



## **Estimating Guidance for CGP**

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## LIST OF ACRONYMS

BEES	Basic Engineering Estimating System
BMPs	Best Management Practices
CGP	Construction General Permit
CSMP	Construction Site Monitoring Program
EPA	Environmental Protection Agency
Eqn.	Equation
NOAA	National Oceanic Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
PE	Professional Engineer
PPDG	Project Planning and Design Guide
RE	Resident Engineer
REAP	Rain Event Action Plan
RL	Risk Level
RQM	Routine Quarterly Monitoring
RWQCB	Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SSP	Standard Special Provisions
SWM	Storm Water Monitoring
SWPPP	Storm Water Pollution Prevention Plan
WPC	Water Pollution Control
WPCP	Water Pollution Control Program
WQPT	Water Quality Planning Tool

**1. ESTIMATING BEES ITEMS****1.1. OVERVIEW**

The new Construction General Permit (CGP: Order No. 2009-009-DWQ, NPDES No. CAS000002) has different, often increased, requirements for stormwater sampling and reporting than the old NPDES permit. To accommodate the new CGP requirements in future highway jobs, the following guidance is offered to estimate the various stormwater pay items including several new items of work.

The CGP takes a risk-based approach based upon sediment discharge and receiving water risk. The risk level (RL) increases from RL 1 to RL 3 as the potential threat to water quality increases. Consequently, some contract items apply to all jobs and some only apply to those with the higher risk levels.

This estimating guidance applies to all projects including the small construction jobs and those under the CGP.

**1.2. CONSTRUCTION SITE MANAGEMENT (BEES ITEM: 074016)**

Examine local BEES bid history to estimate costs for Construction Site Management (SSP 07-346). Coordinate cost estimate with Construction.

**1.3. PREPARE WATER POLLUTION CONTROL PROGRAM (BEES ITEM: 074017)**

Projects with less than one (1) acre of soil disturbance will have Prepare Water Pollution Control Program (WPCP). Small construction projects, between 1 and 5 acres of soil disturbance, that qualify for an EPA Erosivity Waiver will also have a WPCP. Use Table F-6 to estimate the cost of WPCP.

**1.4. PREPARE STORM WATER POLLUTION PREVENTION PLAN (BEES ITEM: 074019)**

Use Table F-6 to estimate the cost of preparing the written document describing the implementation of the project's water pollution controls. Projects with one (1) acre or more disturbed soil area will have Prepare Storm Water Pollution Prevention Plan (SWPPP). Prepare SWPPP includes the cost to prepare the Construction Site Monitoring

Program (CSMP) that includes Sampling and Analysis Plan (SAP) and conduct visual monitoring.

Table F 6: Construction Site Water Pollution Control		
a) Total Construction Cost	Prepare SWPPP	Prepare WPCP
\$0 to \$500,000	\$2,200 + RQM	\$1,000
\$500,000 to \$1,000,000	\$2,700 + RQM	\$1,100
\$1,000,000 to \$1,500,000	\$2,800 + RQM	\$1,100
\$1,500,000 to \$12,000,000	\$3,200 + RQM	\$1,200
Greater than \$12,000,000	\$6,000 + RQM	-

*Note: Information derived from 2009 average bid costs using Caltrans Cost Database with an additional mark-up to account for qualified developers of the SWPPP.*

Routine Quarterly Non-Storm Water Monitoring (RL 1, 2, and 3): All projects required to develop a SWPPP regardless of the RL are to conduct quarterly non-storm water visual monitoring and storm-triggered visual monitoring. To develop cost estimates for routine, quarterly, non-storm water monitoring, equation 1 below should be used. The costs for storm-triggered visual monitoring is assumed to already be included in the costs for preparing a SWPPP, as this was already a Caltrans requirement prior to the development of the new CGP.

