Grant Agreement No: 10-C0103

Project Name: Urban surface water monitoring

Contractor Name: The Regents of the University of California, Department of Plant Sciences
Task 1 - Set Up Automated Sampling Equipment

a. The initial contract called for three [3] automated sampling equipment boxes (“sites”) be erected in Folsom CA (Folsom 1, Folsom 2, and Folsom 6) and two [2] in Orange County CA (Wood Creek 1 and Salt Creek 2). This contract was amended to include the establishment of one [1]
additional site (Folsom 3), for a total of four [4] sites in Folsom and two [2] sites in Orange County, bringing the statewide total to six [6] sites. These sites are constructed for automated water sample collection and continuous water quality monitoring. Prior to the initiation of the contract, two [2] sites (Folsom 1 and 2) were previously installed and have been counted as a part of the four [4] sites required to fulfill contractual requirements. Two [2] sites in Northern California were constructed to fulfill contractual requirements, Folsom 3 and Folsom 6. In Southern California two [2] sites were to be constructed according to this agreement, although two [2] sites (SC3 and WC2) where DPR sampled were already constructed or partially constructed. Southern California sampling activities were covered by a separate agreement between CDPR and Darren Haver, Ph.D. Over the course of the agreement, sampling in Southern California took place at four [4] sites, Salt Creek 2, Salt Creek 3, Wood Creek 1 and Wood Creek 2. After the agreement was initiated, the contractor satisfied DPR’s request to move the flow monitoring equipment to another storm drain outfall at Wood Creek 2 to create Wood Creek 3. While the contractor was tasked with the establishment of a site at Wood Creek 1, construction is currently incomplete due to site constraints including the design of the storm drain outfall that complicates flow measurement. The initial design standard ("green box standard") of the sampling sites consisted of placing water quality monitoring and sampling equipment in a 3.5’ x 5’ x 4’ box near the selected outflow and mounting sensors in the pipe. All sites except Wood Creek 1 and Folsom 3 conform to the green box standard. Due to the topography, a green box at Wood Creek 1 was declined in favor of two fiberglass boxes, provided by the contractor, to hold water monitoring equipment and batteries while water quality sensors continue to be mounted in the pipe ("WC1 standard"). It was agreed that the additional site requested in the amendment (Folsom 3) would be constructed according to the WC1 Standard. This site was completed and started operation in February 2013. At the time of reporting, five [5] sites are operational while one [1] site (Wood Creek 1) remains partially completed due to complications related to pipe design. All sites except Wood Creek 1 are providing flow data.

a-a) Hach Sigma 900 automated samplers were deployed at all sites for storm sampling unless directed by DPR personnel. They are stored by the Haver Lab or Oki Lab when not in use. Prior to storm sampling, the Sigma 900 automated samplers are placed at the sites as directed by DPR. For storm sample collection, the contractor programs the Sigma 900 automated samplers according to DPR directions and protocols.

a-b) As of this report, all sites contain a Hach Sigma 950 flow meter.

a-c) All sites contain batteries recharged from a solar panel.

a-d) All sites constructed to the green box standard contain: a Sigma Electrical Conductivity probe, a pH probe, water depth, water velocity, and a rain gauge. During a meeting with DPR
Contract Manager Mike Ensminger, it was decided that dissolved oxygen sensors were not to be replaced when failure occurs and the contractors would no longer be responsible for collecting dissolved oxygen measurements once the supply of sensors is exhausted. Folsom 3, although constructed to a different standard, contains all of the aforementioned water quality sensors except for a dissolved oxygen sensor which was not included due to lack of supply. Wood Creek 1 does not contain probes due to the reasons provided in Section 1A. Probes will be installed at Wood Creek 1 when site constraints are overcome.

a-e) Modems have been installed and wireless connectivity and remote access has been enabled at all sites except Wood Creek 1. Data has been offloaded regularly at all sites except Wood Creek 1. When conditions are favorable, a wireless modem will be installed at this site.

a-f) Teflon-lined polyethylene tubing has been installed at all sites as needed to fulfill DPR requests to collect storm samples using an automated sampler.

a-h) All installations are being monitored for pests. At this point in time some green boxes have had Terro bait stations installed for ant control. The bait stations are an off-the-shelf product comprised of sodium tetraborate decahydrate (5.40%) and other ingredients (94.60%). Glyphosate was applied at some sites to maintain clear pathways and eliminate harmful weeds. An over-the-counter product, containing glyphosate (2.0%), pelargonic or other fatty acids (2.0%) and other ingredients (96%) was used.

b. Concrete footings were installed at all sites to support equipment. These were installed according to general contracting practices.

c. Automated sampling equipment has been maintained according to the manufacturer’s instructions. Initially maintained monthly, then bimonthly (twice per month) maintenance trips were made in Northern California to ensure all water monitoring equipment was working as designed. Tasks required include: recalibrating and replacing sensors, cleaning sensors and adding batteries. Annual site maintenance trips were also performed in the fall to prepare for storm sampling; maintenance trips include all the above tasks plus cleaning solar panels and rain gauges, installing new pH sensors and checking all other equipment. Specialized site maintenance was performed to enhance site operation including installing additional solar panels and higher quality cable to increase power supply reliability in adverse conditions, such as low winter light levels and summer heat.

d. No equipment has been removed from any of the sites.

Task 2 - Monitoring and Sample Collection
a. The Junior Specialist has prepared the monitoring equipment and supplies for automated and grab sampling under the direction of DPR personnel. Using sampling protocol’s furnished by Michael Ensminger, the Junior
Specialist has assembled and prepared sampling equipment boxes, calibrated YSI sensors, labeled bottles and bagged ice for sample temperature control. The Junior Specialist has programmed the Sigma 900 for automated sampling according to the DPR sampling requirements.

b. The Junior Specialist has assisted DPR sampling crews in collection of water samples as appropriate. The Junior Specialist has assisted sampling by collecting water samples (grab and automated), using a YSI handheld meter and a flow meter to generate water quality information and recorded data.

c. The Junior Specialist has provided flow data and other water quality parameters upon request by DPR and when the data is available. This has taken the form of a spreadsheet of data encompassing a five [5] day period centered on the sampling date, including flow totals broken down hourly and every quarter hour along with a graph illustrating the hourly flows over that period.

d. The Junior Specialist has not collected sediment samples at all sediment sampling trips at the request of DPR contract manager Michael Ensminger.

e. The Junior Specialist has assisted in the delivery of sediment and water samples to the DPR lab in West Sacramento through the cataloging of samples taken in the field and portioning samples taken from automated sampling equipment. The Junior Specialist has delivered sediment and water samples for testing to the UC Davis Aquatic Toxicity Lab.

Task 3 - Results, Data Summary, and Data Analysis

a. Using the Shimadzu Total Organic Carbon Analyzer, the Junior Specialist has analyzed water and sediment samples for Total Organic Carbon. The Junior Specialist has also prepared samples through drying, grinding and sieving unprocessed sediment samples. In addition to these tasks, the Junior Specialist has measured water samples for suspended-sediment concentration.

b. The Junior Specialist has entered and uploaded processed data from sampling into the DPR Surface Water’s Urban Monitoring Database. The Junior Specialist has also scanned data sheets and formatted results to interface with DPR’s reporting format.

c. The Junior Specialist has authored a Standard Operating Procedure paper and an Annual Report. The Junior Specialist has also presented a poster at the 2012 meeting of the Northern California Society of Environmental Toxicology and Chemistry on behalf of DPR. The Junior Specialist has also provided an equipment inventory when requested by DPR and a cost analysis of new construction for the forthcoming agreement.