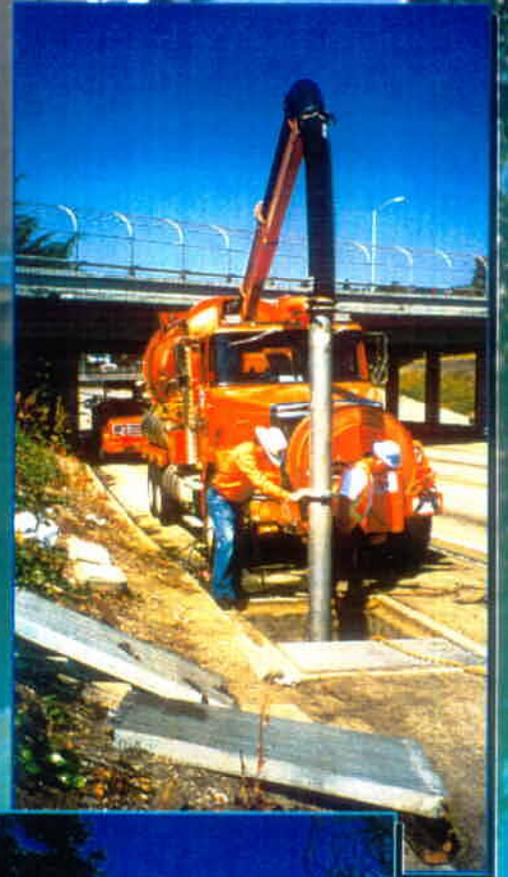




Storm Water Quality Handbook

Maintenance Staff Guide



May 2003
Revised: October 2007

CALTRANS STORM WATER QUALITY HANDBOOK MAINTENANCE STAFF GUIDE

CTSW-RT-02-057



California Department of Transportation
Division of Maintenance
1120 "N" Street
Sacramento, California 95814

May 2003
Revised: October 2007

This *Caltrans Storm Water Quality Handbook Maintenance Staff Guide* is published solely to provide information and guidance to the employees of the California Department of Transportation. It is not designed to, nor does it establish, a legal standard of care. It is subject to modifications as conditions warrant.

It is not intended that any standard of conduct or duty toward the public shall be created or imposed by the publication of this *Maintenance Staff Guide*.

The Maintenance organization is assigned the care and upkeep of State highways such that the investment in such highways will be preserved, and the maximum benefits afforded by constructed facilities will continue to be available to the traveling public.

This *Maintenance Staff Guide* is issued as a supplement to the *Maintenance Manual* to assist Maintenance personnel in complying with National Pollution Discharge Elimination System permit issued by the State Water Resources Control Board and Regional Water Quality Control Boards. It is Caltrans' goal to reduce storm water pollution to the maximum extent practicable through the implementation of Best Management Practices identified herein.

Uniform standards for all Caltrans maintenance activities may be impossible to maintain due to the resource limitations, volume and type of traffic, climatic conditions, variations in water quality objectives and other factors.

The Maintenance employee should attempt to perform each operation in the safest and most efficient manner, while maintaining good relations with the public. The employee should understand the contents of this *Maintenance Staff Guide* and be familiar with similar manuals issued by other offices or branches of Caltrans (*Construction Site Best Management Practices (BMPs) Guide*, *Storm Water Pollution Prevention Plan (SWPPP)* and *Water Pollution Control Program (WPCP) Preparation Manual and Project Planning and Design Staff Guide*).



SECTION 1 INTRODUCTION	1-1
1.1 Maintenance Staff Guide Purpose and Scope	1-1
1.2 Regulatory Background	1-1
1.2.1 Caltrans NPDES Statewide Storm Water Permit	1-3
1.2.2 Statewide Storm Water Management Plan	1-3
1.2.3 Statewide Storm Water Quality Practice Guidelines	1-4
1.3 Roles and Responsibilities	1-4
1.4 Maintenance Staff Guide Organization	1-8

SECTION 2 OBJECTIVES OF MAINTENANCE STORM WATER MANAGEMENT PROGRAM	2-1
2.1 General Objectives of the Program	2-1
2.2 Pollutants of Concern for Highway Maintenance Activities and Facilities	2-1
2.2.1 Petroleum Products	2-2
2.2.2 Sediment	2-2
2.2.3 Litter and Debris	2-2
2.2.4 Metals	2-3
2.2.5 pH	2-3
2.2.6 Nutrients	2-3
2.2.7 Pathogens	2-3
2.2.8 Pesticides	2-4
2.2.9 Other Pollutants	2-4
2.3 Incorporation of BMPs into Maintenance Programs and Activities	2-4
2.4 How to Use Activity Cut-Sheets and BMPs	2-5
2.4.1 Activity Cut-Sheets	2-5
2.4.2 General BMPs	2-6
2.4.3 Activity Cut-Sheet and General BMPs Selection Process	2-6
2.5 Feedback Process	2-7

FIGURES

Figure 1-1 Map of California with RWQCB and District Boundaries	1-2
Figure 1-2 Maintenance Management Responsibility	1-5
Figure 2-1 How to Use Activity Cut-Sheets and BMPs	2-6
Figure 2-2 BMP Questionnaire	2-8
Figure 2-3 Feedback Process	2-9

APPENDICES

Appendix A Acronyms and Definition of Terms	
Appendix B Activity Cut-Sheets	
Appendix C Maintenance BMPs	



SECTION 1

INTRODUCTION

1.1 MAINTENANCE STAFF GUIDE PURPOSE AND SCOPE

The California Department of Transportation (Caltrans) - Division of Maintenance (Maintenance) developed the Storm Water Quality Handbook – Maintenance Staff Guide (Staff Guide) as an employee handbook for the protection of water resources. The Staff Guide provides detailed instructions on applying the approved Maintenance storm water best management practices (BMPs) to Maintenance facility operations and highway activities.

For each Maintenance operation or activity, multiple approved Maintenance BMPs may be applicable. Because it may be impracticable to review all the potentially applicable BMPs for each operation or activity, Activity Cut-Sheets were developed in a user-friendly format for common Maintenance facility operations and highway activities that have a high potential to affect storm water quality. Each Activity Cut-Sheet summarizes the approved Maintenance BMPs that may be applied to the operation or activity. It is not the intent of the Staff Guide to provide Activity Cut-Sheets covering all the Maintenance operations and activities.

The intent of the Staff Guide is to aid the user in understanding and applying the approved Maintenance BMPs. The user has the option of using the Activity Cut-Sheets in the Staff Guide (Appendix B) or using only the approved Maintenance BMPs (Appendix C). The Staff Guide is an employee handbook and does not replace or supersede the approved Maintenance BMPs.

1.2 REGULATORY BACKGROUND

Federal regulations for controlling discharges of pollutants from municipal separate storm sewer systems (MS4s), construction sites, and industrial activities were incorporated into the National Pollutant Discharge Elimination System (NPDES) permit process by the 1987 amendments to the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) and the federal storm water regulations issued by the U.S. Environmental Protection Agency (EPA) in 1990.

In California, the EPA delegated the NPDES permitting authority to the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs). Figure 1-1 depicts how the Caltrans district boundaries and RWQCB boundaries overlap.

Under federal regulations, aspects of Caltrans' facilities and highway systems are under the jurisdiction of NPDES storm water regulations for two primary reasons:

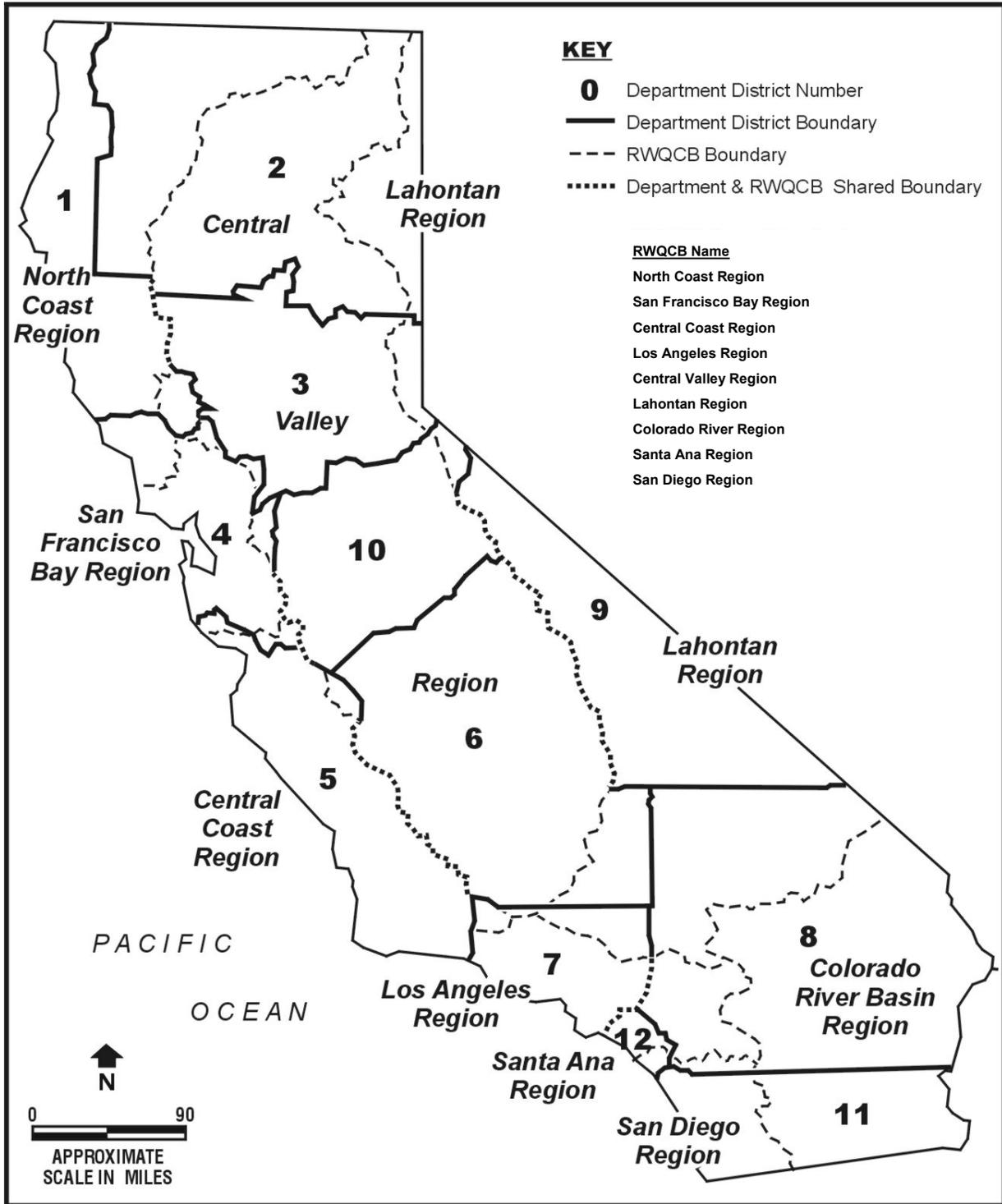


Figure 1-1
Map of California with RWQCB and District Boundaries

1. Highways and related facilities are served by extensive storm water drainage systems that in urban areas are often connected to, and are considered to be comparable to, municipal storm drain systems, which are covered explicitly in the regulations.
2. Construction of highways and related facilities often results in soil disturbance for which specific requirements are contained in the federal regulations and the State's General Permit for Storm Water Discharges Associated with Construction Activity.

1.2.1 Caltrans NPDES Statewide Storm Water Permit

To achieve a consistent approach to compliance with the storm water regulations, Caltrans determined that a statewide permit would be the most effective means to address its activities in all Districts. To comply with the storm water regulations, Caltrans implemented a program to reduce the discharge of pollutants to storm water drainage systems that serve highways and highway-related properties, facilities and activities. This program is described in Caltrans' Statewide Storm Water Management Plan (SWMP) and other guidance documents.

The SWRCB issued an NPDES Statewide Storm Water Permit (Permit) to Caltrans in 1999 (Order No. 99-06-DWQ [NPDES No. CAS000003]) to regulate storm water discharges from Caltrans facilities. The Permit regulates storm water discharges from Caltrans' rights-of-way both during and after construction, as well as from existing facilities and operations. The Permit also gave the RWQCBs the option to specify additional requirements considered necessary to meet water quality standards. A copy of the Permit can be downloaded from the Caltrans Storm Water Management Program web site (<http://www.dot.ca.gov/hq/env/stormwater/special/index.htm>) or requested from the Headquarters Maintenance Storm Water Coordinator.

The Permit requires Caltrans to implement a year-round program in all parts of the State to effectively control storm water and non-storm water discharges.

Discharges from Caltrans' rights-of-way that are not composed entirely of storm water are prohibited. The permit language states that "Any discharge from Caltrans right-of-way or Caltrans properties, facilities, and activities within those rights-of-way that is not composed entirely of 'storm water' to waters of the United States is prohibited unless authorized pursuant to...this NPDES Permit (Permit, General Discharge Prohibitions, A.1)." To meet this requirement, Caltrans developed a series of BMPs to minimize pollutants in the storm water to the maximum extent practicable (MEP).

1.2.2 Statewide Storm Water Management Plan

The Permit directs Caltrans to implement and maintain an effective SWMP. The SWMP is the Caltrans policy document that describes how Caltrans conducts its storm water management activities (i.e., procedures and practices), provides descriptions of each of the major management program elements, discusses the processes used to evaluate and



select appropriate BMPs and presents key implementation responsibilities and schedules. The Maintenance Storm Water Management Program is a component of the SWMP that describes:

- The program to implement Maintenance BMPs (Category IA) as part of the ongoing maintenance activities for existing highways and highway-related properties, facilities and activities.
- The activities to manage potential storm water pollution from accidental spills, illicit connections, illegal discharges and illegal dumping within the Caltrans rights-of-way.
- Implementation of BMPs to reduce the potential for storm water pollution at Maintenance facilities by minimizing contact between storm water and various materials and substances used and stored at Maintenance facilities (Caltrans Statewide SWMP, Section 5.0).

However, the SWMP does not provide the details to implement the Maintenance BMPs. The details are provided in the Statewide Storm Water Quality Practice Guidelines (Guidelines).

1.2.3 Statewide Storm Water Quality Practice Guidelines

The Guidelines describe each approved BMP listed in the SWMP for statewide application and include the approved Maintenance, Division of Design, Division of Construction and the Treatment BMPs. The Guidelines provide Caltrans personnel with details on implementation expectations on each approved BMP. The approved BMPs are subsequently incorporated into various specifications, policy manuals, training materials and employee handbooks including the Staff Guide. The approved Maintenance BMPs are provided in Appendix C.

1.3 ROLES AND RESPONSIBILITIES

The Headquarters Division of Environmental Analysis coordinates implementation of the SWMP through two lines of authority, traditional line management and functional line management. Traditional line management consists of 12 District Directors and the functional Division Chiefs within each District (i.e., Maintenance, Planning, etc.). Functional line management consists of the Director, the Deputy Directors and the Headquarters' Division Chiefs (i.e., Maintenance, Environmental, etc.) and their functional counterparts in the Districts (e.g., functional Division Chiefs). The management responsibilities for the Maintenance storm water program is presented in Figure 1-2.

The Headquarters Division of Maintenance, in consultation and coordination with the Headquarters Division of Environmental Analysis, is responsible for:



- Managing the Maintenance Storm Water Management Program as presented in the Statewide SWMP;
- Developing and maintaining guidance documents, such as the Caltrans Maintenance Manual and this Staff Guide;
- Providing general guidance on the implementation of BMPs;
- Monitoring the Maintenance Storm Water Management Program in the Districts to ensure the BMPs are adequately implemented; and
- Evaluating the Districts’ implementation of BMPs in managing storm water discharges associated with the maintenance of the Caltrans facilities, highways, highway-related properties and assisting in the preparation of the Caltrans Annual Report to the SWRCB, as it relates to Maintenance activities.

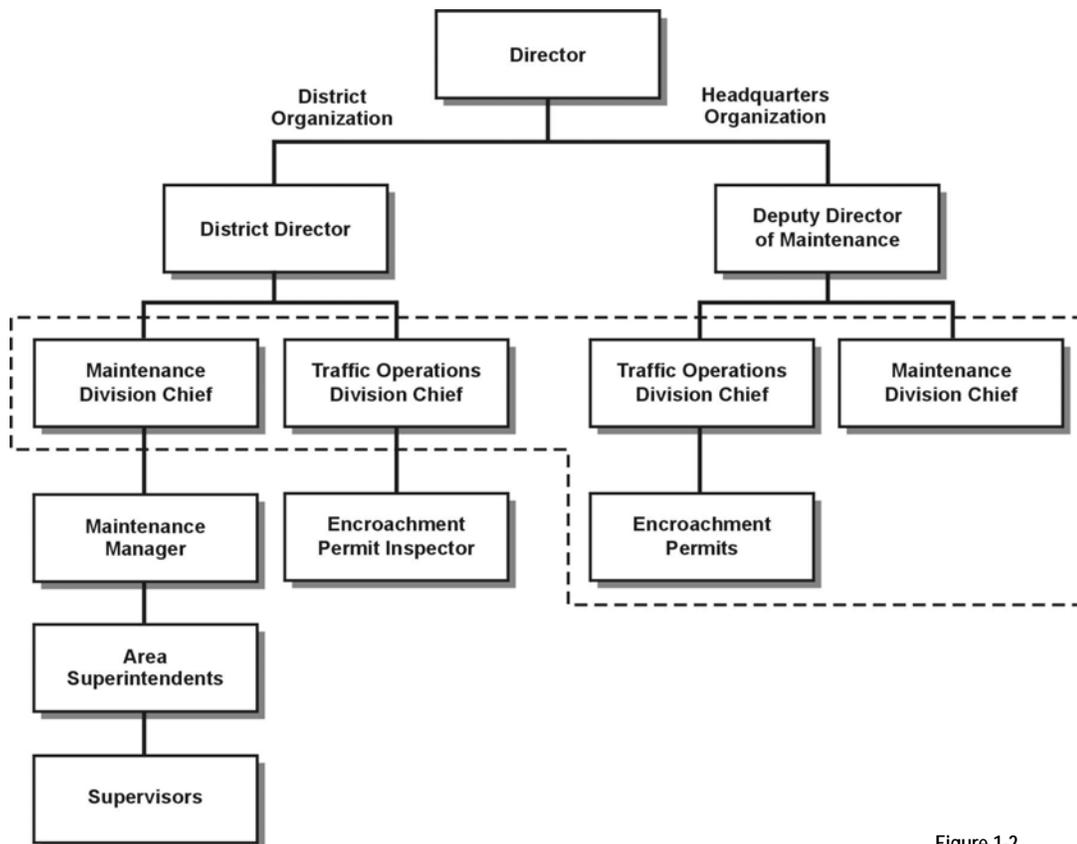


Figure 1-2
Maintenance Management Responsibility

The Headquarters **Maintenance Division Chief** is responsible for statewide implementation policies and procedures, the personnel and equipment of the Division of Maintenance. This includes ensuring compliance with all elements of the Statewide SWMP required by the Division of Maintenance.

The **Headquarters Maintenance Storm Water Coordinator** is the liaison with Headquarters Division of Environmental Analysis. The coordinator provides guidance to District NPDES (or District Maintenance Storm Water) Coordinators regarding water quality issues. The coordinator is responsible for overseeing development of storm water guidance documents used by Maintenance.

The Districts are responsible for implementing the SWMP within the District and complying with the Permit and any RWQCB-specific requirements.

- The **Maintenance District Division Chiefs** are responsible for the implementation of the policies, procedures, personnel and equipment of the District Maintenance Stormwater Management Program within their respective Districts. This includes ensuring compliance with all elements of the SWMP required to be implemented by the District Maintenance Divisions.
- The District **Maintenance Managers** direct maintenance activities within regions or programs of a District. Each region is subdivided into Maintenance Areas. The Maintenance Manager provides direct supervision to the Maintenance Superintendent within each region or program.
- The District **Maintenance Superintendents** direct maintenance activities within Maintenance Areas with a region and provide direction to Maintenance Supervisors. Maintenance Areas contain multiple maintenance facilities. The Superintendents are responsible for ensuring that maintenance BMPs are implemented in their jurisdictions.
- The District **Maintenance Supervisors** are responsible for direct supervision of a maintenance crew. Supervisors provide on-the-job training for specific crew assignments, including compliance with water quality protection requirements. Supervisors have on-site responsibility for BMP implementation.
- The **District NPDES Storm Water Coordinators** serve as liaison with the Water Quality Program. Liaison activities include conducting meetings related to storm water management issues with the coordinators from each functional unit and with other MS4 permittees to resolve problems and concerns. Liaison activities also include regular communications with representatives of the RWQCB. The functional unit coordinators will assist the District Divisions in implementing the Division's storm water management activities.
- The **District Maintenance Storm Water Coordinators** (also referred to as District Maintenance Storm Water Managers) are established in each District. Districts have designated Storm Water Coordinators, in other functional units such as, Environmental, Construction and Design. District Maintenance Storm Water Coordinator responsibilities include:

- Serving as the point of contact for regulatory inquiries regarding implementation of the Maintenance Storm Water Management Program;
 - Reviewing proposed storm water compliance programs for elements related to Maintenance activities;
 - Monitoring and evaluating BMPs implementation and effectiveness as related to Maintenance activities;
 - Participating in meetings related to storm water management issues with storm water coordinators from other functional units in the District to resolve problems, concerns and areas that need attention;
 - Coordinating with Headquarters Division of Maintenance to arrange training of District Maintenance personnel in storm water quality management; and
 - Compiling and preparing materials for the Maintenance portion of the Department's Statewide SWMP Annual Report to the SWRCB.
- The **District Hazardous Material Coordinators** (also referred to as a District Hazardous Material Managers) coordinate response to spills of hazardous substances on Caltrans rights-of-way and coordinates management of Caltrans-generated hazardous waste. The coordinator is usually responsible for providing training information associated with hazardous materials and may be responsible to assist in implementing storm water quality protection practices in the District.
 - The **District Landscape Specialists** provide guidance regarding use of pesticides and chemical control of vegetation in field maintenance operations. The Landscape Specialist is responsible for ensuring that all chemicals used in the District are approved by the responsible regulatory agencies.
 - The **Leadworkers** conduct tailgate meetings (in absence of the Maintenance Supervisor) to review environmental concerns, BMPs and ensures that appropriate procedures are implemented during maintenance activities.
 - The **Maintenance Workers/Landscape Workers/Equipment Operators** are responsible for implementing BMPs while conducting maintenance activities.
 - The **District Equipment Managers** ensures that vehicle inspections include checks for leaks on District Maintenance vehicles.
 - The **Equipment Shop Superintendents** are the front line manager who directs vehicle servicing and repair activities within an equipment shop or service region.
 - The **Mechanics** (Resident/Traveling) are responsible for implementing BMPs while conducting vehicle servicing and repair activities.

1.4 MAINTENANCE STAFF GUIDE ORGANIZATION

The Staff Guide is organized as follows:

Section 1 - Introduction. This section identifies the purpose and scope of the Staff Guide, provides the regulatory background to storm water protection and the roles and responsibilities of the Maintenance staff.

Section 2 – Objectives. This section provides the objectives of the Maintenance Storm Water Management Program, the pollutants of concern for Maintenance facilities and highway activities, how the BMPs are incorporated into the Maintenance program and the program evaluation.

Appendix A - Acronyms and Definition of Terms.

Appendix B - Activity Cut-Sheets. This appendix contains Maintenance activities organized as Maintenance Family activities for facility operations and highway activities. The BMPs are summarized for common Family activities that have the potential to affect water quality.

Appendix C - Maintenance BMPs. This appendix contains the detailed Maintenance BMPs that were developed in the Caltrans Statewide Storm Water Quality Practice Guidelines to be used for Maintenance facility operations and highway activities.

SECTION 2

**OBJECTIVES OF MAINTENANCE
STORM WATER MANAGEMENT
PROGRAM**

2.1 GENERAL OBJECTIVES OF THE PROGRAM

The Caltrans Maintenance Manual provides direction, guidance, policies and procedures for all the maintenance activities performed by Maintenance personnel. To ensure that maintenance activities are conducted in a manner that prevents or controls the pollutants discharged to surface waters, Caltrans Maintenance Manual Volume 1 established a Maintenance Storm Water Management Program providing this overall program objective.

A key component to meeting the Maintenance Storm Water Management Program objective is the development of the Staff Guide. The Staff Guide is a Maintenance employee handbook that incorporates the approved Maintenance BMPs presented in the Statewide SWMP and Guidelines. Reviewing all the potentially applicable Maintenance BMPs may not be practicable for each Maintenance activity and facility operation. By associating the BMPs to the Maintenance activities defined in the Caltrans Maintenance Manual, the Staff Guide focuses on providing detailed instructions on how to apply the BMPs to maintenance activities. The Staff Guide is organized to include the:

- Objectives of the Maintenance storm water program,
- Pollutants of concern at Maintenance facilities and activities,
- Incorporation of storm water controls into Maintenance operations and activities,
- [Storm Water] Program evaluation, and
- Detailed Activity Cut-Sheets, and
- Maintenance BMPs.

The Permit and the Statewide SWMP require the use of BMPs to control potential pollutants that could be discharged to storm water drainage systems. Maintenance field personnel perform a key role in this program. They observe and correct situations that could cause water pollution. In addition, they conduct highway activities such as road and bridge repair and vegetation management, using BMPs described in this Staff Guide. Other BMPs described herein are intended for use at Maintenance facilities. The BMPs described in this Staff Guide have been selected to focus on those storm water-related pollutants of concern most likely to come from Maintenance facility operations and highway activities.

2.2 POLLUTANTS OF CONCERN FOR HIGHWAY MAINTENANCE ACTIVITIES AND FACILITIES

Maintenance activities are organized into several Families (Families A to T) consistent with the Department's methods used to record, report and monitor maintenance work as it is planned and performed. Within each Family, there are numerous specific activities, each of which may contribute pollutants via the storm water drainage system. Selecting the appropriate BMP(s) requires an understanding of the types of pollutants that the BMP is designed to remove.

“Pollutants of concern” include a broad range of materials that could result in adverse effects if discharged to receiving waters. Caltrans’ maintenance activities involve the use of a wide variety of products. Under normal, intended conditions of use, these materials are generally not considered “pollutants of concern.” However, if these products are used, stored, spilled or disposed of in a way that may cause them to contact storm water, they may become a concern for water quality. The typical pollutants generated by Caltrans’ Maintenance facility operations and during highway activities are described below.

2.2.1 Petroleum Products

Petroleum products (e.g., gasoline, diesel fuel, motor oil and other lubricants) are common pollutants deposited on the highways and Caltrans’ rights-of-way. Some fuels and lubricants contain additives, which may themselves be toxic to humans and aquatic life.

Potential sources of petroleum products from Caltrans’ activities include leaks from vehicles and machinery and maintenance activities such as fueling, changing oil and washing. Although petroleum products are commonly used on a daily basis, it is important to be careful about how they are used and disposed.

2.2.2 Sediment

In general, sediment is considered a pollutant when it significantly exceeds natural concentrations. Sometimes other potential pollutants (e.g., lead) may become attached to sediments and are transported with the sediments to receiving waters, increasing the potential for water quality impacts.

Possible sources of sediment in runoff from Maintenance facilities and highway maintenance activities include the tracking, transport and storage of loose bulk materials (e.g., sand or other aggregate), grading-related activities and soil erosion.

2.2.3 Litter and Debris

Litter in storm water is defined as manufactured objects and includes items such as paper, aluminum cans, styrofoam cups and other items commonly discarded which can be transported by wind and storm water into the storm drainage system. This definition does not include materials of natural origin such as gravel or vegetation. Litter is quantified by 24-hour air-dried volume and weight measurements.

Litter in surface waters can inhibit the growth of aquatic vegetation, harm aquatic organisms by ingestion or entanglement, convey other pollutants, such as toxic substances and cause aesthetic problems on shorelines. In addition to impacting water quality, these items may obstruct the storm water drainage system.

2.2.4 Metals

The term “metals,” as used here, refers to dissolved and suspended metals. Metals found in highway storm water runoff are considered pollutants because above a certain threshold even low concentrations of these materials may harm aquatic life.

These metals come from various sources and activities, including fuel combustion, brake pad wear (copper), tire wear (cadmium and zinc), metal corrosion, pressure-treated wood and creosote posts used for guard rails (arsenic), paints, herbicides and other materials.

2.2.5 pH

The pH of a water sample is a measure of its acidity or alkalinity. Water that is acidic or alkaline potentially causes harm to aquatic organisms or consumers of the water, and may even result in damage to equipment and materials.

Some Caltrans’ maintenance activities that may change the pH of runoff include the storage of cracked batteries resulting in leaking battery acid, tube and tunnel washing and management of concrete wastes.

2.2.6 Nutrients

A nutrient is any substance assimilated by living things that promote growth. The term is generally applied to nitrogen and phosphorus in wastewater, but is also applied to other essential trace elements.

Excessive nutrients, such as phosphorus and nitrogen, to receiving waters can over-stimulate the growth of aquatic plants causing abnormal algal blooms which contribute to low dissolved oxygen levels and can result in fish kills. Nutrients generally have more adverse effects in water bodies with slow flushing rates, such as slow-moving streams and lakes. Also, nutrients attached to suspended solids in storm water runoff can cause problems where they settle out downstream.

Some of the possible sources of nitrogen and phosphorous from Caltrans’ maintenance activities and facilities include storage of fertilizers, decaying plant materials from tree trimming, vegetation management surfactants and emulsifiers and natural sources such as the mineralized organic matter in soils.

2.2.7 Pathogens

Pathogenic microorganisms, including viruses, bacteria, protozoa and helminth worms, are of concern in storm water runoff. The direct measurement of specific pathogens in water is extremely difficult. For that reason, the coliform group of organisms is commonly used as an indicator of the potential presence of pathogens of fecal origin. Sources of total and fecal coliforms in storm water runoff are ubiquitous (e.g., soil microorganisms, wild and domestic

animal droppings, etc.). Human sources could include illicit sewer connections, seepage from septic tanks and spillage from portable toilets.

2.2.8 Pesticides

A pesticide is a chemical agent designed to control pest organisms. The most common forms of pesticides are organic chemicals designed to target insects (insecticides) or vascular plants (herbicides). Pesticides have been repeatedly detected in surface waters and precipitation in the United States. Water is one of the primary media in which pesticides are transported from targeted applications to other parts of the environment. As the use of pesticides has increased, concerns about the potential adverse effects of pesticides on the environment and human health have also increased. Pesticides and herbicides are used in Caltrans' chemical weed control and integrated pest management activities.

2.2.9 Other Pollutants

Other pollutants originating from Caltrans' maintenance facilities and activities include asphalt, detergents and epoxy resins.

A common product used extensively in Caltrans' maintenance activities is asphalt (especially cold mix), which, while not a pollutant under normal conditions of use, could potentially contribute pollutants to surface waters if mishandled or disposed of improperly.

Synthetic detergents and their additives also contain a variety of chemicals that are potentially harmful in the environment. Some of these additives, such as bleaches, dyes, fragrances and enzymes, are toxic to aquatic life. Detergents are commonly used in cleaning and washing activities as part of routine maintenance of vehicles and equipment.

Some bonding, adhesive materials and protective coatings contain epoxy resins. Caltrans' maintenance activities that use epoxy resins include repairs of cracks, joints, bridges, barriers and irrigation lines. Some of the constituents of epoxy products may be toxic to aquatic life and some are potentially carcinogenic (cancer-causing) to humans.

2.3 INCORPORATION OF BMPS INTO MAINTENANCE PROGRAMS AND ACTIVITIES

As described above, the potential pollutants of concern for Caltrans' Maintenance operations and activities include petroleum products, sediment, litter and debris, metals, pH, nutrients, pathogens, pesticides and other pollutants. Many of these potential pollutants can be prevented from being discharged via the storm water drainage system. This can be achieved by selecting and implementing appropriate BMPs.

Caltrans established BMP categories in the Statewide SWMP. The categories include:

1. Maintenance BMPs (Category IA),
2. Design Pollution Prevention BMPs (Category IB),
3. Construction Site BMPs (Category II), and
4. Treatment BMPs (Category III).

Within each category, the BMPs are grouped as either:

- **Approved:** These BMPs have been approved for statewide implementation by Caltrans.
- **Further Research Needed:** Statewide implementation of these BMPs is deferred until further research is completed.
- **Rejected:** These BMPs have been evaluated and rejected.

This Staff Guide applies the approved Maintenance BMPs (Category IA) to the Maintenance facility operations and highway activities that may affect storm water quality.

Caltrans developed a wide range of Maintenance BMPs that are suitable for implementation by Maintenance personnel throughout the State. They are provided in Appendix C of the Staff Guide for easy referencing.

2.4 HOW TO USE ACTIVITY CUT-SHEETS AND GENERAL BMPS

The following section provides information on how to use the Activity Cut-Sheets and General BMPs.

2.4.1 Activity Cut-Sheets

Typically, several BMPs are potentially applicable to a maintenance activity. Prior to implementing a maintenance activity, the Supervisor and work crew should review each BMP identified for the activity. However, review of each BMP as presented in Appendix C may not be practicable for every maintenance activity. To simplify the review process, BMPs were summarized in the Activity Cut-Sheets for common maintenance activities. The objective of the Activity Cut-Sheet is to provide a straightforward working-level approach to implement pollution control measures. The Activity Cut-Sheets are presented in Appendix B.

The Activity Cut-Sheets presented in the Staff Guide consist of common highway activities implemented by Maintenance with a potential to affect water quality. They do not represent a comprehensive inventory of activities encountered by Maintenance. For the Maintenance activities that are not represented by an Activity Cut-Sheet, the BMPs provided in Appendix C should be selected for an activity and reviewed for application.

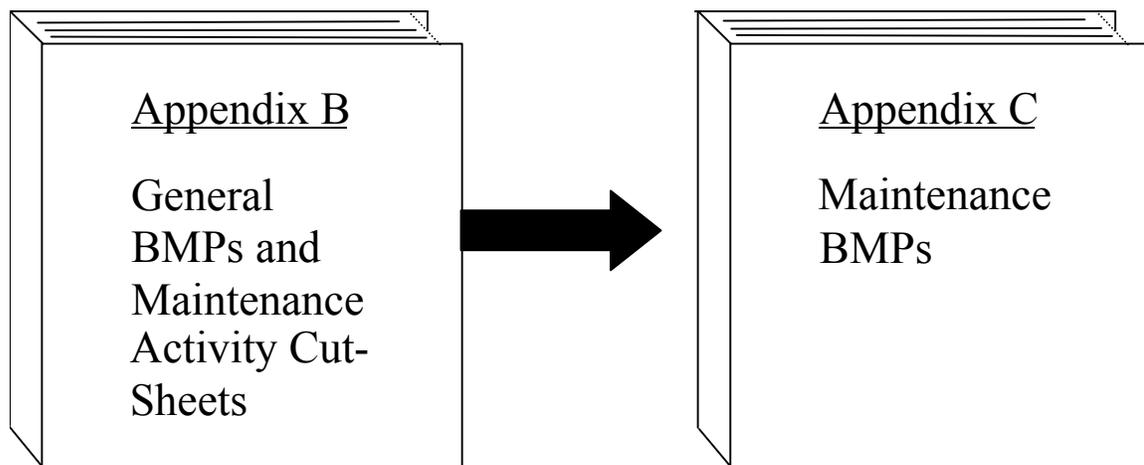
2.4.2 General BMPs

In addition to Activity Cut-Sheets, General BMPs were assembled. There are several Maintenance BMPs that are commonly applied to all Caltrans' maintenance activities. These have been termed General BMPs in the Staff Guide. To minimize the redundant presentation of these more common BMPs in the Activity Cut-Sheets, the General BMPs are applied to all the maintenance activities and should be reviewed with the Activity Cut-Sheets. The General BMPs include Scheduling and Planning; Spill Prevention and Control; Sanitary/Septic Waste Management; Material Use; Safer Alternative Products; Vehicle/Equipment Cleaning, Fueling, and Maintenance; Illicit Connections Detection, Reporting and Removal; Illegal Spill Discharge Control and Maintenance Facility Housekeeping Practices (Appendix B).

2.4.3 Activity Cut-Sheet and General BMPs Selection Process

This section describes the process for selecting the Activity Cut-Sheet. Figure 2-1 illustrates the selection of the Activity Cut-Sheets for review with General BMPs and the review of the Maintenance BMPs if additional information is needed.

For example, a work crew is scheduled to conduct asphalt paving. The Maintenance Supervisor (or Leadworker) would select the General BMPs and the "A Family - Flexible Pavement/Asphalt Paving" Activity Cut-Sheet for review with the work crew (Appendix B).



**Figure 2-1
How to Use Activity
Cut-Sheets and BMPs**

If more information or detail is needed beyond the General BMPs and the specific Activity Cut-Sheet, the Supervisor can select and review the individual Maintenance BMPs for an activity or operation provided in Appendix C.

Maintenance BMPs that may be applicable for the operation or activity are shown on a table specified for the operation or activity (Appendix C). Based on the information provided on the table, the individual Maintenance BMPs for an activity or operation are selected and reviewed for applicability. The tables are provided in Appendix C and are designed to provide a quick reference to the user. Tables C-1 to C-60 are organized by Maintenance Activities. Each Maintenance BMP identified on any table, identifies the location of the Maintenance BMP in the appendix.

2.5 FEEDBACK PROCESS

Evaluation and implementation of BMPs by field personnel is key to the process of continually improving the Maintenance Storm Water Management Program. As part of implementing the Statewide SWMP, Caltrans regularly reviews its activities, inspects its facilities, oversees and guides its personnel and conducts focused studies to refine, enhance and improve BMPs. Information obtained will support responsible management of the limited resources available to implement the BMPs and control pollutants from entering storm water drainage systems to the MEP. This monitoring and evaluation program serves as a quality control mechanism to help assess the effectiveness of the implementation of activities as required by the Statewide SWMP. The program evaluation will be an iterative process - a continuous loop of gathering information about implementation, evaluating and learning from the information that is collected and providing feedback that will result in continuous improvement. Field personnel are encouraged to complete the BMP Questionnaire (Figure 2-2).

Field personnel can submit the questionnaire to their Maintenance Supervisor, who will then forward it to the Maintenance Superintendent. The Maintenance Superintendent will submit the questionnaire to the Maintenance Manager for review. The Maintenance Manager will forward it to the District Maintenance Storm Water Coordinator who will compile questionnaires and forward them to the Headquarters Maintenance Storm Water Coordinator. The Headquarters Maintenance Storm Water Coordinator will review the questionnaires and identify BMPs requiring modification (Figure 2-3).

Maintenance Activity Questionnaire

Activity:

Date:

County:

District:

Route:

Name:

Post Mile:

Title:

Maintenance Facility:

Can any of the BMP procedures being implemented be improved? Please describe new or improved BMP procedures. (Attach additional comments as necessary.)

If the BMP is not being implemented as described in the Maintenance Staff Guide, what is the cause:

- Safety Concern Lack of Training

Describe:

- Operational

Describe:

- Equipment or material availability

Describe equipment or material needs:

- Personnel (Additional personnel are needed.)

Describe additional person-years (PYs) required:

- Financial Resources

Describe the category of financial resources:

Reviewed by: Supervisor Superintendent Region Manager Storm Water Coordinator

**Figure 2-2
BMP Questionnaire**



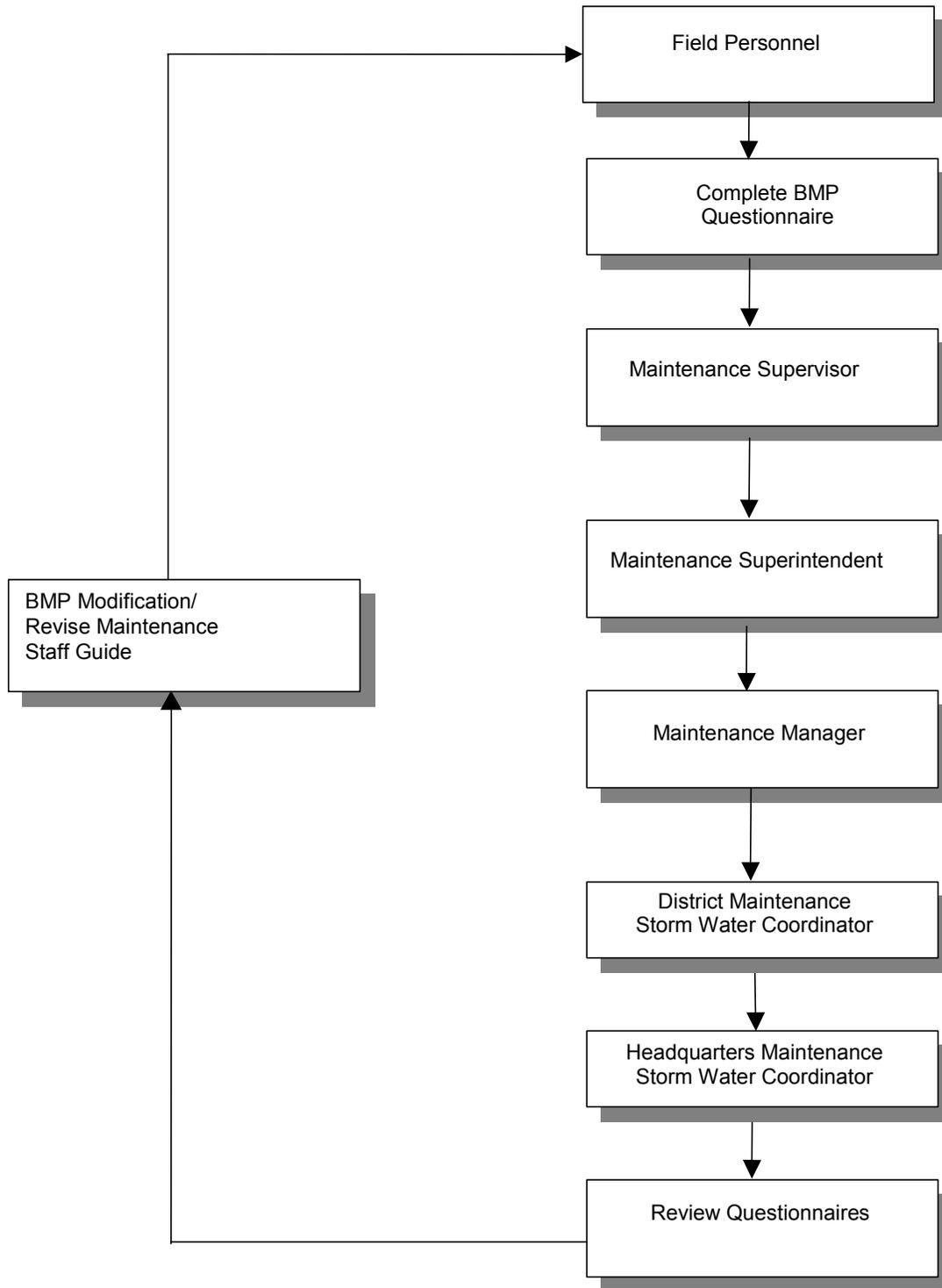


Figure 2-3
Feedback Process

APPENDIX A

**ACRONYMS AND
DEFINITION OF TERMS**

Acronyms

BMP	Best Management Practice
Cal/OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
IMMS	Integrated Maintenance Management System
MEP	Maximum Extent Practicable
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
OES	Office of Emergency Services
PCA	Pest Control Advisor
PCC	Portland Cement Concrete
POTW	Publicly owned treatment works
PY	Person-year
RWQCB	California Regional Water Quality Control Board
SPCC	Spill Prevention Control and Countermeasure
SWMP	Storm Water Management Plan
SWRCB	California State Water Resources Control Board
U.S.	United States
USA	Underground Service Alert

Definition of Terms

Best Management Practice (BMP): A measure implemented to protect water quality and reduce potential for pollution associated with storm water runoff. Any program, technology, process, siting criteria, operating method, or device that controls, prevents, removes, or reduces pollution. Caltrans established categories of BMPs: Maintenance, Design Pollution Prevention, Construction Site and Treatment.

Clean Water Act: Refers to the Federal Water Pollution Control Act enacted by Congress in 1972 by Public Law 92-500 and amended by the Water Quality Act in 1987



(also called the Clean Water Act). The Clean Water Act prohibits the discharge of pollutants to waters of the United States unless the discharge is covered by the terms of a discharge permit. The Clean Water Act is probably best known for its stated objective of “fishable and swimmable” waters. The 1987 amendment to the Clean Water Act includes guidelines for regulating discharges from storm water drainage systems for certain municipalities, industries and construction activities.

Compliance monitoring: Refers to various information-gathering activities that Caltrans will use to assess its efforts to comply with the requirements in the Permit and the Statewide SWMP. Compliance monitoring will involve a broad variety of observations and inspections that will help Caltrans managers know whether the storm water management procedures and practices described in the Statewide SWMP are being implemented as intended.

Drainage inlet: A drainage structure which collects surface runoff and conveys it to an underground storm water drainage system.

Erosion: The wearing away of land surface primarily by wind or water. Erosion occurs naturally as a result of weather or runoff, but can be intensified by clearing, grading or excavation of the land surface may increase the erosion rate.

Existing vegetation: Any vegetated area that has not already been cleared and grubbed.

Fire protection strips: Buffer strips adjacent to the right-of-way where vegetation is controlled to reduce the risk of fire.

Good housekeeping: A common practice related to the storage, use, or cleanup of materials, performed in a manner that minimizes the discharge of pollutants.

Grubbed: Vegetation has been removed by mechanical or manual methods.

Hazardous waste: A hazardous waste possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA or state lists. A waste or combination of wastes, that, may either cause or significantly contribute to an increase in mortality or an increase in serious irreversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed, because of its quantity, concentration, or physical, chemical or infectious characteristics. Regulated under the federal Resource Conservation and Recovery Act and the California Health and Safety Code.

Herbicide: Chemical compounds that are used to control weeds.

Hydrologic unit: A subunit of a basin as defined by a RWQCB.

Illicit connections: Connections made to Caltrans' storm water drainage systems by others without permission.

Illegal discharge: Any non-permitted discharge to a receiving water.

Integrated Maintenance Management System (IMMS): A system used to record, report and monitor maintenance work as it is planned and performed. The IMMS uses an alpha-numeric numbering system and provides descriptions of the maintenance program components and the "Family" problem structure model.

Maintenance activities: Routine maintenance activities that may require clearing, grading or excavation to maintain original line and grade, hydraulic capacity, or original purpose of the facility.

Maintenance facilities: Facilities under Caltrans' ownership or control that contain such areas as fueling areas, waste storage or disposal facilities, wash racks, equipment or vehicle storage and materials storage areas.

Maintenance Staff Guide: An employee handbook for Caltrans Maintenance personnel designed to provide guidance on potential pollutant sources and BMPs for Caltrans' maintenance facilities and activities.

Maintenance Storm Water Management Program: The component of the Statewide Storm Water Management Plan (SWMP) that describes: The program to implement BMPs as part of the ongoing maintenance activities for existing highways and highway-related properties, facilities and activities; surveillance activities to help manage potential storm water contamination from accidental spills, illicit connections, illegal discharges and illegal dumping on Caltrans' property; and implementation of BMPs to reduce the potential for storm water pollution at existing highway maintenance facilities by minimizing contact between storm water and the various substances used at maintenance facilities.

