

Wet Weather Operational Optimization 2014-2018 Program Plan



Real-time
Control
Sites



High Rate
Treatment
Facilities



Stormwater
Control
Measures

Watershed Operations Division

Operational Optimization 2014-2018 Program Plan Watershed Operations Division

The Operational Optimization Program was formed in 2013 to execute one of the division's critical strategies, "Use real-time data and global control algorithms to optimize performance of entire system during wet weather". The goal of this program is to implement tools that enable coordinated control of MSD wet weather assets and achieve optimized operations. These tools are needed to enable observation of the system in real-time, control operable assets in the system, and utilize algorithms that optimize available treatment and storage capacity as an integrated wastewater system.

To achieve the Program goals, four discrete capabilities are being developed and matured in parallel: Sensors, Visualization, Analytics, and Control Points.

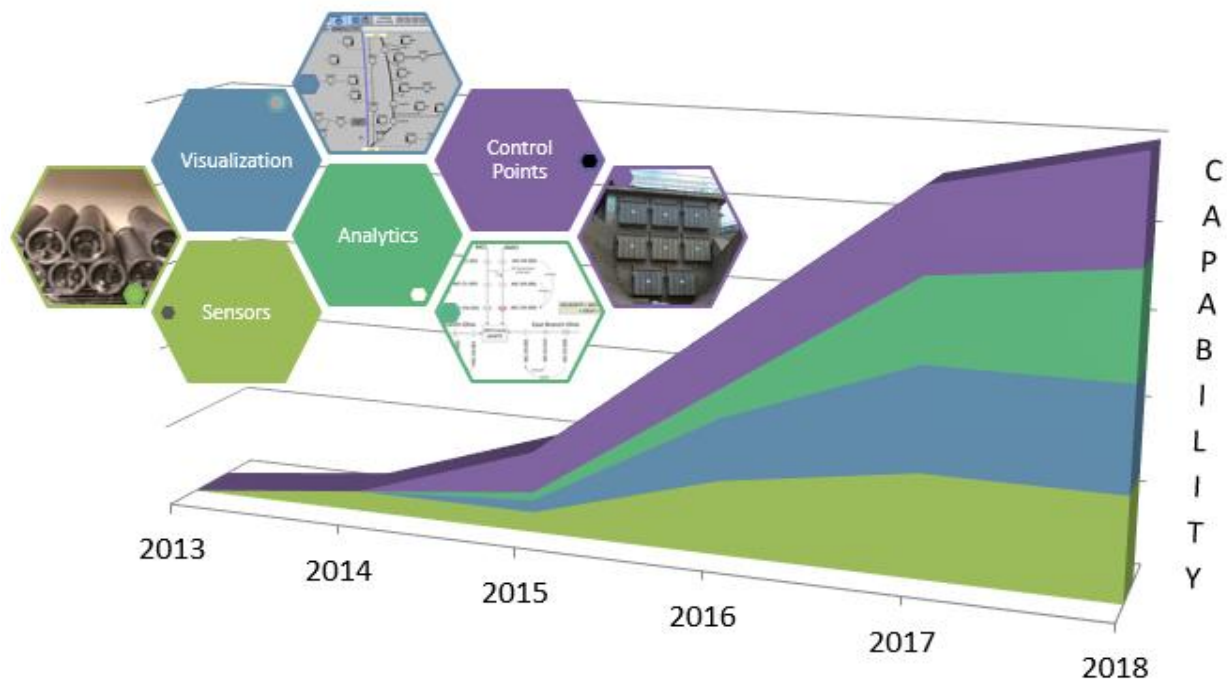


Figure 1 – Capability Layering

Sensors provide the capability to collect data from the field throughout the wastewater collection system;

Visualization provides the capability to see the field data and be notified of alarm conditions;

Analytics provide the capability to "think", or process the data received, to make sense of it and to drive operational decisions and automated actions. Analytics are the logic and algorithms that enable assets to be truly optimized, both individually and collectively and;

Control Points provide the capability to physically control flow in the collection system from the Wet Weather SCADA System, in order to hold it back or divert to treatment or storage.

