CHAPTER 890 – STORMWATER MANAGEMENT

Topic 891 – General

Index 891.1 – Introduction

The term “stormwater management” refers to the cooperative efforts of public agencies and the private sector to mitigate, abate, or reverse the adverse results, both in water quantity and water quality, associated with the altered runoff phenomena that typically accompanies urbanization. Stormwater management encompasses a number of control measures, which may be either structural or non-structural (including policy and procedural measures) in nature.

The State Water Resources Control Board (SWRCB) has the authority under the Clean Water Act and Porter-Cologne Act to issue National Pollutant Discharge Elimination System (NPDES) permits. Caltrans has a robust stormwater management program which focuses on NPDES permit compliance. This chapter will introduce the permits and provide resources to incorporate the necessary control measures in project development.

This chapter will focus primarily on the management of stormwater runoff quantity, and NPDES permit compliance. Information related to the designer’s responsibility for the management of stormwater runoff quality is contained in the Department’s Project Planning and Design Guide (PPDG).

891.2 Philosophy

When runoff impacts result from a Department project, then the cost of mitigating these impacts is a legitimate part of the project cost. Since transportation funds are increasingly limited, and because mitigation of runoff problems can be expensive, it is important to identify the causative factors and responsible parties. When runoff impacts are caused by others, avenues for assigning these costs to the responsible party should be evaluated. The local agencies responsible for land use in the area are a good place to begin this evaluation, as many of these local agencies have enacted land use regulations in an effort to control flooding. These regulations often require that developers limit changes in the volume and rate of discharge between the pre- and post-development site conditions. In addition, many local agencies must be responsive to their own stormwater permits which require that they implement programs to control the quality of stormwater discharges within their jurisdiction. When runoff impacts are caused jointly by the Department and others, it may be possible to develop cooperative agreements allowing joint impact mitigation. See Indexes 803.2 and 803.3 for further discussion on cooperative agreements and up-grading of existing highway drainage facilities.

891.3 Permits

Federal regulations for controlling discharges of pollutants from Multiple Separate Storm Sewer Systems (MS4s), construction sites, and industrial activities were incorporated into the NPDES permit process by the 1987 amendments to the Clean Water Act and by the subsequent 1990 promulgation of federal stormwater regulations issued by the U.S. EPA. The EPA regulations require municipal, construction, and industrial stormwater discharges to comply with an NPDES permit. In California, the EPA delegated its authority to issue NPDES permits to the SWRCB.

In 1970, the Porter-Cologne Water Quality Control Act took effect and created nine Regional Water Quality Control Boards (RWQCBs). While the SWRCB writes the statewide NPDES permits and has jurisdiction throughout California, the RWQCBs enforce them. The RWQCBs may also adopt region-specific permits. See Section 3.2.1 in the PPDG or the SWRCB website for a map of RWQCB jurisdiction and links to each RWQCB for a list of region-specific requirements.

The Caltrans stormwater management program has been developed to comply with the following NPDES permits:

(1) *Caltrans NPDES Statewide Stormwater Permit (Caltrans Permit)*. This is a MS4 permit to regulate stormwater and non-stormwater discharges specifically from Caltrans properties and facilities, and discharges associated with operation and maintenance of the State highway system. The Caltrans Permit applies to all work on Caltrans right-of-way by Caltrans, Local Agencies, and Encroachment Permit recipients.

The Caltrans Stormwater Management Plan describes how Caltrans plans to implement the Caltrans Permit requirements. It describes Caltrans' stormwater management program and addresses stormwater pollution control related to various activities, such as planning, design, construction, maintenance and operations of roadways and facilities, and presents key implementation responsibilities and schedules.

Under the 2022 Caltrans Permit, highway projects in the state right-of-way creating 10,000 square feet or more of New Impervious Surface (NIS), or non-highway facility projects creating 5,000 square feet or more of NIS trigger a requirement to implement post-construction treatment BMPs. The PPDG provides directions to calculate NIS, a list of approved treatment BMPs, and a checklist to select the most appropriate treatment BMPs for the project.