Maximum Extent Practicable (MEP): The extent of implementation of storm water management practices that are effective at reducing storm water pollution except when any of the following conditions are met: (1) other effective management practices would achieve greater or substantially the same pollution control benefits; (2) the management practice would not be technically feasible; (3) the cost of management practice implementation would greatly outweigh pollution control benefits; or (4) implementation of the management practice would compromise other legal and institutional constraints, expectations and obligations imposed by federal or state statute or case law.

Median area: The portion of a divided highway separating the traveled ways for traffic in opposite directions. Often contains storm drain system facilities, such as ditches and swales.

Monitoring: Refers to a variety of activities and processes through which Caltrans will obtain information relevant to its implementation of the storm water quality management program and so that the need for and/or opportunities for revising or refining its program can be identified.

National Pollutant Discharge Elimination System (NPDES): The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits under the Clean Water Act. In California, the NPDES permits are incorporated into Waste Discharge Requirements.

Nonpoint source discharge: Discharge from a diffuse pollution source (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet).

Non-storm water discharge: Any discharge to a storm drain system or receiving water that is not composed entirely of storm water.

Oil waste: Oil of any kind or in any form, including but not limited to, petroleum, fuel oil, sludge, oil refuse and oil mixed with wastes other than dredged soil.

Outfall: The point source where a municipal storm sewer discharges to waters of the United States.

Permit: Refers to the NPDES Storm Water Permit (Order No. 99-06-DWQ) adopted by the SWRCB on July 15, 1999 (or the most recent permit issued).

Pump station: A complete pumping installation including a storage box, pump or pumps, standby pumps, connecting pipes, electrical equipment, pumphouse and outlet chamber.

Regional Water Quality Control Boards (RWQCBs): “Regional Board” means any California Regional Water Quality Control Board for a region specified in Section 13200 of the California Water Code.

Reporting: Refers primarily to information Caltrans will report to the SWRCB, although there also will be instances where information will be reported or otherwise communicated within Caltrans.

Retention basin: An infiltration basin designed to capture runoff volume from the water quality design storm and infiltrate it prior to a significant storm event.

Sanitary sewer: Underground pipes that carry off only domestic or industrial waste, not storm water.

Sediment: Organic or inorganic material that is carried by or is suspended in water and that settles out to form deposits in the storm drain system or receiving waters.

Site: The land or water area where any facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity.

Soil Stabilization: Control measures used to minimize erosion.

Spill: An accidental dumping or spilling of a potential pollutant onto the ground or into a waterway.

State Water Resources Control Board (SWRCB): As delegated by EPA, California agency that implements and enforces Clean Water Act Section 402(p) NPDES permit requirements, and is issuer and administrator of Caltrans' NPDES Storm Water Permit. Works with the nine Regional Water Quality Control Boards.

Storm drain inlet: A drainage structure that collects surface runoff and conveys it to an underground storm drain system.

Storm water: Storm water means storm water runoff, snow melt runoff, surface runoff and drainage.

Storm water drainage system: Streets, gutters, inlets, conduits, natural or artificial drains, channels and watercourses, or other facilities that are owned, operated, maintained and used for the purpose of collecting, storing, transporting or disposing of storm water.

Storm Water Management Plan (SWMP): The plan that describes Caltrans' statewide program to reduce the discharge of pollutants from storm water drainage systems associated with Caltrans' highways and highway-related facilities, properties and activities to the maximum extent practicable. Caltrans Planning and Design, Construction and Maintenance activities statewide are addressed by the SWMP. The SWMP also describes assignment of responsibilities for implementing BMPs, as well as training, public education and participation, monitoring, program evaluation and reporting activities.

Storm water management practice: Activities, prohibitions or modifications of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State.

Storm Water Quality Practice Guidelines (Guidelines): A document that provides a description of each approved best management practice included in the Statewide Storm Water Management Plan (SWMP) for statewide application.

Sump: In drainage, any low area which does not permit the escape of water by gravity flow.

Surface runoff: Precipitation, snow-melt or irrigation water in excess of what can infiltrate the soil surface and be stored in small surface depressions.



Vegetation control: Maintenance of vegetation on facilities owned by Caltrans by a combination of chemical application (herbicides) and mechanical methods (mowing, cutting, etc.).

Vista point: A paved area beyond the shoulder which permits travelers to safely exit the highway to stop and view a scenic area. In addition to parking areas, trash receptacles, interpretive displays, restrooms, drinking water and telephones may also be provided.

Watercourse: Surface water bodies including streams, lakes, bays, estuaries, lagoons, reservoirs and ponds.

APPENDIX B

ACTIVITY CUT-SHEETS

Activity Cut-Sheet Table of Contents

GENERAL BEST MANAGEMENT PRACTICES	B-4
A FAMILY FLEXIBLE PAVEMENT	B-9
Asphalt Cement Crack and Joint Grinding/Sealing	B-9
Asphalt Paving	B-10
Structural Pavement Failure (Digouts) Pavement Grinding and Paving	B-11
Emergency Pothole Repairs	B-13
Sealing Operations	B-14
B FAMILY RIGID PAVEMENT	B-15
Portland Cement Crack and Joint Sealing	B-15
Mudjacking and Drilling	B-16
Concrete Slab and Spall Repair	B-17
C FAMILY SLOPE/DRAINS/VEGETATION	B-19
Shoulder Grading	B-19
Nonlandscaped Chemical Vegetation Control	B-21
Nonlandscaped Mechanical Vegetation Control/Mowing	B-23
Nonlandscaped Tree and Shrub Pruning, Brush Chipping, Tree and Shrub Removal	B-24
Fence Repair	B-25
Drainage Ditch and Channel Maintenance	B-26
Drain and Culvert Maintenance	B-28
Curb and Sidewalk Repair	B-30
D FAMILY LITTER/DEBRIS/GRAFFITI	B-32
Sweeping Operations	B-32
Litter and Debris Removal	B-33
Emergency Response and Cleanup Practices	B-34
Graffiti Removal	B-36



E FAMILY	LANDSCAPING	B-37
	Chemical Vegetation Control	B-37
	Manual Vegetation Control	B-39
	Landscaped Mechanical Vegetation Control/Mowing	B-40
	Landscaped Tree and Shrub Pruning, Brush Chipping, Tree and Shrub Removal	B-41
	Irrigation Line Repairs	B-42
	Irrigation (Watering), Potable and Nonpotable	B-43
F FAMILY	ENVIRONMENTAL	B-44
	Storm Drain Stenciling	B-44
	Roadside Slope Inspection	B-45
	Roadside Stabilization	B-46
	Storm Water Treatment Devices	B-48
	Traction Sand Trap Devices	B-49
G FAMILY	PUBLIC FACILITIES	B-50
	Public Facilities	B-50
H FAMILY	BRIDGES	B-52
	Welding and Grinding	B-52
	Sandblasting, Wet Blast with Sand Injection and Hydroblasting	B-54
	Painting	B-56
	Bridge Repairs	B-57
	Draw Bridge Maintenance	B-58
J FAMILY	OTHER STRUCTURES	B-59
	Pump Station Cleaning	B-59
	Tube and Tunnel Maintenance and Repair	B-61
	Ferryboat Operations	B-62
	Tow Truck Operations	B-63
	Toll Booth Lane Scrubbing Operations	B-64

K FAMILY	ELECTRICAL	B-65
	Sawcutting for Loop Installation	B-65
M FAMILY	TRAFFIC GUIDANCE	B-67
	Thermoplastic Striping and Marking	B-67
	Paint Striping and Marking	B-68
	Raised/Recessed Pavement Marker Application and Removal	B-70
	Sign Repair and Maintenance	B-71
	Median Barrier and Guard Rail Repair	B-73
	Emergency Vehicle Energy Attenuator Repair	B-75
R FAMILY	SNOW AND ICE CONTROL	B-76
	Snow Removal	B-76
	Ice Control	B-77
S FAMILY	STORM MAINTENANCE	B-78
	Minor Slides and Slipouts Cleanup/Repair	B-78
T FAMILY	MANAGEMENT AND SUPPORT	B-80
	Building and Grounds Maintenance	B-80
	Storage of Hazardous Materials (Working Stock)	B-82
	Material Storage Control (Hazardous Waste)	B-84
	Outdoor Storage of Raw Materials	B-85
	Vehicle and Equipment Fueling	B-86
	Vehicle and Equipment Cleaning	B-87
	Vehicle and Equipment Maintenance and Repair	B-88
	Aboveground and Underground Tank Leak and Spill Control	B-90

GENERAL BEST MANAGEMENT PRACTICES

There are Best Management Practices (BMPs) that are commonly applied to all Maintenance activities. For the purpose of this Staff Guide, these have been termed General BMPs. Summaries of these General BMPs are provided below with the detailed Maintenance BMPs found in Appendix C. The General BMPs should be reviewed with the Activity Cut-Sheet(s) prior to beginning the scheduled Maintenance activity.

GENERAL BMPs

IMPLEMENTATION

Scheduling and Planning

- Plan and schedule all Maintenance activities in a manner that considers the use of BMPs. Recognize how the activity will affect storm water so that the proper BMPs can be placed or utilized at the proper time. Some Maintenance activities shall not be performed during rain events or when storms are predicted unless required by emergency conditions. The Activity Cut-Sheets will advise of these conditions. Poor planning does not constitute an emergency condition.
- Reduce the potential for erosion and pollutant transport through wind, rain, runoff and vehicle track-out by not scheduling maintenance activities that could adversely impact storm water during the rainy season and prior to forecast storm events.
- Plan your work to protect storm water drainage systems and watercourses from discharge of potential pollutants. Plan ahead when working near storm water drainage systems and sensitive water bodies. They may need a higher level of awareness and protection.
- Be aware of where the flow of a leak, spill, or other runoff would go.
- Identify drain inlets and watercourses, both upstream and downstream of the work site.
- All vehicles and equipment should be clean and in good operating condition. Perform a thorough pre-operational inspection of vehicles and equipment.
- Set-up the work area to minimize the tracking of material by vehicles and equipment in or out of the work area.



Spill Prevention and Control

Practice spill prevention and control at the work site:

- Keep spill cleanup materials available at all sites.
- Any spills should be controlled as soon as it is safe to do so. Transport collected materials back to a Maintenance facility or approved storage or disposal site.
- Use drip pans and/or absorbent materials to contain leaks or spills of vehicle fluids.
- If a leak or spill occurs, protect drainage systems and watercourses from spilled material by covering and blocking drain inlets. Remove covers and blocks once cleanup is completed.
- Use dry cleanup methods for storm water pollutants whenever possible. If water must be used for spill cleanup and/or decontamination, contain the water used for spill cleanup and decontamination and do not discharge to the storm water drainage system or watercourses.
- Large spills must be contained and cleaned up by trained personnel. Contact your Hazmat Specialist if needed.
- To the extent cleanup activities and safety is not compromised, storm water pollutant spills shall be covered and protected from storm water run-on.

Sanitary/Septic Waste Management

Portable toilet units are used at locations where permanent bathrooms are unavailable.

- To prevent leakage, inspect and repair portable toilet units before leaving the Maintenance facility.
- Locate portable toilet units away from storm water drainage system and watercourses.
- Prevent spills by securing the units to prevent tipping on windy days when necessary.
- Septic waste can only be discharged to a municipal- or state-approved sewage disposal system.
- Inspect hose and connections to prevent spills prior to flushing holding tank at sanitary station.
- Control the water used to flush the holding tank to prevent non-storm water discharges. Use of a positive shutoff valve is advisable.
- After flushing the holding tank, if it is necessary to rinse or clean the walls, floor and outside of the unit, clean at a designated rinsing area or wash rack to prevent non-storm water discharges.



Material Use

Prevent materials used by Maintenance from entering the storm water drainage systems, watercourses or water bodies. Materials must be delivered, stored, prepared, transported and used in a manner that minimizes or eliminates the discharge of materials to the storm water drainage systems, watercourses or water bodies.

- Keep a supply of spill cleanup materials and tools near the material use area and clean up all spills as soon as it is safe to do so.
- Use materials only where and when needed to complete the maintenance activity.
- Train employees on proper loading and unloading techniques to prevent spills.
- Avoid depositing materials on the roadway by securing loads, using proper containers and covering loose materials when transporting in open bed trucks.
- When transporting liquids, inspect the condition of containers or tanks to ensure leakage does not occur. Make sure lids or covers are in place and secure.
- When transporting loose materials, inspect truck beds, sideboards, tailgates, cab protectors and pintle hooks both before transporting, and after completing the material delivery.
- Return unused materials to the Maintenance facility for reuse, recycling or proper disposal.

Safer Alternative Products

A variety of products may be harmful to the environment. In some cases, a less harmful product, commonly referred to as a safer alternative product, can be used for the same purpose. Safer alternative products should be considered for all maintenance activities.

- **The Districts must approve safer alternative products.**
- Use safer alternative products when possible. These may include cleaning and painting products, herbicides, graffiti removers, automotive products and fertilizers.
- While safer alternative products may be less harmful to the environment, they are not harmless. Use the materials according to the manufacturers instructions and keep the materials out of the storm water drainage system and watercourses.



Vehicle/Equipment Cleaning, Fueling and Maintenance

- Vehicle and equipment washing is allowed only at designated rinsing areas, wash racks or other designated areas. All engine compartment and undercarriage rinsing/washing must be performed within a wash rack facility. The District Maintenance Storm Water Coordinator will approve or provide input on the proper location for a designated rinsing area.
- Maintain vehicles and equipment in a covered maintenance area where possible. Inspect vehicles and equipment daily for leaks and repair as soon as possible. Use drip pans or absorbent pads to contain leaks until repairs are complete.
- Fueling in the field shall not be performed near unprotected drain inlets or watercourses.
- Keep a supply of spill cleanup material near the fueling area and the maintenance area. Cleanup spills as soon as it is safe to do so and dispose of properly. Hosing down of leaks, drips or spills is prohibited. Cleanup is not complete until all absorbent materials are removed from the pavement.
- See T Family Cut-Sheets for vehicle and equipment cleaning, vehicle and equipment fueling and vehicle and equipment maintenance for further details.

Illicit Connection Detection, Reporting and Removal

Illicit connections are connections to the Caltrans storm water drainage system that have not been approved by Caltrans.

- Maintenance personnel, as part of their routine inspections and maintenance work, shall report all observed suspected illicit connections to the District Maintenance Storm Water Coordinator, who will forward these observations to the District NPDES Storm Water Coordinator. A Storm Water Pollution/Drainage Problem report form has been developed for use in this activity.
- All public initiated calls should be directed to the District's Public Affairs Officer. Calls regarding illicit connections should be logged and routed to the District NPDES Storm Water Coordinator.

Illegal Spill Discharge Control

This BMP is directed at incidents involving dumping, discharges or spills that affect storm water.

- Maintenance Supervisors shall report any reports from field personnel observing illegal dumping or spilling of materials as part of their routine inspections and maintenance work to the District Maintenance Storm Water Coordinator. The District Maintenance Storm Water Coordinator will forward



these observations to the District NPDES Storm Water Coordinator. A Storm Water Pollution/Drainage problem report form has been developed for this use.

- If suspected hazardous materials or hazardous waste dumping has occurred, Maintenance Supervisors shall also report the incident to the District Maintenance Hazardous Materials Manager.
- Spill cleanup shall be handled in accordance with the legal authority presented in Section 2.6 of the SWMP.

Maintenance Facility Housekeeping Practices

Good housekeeping practices are intended to eliminate the potential of discharge of pollutants to drainage paths, storm water drainage systems and watercourses by promoting efficient and safe storage, use and cleanup of potentially harmful materials. Good housekeeping should be practiced both at the Maintenance facility and at the work site.

- Maintain clean and orderly material and equipment storage areas.
- Use the “first in, first out” policy for material storage and control. Avoid ordering more materials that can be stored properly or used in a reasonable timeframe.
- Properly reuse, recycle or dispose of properly cleaned empty containers, excess materials and equipment or parts.
- Cover materials that have the potential to discharge pollutants to the storm water drainage system before predicted rains.
- Containers of liquids should be secured with lids until needed.
- Inspect the storage areas regularly and maintain a clean work area.
- Clean up spills promptly.
- Use drip pans or absorbent pads under leaking vehicle and equipment to capture fluids.
- Wash water shall not be discharged to the storm water drainage system or watercourses.
- Collect and transport litter, debris and waste materials from job sites to the Maintenance facility for proper disposal. Manage waste appropriately.



A FAMILY – FLEXIBLE PAVEMENT

Asphalt Cement Crack And Joint Grinding/Sealing



Paving Operation:
Asphalt application equipment was
cleaned in a bucket over an absorbent
splash pad.

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Asphalt products
- Emulsion
- Fuel
- Non-storm water
- Rubberized sealant
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Crack and joint grinding/sealing involves the sealing and filling of cracks and joints in flexible pavement. This work is done to prevent the entrance of moisture and foreign material into the subgrade, and to maintain the integrity of the pavement surface.

APPROPRIATE APPLICATION

The following procedures are used where grinding or sealing may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events unless required by emergency conditions.
- Protect drains, watercourses and manholes from all potential spills including sealing products.
- Release agents shall not be discharged to the storm water drainage system or watercourses.
- Minimize airborne dust. Use water spray during grinding but minimize runoff.
- Clean equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage. Properly dispose of all generated waste material.
- Do not stockpile sand, sediment or grindings in or near storm water drainage system or watercourses. Protect stockpiles with a cover or sediment barriers during rainstorms.
- Liquid waste should be collected in a container, with a secure lid or transported to the Maintenance facility to be reused, recycled or disposed of properly.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport back to the Maintenance facility to be reused, recycled or disposed of properly.
- Reuse of asphalt grindings shall be in accordance with the California Department of Fish and Game “Memorandum of Understanding on the Use of Asphalt (January 12, 1993).”

A FAMILY – FLEXIBLE PAVEMENT

Asphalt Paving



Grinding Operation: Storm water drain inlets were protected prior to work and a broom sweeper cleaned up loose debris when completed.

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Asphalt products
- Cleaning agents
- Fuel
- Non-storm water
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Paving of degraded asphalt surfaces involves patching or resurfacing roadbed with a mineral aggregate and bituminous binder mixture.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of paving material to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events unless required by emergency conditions.
- If chemicals are used for cleaning, consider safer alternative products where practical and effective.
- Protect drain inlets, watercourses and manholes from potential spills including paving products and tack coat.
- Release agents shall not be discharged to the storm water drainage system or watercourses.
- Prevent runoff. Minimize water used with the roller and for evaporative cooling of the asphalt.
- Do not stockpile sand or sediment in or near storm water drainage system or watercourses. Protect stockpiles with a cover or sediment barriers during rainstorms.
- Clean equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage.
- Liquid waste should be collected in a container, with a secure lid, and transported to the Maintenance facility to be reused, recycled or disposed of properly.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport back to the Maintenance facility to be reused, recycled or disposed of properly.

A FAMILY – FLEXIBLE PAVEMENT

Structural Pavement Failure (Digouts) Pavement Grinding and Paving

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Asphalt products
- Binder
- Cleaning agents
- Concrete
- Fuel
- Non-storm water
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Digouts include major repairs to the structural pavement and require removal of the roadway surface using graders and grinders.

APPROPRIATE APPLICATION

The following procedures are used to prevent release of paving materials and grindings to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events unless required by emergency conditions.
- Protect drain inlets, watercourses and manholes from potential spills including grindings, paving products and tack coat.
- Place the “cold-mix” asphalt (i.e., pre-mixed aggregate and asphalt binder) under a protective cover during rainstorms.
- Tarp loads before hauling to storage site, if necessary. Do not overfill trucks.
- Prevent runoff. Minimize water used with the roller and for evaporative cooling.
- Release agents shall not be discharged to the storm water drainage system or watercourses.
- Minimize airborne dust. Use water spray during grinding but minimize runoff.
- Do not stockpile soil, sediment, asphalt material and asphalt grindings materials or rubble in or near storm water drainage system or watercourses. Protect stockpiles with a cover or sediment barriers during rainstorms.
- Clean equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage. If chemicals are used for cleaning, consider safer alternative products where practical and effective.



A FAMILY – FLEXIBLE PAVEMENT

Structural Pavement Failure (Digouts) Pavement Grinding and Paving

OPERATIONAL PROCEDURES (CONT'D)

- Liquid waste should be collected in a container with a secure lid and transported to the Maintenance facility to be reused, recycled or disposed of properly.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



A FAMILY – FLEXIBLE PAVEMENT

Emergency Pothole Repairs

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Non-storm water
- Pothole asphalt material
- Vehicle fluids

DEFINITION AND PURPOSE

Unscheduled pothole repairs involve the filling and resurfacing of potholes in flexible pavement portions of roadways to eliminate holes.

APPROPRIATE APPLICATION

The following procedures are used where spilled patch material may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Emergency pothole work is not restricted by rain events or predicted storm events.
- Protect drain inlets, watercourses and manholes from potential spills including patch material.
- Use only enough compacted material to fill the pothole.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



A FAMILY – FLEXIBLE PAVEMENT

Sealing Operations

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Aggregate
- Asphalt products
- Fuel
- Non-storm water
- Sand
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Seal coats are required for asphalt pavement due to erosion or oxidation of the road surface. Seal coats include fog seal, sand seal chip seal and slurry seal to reduce road surface permeability and increase traction.

APPROPRIATE APPLICATION

The following procedures are used where sealing materials may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events unless required by emergency conditions.
- Protect drain inlets, watercourses and manholes from potential spills including sealing products.
- Release agents shall not be discharged to the storm water drainage system or watercourses.
- Minimize airborne dust. Use water spray during grinding but minimize runoff.
- Prevent runoff. Minimize water used with the roller.
- Do not stockpile sediment, aggregate, sand or asphalt in or near storm water drainage system or watercourses. Protect stockpiles with a cover or sediment barriers during rainstorms.
- Clean equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage.
- Liquid waste should be collected in a container with a secure lid and transported to the Maintenance facility to be reused, recycled or disposed of properly.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport back to the Maintenance facility to be reused, recycled or disposed of properly.



B FAMILY – RIGID PAVEMENT

Portland Cement Crack And Joint Sealing



Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Asphalt products
- Fuel
- Release agents
- Rubberized sealant
- Sand
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Crack and joint repair involves the sealing and filling of cracks and joints in rigid pavement. This work is done to prevent the entrance of moisture and foreign material into the subgrade, and to maintain the integrity of the pavement surface.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of sealing material to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events unless required by emergency conditions.
- Protect drain inlets and manholes from potential spills during sealing operation.
- Release agents shall not be discharged to the storm water drainage system or watercourses.
- Minimize airborne dust. Use water spray during grinding but minimize runoff.
- Clean equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage.
- Liquid waste should be collected in a container with a secure lid and transported to the Maintenance facility to be reused, recycled or disposed of properly.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.

B FAMILY – RIGID PAVEMENT

Mudjacking And Drilling

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Concrete
- Fuel
- Non-storm water
- Sediment
- Slurry
- Vehicle fluids

DEFINITION AND PURPOSE

Mudjacking is used to maintain and repair rigid type surfacing, its associated base and any Portland concrete cement shoulders less than two feet in width. A Portland cement and pozzolan grout mixture is pumped below the slab (i.e., mudjacking) to replace lost or settled base material.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of grout material to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events unless required by emergency conditions.
- Prevent spills. Secure vehicle loads and cover loose materials in open-
bed vehicles.
- Protect drain inlets, watercourses and manholes from potential spills including grout, slurries and concrete washout.
- Water applied during the drilling and pumping must be controlled to prevent non-storm water discharges.
- Grout and slurries shall not be discharged to the storm water drainage system or watercourses.
- Vehicle and equipment washing is only allowed at designated rinsing areas, wash racks or other designated areas. All engine compartment and undercarriage rinsing/washing must be performed within a wash rack facility. The District Maintenance Storm Water Coordinator will approve or provide input on the approved location for a designated rinsing area.
- Liquid waste and concrete washout should be collected in a container with a secure lid and transported to the Maintenance facility or decanting area for proper disposal. Concrete contractors are required to comply with Caltrans Standard Specifications, Section 7-1.01G Water Pollution.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



B FAMILY – RIGID PAVEMENT

Concrete Slab and Spall Repair

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Concrete
- Fuel
- Non-storm water
- Sediment
- Slurry
- Vehicle fluids

DEFINITION AND PURPOSE

Spalling, slab cracking and settlement are common problems associated with Portland cement concrete pavement that require repairs.

APPROPRIATE APPLICATION

The procedures are used to prevent releases of concrete wastes (e.g., concrete grindings and cuttings, concrete washout) to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Slab repairs shall not be performed during rain events or prior to predicted rain events unless required by emergency conditions.
- Protect drain inlets, watercourses and manholes from potential spills including concrete products and concrete waste.
- When using release agents (e.g., citrus, soy-based or diesel) for cleaning or coating equipment and tools, all products and by-products shall be captured and reused, recycled or properly disposed.
- Release agents shall not be discharged to the storm water drainage system or watercourses.
- Minimize airborne dust. Use water spray during grinding but minimize runoff.
- Minimize amount of water used to clean and cure concrete to prevent runoff.
- Do not stockpile sediment, concrete grindings and cuttings in or near storm water drainage system or watercourses.
- Vehicle and equipment washing is allowed only at designated rinsing areas, wash racks or other designated areas. All engine compartment and undercarriage rinsing/washing must be performed within a wash rack facility. The District Maintenance Storm Water Coordinator will approve or provide input on the approved location for a designated rinsing area.
- Liquid waste and concrete washout should be collected in a container with a secure lid and transported to the Maintenance facility or decanting area for proper disposal. Concrete contractors are required to comply with Caltrans Standard Specifications, Section 7-1.01G Water Pollution.



B FAMILY – RIGID PAVEMENT

Concrete Slab and Spall Repair

OPERATIONAL PROCEDURES (CONT'D)

- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



C FAMILY – SLOPE/DRAINS/VEGETATION

Shoulder Grading



Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Aggregate
- Asphalt products
- Fuel
- Non-storm water
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Areas adjacent to surfaced and unsurfaced road shoulders require maintenance to prevent the loss of lateral support, to prevent the deterioration or failure of the road edge and to maintain roadside drainage patterns.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of sediment and equipment fluids to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events unless required by emergency conditions.
- Tarp imported fill material and other materials that may drift when transporting them to the work area in open-bed trucks. Do not overfill trucks.
- Protect drain inlets, watercourses and manholes from potential spills including sediment, aggregate and asphalt grindings.
- Compact unpaved shoulder as soon as possible after grading. Use water to aid compaction, but prevent runoff.
- Prevent runoff. Water applied during sweeping operations must be controlled to prevent unpermitted non-storm water discharges.
- Control dust and erosion in windy or wind-prone areas using covers, water or soil stabilizers.
- Preserve existing vegetation by defining the work area and following the existing contours. Replace any damaged vegetation outside the defined work area.
- Do not stockpile sediment, aggregate and asphalt grindings in or near storm water drainage system or watercourses. Protect stockpiles with a cover or sediment barriers during rainstorms.
- Vehicle and equipment washing is allowed only at designated rinsing areas, wash racks or other designated areas. All engine compartment and undercarriage rinsing/washing must be performed within a wash rack facility. The District Maintenance Storm Water Coordinator will approve or provide input on the approved location for a designated rinsing area.

C FAMILY – SLOPE/DRAINS/VEGETATION

Shoulder Grading

OPERATIONAL PROCEDURES (CONT'D)

- Prevent runoff. Sediment from equipment rinsing shall not discharge to the storm water drainage system or watercourses.
- Reuse of asphalt grindings shall be in accordance with the California Department of Fish and Game “Memorandum of Understanding on the Use of Asphalt (January 12, 1993).”
- Sweep up or vacuum sediment and excess asphalt. Keep asphalt grindings out of the storm water drainage system and watercourses. Incorporate back into the work area or properly dispose of all generated materials.



C FAMILY – SLOPE/DRAINS/VEGETATION

Nonlandscaped Chemical Vegetation Control



Minimize the use of herbicides.
Protect drain inlets and watercourses.

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Non-storm water
- Pesticides
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

This method of vegetation control uses pesticides (e.g., herbicides, pre-emergents) to eliminate and prevent the growth of undesirable vegetation within the highway right-of-way. Chemical vegetation controls are used to protect preferred vegetation, to provide fire protection and to improve roadside appearance. The activity includes the operation of support equipment, mixing and loading chemicals and chemical application to native vegetation.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of pesticides, sediment and equipment fluids to storm water drainage system and watercourses.

LIMITATIONS

Vegetation management can result in reduced erosion control effectiveness. BMP implementation will depend on traffic, weather, available resources and safety conditions.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events that produce runoff unless required by emergency conditions.
- A licensed Agricultural Pest Control Adviser (PCA) should approve the activities.
- Identify drain inlets and watercourses, both upstream and downstream of the activity site. Protect the drain inlets, storm water drainage system and watercourses from discharges of potential pollutants.
- Mixing and loading into spray equipment should be in a containment area away from drain inlets and watercourses.
- Apply pesticides in compliance with federal, state and local pesticide use regulations as recommended by the District Annual Vegetation Control Plan. Apply pesticides only as specified on the “Pesticide Use Recommendation” on the label and as approved by the PCA.

C FAMILY – SLOPE/DRAINS/VEGETATION

Nonlandscaped Chemical Vegetation Control

OPERATIONAL PROCEDURES (CONT'D)

- Minimize the use of pesticides in or near storm water drainage system or watercourses.
- Calibrate the spray rig to ensure accurate application of pesticides.
- Do not spray chemicals when rainfall-causing runoff is forecast within 12 hours.
- Water used for chemical mixing or in application must be controlled to prevent unpermitted non-storm water discharges.
- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area.



C FAMILY – SLOPE/DRAINS/VEGETATION

Nonlandscaped Mechanical Vegetation Control/Mowing

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Non-storm water
- Sediment
- Vegetation debris
- Vehicle fluids

DEFINITION AND PURPOSE Mechanical vegetation control includes the removal of grass and weeds within the highway right-of-way using machinery and mobile equipment. The purpose is to control grass and weeds to improve roadside appearance and provide fire control.

APPROPRIATE APPLICATION The following procedures are used to prevent releases of sediment and equipment fluids to storm water drainage system and watercourses.

LIMITATIONS Vegetation management can result in reduced erosion control effectiveness. BMP implementation will depend on traffic, weather, available resources and safety conditions.

OPERATIONAL PROCEDURES

- Protect drain inlets and watercourses from potential spills and vegetative debris.
- Do not fuel equipment near drain inlets or watercourses.
- Keep vegetation and clippings out of the storm water drainage system and watercourses. Solid waste should be disposed of properly.
- Prevent runoff. Sediment from equipment rinsing shall not be discharged to the storm water drainage system or watercourses. Rinse sediment in designated rinsing areas to prevent discharge to the storm water drainage system or watercourses.
- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area



C FAMILY – SLOPE/DRAINS/VEGETATION

Nonlandscaped Tree and Shrub Pruning, Brush Chipping, Tree and Shrub Removal



Vegetation debris is removed from pavement.

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Non-storm water
- Sawdust
- Sediment
- Vegetation debris
- Vehicle fluids
- Wood
- Wood mulch

DEFINITION AND PURPOSE

Trees and shrubs are pruned to preserve their health, remove dead branches, protect utilities, maintain sight distances, preserve aesthetics and prevent property damage.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of removed vegetation and equipment fluids to storm water drainage system and watercourses.

LIMITATIONS

Vegetation management can result in reduced erosion control effectiveness. BMP implementation will depend on traffic, weather, available resources and safety conditions.

OPERATIONAL PROCEDURES

- Protect drain inlets and watercourses from potential spills and vegetative debris.
- Do not fuel equipment near drain inlets or watercourses.
- Keep vegetation debris, clippings and mulch out of the storm water drainage system and watercourses. Brush cuttings chipped into wood mulch should not be used at locations prone to washout.
- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area.
- Prevent runoff. Sediment from equipment rinsing shall not be discharged to the storm water drainage system or watercourses.
- Do not stockpile prunings and clippings in or near storm water drainage system or watercourses.
- Brush cuttings that are not chipped should be transported to the maintenance facility for proper disposal.

C FAMILY – SLOPE/DRAINS/VEGETATION

Fence Repair

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Concrete
- Fuel
- Litter and debris
- Metal Debris
- Non-storm water
- Vehicle fluids

DEFINITION AND PURPOSE

Fences provide a physical barrier to control access and prevent crossing by vehicles or pedestrians. The three categories include freeway and right-of-way fences, property fences and median fences.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of concrete, metal debris and equipment fluids to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Protect drain inlets and watercourses from potential spills.
- Stabilize the entrance/exits to the work area if necessary to avoid tracking mud or sediment on to public roads.
- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area.
- Equipment and tools can be cleaned on a mud rinse pad at the Maintenance facility. If a washout needs to occur at the activity site, make sure all liquids are contained and disposed of properly.
- If concrete is used, do not allow concrete waste or slurry to enter storm water drainage system or watercourses. Liquid waste and concrete washout should be collected in a container with a secure lid and transported to the Maintenance facility to be reused, recycled or disposed of properly. Concrete contractors are required to comply with Caltrans Standard Specifications, Section 7-1.01G Water Pollution.
- Sweep and vacuum roadway. If working off-road, inspect and remove rock and sediment from tires prior to leaving the site to reduce the potential of tracking litter, debris and sediment onto public roadways.
- Solid waste should be collected and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



C FAMILY – SLOPE/DRAINS/VEGETATION

Drainage Ditch and Channel Maintenance



Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Concrete
- Fuel
- Litter and debris
- Non-storm water
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Ditches and channels are maintained to avoid obstruction and maintain flow. Fill material may be imported to repair eroded channel walls.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of sediment and equipment fluids to storm water drainage system and watercourses.

PRE-OPERATIONAL PROCEDURES

- Before working on ditches and channels, determine what regulatory permits or approvals are required.
- Inspect ditches and channels for sufficient flow capacity and damage. Clean during the dry or low-flow season, if possible. If chemical contamination is suspected, stop work and notify the Supervisor for further instructions.

OPERATIONAL PROCEDURES

- Tarp loads before hauling to and from the site if necessary. Do not over-fill trucks.
- Stabilize the entrance/exits to the work area and the erodible ground surface adjacent to the ditch and channel using soil stabilization BMPs requiring protection as soon as possible after completing ditch and channel maintenance. Compact soil if re-vegetation is not desired.
- Minimize water quality degradation and maintain a sufficient water flow downstream to maintain aquatic life. Divert the water flow around the work area. Remove diversions when the maintenance activity is completed.
- When cleaning ditches and channels below cut slopes or steep slopes, avoid cutting the toe of the slope.
- Check dams may be used to restrict water flow. Remove the check dams and accumulated sediment when the activity is completed.
- Use drip pans and absorbents to contain equipment fluids such as fuels and hydraulic oils.
- Contain the water used, materials and soil generated during ditch and channel cleaning and manage as liquid or solid waste. Noncontaminated soil may be acceptable for reuse if approved.

C FAMILY – SLOPE/DRAINS/VEGETATION

Drainage Ditch and Channel Maintenance

OPERATIONAL PROCEDURES (CONT'D)

- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area.
- Control dust and erosion in windy or wind-prone areas using covers, water or soil stabilizers.
- Do not stockpile sediment in or near the storm water drainage system or watercourses.
- The District Maintenance Storm Water Coordinator will provide written instructions for pre-approved decanting sites for liquid waste and the proper disposal site for contaminated soil.
- Vehicle and equipment washing is allowed only at District-designated rinsing areas, wash racks or other designated areas. All engine compartment and undercarriage rinsing/washing must be performed within a wash rack facility. The District Maintenance Storm Water Coordinator will approve or provide input on the approved location for a designated rinsing area.
- Liquid waste may be collected in a Vactor™ and transported to the Maintenance facility or decanting area for proper disposal.
- If working off-road, inspect and remove rock and sediment from tires prior to leaving the site to reduce the potential of tracking litter, debris and sediment onto public roadways.



C FAMILY – SLOPE/DRAINS/VEGETATION

Drain and Culvert Maintenance



Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Concrete
- Fuel
- Litter and debris
- Non-storm water
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

This activity includes the maintenance of under drains, horizontal drains, down drains, gutters, overside drains, scuppers and deck drains. Drains are maintained to prevent flooding and allow unobstructed flow.¹

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of sediment and equipment fluids to storm water drainage system and watercourses.

LIMITATIONS

BMP implementation will depend on traffic, weather, available resources and safety conditions. Access to the storm water drainage system and worker safety may limit inspection and cleaning.

PRE-OPERATIONAL PROCEDURES

- Before working on drain and culvert maintenance, determine what regulatory permits or approvals are required.
- Inspect drains and culverts for sufficient flow capacity and damage. Clean during the dry or low-flow season, if possible. If chemical contamination is suspected, stop work and notify the Supervisor for further instructions.

OPERATIONAL PROCEDURES

- Keep the gearbox of equipment above water when equipment is in a water body.
- Construct a barrier to intercept sediment from discharging into storm water drainage system or watercourses. Remove the barriers when the maintenance activity is completed.
- Stabilize the entrance/exits to the work area as necessary to avoid tracking mud or sediments onto public roadways.

¹ An annual storm drain inlet inspection and cleaning program is implemented in the metropolitan areas of San Diego, Orange, Los Angeles and Ventura Counties mandated by court order. These areas follow the Enhanced Storm Drain Inlet Inspection and Cleaning Program BMP.

C FAMILY – SLOPE/DRAINS/VEGETATION

Drain and Culvert Maintenance

OPERATIONAL PROCEDURES (CONT'D)

- Use the minimum amount of water to clear drains and culverts. Water applied during cleaning operations must be controlled to prevent unpermitted non-storm water discharges.
- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area.
- Stabilize ground surfaces that require erosion protection as soon as possible after completing drain and culvert maintenance. Compact soil if revegetation is not desired.
- Do not stockpile sediment in or near the storm water drainage system or watercourses.
- Vehicle and equipment washing is allowed only at designated rinsing areas, wash racks or other designated areas. All engine compartment and undercarriage rinsing/washing must be performed within a wash rack facility. The District Maintenance Storm Water Coordinator will approve or provide input on the approved location for a designated rinsing area.
- Contain the water used and materials generated during drain and culvert cleaning and managed as liquid or solid waste. The District Supervisor and District Maintenance Storm Water Coordinator or Manager will provide written instruction for pre-approved decanting sites for liquid waste and the proper disposal site for contaminated soil.
- If working off-road, inspect and remove rock and sediment from tires prior to leaving the site to reduce the potential of tracking litter, debris, and sediment onto public roadways.
- Liquid waste may be collected in a Vactor™ and transported back to the Maintenance facility or decanting area for proper disposal.



C FAMILY – SLOPE/DRAINS/VEGETATION

Curb and Sidewalk Repair

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Concrete
- Fuel
- Litter and debris
- Non-storm water
- Sediment
- Slurry
- Vehicle fluids

DEFINITION AND PURPOSE

This activity includes repairs made to concrete curbs and sidewalks for the traveling motorists and pedestrians.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of sediment, concrete materials and equipment fluids to storm water drainages system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events unless required by emergency conditions.
- Protect drain inlets, watercourses and manholes from potential spills including sediment, aggregate, grindings, concrete products and concrete waste.
- Release agents shall not be discharged to the storm water drainage system or watercourses.
- Minimize amount of water used to clean and cure concrete to prevent runoff.
- Minimize airborne dust. Use water spray during grinding but minimize runoff.
- Do not stockpile sediment or concrete rubble in or near storm water drainage system or watercourses. Protect stockpiles with a cover or sediment barriers during rainstorms.
- Vehicle and equipment washing is only allowed at designated rinsing areas, wash racks or other designated areas. All engine compartment and undercarriage rinsing/washing must be performed within a wash rack facility. The District Maintenance Storm Water Coordinator will approve or provide input on the approved location for a designated rinsing area.
- Liquid waste and concrete washout should be collected in a container with a secure lid and transported to the Maintenance facility or decanting area for proper disposal. Concrete contractors are required to comply with Caltrans Standard Specifications, Section 7-1.01G Water Pollution.



C FAMILY – SLOPE/DRAINS/VEGETATION

Curb and Sidewalk Repair

OPERATIONAL PROCEDURES (CONT'D)

- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



D FAMILY – LITTER/DEBRIS/GRAFFITI

Sweeping Operations

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Litter and debris
- Non-storm water
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Sweeping operations remove litter and debris from the traveled way and shoulder to prevent the collection of materials in drain inlets, reduce the sediment loading of culverts, reduce traffic hazards and improve aesthetics.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of sediment and equipment fluids to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Do not load hoppers beyond their capacity.
- Adjust brooms frequently for maximum efficiency.
- Do not discharge fluids from sweeping operation to storm water drainage system or watercourses.
- Prevent runoff. Sediment from equipment rinsing shall not be discharged to the storm water drainage system or watercourses. Rinse sediment in designated rinsing areas to prevent discharge to the storm water drainage system or watercourses.
- Do not sweep any unknown substances that may be potentially hazardous.
- Before deadheading the sweeper, stow gutter brooms, but keep the pickup broom down for approximately 150 feet. Lift the pickup broom, and to the maximum extent possible, clear the sweeper's brooms and elevators before merging onto the public roadway or highway.
- Do not stockpile sediment in or near storm drainage system or watercourses. Protect stockpiles with a cover or sediment barriers during rainstorms.
- Sweeper waste should be transported back to the Maintenance facility or temporary pre-designated location to be reused, recycled or disposed of properly.



D FAMILY – LITTER/DEBRIS/GRAFFITI

Litter and Debris Removal

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Litter and debris
- Non-storm water
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Litter and debris are periodically collected from the Department's rights-of-way and removed from drainage grates, trash racks and ditch lines.

APPROPRIATE APPLICATION

The following procedures are used where litter and debris may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Tarp or secure materials transported in open-bed trucks to and from the work area to prevent spillage to the roadway. Do not overfill truck.
- Supervisors should observe the overall condition of their assigned sections and assess the need for litter removal and installation of anti-litter signs.
- Pick up litter as needed or at the assigned frequencies.
- Remove litter and debris from drainage grates, trash racks and ditch lines that have the potential to reduce flows in storm water drainage systems.
- Litter and debris should be removed using dry techniques.
- Solid waste should be put into bags or buckets and secured for transport to the Maintenance facility to be reused, recycled or disposed of properly.
- Do not pick up or handle unmarked containers that may have contaminated materials inside.
- Inspect and replace unreadable anti-litter signs.



D FAMILY – LITTER/DEBRIS/GRAFFITI

Emergency Response and Cleanup Practices

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Debris
- Fuel
- Materials
- Non-storm water
- Sediment
- Unknown materials
- Vehicle fluids

DEFINITION AND PURPOSE

After proper identification and hazard assessment, emergency response and cleanup includes the isolation, containment, removal and disposal of spilled substances on highway rights-of-way. Proper containment and clean-up of spilled material, will reduce the discharge of potential pollutants to the storm water drainage system and watercourses.

APPROPRIATE APPLICATION

The following procedures are used where hazardous substances may pollute storm water runoff or discharge to storm water drainage system and watercourses.

LIMITATIONS

The BMPs presented for this activity only provide operating methods or measures for the purpose of storm water pollution prevention. The applicable local, state and federal hazardous materials, hazardous waste and employee safety requirements are not present. All emergency response and cleanup practices must comply with the requirements of Chapter D5 of the Maintenance Manual, Volume 1.

OPERATIONAL PROCEDURES

- Protect drain inlets and manholes from receiving waste from spills, if it can be done safely.
- Stabilize the entrance/exits to the work area if necessary to avoid tracking mud or sediment on to public roadways.
- Water used for cleaning and non-emergency decontamination shall not be allowed to enter storm water drainage system or watercourses. However, first responders should undertake any necessary emergency actions to save lives and protect the public and themselves.
- Do not track spilled material. Without compromising safety or cleanup efforts, protect spilled material from storm water run-on during rainfall or trackout from motorists.
- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area.



D FAMILY – LITTER/DEBRIS/GRAFFITI

Emergency Response and Cleanup Practices

OPERATIONAL PROCEDURES (CONT'D)

- Avoid stockpiling contaminated soils or hazardous material. If temporary stockpiling is unavoidable, do not stockpile in or near storm water drainage system or watercourses.
- If working off-road, inspect and remove rock and sediment from tires prior to leaving the site to reduce the potential of tracking litter, debris and sediment onto public roadways.
- Coordinate removal of the solid, liquid and hazardous waste with the District Hazardous Materials Coordinator or Manager.



D FAMILY – LITTER/DEBRIS/GRAFFITI

Graffiti Removal

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Graffiti removal products
- Grit
- Non-storm water
- Paint
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Graffiti is removed or painted over. The primary activities are the operation of support equipment, paint removal (may include hydroblasting, sandblasting, soda blasting or washing with graffiti removal products) and painting.

APPROPRIATE APPLICATION

The following procedures are used where paint, grit and non-storm water may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events.
- Secure paint while transporting to avoid spills.
- Refer to H Family activity when sandblasting or hydroblasting.
- Protect drain inlets and watercourses from potential spills.
- Tarps and similar control measures should be used to prevent spills or material drift from being deposited into storm water drainage system or watercourses.
- Only headquarters pre-approved graffiti removal products should be used.
- Mix paint indoors or in a containment area away from drain inlets.
- Water used for cleaning and decontamination shall not be allowed to enter storm water drainage system or watercourses.
- Waste from cleaning paint equipment or brushes should be collected and put into a bucket or drum with a secure lid for transport back to the maintenance facility to be reused, recycled or disposed of properly. Paint waste, especially if it is oil based or contains paint thinner, would need approval from the publicly owned treatment works to dispose of in sewer.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport back to the Maintenance facility to be reused, recycled or disposed of properly.



E FAMILY – LANDSCAPING

Chemical Vegetation Control

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Non-storm water
- Pesticides
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

This method of vegetation control uses pesticides (e.g., herbicides, pre-emergents) to eliminate and prevent the growth of undesirable vegetation within the highway right-of-way. Chemical vegetation controls are used to protect preferred vegetation, to maintain unobstructed views of the road edge and traffic safety devices, to provide fire protection and to improve roadside appearance. The activity includes the operation of support equipment, mixing and loading chemicals and chemical application to native vegetation.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of pesticides, sediment and equipment fluids to storm water drainage system and watercourses.

LIMITATIONS

Vegetation management can result in reduced erosion control effectiveness. BMP implementation will depend on traffic, weather, available resources and safety conditions.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events that produce runoff unless required by emergency conditions.
- A licensed Agricultural Pest Control Adviser (PCA) should approve the activities.
- Identify drain inlets and watercourses, both upstream and downstream of the activity site. Protect the drain inlets, storm water drainage system and watercourses from discharges of potential pollutants.
- Mixing and loading into spray equipment should be in a containment area away from drain inlets and watercourses.
- Apply pesticides in compliance with federal, state and local pesticide use regulations as recommended by the District Annual Vegetation Control Plan. Apply pesticides only as specified on the “Pesticide Use Recommendation” on the label and as approved by the PCA.