In early 2015 MSD went live with the Wet Weather SCADA System. Deployment of this transformational technology is a major milestone in achieving initial capabilities in the first of the three basins, Mill Creek. In 2016 coordinated control will be achieved in the Mill Creek basin and work will expand heavily into the Little Miami and Muddy Creek Basins. By the end of 2016 all critical portions of those basins (along interceptors and trunk sewers) will be visualized in the Wet Weather SCADA System and have sensors deployed and reporting in those areas.

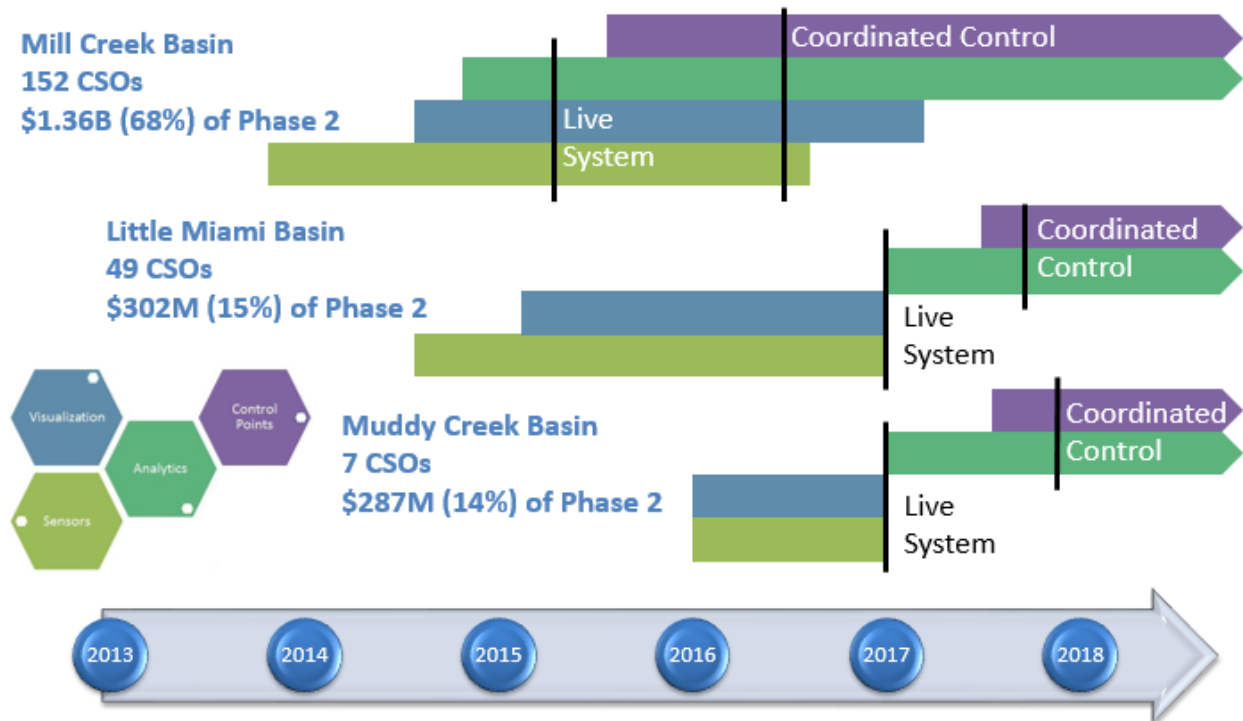


Figure 2 - 2013-2018 Capability Progression and Current Phase 2 Projects by Basin

The number, type, and placement of the sensors in both Muddy Creek and Little Miami will be determined by a team with representation from Watershed Operations, Hamilton County Monitor, and the respective basin planners. This work will be completed by the end of 2015 to ensure timely equipment installation can begin in early 2016. The following will also be completed in 2016:

- Integration of rainfall data in the Wet Weather SCADA System
- Integration of stream and river level in the Wet Weather SCADA System
- Automated overflow estimates per event
- Direct data downloads of QC'd flow monitor data to streamline use in hydraulic model
- Automated work order generation
- Improvements to river intrusion detection logic

From a budgetary perspective, program operating expenditures are elevated between 2014 and 2017 in order to accelerate the development of capabilities through these new tools. This progress is crucial to enable MSD to demonstrate viable cost effective alternatives for overflow reduction and to better inform the hydraulic model in time for the Phase 2 Wet Weather Plan negotiations.