The cost of routine quarterly monitoring (RQM) for non-storm water discharges is a function of the project duration, the drainage area, and the cost per inspection, and can be estimated using Equation 1 as follows:

$$\text{RQM Cost} = (\text{Months}/3 + 1) \times (N + 4) \times \text{Labor} \quad (\text{Eqn. 1})$$

where:

**Months** = the number of months the project will be occurring, including from initial site work through the construction until soil is completely stabilized after construction. This is used to estimate the number of required quarterly inspections.

**N** = calculated number of discharge locations. It is assumed that each discharge area can be reviewed within 1 hour. An additional 4 hours is provided to account for the time required to complete reporting and follow-up.

**Labor** = estimated hourly labor rate for a qualified inspector. Assume \$100 per hour is appropriate.

## 1.5. RAIN EVENT ACTION PLAN (BEES ITEM: 074056)

All RL2 and RL3 projects are to implement a Rain Event Action Plan (REAP) in advance of a forecasted storm. The contractor evaluates site readiness as part of formulating a REAP. This contract item is non-adjustable.

The PE is to set aside \$500 for each REAP that is anticipated to be prepared by the construction contractor. To determine the number of days, use the mean number of days reported for precipitation producing greater than or equal to 0.1 inches for the duration of the project. Use climate data from a nearby representative station identified in the Water Quality Planning Tool or published by the National Climatic Data Center of the National Oceanic Atmospheric Administration at:

(<http://cdo.ncdc.noaa.gov/climatenormals/clim20/state-pdf/ca.pdf>).

Another convenient method to find climate data is using District 8s internal website at: (<http://sv08arcgis/cgp2009/>). The published National Climatic Data Center information can easily be located nearest to your project.