E FAMILY – LANDSCAPING

Chemical Vegetation Control

OPERATIONAL PROCEDURES (CONT'D)

- Minimize the use of pesticides in or near storm water drainage system or watercourses.
- Calibrate the spray rig to ensure accurate application of pesticides.
- Do not spray chemicals when rainfall causing runoff is forecast within 12 hours.
- Water used for chemical mixing or in application must be controlled to prevent unpermitted non-storm water discharges.
- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area.
- Avoid using overhead irrigation for as long as the chemical manufacturer recommends after applying pesticides.



E FAMILY – LANDSCAPING

Manual Vegetation Control

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Non-storm water
- Sediment
- Vegetation debris
- Vehicle fluids

DEFINITION AND PURPOSE

Manual vegetation control is the use of handheld equipment (some equipment may be gas-powered) to control grass and weeds within the highway right-of-way. Manual vegetation controls are used to protect existing vegetation, to maintain unobstructed views of the road edge and traffic safety devices, to provide fire protection, and to improve roadside appearance.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of debris and equipment fluids to storm water drainage system and watercourses.

LIMITATIONS

Vegetation management can result in reduced erosion control effectiveness. BMP implementation will depend on traffic, weather, available resources and safety conditions.

OPERATIONAL PROCEDURES

- Protect drain inlets and watercourses from potential spills and vegetative debris.
- Do not fuel equipment near drain inlets or watercourses.
- Keep vegetation and clippings out of the storm water drainage system and watercourses. Solid waste should be disposed of properly.
- Prevent runoff. Sediment from equipment rinsing shall not be discharged to the storm water drainage system or watercourses. Rinse sediment in designated rinsing areas to prevent discharge to the storm water drainage system.
- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area.



E FAMILY – LANDSCAPING

Landscaped Mechanical Vegetation Control/Mowing

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Non-storm water
- Sediment
- Vegetation debris
- Vehicle fluids

DEFINITION AND PURPOSE

Mechanical vegetation control includes removal of grasses and weeds within the highway right-of-way using machinery and mobile equipment. Mechanical vegetation controls are used to protect preferred vegetation, to maintain unobstructed views of the road edge and traffic safety devices, to provide fire protection and to improve roadside appearance.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of clippings, sediment and equipment fluids to storm water drainage system and watercourses.

LIMITATIONS

Vegetation management can result in reduced erosion control effectiveness. BMP implementation will depend on traffic, weather, available resources and safety conditions.

OPERATIONAL PROCEDURES

- Protect drain inlets and watercourses from potential spills and vegetative debris.
- Do not fuel equipment near drain inlets or watercourses.
- Keep vegetation and clippings out of the storm water drainage system and watercourses. Solid waste should be disposed of properly.
- Prevent runoff. Sediment from equipment rinsing shall not be discharged to the storm water drainage system or watercourses. Rinse sediment in designated rinsing areas to prevent discharge to the storm water drainage system.
- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area.



E FAMILY – LANDSCAPING

Landscaped Tree and Shrub Pruning, Brush Chipping, Tree and Shrub Removal

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Non-storm water
- Sawdust
- Sediment
- Vegetation debris
- Vehicle fluids
- Wood
- Wood mulch

DEFINITION AND PURPOSE

Trees and shrubs of planted landscape vegetation along the highway right-of-way are pruned to preserve their health, remove dead branches, protect utilities, maintain sight distances, preserve aesthetics and prevent property damage. The wood is chipped with mechanical chippers to facilitate the removal of tree and shrub limbs from the roadside. Chipped material can be used as mulch. Dead or diseased trees and shrubs may be removed to protect public safety.

APPROPRIATE APPLICATION

The following procedures are used to prevent releases of removed vegetation and equipment fluids to storm water drainage system and watercourses.

LIMITATIONS

Vegetation management can result in reduced erosion control effectiveness. BMP implementation will depend on traffic, weather, available resources and safety conditions.

OPERATIONAL PROCEDURES

- Protect drain inlets and watercourses from potential spills and vegetative debris.
- Do not fuel equipment near drain inlets or watercourses.
- Keep vegetation debris, clippings and mulch out of the storm water drainage system and watercourses. Brush cuttings chipped into wood mulch should not be used at locations prone to washout.
- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area.
- Prevent runoff. Sediment from equipment rinsing shall not be discharged to the storm water drainage system or watercourses.
- Do not stockpile prunings and clippings in or near storm water drainage system or watercourses.
- Brush cuttings that are not chipped should be transported to the maintenance facility for proper disposal.



E FAMILY – LANDSCAPING

Irrigation Line Repairs

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Debris
- Fuel
- Non-storm water
- Primer
- PVC glue
- Sand
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Irrigation line repairs include maintenance (water line flushing) and repair activities on broken water lines, sprinklers and valves.¹

APPROPRIATE APPLICATION

The following procedures are used where debris and irrigation materials may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Tarp imported fill material transported in open-bed trucks to the work area. Do not overfill trucks.
- Shut off the water source to isolate a broken line, sprinkler or valve as soon as possible to minimize the loss of water.
- Protect downstream storm water drainage system and watercourse from water pumped or bailed from trenches excavated to repair water lines.
- Protect drain inlets and watercourses from potential spills and debris.
- Do not fuel equipment near drain inlets or watercourses.
- When possible, water used to flush the line should be applied to the landscape.
- Manage irrigation systems to ensure the appropriate amount of water is used and runoff is minimized.
- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area.
- Stabilize the erodible ground surface that require protection as soon as possible after completing repairs. Compact soil or apply wood mulch if revegetation is not desired.
- Sweep or vacuum site and inspect and remove rock and sediment from tires prior to leaving the site to reduce the potential of tracking litter, debris and sediment from the site. Properly dispose of all solid waste.

¹ Irrigation water and landscape irrigation are conditionally exempt discharges if appropriate control measures are developed and implemented under the SWMP.

E FAMILY – LANDSCAPING

Irrigation (Watering), Potable and Nonpotable

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Sediment
- Non-storm water
- Vehicle fluids

DEFINITION AND PURPOSE Irrigation or watering activities are performed using potable and non-potable water.¹

APPROPRIATE APPLICATION The following procedures are used where equipment fluids may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Frequently inspect and repair broken water lines.
- Protect drain inlets and watercourses from potential spills and debris.
- Do not fuel equipment near drain inlets or watercourses.
- When possible, water used to flush the line should be applied to the landscape.
- Avoid overwatering. Manage irrigation systems to ensure the appropriate amount of water is used and runoff is minimized.
- Minimize disturbance of existing vegetation.

¹ Irrigation water and landscape irrigation are conditionally exempt discharges if appropriate control measures are developed and implemented under the SWMP.

F FAMILY – ENVIRONMENTAL

Storm Drain Stenciling

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Non-storm water
- Paint
- Sediment
- Trash
- Vehicle fluids

DEFINITION AND PURPOSE

Stencils are applied to facility storm drain inlets in areas with pedestrian use for communities with over 10,000 residents or in smaller communities with MS4 permits.

APPROPRIATE APPLICATION

The following procedures are used where storm drain stenciling may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Protect drains, watercourses and manholes from potential spills and stenciling products.
- Non-storm water discharges to drainage paths, drainage systems and watercourses are prohibited.
- Verify that spill control cleanup materials are located in the unloading and use areas.
- Avoid sweeping sediment into drain inlets.
- The use of safer alternative products may still be harmful if discharged to drainage paths, storm water drainage system or watercourses. Use safer alternative products in accordance with manufacturer recommendations.
- Mixing of paint and loading of equipment should be away from drain inlets.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



F FAMILY – ENVIRONMENTAL

Roadside Slope Inspection

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Sediment
- Non-storm water
- Vehicle fluids

DEFINITION AND PURPOSE

Roadside vegetated slopes are periodically inspected to determine the need for erosion control measures.

APPROPRIATE APPLICATION

The following procedures are used to identify potential pollutant sources to storm water runoff or discharge to storm water drainage systems and watercourses during roadside slope inspection.

OPERATIONAL PROCEDURES

- Inspect slopes for erosion on a five-year cycle. Slopes with recurring problems should be inspected on an as-needed basis.
- District Maintenance staff will conduct initial inspections of roadside vegetated slope erosion and prepare an evaluation report on an approved inspection form (Preliminary Maintenance Slope Inspection Form [CT-Maint-NPDES-005]) for each slope inspected.
- Minor erosion repairs and stabilization, as determined by existing Department Division of Maintenance policy, may be completed by District Maintenance crews.
- When complex roadside vegetated slope erosion problems are identified, a District multi-disciplinary review team will consider solutions and may recommend the needed corrective action as a future project for the State Highway Operation and Protection Program (SHOPP).
- Record the inspection findings and repairs.



F FAMILY – ENVIRONMENTAL

Roadside Stabilization

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Binders
- Fertilizer
- Fiber
- Fuel
- Non-storm water
- Sediment
- Seed
- Vehicle fluids

DEFINITION AND PURPOSE

Roadside stabilization refers to the erosion control and/or soil stabilization practices on slopes within the highway right-of-way.

APPROPRIATE APPLICATION

The following procedures are used where roadside stabilization material may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Inspect roadside slopes for erosion on a five-year cycle. Areas with recurring problems should be inspected on an as-needed basis.
- Tarp imported fill material and other roadside stabilization materials with drift potential when transporting them to the work area in open bed trucks. Do not overfill trucks.
- Protect drain inlets and watercourses from potential spills including roadside stabilization materials.
- Stabilize the entrance/exits to the work area, if necessary, to avoid tracking mud or sediments on to public roadways.
- Do not stockpile sediment or material in or near storm water drainage system or watercourses. Protect stockpiles with a cover or sediment barrier during rainstorms.
- Check dams are used in the work area receiving concentrated flow. Sediment buildup should be removed before reaching 1/3 the height of check dam. Remove the check dams when the maintenance activity is completed.
- Install sediment barriers around the toe of the slope, downslope and around the slope and stockpiles to allow sediment to settle before any runoff leaves the work area. Sediment can be controlled with silt fences, sandbags or gravel bags, straw bales and fiber rolls.
- Hydromulch, hydroseed/handseed or straw mulch the erodible ground surface requiring protection as soon as possible after completing stabilization work. Contact the District Landscape Specialist, District Erosion Control Specialist or Landscape Architect for the appropriate application rates.



F FAMILY – ENVIRONMENTAL

Roadside Stabilization

SEDIMENT CONTROL (CONT'D)

- Silt fences should be constructed with a setback of at least 1 meter beyond the toe of a slope, if possible. Remove sediment prior to accumulation reaching one-third of the fence height. Incorporate removed sediment into the maintenance activity site if possible. Remove the silt fence when it is no longer needed.
- Fiber rolls are not used for high water flows. Fiber rolls that are used to reduce slope length should be placed in a shallow trench on a level contour and staked securely. Fiber rolls may be left at the site to biodegrade.
- Inspect and repair silt fence, sandbags, gravel bags, straw bale barriers or fiber rolls to ensure the sediment barrier(s) is functioning properly.
- Preserve existing vegetation by defining the work area and replacing the damaged vegetation outside the defined work area.
- Control dust and erosion in windy or wind-prone areas using covers, water or soil stabilizers.
- Use appropriate amount of water so that runoff and erosion is minimized.
- Compact soil if revegetation is not desired. Consider applying wood mulch. Contact the District Landscape Specialist, District Erosion Control Specialist or Landscape Architect for the appropriate application rate.
- Sweep or vacuum excess over spray of binders, fertilizers fiber and seed on hardscape. Incorporate the materials into the maintenance activity area.
- Sweep and vacuum site and inspect and remove rock and sediment from tires prior to leaving the site to reduce the potential of tracking litter, debris, and sediment from the site. Recycle or dispose of material properly.



F FAMILY – ENVIRONMENTAL

Storm Water Treatment Devices

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Non-storm water
- Oil
- Sediment
- Trash
- Vehicle fluids

DEFINITION AND PURPOSE

Storm water treatment devices are measures or structures installed primarily to reduce storm water pollutants and improve water quality. The devices include vegetated treatment systems, infiltration basins and detention devices.

APPROPRIATE APPLICATION

Storm water treatment devices are planned, designed and installed through the Caltrans new construction, major reconstruction and retrofit project delivery process where a storm drain system discharges directly or indirectly to surface water. The devices are maintained in accordance with the procedures specified in the Storm Water Quality Practice Guidelines.

OPERATIONAL PROCEDURES

- Limit the entrance/exit points to the activity site and stabilized against erosion.
- Avoid stockpiling contaminated soil or sediment and dispose of properly.
- If clean sediment cannot be recycled, transport the material back to the Maintenance facility or an approved storage site.
- Remove gravel and sediment from tires before reentering the highway.
- See operation and maintenance procedures in Vegetated Treatment Systems (Biofiltration Swales and Strips) BMP.
- See operation and maintenance procedures in Detention Device BMP.
- See operation and maintenance procedures in Infiltration Basins BMP.



F FAMILY – ENVIRONMENTAL

Traction Sand Trap Devices

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Oil
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Storm water treatment devices are structures installed primarily to reduce storm water pollutants and improve water quality. The devices include vegetated treatment systems, infiltration basins, detention devices and traction sand traps. Sand trap devices are maintained as effective devices for treating runoff discharges.

APPROPRIATE APPLICATION

Storm water treatment devices are planned, designed and installed through the Caltrans new construction, major reconstruction and retrofit project delivery process where a storm drain system discharges directly or indirectly to surface water. The devices are maintained in accordance with the procedures specified in the Guidelines.

OPERATIONAL PROCEDURES

- Inspect annually and after significant storms. Remove accumulated sediment if sediment exceeds design capacity.
- Inspect 72 hours after one significant storm per year and drain facility, if possible. If standing water cannot be removed then notify vector control authority (mosquito abatement). Notify engineer to consider removing sediment to restore infiltration capacity. If infiltration rate is unacceptable or unable to implement alternative solution then decommission sand trap device.
- Inspect semi-annually for general maintenance including inlet/outlet structural integrity, damaged structures, graffiti or vandalism, etc.
- Protect drain inlets and watercourses from potential spills and debris.
- Avoid stockpiling contaminated soil or sediment and dispose of properly.
- If clean sediment cannot be recycled, transport the material back to the Maintenance facility or approved storage site.



G FAMILY – PUBLIC FACILITIES

Public Facilities

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Litter
- Non-storm water
- Paint
- Pesticides
- Sand blast grit
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Public facilities include safety roadside rest areas, weigh stations, park-and-ride lots and vista points. The degree of maintenance includes a range of custodial responsibilities that may include restrooms, fountains, picnic areas, and other public facilities. Maintenance of appurtenances such as roadway surfacing, signs, pavement markings, buildings, landscaping and electrical installations are also considered under this category.

APPROPRIATE APPLICATION

The following procedures are used where maintenance of public facilities may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Secure or cover transported materials, equipment and supplies to and from public facilities to prevent spillage to the roadway.
- Keep the storage areas clean, well organized, and stocked with spill cleanup supplies.
- Inspect and replace unreadable anti-litter signs and storm drain stenciling at public facilities.
- Protect drain inlets and watercourses from potential spills.
- Do not fuel equipment near drain inlets or watercourses.
- Preserve existing vegetation by defining the work area and replace the damaged vegetation outside the defined work area.
- Avoid overwatering. Ensure irrigation controllers are programmed to minimize runoff.
- When using chemicals for cleaning, consider safer alternative products where practical and effective.
- Used spill cleanup materials, contaminated materials and recovered spill material that are not reusable shall be disposed of properly. Do not pick up any unknown items or materials that may be potentially hazardous. Notify the District Supervisor.



G FAMILY – PUBLIC FACILITIES

Public Facilities

OPERATIONAL PROCEDURES (CONT'D)

- Liquid waste and concrete washout should be collected in a container with a secure lid and transported back to the Maintenance facility for proper disposal. Concrete contractors are required to comply with Caltrans Standard Specifications 7-1.01G Water Pollution.
- Solid waste should be stored away from storm water drainage system and watercourses.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport back to the Maintenance facility to be reused, recycled or disposed of properly.



H FAMILY – BRIDGES

Welding and Grinding

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Debris
- Fuel
- Grit
- Lead contaminated materials
- Metal grindings
- Non-storm water
- Paint
- Sediment
- Solder
- Vehicle fluids

DEFINITION AND PURPOSE

Welding and grinding is performed on bridges to repair damaged or deteriorating components, but has been expanded to also include roads and individual service facilities.

APPROPRIATE APPLICATION

The following procedures are used where welding and grinding work may pollute storm water runoff or discharge to storm water drainage system and watercourses.

LIMITATIONS

The BMPs for this activity provide operating methods or measures only for the purpose of storm water pollution prevention. The applicable local, state and federal hazardous materials, employee safety and fire prevention requirements are not presented.

Although not a BMP, it is important that only properly trained employees with the appropriate personal protection equipment shall conduct work on bridges containing lead-based paint.

OPERATIONAL PROCEDURES

- Secure all equipment and tools. Prevent foreign objects from being dropped into the watercourse or bay.
- Use appropriate containment when welding over the side of a bridge to capture slag and metal grindings.
- For welding work over a storm drain inlet, protect the drain inlet to prevent grindings and debris from entering the storm water drainage system or watercourses.
- For welding work on the deck services or expansion plates, use maintenance traveler or wing staging to capture grindings and debris.
- Remove all slag and debris from the deck or other work sites when the job is completed.



H FAMILY – BRIDGES

Welding and Grinding

OPERATIONAL PROCEDURES (CONT'D)

- Use an appropriate container to collect slag, excess materials and solid waste and transport to the Maintenance facility for reuse, recycling or proper disposal.



H FAMILY – BRIDGES

Sandblasting, Wet Blast with Sand Injection and Hydroblasting

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Grit
- Lead contaminated materials
- Non-storm water
- Paint
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE This activity involves the removal of graffiti and is used to clean concrete walls and structural steel. Subtasks include the operation of support vehicles and equipment and the blasting operations.

APPROPRIATE APPLICATION The following procedures are used where blasting grit and paint may pollute storm water runoff or discharge to storm water drainage system and watercourses.

LIMITATIONS The BMPs presented for this activity provide operating methods or measures only for the purpose of storm water pollution prevention. The applicable local, state and federal hazardous materials, employee safety and fire prevention requirements are not presented.

Although not a BMP, it is important that only properly trained employees with the appropriate personal protection equipment shall conduct work on bridges containing lead-based paint.

OPERATIONAL PROCEDURES

- Secure all equipment and tools. Prevent foreign objects from being dropped into the watercourses or bay.
- Protect drain inlets and watercourses from potential spills and debris.
- If chemicals are used for cleaning, consider safer alternative products where practical and effective.
- Evaluate the possibility of using a hydroblaster to complete work.
- While performing hydroblasting using a permanent traveler, use control measures to prevent solid and liquid spills or materials from entering the watercourses.



H FAMILY – BRIDGES

Sandblasting, Wet Blast with Sand Injection and

OPERATIONAL PROCEDURES (CONT'D)

- Use minimum amount of sand necessary when sandblasting.
- Avoid excess use of water to minimize runoff.
- Use approved removal and disposal procedures when sand blasting to remove lead-based paint.
- Liquid waste should be collected in a container with a secure lid and transported to the Maintenance facility for proper disposal.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



H FAMILY – BRIDGES

Painting

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Non-storm water
- Paint
- Vehicle fluids

DEFINITION AND PURPOSE

Painting operations apply to the painting of bridge surfaces, but have also been expanded to include painting of facilities and highway structures. Routine maintenance of painting equipment is also included in this activity.

APPROPRIATE APPLICATION

The following procedures are used where paint may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events, unless required by emergency conditions.
- Make sure paint containers are secure during transport to prevent spillage to the roadway.
- Mix paint indoor away from drain inlets or in a containment area. Load the paint spray equipment at the Maintenance facility.
- Protect drain inlets and watercourses from potential spills including painting products.
- Monitor weather and wind when using spray equipment.
- Use tarps or canvas under work area to capture excess paint or paint chips. Tarps and other control measures should be used to prevent spills or material drift to watercourse (e.g., during bridge maintenance). Transfer material captured into a waste container for proper disposal at a Maintenance facility.
- Do not remove original product label from paint or other hazardous materials containers as it contains important spill cleanup and disposal information. Use the entire product before disposing of the container. Appropriately label all secondary containers.
- Collect all paint equipment wash water and return it to a Maintenance facility for proper disposal.

H FAMILY – BRIDGES

Bridge Repairs

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Concrete
- Debris
- Fuel
- Non-storm water
- Tools, equipment or parts
- Unused material
- Vehicle fluids

DEFINITION AND PURPOSE

Bridge maintenance activities include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints and bent or damaged railings.

APPROPRIATE APPLICATION

The following procedures are used where materials released from the bridge repairs may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- When working over watercourses, stage the operation to capture and collect all debris, leaks and spills.
- Vehicle and equipment washing is allowed only at designated rinsing areas, wash racks or other designated areas. All engine compartment and undercarriage rinsing/washing must be performed within a wash rack facility. The Maintenance Storm Water Coordinator will approve or provide input on the approved location for a designated rinsing area.
- Liquid waste should be collected in a container with a secure lid and transported to the Maintenance facility for proper disposal.
- Collect broken or damaged treated bridge pier fender posts. Solid waste should be collected by vacuum or sweeping and put into bags or buckets and secured for transport to the Maintenance facility to be reused, recycled or disposed of properly.
- See Activity Cut-Sheet Structural Pavement Failure (Digouts) Pavement Grinding and Paving.
- See Activity Cut-Sheet Concrete Slab and Spall Repair.
- See Activity Cut-Sheet Welding and Grinding, if applicable.



H FAMILY – BRIDGES

Draw Bridge Maintenance

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Vehicle fluids
- Non-storm water

DEFINITION AND PURPOSE

Drawbridge maintenance activities include maintaining mechanical and electrical equipment, removing debris and drift and removing debris from sumps.

APPROPRIATE APPLICATION

The following procedures are used where bridge maintenance may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Secure all equipment and tools. Prevent foreign objects from being dropped into the watercourses.
- When working over watercourses, stage the operation to capture and collect all debris, leaks or spills as possible.
- Tarps and similar control measures should be used to prevent spills or capture material drift into watercourses.
- Use drip pans under equipment with grease fittings to capture excess grease. Dispose of waste properly.
- Do not remove original product label from paint or hazardous materials containers as it contains important spill cleanup and disposal information. Use the entire product before disposing of the container. Appropriately label all secondary containers.
- Clean-up excess grease after greasing fittings by wiping down equipment, fittings and metal surfaces. Use the minimum amount of materials necessary to complete the job.
- Clean area by sweeping or vacuuming. Do not hose down.
- Liquid waste should be collected in a container with a secure lid and transported to the Maintenance facility for proper disposal.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



J FAMILY – OTHER STRUCTURES

Pump Station Cleaning

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Litter and debris
- Non-storm water
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Pump stations are used to dewater depressed highway sections where water routinely collects. Maintenance work includes structural repairs, removal of material from sumps, and periodic servicing or repairs of electrical and mechanical equipment.

APPROPRIATE APPLICATION

Periodic pump station inspection and cleaning will reduce the discharge of potential pollutants to the storm water drainage system or watercourses.

LIMITATIONS

The BMPs for this activity only provide operating methods or measures for the purpose of storm water pollution prevention. The applicable local, state and federal hazardous materials and employee safety requirements are not presented.

Although not a BMP, it is important that work in confined space shall be conducted only by properly trained employees who use appropriate personal protection equipment.

OPERATIONAL PROCEDURES

- Protect drains and watercourses from potential spills.
- Stabilize the entrance/exits to the work area with soil stabilizers as necessary.
- Inspect pump stations routinely, per District policy, during the rainy season and off-season. Inspect screen to ensure it is free of debris. Remove solids in the sumps routinely to prevent damage to pumps. Inspect and clean pump outfall facilities, when possible, to ensure a free flow of water beyond the pumping station.
- During maintenance and repair of pump station, remove all waste oil and put into buckets or drums with a secure lid for transport back to the maintenance facility to be reused, recycled or disposed of properly.
- Avoid use of excess water during cleaning to minimize waste and runoff.



J FAMILY – OTHER STRUCTURES

Pump Station Cleaning

OPERATIONAL PROCEDURES (CONT'D)

- Contaminated water used for cleaning and decontamination shall not be allowed to enter storm water drainage system or watercourses.
- Dispose of liquid waste collected in the Vactor™ trucks in an approved method.
- The District Supervisor and District Maintenance Storm Water Coordinator or Manager will provide written instruction for pre-approved decanting sites for liquid waste and the proper disposal site for contaminated soil.
- Sweep and vacuum site and inspect and remove rock and sediment from tires prior to leaving the site to reduce the potential of tracking litter, debris, and sediment from the site. Recycle or dispose of material properly.
- Do not stockpile sediment in or near storm water drainage system or watercourses. Protect stockpiles with a cover or sediment barrier during rainstorms.



J FAMILY – OTHER STRUCTURES

Tube and Tunnel Maintenance and Repair

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Cement
- Cleaning agents
- Fuel
- Grout
- Litter and debris
- Non-storm water
- Paint
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE Maintenance of tunnels and tubes involves removing dirt and debris from the tunnel and repairing the pavement and walls.

APPROPRIATE APPLICATION Tunnel and tube washing and maintenance reduces the accumulation of dirt, debris, and potential pollutants in these passageways, preserves capital investment and improves aesthetics.

OPERATIONAL PROCEDURES

- Sweep tunnel prior to conducting wash operations and properly dispose of swept material.
- Protect drain inlets prior to using cleaning agents and paints.
- Mix paint indoors or in a containment area. Do not clean paint brushes or rinse paint containers into drains or watercourses.
- Prevent cement, grout, concrete waste and non-storm water discharges from entering drains and watercourses. Concrete contractors are required to comply with Caltrans Standard Specifications, Section 7-1.01G Water Pollution.
- If chemicals are used for cleaning, consider safer alternative products where practical and effective.
- Do not remove original product label from paint or hazardous materials containers as it contains important spill cleanup and disposal information. Use the entire product before disposing of the container. Appropriately label all secondary containers.
- Avoid excess use of water to minimize waste and runoff.
- Properly dispose of wastewater and debris. If acceptable to local sewer agency, dispose of wash water to the sanitary sewer system or the liquid waste should be collected and transported to the Maintenance facility for proper disposal.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



J FAMILY – OTHER STRUCTURES

Ferryboat Operations

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Litter
- Non-storm water
- Toxic materials
- Vehicle fluids

DEFINITION AND PURPOSE

Ferryboats conveying vehicles and the public are maintained jointly by Maintenance and the Equipment Service Center.

APPROPRIATE APPLICATION

The following procedures are used where ferry operations may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Perform a thorough pre-operational check to observe any equipment that could fail during ferry operation.
- Contain any leaks onboard by closing cofferdam drains and securing fuel and oil emergency shutoff valves.
- Carry spill clean up material. Clean spills immediately and dispose of waste properly.
- Check refueling equipment and hoses before use. Monitor refueling operation closely and cease operation immediately if a leak develops.
- Do not discharge wash water or waste water to the water channel.
- Notify U.S. Coast Guard of any spills in the watercourses.



J FAMILY – OTHER STRUCTURES

Tow Truck Operations

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Glass
- Metal fragments
- Non-storm water
- Plastics
- Rubber
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE Tow truck operations involve the removal of vehicles from Caltrans' rights-of-way.

APPROPRIATE APPLICATION Potential pollution is possible from spills of vehicle parts and fluids from vehicle accidents and servicing of vehicles.

OPERATIONAL PROCEDURES

- Protect drain inlets and watercourses when necessary to prevent contaminants from entering drainage inlets.
- Clean up fluids or parts that are spilled onto the roadway from an accident site before leaving the scene.
- Use absorbent pads to soak up vehicle fluids, then sweep the area thoroughly to remove all loose debris and eliminate material and residue from entering drainage inlets.
- Liquid waste should be collected in a container with a secure lid and transported to the Maintenance facility for proper disposal.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.
- Also see Activity Cut-Sheet, D Family - Emergency Response and Cleanup Practices.



J FAMILY – OTHER STRUCTURES

Toll Booth Lane Scrubbing Operations

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Cleaning agents
- Non-storm water
- Process water
- Sediment

DEFINITION AND PURPOSE Lane scrubbing operations reduce the accumulation of dirt and oily buildup from vehicles. Lane scrubbing is implemented only near toll plazas.

APPROPRIATE APPLICATION The following procedures are used where lane scrubbing may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Use lane scrubbers with vacuum capability to remove wastewater from pavement during lane scrubbing operations.
- If chemicals are used for cleaning, consider safer alternatives where practical and effective.
- Liquid waste collected in the scrubber should be transported to the Maintenance facility or decanting area for proper disposal.

K FAMILY – ELECTRICAL

Sawcutting for Loop Installation

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Concrete
- Concrete slurry
- Fuel
- Non-storm water
- Sealant
- Vehicle fluids

DEFINITION AND PURPOSE

Detector loops are electrical sensors used to trigger a traffic signal at an intersection and/or for long-term traffic counts. Installation of detector loops is accomplished by cutting into the road surface with a concrete saw, inserting the electric wire into the cut and sealing the cut with loop sealant.

APPROPRIATE APPLICATION

The following procedures are used where saw cutting for loop installation may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Avoid cutting concrete and installing loop detectors during rain events.
- Protect drain inlets and watercourses from potential spills and debris.
- Avoid excess use of water to minimize runoff. Apply water only to the cutting site.
- Minimize the use of loop sealant by carefully estimating the amount needed. Clean-up excess loop sealant and place the collected material in a bucket or drum for transport to the Maintenance facility to be reused, recycled or disposed of properly.
- Do not remove original product label from paint or hazardous materials containers as it contains important spill cleanup and disposal information. Use the entire product before disposing of the container. Appropriately label all secondary containers.
- Vehicle and equipment washing is allowed only at designated rinsing areas, wash racks or other designated areas. All engine compartment and undercarriage rinsing/washing must be performed within a wash rack facility. The District Maintenance Storm Water Coordinator will approve or provide input on the approved location for a designated rinsing area.
- Contain all sawcutting waste including water used to cool the cutting blade. Sweep or vacuum the site to collect all sawcutting waste prior to leaving the site.



K FAMILY – ELECTRICAL

Sawcutting for Loop Installation

OPERATIONAL PROCEDURES (CONT'D)

- Liquid waste should be collected in a container with a secure lid for transport to the Maintenance facility for proper disposal.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



M FAMILY – TRAFFIC GUIDANCE

Thermoplastic Striping and Marking



Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Grit
- Non-storm water
- Plastic
- Sand
- Vehicle fluids

DEFINITION AND PURPOSE

Thermoplastic materials are used for lane stripes and other pavement markings to guide motorists. Thermoplastic material is heated in a preheater and then applied to the pavement by thermoplastic striper or applicators.

APPROPRIATE APPLICATION

The following procedures are used where thermoplastic striping and marking may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events, unless required by emergency conditions.
- Prior to leaving the maintenance facility or work site, make certain all thermoplastic striper and preheater equipment shutoff valves are working properly to prevent leaking.
- The preheater should be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave adequate space at the top of the container when filling thermoplastic to allow room for material to move when deadheading the vehicle.
- Do not preheat, transfer or load thermoplastic near storm water drainage system or watercourses.
- Sweep or vacuum site to reduce the potential of material and debris entering the storm water drainage system or watercourses and reduce the potential of tracking material and debris from the site.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.

M FAMILY – TRAFFIC GUIDANCE

Paint Striping and Marking

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Non-storm water
- Paint
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Pavement striping and marking is used to supplement traffic signs and to guide and control vehicular and pedestrian traffic. Pavement striping delineates the separation of traffic flow on highways and freeways. Paints are applied to pavement by using stencil or striper paint systems.

APPROPRIATE APPLICATION

The following procedures are implemented where paint striping and marking may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events, unless required by emergency conditions.
- Pre-sweeping should be accompanied by watering to reduce the amount of dust generated, if necessary. Avoid excess use of water to minimize runoff.
- Be sure no pressure remains in paint striper system when setting up, cleaning, pulling filters or servicing spray guns. Release pressure on bead tank before removing lid.
- Check to make sure that the paint spray gun remains closed when not in use to prevent leaks. Check for leaking or ruptured paint containers.
- Paint should be loaded and mixed away from storm water drainage system or watercourses. Monitor weather and wind direction to ensure that paint is not entering the storm water drainage system or watercourses during spraying.
- Do not remove original product label from paint or other hazardous materials containers as it contains important spill cleanup and disposal information. Use the entire product before disposing of the container. Appropriately label all secondary containers.
- Liquid waste should be collected in a container with a secure lid and transported to the Maintenance facility for proper disposal.

M FAMILY – TRAFFIC GUIDANCE

Paint Striping and Marking

OPERATIONAL PROCEDURES (CONT'D)

- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.
- Do not stockpile sediment in or near storm water drainage system or watercourses.
- If pre-sweeping is needed, refer to Activity Cut-Sheets, D Family-Sweeping Operations and D Family - Litter and Debris Removal.



M FAMILY – TRAFFIC GUIDANCE

Raised/Recessed Pavement Marker Application and Removal

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Bitumen adhesive
- Epoxy
- Fuel
- Non-storm water
- Vehicle fluids

DEFINITION AND PURPOSE

Pavement markers are used to supplement traffic signs and convey messages or direction to motorists. Pavement markers are either surface mounted (raised) or placed in recessed slots in the pavement. Markers are applied using bitumen/epoxy adhesives. Damaged or old markers are removed for replacement using hand tools or special attachments on a motor grader.

APPROPRIATE APPLICATION

The following procedures are used where pavement marking and removal may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- This activity shall not be performed during rain events or prior to predicted rain events, unless required by emergency conditions.
- Prior to leaving the maintenance facility or work site ensure all shutoff valves on equipment are working properly to prevent spills.
- Melting tanks should be loaded with adequate space at the top to leave room for splashing when deadheading the vehicle.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- Do not pre-heat transfer or load bituminous material near storm water drainage system or watercourses.
- Collect as much excess bituminous material and epoxy as possible from the roadway after removal of markers.
- Liquid waste should be collected in a container with a secure lid and transported to the Maintenance facility for proper disposal.
- Solid waste should be collected by vacuum or sweeping and put into bags or buckets and secured for transport to the Maintenance facility to be reused, recycled or disposed of properly.



M FAMILY – TRAFFIC GUIDANCE

Sign Repair and Maintenance

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Concrete
- Debris
- Fuel
- Non-storm water
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Sign installation may range from digging a hole for a small one-post roadside sign to more complex activities such as mounting large multi-panel signs on overhead sign structures. When signs are damaged or obsolete, they are replaced or removed.

APPROPRIATE APPLICATION

The following procedures are used where sign installation and removal may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Be careful when digging in landscaped areas to avoid damaging buried water lines (call USA at 1-800-227-2600, or 1-800-422-4133), so as to prevent work area debris from being transported by flow from damaged water lines to storm water drainage system or watercourses. Protect storm water drainage system and watercourses in case a leak or spill does occur.
- Compaction should be performed as soon as possible after grading or soil disturbance.
- If concrete is used, do not allow concrete waste or slurry to enter storm water drainage system or watercourses. Liquid waste and concrete washout should be collected in a container with a secure lid and transported to the Maintenance facility to be reused, recycled or disposed of properly. Concrete contractors are required to comply with Caltrans Standard Specifications, Section 7-1.01G Water Pollution.
- Do not remove original product label from paint or hazardous materials containers as it contains important spill cleanup and disposal information. Use the entire product before disposing of the container. Appropriately label all secondary containers.
- Vehicle and equipment washing is allowed only at designated rinsing areas, wash racks or other designated areas. All engine compartment and undercarriage rinsing/washing must be performed within a wash rack facility. The District Maintenance Storm Water Coordinator will approve or provide input on the approved location for a designated rinsing area.



M FAMILY – TRAFFIC GUIDANCE

Sign Repair and Maintenance

OPERATIONAL PROCEDURES (CONT'D)

- Sweep or vacuum prior to leaving the site to reduce the potential of tracking litter, debris and sediment onto public roadways.
- Debris from damaged signposts should be collected and secured in an appropriate container for transport back to the Maintenance facility to be reused, recycled or disposed of properly.



M FAMILY – TRAFFIC GUIDANCE

Median Barrier and Guard Rail Repair

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Concrete
- Debris
- Fuel
- Non-storm water
- Vehicle fluids

DEFINITION AND PURPOSE

Median barriers and guardrails may require repair following an accident, or as part of routine maintenance activities.

APPROPRIATE APPLICATION

The following procedures are used where median barrier and guardrail repair may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Be careful when digging in landscaped areas to avoid damaging buried water lines (call USA at 1-800-227-2600, or 1-800-422-4133), so as to prevent work area debris from being transported by flow from damaged water lines to storm water drainage system or watercourses. Protect storm water drainage system and watercourses in case a leak or spill does occur.
- Stabilize the entrance/exits to the work area, if necessary, to avoid tracking mud or sediments on to public roadways.
- Compaction should be performed as soon as possible after grading or soil disturbance.
- If concrete is used, do not allow concrete waste or slurry to enter storm water drainage system or watercourses. Concrete contractors are required to comply with Caltrans Standard Specifications, Section 7-1.01G Water Pollution.
- Do not remove original product label from paint or hazardous materials containers as it contains important spill cleanup and disposal information. Use the entire product before disposing of the container. Appropriately label all secondary containers.
- Vehicle and equipment washing is only allowed at designated rinsing areas, wash racks or other designated areas. All engine compartment and undercarriage rinsing/washing must be performed within a wash rack facility. The District Maintenance Storm Water Coordinator will approve or provide input on the approved location for a designated rinsing area.
- Sweep or vacuum the site. If working off-road, inspect and remove rock and sediment from tires prior to leaving the site to reduce the potential of tracking litter, debris and sediment onto public roadways.



M FAMILY – TRAFFIC GUIDANCE

Median Barrier and Guard Rail Repair

OPERATIONAL PROCEDURES (CONT'D)

- Collect all debris from damaged guardrail or median barrier. Solid waste should be secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



M FAMILY – TRAFFIC GUIDANCE

Emergency Vehicle Energy Attenuator Repair

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Debris
- Fuel
- Non-storm water
- Sediment (sand)
- Vehicle fluids

DEFINITION AND PURPOSE

Emergency Vehicle Energy Attenuators, or Impact Energy Attenuators, are intended to reduce the severity of a collision with a fixed object that cannot be removed or protected by other types of protective systems. Vehicle Energy Attenuators are typically canisters, which are filled with water or sand, or are of a lightweight, crushable design. Vehicle Energy Attenuators require periodic maintenance to ensure that they are viable and in the correct position following contact with a moving vehicle.

APPROPRIATE APPLICATION

The following procedures are used where vehicle energy attenuator repair may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Protect drain inlets and watercourses from potential spills, debris and energy attenuator materials.
- During clean up and repair operations, make sure that all debris is removed.
- Cleanup and properly dispose of any vehicle fluids or parts, and attenuator debris.
- Liquid waste should be collected in a container with a secure lid and transported to the Maintenance facility or decanting area for proper disposal.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



R FAMILY – SNOW AND ICE CONTROL

Snow Removal

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Sediment (sand, cinder)
- Non-storm water
- Vehicle fluids

DEFINITION AND PURPOSE

Snow removal includes all work in connection with snow removal, drift prevention, installation and maintenance of snow fences, snow pole installation and removal.¹

APPROPRIATE APPLICATION

Proper snow removal will reduce the discharge of sediment and potential pollutants to the storm water drainage system or watercourses.

OPERATIONAL PROCEDURES

- Where possible, avoid blowing or pushing snow or other debris into watercourses, the storm water drainage system, or where a storm drain inlet can be blocked.
- When necessary, sweep after storms to remove sand and cinders and dispose of properly.

¹ Snow removal is considered an emergency operation due to insufficient forecast of extent, duration, severity and location of hazard presented to the public.



R FAMILY – SNOW AND ICE CONTROL

Ice Control



Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Deicing agents (salt)
- Fuel
- Non-storm water
- Sediment (sand, cinder)
- Vehicle fluids

DEFINITION AND PURPOSE

Ice control involves the use of deicing agents and abrasives to maintain public safety.¹

APPROPRIATE APPLICATION

Proper ice control will reduce the discharge of deicing agents and sediment to the storm water drainage system or watercourses.

OPERATIONAL PROCEDURES

- Where necessary, sweep after storms to remove sand and cinders and dispose of properly.
- District 2, 3, 8, 9 and 10 should record the volume of abrasives and deicing materials used within the Lahontan Region on each major route. Recommended salt application rates can be found in Chapter R of the *Caltrans Maintenance Manual, Volume 1*.
- Routinely calibrate spreaders. Because of potentially detrimental effects of deicing agents, personnel should use no more than is necessary for effective ice control.
- Use road abrasives that have been washed, screened, or graded to reduce silt and clay to insignificant levels.
- When using detergents, wash equipment used in the application of deicing agents at a wash area that discharges to a sanitary sewer system or water recovery system.
- Where possible, avoid blowing or pushing ice, snow, abrasives, or other debris into watercourse, the storm water drainage system or where a storm drain inlet can be blocked.
- Where possible, store sand in covered stockpiles in areas where a frozen crust will not form on the stockpile.
- Store deicing agents in covered areas, bunkers, or storage buildings. Do not store deicing chemicals where they will come in contact with storm water runoff.

¹ Ice control is considered an emergency operation due to insufficient forecast of extent, duration, severity and location of hazard presented to the public.

S FAMILY – STORM MAINTENANCE

Minor Slides and Slipouts Cleanup/Repair



Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Asphalt
- Debris
- Fuel
- Non-storm water
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

Repair of minor slides and slip-outs includes cleaning up or backfilling minor slides and minor damage to the roadside. Soil, rocks and boulders deposited on the roadway are removed, and minor erosion damage can be repaired. Downed or damaged vegetation may also be removed.

APPROPRIATE APPLICATION

The following procedures are used where the repair and cleanup of slides and slip outs may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

- Prior to working in a water body or wetland, alternatives should first be considered. If still deemed necessary, the appropriate permits must be obtained.
- Locate and protect storm water drainage systems and watercourses downstream of the area where minor slides and slip-outs are being repaired or cleared.
- Stabilize the entrance/exits to the work area with soil stabilizers as necessary.
- When clearing the roadside of downed or damaged vegetation, avoid placing the vegetation near drain inlets, watercourses or drainage ditches.
- Tires should be cleaned before entering the water, equipment should be cleaned of petroleum residue, and water levels should be kept below the gearboxes of equipment. All lubricants and fuels should be properly sealed.
- Remove sediment build up behind check dams prior to accumulation reaching one-third of the check dam height. Remove check dam when no longer needed.
- Preserve existing vegetation by defining the work area and replace the damaged vegetation outside the defined work area.
- When using dewatering measures, ensure that discharge does not cause erosion.
- Disturbed soil areas should be stabilized to avoid erosion.

S FAMILY – STORM MAINTENANCE

Minor Slides and Slipouts Cleanup/Repair

OPERATIONAL PROCEDURES (CONT'D)

- Control dust and erosion in windy or wind-prone areas using covers, water or soil stabilizers.
- Do not stockpile sediment or concrete rubble in or near storm water drainage system or watercourses. Protect stockpiles with a cover or sediment barriers during rainstorms.
- Inspect and remove rock and sediment from tires prior to leaving the site to reduce the potential of tracking litter, debris and sediment from the site.
- Solid waste should be collected by vacuum or sweeping and secured in an appropriate container for transport to the Maintenance facility to be reused, recycled or disposed of properly.



T FAMILY – MANAGEMENT AND SUPPORT

Building and Grounds Maintenance



Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fertilizer
- Fuel
- Litter
- Non-storm water¹
- Pesticides/herbicides
- Sediment
- Sewage
- Trash
- Vehicle fluids

DEFINITION AND PURPOSE

Permanent maintenance facilities need building and ground maintenance, which includes care of landscaped areas around each facility, cleaning of parking areas and pavements other than areas of industrial activity and maintenance of the storm water drainage system.

APPROPRIATE APPLICATION

The following procedures are used where building and grounds maintenance may pollute storm water runoff or discharge to storm water drainage system and watercourses.

OPERATIONAL PROCEDURES

Building Maintenance

- Inspect storm drains regularly for litter and debris. Clean storm water drainage systems in the fall before the first rains, and as often as necessary to keep litter and debris out of the storm water.
- Minimize water use in washing activities.
- Properly dispose of wash water generated by building maintenance activities. Dispose of wash water to the sanitary sewer system.
- Dispose of sweepings and cleaning wastes as solid waste.
- Sanitary and septic waste shall be discharged to a sanitary sewer or managed by a licensed hauler.

Grounds Maintenance

- The maintenance facility should be routinely swept to keep litter and sediment out of drainage systems.
- Apply fertilizers and pesticides in accordance with the label instructions. See Activity Cut-Sheet, E Family - Chemical Vegetation Control. Use integrated pest management where appropriate.

¹ Irrigation water and landscape irrigation are conditionally exempt discharges if appropriate control measures are developed and implemented under the SWMP.

T FAMILY – MANAGEMENT AND SUPPORT

Building and Grounds Maintenance

OPERATIONAL PROCEDURES (CONT'D)

Grounds Maintenance (cont'd)

- Do not remove original product label from paint or hazardous materials containers as it contains important spill cleanup and disposal information. Use the entire product before disposing of the container. Appropriately label all secondary containers.
- Avoid excessive irrigation of landscaped areas to minimize potential runoff.
- Control erosion and sediment runoff.
- Preserve existing vegetation by defining the work area and replace the damaged vegetation outside the defined work area.
- Do not locate stockpiles near drain inlets or watercourses.
- All wastes should be put into containers and stored appropriately until it can be recycled or disposed of properly.
- All materials of environmental concern shall be properly stored in appropriate secure containment. See Activity Cut-Sheet, T Family - Storage of Hazardous Materials (Working Stock).
- See Activity Cut Sheet, E Family - Irrigation (Watering), Potable and Non-potable.



T FAMILY – MANAGEMENT AND SUPPORT

Storage of Hazardous Materials (Working Stock)

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Asphalt products
- Cement
- Epoxy resins
- Fertilizer
- Fuel
- Paints
- Pesticides/herbicides
- Solvents
- Vehicle fluids

DEFINITION AND PURPOSE

Maintenance facilities store a variety of products which may be harmful to the environment if they come in contact with surface waters.

APPROPRIATE APPLICATION

The following procedures are used reduce the potential for the discharge of materials from hazardous material storage sites to the storm water drainage system or watercourses by minimizing exposure of the materials to storm water and safeguarding against accidental release of materials.

LIMITATIONS

The BMPs for this activity provide operating methods or measures only for the purpose of storm water pollution prevention. The applicable local, state and federal hazardous materials, employee safety and fire prevention requirements are not presented.

Although not a BMP, it should be acknowledged that other environmental laws and regulations do require spill or secondary containment for some hazardous materials and waste.

OPERATIONAL PROCEDURES

Proper hazardous materials storage procedures can be found in the Hazardous Materials Business Plan. Maintenance facilities that store hazardous materials at or above the regulated thresholds will have a Hazardous Materials Business Plan as required by regulation. Hazardous materials storage must conform to this plan.