The Statewide Trash Provision were incorporated into the 2022 Caltrans Permit and added to the Caltrans Stormwater Management Plan. The discharge of trash to surface waters of the State is prohibited by the Statewide Trash Provisions which was included as an attachment to the 2022 Caltrans Permit. Caltrans has developed a Statewide Trash Implementation Plan to ensure compliance with the trash provisions which delineates Significant Trash Generation Areas (STGAs) within Caltrans jurisdiction. Projects with a treatment requirement, in accordance with the Caltrans

Permit, located within a STGA must install certified full-capture trash post-construction treatment BMPs where feasible. Refer to the PPDG section 1.4.2.2 for more information on trash provisions.

(2) *Construction General Permit (CGP)*. The SWRCB elected to adopt a single statewide general permit for construction activities that typically applies to stormwater discharges from sites with soil disturbance of one (1) or more acres. Projects triggering CGP coverage are required to prepare and implement a site-specific Stormwater Pollution Prevention Plan (SWPPP) to identify and manage potential sources of stormwater pollution from construction sites. The SWPPP would include water pollution control drawings showing locations of BMPs selected to best protect pollutants from discharging from the site. Refer to the PPDG Chapter 3 for BMP types and applicability. This statewide CGP applies to all of California except for projects located on Tribal Lands or within the Lake Tahoe Hydrologic Unit.

(3) *Lake Tahoe CGP*. Projects located in the Lake Tahoe Hydrologic Unit must work under the Lake Tahoe CGP issued by the Lahontan RWQCB. It typically applies to stormwater discharges from construction activities with one (1) or more acres of soil disturbance, similar to the statewide CGP, however it holds different requirements targeted for Lake Tahoe as the receiving water. Projects working under the Lake Tahoe CGP are required to prepare a site-specific SWPPP to comply with permit requirements.

(4) *U.S. EPA CGP*. Projects located on Federal Tribal Lands must work under the Federal CGP issued by the U.S. EPA. It typically applies to stormwater discharges from construction activities with one (1) or more acres of soil disturbance. The tribal entity or program may have additional stormwater specific requirements to comply with and should be coordinated with during the design phase, however most projects on tribal reservations utilize the U.S. EPA CGP. Projects working under the U.S. EPA CGP will have to prepare a site-specific SWPPP to comply with permit requirements.

(5) *Industrial General Permit (IGP)*. The IGP regulates industrial stormwater discharges and authorized non-stormwater discharges from industrial facilities in California. The IGP regulates discharges associated with 9 federally defined categories of industrial activities, such as a batch plant or crushing plants which deliver to more than one construction site. The IGP has a different set of personnel requirements and an industrial site-specific SWPPP. If needed, permit is typically obtained by the Contractor for Caltrans projects, but Caltrans has oversite and approval rights.

891.4 Design Standards

During preparation of the project plans, it is not always possible to know where a contractor will perform certain activities. To provide the contractor with flexibility, but to assure that proper controls are implemented, the Construction Contract Standards cover most jobsite stormwater measures. This ensures that stormwater measures will be implemented for certain activities regardless of where on the site those activities are performed. Standard Plan Sheets T51 through T67 provide Temporary Water Pollution Control details. Although Division I of the Standard Specifications requires contractors to comply with all permits,

Section 13 of the Standard Specifications has been established to clarify permit requirements specific to work done in Caltrans right-of-way. There are a series of special provisions to assist with common project-specific needs, such as working under an erosivity waiver, working on tribal lands or in the Lake Tahoe Hydrologic Unit, street sweeping limitations, etc. Coordinate with the District Stormwater Design and Construction Stormwater Coordinators for a list of bid items associated with the Section 13 Standard Specifications and guidance to prepare the engineers estimate.

Section 62 of the Standard Specifications provides construction requirements for many of the approved treatment Best Management Practices as discussed in Topic 892.2. Contact the Headquarters Office of Hydraulics and Stormwater Design for nonstandard specification needs.

Topic 892 – Stormwater Management Strategies

892.1 General

Quantity / Quality Relationship. Management of stormwater quality often requires the assessment of relatively small runoff producing events. As much as 80 percent of average annual rainfall is produced by storms with return periods of less than 2 years. As a result, water quality facilities are typically sized to address relatively small runoff volumes. Conversely, stormwater quantity management is typically directed at reducing the peak flow rate on storms with a 10-year or greater return period, and water quantity control facilities must be sized accordingly.

The Caltrans Permit requires that the stormwater runoff water volumes used for sizing treatment BMPs be based on the 85th percentile, 24-hour storm while full-capture trash devices are sized to treat runoff generated by the 1-year,1-hour event. See PPDG Section 5 for treatment BMP sizing calculation requirements.

