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Acknowledgements

The Stormwater Best Management Practice Handbooks are products of the California Stormwater Quality Association (CASQA). The handbooks were originally published in 1993 by the California Stormwater Quality Task Force, the predecessor of CASQA, and subsequently updated in 2003. This 2009 update of the Industrial and Commercial Handbook reflects the current state of industrial and commercial stormwater quality management practices and revised regulatory requirements. An interactive web portal as a platform for the handbooks has also been created http://www.casqa.org

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This project was funded by CASQA. Anna Lantin, CASQA BMP Subcommittee Chair, managed the project for CASQA.

The development of the Industrial and Commercial Handbook was guided by a Steering Committee, a Technical Advisory Committee, and the CASQA BMP Subcommittee. The Steering Committee provided CASQA’s direction to the Consultant Team. The Steering Committee included representatives from municipal stormwater programs, the SWRCB, the California Department of Public Health, and CASQA. The Technical Advisory Committee included representation from municipal stormwater programs, the SWRCB, regulated industries, and CASQA.

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The *Stormwater Best Management Practice Handbooks* are intended to provide a range of general information about stormwater quality best management practices and related issues. Due to the multitude of applications of best management practices, the handbooks do not address site-specific applications. There may be public domain and/or proprietary alternatives that may be equivalent to the practices listed in this handbook that may be appropriate for specific applications. Therefore the users of the handbooks must seek advice of a stormwater quality professional to determine the applicability of the information provided for any general use or site-specific application. Users of the handbooks assume all liability directly or indirectly arising from use of the handbooks.

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1 Introduction

Stormwater runoff is part of the natural hydrologic process. However, human activities, such as urbanization, can impact stormwater runoff. If not carefully managed, industrial and commercial activities can affect water quality by adding pollutants to rivers, lakes, and streams as well as to coastal bays and estuaries, and ultimately, the ocean. Urban runoff can contribute to water pollution by transporting pollutants generated by human activities and development that can degrade fish, wildlife, and aquatic life habitats; create a loss in aesthetic value; and pose a threat to public health due to contaminated food, drinking water supplies, and recreational waterways (USEPA, 2014). Urban runoff, in this context, includes all flows discharged from urban and suburban land uses into stormwater conveyance systems and receiving waters and includes both dry weather non-stormwater sources (e.g., runoff from landscape irrigation) and wet weather stormwater runoff. In this handbook, urban runoff and stormwater runoff are used interchangeably.

Historically, the effort to control the discharge of stormwater focused on drainage and flood control, and to a limited extent, on the quality of the stormwater (e.g., sediment and erosion control). However, since the 1980s, awareness of the need to improve water quality has increased. With this awareness, federal, state, and local programs have been established to reduce pollutants in stormwater discharges in order to pursue the ultimate goal of maintaining and restoring the beneficial uses of our receiving waters. The emphasis of these programs is to promote the concept and the practice of preventing pollution at the source before it can cause environmental problems. Where source controls are not sufficient, treatment of polluted runoff may be needed to protect receiving water quality.

1.1 Handbook Purpose and Scope

The purpose of this handbook is to provide general guidance for selecting and implementing Best Management Practices (BMPs) to reduce the discharge of pollutants in stormwater runoff from permitted industrial facilities and selected commercial activities to waters of the state and the municipal separate storm sewer system (MS4). This handbook also provides guidance on developing and implementing Stormwater Pollution Prevention Plans (SWPPPs) that document the selection and implementation of BMPs for a particular industrial facility or commercial activity.

This handbook provides the framework and serves as a resource for an informed selection of BMPs and the development and implementation of a facility-specific SWPPP. Due to the diversity in receiving waters, site conditions, and local requirements across California, it is not the intent of this handbook to dictate the actual selection of BMPs or guarantee compliance with National Pollutant Discharge Elimination System (NPDES) permit requirements or local requirements, but rather to provide the framework for an informed selection of BMPs.

Responsibility for complying with NPDES Permit requirements and local ordinances rests with the facility operator and/or land owner. An appropriately qualified stormwater professional must select BMPs that are appropriate for the site and that will provide effective control of stormwater runoff.
1.1.1 Users of the Handbook

This handbook provides guidance suitable for use by individuals involved with controlling stormwater pollution from industrial and commercial sites and activities. Each user of the handbook is responsible for working within their capabilities obtained through training and experience and for seeking the advice and consultation of appropriate experts, if needed.

The target audience for this handbook includes: Qualified Industrial Stormwater Practitioners (QISPs); operators and owners of industrial and commercial facilities that are required to obtain an NPDES permit for stormwater discharges; compliance group leaders; operators and owners of other industrial and commercial facilities that are not required to obtain an NPDES permit, but are committed to implementing BMPs for their sites or activities, including those that are required by their respective municipalities to control pollutants in discharges of urban runoff; municipal agencies, including their business inspectors and code enforcement officials; regulatory agencies, including permit staff and enforcement staff; and the general public with an interest in stormwater pollution control.

1.1.2 Organization of the Handbook

The handbook is organized to assist the user in selecting and implementing BMPs to reduce impacts of stormwater discharges on receiving waters. The handbook sections are described in Table 1-1

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<th>Table 1-1 California Stormwater Industrial and Commercial BMP Handbook Organization</th>
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<td><strong>Section 2 Stormwater Pollution Prevention Planning</strong></td>
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<td><strong>Section 3 Source Control BMPs</strong></td>
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<td><strong>Section 4 Treatment Control BMPs</strong></td>
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<td><strong>Appendix C SWPPP Template</strong></td>
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<td><strong>Appendix D Monitoring Guidance</strong></td>
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<td><strong>Appendix E ERA Tools</strong></td>
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1.1.3 Relationship to other Handbooks

This handbook is one of four handbooks developed by the California Stormwater Quality Association (CASQA) to address BMP selection. Collectively, the four handbooks address BMP selection throughout the life of a project – from planning and design – through construction – and into operation and maintenance. Individually, the content of each handbook is geared to an audience seeking guidance with the corresponding stage of a project.

For a comprehensive understanding of stormwater pollution control throughout the life cycle of the project, it is recommended that the reader obtain and become familiar with all four handbooks. For a focused understanding of stormwater pollution control during a single phase of the project life cycle, a reader may obtain and become familiar with the handbook associated with the appropriate phase.
1.1.4 Significant Changes to Industrial and Commercial BMP Handbook Portal

The Stormwater Best Management Practice Handbooks were originally published in 1993, and substantially updated in 2003. The 2014 update of the Industrial and Commercial Handbook reflects the current state of industrial and commercial stormwater quality management practices and revised regulatory requirements. An online web portal for the handbooks has been created http://www.casqa.org. Future updates of this handbook will be conducted periodically on the web portal.

Overall, the information in the Industrial and Commercial Handbook has been updated and reorganized. Hyperlinks have been provided to direct users to additional information. Significant changes in the 2014 update are noted in Table 1-2.

Table 1-2 Significant Changes in the Industrial Commercial BMP Handbook Portal

<table>
<thead>
<tr>
<th>Section</th>
<th>2014 Change Summary</th>
<th>Handbook Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1</td>
<td>Updated to reflect changes in the General Permit and addition of new sections to the Handbook.</td>
<td>Entire Section</td>
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<tr>
<td>Section 2</td>
<td>New information on NEC and NONA Certifications</td>
<td>2.1.2</td>
</tr>
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<td></td>
<td>Updated Decision Tree</td>
<td>Figure 2.1</td>
</tr>
<tr>
<td></td>
<td>New information on facilities not subject to the General Permit</td>
<td>2.1.3</td>
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<td></td>
<td>New overview of BMPs</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>Identification of Minimum and Advanced BMPs</td>
<td>Table 2-1, 2-2</td>
</tr>
<tr>
<td></td>
<td>Expanded SWPPP overview</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td>Updated SWPPP preparation discussion</td>
<td>2.4</td>
</tr>
<tr>
<td>Section 3</td>
<td>Updated Source Control Fact Sheets</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relocated and numbered Business Guide Sheets</td>
<td></td>
</tr>
<tr>
<td>Section 4</td>
<td>Updated Treatment Control and Manufactured Practice Fact Sheets</td>
<td></td>
</tr>
<tr>
<td>Section 5</td>
<td>Updated to reflect changes in the General Permit requirements for monitoring programs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Revised visual observation discussion</td>
<td>5.1.2</td>
</tr>
<tr>
<td></td>
<td>Updated discussion of sample timing and frequency and conditions for frequency reduction</td>
<td>5.1.3.1</td>
</tr>
<tr>
<td></td>
<td>New discussion of sample locations and conditions for alternate locations, reduction of locations, and for combining samples</td>
<td>5.1.3.2</td>
</tr>
<tr>
<td></td>
<td>New discussion of analytical constituents</td>
<td>5.1.3.3</td>
</tr>
<tr>
<td></td>
<td>Expanded discussion of sample collection and analytical procedures</td>
<td>5.1.3.4</td>
</tr>
<tr>
<td></td>
<td>New discussion on sample result reporting</td>
<td>5.2.2</td>
</tr>
<tr>
<td></td>
<td>New discussion of annual reporting in SMARTS</td>
<td>5.2.3</td>
</tr>
<tr>
<td></td>
<td>New discussion of Exceedance Response Actions and Numeric Action Levels</td>
<td>5.3</td>
</tr>
</tbody>
</table>
1.2 Stormwater Runoff Impacts on Water Quality and Public Health

Stormwater runoff contains numerous natural constituents; however, urbanization and urban activities (including industrial and commercial activities) can increase constituent concentrations to levels that may impact water quality. Potential pollutants associated with stormwater runoff include sediment, nutrients, bacteria and viruses, oil and grease, metals, synthetic organics, pesticides, and gross pollutants (such as, trash, debris, and floatables).

Activities and operations that occur at industrial and commercial facilities are often exposed to the weather. Runoff from precipitation events and wind can carry materials and wastes into storm drainage systems and the receiving waters. Polluted stormwater can have a detrimental effect on the receiving waters: sediment can cloud water, making it difficult for aquatic life to live and reproduce; excess nutrients can cause algae blooms (such as red tide) that reduce oxygen levels in water when the algae die and decompose; bacteria and viruses create health hazards for swimming areas; gross pollutants – most commonly trash – are unsightly and harmful to animals; and other pollutants introduce toxic compounds and elements that can poison aquatic life and animals as well as people that consume them (USEPA, 2013). More details on stormwater pollutants are described in Table 1-3.

The potential for vector production must always be considered when managing stormwater runoff because vectors can create a human health hazard and nuisance, both on site and in the surrounding area. The California Health and Safety Code broadly defines vectors as “any animal capable of transmitting the causative agent of human disease or capable of producing human discomfort or injury, including, but not limited to, mosquitoes, flies, other insects, ticks, mites, and rats, but not including any domesticated animal.” Several types of vectors may become associated with stormwater management and treatment structures, but mosquitoes are the most common and those of greatest concern because they can transmit diseases to humans and animals, as well as be a biting nuisance. Any water that stands for greater than 96 hours can become a source of mosquitoes since many species can complete their development in less than one week. Materials that provide shelter within standing water (e.g., floating or emergent vegetation, riprap, accumulations of floating trash) can make the habitat more attractive to mosquitoes. Mosquito production potential varies by site, season, rainfall, and water quality and control measures may be required in areas where water cannot be removed in less than 96 hours. Strategies for minimizing mosquitoes in stormwater management and treatment structures can include rapid and complete dewatering, sealing devices or containers that hold water greater than 96 hours against adult mosquito entry, and in the case of stormwater ponds and constructed wetlands, making the habitat least conducive to mosquito breeding and survival. In all cases, mosquito management requires careful planning in design, construction, and long term maintenance of BMPs. Responsible mosquito control uses an integrated approach...
that is best conducted in coordination with local agencies with expertise in this field (e.g., Mosquito Abatement Districts). Several resource documents as well as contact information for local mosquito and vector control agencies can be found through the California Department of Public Health website at http://westnile.ca.gov. Local agencies can be identified by entering the zip code of the location of interest under Locate Your Local Mosquito and Vector Control Agency.

Table 1-3 Potential Pollutants and their Impacts on Water Quality

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sediment</td>
<td>Sediment is a common component of stormwater runoff and can be a pollutant. Sediment can be detrimental to aquatic life (primary producers, benthic invertebrates, and fish) by interfering with photosynthesis, respiration, growth, reproduction, and oxygen exchange in water bodies. Sediment can transport other pollutants that attach to it, including nutrients, trace metals, and hydrocarbons. Sediment is the primary component of total suspended solids (TSS) and Suspended Sediment Concentration (SSC), common water quality analytical parameters.</td>
</tr>
<tr>
<td>Nutrients</td>
<td>Nutrients, including nitrogen and phosphorous which are commonly used for fertilizing landscapes, are often found in stormwater. These nutrients can result in excessive or accelerated growth of vegetation, such as algae, resulting in impairments in receiving water bodies. For example, nutrients have led to a loss of water clarity in Lake Tahoe. In addition, un-ionized ammonia (one of the nitrogen forms) can be toxic to fish.</td>
</tr>
<tr>
<td>Bacteria and viruses</td>
<td>Bacteria and viruses are common contaminants of stormwater. In storm drainage systems, sources of these contaminants include animal excrement (from both runoff and animals living in pipelines) and sanitary sewer overflow. High levels of indicator bacteria in stormwater have led to the closure of beaches, lakes, and rivers to contact recreation such as swimming.</td>
</tr>
<tr>
<td>Oil and grease</td>
<td>Oil and grease includes a wide array of hydrocarbon compounds, all of which are toxic to aquatic organisms and some of which are toxic to aquatic organisms at low concentrations. Sources of oil and grease include leakages and line breakage, spills, cleaning and sloughing from vehicle and equipment engines and suspensions, outdoor storage of equipment, maintenance activities, and hydraulic systems, restaurants, and waste oil disposal.</td>
</tr>
<tr>
<td>Metals</td>
<td>Metals including lead, zinc, cadmium, copper, chromium, and nickel are commonly found in stormwater. Many of the artificial surfaces of the urban environment (e.g., galvanized metal, paint, automobiles, or preserved wood as well as tires and vehicle breaks) contain metals, which enter stormwater as the surfaces corrode, flake, dissolve, decay, or leach. Over half the trace metal load carried in stormwater is associated with sediments. Metals are of concern because they are toxic to aquatic organisms, can bioaccumulate (mercury and selenium, in particular, can accumulate to toxic levels in aquatic animals such as fish), and have the potential to contaminate drinking water supplies.</td>
</tr>
<tr>
<td>Synthetic Organics</td>
<td>Synthetic organics may be found in stormwater in low concentrations. Often, synthetic organic compounds (adhesives, cleaners, sealants, solvents, etc.) are widely applied and may be improperly stored and disposed. In addition, deliberate dumping of these chemicals into storm drains and inlets causes environmental harm to waterways.</td>
</tr>
<tr>
<td>Pesticides</td>
<td>Pesticides (including herbicides, fungicides, rodenticides, and insecticides) have been repeatedly detected in stormwater at toxic levels, even when pesticides have been applied in accordance with label instructions. Stormwater can transport pesticides from target areas into receiving waters where, under certain conditions, they may impact non-target animals such as invertebrates and fish.</td>
</tr>
</tbody>
</table>
Table 1-3 Potential Pollutants and their Impacts on Water Quality

| Gross Pollutants | Gross pollutants (trash, debris, and floatables), typically resulting from an urban environment, industrial sites and construction sites, may create an aesthetic “eye sore” in waterways. Gross pollutants also include plant debris (such as leaves and lawn-clippings from landscape maintenance), animal excrement, street litter, and other organic matter. Such substances may harbor bacteria, viruses, hydrocarbons, and vectors and depress the dissolved oxygen levels in streams, lakes, and estuaries, sometimes causing fish kills. |

1.3 Regulatory Requirements

The need to protect the environment has resulted in a number of laws and subsequent regulations and programs. In the following sections, various federal, state, and local programs are discussed in relationship to the control of pollutants in stormwater. The programs are expected to change and evolve over the next several years and the user is advised to contact state and local officials for further information.

The owners and operators of industrial and commercial facilities must understand the relationship between the agencies, their jurisdictions, and the requirements of each, as shown in Figure 1-2. In addition to the regulatory programs discussed in this section, there are a number of other initiatives to reduce potential pollutants through the design and formulation of products that reduce the generation of hazardous substances. U.S. Environmental Protection Agency’s (EPA’s) Green Chemistry Program and the California Department of Toxic Substances Control’s Safer Consumer Product regulations are two such initiatives. These programs and initiatives represent ways to eliminate pollutants through true source control.
1.3.1 Federal NPDES Program

In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) was amended to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with a NPDES permit. The 1987 amendments to the CWA added Section 402(p), which establishes a framework for regulating municipal and industrial stormwater discharges, including discharges associated with construction activities, under the NPDES program. On November 16, 1990, EPA published final regulations that established stormwater permit application requirements.

The stormwater regulations associated with the CWA require specific categories of industrial facilities, which discharge industrial stormwater, to obtain an NPDES permit. Those facilities that discharge industrial stormwater, either directly to surface waters (e.g., rivers, lakes) or indirectly through MS4s must be covered by a permit. This includes the discharge of “sheet flow” from an industrial facility.

Federal law requires that specific industrial stormwater discharges meet all provisions of Section 301 and 402 of the CWA in order to control pollutant discharges. These provisions require the use of best available technology (BAT) economically available and best conventional pollution control technology (BCT) to reduce pollutants and any more stringent controls necessary to meet water quality standards.
EPA regulates industrial stormwater discharges through a Multi-Sector General Permit (MSGP). In California, the MSGP only applies to Indian lands. Owners and operators of industrial facilities on Indian lands need to file a Notice of Intent (NOI) through EPA’s MSGP electronic NOI home page.

### 1.3.2 State NPDES Program

The California NPDES stormwater permitting program is administered by the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs). The SWRCB has adopted a statewide NPDES general permit that covers most of the industrial activities in the state.

RWQCBs may, at their discretion, issue an industry-specific or regional general permit. Readers are advised to confirm requirements with their local RWQCB. Industries may also request an individual NPDES permit instead of the general permit. RWQCBs are only expected to consider individual permits where an individual facility has unique characteristics or poses a significant threat to water quality. The process, however, is expensive and time consuming and the RWQCB may eventually choose not to issue an individual permit.

In California, owners or operators of specific industrial facilities are required obtain NPDES permit coverage by submitting Permit Registration Documents (PRDs) to be covered under the State Water Resources Control Board Order No. 2014-0057-DWQ, National Pollutant Discharge Elimination System General Permit No. CAS000001, General Permit for Storm Water Discharges Associated with Industrial Activities (General Permit) (SWRCB, 2014).

The General Permit was adopted on April 1, 2014 with an effective date of July 1, 2015. The General Permit requires the Discharger to:

1. Eliminate unauthorized non-stormwater discharges;
2. Develop and implement a facility specific stormwater pollution prevention plan (SWPPP), including a Monitoring Implementation Plan (MIP);
3. Implement minimum BMPs and advanced BMPs, if needed, and evaluate effectiveness (to the extent feasible);
4. Conduct monitoring, including visual observations and analytical monitoring of stormwater discharges;
5. Compare analytical monitoring results to numeric action levels (NALs);
6. Perform Exceedance Response Actions (ERAs) when NALs are exceeded; and
7. Certify and submit all compliance documents in the Storm Water Multi Application Reporting and Tracking System (SMARTS).

Failure to comply with the General Permit may result in significant fines for each violation and possible imprisonment.
Who must comply with the Industrial General Permit?

The General Permit applies to stormwater discharges associated with industrial activities based on the facility’s Standard Industrial Classification (SIC) code. The regulated SIC codes are listed in Appendix B. The RWQCB has the authority to require other facilities to obtain permit coverage as well.

Certain facilities that would otherwise be regulated based on their SIC code may qualify for exceptions from all or some of the General Permit requirements.

- No Exposure Certification (NEC) – Facilities that have no exposure of industrial materials or activities may qualify for a No Exposure Certification (NEC); see further details in Section 2 and General Permit Section XVII.
- Notice of Non-Applicability (NONA) – The General Permit may not be applicable to facilities that have no hydrologic connectivity to a water of the United States or no discharges of stormwater from their industrial activity areas. These facilities can submit a NONA; see further details in General Permit Section XX.C.

For more information regarding SIC codes and to determine which codes apply to the facility, visit the Occupational Safety & Health Administration (OSHA) website at: https://www.osha.gov/pls/imis/sicsearch.html

How to obtain coverage under the Industrial General Permit

The General Permit requires facilities to submit the PRDs, including a NOI, into SMARTS at: https://smarts.waterboards.ca.gov, and pay fees. All documents submitted into SMARTS are available to the public. Submittal requirements are identified in the General Permit and include, but not limited to, the following:

- NOI and Signed Electronic Authorization Form;
- Site Map;
- SWPPP; and
- Annual Fee.

Facilities applying for an NEC or NONA also submit the supporting documentation into SMARTS.

How to comply with the Industrial General Permit

This list provides a quick overview of the actions facilities need to take to comply with the General Permit. Concepts introduced here are discussed in further details in subsequent sections of the Handbook. Implementation of an effective stormwater management program requires the ongoing assessment and revision, as needed, of the program based on feedback and lessons learned during program implementation.

- Develop a site-specific SWPPP that identifies and addresses potential sources of pollutants through the use of Minimum BMPs, and Advanced BMPs, as required.
- Develop a site-specific MIP that incorporates visual observations and sampling and analysis to assess SWPPP implementation and effluent quality.

- Implement the SWPPP and MIP:
  - Train staff;
  - Keep the SWPPP at the facility;
  - Conduct monitoring as required and assess compliance with Numeric Action Levels (NALs);
  - Report monitoring data; and
  - Implement the required Exceedance Response Actions (ERAs) if NALs are exceeded.

- Conduct an Annual Comprehensive Facility Compliance Evaluation:

- Revise the SWPPP, as needed.

- Submit an Annual Report.

### 1.3.2.1 Numeric Action Levels

Stormwater runoff from industrial facilities may become contaminated with pollutants associated with the industrial activities. The General Permit requires effluent monitoring and sets action levels to assess BMP performance and SWPPP effectiveness. The purpose of the NAL is to provide a threshold, which if reached or exceeded, compels action. The NALs are not directly enforceable and do not constitute effluent limitations. Rather, they trigger an evaluation of the effectiveness of the facility’s SWPPP. The General Permit contains two types of NALs:

- **Instantaneous Maximum NALs** – these are exceeded when two or more results for the same constituent exceed the Instantaneous Maximum value in the reporting year.

- **Annual Average NALs** – these are exceeded when all of the analytical results for the same constituent exceed the annual average NAL in a single reporting year.

### 1.3.2.2 Exceedance Response Actions and Status Levels

All facilities start with Baseline status, and enter Level 1, and then possibly Level 2 status, based on the exceedance of NALs. Status levels are evaluated independently for each constituent. So a Discharger could be Baseline status, Level 1 status, and Level 2 status for different constituents.

- Baseline status is where all facilities start and remain unless sampling results show exceedances of NALs.

- Level 1 status occurs when an NAL is exceeded for the first time.
Level 2 status occurs when an NAL for the same parameter is exceeded in a subsequent reporting year.

Status changes commence on July 1 following the reporting year during which the NAL exceedance occurred. Facilities with Level 1 status are eligible to return to Baseline status when they have completed all of the required Exceedance Response Actions and have results from four consecutive qualified storm events indicating no additional NAL Exceedances for the exceeded parameter. Facilities with Level 2 status are eligible to return to Baseline status when an Industrial Activity BMP Demonstration has been completed and the results from four consecutive qualified storm events verify the elimination of the exceedances.

1.3.2.3 Qualified Industrial SWPPP Practitioners

The General Permit establishes training requirements for Qualified Industrial Stormwater Practitioners (QISPs). Facilities in Level 1 or Level 2 status must employ a QISP to conduct specified actions. Additionally, new dischargers to an impaired water body, with a 303(d) listing, must use a QISP to develop the demonstration of eligibility for coverage under the General Permit by preparing the information specified in General Permit Section VII.B.

The SWRCB has created two paths to qualification as a QISP:

1. Complete a SWRCB-sponsored or approved training course and competency exam. This path is open to all individuals.

2. Complete a specialized self-guided SWRCB-sponsored registration and training program. This path is only open to California licensed professional civil, industrial, chemical, and mechanical engineers and geologists that have professional overlap with the topics of the General Permit.

1.3.2.4 Total Maximum Daily Loads and Impaired Waters

The CWA requires states to identify water bodies that do not meet water quality objectives based on the established beneficial uses (impaired waters) and to develop plans to improve water quality by limiting pollutant discharges (in the form of total maximum daily loads [TMDLs]). Industrial stormwater dischargers may contribute to impairments and are required to take actions that may go beyond those identified in the General Permit. The SWRCB plans to work with RWQCBs to identify specific TMDL compliance requirements and then amend the General Permit to incorporate additional controls and requirements.

The General Permit does establish some requirements for facilities that discharge into impaired waters and waters with established TMDLs that are effective immediately.

- New facilities that will be discharging to an impaired water body are ineligible for coverage under the General Permit unless they demonstrate that the pollutant for which the water body is impaired is not present at the facility; will not be discharged based on procedures to prevent exposure of the pollutant; or the discharge of the pollutant will not cause or contribute to an exceedance of the water quality objective.

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1 The California Department of Consumer Affairs, Board for Professional Engineers, Land Surveyors and Geologists (CBPELSG) provides the licensure and regulation of professional civil, industrial, chemical, and mechanical engineers and professional geologists in California.
All facilities discharging to impaired waters or water bodies with established TMDLs must assess the potential for the pollutant to be present and include the pollutant (if it is present) in the MIP.

1.3.2.5 Compliance Groups

The General Permit allows a group of Dischargers of the same industry type to create a compliance group. A Compliance Group would be comprised of Dischargers that operate facilities with similar types of industrial activities, pollutant sources, and pollutant characteristics (e.g., truck maintenance or paper recyclers). Compliance Groups must be led by a Compliance Group Leader, who must complete a SWRCB sponsored or approved training program for Compliance Group Leaders and become a Trainer of Record.

Each participant in a Compliance Group is responsible for compliance at their facility, but can benefit from the resources of the group to assist with program implementation (e.g., information sharing and potentially sample frequency reduction).

1.3.3 Municipal NPDES Program

The Phase I municipal stormwater program and municipal NPDES stormwater permits cover and regulate municipalities with populations of over 100,000, drainage systems interconnected with these municipalities' systems, or municipalities determined to be significant contributors of pollutants. Phase II of the municipal stormwater program regulates municipalities with populations that as of March 2003 were less than 100,000, including urbanized areas and various state and federal facilities. In California, the major urbanized counties and the California Department of Transportation are covered by Phase I NPDES municipal stormwater permits.

Municipalities with NPDES stormwater permits for their MS4s are responsible for developing stormwater programs and control measures for commercial and industrial activities in their jurisdiction. While the programs vary significantly, they include:

- Maintaining an inventory of industrial and commercial businesses/activities;
- Conducting education and outreach to owners and operators of industrial and commercial businesses/activities;
- Performing inspections to detect and eliminate illicit discharges; and
- Requiring facilities that conduct industrial activities to obtain coverage under the General Permit.

Municipal programs may include regulating stormwater and non-stormwater discharges from industrial and commercial facilities that the municipality determines are contributing pollutants to the MS4. In particular, some municipalities may prohibit certain types of non-stormwater discharges conditionally authorized by the General Permit. Thus, it is important for the industrial and commercial facility owners and operators to realize that there may be additional and/or more stringent municipal requirements on discharges from their facilities and to check with the local authority responsible for stormwater management.
1.4 References and Resources

The following references and resources include both specific documents or information sources referenced or cited throughout the Industrial and Commercial Handbook and information sources that handbook users may find useful. The BMP fact sheets and business guide sheets in Section 3 and Section 4 of this handbook contain their own references and citations.


2 Stormwater Pollution Prevention Planning for Industrial and Commercial Facilities

2.1 Introduction

The development of a SWPPP is critical in a business’ efforts to reduce pollutants in its stormwater discharges. Information is presented in this section to assist industrial owners and operators in developing SWPPPs. The information provided is consistent with the General Permit. While the primary focus of this handbook is on industries covered by the General Permit, there are also numerous commercial businesses that have potential to impact stormwater quality and may be subject to municipal requirements to control the discharge of pollutants. Guidance is provided in Section 2.5 to assist selected commercial businesses in their efforts to reduce pollutants in stormwater discharges.

Facility operators subject to the General Permit must prepare, retain on site, and implement a site-specific SWPPP except for certain sites that have no exposure of industrial activities or materials as discussed in Section 2.1.2. In accordance with the General Permit, the SWPPP has three major objectives:

1) Identify and evaluate sources of pollutants that may affect the quality of industrial stormwater discharges and authorized Non-Stormwater Discharges (NSWDs);

2) Identify and describe the minimum BMPs (General Permit Section X.H.1) and any advanced BMPs (General Permit Section X.H.2) implemented to reduce or prevent pollutants in industrial stormwater discharges and authorized NSWDs. BMPs must be selected to achieve compliance with this General Permit; and

3) Identify and describe conditions or circumstances that may require future revisions to be made to the SWPPP.

The process to develop and implement a SWPPP is described in this section.

2.1.1 Facilities Requiring SWPPPs

The facilities covered by the General Permit and therefore required to prepare a SWPPP include the following:

- Facilities subject to stormwater effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards (40 CFR Subchapter N);
- Manufacturing facilities;
- Oil and gas/mining facilities;
Stormwater Pollution Prevention Planning for Industrial and Commercial Facilities

- Hazardous waste treatment, storage, or disposal facilities;
- Landfills, land application sites, and open dumps;
- Recycling facilities;
- Steam electric power generating facilities;
- Transportation facilities; and
- Sewage or wastewater treatment works.

The type of facilities included in each of the above categories and their SIC codes are provided in Appendix B.

In California, the activities that take place at a facility (and subsequent SIC code), not the primary business of the facility owner, will determine whether the facility is required to obtain coverage under the General Permit. For example, a school district must obtain coverage under the General Permit for its bus maintenance facility, even though the primary business of the district is education.

Many businesses in California that are not included in Appendix B currently have or may be required to have an NPDES permit for stormwater. These permits are issued because the businesses either belonged to a category for which federal regulations were previously established, or because the respective RWQCB identified a problem. RWQCBs have the authority to require an NPDES permit of any facility that is discharging stormwater, not just those identified in Appendix B.

To assist the business owners and operators in deciding whether their facilities are subject to the General Permit, refer to the first step of Figure 2-1. If a facility is subject to the General Permit, there are two possible compliance options. For facilities at which there is exposure of industrial activities or materials to stormwater that may run off the site, the facility will be required to obtain coverage by filing PRDs, and prepare and implement a SWPPP as shown in the left hand column of the figure. The steps required for these sites are detailed beginning in Section 2.3. Facilities that have no exposure of industrial activities or materials to stormwater are not required to comply with the SWPPP or monitoring requirements of the General Permit. The steps that are required for facilities with no exposure are detailed in Section 2.1.2.

There are a number of commercial businesses that, although not covered by the General Permit, may impact stormwater quality. The oversight of these businesses will vary according to local jurisdiction requirements are discussed further in Section 2.5.

2.1.2 Facilities Subject to the General Permit but Not Required to Prepare a SWPPP

A discharger that certifies their facility has no exposure of industrial activities or materials to stormwater in accordance with the General Permit would qualify for NEC coverage and is not required to comply with the SWPPP or monitoring requirements of the General Permit but may
still be subject to other discharge requirements (e.g., municipal permits or pretreatment programs).

**Figure 2-1 Decision Tree**

The Discharger must conduct one Annual Comprehensive Facility Compliance Evaluation (Annual Evaluation), pay an annual fee, and certify annually that their facilities continue to meet the NEC requirements.

The Discharger must submit the following PRDs for NEC coverage via SMARTS:

- A completed NEC Form and signed certification statement;
- A completed NEC Checklist; and
- A current Site Map.
2.1.3 Facilities Not Subject to the General Permit

Several categories of businesses and activities are not required to obtain coverage under the General Permit. These are:

- Facilities on tribal lands (these facilities must obtain coverage under the EPA MSGP);
- Facilities that have other NPDES permits containing stormwater provisions;
- Stormwater discharges from facilities draining to combined sewer systems;
- Conveyances that discharge stormwater runoff combined with municipal sewage;
- Discharges of stormwater identified in CWA § 402(l) (33 U.S.C. § 1342(l))²; and
- Facilities otherwise subject to the General Permit but for which a valid NONA has been certified and submitted via SMARTS³.

The RWQCB may require particular facilities to obtain an individual NPDES stormwater permit in which case it is likely that the permit will specify the preparation of a SWPPP. Local jurisdictions may also require that a business that falls outside the SIC code list in Appendix B prepare a local stormwater pollution control plan or similar documents following the process presented in this section. Additional information on a stormwater pollution control plan is presented in Section 2.4.

2.2 Overview of BMPs

A general description of BMPs and related nomenclature are provided in this section. BMPs are measures to prevent or mitigate pollution. They include a broad class of measures, many of which may already be used for reasons unrelated to stormwater pollution prevention. BMPs are commonly categorized whether they are non-structural or structural, or whether they are Source Control or Treatment Control (as used in this Handbook). These terms are generally defined as follows:

- **Non-Structural BMPs** - Generally consist of processes, prohibitions, procedures, schedule of activities, etc., that prevent pollutants associated with industrial activity from entering stormwater. They are generally low cost and low technology in nature.

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² Includes agricultural return flows, and stormwater runoff from oil, gas and mining operations that composed entirely of flows which are from conveyances or systems of conveyances (including but not limited to pipes, conduits, ditches, and channels) used for collecting and conveying precipitation runoff and which are not contaminated by contact with, or do not come into contact with, overburden, raw material, intermediate products, finished product, byproduct, or waste products located on the site of such operations.

³ Details of the NONA requirements can be found in Section XX.C of the General Permit.
Section 2

Stormwater Pollution Prevention Planning for Industrial and Commercial Facilities

- **Structural BMPs** - Generally physical facilities that prevent the pollutants from reaching stormwater, such as a roof cover. Others treat or remove pollutants in stormwater, such as detention basins.

- **Source Control BMPs** - (described in Section 3) - Prevent contact between stormwater and the pollution source and can be structural or non-structural. Examples of source control non-structural and structural BMPs include using alternative non-toxic chemicals, and constructing a cover over an industrial activity area to prevent contact with rainfall. Source control BMPs are preferred over treatment control BMPs because they can be highly effective at preventing pollution if implemented properly and are usually, but not always less costly than treatment control BMPs.

- **Treatment Control BMPs** - (described in Section 4) – are typically structures that treat stormwater to remove pollutant(s). Treatment control BMPs may exhibit a range of pollutant removal effectiveness, even if maintained and operated properly. For example, infiltration and retention treatment BMPs may be 100 percent effective at keeping stormwater pollutants and runoff from being discharged from a site. Other treatment BMPs, such as vegetated swales, are less effective. Proper maintenance is essential to sustain the long-term effectiveness and reliability of treatment control BMPs.

The General Permit categorizes BMPs as either

1) Minimum BMPs; or

2) Advanced BMPs.

Dischargers subject to the General Permit are expected to implement and maintain minimum BMPs, to the extent feasible that are applicable to their particular site or facility. The minimum BMPs required by the General Permit are shown in Table 2-1. The General Permit also requires that facilities, to the extent feasible, implement and maintain the advanced BMPs necessary to reduce or prevent discharges of pollutants in stormwater discharges in a manner that reflects best industry practice considering technological availability and economic practicability and achievability.

The logo shown in Table 2-1 is used throughout this Handbook to identify elements of activity specific BMPs which meet one or more of the General Permit minimum BMP requirements. Virtually all of the minimum BMPs in the General Permit can be considered Source Control BMPs that prevent contact between stormwater and the pollution source, and can be structural or non-structural.
### Table 2-1 Minimum BMPs required by the General Permit

<table>
<thead>
<tr>
<th>Good Housekeeping (keep things tidy)</th>
<th>Preventative Maintenance (know what may fail and plan for routine repairs)</th>
<th>Spill and Leak Prevention and Response (have a plan to prevent and clean up accidents)</th>
<th>Material Handling and Waste Management (take steps to make sure materials and waste don’t wash or blow away)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observe and maintain industrial activity outdoor areas</td>
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<tr>
<td>Minimize or prevent material tracking</td>
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<td>Minimize dust generated</td>
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<tr>
<td>Cleanup areas affected by rinse and wash water</td>
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<tr>
<td>Cover stored industrial materials that can be readily mobilized by contact with stormwater</td>
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<tr>
<td>Contain stored non-solid industrial materials or wastes</td>
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<tr>
<td>Prevent disposal of rinse/wash waters</td>
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<tr>
<td>Minimize flows of offsite stormwater and NSWDs into material handling areas</td>
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<tr>
<td>Identify equipment and systems that may leak</td>
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<tr>
<td>Observe the equipment and systems to detect leaks</td>
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<tr>
<td>Establish a schedule for maintenance</td>
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<tr>
<td>Establish procedures for maintenance and repair</td>
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<tr>
<td>Establish procedures and/or controls to minimize spills and leaks</td>
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<tr>
<td>Develop and implement spill and leak response procedures to prevent industrial materials from being discharge</td>
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<tr>
<td>Clean up spills and leaks promptly</td>
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</tr>
<tr>
<td>Identify and describe needed spill and leak response equipment</td>
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<tr>
<td>Train appropriate spill</td>
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<td></td>
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</tr>
<tr>
<td>Minimize handling of industrial materials or wastes that can be readily mobilized by contact with stormwater</td>
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<tr>
<td>Contain non-solid industrial materials or wastes that can be transported or dispersed by the wind or contact with stormwater</td>
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<tr>
<td>Cover industrial waste disposal and industrial material storage containers</td>
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<tr>
<td>Divert run-on and stormwater away from stockpiled materials</td>
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<tr>
<td>Clean spills that occur during handling</td>
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<tr>
<td>Observe and clean outdoor material/waste handling equipment or containers</td>
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</tbody>
</table>
Table 2-1 Minimum BMPs required by the General Permit

<table>
<thead>
<tr>
<th>Category</th>
<th>Required Actions</th>
</tr>
</thead>
</table>
| Erosion and Sediment Controls (minimize erosion and prevent sediment from leaving the site) | Implement effective wind erosion controls  
Provide effective stabilization for inactive areas, finished slopes, and other areas prior to a forecasted storm event.  
Maintain effective perimeter controls and stabilize site entrances  
Divert run-on and stormwater generated from within the facility away from erodible materials  
Properly design sediment basins |
| Employee Training Program (train staff to know what to do) | Train stormwater team members  
Prepare or acquire training manuals  
Identify which personnel need to be trained  
Provide a training schedule  
Maintain training documentation |
| Quality Assurance Record Keeping (keep track of and document everything) | Develop and implement management procedures to ensure implementation of plans  
Develop a method of tracking and recording program implementation  
Maintain implementation records (i.e., BMP deployment records, employee training logs, spill occurrence and clean-up records) |

The advanced BMPs are generally structural BMPs but include both source control and treatment control BMPs. Table 2-2 presents the advanced BMPs included in the General Permit. In addition to the minimum BMPs, an industrial discharger must, to the extent feasible, implement and maintain any advanced BMPs necessary to reduce or prevent discharges of pollutants in its stormwater discharge in a manner that reflects best industry practice considering technological availability and economic practicability and achievability.

Table 2-2 Advanced BMPs required by the General Permit

<table>
<thead>
<tr>
<th>Category</th>
<th>Required Actions</th>
</tr>
</thead>
</table>
| Exposure Minimization BMPs                    | Install storm resistant shelters (either permanent or temporary)  
Prevent the contact of stormwater with industrial materials or area(s) of industrial activity |
| Stormwater Containment and Discharge Reduction BMPs | Construct BMPs that divert, infiltrate, reuse, contain, retain, or reduce the volume of stormwater runoff  
Implement onsite LID BMPs  
Dischargers are encouraged to utilize BMPs that infiltrate or reuse stormwater where feasible |
### 2.3 SWPPP Overview

An overview of the process to develop a SWPPP consists of six phases. Each phase is briefly described in Table 2-3, and presented in detail in the following subsections. The individual elements in the left hand column of Table 2-3 that are italicized are required elements of a SWPPP. These elements have been organized into an overall six Phase process by CASQA to help make the SWPPP more effective, implementable, and understandable. The SWPPP must include the information needed to demonstrate compliance with the requirements of the General Permit. The SWPPP must be submitted electronically via SMARTS, and a copy must be kept at the facility. SWPPP revisions must be completed in accordance with Section X.B of the General Permit.

The SWPPP must contain the following elements:

1. Facility name and contact information;
2. Site map;
3. List of industrial materials;
4. Description of potential pollution sources;
5. Assessment of potential pollutant sources;
6. Minimum BMPs;
7. Advanced BMPs, if applicable;
8. MIP;
9. Annual Evaluation; and
10. Date that SWPPP was initially prepared and the date of each SWPPP amendment, if applicable.

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**Table 2-2 Advanced BMPs required by the General Permit(1)**

<table>
<thead>
<tr>
<th>Treatment Control BMPs</th>
<th>Implement BMPs using one or more mechanical, chemical, biologic, or other treatment technology that will meet the treatment design standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Advanced BMPs</td>
<td>Any additional BMPs not described in the Minimum BMPs that are necessary to meet the effluent limitations of the General Permit</td>
</tr>
</tbody>
</table>

1. Advanced BMPs are required to the extent feasible if necessary to reduce or prevent discharges of pollutants in its stormwater discharge in a manner that reflects best industry practice considering technological availability and economic practicability and achievability.
A checklist from Appendix 1 of the General Permit and which can assist in organizing the information needed to prepare a SWPPP is contained in Appendix C-2. An annotated SWPPP template is provided in Appendix C-2.

### 2.4 Preparation and Implementation of the SWPPP

Each of the elements corresponding to the first five phases of the SWPPP development and implementation process outlined above is described in detail in this section. Phase six is discussed in Section 5.

**Table 2-3 The Six Phases of SWPPP Development and Implementation**

*Italics* indicate required elements of the SWPPP

<table>
<thead>
<tr>
<th>Phase</th>
<th>Summary of Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PLANNING AND ORGANIZATION (see Section 2.4.1)</td>
<td>The first step involves identifying the Pollution Prevention Team (PPT), and gathering and reviewing other existing documents and regulations. Smaller facilities may only involve a single individual. Large facilities should designate a SWPPP Leader to organize the PPT.</td>
</tr>
<tr>
<td>A) Form Pollution Prevention Team</td>
<td></td>
</tr>
<tr>
<td>B) Review other requirements</td>
<td></td>
</tr>
<tr>
<td>C) Review existing facility plans</td>
<td></td>
</tr>
<tr>
<td>2. ASSESSMENT PHASE (see Section 2.4.2)</td>
<td>The SWPPP Leader with the assistance of the PPT conducts an assessment of the facility. Worksheets for conducting an assessment are provided at the end of this Section.</td>
</tr>
<tr>
<td>D) Develop a site map</td>
<td></td>
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<tr>
<td>E) Describe industrial activities</td>
<td></td>
</tr>
<tr>
<td>F) Describe potential pollutant sources</td>
<td></td>
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<tr>
<td>G) List past significant spills and leaks</td>
<td></td>
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<tr>
<td>H) Identify NSWDs</td>
<td></td>
</tr>
<tr>
<td>I) Describe erodible surfaces</td>
<td></td>
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<tr>
<td>J) Identify existing BMPs</td>
<td></td>
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<tr>
<td>K) Assess potential pollution sources</td>
<td></td>
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<tr>
<td>L) Complete an Assessment Summary</td>
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</tr>
<tr>
<td>3. BEST MANAGEMENT PRACTICES IDENTIFICATION PHASE (see Section 2.4.3 and Sections 3 and 4)</td>
<td>BMPs are selected to address the identified sources of stormwater pollution. These may include both existing and additional BMPS. Emphasis is placed on the <em>minimum BMPS</em> which focus on source control. <strong>Advanced BMPS</strong> should be included if needed to comply with the requirements of the General Permit. The SWPPP must include BMPS to prevent or reduce contact of stormwater and NSWDs with pollutants.</td>
</tr>
<tr>
<td>A) Identify minimum BMPS</td>
<td></td>
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<tr>
<td>B) Identify advanced BMPS needed</td>
<td></td>
</tr>
<tr>
<td>C) Identify BMPS to be used during temporary suspension of industrial activities</td>
<td></td>
</tr>
<tr>
<td>D) Describe BMPS</td>
<td></td>
</tr>
<tr>
<td>E) Prepare a MIP</td>
<td></td>
</tr>
<tr>
<td>4. ASSEMBLY PHASE (see Section 2.4.4)</td>
<td>This phase includes assembly of information obtained in the prior phases (e.g., site map, BMPs, worksheets).</td>
</tr>
<tr>
<td>A) Obtain required signatures</td>
<td></td>
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<tr>
<td>B) Select plan location</td>
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</tr>
<tr>
<td>C) Assemble document</td>
<td></td>
</tr>
</tbody>
</table>
Table 2-3 The Six Phases of SWPPP Development and Implementation
(italics indicate required elements of the SWPPP)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Summary of Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. IMPLEMENTATION PHASE</td>
<td>The SWPPP is implemented and its effectiveness evaluated.</td>
</tr>
<tr>
<td>A) Conduct Training</td>
<td></td>
</tr>
<tr>
<td>B) Implement the BMPs</td>
<td></td>
</tr>
<tr>
<td>C) Eliminate unauthorized non-storm discharges</td>
<td></td>
</tr>
<tr>
<td>6. MONITORING AND REPORTING (see Section 5)</td>
<td>The required monitoring is conducted. Of particular importance is that adjustments be made in the SWPPP to update information on the nature of the activities at the site (e.g., change in outside manufacturing processes) insofar as they affect stormwater quality, and to redress observed inadequacies of the BMPs.</td>
</tr>
<tr>
<td>A) Conduct monitoring program</td>
<td></td>
</tr>
<tr>
<td>B) Conduct record keeping and reporting</td>
<td></td>
</tr>
<tr>
<td>C) Conduct annual site evaluation</td>
<td>Review monitoring information</td>
</tr>
<tr>
<td></td>
<td>Evaluate the BMPs</td>
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<tr>
<td></td>
<td>Review and revise the SWPPP as necessary</td>
</tr>
</tbody>
</table>

2.4.1 Phase 1 - Planning and Organization Phase

The development of a SWPPP is a straightforward process that relates activities to the potential for discharge of pollutants from the site. The onsite facility staff must be engaged in the preparation of the SWPPP as they are likely the individuals who will be responsible for carrying out implementation of the SWPPP. Facility personnel must:

- Determine if permit coverage is required;
- Assess permit requirements applicable to the site and be familiar with BMPs that will be implemented;
- Assess time available and capabilities of internal resources to develop compliance documents; and
- Assess whether outside resources are needed based on available time and capabilities of internal resources.

Technical consultants are available and can be a valuable resource to guide development of compliance documents or to prepare complete compliance documents and then train staff. Regardless, the following elements must be completed.

2.4.1.1 Form Pollution Prevention Team

The SWPPP must identify a specific individual or individuals within the facility organization as members of the Pollution Prevention Team (PPT). There are numerous ways to organize the PPT but most important is the need to designate a lead person (SWPPP Leader) responsible for spearheading the effort. For small facilities, stormwater PPTs may consist of just one individual. The size and composition of the team must be appropriate to the complexity of the facility. The
The team must consist of representatives from all departments, at all levels, that will have a role in implementing the SWPPP. The role of each member must be specified. The PPT may have personnel that overlap with related pollution control responsibilities such as a spill prevention and response team. The PPT is responsible for:

- Developing the SWPPP;
- Assisting the facility manager in SWPPP implementation and revision; and
- Conducting the monitoring activities.

The SWPPP must clearly identify the responsibilities, duties, and activities of each PPT member. The SWPPP must contain a statement of the organization’s management policies and responsibilities for implementing the SWPPP. The SWPPP must also identify specific responsibilities by department or division if appropriate.

The SWPPP must also identify procedures that will be implemented to identify alternate PPT members to implement the SWPPP and monitoring requirements when the regularly assigned PPT members are temporarily unavailable (due to vacation, illness, out of town business, etc.).

### 2.4.1.2 Review Other Requirements and Plans

This may include compiling background information and identifying related environmental management plans and regulations. The PPT must assemble the information and currently available data to be used in the Assessment Phase. The PPT must carefully review the existing SWPPP for any facility that currently has coverage under the previous Industrial General Permit.

Additionally, facilities constructed in recent years that were subject to local New Development/Redevelopment requirements under the local agency MS4 Permit may be subject to approved local stormwater management plans. Depending on the local and state agency requirements, these plans may include:

- Water Quality Management Plans (WQMP);
- Standard Urban Stormwater Mitigation Plans (SUSMPs);
- Water Quality Technical Reports (WQTRs) or similar documents; and
- Project Construction SWPPP.

These documents can be useful as sources of information describing the source controls, treatment controls, and other BMPs that were incorporated into the project at the time of construction, redevelopment or retrofit. These documents will help to identify how the site was designed to operate with respect to runoff. The PPT should understand that these previous document and plans do not substitute for the required facility SWPPP under the General Permit.

The Land Title report or Covenants, Conditions, and Restrictions on the deed may mention the existence of these documents and their applicability to subsequent owners.
Other relevant information may include:

- Drawings of the facility's drainage system indicating locations of inlets, pipes, ditches and outlets and the area served by each portion of the system;
- Stormwater quality data previously collected;
- Requirements of the RWQCB regarding the receiving water body into which stormwater runoff from the facility discharges;
- Applicable municipal, state, and federal requirements that pertain to the requirements in this General Permit;
- Specific elements of existing plans, procedures, or regulatory compliance documents that contain stormwater-related BMPs or otherwise relate to the requirements of the General Permit;
- Original sources for elements of existing plans, procedures, or regulatory compliance documents must be referenced and included as part of their SWPPP and a copy of the referenced documents maintained at the facility as part of the SWPPP; and
- Scheduled operating hours when facility is staffed to conduct functions related to industrial activity, but excluding time periods where only routine maintenance, emergency response, security, and/or janitorial services are performed. Scheduled facility operating hours that would be considered irregular (temporary, intermittent, seasonal, weather dependent, etc.).

It would be prudent for the PPT to identify if other local, state, and federal requirements impact, complement, or are inconsistent with the requirements of the SWPPP. The PPT must consider in the Assessment Phase how these various plans affect, integrate with, or conflict with the SWPPP.

2.4.2 Phase 2 - Assessment Phase

The PPT leader should use the PPT to assess the facility. Including the team throughout the development of the SWPPP makes it more likely that they will understand, support, and implement the SWPPP.

The recommended approach is to identify key industrial activities or industrial activity areas that are likely sources of pollutants. A series of worksheets have been developed to assist with completion of this phase. Worksheets 1-8 are provided in Section 2.6.

PHASE 2 - Assessment:

- Develop a site map
- Describe industrial activities (use Worksheet 1)
- Inventory industrial materials and chemicals (use Worksheets 2 & 3)
- List past significant spills and leaks (use Worksheet 4)
- Identify NSWDs (use Worksheets 5 & 6)
- Identify existing BMPs (use Worksheet 7)
- Assess potential pollution sources (use Worksheet 8)
- Complete an Assessment Summary
2.4.2.1 Develop a Site Map

The SWPPP must include a site map, provided on an 8-½ x 11 inch or larger sheet with notes, legends, and other data as appropriate to ensure that the site map is clear and understandable. In many cases it may be preferable to use multiple maps to clearly depict all of the required information. The map is to include the following information:

- Facility boundaries;
- Outline of stormwater drainage areas;
- Portions of the drainage area impacted by run-on from surrounding areas;
- Direction of flow of each drainage area;
- Onsite surface water bodies;
- Areas of soil erosion;
- Nearby water bodies (such as rivers, lakes, ponds);
- Municipal storm drain inlets where the facility’s stormwater discharges;
- Locations of stormwater collection and conveyance system, associated discharge locations, and the direction of flow as well as building downspout and roof drain discharge locations;
- Water quality sampling locations if different than the identified discharge locations;
- Locations and descriptions of structural control measures that affect stormwater discharges, authorized NSWDs, and/or run-on;
- Locations of catch basins and drain inlets;
- Location of authorized NSWDs into the storm drain. Outline of impervious areas of the facility;
- Locations where materials are directly exposed to precipitation;
- Locations where significant spills or leaks have occurred;
- Areas of industrial activities; and
- Visual observation monitoring locations.

A base map of the facility identifies the location of buildings and key surface facilities. The stormwater conveyance systems with the location of the discharge location(s) (e.g. outfalls) and
the drainage boundary to each location must be shown on the base map. Some fieldwork will likely be necessary to identify these features.

The map must identify areas of industrial activity subject to the General Permit. This includes industrial storage areas and storage tanks, shipping and receiving areas, vehicle and equipment storage/maintenance areas, material handling and processing areas, waste treatment and disposal areas, dust or particulate generating areas, cleaning and material reuse areas, and other areas of industrial activity that may have potential pollutant sources.

Identify buildings and or activities that may be sources of NSWDs, such as: process wastewater; non-contact cooling water; washwater; irrigation runoff; and sanitary wastewater. Older buildings more likely to have inappropriate plumbing connections and should be inspected. Remodeling may have resulted in inadvertent cross-connections of non-storm lines to the storm drains.

It is recommended that a Preliminary Site Map be prepared at the outset of the Assessment Phase that describes the general physical layout of the facility (e.g., storm conveyance systems), and information that is readily available. This Preliminary Site Map is then confirmed and enhanced during the assessment of the facility.

2.4.2.2 Describe Industrial Activities

The SWPPP must include a narrative description of the facility's industrial activities, associated potential pollutant sources, and potential pollutants that could be discharged in stormwater discharges or authorized NSWDs. Worksheet 1 provides an activities assessment checklist to aid in identifying industrial activities. Table 2-4 outlines the pollutants potentially associated with common industrial activities.

### Table 2-4 Pollutants Associated with Industrial Activities

<table>
<thead>
<tr>
<th>Activity-or-Facility Type</th>
<th>Potential Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sediments</td>
</tr>
<tr>
<td>Vehicle &amp; Equipment Fueling</td>
<td></td>
</tr>
<tr>
<td>Vehicle &amp; Equipment Washing and Steam Cleaning</td>
<td>X</td>
</tr>
<tr>
<td>Vehicle &amp; Equipment Maintenance and Repair</td>
<td></td>
</tr>
<tr>
<td>Outdoor Loading &amp; Unloading of Materials</td>
<td>X</td>
</tr>
<tr>
<td>Outdoor Container Storage of Liquids</td>
<td>X</td>
</tr>
<tr>
<td>Outdoor Process Equipment Operations and Maintenance</td>
<td>X</td>
</tr>
<tr>
<td>Outdoor Storage of Raw Materials, Products, and Byproducts</td>
<td>X</td>
</tr>
<tr>
<td>Waste Handling &amp; Disposal</td>
<td>X</td>
</tr>
<tr>
<td>Contaminated or Erodible Surface Areas</td>
<td>X</td>
</tr>
</tbody>
</table>
### Table 2-4 Pollutants Associated with Industrial Activities

<table>
<thead>
<tr>
<th>Activity-or-Facility Type</th>
<th>Sediments</th>
<th>Nutrients</th>
<th>Bacteria and Viruses</th>
<th>Oil and Grease</th>
<th>Metals</th>
<th>Synthetic Organics(1)</th>
<th>Pesticides</th>
<th>Gross Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building and Grounds Maintenance</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Building Repair, Remodeling, and Construction</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking/Storage Area Maintenance Activities</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2.4.2.3 Describe Potential Pollutant Sources

How materials are stored and handled affects the potential for water pollution. Knowledge of the type and location of materials provides insight into the pollutants likely to be present. Completing Worksheets 2 and 3 may be useful in assessing potential pollutant sources. Worksheet 2 lists materials that are potential pollutants, whereas Worksheet 3 lists only those industrial materials that are regularly exposed to stormwater. “Industrial materials” includes industrial materials that have the potential to be released with stormwater discharges, which includes but is not limited to the following: 1) raw materials such as plastic pellets; 2) fuels; 3) solvents and detergents; 4) finished materials such as metallic products; 5) raw materials used in food processing or production; 6) hazardous substance designed under Section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); 7) any chemical the facility is required to report pursuant to Section 313 of Title III or the Superfund Amendments and Reauthorization Act (SARA); 8) fertilizers, pesticides; and 9) waste products such as ashes, slag, and sludge.

