COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC GRAVES COUNTY WATER DISTRICT'S UNACCOUNTED-FOR WATER LOSS REDUCTION PLAN, SURCHARGE, AND MONITORING	**)** **)** **)** **)**	**CASE NO. 2019-00347**

NOTICE OF FILING

Graves County Water District ("Graves District") files with the Public Service Commission ("Commission") the attached report on the progress of its water loss detection and repair program for the period from October 1, 2022 to September 30, 2023 as required by the Commission's Order of September 30, 2019 in Case No. 2018-00429.

Dated: April 19, 2024

Respectfully submitted,

Gerald E. Wuetcher
Stoll Keenon Ogden PLLC
300 West Vine Street, Suite 2100
Lexington, Kentucky 40507-1801
Telephone: (859) 231-3017
Fax: (859) 259-3517
gerald.wuetcher@skofirm.com

Counsel for Graves County Water District

CERTIFICATE OF SERVICE

In accordance with 807 KAR 5:001, Section 8, I certify that this document was submitted electronically to the Public Service Commission on April 19, 2024 and that there are currently no parties that the Public Service Commission has excused from participation by electronic means in this proceeding.

Counsel for Graves County Water District

ANNUAL PROGRESS REPORT OF GRAVES COUNTY WATER DISTRICT'S WATER LOSS DETECTION AND REPAIR PROGRAM (OCTOBER 1, 2022 – SEPTEMBER 30, 2023)

On September 30, 2019, the Public Service Commission ("Commission") in Case No. 2018-00429[1] authorized Graves County Water District ("the District") to collect a monthly surcharge of $5.00 per customer for service rendered on and after October 1, 2019 and continuing for 72 months or until the total assessed amount of the surcharge equals $1,721,600, whichever occurs first, subject to certain conditions. These conditions included the submission of a yearly report containing a schedule of the estimated and actual progress of the District's water loss detection and repair program and the estimated and actual expenditures made with surcharge proceeds.[2] The Commission indicated that this yearly report will be used to evaluate the need for prospective adjustments to the water loss detection and repair program and the authorized surcharge.

This report addresses the District's water loss and detection program for the period from October 1, 2022 to September 30, 2023 ("Review Period"). It compares the results of the program's fourth year to the assumptions and estimates contained in the District's program proposal and the program's first three years of operation.

When submitting its proposal, the District could not have foreseen the significant challenges that would confront the program's implementation, including a global pandemic, supply chain shortages, a significant increase in material costs and the destructive tornado that struck Graves County, Kentucky in December 2021. Given the extensive efforts necessary to recover from the December 2021 tornado, many of which are still ongoing, the District advised

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1 *Application of Graves County Water District for An Alternative Rate Adjustment*, Case No. 2018-00429 (Ky. PSC Sep. 30, 2019).

2 *Id.* at 14.

the Commission in its last progress report – the report for Program Year 3 (October 1, 2020 – September 30, 2021) – that Water Loss Detection and Repair Program's announced goals would not likely be achieved before the end of 2027, two years later than originally projected.

While the aftermath of the December 2021 tornado still impedes water loss detection and repair efforts, the District in the Review Period made small advances in its leak detection and repair efforts but did not reduce its water losses. Compared to Program Year 3, the District in the Review Period increased by 5.9 percent the number of manhours devoted to leak detection and increased by nine percent its total spending on leak detection. It more than tripled its expenditures on leak repairs in the Review Period from the prior year and added one new district metered area ("DMA"). The District's water loss as a percentage of total purchased and produced water, however, increased from 27.67 percent to 35.51 percent during the Review Period.

The District believes that the upcoming year will see a significant increase in leak detection and repair efforts, including a greater number of manhours devoted to leak detection, the repair or replacement of problematic water lines, and the establishment of twenty new DMAs. Moreover, while the District's water loss rate increased during the Review Period, a significant portion of this water loss was the result of unique events that are unlikely to recur. The last six months of the Review Period saw water loss rates returning to prior levels. The establishment of the additional DMAs, the replacement of several main segments, and increased water loss detection and repair efforts are expected to produce further reductions in water loss as a percentage of total purchased and produced water. The District believes that the Water Loss Detection and Repair Program's current goals are achievable without significant modifications to the present program. Accordingly, the District recommends that the Commission make no adjustments to the surcharge amount at this time.

