SEWER MONITORING SERIES

PUBLIC WORKS DIRECTORS

Data-Driven Consent Decree Navigation Using Sewer Flow Monitoring

Reducing a $28M Corrective Action Program to $4.44M Through Targeted RDII Characterization

"I can defend every dollar I spend — because I have the data to prove why I spent it."

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Abstract

DIRECT ANSWER — How can sewer flow monitoring help navigate an EPA consent decree?

Sewer flow monitoring provides the quantified, field-measured data that EPA technical reviewers require for credible consent decree corrective action plans. By characterizing the actual sources and volumes of RDII at each SSO location, monitoring data enables utilities to propose targeted, cost-effective corrective action programs — rather than expensive blanket replacements based on estimates. Data-supported plans receive faster EPA approval and produce better outcomes per ratepayer dollar.

This case study documents a public works director navigating a state Notice of Violation (NOV) and threatened consent decree for recurring sanitary sewer overflows (SSOs) at six locations across a 94,000-resident municipal collection system. An 18-month, 31-meter monitoring program with EPA telemetry access characterized RDII sources at each SSO location, revealing that the dominant problem in the most costly sewersheds was fast inflow from cross-connections — not the pipe capacity deficiency the engineering estimate had identified. The monitoring-driven corrective action plan reduced total cost from $28 million to $4.44 million, avoided an 18% rate increase in favor of a 6.5% phased increase, and produced a 34-point improvement in community satisfaction scores — while achieving full EPA consent decree compliance.

$28M	$4.44M	11.5%	5 of 6
engineering estimate only Contemplated CIP (No Monitoring)	monitoring-targeted program Actual Data-Driven CIP	18% contemplated → 6.5% actual Rate Increase Avoided	within 24 months of program start SSO Locations Resolved

Background

What Is a Sanitary Sewer Overflow Consent Decree?

A sanitary sewer overflow (SSO) occurs when untreated wastewater escapes the collection system before reaching the treatment plant. Recurring SSOs constitute violations of the Clean Water Act, exposing utilities to EPA enforcement action. When SSO patterns indicate a systemic problem, EPA may pursue a Consent Decree: a legally binding compliance schedule requiring measurable SSO reduction within defined timeframes or face stipulated penalties of up to $50,000 per day per overflow event.

Director Maria Chen of the City of Oakdale (population: 94,000) received a Notice of Violation from the state environmental agency citing recurring SSOs at six locations. The NOV outlined a 90-day period to submit a corrective action plan demonstrating a credible compliance path.

THE DECISION-MAKER'S DILEMMA

A consent decree creates simultaneous pressure from multiple directions: EPA demands a credible

> corrective action plan; the city council resists rate increases; the environmental advocacy community demands accountability; and the local press is covering SSO events. Without data, no recommendation to the council is defensible. The monitoring investment is not just engineering — it is political protection and governance due diligence.

The utility's engineering consultant estimated $28 million in trunk sewer rehabilitation and pump station upgrades to resolve the six SSO locations — requiring an 18% rate increase phased over five years. This estimate was based on existing hydraulic model data and visual inspection, not field-measured RDII data. Two council members publicly stated they would not vote for it without independent verification.

Methodology

How Was the 18-Month Monitoring Program Structured?

The program had two explicit objectives: (1) characterize actual RDII sources at each SSO location with precision sufficient to support a defensible EPA corrective action plan; and (2) establish quantified SSO volume baselines at each location, replacing engineering estimates.

The 31-meter, 8-rain-gauge network was designed in two tiers. Eighteen meters were placed upstream and downstream of each SSO structure, enabling direct mass-balance calculation of SSO volumes during events — a specific EPA requirement previously met with estimates. Thirteen additional meters characterized RDII at the contributing sewershed level.

Strategic Transparency: EPA Real-Time Dashboard Access

Director Chen granted EPA regional staff read-only access to the monitoring platform's web-based dashboard. EPA reviewers could see data quality, event capture rates, and preliminary RDII trends in near-real-time — eliminating the information asymmetry that characterizes adversarial enforcement relationships. The result: EPA remained constructively engaged, requested only minor clarifications, and approved the corrective action plan on first submission without modification — a rare outcome in consent decree proceedings.