In order to achieve both water quantity and quality benefits, it may be necessary to use a combination of strategies or control measures. For example, placement of a relatively small detention basin or filtration immediately upstream of a quantity attenuating detention basin can provide sediment capture, while allowing larger flows to be mitigated by the major basin. Some types of water quality control measures will need to incorporate bypass features so that the smaller, more frequent, runoff events can be treated while still allowing larger flows to be routed away from the traveled way. Refer to the Headquarters Office of Hydraulics and Stormwater Design website for treatment BMP design guidance documents to be utilized to site and size treatment BMPs.

892.2 Types of Strategies

There are various stormwater management strategies which may be used to mitigate the effects of stormwater runoff problems. They vary from very simple to very complex techniques depending upon specific site conditions and regulatory requirements which must be satisfied.

The PPDG provides both design guidance on specific water quality control measures as well as a more general discussion of how and when to incorporate water quality control measures into projects. Additional Stormwater Quality Handbooks that go into more detail on Construction Site BMPs include the *Construction Site Best Management Practice (BMP) Manual*, *Stormwater Pollution Prevention Plan (SWPPP)*, *Water Pollution Control Program (WPCP) Preparation Manual*, as well as Maintenance BMP guidance in the *Maintenance Staff Guide*. See standard plans and Section 13 of the standard specifications regarding CGP and temporary BMPs to be implemented for compliance with SWPPP and WPCP.

In addition to the measures described in the PPDG, the following measures may provide relief in dealing with the water quantity side of stormwater management.

(1) Best Management Practices (BMPs). The PPDG provides an overview of different types of BMPs and when they should be considered. BMPs can be broken into four categories: Design Pollution Prevention BMPs, Treatment BMPs, Construction Site BMPs and Maintenance BMPs, as shown in the table below. Refer to Section 3.3 in the PPDG for an overview of BMPs.

BMP	**Description**	**Responsible Division for BMP implementation**
Design Pollution Prevention (DPP) BMPs	Permanent soil stabilization and concentrated flow controls and slope protection systems, etc.	Design, Construction, and Maintenance
Treatment BMPs	Permanent treatment devices and facilities	Design, Construction, and Maintenance
Construction Site BMPs	Temporary soil stabilization and sediment control, non-stormwater management, waste management, etc.	Design and Construction
Maintenance BMPs	Litter pickup, drainage cleaning, street sweeping, etc.	Maintenance

Design guidance for specific Treatment BMPs, such as biofiltration strips/swales, detention devices, infiltration areas, media filters, etc., provide information related to design elements, calculations, cost estimates and layout details. Refer to the Office of Hydraulics and Stormwater Design website for references and resources.

(2) *Groundwater Impacts.* In some locations highly permeable underground strata may allow percolation of excess runoff into the ground. Benefits include recharge of underground aquifers and the possible reduction or elimination of conveyance systems along with pollutant removal. Special care must be exercised in areas of high groundwater to avoid potential contamination of the aquifer.

- *SGMA. The Sustainability Groundwater Management Act (SGMA)* was passed in 2014 which defines sustainable groundwater management as the “management and use of groundwater in a manner that can be maintained during the planning

and implementation horizon without causing undesirable results." Undesirable results include:

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply
- Significant and unreasonable reduction of groundwater storage
- Significant and unreasonable sea water intrusion
- Significant and unreasonable degraded water quality
- Significant and unreasonable land subsidence
- Depletion of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water

SGMA required local agencies to form groundwater sustainability agencies then develop and implement basin specific groundwater sustainability plans to avoid the undesirable results listed above and mitigate overdraft within 20 years. The Department of Water Resources provides regulatory oversight of this program, more information can be found on their website: water.ca.gov/sgma

Caltrans projects with the potential to impact groundwater basins will need to be aware of local groundwater sustainability agencies' regulations and coordinate with them to avoid contributing to undesirable results.

- *Drinking water.* If a project has the potential to impact groundwater, special care must be taken to avoid impacts to drinking water wells. Typically, local city or county health departments issue well drilling permits and maintain well logs which are publicly available. The SWRCB's Groundwater Ambient Monitoring and Assessment Program has additional resources and maintains an online database of statewide well logs from the *Well Completion Report Map Application*.
- *Injection Wells.* The Environmental Protection Agency (EPA) has additional regulations on Class V Wells, which are used to inject non-hazardous fluids underground. Injection wells pose a threat to ground water quality if not managed properly. Most Class V wells are unsophisticated shallow systems that depend on gravity to drain fluids into the ground (e.g., stormwater drainage wells, dry wells, etc.), but there are over 20 well subtypes that fall into the Class V category.