Program Implementation

In its Order of September 30, 2019, the Commission directed the District to submit a comprehensive unaccounted-for water loss reduction plan that established priorities and a time schedule for eliminating each source of unaccounted-for water loss and provides a detailed spending plan for the surcharge proceeds.[3] On December 20, 2019, the District submitted its comprehensive plan.[4] Appendix A to this report compares the original schedule for implementing the program with the program's current status.

During its first year, the proposed plan's implementation generally proceeded according to schedule. In December 2019 Mayfield Electric and Water Systems ("MEWS") hired an employee whose principal responsibility was leak detection on the District's system.[5] Although the District originally proposed to assign two persons who would each perform 20 hours of leak detection activity weekly, the District determined that assigning one person whose sole duty was leak detection would be more effective. Other MEWS employees continued to perform leak detection assignments when necessary. In January 2020, the District entered into a lease agreement for a hydro-excavator truck. In May 2020 it purchased a Mikron 3 listening device to better locate leaks. It, however, elected not to purchase 20 noise logger devices and related equipment as originally proposed. MEWS agreed to purchase the devices and to share the equipment with the District at no cost.

Beginning in February 2020, installation of additional magnetic water meters throughout the District's distribution system to establish DMAs began. Water usage for each DMA is metered

[3] Order of Sept. 30, 2019 at 12.

[4] A detailed spending plan for the surcharge proceeds had been contained in the surcharge proposed submitted in Case No. 2018-00429 on August 19, 2019.

[5] The District contracts with Mayfield Electric and Water Systems ("MEWS") for all operation and maintenance services. MEWS performs these services in consultation with the District's Board of Commissioners.

with a meter connected to MEWS's Automated Meter Infrastructure ("AMI"). MEWS monitors water usage within each zone and can quickly identify excessive water usage in a DMA. Once excessive water usage is identified, leak sensors are deployed in the DMA. These sensors significantly narrow the area in which the leak is located. The leak detection specialist then pinpoints the exact leak location, and a work crew is deployed to repair the leak.

The District originally proposed to establish 35 DMAs by the end of the Program Year 2. As of September 30, 2020, 19 DMAs existed. In its report on the program's first year, the District stated its intention to have 53 DMAs in operation by September 30, 2021.[6] With a greater number of DMAs, the District asserted, water leaks could be detected earlier, and the volume of lost water further reduced. In addition to the savings from lower water losses, reducing the search area for a leak through the creation of additional DMAs was expected to lower water loss detection expense since fewer manhours will be spent searching for a leak.

The District did not meet its goal of establishing 53 DMAs by the end of Program Year 2. As of September 30, 2021, only 26 DMAs were operational. Supply chain problems caused by the COVID-19 pandemic limited the District's ability to procure and install meters. Suppliers were unable to fill the District's orders for metering equipment. Only four additional meters were delivered to the District during Program Year 2. Ten additional meters were delivered in December 2021, two were severely damaged or destroyed shortly after their delivery as a result of the tornado.[7] The extent of the damage from the December 2021 tornadoes forced the District to shift

[6] Annual Progress Report of Graves County Water District's Water Loss and Repair Program ("Program Year 1 Report") (Jan. 4, 2021) at 3.

[7] The District has been reimbursed by its insurance carrier for the two damaged meters. In the Annual Report for Program Year 3, the District incorrectly reported that ten meters had been destroyed and the insurance proceeds had been used to purchase replacement metering equipment. The remaining eight meters are in the District's inventory. Furthermore, the insurance proceeds for the two damaged meters were incorrectly deposited to the District's general fund account. During the preparation of this Report, the District discovered the error and is in the process of transferring the proceeds to its surcharge account. This transfer will be reflected on an upcoming monthly surcharge report.

its attention from establishing new DMAs to repair and rehabilitation efforts. No new DMAs were established in Program Year 3 and only one DMA was established in the Review Period.

The District expects to establish twenty DMAs in the current program year (Program Year 5) and to meet its goal of 53 DMAs before the end of Program Year 6. At the conclusion of the current program year, the District will review its plans for DMAs to determine if additional DMAs should be established and the time period for such construction.