For each industrial material on the list, describe the following:

- Locations where the industrial material is being stored, received, shipped, and handled;
- Receiving and loading procedures;
- Spill or leak prevention and response procedures;
- Typical quantities onsite and frequency of use;
- Areas protected by containment structures and the corresponding containment capacity must also be described; and
- Industrial activities that generate a significant amount of dust or particulate that may be deposited within the facility boundaries, including the discharge locations, the source type, and the characteristics of the dust or particulate pollutant.
Worksheets #2 and #3 can be used to help inventory industrial materials stored and used on site and any that have spilled or leaked in significant quantities and have discharged from the facility’s storm water conveyance system within the previous five-year period.

### 2.4.2.4 List Past Significant Spills and Leaks

The SWPPP must evaluate the facility for areas where industrial materials have spilled or leaked in significant quantities and have discharged from the facility’s stormwater conveyance system within the previous five-year period. Worksheet 4 may be useful for this requirement. The word "significant" in this instance relates to quantity, specifically the volume, concentrations, or mass of a pollutant in stormwater discharge that can cause or threaten to cause pollution, contamination, or nuisance, that adversely impact human health or the environment, and cause or contribute to a violation of applicable water quality standards for the receiving water. List releases of oil or hazardous substances in excess of reportable quantities and include the following information:

- Type, characteristics, and approximate quantity of the material spilled or leaked;
- Cleanup or remedial actions that have occurred or are planned;
- Approximate remaining quantity of materials that may be exposed to stormwater or NSWDs discharges; and
- Preventative measures taken to ensure spills or leaks do not reoccur.

Although only significant spills are required to be included in the SWPPP, identifying areas where smaller spills occur frequently is also useful. Identify on the site map the areas where repeated spills have occurred, or where the risk of spill is particularly significant.

Specific requirements in the General Permit that must be documented in the SWPPP include:

- A list of industrial materials, including unauthorized NSWDs discharged from the facility’s stormwater conveyance system within the previous five-year period;
- A list of toxic chemicals identified in 40 CFR § 302 that have been discharged from the facility’s stormwater conveyance system as reported on EPA Form R, as well as oil and hazardous substances in excess of reportable quantities (40 CFR §§ 110, 117, and 302) that have discharged from the facility’s stormwater conveyance system within the previous five-year period;
- A list of industrial materials that have spilled or leaked in significant quantities and had the potential to be discharged from the facility’s stormwater conveyance system within the previous five-year period; and
- For each discharge or potential discharge listed include the location, characteristics, and approximate quantity of the materials spilled or leaked; approximate quantity of the materials discharged from the facility’s stormwater conveyance.

Worksheet #4 can be used to help document spills and significant leaks.
2.4.2.5 Identify Non-Stormwater Discharges (NSWDs)

Facility operators must investigate the facility to identify potential NSWDs and their sources. As part of this investigation, all drains (inlets and outlets) must be evaluated to identify whether they connect to the storm drain system. NSWDs must be described. This must include the source, estimated quantity, frequency, and characteristics of the NSWDs and associated drainage area. The General Permit authorizes a specific set of NSWDs (Table 2-3) provided the discharges meet the conditions in the General Permit including:

- Discharge is not in violation of a Regional Water Board Basin Plan, Statewide Water Quality Control Plan or Policy;
- The Discharge is not prohibited by a municipal ordinance or requirement;
- BMPs appropriate for the discharge are identified in the SWPPP and implemented to:
  a. Prevent or reduce the contact of authorized NSWDs with materials or equipment that are potential sources of pollutants;
  b. Minimize, to the extent practicable, the flow or volume of authorized NSWDs;
  c. Ensure that authorized NSWDs do not contain quantities of pollutants that cause or contribute to an exceedance of a water quality standard; and,
  d. Prevent or reduce discharges of pollutants in authorized NSWDs in a manner that reflects best industry practice considering technological availability and economic achievability.
- Monthly visual observations (General Permit Section XI.A.1) of NSWDs and sources must be conducted to ensure adequate BMP implementation and effectiveness; and,
- Authorized NSWDs must be reported and described in the Annual Report.

<table>
<thead>
<tr>
<th>Table 2-5 Authorized Non-Stormwater Discharges (NSWDs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire hydrant, and fire prevention or response system flushing</td>
</tr>
<tr>
<td>Potable water sources, including potable water related to the operation, maintenance, or testing of potable water system</td>
</tr>
<tr>
<td>Drinking fountain water</td>
</tr>
<tr>
<td>Atmospheric condensates including refrigeration, air conditioning, and compressor condensate</td>
</tr>
<tr>
<td>Irrigation drainage and landscape watering provided pesticides, herbicides and fertilizers have been applied in accordance with the manufacturer’s label</td>
</tr>
<tr>
<td>Uncontaminated natural springs, groundwater, foundation drainage, footing drainage</td>
</tr>
<tr>
<td>Sea water infiltration where the sea waters are discharged back into the source</td>
</tr>
<tr>
<td>Incidental windblown mist from cooling towers that collects on rooftops or adjacent portions of your facility, but not intentional discharges from the cooling tower (e.g., “piped” cooling tower blowdown or drains)</td>
</tr>
</tbody>
</table>

Firefighting related discharges are not subject to the General Permit. These discharges, however, may be subject to RWQCB enforcement actions under other sections of the Water
Code. Firefighting related discharges that are contained and are later discharged may be subject to municipal agency ordinances and/or RWQCB requirements.

The allowable non-stormwater discharges may differ among RWQCBs and local agencies; therefore, the allowable NSWDs may vary for businesses located in different areas even though they are all covered by the General Permit.

The process to identify NSWDs to the drainage system and determining whether they are authorized or unauthorized can be documented using Worksheets 5. Section 3 (Source Control Fact Sheet SC-10) provides a detailed procedure for identifying unauthorized NSWDs. The General Permit requires that a corrective process to eliminate the discharge must begin immediately. It is recommended that unauthorized discharges be terminated before the SWPPP is completed as discussed further under Section 2.4.3.2. Worksheet 6 can be used to document this process. If this is not possible, the specific actions or BMPs proposed to terminate these discharges must be included in the SWPPP.

If the Discharger does not have access to some point in the drainage system or because the facility is in the process of eliminating the discharge, the RWQCB must be notified of the situation. The Discharger must notify the RWQCB of potential sources of NSWDs for which the necessary testing could not be performed and why. Notification to the RWQCB should also include a responsive time schedule to complete elimination. Discharges that are essential to industrial operations and cannot be eliminated should be noted.

2.4.2.6 Describe Erodible Surfaces

The SWPPP must include a description of the facility locations where soil erosion may be caused by industrial activity, contact with stormwater, authorized and unauthorized NSWDs, or run-on from areas surrounding the facility. This would include areas within the site boundary that are not covered by impervious surfaces (roads, driveways, parking, roof tops, etc.) or by planted and/or permanently maintained vegetative cover.

2.4.2.7 Identify Existing BMPs

Those businesses already covered under the General Permit should already have a SWPPP and therefore some BMPs should already be implemented. However, even businesses that are preparing their first SWPPP or updating their SWPPP to comply with a re-issued General Permit will likely have BMPs already in place. These may include pavement sweeping, cleaning of catch basins, covered waste storage bins, and spill prevention and cleanup procedures. Worksheet 1 provides a checklist of BMPs that may be helpful in determining existing BMPs at a facility. Note these BMPs in relationship to the site activities and potential pollution sources. There may be other BMPs that were installed for reasons unrelated to stormwater control. Examples are berming, covered materials storage, and designated wash areas.

2.4.2.8 Assess Potential Pollution Sources

The SWPPP must include a narrative assessment of industrial activities and potential pollutant sources to determine which areas of the facility are likely sources of pollutants in stormwater and NSWDs, and which pollutants are likely to be present in stormwater and NSWDs. Worksheet 8 may help with this task. Worksheet 8 includes a column to list existing BMPs (identified in Worksheet 7 that may address or partially address these sources. Based on this
assessment, it may be determined that the existing BMPs are not adequate to address sources and comply with the General Permit. In that case, additional BMPs would be selected in the BMP Identification Phase, in Section 2.4.3 and can be documented in the last column in Worksheet 8.

Facility owners and operators must consider and evaluate various factors when performing the pollutant source assessment such as current stormwater BMPs; quantities of significant materials handled, produced, stored, or disposed of; likelihood of exposure to stormwater or authorized NSWDs; history of spills or leaks; and run-on from outside sources. Facility owners and operators must summarize the areas of the facility that are likely sources of pollutants and the corresponding pollutants, approximate quantity, physical characteristics (e.g., liquid, powder, solid, etc.), of each significant material handled, produced, stored, recycled, or disposed that are likely to be present in stormwater discharges and authorized NSWDs. The assessment must examine the direct and indirect pathways by which pollutants may be exposed to stormwater or authorized NSWDs.

Additional steps that need to be considered as part of the evaluation include:

- Evaluate industrial activities identified under Section 2.4.2.2 that generate dust or particulates that may be deposited within the facility’s boundaries and identify their discharge locations. The evaluation should focus on the characteristics of dust and particulate pollutants; the approximate quantity of dust and particulate pollutants that may be deposited within the facility boundaries; and a description of the primary areas of the facility where dust and particulate pollutants would settle.

- Evaluate the locations identified under Section 2.4.2.6 where soil erosion may occur as a result of industrial activity, stormwater discharges associated with industrial activity, or authorized NSWDs. The evaluation should focus on the potential for erosion, the extent of the erodible area and the proximity and pathway for potential stormwater discharges.

- Summarize existing stormwater quality data.

- Prepare a list of industrial materials or toxic chemicals that have spilled or leaked in significant quantities and have been discharged from the facility’s stormwater conveyance system.

- Conduct more detailed field studies if necessary.
  - Complex facilities may require extensive fieldwork to locate the drainage systems and discharge locations. Some analysis of storm samples including flow measurements may be desirable to obtain a better understanding of the situation.

- Consider the potential and relative significance of each activity to cause stormwater pollution. This will be subjective based on the relative percentage of area covered by each activity, the nature of the activity, and the types of pollutants.
Identify industrial pollutants related to the receiving waters with 303(d) listed impairments or approved TMDLs that may be causing or contributing to an exceedance of a water quality standard in the receiving waters.

The result of the assessment is to determine the effectiveness of existing BMPs to reduce or prevent pollutants in industrial stormwater discharges and authorized NSWDs; and to predict the effectiveness of implementing, to the extent feasible and applicable, additional minimum BMPs not currently used to reduce or prevent pollutants in industrial stormwater discharges and authorized NSWDs.

Based upon the assessment, the SWPPP will identify areas of the facility where the minimum BMPs described in Section 2.4.3.1 will not adequately reduce or prevent pollutants in stormwater discharges in compliance with the Receiving Water Limitations of the General Permit. For that case, the SWPPP will need to identify advanced BMPs, as described in Section 2.4.3.2, for those areas. In addition, the SWPPP will identify additional parameters, beyond the basic parameters (see discussion in Section 5) that indicate the presence of pollutants likely to be present in industrial stormwater discharges from a facility.

Also based upon the assessment, dischargers should identify drainage areas with no exposure to industrial activities and materials by applying the criteria for conditional NEC definitions in Section XVII of the General Permit. NEC coverage is available on a facility-wide basis only, not for individual outfalls. Complete an Assessment Summary

Compile the above information for review and comment by the PPT. This summary will serve as the basis for the BMP Identification Phase. The PPT should have sufficient information to determine which areas and activities may be contributors to stormwater pollution, and which additional BMPs are most suitable. Prioritization of BMP implementation may also be apparent at this time.

2.4.3 Phase 3 - BMP Identification Phase

The third phase in the preparation of the SWPPP is to identify BMPs that are and/or will be implemented at the site. These will include existing BMPs as well as new BMPs that are identified as a result of the assessment described in the preceding section. The description is to include a discussion on the effectiveness of each BMP to reduce or prevent pollutants in stormwater discharges and authorized NSWDs, and a summary of all BMPs implemented for each pollutant source. This information should be summarized similar to Worksheet 8.

A brief overview of the major categories of Source Control BMPs follows.

2.4.3.1 Identify Erosion and Sediment Control BMPs

If your site assessment has identified erodible areas (e.g., typically bare areas not covered by pavement, buildings or vegetation), it is necessary to identify BMPs that reduce sediment.
generation. BMP Fact Sheet SC-40 has some information on erosion and sediment control BMPs. In addition, the New Development-Redevelopment Handbook and the Construction Handbook both provide more extensive information on erosion and sediment control BMPs.

### 2.4.3.2 Identify BMPs for Non-stormwater Discharges

The General Permit prohibits NSWDs to the storm drainage system except for certain authorized discharges that meet specific conditions (see Section 2.4.2). If the discharge is not allowed through one of the General Permit exceptions, then they either must be terminated or the facility must obtain a separate permit allowing for the discharge. As NSWDs are potentially significant contributors of pollutants, they should be given prompt attention (see Source Control Fact Sheet SC-10). If possible, NSWDs should be terminated before the completion of the SWPPP. However, some may require a considerable investment, requiring more time to reach full termination. If this is the case, the specific BMPs that will be implemented to terminate the discharges are to be included in the SWPPP. If certain NSWDs are allowed, it is still necessary to implement BMPs that reduce pollutants in these discharges.

### 2.4.3.3 Identify Source Control BMPs

The axiom of "80 percent of the problem can be solved with 20 percent of the effort" probably is true for many industries and sites. Low or modest cost BMPs, many of which may already be in place, may provide satisfactory protection. The General Permit requires that a number of minimum BMPs must be implemented at all sites. Source Control BMPs are more fully described in Section 3 of this Handbook.

The following categories of minimum BMPs must be included in the SWPPP:

- Good housekeeping;
- Preventive maintenance;
- Spill and leak prevention and response;
- Material handling and waste management;
- Erosion and sediment controls;
- Employee training; and
- Quality assurance and record keeping.

It may be concluded at the end of the above effort that that implementation of minimum BMPs may or may not be sufficient to reduce pollutants to an acceptable level and/or meet other requirements such as TMDLs. Given that this decision is subjective, particularly in the absence of stormwater monitoring pollutant data, the PPT Leader has several options:

1. Complete the analysis at this point, only including applicable minimum BMPs identified in the above effort and implement the SWPPP. If previous monitoring results and initial monitoring results after implementing the revised SWPPP indicate that the effectiveness of reducing pollutants through implementing only the minimum BMPs is found to be
sufficient, the facility can continue implementing the BMPs and conducting on-going monitoring as required.

2) If previous visual observations and/or sampling data or other elements of the assessment (such as TMDL compliance) indicate that implementing only the minimum BMPs is not sufficient, identify and implement one or more Advanced BMPs as discussed in Section 2.4.3.4 and include in the SWPPP.

3) If only minimum BMPs are initially implemented, but initial or subsequent monitoring indicates that the minimum BMPs are found to be insufficient, identify and implement one or more Advanced BMPs as noted in the previous step.

4) During this assessment process, Dischargers should be prepared to respond quickly to monitoring data that indicates an NAL may be exceeded. This may mean implement new BMPs after the results are received from a single storm event. Should NALs be exceeded during this process, the facility will need to complete Exceedance Response Actions. (See Section 5 and Appendix E.)

General categories of structural source control BMPs include but are not limited to:

- Installing berms or simple curbing to divert runoff water from around the activity area to reduce the amount of polluted stormwater leaving the area.
- Implementing overhead coverage: This includes structures that provide horizontal coverage of materials, chemicals, and pollutant sources from contact with stormwater and authorized NSWDs.
- Using secondary containment structures: This generally includes containment structures around storage tanks and other areas for the purpose of collecting leaks or spills.
- Moving an outdoor operation indoors.
- Designating equipment wash areas with proper containment/collection systems.
- Constructing storm resistant shelters (either permanent or temporary) that prevent the contact of stormwater with the identified industrial materials or area(s) of industrial activity (advanced BMP).

Constructing facilities that divert, infiltrate, reuse, contain, retain, or reduce the volume of stormwater runoff coming onto or generated on-site before contacting sources of contaminants (advanced BMP).

To ensure that these BMPs are properly implemented, the facility must implement an employee training, inspection, record keeping, and quality control as part of the SWPPP.
2.4.3.4 Identify Treatment Control or Other Advanced BMPs

Treatment Control or other advanced BMPs are required under the General Permit if the source control BMPs are insufficient to meet numeric effluent limits required by current federal regulations for certain industries; or if it is determined necessary to reduce or prevent discharges of pollutants in stormwater discharged from the site that cannot be accomplished with source control BMPs only in a manner that reflects best industry practice considering technological availability and practicability and economic achievability. Treatment Control BMPs are more fully described in Section 4 of this Handbook.

Consider treatment control BMPs if:

- Deployment of source control BMPs has been ineffective, in which case a Treatment Control BMP may be more cost-effective;

- Monitoring data indicate an exceedance of an NAL or the potential to exceed an NAL;

- The facility has knowledge from past BMP implementation that the minimum BMPs will not sufficiently reduce pollutants in the discharge;

- Advanced BMPs have been determined to be the Best Industry Practice;

- The facility is required to meet a federal numeric effluent limit that cannot be met with source control BMPs;

- The facility discharges to an 303(d) listed water body or a water body subject to a TMDL for a pollutant present at the facility and treatment control BMPs are necessary to meet the TMDL-specific permit requirements; and

- There is a pollutant of particular concern that can only be controlled with a treatment control BMP.

Evaluate the following possibilities:

- If you have several separate drainage systems serving different areas, consider consolidating the pollutant generating activities into one area to reduce the number of treatment devices needed.

- Site a treatment device in the immediate vicinity of the activity, rather than at the far end of the drainage system. This will reduce the contributing drainage area and may reduce the size of the treatment device required.

- If you have a wastewater treatment system, consider diverting the sources of particular concern to the sewer treatment plant. This may require pre-treatment permits or approvals from the agency providing sewer service.

- For activities that cover a small area but are potentially significant polluters, such as equipment washing, consider using an offsite commercial washing facility or covering
the area and directing the wash water to a sanitary sewer. Consultation with the local sewer district is necessary.

After completing the above analysis, consider again covering the activity of concern. Even if it may be somewhat more expensive than treatment, covering has the advantage of being 100 percent effective. For certain industries, covering may avoid the need for coverage under the General Permit.

2.4.3.5 Prepare BMP List and Prioritize

The final step is to "wrap-up" the list of BMPs, clearly showing the BMPs identified for each activity. Decide which BMPs to implement first. Make sure the BMP list meets the requirements specified in the General Permit. Here is a final checklist of considerations:

- Have you identified the specific solutions to eliminate unauthorized NSWDs and provide BMPs for those that are allowed?
- Have you identified lower-cost BMPs that cover all of the activities you checked in Worksheet 1?
- Have you developed a strategy to deal with those activities that will still be significant sources of pollution for which more expensive BMPs are needed?
- Are you required to comply with Federal Storm Water Effluent Limitation Guidelines (Subchapter N), and if so, have you identified the specific BMPs to fulfill this obligation?
- Are you required to address a 303(d) listed water body or a water body subject to a TMDL?
- Have you prepared a training program to provide the proper background to the employees who will implement the BMPs?
- Have you selected BMPs that are least likely to harbor or breed vectors such as mosquitoes? Have you considered vector suppression in your maintenance plan? If not, have you consulted with the local vector control agency about preventative maintenance and regular vector monitoring and abatement?
- Do you have a commitment and schedule for implementation of the BMPs, maintenance, inspection, and ongoing evaluation?

2.4.3.6 Prepare the Monitoring Implementation Plan

One of the important final steps in the preparation of the SWPPP is to develop a program to monitor how well the BMPs are being implemented, and how well they are reducing the amount of pollutants leaving your site in the stormwater. The MIP must be prepared in accordance with the requirements of the General Permit and be included in the SWPPP. See Section 5 for details of the MIP requirements.
2.4.3.7  Prepare Additional Implementation Information

Phase 5 (discussed below) and Phase 6 (discussed in Section 5) outline detailed suggestions on how to implement and evaluate the relative success of the SWPPP. The General Permit specifies the following to be documented in the SWPPP:

- Designate the personnel responsible for carrying out the SWPPP;
- Describe how records of the inspections, follow-up actions, and implementation of the BMPs will be prepared and kept; and
- Develop a training program to train staff so they understand the SWPPP.

2.4.4  Phase 4 - Assemble the SWPPP

The final phase, before Implementation, is to assemble the SWPPP. Completing the SWPPP requires several actions.

2.4.4.1  Obtain Electronic Signatures and Certifications

The SWPPP must include the name and title of the Legally Responsible Person (LRP) responsible for the SWPPP, the dates of initial preparation and each amendment. The SWPPP must be submitted electronically by the LRP or their duly authorized representative. SMARTS requires an electronic signature and certification at the time of submittal.

2.4.4.2  Select Plan Location

An official copy of the SWPPP must be located at the facility, not offsite. The SWPPP is primarily for use by the PPT; therefore locating the SWPPP offsite would negate its purpose. However, if an office or suitable space is not available at the facility, then the SWPPP should be kept at the appropriate administrative office. Regardless, a copy of the SWPPP must be available for review should a representative of the RWQCB or local municipality come on-site. The SWPPPs are considered to be available to the public pursuant to Section 308(b) of the CWA, and therefore are available to the public through SMARTS.

2.4.4.3  Compile and Assemble the SWPPP

The SWPPP should be compiled by assembling the site map, narrative descriptions, and worksheets and the Monitoring Implementation Plan into a 3-ring binder or bound document.

2.4.4.4  Submit the PRDs

Once the PRDs for NOI coverage are assembled, the following items must be submitted via SMARTS to register for coverage under the General Permit:

- A completed Notice of Intent (NOI) and signed certification statement;
Section 2
Stormwater Pollution Prevention Planning for Industrial and Commercial Facilities

- A copy of a current Site Map from the SWPPP;
- The completed SWPPP; and
- Payment of appropriate annual fees.

Any information provided to the SMARTS or the RWQCB by the Discharger must comply with the Homeland Security Act and other federal law that addresses security in the United States; any information that does not comply should not be submitted in the PRDs. The Discharger must provide justification to the RWQCB regarding redacted information within any submittal. Dischargers may redact trade secrets from required submittals. Dischargers who certify and submit redacted information via SMARTS must include a general description of any redacted information and the basis for the redaction in the submittal that includes the information. Dischargers must submit complete and un-redacted paper copies of the information to the RWQCB within 30 days of the of the redacted information submittal.

Note that a single set of PRDs must be submitted for coverage under the General Permit for multiple industrial activities occurring at the same facility.

2.4.5 Phase 5 – Implement the SWPPP

Finally, implement the SWPPP by training personnel, implementing BMPs, and eliminating unauthorized NSWDs. The SWPPP should be implemented according to the Monitoring Implementation plan developed in Phase 3.

Dischargers must identify and provide for adequate resources (personnel and capital) to properly implement the SWPPP.

2.4.5.1 Conduct Training

Training is in itself a minimum BMP and is important for personnel who are responsible for:

- Implementing activities identified in the SWPPP;
- Conducting inspections, sampling, and visual observations; and
- Managing stormwater pollution prevention program.

Training should address topics such as spill response, good housekeeping, material handling procedures, and actions necessary to implement BMPs identified in the SWPPP. The SWPPP should identify periodic dates for such training. Records should be maintained of training sessions held.

2.4.5.2 Implement the BMPs

The BMPs identified in Phase 3 are implemented during this phase. A schedule for implementation of the BMPs, maintenance, inspection, and ongoing evaluation described in the SWPPP should be followed. It is important that BMPs be maintained, particularly treatment...
control BMPs, but other BMPs also require attention such as spill containment materials, drip pans, etc.

2.4.5.3 Eliminate Unauthorized Non-storm Discharges

One of the major elements of the SWPPP is the elimination of unauthorized NSWDs into a facility’s storm drain system. Unauthorized NSWDs can be generated from several of the activities that may take place at industrial facilities (e.g., washing of vehicles, equipment, buildings, or pavement; improper disposal of materials; spilled or leaked materials). BMPs to control spills, leakage, and dumping must be implemented to address NSWDs.

2.4.5.4 SWPPP Revisions

If there is a significant revision to the SWPPP, Dischargers are required to submit these revisions to their SWPPP in SMARTS no later than 30 days after the revision. Dischargers are required to determine what would constitute significant revisions for their facility. For all other SWPPP revisions that are not considered significant, Dischargers are not required to submit these revisions electronically in SMARTS more frequently than every 3 months.

2.4.5.5 Site Map Revisions

If there is a significant change in the facility layout (e.g., new building, change in storage locations, boundary change) a revision to the SWPPP and site map is required. The revised SWPPP must be certified and submitted via SMARTS.

2.4.6 Phase 6 – Monitoring, Reporting, and Program Evaluation

It is important, as well as required by the General Permit, that frequent inspections occur to check if BMPs are being implemented, and to evaluate their relative effectiveness. Section 5 provides guidance on Phase 6, which involves conducting the monitoring program, review of monitoring information, evaluation of BMPs, record keeping and reporting, and review and revision of the SWPPP.

2.5 Commercial Businesses

The General Permit is applicable to a wide range of specified industries (see Section 2.1). However, there are a number of commercial businesses that, although not covered by the General Permit, may impact stormwater quality. The oversight of these businesses will vary according to local jurisdiction requirements. Some jurisdictions may require the business to develop a less formal plan, which may have some of the same elements of the General Permit defined SWPPP. The contents of these plans may vary with each local jurisdiction but all will basically address the following items:

- Identification of pollutant-generating activities;
- Selection and implementation of BMPs to address these activities; and
- Review and modification of the plan to ensure effective implementation.
While some jurisdictions may require the development of a written document, sometimes called a stormwater pollution control plan, other jurisdictions may choose to provide education material to the businesses. To assist these businesses and the jurisdictions overseeing these businesses, specific stormwater pollution control guide sheets have been prepared (see Section 3). These guide sheets may be used as reference material either as a business prepares a stormwater pollution control plan or as a jurisdiction prepares outreach material. The guide sheets incorporate the source control BMPs presented in Section 3 into a business specific pollution control plan. The businesses selected for inclusion represent some of the more common business types in many communities and tend to have a higher potential to impact stormwater quality based on the products they use and their activities. These businesses are listed in Table 2-6.

### Table 2-6 Business Categories and Subcategories Stormwater Pollution Control Guide Sheets

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG-10</td>
<td>Animal Care and Handling Facilities</td>
</tr>
<tr>
<td></td>
<td>Automotive Service Facilities</td>
</tr>
<tr>
<td>BG-20</td>
<td>Body Repair</td>
</tr>
<tr>
<td>BG-21</td>
<td>Maintenance</td>
</tr>
<tr>
<td>BG-22</td>
<td>Service Stations</td>
</tr>
<tr>
<td>BG-23</td>
<td>Auto Recycling</td>
</tr>
<tr>
<td>BG-30</td>
<td>Food Service Facilities</td>
</tr>
<tr>
<td>BG-40</td>
<td>Landscape Maintenance</td>
</tr>
<tr>
<td>BG-50</td>
<td>Marinas, Boat/Shipyards, and Ports</td>
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<tr>
<td></td>
<td>Mobile Cleaning</td>
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<tr>
<td>BG-60</td>
<td>Carpets &amp; Upholstery</td>
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<tr>
<td>BG-61</td>
<td>Food Service-related</td>
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<tr>
<td>BG-62</td>
<td>Surface Cleaning</td>
</tr>
<tr>
<td>BG-63</td>
<td>Swimming Pools &amp; Spas</td>
</tr>
<tr>
<td>BG-64</td>
<td>Water Softeners</td>
</tr>
<tr>
<td>BG-65</td>
<td>Vehicle and Equipment Washing</td>
</tr>
</tbody>
</table>

More details on the business guide sheets are provided in Section 3.

### 2.6 SWPPP Worksheets

Blank copies of worksheets 1-8 for the Assessment Phase of the SWPPP follow.
<table>
<thead>
<tr>
<th>ACTIVITIES - Check each activity present at site</th>
<th>EFFECTIVENESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-storm water discharges to drains. Describe BMPs in place:</td>
<td>HIGH MOD. LOW</td>
</tr>
<tr>
<td>Spill Prevention, Control and Cleanup. Describe BMPs in place:</td>
<td></td>
</tr>
<tr>
<td>Vehicle and equipment fueling. Describe BMPs in place:</td>
<td></td>
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<tr>
<td>Vehicle and equipment washing and steam cleaning. Describe BMPs in place:</td>
<td></td>
</tr>
<tr>
<td>Vehicle and equipment maintenance and repair. Describe BMPs in place:</td>
<td></td>
</tr>
<tr>
<td>Outdoors loading/unloading of liquid materials. Describe BMPs in place:</td>
<td></td>
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<tr>
<td>Outdoor container storage of liquids. Describe BMPs in place:</td>
<td></td>
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<tr>
<td>Outdoor process equipment operations and maintenance. Describe BMPs in place:</td>
<td></td>
</tr>
<tr>
<td>Outdoor storage of raw materials, products and byproducts. Describe BMPs in place:</td>
<td></td>
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<tr>
<td>Waste handling and disposal. Describe BMPs in place:</td>
<td></td>
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<tr>
<td>Contaminated or erodible surface areas. Describe BMPs in place:</td>
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<tr>
<td>Building and grounds maintenance. Describe BMPs in place:</td>
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<tr>
<td>Building repair, remodeling, and construction. Describe BMPs in place:</td>
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<tr>
<td>Parking/Storage Area Maintenance. Describe BMPs in place:</td>
<td></td>
</tr>
</tbody>
</table>
**MATERIAL INVENTORY**

Worksheet No. 2  
Completed By:  
Title:  
Date:  

**Instructions:** List all materials used, stored, or produced onsite. Assess and evaluate these materials for their potential to contribute pollutants to storm water runoff. Also complete Worksheet 3 if the material has been exposed during the last three years.

<table>
<thead>
<tr>
<th>Material</th>
<th>Purpose/Location</th>
<th>Quantity (units)</th>
<th>Quantity Exposed in Last 5 Years (^{(1)})</th>
<th>Likelihood of contact with storm water.</th>
<th>Past significant Spill or Leak (^{(2)})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Used</td>
<td>Produced</td>
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</table>

**Notes:**

\(^{(1)}\) Explain on separate sheet if quantity was more than the "minimum?"

\(^{(2)}\) Explain items checked yes on a separate sheet.
**MATERIAL INVENTORY**

Instructions: Based on your material inventory, describe the significant materials that were exposed to storm water during the past five years and/or are currently exposed. For the definition of "significant materials" see Appendix B of the manual.

<table>
<thead>
<tr>
<th>Description of Exposed Significant Material</th>
<th>Period of Exposure</th>
<th>Quantity Exposed (Units)</th>
<th>Location (as indicated on the site map)</th>
<th>Method of Storage or Disposal (e.g., pile, drum, tank)</th>
<th>Description of Material Management Practices (e.g., pile covered, drum sealed)</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
## SPILLS INVENTORY

**Worksheet No. 4**
**Completed By:**
**Title:**
**Date:**

### Instructions:
Record below all significant spills and significant leaks of toxic or hazardous pollutants that have occurred at the facility in the five years prior to the effective date of the permit.

### Definitions:
Significant spills include, but are not limited to, releases of oil or hazardous substances in excess of reportable quantities.

### 1st Year Prior

<table>
<thead>
<tr>
<th>Date (month/day/year)</th>
<th>Check Box</th>
<th>Location (as indicated on site map)</th>
<th>Description</th>
<th>Response Procedure</th>
<th>Preventive Measures Taken</th>
</tr>
</thead>
<tbody>
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</table>

### 2nd Year Prior

<table>
<thead>
<tr>
<th>Date (month/day/year)</th>
<th>Check Box</th>
<th>Location (as indicated on site map)</th>
<th>Description</th>
<th>Response Procedure</th>
<th>Preventive Measures Taken</th>
</tr>
</thead>
<tbody>
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</table>

### 3rd Year Prior

<table>
<thead>
<tr>
<th>Date (month/day/year)</th>
<th>Check Box</th>
<th>Location (as indicated on site map)</th>
<th>Description</th>
<th>Response Procedure</th>
<th>Preventive Measures Taken</th>
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<tbody>
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</tr>
</tbody>
</table>
## NON-STORM WATER DISCHARGE ASSESSMENT

<table>
<thead>
<tr>
<th>Date of Test or Evaluation</th>
<th>Name of Person Who Conducted the Test or Evaluation</th>
<th>Outfall Directly Observed During the Test (identify as indicated on the site map)</th>
<th>Method Used to Test or Evaluate Discharge</th>
<th>Describe Results from Test for the Presence of Non-Storm Water Discharge</th>
<th>Identify Potential Significant Sources</th>
<th>Authorized NSWD?(^1)</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

\(^1\) If authorized NSWD, BMPs must be identified as appropriate. If unauthorized NSWD, see Worksheet 6.
### Unauthorized Non-Stormwater Discharge Elimination Documentation

**Worksheet No. 6**  
Completed by: ____________________________  
Title: ___________________________________  
Date: ___________________________________

**Directions:** Use this worksheet to document steps taken to eliminate unauthorized NSWDs identified in Worksheet 5

<table>
<thead>
<tr>
<th>Identify Outfall at which NSWD was identified</th>
<th>Description of Probable Source(s)</th>
<th>Description of Approach to Eliminating Source(s)</th>
<th>Anticipated Date for Completion</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
**Worksheet No. 7**  
**CHECKLIST FOR CONSIDERATION OF MINIMUM BMPs**

<table>
<thead>
<tr>
<th>Name of Facility</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Reviewer</td>
<td>Date</td>
</tr>
</tbody>
</table>

Check "Y," "N," or "N/A" for the following questions related to the industrial facility.

### Good Housekeeping

- Are outdoor areas observed to determine housekeeping needs?
- Is material tracking prevented or minimized?
- Is dust generated from industrial materials or activities minimized?
- Are all facility areas impacted by rinse/wash waters are cleaned as soon as possible?
- Are all stored industrial materials that can be readily mobilized by contact with storm water?
- Are all stored non-solid industrial materials or wastes (e.g., particulates, powders, shredded paper, etc.) that can be transported or dispersed by the wind or contact with storm water contained?
- Is disposal of any rinse/wash waters or industrial materials prevented from entering into the storm water conveyance system?
- Are storm water discharges from non-industrial areas minimized from contacting industrial areas of the facility?
- Are authorized NSWDs from non-industrial areas minimized from contacting industrial areas of the facility?

### Preventive Maintenance

- Are all equipment and systems used outdoors that may spill or leak pollutants identified?
- Are the identified equipment and systems identified to detect leaks or conditions that may result in the development of leaks?
- Is an appropriate schedule established for maintenance of identified equipment and systems?
- Is there a spill prevention and response team?
- Are procedures established for prompt maintenance and repair of equipment, and maintenance of systems when conditions exist that may result in the development of spills or leaks?

### Spill and Leak Prevention and Response

- Are procedures and/or controls established to minimize spills and leaks?
- Are spill and leak response procedures developed and implemented to prevent industrial materials from discharging into the storm water conveyance system and cleaned promptly and disposed of properly?
- Are all necessary and appropriate spill and leak response equipment, location(s) of spill and leak response equipment, and spill or leak response equipment maintenance procedures identified and described?
- Are appropriate spill and leak response personnel identified and trained?

### Material Handling and Waste Management

- Is handling of industrial materials or wastes that can be readily mobilized by contact with storm water prevented or minimized during a storm event?
- Is all stored non-solid industrial materials or wastes that can be transported or dispersed by the wind or contact with storm water contained?
- Are industrial waste disposal containers and industrial material storage containers that contain industrial materials covered when not in use?
- Is run-on and storm water generated from within the facility diverted away from all stockpiled materials?
- Are all spills of industrial materials or wastes that occur during handling cleaned in accordance with the spill response procedures?
- Is any outdoor material or waste handling equipment or containers that can be contaminated by contact with industrial materials or wastes observed and cleaned as appropriate?

### Erosion and Sediment Controls (for each erodible surface facility location identified in the SWPPP)

- Are effective wind erosion controls implemented?
- Is effective stabilization provided for active areas, finished slopes, and other erodible areas prior to a forecasted storm event?
- Are effective perimeter controls maintained and stabilize all site entrances and exits stabilized to sufficiently control discharges of erodible materials from discharging or being tracked off the site?
- Is run-on and storm water generated from within the facility diverted away from all erodible materials?
- If sediment basins are implemented, do they comply with the design storm standards in Section X.H.6 of the General Permit?

### Employee Training Program

- Are all team members implementing the various compliance activities of the General Permit properly trained to implement the requirements of the General Permit?
- Have appropriate training manuals or training materials been prepared or acquired?
- Have the personnel that need to be trained, their responsibilities, and the type of training they shall receive been identified?
- Has a training schedule been provided?
- Is documentation maintained of all completed training classes and the personnel that received training in the SWPPP?

### Quality Assurance and Record Keeping

- Have management procedures been developed and implemented to ensure that appropriate staff implements all elements of the SWPPP, including the Monitoring Implementation Plan?
- Has a method of tracking and recording the implementation of BMPs identified in the SWPPP been developed?
- Is there a system to maintain the BMP implementation records, training records, and records related to any spills and cleanup related response activities for a minimum of five (5) years?

Any items checked "No" require consideration in the selection of BMPs.

N/A = Not Applicable.
Worksheet No. 8
ASSESSMENT OF POTENTIAL POLLUTION SOURCES AND CORRESPONDING BMPs

<table>
<thead>
<tr>
<th>Area</th>
<th>Activity</th>
<th>Pollutant</th>
<th>Pollutant Source(s)</th>
<th>Best Management Practices</th>
</tr>
</thead>
<tbody>
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3 Source Control BMPs

3.1 Introduction

This section provides a description of specific source control Best Management Practices (BMPs) for common industrial and commercial activities that may pollute stormwater. In this Handbook, Source Control BMPs are structured around the concept of “activities” as experience has shown that with few exceptions one or more of these activities will satisfactorily describe all industrial/commercial facilities. For certain commercial businesses, separate guide sheets have been developed that incorporate business specific source control BMPs.

3.2 Source Control BMPs

Source control BMPs are listed in Table 3-1 and fact sheets for each are provided at the end of this section.

A BMP fact sheet is a short document that gives all the information about a particular BMP. Typically each fact sheet contains the information outlined in Figure 3-1. The fact sheets also contain side bar presentations with information on BMP objectives and targeted constituents.

### Table 3-1 Source Control BMPs

<table>
<thead>
<tr>
<th>Non-Stormwater Management</th>
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<tbody>
<tr>
<td>SC-10 Non-Stormwater Discharges</td>
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<td>SC-11 Spill Prevention, Control and Cleanup</td>
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<th>Vehicle and Equipment Management</th>
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<td>SC-21 Vehicle and Equipment Cleaning</td>
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<td>SC-22 Vehicle and Equipment Repair</td>
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<th>Material and Waste Management</th>
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<td>SC-30 Outdoor Loading/Unloading</td>
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<td>SC-31 Outdoor Liquid Container Storage</td>
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<td>SC-32 Outdoor Equipment Operations</td>
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<td>SC-34 Waste Handling and Disposal</td>
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<td>SC-35 Safer Alternative Products</td>
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<th>Building and Grounds Management</th>
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<td>SC-42 Building Repair and Construction</td>
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<td>SC-43 Parking/Storage Area Maintenance</td>
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<tr>
<td>SC-44 Drainage System Maintenance</td>
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</tbody>
</table>

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Industrial Activity Description of the BMP

**Description**

- General Pollution Prevention Protocols
- Good Housekeeping
- Preventative Maintenance
- Spill and Leak Prevention and Response
- Material Handling and Waste Management
- Erosion and Sediment Controls
- Employee Training Program
- Quality Assurance and Record Keeping
- Other Considerations (Limitations and Workarounds)

**Approach**

**Requirements**

- Costs (including capital and operation & maintenance)
- Maintenance (including administrative and staffing)

**Supplemental Information**

- Further Detail of the BMP

---

**Figure 3-1 Contents of Source Control BMP Fact Sheet**
Figure 3-2 Contents of Source Control BMP Fact Sheet
The BMP fact sheets are individually page numbered and are suitable for photocopying and inclusion in SWPPPs. Current copies of the fact sheets can be individually downloaded from the California Stormwater BMP Handbook web site at http://www.casqa.org.

3.3 Business Category Stormwater Pollution Control Guide Sheets

3.3.1 Introduction
This section describes “guide sheets” for the specific categories and subcategories of businesses shown in Table 3-2.

These categories represent some of the more common businesses types in any community and those businesses that tend to have a higher potential to pollute stormwater based on the products they use and their activities. Most of the business categories discussed in this section are not required to obtain coverage under state and federal stormwater regulations, with the exception of auto recycling facilities, marinas and boatyards and small commercial airports.

3.3.2 Use of Guide Sheets
The guide sheets are provided in Appendix D. Guide sheets are business-based as opposed to the activity-based like the source control fact sheets. The guide sheets basically address a collection of activities typically associated with a certain type of business. BMPs are identified for these activities and are complimentary to the source control BMPs described above. Each guide sheet provides a single source of information to the business regarding stormwater pollution prevention.

The guide sheets are organized as shown in Figure 3-2.

<table>
<thead>
<tr>
<th>Table 3-2 Business Categories and Subcategories</th>
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<td>BG-21 Maintenance</td>
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<td>BG-22 Service Stations</td>
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<td>BG-23 Auto Recycling</td>
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<td>BG-30 Food Service Facilities</td>
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<td>BG-40 Landscape Maintenance</td>
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<tr>
<td>BG-50 Marinas, Boat/Shipyards, and Ports</td>
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<td>BG-60 Carpets &amp; Upholstery</td>
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<td>BG-61 Food Service-related</td>
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<td>BG-62 Surface Cleaning</td>
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<td>BG-63 Swimming Pools &amp; Spas</td>
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<td>BG-64 Water Softeners</td>
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<td>BG-65 Vehicle and Equipment Washing</td>
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</table>
3.3.3 Guide Sheet Limitations

Although the intent is to provide as much information in one place as possible, for some business categories there is much more information available than can be included in this handbook. The references section of each guide sheet is intended to minimize this potential limitation. The guide sheets do not provide design details or maintenance requirements for treatment controls. This information is provided in the New Development and Redevelopment Handbook, and Section 4 of this handbook, respectively.

<table>
<thead>
<tr>
<th>Business Category Name</th>
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<tbody>
<tr>
<td>Description of the Business Category</td>
</tr>
<tr>
<td>Pollutant Sources – Describes the most common pollutants and their sources</td>
</tr>
<tr>
<td>Approach – Explains the overall approach to pollutant control</td>
</tr>
<tr>
<td>Source Control BMPs – Lists controls that help keep pollutants out of stormwater</td>
</tr>
<tr>
<td>Treatment Control BMPs - Lists controls that help remove pollutants from stormwater</td>
</tr>
<tr>
<td>More Information – Provides references to: 1) materials with more specific information than is included in these guide sheets or 2) other formats – posters and videos – that may complement these guide sheets</td>
</tr>
<tr>
<td>References – Other information and resources</td>
</tr>
</tbody>
</table>

Figure 3-3 Example Guide Sheet
Non-Stormwater Discharges

Description
Non-stormwater discharges (NSWDs) are flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain if local regulations allow. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include: potable water sources, fire hydrant flushing, air conditioner condensate, landscape irrigation drainage and landscape watering, emergency firefighting, etc. as discussed in Section 2.

However there are certain non-stormwater discharges that pose an environmental concern. These discharges may originate from illegal dumping of industrial material or wastes and illegal connections such as internal floor drains, appliances, industrial processes, sinks, and toilets that are illegally connected to the nearby storm drainage system through on-site drainage and piping. These unauthorized discharges (examples of which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants into storm drains.

Non-stormwater discharges will need to be addressed through a combination of detection and elimination. The ultimate goal is to effectively eliminate unauthorized non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of

Objectives
- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents
- Sediment
- Nutrients ✓
- Trash
- Metals ✓
- Bacteria ✓
- Oil and Grease ✓
- Organics ✓

Minimum BMPs Covered
- Good Housekeeping ✓
- Preventative Maintenance
- Spill and Leak Prevention and Response ✓
- Material Handling & Waste Management
- Erosion and Sediment Controls
- Employee Training Program ✓
- Quality Assurance Record Keeping ✓
pollutants on streets and into the storm drain system and downstream water bodies.

**Approach**
Initially the Discharger must make an assessment of non-stormwater discharges to determine which types must be eliminated or addressed through BMPs. The focus of the following approach is the elimination of unauthorized non-stormwater discharges. See other BMP Fact Sheets for activity-specific pollution prevention procedures.

**General Pollution Prevention Protocols**
- Implement waste management controls described in SC-34 Waste Handling and Disposal.
- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially those that are not classified as hazardous. These are often not responded to as effectively as they need to be.
- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” or similar stenciled or demarcated next to them to warn against ignorant or unintentional dumping of pollutants into the storm drainage system.
- Manage and control sources of water such as hose bibs, faucets, wash racks, irrigation heads, etc. Identify hoses and faucets in the SWPPP, and post signage for appropriate use.

**Non-Stormwater Discharge Investigation Protocols**
Identifying the sources of non-stormwater discharges requires the Discharger to conduct an investigation of the facility at regular intervals. There are several categories of non-stormwater discharges:
- Visible, easily identifiable discharges, typically generated as surface runoff, such as uncontained surface runoff from vehicle or equipment washing; and
- Non-visible, (e.g., subsurface) discharges into the site drainage system through a variety of pathways that are not obvious.

The approach to detecting and eliminating non-stormwater discharges will vary considerably, as discussed below:

**Visible and identifiable discharges**
- Conduct routine inspections of the facilities and of each major activity area and identify visible evidence of unauthorized non-stormwater discharges. This may include:
  - Visual observations of actual discharges occurring;
Non-Stormwater Discharges

- Evidence of surface staining, discoloring etc. that indicates that discharges have occurred;
- Pools of water in low lying areas when a rain event has not occurred; and
- Discussions with operations personnel to understand practices that may lead to unauthorized discharges.

If evidence of non-stormwater discharges is discovered:

- Document the location and circumstances using Worksheets 5 and 6 (Section 2 of the manual), including digital photos;
- Identify and implement any quick remedy or corrective action (e.g., moving uncovered containers inside or to a proper location); and
- Develop a plan to eliminate the discharge. Consult the appropriate activity-specific BMP Fact Sheet for alternative approaches to manage and eliminate the discharge.

Consult the appropriate activity-specific BMP Fact Sheet for alternative approaches to manage and eliminate the discharge. Make sure the facility SWPPP is up-to-date and includes applicable BMPs to address the non-stormwater discharge.

Other Illegal Discharges (Non visible)

Illicit Connections

- Locate discharges from the industrial storm drainage system to the municipal storm drain system through review of “as-built” piping schematics.
- Isolate problem areas and plug illicit discharge points.
- Locate and evaluate discharges to the storm drain system.

Visual Inspection and Inventory:

- Inventory and inspect each discharge point during dry weather.
- Keep in mind that drainage from a storm event can continue for a day or two following the end of a storm and groundwater may infiltrate the underground stormwater collection system.
- Non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

- A review of the “as-built” piping schematic is a way to determine if there are any connections to the stormwater collection system.
Inspect the path of loading/unloading area drain inlets and floor drains in older buildings.

Never assume storm drains are connected to the sanitary sewer system.

**Monitoring for investigation/detection of illegal discharges**

- If a suspected illegal or unknown discharge is detected, monitoring of the discharge may help identify the content and/or suggest the source. This may be done with a field screening analysis, flow meter measurements, or by collecting a sample for laboratory analysis. Section 5 and Appendix D describe the necessary field equipment and procedures for field investigations.

- Investigative monitoring may be conducted over time. For example, if a discharge is intermittent, then monitoring might be conducted to determine the timing of the discharge to determine the source.

- Investigative monitoring may be conducted over a spatial area. For example, if a discharge is observed in a pipe, then monitoring might be conducted at accessible upstream locations in order to pinpoint the source of the discharge.

- Generally, investigative monitoring requiring collection of samples and submittal for lab analysis requires proper planning and specially trained staff.

**Smoke Testing**

Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two piping systems. Smoke testing is generally performed at a downstream location and the smoke is forced upstream using blowers to create positive pressure. The advantage to smoke testing is that it can potentially identify multiple potential discharge sources at once.

- Smoke testing uses a harmless, non-toxic smoke cartridges developed specifically for this purpose.

- Smoke testing requires specialized equipment (e.g., cartridges, blowers) and is generally only appropriate for specially trained staff.

- A Standard Operating Procedure (SOP) for smoke testing is highly desirable. The SOP should address the following elements:
  - Proper planning and notification of nearby residents and emergency services is necessary since introducing smoke into the system may result in false alarms;
  - During dry weather, the stormwater collection system is filled with smoke and then traced back to sources;
Temporary isolation of segments of pipe using sand bags is often needed to force the smoke into leaking pipes; and

The appearance of smoke in a waste vent pipe, at a sewer manhole, or even the base of a toilet indicates that there may be a connection between the sanitary and storm water systems.

Most municipal wastewater agencies will have necessary staff and equipment to conduct smoke testing and they should be contacted if cross connections with the sanitary sewer are suspected. See SC-44 Drainage System Maintenance for more information.

Dye Testing

Dye testing is typically performed when there is a suspected specific pollutant source and location (i.e., leaking sanitary sewer) and there is evidence of dry weather flows in the stormwater collection system.

Dye is released at a probable upstream source location, either the facility’s sanitary or process wastewater system. The dye must be released with a sufficient volume of water to flush the system.

Operators then visually examine the downstream discharge points from the stormwater collection system for the presence of the dye.

Dye testing can be performed informally using commercially available products in order to conduct an initial investigation for fairly obvious cross-connections.

More detailed dye testing should be performed by properly trained staff and follow SOPs. Specialized equipment such as fluorometers may be necessary to detect low concentrations of dye.

Most municipal wastewater agencies will have necessary staff and equipment to conduct dye testing and they should be contacted if cross connections with the sanitary sewer are suspected.

TV Inspection of Drainage System

Closed Circuit Television (CCTV) can be employed to visually identify illicit connections to the industrial storm drainage system. Two types of CCTV systems are available: (1) a small specially designed camera that can be manually pushed on a stiff cable through storm drains to observe the interior of the piping, or (2) a larger remote operated video camera on treads or wheels that can be guided through storm drains to view the interior of the pipe.

CCTV systems often include a high-pressure water jet and camera on a flexible cable. The water jet cleans debris and biofilm off the inside of pipes so the camera can take video images of the pipe condition.
CCTV units can detect large cracks and other defects such as offsets in pipe ends caused by root intrusions or shifting substrate.

CCTV can also be used to detect dye introduced into the sanitary sewer.

CCTV inspections require specialized equipment and properly trained staff and are generally best left to specialized contractors or municipal public works staff.

**Illegal Dumping**

Substances illegally dumped on streets and into the storm drain systems and creeks may include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. These wastes can cause stormwater and receiving water quality problems as well as clog the storm drain system itself.

Establish a system for tracking incidents. The system should be designed to identify the following:

- Illegal dumping hot spots;
- Types and quantities (in some cases) of wastes;
- Patterns in time of occurrence (time of day/night, month, or year);
- Mode of dumping (abandoned containers, “midnight dumping” from moving vehicles, direct dumping of materials, accidents/spills);
- An anonymous tip/reporting mechanism; and
- Evidence of responsible parties (e.g., tagging, encampments, etc.).

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people at the facility who are aware of the problem and who have the tools to at least identify the incident, if not correct it. Therefore, train field staff to recognize and report the incidents.

Once a site has been cleaned:

- Post “No Dumping” signs with a phone number for reporting dumping and disposal.
- Landscaping and beautification efforts of hot spots may also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.
- See fact sheet SC-11 Spill Prevention, Control, and Cleanup.
Inspection
- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Conduct field investigations of the industrial storm drain system for potential sources of non-stormwater discharges.
- Pro-actively conduct investigations of high priority areas. Based on historical data, prioritize specific geographic areas and/or incident type for pro-active investigations.

Spill and Leak Prevention and Response
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.
- See SC-11 Spill Prevention Control and Cleanup.

Employee Training Program
- Training of technical staff in identifying and documenting illegal dumping incidents is required. The frequency of training must be presented in the SWPPP, and depends on site-specific industrial materials and activities.
- Consider posting a quick reference table near storm drains to reinforce training.
- Train employees to identify non-stormwater discharges and report discharges to the appropriate departments.
- Educate employees about spill prevention and cleanup.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan. Employees should be able to identify work/jobs with high potential for spills and suggest methods to reduce possibility.
- Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.
Non-Stormwater Discharges

Quality Assurance and Record Keeping

Performance Evaluation

- Conduct spill response drills annually (if no events occurred) in order to evaluate the effectiveness of the plan.
- When a responsible party is identified, educate the party on the impacts of his or her actions.

- Obtain feedback from personnel assigned to respond to, or inspect for, illicit connections and illegal dumping incidents.
- Develop document and data management procedures.
- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained, and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any on-site drainage points observed.
- Annually document and report the results of the program.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.
- Document training activities.

Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended “work-arounds.”

- Many facilities do not have accurate, up-to-date ‘as-built’ plans or drawings which may be necessary in order to conduct non-stormwater discharge assessments.
  - Online tools such as Google Earth™ can provide an aerial view of the facility and may be useful in understanding drainage patterns and potential sources of non-stormwater discharges
  - Local municipal jurisdictions may have useful drainage systems maps.
Video surveillance cameras are commonly used to secure the perimeter of industrial facilities against break-ins and theft. These surveillance systems may also be useful for capturing illegal dumping activities. Minor, temporary adjustments to the field of view of existing surveillance camera systems to target known or suspected problem areas may be a cost-effective way of capturing illegal dumping activities and identifying the perpetrators.

**Potential Capital Facility Costs and Operation & Maintenance Requirements**

**Facilities**

- Capital facility cost requirements may be minimal unless cross-connections to storm drains are detected.
- Indoor floor drains may require re-plumbing if cross-connections are detected.
- Leaky sanitary sewers will require repair or replacement which can have significant costs depending on the size and industrial activity at the facility.

**Maintenance (including administrative and staffing)**

- The primary effort is for staff time and depends on how aggressively a program is implemented.
- Costs for containment, and disposal of any leak or discharge is borne by the Discharger.
- Illicit connections can be difficult to locate especially if there is groundwater infiltration.
- Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

**Supplemental Information**

**Permit Requirements**

The IGP authorizes certain Non-Storm Water Discharges (NSWDs) provided BMPs are included in the SWPPP and implemented to:

- Reduce or prevent the contact of authorized NSWDs with materials or equipment that are potential sources of pollutants;
- Reduce, to the extent practicable, the flow or volume of authorized NSWDs;
- Ensure that authorized NSWDs do not contain quantities of pollutants that cause or contribute to an exceedance of a water quality standards (WQS); and,
Non-Stormwater Discharges

- Reduce or prevent discharges of pollutants in authorized NSWDs in a manner that reflects best industry practice considering technological availability and economic practicability and achievability.”

References and Resources


Santa Clara Valley Urban Runoff Pollution Prevention Program.


Description
Many activities that occur at an industrial or commercial site have the potential to cause accidental spills. Preparation for accidental spills, with proper training and reporting systems implemented, can minimize the discharge of pollutants to the environment.

Spills and leaks are one of the largest contributors of stormwater pollutants. Spill prevention and control plans are applicable to any site at which hazardous materials are stored or used. An effective plan should have spill prevention and response procedures that identify hazardous material storage areas, specify material handling procedures, describe spill response procedures, and provide locations of spill clean-up equipment and materials. The plan should take steps to identify and characterize potential spills, eliminate and reduce spill potential, respond to spills when they occur in an effort to prevent pollutants from entering the stormwater drainage system, and train personnel to prevent and control future spills. An adequate supply of spill clean-up materials must be maintained onsite.

Approach
General Pollution Prevention Protocols

- Develop procedures to prevent/mitigate spills to storm drain systems.

- Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- Establish procedures and/or controls to minimize spills and leaks. The procedures should address:
  - Description of the facility, owner and address, activities, chemicals, and quantities present;

Objectives
- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents
- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Minimum BMPs Covered
- Good Housekeeping
- Preventative Maintenance
- Spill and Leak Prevention and Response
- Material Handling & Waste Management
- Erosion and Sediment Controls
- Employee Training Program
- Quality Assurance Record Keeping
Facility map of the locations of industrial materials;

- Notification and evacuation procedures;

- Cleanup instructions;

- Identification of responsible departments; and

- Identify key spill response personnel.

- Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.

**Spill and Leak Prevention and Response**

**Spill Prevention**

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- If illegal dumping is observed at the facility:

  - Post “No Dumping” signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.

  - Landscaping and beautification efforts may also discourage illegal dumping.

  - Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.

- Store and contain liquid materials in such a manner that if the container is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.