- Store hazardous materials in a designated area containing chemically compatible materials. Do not store incompatible products in the same storage area without some type of physical barrier separating the containers. For example, do not store strong oxidizers with organics, or flammable/combustible materials. Where feasible, store hazardous materials under cover and away from areas that might drain into the storm water drainage system or watercourses. Ensure container covers or caps are secure.



T FAMILY – MANAGEMENT AND SUPPORT

Storage of Hazardous Materials (Working Stock)

OPERATIONAL PROCEDURES (CONT'D)

- Do not remove original product label from paint or hazardous materials containers as it contains important spill cleanup and disposal information. Use the entire product before properly disposing of the container. Appropriately label all secondary containers.
- Install safeguards to prevent accidental releases such as overflow protection devices, automatic shutdown transfer pumps, protection guards around tanks and piping to prevent vehicle or forklift damage. Limit access to unauthorized persons.
- Review Material Safety Data Sheets with personnel on proper labeling requirements, spill cleanup procedures and disposal of hazardous materials.
- Regularly inspect and maintain hazardous materials storage areas to minimize exposure to storm water. Use the Daily/Weekly/Monthly inspection form. Store hazardous materials on impervious surfaces if possible.
- Maintain spill cleanup materials near the storage area. Cleanup spills or leaks immediately if it is safe to do so.
- Store used lead acid batteries in spill or secondary containment. All cracked batteries shall be stored in spill containment.

Regular Maintenance of Outdoor Container Storage Area

- Inspect storage areas as required. Ensure all containers are properly labeled, with lids securely fastened, and in good condition.
- If a container is corroded or leaking, contact the District Hazardous Material Coordinator or Manager to have the waste or material transferred to a new container by trained and qualified personnel. Label the new container appropriately and properly dispose of the old container.

Paint Storage Area

- Inspect all paint pallets to ensure that all product containers are secured before transfer or transportation.
- Load and off-load paint on level ground when using a forklift to minimize possible spills and ruptures of paint containers.
- Where feasible, store paint materials in an area with a canopy or roof designed to direct runoff away from the area.

Wood Post Storage Area

- Cover treated wood posts during the rainy season.



T FAMILY – MANAGEMENT AND SUPPORT

Material Storage Control (Hazardous Waste)

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Asphalt products
- Fuel
- Lead-acid batteries
- Paints
- Solvents
- Vehicle fluids

DEFINITION AND PURPOSE

Maintenance facilities store a variety of products that may adversely impact water quality if they come in contact with surface waters.

APPROPRIATE APPLICATION

These procedures are applicable to all maintenance facilities that store any material considered by the State of California or federal regulations to be hazardous waste, and intended to reduce the potential for the discharge of hazardous waste to storm water drainage system or watercourses by providing safeguards against accidental releases.

LIMITATIONS

The BMPs for this activity provide operating methods or measures only for the purpose of storm water pollution prevention. The applicable local, state and federal hazardous materials, employee safety and fire prevention requirements are not presented.

Although not a BMP, it should be acknowledged that other environmental laws and regulations do require spill or secondary containment for some hazardous materials and waste.

OPERATIONAL PROCEDURES

- Weekly inspections are required for hazardous waste storage areas. Use the Daily/Weekly/Monthly inspection form. Storage areas should be properly secured to prevent unauthorized access.
- Hazardous waste shall be stored in appropriate containers, with lids securely fastened, constructed of compatible materials and properly labeled in accordance with federal, state and local regulations. Refer to the Maintenance Hazardous Waste Manual.
- Containment facilities shall provide for appropriate spill containment volume.
- Maintain an ample supply of appropriate spill cleanup materials near hazardous materials storage areas.
- In the event of a spill, dry cleanup methods should be used. Contaminated cleanup materials, contaminated materials and recovered spill material shall be disposed of properly.



T FAMILY – MANAGEMENT AND SUPPORT

Outdoor Storage of Raw Materials

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Asphaltic material
- Sand
- Deicing agents
- Vehicle fluids
- Fuel

DEFINITION AND PURPOSE

Maintenance facilities store a variety of raw materials that may adversely impact water quality if they come in contact with surface waters.

APPROPRIATE APPLICATION

These procedures are applicable to all maintenance facilities that store raw material such as asphalt, sand, soils, treated wood posts and mulch outdoors, and are intended to reduce the potential for discharges of potential pollutants to storm water drainage system or watercourses.

OPERATIONAL PROCEDURES

- Inspect storage areas regularly. Use the Daily/Weekly/Monthly inspection form.
- Protect storm drain inlets and watercourses from potential spills of raw materials.
- Maintain spill cleanup materials and tools. Cleanup spills immediately, if it is safe to do so, and dispose of any generated waste properly.
- Keep surfaces swept clean where material is blown or washed from the storage area, keeping materials covered and keeping storage containers in good condition.
- Store materials away from storm water drainage systems or watercourses.
- Where feasible, cover the storage area with a canopy or roof that is designed to direct the runoff away from the storage area, or cover (tarp) dry materials to prevent water intrusion during the winter season.
- During rain events, stockpiles of cold-mix asphalt shall be covered. Other stockpiles shall be covered or protected with soil stabilization measures or a perimeter sediment barrier. Contact the District Maintenance Storm Water Coordinator if problems arise.



T FAMILY – MANAGEMENT AND SUPPORT

Vehicle and Equipment Fueling

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel

DEFINITION AND PURPOSE

When vehicle and equipment fueling takes place at a maintenance facility, there is the potential for fuel to be leaked or spilled at the site. The procedures for vehicle and equipment fueling are designed to minimize contact between storm water runoff and spilled fuel, oil or other leaked vehicle fluids at equipment fueling areas.

APPROPRIATE

These procedures should be used at all equipment fueling areas.

OPERATIONAL PROCEDURES

- Fuel tanks and fuel dispensers shall have current permits with the appropriate agencies.
- Personnel at maintenance facility shall be trained to ensure that materials are properly handled and stored.
- Inspect all aboveground fueling tanks and fueling dispensers daily, using the Daily Inspection Form. Report any nozzle, hose leaks or malfunctions to the Supervisor immediately. Repair as necessary.
- When in use, inspect portable fueling tanks regularly for cracks and leaks. Repair as necessary.
- Proper fueling and spill cleanup instructions shall be posted at fueling areas.
- Clean up spills immediately, if it is safe to do so, using dry cleanup techniques and materials.
- Hosing down of leaks, drips and spills is prohibited.
- Automatic shut-off valves shall be installed at each pump where required. Manual shut-off valves shall be near fuel pumps and clearly posted where required.
- Spill cleanup materials and spill control equipment shall be maintained near fueling areas to clean up spills. Spills should be cleaned immediately and waste disposed of properly.

T FAMILY – MANAGEMENT AND SUPPORT

Vehicle and Equipment Cleaning



Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Cleaning agents
- Fuel
- Metals
- Non-storm water
- Sediment
- Vehicle fluids

DEFINITION AND PURPOSE

When vehicle and equipment cleaning is conducted at a Maintenance facility, it is essential that the wash water not be disposed to the storm water drainage system or watercourses.

APPROPRIATE APPLICATION

Proper vehicle and equipment cleaning minimizes contact between storm water runoff and the equipment washing area, and ensures that the wash water is not discharged to the storm water drainage system or watercourses.

OPERATIONAL PROCEDURES

- Vehicle and equipment washing areas should be inspected daily and cleaned as needed.
- The sump should be serviced regularly.
- Use designated areas for rinsing of vehicles and equipment to capture solid materials and minimize waste.
- Vehicle washing activities should be located at a structure or building equipped with a municipal sewer connection or closed loop system.
- If a washing area must be located outdoors, the area should have the following characteristics: The area should be surrounded by berms or graded to minimize contact with storm water running onto the area. The area should be paved with concrete. The pressure washing area should drain to a dead-end sump or directly into the sanitary sewer system.
- Wash water containing cleaning solutions such as detergents and degreasers, or hydrocarbons, shall be prevented from entering the storm water drainage system or watercourses.
- Approved safer alternative products should be used where practical and effective.
- Do not remove original product label from paint or hazardous materials containers as it contains important spill cleanup and disposal information. Use the entire product before disposing of the container. Appropriately label all secondary containers.
- Water usage should be minimized.

T FAMILY – MANAGEMENT AND SUPPORT

Vehicle and Equipment Maintenance and Repair



Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Fuel
- Vehicle fluids
- Lead-acid batteries
- Paint products
- Metals
- Used oil filters

DEFINITION AND PURPOSE

Vehicle and equipment maintenance and repair may include vehicle fluid removal, engine and parts cleaning, body repair and painting.

APPROPRIATE APPLICATION

This procedure is intended to reduce the discharge of potential pollutants from areas in which vehicle maintenance and repair activities are conducted by employing controls which minimize contact between storm water and the activity areas and products used in each activity.

OPERATIONAL PROCEDURES

- Outdoor vehicle and equipment maintenance shall not be performed during rain events or prior to predicted rain events unless required by emergency conditions.
- Maintenance activity areas should be kept clean, well organized and equipped with cleanup supplies.
- Use absorbent pads, drip pans or absorbent material as appropriate. If rags and absorbents are saturated or contaminated with high concentrations of regulated hazardous materials, dispose of rags and absorbents as hazardous waste.

Vehicle Fluid Removal

- Transfer removed vehicle fluids to recycling storage tank or drums by the end of the shift (daily).
- Transfer fluids from drip pans or other temporary containers into recycling storage tanks or drums by the end of the shift (daily).
- Ensure safeguards, such as oil shut-off valves, are installed and maintained on recovery equipment.

Engine and Parts Cleaning

- Use self-contained sinks or tanks when working with solvents. Periodically check degreasing solvent tanks for leaks. Make necessary repairs as soon as possible. Report leaks or malfunctions to the Supervisor immediately.

T FAMILY – MANAGEMENT AND SUPPORT

Vehicle and Equipment Maintenance and Repair

OPERATIONAL PROCEDURES (CONT'D)

Engine and Parts Cleaning (Cont'd)

- Allow parts to drain over the solvent sink or tank. Do not allow the solvents to drip or spill onto the floor. Allow parts to dry over the hot tank, if available. If rinsing is required, rinse over the hot tank.
- When finished using parts washer, be sure to shut it off, close the unit and cleanup area.

Body Repair and Painting

- When receiving damaged vehicles, inspect for fluid leaks and use drip pans, if necessary.
- Minimize use of “hose-off degreasers” to clean body parts before painting. Discharge wash water to sanitary sewer system.
- Use a shop vacuum to clean up dust from sanding material. Do not use vacuums for flammable liquids. Debris from wet sanding can be allowed to dry overnight then swept or vacuumed. Dispose of dust as solid waste.
- Minimize waste paint and thinner by carefully calculating paint needs based on surface area and using proper sprayer cup size.
- Do not use water to control overspray or dust in the paint booth unless you collect this wastewater. This water is to be treated prior to discharge into the sanitary sewer system.
- Clean spray guns in a self-contained cleaner. Recycle the cleaning solution when it becomes too dirty to use. Do not discharge cleaning waste to the sewer or storm drain.

Drain Control

- Keep internal floor drains plugged unless they drain to the sanitary sewer. Use dry cleanup methods, such as sweeping, when possible.
- Keep spill control equipment and covers available to protect external drain inlets.



T FAMILY – MANAGEMENT AND SUPPORT

Aboveground and Underground Tank Leak and Spill Control

Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourse:

- Emulsions
- Fuel
- Vehicle fluids

DEFINITION AND PURPOSE

Maintenance facilities may use aboveground storage tanks for storage of bulk quantities of liquids.

APPROPRIATE APPLICATION

This procedure is intended to reduce the discharge of pollutants to storm water drainage system or watercourses from storage tanks by installing safeguards against accidental releases.

OPERATIONAL PROCEDURES

- Review the Spill Prevention Control and Countermeasures (SPCC) plan for the Maintenance facility aboveground tank(s) if available.
- Tanks, hoses and pumps shall be maintained and inspected daily.
- Maintain good housekeeping practices and cleanup leaks or drips immediately, if it is safe to do so.
- If a spill occurs, protect drain inlets from the releases if safe to do so.
- Maintain an ample amount of spill cleanup materials near the tanks. Clean spills immediately, if it is safe to do so, and dispose of waste properly. Use dry cleanup techniques when possible.
- Rainwater in spill containment is to be inspected or tested before it is discharged. Drain valves shall be closed after releasing clean rainwater.



APPENDIX C

MAINTENANCE BMPs

SECTION C MAINTENANCE BMPS

C.1	Maintenance BMPS	C-4
C.2	Maintenance Activity Tables	C-4
C.3	Scheduling and Planning	C-23
C.4	Sediment Control	C-25
C.4.1	Silt Fence	C-26
C.4.2	Sandbag or Gravel Bag Barrier	C-28
C.4.3	Straw Bale Barrier	C-31
C.4.4	Fiber Rolls	C-33
C.4.5	Check Dam	C-35
C.4.6	Sediment Trap	C-37
C.5	Storm Drain Inlet Protection	C-39
C.6	Concentrated Flow Conveyance Controls	C-41
C.6.1	Overside/Slope Drains	C-41
C.6.2	Ditches, Berms, Dikes and Swales	C-43
C.6.3	Temporary Diversion Ditches	C-45
C.7	Soil Stabilization	C-46
C.7.1	Compaction	C-47
C.7.2	Wood Mulch	C-48
C.7.3	Hydraulic Mulch	C-49
C.7.4	Hydroseeding/Handseeding	C-50
C.7.5	Soil Binders	C-51
C.7.6	Straw Mulch	C-52
C.7.7	Geotextiles, Mats/Plastic Covers and Erosion Control Blankets	C-53
C.7.8	Riprap (Rock Slope Protection)	C-55
C.8	Preservation of Existing Vegetation	C-56
C.9	Clear-Water Diversion	C-58
C.10	Work in a Water Body	C-59
C.11	Wind Erosion Control	C-60



C.12	Sediment Tracking Control	C-61
	C.12.1 Stabilized Activity Entrance/Exit	C-62
	C.12.2 Tire Inspection and Sediment Removal	C-63
C.13	Waste Management	C-64
	C.13.1 Spill Prevention and Control	C-65
	C.13.2 Solid Waste Management	C-67
	C.13.3 Hazardous Waste Management	C-69
	C.13.4 Contaminated Soil Management	C-71
	C.13.5 Sanitary/Septic Waste Management	C-72
	C.13.6 Liquid Waste Management	C-73
	C.13.7 Concrete Waste Management	C-75
C.14	Materials Handling	C-77
	C.14.1 Material Delivery and Storage	C-78
	C.14.2 Material Use	C-80
C.15	Vehicle and Equipment Operations	C-82
	C.15.1 Vehicle and Equipment Cleaning	C-83
	C.15.2 Vehicle and Equipment Fueling	C-85
	C.15.3 Vehicle and Equipment Maintenance	C-87
C.16	Paving Operations Procedures	C-89
C.17	Stockpile Management	C-90
C.18	Water Conservation Practices	C-92
C.19	Potable Water/Irrigation	C-93
C.20	Storm Drain Stenciling	C-94
C.21	Safer Alternative Products	C-95
C.22	Drainage Facilities	C-96
	C.22.1 Baseline Storm Water Drainage Facilities Inspection and Cleaning	C-97
	C.22.2 Enhanced Storm Drain Inlet Inspection and Cleaning Program	C-98
	C.22.3 Illicit Connection Detection, Reporting and Removal	C-99
	C.22.4 Illegal Spill Discharge Control	C-100



C.23	Treatment System Maintenance	C-101
C.23.1	Vegetated Treatment System (Biofiltration Swales and Strips)	C-103
C.23.2	Infiltration Basins	C-107
C.23.3	Infiltration Trenches	C-111
C.23.4	Detention Devices	C-114
C.23.5	Traction Sand Trap Devices	C-118
C.23.6	Gross Solids Removal Devices	C-121
C.23.7	Austin Sand Filters	C-127
C.23.8	Delaware Sand Filters	C-130
C.23.9	Multi-Chambered Treatment Train (MCTT)	C-133
C.23.10	Wet Basin	C-137
C.24	Litter and Debris Removal	C-141
C.24.1	Litter and Debris	C-142
C.24.2	Anti-Litter Signs	C-143
C.25	Chemical Vegetation Control	C-144
C.26	Vegetated Slope Inspection	C-146
C.27	Snow Removal and De-Icing Agents	C-147
C.28	Storm Water Dewatering Operations (Temporary Pumping Operation)	C-148
C.29	Sweeping and Vacuuming	C-149
C.30	Maintenance Facility Housekeeping Practices	C-151

C.1 MAINTENANCE BMPS¹

Caltrans performs a variety of maintenance activities on highways throughout California to maintain a safe and usable condition for the motoring public. In contrast to construction projects, maintenance activities are performed by a small crew for a short duration (most activities are completed within one day) and minimal soil disturbance (generally less than 0.4 ha [1 acre]). This section of the Guidelines describes the storm water pollution prevention BMPs that are used at Maintenance facility operations and during highway activities. Maintenance activity sites are located along the state's highways and rights-of-way. The practices described in this section may be used for purposes other than storm water pollution prevention, but those uses are not described in this Appendix.

This section describes those BMPs to be considered during maintenance activities. These BMPs shall be considered for implementation on an activity-by-activity basis. Caltrans Maintenance Managers provide supervision to the Maintenance Superintendents who ensure the maintenance BMPs are implemented within their jurisdictions. Maintenance Supervisors have on-site responsibility for BMP implementation and maintenance.

Section 1.3.4 of the Statewide SWMP defines emergency conditions under which the protection of public health, safety and property takes precedence over the BMPs in these Guidelines. Maintenance personnel are frequently tasked with responding to emergency situations where some elements of the Guidelines cannot be applied for the duration of the emergency.

The terms “may, should and shall” are used throughout these Guidelines. These terms are used consistently with other Caltrans maintenance guidance documents. They are defined as follows:

- **May:** Maintenance staff have the flexibility to use or not use the guidance provided based on their best professional judgment.
- **Should:** Maintenance staff will follow the guidance provided unless there is a strong justification for doing otherwise. Maintenance staff need to document the justification for not implementing a BMP.
- **Shall:** Maintenance staff must follow the provided guidance.

C.2 MAINTENANCE ACTIVITY TABLES

This section introduces a series of tables that have been prepared for each maintenance activity provided in this section. The purpose of these tables is to identify the approved Maintenance

¹ Appendix C was edited from the Statewide Storm Water Quality Practices Guidelines (Guidelines). The Guidelines contain all the best management practices (BMPs) applied to the maintenance activities approved by the California Department of Transportation Maintenance Division. The Maintenance Activity Tables provided do not represent an exhaustive inventory of Maintenance activities. However, the tables do represent typical activities that may affect storm water and the pollution prevention control methods for consideration.

BMPs that may be applicable for each Caltrans maintenance operation and activity. Personnel performing maintenance activities can determine which BMPs should be applied for each activity by consulting these tables.

For some activities, maintenance personnel may select from a variety of BMPs for storm water pollution prevention. For example, during cleanup or repair of minor slides and slip-outs, several sediment controls are available that may adequately contain sediment. Personnel will need to select one or a combination of the available control methods to address the sediment they encounter at the site. Also, individual BMPs identified on the tables will not necessarily be applicable to all projects involving the activity. For example, not all projects will have on-site fueling operations, but those that do should be required to perform those operations in a manner consistent with the intent of the BMP descriptions that follow the tables.

TABLE C-1: A FAMILY – ASPHALT CEMENT CRACK AND JOINT GRINDING/SEALING

Hazardous Waste Management, C.13.3	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Liquid Waste Management, C.13.6	Stockpile Management, C.17
Paving Operations Procedures, C.16	Storm Drain Inlet Protection, C.5
Safer Alternative Products, C.21	Sweeping and Vacuuming, C.29
Sanitary/Septic Waste Management, C.13.5	Vehicle and Equipment Operations, C.15

TABLE C-2: A FAMILY – ASPHALT PAVING

Hazardous Waste Management, C.13.3	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Liquid Waste Management, C.13.6	Stockpile Management, C.17
Material Use, C.14.2	Storm Drain Inlet Protection, C.5
Paving Operations Procedures, C.16	Sweeping and Vacuuming, C.29
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Sanitary/Septic Waste Management, C.13.5	Water Conservation Practice, C.18

TABLE C-3: A FAMILY – STRUCTURAL PAVEMENT FAILURE (DIGOUT) PAVEMENT GRINDING AND PAVING

Concrete Waste Management, C.13.7	Scheduling and Planning, C.3
Hazardous Waste Management, C.13.3	Solid Waste Management, C.13.2
Illegal Spill Discharge Control, C.22.4	Spill Prevention and Control, C.13.1
Illicit Connection Detection, Reporting and Removal, C.22.3	Stockpile Management, C.17
Liquid Waste Management, C.13.6	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Sweeping and Vacuuming, C.29
Paving Operations Procedures, C.16	Vehicle and Equipment Operations, C.15
Safer Alternative Products, C.21	Water Conservation Practice, C.18
Sanitary/Septic Waste Management, C.13.5	

TABLE C-4: A FAMILY – EMERGENCY POTHOLE REPAIRS

Material Use, C.14.2	Vehicle and Equipment Operations, C.15
Safer Alternative Products, C.21	

TABLE C-5: A FAMILY – SEALING OPERATIONS

Hazardous Waste Management, C.13.3	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Liquid Waste Management, C.13.6	Stockpile Management, C.17
Material Use, C.14.2	Storm Drain Inlet Protection, C.5
Paving Operations Procedures, C.16	Sweeping and Vacuuming, C.29
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Sanitary/Septic Waste Management, C.13.5	Water Conservation Practice, C.18

TABLE C-6: B FAMILY – PORTLAND CEMENT CRACK AND JOINT SEALING

Hazardous Waste Management, C.13.3	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Liquid Waste Management, C.13.6	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Sweeping and Vacuuming, C.29
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Sanitary/Septic Waste Management, C.13.5	

TABLE C-7: B FAMILY – MUDJACKING AND DRILLING

Concrete Waste Management, C.13.7	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Liquid Waste Management, C.13.6	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Sweeping and Vacuuming, C.29
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Sanitary/Septic Waste Management, C.13.5	Water Conservation Practice, C.18

TABLE C-8: B FAMILY – CONCRETE SLAB AND SPALL REPAIR

Concrete Waste Management, C.13.7	Scheduling and Planning, C.3
Hazardous Waste Management, C.13.3	Solid Waste Management, C.13.2
Illegal Spill Discharge Control, C.22.4	Spill Prevention and Control, C.13.1
Illicit Connection Detection, Reporting and Removal, C.22.3	Stockpile Management, C.17
Liquid Waste Management, C.13.6	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Sweeping and Vacuuming, C.29
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Sanitary/Septic Waste Management, C.13.5	Water Conservation Practice, C.18

TABLE C-9: C FAMILY – SHOULDER GRADING

Compaction, C.7.1	Spill Prevention and Control, C.13.1
Illegal Spill Discharge Control, C.22.4	Stockpile Management, C.17
Illicit Connection Detection, Reporting and Removal, C.22.3	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Sweeping and Vacuuming, C.29
Preservation of Existing Vegetation, C.8	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	Water Conservation Practice, C.18
Solid Waste Management, C.13.2	Wind Erosion Control, C.11

TABLE C-10: C FAMILY – NONLANDSCAPED CHEMICAL VEGETATION CONTROL

Chemical Vegetation Control, C.25	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Spill Prevention and Control, C.13.1
Illicit Connection Detection, Reporting and Removal, C.22.3	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Vehicle and Equipment Operations, C.15
Preservation of Existing Vegetation, C.8	Water Conservation Practice, C.18
Safer Alternative Products, C.21	

TABLE C-11: C FAMILY – NONLANDSCAPED MECHANICAL VEGETATION CONTROL/MOWING

Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Preservation of Existing Vegetation, C.8	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	

TABLE C-12: C FAMILY – NONLANDSCAPED TREE AND SHRUB PRUNING, BRUSH CHIPPING, TREE AND SHRUB REMOVAL

Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Preservation of Existing Vegetation, C.8	Stockpile Management, C.17
Sanitary/Septic Waste Management, C.13.5	Storm Drain Inlet Protection, C.5
Scheduling and Planning, C.3	Vehicle and Equipment Operations, C.15

TABLE C-13: C FAMILY – FENCE REPAIR

Compaction, C.7.1	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Stabilized Activity Entrance/Exit, C.21.1
Material Use, C.14.2	Tire Inspection and Sediment Removal, C.12.2
	Vehicle and Equipment Operations, C.15

TABLE C-14: C FAMILY – DRAINAGE DITCH AND CHANNEL MAINTENANCE

Baseline Storm Water Drainage Facilities Inspection and Cleaning, C.22.1	Liquid Waste Management, C.13.6
Clear-Water Diversion, C.9	Material Use, C.14.2
Compaction, C.7.1	Preservation of Existing Vegetation, C.8
Concrete Waste Management, C.13.7	Scheduling and Planning, C.3
Contaminated Soil Management, C.13.4	Sediment Control, C.4
Geotextiles, Mats/Plastic Covers and Erosion Control Blankets, C.7.7	Solid Waste Management, C.13.2
Hydroseeding/Handseeding, C.7.4	Stabilized Activity Entrance/Exit, C.12.1
Illegal Spill Discharge Control, C.22.4	Stockpile Management, C.17
Illicit Connection Detection, Reporting and Removal, C.22.3	Storm Drain Inlet Protection, C.5
	Tire Inspection and Sediment Removal, C.12.2
	Vehicle and Equipment Operations, C.15

TABLE C-15: C FAMILY – DRAIN AND CULVERT MAINTENANCE

Baseline Storm Water Drainage Facilities Inspection and Cleaning, C.22.1	Preservation of Existing Vegetation, C.8
Compaction, C.7.1	Sanitary/Septic Waste Management, C.13.5
Concrete Waste Management, C.13.7	Scheduling and Planning, C.3
Contaminated Soil Management, C.13.4	Sediment Control, C.4
Enhanced Storm Drain Inlet Inspection and Cleaning Program, C.22.2	Solid Waste Management, C.13.2
Hydroseeding/Handseeding, C.7.4	Stabilized Activity Entrance/Exit, C.12.1
Illegal Spill Discharge Control, C.22.4	Stockpile Management, C.17
Illicit Connection Detection, Reporting and Removal, C.22.3	Tire Inspection and Sediment Removal, C.12.2
Liquid Waste Management, C.13.6	Vehicle and Equipment Operation, C.15
	Water Conservation Practice, C.18



TABLE C-16: C FAMILY – CURB AND SIDEWALK REPAIR

Concrete Waste Management, C.13.7	Solid Waste Management, C.13.2
Hazardous Waste Management, C.13.3	Spill Prevention and Control, C.13.1
Illegal Spill Discharge Control, C.22.4	Stockpile Management, C.17
Illicit Connection Detection, Reporting and Removal, C.22.3	Storm Drain Inlet Protection, C.5
Liquid Waste Management, C.13.6	Sweeping and Vacuuming, C.29
Material Use, C.14.2	Vehicle and Equipment Operations, C.15
Safer Alternative Products, C.2.1	Water Conservation Practice, C.18
Scheduling and Planning, C.3	

TABLE C-17: D FAMILY – SWEEPING OPERATIONS

Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Stockpile Management, C.17
Liquid Waste Management, C.13.6	Sweeping and Vacuuming, C.29
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	Water Conservation Practice, C.18

TABLE C-18: D FAMILY – LITTER AND DEBRIS REMOVAL

Anti-Litter Signs, C.24.2	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Sweeping and Vacuuming, C.29
Litter and Debris, C.24.1	Vehicle and Equipment Operations, C.15
Sanitary/Septic Waste Management, C.13.5	Water Conservation Practice, C.18



TABLE C-19: D FAMILY – EMERGENCY RESPONSE AND CLEANUP PRACTICES

Contaminated Soil Management, C.13.4	Scheduling and Planning, C.3
Hazardous Waste Management, C.13.3	Solid Waste Management, C.13.2
Illegal Spill Discharge Control, C.22.4	Spill Prevention and Control, C.13.1
Illicit Connection Detection, Reporting and Removal, C.22.3	Stabilized Activity Entrance/Exit, C.12.1
Liquid Waste Management, C.13.6	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Sweeping and Vacuuming, C.29
Preservation of Existing Vegetation, C.8	Tire Inspection and Sediment Removal, C.12.2
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Sanitary/Septic Waste Management, C.13.5	Water Conservation Practice, C.18

TABLE C-20: D FAMILY – GRAFFITI REMOVAL

Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Liquid Waste Management, C.13.6	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Sweeping and Vacuuming, C.29
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	Water Conservation Practice, C.18

TABLE C-21: E FAMILY – CHEMICAL VEGETATION CONTROL

Chemical Vegetation Control, C.25	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Spill Prevention and Control, C.13.1
Illicit Connection Detection, Reporting and Removal, C.22.3	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Vehicle and Equipment Operations, C.15
Preservation of Existing Vegetation, C.8	Water Conservation Practice, C.18
Safer Alternative Products, C.21	

TABLE C-22: E FAMILY – MANUAL VEGETATION CONTROL

Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Preservation of Existing Vegetation, C.8	Storm Drain Inlet Protection, C.5
Sanitary/Septic Waste Management, C.3.5	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	

TABLE C-23: E FAMILY – LANDSCAPED MECHANICAL VEGETATION CONTROL/MOWING

Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Preservation of Existing Vegetation, C.8	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	

TABLE C-24: E FAMILY – LANDSCAPED TREE AND SHRUB PRUNING, BRUSH CHIPPING AND TREE AND SHRUB REMOVAL

Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Preservation of Existing Vegetation, C.8	Stockpile Management, C.17
Sanitary/Septic Waste Management, C.13.5	Storm Drain Inlet Protection, C.5
Scheduling and Planning, C.3	Vehicle and Equipment Operations, C.15

TABLE C-25: E FAMILY – IRRIGATION LINE REPAIRS

Compaction, C.7.1	Scheduling and Planning, C.3
Hydroseeding/Handseeding, C.7.4	Sediment Control, C.4
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Material Use, C.14.2	Storm Drain Inlet Protection, C.5
Potable Water/Irrigation, C.19	Vehicle and Equipment Operations, C.15
Preservation of Existing Vegetation, C.8	Water Conservation Practice, C.18



TABLE C-26: E FAMILY – IRRIGATION (WATERING), POTABLE AND NONPOTABLE

Illegal Spill Discharge Control, C.22.4	Scheduling and Planning, C.3
Illicit Connection Detection, Reporting and Removal, C.22.3	Vehicle and Equipment Operations, C.15
Potable Water/Irrigation, C.19	Water Conservation Practice, C.18

TABLE C-27: F FAMILY – STORM DRAIN STENCILING

Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Liquid Waste Management, C.13.6	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Storm Drain Stenciling, C.20
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	

TABLE C-28: F FAMILY – ROADSIDE SLOPE INSPECTION

Illegal Spill Discharge Control, C.22.4	Vegetated Slope Inspection, C.26
Illicit Connection Detection, Reporting and Removal, C.22.3	Vehicle and Equipment Operations, C.15

TABLE C-29: F FAMILY – ROADSIDE STABILIZATION

Compaction, C.7.1	Soil Binders, C.7.5
Hydraulic Mulch, C.7.3	Spill Prevention and Control, C.13.1
Hydroseeding/Handseeding, C.7.4	Stabilized Activity Entrance/Exit, C.12.1
Illegal Spill Discharge Control, C.22.4	Stockpile Management, C.17
Illicit Connection Detection, Reporting and Removal, C.22.3	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Sweeping and Vacuuming, C.29
Preservation of Existing Vegetation, C.8	Tire Inspection and Sediment Removal, C.12.2
Safer Alternative Products, C.21	Vegetated Slope Inspection, C.26
Sanitary/Septic Waste Management, C.13.5	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	Water Conservation Practice, C.18
Sediment Control, C.4	Wind Erosion Control, C.11

TABLE C-30: F FAMILY – STORM WATER TREATMENT DEVICES

Contaminated Soil Management, C.13.4	Scheduling and Planning, C.3
Detention Devices, C.23.3	Solid Waste Management, C.13.2
Illegal Spill Discharge Control, C.22.4	Stabilized Activity Entrance/Exit, C.12.1
Illicit Connection Detection, Reporting and Removal, C.22.3	Tire Inspection and Sediment Removal, C.12.2
Infiltration Basins, C.23.2	Vegetated Treatment Systems, C.23.1
Litter and Debris, C.24.1	Vehicle and Equipment Operations, C.15

TABLE C-31: F FAMILY – TRACTION SAND TRAP DEVICES

Contaminated Soil Management, C.13.4	Solid Waste Management, C.13.2
Illegal Spill Discharge Control, C.22.4	Storm Drain Inlet Protection, C.5
Illicit Connection Detection, Reporting and Removal, C.22.3	Traction Sand Trap Devices, C.23.4
Scheduling and Planning, C.3	Vehicle and Equipment Operations, C.15

TABLE C-32: G FAMILY – PUBLIC FACILITIES

Anti-Litter Signs, C.24.2	Preservation of Existing Vegetation, C.8
Concrete Waste Management, C.13.7	Safer Alternative Products, C.21
Illegal Spill Discharge Control, C.22.4	Sanitary/Septic Waste Management, C.13.5
Illicit Connection Detection, Reporting and Removal, C.22.3	Scheduling and Planning, C.3
Liquid Waste Management, C.13.6	Solid Waste Management, C.13.2
Litter and Debris, C.24.1	Spill Prevention and Control, C.13.1
Maintenance Facility Housekeeping Practices, C.30	Storm Drain Inlet Protection, C.5
Material Delivery and Storage, C.14.1	Storm Drain Stenciling, C.20
Material Use, C.14.2	Sweeping and Vacuuming, C.29
Potable Water/Irrigation, C.19	Vehicle and Equipment Operations, C.15
	Water Conservation Practice, C.18

TABLE C-33: H FAMILY – WELDING AND GRINDING

Hazardous Waste Management, C.13.3	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Vehicle and Equipment Operations, C.15
Safer Alternative Products, C.21	

TABLE C-34: H FAMILY – SANDBLASTING, WET BLAST WITH SAND INJECTION AND HYDROBLASTING

Hazardous Waste Management, C.13.3	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Sediment Control, C.4
Illicit Connection Detection, Reporting and Removal, C.22.3	Solid Waste Management, C.13.2
Liquid Waste Management, C.13.6	Spill Prevention and Control, C.13.1
Material Use, C.14.2	Storm Drain Inlet Protection, C.5
Safer Alternative Products, C.21	Sweeping and Vacuuming, C.29
Sanitary/Septic Waste Management, C.13.5	Vehicle and Equipment Operations, C.15
	Water Conservation Practice, C.18

TABLE C-35: H FAMILY – PAINTING

Hazardous Waste Management, C.13.3	Sanitary/Septic Waste Management, C.13.5
Illegal Spill Discharge Control, C.22.4	Scheduling and Planning, C.3
Illicit Connection Detection, Reporting and Removal, C.22.3	Solid Waste Management, C.13.2
Liquid Waste Management, C.13.6	Spill Prevention and Control, C.13.1
Material Use, C.14.2	Storm Drain Inlet Protection, C.5
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15

TABLE C-36: H FAMILY – BRIDGE REPAIRS

Illegal Spill Discharge Control, C.22.4	Vehicle and Equipment Operations, C.15
Sanitary/Septic Waste Management, C.13.5	See A Family - Structural Pavement Failure (Digouts) Grinding and Paving
Scheduling and Planning, C.3	See B Family - Concrete Slab and Spall Repair
Spill Prevention and Control, C.13.1	See H Family - Welding and Grinding



TABLE C-37: H FAMILY – DRAW BRIDGE MAINTENANCE

Hazardous Waste Management, C.13.3	Sanitary/Septic Waste Management, C.13.5
Illegal Spill Discharge Control, C.22.4	Scheduling and Planning, C.3
Liquid Waste Management, C.13.6	Solid Waste Management, C.13.2
Material Use, C.14.2	Spill Prevention and Control, C.13.1
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15

TABLE C-38: J FAMILY – PUMP STATION CLEANING

Contaminated Soil Management, C.13.4	Spill Prevention and Control, C.13.1
Illegal Spill Discharge Control, C.22.4	Stabilized Activity Entrance/Exit, C.12.1
Illicit Connection Detection, Reporting and Removal, C.22.3	Stockpile Management, C.17
Liquid Waste Management, C.13.6	Sweeping and Vacuuming, C.29
Maintenance Facility Housekeeping Practices, C.30	Tire Inspections and Sediment Removal, C.12.2
Scheduling and Planning, C.3	Vehicle and Equipment Operations, C.15
Solid Waste Management, C.13.2	Water Conservation Practice, C.18

TABLE C-39: J FAMILY – TUBE AND TUNNEL MAINTENANCE AND REPAIR

Concrete Waste Management, C.13.7	Solid Waste Management, C.13.2
Illegal Spill Discharge Control, C.22.4	Spill Prevention and Control, C.13.1
Illicit Connection Detection, Reporting and Removal, C.22.3	Storm Drain Inlet Protection, C.5
Liquid Waste Management, C.13.6	Vehicle and Equipment Operations, C.15
Material Use, C.14.2	Water Conservation Practice, C.18
Safer Alternative Products, C.21	See A Family - Structural Pavement Failure (Dugouts) Pavement Grinding and Paving
Scheduling and Planning, C.3	See B Family - Concrete Slab and Spall Repair

TABLE C-40: J FAMILY – FERRYBOAT OPERATIONS

Illegal Spill Discharge Control, C.22.4	Liquid Waste Management, C.13.6
Illicit Connection Detection, Reporting and Removal, C.22.3	Solid Waste Management, C.13.2
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	Water Conservation Practice, C.18

TABLE C-41: J FAMILY – TOW TRUCK OPERATIONS

Hazardous Waste Management, C.13.3	Safer Alternative Products, C.21
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Liquid Waste Management, C.13.6	Spill Prevention and Control, C.13.1
Maintenance Facility Housekeeping Practices, C.30	Vehicle and Equipment Maintenance, C.15

TABLE C-42: J FAMILY – TOLL BOTH LANE SCRUBBING OPERATIONS

Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Stockpile Management, C.17
Liquid Waste Management, C.13.6	Sweeping and Vacuuming, C.29
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	Water Conservation Practice, C.18

TABLE C-43: K FAMILY – SAWCUTTING FOR LOOP INSTALLATION

Concrete Waste Management, C.13.7	Solid Waste Management, C.13.2
Illegal Spill Discharge Control, C.22.4	Storm Drain Inlet Protection, C.5
Illicit Connection Detection, Reporting and Removal, C.22.3	Sweeping and Vacuuming, C.29
Liquid Waste Management, C.13.6	Vehicle and Equipment Operations, C.15
Material Use, C.14.2	Water Conservation Practice, C.18
Scheduling and Planning, C.3	

TABLE C-44: M FAMILY – THERMOPLASTIC STRIPING AND MARKING

Hazardous Waste Management, C.13.3	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Material Use, C.14.2	Sweeping and Vacuuming, C.29
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15

TABLE C-45: M FAMILY – PAINT STRIPING AND MARKING

Illegal Spill Discharge Control, C.22.3	Spill Prevention and Control, C.13.1
Illicit Connection Detection, Reporting and Removal, C.22.4	Stockpile Management, C.17
Liquid Waste Management, C.13.6	Storm Drain Inlet Protection, C.5
Material Use, C.14.2	Sweeping and Vacuuming, C.29
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	Water Conservation Practice, C.18
Solid Waste Management, C.13.2	

TABLE C-46: M FAMILY – RAISED/RECESSED PAVEMENT MARKER APPLICATION AND REMOVAL

Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Material Use, C.14.2	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	

TABLE C-47: M FAMILY – SIGN REPAIR AND MAINTENANCE

Compaction, C.7.1	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Vehicle and Equipment Operations, C.15
Material Use, C.14.2	

TABLE C-48: M FAMILY – MEDIAN BARRIER AND GUARD RAIL REPAIR

Compaction, C.7.1	Stabilized Activity Entrance/Exit, C.12.1
Concrete Waste Management, C.13.7	Sweeping and Vacuuming, C.29
Illegal Spill Discharge Control, C.22.4	Tire Inspection and Sediment Removal, C.12.2
Illicit Connection Detection, Reporting and Removal, C.22.3	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	Water Conservation Practice, C.18
Solid Waste Management, C.13.2	

TABLE C-49: M FAMILY – EMERGENCY VEHICLE ENERGY ATTENUATOR REPAIR

Illegal Spill Discharge Control, C.22.4	Storm Drain Inlet Protection, C.5
Illicit Connection Detection, Reporting and Removal, C.22.3	Sweeping and Vacuuming, C.29
Solid Waste Management, C.13.2	Vehicle and Equipment Operations, C.15
Spill Prevention and Control, C.13.1	Water Conservation Practice, C.18

TABLE C-50: R FAMILY – SNOW REMOVAL

Illegal Spill Discharge Control, C.22.4	Snow Removal and De-Icing Agents, C.29
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	

TABLE C-51: R FAMILY – ICE CONTROL

Illegal Spill Discharge Control, C.22.4	Snow Removal and De-Icing Agents, C.29
Illicit Connection Detection, Reporting and Removal, C.22.3	Spill Prevention and Control, C.13.1
Material Use, C.14.2	Sweeping and Vacuuming, C.29
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15
Scheduling and Planning, C.3	

TABLE C-52: S FAMILY – MINOR SLIDES AND SLIPOUTS CLEANUP/REPAIR

Ditches, Berms, Dikes and Swales, C.6.2	Storm Drain Inlet Protection, C.5
Illegal Spill Discharge Control, C.22.4	Storm Water Dewatering Operation, C.28
Illicit Connection Detection, Reporting and Removal, C.22.3	Sweeping and Vacuuming, C.29
Overside/ Slope Drains, C.6.1	Temporary Diversion Ditches, C.6.3
Preservation of Existing Vegetation, C.8	Tire Inspection and Sediment Removal, C.12.2
Sediment Control, C.4	Vegetated Slope Inspection, C.26
Soil Stabilization, C.7	Vehicle and Equipment Operations, C.15
Solid Waste Management, C.13.2	Wind Erosion Control, C.11
Stabilized Activity Entrance/Exit, C.12.1	Work in a Water Body, C.10
Stockpile Management, C.17	

TABLE C-53: T FAMILY – BUILDING AND GROUNDS MAINTENANCE

Chemical Vegetation Control, C.25	Safer Alternatives Products, C.21
Compaction, C.71	Sanitary/Septic Waste Management, C.13.5
Concrete Waste Management, C.13.7	Scheduling and Planning, C.3
Hazardous Waste Management, C.13.3	Sediment Control, C.4
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Liquid Waste Management, C.13.6	Spill Prevention and Control, C.13.1
Litter and Debris, C.24.1	Stockpile Management, C.17
Maintenance Facility Housekeeping Practices, C.30	Storm Drain Stenciling, C.20
Material Delivery and Storage, C.14.1	Sweeping and Vacuuming, C.29
Material Use, C.14.2	Vehicle and Equipment Operations, C.15
Potable Water/Irrigation, C.19	Water Conservation Practice, C.18
Preservation of Existing Vegetation, C.8	

TABLE C-54: T FAMILY – STORAGE OF HAZARDOUS MATERIALS (WORKING STOCK)

Illegal Spill Discharge Control, C.22.4	Scheduling and Planning, C.3
Material Delivery and Storage, C.14.1	Spill Prevention and Control, C.13.1
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15



TABLE C-55: T FAMILY – MATERIAL STORAGE CONTROL (HAZARDOUS WASTE)

Hazardous Waste Management, C.13.3	Scheduling and Planning, C.3
Illegal Spill Discharge Control, C.22.4	Spill Prevention and Control, C.13.1
Material Delivery and Storage, C.14.1	Vehicle and Equipment Operations, C.15

TABLE C-56: T FAMILY – OUTDOOR STORAGE OF RAW MATERIALS

Illegal Spill Discharge Control, C.22.4	Scheduling and Planning, C.3
Maintenance Facility Housekeeping Practices, C.30	Spill Prevention and Control, C.13.1
Material Delivery and Storage, C.14.1	Stockpile Management, C.17
Safer Alternative Products, C.21	Vehicle and Equipment Operations, C.15

TABLE C-57: T FAMILY – VEHICLE AND EQUIPMENT FUELING

Illegal Spill Discharge Control, C.22.4	Spill Prevention and Control, C.13.1
Material Delivery and Storage, C.14.1	Vehicle and Equipment Fueling, C.15.2

TABLE C-58: T FAMILY – VEHICLE AND EQUIPMENT CLEANING

Illegal Spill Discharge Control, C.22.4	Vehicle and Equipment Cleaning, C.15.1
Liquid Waste Management, C.13.6	Water Conservation Practice, C.18
Material Use, C.14.2	

TABLE C-59: T FAMILY – VEHICLE AND EQUIPMENT MAINTENANCE AND REPAIR

Hazardous Waste Management, C.13.3	Safer Alternative Products, C.21
Illegal Spill Discharge Control, C.22.4	Solid Waste Management, C.13.2
Liquid Waste Management, C.13.6	Spill Prevention and Control, C.13.1
Maintenance Facility Housekeeping Practices, C.30	Vehicle and Equipment Maintenance, C.15

TABLE C-60: T FAMILY – ABOVEGROUND AND UNDERGROUND TANK LEAK AND SPILL CONTROL

Hazardous Waste Management, C.13.3	Material Delivery and Storage, C.14.1
Illegal Spill Discharge Control, C.22.4	Scheduling and Planning, C.3
Liquid Waste Management, C.13.6	Spill Prevention and Control, C.13.1
Maintenance Facility Housekeeping Practices, C.30	Storm Drain Inlet Protection, C.5

C.3 SCHEDULING AND PLANNING

Description:

This BMP involves scheduling and planning of all activities (at maintenance facilities or maintenance activity sites) in a manner that considers the use of BMPs. Planning is needed to reduce the exposure of potential pollutants to wind, rain, runoff and vehicle tracking. Planning is important when working in the vicinity of a drainage system or water body. Caltrans Regional Work Plans identify sensitive water bodies where even higher levels of protection are needed. This BMP also includes the scheduling of maintenance activities and control practices to minimize potential water quality impacts during rainfall events.

Appropriate Applications:

Except for emergency conditions, the following activities shall not be performed during rain events or when storms are predicted:

- Asphalt cement crack and joint grinding/sealing;
- Asphalt paving;
- Structural pavement failure (digouts) pavement grinding and paving;
- Sealing operations;
- Portland cement crack and joint sealing;
- Mudjacking and drilling;
- Shoulder grading (should not be performed if runoff is visible);
- Nonlandscaped chemical vegetation control;
- Curb and sidewalk repair;
- Chemical vegetation control;
- Painting;
- Thermoplastic striping and marking;
- Paint striping and marking;
- Raised/recessed pavement marker application and removal; and
- Outdoor vehicle and equipment maintenance and repair.

Maintenance activities should be scheduled to minimize land disturbance during the rainy season.

Implementation:

- During the rainy season and prior to forecast storm events, avoid scheduling maintenance activities that could adversely affect storm water quality.
- Establish the appropriate planting time when introducing vegetation. If it is necessary to vegetate disturbed soil at other times of the year, then perform more frequent inspections and maintenance. Apply other BMPs (e.g., Section C.7.2 Wood Mulch BMP or Section C.7.6 Straw Mulch BMP) if the vegetation is not successfully established.

