

Lake Village Water Association, Inc.

Infrastructure Improvement Plan

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Existing Water Loss Reduction Practices

The Association continually strives to reduce the non-revenue water volume by conducting continual leak detection through a series of daily processes, as well as planned infrastructure improvement projects. The distribution system is separated into six hydraulic zones, each served by a master meter from the City of Danville or the City of Harrodsburg. Of the master meters, three are on SCADA and continually provide water flow data, while three are read daily at the beginning of each day. The flow totals are calculated to obtain the previous 24 hour usage for each hydraulic zone. Staff have become accustomed to the normal flow volumes for the zones and immediately can determine whether leak detection is necessary to look for a service line or main line leak. Higher than normal flow volumes within a particular zone will immediately make leak detection a priority for staff. Once the cause of the increased flow has been found and repaired, the usage is monitored to ensure that the daily flow returns to normal.

On a monthly basis and immediately after customer meters are read, the non-revenue water volume is calculated for each hydraulic zone by calculating the total volume of water sold within each zone and subtracting the sold volume from the total volume purchased using the daily water volumes obtained by staff. The usage date range corresponds to the billing period date range. Since late 2019 this process has allowed the Association to identify which zones are consistently contributing to an increase in the non-revenue water percentage and allowed for staff to determine where the most intense leak detection efforts should occur. Through this process, the Association was able to reduce the non-revenue water percentage by 3% from 2020 to 2021, with a goal to achieve the same outcome or better going forward.

The Association has determined over the past two years of constant leak detection that there are two common trends within the distribution system, aged infrastructure and the vast majority of the leaks are service lines, not main line leaks or ruptures. Service line leaks contribute immensely to the non-revenue water volume and are also more difficult to locate. Staff start at the master meter within the hydraulic zone where leak detection is occurring and work to isolate sections of the zone by valving off certain areas and utilizing listening equipment to determine whether staff should proceed through certain sections meter by meter with listening equipment. This process has been very productive, but the process never stops. The Association, for the first time, added a fourth full time maintenance staff member to the team to have at least one staff member and often a second staff member devoting daily work time to leak detection within the distribution system. The expense associated with non-revenue water can be paid to our producers or it can be invested in a full time employee that aids the Association in achieving an acceptable non-revenue water volume percentage.

In addition to the day to day processes that have been implemented to reduce the non-revenue water volume, a series of capital improvement projects are planned for the next several years. In April 2019, Strand Associates presented an engineering report that included the Association's known infrastructure needs at the time. Utilizing the report, the Board of Directors, management, and staff prioritized the improvements and developed project profiles for areas of high priority. The Contract 14 Distribution System Improvement Project profile was developed and will replace approximately ten miles of aged infrastructure within the distribution system. The project scope consists of the replacement of infrastructure that was constructed in the 1970's and has contributed to the non-revenue water volume for years. The Association also developed the Contract 15 Distribution System Improvement Project that will address the same need, aged infrastructure. The project scope includes the replacement of approximately ten miles of infrastructure in various areas of the distribution system. Once the Contract 14 project progresses and Contract 15 project enters the planning phase, the remaining infrastructure needs identified in the report as well as current needs at the time will be prioritized with project profiles developed.

Source of Unaccounted-for Water Loss

As a result of the order for Case No. 2022-00068, Case No. 2022-00325 was initiated with certain requirements related to water loss reduction and the spending of surcharge proceeds. Prior to the initiation of Case No. 2022-00349, the Association was already striving to reduce water loss and replace aging infrastructure. In April of 2019, Strand Associates presented the Association with the Distribution System Improvement Projects Preliminary Engineering Report which includes a series of projects to improve the distribution system. The Preliminary Engineering Report is comprised of 19 improvements, most of which will pertain to water loss reduction. The Association released to bid the Contract 14 Distribution System Improvement Project on January 5, 2023. Construction on the Contract 14 Project is scheduled for summer 2023 and will have an 8 month construction period. The project is funded through the KIA Cleaner Water Program and USDA, Rural Development.

Once the Contract 14 Project is underway, the Association will proceed with procuring engineering services for the Contract 15 Distribution System Improvement Project and enter the planning phase for the project. The current project scope as described in the WRIS Project Profile will be reviewed and amended if necessary to reflect the most pressing needs that the Association has to further reduce water loss. The current scope will likely be amended to include a larger portion of the distribution system located within the KY 33 hydraulic zone, which has significantly contributed to the Association's water loss since January 2020. The water loss in the KY 33 zone is heavily attributed to service line leaks. The scope of the project

will include the replacement of all infrastructure including the mains, service lines and all appurtenances owned by the Association. Based on the number of leaks that have been repaired within the zone and the total number of services with the same characteristics, as far as age and bedding, it is reasonable to assume that the existing infrastructure will continue to contribute to the water loss within the hydraulic zone until the infrastructure is replaced. The anticipated commencement of construction for the Contract 15 Distribution System Improvement Project is fall 2024.