  The EPA established minimum requirements to prevent injection wells from contaminating underground sources of drinking water. EPA Region 9 has enforcement responsibility for injection wells in California. More information and permitting details can be found on the EPA Class V Wells website.
- *Waste Discharge Requirements.* The Porter Cologne Act requires a report of waste of waste discharge requirements (ROWD) with the applicable RWQCB to construct injection wells to protect groundwater from discharges. It is recommended to discuss a proposed project that could potentially impact groundwater quality with the RWQCB before submitting the ROWD.

(3) *Drainage Easements*. In areas where right of way is inexpensive it may be possible to purchase flood easements. These areas are typically used for agriculture and are subject to flooding at any time during specified times of the year. Cooperative agreements with local agencies or flood control districts will typically be necessary.

892.3 Design Considerations

The items presented below describe some of the issues to be considered prior to, and during, the design of any stormwater management facility. General issues common to most stormwater management strategies that need to be evaluated are:

- Access for maintenance must be provided, and the facility must be maintainable. Stormwater control facilities must not become regarded as wetlands themselves, which would require special permits for routine maintenance.
- Facilities should be designed to "blend in" with their surroundings to the greatest extent possible. The district landscape architecture unit should be contacted for assistance.
- The effects of the proposed facility on channel capacities and existing floodways require evaluation. Care must be taken to evaluate the effects related to the delayed release from detention facilities since an increase in downstream peak discharges may result (see Figure 892.3).
- The effects of releasing sediment free "hungry" water into channels and the potential for increased erosion rates downstream must be determined.
- Evaluate the effects of depriving downstream water users (human, aquatic or vegetative) of runoff due to retention, percolation or other diversion.
- Avoid creating vector habitat by introducing permanent pools of water unless concurrence is obtained from the local vector control agency. Typically, pools of water left longer than 96-hoiurs can provide vector habitat.

Stormwater management techniques involving on-site and off-site storage may offer the highway design engineer the more reasonable and responsive solution to problems relative to the handling of excess runoff. The cooperation of other jurisdictions is generally a prerequisite to applying these strategies and a cooperative agreement is almost always necessary. See Chapter 12 of the AASHTO Model Drainage Manual for additional design criteria for storage facilities.