Maintenance:

- Verify that work is progressing in accordance with the schedule. If the schedule changes, revise BMPs as necessary.
- Inspect vegetation and perform maintenance to ensure it is established.

C.4 SEDIMENT CONTROL

Sediment control includes those practices that intercept, slow or detain the flow of storm water and allow sediment to settle and be trapped. These practices can consist of installing linear sediment barriers (e.g., Section C.4.1 Silt Fences BMP, Section C.4.2 Sandbag or Gravel Bag Barriers BMP and Section C.4.3 Straw Bale Barriers BMP), Fiber Rolls BMP (Section C.4.4) or Check Dams BMP (Section C.4.5) to break up slope length or flow; they may also include constructing a Sediment Trap BMP (Section C.4.6). Sediment barriers are typically placed below the toe of exposed and/or erodible slopes, downslope of exposed soil areas, around stockpiles, and at other appropriate locations along the perimeter of disturbed soil areas. All sediment barriers require periodic inspection and maintenance.

C.4.1 Silt Fence

Description:

A silt fence is a linear sediment barrier of permeable fabric designed to intercept and slow the flow of sediment-laden sheet flow runoff. Silt fences allow sediment to settle from runoff before water leaves a disturbed soil area. Silt fences are more difficult to construct and maintain than most other sediment control options. This limits their use for short-term maintenance activities.

Appropriate Applications:

- Silt fences may be used for temporary stockpiles.
- For cleanup/repair of minor slides and slipouts, silt fences may be placed below the toe of exposed and erodible slopes or downslope of exposed soil areas to address long-term erosion concerns.
- Silt fences may be used as a temporary measure during roadside stabilization activities.
- Silt fences may also be considered when performing work in the vicinity of sensitive water bodies.
- Silt fences cannot be used under extremely muddy or rocky conditions where the fence cannot be properly anchored.

Implementation:

- Silt fences should be constructed with a setback of at least 1 meter (1.09 yds.) from the toe of a slope or stockpile (see Section C.17). Where a silt fence cannot have a 1-meter setback due to specific site conditions, the silt fence may be constructed as far from the toe of the slope as practicable.
- A conceptual silt fence is shown in Figure C-1. The notes on the figure provide guidance for the proper installation of silt fences.

Maintenance:

- Inspect silt fences to ensure they are functioning properly.
- Repair undercut silt fences. Repair or replace split, torn, slumping or weathered fabric.
- Remove sediment prior to accumulation reaching one-third of the fence height. Consideration should be given to incorporating removed sediment into the maintenance activity site.
- Remove a silt fence when it is no longer needed. Fill postholes and anchorage trench and remove sediment accumulation to conform to existing grade.



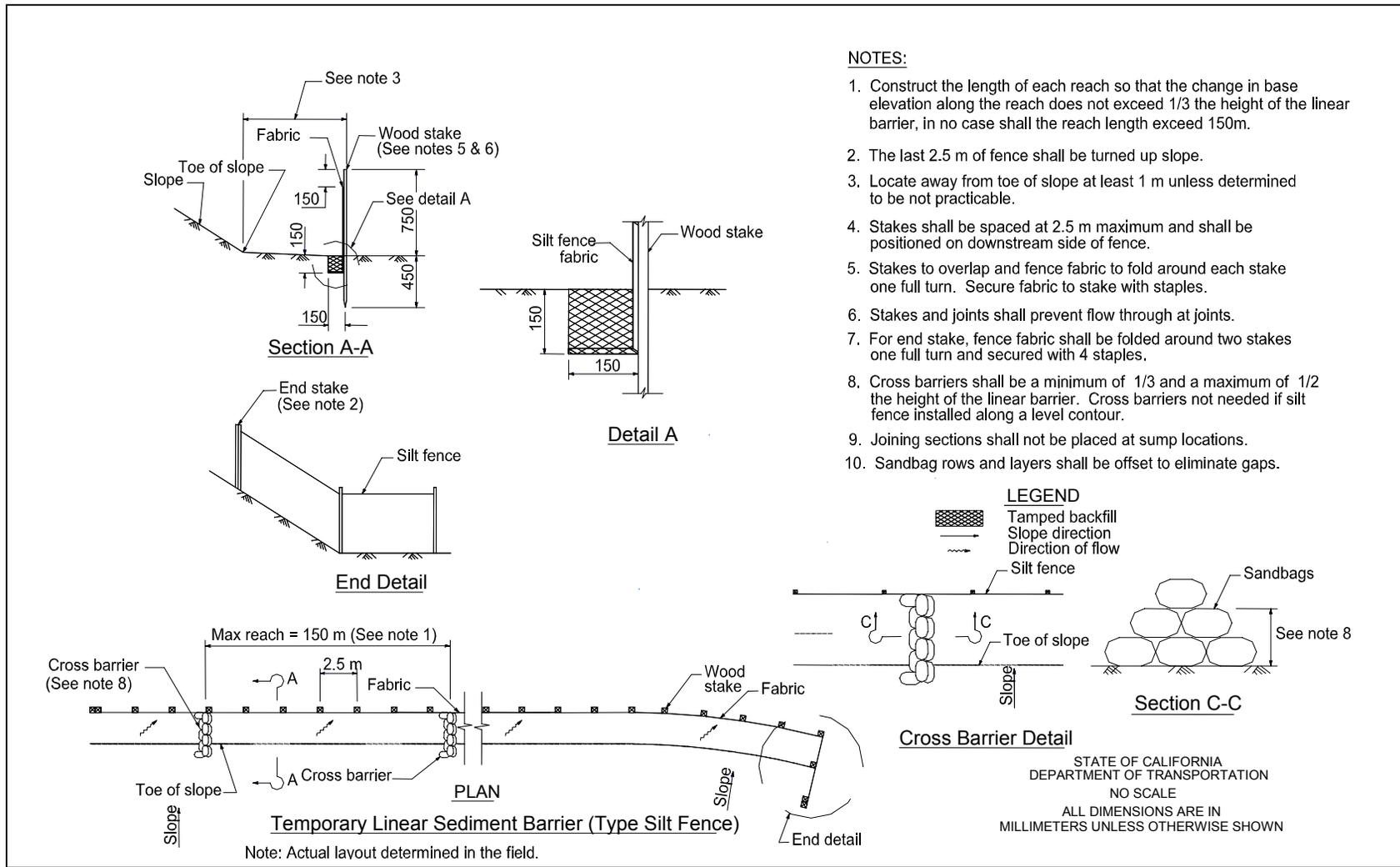


Figure C-1
Conceptual Temporary Linear Sediment Barrier (Silt Fence)

C.4.2 Sandbag or Gravel Bag Barrier

Description:

A sandbag or gravel bag barrier is a linear sediment barrier consisting of stacked sand- or gravel-filled bags designed to intercept and slow the flow of sediment-laden sheet flow runoff. Sandbag and gravel bag barriers allow sediment to settle from runoff before water leaves a disturbed soil area. Sandbag or gravel bag barriers may also be used to divert the flow of water (see Section C.6.2 Ditches, Berms, Dikes and Swales BMP). Gravel bag barriers may be preferred because the gravel is easier to contain if the bag fails.

Appropriate Applications:

- Sandbag and gravel bag barriers are a temporary measure used to divert water and intercept sediment. They may be used during Drain and Culvert Maintenance, Drainage Ditch and Channel Maintenance, Irrigation Line Repairs, Roadside Stabilization, Sandblasting, Wet Blast with Sand Injection and Hydroblasting, Minor Slides and Slipouts Cleanup/Repair and Building and Grounds Maintenance. Other BMPs are preferred if the barrier is required for more than a few months.
- Sandbag and gravel bag barriers should be placed below the toe of slopes with exposed and erodible soil.
- Sandbag or gravel bag barriers may be placed around stockpiles at maintenance activity sites or maintenance facilities.
- They may also be used to protect drain inlets and ditch lines during maintenance activities at maintenance activity sites or maintenance facilities (see Section C.5 Storm Drain Inlet Protection BMP).
- Due to their density, sandbags are preferable to divert flows or to prevent flows from entering a storm water conveyance system or watercourse. Gravel bags are better suited for filtration purposes.

Implementation:

- Sandbag or gravel bag materials:
 - Bag material should be canvas, polypropylene, polyethylene, burlap or polyamide woven fabric.
 - Fill material should consist of clean coarse sand or gravel.
- A conceptual sandbag barrier is shown in Figure C-2. Notes on the figure provide guidance for implementation.

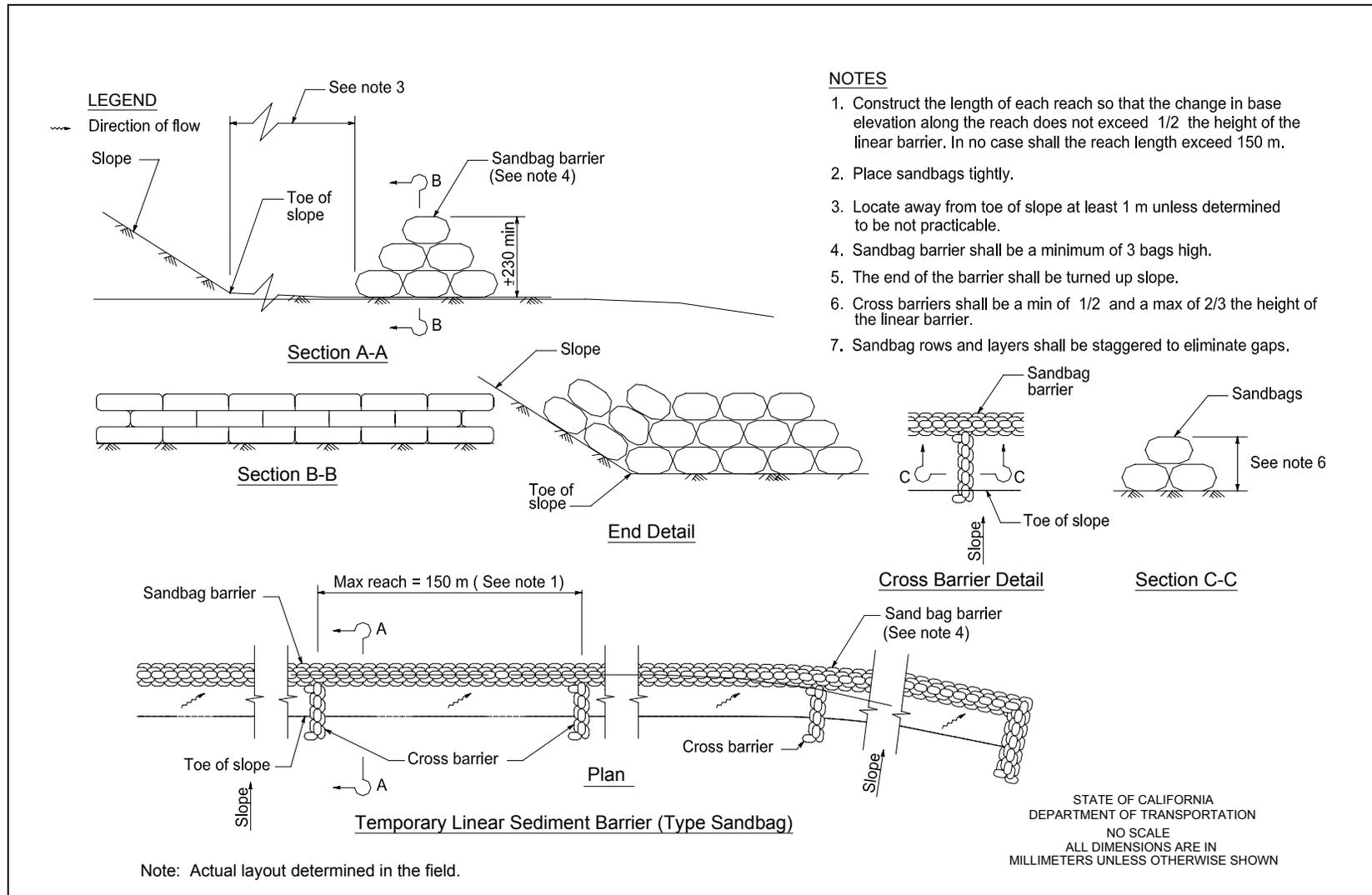


Figure C-2
Conceptual Temporary Linear Sediment Barrier (Sandbag)

Maintenance:

- Inspect sandbags and gravel bags to ensure the sediment barrier is functioning properly.
- Reshape or replace sandbags and gravel bags as needed.
- Repair washouts or other damage as needed.
- Consideration should be given to incorporating removed sediment into the maintenance activity site.
- Remove sandbags and gravel bags when no longer needed. Remove sediment accumulation, clean the maintenance activity site of debris, regrade if necessary and stabilize the area.

C.4.3 Straw Bale Barrier

Description:

A straw bale barrier is a linear sediment barrier consisting of straw bales designed to intercept and slow the flow of and filter sediment-laden sheet flow runoff. Straw bale barriers allow sediment to settle from runoff before water leaves a disturbed soil area. Straw bale barriers are readily available and suitable for many short-term applications in maintenance activities. Straw bale barriers have the disadvantages of being bulky and heavy when wet.

Appropriate Applications:

- Straw bale barriers are best suited for short-term applications and should not be placed into areas receiving concentrated flow.
- Straw bale barriers are typically placed below the toe of exposed and erodible slopes, downslope of disturbed soil areas (e.g., Minor Slides and Slipouts Cleanup/Repair).
- Straw bale barriers may be placed around stockpiles at maintenance activity sites or at maintenance facilities.
- Straw bale barriers may also be used to protect drain inlets(see Section C.5 Storm Drain Inlet Protection BMP) and ditch lines at maintenance activity sites or maintenance facilities during maintenance activities.

Implementation:

- A conceptual straw bale barrier is shown in Figure C-3. The notes on the figure are useful guidance for the placement and anchoring of larger barriers.

Maintenance:

- Repair or replace damaged straw bales as needed.
- Repair washouts or other damage as needed.
- Consideration should be given to incorporating removed sediment into the maintenance activity site.
- Remove straw bales when no longer needed. Remove or redistribute accumulated sediment to grade and stabilize the area.

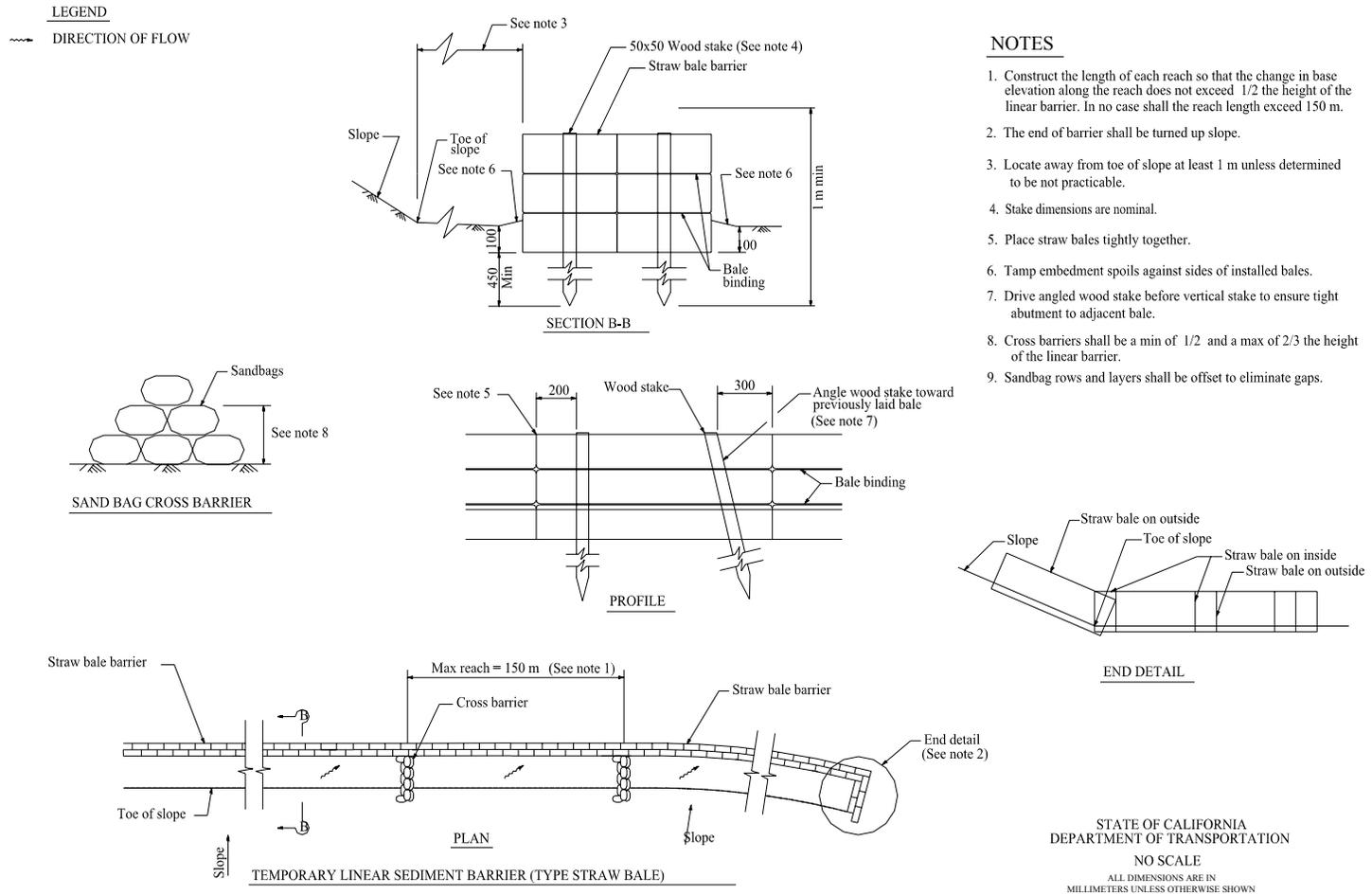


Figure C-3
Conceptual Temporary Linear Sediment Barrier (Straw Bale)

C.4.4 Fiber Rolls

Description:

A fiber roll consists of commercially available straw (straw wattles), native grasses, flax or similar materials that are rolled or bound into a tight tubular roll and placed on the face of slopes at regular intervals. Fiber rolls intercept runoff, reduce flow velocity, release the runoff as sheet flow and provide some removal of sediment from the runoff. Fiber rolls are preferred at activity sites where the rolls may be left in place for assimilation into the site.

Appropriate Applications:

- Fiber rolls may be used for Minor Slides and Slipouts Cleanup/Repair.
- Fiber rolls may be used along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- Fiber rolls provide some sediment control.

Implementation:

- Fiber roll materials are either:
 - Prefabricated rolls; or
 - Rolled tubes of erosion control blanket.
- Assembly of field-rolled fiber roll:
 - Roll length of erosion control blanket into a tube.
 - Bind roll at each end (may be bound along length of roll with jute-type twine).
- Installation:
 - Install fiber rolls on level contours in a shallow trench.
 - Stake fiber rolls securely.
- A conceptual fiber roll installation is shown in Figure C-4. The notes on the figure are useful guidance for the installation of fiber rolls.

Maintenance:

- Replace or repair split, torn, unraveling or slumping fiber rolls.
- Fiber rolls should be inspected for sediment accumulation, that can render the fiber roll ineffective. Normally, removed sediment may be disposed of in accordance with the Department's solid waste management practices. However, if the sediment exhibits characteristics such as odor, color and texture that are not similar to the surrounding native soil, an unknown material may be present. Notify the District HazMat Manager immediately.

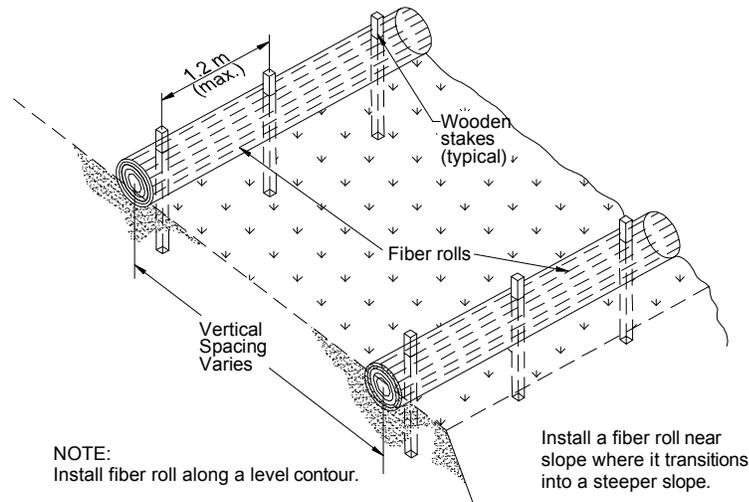


Figure C-4
Conceptual Fiber Roll Installation

C.4.5 Check Dam

Description:

A check dam is a small, temporary device constructed of rock, fiber rolls, gravel bags or sandbags placed across a natural or man-made channel or drainage ditch. Restricting the flow velocity in the ditch line reduces erosion of the drainage ditch.

Appropriate Applications:

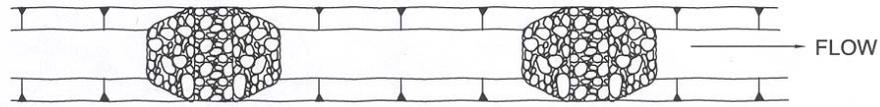
- Check dams shall not be installed in watercourses without required regulatory permits.
- Check dams are primarily considered for use during emergency situations (Minor Slides and Slipouts Cleanup/Repair).
- Check dams may be used when working in areas receiving concentrated flow (see Section C.9 Clear-Water Diversion BMP).
- Check dams may be installed in small open or steep channels.

Implementation:

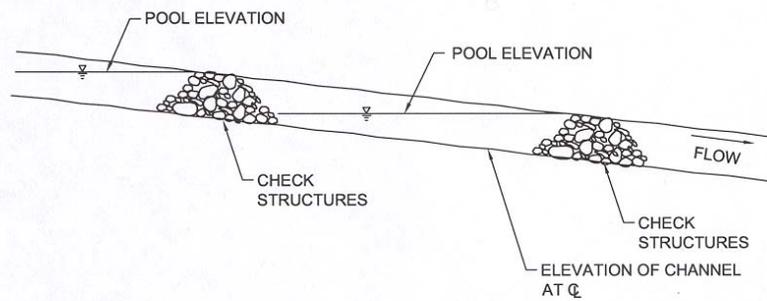
- Check dams should be placed at a distance and height to allow small pools to form behind them.
- A conceptual rock check dam is shown in Figure C-5. The notes on the figure provide guidance for the implementation of check dams.

Maintenance:

- Remove sediment prior to accumulation reaching one-third of the check dam height and consider incorporating removed sediment into the maintenance activity site.
- Remove the check dam when no longer needed.



PLAN



PROFILE

NOTE:

DOWN STREAM POOL ELEVATION EQUAL TO ELEVATION AT TOE OF UPSTREAM CHECK.

DOUBLE CHECK STRUCTURE

N.T.S.

Figure C-5
Conceptual Rock Check Dam

C.4.6 Sediment Trap

Description:

A sediment trap is a basin formed by excavating or constructing an earthen embankment across a ditch line or low drainage area (see Figure C-6). A sediment trap is appropriate for long-term application at a maintenance activity.

Appropriate Applications:

- Sediment traps may be used where the contributing drainage area is less than 2 ha (5 acres). Traps should be placed where sediment-laden storm water may enter a storm water drainage system or watercourse.
- Sediment traps may be used for Minor Slides and Slipouts Cleanup/Repair.
- Sediment traps shall not to be located in waterways.

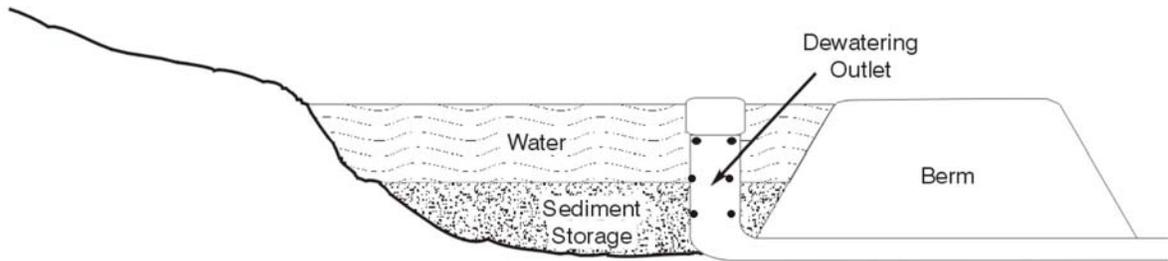
Implementation:

- Traps should be situated according to the following criteria: (1) by excavating a suitable area, such as a low embankment constructed across a swale; (2) where failure would not cause loss of life or property damage; and (3) to provide access for maintenance, including sediment removal and temporary storage of sediment in a protected area.
- Sediment traps should be adequately sized to allow settling of sediment.
- Trap inlets should be located to maximize the travel distance to the trap outlet. Rock or vegetation may be used to protect the trap outlets against erosion (see Section C.7.8 Riprap [Rock Slope Protection] BMP).
- To dewater the trap, the outlet may be constructed in one of the following two ways: (1) use a small diameter riser pipe with dewatering holes encased in gravel; or (2) construct a crushed stone outlet section of the embankment at the low point of the trap.

Maintenance:

- Check sediment trap for seepage and structural soundness.
- Check outlet structure and spillway for any damage or obstructions. Repair damages and remove obstructions as needed.
- Check outlet area for erosion and stabilize if required.
- Remove sediment prior to accumulating one-third the volume of the trap.
- Properly dispose of sediment and debris removed from the trap as follows:

- Dispose of debris in accordance with Section C.13.2 Solid Waste Management BMP.
- Incorporate sediment into the maintenance activity site or manage in accordance with Section C.13.2 Solid Waste Management BMP.



Note: Actual layout determined in the field

**Figure C-6
Conceptual Sediment Trap**

C.5 STORM DRAIN INLET PROTECTION

Description:

This control practice is used in two ways: (1) to detain and/or to filter sediment-laden storm water runoff and (2) to prevent unpermitted non-storm water discharges into storm water drainage systems or watercourses.

Appropriate Applications:

This BMP may be implemented during the following activities:

- Flexible Pavement (A Family);
 - Rigid Pavement (B Family);
 - Slope/Drains/Vegetation (C Family);
 - Traction Sand Trap Devices (F Family);
 - Public Facilities (G Family);
 - Welding or Grinding (H Family);
 - Sawcutting for Loop Installation (K Family);
 - Paint Striping/Marking (M Family);
 - Minor Slides and Slipouts Cleanup/Repair (S Family);
 - Vehicle and Equipment Maintenance and Repair (if required in the field) (T Family); and
 - Aboveground and Underground Tank Leak and Spill Control (T Family).
- Storm drain inlet protection should be considered for activities where sediment-laden storm water may enter a drain inlet.
 - Use this BMP only where ponding of water will not encroach into highway traffic or onto erodible surfaces or slopes.

Implementation:

- Impermeable covers should be used to prevent the unauthorized discharge of non-storm water.
- Storm drain inlets may be temporarily covered with spill pads and/or mats during maintenance activities.
- Storm drain inlets may also be protected by surrounding an inlet with one or a combination of the following:
 - Silt fence (storm water only);
 - Fiber rolls (storm water only);



- Straw bale barrier (storm water only);
- Polyurethane barrier (storm water or non-storm water);
- Rubber barrier (storm water or non-storm water);
- Sandbag or gravel bag barrier (gravel or aggregate preferred for storm water only); or
- Excavated culvert inlet sediment trap (storm water only).

Maintenance:

- Make sure silt fence stakes are securely driven into the ground. Replace damaged stakes.
- Repair fabric as needed. Replace or clean fabric prior to fabric becoming clogged with sediment.
- Check sandbags for proper installation. Replace damaged bags as needed.
- Remove sediment prior to accumulation reaching one-third of the fence height or before the volume of the basin has been reduced by one-half. Sediment removed shall be disposed of in accordance with Section C.13.2 Solid Waste Management BMP or incorporated in the maintenance activity site.
- Remove all inlet protection when no longer needed.

C.6 CONCENTRATED FLOW CONVEYANCE CONTROLS

C.6.1 Oversight/Slope Drains

Description:

An oversight/slope drain is a pipe used to intercept and direct surface runoff into a stabilized watercourse, a trapping device or a stabilized area. Oversight/slope drains are typically used to intercept and direct surface flow away from slope areas to protect slopes. Oversight/slope drains installed during maintenance efforts may be temporary. Maintenance staff may receive assistance from engineering for long-term installations or where installation is difficult.

Appropriate Applications:

- Slope drains may be used at sites where slopes have been eroded by surface runoff (Minor Slides and Slipouts Cleanup/Repair).
- Severe erosion may result if oversight/slope drains fail (oversight/slope drains shall be inspected and maintained).

Implementation:

- When installing oversight/slope drains:
 - Limit drainage area per pipe. For areas larger than 4 ha (10 acre), use a lined channel or a series of pipes.
 - Use ditches, berms, dikes and swales to direct surface runoff into the oversight/slope drain.
 - Secure the drain to the slope surface.
- Consider the following for installing oversight/slope drains:
 - Install perpendicular to slope contours.
 - Protect area around inlet. Protect outlet with riprap or other energy dissipation device. For high-energy discharges, reinforce riprap with concrete or use reinforced concrete device.
 - Compact soil around and under entrance, outlet and along length of pipe.
 - Securely anchor and stabilize pipe and appurtenances into soil.

Maintenance:

- Regularly inspect oversight/slope drains and maintain drains to ensure they are secured to the slope.

- Check outlet for erosion and downstream scour. If eroded, repair damage and install additional energy dissipation measures. If downstream scour is occurring, it may be necessary to reduce flows being discharged into the channel unless other preventive measures are implemented.
- Check slope drain for accumulation of debris and sediment. Clean drains to maintain their capacity.

C.6.2 Ditches, Berms, Dikes and Swales

Description:

Ditches, berms, dikes and swales are temporary or permanent measures used to intercept and direct surface runoff to an overside/slope drain or stabilized watercourse.

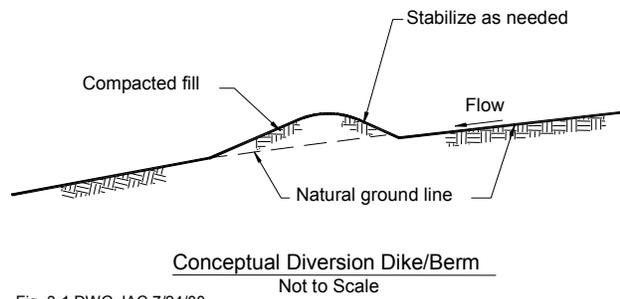
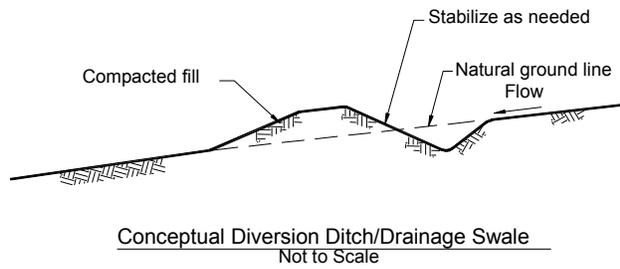
Appropriate Applications:

Ditches, berms, dikes and swales may be implemented for the following purposes:

- To convey flow around maintenance activities;
- To divert flow away from maintenance stockpiles;
- At the top of slopes to divert run-on from adjacent slopes and areas;
- At bottom and mid-slope locations to intercept sheet flow and convey concentrated flows;
- At other locations to convey runoff to overside/drains, stabilized watercourses, storm water drainage system inlets (catch basins), pipes and channels;
- To intercept runoff from paved surfaces; and
- Along roadways and facilities subject to flood drainage.

Implementation:

- Evaluate risks due to erosion, overtopping, flow backups or washout.
- Consider outlet protection where localized scour is anticipated.
- Examine the site for run-on from off-site sources.
- Conveyances should be lined if high flow velocity is anticipated. Consider use of riprap, engineering fabric, asphalt concrete or concrete.
- Conceptual ditches, berms, dikes and swales are shown in Figure C-7.



Fig_3-1.DWG JAC 7/24/00

Figure C-7
Conceptual Ditches, Berms, Dikes and Swales

C.6.3 Temporary Diversion Ditches

Description:

These are temporary measures used to intercept and direct surface runoff to an overside (or slope) drain or stabilized watercourse.

Appropriate Applications:

Temporary diversion ditches may be implemented for one or more of the following purposes:

- To convey flow around maintenance activities (most commonly during Minor Slides and Slipouts Cleanup/Repair);
- To divert flow away from maintenance stockpiles;
- At the top of slopes to divert run-on from adjacent slopes and areas;
- At bottom and mid-slope locations to intercept sheet flow and convey concentrated flows;
- At other locations to convey runoff to overside drains, stabilized watercourses, storm water drainage system inlets (catch basins), pipes and channels; and
- To intercept runoff from paved surfaces.

Implementation:

- Evaluate risks due to erosion, overtopping, flow backups or washout.
- Consider protection where localized scour is anticipated.
- Examine the site for run-on from off-site sources.
- Conveyances should be lined if high flow velocity is anticipated. Consider use of riprap, engineering fabric, asphalt concrete or concrete.

C.7 SOIL STABILIZATION

Disturbed soil areas should be inspected and evaluated for soil stabilization/revegetation to reduce erosion. At the completion of maintenance activities, disturbed soil areas should be stabilized. Stabilization is also required for Minor Slides and Slipouts Cleanup/Repair. Follow-up inspections should be performed to ensure that soil stabilization was successfully implemented.

Soil stabilization consists of preparing the soil surface and applying one of the following BMPs, or combination thereof, to disturbed soil areas or erodible slopes:

- Section C.7.1 Compaction;
- Section C.7.2 Wood Mulch;
- Section C.7.3 Hydraulic Mulch;
- Section C.7.4 Hydroseeding/Handseeding;
- Section C.7.5 Soil Binders;
- Section C.7.6 Straw Mulch;
- Section C.7.7 Geotextiles, Mats/Plastic Covers and Erosion Control Blankets; and
- Section C.7.8 Riprap (Rock Slope Protection).

In some instances, disturbed soil areas may contain seed that will naturally germinate under the right conditions. Maintenance staff may elect to allow natural germination to occur, but these areas must be inspected and otherwise repaired if vegetation does not sprout. Temporary sediment control BMPs will need to be implemented to avoid erosion from these areas while the vegetation is being established.

C.7.1 Compaction

Description:

Soil may be compacted to reduce the potential for erosion and transport of sediment to drainage systems or watercourse.

Appropriate Applications:

- Compaction is not an alternative to restoring vegetation. Compaction is restricted to areas where vegetation is undesirable or is not sustainable.
- Compaction is appropriate for unpaved shoulder areas following shoulder grading activities, guard rail post installation and sign post installation.

Implementation:

- The effect of runoff from the compacted soil on nearby surface water should be considered.
- The area should be evenly graded or leveled prior to compaction.
- Compaction should not be performed while storm water runoff is observed.
- Compaction should be performed as soon as possible after grading or soil disturbance.
- Compaction may be combined with other BMPs (see Section C.7.2 Wood Mulch BMP and Section C.7.6 Straw Mulch BMP).

Maintenance:

- Compacted areas shall be inspected to identify any evidence of erosion upon the completion of maintenance activities.

C.7.2 Wood Mulch

Description:

Wood mulch consists of applying chipped material or commercially available wood mulch products to reduce the potential for eroding the underlying soil. Wood mulch is readily available and has an attractive appearance. Wood mulch may be chosen over other stabilization measures to reduce germination of noxious weeds and the need for vegetation control measures.

Appropriate Applications:

- Wood mulch is appropriate for landscaping applications (Building and Grounds Maintenance).
- Wood mulch may be considered as an option for the Roadside Stabilization activity (see Section C.26 Vegetated Slope Inspection BMP).
- Wood mulch may also be considered as an option during Irrigation Line Repairs.
- Wood mulch should not be applied to steep slopes or placed into drainage paths that could receive concentrated flow. Wood mulch is prone to displacement under these conditions.

Implementation:

- Contact the District Landscape Specialist, District Erosion Control Specialist or Landscape Architect for the appropriate application rates. Use the recommended application rate.
- Wood mulch may be applied by hand, with blowers or with chippers.
- Avoid application onto hardscaped areas.

Maintenance

- Periodically inspect areas where mulch has been applied.

C.7.3 Hydraulic Mulch

Description:

Hydraulic mulch is applied to disturbed soil areas that require protection. Hydraulic mulch consists of applying a mixture of natural or recycled fiber and a tackifier with hydro-mulching equipment. The mulch stabilizes the soil, reduces wind and water erosion and provides protection to seeds increasing survivability (see Section C.7.4 Hydroseeding/Handseeding BMP). It may be used as a temporary repair measure following maintenance activities (to be followed by other soil stabilization BMPs).

Appropriate Applications:

- Hydraulic mulch may be applied to steeper slopes than wood mulch.
- Hydraulic mulch can be applied to areas that receive more concentrated flow where wood mulch would be washed away.
- Hydraulic mulch may be an appropriate measure for Minor Slides and Slipouts Cleanup/Repair.
- Hydraulic mulch may be used for stockpiled soil (see Section C.17 Stockpile Management BMP).

Implementation:

- Contact the District Landscape Specialist, District Erosion Control Specialist or Landscape Architect for the appropriate application rates. Use the recommended application rate.
- Hydro-mulching equipment is used to apply hydraulic mulch.
- Avoid mulch over-spray onto hardscaped areas.

C.7.4 Hydroseeding/Handseeding

Description:

Hydroseeding/Handseeding is a permanent soil stabilization method. Hydroseeding consists of applying a mixture of fiber, seed, fertilizer and stabilizing emulsion with hydro-mulching equipment. Other methods of seeding may also be used, including spreading by hand broadcasting or with a mechanical handspreader. Replacement planting is also covered under this BMP.

Appropriate Applications:

- Hydroseeding/handseeding may be used on erodible surfaces which require protection (e.g., Minor Slides and Slipouts Cleanup/Repair).

Implementation:

- Hydroseeding can be accomplished using a multiple-step or one-step process.
- Avoid over-spray onto hardscaped areas.
- Seed should be uniformly applied.
- Seed should be “scratched in” or covered with straw or soil (see Section C.7.6 Straw Mulch BMP).
- Contact the District Landscape Specialist or Landscape Architect for the appropriate seed type and application rate. The recommended seed type and application rate for the site conditions should be used.

Maintenance:

Seeded or planted areas should be inspected for failures and revegetated, fertilized or mulched.

C.7.5 Soil Binders

Description:

Soil binders consist of applying and maintaining polymeric or lignin sulfonate soil stabilizers or emulsions.

Appropriate Applications:

Soil binders may be applied to disturbed soil areas or soil stockpiles requiring short-term protection.

A variety of soil binders are available for use. Prior to use, the manufacturers' specifications should be reviewed and compared to the site-specific conditions. In selecting a soil binder, the following criteria should be considered:

- Availability of product;
- Ease of cleanup;
- Degradability (how the product degrades and what its by-products are);
- Length of drying time;
- Erosion control effectiveness;
- Longevity;
- Mode of application and availability of application equipment; and
- Water quality impact.

Implementation:

- Apply soil binders per manufacturer's specifications.
- Soil binders shall be nontoxic to plant and animal life.
- Soil binders shall not be applied to frozen soil or areas with standing water.
- Soil binders should not be applied during or immediately before rainfall.
- Avoid over-spray onto hardscaped areas.

Maintenance:

Check protected areas to ensure proper coverage and re-apply soil binder as needed, or implement additional BMPs.

C.7.6 Straw Mulch

Description:

The application of straw mulch consists of placing of a uniform layer of straw. It may be attached by wetting, with an organic tackifier or by mechanical means. It is effective for short-term applications and may be combined with other BMPs (e.g., Section C.7.4 Hydroseeding/Handseeding BMP).

Appropriate Applications:

- Straw mulch may be an appropriate temporary measure for responding to Minor Slides and Slipouts Cleanup/Repair.
- Straw mulch may be applied as a short-term measure to disturbed soil areas. It can be used in this manner for Building and Grounds Maintenance.
- Straw mulch may be used for Roadside Stabilization (see Section C.26 Vegetated Slope Inspection BMP).
- Straw mulch may also be used in combination with permanent seeding strategies (Section C.7.4 Hydroseeding/Handseeding BMP) to enhance plant establishment.
- Straw mulch can be applied to steeper slopes than wood mulch.

Implementation:

- Straw mulch should be derived from native grass, oat, wheat, rice or barley.
- Straw mulch with organic tackifier should not be applied during or immediately before rainfall.
- Avoid placing straw mulch onto hardscaped areas.

Maintenance:

- Straw mulch should be periodically inspected and maintained until permanent stabilization measures or repairs are successful.

C.7.7 Geotextiles, Mats/Plastic Covers and Erosion Control Blankets**Description:**

This BMP involves the placement of geotextiles, mats, chainlink fencing, plastic covers or alternative erosion control products to stabilize disturbed soil areas. These measures may be temporary or permanent.

Appropriate Applications:

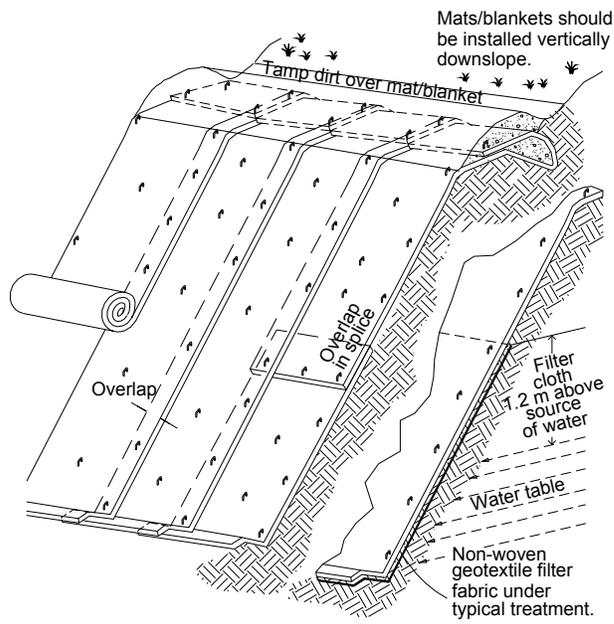
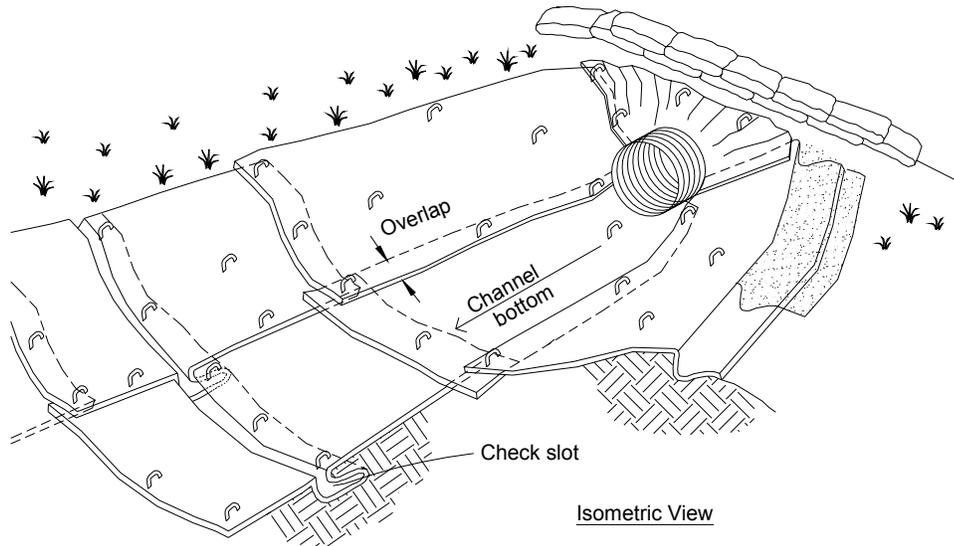
- These measures are used where disturbed soils may be particularly difficult to stabilize, including steep slopes, slopes where erosion hazard is high and slopes where mulch must be anchored. They may be used for Slides and Slipouts Cleanup/Repair or Roadside Stabilization (see Section C.26 Vegetated Slope Inspection BMP).
- Geotextiles, mats/plastic covers and erosion control blankets may also be used for disturbed soil areas where plants are slow to develop or where it is not the appropriate planting season.
- Geotextiles and mats/plastic covers may also be used in areas receiving concentrated flow.

Implementation:

- These measures may be designed with input from geotechnical engineering or hydrology (especially if they are intended as permanent measures).
- Geotextiles, mats/plastic covers and erosion control blankets must be secured to the slope.
- Illustrations of conceptual geotextiles, mats/plastic covers and erosion control blankets are shown in Figure C-8.

Maintenance:

- Inspect for erosion and undermining. Ensure the controls are secured to the slope until permanent soil stabilization has been successfully attained.
- If washout or breaks occur, repair the damage to the slope or channel whenever possible and re-install the material.



Wet Slope Lining
Not to Scale

Note: Actual layout determined in the field.

Figure C-8
Conceptual Geotextiles, Mats/Plastic Covers and Erosion Control Blankets

C.7.8 Riprap (Rock Slope Protection)

Description:

Riprap is placed in locations that receive concentrated flows including ditches, channels, slides and slipouts to prevent scour or reduce the energy of storm water flows.

Appropriate Applications:

- Riprap may be used as a temporary measure when working in channels (Drainage Ditch and Channel Maintenance).
- Riprap can be used as a temporary or permanent measure for Slides and Slipouts Cleanup/Repair.
- Riprap may be used as a velocity dissipation measure on slopes and near pipe outlets or on the banks of channels to reduce erosion.

Implementation:

- Install riprap or grouted riprap.

Maintenance:

- Inspect riprap periodically and restore as necessary.
- Check for scour beneath riprap and repair damage as needed.

C.8 PRESERVATION OF EXISTING VEGETATION

Description:

Preservation of existing vegetation is the identification and protection of desirable vegetation that provides erosion and sediment control benefits. For activities involving the removal of vegetation, the limits of disturbance should be defined to minimize adverse effects on vegetation outside the working area.

Appropriate Applications:

- Vegetation should be preserved during the following activities:
 - Shoulder Grading;
 - Drain and Culvert Maintenance;
 - Drainage Ditch and Channel Maintenance;
 - Chemical Vegetation Control;
 - Manual Vegetation Control;
 - Mechanical Vegetation Control/Mowing;
 - Tree and Shrub Pruning, Brush Chipping, Tree and Shrub Removal;
 - Public Facilities;
 - Minor Slides and Slipouts Cleanup/Repair; and
 - Buildings and Grounds Maintenance.
- Preserve existing vegetation where no maintenance activity is planned or where activities will occur at a later date. Preserve existing vegetation to the maximum extent practicable.

Implementation:

The following general steps should be taken to preserve existing vegetation:

- Ensure that the limits of disturbance are identified. Vegetation disturbed outside these limits should be replaced if damaged (see Section C.7.4 Hydroseeding/Handseeding BMP).
- Minimize disturbed areas by locating temporary roadways to avoid stands of trees and shrubs. Follow existing contours to reduce cutting and filling.
- Minimize the number of access and egress points and locate them to reduce damage to existing vegetation.
- Maintenance materials and equipment storage and parking areas should be located where they will not cause root compaction.