- If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.

**Preventative Maintenance**

- Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.

- Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site’s spill control plan and/or proper spill cleanup procedures.
Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain*.

Check tanks (and any containment sumps) daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. Collect all spilled liquids and properly dispose of them.

Label all containers according to their contents (e.g., solvent, gasoline).

Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).

Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).

Identify key spill response personnel.

**Spill Response**

Clean up leaks and spills immediately.

Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).

On paved surfaces, clean up spills with as little water as possible.

- Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills.
- If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.
- If possible use physical methods for the cleanup of dry chemicals (e.g., brooms, shovels, sweepers, or vacuums).

Never hose down or bury dry material spills. Sweep up the material and dispose of properly.

Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.

For larger spills, a private spill cleanup company or Hazmat team may be necessary.
Reporting

- Report spills that pose an immediate threat to human health or the environment to the Regional Water Quality Control Board or local authority as location regulations dictate.

- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).

- Report spills to 911 for dispatch and clean-up assistance when needed. Do not contact fire agencies directly.

- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Types and quantities (in some cases) of wastes;
  - Patterns in time of occurrence (time of day/night, month, or year);
  - Mode of dumping (abandoned containers, “midnight dumping” from moving vehicles, direct dumping of materials, accidents/spills);
  - Clean-up procedures; and
  - Responsible parties.

Employee Training Program

- Educate employees about spill prevention and cleanup.

- Well-trained employees can reduce human errors that lead to accidental releases or spills:
  - The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur; and
  - Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.

- Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.

- Train employees to recognize and report illegal dumping incidents.
Other Considerations (Limitations and Regulations)
- State regulations exist for facilities with a storage capacity of 10,000 gallons or more of petroleum to prepare a Spill Prevention Control and Countermeasure (SPCC) Plan (Health & Safety Code Chapter 6.67).
- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.
- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

Requirements
Costs (including capital and operation & maintenance)
- Will vary depending on the size of the facility and the necessary controls.
- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.

Maintenance (including administrative and staffing)
- Develop spill prevention and control plan, provide and document training, conduct inspections of material storage areas, and supply spill kits.
- Extra time is needed to properly handle and dispose of spills, which results in increased labor costs.

Supplemental Information
Further Detail of the BMP
Reporting
Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate cleanup activities, and comply with legal requirements. A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm sewer. These records should contain the following information:
- Date and time of the incident;
- Weather conditions;
- Duration of the spill/leak/discharge;
Spill Prevention, Control & Cleanup  SC-11

- Cause of the spill/leak/discharge;
- Response procedures implemented;
- Persons notified; and
- Environmental problems associated with the spill/leak/discharge.

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- Date and time the inspection was performed;
- Name of the inspector;
- Items inspected;
- Problems noted;
- Corrective action required; and
- Date corrective action was taken.

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

Aboveground Tank Leak and Spill Control
Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems;
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves);
- External corrosion and structural failure;
- Spills and overfills due to operator error; and
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa.
Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- All other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanges, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.
- Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Frequently relocate accumulated stormwater during the wet season.
Periodically conduct integrity testing by a qualified professional.

**Vehicle Leak and Spill Control**

Major spills on roadways and other public areas are generally handled by highly trained Hazmat teams from local fire departments or environmental health departments. The measures listed below pertain to leaks and smaller spills at vehicle maintenance shops.

In addition to implementing the spill prevention, control, and clean up practices above, use the following measures related to specific activities:

**Vehicle and Equipment Maintenance**

- Perform all vehicle fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills.
- Regularly inspect vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Immediately drain all fluids from wrecked vehicles.
- Store wrecked vehicles or damaged equipment under cover.
- Place drip pans or absorbent materials under heavy equipment when not in use.
- Use absorbent materials on small spills rather than hosing down the spill.
- Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don’t leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.
Vehicle and Equipment Fueling

- Design the fueling area to prevent the run-on of stormwater and the runoff of spills:
  - Cover fueling area if possible.
  - Use a perimeter drain or slope pavement inward with drainage to a sump.
  - Pave fueling area with concrete rather than asphalt.
- If dead-end sump is not used to collect spills, install an oil/water separator.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Discourage “topping-off” of fuel tanks.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Use absorbent materials on small spills and general cleaning rather than hosing down the area. Remove the absorbent materials promptly.
- Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.
- Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas.
- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Train employees in proper fueling and cleanup procedures.

Industrial Spill Prevention Response

For the purposes of developing a spill prevention and response program to meet the stormwater regulations, facility managers should use information provided in this fact sheet and the spill prevention/response portions of the fact sheets in this handbook, for specific activities.

The program should:

- Integrate with existing emergency response/hazardous materials programs (e.g., Fire Department).
- Develop procedures to prevent/mitigate spills to storm drain systems.
- Identify responsible departments.
Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

Address spills at municipal facilities, as well as public areas.

Provide training concerning spill prevention, response and cleanup to all appropriate personnel.

References and Resources

Clark County Storm Water Pollution Control Manual. Available online at: http://www.co.clark.wa.us/pubworks/bmpman.pdf.

King County Storm Water Pollution Control Manual. Available online at: http://dnr.metrokc.gov/wlr/dss/spcm.htm.


Description
Spills and leaks that occur during vehicle and equipment fueling can contribute hydrocarbons, oil and grease, as well as heavy metals, to stormwater runoff. Implementing the following management practices can help prevent fuel spills and leaks.

Approach
- Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols
- Use properly maintained off-site fueling stations whenever possible. These businesses are better equipped to handle fuel and spills properly.
- Focus pollution prevention activities on containment of spills and leaks, most of which may occur during liquid transfers.

Good Housekeeping
- "Spot clean" leaks and drips routinely. Leaks are not cleaned up until the absorbent is picked up and disposed of properly.
- Manage materials and waste properly (see Material Handling and Waste Management) to reduce adverse impacts on stormwater quality.
- Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.
- Post signs at sinks to remind employees not to pour wastes down drains.

Objectives
- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents
- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Minimum BMPs Covered
- Good Housekeeping
- Preventative Maintenance
- Spill and Leak Prevention and Response
- Material Handling & Waste Management
- Erosion and Sediment Controls
- Employee Training Program
- Quality Assurance Record Keeping
Clean yard storm drain inlets(s) regularly and especially after large storms.

Do not pour materials down storm drains.

Build a shed or temporary roof over fueling area to limit exposure to rain.

Post signs to remind employees and customers not to top off the fuel tank when filling and signs that ban customers and employees from changing engine oil or other fluids at that location.

Report leaking vehicles to fleet maintenance.

Ensure the following safeguards are in place:

- Overflow protection devices on tank systems to warn the operator or automatically shut down transfer pumps when the tank reaches full capacity.
- Protective guards around tanks and piping to prevent vehicle or forklift damage.
- Clear tagging or labeling of all valves to reduce human error.
- Emergency shut-off and emergency phone number.

Preventative Maintenance

Fuel Dispensing Areas

- Inspect vehicles and equipment for leaks regularly and repair immediately.
- Sweep the fueling area weekly, if it is paved, to collect loose particles, and wipe up spills with rags and other absorbent material immediately. Do not hose down the area to a storm drain.
- Fit underground storage tanks with spill containment and overfill prevention systems meeting the requirements of Section 2635(b) of Title 23 of the California Code of Regulations.
- Fit fuel dispensing nozzles with "hold-open latches" (automatic shutoffs) except where prohibited by local fire departments.
- Post signs at the fuel dispenser or fuel island warning vehicle owners/operators against "topping off" of vehicle fuel tanks.
- Design fueling area to prevent stormwater runoff and spills. Use a perimeter drain or slope pavement inward with drainage to sump; regularly remove materials accumulated in sump.
- Pave area with concrete rather than asphalt.
Vehicle and Equipment Fueling  SC-20

- Cover fueling area with an overhanging roof structure or canopy so that precipitation cannot come in contact with the fueling area. Where covering is not feasible and the fuel island is surrounded by pavement, apply a suitable sealant that protects the asphalt from spilled fuels.

- Install vapor recovery nozzles to help control drips as well as air pollution.

- Use secondary containment when transferring fuel from the tank truck to the fuel tank. Cover storm drains in the vicinity during transfer.

Air/Water Supply Area

- Minimize the possibility of stormwater pollution from air/water supply areas by doing at least one of the following:
  - Spot clean leaks and drips routinely to prevent runoff of spillage.
  - Grade and pave the air/water supply area to prevent run-on of stormwater.
  - Install a roof over the air/water supply area.
  - Install a low containment berm around the air/water supply area.

Inspection

- Aboveground Tank Leak and Spill Control:
  - Check for external corrosion and structural failure.
  - Check for spills and overfills due to operator error.
  - Check for failure of piping system.
  - Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.
  - Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
  - Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
  - Conduct integrity testing periodically by a qualified professional.

- Inspect and clean, if necessary, storm drain inlets and catch basins within the facility boundary before October 1 each year.
**Spill Response and Prevention Procedures**

- Keep your spill prevention and control plan up-to-date.
- Maintain an adequate stockpile of spill cleanup materials at locations where it will be readily accessible.
- Clean leaks, drips, and other spills with as little water as possible.
  - Use rags for small spills,
  - Use a damp mop for general cleanup,
  - Use dry absorbent material for larger spills.
- Use the following three-step method for cleaning floors:
  - Clean spills with rags or other absorbent materials
  - Sweep floor using dry absorbent material
  - Mop the floor. Mop water may be discharged to the sanitary sewer via a toilet or sink.
- Remove the adsorbent materials promptly and dispose of properly when using absorbent materials on small spills.
- Store portable absorbent booms (long flexible shafts or barriers made of absorbent material) in unbermed fueling areas.
- Report spills promptly.
- If a dead-end sump is not used to collect spills, install an oil/water separator.

**Material Handling and Waste Management**

- Do not pour liquid wastes into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.
- Do not put used or leftover cleaning solutions, solvents, and automotive fluids in the sanitary sewer.
- Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.
- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
Vehicle and Equipment Fueling  SC-20

- Minimize the possibility of stormwater pollution from outside 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 stormwater.
  - Install a roof over the waste receptacle area.
  - Install a low containment berm around the waste receptacle area.
  - Use and maintain drip pans under waste receptacles.

- Post “no littering” signs.

**Employee Training Program**

- Educate employees about facility-wide pollution prevention measures and goals.
- Train designated employees (e.g., those involved with the handling or management of fuels) on proper fueling and cleanup procedures.
- Train designated employees upon hiring and annually thereafter on proper methods for handling and disposing of waste. Make sure that all employees understand stormwater discharge prohibitions, wastewater discharge requirements, and these best management practices.
- Ensure that employees are familiar with the site’s spill control plan and/or proper spill cleanup procedures.
- Use a training log or similar method to document training. The training log should include entries for:
  - Training topic,
  - Trainer,
  - Attendees,
  - Frequency,
  - Comments,
  - Target date for completion of training, and
  - Date completed.
Quality Assurance and Record Keeping

- Keep accurate maintenance logs that document minimum BMP activities performed for vehicle and equipment fueling, quantities of materials removed, and improvement actions.

- Keep accurate logs of spill response actions that document what types of liquids were spilled, how it was cleaned up, and how the waste was disposed.

- Establish procedures to complete logs and file them in the central office.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- The retrofitting of existing fueling areas to minimize stormwater exposure or spill runoff can be expensive. Good design must occur during the initial installation. Extruded curb along the “upstream” side of the fueling area to prevent stormwater run-on is of modest cost.

- Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

Maintenance

- Most of the operations and maintenance activities associated with implementing this BMP are integrally linked to routine operations as previously described. Therefore additional O&M is not required.

- For facilities responsible for pre-treating their wastewater prior to discharging, the proper functioning of structural treatment system is an important maintenance consideration.

- Routine cleanout of sumps and oil/water separators is required for the devices to maintain their effectiveness, usually at least once a month. During periods of heavy rainfall, cleanout is required more often to ensure pollutants are not washed through the system. Sediment removal is also required on a regular basis to keep the device working efficiently.

Supplemental Information

Designing New Installations

The elements listed below should be included in the design and construction of new or substantially remodeled facilities.

Fuel Dispensing Areas

- Fuel dispensing areas must be paved with Portland cement concrete (or, equivalent smooth impervious surface), with a 2 to 4% slope to prevent ponding, and must be
Vehicle and Equipment Fueling   SC-20

separated from the rest of the site by a grade break that prevents run-on of stormwater to the extent practicable. The fuel dispensing area is defined as extending 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus 1 foot, whichever is less. The paving around the fuel dispensing area may exceed the minimum dimensions of the "fuel dispensing area" stated above.

- The fuel dispensing area must be covered, and the cover’s minimum dimensions must be equal to or greater than the area within the grade break or the fuel dispensing area, as defined above. The cover must not drain onto the fuel dispensing area.

- If necessary, install and maintain an oil control device in the appropriate catch basin(s) to treat runoff from the fueling area.

Outdoor Waste Receptacle Area
- Grade and pave the outdoor waste receptacle area to prevent run-on of stormwater to the extent practicable.

Air/Water Supply Area
- Grade and pave the air/water supply area to prevent run-on of stormwater to the extent practicable.

Designated Fueling Area
- If your facility has large numbers of mobile equipment working throughout the site and you currently fuel them with a mobile fuel truck, consider establishing a designated fueling area. With the exception of tracked equipment such as bulldozers and perhaps small forklifts, most vehicles should be able to travel to a designated area with little lost time. Place temporary “caps” over nearby catch basins or manhole covers so that if a spill occurs it is prevented from entering the storm drain.

Examples
The Spill Prevention Control and Countermeasure (SPCC) Plan, which is required by law for some facilities, is an effective program to reduce the number of accidental spills and minimize contamination of stormwater runoff.

The City of Palo Alto has an effective program for commercial vehicle service facilities. Many of the program’s elements, including specific BMP guidance and lists of equipment suppliers, are also applicable to industrial facilities.

References and Resources


Vehicle and Equipment Cleaning SC-21

Description
Wash water from vehicle and equipment cleaning activities performed outdoors or in areas where wash water flows onto the ground can contribute toxic hydrocarbons and other organic compounds, oils and greases, nutrients, phosphates, heavy metals, and suspended solids to stormwater runoff. Use of the procedures outlined below can prevent or reduce the discharge of pollutants to stormwater during vehicle and equipment cleaning.

Approach
Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives

General Pollution Prevention Protocols

- If possible, use properly maintained off-site commercial washing and steam cleaning businesses whenever possible. These businesses are better equipped to handle and properly dispose of the wash waters.
- Use dry cleaning methods to remove debris and sweep area; avoid washing with water when possible.
- Good housekeeping practices can minimize the risk of contamination from wash water discharges.
- Use biodegradable, phosphate-free detergents for washing vehicles as appropriate
- Emphasize the connection between the storm drain system and runoff, help reinforce that vehicle and equipment washing activities affect local water quality through storm drain stenciling programs.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Minimum BMPs Addressed

- Good Housekeeping
- Preventative Maintenance
- Spill and Leak Prevention and Response
- Material Handling & Waste Management
- Erosion and Sediment Controls
- Employee Training Program
- Quality Assurance Record Keeping
Vehicle and Equipment Cleaning SC-21

☐ Map on-site storm drain locations to avoid discharges to the storm drain system.

☐ Designate specific wash area with clarifier or place wash areas away from storm drain connections.

**Good Housekeeping**

☐ Mark the area clearly as a wash area by:

  ✓ Posting signs stating that only washing is allowed in wash area; and

  ✓ Providing information on how washing is to be done.

☐ Provide trash containers in wash area.

☐ Have all vehicle and equipment washing done in areas designed to collect and hold the wash and rinse water or effluent generated. Recycle, collect or treat wash water effluent prior to discharge to the sanitary sewer system.

☐ If washing/cleaning must occur on-site, consider washing vehicles and equipment inside the building or on an impervious surface to control the targeted constituents by directing them to the sanitary sewer.

☐ If washing must occur on-site and outdoor:

  ✓ Use designated paved wash areas. This area must be covered or bermed to collect the wash water and graded to direct the wash water to a treatment or disposal facility.

  ✓ Do not conduct oil changes and other engine maintenance in the designated washing area. Perform these activities in a place designated for oil change and maintenance activities.

  ✓ Cover the wash area when not in use to prevent contact with rain water.

☐ Do not permit steam cleaning wash water to enter the storm drain system.

☐ If possible, conduct pressure and steam cleaning at appropriate off-site areas to avoid generating runoff with high pollutant concentrations.

**Preventative Maintenance**

☐ Install sumps or drain lines to collect wash water for treatment.

☐ Use hoses with nozzles that automatically turn off when left unattended.

☐ Perform routine inspections of drain lines, holding tanks, and hoses and repair leaks immediately.
Vehicle and Equipment Cleaning SC-21

- Perform routine inspection and maintenance of wash water recycling and treatment systems.

**Spill Response and Prevention Procedures**
- Keep the spill prevention and control plan up-to-date.
- Have an emergency plan, equipment, and trained personnel ready at all times to deal immediately with major spills.
- Collect all spilled liquids and properly dispose of them.
- Store and maintain appropriate spill cleanup materials in a location known to all near the designated wash area.

**Material Handling and Waste Management**
- Collect all wash water from vehicle and equipment cleaning operations. Consider treating and reusing or discharging wash waters to a sanitary sewer system.
- Large quantities of wash waters may require treatment at the facility. Treatment using a process treatment system (e.g., holding tank, filtration system, and related appurtenances) will require engineering and capital expenditures.
- Collect and treat small amounts of wash water at the facility and either recycle or discharge to the sanitary sewer system or collect and dispose of as an industrial waste.
- Discharge wash waters into sanitary sewer only after contacting local sewer authority to find out if pretreatment is required.

**Employee Training Program**
- Train employees on proper cleaning and wash water disposal procedures and conduct “refresher” courses on a regular basis.
- Train staff on proper maintenance measures for the wash area.
- Train employees and contractors on proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.
- Use a training log or similar method to document training.

**Quality Assurance and Record Keeping**
- Keep accurate maintenance/inspection logs that document the minimum BMP activities performed for vehicle and equipment cleaning activities and improvement actions.
Vehicle and Equipment Cleaning SC-21

- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

**Other Facility-Specific Considerations**

- Some municipalities may require pretreatment and monitoring of wash water discharges to the sanitary sewer.
- Steam cleaning can generate significant pollutant concentrations requiring that careful consideration be given to the environmental impacts and compliance issues related to the condensate wastewater generated.

**Potential Limitations and Work-Arounds**

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of certain BMPs. Provided below are typical limitations and recommended “work-arounds”:

- Most car washing best management practices are inexpensive, and rely more on good housekeeping practices (where vehicles are washed, planning for the collection of wash water) than on expensive technology. However, the construction of a specialized area for vehicle washing can be expensive. Also, for facilities that cannot recycle their wash water, the cost of pre-treating wash water through either structural practices or planning for collection and hauling of contaminated water to sewage treatment plants can be cost-prohibitive.

- A potential work-around is to use properly maintained off-site commercial washing and steam cleaning businesses whenever possible.

**Potential Capital Facility Costs and Operation & Maintenance Requirements**

**Facilities**

- Many facilities will already have indoor covered areas where vehicle and equipment cleaning takes place and will require no additional capital expenditures for providing cover.
- Capital investments will be required at some sites if systems to collect and recycle/treat and properly discharge wash water are not in place. The cost associated with these investments will vary depending on the size of the washing facility and local regulations regarding effluent wash water.

**Maintenance**

- Perform wash and collection system inspections and repair.
- Sweep washing areas frequently to remove solid debris.
Vehicle and Equipment Cleaning SC-21

- Repair berms and dikes as necessary.
- Inspect and maintain sumps, oil/water separators, and on-site treatment/recycling units.

**Supplemental Information**

*Designated Cleaning Areas*

- Washing operations outside should be conducted in a designated wash area having the following characteristics:
  - Paved with Portland cement concrete
  - Covered and bermed to prevent contact with stormwater and contain wash water
  - Sloped for wash water collections
  - Drainage system for wash water to the sanitary or recycle treatment process waste sewer, or to a dead-end sump equipped with an oil/water separator if necessary.

**References and Resources**


Vehicle and Equipment Cleaning SC-21

**Description**

Vehicle or equipment maintenance and repair are potentially significant sources of stormwater pollution, due to use of harmful materials and wastes during maintenance and repair processes. Engine repair and service (e.g., parts cleaning), replacement of fluids (e.g., oil change), and outdoor equipment storage and parking (leaking vehicles) can impact water quality if stormwater runoff from areas with these activities becomes polluted by a variety of contaminants. Implementation of the following activities must be done where applicable to prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment maintenance and repair activities.

**Approach**

The BMP approach is to reduce the potential for pollutant discharges through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives. General pollution prevention protocols are presented followed by applicable minimum BMPs as required by the Industrial General Permit.

**General Pollution Prevention Protocols**

- Designate a vehicle maintenance area designed to prevent stormwater pollution.
- Minimize contact of stormwater with outside operations through berming and appropriate drainage routing.
- Keep accurate maintenance logs to evaluate materials removed and improvements made.
- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Use drop cloths and drip pans.

**Objectives**

- **Cover**
- **Contain**
- **Educate**
- **Reduce/Minimize**
- **Product Substitution**

**Targeted Constituents**

- **Sediment**
- **Nutrients**
- **Trash**
- **Metals**
- **Bacteria**
- **Oil and Grease**
- **Organics**

**Minimum BMPs Covered**

- **Good Housekeeping**
- **Preventative Maintenance**
- **Spill and Leak Prevention and Response**
- **Material Handling & Waste Management**
- **Erosion and Sediment Controls**
- **Employee Training Program**
- **Quality Assurance Record Keeping**
Vehicle and Equipment Repair

Minimize use of solvents. Clean parts without using solvents whenever possible, or use water-based solvents for cleaning.

Recycle used motor oil, diesel oil, and other vehicle fluids and parts whenever possible.

**Operational Protocols**

**General**
- Move maintenance and repair activities indoors whenever feasible.
- Place curbs around the immediate boundaries of process equipment.

**Good Housekeeping**
- Store idle equipment under cover.
- Use a vehicle maintenance area designed to prevent stormwater pollution - minimize contact of stormwater with outside operations through berming and appropriate drainage routing.
- Avoid hosing down your work areas. If work areas are washed, collect and direct wash water to sanitary sewer. Use dry sweeping if possible.
- Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.
- Post signs at sinks to remind employees not to pour wastes down drains.
- Clean yard storm drain inlets(s) regularly and especially after large storms.
- Do not pour materials down storm drains.
- Cover the work area to limit exposure to rain.
- Place curbs around the immediate boundaries of process equipment.
- Build a shed or temporary roof over areas where parked cars await repair or salvage, especially wrecked vehicles. Build a roof over vehicles kept for parts.

**Preventive Maintenance and Repair Activities**
- Provide a designated area for vehicle maintenance.
- Inspect vehicles and equipment for leaks regularly and repair immediately.
- Make sure incoming vehicles are checked for leaking oil and fluids. Do not allow leaking vehicles or equipment on-site without correcting the source of the leak and cleaning up any spill.
- Keep equipment clean; don’t allow excessive build-up of oil and grease.
Perform all vehicle fluid removal or changing inside or under cover if possible to prevent the run-on of stormwater and the runoff of spills.

Use a tarp, ground cloth, or drip pans beneath the vehicle or equipment to capture all spills and drips if temporary work is being conducted outside. Collected drips and spills must be disposed, reused, or recycled properly.

It is important to sweep the maintenance area weekly, if it is paved, to collect loose particles, and wipe up spills with rags and other absorbent material immediately. Do not hose down the area to a storm drain.

Establish standard procedures to prevent spillage/leakage of fluids including:

- Keep a drip pan under the vehicle while you unclip hoses, unscrew filters, or remove other parts. Use a drip pan under any vehicle that might leak while working on it to keep splatters or drips off the shop floor.

- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.

- Keep drip pans or containers under vehicles or equipment that may drip during repairs.

- Do not change motor oil or perform equipment maintenance in non-appropriate areas.

Drain oil and other fluids first if the vehicle or equipment is to be stored outdoors. Elevate and tarp stored vehicles and equipment.

Monitor parked vehicles closely for leaks. Pans should be placed under any leaks to collect the fluids for proper disposal or recycling.

Mechanics should clean vehicle parts without using liquid cleaners wherever possible to reduce waste.

Steam cleaning and pressure washing may be used instead of solvent parts cleaning. The wastewater generated from steam cleaning must be discharged to an on-site oil water separator that is connected to a sanitary sewer or blind sump. Non-caustic detergents should be used instead of caustic cleaning agents, detergent-based or water-based cleaning systems in place of organic solvent degreasers, and non-chlorinated solvent in place of chlorinated organic solvents for parts cleaning. Refer to SC21 for more information on steam cleaning.

Fifth-wheel bearings on trucks require routine lubrication. Typically chassis grease is applied to the fifth-wheel bearing at rates that result in grease dripping off of the bearing into the environment. To address this concern the following options are available:

- Use specialized lubricants with good adhesion (e.g., stay in place) properties. Carefully follow manufacturer's label regarding the use of adhesive lubricant for
truck fifth-wheels. Typically this means applying no more than 8 oz. of grease. No visible extrusion of lubricant from the fifth-wheel bearing when truck and trailer are connected should be present.

☑ Use on-board truck or on-board trailer automatic lubrication systems. If these systems apply lube thinner than National Grease Lubrication Institute #2, equipment for collection of used lubricant is needed to prevent excess lubricant from dripping off the truck.

☑ Use plastic or Teflon plates instead of grease or other lubricants. Carefully follow manufacturer’s instructions for installation and operation.

☐ Use one of the following for lubricating vehicle-trailer coupling:

☑ Specialized adhesive lubricants;

☑ Grease-free fifth wheel slip plates (e.g., plastic or Teflon coatings); and

☑ On-Board automatic lubricating systems.

**Spill and Leak Prevention and Response Procedures**

☐ Keep your spill prevention and control plan up-to-date.

☐ Place an adequate stockpile of spill cleanup materials where it will be readily accessible.

☐ Clean leaks, drips, and other spills with as little water as possible. Use rags for small spills, a damp mop for general cleanup, and dry absorbent material for larger spills. Use the following three-step method for cleaning floors:

☑ Clean spills with rags or other absorbent materials;

☑ Sweep floor using dry absorbent material; and

☑ Mop the floor.

Mop water may be discharged to the sanitary sewer via a toilet or sink.

☐ Remove the adsorbent materials promptly and dispose of properly when using adsorbent materials on small spills.

**Material Handling and Waste Management**

☐ Designate a special area to drain and replace motor oil, coolant, and other fluids, where there are no connections to the storm drain or the sanitary sewer, and drips and spills can be easily cleaned up.

☐ Drain all fluids immediately from wrecked vehicles. Ensure that the drain pan or drip pan is large enough to contain drained fluids (e.g., larger pans are needed to contain antifreeze, which may gush from some vehicles).
Vehicle and Equipment Repair

- Do not pour liquid waste to floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.
- Do not put used or leftover cleaning solutions, solvents, and automotive fluids and in the sanitary sewer.
- Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.
- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
- Place oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal since municipalities prohibit or discourage disposal of these items in solid waste facilities.
- Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters. Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater.
- Store cracked batteries in a non-leaking secondary container and dispose of properly at recycling or household hazardous waste facilities.

**Employee Training Program**

- Train employees and contractors in the proper handling and disposal of engine fluids and waste materials.
- Employees should have the tools and knowledge to immediately begin cleaning up a spill should one occur.
- Conduct annual training to ensure that employees are familiar with the facility’s spill control plan and/or proper spill cleanup procedures (You can use reusable cloth rags to clean up small drips and spills instead of disposables; these can be washed by a permitted industrial laundry. Do not clean them at home or at a coin-operated laundry business).
- Use a training log or similar method to document training.

**Quality Assurance and Recordkeeping**

- Keep accurate maintenance logs to evaluate materials removed and improvements made.
- Establish procedures to collect and file maintenance logs in the central office.
Other Facility-Specific Considerations

Parts Cleaning

Vehicle and equipment maintenance facilities often must clean parts as part of day-to-day operations. The following activities should be considered:

- Clean vehicle parts without using liquid cleaners wherever possible to reduce waste.
- Steam cleaning and pressure washing may be used instead of solvent parts cleaning.
- Wastewater generated from steam cleaning must be discharged to an on-site oil water separator that is connected to a sanitary sewer or blind sump.
- Use non-caustic detergents instead of caustic cleaning agents, detergent-based or water-based cleaning systems in place of organic solvent degreasers, and non-chlorinated solvent in place of chlorinated organic solvents for parts cleaning. Refer to SC21 for more information on steam cleaning.

Potential Limitations and Work-Arounds

- Some facilities may have space constraints and time limitations that may preclude all work from being conducted indoors.
  - Designate specific areas for outdoor activities.
  - Require employees to understand and follow preventive maintenance and spill and leak prevention BMPs.
- It may not be possible to contain and clean up spills from vehicles/equipment brought on-site after working hours.
  - Provide a designated area for afterhours deliveries.
  - Install spill kits.
- Drain pans (usually 1 ft. x 1 ft.) are generally too small to contain antifreeze
  - Purchase or fabricate large drip pans (3 ft. x 3 ft.) with sufficient volume to contain expected quantities of liquids based on equipment/vehicle specifications.
- Dry floor cleaning methods may not be sufficient for some spills.
  - Use three-step method instead.
- Identification of engine leaks may require some use of solvents.
  - Minimize the use of solvents and use drip pans to collect spills and leaks.
- Prices for recycled materials and fluids may be higher than those of non-recycled materials.
Some facilities may be limited by a lack of providers of recycled materials, and by the absence of businesses to provide services such as hazardous waste removal, structural treatment practice maintenance, or solvent equipment and solvent recycling.

### Potential Facilities and Maintenance Requirements

#### Facilities Requirements

- For facilities that already have covered areas where maintenance takes place, have berms or other means to retain spills and leaks, and have other appropriate constructed systems for containment, there may not need to be any significant new capital investment. Capital costs will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

#### Maintenance Requirements

- Most of the operations and maintenance activity associated with implementing this BMP are integrally linked to routine operations as previously described. Therefore, significant additional operations and maintenance efforts are not likely to be required.

- For facilities responsible for pre-treating their wastewater prior to discharging, the proper functioning of structural treatment system is an important maintenance consideration. Routine cleanout of oil and grease is required for the devices to maintain their effectiveness, usually at least once a month. During periods of heavy rainfall, cleanout is required more often to ensure pollutants are not washed through the trap. Sediment removal is also required on a regular basis to keep the device working efficiently.

- It is important to sweep the maintenance area weekly, if it is paved, to collect loose particles, and wipe up spills with rags and other absorbent material immediately. Do not hose down the area to a storm drain.

### Supplemental Information

#### Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, 1,1,1-trichloroethane or methylene chloride. Many of these cleaners are harmful and must be disposed of as a hazardous waste. Cleaning without using liquid cleaners (e.g., wire brush) whenever possible reduces waste. Prevent spills and drips of solvents and cleansers to the shop floor. Do all liquid cleaning at a centralized station so the solvents and residues stay in one area. Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for reuse. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents.

- Clean parts without using liquid cleaners whenever possible to reduce waste.

- Prevent spills and drips of solvents and cleansers to the shop floor.
Do all liquid cleaning at a centralized station so the solvents and residues stay in one area.

Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for reuse.

**Recycling**
Separating wastes allows for easier recycling and may reduce treatment costs. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents (e.g., 1,1,1-trichloroethane) separate from non-chlorinated solvents (e.g., kerosene and mineral spirits).

Many products made of recycled (i.e., refined or purified) materials are available. Engine oil, transmission fluid, antifreeze, and hydraulic fluid are available in recycled form. Buying recycled products supports the market for recycled materials.

Recycling is always preferable to disposal of unwanted materials.

Separate wastes for easier recycling. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents separate from non-chlorinated solvents.

Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries).

Purchase recycled products to support the market for recycled materials.

**Safer Alternatives**
If possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous material:

Use non-caustic detergents instead of caustic cleaning for parts cleaning.

Use detergent-based or water-based cleaning systems in place of organic solvent degreasers. Wash water may require treatment before it can be discharged to the sewer.

Replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check list of active ingredients to see whether it contains chlorinated solvents.

Choose cleaning agents that can be recycled.

**References and Resources**


Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp-w2k.com/.


Outdoor Loading/Unloading

Description
The loading/unloading of materials usually takes place outside on docks or terminals; therefore, materials spilled, leaked, or lost during loading/unloading may collect in the soil or on other surfaces and have the potential to be carried away by wind, stormwater runoff or when the area is cleaned. Additionally, rainfall may wash pollutants from machinery used to unload or move materials. Implementation of the following protocols will prevent or reduce the discharge of pollutants to stormwater from outdoor loading/unloading of materials.

Approach
Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols
- Park tank trucks or delivery vehicles in designated areas so that spills or leaks can be contained.
- Limit exposure of material to rainfall whenever possible.
- Prevent stormwater run-on.
- Check equipment regularly for leaks.

Good Housekeeping
- Develop an operations plan that describes procedures for loading and/or unloading.
- Conduct loading and unloading in dry weather if possible.

Objectives
- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents
- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Minimum BMPs Covered
- Good Housekeeping
- Preventative Maintenance
- Spill and Leak Prevention and Response
- Material Handling & Waste Management
- Erosion and Sediment Controls
- Employee Training Program
- Quality Assurance Record Keeping
Cover designated loading/unloading areas to reduce exposure of materials to rain.

Consider placing a seal or door skirt between delivery vehicles and building to prevent exposure to rain.

Design loading/unloading area to prevent stormwater run-on, which would include grading or berming the area, and position roof downspouts so they direct stormwater away from the loading/unloading areas.

Have employees load and unload all materials and equipment in covered areas such as building overhangs at loading docks if feasible.

Load/unload only at designated loading areas.

Use drip pans underneath hose and pipe connections and other leak-prone spots during liquid transfer operations, and when making and breaking connections. Several drip pans should be stored in a covered location near the liquid transfer area so that they are always available, yet protected from precipitation when not in use. Drip pans can be made specifically for railroad tracks. Drip pans must be cleaned periodically, and drip collected materials must be disposed of properly.

Pave loading areas with concrete instead of asphalt.

Avoid placing storm drains inlets in the area.

Grade and/or berm the loading/unloading area with drainage to sump; regularly remove materials accumulated in sump.

**Spill Response and Prevention Procedures**

Keep your spill prevention and control plan up-to-date or have an emergency spill cleanup plan readily available, as applicable.

Contain leaks during transfer.

Store and maintain appropriate spill cleanup materials in a location that is readily accessible and known to all employees.

Ensure that employees are familiar with the site’s spill control plan and proper spill cleanup procedures.

Use drip pans or comparable devices when transferring oils, solvents, and paints.

**Material Handling and Waste Management**

Spot clean leaks and drips routinely to prevent runoff of spillage.

Do not pour liquid wastes into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.
Outdoor Loading/Unloading

□ Do not put used or leftover cleaning solutions, solvents, and automotive fluids in the storm drain or sanitary sewer.

□ Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.

□ Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.

□ Minimize the possibility of stormwater pollution from outside 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 stormwater.
  ✓ Install a roof over the waste receptacle area.
  ✓ Install a low containment berm around the waste receptacle area.
  ✓ Use and maintain drip pans under waste receptacles.

□ Post “no littering” signs.

□ Perform work area clean-up and dry sweep after daily operations.

**Employee Training Program**

□ Train employees (e.g., fork lift operators) and contractors on proper spill containment and cleanup.

□ Have employees trained in spill containment and cleanup present during loading/unloading.

□ Train employees in proper handling techniques during liquid transfers to avoid spills.

□ Make sure forklift operators are properly trained on loading and unloading procedures.

**Quality Assurance and Record Keeping**

□ Keep accurate maintenance logs that document activities performed, quantities of materials removed, and improvement actions.

□ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.

□ Establish procedures to complete logs and file them in the central office.

□ Keep accurate logs of daily clean-up operations.
Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended “work-arounds.”

- Space and time limitations may preclude all transfers from being performed indoors or under cover.
  - Designate specific areas for outdoor loading and unloading.
  - Require employees to understand and follow spill and leak prevention BMPs.
- It may not be possible to conduct transfers only during dry weather.
  - Limit materials and equipment rainfall exposure to all extents practicable.
  - Require employees to understand and follow spill and leak prevention BMPs.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

Many facilities will already have indoor or covered areas where loading/unloading takes place and will require no additional capital expenditures.

If outdoor activities are required, construction of berms or other means to retain spills and leaks may require appropriate constructed systems for containment. These containment areas may require significant new capital investment.

Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

Maintenance

Most of the operations and maintenance activities associated with implementing this BMP are integrally linked to routine operations as previously described. Therefore additional O&M is not required.

- Conduct regular inspections and make repairs and improvements as necessary.
- Check loading and unloading equipment regularly for leaks.
- Conduct regular broom dry-sweeping of area. Do not wash with water.

Supplemental Information

Loading and Unloading of Liquids

- Loading or unloading of liquids should occur in the manufacturing building so that any spills that are not completely retained can be discharged to the sanitary sewer,
treatment plant, or treated in a manner consistent with local sewer authorities and permit requirements.

For loading and unloading tank trucks to above and below ground storage tanks, the following procedures should be used:

- The area where the transfer takes place should be paved. If the liquid is reactive with the asphalt, Portland cement should be used to pave the area.
- The transfer area should be designed to prevent run-on of stormwater from adjacent areas. Sloping the pad and using a curb, like a speed bump, around the uphill side of the transfer area should reduce run-on.
- The transfer area should be designed to prevent runoff of spilled liquids from the area. Sloping the area to a drain should prevent runoff. The drain should be connected to a dead-end sump or to the sanitary sewer. A positive control valve should be installed on the drain.

For transfer from rail cars to storage tanks that must occur outside, use the following procedures:

- Drip pans should be placed at locations where spillage may occur, such as hose connections, hose reels, and filler nozzles. Use drip pans when making and breaking connections.
- Drip pan systems should be installed between the rails to collect spillage from tank cars.

**References and Resources**


Description
Accidental releases of materials from above ground liquid storage tanks, drums, and dumpsters present the potential for contaminating stormwater with many different pollutants. Tanks may store many potential stormwater runoff pollutants, such as gasoline, aviation gas, diesel fuel, kerosene, oils, greases, lubricants and other distilled, blended and refined products derived from crude petroleum. Materials spilled, leaked, or lost from storage tanks may accumulate in soils or on other surfaces and be carried away by rainfall runoff. These source controls apply to containers located outside of a building used to temporarily store liquid materials and include installing safeguards against accidental releases, installing secondary containment, conducting regular inspections, and training employees in standard operating procedures and spill cleanup techniques.

Approach
**General Pollution Prevention Protocols**
- Educate employees about pollution prevention measures and goals.
- Keep an accurate, up-to-date inventory of the materials delivered and stored on-site.
- Try to keep chemicals in their original containers, and keep them well labeled.
- Develop an operations plan that describes procedures for loading and/or unloading. Refer to SC-30 Outdoor Loading/Unloading of Materials for more detailed BMP information pertaining to loading and unloading of liquids.
- Protect materials from rainfall, run-on, runoff, and wind dispersal:
  - Cover the storage area with a roof.

**Objectives**
- Cover
- Contain
- Educate
- Reduce/Minimize

**Targeted Constituents**
- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

**Minimum BMPs Covered**
- Good Housekeeping
- Preventative Maintenance
- Spill and Leak Prevention and Response
- Material Handling & Waste Management
- Erosion and Sediment Controls
- Employee Training Program
- Quality Assurance Record Keeping
Minimize stormwater run-on by enclosing the area or building a berm around it.

Use a walled structure for storage of liquid containers.

Use only watertight containers and keep the lids closed.

Employ safeguards against accidental releases:

- Provide overflow protection devices to warn operator or automatic shutdown transfer pumps.
- Provide protection guards (bollards) around tanks and piping to prevent damage from a vehicle or forklift.
- Provide clear tagging or labeling, and restrict access to valves to reduce human error.
- Berm or surround tank or container with secondary containment system, including dikes, liners, vaults, or double walled tanks.
- Be aware and ready to address the fact that some municipalities require secondary containment areas to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.
- Contact the appropriate regulatory agency regarding environmental compliance for facilities with “spill ponds” designed to intercept, treat, and/or divert spills.
- Have registered and specifically trained professional engineers identify and correct potential problems such as loose fittings, poor welding, and improper or poorly fitted gaskets for newly installed tank systems.

Use MSDSs to ID hazardous components and keep incompatible products apart and to list/have available appropriate PPE and clean-up products.

Good Housekeeping

- Provide storage tank piping located below product level with a shut-off valve at the tank; ideally this valve should be an automatic shear valve with the shut-off located inside the tank.
- Provide barriers such as posts or guardrails, where tanks are exposed, to prevent collision damage with vehicles.
- Provide secure storage to prevent vandalism-caused contamination.
- Place tight-fitting lids on containers.
Outdoor Liquid Container Storage

- Enclose or cover the containers where they are stored.
- Raise the containers off the ground by use of pallet or similar method, with provisions for spill control.
- Do not store liquid containers near the storm drainage system or surface waters.
- Sweep and clean the storage area regularly if it is paved, do not hose down the area to a storm drain.

**Preventative Maintenance**

- Inspect storage areas regularly for leaks or spills.
- Conduct routine inspections and check for external corrosion of material containers. Also check for structural failure, spills and overfills due to operator error, failure of piping system.
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.
- Visually inspect new tank or container installations for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Replace containers that are leaking, corroded, or otherwise deteriorating with ones in good condition. If the liquid chemicals are corrosive, containers made of compatible materials must be used instead of metal drums.
- New or secondary containers must be labeled with the product name and hazards.

**Spill Response and Prevention Procedures**

- Keep your spill prevention and control plan up-to-date.
- Maintain an adequate stockpile of spill cleanup materials at locations where it will be readily accessible.
- Have an emergency plan, equipment, and trained personnel ready at all times to deal immediately with major spills.
- Collect spilled liquids and properly dispose of them.
- Remove the adsorbent materials promptly and dispose of properly when using adsorbent materials on small spills.
- Have employees trained in emergency spill cleanup procedures present when dangerous waste, liquid chemicals, or other wastes are delivered.
Prevent operator errors by using engineering safeguards and thus reducing accidental releases of pollutants.

**Material Handling and Waste Management**

- Contain the material in such a manner that if the container leaks or spills, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters or groundwater.

- Place drip pans or absorbent materials beneath mounted container taps, and at potential drip and spill locations during filling and unloading of containers. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.

- Ensure that any underground or aboveground storage tanks are designed and managed in accordance with applicable regulations, identified as a potential pollution source, and have secondary containment such as a berm or dike with an impervious surface.

- Do not pour liquids into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.

- Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.

- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.

**Employee Training Program**

- Train employee (e.g., fork lift operators) and contractors in proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur.

- Train employees in proper spill response and prevention, materials handling, and waste management.

- Use a training log or similar method to document training.

**Quality Assurance and Record Keeping**

- Keep accurate maintenance/inspection logs that document minimum BMP activities performed for liquid container storage and improvement actions.

- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.

- Establish procedures to complete logs and file them in the central office.

**Other Facility-Specific Considerations**

- Storage sheds often must meet building and fire code requirements.
The local fire district must be consulted for limitations on clearance of roof covers over containers used to store flammable materials.

All specific standards set by Federal and State laws concerning the storage of oil and hazardous materials must be met.

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code.

Storage of oil and hazardous materials must meet specific Federal and State standards including:

- Spill Prevention Control and Countermeasure Plan (SPCC) Plan;
- Secondary containment;
- Integrity and leak detection monitoring; and
- Emergency preparedness plans.

**Potential Capital Facility Costs and Operation & Maintenance Requirements**

**Facilities**

- Capital investments such as sheds, covers, dikes, and curbs will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

**Maintenance**

- Most of the operations and maintenance activities associated with implementing this BMP are integrally linked to routine operations as previously described. Therefore additional O&M is not required.

- Conduct regular inspections and make repairs and improvements as necessary.

- Conduct regular broom dry-sweeping of area. Do not wash with water.

**Supplemental Information**

The most common causes of unintentional releases are:

- Installation problems;
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves);
- External corrosion and structural failure;
- Spills and overfills due to operator error; and
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa.
Aboveground Tank Leak and Spill Control

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be paved with Portland cement concrete, free of cracks and gaps, and impervious in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10% of the volume of the containers or 110% of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- Other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine weekly inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanger, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.
- Inspect new tank or container installation visually for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Frequently release accumulated stormwater during the wet season.
- Have periodic integrity testing conducted by a qualified professional.
Dikes

One of the best protective measures against contamination of stormwater is the use of dikes. Containment dikes are berms or retaining walls that are designed to hold spills. Use of dikes is an effective pollution prevention measure for above ground storage tanks and railcar or tank truck loading and unloading areas. The dike surrounds the area of concern and holds the spill, keeping spill materials separated from the stormwater side of the dike area. Diking can be used in any industrial or municipal facility, but it is most commonly used for controlling large spills or releases from liquid storage areas and liquid transfer areas.

- For single-wall tanks, containment dikes should be large enough to hold the contents of the storage tank for the facility plus rain water.
- For trucks, diked areas should be capable of holding an amount equal to the volume of the tank truck compartment. Diked construction material should be strong enough to safely hold spilled materials.
- Dike materials can consist of earth, concrete, synthetic materials, metal, or other impervious materials.
- Strong acids or bases may react with metal containers, concrete, and some plastics.
- Where strong acids or bases or stored, alternative dike materials should be considered. More active organic chemicals may need certain special liners for dikes.
- Dikes may also be designed with impermeable materials to increase containment capabilities.
- Dikes should be inspected during or after significant storms or spills to check for washouts or overflows.
- Regular checks of containment dikes to insure the dikes are capable of holding spills should be conducted.
- Inability of a structure to retain stormwater, dike erosion, soggy areas, or changes in vegetation indicate problems with dike structures. Damaged areas should be patched and stabilized immediately.
- Earthen dikes may require special maintenance of vegetation such as mulching and irrigation.
- Remove accumulated stormwater after precipitation events and dispose of according to local regulations.

Curbing

Curbing is a barrier that surrounds an area of concern. Curbing is similar to containment diking in the way that it prevents spills and leaks from being released into the environment. Curbing is usually small scaled and does not contain large spills to the degree that dikes can. Curbing is common at many facilities in small areas where
handling and transfer of liquid materials occur. Curbing can redirect contaminated stormwater away from the storage area. It is useful in areas where liquid materials are transferred from one container to another. Asphalt is a common material used for curbing; however, curbing materials can include earth, concrete, synthetic materials, metal, or other impenetrable materials.

- Spilled materials should be removed immediately from curbed areas to allow space for future spills.
- Curbs should have manually-controlled pump systems rather than common drainage systems for collection of spilled materials.
- The curbed area should be inspected regularly to clear clogging debris.
- Maintenance should also be conducted frequently to prevent overflow of any spilled materials as curbed areas are designed only for smaller spills.
- Remove accumulated stormwater after precipitation events and dispose of according to local regulations.
- Curbing has the following advantages:
  - Excellent run-on control;
  - Inexpensive;
  - Ease of installment;
  - Provides option to recycle materials spilled in curb areas; and
  - Common industry practice.

References and Resources


Description
Outside process equipment operations and maintenance can contaminate stormwater runoff. Activities, such as grinding, painting, coating, sanding, degreasing or parts cleaning, landfills and waste piles, and solid waste treatment and disposal are examples of process operations that can lead to contamination of stormwater runoff. The targeted constituents will vary for each site depending on the operation being performed.

Approach
Implement source control BMPs to limit exposure of outdoor equipment to direct precipitation and stormwater run-on. Refer to SC-22 Vehicle and Equipment Repair for additional information.

General Pollution Prevention Protocols
- Perform the activity during dry periods whenever possible.
- Install secondary containment measures where leaks and spills may occur.
- Use non-toxic chemicals for maintenance and minimize or eliminate the use of solvents.
- Connect process equipment area to public sanitary sewer or facility wastewater treatment system when possible. Some jurisdictions require that secondary containment areas be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

Good Housekeeping
- Manage materials and waste properly (see Material Handling and Waste Management) to reduce adverse impacts on stormwater quality.

Objectives
- Cover
- Contain
- Educate
- Reduce/Minimize

Targeted Constituents
- Sediment ✓
- Nutrients ✓
- Trash ✓
- Metals ✓
- Bacteria ✓
- Oil and Grease ✓
- Organics ✓

Minimum BMPs Covered
- Good Housekeeping ✓
- Preventative Maintenance ✓
- Spill and Leak Prevention and Response ✓
- Material Handling & Waste Management ✓
- Erosion and Sediment Controls ✓
- Employee Training Program ✓
- Quality Assurance Record Keeping ✓
Outdoor Equipment Operations  SC-32

- Cover the work area with a permanent roof if possible.
- Use drop cloths for sanding and painting operations.
- Use a vacuum for fine particle clean-up in pavement cracks and crevices.
- Minimize contact of stormwater with outside process equipment operations through berming and drainage routing (run-on prevention).
- "Spot clean" leaks and drips routinely. Leaks are not cleaned up until the absorbent is picked up and disposed of properly.
- Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.
- Use roll down or permanent walls when windy/breezy to prevent wind transport of particulates/pollutants.

Preventative Maintenance

- Design outdoor equipment areas to prevent stormwater runoff and spills. Use a perimeter drain or slope pavement inward with drainage to sump.
- Dry clean the work area regularly. Do not wash outdoor equipment with water if there is a direct connection to the storm drain.
- Pave area with concrete rather than asphalt.
- Inspect outdoor equipment regularly for leaks or spills. Also check for structural failure, spills and overfills due to operator error, and/or failure of piping system.
- Inspect and clean, if necessary, storm drain inlets and catch basins within the outdoor equipment area before October 1 each year.

Spill Response and Prevention Procedures

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Have employees trained in emergency spill cleanup procedures present when dangerous waste, liquid chemicals, or other wastes are delivered.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Prevent operator errors by using engineering safe guards and thus reducing accidental releases of pollutant.

Material Handling and Waste Management
Outdoor Equipment Operations  SC-32

- Do not pour liquid wastes into floor drains, sinks, outdoor storm drain inlets, or other storm drain or sewer connections.

- Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.

- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.

- Minimize the possibility of stormwater pollution from outside 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 stormwater.
  - Install a roof over the waste receptacle area.

Employee Training Program

- Educate employees about pollution prevention measures and goals.

- Train employees on proper equipment operation and maintenance procedures.

- Train all employees upon hiring and annually thereafter on proper methods for handling and disposing of waste. Ensure that all employees understand stormwater discharge prohibitions, wastewater discharge requirements, and these best management practices.

- Use a training log or similar method to document training.

- Ensure that employees are familiar with the site’s spill control plan and/or proper spill cleanup procedures.

Quality Assurance and Record Keeping

- Keep accurate maintenance logs that document minimum BMP activities performed for outdoor equipment, types and quantities of materials removed and disposed of, and any improvement actions.

- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.

- Establish procedures to complete logs and file them in the central office.

Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended “work-arounds.”
Providing cover over outdoor equipment may be impractical or cost-prohibitive.

- Operate outdoor equipment only during periods of dry weather.

Regular operations and time limitations may require outdoor activities during wet weather.

- Designate specific areas for outdoor activities.
- Allow time for work area clean-up after each shift.
- Require employees to understand and follow preventive maintenance and spill and leak prevention BMPs.
- Design and install secondary containment and good housekeeping BMPs for outdoor equipment area.

Storage sheds often must meet building and fire code requirements.

**Potential Capital Facility Costs and Operation & Maintenance Requirements**

**Facilities**

- Many facilities will already have indoor covered areas where vehicle and equipment repairs take place and will require no additional capital expenditures.
- If outdoor activities are required, construction of berms or other means to retain spills and leaks may require appropriate constructed systems for containment. These containment areas may require significant new capital investment.
- Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

**Maintenance**

- Most of the operations and maintenance activities associated with implementing this BMP are integrally linked to routine operations as previously described. Therefore additional O&M is not required.
- For facilities responsible for pre-treating their wastewater prior to discharging, the proper functioning of structural treatment system is an important maintenance consideration.
- Routine cleanout of oil and grease is required for the devices to maintain their effectiveness, usually at least once a month. During periods of heavy rainfall, cleanout is required more often to ensure pollutants are not washed through the trap. Sediment removal is also required on a regular basis to keep the device working efficiently.
References and Resources


Santa Clara Valley Urban Runoff Pollution Prevention Program. [http://www.scvurppp-w2k.com/](http://www.scvurppp-w2k.com/)

Outdoor Storage of Raw Materials SC-33

Description
Stockpiles of raw materials, by-products, and finished products exposed to rain and/or runoff can pollute stormwater. Stormwater can become contaminated when materials wash off or dissolve into water due to improper storage and containment. To prevent or reduce the discharge of pollutants to stormwater from raw material delivery and storage, pollution prevention and source control measures must be implemented, such as minimizing the storage of hazardous materials on-site, enclosing or covering materials, storing materials in a designated area, installing secondary containment, conducting regular inspections, preventing stormwater run-on and runoff, and training employees and subcontractors. This fact sheet focuses on source control BMPs for stockpiles of solid materials; if the raw material, by-product, or product is a liquid, more information for outside storage of liquids can be found under SC-31 Outdoor Liquid Container Storage.

Approach
Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

- Emphasize employee education for successful BMP implementation.
- Store materials that could contaminate stormwater inside or under permanent cover. If this is not feasible, then all outside storage areas should be covered with a roof and bermed or enclosed to prevent stormwater contact.
- Elevate and tarp solid materials such as beams, metal, etc.
- Minimize the inventory of raw materials kept outside.

Objectives
- Cover
- Contain
- Educate
- Reduce/Minimize

Targeted Constituents
- Sediment ✓
- Nutrients ✓
- Trash
- Metals ✓
- Bacteria
- Oil and Grease ✓
- Organics ✓

Minimum BMPs Covered
- Good Housekeeping ✓
- Preventative Maintenance ✓
- Spill and Leak Prevention and Response ✓
- Material Handling & Waste Management
- Erosion and Sediment Controls ✓
- Employee Training Program ✓
- Quality Assurance Record Keeping ✓
Outdoor Storage of Raw Materials SC-33

- Keep an accurate, up-to-date inventory of the materials delivered and stored on-site.
- Stormwater runoff that could potentially be contaminated by materials stored outdoors should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.

**Good Housekeeping**

- If raw materials cannot all be stored inside or under permanent cover, prevent exposure to direct precipitation and stormwater run-on by installing a storm-resistant waterproof covering made of polyethylene, polypropylene or hypalon over all materials stored outside. The covers must be in place at all times when work with the stockpiles is not occurring (Applicable to small stockpiles only).

- Implement erosion control practices at the perimeter of the facility site and at any catch basins to prevent erosion of the stockpiled material off-site, if the stockpiles are so large that they cannot feasibly be covered and contained.

- Minimize stormwater run-on by enclosing the area or building a berm around it.

- Keep storage areas clean and dry.

- Slope paved areas in a manner that minimizes pooling of water on the site, particularly with materials that may leach pollutants into stormwater and/or groundwater, such as compost, logs, and wood chips. A minimum slope of 1.5% is recommended.

- Secure drums stored in an area where unauthorized persons may not gain access to prevent accidental spillage, pilferage, or any unauthorized use.

- Install curbing or berms along the perimeter of the area to prevent the run-on of uncontaminated stormwater from adjacent areas as well as runoff of stormwater from the stockpile areas.

- Slope the area inside the curb or berm to a drain with sump. The sump should be equipped with an oil and water separator if applicable for materials stored onsite.

- Do not store materials on top of or directly adjacent to storm drain inlets.

- Cover wood products treated with chromated copper arsenate, ammonical copper zinc arsenate, creosote, or pentachlorophenol with properly secured tarps or store indoors.

**Preventative Maintenance**

- Maintain outdoor storage containers in good condition. Replace leaky or otherwise inadequate containers as necessary.

- Maintain outdoor waterproof covers (e.g., tarps) in good condition and properly secure them to be storm resistant. Replace tarps damaged by UV exposure or wear and tear on a regular basis.
Outdoor Storage of Raw Materials SC-33

- Perform routine inspection of storm drains and sumps and regularly remove accumulated materials.
- Dry clean the work area regularly. Do not wash outdoor material storage areas with water if there is a direct connection to the storm drain.
- Pave outdoor storage areas for liquids such as solvents with concrete rather than asphalt.
- Conduct regular inspections of storage areas so that leaks and spills are detected as soon as possible.
- Routinely inspect berms, curbing, containment, and sediment controls for proper function and repair as necessary.

**Spill and Leak Prevention and Response**

- Keep the facility spill prevention and control plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of hazardous or otherwise dangerous materials.

