



CONSENT ADMINISTRATIVE ORDER

LIS No. 06-037

Closure Report

November 2023

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I. EXECUTIVE SUMMARY

Statement of Problem

In January 2000, the Sierra Club sued Little Rock Water Reclamation Authority (LRWRA)¹ due to sanitary sewer overflows (SSOs) which occurred during wet and dry weather events. LRWRA and the Sierra Club reached a settlement (“Settlement Agreement”) in September 2001, following the completion of a System Evaluation and Capacity Assurance Plan (SECAP), a long-term capital improvement program to eliminate collection system discharges that occur during heavy rains. In March 2006, the Arkansas Department of Energy and Environment (ADEE)² and LRWRA entered into Consent Administrative Order LIS No. 06-037 (CAO) which required compliance with the SECAP program and other provisions. The Settlement Agreement and CAO led LRWRA to undertake a 20-year effort to eliminate overflows and otherwise improve its sanitary sewer system.

LRWRA Response

After the Little Rock Water Reclamation Commission (LRWRC)³ adopted the completed SECAP in late 2002, LRWRA initiated capital improvements to its system which included the design and construction of the Little Maumelle Water Reclamation and the Peak Flow Attenuation Facilities, the hydraulic expansion of Adams Field and Fourche Creek Water Reclamation Facilities, and numerous Overflow Mitigation Projects.⁴ LRWRA also implemented an aggressive collection system cleaning, inspection, and maintenance program that addressed non-capacity related sanitary sewer overflows.

For compliance purposes, LRWRA developed a Collection System Management Plan and increased staffing by 13% to promptly respond to overflows and proactively mitigate dry weather overflows. LRWRA also created an innovative dashboard to track rainfall events in Little Rock and introduced programs to reduce the causes of overflows. The LRWRC and Little Rock’s city leaders have supported these improvements by authorizing the necessary rate increases, and the residents of Little Rock have borne the financial responsibility of this critical work.

Results Accomplished

LRWRA achieved compliance with the CAO’s dry weather, or non-capacity related overflows, mitigation requirements in January 2009, three years after the CAO issuance. Furthermore, LRWRA has seen a continued reduction in dry weather overflows as it has expanded the collection system.

¹ Throughout this document, “Little Rock Water Reclamation Authority” is used to refer to the entity formerly known as “Little Rock Wastewater Utility.” The utility changed its name in 2017.

² Throughout this document, “Arkansas Department of Energy and Environment”, which was established as a new umbrella agency in 2019 as part of the Transformation and Efficiencies Act of 2019, is used to refer to the “Arkansas Department of Environmental Quality” which was absorbed by the new agency.

³ Throughout this document, “Little Rock Water Reclamation Commission” is used to refer to the entity formerly known as the “Little Rock Sanitary Sewer Committee.” The Little Rock Board of Directors passed Ordinance No. 21,040 on May 19, 2015, which changed the Commission’s name.

⁴ LRWRA updated the SECAP in 2010 and amended it twice. The LRWRC approved each update and Amendment.

Regarding wet weather, or capacity-related overflows, LRWRA adopted a 2-year storm curve and implemented a “look back” approach, which considers cumulative precipitation from the previous 10 days in comparison to the 2-year storm curve. This effort provided an enhanced definition to the “design storm” in the SECAP and was incorporated in the rainfall dashboard.

Because of the considerable effort and substantial capital investment over the last two decades, LRWRA experienced **zero** wet weather overflows in the seventeen rain events from April to mid-November 2023. This includes three (3) rain events that exceeded the 2-year design storm⁵. LRWRA is pleased to report this important wet weather overflow compliance metric.

LRWRA’s CAO and Settlement Agreement compliance efforts over the past twenty years extend far beyond SECAP projects. They also include community outreach and awareness programs, education in local schools to students of all ages, environmental sustainability efforts, and more.

Conclusion

LRWRA has an unwavering commitment to excellence and the continual improvement of its system. Despite achieving compliance with the CAO and Settlement Agreement, future collection system maintenance and asset management efforts will be rigorous and ongoing in numerous ways.

First, the utility will continue the collection system inspection program to actively identify deficiencies, and the root control and Fats, Oils, and Grease (FOG) programs — acknowledged contributors to dry weather overflows. Second, to curtail wet weather overflows, LRWRA will expand the collection system flow monitors which detect extraneous flows. Third, the utility will annually update its 10-year capital improvement plan to address specific areas of concern. Fourth, the utility has placed a high priority on addressing mechanical deficiencies in key assets through its Asset Management program. Fifth, LRWRA is proactively investing in innovative technologies, including “smart” manhole covers and sewer “artificial intelligence,” aimed at providing real-time information to operators and field personnel. Finally, LRWRA will enhance its already robust public engagement and educational efforts to encourage responsible sewer usage by all users.

In summary, LRWRA has fully adhered to all stipulations in the CAO and Settlement Agreement, implementing the SECAP and its amendments and investing nearly \$500 million dollars through a 20-year capital campaign. This report serves as comprehensive documentation affirming LRWRA’s complete compliance. LRWRA respectfully requests that ADEE concur with LRWRA’s fulfillment of all CAO requirements.⁶

⁵ A “design storm” refers to a hypothetical and carefully calculated weather event used by engineers to estimate the potential impact of rainfall on a specific area or structure. It is a standardized meteorological event with defined characteristics based on historical weather data and statistical analysis.

⁶ In conjunction with the submission of this “CAO Closure Report” to ADEE, LRWRA will seek closure of the Settlement Agreement from the Sierra Club of Arkansas.

