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Maximizing Use of Technology to Reduce Travel Time for Flow Weighted Composite Sampling of Stormwater

A new NPDES permit increased the number of monitoring locations requiring flow weighted composite samples from six to fourteen. A staffing increase was not an option. To be able to effectively operate fourteen monitoring stations with limited staff, technology was researched and installed to limit trips to each site through automated triggering of samplers, communicating close to real time information, remote adjustment of sample pacing, and eliminating the need for ice deliveries.

Systems used previously were manually triggered at the onset on precipitation, and visited throughout the event to adjust to changing storm conditions. Samplers are now triggered by the increase in flow or remotely if necessary. Remote communication is achieved with Teledyne-Isco's 2105c interface/controller units which push data via an IP address to a central database. To monitor the flow Teledyne-Isco 4200 series flow monitoring loggers are feeding the 2105c interface/controller units level, flow, and rainfall data, which is also pushed to the internet. This information is compared to sample counts to identify potential problems.

Flowlink Pro software and an SQL server are used for data storage, remote programming and for near real time access to sample counts, level, flow, rainfall and site battery voltage via the internet. Remote programming of the sample pacing is done from office and field computers to adjust to changes in the quantitative precipitation forecast. Automated data collection by the SQL server eliminates manual data downloads during site visits and saves more time.

Most existing stations had power, however at the newly required stations power was not always available. The monitoring equipment could run on battery power, but several trips to deliver the volume of ice for 11 sites would be needed. 120 watt solar panels were selected and oversized in design to allow for installations flat on the gauge house roof and to allow for a layer of polycarbonate for protection. Special refrigerators were selected that consume very little energy allowing the use of solar without concern of draining batteries.

Cellular communication and solar design means the new monitoring stations can be economically relocated because they do not require land lines.

The implementation of this technology has resulted in real savings of costs and staff resources with a greater ability to track and adjust to storms, and manage data.