that are installed at points within the distribution system can help locate leaks. RRWD can install acoustic noise loggers permanently to provide continuous leak detection. RRWD currently does not have any of the above-mentioned leak detection equipment. With the purchase of leak detection equipment, RRWD can be more efficient in locating leaks saving time and water in the process.

RRWD is considering purchasing a water meter testing bench. The meter testing bench will allow RRWD staff to test customer meters within their system in order to determine if the meter is reading accurately. If a water meter is reading slow, then the district is not billing the correct amount on the monthly bills resulting in a higher calculated water loss percentage. The testing bench will also allow RRWD to efficiently test their meters and switch them out in a timely manner reducing the amount of water loss in their system.

RRWD has identified problem areas within the distribution system that is constantly leaking/breaking. Replacing these problematic water mains has become a top priority in order to

reduce the amount of water loss within their distribution system. Diamond Ridge Road has 1,000 L.F. of 3" water main that keeps failing due to soil failure (slipping) of the hillside. Horton Flats Road has approximately 7,500 L.F. of 4" and 3" problematic water main due to the amount of leaks and breaks that have been repaired in this section. KY 1496 has approximately 20,000 L.F. of 4" water main that keeps requiring repairs due to leaks and breaks. There is approximately 500 L.F. of 6" water main that requires repairs due to leaks and breaks in front of Willard School. Huff Run Road has approximately 15,000 L.F. of 8" water main that has been problematic due to the number of breaks in the main.

Table 7 – Qualified Infrastructure Future Expenditures

| Project | Project Description | Project Cost |
|---|---|---------------------|
| Pressure Reducing Stations | Installation of pressure reducing stations on five branch lines. | \$ 50,000 |
| Water Valve Insertion | Installation of water valves of various sizes within the system to help reduce the amount of time it takes to find and repair leaks | \$ 100,000 |
| Zone Meters | Installation of zone meters to help narrow down areas that may have potential leaks | \$ 250,000 |
| Leak Detection Equipment | Purchase of leak detection equipment to find leaks quicker | \$ 25,000 |
| Water Meter Testing Bench | Purchase of a water meter testing bench to test meters for accuracy | \$ 50,000 |
| Diamond Ridge RD Water Main Replacement | Replacement of problematic water main | \$ 60,000 |
| Horton Flats Road Water Main Replacement | Replacement of problematic water main | \$ 325,000 |
| KY 1496 Water Main Replacement | Replacement of problematic water main | \$ 850,000 |
| Willard School Water Main Replacement | Replacement of problematic water main | \$ 50,000 |
| Huff Run Road Water Main Replacement | Replacement of problematic water main | \$ 800,000 |
| Total – Qualified Infrastructure Future Expenditures | | \$ 2,560,000 |

CONCLUSION

RRWD has been proactive in their pursuit to reduce water loss within their distribution system prior to the PSC Case No. 2024-00176. The Phase 12 Water System Improvements project has reduced their water loss from ~60% down to ~28%. The above capital improvements projects will help further RRWD's goal to achieve a tolerable water loss for the system.