II. ADDRESSING SYSTEM IMPROVEMENTS FOR COMPLIANCE

The LRWRC entered into a Settlement Agreement with the Sierra Club in September 2001, which the United States Department of Justice approved in November 2001. The Settlement Agreement established specific performance requirements and compliance deadlines for minimizing capacity-related or wet weather SSOs. ADEE imposed similar requirements through regulatory action, and in March 2006, ADEE and LRWRA entered into a CAO.

Since 2001, LRWRA has dedicated substantial capital and internal resources to obtain compliance with the terms of the CAO and Settlement Agreement. LRWRA's efforts included a reorganization of field personnel aimed at more effectively assessing each segment of pipe, correcting any defects found, and enhancing the system's capacity to the highest level. LRWRA expended nearly \$500M in capital investments to improve infrastructure for increased reliability, reduce I/I, and expand storage and treatment capacity.

LRWRA developed a written summary/report of the collection management system program in accordance with the Schedule of Compliance Activities, which was attached to the CAO as Attachment A. LRWRA submitted that report to ADEE on June 7, 2006. While this summary/report provided an overview of both goals and plans, LRWRA communicated its progress, milestones, and compliance through the submission of subsequent annual reports. Since 2006, LRWRA has provided annual reports⁷ to ADEE which (a) demonstrate its efforts to establish design and performance provisions (per Section IV (page 9 of the CAO) and (b) report its effectiveness of each element of its collection system management program.

Consulting engineers used computer hydraulic modeling, smoke testing, dye testing, and visual assessments to evaluate the progress and effectiveness of LRWRA's capital improvement plan. Over two decades, the utility remained agile with the ability to make quick and effective adjustments to change its programs as needed to meet the requirements of the CAO and Settlement Agreement. The following presents a chronological account of utility's efforts, highlighting some of the major projects LRWRA completed to achieve positive outcomes and compliance.

1. System Evaluation & Capacity Assurance Plan to Address Wet Weather Overflows

The SECAP is designed to address the challenges posed by growth and development on the City of Little Rock's sanitary sewer system. The SECAP serves as a comprehensive methodology to evaluate, plan, and schedule necessary actions such as system repairs, improvements, and capital projects. The primary goals of the SECAP are to ensure that the sanitary sewer system maintains adequate capacity and to minimize the risk of overflows. By systematically evaluating the system's performance and proactively planning for needed enhancements, the SECAP aims to manage growth and development in a way that maintains the integrity and efficiency of the sanitary sewer infrastructure in the City of Little Rock.⁸

⁷ LRWRA includes with this submission electronic copies of each "Consent Administrative Order Annual Report", dated 2006 through 2022, previously submitted to ADEE. [LINK HERE](#)

⁸ Little Rock Water Reclamation Authority, Capital Improvements, <https://www.lrwra.com/business-center/#cimprovements>.

2. 2002 SECAP

LRWRA engaged national engineering firm, Montgomery Watson Harza, to prepare LRWRA's initial SECAP report in 2002. The SECAP developed a program to eliminate capacity-related overflows from rainfall amounts up to the design storm. The program established a timeline to bring the wastewater system into compliance with the Settlement Agreement, and later the CAO, by the end of 2016. All parties subsequently agreed to extend the compliance deadline to December 31, 2023.

The 2002 SECAP report identified multiple projects focused on the expansion of the utility's conveyance and treatment capacity and the construction of 75-million-gallons of peak flow storage.

3. 2010 SECAP (SECAP Update)

In December 2009, LRWRC retained RJN Group Inc. to perform an evaluation of the impact of the completed projects under the 2002 SECAP, and to validate the need for the remaining projects to meet the compliance requirements of the Settlement Agreement and the CAO. LRWRA outlined the following objectives for the 2010 update:

- Complete a city-wide wastewater flow monitoring system and update the computerized hydraulic model of the sewer collection system.
- Identify existing capacity deficiencies and capacity requirements.
- Analyze the existing pump stations, flow equalization (EQ) basins, and water reclamation facilities and provide recommendations for operational efficiency.
- Provide recommendations for potential I/I reduction.
- Provide an improvement plan to remove overflows for the design storm.

The SECAP Update report, completed on November 8, 2010, outlined a series of capital projects targeting needed pipeline improvements, peak flow storage facilities, and I/I reduction in the Cantrell Road Basin. Additionally, the report identified improvements intended to eliminate several model-predicted overflows projected to occur at manholes not previously documented as observed overflow locations. Ultimately, the 2010 SECAP report led to two Amendments to allow for the adoption and implementation of emerging trends in the industry.

a. SECAP Update Amendment No. 1

The LRWRC adopted Amendment No. 1 by resolution in April 2016. This Amendment extended the deadline for the obligations under the Settlement Agreement to December 31, 2023, and allowed for the construction of a high-rate filtration parallel treatment process at the Adams Field Water Reclamation Facility. This construction eliminated the need for additional peak flow storage facilities at the Adams Water Reclamation Facility and the Scott Hamilton Peak Flow Attenuation Facility. The high-rate filtration option provides a continuous increase in wet weather capacity and protects LRWRA's sensitive biological treatment processes.

b. SECAP Update Amendment No. 2

The LRWRC adopted Amendment No. 2 by resolution in April 2019. This Amendment allowed for the targeted reduction of I/I in the Rock Creek and Cantrell Road areas as an effective means of reducing capacity related SSOs. This shift in focus from storage to I/I reduction provided two benefits: reducing I/I and renewing the collection system. This Amendment also further clarified the design storm, shifting from a single point to a 2-year intensity-duration curve. LRWRA created a public-facing

online dashboard to allow easy access and viewing of rainfall totals for comparison to the two-year storm curve. Further details about the dashboard are provided in Sections II.7.b and IV.2.b.