Figure 1 — Consent Decree Resolution: Data-Driven Corrective Action Program
Case Study 2: Public Works Director

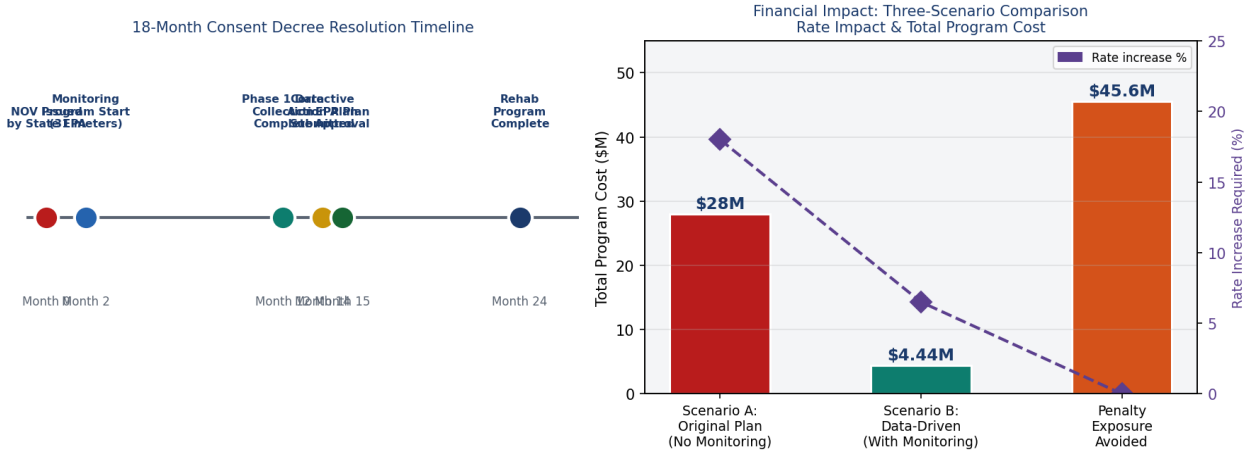

Figure 1 — Left: 18-month consent decree resolution timeline. Right: Three-scenario financial comparison confirming the monitoring-first approach as the dominant strategy.

Results

What Did the RDII Characterization Reveal at Each SSO Location?

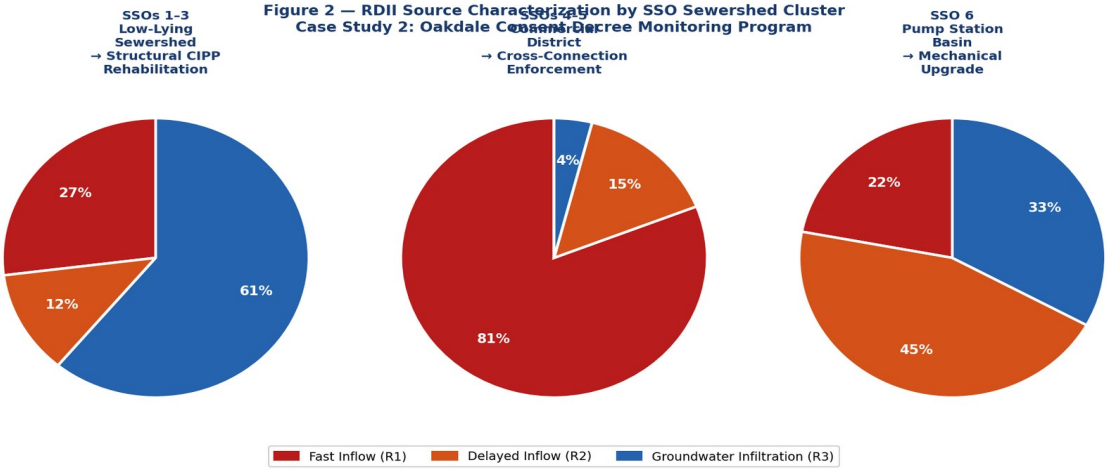

Figure 2 — RDII source decomposition by SSO cluster. Fast inflow dominance in the commercial district (81%) mandated cross-connection enforcement rather than pipe replacement, saving $8.1M.