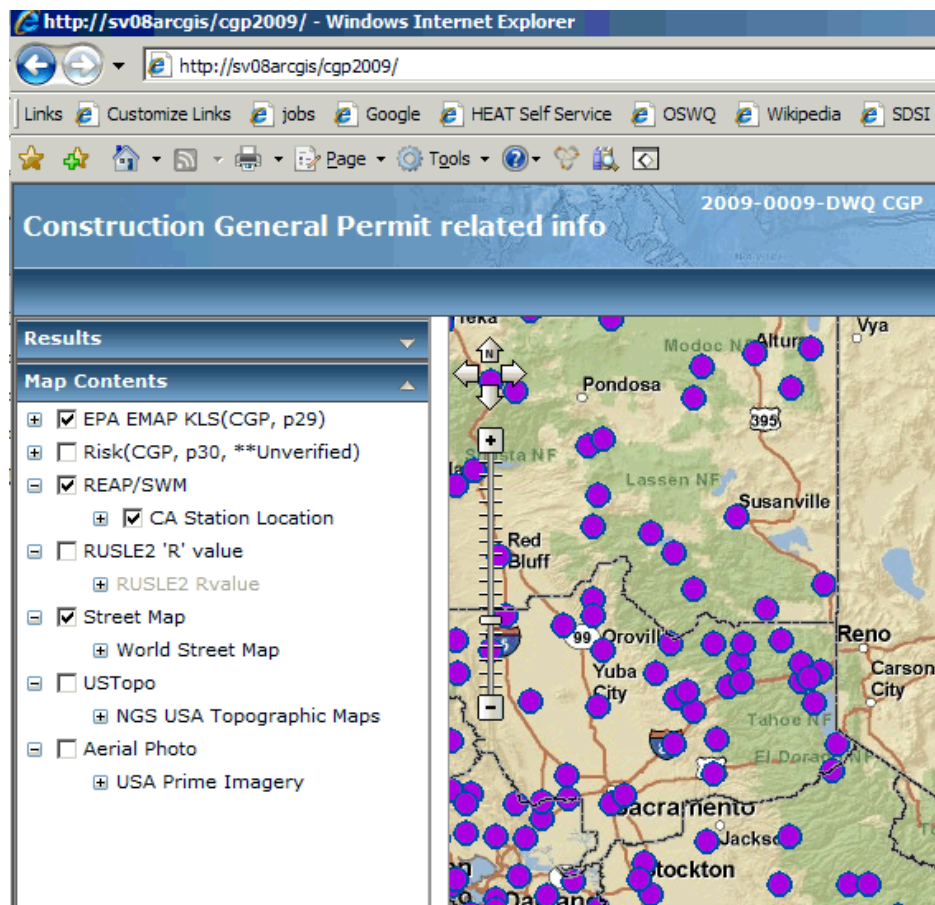


Figure 1-1 Find Climate Data Using D8s Internal Website

**1.6. STORM WATER ANNUAL REPORT (BEES ITEM: 074057)**

In order to account for the submittal of an annual report to the RWQCB regarding project compliance with the CGP, the PE should set aside \$2,000 for each year of construction. This contract item is non-adjustable.

**1.7. STORM WATER SAMPLING AND ANALYSIS DAY (BEES ITEM: 074058)**

Storm Water Sampling and Analysis (monitoring) costs have become more discernable due to new requirements of the CGP; consequently, the cost is to be associated with a unit price in the PS&E. Monitoring costs for compliance with the CGP can be estimated using the procedures and equations described below. Be sure to use only those procedures applicable to the RL of the project and the associated representative number of rain days. This contract item is non-adjustable.

The estimating procedure outlined below accounts for sampling and analysis costs based primarily on the precipitation characteristics, discharge locations, and construction duration of the project. The sections below outline the types of sampling and analysis required for different RL 2 and RL 3 projects and how to develop associated cost estimates.

Storm Water Monitoring for pH and Turbidity: Sampling and analysis of storm water runoff for pH and turbidity is required at all RL 2 and RL 3 projects. At a minimum, 3 samples must be collected per day of qualifying storm events, which are those producing precipitation of 0.5-inch or more at the time of discharge.

The cost of storm water monitoring (SWM) is a function of the precipitation frequency, construction duration, and the number of sampling locations for the project, as well as the cost per sample. The SWM cost can be estimated using Equation 2 as follows:

$$\text{SWM Cost} = M \times \{[\text{Days}_{0.5"} \times \$1000] + \$2000 (1 + 0.1 (\text{Months}/12))\} \quad (\text{Eqn. 2})$$

where:

M = cost multiplier based on the number of anticipated discharge sampling points. When M = 1, the cost estimate assumes that up to 7 locations can be sampled by one fully equipped staff per event. Sites with 8 to 14 sampling locations assumes that one additional staff-day will be required, thus M=2. For sites with 15 – 21 sampling locations M=3, and so forth.

Days<sub>0.5"</sub> = estimated total number of days over project timeline with precipitation event greater than 0.5 inches. However, it is recommended that the difference between the mean number of days for both precipitation events greater than 0.5 inches and 0.1 inches be used. Use climate data from a nearby representative station identified in the Water Quality Planning Tool or published by the National Climatic Data Center of the National Oceanic Atmospheric Administration at:

<http://cdo.ncdc.noaa.gov/climatenormals/clim20/state-pdf/ca.pdf>

Months = the number of months the project will be occurring, including from initial site work through the construction until the site is completely stabilized after construction.

\$1000 = daily cost to perform sampling and analysis, as well as reporting, using one staff at up to 7 discharge locations, excluding equipment.

\$2000 = purchase cost for field turbidimeter, pH meter, calibration solutions, rain gauge, and all ancillary sampling equipment. A maintenance and calibration estimate of 10% per year is included in the equation.

The cost storm water sampling and analysis per day can be estimated using Equation 3 as follows:

$$\text{Storm Water Sampling and Analysis Day} = \text{SWM Cost} / \text{Days}_{0.5"} \quad (\text{Eqn. 3})$$

### **1.8. RECEIVING WATER BIOASSESSMENT (RL 3) (BEES ITEM: \_\_\_\_\_)**

Bioassessment monitoring in receiving waters is required for all RL 3 projects that have 30 acres or more of disturbed area and directly discharge into receiving waters impaired for sediment or listed with beneficial uses of COLD and SPAWN and MIGRATORY.