**Erosion and Sediment Controls**

- Keep materials covered to prevent erosion of stockpiles. This may not be feasible for large stockpiles.
- Install sediment controls such as fiber rolls around the perimeter of stockpiles to prevent transport of raw materials to the storm drain.
- Install drain inlet protection around all inlets to prevent raw materials from entering storm drain.
- Install sediment controls such as silt fence around the perimeter of the site to prevent transport of raw materials to the storm drain or offsite surface waters.

**Employee Training Program**

- Educate employees about pollution prevention measures and goals.
- Train employees how to properly store outdoor raw materials using the source control BMPs described above.
- Use a training log or similar method to document training.
- Ensure that employees are familiar with the site’s spill control plan and/or proper spill cleanup procedures.
Outdoor Storage of Raw Materials SC-33

**Quality Assurance and Record Keeping**

- Keep accurate maintenance logs that document minimum BMP activities performed for outdoor storage of raw materials, types and quantities of materials removed and disposed of, and any improvement actions.

- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.

- Establish procedures to complete logs and file them in the central office.

**Other Facility-Specific Considerations**

- Storage sheds often must meet building and fire code requirements. Storage of reactive, ignitable, or flammable liquids must comply with the Uniform Fire Code and the National Electric Code.

- Some municipalities require that secondary containment areas (regardless of size) be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

- The local fire district must be consulted for limitations on clearance of roof covers over containers used to store flammable materials.

**Potential Limitations and Work-Arounds**

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended “work-arounds”

- Space limitations may preclude storing all materials indoors.
  
  ✓ Implement good housekeeping, preventative maintenance, and erosion and sediment controls as described above.

**Potential Capital Facility Costs and Operation & Maintenance Requirements**

**Facilities**

- Many facilities will already have indoor covered areas where raw materials will be stored and will require no additional capital expenditures.

- If outdoor storage of materials is required, construction of berms or other means to prevent stormwater run-on and runoff may require appropriate constructed systems for containment. These containment areas may require significant new capital investment.

- Purchase and installation of erosion and sediment controls will require additional capital investments, and this amount will vary depending on site characteristics.

- Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.
Maintenance

- Accurate and up-to-date inventories should be kept of all stored materials.
- Berms and curbs may require periodic repair and patching.
- Parking lots or other surfaces near bulk materials storage areas should be swept periodically to remove debris blown or washed from storage areas.
- Sweep paved storage areas regularly for collection and disposal of loose solid materials, do not hose down the area to a storm drain or conveyance ditch.
- Erosion and sediment controls require regular inspection and periodic replacement or reinstallation.

Supplemental Information

Raw Material Containment

Paved areas should be sloped in a manner that minimizes pooling of water on the site, particularly with materials that may leach pollutants into stormwater and/or groundwater, such as compost, logs, and wood chips. A minimum slope of 1.5% is recommended.

- Curbing or berms should be placed along the perimeter of the area to prevent the run-on of uncontaminated stormwater from adjacent areas as well as runoff of stormwater from stockpile areas.
- The storm drainage system should be designed to minimize use of catch basins in the interior of the area as they tend to rapidly fill with manufacturing material.

The area should be sloped to drain stormwater to the perimeter where it can be collected or to internal drainage alleyways where material is not stockpiled.

The “doghouse” design has been used to store small liquid containers. The roof and flooring design prevent contact with direct rain or runoff. The doghouse has two solid structural walls and two canvas covered walls. The flooring is wire mesh about secondary containment.

References and Resources


Outdoor Storage of Raw Materials SC-33


Description

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff. The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, reuse, and recycling; and preventing run-on and runoff.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

☐ Accomplish reduction in the amount of waste generated using the following source controls:
  ✓ Production planning and sequencing;
  ✓ Process or equipment modification;
  ✓ Raw material substitution or elimination;
  ✓ Loss prevention and housekeeping;
  ✓ Waste segregation and separation; and
  ✓ Close loop recycling.

☐ Establish a material tracking system to increase awareness about material usage. This may reduce spills and minimize contamination, thus reducing the amount of waste produced.

☐ Recycle materials whenever possible.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

- Sediment
- Nutrients
- Trash
- Metals ✓
- Bacteria ✓
- Oil and Grease ✓
- Organics ✓

Minimum BMPs Covered

- Good Housekeeping ✓
- Preventative Maintenance ✓
- Spill and Leak Prevention and Response ✓
- Material Handling & Waste Management ✓
- Erosion and Sediment Controls
- Employee Training Program ✓
- Quality Assurance Record Keeping ✓
Use the entire product before disposing of the container.

To the extent possible, store wastes under cover or indoors after ensuring all safety concerns such as fire hazard and ventilation are addressed.

Provide containers for each waste stream at each work station. Allow time after shift to clean area.

**Good Housekeeping**

- Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater run-on and runoff with a berm. The waste containers or piles must be covered except when in use.

- Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.

- Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain. Clean in a designated wash area that drains to a clarifier.

- Transfer waste from damaged containers into safe containers.

- Take special care when loading or unloading wastes to minimize losses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.

- Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.

- Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.

- Stencil or demarcate storm drains on the facility’s property with prohibitive message regarding waste disposal.

- Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene or hypalon.

- If possible, move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

**Preventative Maintenance**

- Prevent stormwater run-on from entering the waste management area by enclosing the area or building a berm around the area.

- Prevent waste materials from directly contacting rain.
Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene or hypalon.

Cover the area with a permanent roof if feasible.

Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.

Check waste containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.

Sweep and clean the waste management area regularly. Use dry methods when possible (e.g., sweeping, vacuuming, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.

Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.

Repair leaking equipment including valves, lines, seals, or pumps promptly.

### Spill Response and Prevention Procedures

- Keep your spill prevention and plan up-to-date.
- Have an emergency plan, equipment and trained personnel ready at all times to deal immediately with major spills.
- Collect all spilled liquids and properly dispose of them.
- Store and maintain appropriate spill cleanup materials in a location known to all near the designated wash area.
- Ensure that vehicles transporting waste have spill prevention equipment that can prevent spills during transport. Spill prevention equipment includes:
  - Vehicles equipped with baffles for liquid waste; and
  - Trucks with sealed gates and spill guards for solid waste.

### Material Handling and Waste Management

#### Litter Control

- Post “No Littering” signs and enforce anti-litter laws.
- Provide a sufficient number of litter receptacles for the facility.
- Clean out and cover litter receptacles frequently to prevent spillage.

#### Waste Collection

- Keep waste collection areas clean.
Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.

Secure solid waste containers; containers must be closed tightly when not in use.

Do not fill waste containers with washout water or any other liquid.

Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc., may not be disposed of in solid waste containers (see chemical/hazardous waste collection section below).

Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal. Affix labels to all waste containers.

Chemical/Hazardous Wastes

Select designated hazardous waste collection areas on-site.

Store hazardous materials and wastes in covered containers and protect them from vandalism.

Place hazardous waste containers in secondary containment.

Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.

Hazardous waste cannot be reused or recycled; it must be disposed of by a licensed hazardous waste hauler.

Employee Training Program

Educate employees about pollution prevention measures and goals.

Train employees how to properly handle and dispose of waste using the source control BMPs described above.

Train employees and subcontractors in proper hazardous waste management.

Use a training log or similar method to document training.

Ensure that employees are familiar with the site’s spill control plan and/or proper spill cleanup procedures.

Quality Assurance and Record Keeping

Keep accurate maintenance logs that document minimum BMP activities performed for waste handling and disposal, types and quantities of waste disposed of, and any improvement actions.

Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
Establish procedures to complete logs and file them in the central office.

**Potential Capital Facility Costs and Operation & Maintenance Requirements**

**Facilities**

- Capital costs will vary substantially depending on the size of the facility and the types of waste handled. Significant capital costs may be associated with reducing wastes by modifying processes or implementing closed-loop recycling.

- Many facilities will already have indoor covered areas where waste materials will be stored and will require no additional capital expenditures for providing cover.

- If outdoor storage of wastes is required, construction of berms or other means to prevent stormwater run-on and runoff may require appropriate constructed systems for containment.

- Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

**Maintenance**

- Check waste containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.

- Sweep and clean the waste management area regularly. Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.

- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.

- Repair leaking equipment including valves, lines, seals, or pumps promptly.

**References and Resources**


**Description**

Promote the use of less harmful products and products that contain little or no TMDL and 303(d) list pollutants. Alternatives exist for most product classes including chemical fertilizers, pesticides, cleaning solutions, janitorial chemicals, automotive and paint products, and consumables (batteries, fluorescent lamps).

**Approach**

Pattern a new program after the many established programs around the state and country. Integrate this best management practice as much as possible with existing programs at your facility.

Develop a comprehensive program based on:

- The “Precautionary Principle,” which is an alternative to the "Risk Assessment" model that says it’s acceptable to use a potentially harmful product until physical evidence of its harmful effects are established and deemed too costly from an environmental or public health perspective. For instance, a risk assessment approach might say it’s acceptable to use a pesticide until there is direct proof of an environmental impact. The Precautionary Principle approach is used to evaluate whether a given product is safe, whether it is really necessary, and whether alternative products would perform just as well.

- Environmentally Preferable Purchasing Program to minimize the purchase of products containing hazardous ingredients used in the facility's custodial services, fleet maintenance, and facility maintenance in favor of using alternate products that pose less risk to employees and to the environment.

- Integrated Pest Management (IPM) or Less-Toxic Pesticide Program, which uses a pest management approach that minimizes the use of toxic chemicals and gets rid of pests.
Safer Alternative Products

by methods that pose a lower risk to employees, the public, and the environment.

- Energy Efficiency Program including no-cost and low-cost energy conservation and efficiency actions that can reduce both energy consumption and electricity bills, along with long-term energy efficiency investments.

Consider the following mechanisms for developing and implementing a comprehensive program:

- Policies
- Procedures
  - Standard operating procedures (SOPs);
  - Purchasing guidelines and procedures; and
  - Bid packages (services and supplies).
- Materials
  - Preferred or approved product and supplier lists;
  - Product and supplier evaluation criteria;
  - Training sessions and manuals; and
  - Fact sheets for employees.

Implement this BMP in conjunction with the Vehicle and Equipment Management fact sheets (SC-20 – SC-22) and SC-41 Building and Grounds Maintenance.

Employee Training Program

- Employees who handle potentially harmful materials should be trained in the use of safer alternatives.

- Purchasing departments should be trained on safer alternative products and encouraged to procure less hazardous materials and products that contain little or no harmful substances or TMDL pollutants.

- Employees and contractors / service providers can both be educated about safer alternatives by using information developed by a number of organizations including the references and resources provided in this fact sheet.

Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended “work-arounds”

- Alternative products may not be available, suitable, or effective in every case.
Minimize use of hazardous/harmful products if no alternative product is available.

**Regulatory Considerations**

This BMP has no regulatory requirements unless local/municipal ordinance applies. Existing regulations already encourage facilities to reduce the use of hazardous materials through incentives such as reduced:

- Specialized equipment storage and handling requirements;
- Storm water runoff sampling requirements;
- Training and licensing requirements; and
- Record keeping and reporting requirements.

**Cost Considerations**

- The primary cost is for staff time to: 1) develop new policies and procedures and 2) educate purchasing departments and employees who handle potentially harmful materials about the availability, procurement, and use of safer alternatives.
- Some alternative products may be slightly more expensive than conventional products.

**Supplemental Information**

The following discussion provides some general information on safer alternatives. More specific information on particular hazardous materials and the available alternatives may be found in the references and resources listed below.

- Automotive products – Less toxic alternatives are not available for many automotive products, especially engine fluids. But there are alternatives to grease lubricants, car polishes, degreasers, and windshield washer solution. Refined motor oil is also available.
- Vehicle/Trailer lubrication – Fifth wheel bearings on trucks require routine lubrication. Adhesive lubricants are available to replace typical chassis grease.
- Cleaners – Vegetables-based or citrus-based soaps are available to replace petroleum-based soaps/detergents.
- Paint products – Water-based paints, wood preservatives, stains, and finishes with low VOC content are available.
- Pesticides – Specific alternative products or methods exist to control most insects, fungi, and weeds.
- Chemical Fertilizers – Compost and soil amendments are natural alternatives.
- Consumables – Manufacturers have either reduced or are in the process of reducing the amount of heavy metals in consumables such as batteries and fluorescent lamps.
All fluorescent lamps contain mercury, however low-mercury containing lamps are now available from most hardware and lighting stores. Fluorescent lamps are also more energy efficient than the average incandescent lamp.

- Janitorial chemicals – Even biodegradable soap can harm fish and wildlife before it biodegrades. Biodegradable does not mean non-toxic. Safer products and procedures are available for floor stripping and cleaning, as well as carpet, glass, metal, and restroom cleaning and disinfecting. Use paper products with post-consumer recycled content and implement electric hand dryers.

**Examples**
There are a number of business and trade associations, and communities with effective programs. Some of the more prominent are listed below in the references and resources section.

**References and Resources**
Note: Many of these references provide alternative products for materials that typically are used inside and disposed to the sanitary sewer as well as alternatives to products that usually end up in the storm drain.

**General Sustainable Practices and Pollution Prevention Including Pollutant-Specific Information**
California Department of Toxic Substances Control,  
http://www.dtsc.ca.gov/PollutionPrevention/GreenTechnology/Index.cfm.


City of Santa Monica Office of Sustainability and Environment,  
http://www.smgov.net/departments/ose/.


City and County of San Francisco, Department of the Environment,  


Sacramento Clean Water Business Partners.  

USEPA. National Pollutant Discharge Elimination System (NPDES) Stormwater Discharges From Industrial Facilities,  

USEPA Region IX Pollution Prevention Program,  

_Metals (mercury, copper)_


  Auto Recycling Project

  Brake Pad Partnership

_Pesticides and Chemical Fertilizers_


_Dioxins_
Contaminated or Erodible Areas SC-40

Description
Areas within an industrial site that are bare of vegetation or are subject to activities that promote the suppression of vegetation are often subject to erosion. In addition, they may or may not be contaminated from past or current activities. If the area is temporarily bare because of construction, see SC-42 Building Repair, Remodeling, and Construction. Sites with excessive erosion or the potential for excessive erosion should consider employing the soil erosion BMPs identified in the Construction BMP Handbook. Note that this fact sheet addresses soils that do not exceed hazardous waste criteria (see Title 22 California Code of Regulations for Hazardous Waste Criteria).

Approach
Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols
Implement erosion and sediment control BMPs to stabilize soils and reduce pollutant discharges from contaminated or erodible surfaces.

Erosion and Sediment Controls
- Preserve natural vegetation whenever possible. See also EC-2 Preservation of Existing Vegetation, in the Construction BMP Handbook.
- Analyze soil conditions.
- Remove contaminated soil and dispose of properly.
- Stabilize loose soils by re-vegetating whenever possible. See also EC-4 Hydroseeding, in the Construction BMP Handbook.

Objectives
- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents
- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Minimum BMPs Covered
- Good Housekeeping
- Preventative Maintenance
- Spill and Leak Prevention and Material Handling & Waste Management
- Erosion and Sediment Controls
- Employee Training Program
- Quality Assurance Record Keeping
Contaminated or Erodible Areas SC-40

- Utilize non-vegetative stabilization methods for areas prone to erosion where vegetative options are not feasible. Examples include:
  - Areas of vehicular or pedestrian traffic such as roads or paths;
  - Arid environments where vegetation would not provide timely ground coverage, or would require excessive irrigation;
  - Rocky substrate, infertile or droughty soils where vegetation would be difficult to establish; and
  - Areas where vegetation will not grow adequately within the construction time frame.

There are several non-vegetative stabilization methods and selection should be based on site-specific conditions. See also EC-16 Non-Vegetative Stabilization, in the Construction BMP Handbook.

- Utilize chemical stabilization when needed. See also EC-5 Soil Binders, in the Construction BMP Handbook.

- Use geosynthetic membranes to control erosion if feasible. See also EC-7 Geotextiles and Mats, in the Construction BMP Handbook.

- Stabilize all roadways, entrances, and exits to sufficiently control discharges of erodible materials from discharging or being tracked off the site. See also TC 1-3 Tracking Control, in the Construction BMP Handbook.

- Implement wind erosion control measures as necessary. See also WE-1 Wind Erosion Control, in the Construction BMP Handbook.

Employee Training Program

- Educate employees about pollution prevention measures and goals.

- Train employees how to properly install and maintain the erosion and sediment source control BMPs described above. Detailed information is provided in the Construction BMP Handbook.

- Use a training log or similar method to document training.

Quality Assurance and Record Keeping

- Keep accurate logs that document actions taken to maintain and improve the effectiveness of the erosion and sediment control BMPs described above.

- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.

- Establish procedures to complete logs and file them in the central office.
Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Many facilities do not have contaminated or erodible areas and will require no additional capital expenditures.

- For sites with contaminated or erodible areas, purchase and installation of erosion and sediment controls will require additional capital investments, and this amount will vary depending on site characteristics and the types of BMPs being implemented.

- Minimize costs by maintaining existing vegetation and limiting site operations on bare soils.

Maintenance

- The erosion and sediment control BMPs described above require periodic inspection and maintenance to remain effective. The cost of these actions will vary depending on site characteristics and the types of BMPs being implemented.

- Irrigation costs may be required to establish and maintain vegetation.

Supplemental Information

Stabilization of Erodible Areas

Preserving stabilized areas minimizes erosion potential, protects water quality, and provides aesthetic benefits. The most effective way to control erosion is to preserve existing vegetation. Preservation of natural vegetation provides a natural buffer zone and an opportunity for infiltration of stormwater and capture of pollutants in the soil matrix. This practice can be used as a permanent source control measure.

Vegetation preservation should be incorporated into the site. Preservation requires good site management to minimize operations on bare soils where vegetation exists. Proper maintenance is important to ensure healthy vegetation that can control erosion. Different species, soil types, and climatic conditions will require different maintenance activities such as mulching, fertilizing, liming, irrigation, pruning and weed and pest control.

The preferred approach is to leave as much native vegetation on-site as possible, thereby reducing or eliminating any erosion problem. However, assuming the site already has contaminated or erodible surface areas, there are four possible courses of action which can be taken:

- The area can be revegetated if it is not in use and therefore not subject to damage from site activities. In as much as the area is already devoid of vegetation, special measures are likely necessary. Lack of vegetation may be due to the lack of water and/or poor soils. The latter can perhaps be solved with fertilization, or the ground may simply be too compacted from prior use. Improving soil conditions may be sufficient to support the recovery of vegetation. Use process wastewater for irrigation if possible, and see the Construction BMP Handbook for further procedures on establishing vegetation.
Box of Tree Logos

Contaminated or Erodible Areas SC-40

- Watering trucks to prevent dust.
- Chemical stabilization can be used as an alternate method in areas where temporary seeding practices cannot be used because of season or climate. It can provide immediate, effective, and inexpensive erosion control. Application rates and procedures recommended by the manufacturer should be followed as closely as possible to prevent the products from forming ponds and creating large areas where moisture cannot penetrate the soil. See also EC-5, Soil Binders, in the Construction BMP Handbook for more information. Advantages of chemical stabilization include:
  - Applied easily to the surface;
  - Stabilizes areas effectively; and
  - Provides immediate protection to soils that are in danger of erosion.
- Contaminated soils should be cleaned up or removed. This requires determination of the level and extent of the contamination. Removal must comply with State and Federal regulations; permits must be acquired and fees paid.
- Non-vegetated stabilization methods are suitable for permanently protecting from erosion by water and wind. Non-vegetated stabilization should only be utilized when vegetation cannot be established due to soil or climactic conditions, or where vegetation may be a potential fire hazard.

Examples of non-vegetative stabilization BMPs are provided below:

- **Decomposed Granite (DG) and Gravel Mulch** are suitable for use in areas where vegetation establishment is difficult, on flat surfaces, trails and pathways, and when used in conjunction with a stabilizer or tackifier, on shallow slopes (i.e., 10:1 [H:V]). DG and gravel can also be used on shallow rocky slopes where vegetation cannot be established for permanent erosion control.

- **Degradable Mulches** can be used to cover and protect soil surfaces from erosion both in temporary and permanent applications. In many cases, the use of mulches by themselves requires routine inspection and re-application. See EC-3 Hydraulic Mulch, EC-6 Straw Mulch, EC-8 Wood Mulch, or EC-14 Compost Blankets of the Construction BMP Handbook for more information.

- **Geotextiles and Mats** can be used as a temporary stand-alone soil stabilization method. Depending on material selection, geotextiles and mats can be a short-term (3 months – 1 year) or long-term (1-2 years) temporary stabilization method. For more information on geotextiles and mats see EC-7 Geotextiles and Mats of the Construction BMP Handbook.

- **Rock Slope Protection** can be used when the slopes are subject to scour or have a high erosion potential, such as slopes adjacent to flowing waterways or slopes subject to overflow from detention facilities (spillways).
Soil Binders can be used for temporary stabilization of stockpiles and disturbed areas not subject to heavy traffic. See EC-5 Soil Binders for more information.

References and Resources


Description
Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach
Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols
- Switch to non-toxic chemicals for maintenance to the maximum extent possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.
- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

Objectives
- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents
- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Minimum BMPs Covered
- Good Housekeeping
- Preventative Maintenance
- Spill and Leak Prevention and Response
- Material Handling & Waste Management
- Erosion and Sediment Controls
- Employee Training Program
- Quality Assurance Record Keeping
□ Clean work areas at the end of each work shift using dry cleaning methods such as sweeping and vacuuming.

**Good Housekeeping**

*Pressure Washing of Buildings, Rooftops, and Other Large Objects*

□ In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.

□ If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.

□ If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

*Landscaping Activities*

□ Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.

□ Use mulch or other erosion control measures on exposed soils. See also SC-40, Contaminated and Erodible Areas, for more information.

*Building Repair, Remodeling, and Construction*

□ Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.

□ Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.

□ Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.

□ Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.

□ Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and
solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.

- Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

**Mowing, Trimming, and Planting**

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.

- Use mulch or other erosion control measures when soils are exposed.

- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.

- Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.

- Use hand weeding where practical.

**Fertilizer and Pesticide Management**

- Do not use pesticides if rain is expected.

- Do not mix or prepare pesticides for application near storm drains.

- Use the minimum amount needed for the job.

- Calibrate fertilizer distributors to avoid excessive application.

- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.

- Apply pesticides only when wind speeds are low.

- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.

- Irrigate slowly to prevent runoff and then only as much as is needed.

- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.

**Inspection**

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.
Building & Grounds Maintenance SC-41

**Spill Response and Prevention Procedures**

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- Clean up spills immediately.

**Material Handling and Waste Management**

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- Dispose of empty pesticide containers according to the instructions on the container label.
- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

**Employee Training Program**

- Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the needs of individual staff.

**Quality Assurance and Record Keeping**

- Keep accurate logs that document maintenance activities performed and minimum BMP measures implemented.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.
Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Additional capital costs are not anticipated for building and grounds maintenance. Implementation of the minimum BMPs described above should be conducted as part of regular site operations.

Maintenance

- Maintenance activities for the BMPs described above will be minimal, and no additional cost is anticipated.

Supplemental Information

Fire Sprinkler Line Flushing

Site fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources


Sacramento Stormwater Management Program. Best Management Practices for Industrial Storm Water Pollution Control. Available online at:


Description
Site modifications are common, particularly at large industrial sites. The activity may vary from minor and normal building repair to major remodeling, or the construction of new facilities. These activities can generate pollutants including solvents, paints, paint and varnish removers, finishing residues, spent thinners, soap cleaners, kerosene, asphalt and concrete materials, adhesive residues, and old asbestos installation. Protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants to stormwater from building repair, remodeling, and minor construction by using soil erosion controls, enclosing or covering building material storage areas, using good housekeeping practices, using safer alternative products, and training employees.

This fact sheet is intended to be used for minor repairs and construction. If major construction is required, the guidelines in the Construction BMP Handbook should be followed.

Approach
The BMP approach is to reduce potential for pollutant discharges through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols
- Recycle residual paints, solvents, lumber, and other materials to the maximum extent practicable.
- Avoid outdoor repairs and construction during periods of wet weather.
- Use safer alternative products to the maximum extent practicable. See also SC-35 Safer Alternative Products for more information.

Objectives
- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents
- Sediment ✓
- Nutrients ✓
- Trash ✓
- Metals ✓
- Bacteria ✓
- Oil and Grease ✓
- Organics ✓

Minimum BMPs Covered
- Good Housekeeping ✓
- Preventative Maintenance
- Spill and Leak Prevention and Response ✓
- Material Handling & Waste Management ✓
- Erosion and Sediment Controls ✓
- Employee Training Program ✓
- Quality Assurance Record Keeping ✓
Buy recycled products to the maximum extent practicable.

Inform on-site contractors of company policy on these matters and include appropriate provisions in their contract to ensure certain proper housekeeping and disposal practices are implemented.

Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids.

Good Housekeeping

Repair & Remodeling

- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep and vacuum the area regularly to remove sediments and small debris.

- Cover raw materials of particular concern that must be left outside, particularly during the rainy season. See also SC-33 Outdoor Storage of Raw Materials for more information.

- Use equipment and tools such as bag sanders to reduce accumulation of debris.

- Limit/prohibit work on windy days; implement roll-down walls or other measures to reduce wind transport of pollutants.

- Do not dump waste liquids down the storm drain.

- Dispose of wash water, sweepings, and sediments properly.

- Store liquid materials properly that are normally used in repair and remodeling such as paints and solvents. See also SC-31 Outdoor Liquid Container Storage for more information.

- Sweep out rain gutters or wash the gutter and trap the particles at the outlet of the downspout. A sock or geofabric placed over the outlet may effectively trap the materials. If the downspout is tight lined, place a temporary plug at the first convenient point in the storm drain and pump out the water with a vactor truck, and clean the catch basin sump where you placed the plug.

- Clean the storm drain system in the immediate vicinity of the construction activity after it is completed. See also SC-44 Drainage System Maintenance for more information.

Painting

- Enclose painting operations consistent with local air quality regulations and OSHA.

- Local air pollution regulations may, in many areas of the state, specify painting procedures which if properly carried out are usually sufficient to protect water quality.

- Develop paint handling procedures for proper use, storage, and disposal of paints.
Transport paint and materials to and from job sites in containers with secure lids and tied down to the transport vehicle.

Test and inspect spray equipment prior to starting to paint. Tighten all hoses and connections and do not overfill paint containers.

Mix paint indoors before using so that any spill will not be exposed to rain. Do so even during dry weather because cleanup of a spill will never be 100 percent effective.

Transfer and load paint and hot thermoplastic away from storm drain inlets.

Do not transfer or load paint near storm drain inlets.

Plug nearby storm drain inlets prior to starting painting and remove plugs when job is complete when there is risk of a spill reaching storm drains.

Cover nearby storm drain inlets prior to starting work if sand blasting is used to remove paint.

Use a ground cloth to collect the chips if painting requires scraping or sand blasting of the existing surface. Dispose of the residue properly.

Cover or enclose painting operations properly to avoid drift.

Clean the application equipment in a sink that is connected to the sanitary sewer if using water based paints.

Capture all cleanup-water and dispose of properly.

Dispose of paints containing lead or tributyl tin and considered a hazardous waste properly.

Store leftover paints if they are to be kept for the next job properly, or dispose properly.

Recycle paint when possible. Dispose of paint at an appropriate household hazardous waste facility.

**Spill Response and Prevention Procedures**

- Keep your spill prevention and control plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Clean up spills immediately.
- Excavate and remove the contaminated (stained) soil if a spill occurs on dirt.

**Material Handling and Waste Management**

- Post “No Littering” signs and enforce anti-litter laws.
Provide a sufficient number of litter receptacles for the facility.

Clean out and cover litter receptacles frequently to prevent spillage.

Keep waste collection areas clean.

Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.

Secure solid waste containers; containers must be closed tightly when not in use.

Do not fill waste containers with washout water or any other liquid.

Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc., may not be disposed of in solid waste containers (see chemical/hazardous waste collection section below).

Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal. Affix labels to all waste containers.

Make sure that hazardous waste is collected, removed, and disposed of properly. See also SC-34, Waste Handling and Disposal for more information.

**Sediment and Erosion Controls**

Limit disturbance to bare soils and preserve natural vegetation whenever possible. See also EC-2, Preservation of Existing Vegetation, in the Construction BMP Handbook.

Stabilize loose soils by re-vegetating whenever possible. See also EC-4 Hydroseeding, in the Construction BMP Handbook.

Utilize non-vegetative stabilization methods for areas prone to erosion where vegetative options are not feasible. Examples include:

✓ Areas of vehicular or pedestrian traffic such as roads or paths;

✓ Arid environments where vegetation would not provide timely ground coverage, or would require excessive irrigation;

✓ Rocky substrate, infertile or droughty soils where vegetation would be difficult to establish; and

✓ Areas where vegetation will not grow adequately within the construction time frame.

There are several non-vegetative stabilization methods and selection should be based on site-specific conditions. See also EC-16 Non-Vegetative Stabilization, in the Construction BMP Handbook.
Utilize chemical stabilization when needed. See also EC-5 Soil Binders, in the Construction BMP Handbook.

Use geosynthetic membranes to control erosion if feasible. See also EC-7 Geotextiles and Mats, in the Construction BMP Handbook.

Stabilize all roadways, entrances, and exits to sufficiently control discharges of erodible materials from discharging or being tracked off the site. See also TC 1-3 Tracking Control, in the Construction BMP Handbook.

Refer to the supplemental information provided below for projects that involve more extensive soil disturbance activities.

**Employee Training Program**

- Educate employees about pollution prevention measures and goals.
- Train employees how to properly implement the source control BMPs described above. Detailed information for Sediment and Erosion Control BMPs is provided in the Construction BMP Handbook.
- Proper education of off-site contractors is often overlooked. The conscientious efforts of well trained employees can be lost by unknowing off-site contractors, so make sure they are well informed about pollutant source control responsibilities.
- Use a training log or similar method to document training.

**Quality Assurance and Record Keeping**

- Keep accurate maintenance logs that document minimum BMP activities performed for building repair and construction, types and quantities of waste disposed of, and any improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

**Potential Limitations and Work-Arounds**

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended “work-arounds.”

- This BMP is for minor construction only. The State’s General Construction Activity Stormwater Permit has more extensive requirements for larger projects that would disturb one or more acres of surface.

  - Refer to the companion “Construction Best Management Practice Handbook” which contains specific guidance and best management practices for larger-scale projects.
Time constraints may require some outdoor repairs and construction during wet weather.

- Require employees to understand and follow good housekeeping and spill and leak prevention BMPs.
- Inspect sediment and erosion control BMPs daily during periods of wet weather and repair or improve BMP implementation as necessary.

Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.

- Minimize use of hazardous materials to the maximum extent practicable.

Be certain that actions to help stormwater quality are consistent with Cal- and Fed-OSHA and air quality regulations.

Prices for recycled/safer alternative materials and fluids may be higher than those of conventional materials.

Potential Capital Facility Costs and Operation & Maintenance Requirements

**Facilities**

- Limited capital investments may be required at some sites if adequate cover and containment facilities do not exist for construction materials and wastes.
- Purchase and installation of erosion and sediment controls, if needed will require additional capital investments, and this amount will vary depending on site characteristics and the types of BMPs being implemented.
- Minimize costs by maintaining existing vegetation and limiting construction operations on bare soils.

**Maintenance**

- The erosion and sediment control BMPs described above require periodic inspection and maintenance to remain effective. The cost of these actions will vary depending on site characteristics and the types of BMPs being implemented.
- Irrigation costs may be required to establish and maintain vegetation.

**Supplemental Information**

**Soil/Erosion Control**

If the work involves exposing large areas of soil, employ the appropriate soil erosion and control techniques. See the Construction Best Management Practice Handbook. If old buildings are being torn down and not replaced in the near future, stabilize the site using measures described in SC-40 Contaminated or Erodible Areas.
If a building is to be placed over an open area with a storm drainage system, make sure the storm inlets within the building are covered or removed, or the storm line is connected to the sanitary sewer. If because of the remodeling a new drainage system is to be installed or the existing system is to be modified, consider installing catch basins as they serve as effective “in-line” treatment devices. Include in the catch basin a “turn-down” elbow or similar device to trap floatables.

**References and Resources**


Parking Area Maintenance

Description
Parking lots can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

BMPs for other outdoor areas on site (loading/unloading, material storage, and equipment operations) are described in SC-30 through SC-33.

Approach
The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols
- Encourage advanced designs and maintenance strategies for impervious parking lots. Refer to the treatment control BMP fact sheets in this manual for additional information.
- Keep accurate maintenance logs to evaluate BMP implementation.

Good Housekeeping
- Keep all parking areas clean and orderly. Remove debris, litter, and sediments in a timely fashion.
- Post “No Littering” signs and enforce anti-litter laws.

Objectives
- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents
- Sediment ✓
- Nutrients
- Trash ✓
- Metals ✓
- Bacteria
- Oil and Grease ✓
- Organics ✓

Minimum BMPs Covered
- Good Housekeeping ✓
- Preventative Maintenance ✓
- Spill and Leak Prevention and Response ✓
- Material Handling & Waste Management
- Erosion and Sediment Controls
- Employee Training Program ✓
- Quality Assurance Record Keeping ✓
Parking Area Maintenance

- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.

**Preventative Maintenance**

**Inspection**
Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.

- Inspect cleaning equipment/sweepers for leaks on a regular basis.

**Surface Cleaning**

- Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- Dispose of parking lot sweeping debris and dirt at a landfill.
- Follow the procedures below if water is used to clean surfaces:
  - Block the storm drain or contain runoff.
  - Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
- Follow the procedures below when cleaning heavy oily deposits:
  - Clean oily spots with absorbent materials.
  - Use a screen or filter fabric over inlet, then wash surfaces.
  - Do not allow discharges to the storm drain.
  - Vacuum/pump discharges to a tank or discharge to sanitary sewer.
  - Dispose of spilled materials and absorbents appropriately.

**Surface Repair**

- Check local ordinance for SUSMP/LID ordinance.
- Preheat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in
place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.

- Use only as much water as necessary for dust control during sweeping to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

**Spill Response and Prevention Procedures**

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

**Employee Training Program**

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Use a training log or similar method to document training.

**Quality Assurance and Record Keeping**

- Keep accurate maintenance logs that document minimum BMP activities performed for parking area maintenance, types and quantities of waste disposed of, and any improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

**Potential Capital Facility Costs and Operation & Maintenance Requirements**

**Facilities**

- Capital investments may be required at some sites to purchase sweeping equipment, train sweeper operators, install oil/water/sand separators, or implement advanced BMPs. These costs can vary significantly depending upon site conditions and the amount of BMPs required.
Maintenance

- Sweep and clean parking lots regularly to minimize pollutant transport into storm drains from stormwater runoff.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Maintain advanced BMPs such as vegetated swales, infiltration trenches, or detention basins as appropriate. Refer to the treatment control fact sheets for more information.

Supplemental Information

Advanced BMPs

Some parking areas may require advanced BMPs to further reduce pollutants in stormwater runoff, and a few examples are listed below. Refer to the Treatment Control Fact Sheets and the New Development and Redevelopment Manual for more information.

- When possible, direct sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.

References and Resources


Description
As a consequence of its function, the stormwater drainage facilities on site convey stormwater that may contain certain pollutants either to the offsite conveyance system that collects and transports urban runoff and stormwater, or directly to receiving waters. The protocols in this fact sheet are intended to reduce pollutants leaving the site to the offsite drainage infrastructure or to receiving waters through proper on-site conveyance system operation and maintenance. The targeted constituents will vary depending on site characteristics and operations.

Approach
Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols
☐ Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins’ sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

☐ Develop and follow a site specific drainage system maintenance plan that describes maintenance locations, methods, required equipment, water sources, sediment collection areas, disposal requirements, and any other pertinent information.

Good Housekeeping
Illicit Connections and Discharges
☐ Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:

Objectives
- Cover
- Contain
- Educate
- Reduce/Minimize

Targeted Constituents
- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Minimum BMPs Covered
- Good Housekeeping
- Preventative Maintenance
- Spill and Leak Prevention and Response
- Material Handling & Waste Management
- Erosion and Sediment Controls
- Employee Training Program
- Quality Assurance Record Keeping
Drainage System Maintenance

- Identify evidence of spills such as paints, discoloring, odors, etc.
- Record locations of apparent illegal discharges/illicit connections.
- Track flows back to potential discharges and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” or similar stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.

- Refer to fact sheet SC-10 Non-Stormwater Discharges for additional information.

**Illegal Dumping**

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.

- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots;
  - Types and quantities (in some cases) of wastes;
  - Patterns in time of occurrence (time of day/night, month, or year);
  - Mode of dumping (abandoned containers, “midnight dumping” from moving vehicles, direct dumping of materials, accidents/spills); and
  - Responsible parties.

- Post “No Dumping” signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.

- Refer to fact sheet SC-10 Non-Stormwater Discharges for additional information.

**Preventative Maintenance**

**Catch Basins/Inlet Structures**

- Staff should regularly inspect facilities to ensure compliance with the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.

Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Prioritize storm drain inlets; clean and repair as needed.

Keep accurate logs of the number of catch basins cleaned.

Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.

Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

**Storm Drain Conveyance System**

Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.

Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

**Pump Stations**

Clean all storm drain pump stations prior to the wet season to remove silt and trash.

Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.

Conduct routine maintenance at each pump station.

Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

**Open Channel**

Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.

Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural state of any river, stream, or lake in California, must enter into a Stream or Lake Alteration Agreement with the Department of Fish and Wildlife. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Army Corps of Engineers and USFWS.

**Spill Response and Prevention Procedures**

Keep your spill prevention control plan up-to-date.
Investigate all reports of spills, leaks, and/or illegal dumping promptly.

Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.

Clean up all spills and leaks using “dry” methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.

**Employee Training Program**

- Educate employees about pollution prevention measures and goals.
- Train employees how to properly handle and dispose of waste using the source control BMPs described above.
- Train employees and subcontractors in proper hazardous waste management.
- Use a training log or similar method to document training.
- Ensure that employees are familiar with the site’s spill control plan and/or proper spill cleanup procedures.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).
  - Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

**Quality Assurance and Record Keeping**

- Keep accurate maintenance logs that document minimum BMP activities performed for drainage system maintenance, types and quantities of waste disposed of, and any improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Keep accurate logs of illicit connections, illicit discharges, and illegal dumping into the storm drain system including how wastes were cleaned up and disposed.
- Establish procedures to complete logs and file them in the central office.

**Potential Limitations and Work-Arounds**

Provided below are typical limitations and recommended “work-arounds” for drainage system maintenance:
Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.

- Perform all maintenance onsite and do not flush accumulated material downstream to private property or riparian habitats.

Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, and liquid/sediment disposal.

- Develop and follow a site specific drainage system maintenance plan that describes maintenance locations, methods, required equipment, water sources, sediment collection areas, disposal requirements, and any other pertinent information.

Regulations may include adoption of substantial penalties for illegal dumping and disposal.

- Do not dump illegal materials anywhere onsite.
- Identify illicit connections, illicit discharge, and illegal dumping.
- Cleanup spills immediately and properly dispose of wastes.

Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the sanitary sewer system.

- Collect all materials and pollutants accumulated in drainage system and dispose of according to local regulations.
- Install debris excluders in areas with a trash TMDL.

**Potential Capital Facility Costs and Operation & Maintenance Requirements**

**Facilities**

- Capital costs will vary substantially depending on the size of the facility and characteristics of the drainage system. Significant capital costs may be associated with purchasing water trucks, vacuum trucks, and any other necessary cleaning equipment or improving the drainage infrastructure to reduce the potential.

- Developing and implementing a site specific drainage system maintenance plan will require additional capital if a similar program is not already in place.
**Maintenance**

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.
- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

**Supplemental Information**

*Storm Drain Flushing*

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing re-suspension and overflow of a portion of the solids during storm events. Flushing prevents “plug flow” discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used if allowed or that fire hydrant line flushing coincide with storm sewer flushing.
References and Resources


Description
This category covers two types of animal care and handling facilities:

- Small animal facilities and facilities in urbanized areas including:
  - Kennels
  - Rescue centers
  - Veterinary facilities
  - Racetracks
- Horse keeping facilities including:
  - Boarding stables
  - Equestrian centers
  - Small farms
  - Suburban horse owners

Typically the second category of facilities will have access to pasture and will often be near or include waterways.

This category does not include concentrated animal feeding operations (CAFO) as defined by USEPA regulations.

Pollutant Sources
The following are sources of pollutants:

- Animal washing
- Feeding / grazing
- Urine / feces and manure deposits
Unpaved or non-vegetated areas

Pollutants can include:
- Coliform bacteria
- Nutrients
- Sediment

**Approach**

Minimize exposure of rain and runoff to animal care and handling areas by using cover and containment. In and around these areas, use good housekeeping to minimize the generation of pollutants. Make stormwater pollution prevention BMPs a part of standard operating procedures and the employee training program.

**Source Control BMPs**

The best management practices are listed by activity or typical areas.

<table>
<thead>
<tr>
<th>Small Animal Facilities and Facilities in Urbanized Areas</th>
<th>□ Regularly sweep and clean animal keeping areas to collect and properly dispose of droppings, uneaten food, and other potential stormwater pollutants.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Do not hose down areas that may contain potential stormwater pollutants into storm drains or to streams or creeks.</td>
</tr>
<tr>
<td></td>
<td>□ Do not allow any wash waters to be discharged to storm drains or to receiving water without proper treatment.</td>
</tr>
<tr>
<td></td>
<td>□ If animals are kept in unpaved and uncovered areas, the ground must either have vegetative cover or some other type of ground cover such as mulch.</td>
</tr>
<tr>
<td></td>
<td>□ If animals are not leashed or in cages, the area where animals are kept must be surrounded by a fence or other means that prevents animals from moving away from the controlled area where BMPs are used.</td>
</tr>
</tbody>
</table>
## Horse Keeping Facilities

### Site Layout Considerations
- Site barns, corrals, manure storage, and other high-use areas on higher ground when possible or on the portion of property that drains away from creeks and channels. Do not site facilities or pasture on land where the slope is 30% or more.
- Locate the following areas at least 50 feet away from creeks, intermittent streams, drains, domestic wells, septic tank or leach field sites:
  - Animal washing
  - Arenas and riding rings
  - Stalls, paddocks, and turnouts
  - Pasture and equestrian courses
  - Land application of manure and compost
- Locate feed storage bins and stockpiles at least 150 feet away from creeks, intermittent streams, drains, domestic wells, and septic tank or leach field sites.
- Separate barnyards, paddocks, and manure storage areas from waterways with vegetated buffers or pasture to act as a natural filter.
- Keep “clean water clean.” Use grassed ditches, berms, or subsurface drains and properly sized roof gutters and downspouts to divert clean runoff around barnyard manure and sediment.
- Divert contaminated runoff from manured areas away from waterways and to low-gradient vegetated buffers.
- Construct or repair trails, arenas, roads, parking areas, ditches, and culverts to drain water but not sediment.
- Use fencing to keep horses away from environmentally sensitive areas and protect stream banks. Keep fencing and gates in good repair at all times.

### Horse Access to Waterways
- Provide animals with other sources of water and shade.
- Design stream crossings to minimize erosion.
- Prevent trampling of streamside vegetation.

### Grazing Management
- Focus on protecting the pasture’s soil and vegetative cover. Prevent bare areas from forming.
- Establish healthy and vigorous pastures with at least 3 inches of leafy material present.
- Subdivide grazing areas into three or more units of equal size, which can be grazed in rotation.
Clip tall weeds and old grass to control weeds and stimulate grass growth.

Rotate animals to clean pasture when grass is grazed down to 3-4 inches.

Let pasture regrow to 8-10 inches before allowing regrazing.

Manage grazing so that a cover of dry residual vegetation protects soil from the first rains.

Keep animals away from wet fields when possible.

During heavy rainfall, consider indoor feeding.

Use manure and soiled bedding sparingly to fertilize pastures and croplands.

Use turnout paddocks as “sacrifice areas” to preserve pastures.

Horse Waste Management

Clean up manure and soiled bedding regularly, especially during wet weather.

After cleanup, during the arid summer, water the areas where horses frequently deposit manure to promote decomposition.

Store horse waste in sturdy, insect-resistant, and seepage-free units that have an impervious surface bottom and a cover to prevent leaching and runoff, such as:

- Plastic garbage cans with lids
- Fly-tight wooden or concrete storage sheds
- Composters
- Pits or trenches lined with an impermeable layer

Do not dump horse waste on the edge or directly into stream channels.

Compost.  Keep compost piles moist, and well aerated to promote decomposition.

Give away composted material to local greenhouses, nurseries and botanical gardens.

Transport manure to topsoil companies or composting centers.

Fertilize pastures, cropland, and lawns with manure and soiled bedding. Do not apply fertilizer just before or during rainstorms.

Chemical Management

Use Integrated Pest Management (IPM) or less-toxic methods for insect and weed control.

Use chemical insecticides and herbicides as a last resort. Always properly store and dispose of chemical pesticides.

Do not let horse wash water drain directly into waterways.
Treatment Control BMPs

If treatment controls are installed at the facility, see Section 4 of this Handbook for information on inspecting and maintaining the BMPs.

For information on designing treatment controls, see Section 5 of the New Development and Redevelopment Planning Handbook.

More Information


References


Description
This category includes facilities that conduct auto body repairs and painting. Information specific to auto dismantling, maintenance, and service stations is provided in other guide sheets.

Pollutant Sources
The following are typical activities these facilities that are potential sources of pollutants:

- Wet and dry sanding
- Painting and application of body fillers
- Washing cars and other vehicles
- Cleaning floors
- Auto body repairs (e.g., welding/brazing)

Pollutants can include:

- Heavy metals (copper, lead, nickel, and especially zinc)
- Hydrocarbons (oil and grease, PAHs)
- Toxic chemicals (solvents, chlorinated compounds)
- Paints

Approach
Minimize exposure of rain and runoff to auto body repair and painting areas by using cover and containment. In and around these areas, use good housekeeping to minimize the generation of pollutants. Make stormwater pollution prevention BMPs a part of standard operating procedures and
the employee training program. Provide employee education materials in the first language of employees, as necessary.

Auto body repair products, such as body filler, primers, paints, and sandpaper often contain significant amounts of zinc. The original paint on a customer’s car may also contain high concentrations of zinc. The following practices should help reduce or eliminate the amount of zinc and other pollutants in wastewater discharges.

**Source Control BMPs**
The best management practices are listed by activity or area.

<table>
<thead>
<tr>
<th>Panel Sanding</th>
<th>Dry Sanding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Conduct all sanding indoors.</td>
</tr>
<tr>
<td></td>
<td>□ Sweep, vacuum, or use other dry cleanup methods routinely to pick up dust from dry sanding of primer, metal, or body filler.</td>
</tr>
<tr>
<td></td>
<td>□ Make extra efforts to thoroughly sweep or vacuum dust prior to mopping.</td>
</tr>
<tr>
<td></td>
<td>□ Use vacuum sanding equipment whenever possible in order to reduce the amount of airborne dust.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wet Sanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Conduct all wet sanding activities indoors.</td>
</tr>
<tr>
<td>□ Do not wet sand in a wash rack or in an area with a floor drain.</td>
</tr>
<tr>
<td>□ Use a spray bottle to wet a small panel area and collect the liquid waste to reduce or eliminate need for a sanding bucket:</td>
</tr>
<tr>
<td>□ Use dent repair tools whenever practical for small dents.</td>
</tr>
<tr>
<td>□ Use vacuum sanding equipment whenever practical (for larger panels) in order to minimize the amount of wastewater.</td>
</tr>
<tr>
<td>□ Place a pan under the car panel being sanded to catch drips. Pour the collected water back into the wet sanding bucket.</td>
</tr>
<tr>
<td>□ Clean up drips or small spills with a rag, or let dry and then sweep or vacuum up the dust.</td>
</tr>
</tbody>
</table>
### Washing Cars

After bodywork is completed, some sanding dust often remains on the vehicle. When the car is washed, the dust can be rinsed off and discharged with the wash water. Therefore, vehicle wash water from an auto body shop is typically contaminated with zinc and/or other metals, and it should not be discharged to the storm drain under any circumstances, or to the sanitary sewer without treatment.

- Remove dust from the vehicle prior to washing. Be sure to check areas where dust might collect, such as the doorjambs, hood, and trunk.
- Try to keep the amount of airborne dust to a minimum.

There are two options for discharge of vehicle wash water:

**Option #1:**
Wash vehicles and discharge the wastewater to the sanitary sewer through a permitted treatment system or recycling unit. An industrial pretreatment discharge permit must be obtained in many jurisdictions for such a sewer discharge.

**Option #2:**
Collect the wash water and dispose of it offsite.

### Cleaning Floors

Sanding dust and wet-sanding drips often end up on the shop floor. If the shop floor is mopped and the mop water is discharged to the sanitary sewer, the mop water alone can cause a violation of local sanitary sewer discharge limits for zinc.

Instead of mopping, sweep the floors.

- If mopping must be done, follow this three-step procedure:
  1. Clean up all drips and spills with rags or other absorbent materials.
  2. Sweep or vacuum to pick up dust. (This should be a frequent routine.)
  3. Finally mop with a minimal amount of water. Do not let water run outside.

- Dispose of the mop water to the sanitary sewer through a drain or permitted treatment system. As an additional precaution, let the mop water settle overnight or longer (in a bucket or settling unit) prior to discharge.
Primers in particular may contain significant amounts of zinc. A review of the Material Safety Data Sheets (MSDS) of primers shows that certain primers contain as much as 40 percent zinc phosphate by volume. It doesn’t take much of these primers reaching the sanitary sewer for a shop to exceed local sanitary sewer discharge limits for zinc.

- Conduct all painting indoors, preferably in a pant booth.
- Review the MSDS of the products used and look for the zinc concentrations listed. Use primers and paints with lower zinc content if they work equally well.
- Have a good working relationship with your vendors. They can be an invaluable source of information about new and versatile (low metal) paints, technologies, and industry trends.
- When cleaning auto body parts before painting, minimize use of hose-off degreasers. Brush off dirt and use rags to wipe down parts. If an acid-based metal cleaner or cleaner/conditioner is used to treat bare metal and rinse water is recommended to stop the chemical reaction, use as little water as possible and wipe down the area with a rag or towel.
- Reduce waste by using low-volume paint mixing equipment and high-efficiency painting tools.
- Minimize waste paint and thinner by carefully calculating paint needs based on surface area and using the proper sprayer cup size.
- Clean spray guns in a self-contained cleaner. The gun-cleaning solution, whether solvent or aqueous-based, should be recycled or disposed of properly when it becomes too dirty to use. Never discharge gun-cleaning solution to the sewer or storm drain.
- Do not use water to control overspray or dust in the paint booth unless it is sure to evaporate in the booth (so the dust can be swept up), or this wastewater is collected. The water should be treated prior to discharge into the sewer system.

### Options for Handling Liquid Sanding Waste

In addition to the potential for wet sanding to cause stormwater pollution, emptying the wet sanding bucket directly into a sink or other sanitary sewer drain is one of the primary causes of body shop wastewater discharge permit violations. Therefore, shops should seriously consider reducing or eliminating the need for a wet sanding bucket. However, if a sanding bucket must be used, there are three options for disposal of the contents:
**Option # 1: Settling**

Up to 80 percent of the zinc in the sanding bucket would settle out if the bucket is simply left to stand undisturbed for 24 - 48 hours. This is the simplest and least costly method of achieving significant zinc reductions – assuming the shop has space for the buckets to be put aside during the workday. Sanding bucket wastewater may also be poured into a settling unit (see next section) prior to discharge to a sump or to the sanitary sewer.

**Step 1:** Remove sponge and sandpaper from water. Wring out the sponge over the bucket.

**Step 2:** Settle out zinc particles in one of two ways:

- **Allow the wet sanding bucket to stand at least overnight – preferably longer – in a place where it will not be disturbed.**
- **Pour contents of the wet sanding bucket into a settling unit.**

Devise a system to let shop employees know how long the bucket has been settling, and that it is not to be disturbed.

**Step 3:** Separate water from sludge:

Carefully bail the clear water from the top of the bucket, or remove the clear water from the settling unit after it has been allowed to sit at least overnight. Avoid any agitation of sludge on the bottom. The clear water on top may be discharged to the sanitary sewer through a drain or permitted treatment system (such a sump or oil/water separator).

**Step 4:** Dispose of sludge:

Dispose of non-hazardous dried sludge in trash. Please note that the California Department of Toxic Substances Control places responsibility on each shop owner for proving that such waste is non-hazardous. If the sludge is hazardous, it must be disposed of appropriately. (Contact the DTSC for more information)

If the settling bucket is uncovered, make sure it is placed in secondary containment.
Option #2: Discharge to a Permitted Treatment System

A shop may elect to route contents of the wet sanding bucket through a treatment system or recycling unit prior to discharging to the sanitary sewer. An industrial pretreatment discharge permit may be required in many jurisdictions for such a sewer discharge.

In addition, the wastewater should first be allowed to settle overnight in the bucket or in a settling unit (see Option #1).

Option #3: Offsite Disposal

A shop may choose to collect and dispose of wet sanding wastewater offsite. This alternative may be attractive to those shops interested in reducing their waste streams or eliminating all wastewater discharges and becoming a “zero-discharger.” There are two possible methods for offsite disposal of wet-sanding bucket wastewater:

   a) Disposal with other collected wastes

   Depending upon the hauler, it may be possible to dispose of the wet-sanding wastewater with waste paint rinse water or waste antifreeze. Check with the local hauler to see if this is acceptable.

   or

   b) Disposal as a hazardous waste

   Wet-sanding wastewater may be collected separately and hauled offsite for disposal as a hazardous waste, either by a licensed waste hauler or through a Very Small Quantity Generator (VSQG) hazardous waste collection program for small businesses.

Simple Settling Units for Wet Sanding and Mop Wastewater

Settling units may be used to remove zinc and other metals from wastewater, generated by activities such as wet sanding and mopping. Even shops with a sump or oil-water separator may find it beneficial to settle out wet sanding and mop wastewater prior to discharge to the separator and/or sanitary sewer. Settling units can range from simple, compact containers to complex treatment systems. Unless the shop has a high volume of wastewater from sanding or mopping, it may want to consider one of the simpler units – since complex treatment systems can be very expensive to purchase, install, and maintain. In fact, the shop may be able to make its own simple settling unit using an empty plastic 30-gallon drum, for example, and a little creativity.

Selecting the Right Unit for the Shop

In choosing or designing a settling unit, several factors should be considered including:

- Potential volume of wastewater and the size of a container that will ensure adequate settling time. In order to determine the appropriate size, the volume of wastewater should be calculated – wet sanding and/or mop water – that is generated each day. The settling unit should be able to contain at least double or triple this daily volume.

- A method for removing the clear wastewater from the unit without disturbing the sludge on the bottom. A valve or spigot should be located no lower than half-way down the side of the unit.
Strategy (method and frequency) for removing sludge from the bottom of the unit. Sludge should be removed on a regular basis, and never allowed to build up higher than ¼ of the container’s height. Remove sludge only after draining off the clear wastewater on top. Sludge can either be removed from the bottom of the settling unit or scooped out by hand from the top. Removal may require a large opening with a secure cap (as sludge may clog a valve or spigot). Some shops use a container with a conical bottom to facilitate both settling and sludge removal.

In addition,

- Identify a location in the shop that is convenient but enough out of the way so that the settling unit will not be disturbed accidentally. The unit may be placed on the ground, or elevated.
- To settle wastewater for longer than overnight, consider a system comprised of several containers used in sequence.

**Multiple Settling Units, In Series**

A sequence of two or more settling containers is one way to increase settling time for the wastewater. For example, some shops construct their own tow-drum units. Wastewater is held in the first drum for 24 hours and allowed to settle; then the clear water on top is drained into the second drum for an additional 24 hours or more of settling prior to discharge to the sanitary sewer. (Be sure to follow sludge-removal precautions detailed in the previous section).

The decision to use a settling unit with a single container versus one with multiple containers may depend partly on the metals concentrations in the wastewater and the time required to allow the metals to settle out to acceptable levels. Also, there must be adequate space in the shop, in a convenient location, where the unit(s) will not be disturbed.

**Testing Settled Wastewater**

After installing a settling unit, be sure to have the settled wastewater tested at least twice to make sure the system allows for enough settling time. Overnight settling may be sufficient for some shops’ wastewater, but others may require 48 or 72 hours of settling in order to comply with local discharge limits. An analytical lab should test the settled wastewater for zinc, nickel, and lead. The results should confirm whether or not enough settling time to ensure that the wastewater is acceptable for discharge.

**Treatment Control BMPs**

If treatment controls are installed at the facility, see Section 4 of this Handbook for information on inspecting and maintaining the BMPs.

For information on designing treatment controls, see Section 5 of the New Development and Redevelopment Planning Handbook.