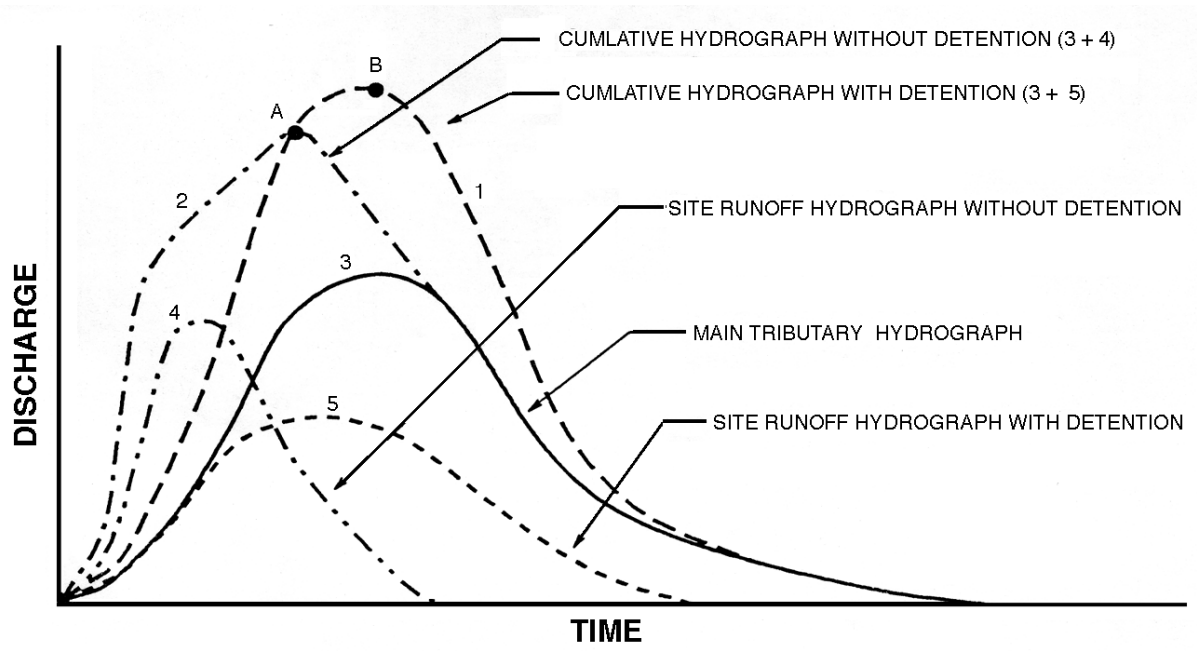
892.4 Mixing with Other Waste Streams

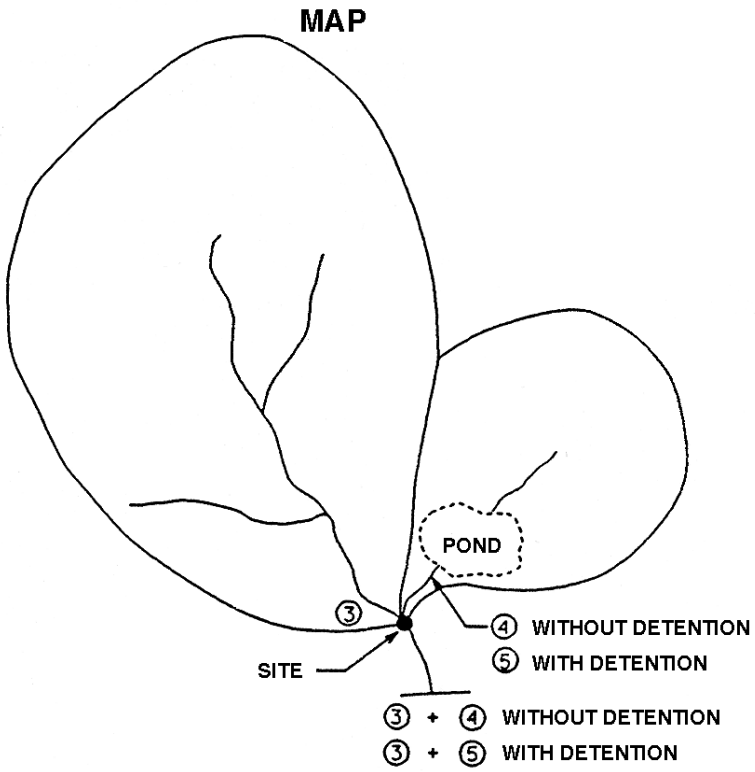
Stormwater runoff from State highways will usually be carried to a receiving body of water without being combined with wastewater. Although some combined storm and sanitary sewers do exist, their use should be avoided.

The most common areas of waste stream mixing have been at maintenance stations. These facilities may have combined stormwater and wash rack systems. Because of wash water and rinse water, maintenance stations present unique water quality problems from concentrated levels of pollutant loadings. The preferable design has a separate system for the wash rack so that it is not mixed with stormwater and rinse water. For additional advice on treatment of concentrated waste streams at maintenance stations, contact the Water/Waste Water Unit in the Division of Engineering Services – Structures Design.

Figure 892.3

Example of Cumulative Hydrograph With and Without Detention





Topic 893 – Maintenance Requirements for Stormwater Management Features

893.1 General

As mentioned previously, the ability and the commitment to maintain stormwater management facilities is necessary for their proper operation. The designer must consider the maintenance needs, and the type of maintenance that will take place, in order to provide for adequate access to and within the facility site.

Additionally, the designer should initiate both verbal and written contact with District maintenance to verify the availability of resources to provide proper maintenance and to keep them aware of potential high maintenance items that will be constructed. Initial estimates of how often sediment removal should be performed should be provided by the designer based upon estimated design loadings. Other types of maintenance, such as periodic inspections of embankments, inlet/outlet structures, debris removal, etc. should also be discussed. Due to the large capital investment required for constructing stormwater management facilities, proper maintenance cannot be overlooked.

Refer to the PPDG Section 3.3.4 for a discussion on Maintenance BMPs and the *Maintenance Staff Guide Stormwater Quality Handbook* available on the Maintenance Drainage and Stormwater website.