- Keep equipment away from trees to prevent trunk damage and root damage.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Avoid placing soil around trunks of trees.

C.9 CLEAR-WATER DIVERSION

Description:

Clear-water diversion consists of a system of structures and measures that intercept clear water, transport it around a maintenance activity site and discharge it downstream with minimal water quality degradation. Structures commonly used as part of this system include diversion ditches, berms, dikes, slope drains and drainage and interceptor swales.

Appropriate Applications:

- Clear-water diversions would most likely be implemented during Minor Slides and Slipouts Cleanup/Repair.
- It is possible that a clear-water diversion may be implemented when working on a ditch line or channel.

Implementation:

- Clear-water diversions shall not be performed without required regulatory permits.
- Stationary equipment (such as motors and pumps) located within or adjacent to a water body should be positioned over drip pans.
- When any artificial obstruction is being constructed, maintained or placed in operation, sufficient water shall at all times be allowed to pass downstream to maintain aquatic life downstream.
- Disturbance or removal of vegetation should not exceed the minimum necessary to complete operations.
- Remove diversions when the maintenance activity is completed.

C.10 WORK IN A WATER BODY

Description:

Maintenance activities occasionally require equipment or personnel to enter a stream, river, channel or other water body. This BMP describes measures that are required for maintenance activities in water bodies.

Appropriate Applications:

- Although working in a water body is not routine, Minor Slides and Slipouts Cleanup/Repair, Drainage Ditch and Channel Maintenance, Bridge Repairs and Draw Bridge Maintenance could require work in a water body.

Implementation

- Maintenance equipment shall not enter a water body without the required regulatory permits (*e.g.*, Army Corps of Engineers Clean Water Act Section 404 permit, California Department of Fish and Game Code Section 1601 Agreement, SWRCB Clean Water Act Section 401 Water Quality Certification). The Maintenance Storm Water Coordinator should be contacted to identify the appropriate permits.
- Evaluate alternatives to performing work in the water body.
- Tires shall be cleaned before entering a water body.
- Heavy equipment driven into a water body to accomplish work should be clean of petroleum residue.
- Water levels should be below the gear boxes of the equipment in use, or equipment lubricants and fuels should be sealed such that inundation by water shall not result in leaks.

C.11 WIND EROSION CONTROL

Description:

Wind erosion control consists of applying water or other dust palliatives as necessary to prevent or alleviate dust nuisances. Covering of small stockpiles is an alternative to applying water or other dust palliatives. This BMP may be combined with Section C.4 Sediment Controls BMP.

Appropriate Applications:

- Wind erosion controls should be implemented for stockpiles of loose materials.
- This practice is also implemented on disturbed soils subject to wind erosion (including Shoulder Grading, Roadside Stabilization and Minor Slides and Slipouts Cleanup/Repair).

Implementation:

- Evaluate suspending work under windy conditions when loose materials are prone to erosion.
- All distribution equipment shall be equipped with a positive means of shutoff.
- At least one mobile unit should be available to apply water or dust palliative to the maintenance activity site.
- Only potable and nonpotable (uncontaminated) water shall be used. Reclaimed wastewater or otherwise contaminated water shall not be used.
- Materials applied as temporary soil stabilizers may also provide wind erosion control benefits (see Section C.7 Soil Stabilization BMPs).
- Do not apply excess water. Non-storm water discharges are prohibited.

Maintenance:

Inspect protected areas to ensure proper coverage.

C.12 SEDIMENT TRACKING CONTROL

Sediment tracking controls are implemented to avoid tracking sediment from maintenance activity sites or maintenance facilities onto public roads or the highway. These controls include:

- Section C.12.1 Stabilized Activity Entrance/Exit; and
- Section C.12.2 Tire Inspection and Sediment Removal.

The Sweeping and Vacuuming BMP (see Section C.29) may also be applied as a tracking control. At least one of these BMPs should be implemented when off-road maintenance activities are likely to introduce sediment onto the highway. For extended maintenance activities or site conditions where considerable material tracking will occur, a combination of these BMPs should be considered.

C.12.1 Stabilized Activity Entrance/Exit

Description:

This temporary control practice is a defined point of entrance/exit to a maintenance site that is stabilized to reduce the tracking of mud and soil onto public roads by maintenance vehicles.

Appropriate Applications:

- Use at maintenance activity sites where sediment may be tracked onto public roads by maintenance vehicles.

Implementation:

- Limit the points of entrance/exit to the maintenance activity site.
- Stabilize entrance/exits with wood chips, straw, rock aggregate, commercially available manufactured steel-ribbed plate or other suitable material.

Maintenance:

- Inspect entrance/exit for functionality.
- Replace or supplement rock aggregate as needed.
- Periodically clean steel-ribbed plates.
- Incorporate removed sediment or soil back into the maintenance activity site.

C.12.2 Tire Inspection and Sediment Removal

Description:

Tires are inspected and sediment is removed to reduce tracking of sediment onto public roads or the highway.

Appropriate Actions:

- Tires should be inspected after the completion of off-road activities. Sediment should be removed as needed.

Implementation:

- Inspect tires prior to entering the roadway after off-road work.
- Use dry cleanup techniques to remove rock and sediment from tires prior to leaving the worksite.

C.13 WASTE MANAGEMENT

Waste management consists of implementing procedural and structural BMPs for handling, storing and disposing of wastes generated by a maintenance activity to prevent the release of waste materials into storm water discharges. Waste management includes the following BMPs:

- Section C.13.1 Spill Prevention and Control;
- Section C.13.2 Solid Waste Management;
- Section C.13.3 Hazardous Waste Management;
- Section C.13.4 Contaminated Soil Management;
- Section C.13.5 Sanitary/Septic Waste Management;
- Section C.13.6 Liquid Waste Management; and
- Section C.13.7 Concrete Waste Management.

These controls shall be implemented for all applicable activities, material usage and site conditions.

C.13.1 Spill Prevention and Control

Description:

Spill prevention and control procedures and practices are implemented to prevent and control spills in a manner that minimizes or prevents discharge to storm water drainage systems or watercourses at maintenance activity sites and maintenance facilities (see Section C.14.2 Material Use BMP for additional materials handling procedures).

Appropriate Applications:

- These controls apply at maintenance activity sites and at maintenance facilities.
- Spill prevention and control procedures are implemented wherever non-hazardous chemicals and/or hazardous substances are stored or used. Substances may include, but are not limited to, soil stabilizers, dust palliatives, pesticides, growth inhibitors, fertilizers, paints, de-icing chemicals, fuels, lubricants and other petroleum distillates.
- To the extent that the clean up work can be accomplished safely, wastes shall be contained and cleaned up immediately.

Implementation:

- In the event of a spill or leak, the Section C.5 Storm Drain Inlet Protection BMP should be implemented to prevent non-storm water discharge.
- If a spill or leak occurs in the containment area, accumulated rainwater shall be evaluated to determine appropriate disposal method.
 - If accumulated rainwater is hazardous, dispose of in accordance with the Section C.13.3 Hazardous Waste Management BMP.
 - If accumulated rainwater is chemically contaminated, but nonhazardous, dispose of in accordance with the Section C.13.6 Liquid Waste Management BMP.
- To the extent that cleanup activities and safety are not compromised, spills shall be covered and protected from storm water run-on during rainfall.
- Dry cleanup methods should be used when possible.
- Used cleanup materials, contaminated materials and recovered spill material that is no longer suitable for its intended purpose shall be disposed in accordance with the Section C.13.3 Hazardous Waste Management BMP or Section C.13.2 Solid Waste Management BMP, depending on waste characteristics.
- Contaminated water used for cleaning and decontamination shall not be allowed to enter storm water drainage systems or watercourses.
- Waste storage areas shall be kept clean, well organized and equipped with cleanup supplies that are appropriate for the materials being stored. Perimeter controls,

containment structures, covers and liners shall be repaired or replaced as needed to maintain proper function.

- Tarps and similar control measures should be used to prevent spills or material drift from being deposited into watercourses (e.g., during bridge maintenance).

Maintenance:

- Verify that spill control cleanup materials are located near material storage, unloading and use areas.
- Update spill prevention and control plans and stock appropriate cleanup materials whenever changes occur in the types of chemicals stored on site.



C.13.2 Solid Waste Management

Description:

Solid waste management procedures and practices are designed to minimize or eliminate the discharge of pollutants to drainage systems or watercourses associated with the stockpiling or removal of maintenance activity wastes.

Appropriate Applications:

Solid waste management practices are implemented during maintenance activities that generate solid wastes. These solid wastes include, but are not limited to:

- Maintenance wastes, including brick, mortar, asphalt concrete, Portland cement, concrete, timber, steel and metal scraps, pipe and electrical cuttings, nonhazardous equipment parts, styrofoam, grindings, sandblast grit and other materials used to transport and package maintenance materials;
- Highway planting wastes, including vegetative material, plant containers and packaging materials; and
- Litter and debris, including food containers, beverage cans, coffee cups, paper bags and plastic wrappers.

Implementation:

- Use dry cleanup techniques (e.g., vacuuming, sweeping, dry rags) to remove solid waste from the maintenance activity site when practicable. Use another technique only when dry cleanup techniques are not practicable, such as having to wet for dust control for safety or air quality reasons.
- Recycle, reuse or properly dispose of solid waste.
- Storm water run-on shall be prevented from contacting stored solid waste through the use of ditches, berms, dikes and swales (see Section C.6 Concentrated Flow Conveyance Controls BMP).
- Solid waste storage areas at maintenance facilities should be located away from drainage facilities and watercourses and shall not be located in areas prone to flooding or ponding.
- Reuse of asphalt grindings shall be in accordance with the California Department of Fish and Game MOU.
- Reused asphalt grindings shall be compacted when the material is placed near water bodies (see Section C.7.1 Compaction BMP).

Maintenance:

- Periodically inspect the solid waste storage areas and review the disposal procedures.
- Repair or replace damaged or missing BMPs.

C.13.3 Hazardous Waste Management

Description:

Hazardous waste management procedures and practices are designed to minimize or eliminate the discharge of pollutants at maintenance activity sites and maintenance facilities to storm water drainage systems or watercourses.

Appropriate Applications:

Hazardous waste management practices are implemented during maintenance activities and at maintenance facilities that generate or store hazardous waste from the use of petroleum products, asphalt products, concrete curing compounds, pesticides, acids, paints, solvents, wood preservatives, stains, roofing tar and any other materials considered a hazardous waste.

Implementation:

- At the Department's Maintenance Facilities, hazardous waste shall be stored in sealed containers constructed of a compatible material and shall be properly labeled in accordance with the Department's Maintenance Hazardous Waste Manual; Chapter 2 *Hazardous Waste Storage*.
- All hazardous waste shall be stored, transported and disposed in accordance with federal, state and local regulations. Refer to the Department's Maintenance Hazardous Waste Manual. For example, the Hazardous Waste Manual includes the following: Chapter 2 *Hazardous Waste Storage*; Chapter 3 *Disposal of Hazardous Waste*; and Appendix E Section D5.07 *Cleanup and Transport Requirements for Government Agencies*.
- Maintenance staff are to follow label instructions regarding the proper handling, mixing and application of materials which could generate hazardous waste and a discharge to waterways.
- Maintenance staff shall implement good housekeeping procedures and exercise care and caution when handling hazardous materials capable of generating wastes that could create a contaminated water discharge. For example: Paint brushes and equipment for water- and oil-based paints shall be cleaned within a contained area and associated waste shall not be allowed to contaminate site soils, watercourses or storm water drainage systems; containers shall not be overfilled.
- The District HazMat Manager is the Maintenance Division lead for Maintenance HazMat activities. Maintenance staff shall contact the HazMat Manager immediately if wastes are generated or encountered within the Department's Right of Way requiring special HazMat handling procedures.

Maintenance:

Periodically inspect the maintenance facility storage site to ensure all requirements are met and to review storage, disposal, and transport procedures.



C.13.4 Contaminated Soil Management

Description:

These are procedures and practices to minimize or eliminate the discharges of pollutants from contaminated soil/sediment to storm water drainage systems or watercourses.

Appropriate Applications:

Contaminated soil/sediment generated during emergency response or other maintenance activities should be collected and managed for treatment or disposal.

Implementation:

- Work with the local regulatory agencies to develop options for treatment, reuse and/or disposal of contaminated soil. Disposal of contaminated soil shall be in accordance with the Section C.13.2 Solid Waste Management BMP or Section C.13.3 Hazardous Waste Management BMP, depending on soil characteristics.
- Avoid stockpiling contaminated soils or hazardous material.
- Do not stockpile in or near storm water drainage systems or watercourses.
- If temporary stockpiling is necessary:
 - Cover the stockpile with plastic sheeting or tarps; and/or
 - Install a berm or barrier around the stockpile to prevent runoff from leaving the area.

Maintenance:

Temporary stockpiles of contaminated soil should be inspected regularly and controls shall be repaired as needed.

C.13.5 Sanitary/Septic Waste Management

Description:

Sanitary/septic waste management procedures and practices are designed to minimize or eliminate the discharge of sanitary/septic waste materials to storm drain systems or watercourses.

Appropriate Applications:

Sanitary/septic waste management practices are implemented for all maintenance activities that use portable sanitary/septic waste systems.

Implementation:

- Sanitary facilities shall be located away from drainage facilities and watercourses. When subjected to risk of high winds, sanitary facilities shall be secured to prevent overturning.
- Wastewater shall not be discharged (unless the discharge is to a permitted leach field or pond) or buried within the highway right-of-way.

Maintenance:

- Sanitary/septic waste should be discharged to a sanitary sewer or managed by a licensed hauler.
- Sanitary/septic waste storage and the disposal procedures should be managed to prevent non-storm water discharge.

C.13.6 Liquid Waste Management

Description:

Liquid waste management procedures and practices are designed to prevent the discharge of pollutants to storm water drainage systems or watercourses as a result of the creation, collection or disposal of nonhazardous materials that may be unauthorized non-storm water discharges.

Appropriate Applications:

- Liquid waste management is applicable to maintenance activities that generate nonhazardous byproducts, residuals or wastes, including drilling slurries and drilling fluids; grease-free and oil-free wastewater and rinse water; dredging; and other non-storm water liquid discharges.
- Unpermitted non-storm water discharges are prohibited.

Implementation:

- Non-storm water discharges to drainage paths, drain systems and watercourses are prohibited.
- Drilling and saw cutting fluids:
 - Stick-down berms may be used to improve containment.
 - Fluids may be collected by vacuum or other methods.
 - Collected fluids shall be contained and recycled, evaporated or discharged to the sanitary sewer system with approval from the publicly-owned treatment works (POTW).
 - Fluids shall not be discharged to storm water drainage systems or watercourses.
- Vactor™ liquid wastes:
 - a) A visual inspection of water drainage facilities shall be performed prior to cleaning. Caltrans operators are trained to visually inspect for petroleum products, odors, discoloration and other physical evidence of contamination. If chemical contamination is suspected, the operators will stop work and notify the Maintenance Supervisor. The Supervisor will follow existing Caltrans Hazardous Materials Spills procedures and coordinate removal of the contamination with the District Maintenance Hazardous Materials Coordinator.
 - b) Liquid waste collected in the Vactor™ trucks may be evaporated or discharged to a Regional Water Quality Control Board approved temporary decanting location in the District. The Maintenance Supervisor shall ensure Vactor™

crews are aware of approved decanting procedures and the approved decanting location.

- Tunnel cleaning:
 - Discharge to storm water drainage systems or watercourses from tunnel maintenance is prohibited.
 - Storm drain inlets and systems shall be adequately protected from liquid waste discharges (see Section C.5 Storm Drain Inlet Protection BMP).
 - Nonhazardous spent solvents shall be captured and reused, recycled or disposed in accordance with federal, state and local requirements.
 - Refer to the Section C.14 Materials Handling BMPs for appropriate handling and storage of liquids at maintenance activity sites.
 - Refer to the Section C.13.7 Concrete Waste Management BMP for appropriate management of concrete waste.

Maintenance:

- At the completion of the task, remove deposited solids from containment areas and capturing devices.
- Check containment areas and capturing devices for damage and repair.

C.13.7 Concrete Waste Management

Description:

Concrete waste management procedures and practices are designed to ensure that concrete wastes are properly handled and eliminate the discharge of concrete waste to storm water drainage systems or watercourses.

Appropriate Applications:

Concrete waste can be generated in various maintenance activities including Curb and Sidewalk Repair, Mudjacking and Drilling, Drain and Culvert Maintenance, Drainage Ditch and Channel Maintenance, Public Facilities, Sawcutting for Loop Installation, Sign Repair and Maintenance, Median Barrier and Guard Rail Repair, and Building and Grounds Maintenance.

Implementation:

- Contracts for concrete providers require contractors to appropriately manage any concrete waste and prohibit non-storm water discharges generated at the job site. The Department's *Standard Specifications Section 7-1.01G Water Pollution* requires compliance to applicable statutes relating to the prevention or abatement of water pollution.
- Portland cement concrete waste shall not be allowed to enter storm water drainage or watercourses.
- Concrete waste from grout pumping operations shall be contained.
- Concrete residue should be collected by vacuum or shovel for proper disposal. Concrete debris may be disposed of through on-site burial consistent with the requirements of Caltrans Standard Specification 15-3.02.
- Liquid waste can be contained in a bucket or drum with a tight-fitting lid for transport and approved off-site disposal. Plastic bags may be used if nothing else is available. Avoid breaking the bags by double-bagging and filling the bags to about one-fifth of their capacity. Allow solids to settle and recycle or dispose of in accordance with the Section C.13.2 Solid Waste Management BMP. The liquid waste may be evaporated. Decanted liquid waste shall be discharged to sanitary sewer only with the POTW's approval. Decanted liquid waste may also be removed for disposal as hazardous waste. Refer to the Section C.13.3 Hazardous Waste Management BMP.
- A temporary concrete washout facility may be constructed at the maintenance activity area. Below-grade concrete washout facilities are preferred. Above-grade facilities are used if excavation is not practical. Designated washout areas should be located at least 15 meters (50 feet) away from drainage facilities.
- Below-grade facilities consist of a pit excavated away from watercourses. Above-grade washout facilities should be bermed using sandbags or straw bales. Local



requirements or other environmental restrictions should be reviewed prior to placing concrete waste on the ground.

Maintenance:

The supervisor or the designee shall monitor the concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure that concrete waste is collected and disposed of properly.



C.14 MATERIALS HANDLING

Materials handling consists of implementing procedural and structural BMPs for handling, storing and using maintenance materials in a manner that prevents the release of those materials into storm water.

C.14.1 Material Delivery and Storage

Description:

Material delivery and storage procedures and practices are designed for the proper handling and storage of materials at the maintenance facility. These procedures and practices minimize or eliminate the discharge of these materials to storm water drainage systems or watercourses.

Appropriate Applications:

- These procedures are implemented at maintenance facilities involved in the delivery and storage of aggregate, pesticides, fertilizers, detergents, plaster, petroleum products, asphalt and concrete components, hazardous chemicals, concrete compounds or other materials that may be detrimental if released to storm water drainage systems or watercourses.
- Refer to Section C.14.2 Material Use BMP and Section C.17 Stockpile Management BMP for procedures that apply to any materials that are assembled for use at a maintenance activity site.

Implementation:

- Containment facilities shall provide for a spill containment volume equal to 110% of the largest container in the facility.
- Containment facilities shall be impervious to the materials stored there.
- Containment facilities should be maintained free of rainwater and spills.
- Rainwater in containment facilities should be inspected prior to discharge. Drain valves should remain closed except to release clean rainwater.
- Personnel at maintenance facilities shall be trained to ensure that materials are properly handled and stored.
- Separation should be provided between stored containers to allow for spill cleanup and emergency response cleanup.
- To provide protection from rain, bagged and boxed materials stored outdoors shall be stored on pallets throughout the rainy season.
- To provide protection from rain, bagged and boxed materials shall be covered prior to rain events.
- Storage areas shall be kept clean, well organized and equipped with cleanup supplies for the materials being stored. Perimeter controls, containment structures, covers and liners shall be repaired or replaced as needed.

Maintenance:

- Check to ensure that designated storage areas are kept clean and well organized.
- Repair and/or replace perimeter controls, containment structures and covers as needed to keep them functioning properly.

C.14.2 Material Use

Description:

Material use procedures and practices are used at maintenance facilities and maintenance activity sites to prevent the discharge of materials to storm water drainage systems or watercourses.

Appropriate Applications:

These procedures are implemented at maintenance facilities and at maintenance activity sites where pesticides, fertilizers, detergents, plaster, petroleum products, asphalt and concrete components, hazardous chemicals, concrete compounds and other material that may be detrimental if released to the environment are used or prepared.

Implementation:

- Contract agreements with haulers who supply materials to maintenance activity sites should require them to supply materials in accordance with the requirements of this BMP.
- Latex paint and paint cans, used brushes, rags, absorbent materials and drop cloths shall be disposed of in accordance with federal, state and local requirements.
- Do not remove the original product label from a container as it contains important spill cleanup and disposal information. Make copies of the label information or material safety data sheet if needed. Use the entire product before disposing of the container. Appropriately label all secondary containers.
- Mix paint indoors or in a containment area. Do not clean paintbrushes or rinse paint containers where rinsate may discharge into a street, gutter, storm water drainage systems or watercourses. Rinsate from latex paint cleaning may be recycled or discharged to the sanitary sewer. Empty paint cans shall be dry prior to disposal as solid waste. See Section C.13.6 Liquid Waste Management BMP and Section C.13.2 Hazardous Waste Management BMP.
- Paint should be loaded into spray equipment at a maintenance facility. Nearby drain inlets should be protected at maintenance facilities and at maintenance activity site.
- Use materials only where and when needed to complete the maintenance activity. Consider the use of safer alternative materials (See Section C.21) when possible. Reduce or eliminate use of hazardous materials on site when possible.
- Keep a supply of spill cleanup material near material use areas. Train employees in spill cleanup procedures.
- Secure loads and cover loose materials in open-bed trucks during hauling to activity sites.

- Truck beds should be inspected after the completion of material delivery to avoid depositing materials on the roadway.
- Use proper loading and unloading techniques to prevent spills.

C.15 VEHICLE AND EQUIPMENT OPERATIONS

Vehicle and equipment operations, procedures and practices are designed to minimize or eliminate the discharge of pollutants from vehicle and equipment cleaning, fueling and maintenance operations to storm water drainage systems or watercourses.



C.15.1 Vehicle and Equipment Cleaning

Description:

Discharges to storm water drainage systems or watercourses from vehicle and equipment cleaning are prohibited. Vehicle and equipment cleaning procedures and practices are used to eliminate the discharge of pollutants from vehicle and equipment cleaning operations to storm water drainage systems or watercourses.

Appropriate Applications:

- These procedures apply whenever vehicle and equipment cleaning is performed.
- Waste generated during concrete washout must be managed in accordance with the Section C.13.7 Concrete Waste Management BMP. Non-storm water discharges of concrete washout are prohibited.

Implementation:

- Contractual provisions require contractors to use cleaning practices consistent with the requirements of this BMP when working at maintenance activity sites.
- When using solvents for cleaning vehicles and equipment, used solvents and by-products shall be captured and reused, recycled or disposed of according to the requirements of the Section 13.6 Liquid Waste Management BMP or Section C.13.3 Hazardous Waste Management BMP, depending on waste characteristics. Minimize use of solvents.
- When possible, truck beds should be cleaned using a dry cleanup technique (sweep up or shovel out).
- Vehicle and equipment washing shall occur only at designated rinsing areas, facility wash racks or other designated areas:
 - Whether at rinsing areas at the maintenance facility or the field, vehicle and equipment wash water shall be discharged to a sanitary sewer. If no connection to the sanitary sewer available, wash water should be contained for percolation (if preapproved by the RWQCB) or evaporative drying away from storm drain inlets or watercourses.
 - Facility wash racks shall discharge to a sanitary sewer, recycle system or other approved discharge system and shall not discharge to the storm water drainage systems or watercourses.
 - Concrete washout areas are described under Section C.13.7 Concrete Waste Management BMP.
- Minimize water use to reduce potential for unpermitted non-storm water discharges (e.g., provide a positive shutoff type of hose nozzle).

- Post signs for rinsing and wash areas that identify the allowable cleaning methods for the location and discharge prohibitions.

Maintenance:

- Regularly inspect and maintain the designated rinsing areas, facility wash racks, designated cleaning areas, wash pads, clarifiers, oil-water separators, sumps and sediment traps.

C.15.2 Vehicle and Equipment Fueling

Description:

Vehicle and equipment fueling procedures and practices are designed to minimize or eliminate the discharge of fuel spills and leaks into storm water drainage systems or watercourses during equipment fueling and the bulk delivery of fuel.

Appropriate Applications:

These procedures apply at all maintenance sites where vehicle and equipment fueling occurs.

Implementation:

Bulk Fuel Delivery

- All aboveground and underground storage tanks shall be equipped with automatic overfill shutoff valves.
- Implement Section C.13.1 Spill Prevention and Control BMP to prevent spillage.
- Implement Section C.5 Storm Drain Inlet Protection BMP to prevent non-storm water discharges to the storm water drainage systems and watercourses.

Fueling Area Maintenance

- Label drains at fuel dispensing areas to indicate if they discharge to the storm drain or to the sewer.
- Storm drain inlets may be temporarily covered with spill pads and/or mats during fueling operations.
- Absorbent spill cleanup materials or drip pans shall be stored in fueling and maintenance areas and used materials shall be disposed in accordance with the Section C.13.3 Hazardous Waste Management BMP.
- Immediately clean up leaks and drips.
- Hosing off the fueling area is prohibited. Dry shop clean up practices should be used.
- Manage wastes to reduce adverse impacts on storm water quality (see Section C.13.2 Solid Waste Management BMP and Section C.13.3 Hazardous Waste Management BMP). Fueling areas should be kept free of litter and debris that might become contaminated with petroleum products.
- Maintain and implement a current spill response plan for fueling operations.

Refueling Practices

- Nozzles used at dedicated fueling areas shall be equipped with an automatic shutoff.
- Warnings against “topping off” fuel tanks should be posted at fuel dispensers.
- Fueling operations shall not be left unattended.
- Fueling in the field shall not be performed near unprotected drainage facilities or watercourses. See Section C.13.1 Spill Prevention and Control BMP and Section C.5 Storm Drain Inlet Protection BMP for pollution prevention and response requirements.

Maintenance:

- Inspect fueling facilities daily and correct deficiencies.
- Keep a supply of spill cleanup materials on site.

C.15.3 Vehicle and Equipment Maintenance

Description:

Vehicle and equipment maintenance procedures and practices are designed to minimize or eliminate the discharge of pollutants to storm water drainage systems or watercourses from vehicle and equipment maintenance.

Appropriate Applications:

- These procedures are applied where equipment and vehicles are stored or repaired.
- These procedures should be implemented to avoid prohibited discharges to the storm water drainage system of fuel, oil, hydraulic fluid, brake fluid, antifreeze and wiper fluid.

Implementation:

Indoor Maintenance

- Maintenance should be performed in covered or indoor maintenance areas where potential pollutants cannot be introduced into storm water drainage systems.

Field or Outdoor Maintenance

- Drip pans or absorbent materials shall be used during vehicle and equipment maintenance work that involves fluids.
- See Section C.13.1 Spill Prevention and Control BMP for pollution prevention and response measures.
- The Section C.13.4 Contaminated Soil Management BMP should be used to address any contaminated soil resulting from vehicle or equipment repair.
- Use dry methods (e.g., dry rags, vacuuming or sweeping) for cleaning associated with maintenance in outdoor areas.

General Maintenance (in the field or in the yard)

- Vehicles and equipment shall be inspected for leaks on each day of use. Leaks should be repaired immediately; problematic vehicles or equipment shall be removed from the maintenance activity site.
- All parts washing should be performed in designated areas. Do not wash parts where wash waste cannot be captured. Use self-contained sinks or tanks when working with solvents.
- Non-storm water discharges into storm water drainage systems or watercourses are prohibited.

- Wastes should be collected and reused, recycled, removed or disposed of in accordance with the Section C.13.3 Hazardous Waste Management BMP.

Maintenance:

- Inspect areas following field maintenance areas to ensure there is no residual contamination that might impact storm water quality. Clean areas as needed using dry methods, (e.g., sweeping or vacuuming).
- Maintain waste fluid containers in leak-proof condition.
- Inspect equipment for damaged hoses and leaky gaskets. Repair or replace as necessary.

C.16 PAVING OPERATIONS PROCEDURES

Description:

Paving operations procedures are designed to minimize pollution of storm water runoff during paving operations.

Appropriate Applications:

These procedures are implemented where paving, surfacing, resurfacing or saw cutting may pollute storm water runoff or discharge to storm water drainage systems or watercourses.

Implementation:

- Protect drainage inlet structures and manholes during paving operations including when seal coat, tack coat, slurry seal or fog seal is applied.
- Seal coat, tack coat, slurry seal or fog seal should not be applied if rainfall is predicted to occur during the application or curing period.
- When using asphalt release agents (e.g., citrus, soy-based or diesel) for cleaning and coating of equipment and tools, all products and by-products shall be captured and reused, recycled or disposed in accordance with the requirements of the Section C.13.3 Hazardous Waste Management BMP. Asphalt release agents shall not be discharged to the storm water drainage systems or watercourses.
- Clean pavers over absorbent pads, drip pans, plastic sheeting or other materials to collect residual cleaning wastes. Section C.5 Storm Drain Inlet Protection BMP should be used during cleaning to prevent any unauthorized non-storm water discharge. Dispose of removed material in accordance with the Section C.13.3 Hazardous Waste Management BMP.
- Pick up and reuse, recycle or dispose of cured material in accordance with the Section C.13.2 Solid Waste Management BMP.
- Prevent water used to clean emulsion kettles from discharging into storm water drainage systems or watercourses (see Section C.5 Storm Drain Inlet Protection BMP). Recycle products where possible to avoid discharge.
- Diesel fuel used in kettle cleaning shall be contained and reused, recycled or disposed of in accordance with the Section C.13.3 Hazardous Waste Management BMP.

Maintenance:

Maintain machinery regularly to minimize leaks and drips.



C.17 STOCKPILE MANAGEMENT

Description:

Stockpile management procedures and practices are designed to reduce or eliminate pollution of storm water from stockpiles of vegetative wastes and paving materials.

Appropriate Applications:

- Stockpile management procedures are used for stockpiles of contaminated and uncontaminated soil.
- Stockpile management procedures are used for the stockpiling of vegetative waste and paving materials.
- Stockpile management procedures are used for materials removed from drains, ditches and culverts.
- Stockpile management procedures are used for waste piles.
- Stockpile management procedures are used for any other material or waste that could impact storm water quality (e.g., snow haul in the Lahontan Region).

Implementation:

- Do not locate stockpiles in areas of concentrated flows of storm water, drainage systems, inlets or watercourses.
- Do not locate stockpiles adjacent to sensitive water bodies.
- Divert storm water run-on away from stockpiles. See Section C.6.2, Ditches, Berms, Dikes and Swales BMP.
- Wind erosion control practices shall be implemented on stockpile material. See Section C.11, Wind Erosion Control BMP.
- Manage stockpiles of contaminated soil in accordance with the Section C.13.4, Contaminated Soil Management BMP.
- Minor slides/slipouts usually occur during major storms. Stockpiles should be removed as soon as practicable and materials should be placed so that waterways are not impacted (see Section C.4 Sediment Control BMP).
- During rain events, stockpiles of “cold mix” asphalt (i.e., pre-mixed aggregate and asphalt binder) shall be covered. Any deviation from this BMP for “cold mix” shall be coordinated with the RWQCB.
- During rain events, soil stockpiles shall be covered or protected with soil stabilization measures and a temporary perimeter sediment barrier.

- During rain events, stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base or aggregate subbase shall be covered or protected with a temporary perimeter sediment barrier.

Maintenance:

Repair and/or replace perimeter controls and covers as necessary to keep them functioning properly.

C.18 WATER CONSERVATION PRACTICES

Description:

Water conservation practices minimize water use during a maintenance activity to avoid causing erosion and/or the transport of pollutants into the drainage system and watercourses. Non-storm water discharges to storm water drainage systems and watercourses are prohibited unless the discharge is authorized by a separate National Pollutant Discharge Elimination System (NPDES) permit, exempted or conditionally exempt as provided in the Caltrans Statewide Storm Water Permit.

Appropriate Applications:

- All maintenance activities should practice water conservation.
- Unpermitted non-storm water discharges are prohibited.

Implementation:

- Keep water application equipment in good working condition.
- Avoid using water to clean maintenance areas. Use dry cleanup methods where practical. Sweep paved areas.
- Use the minimum amount of water needed to complete each maintenance activity.

Maintenance:

- Repair water supply and distribution equipment to minimize the loss of water.

C.19 POTABLE WATER/IRRIGATION

Description:

In accordance with Table 5-2 of the Statewide SWMP, some non-storm water discharges are conditionally exempt by the Permit. The conditionally exempt non-storm water discharges include irrigation water, potable water sources and water from line and hydrant flushing. This BMP is intended to reduce the possibility for the discharge of potential pollutants associated with conditionally exempt discharges from irrigation systems, planned and unplanned discharges from potable water sources and water line or hydrant flushing.

Appropriate Applications:

This BMP should be implemented on a site-specific basis whenever the above activities or discharges occur.

Implementation:

- When possible, flushed water should be applied for landscaping purposes.
- Shut off the water source to isolate a broken line, sprinkler or valve as soon as possible to minimize the loss of water.
- Repair broken water lines as soon as possible.
- Protect downstream storm water drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.
- Manage irrigation systems to ensure the appropriate amount of water is used and runoff is minimized.

C.20 STORM DRAIN STENCILING

Description:

Stenciled messages at storm drain inlets are intended to educate the public about storm water runoff pollution. Where required, warnings prohibiting discharges to storm drains should be placed near inlet structures.

Appropriate Applications:

Storm drain stenciling is approved for park-and-ride lots, safety roadside rest areas, vista points, commercial vehicle enforcement facilities and along roads and highways legally accessible by the public in developed communities with a population greater than 10,000 or that traverse through cities, towns and communities with populations of 10,000 or more, or less if the area is covered by a MS4 permit. Stenciling is not required in areas where pedestrians are prohibited.

Implementation:

Warnings to discourage illegal discharges should be stenciled onto or adjacent to drain inlets where appropriate. The goal is to increase public awareness of how rainfall runoff can carry litter, automotive fluids, motor oil and other contaminants into waterways.

Maintenance:

Stenciling should be inspected and replaced when unreadable.

C.21 SAFER ALTERNATIVE PRODUCTS

Description:

A variety of products that may be harmful to the environment if they come into contact with surface waters are used in maintenance facilities and activities. In some cases, a less harmful product that serves the same purpose can replace a harmful product. The less harmful product is referred to as a safer alternative product. The primary purpose of using safer alternative products is to reduce the potential for the discharge of toxic products to drainage paths, storm water drainage systems or watercourses.

Appropriate Applications:

Safer alternative products should be considered for all maintenance activities. For example, when safer alternative products exist for cleaning products, paints, herbicides, automotive products and fertilizers, they should be used where practical and effective. Alternative products may not be available, effective or cost effective in every situation.

Implementation:

- Create awareness among employees regarding the benefits of safer alternative products. Safer alternative product awareness will be incorporated into the Maintenance Division storm water staff training program. For example the use of lower phosphate detergents where applicable at facilities and the use of water based cleaners versus halogenated solvents (cleaning fluids).
- The materials used on Maintenance projects shall conform to approved materials in the current *State of California, Department of Transportation, Standard Specifications*. The Department's Translab has an established testing protocol for product review and testing before a material becoming a standard material for use. For example, the Standard Specifications include approved asphalt mixtures and thermoplastic striping materials.
- The use of a safer alternative product may still result in the discharge of harmful materials to drainage paths, storm water drainage systems or watercourses. All products are to be used in accordance with manufacturers' recommendations.

C.22 DRAINAGE FACILITIES

These BMPs address the maintenance of drainage facilities to reduce the potential for pollutant discharge. Drainage Facilities BMPs include Baseline Storm Water Drainage Facilities Inspection and Cleaning BMP (Section C.22.1), Enhanced Storm Drain Inlet Inspection and Cleaning Program BMP (Section C.22.2), Illicit Connection Detection, Reporting and Removal BMP (Section C.22.3) and Illegal Spill Discharge Control BMP (Section C.22.4).

C.22.1 Baseline Storm Water Drainage Facilities Inspection and Cleaning

Description:

Culverts, ditches, gutters, underdrains, horizontal drains and downdrains require inspection and cleaning to prevent flooding and to provide for sufficient hydraulic capacity.

Appropriate Applications:

These procedures are applicable to maintenance personnel who conduct storm water drainage system facilities inspection and cleaning. BMP implementation will depend on traffic, weather, available resources, safety conditions and access to storm water drainage systems.

Implementation:

- Inspect culverts, ditches, gutters, underdrains, horizontal drains, downdrains and outlets annually and as needed during the winter season to determine if cleaning is required or if damage has occurred.
- Clean culverts to maintain sufficient hydraulic capacity of the culvert.
- Inspect ditches and gutters to maintain sufficient hydraulic capacity. Schedule routine ditch-cleaning activities designed to maintain sufficient hydraulic capacity of ditches prior to the rainy season.
- When cleaning drainage ditches below cut slopes or steep slopes, avoid cutting the toe of the slope. This can also prevent damage to the ditch.
- Water used and the material generated during drainage facility cleaning should be collected and managed per the requirements of the Section C.13.2 Solid Waste Management and Section C.13.6 Liquid Waste Management BMPs.
- Where waterways are affected, coordinate maintenance activities with the appropriate regulatory agency.
- Temporary stockpiles of removed material should be managed per the requirements of the Section C.17 Stockpile Management BMP.
- The Maintenance Supervisors in charge of the activity will provide Vactor™ operators with written instructions identifying pre-approved decanting sites.
- Maintenance Supervisors will work with the District Maintenance Storm Water Coordinator in establishing approved decanting sites for Vactor™ waste.

C.22.2 Enhanced Storm Drain Inlet Inspection and Cleaning Program**Description:**

Caltrans will implement an annual storm drain inlet inspection and cleaning program in the metropolitan areas of San Diego, Orange, Los Angeles and Ventura Counties.

Appropriate Applications:

Within the target counties, an annual inspection and cleaning program should be implemented. This program will not address left shoulder, median or ramp inlets that require lane closures for access. Right shoulder inlets and other inlets that do not require lane closures should be inspected and the impact of litter and debris from these inlets should be assessed in the Monitoring and Research Program. Inspection and cleaning activities should be reported annually by county, route and post mile.

Implementation:

- Inspect drain inlets annually in the target counties to determine if cleaning is required or if damage has occurred.
- Clean inlets with 12 inches or more of accumulated material.
- Maintain records and a database of inspection and cleaning information.

C.22.3 Illicit Connection Detection, Reporting and Removal**Description:**

This procedure directs maintenance staff to detect and report illicit connections and illegal discharges into Caltrans storm water drainage systems. Illicit connections are connections to Caltrans drainage systems that have not been approved by Caltrans.

This management practice is directed at continuous or recurring discharges through direct connections to storm water drainage systems or as run-on from adjacent properties.

Appropriate Applications:

Detecting and reporting illicit connections applies to all field activities performed by maintenance staff. If an illicit connection is discovered, it shall be reported.

Implementation:

- Maintenance personnel, as part of their routine inspections and maintenance work, shall report all observed suspected illicit connections to the District Maintenance Storm Water Coordinator, who will forward these observations to the NPDES Storm Water Coordinator. A Storm Water Pollution/Drainage report has been developed for use in this activity.
- All public-initiated calls should be directed to the District's Public Affairs Officer. Calls regarding illicit connections should be logged and routed to the NPDES Storm Water Coordinator.
- Response and permitting or removal of illegal connections will be in accordance with Section 1.3.3 of the Statewide SWMP.

C.22.4 Illegal Spill Discharge Control

Description:

This procedure calls for maintenance field staff who detect illegal dumping, discharges and spills of pollutants on Caltrans properties and facilities to report them.

This BMP is directed at incidents involving dumping, discharges or spills that affect storm water.

Appropriate Applications:

- Any spills or dumped materials that are observed by maintenance personnel shall be reported.

Implementation:

- Maintenance supervisors shall report to the District Maintenance Storm Water Coordinator any field personnel observed illegal dumping or spilling of materials as part of their routine inspections and maintenance work. The District Maintenance Storm Water Coordinator will forward these observations to the District NPDES Coordinator. A Storm Water Pollution/Drainage Problem report form has been developed for this use.
- If suspected hazardous materials or hazardous waste dumping has occurred, Maintenance Supervisors shall also report the incident to the District Maintenance Hazardous Materials Manager.
- Spill cleanup shall be handled in accordance with the legal authority presented in Section 2.6 of the SWMP.

C.23 STRUCTURAL TREATMENT SYSTEM MAINTENANCE

The following systems represent the approved structural treatment best management practices (STBMPs) that have been approved as technically and fiscally feasible in reducing constituents of concern to improve water quality. The systems include:

- Biofiltration Strips and Swales (Section C.23.1),
- Infiltration Basins (Section C.23.2),
- Infiltration Trenches (Section C.23.3),
- Detention Devices (Section C.23.4),
- Traction Sand Traps (Section C.23.5),
- Gross Solids Removal Devices (Section C.23.6),
- Austin Sand Filters (Section C.23.7),
- Delaware Sand Filters (Section C.23.8),
- Multi-Chambered Treatment Trains (Section C.23.9), and
- Wet Basins (Section C.23.10).

This section of the Staff Guide describes typical STBMPs and their recommended maintenance. Actual field STBMPs may vary from the standard schematics shown in this section. Division of Maintenance supervisory staff may modify the recommended frequency of a maintenance activity on a site-specific basis to ensure functionality.

Previous study of STBMPs demonstrated that inspection frequency and vegetation management were primary cost factors (BMP Retrofit Pilot Study Final Report, CTSW-RT-01-050). Consequently these items are minimized in these guidelines, though other district policies, such as fire safety and aesthetics, may dictate more frequent maintenance. Further, with increasing numbers of STBMPs, it is critical that the maximum amount of necessary work is accomplished with each site visit. To this end, it is recommended that STBMP inspectors carry the necessary equipment (Table C-61) to unclog a BMP that needs immediate maintenance. If the BMP is inspected 3 days after a storm event, concurrent unclogging may allow draining before the 96-hour limit for vector breeding and vector control district consultation. It also allows subsequent maintenance, if needed, to be scheduled during a dry period rather than the period immediately following a storm, which is often a period of peak demand on maintenance resources.



There may be occasions where emergencies arise, such as accidents, toxic spills, or other incidents, where immediate response is needed. On those occurrences, Caltrans crews will respond to the emergency, on a priority basis and, if necessary, the BMP will be taken out of service until the BMP functionality can be restored. The goal for such critical situations is to have the BMP back into service within 30 days.

Prior to intrusive maintenance at any BMP, maintenance personnel should check with the District biologist to ensure there are no endangered species, threatened species or species of special concern within the BMP maintenance area.

This section does not include maintenance that may be necessary for vector control of devices that hold a permanent pool of water where vector prevention has failed. In such cases the local vector control authority should be consulted.

For many treatment BMPs, the wet season inspections are scheduled 3 days after substantial rainfall events (0.75 inches is suggested for most areas of California), which requires tracking storm size and when the storm event ended. A rain gauge at the maintenance station can be used to verify storm size. There are also Internet resources, such as weather.com where the ‘yesterday’ tab gives precipitation measurements.

Table C-61. Inspection and Unclogging Equipment list

ITEM	PURPOSE
Hard hat, boots, gloves	Safety and comfort
Camera, inspection forms, tape measure	Documentation
Plumbing snake and thin rod	Unclogging orifices
Metal rake	Breaking up accumulated sediment that act as dams, scarifying infiltration basins and filters,

C.23.1 Biofiltration Strips and Swales

Description:

These measures are intended to maintain established biofiltration swales and strips as effective devices for treating runoff discharges. These requirements for inspection and maintenance will allow the devices to continue to function as designed for water quality purposes.

Appropriate Application:

The BMP maintenance described in Table C-62 and Table C-63 apply to personnel that inspect and maintain biofilter swales, where water depths tend to be deeper than strips so plant height guidelines may be helpful to performance. For strips, the Roadside Vegetated Treatment Sites (RVTS) Study (CTSW-RT-07-127.01.2) characterized the treatment benefit of roadside strips that did not have a water quality based maintenance program. The comparison of the RVTS results with previous studies suggest that maintenance of biofiltration strips, beyond the Department's current statewide protocols for vegetation, do not enhance pollutant removal. Therefore, biofiltration strips and other RVTS-type areas that receive sheet flow should be maintained according to existing district maintenance protocols. Further, some areas may have strips that do not have vegetation to design standards (e.g. 80 percent coverage) because soil and climate may limit the success of establishment. In these cases, stormwater treatment benefit may still occur, mostly from infiltration, so a continual effort to force establishment of vegetation may not be justified. Refer to the District landscape architect office for advice on identifying these circumstances.

Swales tend to have higher water depths than strips, so preventative and corrective maintenance for maintaining plant vegetation height should be implemented.

The preventative maintenance routine is described in Table C-62, and the corrective maintenance activities are described in Table C-63.

Chemical vegetative control measures will not be used on vegetated treatment BMPs except where Caltrans is directed by the California Department of Food and Agriculture to treat the BMPs for invasive weeds. Fire control strips up to 2.4 meters (8 feet) wide may be maintained through pesticide applications adjacent to biofiltration swales. The areas used for fire control will not be considered as part of the treatment system. Report the use of chemicals in the Caltrans Stormwater Management Annual Report.



Implementation:

Field measurements of maintenance indicators are made by visual observation. Frequencies provided are for the minimum required level of service. Greater maintenance frequencies may be required depending on the particular site and level of traffic.