As new metering equipment is installed, it will be integrated into MEWS's AMI infrastructure. The real-time information can be used to assign the leak specialist and other MEWS employees to locate and repair leaks on the District's system. The District had previously proposed to install additional infrastructure to allow for the use of predictive analysis software to identify leaks. Testing of that infrastructure, however, showed it was incompatible with the District's water facilities. The District will not proceed further with that proposal but will instead review other types of technology that can enhance its ability to locate leaks and main breaks.

Surcharge Revenue

During the Review Period, the District collected $291,640 in surcharge revenues, or an average of $24,303 monthly. In the prior review period, $289,355, or a monthly average of $24,113 of surcharge revenues were collected. In the first four years of the surcharge, the District has collected $843,310 in revenue from the surcharge.

In its proposal, the District calculated surcharge revenue assuming 4,781 customers and expected annual revenues from the surcharge of $286,860. As shown in Table 1 below, the District's customer base has exceeded that level for much of the time the surcharge has been in effect. Based upon the average monthly number of customers paying the surcharge in the Review Period (4,861), the District now estimates annual surcharge revenue of $291,660 and expects the

District to reach the total authorized amount in 72.2 months. The last month that the surcharge will likely be billed remains October 2025.

As of the end of the current review period, the District had collected approximately $1,134,950 of surcharge revenue. Based upon its four-year history, the surcharge has generated average monthly revenues of $24,148 and annual revenues of $283,738.

TABLE 1

	YEAR 1		YEAR 2		YEAR 3		YEAR 4	
Month	**Customer Bills**	**Surcharge Revenue**	**Customer Bills**	**Surcharge Revenue**	**Customer Bills**	**Surcharge Revenue**	**Customer Bills**	**Surcharge Revenue**
October			4,841	$ 24,205	4,794	$ 23,970	4,844	$ 24,210
November	4,778	$ 23,890	4,827	$ 24,135	4,838	$ 24,190	4,859	$ 24,295
December	4,813	$ 24,065	4,838	$ 24190	4,812	$ 24,060	4,856	$ 24,280
January	4,794	$ 23,970	4,830	$ 24,150	4,818	$ 24,090	4,876	$ 24,380
February	4,796	$ 23,980	4,815	$ 24,075	4,795	$ 23,975	4,849	$ 24,245
March	4,793	$ 23,965	4,818	$ 24,090	4,820	$ 24,100	4,848	$ 24,240
April	4,774	$ 23,870	4,819	$ 24,095	4,799	$ 23,995	4,854	$ 24,270
May	4,783	$ 23,915	4,826	$ 24,130	4,814	$ 24,070	4,852	$ 24,260
June	4,816	$ 24,080	4,830	$ 24,150	4,851	$ 24,255	4,860	$ 24,300
July	4,825	$ 24,125	4,829	$ 24,145	4,844	$ 24,220	4,878	$ 24,390
August	4,834	$ 24,170	4,818	$ 24,090	4,844	$ 24,220	4,871	$ 24,355
September	4,837	$ 24,185	4,857	$ 24,285	4,844	$ 24,210	4,883	$ 24,415
TOTAL	52,843	$264,215	57,948	$289,740	57,873	$289,355	58,330	$291,640

Since the surcharge's inception, the District has reported the amount of surcharge billed as surcharge revenue. In May 2023 the District advised the Commission that this reporting method overstated collected surcharge revenue.[8] Due to limitations in its accounting system, MEWS cannot easily determine the number of District customer accounts that fail to pay their bill (and therefore the surcharge). Accordingly, each monthly billing period MEWS treats all District customer bills as paid and deposits into the District's surcharge account an amount equal to **surcharge billings,** not **collected surcharge proceeds.** The District has reported this amount to the Commission as surcharge revenue in its monthly reports and its annual progress reports. While

[8] Motion to Amend the Commission's Order of December 27, 2022, Accept Cumulative Report of Collected Surcharge Proceeds, and Authorize the Transfer of Funds From Surcharge Account to General Fund at 2-4 (Ky. PSC filed May 25, 2023).

MEWS makes quarterly adjustments to its bill to the District for all contract services to reflect the overpayment, the District has not amended its reports to reflect these adjustments.

