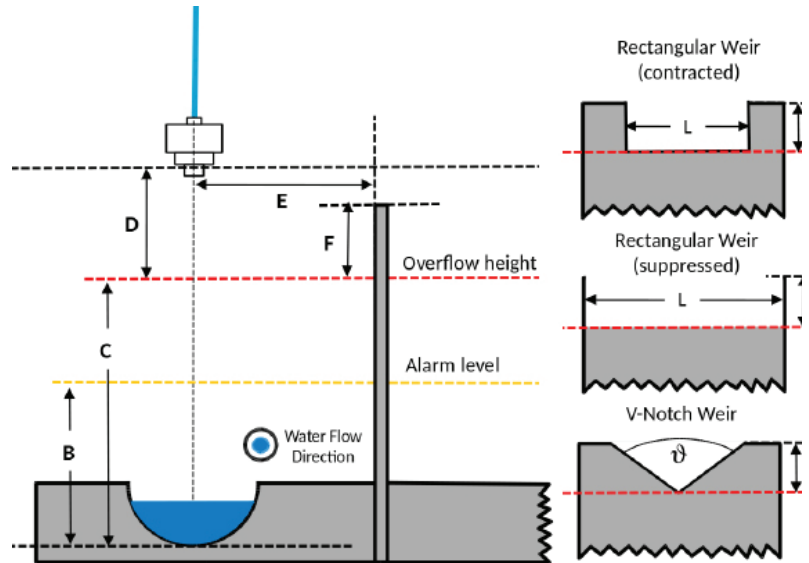


## Real-Time Flow Monitoring for Weirs and Weir Structures

**SmartWeir™** is a real-time monitoring system for determining start-stop-duration times and overflow volume of a **CSO event** using real-time measurement of water flow over a weir. This system includes a remote water level sensor, advanced satellite communications, automatic reporting and 24/7 data access via a web browser.

A highly reliable and accurate ultrasonic level sensor is installed behind the weir. It is positioned for determining flow based on the weir design using classic weir formulae developed, tested and approved by ASTM, ISO, and USBR to calculate flow rates. Level and flow data are transmitted via the military grade Iridium® satellite system to the SmartCover® cloud, where it is seamlessly accessed by system users via the internet. For CSO sites, the start-time, stop-time, and incident flow volume can be logged and reported in real-time. SmartWeir™ is fully two-way allowing operational parameters to be



The SmartWeir™ application of SmartCover® technology requires the sensor to be properly positioned to measure flow based on ASTM, ISO, and USBR standards.

changed by the user at any time to provide optimal results.

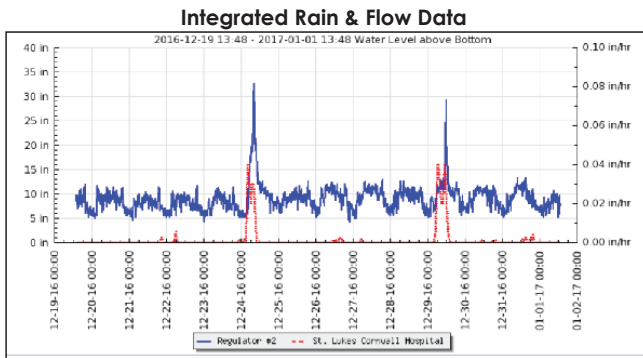
### CSO Reporting

Under normal conditions, the combined sewers are not overflowing. In rain events of sufficient intensity, a combined sewer overflow (CSO) can occur. Regulatory agencies require CSS operators to know and report - in real-time when a CSO starts, stops, the duration of the event, and the overflow volume. SmartWeir provides this data to the CSS operator.

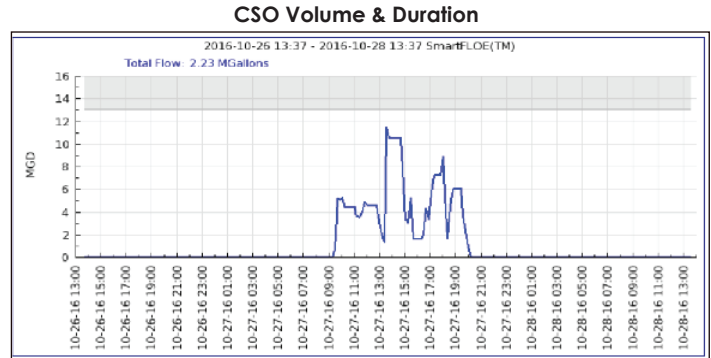
Additionally it can provide automatic real-time notification if required.



A sample installation of a SmartWeir™ in a CSS regulating structure. The ultrasonic sensor is hanging from the ceiling of the structure in the lower part of the photo, and the overflow weir is above, where the light is shining.



Example of response of combined sewer structure to local rain events



Example of combined sewer overflow event. Start time, stop time, duration, overflow volume and automatic real-time notification are part of SmartWeir™ for CSS.

## Features and Specifications

### Structure Types Monitored:

- Open channel weirs
- Combined sewer structures

### Sensor Type:

- Ultrasonic, non-contact
- 4" to 200" dynamic range
- Accuracy: +0.25% detected range  
Resolution: 0.1"
- Temperature compensating
- Level measurements: 1,2,5, or 10 minutes
- Reporting: Every 24 to 60 minutes or upon overflow state

### Remote Communications:

- Two-way wireless: sends data from site; receive commands sent by user for operational parameters
- Military-grade communications: Iridium® low earth orbit satellite constellation

### Data Analysis, Data Fusion and Storage:

- SmartCover server cloud, located in an enterprise grade data center
- Access to data, charts, graphs, analysis through any internet connection
- Weir flow formulae developed and used by ASTM, ISO and USBR
- Integration of NOAA based and ground truth adjusted real-time rain data
- Integration of USGS tidal data for historical and predictive effects on sewers
- Rain correlation tool, providing real-time response of a system to local rain events

### Decision and Operational Support:

- Patented SmartTrend® tool signals when an overflow structure requires cleaning after a storm or event
- Start time, stop time, duration, volume, and real-time notification of overflow conditions

### Benefits:

- Know how your system responds to rain events
- Quantify overflow events, for regulatory relief and measurement of mitigating measures
- Real-time visibility into your system

Local SmartCover Support Provided By