SSO Locations	Dominant RDII	Primary Source Identified	Corrective Action	Cost
SSOs 1–3 (Low-lying sewershed)	R3: Slow infiltration (73%)	Deteriorated 1950s clay pipe joints; manhole wall infiltration	CIPP lining 2.8 miles; manhole sealing 87 structures	$3.2M
SSOs 4–5 (Commercial district)	R1: Fast inflow (81%)	14 commercial properties with illegal storm cross-connections	Cross-connection enforcement + disconnection assistance program	$340K
SSO 6 (Pump station basin)	Not RDII-related	Mechanical pump failure; controls malfunction	Controls replacement + wet well upgrade + backup power	$620K

The commercial district diagnosis was the most significant finding. The prior engineering estimate had proposed $8.4 million in interceptor replacement there. The monitoring data revealed the problem was entirely private property cross-connections — a $340,000 enforcement program. The $8.06 million difference would have been spent on infrastructure that did not address the dominant RDII source.

REGULATORY OUTCOME

EPA's technical review team approved the corrective action plan without modification, specifically citing the RDII decomposition analysis as providing "a technically sound basis for the proposed corrective measures." The plan was the first in the regional EPA office's recent history to receive first-submission approval — a direct consequence of the quality and completeness of the monitoring data package.

Engineering Significance

SIGNIFICANCE 1: QUANTIFIED RDII SOURCES ENABLE TARGETED ENFORCEMENT

SSO corrective action programs fail when they address symptoms (pipe capacity) rather than causes (RDII sources). RDII decomposition analysis that identifies private property cross-connections as the dominant inflow source enables corrective action at orders of magnitude lower cost than pipe replacement — which would not have fixed the underlying problem.

SIGNIFICANCE 2: MEASUREMENT-BASED SSO VOLUME REPORTING CHANGES ENFORCEMENT DYNAMICS

Moving from estimated to measured SSO volumes serves the utility's interests in multiple ways. Overestimated volumes result in excessive stipulated penalties. Accurate measurement documents actual compliance progress objectively. And measurement-based reporting signals good-faith engagement to regulatory staff — which influences enforcement posture in ways that are consistently reported by utilities that have made the transition.

Conclusion

Director Chen's Oakdale experience demonstrates that sewer flow monitoring is not merely a technical tool — it is a governance and risk management instrument for public works directors operating in enforcement environments. The program transformed a politically toxic $28 million program into a $4.44 million plan backed by field data, with measurable EPA milestones and ratepayer-defensible cost justification.

Public works directors facing SSO enforcement actions should treat flow monitoring as a prerequisite to corrective action plan development. Without it, every dollar spent on rehabilitation is subject to challenge. With it, every dollar becomes an investment in a documented solution to a documented problem.

Frequently Asked Questions

Q: What does EPA require in a consent decree corrective action plan for SSOs?

EPA requires consent decree corrective action plans to include: a baseline assessment of SSO frequency, location, and estimated volumes; identification of the causes of SSOs (capacity deficiency, I/I, operational issues, or infrastructure failure); a schedule of corrective actions with enforceable milestones; and performance metrics to measure SSO reduction. Plans supported by field-measured RDII data receive faster approval and face fewer requests for additional information.

Q: How can a public works director justify flow monitoring investment to the city council?

Frame monitoring as insurance against acting on incorrect information. Present the cost of the monitoring program against three scenarios: (1) acting on estimates and building the wrong solution; (2) monitoring first and building the right solution; (3) delaying all action and accumulating consent decree penalties. In virtually every case, Scenario 2 has the lowest total cost and lowest risk. The monitoring investment is typically 1–5% of the capital program it informs.

Q: What is the typical penalty for SSO violations under a consent decree?

Consent decree stipulated penalties for SSO violations typically range from $1,000 to $50,000 per day per overflow event. For a utility with six recurring SSO locations, uncontrolled penalty exposure can exceed $1 million per year — making a $300,000–$800,000 monitoring program an economically straightforward investment.

References

- US EPA (2005). Guide for Evaluating CMOM Programs at Sanitary Sewer Collection Systems. EPA 305-B-05-002.
- US EPA (2004). Report to Congress: Impacts and Control of CSOs and SSOs. EPA 833-R-04-001.
- Water Environment Federation (2019). Sanitary Sewer Flow Monitoring and Data Analytics Fact Sheet.