The District has reviewed its records and MEWS's billing and collection adjustments for the period from September 30, 2019 to October 31, 2023, and determined that collected surcharge revenue was overstated by $2,255, or approximately 0.2 percent of total reported surcharge revenue.

Surcharge Account

In its Order of September 30, 2019, the Commission directed the District to maintain surcharge collections in a separate interest-bearing account. Shortly thereafter, the District established such an account at FNB Bank, Inc., of Mayfield, Kentucky (formerly known as the First National Bank of Mayfield). The District deposits surcharge proceeds into the account monthly. All expenditures related to the Water Loss Detection and Reduction Program are made from this account.

Table 2 shows the account balance at the end of each program year and the amount of interest earned on the account during that year. At the end of the current review period, the surcharge account had a balance of $208,813.35. During the Review Period, the account had interest income of $2,095.81.

Table 2

Program Year	Ending Balance	Interest Earned
1 (Ending September 30, 2020)	$ 9,812.70	$ 106.53
2 (Ending September 30, 2021)	$ 50,461.77	$ 34.94
3 (Ending September 30, 2022)	$146,788.08	$ 170.51
4 (Ending September 30, 2023)	$208,813.35	$2,095.81
Total:		$2,407.79

As noted above, because MEWS deposits into the District's surcharge account an amount equal to **surcharge billings** rather than **collected surcharge** proceeds, as of October 2023, the

District's surcharge account contained approximately $2,295 in excess of that actually collected. Through quarterly adjustments to its bill to the District for non-Water Loss Detection and Repair Program services, MEWS has recovered the excessive deposits. Because the District pays MEWS for non-Water Loss Detection and Repair Program services from the District's general fund, these billing adjustments effective result in a transfer of funds from the District's general fund to the surcharge account. The District has requested authorization from the Commission to transfer these excessive deposits from the surcharge account to its general fund and is awaiting a decision on this request.[9]

Overall Expenditures

Table 3 reflects actual expenditures in the program's first four years, as well as projected expenditures for the Review Period (Program Year 4) and Program Year 5. It also shows the total amount estimated for each category as set forth in the District's proposal. The discussion below and Appendix B to this report provide additional details regarding the actual and projected amounts.

Table 3

	Proposed Total	Total To Date	Year 1 Actual	Year 2 Actual	Year 3 Actual[10]	Year 4 Proposed	Year 4 Actual	Year 5 Proposed
DMA Establishment	$ 383,285	$199,062	$109,832	$ 63,403	$ 25,827	$ 13,100	0	$150,000
Hydro-Excavator Truck	$ 300,000	$286,459	$ 52,084	$ 78,125	$ 78,125	$ 78,125	$78,125	$ 78,125
Leak Detection Equipment	$65,186	$4,400	$ 4,400	$ 0	$ 0	0	0	$ 25,000
Loss Detection	$ 541,710	$266,173	$ 57,936	$ 83,271	$ 59,780	$66,800	$65,186	$126,700
Leak Repair	$ 200,000	$149,871	$ 28,311	$ 9,010	$ 27,422	$40,583	$85,128	$120,000
Total	$1,447,820	$905,965	$252,563	$233,809	$191,154	$198,608	$228,439	$499,825

[9] *Id.*

[10] In the Annual Report for Program Year 3, the District reported DMA establishment expenditure as $30,370, which represented the purchase of 10 meters and 5 encoders in December 2021. Two meters, however, were badly damaged during the December 2021 tornado. The District's insurance carrier subsequently reimbursed the District for this loss ($4,543). See note 7 for additional details. Table 3 reflects removal of the cost of the two meters from Program Year 3.

During the first four years of the Water Loss Detection and Repair Program, the District has expended $905,965 of surcharge proceeds, or approximately 79.8 percent of the collected surcharge proceeds.