4. Implementation of the SECAP Reports and Subsequent Amendments

The following is a descriptive list of noteworthy projects identified in the SECAP reports. The completion of these major projects enabled LRWRA to store, convey, and treat wet weather peak flows while simultaneously rehabilitating its collection system to reduce I/I where feasible.

a. Little Maumelle Water Reclamation Facility \$88.8 Million

Prior to 2001, the Little Maumelle Pump Station transferred wastewater flows from the Little Maumelle River Basin to the Rebsamen Interceptor, which parallels the Arkansas River, to the Adams Field Water Reclamation Facility. During significant wet weather events, the pump station overloaded the interceptor causing overflows in the vicinity of Murray Park.

LRWRA completed construction of the Little Maumelle Water Reclamation Facility in 2011 at a cost of \$88.8M. The project was designed for 4 MGD biological and 14 MGD hydraulic capacity and relieves flow on the Rebsamen Interceptor – a significant component of LRWRA’s system. The project protects the environment from overflows and provides for westward growth of Little Rock.

b. Scott Hamilton Peak Flow Water Attenuation Facility \$23.1 Million

LRWRA completed construction of the Scott Hamilton Peak Flow Water Attenuation Facility in 2009 at a cost of \$23.1M. It was designed primarily to reduce capacity related to sanitary sewer overflows. The facility provides 61-million gallons of storage for diluted wastewater from significant rainfall events. The basins remain empty until they are needed. Gauges, installed in the interceptor manholes, monitor the depth of flow. Prior to a manhole overflowing, a signal is sent to motorized diversion structures which diverts the flow and pumps the excess wastewater to the storage basins. The wastewater is held in the storage basins until the level of water in the interceptor pipelines recedes. An automated valve then opens, allowing the wastewater to drain from the storage basins back to the interceptor pipelines. The Scott Hamilton Peak Flow Water Attenuation Facility works in conjunction with the Adams Field Water Reclamation Facility’s 14-million-gallon basin providing a total of 75-million gallons of storage volume.

c. Adams Field Parallel Treatment \$38.7 Million

LRWRA completed construction of the Adams Field Water Reclamation Facility Parallel Treatment Project in 2021 at a cost of \$38.7M. Parallel treatment increased LRWRA’s peak wet-weather capacity from 60 MGD to 94 MGD. In wet-weather mode, the plant processes a minimum of 36 MGD through its normal treatment process and now, the primary clarifier effluent that exceeds 36 MGD can be treated through the parallel treatment process comprised of a pile cloth filter system. The filter effluent is combined with the effluent from the normal treatment process prior to disinfection and discharge. An added benefit of this filter process is during average flow conditions, secondary clarifier effluent may pass through the same filtration facility for tertiary polishing prior to disinfection and discharge, improving effluent quality.

d. Fourche Creek Water Reclamation Facility Hydraulic Upgrade **\$30.7 Million**

In 2008, LRWRA completed a 20-year Capital Improvement Plan (CIP) to assess treatment processes, identify deficiencies, and plan for improvements. An upgrade to the Arch Street Pump Station necessitated a hydraulic upgrade of the Fourche Creek Water Reclamation Facility to a minimum of 48 MGD. The project was divided into, and completed in, three phases:

- Phase One – Added a disinfection system (January 2011).
- Phase Two – Added a large circular secondary clarifier (October 2011).
- Phase Three – Modified the primary clarifier collector and addressed reliability within the headworks process (February 2021).

With the completion of the project in early 2021, the facility can hydraulically handle 48 MGD. To further increase capacity, LRWRA constructed additional improvements to protect the overloading of the primary clarifiers during peak flows by diverting screened influent flows directly to the aeration basins.

e. Inflow and Infiltration Reduction Program **\$40.1 Million**

As part of the effort to mitigate SSOs in its collection system, LRWRA developed an I/I Reduction Program for the Cantrell Road Pump Station and Rock Creek Tributary Areas to locate and remove sufficient I/I to negate the need to build the proposed Cantrell Road and Rock Creek Peak Flow storage facilities recommended in the 2010 SECAP Update. The I/I Reduction Program strategy complements LRWRA's Project RENEW⁹ Program through continued asset renewal within the collection system. The methods used for the I/I Reduction Program include pipe burst, relay in place, cured in place pipe, test and seal joint grouting, and manhole rehabilitation. Along with I/I reduction measures, the I/I Reduction Program includes capacity improvements that help the system handle the additional flows received during wet weather events. Two notable capacity improvement projects are the Booker Arts Magnet Elementary Upsizing Project and the Benny Craig Park Capacity Improvements Project. Each of these projects has an estimated completion date of April 2024.

f. 36th Street to Mabelvale Pike Outfall **\$15.4 Million**

In 2020, LRWRA designed the 36th Street to Mabelvale Pike Outfall project to provide relief for the Rock Creek and the Brodie Creek Interceptors. In dry weather conditions, there are no hydraulic issues in the system. However, prior to this project, in wet weather conditions, sections of these interceptors became overloaded resulting in overflows. The project included the installation of 12,000 feet of 42-inch and 54-inch wet-weather gravity relief sewers from 36th Street (Boyle Park Area) to east of Mabelvale Pike (Peak Flow Pump Station). The wet-weather interceptor includes two main diversion points where wastewater flows into the peak flow system when set points are hit based on the hydraulic model of the system. This project provided a path for the excessive Rock Creek and Brodie Creek interceptor flows to reach the Scott Hamilton Peak Flow Attenuation Facility.