**More Information**

*Booklets, Checklists, Fact Sheets, and Pamphlets*

California Department of Toxic Control Substances, undated website, *California Green Station Program, Vehicle Service and Repair (VSR)*. Includes fact sheets, training modules, and other resources. Available on-line at https://dtsc.ca.gov/PollutionPrevention/VSR.cfm.


San Diego North County Stormwater Program in conjunction with Los Angeles Stormwater Program. BMP Shop Poster: *Stormwater Protection is in Good Hands, Yours*. Available on-line at: http://www.sdcounty.ca.gov/dpw/watersheds/watershedpdf/automotive_poster.pdf


**References**


Description

This category includes facilities that conduct general maintenance and repair on vehicles including:

- General repair shops
- Radiator repair shops
- Car dealerships
- Car washes
- Fleet maintenance operations

Information specific to: auto dismantling, body repair, and service stations is provided in other guide sheets.

Pollutant Sources

The following are sources of pollutants:

- Changing oil and other fluids
- Cleaning engines and parts
- Flushing radiators
- Washing cars and other vehicles

Pollutants can include:

- Heavy metals (copper, lead, nickel, and zinc)
- Hydrocarbons (oil and grease, PAHs)
- Toxic chemicals (solvents, chlorinated compounds, glycols)
- Acids and alkalis
Approach
Minimize exposure of maintenance areas to rain and runoff by using cover and containment. In and around these areas, use good housekeeping to minimize the generation of pollutants. Make stormwater pollution prevention BMPs a part of standard operating procedures and the employee training program. Provide employee education materials in the first language of employees, as necessary.

Source Control BMPs
The best management practices are listed by activity or area.

<table>
<thead>
<tr>
<th>Changing Oil and Other Fluids</th>
<th>Waste oil, antifreeze, and other vehicle fluids contain toxic chemicals and heavy metals from wear and tear of engine parts. See fact sheet SC-22 - Vehicle and Equipment Maintenance and Repair for other information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Whenever possible, change vehicle fluids indoors and only on floors constructed of non-porous materials. Avoid working over asphalt and dirt floors – surfaces that absorb vehicle fluids.</td>
</tr>
<tr>
<td></td>
<td>□ If vehicle fluids must be removed outdoors, always use a drip pan. Prevent spills from reaching the street or storm drain by working over an absorbent mat and covering nearby storm drains, or working in a bermed area. If necessary, you can use absorbent socks to create a bermed area.</td>
</tr>
<tr>
<td></td>
<td>□ When draining fluids into a drain pan, place a larger drip pan (e.g., 3’ x 4’) under the primary drain pan to catch any spilled fluids.</td>
</tr>
<tr>
<td></td>
<td>□ Transfer used fluids drained from vehicles to a designated waste storage area as soon as possible. Drain pans and other open containers of fluids should not be left unattended unless they are covered and within secondary containment.</td>
</tr>
<tr>
<td></td>
<td>□ Store waste containers of antifreeze and oil within secondary containment. Antifreeze and waste oil should be stored separately and recycled, or disposed of as hazardous waste.</td>
</tr>
<tr>
<td></td>
<td>□ Never pour vehicle fluids or other hazardous wastes into sinks, toilets, floor drains, outside storm drains, or in the garbage. These substances should be kept in designated storage areas until recycled or safe disposal.</td>
</tr>
<tr>
<td></td>
<td>□ Drain fluids from leaking or wrecked vehicles as soon as possible, to avoid leaks and spills.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cleaning Engines and Parts, and Flushing Radiators</th>
<th>Solvents and other engine cleaning fluids are hazardous to employees and can cause pollution in storm sewers and nearby creeks and streams. (See fact sheet SC-21 – Vehicle and Equipment Washing and Stream Cleaning and fact sheet SC-22 - Vehicle and Equipment Maintenance and Repair for other information)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Eliminate discharges from these operations to the sanitary sewer and storm drains. Use a licensed service to haul and recycle or dispose of wastes.</td>
</tr>
</tbody>
</table>
Designate specific areas or service bays for engine, parts, or radiator cleaning. Do not wash or rinse parts outdoors.

Use self-contained sinks and tanks when working with solvents. Keep sinks and tanks covered when not in use.

Inspect degreasing solvent sinks regularly for leaks, and make necessary repairs immediately.

Avoid soldering over drip tanks. Sweep up drippings and recycle or dispose as hazardous waste.

Rinse and drain parts over the solvent sink or tank, so that solvents will not drip or spill onto the floor. Use drip boards or pans to catch excess solutions and divert them back to a sink or tank.

Allow parts to dry over the hot tank. If rinsing is required, rinse over the tank as well.

Collect and reuse parts cleaning solvents and water used in flushing and testing radiators. When reuse is no longer possible, these solutions may be hazardous wastes, and must be disposed of properly.

Never discharge cleaning solutions used for engines or parts into the sewer system without adequate treatment. Most facilities have these solutions hauled offsite as hazardous waste because of the permits necessary for onsite treatment.

Only discharge rinsewater to the sanitary sewer with adequate treatment and approval of the local municipal wastewater utility.

Never discharge wastewater from steam cleaning, or engine/parts cleaning to a street, gutter, or storm drain.

Sweep or use a vacuum to clean up dust and debris from scraping or bead blasting radiators.

Consider using static tanks for rinsing to reduce the volume of discharged rinsewater.

Consider using counter-current rinsing to reduce water usage and rinsewater discharges.

### Washing Cars and Other Vehicles

(See fact sheet SC-21 – Vehicle and Equipment Washing and Stream Cleaning for other information)

**Regular Activity**

- If car washing is a central activity of your business, the preferred option is to treat and recycle the wash water.

- Designate a vehicle washing area and wash cars and trucks only in that area. This “wash pad” should be bermed or protected from storm drains and should drain to an oil/water separator before discharging to the sewer.
**BG-21 Automotive Service – Maintenance**

- Cover an outside wash pad or minimize the area of an uncovered pad to reduce the amount of rainwater reaching the sewer. Consult your local municipal wastewater utility for guidance.
- Minimize the use of acid-based wheel cleaners. These products may require additional treatment (beyond oil/water separation) before discharge to the sewer.

**Occasional Activity**
- Even biodegradable soap is toxic to fish and wildlife. Whenever possible, take vehicles to a commercial car wash.
- If soap is used in washing, the wash water must be collected and discharged, preferably with treatment, to the sanitary sewer. This water cannot be discharged to a storm drain.
- Never rinse off spray-on acid-based wheel cleaners where rinse water may flow to a street, gutter, or storm drain.

**Washing New Vehicles**
- If cleaning the exterior of new vehicles with water only, the discharged water may go to the storm drain directly.
- Always protect the storm drains from solvents used to remove protective coatings from new cars. Discharges of these solvents to the sanitary sewer must receive adequate treatment and approval of the local municipal wastewater utility.

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**Keeping a Clean Shop**

Good housekeeping practices minimize liability, reduce costs, and make it easier to detect spills and potential problems. (See fact sheet SC-22 - Vehicle and Equipment Maintenance and Repair for other information)

<table>
<thead>
<tr>
<th>Good Housekeeping Practices</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Use drip pans under leaking vehicles to capture fluids.</td>
<td></td>
</tr>
<tr>
<td>Sweep or vacuum the shop floor frequently. Use mopping as an alternative to hosing down work areas.</td>
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</tr>
<tr>
<td>If mopping is used to clean shop floors:</td>
<td></td>
</tr>
<tr>
<td>1. Spot clean any spilled oil or fluids using absorbents or rags.</td>
<td></td>
</tr>
<tr>
<td>2. Use dry cleanup methods: Sweep the floor using absorbents.</td>
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</tr>
<tr>
<td>3. After steps 1 and 2 above (if mopping is still needed), mop and discharge mop water to the sanitary sewer.</td>
<td></td>
</tr>
<tr>
<td>Do not pour mop water into the parking lot, street, gutter, or storm drain.</td>
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</tr>
<tr>
<td>Remove unnecessary hoses to discourage washing down floors and outside paved areas.</td>
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</tr>
</tbody>
</table>
Regularly sweep parking lots and areas around your facility instead of washing them down with water.

Collect all metal filings, dust, and paint chips from grinding, shaving, and sanding, and dispose of the waste properly. Never discharge these wastes to the storm drain or sanitary sewer.

Collect all dust from brake pads separately and dispose of the waste properly. Never discharge these wastes to the storm drain or sanitary sewer.

Send rags to an industrial laundry.

Inspect and clean if necessary, storm drain inlets and catch basins within the facility boundary before October 1 each year.

Consider using an oleophilic mop (picks up oil and not water) to reduce the volume of waste liquids you collect and reduce your cost for disposal.

Storage

Appropriate storage protects your shop from hazardous spills. Consult your local hazardous waste agency for details. (See Material and Waste Management fact sheets – SC-30 series for other information)

- Store hazardous materials and wastes where they are protected from rain and in a way that prevents spills from reaching the sanitary sewer or storm drain.
- Keep lids on waste barrels and containers, and store them indoors or under cover to reduce exposure to rain.
- All hazardous wastes must be labeled according to hazardous waste regulations. Consult the fire department or your local municipal waste management and recycling agency for details.
- Keep wastes separate to increase your waste recycling/disposal options and to reduce your costs.
- Never mix waste oil with fuel, antifreeze, or chlorinated solvents. Consult your hazardous waste hauler for details.
- Double-contain all bulk fluids to prevent accidental discharges to the sewer and storm drain. Consult the fire department or municipal waste management and recycling agency for details.
- Carefully transfer fluids from drip pans or collection devices to designated waste storage areas, as soon as possible.
- When receiving vehicles to be parted or scavenged, park them on a paved surface and immediately drain and collect gasoline and other fluids properly.
Drain all fluids from components, such as engine blocks, which you may store for reuse or recycling. Keep these components under cover and on a drip pan.

Store new batteries securely to avoid breakage and acid spills during earthquakes. Shelving should be secured to the wall.

Store used batteries indoors and in plastic trays to contain potential leaks. Recycle old batteries.

**Spill Prevention and Control**

Spills cause safety hazards for employees and can spread if not cleaned up immediately. The best spill control is prevention. (See fact sheet SC-11 - Spill Prevention, Control and Cleanup for other information)

<table>
<thead>
<tr>
<th>Spill prevention and Control Guidance</th>
<th>Maintain and keep current, as required by other regulations, a spill response plan and ensure that employees are trained on the elements of the plan.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contain and cover all solid and liquid wastes – especially during transfer.</td>
</tr>
<tr>
<td></td>
<td>Purchase and maintain the proper absorbent materials for containment and cleanup of different spills, and make sure they are easily accessible anywhere in the shop. Saturated absorbents generally must be disposed of as hazardous waste.</td>
</tr>
<tr>
<td></td>
<td>“Spot clean” leaks and drips routinely to prevent runoff of spillage. Leaks are not cleaned up until the absorbent is picked up and disposed of properly.</td>
</tr>
<tr>
<td></td>
<td>Seal or remove floor drains to prevent accidental discharge to the sewer system.</td>
</tr>
<tr>
<td></td>
<td>Minimize the distance between waste collection points and storage areas.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outdoor Waste Receptacle Area</th>
<th>Minimize the possibility of stormwater pollution from outside waste receptacles by doing at least one of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use only watertight waste receptacle(s) and keep the lid(s) closed, or</td>
</tr>
<tr>
<td></td>
<td>Grade and pave the waste receptacle area to prevent run-on of stormwater, or</td>
</tr>
<tr>
<td></td>
<td>Install a roof over the waste receptacle area, or</td>
</tr>
<tr>
<td></td>
<td>Install a low containment berm around the waste receptacle area, or</td>
</tr>
<tr>
<td></td>
<td>Use and maintain drip pans under waste receptacles.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Air/Water Supply Area</th>
<th>Minimize the possibility of stormwater pollution from air/water supply areas by doing at least one of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spot clean leaks and drips routinely to prevent runoff of spillage, or</td>
</tr>
</tbody>
</table>
Grade and pave the air/water supply area to prevent run-on of stormwater, or
Install a roof over the air/water supply area, or
Install a low containment berm around the air/water supply area.

Recycling / Wastewater Treatment
Recycling and properly treating wastes protects the environment and reduces costs. (See fact sheet SC-22 Vehicle and Equipment Maintenance and Repair and fact sheet SC-34 – Waste Handling and Disposal for other information)

| Recycling/Wastewater Management Guidance | ☐ Provide properly labeled containers, drums or totes to recycle solvents, paints, oil filters, antifreeze, motor oil, batteries, and lubricants. |
| ☐ Set up a recycling system to make it easy for employees to separate wastes and to recycle. |
| ☐ Choose wastewater treatment systems that are easy to maintain and repair. |
| ☐ Properly maintain and service all pretreatment equipment, including sumps, separators, and grease traps to ensure proper functioning. Follow manufacturer’s maintenance instructions and consider using a licensed service to conduct maintenance on a regular basis. |
| ☐ Frequently inspect equipment for malfunctioning parts, leaks, and the accumulation of pollutants such as oil and grease. Since pretreatment equipment is supposed to remove pollutants, a lack of accumulation may be a sign of a malfunction. |
| ☐ Retain only a licensed vendor to haul away and dispose of wastes. |
| ☐ Consider installing self-contained, zero-discharge treatment systems that recycle wastewater. |

Purchasing
Purchasing decisions have a direct and long-term impact on the products used and disposed of by your shop. Make pollution prevention easier and reduce costs and liability by controlling the types and amounts of products purchased.

- Ask your supplier for information on less toxic chemical cleaners and other products. There are alternatives to chlorinated solvents; chlorofluorocarbons; and 1,1,1, trichloroethane (TCA).
- Ask your supplier for information on the composition of brake pads. Studies have shown that brake dust washed off streets by rain may be the single biggest contributor of copper, a major pollutant, to waterways. Your awareness and understanding of this problem and the available alternatives will help us come up with solutions in the future.
- Minimize inventory by purchasing only as much product as you will need in the foreseeable future. This will reduce your storage space needs, inventory tracking costs, and liability for storing hazardous materials and waste.
Education and Training

Your success in following these guidelines depends on an effective training program.

- Train all employees upon hiring – and annually thereafter – on personal safety, chemical management, and proper methods for handling and disposing of waste. Make sure that all employees understand stormwater discharge prohibitions, wastewater discharge requirements, and these best management practices. Use a training log or similar method to document training.

- Post instructional/informational signs around your shop for customers and employees. Put signs above all sinks prohibiting discharges of vehicle fluids and wastes. Put signs on faucets (hose bibs) reminding employees and customers to conserve water and not to use water to clean up spills.

- Label drains within the facility boundary, by paint/stencil (or equivalent), to indicate whether they flow to an oil/water separator, directly to the sewer, or to a storm drain. Labels are not necessary for plumbing fixtures directly connected to the sanitary sewer.

Treatment Control BMPs

If treatment controls are installed at the facility, see Section 4 of this Handbook for information on inspecting and maintaining the BMPs.

For information on designing treatment controls, see Section 5 of the New Development and Redevelopment Planning Handbook.

More Information

Booklets, Checklists, Fact Sheets, and Pamphlets


California Department of Toxic Control Substances, undated website, California Green Station Program, Vehicle Service and Repair (VSR). Includes fact sheets, training modules, and other resources. Available on-line at https://dtsc.ca.gov/PollutionPrevention/VSR.cfm.


San Diego North County Stormwater Program in conjunction with Los Angeles Stormwater Program. BMP Shop Poster: *Stormwater Protection is in Good Hands, Yours.* Available on-line at: [http://www.sdcounty.ca.gov/dpw/watersheds/watershedpdf/automotive_poster.pdf](http://www.sdcounty.ca.gov/dpw/watersheds/watershedpdf/automotive_poster.pdf)


**References**


Description
This category includes facilities that provide vehicle fueling services, including self-serve facilities as well as those that provide a car washing facility. Information specific to auto dismantling, body repair, and maintenance is provided in other guide sheets.

Pollutant Sources
The following are sources of pollutants:
- Fueling,
- Spills,
- Surface cleaning, and
- Air/Water supply.
- Dumpster and trash can areas
Pollutants can include:
- Heavy metals (copper, lead, nickel, and zinc),
- Hydrocarbons (oil and grease, PAHs),
- Toxic chemicals (benzene, toluene, xylene, MTBE),
- Detergents
- Food waste and trash

Approach
Minimize exposure of rain and runoff to fueling areas by using cover and containment. In and around these areas, use good housekeeping to minimize the generation of pollutants. Make stormwater pollution prevention BMPs a part of standard operating procedures and the employee training program. Provide employee education materials in the first language of employees, as necessary.

Coverage
These best management practices cover the following activities or areas:
- Fuel dispensing
- Underground storage tanks
- Air/Water supply
- Outdoor waste receptacles
- Car washing facilities
Retail gasoline outlets will typically have these activities/areas onsite. Outdoor activities/areas are potentially exposed to stormwater runoff, and pollutants can also be transported to the storm drain system via leaks or spills. The best management practices described in this guide are intended to be implemented, monitored, and maintained on a year round basis. Training of employees in good housekeeping measures and spill and leak prevention is critical in preventing discharge of pollutants in stormwater.

**Source Control BMPs**

The best management practices are listed by activity or area. Existing Facilities

<table>
<thead>
<tr>
<th>Fuel Dispensing Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Maintain fuel dispensing areas using dry cleanup methods such as sweeping for removal of litter and debris, or use of rags and absorbents for leaks and spills. Fueling areas should never be washed down unless the wash water is collected and disposed of properly.</td>
</tr>
<tr>
<td>□ Fit fuel dispensing nozzles with “hold-open latches” (automatic shutoffs) except where prohibited by local fire departments.</td>
</tr>
<tr>
<td>□ Post signs at the fuel dispenser or fuel island warning vehicle owners/operators against “topping off” of vehicle fuel tanks</td>
</tr>
<tr>
<td>□ Train employees in implementing proper leak and spill prevention and cleanup practices. Major spills require specialized materials and emergency support personnel.</td>
</tr>
<tr>
<td>□ Fit underground storage tanks with spill containment and overfill prevention systems meeting the requirements of Section 2635(b) of Title 23 of the California Code of Regulations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Underground Storage Tanks</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Train employees in implementing proper leak and spill prevention and cleanup practices. Major spills require specialized materials and emergency support personnel.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facility – General</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ “Spot clean” leaks and drips routinely. Leaks are not cleaned up until the absorbent is picked up and disposed of properly.</td>
</tr>
<tr>
<td>□ Maintain and keep current, as required by other regulations, a spill response plan and ensure that employees are trained on the elements of the plan.</td>
</tr>
<tr>
<td>□ Manage materials and waste to reduce adverse impacts on stormwater quality.</td>
</tr>
<tr>
<td>□ Train all employees upon hiring and annually thereafter on proper methods for handling and disposing of waste. Make sure that all employees understand stormwater discharge prohibitions, wastewater discharge requirements, and these best management practices. Use a training log or similar method to document training.</td>
</tr>
<tr>
<td>□ Label/stencil drain inlets within the facility boundary to remind employees and customers whether they flow to an oil/water separator, directly to the sewer, or to a storm drain. Labels are not necessary for plumbing fixtures directly connected to the sanitary sewer.</td>
</tr>
<tr>
<td>□ Routinely inspect and clean if necessary, storm drain inlets and catch basins within the facility boundary before the beginning of the rainy season (e.g. October 1) each year.</td>
</tr>
</tbody>
</table>
Outdoor Waste Receptacle Area

- Spot clean leaks and drips routinely to prevent runoff of spillage.
- Minimize the possibility of stormwater pollution from outside waste receptacles by implementing at least one of the following:
  - Use only watertight waste receptacle(s) and keep the lid(s) closed, or
  - Grade and pave the waste receptacle area to prevent run-on of stormwater, or
  - Install a roof over the waste receptacle area, or
  - Install a low containment berm around the waste receptacle area, or
  - Use and maintain drip pans under waste receptacles.

Air/ Water Supply Area

- Minimize the possibility of stormwater pollution from air/water supply areas by implementing at least one of the following:
  - Spot clean leaks and drips routinely to prevent runoff of spillage, or
  - Grade and pave the air/water supply area to prevent run-on of stormwater, or
  - Install a roof over the air/water supply area, or
  - Install a low containment berm around the air/water supply area.

Car Washing Facility

- Install a wash water treatment system; do not discharge wash water directly to the storm drain.
- Minimize the possibility of stormwater pollution from car washing facilities by implementing the following:
  - Grade and pave the car wash area to prevent run-on of stormwater,
  - Install a roof over the car wash area,
  - Slope the car wash area toward the wash water treatment system, not the storm drain, and
  - Train employees in implementing proper leak and spill prevention and cleanup practices.

Treatment Control BMPs

If treatment controls are installed at the facility, see Section 4 of this Handbook for information on inspecting and maintaining the BMPs.

For information on designing treatment controls, see Section 5 of the New Development and Redevelopment Planning Handbook.

More Information

Booklets, Checklists, Fact Sheets, and Pamphlets


California Department of Toxic Control Substances, undated website, California Green Station Program, Vehicle Service and Repair (VSR). Includes fact sheets, training modules, and other resources. Available on-line at https://dtsc.ca.gov/PollutionPrevention/VSR.cfm.
Description
This category includes facilities that impound, store, dismantle, and sell vehicles and vehicle parts. These facilities are required to obtain permit coverage under the General Permit. This guide sheet is intended to assist these facilities with permit compliance but does not supersede permit requirements. Activities include: draining fluids from vehicles, crushing and scrapping vehicle bodies, and recovering and recycling parts and vehicle fluids. Information specific to: body repair, maintenance, and service stations is provided in other guide sheets.

Pollutant Sources
The following are sources of pollutants:

- Draining fluids from vehicles
- Crushing and scrapping vehicle bodies
- Recovering and recycling parts and vehicle fluids
- Unpaved or non-vegetated areas

Pollutants can include:

- Mercury - switches for convenience lighting, antilock braking systems (ABS), active ride control systems, high intensity discharge (HID) headlamps, and background lighting in automotive displays
- Other heavy metals (aluminum, cadmium, chromium, copper, iron, lead, and zinc) – waste oil, hydraulic fluid, antifreeze, fuels, tires/wheels, body/paint,
BG-23 Automotive Services — Auto Recycling

- Radiators, carburetors/engines/transmissions, mufflers, catalytic converters, batteries, air bags, and brake pads
- Oils and greases - waste oil, hydraulic fluid, fuels, and parts cleaners
- PAHs - waste oil, hydraulic fluid, fuels, parts cleaners, carburetors/engines/transmissions, and catalytic converters
- Toxic chemicals - antifreeze
- Sediment
- Trash

**Approach**

Minimize exposure of rain and runoff to impound, dismantling, crushing, and storage areas by using cover and containment. In and around these areas, use good housekeeping to minimize the generation of pollutants. Make stormwater pollution prevention BMPs a part of standard operating procedures and the employee training program. Provide employee education materials in the first language of employees, as necessary.

**Source Control BMPs**

The best management practices are listed by activity or area.

<table>
<thead>
<tr>
<th>Good Housekeeping</th>
<th>General Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>An in-coming vehicle inspection inventory program should include a check for fluid leaks and for unwanted material that could have been placed in the vehicles. Re-inspect work and storage areas for signs of leaking vehicles, parts, or equipment.</td>
</tr>
<tr>
<td></td>
<td>Construct fences or other physical barriers to act as visual and noise barriers, help to control dust, help prevent theft, and control the direction of runoff.</td>
</tr>
<tr>
<td></td>
<td>Maintain an organized inventory of materials used at the facility.</td>
</tr>
<tr>
<td></td>
<td>Consider indoor storage of vehicles, parts, and equipment, and the use of berms and/or dikes to control stormwater runoff.</td>
</tr>
</tbody>
</table>

**Employee and Customer Education**

- Develop a stormwater management policy statement for your employees. Management can provide direction and support for pollution prevention by reviewing this policy with employees and keeping it posted.
- Ensure that employees are trained to follow these pollution prevention practices and to monitor customers to help ensure they prevent pollution as well. Train employees when they are hired, and annually after that. Emphasize that by following these practices they are helping to protect the local waterways.
| Ensure that non-English-speaking employees are also trained in these practices (for example, use a bilingual instructor, post signs, and provide written information in their own language). |
| Have customers sign a form that makes them responsible for preventing spills. Provide them with drip pans when needed. |
| Label storm drain inlets with a stormwater pollution prevention message. |

Vehicle Dismantling/Fluid Management

**Site Configuration**

- Confine the dismantling and storage of vehicles, parts, and equipment to designated areas that are paved, covered and bermed. Paving should be concrete or other less porous surface. Consider using an epoxy type of sealant. Berms can be rounded like speed bumps, so that vehicles and forklifts can move over them.
- Consider constructing an impound/inventory area with non-porous surface for leaking vehicles prior to dismantling.
- Remove fluids as soon as possible from vehicles brought into the facility for processing or dismantling. Use a funnel adapter to a “quarter barrel” whenever possible. Transfer the contents of drain pans or quarter barrels to the designated waste storage area as soon as possible.

**Fluid Removal**

- If fluids must be drained or oily parts removed in an unpaved area, use extra-large drip pans.
- To prevent accidental spills do not leave drip pans outside, exposed to rainfall, or left unattended.
- Drain all parts of fluids prior to disposal.
- Drain fluids and remove parts as follows before customers can spill or disperse them:
  - **Engine oil** - Should be drained and stored in labeled, doubled-walled, above ground tanks. Used oil can either be recycled for onsite use in a waste oil heater, or sent offsite for re-refining or fuel blending.
  - **Oil filters** - Drain fluids and crush prior to disposal. A bearing press can be used for this purpose by placing a container under the press to collect the oil.
  - **Antifreeze** - Should be reclaimed and reused or properly disposed of.
  - **Window washer fluid** - Drain for reuse
  - **Freon** – Recover first
  - **Fuel** – Recover first
### Other vehicle parts

- **Batteries** - Remove as soon as possible after vehicle enters the yard. Store good batteries inside for resale. Store dead batteries inside on pallets (if your floor is gravel or dirt, put a layer of absorbent material below the pallet) or in storage containers, or store dead batteries outside in a leak proof, covered container.

- **Mercury-containing switches** – Protect from shredding or crushing by removing from hood and trunk light assemblies and anti-lock brakes. Store in a covered container kept in a secure, dry area. Dispose of legally by having switches processed at a recycling facility that recovers mercury.

- **Mufflers, tailpipes, and catalytic converters** – Recover and protect from shredding.

- **Gas tanks** – Remove and drain.

- **Jacks** – Remove and prevent customers from using.

- **Tires** – Remove, store, recycle, and prevent water accumulation. Do not bury or landfill.

- **Air bags** – Deploy or recover per manufacturer guidelines.

- **Burnt autos** – Cover and remove as soon as possible.

### Storage of Vehicles and Parts

- Store wastes in covered, bermed (contained) areas that have no drains. Waste containers should be constructed of materials that are impermeable to the liquids in the first container.

- Double-contain fluids to prevent accidental spills to the sewer system. Keep double containment clean and dry.

- Parts that might leak fluids, such as engines, transmissions, radiators, and batteries should be stored under cover, and on an impermeable surface.

- Keep vehicle hoods down when not in use. For vehicles without hoods, use covers such as tarps or sheet metal to keep rainfall out.

- Place absorbent in bottom of core bins to absorb fluids leaking from core parts.

- Keep used oil separate from part cleaning solvents, antifreeze, and fuel. Engine oil, transmission fluid, brake fluid, and power steering fluid can be combined and stored together.

- Label storage containers of all fluids and waste materials.

- Use canvas or sheets of plastic to temporarily cover storage areas.
Transmission and engine cores may be stored in plastic storage boxes with one of the following:

- Leak proof tops;
- Lugger boxes without a solid bottoms and covered by a permanent roof;
- Lugger boxes without a solid bottom stored under a permanent roof on a concrete pad with curbing; or
- An enclosed trailer with a steel floor to contain fluid runoff and a drain in the floor to properly remove waste fluids.

Parts Cleaning

- Perform all part cleaning operations indoors or cover and berm outside cleaning areas.
- Clean parts by using minimal amounts of solvents or detergents.
- Recycle and reuse cleaning fluids where practical.
- Spent cleaning solutions should be removed by a waste hauler or recycler.
- Use phosphate-free biodegradable detergents. Consider using detergent-based or water-based cleaning systems in place of organic solvent degreasers.

Vehicle Crushing Activities

- Provide a containment system – such as a concrete pad with berms – for vehicle crushers. Fluids and stormwater runoff from such bermed areas could be discharged into a sump, oil/water separator, sanitary sewer, or other appropriate drainage system that prevents stormwater pollution.
- Consider placing crushing and scrapping areas under cover.
- If a gravel/geotextile fabric foundation is provided under a crusher, install a fluid collection system to capture fluids that are released during the crushing operation.
- Capture crusher fluids to prevent spillage. Collect this mixture of fluids in a spill proof covered container, test the fluid, and dispose of it properly. It should not be allowed to drain onto the ground. Keep the drain within the crusher clear so that the fluids do not collect and overflow from the crusher onto the ground.
### Preventive Maintenance

- Develop a preventive maintenance program that involves timely inspections and/or maintenance of the crusher and facility equipment and vehicles. The program may include:
  - Service checklists and maintenance logs for each piece of equipment;
  - Employee education and instruction material; and
  - Review of manufacturer-recommended parts replacement and maintenance activities and frequencies.

- Keep the crusher and other equipment clean by frequently wiping off accumulated oil and grease that may be exposed to stormwater (except where needed for proper operation of the equipment) or that may hide equipment trouble spots.

- Conduct scheduled maintenance of facility equipment and vehicles in a covered or bermed area, where practicable.

- Schedule periodic inspections of equipment for leaks, spills and malfunctioning, worn, or corroded parts. Regularly inspect tanks, valves, hoses, and containers. Look for signs of wear or weakness.

- On secondary containment structures, regularly inspect the valve, seals around the outlet pipe, the outlet pipe itself, and the dike for cracks, damage, or leaks.

- When secondary containment reservoirs require pumping or release, a sample of collected water should be visually inspected or tested for pollutants. If pollutant levels are significant or there is contamination, pump the accumulated water into barrels or into a tanker truck and haul to a wastewater treatment facility.

- Repair or replace parts before they wear out.

- Repair malfunctioning equipment that is responsible for any leak or spill as soon as possible.

- Secure and lock above ground tank storage areas. Tanks, pumps, fittings, pipes, and containers should be inspected routinely for integrity and leaks.

- Perform maintenance activities indoors.

- Valves on secondary containment structures should be kept in the “off” position at all times, except when collected water is being removed.

### Spill Prevention and Response

- Prevention
  - Install safeguards (such as diking or berming) against accidental releases at dismantling and storage areas.
  - Place waste fluid storage containers in a convenient and safe place to avoid having to move waste fluids long distances.
| Containers and tanks should be stored on a concrete or impermeable surface, and if feasible, under cover. All containers should be labeled according to content and hazard characteristics. Keep drums containing chemicals away from sumps and drains. Maintain good integrity of all storage containers. |
| Provide spill cleanup equipment at locations where spills are most likely to occur. |
| Make available MSDS sheets and other safety materials that identify types of fluids that have the potential to spill, indicate whether these fluids are hazardous or toxic, list appropriate safety equipment to be worn, and specify correct materials and procedures to use to clean up the spill. |
| Identify cleanup procedures, including the use of dry absorbent materials or other cleanup methods to collect, dispose of, or recycle spilled or leaked fluids. Maintain an adequate supply of dry absorbent material onsite. Properly dispose of used absorbent materials. |
| Never pour liquids or dry materials down a storm drain. |
| Place drip pans, plastic sheets, or canvas tarps beneath vehicles, parts, and equipment during maintenance and dismantling activities. If any parts are removed, they should be placed in a drip pan. Drip pans should not be left unattended. |
| When refueling vehicles and equipment, park as close to the pump as possible. Keep fuel nozzle upright when not in use, and replace nozzle securely in the pump. |
| Pave refueling area to prevent contamination of the soil if a spill occurs. |
| Equip fuel pumps and tanks with overflow prevention and automatic shut-off devices. |

**Response**

| Contain oil or other fluids spilled during parts removal. |
| Control any spills that may occur around fueling areas. |
| Observed spills and leaks should be captured and cleaned up as soon as possible using dry absorbents, drip pan, towel, mops, pads, and booms. |
| Keep spilled fluids from entering drains by using drain mats or plugs. Seal or remove unused floor drains. |
| Remove soils with spilled fluids to prevent rainwater from carrying pollutants to local waterways. |
| Contain oil or other fluids spilled during parts removal. |
### Erosion and Sediment Control
- Implement appropriate vegetative, structural, or stabilization measures to limit soil erosion.
- Regularly sweep and clean paved surfaces to reduce sediment buildup. Sediment should be swept up and placed into a covered, watertight dumpster for proper disposal.
- Install filtering or diversion practices, such as filter fabric fences, sediment filter booms, earthen or gravel berms, curbing or equivalent measures.
- Install sediment traps, vegetative buffer strips, silt fencing or equivalent measures to remove sediment prior to discharge through an inlet or catch basin.
- Do not use vehicle fluids, oils, or fuels for dust control or weed control.
- Establish and maintain a vegetative cover in areas not used for vehicle salvage activities.

### Non-Stormwater Discharges
- Disconnect or seal off all existing floor drains and sinks that are connected to the storm drainage system.
- Wash vehicles and equipment in a contained area.
- Do not steam clean parts outside without proper wastewater containment.
- Do not discharge steam cleaned wastewater to a septic tank system because the oils may not be treated or removed in the system.
- Do not pour liquid waste or parts wash water down storm drain inlets.
- Do not hose down the shop floor if water would be conveyed to a storm drain.

### Treatment Control BMPs
- Use vegetated swales and buffer strips, catch basin filters, and/or other similar measures to facilitate settling or filtering of pollutants in runoff.
- Construct grassed swales, berms, and diversions to direct water flow to a central point for better control and management.
- Properly maintain grassed swales by keeping swales free of debris and litter, maintaining vegetation and periodically removing accumulated sediment. Do not place material or waste in swales or in the runoff paths.
- Divert runoff away from material storage areas through such practices as dikes, berms, containment trenches, culverts, elevated concrete pads, and/or surface grading.
Consider installing a detention pond. Monitor accumulation of sediments in the bottom of detention ponds. Remove accumulated metals and other materials from the bottom of detention ponds as needed.

Considering installing oil-water separators to reduce the levels of petroleum-based oils in stormwater runoff. Test and clean out sediments and oily deposits that have accumulated in the oil-water separator. Sediments should be tested for metals and other pollutants that may be expected to be present.

If treatment controls are installed at the facility, see Section 4 of this Handbook for information on inspecting and maintaining the BMPs.

For information on designing treatment controls, see Section 5 of the New Development and Redevelopment Planning Handbook.

More Information


References


Consider installing a detention pond. Monitor accumulation of sediments in the bottom of detention ponds. Remove accumulated metals and other materials from the bottom of detention ponds as needed.

Considering installing oil-water separators to reduce the levels of petroleum-based oils in stormwater runoff. Test and clean out sediments and oily deposits that have accumulated in the oil-water separator. Sediments should be tested for metals and other pollutants that may be expected to be present.

If treatment controls are installed at the facility, see Section 4 of this Handbook for information on inspecting and maintaining the BMPs.

For information on designing treatment controls, see Section 5 of the New Development and Redevelopment Planning Handbook.

More Information


References


BG-30 Food Service Facilities

Description
This category includes:

- Restaurants
- Food truck commissaries
- Institutional cafeterias
- Grocery stores, bakeries, and delicatessens
- Any facility requiring a Health Department permit for food preparation

Pollutant Sources
The following are sources of pollutants:

- Cleaning of equipment
- Grease handling and disposal
- Spills
- Surface cleaning
- Cooling and refrigeration equipment maintenance
- Landscaping and grounds maintenance
- Dumpster and loading dock area
- Parking lots
- Illicit connections to storm drain system

Pollutants can include:
- Organic materials (food wastes)
- Oil and grease
- Toxic chemicals in cleaning products, disinfectants, and pesticides

**Approach**

Minimize exposure of rain and runoff to outdoor cleaning and storage areas by using cover and containment. In and around these areas, use good housekeeping to minimize the generation of pollutants. Make stormwater pollution prevention BMPs a part of standard operating procedures and the employee training program. Provide employee education materials in the first language of employees.

**Source Control BMPs**

The best management practices are listed by activity or area in the following table.

| Dumpster and Loading Dock Areas |  
|--------------------------------|--------------------------------------------------|
|  
| □ Store and transfer all solid and liquid wastes, such as tallow, in watertight covered containers. |
|  
| □ Keep litter from accumulating around loading docks by providing trash receptacles and encouraging employees to use them. |
|  
| □ Bag and seal food waste before putting it in the dumpster. Do not place uncontained liquids, or leaking containers or garbage bags into a dumpster. |
|  
| □ Keep dumpster lids closed to keep out rainwater and to prevent trash from spilling out. |
|  
| □ If the dumpster regularly overflows, get a bigger one or arrange for more frequent collection. If the dumpster is shared with other tenants, speak with the property/lease manager about scheduling more frequent trash pickups or a larger dumpster. |
|  
| □ Don’t hose out dumpsters. Apply absorbent over any fluids spilled in dumpster. Absorbent will usually be knocked out when the dumpster is emptied. |
|  
| □ Have the dumpster leasing company repair or replace leaky dumpsters and compactors, and have them clean out dirty dumpsters. |
|  
| □ Install a spill cleanup kit near the dumpster and loading dock areas. |
|  
| □ Post employee reminder signs such as “Keep lid closed” near tallow bins and dumpsters. |
|  
| □ Consider enclosing the dumpster in a roofed and bermed area to prevent exposure to rainwater, and draining the area to the sanitary sewer. Contact the local wastewater treatment plant or the county environmental health department for guidance. |
|  
| □ Keep dumpsters or the dumpster enclosure locked to prevent illegal dumping. |
|  
| □ For more information on cleaning dumpster areas see the Mobile Cleaning - Food Service Business-related business guide sheet in this series.
| **Equipment and Outdoor Cleaning** | - Make sure all discharges from cooling equipment go to the sanitary sewer and not the street, gutter, or storm drain.
- Clean floor mats, filters, and garbage cans in a mop sink, floor drain, or proper outside area connected to the sanitary sewer with an oil and water separator. Don’t wash them in a parking lot, alley, sidewalk, or street.
- Consider installing anti-slip floors when you remodel.
- Consider cleaning filters in the dishwasher. Contact the local wastewater treatment plant or the county environmental health department for guidance.
- Pour wash water into a janitorial or mop sink. Don’t pour it out onto a parking lot, alley, sidewalk, or street.
- For outdoor cleaning, have employees or contractors follow the instructions in the following business guide sheet in this series:
  - Mobile Cleaning - Food Service Business-related
  - Mobile Cleaning – Surface cleaning
- For more information in general on cleaning floor mats, equipment, exhaust filters, and outdoor surfaces see the Mobile Cleaning - Food Service Business-related business guide sheet in this series. |

| **Spill Cleanup** | - Prepare a spill cleanup plan that includes:
  - Procedures for different types of spills
  - Schedule for initial and annual training of employees
  - Cleanup kits in well-marked, accessible areas
  - Designation of key employee who monitors cleanup
  - Posting the plan in the work area
- If a spill occurs, immediately stop the spill at its source.
- Keep the spill from entering the street, gutter, or storm drain.
- Use dry methods for spill cleanup (sweeping, cat litter, etc.). Don’t hose down spills.
- If wet cleaning (including high-temperature or high pressure washing) is required, dry clean first and then mop (or if it is absolutely necessary, wash) and collect the water. Dispose of water in sink or other indoor drain, not in the street, gutter, or storm drain.
- If a final rinse is necessary for health reasons, collect the rinsewater and dispose it to the sink or indoor floor drain. If outdoors, block the storm drain before applying water. Mop up or wet-vacuum water, and dispose it to a sink or indoor drain.
- Do not use bleach or disinfectants if there is a possibility that rinsewater could flow to a street, gutter, or storm drain. |
<table>
<thead>
<tr>
<th><strong>Reusing and Recycling</strong></th>
<th>For more information on cleaning outdoor surfaces see the Mobile Cleaning - Surface Cleaning business guide sheet in this series.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recycling and Disposal</strong></td>
<td>Separate wastes. Keep your recyclable wastes in separate containers according to the type of material. They are easier to recycle if separated.</td>
</tr>
<tr>
<td></td>
<td>Recycle the following materials:</td>
</tr>
<tr>
<td></td>
<td>Food waste (non-greasy, non-animal food waste can be composted). Donate leftover, edible food whenever possible to local food banks.</td>
</tr>
<tr>
<td></td>
<td>Paper and cardboard</td>
</tr>
<tr>
<td></td>
<td>Container glass, aluminum, and tin</td>
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<tr>
<td></td>
<td>Pallets and drums</td>
</tr>
<tr>
<td></td>
<td>Dispose of toxic waste properly. Toxic waste includes used cleaners, and rags (soaked with solvents, floor cleaners, and detergents).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Grease Handling and Disposal</strong></th>
<th>Never pour oil, grease, or large quantities of oily liquids such as sauces or salad dressings or waste grease down a sink, floor drain, storm drain, or into a dumpster.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Install screens and solid traps in sink and floor drains to catch larger solids. Clean these screens and traps frequently.</td>
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<tr>
<td></td>
<td>Don’t try to “dissolve” grease by adding hot water or emulsifying chemicals – it will only move the grease further down the building’s sewer line and make it harder to remove later.</td>
</tr>
<tr>
<td></td>
<td>Recycle grease and oil. Don’t pour it into sinks, floor drains, or onto a parking lot or street. Look in the phone book for “Renderers” or call the local recycling or household hazardous waste information line.</td>
</tr>
<tr>
<td></td>
<td>Use tallow bins or sealed containers with tamper-proof lids. Keep the exterior of the container clean. Check for leaks. Ask the recycler for a leak-free tallow bin and replace any leaky grease containers. If grease is stored outside, keep it under a roof, if possible.</td>
</tr>
<tr>
<td></td>
<td>Do not contaminate the recyclable oils and grease in the tallow bin with the waste grease from the grease trap or grease interceptor.</td>
</tr>
<tr>
<td></td>
<td>Inspect and clean all waste grease removal devices (grease trap or grease interceptor) often enough to keep them functioning properly and efficiently.</td>
</tr>
<tr>
<td></td>
<td>For disposal of waste grease from the grease trap or grease interceptor, see “Grease Traps” or “Septic Tanks” in the phone book.</td>
</tr>
</tbody>
</table>
### Landscaping and Grounds Maintenance

- Never dispose of leftover pesticides in the gutter, street, or storm drain. Leftover pesticides must be either used up or disposed of as hazardous waste.
- Do not blow or rake leaves, grass, or garden clippings into the street, gutter, or storm drain.
- If pesticides are used, do not over apply or apply when rain is forecast.
- Do not use copper-based algaecides in pools or fountains. Control algae with chlorine or other alternatives to copper-based products.

### Pest Control

#### Food Sources

- Keep the kitchen free of food scraps.
- Take out garbage each night in a closed container.
- Refrigerate all food or store in pest-proof containers each night.
- Keep ventilation system working properly to keep greasy residue off walls.

#### Appliances

- Keep dishwasher area clean. Check the trap nightly.
- Where possible, elevate appliances at least 6 inches off the floor.
- Clean under appliances nightly.
- Steam clean or wash appliances weekly.
- Remember to clean under the counter, under the sink, and the refrigerator vent.

#### Drains and Trash Cans

- Steam clean or scrub floor drains with a brush to help eliminate fruit flies.
- Keep dumpster area clean – inside and out.
- Wash garbage cans regularly.

#### Supplies and Entry Points

- Check for pests before bringing supplies in to the kitchen. Roaches like corrugated boxes.
- Don’t store boxes in the kitchen – take boxes away or store in a refrigerated area.
- Seal any gaps below doors.

#### Reduce Habitat

- Inspect the entire establishment – inside and out.
- Suggest physical modifications that may help to eliminate pest behavior.
| □ Suggest changes in food storage or cleanup practices to eliminate food sources for pests. |
| □ Place boric acid powder in wall voids. |
| □ Seal cracks and crevices. |

**Monitor for Pests**

| □ Use sticky traps to monitor how well the pest control program is working. Pests caught in the traps warn of a possible problem. |
| □ When hiring a pest control service, look for a company that provides Integrated Pest Management (IPM) services. |

**Use Baits First**

| □ Use baits for controlling pests. Remove bait when pests are gone, or else the bait may attract more pests. |
| □ Use chemicals only as a last resort. If absolutely necessary, choose less-toxic chemicals, and ask the pest service to provide label information. |
| □ Apply pesticides only if necessary, not on a regular schedule. Follow label directions. Do not apply pesticides around floor drains, sinks, or food. |

**Purchasing**

| □ Use non-disposable products. Serve food on ceramic dishware rather than paper, plastic or Styrofoam, and use cloth napkins rather than paper ones. If you must use disposable products, use paper instead of Styrofoam. |
| □ Buy the least toxic products available: |
| ✓ Look for “non-toxic,” “non-petroleum based,” “free of ammonia, phosphates, dye, or perfume,” or “readily biodegradable” on the label. Don't assume biodegradable products are safe. Biodegradable means the product will eventually break down, but it may harm the environment in the meantime. |
| ✓ Avoid chlorinated compounds, petroleum distillates, phenols, formaldehyde, and caustic or acidic products. |
| ✓ Use water-based products. |
| ✓ Look for and purchase “recycled” and “recyclable” containers. By doing so, you help ensure a use for the recyclable materials that people collect and recycle. |

**Education and Training**

| □ Employees can help prevent pollution when urban runoff training is included in employee orientations and reviews. |
| □ Train all employees upon hiring and annually thereafter. |
| □ Use a training log to document employee training. |
Post information about or labels for BMPs where employees and customers can see them.

Remember the facility is liable for the behavior of contractors. Be sure all contractors hired to clean inside or outside are aware of and implement these BMPs.

Explain BMPs to other food businesses through your business associations or chambers of commerce.

Treatment Control BMPs

If treatment controls are installed at the facility, see Section 4 of this Handbook for information on inspecting and maintaining the BMPs.

For information on designing treatment controls, see Section 5 of the Development and Redevelopment Handbook.

References


Description
This category includes businesses that provide landscaping and landscape maintenance/gardening services.

Pollutant Sources
The following are sources of pollutants:
- Selecting plants or landscape design,
- Installing new landscaping,
- Maintaining landscapes,
- Using pesticides and fertilizers, and
- Using gas-powered equipment.

Pollutants can include:
- Nutrients (fertilizers, yard wastes),
- Pesticides,
- Heavy metals (copper, lead, and zinc),
- Hydrocarbons (fuels, oils and grease), and
- Sediments.

Approach
Minimize the potential for stormwater pollution and the need for resources/controls (water, pesticides, fertilizers) by creating and maintaining landscapes in a way that is compatible with the local soils, climate, and amount of rain and sun. Make stormwater pollution prevention BMPs a part of standard operating procedures and the employee training program.
BG-40 Landscape Maintenance

Provide employee education materials in the first language of employees, as necessary.

**Source Control BMPs**

The best management practices are listed by activity or area.

<table>
<thead>
<tr>
<th>Landscape Design</th>
<th>Specify native, low maintenance, and insectary (attract beneficial insects) plants and landscape designs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Design zoned, water-efficient irrigation systems using technologies such drip irrigation, soaker hoses, or microspray systems. Landscape design should be consistent with the local Water Efficient Landscape Ordinance. See the following website for a list of local ordinances: ftp://ftp.water.ca.gov/Model-Water-Efficient-Landscape-Ordinance/Local-Ordinances/</td>
</tr>
<tr>
<td></td>
<td>Do not landscape riparian areas, except to remove non-native plants and replace them with native riparian landscaping.</td>
</tr>
<tr>
<td></td>
<td>Replant with native species where possible when landscaping or building an ornamental pond. Do not assume something is native because you have seen it in your area. Contact the local nursery for information or visit the California Exotic Pest Plant Council website (<a href="http://www.caleppc.org">www.caleppc.org</a>).</td>
</tr>
<tr>
<td>Landscape Installation</td>
<td>Protect stockpiles and landscaping materials from wind and rain by storing them under tarps or secured plastic sheeting.</td>
</tr>
<tr>
<td></td>
<td>Schedule grading and excavation projects during dry weather.</td>
</tr>
<tr>
<td></td>
<td>Divert runoff from exposed soils or lower its velocity by leveling and terracing.</td>
</tr>
<tr>
<td></td>
<td>Use temporary check dams or ditches to divert runoff away from storm drains.</td>
</tr>
<tr>
<td></td>
<td>Protect storm drains with sandbags or other sediment controls.</td>
</tr>
<tr>
<td></td>
<td>Revegetation is an excellent form of erosion control for any site. Keep soils covered with vegetation or temporary cover material (mulch) to control erosion.</td>
</tr>
<tr>
<td></td>
<td>Check plant roots before buying a plant. Do not buy plants with roots that kinked or circling around the container. Do not buy plants with soft, rotten, or deformed root crowns.</td>
</tr>
<tr>
<td></td>
<td>Do not pile soil around the plant any higher than the root crown.</td>
</tr>
<tr>
<td>Landscape Maintenance Yard Waste</td>
<td>Allow leaf drop to become part of the mulch layer in tree, shrub, and groundcover areas.</td>
</tr>
<tr>
<td></td>
<td>Keep lawn mower blades sharp, and grasscycle.</td>
</tr>
</tbody>
</table>
Grasscycle – leave grass clippings on the lawn when mowing. Once cut, grass clippings first dehydrate, and then decompose, quickly disappearing from view. Proper mowing is required for successful grasscycling. Cut grass when the surface is dry, and keep mower blades sharp. Follow the "1/3 Rule": mow the lawn often enough so that no more than 1/3 of the length of the grass blade is cut in any one mowing. Frequent mowing will produce short clippings that will not cover up the grass surface. The lawn may have to be cut every seven days when the lawn is growing fast but only every 7 to 14 days when the lawn is growing slowly.

Do not leave clippings on pavement or sidewalks where they can wash off into the street, gutter, or storm drain.

Collect lawn and garden clippings, pruning waste, and tree trimmings. Chip if necessary, and compost or take to the local municipal yard waste recycling/composting facility.

In communities with curbside pick-up of yard waste, place clippings and pruning waste at the curb in approved bags or containers. No curbside pickup of yard waste is available for commercial properties.

Do not blow or rake leaves or other yard waste into the street, or place yard waste in gutters or on dirt shoulders, unless it is being piled up for recycling (allowed by some municipalities). After pick-up, sweep up any leaves, litter, or residue in gutters or on street.

Fertilizing and Pruning

Perform soil analysis seasonally to determine actual fertilization need and application rates.

Fertilize garden areas with a mulch of leaves, bark, or composted manure and/or garden waste.

Apply chemical fertilizer only as needed, when plants can best use it, and when the potential for it being carried away by runoff is low. Make sure the fertilizer spreader is calibrated.

Prune plants sparingly, if at all. A healthy plant – one that is native to the area and growing under the right conditions – should not need pruning, except when it is not in the right location (where safety or liability is a concern).

Watering

Use soil probes to determine soil moisture depth, overall moisture levels, and the need to adjust irrigation schedules.

Check sprinklers regularly. Adjust as needed to minimize or eliminate overspray onto impervious surfaces. Replace broken sprinklers or lines.
<table>
<thead>
<tr>
<th><strong>Pest and Weed Control</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Obtain appropriate licenses for pest control and pesticides. Contact the Department of Pesticide Regulation for more information.</td>
</tr>
<tr>
<td>□ Become trained in and offer customers less-toxic pest control or Integrated Pest Management (IPM).</td>
</tr>
<tr>
<td>□ The label on a pesticide container is a legal document. Use a pesticide only as instructed on the label.</td>
</tr>
<tr>
<td>□ Store pesticides, fertilizers, and other chemicals indoors or in a shed or storage cabinet.</td>
</tr>
<tr>
<td>□ Use pesticides sparingly, according to instructions on the label. Rinse empty containers, and use rinsewater as product.</td>
</tr>
<tr>
<td>□ Dispose of rinsed, empty containers in the trash. Dispose of unused pesticides as hazardous waste.</td>
</tr>
<tr>
<td>□ To control weeds, use drip irrigation and mulch. Hand-pull weeds including roots or cut down to ground. Repeat cutting before they flower, grow new leaves, or go to seed. Use herbicides containing pelargonic acid or herbicidal soap as a last resort.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Handling Gasoline</strong></th>
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</thead>
<tbody>
<tr>
<td>□ Use only containers approved by a nationally recognized testing lab, such as Underwriters Laboratories (UL). Keep the container tightly sealed. Containers should be fitted with a spout to allow pouring without spilling and to minimize the generation of vapors.</td>
</tr>
<tr>
<td>□ Fill cautiously. Always use a funnel and/or spout to prevent spilling or splashing when fueling power mowers, blowers, and all other gas-powered equipment.</td>
</tr>
<tr>
<td>□ Avoid spilling gasoline on the ground, especially near wells. If a spill occurs use kitty litter, saw dust, or an absorbent towel to soak up the spill, then dispose of it properly.</td>
</tr>
<tr>
<td>□ Store carefully. Gasoline moves quickly through soil and into groundwater, therefore, store and use gasoline and fuel equipment as far away from your drinking water well as possible. Be certain to keep a closed cap on the gasoline container. Store at ground level, not on a shelf to minimize the danger of falling and spilling.</td>
</tr>
<tr>
<td>□ Do not dispose of gasoline down the drain, into surface water, onto the ground, or in the trash. Contact the local municipality for directions on proper disposal of excess or old gasoline. Transport old gas in an approved gasoline container.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Working Near Waterbodies</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Do not dump lawn clippings, other yard waste, or soil along creek banks or in creeks.</td>
</tr>
</tbody>
</table>
Do not store stockpiles of materials (soil, mulch) along creek banks. These piles can erode over time into a creek.

Do not spray pesticides or fertilizers by creeks.

Do not over water near streams. The excess water may carry pesticides, fertilizers, sediments, and anything else in its path directly into the creek.

**Treatment Control BMPs**

Not applicable.

**More Information**


**References**


Description

This category includes marinas, boatyards, shipyards, and ports that provide services for boats and ships – both public and private – including fishing fleets, excursion boats, and private fishing boats. Most of these facilities are required to obtain permit coverage under General Permit. This guide sheet is intended to assist these facilities with permit compliance but does not supersede permit requirements. Ports often have the added responsibility of helping regulators ensure that Port tenants adhere to the stormwater regulations. Although tenants of Port facilities are often involved in water-related activities, virtually any kind of business can be operating at a Port so the full gamut of pollutant-generating activities may be of concern. Activities of concern that are unique to this category are:

- Boat and ship painting, cleaning, fueling, maintenance, and breaking
- Vessel operations
- Waterfront or over-water areas management
- Fish handling

Other activities of concern include:

- Vehicle and equipment maintenance, fueling, and washing
- Material and waste handling, storage, and disposal
- Leaks and spills
- Outdoor process equipment operation
- Building and grounds maintenance
- Building construction, repair, and remodeling
Pollutant Sources
The following sources of pollutants are unique to this category or present unique challenges in this situation:

- Boat and Ship Building, Maintenance, Fueling, Repair, and Breaking
  - Wet and dry sanding
  - Sand blasting
  - Painting
  - Boat cleaning
  - Fueling
  - Changing oil and other fluids
  - Cleaning engines and parts
  - Flushing radiators
  - Hull repair products
  - Spills
  - Scrapping operations
  - Dumpster and trash can areas

- Vessel Operations
  - Vessel sewage
  - Bilge water
  - Loading / unloading
  - Waterfront or over-water areas management
  - Dry-docks maintenance
  - Non-Dry-docks containment
  - Collection facilities and recycling
  - Pier deck and floor cleaning
  - Inspections

- Fish Handling
Potential pollutants from these unique activities include:

- Heavy metals (copper, lead, tin, and zinc) - spent abrasive grits, anti-corrosive compounds, paint chips, scrap metal, welding rods
- Hydrocarbons (fuels, oils and grease, PAHs)
- Toxic chemicals (solvents, ethylene glycol, cleaners / detergents, resins, glass fibers)
BG-50 Marinas, Boat/Shipyards, and Ports

- PCBs (electrical equipment (e.g., transformers and capacitors), hydraulic fluids, flame retardants, lubricants, paints, dyes, sealants, and plasticizers)
- Asbestos (insulation)
- Trash
- Fish wastes

Approach
Minimize exposure of boat and ship building, maintenance, fueling, and repair areas as well as fish handling areas to rain and runoff by using cover and containment. In and around these areas, use good housekeeping to minimize the generation of pollutants. Make stormwater pollution prevention BMPs a part of standard operating procedures and the employee training program. Provide employee education materials in the first language of employees, as necessary.

