

Sophisticated Combined Sewer Overflow Monitoring Results in Reduced Capital Expenditures

City of Seattle, Washington

ADS Succeeds in High Accuracy Quantification of Combined Sewer Overflows

The Seattle Public Utilities combined sewer overflow monitoring network consists of over 100 overflow points draining to 86 outfalls into Lake Washington and Puget Sound. Seventeen rain gages with historical information stretching back over 30 years are also a crucial component of the monitoring network.

In 2006, Seattle Public Utilities (SPU) was aware that there was a big problem with the quality of the city's combined sewer overflow (CSO) data. SPU also knew that the EPA and the Department of Ecology were planning to impose Consent Decrees or Administrative Orders against agencies including SPU for having uncontrolled CSO outfalls. In anticipation of the incoming changes, SPU decided to ramp up its efforts to better understand the magnitude of Seattle's CSO problem through improved flow monitoring.

The main elements of the legal actions taken against SPU over uncontrolled CSOs were as follows:

Under the settlement with the city of Seattle, the city will develop and implement a long-term plan for better controlling sewer overflows and improve system-wide operations and maintenance. The city will also implement plans to control fats, oils, and greases, and reduce debris being discharged by the system... By implementing these measures; the city will reduce its raw sewage discharges by approximately 99 percent at an estimated cost of \$600 million. Seattle will also pay a civil penalty of \$350,000.

Between 2007 and 2010, Seattle discharged approximately 200 million gallons of raw sewage into area waterways on an annual basis. During this time period, the city also improperly operated and maintained its sanitary sewer system, resulting in unauthorized discharges of raw sewage to public and private properties, including basement backups. (WaterWorld, April 19, 2013)

Return on Investment Examples for Seattle Public Utilities

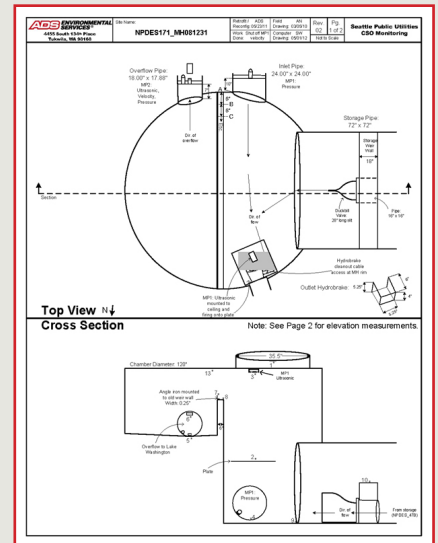
Windermere CSO Basin: Originally, the storage volume was estimated at around 3.9 million gallons. Through better monitoring/modeling, that amount shrank to about 2 million gallons, a 50% reduction in the required storage volume. This correlates to a \$20 million savings (at \$10/gallon.)

South Henderson CSO Basin: Based on the old data, the control volume was around 20 million gallons. Through better monitoring/modeling, that number was reduced to 3 million gallons. This improvement not only saved about \$170 million (at \$10/gallon), it also opened up many more options for SPU to resolve the problem.

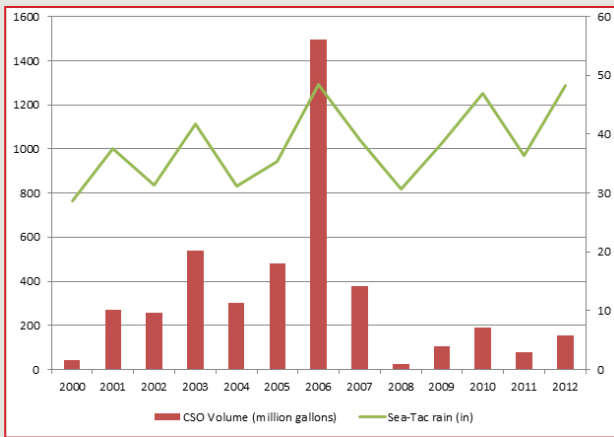


Other users of the flow data at SPU, including modelers, the CSO retrofit team, and those responsible for reporting the monthly overflows to Ecology, were also searching for more accuracy for their frequency and overflow numbers. Between 2008 and 2010, much more accurate CSO control volumes were developed from an intensive monitoring study using ADS equipment, deployed throughout the uncontrolled CSO basins.

Seattle Public Utilities required a reliable, knowledgeable, and highly-skilled contractor to handle the complexity of both the permanent and temporary monitoring, and in particular the calculation of combined sewer overflows using a combination of weir depth-to-flow calculations and area-velocity flow meters. Also essential: near real-time access to the raw flow data and 24/7 alarm response for dry weather overflows.

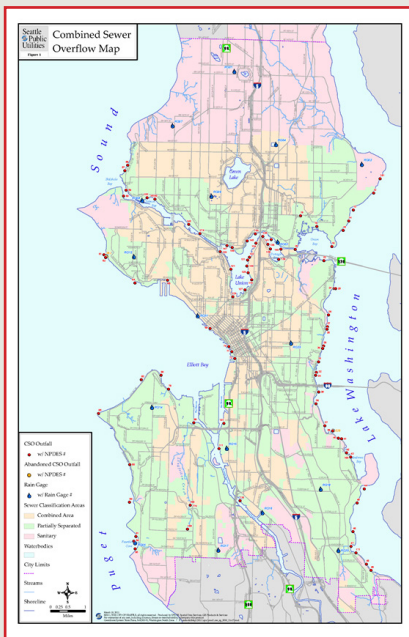


Schematic of a particular hard to monitor flow site in Seattle



CSO Volume (million gallons) reported to Department of Ecology vs. rainfall from SeaTac Airport through 2012

ADS Environmental Services was brought on to replace the existing flow monitoring contractor in August of 2007. Through a process of careful attention to data quality, swift response to equipment and data issues, and a more collaborative approach to maintenance issues, the usefulness of the Seattle Public Utilities CSO overflow data increased dramatically.



CSO Basins in Seattle, WA

“We previously thought we were overflowing between 300-400 million gallons per year (on average), and that number dropped down to 100-200 million gallons per year (on average) since we improved our monitoring... It’s definitely a big savings.”

Andrew Lee
*Drainage & Wastewater Capital Portfolio Manager,
 Seattle Public Utilities*

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