⁹ Project RENEW is LRWRA's comprehensive, citywide, capital improvement initiative, initiated in 2016, aimed at prioritizing the maintenance and replacement of deteriorating sewer lines.

g. Required SECAP Update Projects

In 2009, and annually since then, LRWRA has evaluated the collection system's capacity to transport both dry and wet weather flows. The evaluations have revealed areas within the wastewater infrastructure where capacity may have been insufficient to handle current and projected demands. To pinpoint areas susceptible to overflows and inadequate capacity, the utility conducted simulations using its calibrated hydraulic model.

In response, LRWRA has developed and completed thirty (30) Required Projects (R-Projects)¹⁰ to enhance system efficiency, ensure compliance with regulatory standards, and effectively mitigate SSOs.

LRWRA also accomplished Overflow Mitigation Projects (OMP) to address I/I and other deficiencies to achieve positive outcomes and compliance.¹¹

5. Collection System Management Plan

LRWRA utilizes its Collection System Management Plan (CSMP)¹² to manage Little Rock's sanitary sewer collection system. The plan specifically identifies all utility staff responsible for implementing, managing, and updating the CSMP. The CSMP's goals, listed below, supplement LRWRA's primary objectives which are to provide affordable, safe, and high-quality sanitary sewer service to the residents of Little Rock and to preserve their health and well-being and the environment. The major goals of the CSMP include:

- Properly manage, operate, and maintain all parts of the wastewater collection system.
- Provide adequate capacity to convey peak flows.
- Minimize the frequency of SSOs.
- Mitigate the impact of SSOs.

6. CAO and Settlement Agreement Staffing Response

The utility added seven additional crews to its Cleaning & Inspection division. These included two hydro-cleaning crews, three line-walking crews, and two hand-rodding crews. In the Construction & Repairs division, LRWRA added a capital projects/repair crew. And the Engineering Department added an additional staff engineer to focus on expediting mainline rehabilitation projects and identify problem areas within the collection system.

Overall, the utility increased its staff by twenty-six individuals, or approximately 13%, to better maintain the growing sanitary sewer collection system.

¹⁰ Little Rock Water Reclamation Authority, Table of Required SECAP Update Projects, https://www.lrwra.com/site/assets/files/1760/required_secap_update_projects.pdf.

¹¹ Little Rock Water Reclamation Authority, Overflow Mitigation Projects (OMPs), https://www.lrwra.com/site/assets/files/1760/overflow_mitigation_projects_omp.pdf.

¹² Little Rock Water Reclamation Authority, Collection System Management Plan (CSMP), https://www.lrwra.com/site/assets/files/1760/collection_system_management_plan_csmp.pdf. The CSMP was submitted to ADEE on June 6, 2006.

7. Documentation and Reporting of Sanitary Sewer Overflows

a. Sanitary Sewer Overflow Response Plan

In accordance with Section VI of the CAO, LRWRA implemented a Sanitary Sewer Overflow Response Plan (SSORP)¹³ on September 30, 2002. The SSORP established several procedures by which the appropriate maintenance crew is immediately dispatched (including after business hours) to any SSO location to quickly minimize impacts on the environment, public health, and the integrity of the sewer collection system and treatment facilities.¹⁴ LRWRA reviews the SSORP at the end of each year and updates it as appropriate. Each year's updated SSORP has been submitted to ADEE in March in the "Consent Administrative Order Annual Report." LRWRA trains all employees involved in any step of the SSORP to keep them informed on the requirements of the plan.¹⁵

The SSORP outlines the procedures to track the location and frequency of each SSO throughout the collection system. For this purpose, a workorder is generated in the utility's computerized maintenance management system for each occurrence of SSO, whether it is non-capacity or capacity. This helps facilitate LRWRA's investigative, rehabilitation, and/or repair efforts necessary to mitigate and/or eliminate the occurrence of SSO at any given sewer manhole location throughout the collection system. One of the key components of the annual review is the list of SSO locations that is updated based on the rehabilitation and corrective efforts undertaken the previous year. Each year, that list details every manhole location that will be checked by field crews following each rain event with an accumulation of one inch or greater. As demonstrated below in Section III, that list has progressively declined each year evidencing the success of the program.

The SSORP also includes provisions related to LRWRA's notification and reporting of confirmed SSOs to regulatory authorities to remain compliant with all ADEE permit limits. Thus, all SSOs are reported monthly to ADEE in each water reclamation facility's Discharge Monitoring Report (DMR). This reporting includes the total number of SSOs and the estimated total volume in gallons. LRWRA also notifies ADEE within 24 hours of any SSO which has resulted in human contact or environmental impact such as discharge to waterways.¹⁶

The SSORP properly identifies measures to protect public health and the environment in accordance with the terms of the CAO.

b. Design Storm & Rainfall Dashboard

The 2002 SECAP and subsequent Amendments were developed to contain all storm flows from an observed storm on November 23-24, 2000, now referred to as design storm, which equals approximately a two year, 48-hour storm. However, this single-point observation did not consider the impact of ground saturation at the start of any storm or the impact of rainfall events with different

¹³ Little Rock Water Reclamation Authority, Sanitary Sewer Overflow Response Plan (SSORP) 2023, https://www.lrwra.com/site/assets/files/1760/sanitary_sewer_overflow_response_plan_2023_ssorp.pdf.

¹⁴ This evidences compliance with Section VI, Paragraph 1 of the CAO.

¹⁵ This evidences compliance with Section VI, Paragraph 4 of the CAO.

¹⁶ This evidences compliance with Section VI, Paragraphs 2 and 3 of the CAO.

durations along with the significance of back-to-back storm events. Amendment No. 2 to the 2010 SECAP Update contained a recommendation to clarify the definition of a two-year storm.