Establishment of DMAs

The District added one DMAs in September 2023, increasing the total number of DMAs to 27. Total cost to establish these 27 DMAs is $175,938, which results in an average DMA installation cost of $6,516.[11]

The District had originally estimated the cost of a DMA at $10,951 or approximately $4,288 greater than the average DMA cost. The principal reason for the significant difference in expected and actual DMA cost is lower than expected meter costs. In its proposal, the District estimated the average meter cost to be $5,295. In the first year of the surcharge's operation, the District procured six-inch magnetic meters with an encoder at a cost of $3,949.50. Additionally, the fifteen percent contingency (or $1,428) included in the original estimate proved unnecessary. Based upon these lower costs, the District revised its plans to add an addition eighteen DMAs to the originally proposed thirty-five (35) DMAs. While the price of meters has increased in the last two years, a recent purchase of electromagnetic meters in October 2023 suggests that current meter prices are still below the District's original cost estimates and that the District's revised goal of 53 DMAs funded solely through surcharge proceeds is still possible.

The District has acquired sufficient electromagnetic meters to establish twenty new DMAs in Program Year 5, bringing the District's total number of DMAs to 47. Most of these DMAs will be established in the Based upon its most recent purchase of metering equipment, the District

[11] The total cost of the prior 26 DMAs is $173,235. The District reported the cost of the new DMA as $2,702.22, including labor and mileage expense. With the addition of this meter, the average DMA cost as of September 30, 2023 was $6,516.19.

estimates the current cost of establishing a DMA to be $7,500 and anticipates spending approximately $150,000 for DMA establishment in Program Year 5. Most of the new DMAs will be established in areas that were formerly South Graves Water District and Consumers Water District. The District is still committed to the establishment of a total of 53 DMAs by September 30, 2025 and is considering the establishment of additional DMAs depending upon funding availability.

Hydro-Excavator Truck

In its original proposed, the District proposed to acquire a hydro-excavator truck at an estimated cost of $300,000. In January 2020, the District entered an agreement to a lease a hydro-excavator truck. The monthly lease payment on this truck is approximately $6,510.39. Annual cost of the lease is $78,125. the District has renewed this lease annually each year since 2020. Total amount expended as of September 30, 2023 for the lease of the hydro-excavator truck is $286,459. Under the terms of the lease agreement, ownership of the truck will transfer to the District at the end of Program Year 5.

Leak Detection Equipment

In May 2020 the District acquired at a cost of $4,400 a Mikron 3 listening device to locate leaks. This cost is equal to the estimated cost contained in the District's proposal. The District has not purchased twenty noise logger devices and related equipment as originally proposed. Instead, it uses similar devices that MEWS has acquired and agreed to share at no charge. No additional purchases of leak detection equipment have been made since Program Year 1. The District is currently reviewing the use of drones equipped with thermal sensors to detect water leaks and has budgeted $25,000 for the possible purchase of such drones, as well as other advanced technology.

Water Loss Detection

The District originally proposed to assign two persons working 20 hours weekly to leak detection. After additional consideration, it determined one person devote his or her entire attention to leak detection was preferable. MEWS hired a leak detection specialist in December 2019. In Program Year 1, approximately 1,233 regular manhours and 68 overtime manhours were devoted to leak detection.[12] These totals reflect not only the leak detection specialist's time, but that of other MEWS employees who were occasionally assigned leak detection tasks. During the next year, MEWS employees worked approximately 1,899 regular manhours and 24 overtime manhours and traveled approximately 9,934 miles as part of the District's leak detection efforts. The most hours were devoted to the areas that were formerly South Graves Water District (838 hours, 5,105 miles) and Consumers Water District (536 hours, 2,461 miles). Total sum expended on leak detection in Year 2 was $83,271.

Despite the temporary halt to leak detection efforts in the aftermath of the December 2021 tornado, approximately 1,365 regular manhours and 5 overtime manhours were devoted to leak detection during the Program Year 3. The most hours were devoted to the areas that were formerly South Graves Water District (814 hours, 5,035 miles) and Hickory Water District (354 hours, 1,671 miles). Total sum expended on leak detection during the Program Year 3 was $59,780.

During the Review Period (Program Year 4), approximately 1,431 regular manhours and 20 overtime manhours were spent on leak detection. Approximately 9,098 miles were logged to locate water leaks. The most hours were devoted to the areas that were formerly South Graves Water District (985 hours, 5,909 miles), Hickory Water District (521 hours, 960 miles), and

[12] MEWS vehicles travelled approximately 7,854 miles in support of leak detection assignments.