Utilizing the work orders from January 2020 to present, all work orders contributing to water loss were compiled into a database, including address, date of occurrence, estimated water loss and further categorized by the type of incident that contributed to the water loss, such as service line repair, water main repair, meter malfunction and flushing. The database was then sorted by road name to determine where the leaks were occurring. Lastly, the database was sorted to identify whether the roads with a significant number of leaks are included in the Contract 14 project scope, Contract 15 project scope or located along the Contract 13 project scope, which was completed in 2015. Contract 13 replaced approximately 14 miles of aged infrastructure and was completed in 2015. The Association noticed a significant reduction in water loss and water costs, as well as service reliability. The project scope did not include the replacement of service lines and over time, the number of repairs along the route have been increasing. Service line leaks along two roads, Paradise Camp Road and Norman's Camp Road have contributed greatly to the water loss since 2020. Based on the number of leaks that have occurred in the two areas and the number of customers located along the roads, it is reasonable for the Association to assume that the problem with service line leaks will persist until new service lines are installed along the two roads.

Gwinn Island Road and Shakertown Road contributed immensely to water loss since 2020 and were not included in the Contract 13 project scope, nor the Contract 14 or Contract 15 projects. The two roads, located within the KY 33 hydraulic zone will be added to the Contract 15 project scope for replacement in late 2024. Leak detection will be ongoing to maintain an acceptable level of water loss within the KY 33 hydraulic zone until the infrastructure improvement projects are complete.

Proposed Use of Water Loss Surcharge Proceeds

With regard to the surcharge proceeds, the Association proposes to purchase new leak detection equipment to upgrade the existing equipment. In addition, the Association will immediately request assistance from the Kentucky Rural Water Association to review the existing water loss reduction practices being utilized by the Association in an effort to provide

an outside perspective to our ongoing efforts, as well as assist in locating any significant leaks within the distribution system that Association staff have been unable to locate. The surcharge proceeds may also be utilized to cover the expense of installing meters within each hydraulic zone to monitor flow within certain areas of the distribution system. Lastly, the surcharge proceeds may be utilized to cover the expense of installing valves if the installation will improve leak detection efforts within certain areas of the distribution system.

With the exception of the leak detection equipment and meter purchases, the Association plans to utilize the surcharge proceeds to implement a Service Line Replacement Program that will begin with the replacement of service lines for areas that were included in the Contract 13 project scope. The service lines located on the mains that were replaced are contributing immensely to the water loss volume. The service line replacement project will begin with Paradise Camp Road, Hughley Lane and Cedar Lane, followed by Normans Camp Road. The anticipated average cost for the service line replacement is \$1,200 per property. The total number of service lines to be replaced will be determined by the amount of surcharge proceeds that are collected annually, as well as the material and labor costs at the time of installation. The surcharge proceeds are estimated to be approximately \$45,000 annually which will allow for 37 service lines to be replaced per year with the surcharge proceeds. If the surcharge proceeds exceed the estimated \$45,000 annually, then the number of service lines replaced will be increased to equal the amount of the surcharge proceeds collected.

During the 48 month period that the surcharge will be collected, the Association will be able to replace approximately 135 service lines in the areas that have been proposed. Service lines that have been replaced or are newly installed will not be replaced to allow for the funds to be utilized on aged infrastructure. The Association will supplement the surcharge proceeds over the 48 months in order to ensure that all of the services lines in the areas are replaced. All future projects, including Contract 14, will include the replacement of service lines along with the mains to ensure that water loss is addressed in areas where infrastructure is being replaced.

<u>Service Area</u>	<u>No. of Service Lines</u>
Paradise Camp Road	123
Hughley Lane	69
Cedar Lane	16
Norman's Camp Road	60

Estimated Cost

Leak Detection Equipment	\$10,000
Installation of meters to monitor usage (4)	\$8,000
<u>Service Line Replacement (135)</u>	<u>\$162,000</u>
Total Cost	\$180,000

Proposed Schedule

Upgrade Leak Detection Equipment	March 2023
Install meters to monitor usage	May/June 2023
Begin Contract 14 Distribution Improvement Project	May 2023
Begin Phase 1 Service Line Replacement Program (33 properties)	July 2023
Procure Engineering Services for Contract 15 Improvement Project	August 2023
Begin Contract 15 Improvement Project planning and design	September 2023
Complete Contract 14 Distribution Improvement Project	March 2024
Begin Phase 2 Service Line Replacement Project (33 properties)	July 2024
Contract 15 Improvement Project Bid Advertisement	September 2024
Begin Phase 3 Service Line Replacement Program (33 properties)	July 2025
Complete Contract 15 Improvement Project	July 2025
Begin Phase 4 Service Line Replacement Program (33 properties)	July 2026

The improvements that will occur over the next 48 months will address aging infrastructure and replace large portions of the Association's oldest mains and service lines that are near 50 years old. Through completion of the projects, the Association will be able to maintain an acceptable level of water loss and enhance the reliability of the service, while continuing to plan for further improvements over the next 5 to 10 years.