The recommendation incorporated the “two-year return period precipitation data table” outlined in the Settlement Agreement along with a 10-day look back of previous rainfall events to provide LRWRA and ADEE with a simple and unambiguous compliance mechanism that covers the impact of extended periods of rainfall. Additionally, pursuant to RJN’s recommendation on how LRWRA could monitor rainfall, the utility created a rainfall dashboard to allow easy access online to observe rainfall events. This data allows LRWRA to evaluate system performance and overflow mitigation program compliance.

8. Additional Programs Not Included in the SECAP

LRWRA’s CAO and Settlement Agreement compliance efforts extend beyond the projects outlined in the SECAP reports. They include innovative and award-winning programs including the “Can the Grease” campaign, Sewer Service Line Replacement Program, and “Cap the Cleanout” initiative. Each program contributes to community awareness, infrastructure improvement, and environmental sustainability.

a. Can the Grease

LRWRA launched the “*Can the Grease*” campaign in the June 2002 with two primary goals - to increase community awareness about the impact of grease on the sewer system, and to decrease the number of grease-related overflows. Over the course of several months, the utility distributed educational materials door-to-door in the community. The packet included literature on problems associated with dumping household grease into the sanitary sewer collection system, a refrigerator magnet bearing the campaign name, and a reusable grease container. Since the inception of the program, LRWRA has distributed 104,787 grease educational packets and cans, most of which were requested by Little Rock residents. LRWRA’s “*Can the Grease*” program has received local, regional, national, and even international attention. Sister utilities routinely seek LRWRA’s advice on how to implement their own program.



b. Sewer Service Line Replacement Program

Tasked with reducing I/I to its collection system, LRWRA developed a Sewer Service Line Replacement Program¹⁷ in 2013 to assist homeowners in paying for the replacement of the service line from their home to the sewer main. The partial reimbursement program reimburses homeowners up to \$2,500 after their service line is replaced by a plumber and inspected by the utility.

Addressing these service lines assured homeowners reliable service while allowing LRWRA to address private sources of I/I. National wastewater industry studies have shown that as much as forty (40) percent of the I/I entering into a collection system comes from private service laterals, and many of the

¹⁷ Little Rock Water Reclamation Authority, Sewer Service Line Replacement Program, <https://www.lrwra.com/programs/sslrp/>.

homes have had long-standing sewer service line issues that were too costly to repair by the homeowner alone.

To date, LRWRA has reimbursed 3,700 service line replacements. The average cost of replacing a service line in 2023 is \$5,307. Since 2013, LRWRA has reimbursed over \$9.2 million dollars to participating residents. This represents approximately forty-two (42) miles of service lines replaced, resulting in the removal of an estimated thirteen (13) million gallons of I/I from the system annually.

c. Cap the Cleanout

LRWRA launched the “*Cap the Cleanout*” initiative in 2017. Through this program, if, during the evaluation and rehabilitation of sewer lines in project areas, field personnel discover that a resident’s sewer line lacks a cleanout cap, LRWRA will provide a complimentary replacement cap and install it for the resident. This is part of a continued effort to help residents properly maintain their sewer service lines while helping the utility seal the collection system. Capping cleanouts offers numerous advantages, including preventing rainwater from entering the sewer system, reducing the treatment load at reclamation facilities, keeping debris out of service lines to prevent blockages and backups in homes, preventing entry of small animals and rodents into the sewer system, and eliminating sewer odors.