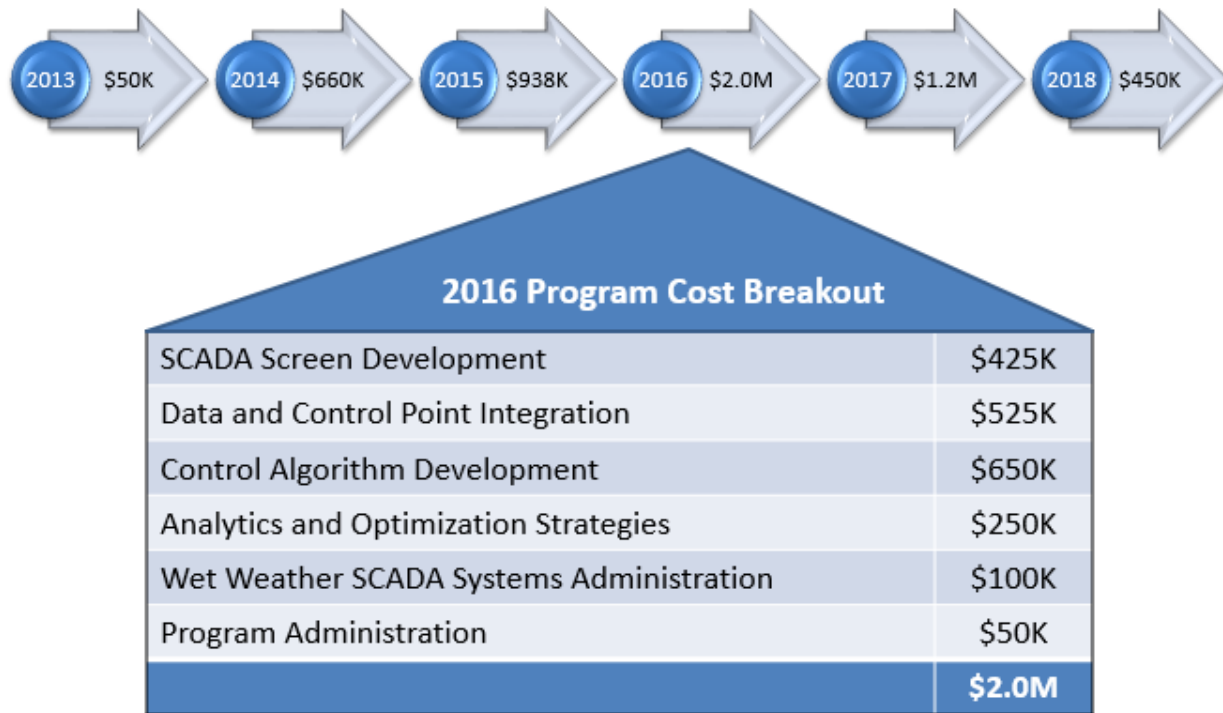


Figure 3 - 2013 – 2018 Operational Optimization Program Operating Cost

The Phase 2 projects that present the most opportunities to be impacted by new capabilities brought forth by the Wet Weather SCADA System are as follows:

- 11 High Rate Treatment Facilities, \$625M (31%)
- 19 Storage Facilities, \$267M (13%)
- 43 Separation Projects, \$104M (5%)
- 73 Regulator Improvements, \$306M (15%)

Optimization of existing assets is MSD’s best strategy for reducing wet weather overflows in the most cost effective manner. The achievement of these capabilities as laid out in Figure 2 is paramount to informing the Phase 2 project negotiations.