Pollutant-generating activities at these facilities require extra attention because many of the activities are conducted on boats and ships or on piers, docks, or wharfs directly over waterbodies. Apply good housekeeping, preventive maintenance, and cover and containment in and around work areas.

Source Control BMPs
The best management practices are listed by activity or area. The focus of this guide sheet is BMPs for the unique areas and activities at marinas, boatyards, shipyards, and ports. Additional source controls for areas and activities that are not unique to these facilities can be found in the facts sheets in Section 3.

<table>
<thead>
<tr>
<th>Painting, Blasting, Sanding, and Stripping</th>
<th>Site Configuration and Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Conduct ship painting, blasting, sanding, or stripping in specifically designated areas designed to minimize releases.</td>
<td></td>
</tr>
<tr>
<td>□ Pave work areas, preferably with concrete to allow easier removal of spills or wastes. Slope surface to allow capture of spills into a confined area or catch basin. Use catch basins with a valve that allow spills and releases to enter a dead-end sump. Use berms to minimize run-on of stormwater.</td>
<td></td>
</tr>
<tr>
<td>□ Create a paint/spray booth to prevent residue from being carried into surface waters and into the air. Portable, temperature-controlled boat paint booths are commercially available.</td>
<td></td>
</tr>
<tr>
<td>□ If a spray booth is not available, use temporary controls such as:</td>
<td></td>
</tr>
<tr>
<td>✓ Wind-blocking tarps to prevent dust and overspray from escaping.</td>
<td></td>
</tr>
<tr>
<td>✓ Shrouds between the vessel and pier/shore to prevent spillage into the water. Shrouds should be cleaned frequently to prevent material from being blown into the water.</td>
<td></td>
</tr>
<tr>
<td>✓ Plywood and/or plastic sheeting to cover open areas between decks when sandblasting (scuppers, railings, freeing ports, ladders, and doorways).</td>
<td></td>
</tr>
</tbody>
</table>
## BG-50 Marinas, Boat/Shipyards, and Ports

<table>
<thead>
<tr>
<th>✓</th>
<th>Drip pans, drop cloths, tarpaulins, or other protective devices in all paint mixing and solvent operations unless carried out in impervious contained and covered areas.</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>Prohibit uncontained spray painting, blasting or sanding activities over open water.</td>
</tr>
<tr>
<td>□</td>
<td>Prohibit outside spray painting, blasting, or sanding activities during windy conditions that render containment ineffective.</td>
</tr>
</tbody>
</table>

### Collection, Cleanup, Storage, Recycling, and Disposal

<p>| □ | Use vacuum sanders that have dust-containment bags to remove paint from hulls and collect paint dust. |
| □ | Plug scuppers to contain dust and debris. |
| □ | Don’t sand underwater or in a strong breeze. |
| □ | Wipe down small amounts of sanding dust with a damp rag. |
| □ | Clean up stripping wastes immediately to reduce potential releases from wind or stormwater. |
| □ | Collect spent abrasives regularly and store under cover to await proper disposal. |
| □ | Collect and properly dispose of wash water from washing painted boat hulls. Consider taking the boat to a local boat yard that is equipped to collect and treat wash water. |
| □ | Vacuum or sweep paved surfaces regularly. |
| □ | Do not hose down area. |
| □ | Dispose of empty solvent and paint containers properly. |
| □ | Dispose of lead-based paint residues in accordance with local, state, and federal guidelines. |
| □ | Do not pour out unused portions on the ground or down the storm drains. Use proper receptacles or disposal facilities for unused portions. |
| □ | Reuse blast material where possible. |
| □ | For boaters and tenants, provide: |
| ✓ | Used paint disposal facilities |
| ✓ | Paint stripping debris disposal area |
| □ | All paint and chemical strippers should be labeled and stored properly. |
| □ | Where necessary, regularly clean stormwater conveyances of deposits of abrasive blasting debris and paint chips, and dispose of waste properly. |</p>
<table>
<thead>
<tr>
<th>Waste Minimization</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Minimize volume of paints and chemical strippers purchased and stored to minimize waste.</td>
</tr>
<tr>
<td>□ Minimize amount of material subject to wind or rain.</td>
</tr>
<tr>
<td>□ Mix materials away from the water.</td>
</tr>
<tr>
<td>□ Reuse solvents and thinners.</td>
</tr>
<tr>
<td>□ Use brush or roller painting, rather than spray painting, where possible.</td>
</tr>
<tr>
<td>□ Use water-based paints and solvents, where possible.</td>
</tr>
<tr>
<td>□ Switch to longer lasting, less-toxic antifouling paints where possible.</td>
</tr>
<tr>
<td>□ Enforce the prohibition on the use of TBT-based paint as required by California Code of Regulations, Title 3, § 6400(e).</td>
</tr>
<tr>
<td>□ Support the use of environmentally compatible products.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Boat Cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>(See fact sheet SC21 – Vehicle and Equipment Washing and Steam Cleaning for other information not unique to this business type)</td>
</tr>
<tr>
<td>□ Do not allow in-water boat cleaning and encourage:</td>
</tr>
<tr>
<td>✓ Frequent cleaning of hulls to reduce buildup of hard growth</td>
</tr>
<tr>
<td>✓ Use of phosphate-free soaps and detergents</td>
</tr>
<tr>
<td>✓ Use of alternative anti-fouling paints</td>
</tr>
<tr>
<td>✓ Use of “natural” cleansers instead of solvents</td>
</tr>
<tr>
<td>□ No soaps or detergents of any kind should be used to wash the topsides of boats where the wash water will enter a waterbody</td>
</tr>
<tr>
<td>□ Discourage the use of detergents containing ammonia, sodium hypochlorite, chlorinated solvents, petroleum distillates, or lye.</td>
</tr>
<tr>
<td>□ Detergents and cleaning compounds used for washing boats should be phosphate-free and biodegradable, and amounts used should be kept to a minimum.</td>
</tr>
<tr>
<td>□ Do not allow in-the-water hull scraping or any abrasive process that occurs underwater and results in paint being removed from the boat hull. Encourage frequent hand washing with soft materials to remove scum and fouling organisms.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fueling</th>
</tr>
</thead>
<tbody>
<tr>
<td>(See fact sheet SC-20 – Vehicle and Equipment Fueling for other information not unique to this business type)</td>
</tr>
<tr>
<td>□ Have a responsible employee supervise the fuel dock.</td>
</tr>
</tbody>
</table>
**BG-50 Marinas, Boat/Shipyards, and Ports**

- Use automatic shut-off nozzles and promote the use of “whistles” and fuel/air separators on air vents or tank stems of inboard fuel tanks to minimize the amount of fuel spilled into surface waters during fueling of boats.

<table>
<thead>
<tr>
<th><strong>Maintenance</strong></th>
<th>Site design</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimize releases to surface water.</td>
</tr>
<tr>
<td></td>
<td>✓ Provide space for onshore maintenance that is connected to oil/water separator or sanitary sewer.</td>
</tr>
<tr>
<td></td>
<td>✓ Conduct hull repair and maintenance work in a drydock, whenever possible.</td>
</tr>
<tr>
<td></td>
<td>✓ Cover work areas.</td>
</tr>
<tr>
<td></td>
<td>✓ For new drydocks, provide full or moveable covers to prevent stormwater from entering work area.</td>
</tr>
<tr>
<td></td>
<td>Provide adequate stormwater controls.</td>
</tr>
<tr>
<td></td>
<td>✓ In uncovered drydocks, provide stormwater capture and pumping systems.</td>
</tr>
<tr>
<td></td>
<td>✓ Pump stormwater to treatment system or sanitary sewer.</td>
</tr>
<tr>
<td></td>
<td>For small vessels, provide and clearly mark designated work areas for outside boat repairs and maintenance. Do not permit work outside designated areas.</td>
</tr>
<tr>
<td></td>
<td>If work must be performed on a vessel while it is in the water, a tarp should be placed above the water surface underneath the work area to collect drips, spills, and loose solids.</td>
</tr>
<tr>
<td></td>
<td>Sweep maintenance yard areas, docks, and boat ramps weekly to collect oils, trash, paper, glass, and other loose debris. Do not hose down the area to the water or a storm drain.</td>
</tr>
<tr>
<td></td>
<td>Provide covered containers for solid waste that is generated within the facility to prevent direct discharges of trash into receiving waters.</td>
</tr>
</tbody>
</table>

**Maintenance Policies**

(See fact sheet SC-22 – Vehicle and Equipment Maintenance and Repair for other information not unique to this business type)

- Decide what type and how much maintenance and cleaning (as a percent of boat surface area) will be permitted in slips. Require boaters and tenants to take larger projects to onshore or drydock facilities with proper equipment and pollution controls.
- Prohibit maintenance activities unless appropriate space is available.
- Require that engine parts be washed over a container or in a parts washer, not over water or ground. Dispose of wash water as a hazardous waste.
## BG-50 Marinas, Boat/Shipyards, and Ports

- Insert language into facility leases and contracts that requires tenants and contractors to use certain areas and techniques when conducting boat maintenance.
- Establish the rule – “Nothing is left on the dock, nothing goes in the water.” If nothing is on the dock, nothing can be knocked or blown over or off of the dock.
- Educate boaters, tenants, employees, and contractors of these policies.

### Spill Prevention and Response

<table>
<thead>
<tr>
<th>Activity</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each facility should develop and maintain an oil spill prevention and countermeasures plan.</td>
<td>In the event of an accidental discharge of oil or hazardous material into the water or onto a deck or pier with a potential for entry into the water, immediately notify the yard, port, or marina owner or manager.</td>
</tr>
<tr>
<td>Inform your local harbormaster and fire department about your oil spill recovery plan and equipment.</td>
<td>Each facility should have adequate oil spill response equipment that is easily accessible and clearly marked.</td>
</tr>
<tr>
<td>In the event of an accidental discharge of oil or hazardous material into the water or onto a deck or pier with a potential for entry into the water, immediately notify the yard, port, or marina owner or manager.</td>
<td>Each facility should have adequate oil spill response equipment that is easily accessible and clearly marked.</td>
</tr>
<tr>
<td>Each facility should have adequate oil spill response equipment that is easily accessible and clearly marked.</td>
<td>If a spill occurs:</td>
</tr>
<tr>
<td>Each facility should have adequate oil spill response equipment that is easily accessible and clearly marked.</td>
<td><em>Stop source of spill immediately and contain liquid.</em></td>
</tr>
<tr>
<td>Each facility should have adequate oil spill response equipment that is easily accessible and clearly marked.</td>
<td><em>If the substance spills near or in the water, use containment booms, as appropriate. Do not use emulsifiers or dispersants.</em></td>
</tr>
<tr>
<td>Each facility should have adequate oil spill response equipment that is easily accessible and clearly marked.</td>
<td><em>As appropriate, cover spill with absorbent material.</em></td>
</tr>
<tr>
<td>Each facility should have adequate oil spill response equipment that is easily accessible and clearly marked.</td>
<td><em>If spill is in an enclosed area, keep the area ventilated.</em></td>
</tr>
<tr>
<td>Each facility should have adequate oil spill response equipment that is easily accessible and clearly marked.</td>
<td><em>Properly dispose of used oil spill response supplies.</em></td>
</tr>
</tbody>
</table>

### Ship Breaking

<table>
<thead>
<tr>
<th>Activity</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimize contact of rust or paint stripping debris with surface water.</td>
<td>Use drydock facilities whenever possible.</td>
</tr>
<tr>
<td>Minimize contact of rust or paint stripping debris with surface water.</td>
<td>At a minimum, use dry-docks for final hull scrapping.</td>
</tr>
<tr>
<td>Minimize contact of rust or paint stripping debris with surface water.</td>
<td>Provide shroud between ship and pier to minimize materials spilling into water.</td>
</tr>
<tr>
<td>Minimize contact of rust or paint stripping debris with surface water.</td>
<td>Cover work areas.</td>
</tr>
<tr>
<td>Minimize contact of rust or paint stripping debris with surface water.</td>
<td>Outfit new dry-docks with cover.</td>
</tr>
<tr>
<td>Minimize contact of rust or paint stripping debris with surface water.</td>
<td>Place tarp over inactive work areas where possible.</td>
</tr>
<tr>
<td>Boxed</td>
<td>Cover storage areas.</td>
</tr>
<tr>
<td>Boxed</td>
<td>Scrapping and storage areas should be paved where possible.</td>
</tr>
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</tbody>
</table>

### Scrapping Operations

| Boxed | Cover work areas where possible. |
| Boxed | Provide tarps or solid covers, particularly in areas where fuels, lubricants, and other hazardous materials were used and stored. |
| Boxed | Remove fluids before starting scrapping process. |
| Boxed | Store fluids separately. |
| Boxed | Do not mix fuel, lubricants, and other chemicals together. |
| Boxed | Provide adequate spill response material at scrapping and storage areas. |
| Boxed | Clean up spills of fluids before scrapping. |
| Boxed | Clean up spills during scrapping process as they occur. |
| Boxed | Cover all fluids removed during scrapping operations. |
| Boxed | Cover oily scrap with tarp to eliminate stormwater run-on. |
| Boxed | Encourage operators to keep equipment tuned up and in good working condition. |
| Boxed | Leaks should be identified and repaired. |
| Boxed | Provide shroud between ship and pier/dock to prevent materials from spilling into surface water. |
## BG-50 Marinas, Boat/Shipyards, and Ports

| **Clean shroud** | Clean shroud frequently to prevent material from being blown into the water. |
| **Clean work areas** | Clean work areas frequently. |
| **Remove dust** | Remove dust and spills on a daily basis and before hull is breached. |
| **Remove asbestos** | Remove asbestos in accordance with local, state, and federal regulations. |
| **Remove sand blast residue** | Remove and dispose of sand blast residue in accordance with local, state, and federal guidelines. |
| **Do not sand blast** | Do not sand blast over open water. |
| **Provide cover** | Provide cover over work area and shroud under work area. |
| **Remove PCB-containing materials** | Remove PCB-containing materials in accordance with federal, state, and local guidelines. |
| **Provide skin and respiratory protection** | Provide skin and respiratory protection for affected workers. |

### Vessel in-harbor Operations

| **Sewage Disposal** | Install pumpout stations to receive sewage from onboard Marine Sanitation Devices (MSDs). |
| **Install a dump station** | Install a dump station, possibly located at the end of a pier, to receive sewage from portable or removable toilets (port-a-potty) typical on smaller boats. |
| **Ensure pumpout facilities available** | Ensure that pumpout facilities are available on weekend mornings and evenings when demand is high. |
| **Keep pumpout fees** | Keep pumpout fees to a minimum to encourage use. |
| **Inspect pumpout stations** | Inspect pumpout stations routinely enough to ensure that the equipment is functioning properly. If it takes longer than 30-35 seconds to empty a 5-gallon bucket, the station needs servicing. |
| **Arrange maintenance contracts** | Arrange maintenance contracts with contractors competent in the repair and servicing of pumpout facilities. |
| **Maintain a dedicated fund** | Maintain a dedicated fund for the repair and maintenance of marina pumpout stations. |
| **Add language to slip leasing agreements** | Add language to slip leasing agreements mandating the use of pumpout facilities and specifying penalties for failure to comply. |
| **Enforce California’s no discharge zone** | Enforce California’s no discharge zone (no discharge of untreated sewage into any lake, river, reservoir, or coastal area) and federal “No Discharge Areas” (significant bays and harbors in California). |
| **Formally advise** | Formally advise the local municipality that there is a pumpout facility available and provide pertinent information, such as times of operation and fees. |
BG-50 Marinas, Boat/Shipyards, and Ports

- Encourage the local harbormaster to enforce existing state and federal regulations pertaining to Marine Sanitation Devices and the illegal discharge of boat sewage.
- Educate boaters about the state and federal regulations, impacts of discharging untreated sewage, and the availability of pumpout stations.
- Encourage boaters to use marina restrooms, not boat heads.
- Consider requiring new live-aboard tenants to have adequate holding tanks, not just portable toilets.
- Provide signage marking pumpout station locations, hours of operation, and operation guidance.

Bilge Water Disposal

- Provide bilge pumpout stations connected to oil/water separator and sanitary sewer. Regularly inspect connecting hoses for leaks.
- Inform ship captains, boaters, tenants, and contractors that discharging bilge water contaminated with oil, fuel, or other regulated contaminants is illegal. Post location of the nearest bilge pumpout service, if the marina does not have one.
- Promote the use of oil-absorbing materials in the bilge areas of all boats with inboard engines. Encourage your tenants to examine these materials at least once a year, replace them as necessary, and recycle them if possible or dispose of them in accordance with petroleum disposal regulations.
- Keep low cost or no cost oil absorbent pads available for boaters and tenants to remove oil from bilge water. Dispose the pads as hazardous waste once they are saturated.
- Collect oil contaminated by water, fuel, or engine fluids for proper disposal. If the marina does not collect waste oil, post the location of the nearest collection facility.

Loading / Unloading Vessels
(See fact sheet SC-30 – Outdoor Loading / Unloading of Materials for other information not unique to this business type)

- Use covered containers for loading / unloading materials and products.
- Cover materials stored outside.
- Use temporary barriers during unloading from vessels to contain runoff from pier deck.
### Waterfront or Over-water Areas Management

<table>
<thead>
<tr>
<th>Waterfront or Over-water Areas Management</th>
<th>Dry Dock Maintenance and Dry Docking</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Hang plastic barriers from flying bridge of the drydock, from bow or stern of vessel, or from temporary structures and place beneath hull and between drydock walls for containment.</td>
<td></td>
</tr>
<tr>
<td>□ Weight bottom edge of containment tarps during light breeze.</td>
<td></td>
</tr>
<tr>
<td>□ Cover open areas between decks when sandblasting (railings, scuppers, freeing ports, ladders, doorways, etc.).</td>
<td></td>
</tr>
<tr>
<td>□ Sweep accessible areas of drydock to remove debris before flooding.</td>
<td></td>
</tr>
<tr>
<td>□ Clean rest of drydock after vessel is removed and dock raised.</td>
<td></td>
</tr>
<tr>
<td>□ Collect any wash water used and treat to remove solids and other potential pollutants.</td>
<td></td>
</tr>
</tbody>
</table>

**Non-drydock Containment**

<table>
<thead>
<tr>
<th>Non-drydock Containment</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Hang tarps from boat, fixed, or floating platforms and place under boats to reduce wind-blown pollutants and collect waste.</td>
</tr>
<tr>
<td>□ Pave or tarp surfaces under marine railways and clean before incoming tide.</td>
</tr>
<tr>
<td>□ Haul vessels beyond high tide zone before work starts or stop work during high tide.</td>
</tr>
<tr>
<td>□ Place containment berms around fixed pieces of machinery that use oil and gas within the facility.</td>
</tr>
</tbody>
</table>

**Collection facilities and recycling**

(See fact sheet SC-34 – Waste Handling and Disposal for other information not unique to this business type)

<table>
<thead>
<tr>
<th>Collection facilities and recycling</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Provide covered receptacles for recycling used oil and oil filters in accessible locations.</td>
</tr>
<tr>
<td>□ Provide proper and easily accessible trash disposal facilities to marina patrons. Because of the tendency for windy conditions in nearshore areas, covered dumpsters or other covered receptacles are preferred.</td>
</tr>
<tr>
<td>□ Provide facilities for the eventual recycling of appropriate materials, such as glass, aluminum, plastic, trash, newspapers, and batteries.</td>
</tr>
<tr>
<td>□ Clearly mark receptacles to minimize disposal of hazardous waste such paints and solvents.</td>
</tr>
<tr>
<td>□ Develop information packets for ship captains and boaters:</td>
</tr>
<tr>
<td>✓ Identify solid waste facilities.</td>
</tr>
<tr>
<td>✓ Prescribe acceptable waste handling procedures.</td>
</tr>
</tbody>
</table>
**BG-50 Marinas, Boat/Shipyards, and Ports**

- Educate ship captains, boaters, employees, and contractors of the following requirements (MARPOL treaty):
  - No discharge of garbage (food wastes), plastics, trash (non-plastic), packaging, line, nets, or fish cleaning wastes within 3 nautical miles of United States coastline.
  - Boats over 26 feet must display MARPOL placard in a visible location.
  - Boats over 40 feet must display the placard plus have a written waste management plan on board.

- Empty solid waste receptacles as often as necessary to keep up with disposal.

### Pier Deck and Floor Cleaning

(See business guide sheet – Mobile Cleaning - Surface Cleaning for other information not unique to this business type)

- Monitor outdoor areas for dirt and debris.
- Clean regularly all accessible work, service, and storage areas to remove debris, spent sandblasting material, and any other potential stormwater pollutants.
- Do not dump or sweep debris and wastes into outdoor drains, between planking, or over the side of piers.
- Sweep and pickup rather than hosing down. If hosing is unavoidable dry sweep thoroughly first to collect potential pollutants prior to rinsing.
- Do not use soap or chemicals when rinsing down areas that drain into outdoor drains, between planking, or over the side of piers.
- Do not wash vehicles or equipment with soap or cleaners on pier decks or valleys that do not drain to the sewer system.
- Do not rinse fish wastes to outdoor drains or off the premises.
- Immediately repair or replace leaking connections, valves, pipes, hoses and equipment that causes the pollution of stormwater.
-Immediately clean up any spillage on dock, boat, or ship deck areas and dispose of the wastes properly.

### Inspections

- Conduct routine inspections of all work areas to ensure releases are minimized.
- Regularly inspect stormwater management devices such as traps and screens and remove captured spent abrasives, paint chips, and solids to ensure that these wastes do not get flushed into stormwater or receiving water.
Fish Handling
- Clean fish offshore where the fish are caught and dispose fish waste at sea.
- Dispose of unwanted bait at sea or freeze and use on the next trip.
- Establish designated fish cleaning stations at the marina and boat launching sites and require fishermen to only use these sites to clean fish.
- Ensure that fish cleaning areas have ample covered receptacles for waste and are hooked up to the sewer system. Clean the stations frequently and make sure the collected waste is disposed of regularly and properly.
- Compost fish waste when possible. Contact a local extension service for information on locally applicable composting procedures and equipment and where supplies can be purchased.

Education
- Participate in the California Clean Marina Program and become a certified clean marina. More information at: http://www.cleanmarina.org/
- Provide information to marina tenants on collection and recycling programs for oil, oil-absorbing pads, and oil filters.
- Direct marina patrons to the proper disposal of all used hydrocarbon products through the use of signs, mailings, and other means.
- Insert language into facility contract that recommends tenants use fuel/air separators and oil absorption materials.

Treatment Control BMPs
- Direct deck drainage to a collection system sump for settling and/or additional treatment.
- For activities with high pollutant-generating potential, conduct the activity in a dedicated, self-contained area and direct the wastewater to the sanitary sewer (with the permission of the local wastewater authority).

If treatment controls are installed at the facility, see Section 4 of this Handbook for information on inspecting and maintaining the BMPs.

For information on designing treatment controls, see Section 5 of the New Development and Redevelopment Planning Handbook.

More Information

Facility Owners and Operators

California Clean Marina Program. More information at: http://www.cleanmarina.org/


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**Boaters and Tenants**


**References**


USEPA, Office of Water, National Pollution Discharge Elimination System, Undated website. EPA’s Multi-Sector General Permit (MSGP). Available on-line at:

Description
This category includes businesses that both conduct their own mobile cleaning activities and those that are hired as contractors to conduct these activities. Mobile cleaning differs from other cleaning activities in that the cleaning is not conducted in a dedicated, fixed location with a wastewater capture and treatment system connected to the sanitary sewer system. This category includes cleaning of carpets and upholstery. Information specific to: other amenities, transportation-related cleaning, food service business-related cleaning, or surface cleaning is provided in other guide sheets.

Pollutant Sources
The following are sources of pollutants:

- Cleaning chemicals
- Carpet fibers

Pollutants can include:

- Toxic organic compounds

Approach
Never discharge wash water or wastewater from these activities to the driveway, street, gutter, or near a storm drain.
Source Control BMPs
The best management practices are listed by activity or area in the table below.

<table>
<thead>
<tr>
<th>Disposal of Wastewater</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Check the local municipal sewer agency or wastewater authority’s requirements for special discharge requirements.</td>
</tr>
<tr>
<td>□ Cleaning waste must be discharged to a sink, toilet, or other drain connected to the sanitary sewer system – never to the driveway, a street, gutter, parking lot, or storm drain. Either:</td>
</tr>
<tr>
<td>✔ Collect the spent cleaning fluid tank and transport it service provider’s facility and properly dispose in a utility sink or other connection to the sanitary sewer</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>✔ Arrange with the customer to discharge into a toilet or utility sink on the residential or commercial location.</td>
</tr>
</tbody>
</table>

These guidelines apply even to cleaning products labeled “nontoxic” and “biodegradable.” “Nontoxic” means the product is not toxic to the user. “Biodegradable” means the product will eventually break down. Such products can harm wildlife if they enter a storm drain.

Treatment Control BMPs
The use of self-contained, mobile wastewater collection/treatment units may be appropriate and cost-effective for some mobile cleaning activities.

References


BG-61 Mobile Cleaning – Food Service Related

Description
This category includes businesses that both conduct their own mobile cleaning or “power washing” activities and those that are hired as contractors to conduct these activities. Mobile cleaning differs from other cleaning activities in that the cleaning is not conducted in a dedicated, fixed location with a wastewater capture and treatment system connected to the sanitary sewer system. This category includes mobile cleaning or power washing of food service business-related objects or areas:

- Restaurant alleys and dumpster areas
- Restaurant floor mats and exhaust filters (baffles)
- Kitchen oil and grease
- Grocery carts
- Lunch wagons and food carts

Information specific to: transportation-related cleaning, surface cleaning, or cleaning of amenities is provided in other guide sheets.

Pollutant Sources
The following are sources of pollutants:

- Using harmful cleaning chemicals – including soaps as well as solvents
- Removing food waste, trash, and oil and grease
- Generating polluted wash water from cleaning activities

Pollutants can include:

- Organic materials (food wastes)
BG-61 Mobile Cleaning – Food Service Related

- Oil and grease
- Toxic chemicals in cleaning products, disinfectants, and pesticides

**Approach**

The potential for generating stormwater pollution as part of these activities requires extra attention because by definition these activities are conducted outside with water (and sometimes chemicals) for the purpose of removing residues, dirt, and debris. Make stormwater pollution prevention BMPs and proper wastewater disposal a part of standard operating procedures and the employee training program. Provide employee education materials in the first language of employees, as necessary.

Use the following four-step approach:

1. Do dry cleanup before washing down
2. Wash without soaps and solvents
3. Keep polluted water out of storm drains
4. Dispose of wastewater correctly and legally

**Source Control BMPs**

The best management practices are listed by activity or area in the following table. Discharging wastewater to the sanitary sewer must be performed in accordance with local regulations.

<table>
<thead>
<tr>
<th>Restaurant Alleys and Dumpster Areas</th>
<th>□ Do not discharge wash water to storm drain.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Use dry cleaning methods only (use absorbents, sweep debris)</td>
</tr>
<tr>
<td></td>
<td>□ After using dry cleaning methods,</td>
</tr>
<tr>
<td></td>
<td>✓ Temporarily seal the storm drain.</td>
</tr>
<tr>
<td></td>
<td>✓ Wash area with hose and brush.</td>
</tr>
<tr>
<td></td>
<td>✓ Pump wash water to sanitary sewer.</td>
</tr>
<tr>
<td></td>
<td>✓ Use screens to collect wash water particles before entrance to sanitary sewer.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Restaurant Floor Mats and Exhaust Filters (baffles)</th>
<th>□ Do not discharge wash water to storm drain.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ When cleaning mats, either:</td>
</tr>
<tr>
<td></td>
<td>✓ Clean mats, etc. indoors and discharge to sanitary sewer or clean mats, etc. outside in berm or sloped area which drains to sanitary sewer. [or]</td>
</tr>
<tr>
<td></td>
<td>✓ Take mats and baffles to a public car wash that discharges wash water to the sanitary sewer</td>
</tr>
</tbody>
</table>
**BG-61 Mobile Cleaning – Food Service Related**

<table>
<thead>
<tr>
<th>Kitchen Oil and Grease</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Do not pour wash waters into storm drain or sanitary sewer (sink, floor drain, etc.)</td>
</tr>
<tr>
<td>□ Consult local wastewater authority for proper disposal of Fats, Oils, and Grease (FOG)</td>
</tr>
<tr>
<td>□ Save in sealed containers such as tallow bin</td>
</tr>
<tr>
<td>□ Separate recyclable fats from waste grease (from an interceptor or trap).</td>
</tr>
<tr>
<td>□ See “Tallow,” “Grease Traps,” or “Septic” in yellow pages for recycling or disposal service or locations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grocery Carts</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ If soap is used</td>
</tr>
<tr>
<td>✓ Collect and filter the wastewater.</td>
</tr>
<tr>
<td>✓ Then pump it to the sanitary sewer.</td>
</tr>
<tr>
<td>□ If soap is not used</td>
</tr>
<tr>
<td>✓ Capture and filter wash water.</td>
</tr>
<tr>
<td>✓ Spread wash water over pervious surfaces to allow infiltration or use for landscape irrigation (with owner's permission).</td>
</tr>
</tbody>
</table>

**Treatment Control BMPs**

The use of self-contained, mobile wastewater collection/treatment units may be appropriate and cost-effective for some mobile cleaning activities.

**References**

BG-61 Mobile Cleaning –
Food Service Related

BG-62 Mobile Cleaning – Surface Cleaning

Description
This category includes businesses that both conduct their own mobile cleaning or “power washing” activities and those that are hired as contractors to conduct these activities. Mobile cleaning differs from other cleaning activities in that the cleaning is not conducted in a dedicated, fixed location with a wastewater capture and treatment system connected to the sanitary sewer system. This category includes mobile cleaning or power washing of flat surfaces including:

- Sidewalks and plazas
- Parking areas, driveways, and drive-throughs
- Restaurant / food handling cleaning and storage areas
- Building exteriors, roofs, and decks
- Painted surfaces being cleaned to remove paint or graffiti
- Graffiti removal

Information specific to: transportation-related cleaning, food service business-related cleaning, or cleaning of amenities is provided in other guide sheets.

Pollutant Sources
The following are sources of pollutants:

- Using harmful cleaning chemicals – including soaps as well as solvents
- Removing toxic materials such as oil, antifreeze, and grease from parking lots, sidewalks, and other surfaces
BG-62 Mobile Cleaning – Surface Cleaning

- Generating polluted wash water from activities such as wet sand blasting of buildings to remove paint

Pollutants can include:

- Heavy metals (copper, lead, and zinc)
- Oils and greases
- Trash
- Sediment
- Toxic organic compounds

Highly polluted sites can generate hazardous waste including:

- Oil-saturated absorbents (but not oil-saturated rags, which can be cleaned at an industrial laundry)
- Wash water that contains lead paint chips
- Solvent cleaners

Approach

The potential for generating stormwater pollution as part of these activities requires extra attention because by definition these activities are conducted outside with water (and sometimes chemicals) for the purpose of removing residues, dirt, and debris. Make stormwater pollution prevention BMPs and proper wastewater disposal a part of standard operating procedures and the employee training program. Provide employee education materials in the first language of employees, as necessary.

Use the following four-step approach:

1. Do dry cleanup before washing down
2. Wash without soaps and solvents
3. Keep polluted water out of storm drains
4. Dispose of wastewater correctly and legally
**BG-62 Mobile Cleaning – Surface Cleaning**

**Source Control BMPs**

The best management practices are listed by activity or area in the table below. Discharging wastewater to the sanitary sewer must be performed in accordance with local regulations.

<table>
<thead>
<tr>
<th>Type of Surface</th>
<th>Cleaning Method</th>
<th>Proper Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidewalks, plazas</td>
<td>□ Dry cleanup first, wash without soap.</td>
<td>□ Screen wash water, if needed, to catch debris then discharge to landscaping, or to a gutter, street, or storm drain.</td>
</tr>
<tr>
<td></td>
<td>□ If necessary to wash with soap, temporarily block the storm drain or contain runoff.</td>
<td>□ Discharge to landscaping or collect water and pump to the sanitary sewer.</td>
</tr>
<tr>
<td></td>
<td>□ Screen wash water, if needed, to catch debris then discharge to landscaping, or to a gutter, street, or storm drain.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Discharge to landscaping or collect water and pump to the sanitary sewer.</td>
<td></td>
</tr>
<tr>
<td>Parking areas, driveways, drive-throughs</td>
<td>□ Temporarily block the storm drain or contain runoff.</td>
<td>□ Collect water and pump to the sanitary sewer.</td>
</tr>
<tr>
<td></td>
<td>□ Use absorbents to pick up oil; then dry sweep.</td>
<td>□ <em>Check the local wastewater authority’s requirements for discharge.</em></td>
</tr>
<tr>
<td></td>
<td>□ Clean with or without soap.</td>
<td></td>
</tr>
<tr>
<td>Restaurant/food handling dumpster areas, grease storage</td>
<td>□ Temporarily block the storm drain or contain runoff.</td>
<td>□ If you must use water after sweeping/using absorbents, collect water and pump to the sewer.</td>
</tr>
<tr>
<td></td>
<td>□ Perform an initial dry cleanup using a broom.</td>
<td>□ <em>Check the local wastewater authority’s requirements for discharge.</em></td>
</tr>
<tr>
<td>Building surfaces, decks, etc., without loose paint</td>
<td>□ Use high-pressure water, no soap.</td>
<td>□ Screen wash water, if needed, to catch debris</td>
</tr>
<tr>
<td></td>
<td>□ Discharge to landscaping, or to a gutter, street, or storm drain.</td>
<td>□ Make sure pH is between 6 and 10</td>
</tr>
<tr>
<td>Unpainted building surfaces, wood decks, etc.</td>
<td>□ Block the storm drain or contain runoff.</td>
<td>□ Discharge to landscaping or collect wash water into a tank and pump to the sanitary sewer.</td>
</tr>
<tr>
<td></td>
<td>□ Use soap or acid wash to remove deposits, wood restorer, or other chemicals.</td>
<td>□ <em>Check the local wastewater authority’s requirements for discharge.</em></td>
</tr>
</tbody>
</table>
## Painted surfaces being cleaned to remove paint or graffiti

- Temporarily block the storm drain or contain runoff.
- Use cleaning method which minimizes use of water.
- Collect wash water in a tank and pump to the sewer, or dispose as hazardous waste, as appropriate.
- Call the local municipal wastewater agency or check the CalRecycle Website for help in determining whether the paint contains toxic pollutants or if the solvent cleaners you use are hazardous.

## Graffiti removal

- Temporarily block the storm drain or contain runoff.
- Direct all runoff to a landscaped or unpaved area or follow instructions above for painted surfaces.

### Treatment Control BMPs

The use of self-contained, mobile wastewater collection/treatment units may be appropriate and cost-effective for some mobile cleaning activities.

### References


Description
This category includes businesses that both conduct their own mobile cleaning activities and those that are hired as contractors to conduct these activities. Mobile cleaning differs from other cleaning activities in that the cleaning is not conducted in a dedicated, fixed location with a wastewater capture and treatment system connected to the sanitary sewer system. This category includes cleaning swimming pools and spas. Information specific to: other amenities, transportation-related cleaning, food service business-related cleaning, or surface cleaning is provided in other guide sheets.

Pollutant Sources
The following are sources of pollutants:
- Filter cleaning
- Algae control
- Pool draining
Pollutants can include:
- Copper
- Chlorine
- Solids from filter backwash.

Approach
Never discharge wash water or wastewater from these activities to the driveway, street, gutter, or near a storm drain. Follow local regulations for draining swimming pools into the sanitary sewer system.

Source Control BMPs
The best management practices are listed by activity or area in the table below.
## Preventative Maintenance
- Prevent algae problems with regular cleaning, consistent adequate chlorine levels, and well-maintained water filtration and circulation systems.
- Manage pH and water hardness to minimize corrosion of copper pipes.

## Filter Cleaning
- Never clean a filter in the street or near a storm drain.
- Rinse cartridge filters onto a dirt area, and spade filter residue into soil.
- Backwash diatomaceous earth filters onto dirt. Dispose of spent diatomaceous earth in the garbage.
- If there is not a suitable dirt area, call the local wastewater treatment plant for instructions on discharging filter backwash or rinsewater to the sanitary sewer.

## Algae Problems
- Resolve persistent problems without copper algaecides. Use chlorine or other alternatives. For more information about non-copper algae prevention, consult a pool chemical supplier.

## Draining Pools
- Do not discharge pool, spa, or fountain water to the street, storm drain, or where water might flow to a creek or seasonal stream.
- It is almost always possible to discharge to a sanitary sewer cleanout. If assistance is needed in locating the cleanout, call the local sanitary sewer agency.
- When draining a pool to the sanitary sewer, prevent backflow by maintaining an “air gap” between the discharge line and the sewer line (do not seal the connection between the hose and sewer line).
- When it is time to drain a pool, spa, or fountain, be sure to call the local sanitary sewer agency for further guidance on flow rate restrictions, backflow prevention, and handling special cleaning waste (such as acid wash).
- Discharge flows should be kept to the low levels typically possible through a garden hose. Higher flow rates may be prohibited by local ordinance.

### Treatment Control BMPs
The use of self-contained, mobile wastewater collection/treatment units may be appropriate and cost-effective for some mobile cleaning activities.

### References


Description

This category includes businesses that both conduct their own mobile cleaning or “power washing” activities and those that are hired as contractors to conduct these activities. Mobile cleaning differs from other cleaning activities in that the cleaning is not conducted in a dedicated, fixed location with a wastewater capture and treatment system connected to the sanitary sewer system. This category includes mobile cleaning or power washing of transportation-related objects or areas including:

- Mobile cleaning or power washing of vehicle exteriors
- Engine or equipment degreasing
- Acid cleaning of unpainted trucks or containers
- Auto detailing
- Car lot rinsing

Information specific to: food service business-related cleaning, surface cleaning, or cleaning of amenities is provided in other guide sheets.

Pollutant Sources

The following are sources of pollutants:

- Using harmful cleaning chemicals – including soaps as well as solvents
- Removing toxic materials such as oil, antifreeze, and grease
- Generating polluted wash water from cleaning activities

Pollutants can include:

- Heavy metals (copper, lead, nickel, and zinc)
BG-64 Mobile Cleaning – Vehicle and Equipment Washing

- Hydrocarbons (oil and grease, PAHs)
- Toxic chemicals (solvents, chlorinated compounds, glycols)
- Acids and alkalis

**Approach**

The potential for generating stormwater pollution as part of these activities requires extra attention because by definition these activities are conducted outside with water (and sometimes chemicals) for the purpose of removing residues, dirt, and debris. Make stormwater pollution prevention BMPs and proper wastewater disposal a part of standard operating procedures and the employee training program. Provide employee education materials in the first language of employees, as necessary.

Use the following four-step approach:

1. Do dry cleanup before washing down
2. Wash without soaps and solvents
3. Keep polluted water out of storm drains
4. Dispose of wastewater correctly and legally

**Source Control BMPs**

The best management practices are listed by activity or area in the table below. Discharging wastewater to the sanitary sewer must be performed in accordance with local regulations.

<table>
<thead>
<tr>
<th>Exterior Fleet Washing</th>
<th>Do not discharge contaminated wash water to storm drain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use wash pads to capture wash water</td>
</tr>
<tr>
<td></td>
<td>Use one of the following practices for disposal of the wash water:</td>
</tr>
<tr>
<td></td>
<td>✓ Discharge to sanitary sewer</td>
</tr>
<tr>
<td></td>
<td>or</td>
</tr>
<tr>
<td></td>
<td>✓ Temporarily seal storm drain, collect, and discharge to sanitary sewer or if minimal discharge, discharge to vegetated area (with owner’s permission) if it will contain all wastewater without runoff.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semi-Trailers (food service business-related interior cleaning)</th>
<th>Do not discharge wash water into storm drain inlets.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sweep, collect, and dispose of debris.</td>
</tr>
<tr>
<td></td>
<td>Use dry cleaning methods.</td>
</tr>
<tr>
<td></td>
<td>Dispose of food residue as garbage or to sanitary sewer.</td>
</tr>
<tr>
<td></td>
<td>Avoid hosing down trailer.</td>
</tr>
<tr>
<td></td>
<td>Send wash water to sanitary sewer.</td>
</tr>
</tbody>
</table>
### Treatment Control BMPs

The use of self-contained, mobile wastewater collection and treatment units may be appropriate and cost-effective for some mobile cleaning activities.

### References


Orange County Stormwater Program. Industrial/Commercial Business Activities Best Management Practices. Fact Sheet IC24 Disposal of Wastewater Generated by Mobile

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| **Boat Cleaning** (if paint chips are removed in preparation for painting) | ☐ Discharge filtered wash water to sanitary sewer.  
☐ Dispose of lead-based, copper-based, tributyltin, or PCB paint particles as hazardous waste.  
☐ Other types of paint chips may be disposed of in a garbage can. Consult the local garbage company. |
|---|---|
| **Engine and Equipment Degreasing** | ☐ Do not discharge wash water to storm drain.  
☐ Pretreatment is required before discharge to the sanitary sewer is allowed.  
☐ Clean wash pads.  
☐ Discuss with customer’s facility operator first. |
| **Acid Cleaning of Unpainted Trucks or Containers** | ☐ Do not discharge wash water to storm drain.  
☐ Neutralize runoff to a pH between 6 and 10.  
☐ Discharge to sanitary sewer (once runoff is neutralized). |
| **Auto Detailing** | ☐ Small amounts of runoff may be allowed to evaporate on a paved surface.  
☐ Plug the storm drain. Collect and discharge to sanitary sewer or if minimal discharge, discharge to unpaved area (with owner’s permission) if it will contain all wastewater without runoff.  
☐ Discharge remaining soapy wash water to sanitary sewer or distribute over a large dirt area (with owner’s permission). |
| **Rinsing of New Cars for Dust Removal** (no soap used) | ☐ May discharge to storm drain or unpaved area.  
☐ Do not allow runoff to flow through oil deposits on streets. |
BG-64 Mobile Cleaning – Vehicle and Equipment Washing


Description
This category includes businesses that both conduct their own mobile cleaning activities and those that are hired as contractors to conduct these activities. Mobile cleaning differs from other cleaning activities in that the cleaning is not conducted in a dedicated, fixed location with a wastewater capture and treatment system connected to the sanitary sewer system. This category includes servicing water softeners in residential and/or commercial locations.

Information specific to: other amenities, transportation-related cleaning, food service business-related cleaning, or surface cleaning is provided in other guide sheets.

Pollutant Sources
The following are sources of pollutants:
- Regeneration

Pollutants can include:
- Brine containing chlorides, calcium, and magnesium

Approach
Never discharge wash water or wastewater from these activities to the street, gutter, or near a storm drain. Make stormwater pollution prevention BMPs and proper wastewater disposal a part of standard operating procedures and the employee training program. Provide employee education materials in the first language of employees, as necessary.

Source Control BMPs
The best management practices are listed by activity or area in the table below. Discharging wastewater to the sanitary sewer must be performed in accordance with local regulations.

Treatment Control BMPs
The use of self-contained, mobile wastewater collection and treatment units may be appropriate and cost-effective for some mobile cleaning activities.
## Brine Disposal

- Brine from regeneration must be discharged to a sink, toilet, or other drain connected to the sanitary sewer system – never to a street, gutter, parking lot, or storm drain. Either:
  - Empty the brine into a utility sink or other indoor sewer connection at the service provider’s home base
  - or
  - Arrange with the customer to discharge into a toilet or utility sink on their premises.

- Check the local wastewater authority’s requirements for discharge. Some wastewater authorities may prohibit discharge of brine to the sewer system, particularly where discharge salinity is regulated. In these areas, on-site regeneration is not allowed.

## Wastewater Salinity Reduction

- Reducing the salinity content of your wastewater can reduce the impacts of salinity on the sanitary sewer system
  - Put kitchen food waste in the trash instead of the in-sink garbage disposal. Food waste is high in salt.
  - If you use powered soap in your dishwashers or washing machine, replace it with liquid soap. Powdered soaps have higher salt content.
  - Use dryer sheets instead of liquid laundry softeners. Liquid softeners have high salt content.
  - When cleaning floors, use mopping pads instead of a traditional mop and bucket of water

## References


4 Treatment Control BMPs

4.1 Introduction

This section discusses the inspection and maintenance requirements for treatment control BMPs for stormwater runoff. The specific design requirements, performance specifications, and limitations of each of these BMPs are discussed in detail in the New Development and Redevelopment BMP Handbook. Inspection and maintenance requirements are necessary to verify that each treatment control BMP performs efficiently throughout its design life. Although specific inspection and maintenance frequencies are presented in the following fact sheets, these are only suggested and should be adapted to each site situation to best accommodate environmental, economic, and local regulatory concerns.

For the purpose of this Handbook, treatment control BMPs have been classified according to whether they are public domain or proprietary controls. Public domain controls, as the name implies, are controls that are available to the general public, while proprietary controls are typically patented devices and are purchased from a vendor.

4.2 Public Domain BMPs

The public domain treatment control BMPs discussed in this section are listed in Table 4-1. Maintenance fact sheets for each treatment control BMP are provided in Section 4.5.

4.3 Manufactured (Proprietary) Treatment Control Devices

Numerous proprietary treatment control devices are available as well. Manufacturers typically have recommended inspection schedules and maintenance requirements for each device. If your industry utilizes proprietary treatment control devices for stormwater runoff, a maintenance agreement and detailed maintenance plan should be developed to ensure that they are well maintained and operate according to design specifications. For many manufactured devices, industry owners can contract with the manufacturer or representative to provide

Table 4-1 Maintenance Fact Sheets for Public Domain Treatment Control BMPs

<table>
<thead>
<tr>
<th>TC-10</th>
<th>Infiltration Trench</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC-11</td>
<td>Infiltration Basin</td>
</tr>
<tr>
<td>TC-12</td>
<td>Harvest and Reuse</td>
</tr>
<tr>
<td>TC-20</td>
<td>Wet Pond</td>
</tr>
<tr>
<td>TC-21</td>
<td>Constructed Wetland</td>
</tr>
<tr>
<td>TC-22</td>
<td>Extended Detention Basin</td>
</tr>
<tr>
<td>TC-30</td>
<td>Vegetated Swale</td>
</tr>
<tr>
<td>TC-31</td>
<td>Vegetated Buffer Strip</td>
</tr>
<tr>
<td>TC-32</td>
<td>Bioretention</td>
</tr>
<tr>
<td>TC-40</td>
<td>Media Filter</td>
</tr>
<tr>
<td>TC-50</td>
<td>Water Quality Inlet</td>
</tr>
<tr>
<td>TC-60</td>
<td>Multiple Systems</td>
</tr>
</tbody>
</table>

Table 4-2 Maintenance Fact Sheets for Manufactured (Proprietary) Treatment Control BMPs

<table>
<thead>
<tr>
<th>MP-20</th>
<th>Biotreatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP-40</td>
<td>Media Filter</td>
</tr>
<tr>
<td>MP-50</td>
<td>Wet Vault</td>
</tr>
<tr>
<td>MP-51</td>
<td>Gravity Separator</td>
</tr>
<tr>
<td>MP-52</td>
<td>Drain Inlet Insert</td>
</tr>
</tbody>
</table>
maintenance services. Table 4-2 shows a list of available manufactured stormwater treatment control devices. Maintenance fact sheets for each BMP are provided in Section 4.5.

### 4.4 Maintenance BMP Fact Sheet Format

<table>
<thead>
<tr>
<th>Name of Treatment Control BMP</th>
<th>A maintenance BMP fact sheet is a short document that gives guidance information about inspecting and maintaining a particular BMP including suggested frequencies for inspection and maintenance activities. Typically, each fact sheet contains the information outlined in Figure 4-1.</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Description</td>
<td>The fact sheets also contain side bar presentations with information on BMP maintenance concerns, objectives and goals; targeted constituents; and removal effectiveness if known.</td>
</tr>
<tr>
<td>Inspection/Maintenance Considerations</td>
<td></td>
</tr>
<tr>
<td>Inspection Activities</td>
<td></td>
</tr>
<tr>
<td>Maintenance Activities</td>
<td></td>
</tr>
<tr>
<td>Additional Information</td>
<td></td>
</tr>
<tr>
<td>References</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4-1 Example Fact Sheet**

### 4.5 Maintenance BMP Fact Sheets

Maintenance fact sheets for public domain and manufactured treatment control BMPs follow. The BMP fact sheets are individually page numbered and are suitable for photocopying and inclusion in SWPPPs. Current copies of the fact sheets can be individually downloaded from the California Stormwater BMP Handbook web site at [http://www.casqa.org](http://www.casqa.org). As noted previously, the reader should refer to the New Development and Redevelopment BMP Handbook for details regarding BMP design, performance, and installation. In addition to the references at the end of each fact sheet, the 2003 version of the California Stormwater BMP Handbook was used as a general reference and starting point for the preparation of the maintenance fact sheets that follow.
Infiltration Trench TC-10

General Description
An infiltration trench is a gravel-filled trench that receives stormwater runoff. Runoff is stored in the void space between the stones and infiltrates through the bottom and sides of the trench into the soil matrix. Infiltration trenches promote stormwater infiltration, reduce discharge of stormwater to receiving waters and provide pollutant removal. Pretreatment using buffer strips, swales, or detention basins is important for limiting amounts of sediment, oil & grease, and trash and debris entering the trench which can clog and render the trench ineffective.

Inspection/Maintenance Considerations
Frequency of clogging is dependent on effectiveness of pretreatment, such as vegetated buffer strips (see TC-31), vegetated swales (see TC-30), and detention basins (see TC-22) at removing sediments. Generally, clogging is occurring if the trench shows signs of long surface ponding. Clogging often occurs within the surface layer and removing and replacing the top 2-3 inches of the surface media may improve performance. If the clogging is subsurface, as determined by observing an inspection well, then completely removing the media and rehabbing the trench is needed. Clogged infiltration trenches with surface standing water can become a nuisance due to mosquito breeding. Maintenance efforts associated with infiltration trenches should include frequent inspections to ensure that water infiltrates into the subsurface completely at a recommended infiltration rate of 96 hours or less to prevent creating mosquito and other vector habitats.

Advanced BMPs Covered

Maintenance Concerns
- Accumulation of metals
- Clogged soil or outlet structures
- Vegetation/landscape maintenance

Targeted Constituents
- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Legend (Removal Effectiveness)
- Low
- High
- Medium
- Requires Pretreatment

Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.
## Infiltration Trench

<table>
<thead>
<tr>
<th>Inspection Activities</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Inspect after major storms for the first few months to ensure proper functioning. Drain times should be observed to confirm that the designed drain time has been achieved.</td>
<td>After construction and semi-annually (beginning and end of rainy season)</td>
</tr>
<tr>
<td>□ Inspect for upslope or adjacent contributing sediment sources and ensure that pretreatment systems are in place.</td>
<td>Semi-annual and after major storm events</td>
</tr>
<tr>
<td>□ Inspect facility for signs of wetness or damage to structures, signs of petroleum hydrocarbon contamination, standing water, trash and debris, sediment accumulation, slope stability, standing water, and material buildup.</td>
<td>Annual</td>
</tr>
<tr>
<td>□ Check for standing water or, if available, check observation wells following 3 days of dry weather to ensure proper drain time.</td>
<td></td>
</tr>
<tr>
<td>□ Inspect pretreatment devices and diversion structures for damage, sediment buildup, and structural damage.</td>
<td></td>
</tr>
<tr>
<td>□ Trenches with filter fabric should be inspected for sediment deposits by removing a small section of the top layer. If inspection indicates that the trench is partially or completely clogged, it should be restored to its design condition.</td>
<td></td>
</tr>
</tbody>
</table>

## Maintenance Activities

<table>
<thead>
<tr>
<th>Maintenance Activities</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Repair undercut and eroded areas at inflow and outflow structures.</td>
<td>Standard maintenance (as needed)</td>
</tr>
<tr>
<td>□ Remove sediment, debris, and oil/grease from pretreatment devices, forebays, inlet/outlet structures, overflow spillway, and trenches as necessary.</td>
<td>Semi-annual, more often as needed</td>
</tr>
<tr>
<td>□ Remove trash, debris, grass clippings, trees, and other large vegetation from the trench perimeter and dispose of properly.</td>
<td>Annual</td>
</tr>
<tr>
<td>□ Mow and trim vegetation to prevent establishment of woody vegetation, and for aesthetic and vector reasons.</td>
<td></td>
</tr>
<tr>
<td>□ Remove accumulated sediment from the surface of the trench. Replace first layer of aggregate and filter fabric if clogging appears only to be at the surface.</td>
<td></td>
</tr>
<tr>
<td>□ Clean trench when loss of infiltrative capacity is observed. If drawdown time is observed to have increased significantly over the design drawdown time, removal of sediment may be necessary. This is an expensive maintenance activity and the need for it can be minimized through prevention of upstream erosion.</td>
<td></td>
</tr>
<tr>
<td>□ Monitor ongoing effectiveness and determine if another BMP type or additional pretreatment could improve long-term performance. A qualified designer with knowledge of local soils and BMP design should be consulted in order to make this determination.</td>
<td>Every 5 years</td>
</tr>
</tbody>
</table>
Most of the maintenance should be concentrated on the pretreatment practices, such as buffer strips and swales upstream of the trench to limit the amount of sediment that reaches the infiltration trench. Regular inspection should determine if the sediment removal structures require routine maintenance. Infiltration trenches should not be put into operation until the upstream tributary area is stabilized.

Additional Information

Infiltration practices have historically had a high rate of failure compared to other stormwater management practices. One study conducted in Prince George's County, Maryland (Galli, 1992), revealed that less than half of the infiltration trenches investigated (of about 50) were still functioning properly, and less than one-third still functioned properly after 5 years. Many of these practices, however, did not incorporate advanced pretreatment. By carefully selecting the location and improving the design features of infiltration practices, their performance should improve.

It is absolutely critical that settleable particles and floatable materials be removed from runoff water before it enters the infiltration trench. The trench will clog and become nonfunctional if excessive particulate matter is allowed to enter the trench.

Special considerations are required for infiltration trenches to be effective in cold climates – refer to the Stormwater Managers Resource Center for more information.

References


Infiltration Trench


General Description

An infiltration basin is a shallow impoundment that is designed to infiltrate stormwater. Infiltration basins store stormwater runoff until it gradually exfiltrates into the underlying soil. Pollutant removal occurs through the infiltration of runoff and the adsorption of pollutants into the soil and vegetation. Additional benefits include:

- Reduced runoff volume and attenuation of peak flows, and
- Facilitated groundwater recharge thus helping to maintain low flows in stream systems.

Inspection/Maintenance Considerations

The use and regular maintenance of pretreatment BMPs will significantly minimize maintenance requirements for the basin. Installing vegetated swales or a sediment forebay upstream from the infiltration basin can provide effective pretreatment and reduce maintenance.