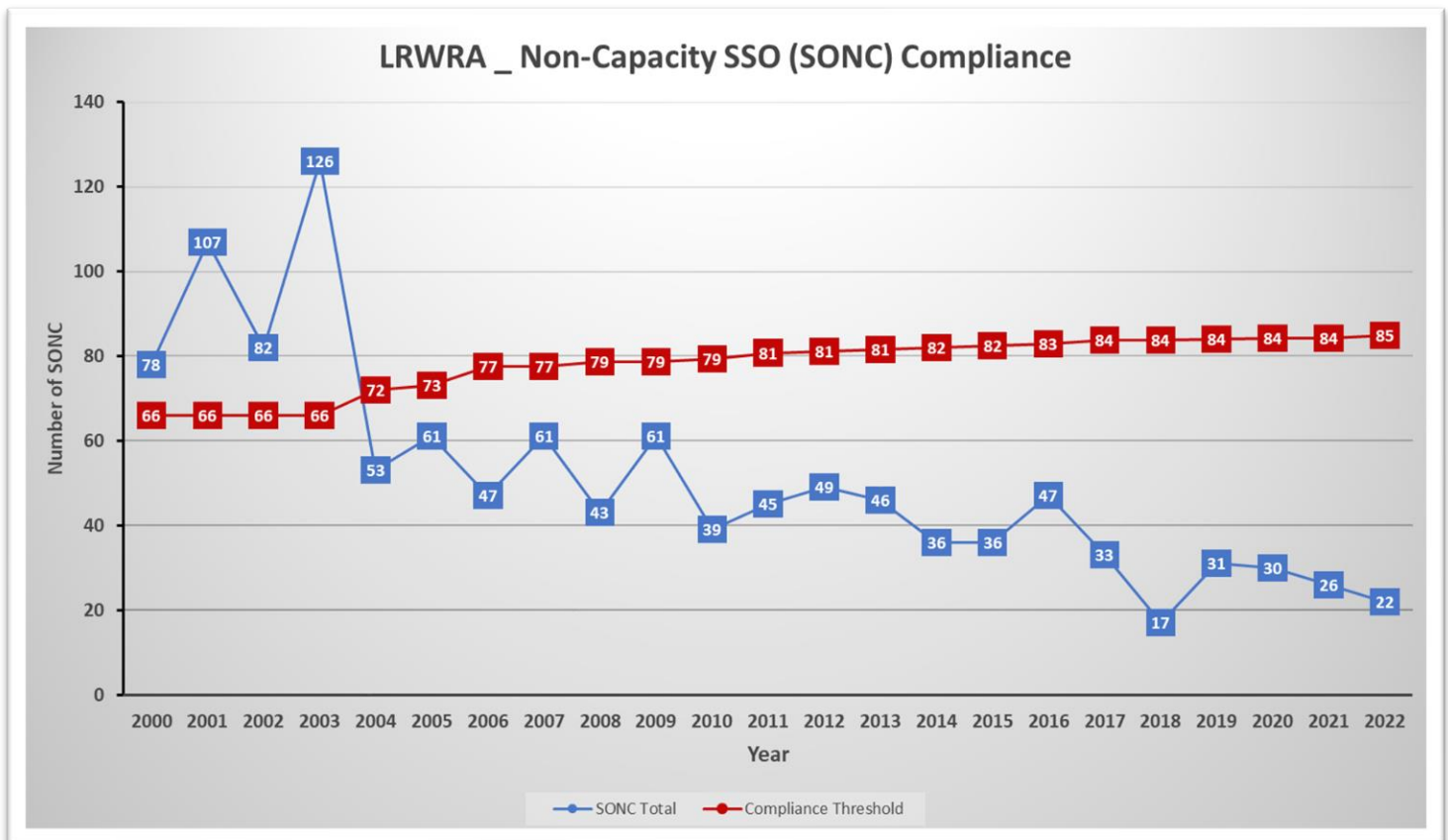
III. ACHIEVING COMPLIANCE

LRWRA's efforts, punctuated by the over twenty years of previously referenced capital investments and broad-reaching programs, have led to the achievements detailed below.

1. Non-Capacity (Dry-Weather) Overflows Compliance

LRWRA's efforts in operating and maintaining the collection system have yielded significant results, reducing the number of non-capacity-related overflows below the compliance standard set forth in both the Settlement Agreement and the CAO, which mandated no more than six (6) overflows per one hundred miles of sanitary sewer lines by the 2008 deadline. At that time, LRWRA managed 1,311 miles of sanitary sewer lines and documented only thirty-three non-capacity-related overflows related to system operation and maintenance, well below the compliance standard of seventy-eight (78).

As illustrated in this graph covering the years 2000 through 2022, LRWRA has consistently maintained performance significantly below the prescribed threshold year after year, despite the expansion of LRWRA's sanitary sewer system to approximately 1,416 miles by December 31, 2022. This sewer expansion raised the annual compliance threshold total to eighty-five (85) non-capacity overflows. In 2023, LRWRA has recorded twenty-seven (27) non-capacity related SSOs. **Therefore, LRWRA has complied with Section VII, Paragraph 1 of the CAO, as it has demonstrated compliance with the proper maintenance and operation of the wastewater collection system as it applied to dry weather overflows.**



2. Capacity-Related (Wet-Weather) Overflows Compliance

Upon entering the Settlement Agreement, LRWRA identified three hundred thirty-nine (339) historical SSO locations within the sanitary sewer collection system. Through substantial effort and significant capital investment spanning over twenty (20) years, LRWRA has achieved a noteworthy outcome: **zero (0) SSOs** in the seventeen rain events from April to mid-November 2023. This includes three (3) rain events that exceeded the 2-year design storm. **Therefore, LRWRA has complied with Section VII, Paragraph 2 of the CAO, as it has demonstrated compliance with the proper maintenance and operation of the wastewater collection system as it applied to wet weather overflows.**

IV. BEYOND COMPLIANCE: PRIORITIZING RECURRENCE PREVENTION

While overflows are inherent in water reclamation utility operations, ongoing challenges persist in all sanitary sewer collection systems, including grease accumulation, root intrusion, and contractor damage. The harsh wastewater environment leads to electrical and mechanical failures, posing a constant challenge to the reliable operation of pump stations and reclamation facilities. Prioritizing the mitigation of overflows is crucial for water reclamation utilities, including LRWRA. This not only safeguards the environment and residents' health but also serves as a testament to a utility's commitment to delivering dependable service. LRWRA will employ the following initiatives in its mission to consistently provide exceptional service to residents.

1. Ongoing Preventive Collection System Maintenance

a. Acoustic Inspection Program

Initiated in January 2017, the acoustic inspection program strategically directed LRWRA's Collection System Maintenance staff to gravity sewer lines requiring attention. This marked a shift from LRWRA's prior practice of scheduled cleanings, where lines were cleaned at set intervals, regardless of a line's actual need. The program facilitated a transition from time-based to condition-based maintenance activities, enabling the utility to refocus personnel and resources on specific maintenance needs.

At the center of the program is the Sewer Line Rapid Assessment Tool (SL-RAT), a tandem unit with the transmitting part at the upstream manhole and the receiving part at the downstream manhole. Using acoustical soundings, the tool assigns a score from 0 to 10 to the sewer segment between both manholes, reflecting the line's condition—0 for completely blocked and 10 for completely open. This provides a swift, straightforward, and cost-effective means for LRWRA to assess line conditions.

With the acoustic inspection program in place, LRWRA can now inspect over 1,100 miles of gravity sewer lines up to 12-inches in diameter within a 12-month period. Prior to the program, staff could only manage to inspect and clean 30% to 40% of that system within the same timeframe.

b. Cleaning & Televising

As previously noted, LRWRA's acoustic inspection program serves as the primary driver for LRWRA's Maintenance staff's activities. Established scoring thresholds determine whether a line requires cleaning or televising, and staff regularly evaluate and update these thresholds. Six hydro-cleaning crews, equipped with large combination cleaning and vacuum trucks, carry out the cleaning efforts. Four crews are designated to specific geographical areas in the city of Little Rock, while the other two cover the entire city, assisting with emergency response and preventive maintenance of LRWRA-owned lift stations. The Cleaning & Inspection office personnel determine if a line can be accessed by hydro-cleaning trucks to minimize the use of hand rod cleaning. In cases where this is not feasible, LRWRA maintains three hand rod cleaning crews to address lines in challenging-to-reach areas.