Hardeman Water District (261 hours, 419 miles). The total expenditure on leak detection during the Review Period was $65,186.75.[13]

For Program Year 5, the District expects to spend approximately $126,700 on its leak detection efforts. This estimate assumes that the leak detection specialist will work 2,000 regular hours and will travel approximately 12,000 miles as part of that effort.[14] It further assumes that other MEWS employees will work a total of 1,000 hours in support of leak detection efforts through such activities as data review and planning. (These leak detection activities have not previously been reported and, as a result, their costs have not been reimbursed from surcharge funds.) This current estimate assumes an hourly rate of $40. However, the current Contract Agreement for Operations, Maintenance and Management Services expires in Program Year 5 and the District and MEWS will be negotiating new contract labor rates.

The District will continue to focus its leak detection efforts on the South Graves Water District area, which is currently experiencing the highest water loss rate.

Loss Repair

The District originally assumed 200 water main breaks or leaks would be located and repaired in the first year of the program, 100 main breaks or leaks would be located and repaired in the second year, and 50 main breaks or leaks would be located repaired in each of the remaining four years. It estimated the costs associated with labor and materials to repair a break or leak at $400.[15] During Program Year 1, 68 leaks were repaired at a cost of $28,310, or an average repair cost of $416.32 per leak. In its report for Program Year 1, the District estimated that over the remaining five years of the surcharge eighty-seven breaks or leaks annually would be discovered

[13] In its report for Program Year 3, the District had projected spending $67,313 on leak detection efforts. The projection assumed 1,560 manhours and 7,500 miles in support of these efforts. Program Year 3 Report at 9.
[14] This estimate is based upon the current IRS mileage rate of $0.67 per mile.
[15] Total leak repair cost = (200 leaks x $400) + (100 leaks x $400) + (4 years x (50 leaks x $400)) = $200,000.

and repaired. During Year 2, however, only 18 breaks or leaks were detected. The cost to repair these leaks was approximately $9,010 or an average repair cost of $500.56.

The lower number of breaks and leaks reported in Program Year 2 led MEWS and the District to suspect that some breaks and leaks were not being properly recorded. As a result, the District modified its reporting system to improve the tracking of leak discovery and repair and to ensure repairs are funded from surcharge proceeds. Water District Job Orders are still used to report the details of leak repairs, including the number of personnel involved, regular and overtime hours, and equipment and materials used. The leak detection specialist, however, now separately reports each located water main break or leak. This information is included in the monthly surcharge reports as well as entered in MEWS work reporting system.

Despite the problems resulting from the December 2021 tornado, approximately 58 breaks and leaks were discovered and repaired in Program Year 3 at a total cost of $27,055, or an average cost of $466.47 per leak.

During the Review Period, 77 breaks and leaks were discovered and repaired at a total cost of $82,425 or an average cost of $1,070.45 per leak. The District had projected the repair of 87 breaks and leaks at a total cost of $40,583.[16] Those discovered during the review were more significant and required greater manpower and materials to repair than in prior years. The increased cost per leak also reflects the effects of inflation. The largest number of leaks was found in Hickory area, which had 28 leaks. Twenty leaks were discovered in the South Graves District.

In Program Year 5, the District intends to take a more aggressive approach to water main breaks and leaks. It has identified several large sections of water main that are subject to frequent breaks and intends to replace rather than repair these main sections. The District expects to expend

[16] For calendar year 2023, the District had a total of 99 water main breaks and leaks.

approximately $82,000 for materials and labor to replace these sections. In addition to these replacements, it expects to expend $38,000 for leak repair. This estimate assumes that 80 water main breaks or leaks will be repaired during Program Year 5 at an average cost of $475 per break.

Water Loss Results

As shown in Table 4 below, the District's water loss rate for the Review Period was 35.51 percent. It is the highest since the Water Loss Detection and Repair Program began. A significant reason for the high-water loss was due to the temporary removal from service of water storage tanks serving the South Graves and Sedalia service areas for rehabilitation and repainting. These tanks were removed from service in mid-October 2022 and not returned to service until January 2023. To maintain adequate system pressure in these areas while the tanks were not in-service, water was continuously pumped into the system from wells serving the area. To avoid excessive water pressures while the tanks were out of service, hydrants were installed at the end of each distribution system that opened when pressure exceeded appropriate levels.