Spill response procedures and controls should be implemented to prevent spills from reaching the infiltration system. This BMP may require groundwater monitoring, and basins cannot be put into operation until the upstream tributary area is stabilized.
### Infiltration Basin

**Inspection Activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Observe drain time for a storm after completion or modification of the facility to confirm that the desired drain time has been obtained.</td>
<td>Post construction and semi-annually (beginning and end of rainy season)</td>
</tr>
<tr>
<td>□ Newly established vegetation should be inspected several times to determine if any landscape maintenance (reseeding, irrigation, etc.) is necessary.</td>
<td></td>
</tr>
<tr>
<td>□ Inspect for upslope or adjacent contributing sediment sources and ensure that pretreatment systems are in place.</td>
<td></td>
</tr>
<tr>
<td>□ Inspect for the following issues: differential accumulation of sediment, signs of wetness or damage to structures, erosion of the basin floor, dead or dying grass on the bottom, condition of riprap, drain time, signs of petroleum hydrocarbon contamination, standing water, trash and debris, sediment accumulation, slope stability, pretreatment device condition</td>
<td>Semi-annually and after extreme events</td>
</tr>
</tbody>
</table>

**Maintenance Activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Factors responsible for clogging should be repaired immediately.</td>
<td>Immediately</td>
</tr>
<tr>
<td>□ Remove invasive weeds once monthly during the first two growing seasons.</td>
<td>Monthly during growing season</td>
</tr>
<tr>
<td>□ Stabilize eroded banks with erosion control mat or mulch and revegetate.</td>
<td>Standard maintenance (as needed)</td>
</tr>
<tr>
<td>□ Repair undercut and eroded areas at inflow and outflow structures.</td>
<td></td>
</tr>
<tr>
<td>□ Maintain access to the basin for regular maintenance activities.</td>
<td></td>
</tr>
<tr>
<td>□ Mow as appropriate for vegetative cover species.</td>
<td></td>
</tr>
<tr>
<td>□ Monitor health of vegetation and replace as necessary.</td>
<td></td>
</tr>
<tr>
<td>□ Control mosquitoes as necessary.</td>
<td></td>
</tr>
<tr>
<td>□ Remove litter and debris from infiltration basin area as required.</td>
<td></td>
</tr>
<tr>
<td>□ Trim vegetation to prevent establishment of woody vegetation that decreases storage volume.</td>
<td></td>
</tr>
<tr>
<td>□ Mow and remove grass clippings, litter, and debris.</td>
<td>Semi-annual</td>
</tr>
<tr>
<td>□ Replant eroded or barren spots to prevent erosion and accumulation of sediment.</td>
<td></td>
</tr>
<tr>
<td>□ Scrape bottom and remove sediment when accumulated sediment reduces original infiltration rate by 25-50%. Restore original cross-section and infiltration rate. Properly dispose of sediment.</td>
<td>3-5 year maintenance</td>
</tr>
<tr>
<td>□ Seed or sod to restore ground cover.</td>
<td></td>
</tr>
<tr>
<td>□ Disc or otherwise aerate bottom.</td>
<td></td>
</tr>
<tr>
<td>□ Dethatch basin bottom.</td>
<td></td>
</tr>
</tbody>
</table>

If there are actual signs of clogging or significant loss of infiltrative capacity the following maintenance activities should be considered:

- □ Mechanically de-thatching and/or aerating the top soils along the sides and bottom of the basin.
- □ Tilling or dicing to scarify the bottom of the basin
Infiltration Basin

These activities should be on an “as-needed” rather than on a routine basis. Always remove deposited sediments before scarification, and use a hand-guided rotary tiller, if possible, or a disc harrow pulled by a light tractor.

Clogged infiltration basins with surface standing water can become a breeding area for mosquitoes and midges. Maintenance efforts associated with infiltration basins should include frequent inspections to ensure that water infiltrates into the subsurface completely (recommended infiltration rate of 96 hours or less) and that vegetation is carefully managed to prevent creating mosquito and other vector habitats.

Additional Information

In most cases, surface sediment removed from an infiltration basin during periodic maintenance to restore capacity does not contain toxic materials (e.g., metals, oil and grease, or organics) at levels posing a hazardous concern. Studies to date indicate that pond sediments are generally below toxicity limits and can be safely landfilled or disposed onsite. Onsite sediment disposal is always preferable (if local authorities permit) as long as the sediments are deposited away from the perimeter to prevent their reentry into the basin. Sediments should be tested for toxic materials in compliance with current landfill requirements and disposed of properly.

Maintenance activities should use lightweight equipment (e.g., bobcat), which will not compact the underlying soil to remove the top layer of sediment. The remaining soil should be tilled and revegetated as soon as possible.

Sediment removal within the basin should be performed when the sediment is dry enough so that it is cracked and readily separates from the basin floor. This minimizes intermixing of the finer sediment with underlying coarser material on the basin floor.

Special maintenance considerations are required maintain infiltration basins effectiveness in cold climates. Treating runoff containing salt-based deicers in an infiltration basin may reduce soil fertility cause vegetation to fail. Incorporating mulch into the soil can help to mitigate this problem. Infiltration basins should not be used to store snow plowed from highways or parking lots. The sand in this snow can clog the basin. In addition, the chlorides and other pollutants can contaminate the groundwater.

References


Infiltration Basin


Harvest and Reuse

General Description

Harvest and reuse refers to the capture of stormwater runoff in a holding pond or vault and subsequent use of the captured volume for irrigation of landscape or natural pervious areas. This technology is very effective as a stormwater quality practice in that, for the captured water quality volume, it provides virtually no discharge to receiving waters thereby greatly reducing pollutant loads from industrial sources.

This technology mimics natural undeveloped watershed conditions wherein the vast majority of the rainfall volume during smaller rainfall events is infiltrated through the soil profile. Their main advantage over other infiltration technologies is the use of an irrigation system to spread the runoff over a larger area for infiltration and/or to satisfy evapotranspiration demands of vegetation including ornamental vegetation on the site. This allows them to be used in areas with low permeability soils.

Stormwater harvesting typically utilizes rain barrels or cisterns.

- Rain barrels are small containers, typically ranging from 50 to 100 gallons installed adjacent to individual downspouts to capture rainwater runoff from roofs. The stored water can be used for irrigation, vehicle washing, or other non-potable applications. Rain barrels are inexpensive, easy to install and maintain, and well suited to small-scale sites.

- Cisterns are typically much larger than rain barrels, ranging from 1,000 gallons for small installations to millions of gallons beneath large facilities. They can be installed above or below ground, or even on the roof, depending upon site conditions.

Advanced BMPs Covered

Maintenance Concerns

- Sediment Accumulation
- Mechanical malfunction
- Vector Control

Targeted Constituents

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Legend (Removal Effectiveness)

- Low
- High
- Medium

* Requires Pretreatment

Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.
The use of harvested rainwater for irrigation may utilize a simple gravity system for small systems or use pumps for larger systems. The pump and wet well should be automated with a rainfall sensor to provide irrigation only during periods when required infiltration rates can be realized.

<table>
<thead>
<tr>
<th>Inspection Activities</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ The irrigation system should be inspected and tested (or observed while in operation) to verify proper operation regularly during periods of use.</td>
<td>Frequently (3-6 times per year)</td>
</tr>
<tr>
<td>□ Any leaks, broken spray heads, or other malfunctions with the irrigation system should be repaired immediately.</td>
<td></td>
</tr>
<tr>
<td>□ Inspect gutter systems, pipes, and storage facilities for accumulated sediment and debris and remove as necessary.</td>
<td>Semi-annually (beginning and end of rainy season)</td>
</tr>
<tr>
<td>□ Inspect rain barrels, cisterns, and other water storage containers to ensure they remain mosquito-proof. Repair damaged or missing screens or other mosquito-preventive measures. Contact the local mosquito and vector control agency if mosquito breeding is observed or suspected.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maintenance Activities</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ The upper stage, side slopes, and bottom of a retention basin should be mowed regularly to control weeds and discourage woody growth that reduces storage volumes.</td>
<td>Standard maintenance (as needed)</td>
</tr>
<tr>
<td>□ Sediment must be removed from inlet structure/sediment forebay, and from around the sump area at least 2 times annually or when depth reaches 3 inches. When sediment in other areas of the basin fills the volume allocated for sediment accumulation, all sediment should be removed and disposed of properly.</td>
<td>Semi-annual</td>
</tr>
<tr>
<td>□ Grass areas in and around basins must be mowed at least twice annually to limit vegetation height to 18 inches. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas. When mowing is performed, a mulching mower should be used, or grass clippings should be caught and removed.</td>
<td></td>
</tr>
<tr>
<td>□ Debris and litter will accumulate near the basin pump and should be removed during regular mowing operations and inspections. Particular attention should be paid to floating debris that can eventually clog the irrigation system.</td>
<td></td>
</tr>
<tr>
<td>□ For underground cisterns, ensure that manhole is accessible, operational, and secure.</td>
<td></td>
</tr>
<tr>
<td>□ The pond side slopes and embankment may periodically suffer from slumping and erosion, although this should not occur often if the soils are properly compacted during construction. Re-grading and re-vegetation may be required to correct the problems.</td>
<td>Infrequently</td>
</tr>
</tbody>
</table>

**Inspection/Maintenance Considerations**

Pollutant removal rates are estimated to be nearly 100% for all pollutants in the captured and irrigated stormwater volume. However, relatively frequent inspection and maintenance is necessary to verify proper operation of these facilities and to prevent accumulated sediment and debris from clogging conveyance lines. Some maintenance concerns are specific to the type of irrigation system or practice used.
Additional Information

Rain barrels, cisterns, sumps, and vaults that store water can become a nuisance due to mosquito and other vector breeding. Preventing mosquito access to standing water in rain barrels and above-ground cisterns can often be achieved by sealing openings with stainless steel wire mesh (1/16” openings or less). Sealing below-ground storage systems against mosquitoes can be more difficult depending on the design and the number of potential entry points. Open storage structures such as ponds and retention basins (see appropriate fact sheets) will require routine preventative maintenance plans to minimize mosquito production. Certain systems may require routine inspection and treatment by local mosquito and vector control agencies.

Special considerations are required for harvest and reuse to be effective in cold climates. Underground or indoor systems are more appropriate for year-round use, but these systems are more difficult to design, construct, and maintain.

References


Wet Pond

General Description

Wet ponds (a.k.a. stormwater ponds, retention ponds, extended detention wet ponds) are constructed basins that have a permanent pool of water throughout the year (or at least throughout the wet season). The primary pollutant removal mechanism is settling while stormwater is retained in the wet pool. The basin supports plant species that provide pollutant removal by biological processes. This vegetation may also help reduce erosion of side slopes and trap sediments. Wet ponds differ from constructed wetlands primarily in having a greater average depth.

Wet ponds are an effective BMP in locations that have near-continuous inflows. While there are several different versions of the wet pond design, the most common modification is the extended detention wet pond, where storage is provided above the permanent pool in order to detain stormwater runoff and promote settling.

Inspection/Maintenance Considerations

In order to maintain the pond’s design capacity, sediment must be removed occasionally and adequate resources must be committed to properly maintain peripheral aquatic vegetation, control vector production, and to maintain effective pool volume. Wet ponds can become a nuisance due to mosquito and midge breeding unless carefully designed and maintained. A proactive and routine preventative maintenance plan (which can vary according to location) is crucial to minimizing vector habitat. A vegetated buffer should be preserved around the pond to protect the banks from erosion and provide some pollutant removal before runoff enters the pond by overland flow.

Advanced BMPs Covered

- Stormwater Containment and Discharge Reduction
- Treatment Control

Maintenance Concerns

- Vegetation/Landscape Maintenance
- Endangered Species Habitat Creation
- Sediment and Trash Removal
- Bank Erosion
- Clogging of the Outlet
- Invasive/exotic Plant Species
- Vector Control

Targeted Constituents

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sediment</td>
<td>★★</td>
</tr>
<tr>
<td>Nutrients</td>
<td>★</td>
</tr>
<tr>
<td>Trash</td>
<td>★★</td>
</tr>
<tr>
<td>Metals</td>
<td>★</td>
</tr>
<tr>
<td>Bacteria</td>
<td>★</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>★★</td>
</tr>
<tr>
<td>Organics</td>
<td>★</td>
</tr>
</tbody>
</table>

Legend (Removal Effectiveness)

- Low ▲ Medium ★ High
- Requires Pretreatment

Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.
### Inspection Activities

<table>
<thead>
<tr>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post construction</td>
</tr>
<tr>
<td>Semi-annual, after significant storms, or more frequent as needed</td>
</tr>
<tr>
<td>Annual inspection</td>
</tr>
</tbody>
</table>

- Inspect after several storm events to confirm that the drainage system functions and bank stability and vegetation growth are sufficient.
- Inspect for invasive vegetation, trash and debris, clogging of inlet/outlet structures, excessive erosion, sediment buildup in basin or outlet, cracking or settling of the dam, bank stability, tree growth on dam or embankment, vigor and density of the grass turf on the basin side slopes and floor, differential settlement, leakage, subsidence, damage to the emergency spillway, mechanical component condition, and graffiti.
- Inspect condition of inlet and outlet structures, pipes, sediment forebays, basin, and upstream and downstream channel conditions. Monitor drain times, and check for algal growth, signs of pollution such as oil sheens, discolored water, or unpleasant odors, and signs of flooding.
- During inspections, note changes to the wet pond or the contributing watershed as these may affect basin performance.

### Maintenance Activities

<table>
<thead>
<tr>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post construction</td>
</tr>
<tr>
<td>Semi-annual, after significant storm events</td>
</tr>
<tr>
<td>Annual maintenance (if needed)</td>
</tr>
<tr>
<td>5- to 7-year maintenance</td>
</tr>
<tr>
<td>&gt;5 year maintenance</td>
</tr>
</tbody>
</table>

- Where permitted by the Department of Fish and Wildlife or other agency regulations, stock wet ponds regularly with mosquito fish (*Gambusia* spp.) to enhance natural mosquito and midge control and regularly maintain emergent and shoreline vegetation to provide access for vector inspectors and facilitate vector control if needed.
- Coordinate with the local mosquito and vector control agency to control mosquitoes and midges, if necessary.
- Remove sediment from outlet structure. Dispose of properly.
- Remove accumulated trash and debris in the basin, inlet/outlet structures, side slopes, and collection system as required.
- Repair undercut areas and erosion to banks and basin.
- Maintain protected vegetated buffer around pond. Maintain vegetation in and around basin to prevent any erosion or aesthetic problems. Minimize use of fertilizers and pesticides. Reseed if necessary.
- Manage and harvest wetland plants.
- Perform structural repair or replacement, as needed.
- Remove sediment from the forebay and regrade when the accumulated sediment volume exceeds 10-20% of the forebay volume. Clean in early spring so vegetation damaged during cleaning has time to re-establish.
- Remove sediment when the permanent pool volume has become reduced significantly (sediment accumulation exceeds 25% of design depth), resuspension is observed, or the pond becomes eutrophic.

### Additional Information

In most cases, surface sediment removed from a wet pond during periodic maintenance to restore capacity does not contain toxic materials (e.g., metals, oil and grease, or organics) at levels posing a hazardous concern. Studies to date indicate that pond sediments are generally below toxicity limits and can be safely landfilled or disposed onsite. Onsite sediment disposal is always preferable (if local authorities permit) as long as...
as the sediments are deposited away from the perimeter to prevent their reentry into the basin. Sediments should be tested for toxic materials in compliance with current landfill disposal requirements. Sediments containing high levels of pollutants should be disposed of properly.

Light equipment, which will not compact the underlying soil, should be used to remove the top layer of sediment. The remaining soil should be tilled and revegetated as soon as possible.

Wet ponds require a regular source of base flow if water levels are to be maintained. If base flow is insufficient during summer months, supplemental water may be necessary to maintain water levels.

Special considerations are required for wet ponds to be effective in cold climates – refer to the Stormwater Managers Resource Center for more information.

References


Wet Pond


General Description

Constructed wetlands are constructed basins that have a permanent pool of water throughout the year (or at least throughout the wet season) and differ from wet ponds primarily in being shallower and having greater vegetation coverage. Stormwater runoff is stored in shallow vegetated pools with saturated soils that are designed to provide the necessary depth, frequency, and duration of inundation in order to support wetland vegetation.

Constructed wetlands are among the most effective stormwater practices in terms of pollutant removal and they also offer aesthetic value. However, they are highly specialized, and sites implementing this BMP should consult the designer for operations and maintenance guidance.

As stormwater runoff flows through the wetland, pollutant removal is achieved through microbial transformation, plant uptake, settling, and adsorption. Pretreatment is critical to the function of constructed wetlands. In addition to a forebay, other BMPs such as vegetated swales or buffer strips (see applicable fact sheets) will help filter stormwater before it enters a stormwater wetland. This can reduce overall maintenance needs of the wetland itself.

A distinction should be made between using a constructed wetland for stormwater management and diverting stormwater into a natural wetland. The latter practice is prohibited and in all circumstances, natural wetlands should be protected from the adverse effects of development, including impacts from increased storm water runoff. This is especially important because natural wetlands provide storm water and flood control benefits on a regional scale.

Advanced BMPs Covered

- Stormwater Containment and Discharge Reduction
- Treatment Control

Maintenance Concerns
- Vegetation/Landscape Maintenance
- Endangered Species Habitat Creation
- Sediment and Trash Removal
- Bank Erosion
- Clogging of the Outlet
- Invasive/exotic Plant Species
- Vector Control
- Pollutant Release Potential

Targeted Constituents

- Sediment ▲
- Nutrients ▲
- Trash ▲
- Metals ▲
- Bacteria ▲
- Oil and Grease ▲
- Organics ▲

Legend (Removal Effectiveness)
- Low ▲ Medium ▲ High
- Requires Pretreatment

Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.
Inspection/Maintenance Considerations

Wetlands need a continuous base flow to maintain aquatic plants. Salts and scum can accumulate in wetlands and, unless properly designed and managed, can be flushed out during larger storms. Wetlands can also release nutrients during the non-growing season. Wetlands can become a breeding area for mosquitoes and midges unless carefully designed and maintained. A proactive and routine preventative maintenance plan (which can vary according to location) is crucial to minimizing vector habitat.

To maximize wetland removal of pollutants, the vegetation must be harvested frequently. Harvesting is particularly important with respect to the removal of phosphorus and metals, and less so for removal of nitrogen. Harvesting should occur by mid-summer before the plants begin to transfer phosphorus from the aboveground foliage to subsurface roots, or begin to lose metals that desorb during plant die off. It is also desirable that every few years the entire plant mass including roots be harvested. This is because the belowground biomass constitutes a significant reservoir of the nutrients and metals that are removed from the stormwater by plants.

Wetlands should incorporate design features to make sediment cleanout of both the forebay and the main body of the wetland easier. Wetlands should have direct maintenance access to the forebay for sediment removal, and the main body of the wetland should have a drain so that it can be drawn down for infrequent dredging and vegetation harvesting.

Closely monitor the wetland plant community, both during the growing season and, if needed, during the dry season, to assure healthy growth of desired plants. Remove exotic or nuisance species as soon as they appear to limit their establishment and areal extent. Thin or transplant plants from areas where they are growing densely and use them to further establish or growth in areas with less vigorous plant growth.
### Inspection Activities

<table>
<thead>
<tr>
<th>Description</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspect after several storm events for bank stability, vegetation growth,</td>
<td>After construction</td>
</tr>
<tr>
<td>drainage system functioning, and structural damage.</td>
<td></td>
</tr>
<tr>
<td>Inspect for invasive vegetation, differential settlement, cracking;</td>
<td>Semi-annual</td>
</tr>
<tr>
<td>erosion, leakage, or tree growth on the embankment; the condition of the</td>
<td>inspection</td>
</tr>
<tr>
<td>riprap in the inlet, outlet, and pilot channels; sediment accumulation in</td>
<td></td>
</tr>
<tr>
<td>the basin; clogging of outlet; and the vigor and density of the vegetation</td>
<td></td>
</tr>
<tr>
<td>on the basin side slopes and floor. Correct observed problems as necessary.</td>
<td></td>
</tr>
<tr>
<td>Inspect for damage to the embankment and inlet/outlet structures. Repair</td>
<td>Annual inspection</td>
</tr>
<tr>
<td>as necessary.</td>
<td></td>
</tr>
<tr>
<td>Note signs of hydrocarbon buildup such as floating oil on water surface.</td>
<td></td>
</tr>
<tr>
<td>Monitor for sediment accumulation in the facility and forebay.</td>
<td></td>
</tr>
<tr>
<td>Examine inlet and outlet devices to ensure they are free of debris and are</td>
<td></td>
</tr>
<tr>
<td>operational.</td>
<td></td>
</tr>
</tbody>
</table>

### Maintenance Activities

<table>
<thead>
<tr>
<th>Description</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace wetland vegetation to maintain at least 50% surface area coverage</td>
<td>One-time</td>
</tr>
<tr>
<td>in wetland plants after the second growing season.</td>
<td></td>
</tr>
<tr>
<td>Repair undercut areas, erosion to banks, and bottom as required.</td>
<td>As needed</td>
</tr>
<tr>
<td>Where permitted by the Department of Fish and Wildlife or other agency</td>
<td>Annual maintenance</td>
</tr>
<tr>
<td>regulations, stock constructed wetlands regularly with mosquito fish (</td>
<td>(if needed)</td>
</tr>
<tr>
<td>Gambusia spp.) to enhance natural mosquito and midge control and regularly</td>
<td></td>
</tr>
<tr>
<td>maintain emergent and shoreline vegetation to provide access for vector</td>
<td></td>
</tr>
<tr>
<td>inspections and facilitate vector control if needed.</td>
<td></td>
</tr>
<tr>
<td>Coordinate with the local mosquito and vector control agency to control</td>
<td></td>
</tr>
<tr>
<td>mosquitoes and midges, if necessary.</td>
<td></td>
</tr>
<tr>
<td>Clean and remove debris from inlet and outlet structures.</td>
<td>Frequent</td>
</tr>
<tr>
<td>Remove litter and debris from banks, basin bottom, trash racks, outlet</td>
<td>(3-4 times/year)</td>
</tr>
<tr>
<td>structures, and valves as required.</td>
<td></td>
</tr>
<tr>
<td>Supplement wetland plants if a significant portion have not</td>
<td>Annual</td>
</tr>
<tr>
<td>established (at least 50% of the surface area).</td>
<td>maintenance</td>
</tr>
<tr>
<td>Remove nuisance plant species.</td>
<td>(if needed)</td>
</tr>
<tr>
<td>Clean forebay to avoid accumulation in main wetland area to minimize</td>
<td>5- to 7-year</td>
</tr>
<tr>
<td>when the main wetland area needs to be cleaned.</td>
<td>maintenance</td>
</tr>
<tr>
<td>Harvest plant species if vegetation becomes too thick causing flow</td>
<td>5- to 7-year</td>
</tr>
<tr>
<td>backup and flooding. More frequent plant harvesting may be required by</td>
<td>maintenance</td>
</tr>
<tr>
<td>local vector control agencies.</td>
<td>(or more frequently</td>
</tr>
<tr>
<td>Monitor sediment accumulations, and remove sediment when the</td>
<td>As needed</td>
</tr>
<tr>
<td>accumulated sediment volume exceeds 10-20% of the basin volume, plants are</td>
<td>maintenance</td>
</tr>
<tr>
<td>“choked” with sediment, or the wetland becomes eutrophic. It is suggested</td>
<td>(20- to 50-years)</td>
</tr>
<tr>
<td>that the main area be cleaned one half at a time with at least one growing</td>
<td></td>
</tr>
<tr>
<td>season in between cleanings. This will help to preserve the vegetation</td>
<td></td>
</tr>
<tr>
<td>and enable the wetland to recover more quickly from the cleaning.</td>
<td></td>
</tr>
</tbody>
</table>
**Additional Information**

Proper maintenance is of primary importance for constructed wetlands to continue to function as originally designed. The designer of the constructed wetland must be consulted to develop a site-specific maintenance plan outlining the schedule and scope of required maintenance operations.

Special considerations are required for constructed wetlands to be effective in cold climates – refer to the Stormwater Managers Resource Center for more information.

**References**


General Description

Dry extended detention ponds (a.k.a. dry ponds, extended detention basins, detention ponds, extended detention ponds) are basins whose outlets have been designed to draw down the stormwater runoff from a water quality design storm for some minimum time (e.g., 48 hours) to allow particles and associated pollutants to settle. Unlike wet ponds, these facilities do not have a large permanent pool. They can also be used to provide flood control by including additional flood detention storage. Considerable stormwater volume reduction can also occur, depending on the infiltration capacity of the subsoil.

Inspection/Maintenance Considerations

Inspections should be conducted semi-annually and after significant storm events to identify potential problems early. Most maintenance efforts will need to be directed toward vegetation management and vector control, which may focus on basic housekeeping practices such as removal of debris accumulations and vegetation management to ensure that the basin dewaters completely (recommended 48 hour residence time or less) to prevent creating mosquito and other vector habitats.

If infiltration is desired for stormwater reduction, the following additional maintenance may be required to maintain infiltrative capacity:

- Mechanically de-thatching and/or aerating the top soils along the sides and bottom of the basin;
- Tilling or dicing to scarify the bottom of the basin; and
- Maintaining adequate vegetative cover.

Advanced BMPs Covered

- Stormwater Containment and Discharge Reduction
- Treatment Control

Maintenance Concerns

- Accumulation of Metals and Toxics
- Clogged Soil Outlet Structures
- Vegetation/Landscape Maintenance
- Erosion
- Vector Control

Targeted Constituents

- Sediment ▲
- Nutrients ●
- Trash ■
- Metals ▲
- Bacteria ▲
- Oil and Grease ▲
- Organics ▲

Legend (Removal Effectiveness)

- Low ■
- Medium ▲
- High ●
- Requires Pretreatment

Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.
Extended Detention Basin

Refer to TC-11 Infiltration Basin for further information.

### Inspection Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Inspect after several storm events for bank stability, vegetation growth, and to determine if the desired residence time has been achieved.</td>
<td>Post construction</td>
</tr>
<tr>
<td>□ Inspect outlet structure for evidence of clogging or outflow release velocities that are greater than design flow.</td>
<td></td>
</tr>
<tr>
<td>□ Inspect for the following issues: differential settlement, cracking, erosion of pond banks or bottom, leakage, tree growth on the embankment, the condition of the riprap in the inlet, clogging of outlet and pilot channels, standing water, slope stability, presence of burrows, sediment accumulation in the basin, forebay, and outlet structures, trash and debris, and the vigor and density of vegetation on the basin side slopes and floor.</td>
<td>Semi-annual, after significant storms, or more frequent</td>
</tr>
<tr>
<td>□ Inspect for the following issues: subsidence, damage to the emergency spillway, inadequacy of the inlet/outlet channel erosion control measures, changes in the condition of the pilot channel, accumulated sediment volume, and semi-annual inspection items.</td>
<td>Annual</td>
</tr>
<tr>
<td>□ During inspections, changes to the extended storage pond or the contributing watershed should be noted, as these may affect basin performance.</td>
<td>Annual inspection</td>
</tr>
</tbody>
</table>

### Maintenance Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ If necessary, modify the outlet orifice to achieve design values if inspection indicates modifications are necessary.</td>
<td>Standard Maintenance (As needed)</td>
</tr>
<tr>
<td>□ Repair undercut or eroded areas.</td>
<td></td>
</tr>
<tr>
<td>□ Mow side slopes for aesthetics and to remove woody debris that reduces storage volume.</td>
<td></td>
</tr>
<tr>
<td>□ Maintain vegetation in and around basin to prevent any erosion and minimize aesthetic concerns. Minimize use of fertilizers and pesticides. Reseed if necessary.</td>
<td></td>
</tr>
<tr>
<td>□ Remove litter and debris.</td>
<td></td>
</tr>
<tr>
<td>□ Make structural changes or repairs as needed to eliminate pools of water that stand longer than 96 hrs to prevent mosquito production, particularly during the warmer months of the year. Identify and eliminate sources of non-stormwater runoff that feed standing water pools. Coordinate with the local mosquito and vector control agency to control mosquitoes, if necessary.</td>
<td></td>
</tr>
<tr>
<td>□ Remove accumulated trash and debris from the basin, around the riser pipe, side slopes, embankment, emergency spillway, and outflow trash racks. The frequency of this activity may be altered to meet specific site conditions.</td>
<td>Semi-annual, or more frequent, as needed</td>
</tr>
<tr>
<td>□ Trim vegetation at the beginning and end of the wet season to prevent establishment of woody vegetation and for aesthetic and vector reasons.</td>
<td></td>
</tr>
<tr>
<td>□ Seed or sod to restore dead or damaged ground cover.</td>
<td>Annual maintenance (as needed)</td>
</tr>
<tr>
<td>□ Repair erosion to banks and bottom as required.</td>
<td></td>
</tr>
<tr>
<td>□ Supplement vegetation if a significant portion have not been established (at least 50% of the surface area).</td>
<td>Annual maintenance (if needed)</td>
</tr>
<tr>
<td>□ Remove nuisance plant species.</td>
<td></td>
</tr>
<tr>
<td>□ Remove sediment from the forebay to reduce frequency of main basin cleaning.</td>
<td>3- to 5-year</td>
</tr>
</tbody>
</table>
Extended Detention Basin

- Remove sediment from the basin bottom and thatch, aerate, or scarify soils to maintain infiltration capacity.

- Monitor sediment accumulation and remove accumulated sediment and regrade about every 10 years or when the accumulated sediment volume exceeds 10-20% of the basin volume, or when accumulation reaches 6 inches or if resuspension is observed. Clean in early spring so vegetation damaged during cleaning has time to re-establish.

### Additional Information

In most cases, surface sediment removed from an extended detention basin during periodic maintenance to restore capacity does not contain toxic materials (e.g., metals, oil and grease, or organics) at levels posing a hazardous concern. Studies to date indicate that pond sediments are generally below toxicity limits and can be safely landfilled or disposed onsite. Onsite sediment disposal is always preferable (if local authorities permit) as long as the sediments are deposited away from the perimeter to prevent their reentry into the basin. Sediments should be tested for toxic materials in compliance with current landfill requirements and disposed of properly.

Special considerations are required for extended detention basins to be effective in cold climates. Refer to the Stormwater Managers Resource Center for more information.

### References

- California Department of Transportation. *Treatment BMP Technology Report (CTSW-RT-09-239.06)*, 2010. Available online at:


Extended Detention Basin TC-22


Vegetated Swale TC-30

General Description
Vegetated swales (also referred to as bioswales, biofiltration swales, or landscaped swales) are open, shallow channels with vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream discharge points. They are designed to treat runoff through filtering by the vegetation in the channel, filtering through a subsoil matrix, and/or infiltration into the underlying soils. Swales can be natural or manmade. They trap particulate pollutants (suspended solids and trace metals), promote infiltration, reduce flow velocity, and increase time of concentration of stormwater runoff. Vegetated swales can be implemented to provide effective pretreatment for detention and infiltration stormwater BMPs.

Vegetated swales can serve as part of a stormwater drainage system and can replace curbs, gutters and storm sewer systems. Therefore, swales are best suited for small landscaped portions of industrial or commercial facilities with low peak flow rates. They are not well suited to treat stormwater runoff from industrial areas that have insufficient source control BMPs.

Inspection/Maintenance Considerations
A thick vegetative cover is needed for vegetated swales to function properly. Usually, swales require little more than normal landscape maintenance activities such as irrigation and mowing to maintain pollutant removal efficiency. Swales can become a nuisance due to mosquito breeding in standing water if obstructions develop (e.g., debris accumulation, invasive vegetation) and/or if proper drainage slopes are not implemented and maintained. The application of fertilizers and pesticides should be minimized.

Advanced BMPs Covered

Maintenance Concerns
- Channelization
- Vegetation/Landscape Maintenance
- Vector Control
- Aesthetics
- Flow Obstructions

Targeted Constituents

Legend (Removal Effectiveness)
- Low
- Medium
- High
- Requires Pretreatment

Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.
## Vegetated Swale

**Inspection Activities**

<table>
<thead>
<tr>
<th>Action</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Inspect after seeding and after first major storms for any damages.</td>
<td>Post construction</td>
</tr>
<tr>
<td>□ Inspect for signs of erosion, damage to vegetation, channelization of flow, debris and litter, and areas of sediment accumulation. Perform inspections at the beginning and end of the wet season. Additional inspections after periods of heavy runoff are desirable.</td>
<td>Semi-annual</td>
</tr>
<tr>
<td>□ Inspect level spreader for clogging, grass alongside slopes for erosion and formation of rills or gullies, and sand/soil bed for erosion problems.</td>
<td>Annual</td>
</tr>
</tbody>
</table>

**Maintenance Activities**

<table>
<thead>
<tr>
<th>Action</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Mow grass to maintain a height of 3–4 inches, for safety, aesthetic, or other purposes. Litter should always be removed prior to mowing. Clippings should be composted.</td>
<td>As needed (frequent, seasonally)</td>
</tr>
<tr>
<td>□ Irrigate swale during dry season (April through October) or when necessary to maintain the vegetation.</td>
<td>Semi-annual</td>
</tr>
<tr>
<td>□ Provide weed control, if necessary to control invasive species.</td>
<td></td>
</tr>
<tr>
<td>□ Remove litter, branches, rocks blockages, and other debris and dispose of properly.</td>
<td></td>
</tr>
<tr>
<td>□ Maintain inlet flow spreader (if applicable).</td>
<td></td>
</tr>
<tr>
<td>□ Repair any damaged areas within a channel identified during inspections. Erosion rills or gullies should be corrected as needed. Bare areas should be replanted as necessary.</td>
<td></td>
</tr>
<tr>
<td>□ Declog the pea gravel diaphragm, if necessary.</td>
<td>Annual (as needed)</td>
</tr>
<tr>
<td>□ Correct erosion problems in the sand/soil bed of dry swales.</td>
<td></td>
</tr>
<tr>
<td>□ Plant an alternative grass species if the original grass cover has not been successfully established. Reseed and apply mulch to damaged areas.</td>
<td></td>
</tr>
<tr>
<td>□ Remove all accumulated sediment that may obstruct flow through the swale. Sediment accumulating near culverts and in channels should be removed when it builds up to 3 in. at any spot, or covers vegetation, or once it has accumulated to 10% of the original design volume. Replace the grass areas damaged in the process.</td>
<td>As needed (infrequent)</td>
</tr>
<tr>
<td>□ Rototill or cultivate the surface of the sand/soil bed of dry swales if the swale does not draw down within 48 hours.</td>
<td></td>
</tr>
</tbody>
</table>
Additional Information

Research (Colwell et al., 2000) indicates that grass height and mowing frequency have little impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.

The swale bottom and side slopes should be covered with dense vegetative cover to filter pollutants out of runoff and helps reduce flow velocities and protect the swale from erosion. Fine, close-growing grasses are ideal because increasing the surface area of the vegetation exposed to runoff improves the effectiveness of the swale. Drought tolerant vegetation than can tolerate sediment and debris accumulations are best-suited for swales.

References


Vegetated Swale


Vegetated Buffer Strip

General Description
Vegetated buffer strips (vegetated filter strips, biostrips, filter strips, and grassed filters) are vegetated surfaces that are designed to treat sheet flow from adjacent surfaces. They are an effective, easy to implement BMP that often go unrecognized at industrial and commercial facilities.

Vegetated buffer strips function by slowing runoff velocities and allowing sediment and other pollutants to settle and by providing some infiltration into underlying soils. They are well-suited to treating runoff from roads, roof downspouts, small parking lots, and pervious surfaces. They can be implemented to provide effective pretreatment for detention and infiltration stormwater BMPs.

Vegetated buffer strips can serve as part of a stormwater drainage system and can replace curbs, gutters and storm sewer systems. Therefore, they are best suited for small landscaped portions of industrial or commercial facilities with low peak flow rates. They are not well suited to treat stormwater runoff from industrial areas that have insufficient source control BMPs.

Inspection/Maintenance Considerations
Vegetated buffer strips require frequent landscape maintenance. In many cases, vegetated buffer strips initially require intense maintenance, but less maintenance is needed over time. Maintenance tasks may be conducted by a landscaping contractor. Maintenance requirements typically include grass or shrub-growing activities such as irrigation, mowing, trimming, removal of invasive species, and replanting when necessary. Buffer strips require more attention as the volume of sediment increases. Vegetated buffer strips can become a nuisance due to mosquito breeding in level spreaders (unless

Advanced BMPs Covered

Maintenance Concerns
- Vector Control
- Invasive Species Management
- Vegetation/Landscape Maintenance
- Erosion
- Channelization of Flow
- Aesthetics

Targeted Constituents

<table>
<thead>
<tr>
<th>Targeted Constituents</th>
<th>Sediment</th>
<th>Nutrients</th>
<th>Trash</th>
<th>Metals</th>
<th>Bacteria</th>
<th>Oil and Grease</th>
<th>Organics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>▲</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend (Removal Effectiveness)
- Low
- High
- Medium
* Requires Pretreatment

Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.
designed to dewater completely in 96 hours or less) and/or if proper drainage slopes are not maintained.

### Inspection Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once the vegetated buffer strip is established, inspect at least three times per year. Repair all damage immediately.</td>
<td>Post construction</td>
</tr>
<tr>
<td>Inspect buffer strips after seeding and repair as needed.</td>
<td></td>
</tr>
<tr>
<td>Inspect buffer strip and repair all damage immediately.</td>
<td>After major storms</td>
</tr>
<tr>
<td>Inspect soil and repair eroded areas.</td>
<td></td>
</tr>
<tr>
<td>Inspect for erosion or damage to vegetation, preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the strips are ready for winter. However, additional inspection after periods of heavy runoff is desirable.</td>
<td>Semi-annual</td>
</tr>
<tr>
<td>Inspect pea-gravel diaphragm/level spreader for clogging and effectiveness and remove built-up sediment.</td>
<td></td>
</tr>
<tr>
<td>Inspect for rolls and gullies. Immediately fill with topsoil, install erosion control blanket and seed or sod.</td>
<td></td>
</tr>
<tr>
<td>Inspect to ensure vegetation is well established. If not, either prepare soil and reseed or replace with alternative species. Install erosion control blanket.</td>
<td></td>
</tr>
<tr>
<td>Check for debris and litter, and areas of sediment accumulation.</td>
<td></td>
</tr>
</tbody>
</table>

### Maintenance Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water plants daily for 2 weeks after construction.</td>
<td>Post construction</td>
</tr>
<tr>
<td>Mow regularly to maintain vegetation height between 2 - 4 inches, and to promote thick, dense vegetative growth. Cut only when soil is dry to prevent tracking damage to vegetation, soil compaction and flow concentrations. Clippings are to be removed immediately after mowing.</td>
<td>Frequently, as needed</td>
</tr>
<tr>
<td>Remove all litter, branches, rocks, or other debris. Damaged areas of the filter strip should be repaired immediately by reseeding and applying mulch.</td>
<td></td>
</tr>
<tr>
<td>Regularly maintain inlet flow spreader.</td>
<td></td>
</tr>
<tr>
<td>Irrigate during dry season (April through October) when necessary to maintain the vegetation.</td>
<td></td>
</tr>
<tr>
<td>Remulch void areas.</td>
<td>Semi-annual</td>
</tr>
<tr>
<td>Treat diseased trees and shrubs, remove dead vegetation.</td>
<td></td>
</tr>
<tr>
<td>Remove sediment and replant in areas of buildup. Sediment accumulating near culverts and in channels should be removed when it builds up to 3 in. at any spot, or covers vegetation.</td>
<td>Annual</td>
</tr>
<tr>
<td>Limit fertilizer applications based on plant vigor and soil test results.</td>
<td></td>
</tr>
<tr>
<td>Rework or replant buffer strip if concentrated flow erodes a channel through the strip.</td>
<td></td>
</tr>
</tbody>
</table>
**Vegetated Buffer Strip**

**Additional Information**

Research (Colwell et al., 2000) indicates that grass height and mowing frequency have little impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.

Trash tends to accumulate in swale areas, particularly along highways. The need for litter removal is determined through periodic inspection, but litter should always be removed prior to mowing.

The buffer strip should be covered with dense vegetative cover to filter pollutants out of runoff and helps reduce flow velocities and protect the strip from erosion. Fine, close-growing grasses are ideal because increasing the surface area of the vegetation exposed to runoff improves the effectiveness of the swale. Drought tolerant vegetation that can tolerate sediment and debris accumulations is best-suited for vegetated buffer strips.

**References**


Vegetated Buffer Strip


Bioretention

General Description
The bioretention best management practice (BMP) functions as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. These facilities normally consist of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants. The runoff’s velocity is reduced by passing over or through a sand bed and is subsequently distributed evenly along a ponding area. Exfiltration of the stored water in the bioretention area planting soil into the underlying soils occurs over a period of days.

Inspection/Maintenance Considerations
Bioretention requires monthly landscaping maintenance, including measures to ensure that the area is functioning properly and irrigation during dry periods. In many cases, bioretention areas initially require intense maintenance, but less maintenance is needed over time. Maintenance tasks may be conducted by a landscaping contractor, who may already be hired at the site.

Sediment may enter the bioretention cell and form a crust on the soil surface, limiting the porosity of the soil. Raking of the mulch and soil surface may be needed to maintain high infiltration rates. In cold climates the soil may freeze, preventing runoff from infiltrating into the planting soil.

Bioretention systems can become a nuisance due to mosquito and midge breeding. Maintaining soil porosity and basic housekeeping practices such as removal of debris accumulations and vegetation management are necessary to ensure that the system dewatered completely (recommended 72 hour residence time or less) to prevent creating mosquito and other vector habitats.

Advanced BMPs Covered

Maintenance Concerns
- Clogged Soil or Outlet Structures
- Sediment Accumulation
- Invasive Species Management
- Vegetation/Landscape Maintenance
- Erosion
- Channelization of Flow
- Vector Control
- Aesthetics

Targeted Constituents
- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Legend (Removal Effectiveness)
- Low
- High
- Medium
- Requires Pretreatment

Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.
Additional Information

Landscaping is critical to the function and aesthetic value of bioretention areas. It is preferable to plant the area with native vegetation, or plants that provide habitat value, where possible. Another important design feature is to select species that can withstand the hydrologic regime they will experience. At the bottom of the bioretention facility, plants that tolerate both wet and dry conditions are preferable. At the edges, which will remain primarily dry, upland species will be the most resilient. It is best to select a combination of trees, shrubs, and herbaceous materials.
For areas with low permeability native soils or steep slopes, bioretention areas can be designed with an underdrain system that routes the treated runoff to the storm drain system rather than depending entirely on infiltration.

Special considerations are required for bioretention to be effective in cold climates – see the Stormwater Managers Resource Center for more information.

**References**


**General Description**

Stormwater media filters are typically two-chambered including a pretreatment settling basin and a filter bed filled with sand or other adsorptive filtering media. As stormwater flows into the first chamber, large particles settle out, and then finer particles and other pollutants are removed as stormwater flows through the filtering media in the second chamber. There are a number of design variations including the Austin sand filter, Delaware sand filter, and multi-chambered treatment train (MCTT).

**Inspection/Maintenance Considerations**

Media filters may exhibit decreased effectiveness after a few years of operation, depending on the activities occurring in the drainage area. Media filters clog easily when subjected to high sediment loads. Sediment reducing pretreatment practices, such as vegetated buffer strips or vegetated swales, placed upstream of the filter, should be maintained properly to reduce sediment loads into filter.

Media filters can become a nuisance due to mosquito or midge breeding if not properly designed and maintained. Installations should dewater completely (recommended 96 hour or less residence time) to prevent creating mosquito and other vector habitats.

Maintenance efforts will need to focus on basic housekeeping practices such as removal of debris accumulations and vegetation management (in filter media) to prevent clogs and/or pools of standing water. To minimize the potential for clogging, frequent maintenance and inspection practices are required. Waste sand, gravel, filter fabric, or filter media must be disposed of properly and in accordance with all applicable laws.

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**Advanced BMPs Covered**

- Treatment Control

**Maintenance Concerns**

- Pollutant Breakthrough
- Clogged Sand Media
- Trash and Debris Accumulation
- Vector Control

**Targeted Constituents**

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

**Legend (Removal Effectiveness)**

- ◼ Low
- ▲ Medium
- ■ High
- ★ Requires Pretreatment

*Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.*
### Inspection Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ During the first year of operation, inspect chambers quarterly to ensure that the system is functioning properly.</td>
<td>Post construction</td>
</tr>
<tr>
<td>□ Inspect sand filters after every major storm in the first few months after construction to ensure that the system is functioning properly.</td>
<td>Quarterly, and after major storms</td>
</tr>
<tr>
<td>□ Ensure that filter surface, inlets, and outlets are clear of debris.</td>
<td></td>
</tr>
<tr>
<td>□ Ensure that the contributing area is stabilized and mowed, with clippings removed.</td>
<td></td>
</tr>
<tr>
<td>□ Check to ensure that the filter surface is not clogging.</td>
<td></td>
</tr>
<tr>
<td>□ Ensure that activities in the drainage area minimize oil/grease and sediment entry to the system.</td>
<td></td>
</tr>
<tr>
<td>□ Inspect the facility once during the wet season after a large rain event to determine whether the facility is draining completely within 96 hr.</td>
<td></td>
</tr>
<tr>
<td>□ Inspect for standing water, sediment, trash and debris, structural damage, and to identify potential problems.</td>
<td>Semi-annual</td>
</tr>
<tr>
<td>□ Check to see that the filter bed is clean of sediments and the sediment chamber contains no more than six inches of sediment.</td>
<td>Annual</td>
</tr>
<tr>
<td>□ Make sure that there is no evidence of deterioration of concrete structures.</td>
<td></td>
</tr>
<tr>
<td>□ Inspect grates (if used).</td>
<td></td>
</tr>
<tr>
<td>□ Inspect inlets, outlets, and overflow spillway to ensure good condition and no evidence of erosion.</td>
<td></td>
</tr>
<tr>
<td>□ Ensure that flow is not bypassing the facility.</td>
<td></td>
</tr>
<tr>
<td>□ Ensure that no noticeable odors are detected outside the facility.</td>
<td></td>
</tr>
</tbody>
</table>

### Maintenance Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Remove trash and debris from the sedimentation basin (Austin design), the riser pipe, and the filter bed as needed.</td>
<td>Frequently (as needed)</td>
</tr>
<tr>
<td>□ Prevent grass clippings from washing into the filter.</td>
<td></td>
</tr>
<tr>
<td>□ Remove trash from inlet grates to maintain the inflow capacity of the media filter.</td>
<td></td>
</tr>
<tr>
<td>□ Upstream vegetation should be maintained as needed.</td>
<td></td>
</tr>
<tr>
<td>□ Make structural changes or repairs as needed to eliminate pools of water that stand longer than 96 hrs to prevent mosquito production, particularly during the warmer months of the year. Identify and eliminate sources of non-stormwater runoff that feed standing water pools. Coordinate with the local mosquito and vector control agency to control mosquitoes, if necessary.</td>
<td></td>
</tr>
<tr>
<td>□ Clean filter surface semiannually; or more often if watershed is excessively erosive.</td>
<td>Semi-annual</td>
</tr>
<tr>
<td>□ Replace sorbent pillows (Multi-Chamber Treatment Train only).</td>
<td></td>
</tr>
<tr>
<td>□ Repair or replace any damaged structural parts.</td>
<td>Annual</td>
</tr>
<tr>
<td>□ Stabilize any eroded areas.</td>
<td></td>
</tr>
<tr>
<td>□ Remove accumulated sediment in the sedimentation chamber every 10 years or when the sediment occupies 10-20% of the basin volume or accumulates to a depth of six inches, whichever is less.</td>
<td>As needed</td>
</tr>
<tr>
<td>□ Remove top 2 in. of media filter and dispose of properly if facility drain time exceeds 96 hr. Restore media depth to 18 in. when overall media depth drops to 12 in.).</td>
<td></td>
</tr>
</tbody>
</table>
**Additional Information**

In general, media filters are preferred over infiltration practices, such as infiltration trenches, when contamination of groundwater with conventional pollutants is of concern. This usually occurs in areas where underlying soils alone cannot treat runoff adequately - or ground water tables are high. In most cases, media filters can be constructed with impermeable basin or chamber bottoms, which help to collect, treat, and release runoff to a storm drainage system or directly to surface water with no contact between contaminated runoff and groundwater. In regions where evaporation exceeds rainfall and a wet pond would be unlikely to maintain the required permanent pool, a media filtration system can be used.

Special considerations are required for media filters to be effective in cold climates. In cold climates, filters can be used, but surface or perimeter filters will not be effective during the winter months, and unintended consequences might result from a frozen filter bed. Using a larger under drain system to encourage rapid draining during the winter months may prevent freezing of the filter bed. Also, the sediment chamber should be larger in cold climates to account for road sanding.

**References**


**General Description**

Water quality inlets (WQIs), also typically called trapping catch basins, oil/grit separators or oil/water separators, consist of one or more chambers that promote sedimentation of coarse materials and separation of free oil (as opposed to emulsified or dissolved oil) from stormwater. Some WQIs also contain screens to help retain larger or floating debris, and many of the newer designs also include a coalescing unit that helps promote oil/water separation.

These devices are appropriate for capturing hydrocarbon spills, but provide very marginal sediment removal and are not very effective for treatment of stormwater runoff. WQIs typically capture only the first portion of runoff for treatment and are generally used for pretreatment before discharging to other best management practices (BMPs).

**Inspection/Maintenance Considerations**

High sediment loads can interfere with the ability of the WQI to effectively separate oil and grease from the runoff. During periods of high flow, sediment can be re-suspended and released from the WQI into surface waters if this is the only BMP on site prior to discharge. Maintenance of WQIs can be easily neglected because they are underground. Establishment of a maintenance schedule is helpful for ensuring proper maintenance occurs. The required maintenance effort will be site-specific due to variations in sediment and hydrocarbon loading. Since WQI residuals contain hydrocarbon by-products, they may require disposal as hazardous waste. Many WQI owners coordinate with waste haulers to collect and dispose of these residuals.

**Advanced BMPs Covered**

![Treatment Control]

**Maintenance Concerns**

- High Sediment Loads
- Hazardous Waste
- Vector Control
- Pollutant Release

**Targeted Constituents**

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Eff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sediment</td>
<td>●</td>
</tr>
<tr>
<td>Nutrients</td>
<td>●</td>
</tr>
<tr>
<td>Trash</td>
<td>▲</td>
</tr>
<tr>
<td>Metals</td>
<td>●</td>
</tr>
<tr>
<td>Bacteria</td>
<td>●</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>▲</td>
</tr>
<tr>
<td>Organics</td>
<td>●</td>
</tr>
</tbody>
</table>

**Legend (Removal Effectiveness)**

- ● Low
- ▲ Medium
- ■ High
- • Requires Pretreatment

*Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.*
Water Quality Inlet

**Inspection Activities**

- Inspect regularly to determine if maintenance is required.
  - Suggested Frequency: Monthly during the wet season, or after significant rain events

- Contact the local mosquito and vector control agency if mosquito breeding is observed or suspected.
  - Suggested Frequency: As needed

**Maintenance Activities**

- Clean out and dispose of accumulated oil, grease, and sediments. Remove accumulated trash and debris. The clean out and disposal techniques should be environmentally acceptable and in accordance with local regulations.
  - Suggested Frequency: Annual, before the wet season, or more frequent as needed

**Additional Information**

Water quality inlets are most effective for drainage areas of 1 acre or less. They are often used in industrial applications such as airport runways, equipment washdown areas, and gas station parking lots. WQIs can be situated at the ground surface or underground, and they are available as pre-manufactured or cast-in-place units, typically constructed with reinforced concrete. They should be water-tight to prevent possible groundwater contamination, and should be sited such that vactor trucks can easily access and remove sediment and pollutants.

Since WQIs can be relatively deep, they may be designated as confined spaces. Caution should be exercised to comply with confined space entry safety regulations if it is required.

**References**


General Description

A multiple treatment system uses two or more treatment control BMPs in series to enhance pollutant removal and minimize maintenance efforts. There are many different combinations of treatment control BMPs to consider, and selection should be based on site-specific conditions and needs. Examples of multiple systems include:

- Water quality inlet combined with a media filter, infiltration basin, or infiltration trench;
- Vegetated swale or bioretention unit combined with a media filter, infiltration basin, or infiltration trench;
- Vegetated buffer strip combined with a vegetated swale;
- Extended detention zone on a wet pond; and
- Extended detention basin or media filter combined with a harvest and reuse system.

Inspection/Maintenance Considerations

Each of the separate treatment processes will require maintenance as described in the previous fact sheets. For example, a multiple system comprised of a biofilter combined with an infiltration basin would require the inspection and maintenance considerations outlined on the fact sheet for each process.

### Inspection Activities

<table>
<thead>
<tr>
<th>Inspection Activities</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refer to individual treatment control fact sheets</td>
<td>As needed</td>
</tr>
</tbody>
</table>

### Maintenance Activities

<table>
<thead>
<tr>
<th>Maintenance Activities</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refer to individual treatment control fact sheets</td>
<td>As needed</td>
</tr>
</tbody>
</table>
**General Description**

Biotreatment systems are manufactured BMPs that mimic treatment provided by natural systems with a smaller footprint. Physical straining, biological and chemical reactions in the mulch, root zone, and soil matrix, and infiltration into the underlying subsoil are the main treatment processes. Biotreatment cells reduce peak discharge and runoff volume by detaining water through surface ponding, storage in soil and gravel layers, and evapotranspiration. They can be designed to incorporate infiltration to underlying soils and/or an underdrain system that collects treated stormwater and directs it to the storm drain.

Examples of biotreatment systems include manufactured wetlands and planter box biofilters that can incorporate a wide range of vegetation from grasses to trees.

**Inspection/Maintenance Considerations**

To maintain treatment performance longevity, pretreatment systems should be installed at sites with high loads of sediment, trash, and floatables. If pretreatment is provided then maintenance consideration must be given to remove accumulated materials.

Biotreatment systems require frequent landscaping maintenance, including harvesting of wetland vegetation and planter box irrigation in dry climates. Maintenance tasks may be conducted by a landscaping contractor, who may already be hired at the site. Refer to TC-21, Constructed Wetland, TC-32, Bioretention, and specific manufacturer recommendations for more information.

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**Advanced BMPs Covered**

- Stormwater Containment and Discharge Reduction
- Treatment Control

**Maintenance Concerns**

- Vegetation/Landscape Maintenance
- Mulch and Planting Media Replacement
- Clogged Soil or Outlet Structures
- Invasive/Exotic Plant Species
- Vector Control

**Targeted Constituents**

- Sediment ✓
- Nutrients ✓
- Trash ✓
- Metals ✓
- Bacteria ✓
- Oil and Grease ✓
- Organics ✓

*Removal Effectiveness varies for different manufacturer designs. See New Development and Redevelopment Handbook-Section 5 for more information.*
### Inspection Activities

- Inspect during the dry season to determine if irrigation of plants is necessary. **As needed**
- Inspect to ensure vegetation is well established. If not, either prepare soil and reseed or replace with alternative species. Install erosion control blanket if necessary. **Semi-annual**
- Check for debris and litter, and areas of sediment accumulation.
- Inspect health of trees and shrubs.
- Inspect to verify that invasive species of wetland plants is not occurring. **Annual**

### Maintenance Activities

- Water plants daily for at least 2 weeks. **At project completion**
- Remove litter and debris. **Monthly**
- Remove sediment.
- Remulch void areas.
- Treat diseased trees and shrubs.
- Mow turf areas.
- Repair erosion at inflow points.
- Repair outflow structures.
- Unclog underdrain.
- Regulate soil pH regulation. **As needed**
- Repair undercut areas, erosion to banks, and bottom as required.
- Make structural changes or repairs as needed to eliminate pools of water that stand longer than 96 hrs to prevent mosquito production, particularly during the warmer months of the year. Identify and eliminate sources of non-stormwater runoff that feed standing water pools. Contact the local mosquito and vector control agency if mosquito breeding is observed or suspected. **Every 2-3 years, or as needed**
- Remove and replace dead and diseased vegetation. **Semi-annual**
- Add mulch. **Annual**
- Replace tree stakes and wires.
- Supplement wetland plants if a significant portion have not established (at least 50% of the surface area).
- Remove nuisance plant species.
- Mulch should be replaced every 2 to 3 years or when bare spots appear or infiltration rates are reduced. Remulch prior to the wet season. **Every 2-3 years, or as needed**
- Harvest plant species if vegetation becomes too thick causing flow backup and flooding. More frequent plant harvesting may be required by local vector control agencies. **5- to 7-year maintenance (or more frequently as required)**
References


**General Description**

Manufactured stormwater filters are typically underground systems that utilize membranes of various materials or cartridges filled with different types of media to filter stormwater runoff. For cartridge systems, the media used can be inert, such as sand or gravel, or adsorptive, such as peat or manufactured media. The effectiveness of these systems depends on the type of membrane or media being implemented, the filter loading rate, and the characteristics of the influent stormwater. For some systems, the water chemistry will also determine the effectiveness of the filter in removing dissolved constituents. Pretreatment is recommended to prevent clogging and premature failure of the filter.

**Inspection/Maintenance Considerations**

Stormwater filters may exhibit decreased effectiveness after a single year of operation, depending on the activities occurring in the drainage area and filter loading. Stormwater filters clog easily when subjected to high sediment loads. Sediment reducing pretreatment practices, such as vegetated buffer strips or vegetated swales, placed upstream of the filter should be maintained properly to reduce sediment loads into filter.

Maintenance efforts will need to focus on basic housekeeping practices such as removal of sediment and debris accumulations to prevent clogs and/or ponds of standing water. To minimize the potential for clogging, frequent maintenance and inspection practices are required. Waste sand, gravel, membranes, or filter media must be disposed of properly and in accordance with all applicable laws.

Stormwater filters can become a nuisance due to mosquito or midge breeding if not properly designed and maintained. Installations should dewater completely (recommended 96 hour or

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**Advanced BMPs Covered**

- Pollutant Breakthrough
- Clogged Membrane/Media
- Sediment, Trash, and Debris Accumulations
- Vector Control

**Targeted Constituents**

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

*Removal Effectiveness varies for different manufacturer designs. See New Development and Redevelopment Handbook-Section 5 for more information.*
less residence time) to prevent creating mosquito and other vector habitats.