TABLE C-62: BIOFILTRATION SWALES SYSTEMS PREVENTATIVE MAINTENANCE

FREQUENCY	ROUTINE ACTION	ACTIVITY CUT-SHEET
Annually	Mow grass, grass-lined swales and strips to an average height of 6 inches	B-40

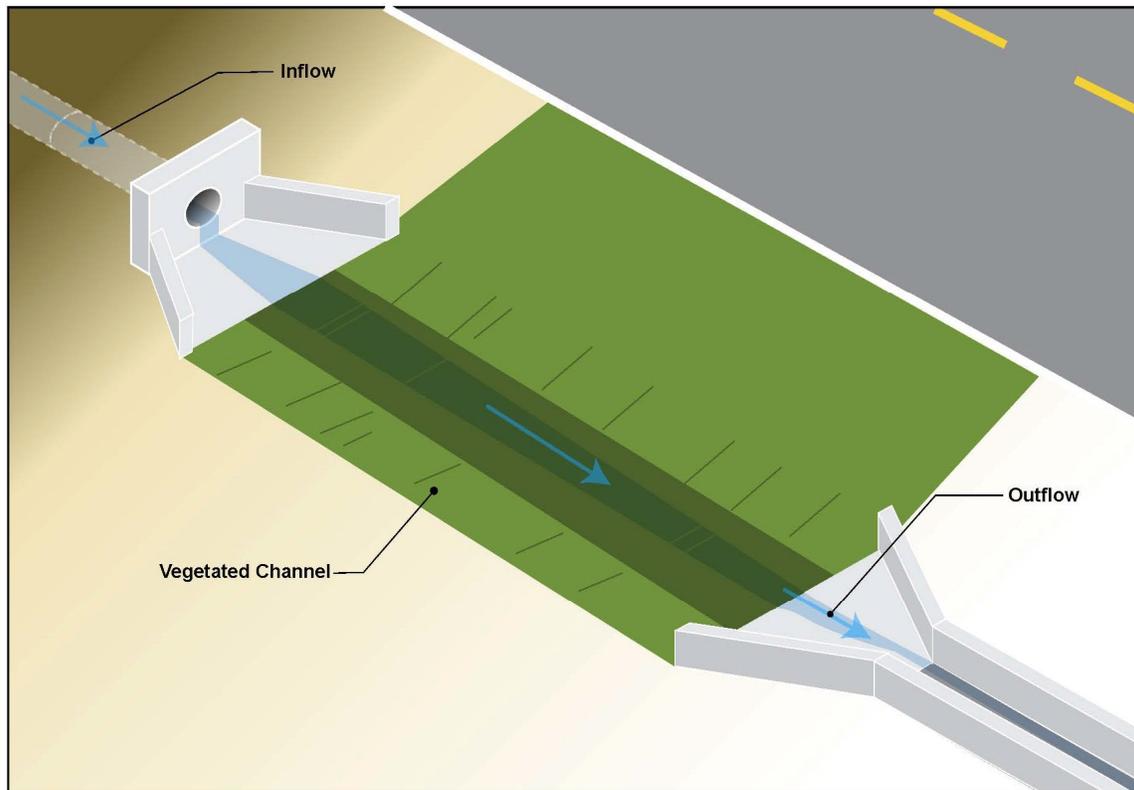
TABLE C-63: BIOFILTRATION SWALES MAINTENANCE ACTIVITIES

MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Evidence of significant channeling, erosion, seeps, or ponding	Annually in late wet season	Correct channelized, eroded, seeped, or ponded areas using additional fill and vegetation depending on coverage and/or by removing accumulated sediment. Complete prior to next wet season.
Average vegetation height exceeds 12 inches, emergence of trees, or woody vegetation	Semi-Annually, once during wet season, once during dry season (depending on growth)	Cut vegetation to an average height of 6 inches; cuttings may be removed at discretion of District Maintenance.
Less than 80 percent coverage in swale invert and swale side slope	Semi-Annually, once late wet season and once late dry season	Assess quantity needed and reseed/revegetate barren spots by November. Contact environmental or landscape architect for appropriate seed mix. Scarify area to be restored, to a depth of 2-inches. Restore side slope coverage with hydroseed mixture. If growth is unsuccessful after 2 applications (2 seasons) of reseeding/revegetating, an erosion blanket or equivalent protection should be installed over eroding areas
Debris/trash present	Inspect during routine trash collection	Remove litter, and debris per routine District schedule.



TABLE C-63: BIOFILTRATION SWALES MAINTENANCE ACTIVITIES

<p>MAINTENANCE INDICATOR</p>	<p>INSPECTION FREQUENCY</p>	<p>MAINTENANCE ACTIVITY</p>
<p>Sediment at or near vegetation height, channeling of flow within swale and energy dissipaters, inhibited flow due to change in slope</p>	<p>Annually in the dry season</p>	<ul style="list-style-type: none"> • Remove sediment. If flow is channeled, determine cause and take corrective action. If sediment becomes deep enough to change the flow gradient, remove sediment during dry season, characterize and properly dispose of sediment, and revegetate. • Notify engineer or District Maintenance Storm Water Coordinator to determine if regrading is necessary. If necessary, regrade to design specification and revegetate swale/strip. If regrading is necessary, the process should start in May. Revegetate strip/swale in Nov. Target completion prior to wet season. • Remove, characterize, and properly dispose of sediment. Refer to Activity Cut-Sheet B-48.
<p>Burrows, holes, mounds</p>	<p>Annually and after vegetation trimming</p>	<p>Where burrows cause erosion or jeopardize structural integrity, backfill firmly.</p>
<p>Water accumulation in spreader ditch and/or collector ditch for more than 72 hours</p>	<p>Within 72 hours after a storm event 0.75 inches or greater. If no such event occurs before April 1, conduct wet season inspections in April.</p>	<ul style="list-style-type: none"> • At the time of inspection, de-water the spreader ditch to a depth of less than 0.25 inches. If sediment impedes the de-watering activity, then move or remove that portion of the sediment. • Characterize and properly dispose.
<p>Inlet structures, outlet structures, side slopes or other features hindered by debris or damaged, significant erosion, fence damage, graffiti, vandalism, etc.</p>	<p>Semi-Annually, late wet season and late dry season</p>	<p>Repair/take corrective action prior to wet season. Contact the District Maintenance Storm Water Coordinator if repairs /solutions are not readily available in the field. The District Maintenance Storm Water Coordinator will coordinate with appropriate staff for repairs/solutions.</p>



BIOFILTRATION SWALE

Figure C-9
Schematic of a Biofiltration Swale & Strip

C.23.2 Infiltration Basins

Description:

These measures are intended to maintain infiltration basins as effective devices for treating runoff discharges. These requirements for inspection and maintenance will allow the devices to continue to function as designed for water quality purposes.

Appropriate Applications:

The BMP maintenance described in Table C-64 and Table C-65 apply to personnel who inspect and maintain infiltration basins. The preventative maintenance routine is described in Table C-64, and the actual maintenance activities are described in Table C-65. A schematic of an infiltration basin is shown in Figure C-9.

Implementation:

Field measurements of maintenance indicators are made by visual observation. The illustration below provides a graphical representation of the drain time threshold for standing water:

TABLE C-64 INFILTRATION BASIN PREVENTATIVE MAINTENANCE		
FREQUENCY	ROUTINE ACTION	ACTIVITY CUT-SHEET
Annually at the end of the wet season	Trim vegetation to an average height of 6 inches.	B-39, B-40

TABLE C-65: INFILTRATION BASIN MAINTENANCE ACTIVITIES

MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Emergence of trees or woody vegetation	Once during wet season, once during dry season	Remove any trees, or woody vegetation at District Maintenance discretion, reasons may include maintenance access, clogged inlets, or tree preservation requirements in coastal zone.
Debris/trash present	Inspect during routine trash collection- Minimum twice per year	Remove and dispose of trash and debris per routine District schedule.



TABLE C-65: INFILTRATION BASIN MAINTENANCE ACTIVITIES

MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Standing water for more than 72 hours	Annually 3 days after a 0.75-inch storm event. If no such event occurs before April 1, conduct wet season inspections in April.	<ul style="list-style-type: none"> • Drain facility, if possible, by scarifying the invert or by opening the maintenance drain at the time of inspection. • Notify engineer or District Maintenance Storm Water Coordinator to consider the following: <ul style="list-style-type: none"> - Remove sediment, scarify invert, and regrade if necessary. - If unable to achieve acceptable infiltration rate or implement alternative solution then move to decommission. - If standing water cannot be removed within 96 hours notify the District Maintenance Storm Water Coordinator/Vector Control District. - Remove, characterize, and properly dispose of sediment. Refer to Activity Cut-Sheet B-48.
Standing water for more than 96 hours	1 day after above inspection where standing water was observed and action taken.	Notify the District Maintenance Storm Water Coordinator/Vector Control District.
Sediment depth exceeds marker on staff gage	Annually in the dry season	Remove, characterize and properly dispose of sediment. Regrade and revegetate bare areas. Guidelines on revegetation will be consistent with existing vegetation within basin. Also refer to maintenance activity for 'Evidence of Erosion' indicator for guidelines on revegetation.
Evidence of erosion	During dry season	Reseed/revegetate barren spots prior to wet season. Contact environmental or landscape architect for appropriate seed mix. Scarify surface if needed. If after two applications (2 seasons) of reseeding / revegetating and growth is unsuccessful both times, an erosion blanket or equivalent protection will be installed over eroding areas. No erosion blanket will be installed in the basin invert.
Burrows, holes, mounds	Annually and after vegetation trimming	Where burrows cause erosion or jeopardize structural integrity, backfill firmly.



TABLE C-65: INFILTRATION BASIN MAINTENANCE ACTIVITIES

MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Inlet structures, outlet structures, side slopes or other features hindered by debris or damaged, significant erosion, graffiti or vandalism, fence damage, etc.	Semi-Annually, late wet season and late dry season	Take corrective action prior to wet season. If repair solutions are not readily available in the field notify the District Maintenance Storm Water Coordinator who will coordinate with appropriate staff.
Average plant height is greater than 12 inches	Inspect once during wet season and once during dry season	Cut or remove vegetation and clippings as appropriate.

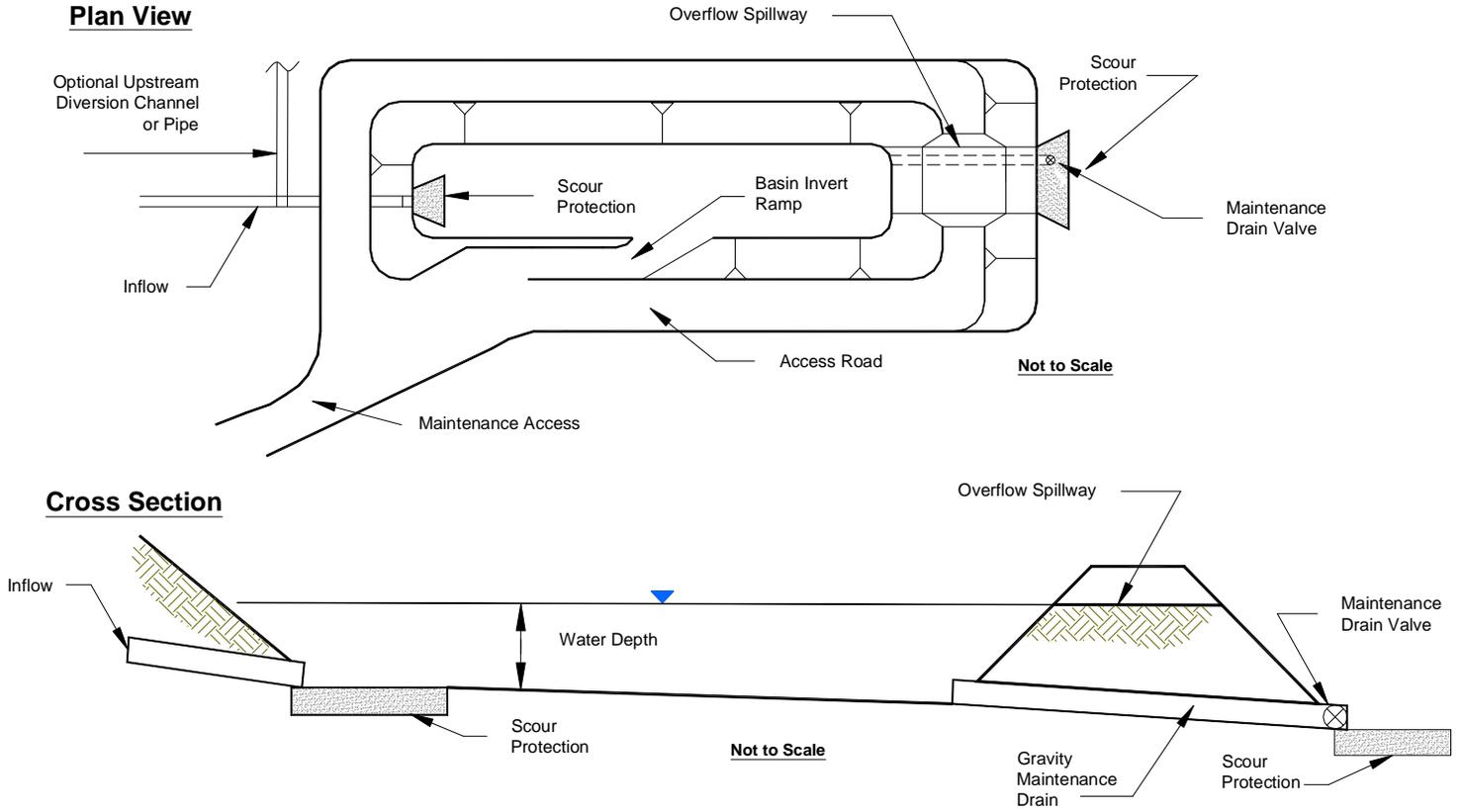


Figure C-10
Schematic of an Infiltration Basin

C.23.3 Infiltration Trenches

Description:

These measures are intended to maintain effective infiltration trenches for treating runoff discharges. These requirements for inspection and maintenance will allow the devices to continue to function as designed for water quality purposes.

Appropriate Application:

The BMP maintenance described in Table C-66 applies to personnel who inspect and maintain infiltration trenches. The maintenance activities are described in Table C-66. A schematic of an infiltration trench is shown in Figure C-10.

Implementation:

Field measurements of maintenance indicators are made by visual observation. The illustration below provides a graphical representation of the drain time threshold for standing water:

TABLE C-66: INFILTRATION TRENCH MAINTENANCE ACTIVITIES

MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Standing surface water for more than 72 hours	Once annually, within 72 hours after a 0.75 inch storm event. If no such event occurs before April 1, conduct wet season inspections in April.	<ul style="list-style-type: none"> • Drain facility by unclogging the orifice or opening the emergency drain at time of inspection • Notify engineer or District Maintenance Storm Water Coordinator to consider the following: <ul style="list-style-type: none"> - Undertake investigation for course of action to achieve acceptable infiltration rate. If unable to achieve acceptable infiltration then BMP operations cease. • Remove top 18-inch layer of trench, including surface gravel layer, filter fabric, and trench filler material; wash trench filler material and reinstall surface gravel layer, filter fiber, and trench filler material into trench prior to wet season. Refer to Activity Cut-Sheet B-48.
Standing water for more than 96 hours	1 day after above inspection where standing water was observed and action taken.	Notify the District Maintenance Storm Water Coordinator/Vector Control District.



TABLE C-66: INFILTRATION TRENCH MAINTENANCE ACTIVITIES

MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Trash/debris present.	Inspect during routine trash collection-Minimum twice per year	Remove and dispose of trash and debris per routine District schedule.
Visible sediment	Annually in the dry season	Remove top 18-inch layer of trench, including surface gravel layer, filter fabric, and trench filler material; wash trench filler material and reinstall surface gravel layer, filter fiber, and trench filler material into trench prior to wet season.
Inlet structures, outlet structures, filter fabric or other features hindered by debris or damaged, emergence of trees or woody vegetation, graffiti or vandalism, fence damage, etc.	Semi-Annually, late wet season and late dry season	Take corrective action, prior to wet season. If repair solutions are not readily available in the field notify the District Maintenance Storm Water Coordinator who will coordinate with appropriate staff.

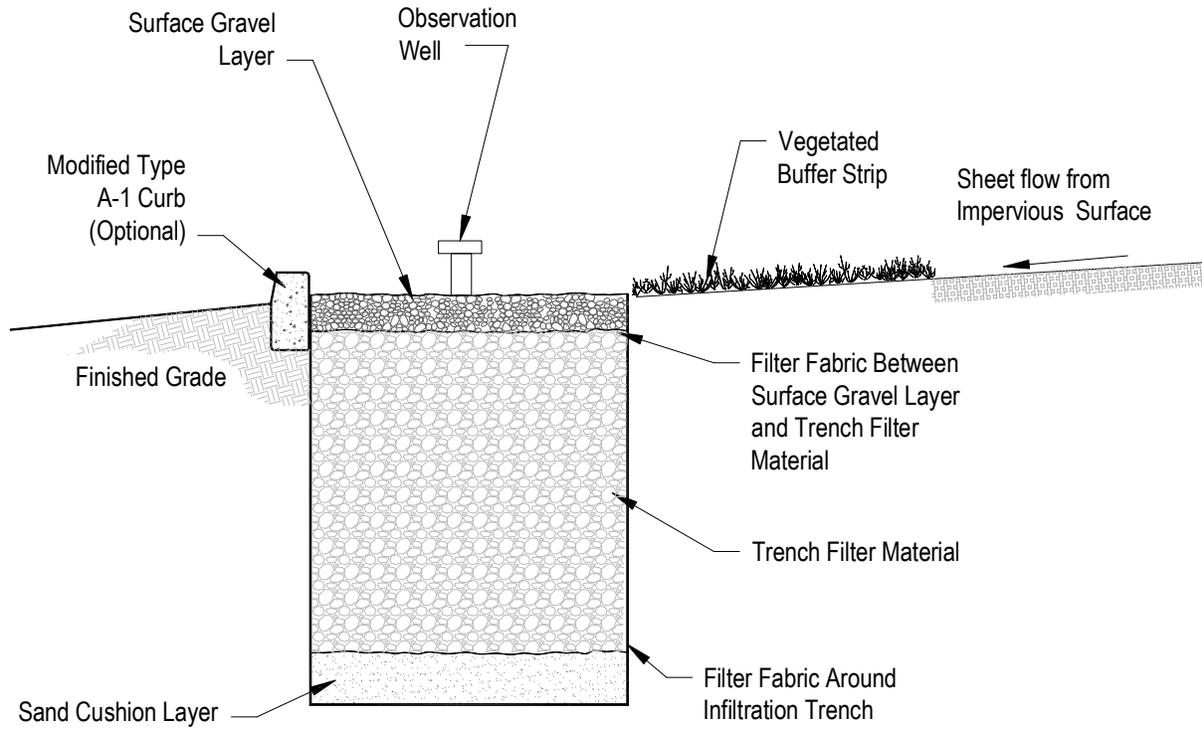


Figure C-11
Schematic of an Infiltration Trench

C.23.4 Detention Devices

Description:

These measures are intended to maintain effective detention devices for treating runoff discharges. These requirements for inspection and maintenance will allow the devices to continue to function as designed for water quality purposes.

Appropriate Application:

The BMP maintenance described in Table C-67 and Table C-68 apply to personnel who inspect and maintain detention devices. The preventative maintenance routine is described in Table C-67, and the actual maintenance activities are described in Table C-68. A schematic of a detention device is shown in Figure C-11. A schematic of a water quality outlet structure is shown in Figure C-12.

Implementation:

Field measurements of maintenance indicators are made by visual observation. The figure below provides a graphical representation of the drain time threshold for standing water:

TABLE C-67: DETENTION DEVICE PREVENTATIVE MAINTENANCE

FREQUENCY	ROUTINE ACTION	ACTIVITY CUT-SHEET
Annually at the end of wet season	Remove accumulated debris around outlet structure	B-39, B-40

TABLE C-68: DETENTION DEVICE MAINTENANCE ACTIVITIES

MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Emergence of trees or woody vegetation	Once during wet season, once during dry season	Remove any trees, or woody vegetation if interferes with function of detention basins (impaired access to inlet/outlets, clogged outlets, or reduced storage volume).
Trash/debris present	Inspect during routine trash collection	Remove and dispose of trash and debris per routine District schedule.



TABLE C-68: DETENTION DEVICE MAINTENANCE ACTIVITIES

MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Evidence of erosion	During dry season	Reseed/revegetate barren spots prior to wet season. Contact environmental or landscape architect for appropriate seed mix. Scarify surface if needed. If after two applications (2 seasons) of reseeding / revegetating and growth is unsuccessful both times, an erosion blanket or equivalent protection will be installed over eroding areas. No erosion blanket will be installed in the basin invert.
Standing water for more than 72 hours	Within 72 hours after a storm event 0.75 inches or greater. If no such event occurs before April 1, conduct wet season inspections in April.	<ul style="list-style-type: none"> • Drain facility • Check and unclog clogged orifice at time of inspection. • Notify the District Maintenance Storm Water Coordinator if an immediate solution is not evident. • Remove, characterize, and properly dispose of sediment. Refer to Activity Cut-Sheet B-48.
Standing water for more than 96 hours	1 day after above inspection where standing water was observed and action taken.	Notify the District Maintenance Storm Water Coordinator/Vector Control District.
Sediment depth exceeds marker on staff gage (average 18 inches)	Annually in the dry season	Remove and properly dispose of sediment. Regrade if necessary.
Burrows, holes, mounds	Annually and after vegetation trimming	Where burrows cause erosion or jeopardize structural integrity, backfill firmly.
Inlet structures, outlet structures, side slopes or other features hindered by debris or damaged, significant erosion, graffiti or vandalism, fence damage, etc.	Semi-Annually, late wet season and late dry season	Take corrective action prior to wet season. Consult engineer or District Maintenance Storm Water Coordinator if immediate solution is not evident.
Average plant height is greater than 12 inches	Inspect once during wet season and once during dry season	Cut or remove vegetation and clippings as appropriate.

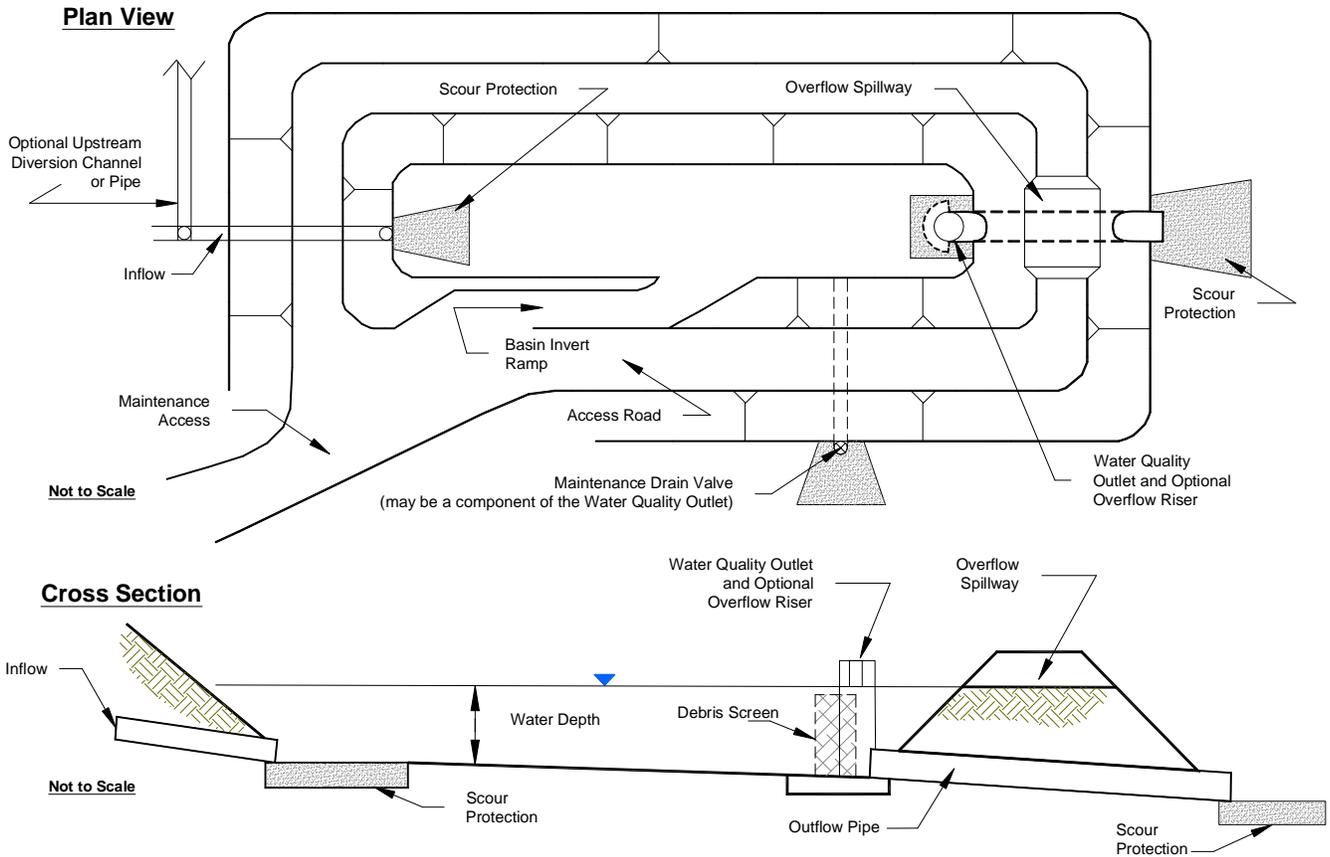
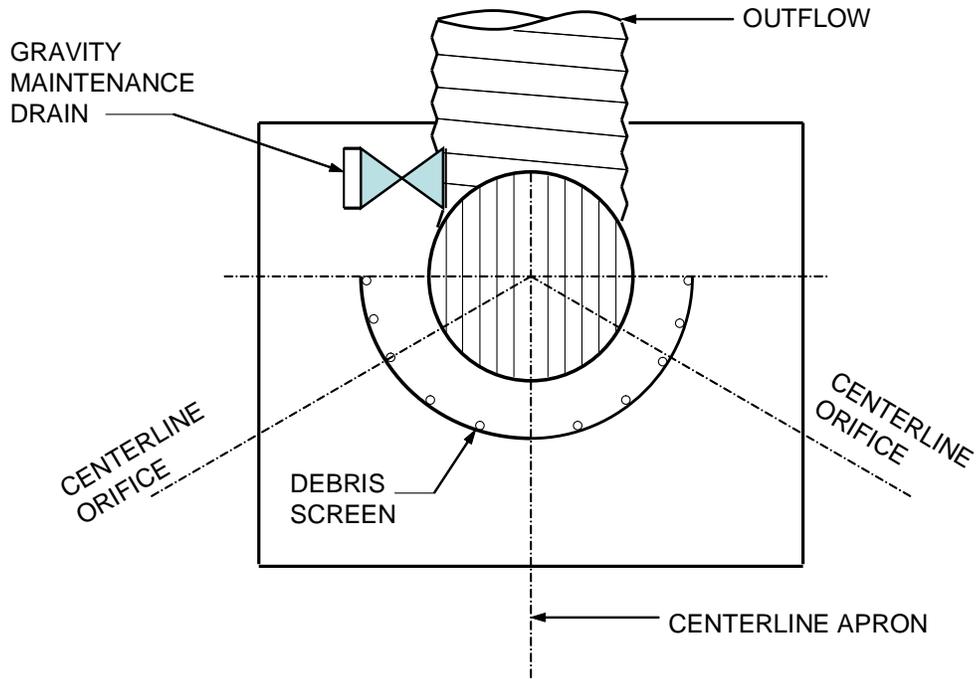


Figure C-12
Schematic of a Detention Device

PLAN



PROFILE

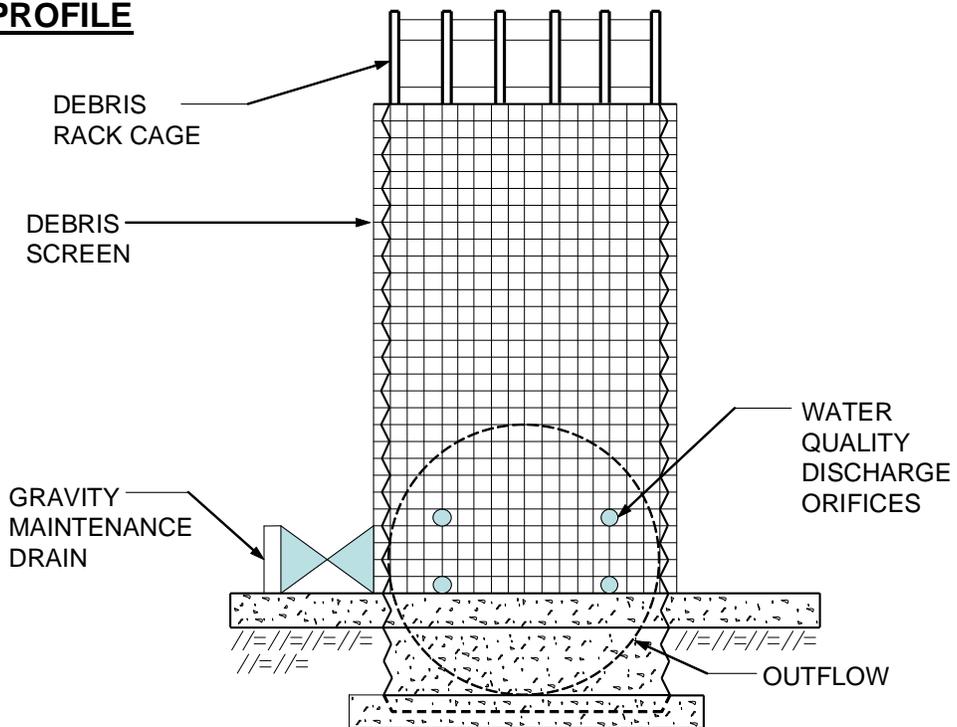


Figure C-13
Schematic of a Water Quality Outlet Structure

C.23.5 Traction Sand Trap Devices

Description:

This BMP is intended to maintain sand trap devices as effective devices for treating runoff discharges. These requirements for regular inspection and maintenance will allow the devices to continue to function as designed.

Appropriate Applications:

The BMP maintenance described in Table C-69 applies to personnel who inspect and maintain traction sand trap devices. The maintenance activities are described in Table C-69.

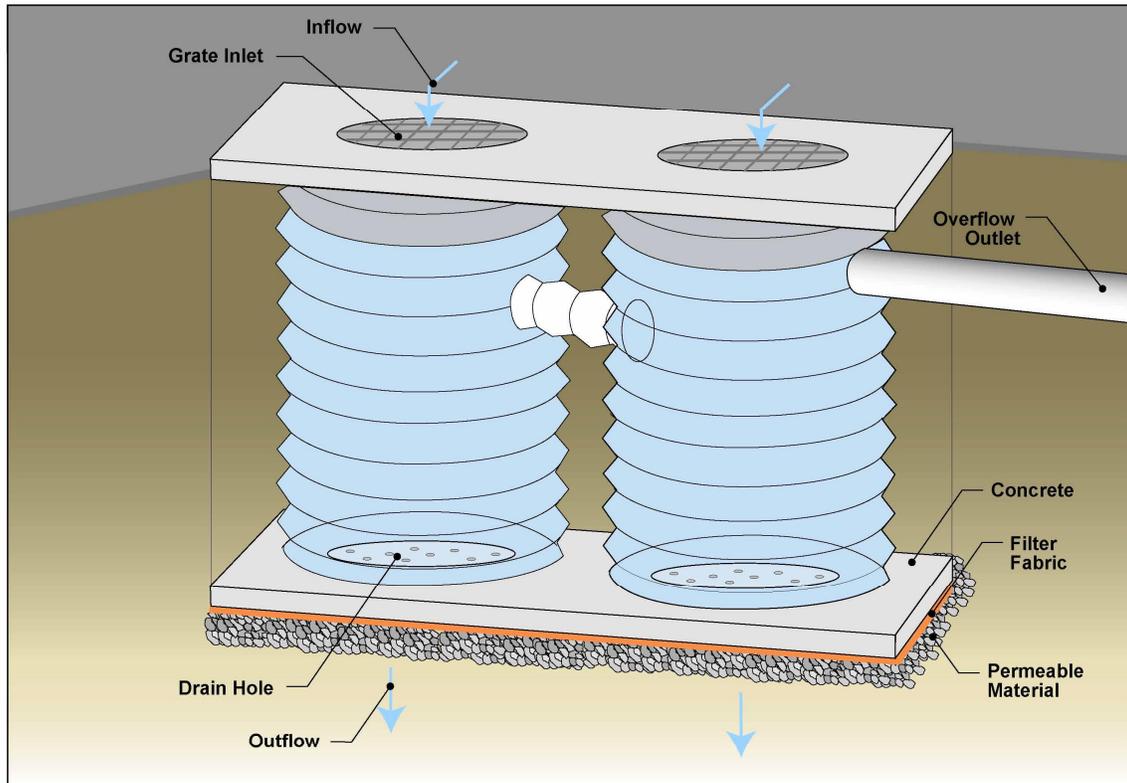
Implementation:

Field measurements of maintenance indicators are made by visual observation. The illustration below provides a graphical representation of the drain time threshold for standing water:

TABLE C-69: TRACTION SAND TRAP DEVICE MAINTENANCE ACTIVITIES

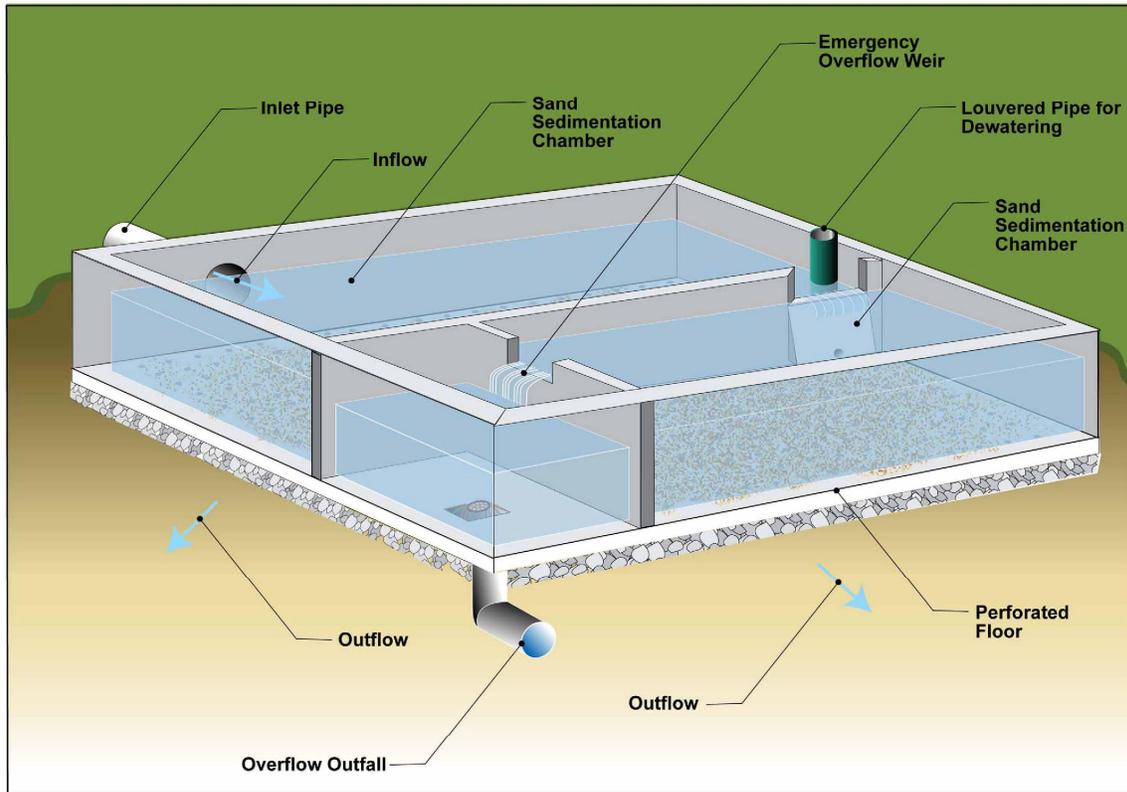
MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Sediment volume exceeds design capacity	Inspect annually and after significant storms	<ul style="list-style-type: none"> • Remove accumulated sediment. • Remove, characterize, and properly dispose of sediment. Refer to Activity Cut-Sheets B-48 and B-49
General maintenance items: Inlet/outlet structural integrity, damaged structures, graffiti or vandalism, etc.	Semi-Annually, late wet season and late dry season	Take corrective action prior to wet season. Report general maintenance problems to the District Maintenance Storm Water Coordinator if immediate solution is not evident.
Standing water in structure, between April 16 th and September 30 th , 96 hours after a storm event.	Inspect 96 hours after one run-off generating storm per year.	Drain facility if possible. If standing water cannot be removed notify the District Maintenance Storm Water Coordinator/Vector Control District.





TRACTION SAND TRAP (PIPE INLET TYPE)

Figure C-14
Schematic of a Traction Sand Trap (Pipe Inlet Type)



TRACTION SAND TRAP- VAULT TYPE

Figure C-15
Schematic of a Traction Sand Trap (Vault Type)

C.23.6 Gross Solids Removal Devices

Description:

This BMP is intended to maintain gross solids removal devices as effective devices for treating runoff discharges. These requirements for regular inspection and maintenance will allow the devices to continue to function as designed.

Appropriate Applications:

The BMP maintenance described in Table C-70 applies to personnel who inspect and maintain gross solids removal devices. The maintenance activities are described in Table C-70. Schematics of a Linear Radial Device are shown in Figures C-13 and C-14. A schematic of a Type 1 Inclined Screen Device is shown in Figure C-15, and a schematic of a Type 2 Inclined Screen Device is shown in Figure C-16.

Implementation:

Field measurements of maintenance indicators are made by visual observation. The illustration below provides a graphical representation of the drain time threshold for standing water:

TABLE C-70: GROSS SOLIDS REMOVAL DEVICE MAINTENANCE ACTIVITIES

MAINTENANCE INDICATOR	MEASUREMENT FREQUENCY	MAINTENANCE ACTIVITY
Inlet structures, outlet structures, or other features hindered by debris or damaged. Check for graffiti or vandalism.	Semi-Annual Inspection, late dry season and end of wet season	Take corrective action prior to wet season. Report to District Maintenance Storm Water Coordinator if immediate solution is not evident.
Presence of gross solids (trash and debris)	Recommend monthly during the wet season.	<ul style="list-style-type: none"> • Remove trash and debris as needed to maintain proper functioning. Minimum is to inspect for trash and debris with Semi-Annual Inspection. • Remove accumulated gross solids. Refer to Activity Cut-Sheet B-48
Standing water in structure 72 hours after any storm	With Semi-Annual Inspection and 72 hours after any storm.	Remove standing water and material that may be impeding complete gravity drainage



TABLE C-70: GROSS SOLIDS REMOVAL DEVICE MAINTENANCE ACTIVITIES

MAINTENANCE INDICATOR	MEASUREMENT FREQUENCY	MAINTENANCE ACTIVITY
Standing water for more than 96 hours	1 day after above inspection where standing water was observed and action taken.	Notify the District Maintenance Storm Water Coordinator/Vector Control District.
Screens <ul style="list-style-type: none"> • clogged, • damaged • loose • do not open/close properly. 	Minimum Semi-Annually, late dry season and end of wet season	Clean screens. Contact the District Maintenance Storm Water Coordinator if repairs /solutions are not readily available in the field. The District Maintenance Storm Water Coordinator will coordinate with appropriate staff for repairs/solutions.

1 Monitoring and abatement of vectors may be done through agreement with the local vector control authority.

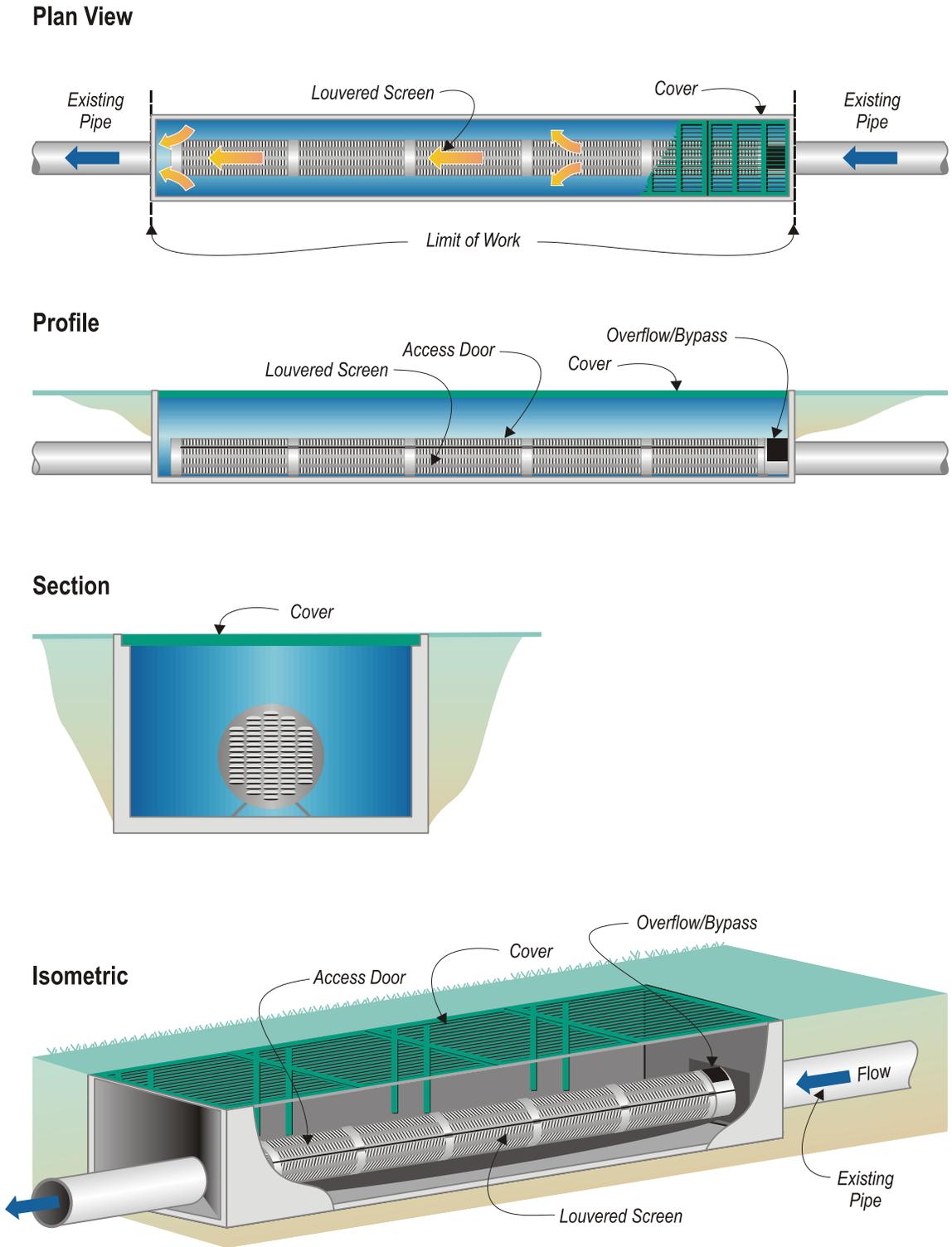


Figure C-16
Schematic of a Linear Radial Device

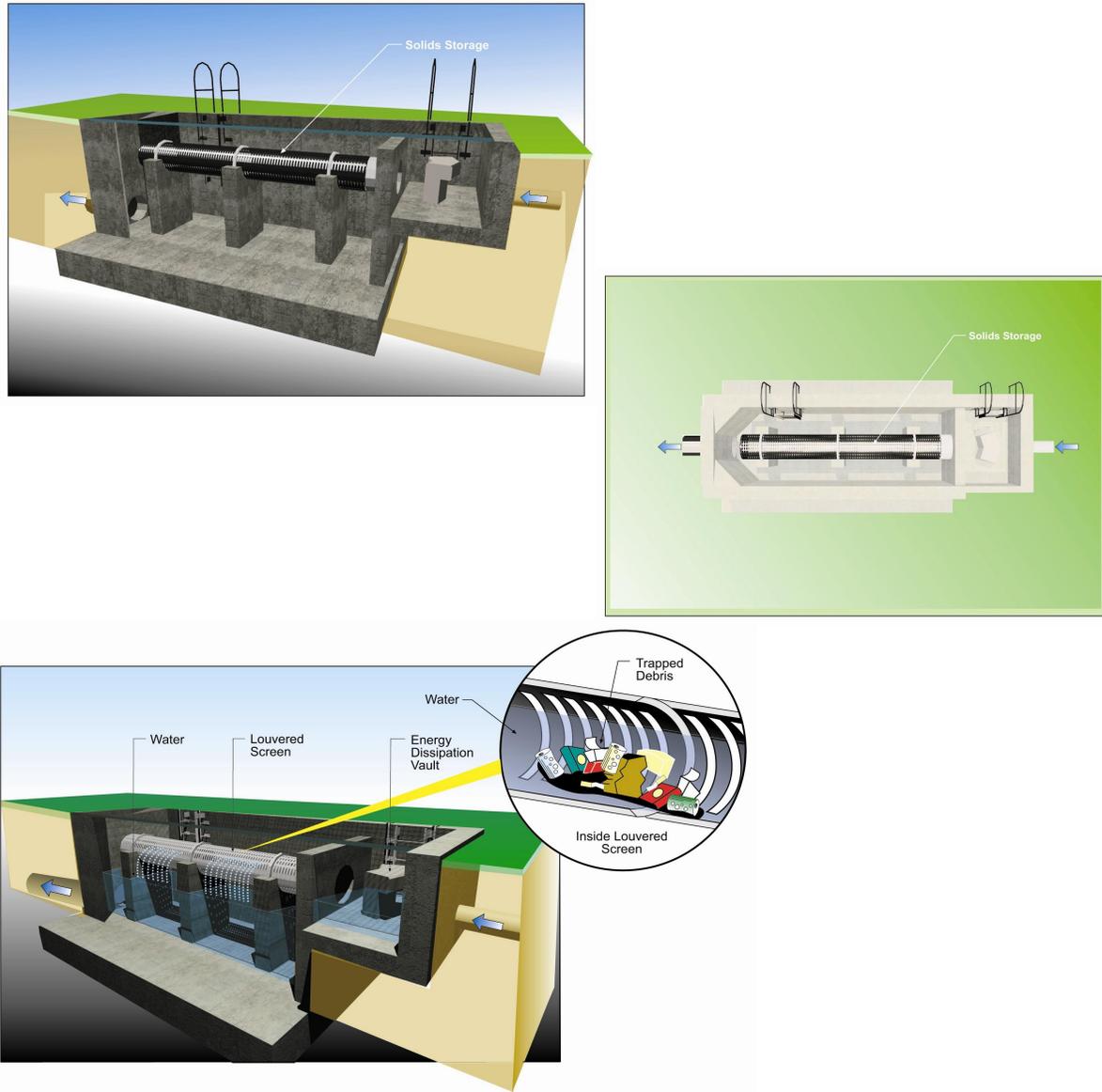
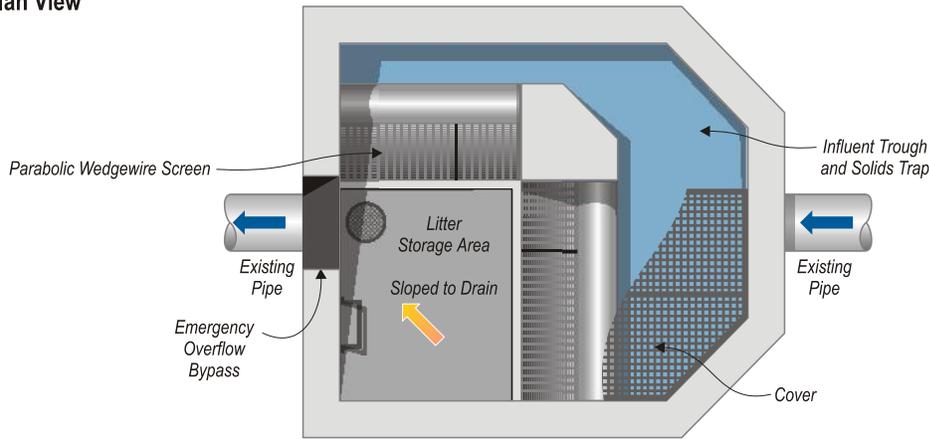
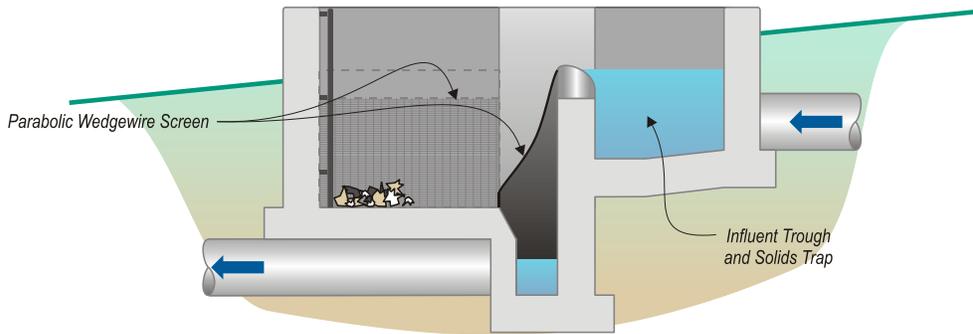


Figure C-17
Schematic of a Linear Radial Device (HV)

Plan View



Profile



Isometric

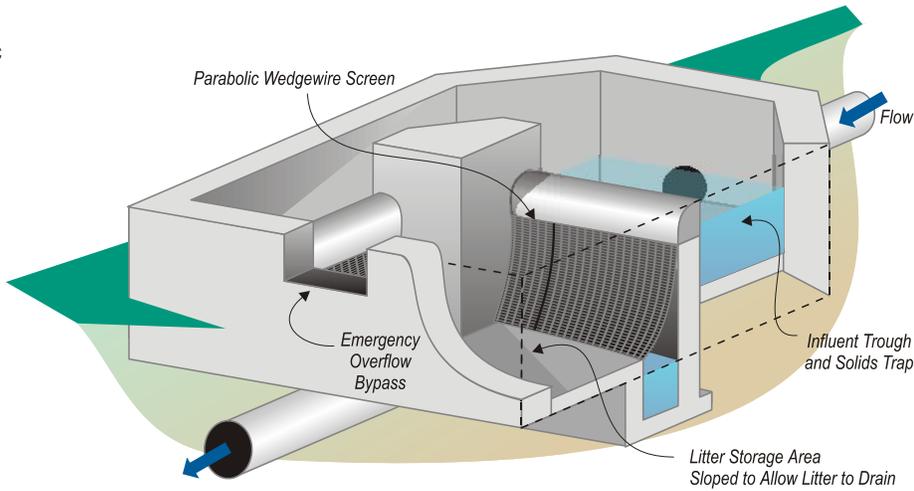


Figure C-18
Schematic of a Type 1 Inclined Screen Device

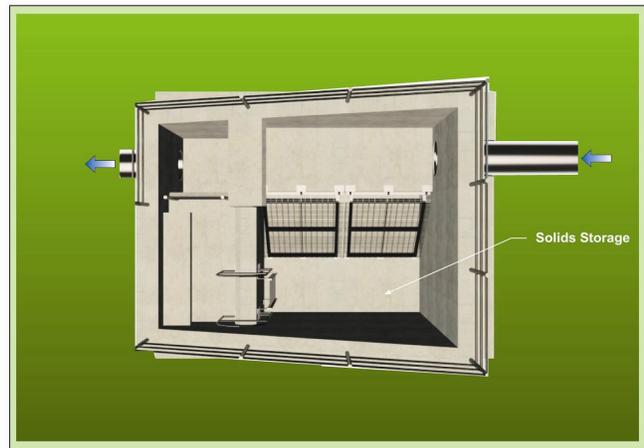
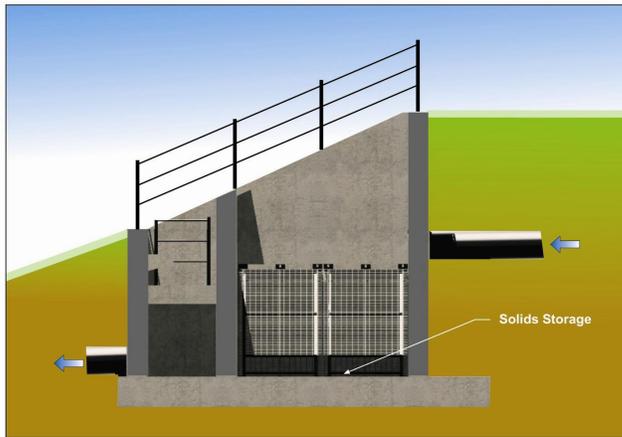


Figure C-19
Schematic of a Type 2 Inclined Screen Device

C.23.7 Austin Sand Filters

Description:

This BMP is intended to maintain Austin sand filters as effective devices for treating runoff discharges. These requirements for regular inspection and maintenance will allow the devices to continue to function as designed.