The District believes that the higher level of water loss is abating. During the last six months of the Review Period, the water loss rate for five of the District's six service areas dropped significantly. Overall, the District's water loss rate for those six months was 30.26 percent.

Table 4

	December 2019	**Year 1 Dec.-Sep.**	**Year 2 Oct.-Sep.**	**Year 3 Oct.-Sep.**	**Year 4 Oct.-Sep.**	**Year 4 Apr.-Sep.**
Consumers	29.75	22.50	18.57	19.00	27.32	28.24
Fancy Farm	8.89	12.83	18.15	15.95	24.25	19.02
Hardeman	26.77	14.89	5.74	20.28	26.35	20.31
Hickory	43.35	28.93	15.35	21.48	17.25	12.34
Sedalia	0.31	10.57	14.01	22.06	52.11	10.83
South Graves	44.19	45.87	45.00	60.17	66.15	59.13
Total	34.66	26.7073	20.75	27.67	35.51	30.26

The District acknowledges that significant work remains to reduce its water loss rate to the Commission standard of 15 percent. In the upcoming year, the District will focus its efforts on reducing water loss in the South Graves and Consumers areas.

APPENDIX A

WATER LOSS CONTROL PLAN IMPLEMENTATION SCHEDULE

Action	Original Proposal	Status
Procure Hydro-Excavator	NLT 12/01/2020	Lease Agreement Executed 01/15/2020; Hydro-Excavator in use; Lease ends 01/15/2025.
Hire Leak Specialist	12/01/2019	Hired 12/01/2019; began detection activities 01/01/2020
Determine Appropriate Meters for District Meter Areas ("DMAs")	NLT 02/01/2020	Selected Honeywell Electromagnetic Flow Meter for DMAs 02/2020; purchases began in 03/2020; As of 4/1/2024, total of 55 meters have been purchased (does not include the purchase of 2 meters destroyed in December 2021 Tornado
Establish DMA Sites	Establish 35 DMA sites NLT 12/31/2021	Graves District announced on 1/4/2021 its intention to establish an additional 18 sites for a total of 53 sites by 09/30/2021; Decision to establish any additional sites after completion of planned 53 sites is expected by 12/31/2024
Install meter equipment at DMA sites	Install metering equipment at 35 DMA sites NLT 12/31/2021	26 sites with metering equipment in operation as of 09/30/2021. Supply chain issues and December 2021 Tornado delayed installation of meter equipment at proposed DMA sites; As of 9/30/2023, 27 sites with metering equipment in operation; Installation of metering equipment at an additional 20 sites with metering equipment NLT 09/30/2024
Install Pressure Sensors and Pressure Release Value Monitors	NLT 02/28/2023	As of 09/30/2023, two pressure sensors and pressure release valves have been installed; Graves District is continuing to study alternatives to connect these devices to its monitoring network

APPENDIX A

Action	Original Proposal	Status
Establish Internet of Things for interface with advanced metering infrastructure (“AMI”) meters, DMAs, SCADA water tank	Establish NLT 01/01/2021	Interface established; information being received and processed
Establish workflow for DMA information to field crews	Establish NLT 01/01/2021	Information from DMA sites currently being used to determine surveillance areas for Leak Specialist
Establish infrastructure for long-term leak predictive analysis and response	Establish NLT 01/01/2023	Test of equipment necessary for long-term leak predictive analysis proved incompatible with District water infrastructure. Graves District now examining alternative leak detection technologies.
Systemwide monitoring established	12/01/2026	Target Date remains 12/01/2026

APPENDIX B

Total Expenditures:

Labor:	$111,580.00
Materials:	25,263.21
Vehicle Expense:	7,670.63
Equipment:	5,800.00
Hydro-Excavator Truck Lease	78,124.68
Total:	$228,438.52

Labor (Hours:)

Activity	Regular Hours	Overtime Hours
DMA	24	0
Leak Repair	883	265
Leak Detection	1,455	20
Total	2,362	285

Materials:

DMA Activity	$ 1,492.22
Leak Repair	23,770.99
Leak Detection	0.00
Total:	$25,263.21

Vehicle Mileage:

DMA Activity	80.0
Leak Repair	3,095.0
Leak Detection	9,098.0
Total:	12,273.0