Routine CCTV inspections are fundamental to the ongoing operation and maintenance of the collection system. LRWRA conducts CCTV inspections on an as-needed basis, or after cleaning, to assess the effectiveness of the cleaning process. These inspections encompass over 1,100 miles of small-diameter system (8-12 inches) and have recently expanded to include the 13-17 inches in diameter portion of the system. Completed by four CCTV crews, each consisting of two staff members, all eight CCTV

employees are certified by the National Association of Sewer Service Companies (NASSCO), which defines standardized defect coding nomenclature for manholes and sewer lines. LRWRA's adoption of NASSCO standards ensures consistency, contributing to the creation of a comprehensive and reliable inspection database for prioritization, planning, and rehabilitation of the collection system. Like the cleaning crews, three of the CCTV crews are assigned specific geographical areas in the city of Little Rock, while the last crew covers the entire system with a focus on emergency and requested inspections.

c. Chemical Root Control Treatment

This program aims to prevent the formation of roots within pipelines, a phenomenon that can lead to blockages in sewer flows and the accumulation of grease and debris, ultimately reducing the capacity of the lines. Root-related blockages represent a significant cause of non-capacity related SSOs.

Consequently, the utility maintains a list of lines with root-related issues, subjecting them to biannual treatment with a chemical root control agent. This treatment aims to curtail the proliferation and growth of roots in the sewer system. The chemical agent effectively eliminates the roots and inhibits re-growth without causing permanent damage to above-ground vegetation. In addition to in-house operations and maintenance efforts to address root overgrowth in the collection system, licensed contractors perform the chemical treatment. This program plays a crucial role in restoring the capacity of these lines.

d. Fats, Oils and Grease (FOG) Program

To reduce dry weather overflows and enhance LRWRA's compliance with the Environmental Protection Agency's National Pretreatment Program, the Little Rock Board of Directors approved an updated FOG Ordinance on November 5, 2019, at LRWRA's request. The Ordinance was fully implemented on February 3, 2020. LRWRA mandates annual registration for all haulers servicing grease interceptors for Food Service Establishments (FSEs) within the City of Little Rock. These haulers must document the transportation of brown grease from collection points to disposal sites.

LRWRA utilizes *Swift Comply* software to monitor manifested pump outs and compliance schedules for FSEs in Little Rock. The ordinance stipulates that FSEs, such as restaurants, must use only registered haulers, a provision that has proven effective in promoting proper manifest submissions by haulers. Since the inception of the Fog Program, LRWRA has documented over 8.6 million gallons of FOG manifested by haulers.

2. Maintaining System Capacity

a. Sewer Modeling

The *InfoWorks* hydraulic model plays a crucial role in comprehensively representing LRWRA's collection system, which includes gravity line sewers, major pump stations, and force mains. Regular updates, based on LRWRA's accurate record drawings, ensure the model reflects completed projects and improvements. LRWRA utilizes this hydraulic model for various tasks, including capacity evaluations, investigations into I/I reduction strategies, assessments of bypass pumping scenarios, and analysis of rerouting impacts. Moreover, the model aids in post-rainfall event analysis, refining operational settings, deploying rain gauges and *SmartCover* manhole sensors for data collection, and developing Standard Operating Procedures for different storm conditions. Ultimately, the *InfoWorks* hydraulic model serves as a vital tool for enhancing the efficiency and performance of LRWRA's collection system.

b. Rainfall Dashboard

To establish a long-term program to eliminate capacity related SSOs for a specific design storm event, LRWRA realized the importance of collecting rainfall data to evaluate system performance and overflow mitigation program compliance. As discussed in Section II.7b, LRWRA developed a mechanism for determining compliance utilizing a 2-year, 10-day curve. Thereafter, LRWRA developed and published an online GIS-based, dashboard that reflects and updates rainfall which has fallen during any given 10-day period. This dashboard provides LRWRA operators with on-demand views of rainfall events at a granular level, with users able to view all 13 rain gauges individually. This dashboard provides users with the capability to objectively evaluate system performance and the efficacy of LRWRA's rehabilitation efforts.

c. Sewer Service Line Replacement Program

LRWRA will continue this Environmental Protection Agency Pisces Award-winning program to continue to assist residents, reduce I/I, and decrease the cost of collection and treatment.

d. 10-Year Capital Improvement Plan

LRWRA's annual capital outlook will always place emphasis on Asset Management, Asset Reliability, and Asset Renewal. The 2024 ten-year CIP¹⁸ includes \$240 million dollars allocated to renewing the system and providing reliable service while mitigating overflows.

e. Asset Management-Based System Reliability

In 2023, LRWRA significantly changed its Asset Management program, transitioning from a reactive to a proactive approach. This shift was essential to ensure continuous and failure-free performance of LRWRA assets for specified intervals.

Robust asset reliability enhances asset functionality, efficiency, cost savings, and employee safety. To bolster its Asset Management program, LRWRA introduced an Asset Reliability Team, concentrating on preventative and predictive maintenance. These reliability strategies aim to prolong equipment useful life by minimizing wear and tear on assets. The ultimate and crucial benefit of reliable assets in the wastewater industry is the consistent ability to meet regulatory compliance, enabling the utility to fulfill its mission without interruption.

