New Jersey American Water- Bound Brook

Pinpointed Hotspots Leads to Immediate ROI

Case Study

Background

New Jersey American Water (NJAW) is the largest water service provider in the state of New Jersey, serving approximately 2.8 million people in 190 communities. NJAW currently own and/or operate 31 wastewater systems with 21 wastewater treatment plants, 85 lift stations, and more than 500 miles of pipe. Over the last five years, NJAW has invested more than $105 million into wastewater system assets, including wastewater mains, treatment plants and lift stations, to continue providing reliable and environmentally sound service that complies with federal and state wastewater environmental regulations.

The Challenge

Following the acquisition of the Bound Brook sewer collection system in August 2022, NJAW wanted to identify and reduce inflow and infiltration (I&I) in the system. Traditional I&I isolation methodologies require 18 to 24 months of field assessment and analysis.

NJAW desired an innovative approach to significantly reduce the amount of time required to gather data in order to design and build system improvements up to 12 months sooner. Traditional I&I evaluation methods, such as smoke and dye testing, require 18 to 24 months of field assessment and analysis.

The Solution

SmartCover's sewer monitoring technology, combined with data evaluation methods developed by the Hazen and Sawyer (Hazen) environmental engineering team, was selected to accelerate the traditional identification of I&I in the collection system. I&I was identified and analyzed by collecting sewer level data from selected manholes using SmartCover units during dry and wet weather periods.

In an effort to expedite the characterization of Bound Brook sewer assets, NJAW built out the entire system with 40 satellite-based monitoring units to provide real-time data. I&I identification efficiencies were gained by collecting water level data generated at selected manholes with equipment placed strategically throughout the collection system network. The remote sewer monitoring technology integrated National Oceanic and

Highlights

- Reduced annual SSOs from 12 to 0
- Increased "Comprehensive Planning" process efficiency
- Lowered risk to crew safety and pipelines
- Gained ability to make better-informed capital decisions

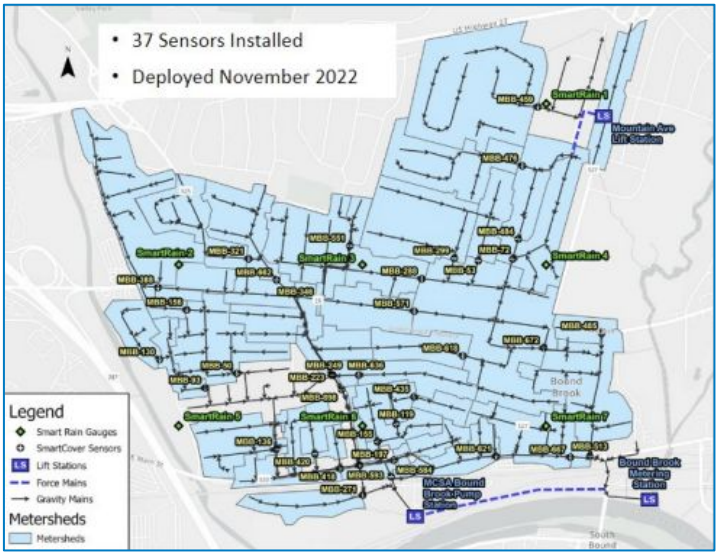

Figure 1: SmartCover deployment

Atmospheric Administration (NOAA) weather (doppler radar) as well as United States Geological Survey (USGS) river/stream and ocean gauges. Typical dry weather level patterns were compared to manhole level responses during rainfall/wet weather events.

his evaluation provided collection system information which indicated the extent of potential I&I throughout the system with improved coverage, greater speed, and reduced cost. Simultaneously, the data produced by the SmartCover technology was used to identify and predict system surcharges and associated flow obstructions or material blockages. The NJAW Operations & Maintenance team benefitted from both the real-time alarms and predictive alerts by taking proactive actions before issues occurred.

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The Results

Following adequate dry weather “calibration time” and a sufficient number of wet weather events, the analysis recommended leaving many level monitors in place to continue collecting data while others were relocated to further pinpoint potential sources of I&I. The relocation, or re-deployment, process involved moving SmartCover sensors from locations with little or negligible I&I indication (or periodic blockage issues) to alternate locations in the system that could benefit from further evaluation. This included moving the sensors to upstream locations to further refine the evaluation results and more closely isolate potential I&I locations. The I&I data collection/evaluation process required a minimum number and intensity of wet weather events to capture the full range of system flow responses. This process allowed for quick and efficient isolation of potential I&I to smaller areas to better focus field investigations and subsequent system rehabilitation plans.

The system-wide deployment of sensors also facilitated timely cleaning to address dry weather blockages, drastically reducing sanitary sewer overflows (SSOs). Within the first four months of operation, the pilot prevented 16 SSOs. The sewer monitors utilize real-time alarms to dispatch crews before overflows occur and thereby eliminate environmental and community impacts associated with SSOs.

In addition to reduced SSOs, the smart sewer system allowed NJAW to extend the life of sewer mains by limiting unnecessary cleanings and optimized crew time by minimizing safety risks in the field, truck fuel costs, and GHG emissions. The ability to quickly respond to (and correct) collection system issues is critical for NJAW to maintain safe, reliable service over a wide geographic area.

Figure 2: Water leak or inflow and infiltration

Figure 3: Storm related surcharge

Conclusion

NJAW is able to perform targeted analysis of its sewers using SmartCover technology to provide real-time data and alarms, preventing SSOs, backups, and subsequent cleanup. The units provide valuable data to make quicker, informed capital investment and daily operations decisions.

Most importantly, by integrating the monitoring and data analysis capabilities of the SmartCover and Hazen teams, NJAW was able to efficiently identify potential I&I throughout its Bound Brook-area wastewater collection system. This process led to significant time savings over traditional I&I investigation and analysis methods, enabling NJAW to launch design and rehabilitation plans much sooner than traditionally happened.

SmartCover technology is a key tool in the utility’s toolkit for collection system maintenance and replacements. Given the Bound Brook project’s success, in less than two years NJAW has increased its use of SmartCover monitors to 196 deployed throughout its various sewer collection systems in New Jersey.