Bioassessment monitoring is required both upstream and downstream of the impacted area, and both before and after the project. The CGP contains an estimate of \$7,500 per sample for this type of work. To account for this work, a supplemental cost of \$30,000 should be added to all RL 3 projects that disturb 30 or more acres and directly discharge into the qualifying receiving waters.

### **1.9. WATER POLLUTION CONTROL MAINTENANCE SHARING (BEES ITEM: 066595)**

The Supplemental Work item for Water Pollution Control Maintenance Sharing still exists but has been shifted to the individual separate item BMPs that allow for cost sharing.



Water Pollution Control Maintenance Sharing cost should be no lower than the amount estimated for Prepare SWPPP (or Prepare WPCP). The following may be used to estimate BMP maintenance costs based upon input from Districts where this approach was piloted. The aggregate total of estimated maintenance costs would be combined into item WPC Maintenance Sharing:

- a) Temp. Silt Fence, estimate at 10% of the separate item cost per rainy season.
- b) Temp. Fiber Roll, estimate at 10% of the separate item cost per rainy season.
- c) Temp. Erosion Control and other hydraulically applied soil stabilization BMPs, estimate at 10% of the separate item cost per rainy season.
- d) Temp. Gravel Bag Berm, estimate at 25% of the item cost per rainy season.
- e) Temp. Drainage Inlet Protection, estimate at 25% of the item cost per rainy season.
- f) Temp. Construction Entrance, estimate at 25% of the item cost per rainy season.

#### **1.10. ADDITIONAL WATER POLLUTION CONTROL (BEES ITEM: 066596)**

The Supplemental Work item for Additional Water Pollution Control will cover additional WPC BMPs suggested by the RE or Contractor. This change order work is expected to be minor for most projects. Estimate this item using the same rate as for Prepare SWPPP, less RQM for SWPPP jobs. For WPCP jobs estimate at the same rate as Prepare WPCP.

#### **1.11. STORMWATER SAMPLING AND ANALYSIS (BEES ITEM: 066597)**

The Supplemental Work item for Storm Water Sampling and Analysis covers the cost of lab tests for water quality samples. Estimate this item using the same rate as for Prepare SWPPP less RQM.

Sampling and analysis for non-visible pollutants is not often required unless previous site contamination is present, or WPC practices are failing and result in a discharge. The number of samples, sampling frequency, and analyses for this type of monitoring is unpredictable for this reason. It is recommended to account for this work as a supplemental cost due to previous site contamination in coordination with the Hazardous Waste Coordinator and District NPDES Storm Water Coordinator.

Sampling and analysis for suspended sediment concentration (SSC) is only required at RL 3 sites with previous exceedances of the daily average turbidity NEL. The additional labor cost required to conduct this sampling would be minimal since this would occur concurrently with existing sampling for pH and turbidity, therefore the primary costs would be analytical and reporting. Analytical costs are typically \$100 per sample. Since the quantity of samples is unknown, as this is a function of an exceedance of the NEL at the project site, the PE should not assign any supplemental costs for this monitoring.

Receiving water quality monitoring is required only at RL 3 sites where exceedances of the NEL have occurred and there is a direct discharge to a receiving water. Since it is unknown

whether exceedances will occur, this cost can not be predicted nor should it be accounted for as a supplemental cost.

**1.12. ALL OTHER SEPARATE ITEM BMPS**

For the variety of separate contract item BMPs the Item Cost database on the OE website will be sufficient. The items mentioned previously are not tracked so other methods must be used as tools for guidance. Also refer to PPDG, Table F-5 for individual BMP costs and Appendix C2 for estimating ATS.