Achieving asset reliability hinges on identifying and cataloging all assets, maintaining real-time visibility into their condition, executing plans to keep assets operational, and promptly making necessary repairs. LRWRA employs a computerized maintenance management system to track the condition and priority ranking of each asset. This information informs LRWRA's planning, budgeting, repair scheduling, and asset replacements, as needed.

f. Inflow and Infiltration Reduction Program

Excessive I/I during wet-weather events causes wastewater utilities multiple issues including high operational costs related to pumping and treating the increased flows, and even more concerning, hydraulically overloading the collection and treatment systems which may result in SSOs. LRWRA

¹⁸ Little Rock Water Reclamation Authority, Capital Improvement Plan, https://www.lrwra.com/site/assets/files/1760/2023_budget_book_pdf.pdf, page 89.

will continue its I/I Reduction Program to locate and remove I/I from the system, which helps mitigate SSOs and maintain system capacity. These efforts will benefit the cost of transport and treatment as well as the additional stress on system operations. This program identifies basins with excessive flows, seals the collection system, and eliminates excess flow taking up needed capacity.

g. Large Diameter Inspection and Repair Program

In 2017, LRWRA inspected all gravity sewer mains 18-inch and larger (commonly referred to as the interceptor system) throughout the collection system to assess the integrity of each main, identify any potential issues, and make repairs as needed. Following the inspection and assessment, all sewer main data was consolidated into databases. To make the vast amount of pipe condition assessment and corresponding basis of rehabilitation useful for capital improvement planning, LRWRA created a dashboard to graphically present targeted data sets. The dashboard provides a breakout of the large diameter inventory with interactive tabs that assist with capital improvement planning decisions.

3. Innovative Programs for Operational Efficiency and Optimization

In recent years, LRWRA has expanded its adoption of various smart sewer technologies to enhance the efficiency, information access, and automation of its daily system operations.

One instance is the incorporation of the real-time continuous monitoring tool, *SmartCover* manhole sensors. In 2023, LRWRA deployed five *SmartCover* manhole sensors to monitor specific segments of the sewer collection system, providing insights into flows, water levels, and potential overflow timing. Prior to this implementation, multiple field crews were dispatched to potential overflow locations throughout the system to verify occurrences following rain events. Remote verification through the *SmartCover* digital platform now eliminates the need for on-site crews, reducing operational costs significantly, and allowing for more efficient personnel utilization. These sensors also aid in pinpointing basins with significant I/I issues, contributing to the identification and prioritization of I/I elimination projects.

LRWRA has also explored the use of artificial intelligence (AI) in the CCTV inspection process. Recent technological advances have enhanced operational optimization and defect coding efficiency. Traditional CCTV inspections are time-consuming, involving manual characterization of observed defects in each sewer line, and often exhibit variabilities between assessments performed by different technicians. LRWRA's pilot study, which focused on leveraging AI capabilities during CCTV inspections, revealed that capture-only technology increased productivity and ensured consistent defect coding. Moreover, LRWRA's AI inspections detected an average of 35% more defects, offering a more comprehensive condition assessment and suggesting potential use as a training tool for technicians. LRWRA's short-term plans include expanding the use of AI to inspect the 13-17-inch diameter sewer lines, covering a thirty-two-mile portion of the collection system.

4. Special Programs and Supplemental Projects

a. Public Education (Don't Flush That!)

In 2019, LRWRA launched a multi-media campaign entitled, “*Don't Flush That!*”. This campaign featured “unflushables” – everyday household items that residents presume are suitable to flush, rinse, or pour down drains, but are harmful to the sewer system, the environment, and public health. The campaign educates Little Rock area residents on only flushing the 3Ps: pee, poop, and paper (toilet paper).

LRWRA generated content on its website to educate residents about the common “unflushables” that affect the sewer system, and offered tips to prevent clogs, backups, and costly repairs. LRWRA has had several media appearances on TV and radio programs highlighting its “*Don't Flush That!*” campaign. Notably, eighteen (18) Kroger stores in Little Rock placed “*Don't Flush That!*” signage in fifty-four (54) displays in their stores. LRWRA also produced educational material to educate elementary students on the importance of only flushing the 3Ps. This educational programming will continue.



b. Educating Students

Through the *Partners in Education Program*, LRWRA visits Little Rock schools to inspire the next generation to consider careers in science, technology, engineering, and math, and to expose students to the vast career opportunities in the water industry. Through hands-on learning projects, facility tours, and science fair collaborations, LRWRA fosters innovation and creativity to educate them on how the utility protects public health and the environment. This educational programming will continue.



Glossary of Acronyms

ADEE – Arkansas Department of Energy and Environment (current)

ADEQ – Arkansas Department of Environmental Quality (historical)

CAO – Consent Administrative Order

CCTV – Closed-Circuit Television

CIP – Capital Improvement Plan

CSMP – Collection System Management Plan

EPA – Environmental Protection Agency

EQ Basin – Equalization Basin

FOG – Fats, Oils, and Grease

I/I – Inflow and Infiltration

LRSSC – Little Rock Sanitary Sewer Committee (historical)

LRWRC – Little Rock Water Reclamation Commission (current)

MGD - Million Gallons per Day

NASSCO - National Association of Sewer Service Companies

OMP - Overflow Mitigation Projects

O&M – Operations and Maintenance

R-Projects – Required Projects

SECAP - System Evaluation and Capacity Assurance Plan

SL-RAT - Sewer Line Rapid Assessment Tool

SOC – Sewer Overflow – Capacity

SONC – Sewer Overflow – Non-Capacity

SSLRP – Sewer Service Line Replacement Program

SSO – Sanitary Sewer Overflow

SSORP - Sanitary Sewer Overflow Response Plan

US DOJ – United States Department of Justice