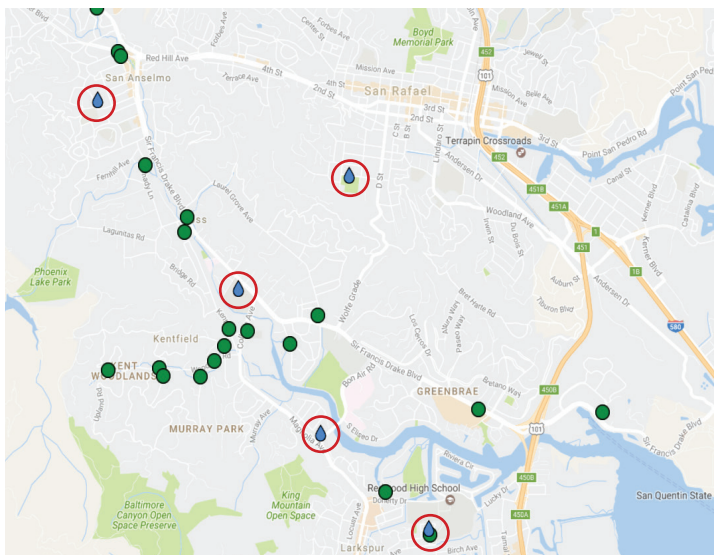


## Rain Data Integration with Level and Flow Measurements

**SmartRain<sup>™</sup>** provides rain data using both Doppler radar and local rain gauges. Combined with level and flow data, it creates a comprehensive view to better understand your collection system.

Rain data can be acquired from any desired location and presented in the user interface along with level or flow data in a single display (Figure 2). Data integration creates an easy method to view and understand the relationship of collection system level or flow changes as affected by rain.



**FIGURE 1:** Rain data is represented as blue raindrops on the map circled in red, and data can be accessed by clicking on the symbols.

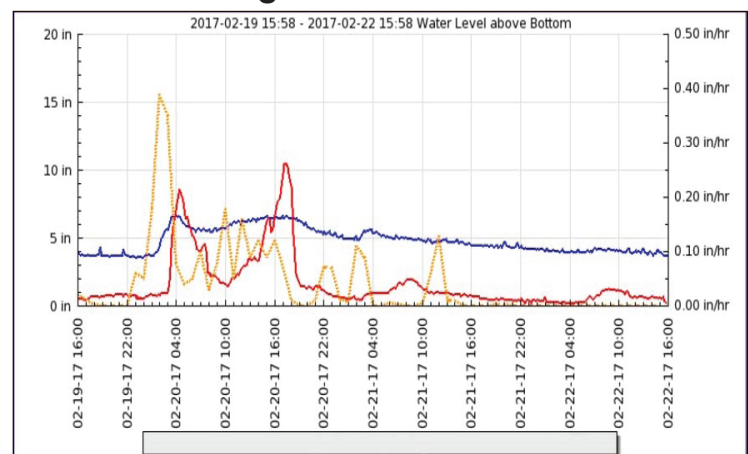
## How SmartRain Works

The location of **SmartRain** gauges is determined by simply specifying latitude and longitude of the desired site (Figure 1). NOAA radar combined and calibrated with ground-truth physical rain gauges provides near-real time rainfall rates at the specified location. Locating multiple rain monitoring sites in a given sewer shed reveals “cause and effect” relationships in the basin. A “rain-field” using a grid of rain monitoring sites is easily deployed, enabling local variability of rain events to be captured. This can show timing and location of I&I at various SmartLevel<sup>™</sup> monitoring points in your collection system.

## Inflow & Infiltration

When **SmartRain** is used in concert with level or flow data it quickly reveals sources of inflow and infiltration (I&I). These data sets are powerful tools for prioritizing capital improvement projects (CIP) to reduce I&I. Inflow and infiltration caused by rain, tide and rivers is a significant cost to the utility. Processing rain water as sewage is expensive.

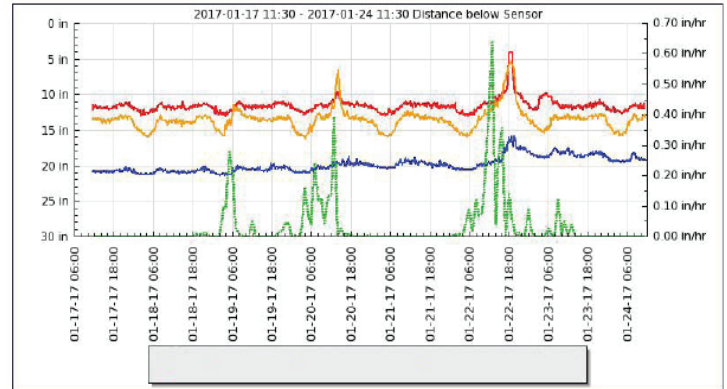
### Strong Rain Influence



**FIGURE 2:** Multi-graph view: overlay up to 5 data streams. Graph: rain data (amber) two level monitoring sites (red and blue).

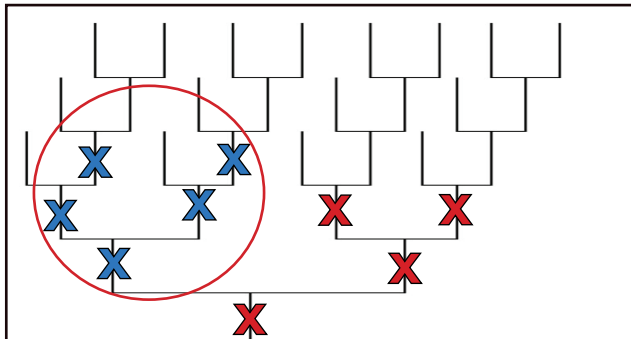
## Unique SmartRain™ Features

- Maintenance-free with no set-up or maintenance required.
- Alerts sent for high rainfall levels.
- Multi-graph view of level or flow sites with rain sites.
- Level and flow sites employ trend analysis (SmartTrend™).
- Profiles the collection system during rain.

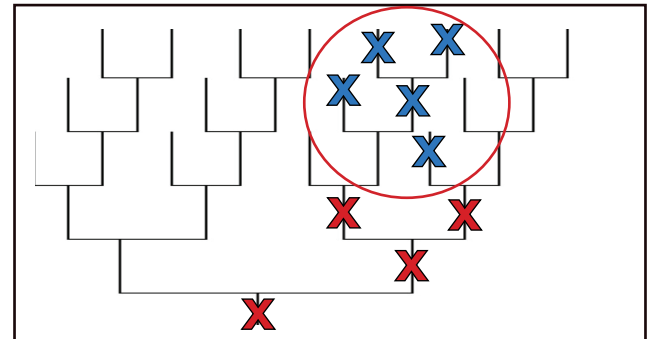


Multi-graph view showing rain (green) and three level monitoring sites

## Integrating Rain and Level Data



Starting at the main monitors are moved as "branches" with higher values are identified



Moved sensors location (circled)

## SmartRain Specifications

SmartRain	
Area Coverage	1 km <sup>2</sup> - (0.62 mi <sup>2</sup> ) radius per monitoring site
Subscription Requirements	1 - year minimum, or multiple years
Hardware Requirements	Must have at least one SmartLevel™ or SmartFLOETM. No additional hardware is required.
Information Requirements	GPS coordinates (does not have to be in same location as SmartLevel™ or SmartFLOETM units)
Sensor	Doppler radar and local rain gauges
Resolution / Frequency	0.001" / updated once per hour
Alerts	Rainfall alerts sent
Set-Up	Latitude and longitude location

Local SmartCover Support Provided By