Appropriate Applications:

The BMP maintenance described in Table C-71 applies to personnel who inspect and maintain Austin sand filters. The maintenance activities are described in Table C-71. A schematic of an Austin Sand Filter is shown in Figure C-17.

Implementation:

Field measurements of maintenance indicators are made by visual observation. The figure below provides a graphical representation of the drain time threshold for standing water:

TABLE C-71: AUSTIN SAND FILTER MAINTENANCE ACTIVITIES

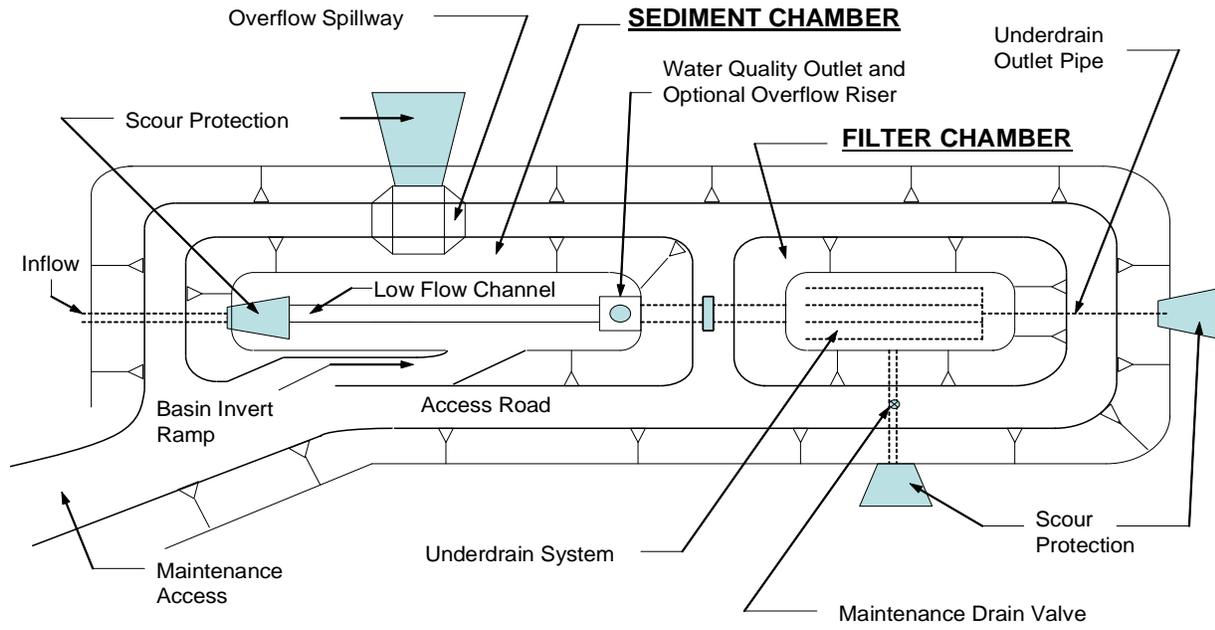
MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Drain time exceeds 72 hours	Annually, 3 days after a 0.75-inch storm event. If no such event occurs before April 1, conduct wet season inspections in April	<ul style="list-style-type: none"> • Remove sediment, trash and debris. • For sand filters with a standpipe, if standing water is upstream of the dividing wall, check orifice and unclog orifice at time of inspection. • If standing water is over the sand bed, scarify with a rake at time of inspection. The top 2 inches of media may need to be removed and disposed of if drain time continuously exceeds design time. Contact the District Maintenance Storm Water Coordinator who will coordinate with appropriate staff regarding remediation. • Restore media depth to 18 inches when overall media depth drops to 12 inches.¹ • Sand media should be ASTM C331 • Remove sand; sand media should be ASTM C331. Reference Activity Cut-Sheet B-48.
Standing water for more than 96 hours	1 day after above inspection where standing water was observed and action taken.	Notify the District Maintenance Storm Water Coordinator/Vector Control District.

TABLE C-71: AUSTIN SAND FILTER MAINTENANCE ACTIVITIES

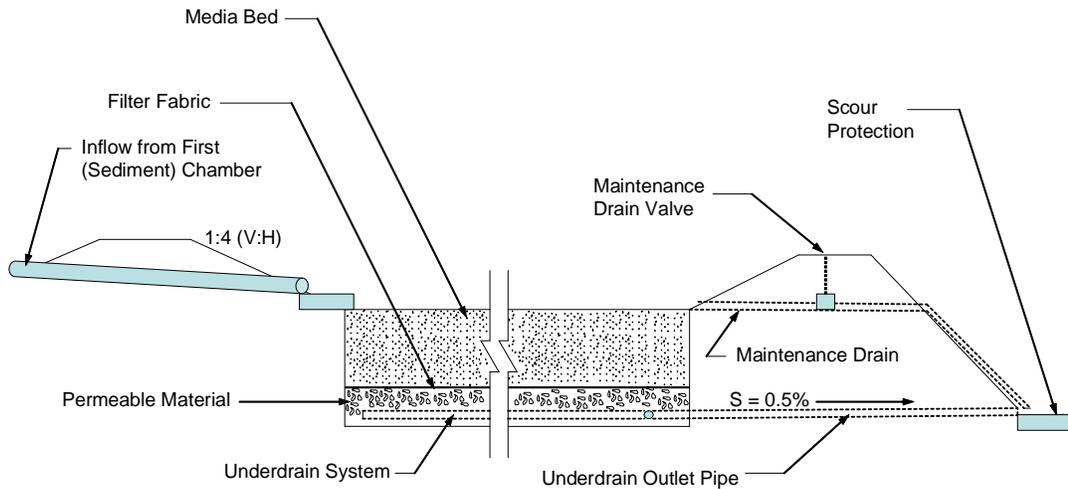
MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Sediment depth exceeds marker on staff gage in sedimentation basin; or sediment interferes with gravity drainage in standpipe and/or orifice plate	Annually during dry season.	Remove sediment prior to wet season. Characterize sediment and properly dispose.
Trash/debris present	Supervisors may set a schedule for debris and trash removal. Minimum is twice per year.	Remove and dispose of trash and debris per routine District schedule.
Burrows, holes, mounds	Annual inspections after vegetation trimming	Where burrows cause erosion or jeopardize structural integrity, backfill firmly.
Water accumulation in any structure or other location within the filter	Annually 3 days after a 0.75-inch storm event. If no such event occurs before April 1, conduct wet season inspections in April.	<ul style="list-style-type: none"> • Remove sediment, trash, and debris. • Check orifice in standpipes, and check pump where applicable. • Gravity drains where possible. • If standing water cannot be removed within 96 hours or remains through wet season, notify the District Maintenance Storm Water Coordinator/Vector Control District.
Inlet structures, outlet structures, filter fabric or other features hindered by debris or damaged, emergence of vegetation, graffiti or vandalism, fence damage, etc.	Semi-Annually, late wet season and late dry season	Take corrective action for repairs and cleaning. Contact the District Maintenance Storm Water Coordinator if repairs /solutions are not readily available in the field. The District Maintenance Storm Water Coordinator will coordinate with appropriate staff for repairs/solutions.

¹ Specification data to replace the sand at the Austin and Delaware media filters and at the Multi-Chambered Treatment Trains (MCTTs) can be found within the Caltrans Standard Specifications, July 1999 manual in sections 90-2.02 and 90-2.02B. The filter fabric specification for the MCTTs can be found in Caltrans Standard Specifications, July 1999 manual in section 88-1.03 for underdrains. In addition, an apparent opening size of 100 (U.S. Sieve) is recommended.





Plan View



Second (Filter) Chamber Cross Section

NOT TO SCALE

Figure C-20
Schematic of an Austin Sand Filter

C.23.8 Delaware Sand Filters

Description:

This BMP is intended to maintain Delaware sand filters as effective devices for treating runoff discharges. These requirements for regular inspection and maintenance will allow the devices to continue to function as designed.

Appropriate Applications:

The BMP maintenance described in Table C-72 applies to personnel who inspect and maintain Delaware sand filters. The maintenance activities are described in Table C-72. A schematic of a Delaware Sand Filter is shown in Figure C-18.

Implementation:

Field measurements of maintenance indicators are made by visual observation. The illustration below provides a graphical representation of the drain time threshold for standing water:

TABLE C-72: DELAWARE SAND FILTER MAINTENANCE ACTIVITIES

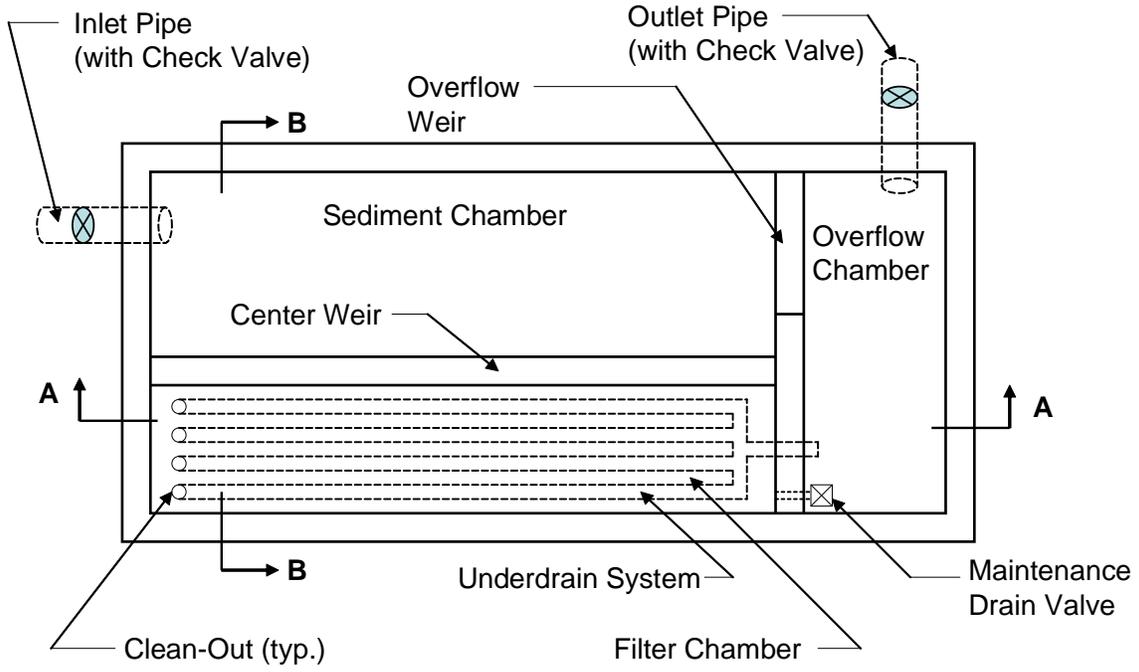
MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Drain time exceeds 72 hours in the filter chamber	Annually, 3 days after a 0.75-inch storm event. If no such event occurs before April 1, conduct wet season inspections in April	<ul style="list-style-type: none"> • Remove sediment, trash and debris. • Check orifice and pumps where applicable. • The top 2 inches of media may need to be removed and disposed of if drain time continuously exceeds design time. Contact the District Maintenance Storm Water Coordinator who will coordinate with appropriate staff regarding remediation. • Restore media depth to 18 inches when overall media depth drops to 12 inches. • ¹Sand media should be ASTM C331 • Remove sand; sand media should be ASTM C331. Refer to Activity Cut-Sheet B-48.
Sediment depth exceeds marker on staff gage in sedimentation basin	Annually during dry season	Remove sediment prior to wet season. Characterize sediment and properly dispose.
Trash/debris present	Supervisors may set a schedule for debris and trash removal.	Remove and dispose of trash and debris per routine District schedule.

TABLE C-72: DELAWARE SAND FILTER MAINTENANCE ACTIVITIES

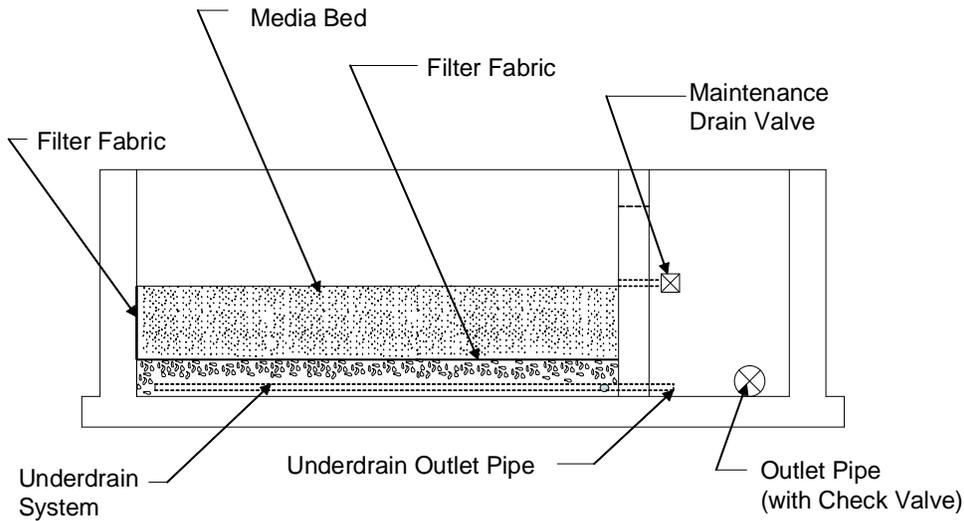
MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
	Minimum is twice per year.	
Inlet structures, outlet structures, filter fabric or other features hindered by debris or damaged, emergence of vegetation, graffiti or vandalism, fence damage, etc.	Semi-Annually, late wet season and late dry season	Take corrective action for repairs and cleaning. Contact the District Maintenance Storm Water Coordinator if repairs /solutions are not readily available in the field. The District Maintenance Storm Water Coordinator will coordinate with appropriate staff for repairs/solutions.
Valve Leakage	Semi-Annually, late wet season and late dry season	Tighten with wrench

1 Specification data to replace the sand at the Austin and Delaware media filters and at the Multi-Chambered Treatment Trains (MCTTs) can be found within the Caltrans Standard Specifications, July 1999 manual in sections 90-2.02 and 90-2.02B. The filter fabric specification for the MCTTs can be found in Caltrans Standard Specifications, July 1999 manual in section 88-1.03 for underdrains. In addition, an apparent opening size of 100 (U.S. Sieve) is recommended.

2 Escondido sand filter restores media to a depth of 12 inches.



Plan View



Section A-A

Figure C-21
Schematic of a Delaware Sand Filter

C.23.9 Multi-Chambered Treatment Train (MCTT)

Description:

This BMP is intended to maintain MCTTs as effective devices for treating runoff discharges. These requirements for regular inspection and maintenance will allow the devices to continue to function as designed.

Appropriate Applications:

The BMP maintenance described in Table C-73 and Table C-74 apply to personnel who inspect and maintain MCTT devices. The preventative maintenance routine is described in Table C-73, and the actual maintenance activities are described in Table C-74. A schematic of a Multi-Chambered Treatment Train is shown in Figure C-19.

Implementation:

Field measurements of maintenance indicators are made by visual observation. The illustration below provides a graphical representation of the drain time threshold for standing water:

TABLE C-73 MULTI-CHAMBERED TREATMENT TRAIN (MCTT) PREVENTATIVE MAINTENANCE

FREQUENCY	ROUTINE ACTION	ACTIVITY CUT-SHEET
Annually, in Summer	Replace sorbent pillows in main settling chamber	B-48

1 Specification data to replace the sand at the Austin and Delaware media filters and at the Multi-Chambered Treatment Trains (MCTTs) can be found within the Caltrans Standard Specifications, July 1999 manual in sections 90-2.02 and 90-2.02B. The filter fabric specification for the MCTTs can be found in Caltrans Standard Specifications, July 1999 manual in section 88-1.03 for underdrains. In addition, an apparent opening size of 100 (U.S. Sieve) is recommended.



TABLE C-74: MULTI-CHAMBERED TREATMENT TRAIN (MCTT) MAINTENANCE ACTIVITIES

<p>MAINTENANCE INDICATOR</p>	<p>INSPECTION FREQUENCY</p>	<p>MAINTENANCE ACTIVITY</p>
<p>Drain time through the filter chamber is greater than 72 hours or sediment accumulation is greater than 0.1 inch over more than 50 percent of the fabric surface area</p>	<p>Annually, 3 days after a 0.75-inch storm event. If no such event occurs before April 1, conduct wet season inspections in April.</p>	<ul style="list-style-type: none"> ● Remove and replace filter fabric blanket.¹ ● If problem persists, notify the District Maintenance Storm Water Coordinator; the media may need to be replaced. Complete prior to wet season. ● ¹ Sand media should be ASTM C33 ● Remove and replace media filter. Refer to Activity Cut-Sheet B-48. ● Remove, characterize, and properly dispose of sediment. Refer to Activity Cut-Sheet B-48.
<p>Standing water for more than 96 hours</p>	<p>1 day after above inspection where standing water was observed and action taken.</p>	<p>Notify the District Maintenance Storm Water Coordinator/Vector Control District.</p>
<p>Trash and debris present</p>	<p>Semi-Annually, late wet season and late dry season</p>	<p>Remove and dispose of trash and debris.</p>
<p>Sediment accumulates to 50% of the volume underneath the tube settlers (~6 inches). Maximum of 2-feet in grit chamber</p>	<p>Remove tube settler in sedimentation basin and plastic grate in grit chamber; measure sediment depth annually during the dry season</p>	<p>Remove sediment prior to wet season. Characterize sediment and properly dispose.</p>
<p>Water accumulation greater than 72 hours in any structure or other location within the device that is not protected from mosquito access²</p>	<p>Annually, 3 days after a 0.75-inch storm event. If no such event occurs before April 1, conduct wet season inspections in April.</p>	<p>Take action to drain standing water, such as removing accumulated sediment</p>
<p>Water accumulation greater than 96 hours in any structure or other location within the device that is not protected from mosquito access</p>	<p>1 day after above inspection where standing water was observed and action taken.</p>	<p>Notify the District Maintenance Storm Water Coordinator/Vector Control District.</p>
<p>Operation greater than 9 years</p>	<p>Every 9 years</p>	<p>Remove and replace filter media. Characterize and properly dispose.¹</p>

TABLE C-74: MULTI-CHAMBERED TREATMENT TRAIN (MCTT) MAINTENANCE ACTIVITIES

MAINTENANCE INDICATOR	INSPECTION FREQUENCY	MAINTENANCE ACTIVITY
Sorbent pillows in main settling chamber darkened by oily material	Annually, in Summer	Annually, renew sorbent pillows, or immediately if pillows are darkened by oily material; characterize and properly dispose.
Pump –storm status Indicator lights show Amber. Amber =pump failure Green=OK	Within 72 hours after every storm	Make assessment to determine if problem is electrical or mechanical. Take appropriate action. Replace pump if needed.
Pump-Warranty status	Annually in the dry season	Inspect pumps for serviceability and required periodic maintenance per manufacturer’s guidelines
Inlet structures, outlet structures, pump status indicator lights, filter fabric, settling tubes, mosquito screen over sump pumps (if any), or other features hindered by debris or damaged, emergence of vegetation, graffiti or vandalism, fence damage, etc.	Semi-Annually, during wet season and late dry season	Take corrective action prior to the wet season. Contact the District Maintenance Storm Water Coordinator if repairs /solutions are not readily available in the field. The District Maintenance Storm Water Coordinator will coordinate with appropriate staff for repairs/solutions.

- 1 Specification data to replace the sand at the Austin and Delaware media filters and at the Multi-Chambered Treatment Trains (MCTTs) can be found within the Caltrans Standard Specifications, July 1999 manual in sections 90-2.02 and 90-2.02B. The filter fabric specification for the MCTTs can be found in Caltrans Standard Specifications, July 1999 manual in section 88-1.03 for underdrains. In addition, an apparent opening size of 100 (U.S. Sieve) is recommended.
- 2 At time of publication, all Caltrans MCTTs have covers that prevent mosquito access to permanent standing water features



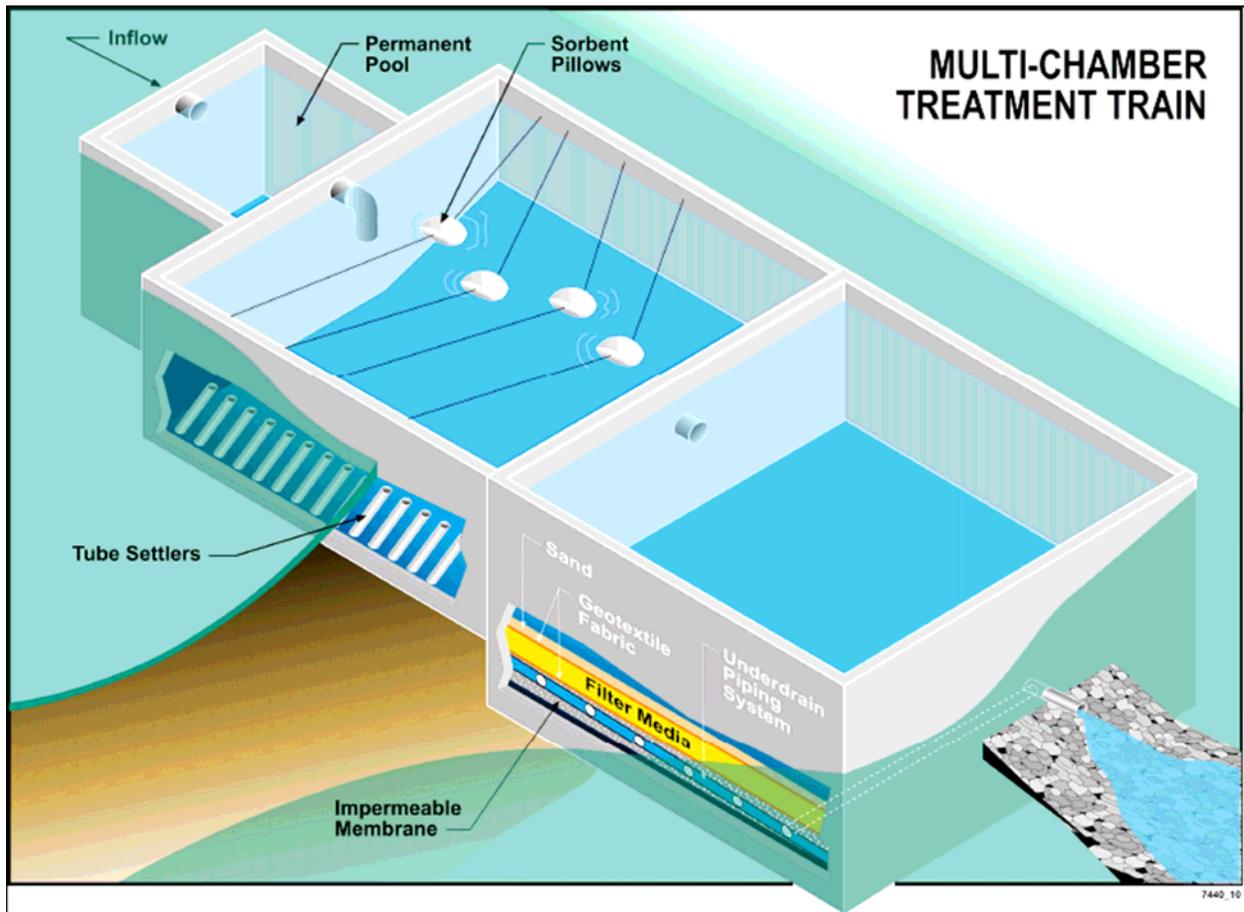


Figure C-22
Schematic of a Multi-Chambered Treatment Train (MCTT)

C.23.10 Wet Basin

Description:

This BMP is intended to maintain wet basin as effective devices for treating runoff discharges. These requirements for regular inspection and maintenance will allow the devices to continue to function as designed.

Appropriate Applications:

The BMP maintenance described in Table C-75 and Table C-76 apply to personnel who inspect and maintain wet basin devices. The preventative maintenance routine is described in Table C-75, and the actual maintenance activities are described in Table C-76. A schematic of a wet basin is shown in Figure C-20.

Implementation:

Field measurements of maintenance indicators are made by visual observation. The illustration below provides a graphical representation of the drain time threshold for standing water:

TABLE C-75: WET BASIN PREVENTATIVE MAINTENANCE

FREQUENCY	ROUTINE ACTION	Activity Cut-Sheet
Annually prior to dry season	Maintain vegetated access road to reduce fire hazard from contact with vehicle catalytic converters	B-39, B-40

TABLE C-76: WET BASIN MAINTENANCE ACTIVITIES

<p>MAINTENANCE INDICATOR</p>	<p>INSPECTION FREQUENCY</p>	<p>MAINTENANCE ACTIVITY</p>
<p>Drawdown greater than 25 hours or water is flowing over weir</p>	<p>Once during wet season and after completion or modification of the facility. Inspect 25+ hours after 0.75-inch storm event.</p>	<p>If drawdown is greater than 25 hours:</p> <ul style="list-style-type: none"> ● Open gate to discharge water to permanent pool elevation. ● Clear outlet of debris. ● Notify the District Maintenance Storm Water Coordinator. <p>If water is spilling over weir, open canal gate until water level is at permanent pool elevation. Check/clear outlet of debris.</p>
<p>Burrows, holes, mounds</p>	<p>Annually and after vegetation trimming</p>	<p>Where burrows cause erosion or jeopardize structural integrity, backfill firmly.</p>
<p>Inlet structures, outlet structures, side slopes or other features hindered by debris or damaged, significant erosion, graffiti or vandalism, fence damage, etc.</p>	<p>Semi-Annually, late wet season and late dry season</p>	<p>Take corrective action, or restore to as constructed condition prior to wet season. Contact the District Maintenance Storm Water Coordinator if repairs /solutions are not readily available in the field. The District Maintenance Storm Water Coordinator will coordinate with appropriate staff for repairs/solutions.</p>
<p>Observable vegetation coverage/density</p>	<p>Annually</p>	<ul style="list-style-type: none"> ● Have a biologist survey the Wet Basin to determine if any birds are nesting or other sensitive animals are present. If birds are nesting, with advice from the biologist, proceed with the maintenance. ● Lower and maintain the water level to expose the area to be maintained; do not completely drain basin. ● Cut vegetation. ● Dispose of the vegetation material in a landfill or other appropriate disposal area. ● Restock mosquito fish as recommended by vector control agency.

TABLE C-76: WET BASIN MAINTENANCE ACTIVITIES

<p>MAINTENANCE INDICATOR</p>	<p>INSPECTION FREQUENCY</p>	<p>MAINTENANCE ACTIVITY</p>
<p>Vegetation density is such that mosquito fish cannot swim freely in the planted area</p>	<p>Annually, or at a special request of the local vector control agency</p>	<ul style="list-style-type: none"> • Have a biologist survey the Wet Basin to determine if any birds are nesting or other sensitive animals are present. If birds are nesting, with advice from the biologist, proceed with the maintenance. • Lower and maintain the water level to expose the area to be maintained; do not completely drain basin. • Cut the vegetation to below the permanent pool water surface. • Dispose of the vegetation material in a landfill or other appropriate disposal area.
<p>Sediment is more than 2 inches in the forebay and 4 inches in the main pond, or sediment depth exceeds marker on staff gage</p>	<p>When pond is drained for Zone 1 vegetation removal, or every 3 years</p>	<ul style="list-style-type: none"> • Remove and properly dispose of sediment. By November, restore vegetation to the plan shown on the as-built drawings. • Remove sediment accumulation in forebay and main pond. Refer to Activity Cut-Sheet B-48.

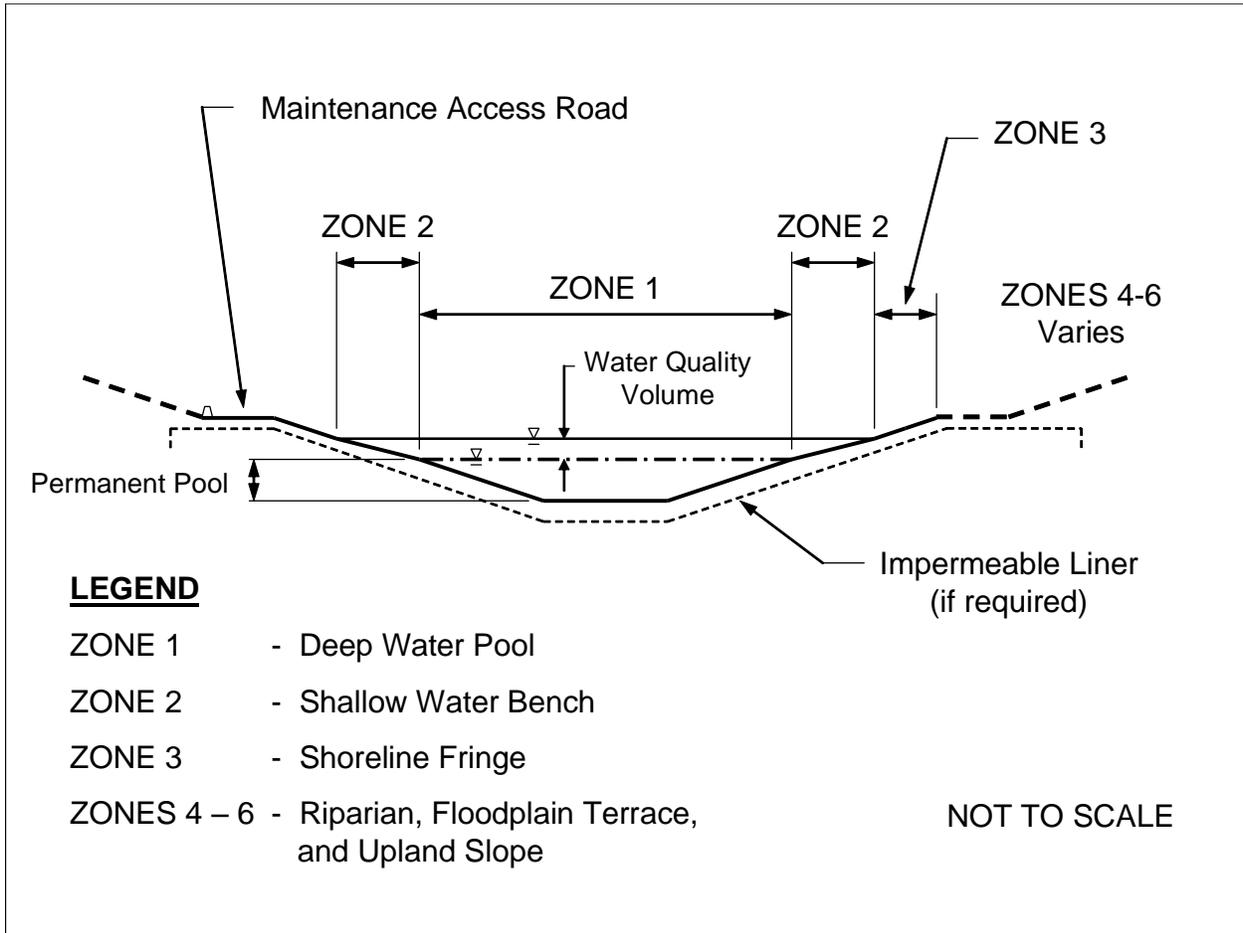


Figure C-23
Schematic of a Wet Basin

C.24 LITTER AND DEBRIS REMOVAL

Litter and debris removal consists of removing and properly disposing of Litter and implementing procedures to discourage littering to reduce the discharge of potential pollutants. Litter and Debris removal BMPs include Litter and Debris BMP (Section C.24.1) and Anti-Litter Signs BMP (Section C.24.2).



C.24.1 Litter and Debris

Description:

These measures are intended to reduce the discharge of litter to storm water drainage systems or watercourses.

Appropriate Applications:

This BMP should be implemented on a site-specific basis whenever litter and debris removal activities are performed. The frequency of removal is dependent on the availability of resources, safety considerations and rate of accumulation.

Implementation:

- Remove litter and debris from drainage grates, trash racks and ditch lines to reduce discharge to the storm water drainage systems and watercourses.
- Secure or cover transported materials, equipment and supplies to and from maintenance activity sites to prevent spillage to the roadway.



C.24.2 Anti-Litter Signs

Description:

Caltrans conducts a signage program that warns against dumping and littering (e.g., “No Dumping” and “\$1,000 Fine for Littering”). These signs are placed along highways where littering violations are frequent. The purpose of this program is to discourage littering by educating motorists about the fine for littering.

The Care for California Program displays signs showing an image of trash being placed into a garbage can. These signs encourage positive behavior.

Appropriate Applications:

Anti-litter signs may be placed:

- Along corridors that receive an unsightly amount of litter.
- Along freeways, safety roadside rest areas, vista points and park-and-ride facilities.

Implementation:

Maintenance Supervisors travel highways in their assigned section to observe overall conditions and assess the need for litter removal and installation of anti-litter signs. Anti-litter signs can be requested when litter removal becomes a concern.

C.25 CHEMICAL VEGETATION CONTROL

Description:

This practice is intended to reduce the potential for the discharge of pollutants generated during chemical vegetation control. This method of vegetation control uses herbicides to eliminate and prevent weed growth. The purpose is to control weed growth that may threaten the growth and health of preferred vegetation, that may become a fire hazard or raise other safety concerns.

Appropriate Applications:

The BMPs should be implemented on a site-specific basis whenever chemical vegetation control activities are performed. Chemical vegetative control measures will not be used on vegetated treatment BMPs (see Section C.23 Treatment System Maintenance BMP) except where Caltrans is directed by the California Department of Food and Agriculture to treat the BMPs for invasive weeds. Caltrans will report the use of these required chemicals in its Annual Report.

Implementation:

- Caltrans has an Integrated Vegetation Management Plan that integrates manual, chemical, mechanical, cultural and biological methods to provide the most effective pest management approach.
- Caltrans follows an approved list of chemicals developed by Maintenance Headquarters that is generally more restrictive than herbicide use options available to other agencies and the public.
- The Caltrans goal is to reduce chemical usage.
- To achieve effective vegetation control through chemical application, maintenance personnel should consider the following: (1) use of the correct herbicide, (2) seasonal timing of applications, (3) timing in relation to expected precipitation events, (4) proximity to water bodies, (5) speed of travel when applying herbicides and (6) proper agitation of the spray tank.
- Apply herbicides in compliance with federal, state and local pesticide use regulations.
- Apply herbicides only as specified on the “Pesticide Use Recommendation” and the label.
- Activities should be approved by a licensed Agricultural Pest Control Adviser.
- Apply herbicides as recommended by the District Annual Vegetation Control Plan.
- Minimize the use of herbicides in or near storm water drainage systems or watercourses.



- Calibrate the spray rig to ensure accurate application of herbicides.
- Avoid using overhead irrigation for as long as the chemical manufacturer recommends after applying herbicides.
- Do not spray chemicals when rainfall causing runoff is forecast within 12 hours.
- Herbicide use should be documented and summarized in the Annual Report.



C.26 VEGETATED SLOPE INSPECTION

Description:

Districts have established Maintenance Inspection/Slope Stabilization Teams to review vegetated slopes. The program will identify problematic slopes for repair to reduce erosion.

Appropriate Application:

Slope and unpaved areas should be inspected on a five-year cycle.

Implementation:

The following general steps should be taken to evaluate slopes and re-establish vegetation:

- Minor slides and slipouts requiring a Maintenance Division response shall be inspected and evaluated at the time of response field activities.
- Areas should be inspected for erosion on a five-year cycle.
- Areas with recurring problems should be inspected on an as-needed basis.
- Slope repairs that are within the abilities of the Maintenance Inspection/Slope Stabilization Team should be repaired by that team.
- Each District will establish a multi-disciplinary team to review problem slopes.
- Problem slopes with erosion concerns that cannot be repaired by the Maintenance Inspection/Slope Stabilization Team should be reported to the multi-disciplinary team. These projects should be forwarded to the State Highway Operation and Protection Program for possible funding and repair.
- A standard Maintenance Division reporting format for scheduling, inspection findings and repairs has been developed for the program. *The Preliminary Maintenance Slope Inspection Form* (number CT-MAINT-NPDE-S005) is to be used and is available electronically from the Department's Headquarters Maintenance Division.

C.27 SNOW REMOVAL AND DE-ICING AGENTS

Description:

This BMP is intended to reduce the discharge of potential pollutants generated during ice control activities. Ice control activities include:

- The mechanical spreading of abrasives and de-icing agents;
- The mechanical removal of snow from the travel way;
- Opening of drains covered by snow and ice; and
- Opening of roads that are normally allowed to close for the winter season.

Appropriate Applications:

- This BMP provides guidance to maintenance personnel who are involved in snow and ice removal activities. The use or nonuse of de-icing agents is based on driver safety, traffic delay, geographic location, weather and total cost.
- In areas of the state where significant amounts of abrasives are required, the sweeping frequency should be increased to remove accumulated abrasives.

Implementation:

- Calibrate spreader to avoid the over-application of de-icing agents or abrasives. Use no more than is necessary for snow and ice control. Consider using alternative de-icing agents where runoff from roads discharges directly to sensitive watercourses.
- Maintain accurate records of the locations of de-icing agents and abrasives application and the quantities of de-icing agents and abrasives used.
- Store de-icing agents (e.g., salt) in appropriate areas, bunkers or storage buildings. Do not store de-icing agents where they will come into contact with storm water runoff.
- Abrasives (e.g., sand and cinders) can be stored in bunkers or storage buildings. Abrasives stored outdoors must be managed in accordance with the requirements of the Section C.17 Stockpile Management BMP.
- Avoid blowing, pushing or dumping snow into the watercourse.



**C.28 STORM WATER DEWATERING OPERATIONS
(TEMPORARY PUMPING OPERATIONS)**

Description:

These practices are implemented where storm water is pumped. This BMP addresses discharge from portable pumps used by maintenance personnel during repairs and to prevent damage to the highway.

Appropriate Applications:

These practices are implemented where storm water is pumped as part of a maintenance activity. Note that per Section 5 of the Statewide SWMP, some discharges are exempt or conditionally exempt.

Implementation:

- Ensure that dewatering discharges do not cause erosion at the discharge point.
- Pumping systems should be equipped with screens on the intake.
- Intakes should be located to reduce the pumping of sediment. Pumping areas near the storm water surface often contain less sediment than areas near the bottom.
- Sediment Control BMPs may be installed at intake or outlet locations to trap excessive sediment.

C.29 SWEEPING AND VACUUMING

Description:

Sweeping and vacuuming are performed to remove litter, debris and de-icing abrasives from paved roads and shoulders. Sweeping to reduce track-out generally involves manual sweeping or use of small equipment, but does not exclude the use of sweepers should the need arise (e.g., for slides and slipouts).

Appropriate Applications:

- Sweeping and vacuuming operations are appropriate for removing de-icing abrasives, material from small slides, litter and debris.
- Sweeping and vacuuming may be implemented anywhere sediment is tracked from off-road maintenance activity sites onto public or private paved roads typically at the points of egress (see Section C.12.1 Stabilized Activity Entrance/Exit BMP).

Implementation:

- Highway Sweeping:
 - Do not sweep up any unknown substance that may be potentially hazardous. If a substance is known to be hazardous, suspected of being hazardous or cannot be identified, notify the District Maintenance HazMat Manager immediately. If an illegally dumped substance within the Department's Right of Way has the potential of entering a municipal drain system, the immediate supervisor and the District Storm Water Coordinator must be notified so that the downstream municipality can be contacted.
 - Adjust brooms to maximize the efficiency of sweeping operations.
 - Do not load hoppers beyond their capacity.
 - Dispose of waste to a landfill or approved site in accordance with local regulations and Section C.13.2, Solid Waste Management BMP. There is to be no dumping on site, especially during the rainy season or during unseasonal storm events to abate wash out. Clean materials may be incorporated into the maintenance activity area.
- Tracking Control:
 - Substantially visible sediment shall be swept or vacuumed from the maintenance activity site.
 - If not mixed with debris or trash, consider incorporating the removed sediment back into the maintenance activity site.



- Washing and rinsing of equipment shall be performed in designated areas and the resulting runoff shall not be discharged to the storm drain system.



C.30 MAINTENANCE FACILITY HOUSEKEEPING PRACTICES

Description:

Daily activities occurring at maintenance facilities often involve the use of materials and products that are potentially harmful to the environment. Good housekeeping practices are intended to eliminate the potential for discharge of pollutants to drainage paths, storm water drainage systems or watercourses by promoting efficient and safe storage, use and cleanup of potentially harmful materials.

Appropriate Applications:

Proper housekeeping practices apply to all maintenance personnel who participate in activities that have a potential to generate pollutants that could discharge to storm water drainage systems or watercourses.

Implementation:

- Maintain clean, orderly material and equipment storage areas. Provide covers for materials as needed.
- Use the ‘first in first out’ policy for material storage and control. Avoid ordering more materials than can be stored properly or used in a reasonable timeframe.
- Properly reuse, recycle or dispose of empty containers, excess materials, equipment and parts that are not likely to be used. All solid wastes shall be managed per the requirements of the Section C.13.2 Solid Waste Management BMP.
- Maintain equipment and buildings to avoid peeling paint, rust and degradation. Request funding for major repairs.
- Sweep or vacuum maintenance facility floors and pavement.
- If mopping is used to clean floors or pavement, contain the mop water and dispose of it to the sanitary sewer system according to the following guidelines:
 - Do not dispose of mop water into the parking lot, street, gutter or drain inlet; and
 - If an oil/water separator is available, pour the mop water into the separator so that the wastewater is treated before being discharged to the sanitary sewer system.
- Secure and close lids on waste receptacles and bins when not in use.
- Clean up spills promptly. See Section C.13.1, Spill Prevention and Control BMP.
- Use drip pans or absorbent material under leaking vehicles and equipment to capture fluids.

- If it is necessary to use a hose for cleaning, wash water shall not be discharged to the storm water drainage systems or watercourses.
- Minimize the possibility of storm water pollution from outdoor waste receptacles by doing at least one of the following:
 - Use only watertight waste receptacle(s) and keep the lid(s) closed;
 - Grade and pave the waste receptacle area to prevent run-on of storm water;
 - Install a roof over the waste receptacle area;
 - Install a low containment berm around the waste receptacle area; or
 - Use and maintain drip pans under waste receptacles.

