



*Section 8*  
*Erosion and Sediment*  
*Control*

# EROSION AND SEDIMENT CONTROL

The clearing and stripping of land for development can cause high localized erosion rates with subsequent deposition and damage to off-site properties. Whereas erosion and sedimentation is a natural process, the intensity is increased by development which can destroy the aesthetic and practical value of other properties, streams and lakes. The purpose of implementing an erosion and sedimentation control plan is to reduce the process to an acceptable level without placing undue burdens on the homeowner, builder or community.

The California State Water Resources Control Board's National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit) regulates stormwater discharges associated with construction activities, and is issued to projects based upon certain criteria and associated risk levels. Projects that disturb one acre or more of area, or disturb less than one acre but are part of a larger common plan of development, are subject to the General Construction Permit requirements.

All projects, regardless of size, are required to submit erosion control plans as part of their grading permit approval process, which identifies temporary construction best management practices (BMPs) that reduce erosion, sediment control, illicit discharges, and other issues related to stormwater runoff during construction activities.

## **8.1 Erosion and Sedimentation Process**

Soil erosion is the process by which soil particles are removed from the land surface by wind, water or gravity. Most natural erosion occurs at slow rates; however, the rate of erosion increases when land is cleared or altered and left disturbed. The five most common types of erosion include erosion from rainfall impact, sheet erosion, rill or gully erosion, stream and channel erosion, and wind erosion.

Sedimentation is defined as the settling out of soil particles transported by water. Sedimentation occurs when the velocity of water in which soil particles are suspended is slowed sufficiently to allow particles to settle out. Larger particles, such as gravel and sand, settle more rapidly than fine particles such as silt and clay.

Effective construction site management first minimizes excessive soil erosion by keeping the soil stabilized as long as possible, and second directs runoff from remaining disturbed areas to locations where sediments are removed prior to discharge to water courses.

### **8.1.1 Factors Influencing Erosion**

There are four primary factors that influence erosion: soil characteristics,

vegetative cover, topography and climate.

*Soil characteristics* which determine the erodibility of the soil are particle size and gradation, organic content, soil structure and soil permeability. Soils with a high proportion of silt and very fine clays are generally the most erodible. Organic matter creates favorable soil structure, improving its stability and permeability. This increases infiltration capacity, delays the start of erosion and reduces the amount of runoff. Soil characteristics that affect soil stability include permeability and infiltration capacity the less permeable the soil, the higher the likelihood of erosion.

*Vegetative cover* plays an extremely important role in controlling erosion by shielding the soil surface from the impacts of falling rain, slowing the velocity of runoff, maintaining the soil's capacity to absorb water and holding soil particles in place.

*Topography*, slope length and steepness are key elements in determining the volume and velocity of runoff. As slope length and/or steepness increase, the rate of runoff increases and the potential for erosion is magnified.

*Rainfall* frequency, intensity and duration are fundamental factors in determining the amount of erosion produced. When storms are frequent, intense or of long duration, erosion risks are high. In California, the erosion risk period is typically high in the winter rainy season (October through April) except in and near the Sierra Nevada Mountains and southern deserts, where summer thunderstorms may occur.

## **8.2 Storm Water Programs**

The State construction general permit prohibits discharges which do not result from rainfall. However, certain *non-storm water* discharges are allowed if they do not cause a significant pollution problem. Table 11.1 provides examples of *non-storm water* discharges allowable under current law.

The need to protect the environment has resulted in a number of laws and subsequent regulations/programs. At times this has resulted in overlap and ambiguity between programs. This situation is true for storm water programs. The Federal Clean Water Act (CWA), as amended in 1987, is the principal vehicle for the control of storm water pollutants. There are, however, other programs that directly or indirectly deal with the control of storm water pollutants.

### **8.2.1 Federal NPDES Program**

In 1972, the Federal CWA was amended to provide that the discharge of pollutants to waters of the United States from any point source is effectively prohibited, unless the discharge is in compliance with the National Pollutant Discharge Elimination System (NPDES) permit. On November 16, 1990, U.S. Environmental Protection Agency (EPA) published final regulations that establish application requirements for storm water permits for specific categories

of industries. Construction activities of five (5) acres or more (or less than 5 acres if part of a common plan of development or sale) are defined in the regulations as an industrial activity.

### **8.2.2 State NPDES Program**

In California, the NPDES storm water permitting program is administered by the State Water Resources Control Board (SWRCB) through nine Regional Water Quality Control Boards. The SWRCB has established a construction general permit that can be applied to most construction activities in the State.

### **8.2.3 Municipal NPDES Program**

Municipalities with a population of over 100,000, drainage systems interconnected with these municipalities' systems or municipalities determined to be significant contributors of pollutants are required to obtain an NPDES storm water permit. In California, most of the major urbanized counties have already obtained an NPDES storm water permit.

Municipalities with NPDES storm water permits for their own municipal separate storm sewer system are responsible for developing a management program for construction activities in their jurisdiction. The program addresses appropriate planning and construction procedures; ensures the implementation, inspection and monitoring of construction sites which discharge storm water into their systems; and provides for education and training for construction site operators.

## **8.3 Storm Water Pollution Prevention Plans**

The following discussion provides guidelines for the development and implementation of a storm water pollution prevention plan (SWPPP) for a construction project.

Stormwater Pollution Prevention Plans shall be prepared per the current Order WQ in effect at the time of construction of the project. The current order, and instruction for preparing a Stormwater Pollution Prevention Plan, including Risk Determination and monitoring/reporting requirements can be found on the State Water Resources Control Board website at the following location: [https://www.waterboards.ca.gov/water\\_issues/programs/stormwater/construction.html](https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html).

Stormwater Pollution Prevention Plans must be prepared by a Qualified Stormwater Pollution Prevention Plan Developer (QSD), and projects are required to submit the SWPPP on the SMARTS website and apply for a Notice of Intent (NOI), in which they will receive a WDID number. This WDID number must be included on the grading plans/erosion control plans for the project.

## **8.4 City Erosion Control Plan (ECP) Requirements**

The Stormwater Pollution Prevention Plan is a state-wide requirement, however, Erosion Control Plans must be submitted to the City for review and approval as part of the grading permit application. Plans must be consistent with the City's municipal code related to Erosion and Sediment Control.

The California Stormwater Quality Association (CASQA) has developed BMP Handbooks (located here: <https://www.casqa.org/resources/bmp-handbooks>) which include BMP Factsheets for development of the erosion control plan.

The ECP must be consistent with the proposed grading plan for the project site. The ECP shall identify the construction BMPs utilized for the project site, including location, applicable CASQA reference number.

Additional resources can be found on the City's website in the Grading and Erosion Control Standards, dated June 11, 2013.