### Inspection Activities

<table>
<thead>
<tr>
<th>Suggested Frequency</th>
<th>Inspection Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post construction</td>
<td>During the first year of operation, inspect chambers quarterly to ensure that the system is functioning properly.</td>
</tr>
<tr>
<td>Quarterly, and after major storms</td>
<td>Inspect filters after every major storm in the first few months after construction to ensure that the system is functioning properly.</td>
</tr>
<tr>
<td>Semi-annual</td>
<td>Ensure that filter surface, inlets, and outlets are clear of debris.</td>
</tr>
<tr>
<td></td>
<td>Ensure that the contributing area is stabilized and mowed, with clippings removed.</td>
</tr>
<tr>
<td></td>
<td>Check to ensure that the filter surface is not clogging.</td>
</tr>
<tr>
<td></td>
<td>Ensure that activities in the drainage area minimize oil/grease and sediment entry to the system.</td>
</tr>
<tr>
<td></td>
<td>Inspect the facility once during the wet season after a large rain event to determine whether the facility is draining completely within 96 hr.</td>
</tr>
<tr>
<td></td>
<td>Inspect for standing water, sediment, trash and debris, structural damage, and to identify potential problems.</td>
</tr>
<tr>
<td></td>
<td>Contact the local mosquito and vector control agency if mosquito breeding is observed or suspected.</td>
</tr>
<tr>
<td>Annual</td>
<td>Check to see that the filter area is clean of sediments and the sediment chamber contains no more than six inches of sediment.</td>
</tr>
<tr>
<td></td>
<td>Make sure that there is no evidence of deterioration of concrete structures.</td>
</tr>
<tr>
<td></td>
<td>Inspect grates (if used).</td>
</tr>
<tr>
<td></td>
<td>Inspect inlets, outlets, and overflow spillway to ensure good condition and no evidence of erosion.</td>
</tr>
<tr>
<td></td>
<td>Ensure that flow is not bypassing the facility.</td>
</tr>
<tr>
<td></td>
<td>Ensure that no noticeable odors are detected outside the facility.</td>
</tr>
</tbody>
</table>

### Maintenance Activities

<table>
<thead>
<tr>
<th>Suggested Frequency</th>
<th>Maintenance Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequently (as needed)</td>
<td>Remove trash and debris from the sedimentation basin (Austin design), the riser pipe, and the filter area as needed.</td>
</tr>
<tr>
<td></td>
<td>Prevent grass clippings from washing into the filter.</td>
</tr>
<tr>
<td></td>
<td>Remove trash from inlet grates to maintain the inflow capacity of the media filter.</td>
</tr>
<tr>
<td></td>
<td>Upstream vegetation should be maintained as needed.</td>
</tr>
<tr>
<td>Semi-annual</td>
<td>Clean filter surface semiannually; or more often if watershed is excessively erosive.</td>
</tr>
<tr>
<td></td>
<td>Replace sorbent pillows (Multi-Chamber Treatment Train only).</td>
</tr>
<tr>
<td>Annual</td>
<td>Repair or replace any damaged structural parts.</td>
</tr>
<tr>
<td></td>
<td>Stabilize any eroded areas.</td>
</tr>
<tr>
<td>As needed</td>
<td>Remove accumulated sediment in the sedimentation chamber every 7-10 years or when the sediment occupies 10-20% of the chamber volume or accumulates to a depth of six inches, whichever is less.</td>
</tr>
<tr>
<td></td>
<td>Remove top 2 in. of media filter and landfill if facility drain time exceeds 72 hr. Restore media depth to 18 in. when overall media depth drops to 12 in.).</td>
</tr>
</tbody>
</table>
References


Wet Vault

General Description

A wet vault is a vault with a permanent water pool, generally 3 to 5 feet deep. The vault may also have a constricted outlet that causes a temporary rise of the water level (i.e., extended detention) during each storm. This live volume generally drains within 12 to 48 hours after the end of each storm.

Inspection/Maintenance Considerations

Maintenance of wet vaults requires special equipment. Each manufacturer provides storage capacities with respect to sediments and floatables, with recommendations on the frequency of cleaning as a function of the percentage of the volume in the unit that has been filled by these materials. A loss of dissolved pollutants may occur as accumulated organic matter (e.g., leaves) decomposes in the units. If regular maintenance is not performed, accumulated sediment may cause noxious gases to form. Because wet vaults hold standing water between storms, they can become a nuisance due to mosquito breeding.

It is important to recognize that as storage of accumulated sediment occurs directly in the operating area of the wet vault, treatment efficiency will decline over time given the reduction in treatment volume. Whether this is significant depends on the design capacity. Some manufactured wet vaults have relatively little sediment storage and therefore must be cleaned frequently (e.g., annually) while others have sufficient capacity to reduce cleaning frequency. Vault maintenance procedures must meet OSHA confined space entry requirements.

Sediment should be tested for toxicants in compliance with current disposal requirements if land uses in the catchment include commercial or industrial zones, or if visual or olfactory indications of pollution are noticed.

Advanced BMPs Covered

- Sediment, Trash, and Debris Accumulations
- Vector Control

Targeted Constituents*

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

*Removal Effectiveness varies for different manufacturer designs. See New Development and Redevelopment Handbook-Section 5 for more information.
### Inspection Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Inspect the unit twice during the first wet season of operation, setting the cleaning frequency accordingly.</td>
<td>Post construction</td>
</tr>
<tr>
<td>□ Inspect for floating debris, sediment buildup, and accumulated petroleum products.</td>
<td>Annual</td>
</tr>
<tr>
<td>□ Contact the local mosquito and vector control agency if mosquito breeding is observed or suspected.</td>
<td>As needed</td>
</tr>
</tbody>
</table>

### Maintenance Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Suggested Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Remove sediment that has accumulated in the vault after construction in the drainage area is complete.</td>
<td>Post construction</td>
</tr>
<tr>
<td>□ The recommended frequency of cleaning differs with the manufacturer, ranging from one to two years.</td>
<td>Annual, or per manufacturers recommendations</td>
</tr>
<tr>
<td>□ Maintenance consists of the removal of accumulated material with a vactor truck. It may be necessary to remove and dispose the floatables separately due to the presence of petroleum product. Annual maintenance is typical.</td>
<td>Annual, or more frequent as needed</td>
</tr>
<tr>
<td>□ Remove floating debris and accumulated petroleum products as needed. Floating oil should be removed from wet vaults that are used as oil/water separators when oil accumulation exceeds one inch.</td>
<td>Annual, or more frequent as needed</td>
</tr>
</tbody>
</table>

### References

Gravity Separators

General Description
Gravity separators: (alternatively, swirl concentrators, swirl or vortex separators, or hydrodynamic separators) are gravity separators, and in principle are essentially wet vaults. The difference from wet vaults, however, is that the gravity separator is round, rather than rectangular, and the water moves in a centrifugal fashion before exiting. By having the water move in a circular fashion, rather than a straight line as is the case with a standard wet vault, it is possible to obtain significant removal of suspended sediments and attached pollutants with less space. They can provide effective pretreatment when paired with filtration devices, such as media filters or bioretention systems.

Gravity separators were originally developed for combined sewer overflows (CSOs), where they are used primarily to remove coarse inorganic solids. Gravity separation has been adapted to stormwater treatment by several manufacturers.

Inspection/Maintenance Considerations
Gravity separators require routine removal of accumulated sediment, trash, and debris. As some of the systems have standing water that remains between storms, gravity separators can become a nuisance due to mosquito breeding. Also, a loss of dissolved pollutants may occur as accumulated organic matter (e.g., leaves) decomposes in the units.

Advanced BMPs Covered

<table>
<thead>
<tr>
<th>Targeted Constituents*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sediment</td>
</tr>
<tr>
<td>Nutrients</td>
</tr>
<tr>
<td>Trash</td>
</tr>
<tr>
<td>Metals</td>
</tr>
<tr>
<td>Bacteria</td>
</tr>
<tr>
<td>Oil and Grease</td>
</tr>
<tr>
<td>Organics</td>
</tr>
</tbody>
</table>

*Removal Effectiveness varies for different manufacturer designs. See New Development and Redevelopment Handbook-Section 5 for more information.
### Inspection Activities

- Inspect the unit twice during the first wet season of operation, setting the cleaning frequency accordingly.
  - Suggested Frequency: Post construction

- Inspect for floating debris, sediment buildup, and accumulated petroleum products.
  - Frequency: Annual

- Contact the local mosquito and vector control agency if mosquito breeding is observed or suspected.
  - Frequency: As needed

### Maintenance Activities

- Remove sediment that has accumulated in the vault after construction in the drainage area is complete.
  - Frequency: Post construction

- The recommended frequency of cleaning differs with the manufacturer, ranging from one to two years.
  - Frequency: Annual, or per manufacturers recommendations

- Maintenance consists of the removal of accumulated material with a vactor truck. It may be necessary to remove and dispose the floatables separately due to the presence of petroleum product. Annual maintenance is typical.

- Remove floating debris and accumulated petroleum products as needed. Floating oil should be removed from wet vaults that are used as oil/water separators when oil accumulation exceeds one inch.
  - Frequency: Annual, or more frequent as needed

### References


Gravity Separators

Drain Inlet Insert

**General Description**

Drain inlet inserts, also known as catch basin, drop inlet or curb inlet inserts, are used to remove pollutants at the point of entry to the storm drain system. There are a multitude of inserts of various shapes and configurations including baffles, baskets, boxes, fabrics, sorbent media, screens, and skimmers. The effectiveness of drain inlet inserts depends on their design, application, loading, and frequency of maintenance to remove accumulated sediment, trash, and debris.

**Inspection/Maintenance Considerations**

Routine inspection and maintenance is necessary to maintain functionality of drain inlet inserts and to prevent re-suspension and discharge of accumulated pollutants. Maintenance activities vary depending on the type of drain inlet insert being implemented; refer to the manufacturer’s recommendations for more information.

**Advanced BMPs Covered**

- **Sediment, Trash, and Debris Accumulations**
- **Pollutant Re-suspension and Discharge**

**Targeted Constituents**

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

*Removal Effectiveness varies for different manufacturer designs. See New Development and Redevelopment Handbook-Section 5 for more information.*
### Inspection Activities
- **Verify that stormwater enters the unit and does not leak around the perimeter.**
  - **Suggested Frequency**: After construction.
- **Inspect for sediment, trash, and debris buildup and proper functioning.**
  - **Suggested Frequency**: At the beginning of the wet season and after significant storms.

### Maintenance Activities
- **Remove accumulated sediment, trash, and debris.**
- **Replace sorbent media.**
  - **Suggested Frequency**: At the beginning of the wet season and as necessary.

### References


5 Monitoring, Reporting, and Program Evaluation

Conducting a monitoring program, reviewing the monitoring information, evaluating BMPs, and record keeping and reporting are all important elements of the implementation phase of the SWPPP. The success of the SWPPP and compliance with the General Permit depend upon the thorough implementation of the monitoring plan and evaluation of the effectiveness of the plan elements once they have been implemented.

The Industrial Commercial BMP Handbook Portal does not address the full scope of monitoring, reporting, or evaluating for facilities subject to federal Subchapter N requirements. Facilities subject to these requirements need to review the federal regulations and design their monitoring program to comply with both the General Permit and federal regulations.

The Industrial Commercial BMP Handbook Portal does not address monitoring for facilities with discharges subject to the California Ocean Plan, which includes discharges into Areas of Special Biological Significance (ASBS). Facilities subject to the California Ocean Plan or that discharge to an ASBS should review the Ocean Plan and Attachment G of the General Permit and design their monitoring program to meet these requirements.

5.1 Conduct Monitoring Program

Two forms of monitoring are required: visual observations (inspections) and stormwater sampling and analysis. Additionally, Dischargers must conduct the planning and preparation necessary to conduct these activities. The General Permit requires that each SWPPP have a MIP. The MIP must include the following elements:

- Identification of team members assigned to conduct monitoring;
- Description of discharge locations;
- Procedures for visual observations;
- Identification of water quality constituents, including basic constituents for all facilities, and, as appropriate: constituents required based on the facility SIC code as outlined in the General Permit; other facility specific potential pollutants; 303(d) list related pollutants; TMDL-related pollutants; and constituents required by federal Subchapter N4;
- Justifications for any reductions in sampled locations, alternative discharge locations, and any combined samples;
- Instructions for field instrument calibration; and

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4 40 CFR Subchapter N, Effluent Limitation Guidelines and Standards
• An example Chain of Custody (COC) form used for sample handling and shipping/transporting to the laboratory.

The monitoring program is designed to address the following objectives:

• Determine whether BMPs are effective for compliance with the effluent and receiving water limitations of the General Permit;

• Determine whether the presence of pollutants in the industrial stormwater discharges and authorized non-stormwater discharges exceed NALs and trigger implementation of addition actions; and

• Assess the effectiveness of BMPs in reducing or preventing pollutants in industrial stormwater discharges and authorized non-stormwater discharges.

5.1.1 Training

Familiarity with the requirements of the MIP and competence in the techniques and protocols specified in the plan are essential to the collection of samples in a manner that meets the goals of the plan, while protecting the health and safety of the monitoring team members. The General Permit requires that monitoring personnel receive training prior to conducting any stormwater monitoring activities. Stormwater monitoring training should include the following basic elements:

• Review of the MIP;

• Training on the use and calibration of field equipment;

• Training on sample handling, collection techniques, and protocols;

• Field training and sampling simulation (supervised dry runs or on-the-job training); and

For facilities that have entered Level 1 or Level 2 status, monitoring personnel must be trained by the QISP designated by the facility.

5.1.2 Visual Observations

All facilities are required to conduct visual observations of facility operations, BMPs, non-stormwater discharges, and stormwater discharges to document the presence of and to identify the source of any pollutants and non-stormwater flows. Results of the visual observations are used to determine if BMPs are adequate and effective. Two types of visual observations are required:

• Monthly visual operations of facility operations, BMPs, and non-stormwater discharges; and

• Stormwater sampling event visual observations of stormwater discharges.

The General Permit requires monthly visual observations of each drainage area for:

• Unauthorized non-stormwater discharges;
Authorized non-stormwater discharges and associated BMPs;

Outdoor industrial equipment and storage areas;

Outdoor industrial activity areas;

BMPs; and

Other potential sources of industrial pollutants.

Monthly observations must be conducted during daylight hours of scheduled facility operating hours, on days with no precipitation or stormwater discharges.

The General Permit requires visual observations of stormwater discharges during each sampling event at the point of discharge for the presence/absence of floating and suspended materials, oil and grease, discolorations, turbidity, odors, and trash/debris. When pollutants are identified in the General Permit requires Dischargers to document the probable source of the pollutants, which may involve follow-up observations of the drainage area.

Observations of volume-based or flow-based stormwater treatment BMPs must include observations of the treated flow and any bypass flow. Additionally, if a facility contains stormwater, such as in a secondary containment berm, the contained stormwater for later discharge must be observed when it is discharged.

Visual observations must be recorded and include, at a minimum, the following:

- Date and time of the observation;
- Locations observed;
- Presence and probable source of pollutants observed in the discharge;
- Name of person making the observations; and
- Response actions taken, including SWPPP revisions.

### 5.1.3 Stormwater Sampling and Analysis

Each facility must collect samples of stormwater discharges according to its MIP. Facilities that participate in Compliance Groups have different sampling frequencies.

#### 5.1.3.1 Sampling Frequency and Timing

Individual Dischargers (facilities not participating in Compliance Groups) must collect samples from two qualifying storm events (QSEs) within the first half of each reporting year (July 1 to December 31) and two QSEs within the second half of each reporting year (January 1 to June 30). Compliance Group members are only required to collect samples from one QSE within the
first half of each reporting year (July 1 to December 31) and one QSE within the second half of each reporting year (January 1 to June 30).

A qualifying storm event is a storm that is described by the following:

1) Produces a discharge from at least one drainage area at the facility; and
2) Is preceded by at least 48 hours with no discharge from any drainage area at the facility.

Stormwater samples must be collected within the first four hours of discharge or within the first four hours of operating hours if a QSE occurred with the previous 12 hour period.

Dischargers may collect samples from additional QSEs. Data from these addition sampling events must be reported into SMARTS and are used to determine NAL exceedances.

**Conditions for Sample Frequency Reduction**

Facilities that are in compliance with all aspects of the General Permit and can demonstrate that results from four consecutive sampling events did not exceed NALs may qualify for reduced sampling.

- Individual Dischargers can reduce sampling frequency to one sample in each half of the reporting year; and
- Compliance Group members can reduce sampling frequency to one sample per reporting year.

Facilities subject to federal Subchapter N requirements are not eligible for a reduction in sampling frequency.

If the conditions for the reduced sampling frequency are met, submit a Sampling Frequency Reduction self-certification in SMARTS and proceed to implement the reduced sampling schedule unless notified otherwise by the RWQCB.

If an exceedance of NALs is observed, facilities are no longer eligible for reduced sampling and must return to the original sampling frequency.

### 5.1.3.2 Sampling Locations

Stormwater runoff samples must be collected at all discharge locations receiving flow from areas with exposed industrial activities. Locations must be representative of stormwater associated with industrial activities and any commingled authorized non-stormwater discharges. Contained stormwater must also be sampled when it is released. Dischargers are not required to conduct monitoring for drainage areas that are not exposed to industrial activities. The General Permit allows for three exceptions to collecting and analyzing samples from each discharge location.

1. **Alternative Discharge Locations** must be designated by a facility when a discharge location is affected by stormwater run-on from surrounding areas that cannot be controlled or when the discharge is difficult to observe or sample, such as submerged outfalls or dangerous locations. In these cases the Discharger must identify alternative locations in the MIP and describe how they qualify as representative sampling locations.
2. **Representative Sampling Reduction** can be proposed by a facility in cases where the industrial activities, BMPs, and the physical conditions in different drainage areas are substantially similar. In this case, a facility can propose to sample a reduced number of discharge locations based on the similarity of the drainage areas. Representative sampling reduction justifications must be documented in the MIP and certified in SMARTS. Facilities can proceed to implement the reduced sampling locations unless notified otherwise by the RWQCB.

3. **Qualified Combined Samples** entails combining equal volume samples from up to four drainage areas into one sample for analysis. Combined samples can be proposed by a facility when drainage areas have similar industrial activities, BMPs, and physical conditions. Qualified combined sample justifications must be documented in the MIP and certified in SMARTS. Only laboratories may combine the samples. Facilities implementing qualified combined sampling need to provide direction to the laboratory on which samples to combine. Once submitted in SMARTS, facilities can direct their laboratories to combine samples unless notified otherwise by the RWQCB.

### 5.1.3.3 Analytical Constituents

All facilities must analyze stormwater samples for the basic three constituents specified by the General Permit. Other constituent must be analyzed based on the type of facility, potential for pollutants to be present in the discharge, presence of 303(d)-listed impaired waters, TMDLs, and federal Subchapter N requirements.5

- All facilities must analyze all samples for pH, TSS, and O&G;
- All facilities must analyze for any potential industrial pollutants identified in the facility-specific assessment of pollutant sources in the SWPPP (see Section 2);
- Facilities with SIC codes listed in Table 1 of the General Permit must analyze for the additional analytical parameters listed in that table (see Appendix B);
- Facilities that discharge to receiving water with 303(d) listed impairments or TMDLs must analyze for the constituent causing the impairment, if industrial activities are a potential source of the constituent;
- Facilities subject to federal Subchapter N requirements must analyze for the constituents identified in the federal regulations; and
- Facilities must also analyze for additional constituents required by the RWQCB.

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5 The *Industrial and Commercial BMP Handbook Portal* does not address the full scope of the Subchapter N requirements. Facilities subject to federal Subchapter N requirements should thoroughly review the federal regulations and design their monitoring program to comply with the General Permit and federal regulations.
5.1.3.4 Sample Collection and Analytical Procedures

Collection of valid, high quality, and representative samples is of paramount importance to assess compliance and to determine NAL exceedances, as well as to provide good data upon which to assess and evaluate BMPs and the SWPPP.

Sample Collection Procedures

The General Permit specifies sampling collection and handling procedures in Attachment H to help obtain representative and high quality samples. Dischargers need to prepare in advance for sampling events by arranging qualified staff, equipment, and materials necessary for sample collection. Examples of actions needed for proper sample collection and handling procedures include the following:

- Establish a relationship with an Environmental Laboratory Accreditation Program (ELAP) certified laboratory that can perform the required analyses;
- Order and obtain appropriate sample containers from the laboratory for the planned analyses and locations;
- Calibrate and maintain monitoring instruments and equipment in accordance with manufacturers’ specifications;
- Employ “clean” sampling techniques to minimize potential sources of sample contamination (see sampling guidelines);
- Collect and preserve samples in accordance with Standard Methods for the Examination of Water and Wastewater;

- Properly handle and package samples until delivered to the laboratory;
  - Samples are delivered to the laboratory within the hold time
  - Keep samples at 4°C during transport to the laboratory
- Label each sample and complete a chain of custody; and
- Review safety protocols and procedures in advance of sampling to protect the safety of sampling staff.

Guidelines to Minimize Sample Contamination

- No smoking.
- Never sample near a running vehicle.
- Do not park vehicles in immediate sample collection area (even non-running vehicles).
- Always wear clean, powder-free nitrile gloves when handling composite bottles, lids, sterile grab sample bottles, tubing, or strainers.
- Never touch the inside surface of a sample bottle or lid, even with gloved hands.
- Do not overfill sample containers.
- Never touch the exposed end of a sampling tube.
- Never allow the inner surface of a sample bottle, lid, or sampling tube to be contacted by any material other than the sample water.
- Never allow any object or material to fall into or contact the collected sample water.
- Avoid allowing rain water to drip from rain gear or other surfaces into sample bottles.
In general, grab samples will be collected. Some Dischargers may opt to use automated samplers. However, automated samplers have limitations for certain constituents, e.g., pH and O&G. If using an automated sampler, the Discharger must determine it is appropriate for the samples to be collected. When using automatic samplers, Dischargers must ship the entire container(s) from the automatic sampler to the laboratory for analysis.

**Analytical Procedures**

The General Permit specifies analytical methods to be used for the three basic constituents and SIC code-specific constituents (Table 5-1). Dischargers must use these methods or obtain approval for alternative methods.

Dischargers may select and propose to the SWRCB appropriate EPA Methods or Standard Methods for constituents not specified in the General Permit. With the exception of pH, as noted in Table 5-1, all analyses must be conducted by a laboratory certified by the California Department of Public Health according to test procedures under 40 CFR Part 136.

### Table 5-1 General Permit Constituents and Required Methods

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Method</th>
<th>Reporting Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>1. pH paper/test kits</td>
<td>Standard units</td>
</tr>
<tr>
<td></td>
<td>2. EPA 150.1 or SM 4500-H-B or calibrated meter</td>
<td></td>
</tr>
<tr>
<td>Suspended Solids (TSS), Total</td>
<td>SM 2540-D</td>
<td>mg/L</td>
</tr>
<tr>
<td>Oil &amp; Grease (O&amp;G), Total</td>
<td>EPA 1664A</td>
<td>mg/L</td>
</tr>
<tr>
<td>Zinc, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Cyanide, Total</td>
<td>SM 4500–CN C, D, or E</td>
<td>mg/L</td>
</tr>
<tr>
<td>Lead, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Chemical Oxygen Demand (COD)</td>
<td>SM 5220C</td>
<td>mg/L</td>
</tr>
<tr>
<td>Aluminum, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>EPA 200.7</td>
<td>mg/L</td>
</tr>
<tr>
<td>Nitrate + Nitrite Nitrogen</td>
<td>SM 4500-NO3- E</td>
<td>mg/L as N</td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>SM 4500-P B+E</td>
<td>mg/L as P</td>
</tr>
<tr>
<td>Ammonia (as N)</td>
<td>SM 4500-NH3 B+ C or E</td>
<td>mg/L</td>
</tr>
<tr>
<td>Magnesium, Total</td>
<td>EPA 200.7</td>
<td>mg/L</td>
</tr>
<tr>
<td>Arsenic, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Cadmium, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Nickel, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Mercury, Total</td>
<td>EPA 245.1</td>
<td>mg/L</td>
</tr>
<tr>
<td>Selenium, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Silver, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Biochemical Oxygen Demand (BOD)</td>
<td>SM 5210B</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

1. Only available to facilities that have never entered Level 1 status for pH or are not subject to Subchapter N.
2. Required for facilities that have either entered Level 1 status for pH or are subject to Subchapter N.

**Field pH Measurements**

- Measurement must occur within 15 minutes of sample collection
- If using a pH meter, it must be calibrated per manufacturer’s instructions
- Staff must be trained in field method to be used
5.1.4 Monitoring Exceptions

Monitoring (visual observations and sample collection) is only required during scheduled facility operating hours and is not required if dangerous weather conditions are present (e.g., flooding, electrical storm). When monitoring is not conducted due to one of the exceptions, an explanation must be provided in the Annual Report.

Although Dischargers are not required to conduct monitoring outside of scheduled operating hours, the General Permit does not prohibit Dischargers from doing so. For example, a facility whose operating hours are primarily after dark may opt to conduct monitoring during daylight hours.

5.2 Conduct Record Keeping and Reporting

Dischargers are required to maintain records of monitoring activities, including visual observations, sampling results, calibrations, and quality control quality assurance records and results. Dischargers should plan for the maintenance of these documents and records when developing the MIP. The General Permit requires periodic reporting of monitoring results and good document management will facilitate this task.

The General Permit requires all facilities to register and submit reports electronically via the SWRCB’s SMARTS website. Documents and information, such as the analytical data and the annual report, are submitted via SMARTS. This is an important change from the 1997 permit, under which there was a paper reporting process with electronic reporting as an option.

5.2.1 Record Keeping

Records of all stormwater monitoring information, inspections and visual observations, certifications, corrective actions, follow-up activities, and copies of all reports must be retained for a period of at least five years. Dischargers must also maintain records of any monitoring data collected more frequently than the minimum number of storm events required by the General Permit. Records to be maintained are:

- The date, place, and time of site inspections, sampling, visual observations, and measurements;
- The individual(s) who performed the site inspections, sampling, visual observations, and measurements;
- The date and approximate time of analyses;
- The individual who performed the analyses;
- Analytical results, method detection limits, and the analytical techniques or methods used;
- Quality assurance and quality control records and results;
- Monthly and stormwater sampling event related visual observation records;
- Visual observations and sample collection exception records;
All calibration and maintenance records for field instruments used;

Certifications and justifications for alternative sample locations, representative sampling reduction, and qualified combined samples; and

The records of any corrective actions and follow-up activities that resulted from the visual observations.

It is also advisable to record and maintain information regarding the storms associated with the sampling events. In particular, storm duration (start and stop dates/times), total precipitation, and precipitation intensity may be useful to the Discharger in evaluating BMP performance or calculating whether a particular event exceeded the design storm for a BMP. Dischargers can use a nearby recording gauge (such as gauges provided by the National Oceanic and Atmospheric Administration’s (NOAA) website or other precipitation data available from nearby locations maintained by other government agencies). Some industries may want to consider installing a recording gauge at their facility.

Also, photographs can be useful records for Dischargers to supplement visual observations or evaluate BMP performance and demonstrate corrective actions.

In addition to record keeping requirements for monitoring records, other sections of the General Permit require the Discharger to maintain records of BMP implementation and maintenance, employee training, and spills and cleanup actions. In particular, implementation and maintenance records for BMPs that are non-structural or administrative, such as good housekeeping, can only be demonstrated through record keeping. These records can assist the Discharger evaluate and improve the BMPs and SWPPP. For example, keeping a record of catch basin cleaning provides insight into the inspection and maintenance frequency needed to reduce accumulated sediment and debris.

### 5.2.2 Sample Result Reporting via SMARTS

Results for sampling conducted as described in the Section 5.1.3 must be submitted via SMARTS. The General Permit specifies that Dischargers must submit data within 30 days of receiving all the results. Note that the reporting window is from receiving the results, not from the date of the sampling event. Dischargers must report the following data:

- pH field measurements;
- Numeric results for all values above the Minimum Level;
- Numeric results for all values between the Minimum Level and the Method Detection Limit; and
- Method Detection Limit for all non-detect results.

### 5.2.3 Annual Reporting via SMARTS

All facilities must complete, certify, and submit an electronic Annual Report via SMARTS by July 15 of each year using the standardized forms and checklists in SMARTS. The following items are required of all Dischargers:
Compliance Checklist that indicates whether a Discharger complied with and has addressed all applicable requirements of the General Permit;

Explanation for any non-compliance incidents as indicated in the Compliance Checklist;

Identification of all revisions made to the SWPPP within the reporting year;

Date of the Annual Evaluation (See Section 5.3); and

Documentation, including the justification, of any deviations from the General Permit requirements (e.g., uncompleted monthly or sampling event visual observations, insufficient number of sampling events).

Sampling results are not required in the Annual Report because this information is submitted into SMARTS following each sampling event (See Section 5.2.2.1.).

Some Dischargers may be required to submit additional information in their annual reports. Facilities subject to federal Subchapter N requirements and Dischargers in Exceedance Response Actions (ERA) Level 2 status need to submit additional information as specified in the General Permit.

- Facilities subject to Subchapter N must report analytical results for each regulated pollutant in their Annual Report;
- Facilities subject to 40 CFR Parts 419 and 443 must submit the estimated volume of industrial stormwater discharges and the mass of each pollutant regulated under 40 CFR Parts 419 and 443;
- Facilities in ERA Level 2 status must submit updates to their Technical Report updates described in Section 5.3.2.2.

## 5.3 Exceedance Response Action Reports

The General Permit requires Dischargers to take actions when sampling results exceed the NALs listed in Table 5-2.

- For annual NALs, an exceedance occurs when the annual average of all analytical results from the reporting year for a particular constituent exceeds the annual NAL value; and
- For instantaneous maximum NALs, an exceedance occurs when two or more analytical results exceed the instantaneous maximum NAL for any given constituent during the reporting year.

Response actions vary based on the number of times an exceedance has occurred and the status of the discharge when the exceedance occurs. All Dischargers start in Baseline status and can move into Level 1 or 2 status based on sampling results. The status is evaluated independently for each constituent.

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6 Part 419: Petroleum refining point source category
7 Part 443: Effluent limitations guidelines for existing sources and standards of performance and pretreatment standards for new sources for the paving and roofing materials (tars and asphalt) point source category
Therefore, a Discharger could have Baseline status, Level 1 status, and Level 2 status for different constituents.

Information required for ERA Level 1 and ERA Level 2 Reports is further described in Appendix E.

### Table 5-2 Numeric Action Levels

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Annual NAL (Average of all results in a reporting year exceed value)</th>
<th>Instantaneous Maximum NAL (2 or more results in a reporting year exceed value)</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>NA</td>
<td>＜6.0; ＞9.0</td>
<td>Std. units</td>
</tr>
<tr>
<td>TSS</td>
<td>100</td>
<td>400</td>
<td>mg/L</td>
</tr>
<tr>
<td>O&amp;G</td>
<td>15</td>
<td>25</td>
<td>mg/L</td>
</tr>
<tr>
<td>Zinc, Total</td>
<td>0.26</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>0.0332</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Cyanide, Total</td>
<td>0.022</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Lead, Total</td>
<td>0.262</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>COD</td>
<td>120</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Aluminum, Total</td>
<td>0.75</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>1.0</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Nitrate + Nitrite Nitrogen</td>
<td>0.68</td>
<td>NA</td>
<td>mg/L as N</td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>2.0</td>
<td>NA</td>
<td>mg/L as P</td>
</tr>
<tr>
<td>Ammonia (as N)</td>
<td>2.14</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Magnesium, Total</td>
<td>0.064</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Arsenic, Total</td>
<td>0.15</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Cadmium, Total</td>
<td>0.0053</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Nickel, Total</td>
<td>1.02</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Mercury, Total</td>
<td>0.0014</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Selenium, Total</td>
<td>0.005</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>Silver, Total</td>
<td>0.0183</td>
<td>NA</td>
<td>mg/L</td>
</tr>
<tr>
<td>BOD</td>
<td>30</td>
<td>NA</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

### 5.3.1 ERA Level 1 Evaluation and Reports

A facility will move from Baseline status to Level 1 status when there is an exceedance of a constituent NAL. A facility enters Level 1 status on July 1 of the next reporting year regardless of when the exceedance occurred.

By October 1 following commencement of Level 1 status, the facility must obtain the assistance of a QISP to conduct an evaluation of industrial pollutant sources that may be related to the exceedance.

As soon as practicable, but no later than January 1 following the commencement of Level 1 status, the Discharger must revise the SWPPP, as necessary, and submit an ERA Level 1 Report. The ERA Level 1 Report must be prepared by a QISP and submitted into SMARTS by the Discharger. The ERA Level 1 Report must include the following information:
5.3.2 ERA Level 2 Action Plan and Technical Reports

A facility that is already in Level 1 status for a constituent enters Level 2 status when an NAL for the same constituent is exceeded in a subsequent reporting year. In this case, the facility is required to develop an ERA Level 2 Action Plan and Technical Report. A facility enters Level 2 status on July 1 of the next reporting year regardless of when the exceedance occurred.

5.3.2.1 ERA Level 2 Action Plan

The ERA Level 2 Action Plan must be prepared by a QISP and submitted into SMARTS by the Discharger no later than January 1 following the commencement of ERA Level 2 status. The ERA Level 2 Action Plan must:

- Identify which of the ERA Level 2 Technical Report demonstrations will be developed;
- Address the drainage area where the NAL exceedance occurred;
- Describe the tasks required to complete Technical Report;
- Provide a schedule to complete the Action Plan no later than one year after its submission; and
- List the name, identification number, and contact information for the QISP.

Facilities need to file new ERA Level 2 Action Plans when there is a Level 2 exceedance for a new constituent. Since the ERA Level 2 Action Plan is developed for a specific drainage area, facilities also need to file a new ERA Level 2 Action Plan when the same constituent is exceeded in a different drainage area.

5.3.2.2 ERA Level 2 Technical Report

On January 1 of the reporting year following the submission of an ERA Level 2 Action Plan, the Discharger must submit an ERA Level 2 Technical Report. The technical report must be prepared by a QISP. The technical report must include one of the following demonstrations:
Industrial Activity BMP Demonstration;

Non-Industrial Pollutant Source Demonstration; and

Natural Background Pollutant Source Demonstration.

ERA Level 2 Technical Reports may be reviewed by the RWQCB or the SWRCB and either may request additional information or reject the report and require the Discharger to take additional actions.

If an extension for submittal is needed, a one-time extension may be requested via SMARTS. Additional extensions or extensions longer than six months are not granted unless approved in writing by the RWQCB.

Subsequent updates of the ERA Level 2 Technical Report are submitted with the facility Annual Report. If there are no changes prompting an update of the Level 2 ERA Technical Report, as specified in the General Permit, the Discharger must certify in the Annual Report that there have been no changes warranting re-submittal of the Level 2 ERA Technical Report.

5.4 Conduct Annual Comprehensive Facility Compliance Evaluation

All facilities must conduct an Annual Evaluation. The specific timing of the evaluation can be determined by the facility. However, the Annual Evaluations need to occur no fewer than eight months and no more than 16 months following the previous evaluation. Deviations from this schedule must be justified. Many facilities choose to conduct the Annual Evaluation just prior to the start of the rainy season or just prior to preparing the Annual Report.

Annual Evaluations must include the following:

- Review of all sampling, visual observations, and inspection records conducted during the previous reporting year;
- Inspection of all areas of industrial activity and associated potential pollutant sources for evidence of, or the potential for, pollutants entering the storm water conveyance system;
- Inspection of all drainage areas previously identified as having no exposure to industrial activities and materials to determine if any change has occurred;
- Inspection of all BMPs and of equipment needed to implement the BMPs;
- Inspection, review, and effectiveness assessment of all BMPs and associated pollutant sources to determine whether the BMPs are properly designed and implemented and are effective in reducing pollution; and
- Assessment of any other factors needed to comply with the Annual Report requirements.

Annual Evaluations allow the Discharger to assess the implementation and effectiveness of the SWPPP and BMPs. If the evaluation determines SWPPP revisions are needed, the SWPPP must be revised with 90 days of completing the evaluation.
6  Glossary and List of Acronyms

6.1  Glossary

303(d) Listed: Water bodies listed as impaired as per Section 303(d) of the 1972 Clean Water Act.

Aerial Deposition: Total suspended particulate matter found in the atmosphere as solid particles or liquid droplets.

Aquatic: The water environment. Plants and animals that live in the water are referred to as being aquatic.

Bacteria: See pathogens.

Beneficial Uses: As defined in the California Water Code, beneficial uses of the waters of the state that may be protected against quality degradation include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

Best Management Practices (BMPs): Includes schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent, eliminate, or reduce the discharge of pollutants. BMPs also include treatment requirements, operating procedures, and practices to control runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Catch Basin (Also known as Inlet): Box-like underground concrete structure with openings in curbs and gutters designed to collect runoff from streets and pavement.

Chain of Custody: Form used to track sample handling as samples progress from sample collection to the laboratory and the resulting analytical data back to the facility.

Clean Water Act (CWA): (33 U.S.C. 1251 et seq.) requirements of the NPDES program are defined under Sections 307, 402, 318 and 405 of the CWA.

Construction Activity: Includes clearing, grading, excavation, and contractor activities that result in soil disturbance.

Construction General Permit: A National Pollutant Discharge Elimination System (NPDES) permit issued by the State Water Resources Control Board for the discharge of stormwater associated with construction activity from soil disturbance of one acre or more.

Detected Not Quantifiable: A sample result that is between the Method Detection Limit (MDL) and the Reporting Level (RL).

Discharge: A release or flow of stormwater or other substance from a conveyance system or storage container. Broader – includes release to storm drains, etc.

Discharger: A person, company, agency, or other entity that is the operator of the industrial facility covered by this General Permit.
**Drainage Area**: The area of land that drains water, sediment, pollutants, and dissolved materials to a common discharge location.

**Erosion**: The wearing away of land surface by wind or water. Erosion occurs naturally from weather or runoff but can be intensified by land-clearing practices related to farming, new development, redevelopment, road building, or timber cutting.

**Erosion Control**: Erosion control is any source control practice that protects the soil surface and prevents soil particles from being detached by rainfall, flowing water, or wind.

**Facility**: A collection of industrial processes discharging storm water associated with industrial activity within the property boundary or operational unit.

**Good Housekeeping BMPs**: BMPs designed to reduce or eliminate the addition of pollutants through analysis of pollutant sources, implementation of proper handling/disposal practices, employee education, and other actions.

**Gross Pollutants**: Typically refers to visible pollutants such as trash, debris, and floatables, which may create an aesthetic “eye sore” in waterways. Gross pollutants also include plant debris (such as leaves and lawn-clippings), animal excrement, street litter, and other organic matter.

**Hazardous Waste**: A waste or combination of wastes that, because of its quantity, concentration, or physical, chemical or infectious characteristics, 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. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appears on special EPA or state lists. Regulated under the federal Resource Conservation and Recovery Act and the California Health and Safety Code.

**Illicit Discharges**: Any discharge to a MS4 or receiving water that is not in compliance with applicable laws and regulations, e.g. is not discharged pursuant to an NPDES permit or applicable exemption or waiver.


**Industrial Materials**: Includes, but is not limited to: raw materials, recyclable materials, intermediate products, final products, by product, waste products, fuels, materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under Section 101(14) of Comprehensive Environmental Response, Compensation, and Liability Act (CERLCA); any chemical the facility is required to report pursuant to Section 313 of Title III of Superfund Amendments and Reauthorization Act (SARA); fertilizers; pesticides; and waste products such as ashes, slag, and sludge and that are used, handled, stored, or disposed in relation to a facility's industrial activity.

**Inlet**: An entrance into a ditch, storm drain, or other waterway.

**Method Detection Limit**: The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
**Minimum Level:** See Reporting Level.

**Municipal Separate Storm Sewer System (MS4):** A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) designed or used for collecting or conveying stormwater; (ii) which is not a combined sewer; and (iii) which is not part of a Publicly Owned Treatment Works (POTW) as defined at Title 40 of the Code of Federal Regulations (CFR) 122.2. A “Small MS4” is defined as an MS4 that is not a permitted MS4 under the Phase I regulations. This definition of a Small MS4 applies to MS4 operated within cities and counties as well as governmental facilities that have a system of storm sewers.

**Natural Background:** Pollutants including substances that are naturally occurring in soils or groundwater. Natural background pollutants do not include legacy pollutants from previous activity at a facility, or pollutants in run-on from neighboring sources which are not naturally occurring.

**Non Detect:** Sample result is less than Method Detection Limit. Analyte being tested cannot be detected by the equipment or method.

**Non-Stormwater Discharge:** Any discharge to MS4 or receiving water that is not composed entirely of stormwater.

**Notice of Intent (NOI):** Part of the required Permit Registration Documents, which provides information on the owner, location, and certifies that the owner will comply with the conditions of the General Permit.

**Notice of Termination (NOT):** Formal notice to SWRCB submitted by owner/operator that an industrial facility no longer requires General Permit coverage and wishes to terminate the permit.

**NPDES Permit:** NPDES is an acronym for National Pollutant Discharge Elimination System. NPDES is the national program for administering and regulating Sections 307, 318, 402, and 405 of the CWA.

**Numeric Action Level:** Pollutant concentration levels used to evaluate if best management practices are effective and if additional measures are necessary to control pollutants. NALs are not effluent limits.

**Nutrients:** Compounds necessary for plant and animal growth. In regards to water quality, the term usually refers to nitrogen and phosphorus compounds.

**Oil and Grease:** Oil and grease includes a wide array of hydrocarbon compounds, some of which are toxic to aquatic organisms at low concentrations.

**Organics:** Compounds that are carbon based. Often synthetic organic compounds (adhesives, cleaners, sealants, solvents, etc.) are widely applied and may be improperly stored and disposed.

**Pathogens:** Refers to bacteria and viruses that cause disease. For separate storm drain systems, sources of these contaminants include animal excrement and sanitary sewer overflow. High levels of indicator bacteria in stormwater have led to the closure of beaches, lakes, and rivers to contact recreation such as swimming.

**Permit Registration Documents:** A formal notice to SWRCB submitted by the owner/operator of an industrial facility that said owner seeks coverage under the General Permit for discharges associated with industrial activities.
**pH:** A measure of the acidic or basic nature of a solution. The typical pH scale ranges from 0 to 14, with pure water being neutral and having a pH of 7. Values above 7 are considered basic and pH values less than 7 are acidic, relative to how far they deviate from neutral (pH=7).

**Pollutant:** Generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

**Pollution Prevention (P2):** Practices and actions that reduce or eliminate the generation of pollutants.

**Precipitation:** Any form of rain or snow.

**Qualified Industrial SWPPP Practitioner (QISP):** An individual assigned to ensure compliance with this General Permit or to assist with determining coverage eligibility for discharges to an impaired water body. The individual must take the appropriate state approved or sponsored training to be qualified.

**Qualifying Storm Event:** Any precipitation event that produces discharge from at least one drainage area and is preceded by at least 48 hours of no discharge from any drainage area.

**Reporting Level:** The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed. Also referred to as Minimum Level.

**Runoff:** Water originating from rainfall, melted snow, and other sources (e.g., sprinkler irrigation) that flows over the land surface to drainage facilities, rivers, streams, springs, seeps, ponds, lakes, and wetlands.

**Run-on:** Off-site stormwater surface flow or other surface flow which enters your site.

**Secondary Containment:** Structures, usually dikes or berms, surrounding tanks or other storage containers, designed to catch spilled materials from the storage containers.

**Sedimentation:** The process of depositing soil particles, clays, sands, or other sediments that were picked up by runoff.

**Sediment:** Soil, sand, and minerals washed from land into water, usually after rain, that collect in reservoirs, rivers, and harbors, destroying fish nesting areas and clouding the water, thus preventing sunlight from reaching aquatic plants.

**Sediment Basin:** A sediment basin is a temporary basin with a controlled release structure that is formed by excavation or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging.

**Sediment Control:** Sediment controls are treatment control practices that trap soil particles after they have been detached and moved by rain, flowing water, or wind. Sediment control measures are usually passive systems that rely on filtering or settling the particles out of the water or wind that is transporting them.

**Sheet Flow:** Flow of water that occurs overland in areas where there are no defined channels and where the water spreads out over a large area at a uniform depth.
**Source Control BMPs:** Operational practices that reduce potential pollutants at the source.

**Source Reduction (also source control):** The technique of stopping and/or reducing pollutants at their point of generation so that they do not come into contact with stormwater.

**Storm Drains:** Above- and below-ground structures for transporting stormwater to streams or outfalls for flood control purposes.

**Stormwater:** Defined as urban runoff and snowmelt runoff consisting only of those discharges, which originate from precipitation events. Stormwater is that portion of precipitation that flows across a surface to the storm drain system or receiving waters.

**Stormwater Discharge Associated with Industrial Activity:** Discharge from any conveyance which is used for collecting and conveying stormwater from an area that is directly related to manufacturing, processing, or raw materials storage activities at an industrial plant.

**Trade Secret:** Information, including a formula, pattern, compilation, program, device, method, technique, or process, that: (1) derives independent economic value, actual or potential, from not being generally known to the public or to other persons who can obtain economic value from its disclosure or use; and (2) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

**Treatment Control BMPs:** Treatment methods to remove pollutants from stormwater.

**Total Suspended Solids:** The measure of the suspended solids in a water sample including inorganic substances such as soil particles, organic substances such as algae, aquatic plant/animal waste, and particles related to industrial/sewage waste.

**Toxicity:** Adverse responses of organisms to chemicals or physical agents ranging from mortality to physiological responses such as impaired reproduction or growth anomalies.

**Turbidity:** Describes the ability of light to pass through water. The cloudy appearance of water caused by suspended and colloidal matter (particles).

**Urban Runoff:** Stormwater from city streets and adjacent domestic or commercial properties that carries pollutants of various kinds into the sewer systems and receiving waters.

**Vector:** Organism that spreads disease (e.g., mosquitoes and rodents).

**Vegetation:** Living plant matter.

**Virus:** See pathogens.
### 6.2 List of Acronyms

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<td>ASBS</td>
<td>Area of Special Biological Assistance</td>
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<tr>
<td>APCD</td>
<td>Air Pollution Control District</td>
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<tr>
<td>APHA</td>
<td>American Public Health Association</td>
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<tr>
<td>APWA</td>
<td>American Public Works Association</td>
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<tr>
<td>ARB</td>
<td>Air Resources Board</td>
</tr>
<tr>
<td>AQMD</td>
<td>Air Quality Management District</td>
</tr>
<tr>
<td>ASCE</td>
<td>American Society of Civil Engineers</td>
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<tr>
<td>AWWA</td>
<td>American Water Works Association</td>
</tr>
<tr>
<td>BAT</td>
<td>Best Available Technology (economically available)</td>
</tr>
<tr>
<td>BCT</td>
<td>Best Conventional Technology (pollution control)</td>
</tr>
<tr>
<td>BMPs</td>
<td>Best Management Practices</td>
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<tr>
<td>BOD</td>
<td>Biochemical Oxygen Demand</td>
</tr>
<tr>
<td>CAL-EPA</td>
<td>California Environmental Protection Agency</td>
</tr>
<tr>
<td>CAL-OSHA</td>
<td>California Division of Occupational Safety and Health Administration</td>
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<td>CASQA</td>
<td>California Stormwater Quality Association</td>
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<td>CBPELSG</td>
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<td>CCR</td>
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<td>CERCLA</td>
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<td>COC</td>
<td>Chain of Custody</td>
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<td>COD</td>
<td>Chemical Oxygen Demand</td>
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<td>CPSWQ</td>
<td>Certified Professional in Storm Water Quality</td>
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<td>CWA</td>
<td>Clean Water Act (Federal Water Pollution Control Act of 1972 as amended in 1987)</td>
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<td>DHS</td>
<td>Department of Health Services</td>
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<td>DTSC</td>
<td>California Department of Toxic Substances Control</td>
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<td>EIR</td>
<td>Environmental Impact Report</td>
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<td>EIS</td>
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<td>ELG</td>
<td>Effluent Limitation Guideline</td>
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<td>Environmental Laboratory Accreditation Program</td>
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<td>United States Environmental Protection Agency</td>
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<td>ESA</td>
<td>Environmentally Sensitive Area</td>
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<td>Erosion and Sediment Control</td>
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<td>ERA</td>
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<td>Hazardous Material</td>
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<td>LRP</td>
<td>Legally Responsible Person</td>
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<td>MBAS</td>
<td>Methylene Blue Activated Substances</td>
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<td>MDL</td>
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<td>Monitoring Implementation Plan</td>
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<td>MP</td>
<td>Manufactured (Proprietary) Treatment Control Practice</td>
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<td>MS4</td>
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<td>MSDS</td>
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<td>Multi-Sector General Permit</td>
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<td>Pollution Prevention</td>
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<td>PCBs</td>
<td>Polychlorinated Biphenyls</td>
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<td>PPT</td>
<td>Pollution Prevention Team</td>
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<td>Acronym</td>
<td>Description</td>
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<td>Publicly Owned Treatment Works</td>
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<td>Standard Methods</td>
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<td>Stormwater Multi Application and Report Tracking System</td>
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<td>Spill Prevention Control and Countermeasure</td>
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<td>SSC</td>
<td>Suspended Sediment Concentration</td>
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<td>SUSMP</td>
<td>Standard Urban Stormwater Mitigation Plan</td>
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<td>SVOC</td>
<td>Semi-Volatile Organic Compound</td>
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<td>SWAMP</td>
<td>Surface Water Ambient Monitoring Program</td>
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<td>SWMP</td>
<td>Stormwater Management Program</td>
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<td>Ultraviolet</td>
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<td>Waste Discharge Identification (Number)</td>
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<td>Waste Discharge Requirements</td>
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<td>Description</td>
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<td>WEF</td>
<td>Water Environment Federation</td>
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<td>WQMP</td>
<td>Water Quality Management Plan</td>
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<td>WQTR</td>
<td>Water Quality Technical Report</td>
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</table>
Appendix A General Permit

Order 2013-0057-DWQ Adopted April 1, 2014; Effective July 1, 2015.

Appendix B Regulated Activities
1. **Facilities Subject To Storm Water Effluent Limitations Guidelines, New Source Performance Standards, or Toxic Pollutant Effluent Standards Found in 40 Code of Federal Regulations, Chapter I, Subchapter N (Subchapter N):**


2. **Manufacturing Facilities:**

Facilities with Standard Industrial Classifications (SICs) 20XX through 39XX, 4221 through 4225. (This category combines categories 2 and 10 of the previous general permit.)

3. **Oil and Gas/Mining Facilities:**

Facilities classified as SICs 10XX through 14XX, including active or inactive mining operations (except for areas of coal mining operations no longer meeting the definition of a reclamation area under 40 Code of Federal Regulations. 434.11(1) because the performance bond issued to the facility by the appropriate Surface Mining Control and Reclamation Acts authority has been released, or except for areas of non-coal mining operations which have been released from applicable State or Federal reclamation requirements after December 17, 1990) and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge storm water contaminated by contact with or that has come into contact with any overburden, raw material, intermediate products, finished products, by-products, or waste products located on the site of such operations. Inactive mining operations are mining sites that are not being actively mined, but which have an identifiable owner/operator. Inactive mining sites do not include sites where mining claims are being maintained prior to disturbances associated with the extraction, beneficiation, or processing of mined material; or sites where minimal activities are undertaken for the sole purpose of maintaining a mining claim.

4. **Hazardous Waste Treatment, Storage, or Disposal Facilities:**

Hazardous waste treatment, storage, or disposal facilities, including any facility operating under interim status or a general permit under Subtitle C of the Federal Resource, Conservation, and Recovery Act.

5. **Landfills, Land Application Sites, and Open Dumps:**

Landfills, land application sites, and open dumps that receive or have received industrial waste from any facility within any other category of this Attachment; including facilities subject to regulation under Subtitle D of the Federal Resource, Conservation, and Recovery Act, and facilities that have accepted wastes from construction activities (construction activities include any clearing, grading, or excavation that results in disturbance).

6. **Recycling Facilities:**

Facilities involved in the recycling of materials, including metal scrapyards, battery reclaimers, salvage yards, and automobile junkyards, including but limited to those classified as Standard Industrial Classification 5015 and 5093.

7. **Steam Electric Power Generating Facilities:**

Any facility that generates steam for electric power through the combustion of coal, oil, wood, etc.

8. **Transportation Facilities:**

Facilities with SICs 40XX through 45XX (except 4221-25) and 5171 with vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication) or other operations identified under this Permit as associated with industrial activity.

9. **Sewage or Wastewater Treatment Works:**

Facilities used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge, that are located within the confines of the facility, with a design flow of one million gallons per day or more, or required to have an approved pretreatment program under 40 Code of Federal Regulations part 403. Not included are farm lands, domestic gardens, or lands used for sludge management where sludge is beneficially reused and are not physically located in the confines of the facility, or areas that are in compliance with Section 405 of the Clean Water Act.
Appendix C SWPPP Template
Disclaimer

This template is provided for the exclusive use of current subscribers to the CASQA Industrial and Commercial BMP Web Portal.

The template herein is provided for information purposes to assist dischargers in preparing a SWPPP. The Industrial General Permit does not require the use of any specific template, including this template.

Use of this template does not guarantee compliance with the Industrial General Permit. Subscribers are directed to the Industrial General Permit to determine permit requirements. Also, regulatory interpretations may change over time as a result of new information, new court cases, or new laws. Dischargers should consult with their regulators for current interpretations.

Due to the multitude of applications of best management practices, the template does not address site-specific applications. Users of this template should use their professional judgment and seek advice from appropriately qualified professionals to determine the applicability of the information provided for general use or site-specific application. CASQA recognizes that there may be public domain and/or proprietary alternatives to the practices listed in the Handbook Portal guidance. As with all BMPs being considered for implementation on an industrial or commercial site, the SWPPP developer is responsible for determining the applicability, fitness for use, effectiveness, and permit compliance of any BMPs whether or not mentioned in this guidance document.

Users assume all liability directly or indirectly arising from the use of the template.

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GENERAL INSTRUCTIONS AND CAVEATS

This template presents a recommended structure and content for a Stormwater Pollution Prevention Plan (SWPPP) including a Monitoring and Implementation Plan. The structure and content is based on a combination of specific General Permit requirements and other suggested content to assist Dischargers to meet the overall General Permit requirements. SWPPPs are site specific and, if this template is used, it must include detailed and specific information to accurately present site conditions and pollution control measures.

- This template should be used in conjunction with “Section 2 Stormwater Pollution Prevention Planning for Industrial and Commercial Facilities” on the CASQA Stormwater BMP Handbook Portal: Industrial and Commercial.

- This template is not intended to be used for “Inactive Mining Operation Certification” (General Permit Section XIII). SWPPPs for inactive mining operations are required to be signed (wet signature and license number) by a California licensed professional engineer.

- Throughout the template placeholder language for project specific text is identified with gray highlighted fields. This text must be replaced to reflect the project conditions.

INSTRUCTIONS

The title page will have the following information:

- Title: “Stormwater Pollution Prevention Plan”;
- Facility Name;
- Facility Address;
- Waste Discharge Identification (WDID);
- Exceedance Response Action Status;
- Facility LRP;
- LRP’s Name, Address, Telephone Number and Duly Authorized Representative (if applicable);
- Authorized Signatory;
- Name of SWPPP preparer and name of the QISP and Consulting Engineering company that provided SWPPP input and training (if applicable); and
- SWPPP Preparation Date.
INDUSTRIAL ACTIVITIES STORMWATER POLLUTION PREVENTION PLAN

for

[Facility Name]

Facility Address:

[Address]

Waste Discharge Identification (WDID):

[WDID]

Exceedance Response Action (ERA) Status:

[Baseline, Level 1, Level 2]

Legally Responsible Person [LRP):

[Company Name]

[Address]

[LRP’s Name]

[Phone Number]

Duly Authorized Representative:

[Duly Authorized Representative if designated by LRP]

[Phone Number]

Prepared for: [if different then LRP]

[Company]

[Address]

SWPPP Prepared by:

[Company Name]

[Address]

SWPPP Preparation Date

[Date]
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INSTRUCTIONS

Include in the SWPPP a certification statement signed by the LRP that identifies the name and telephone number of the LRP. Include project name and project number or identification, if applicable, otherwise delete line. Note: The LRP certifies that all Permit Registration Documents (PRDs) have been submitted via SMARTS and including an LRP certification in the SWPPP is optional.

Legally Responsible Person

Approval and Certification of the Stormwater Pollution Prevention Plan

Facility Name:

Waste Discharge Identification (WDID):

“I certify under penalty of law that this document and all Attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

____________________________
Legally Responsible Person

____________________________
Signature of [Duly Authorized Representative of] Legally Responsible Person or Approved Signatory

____________________________
Date

____________________________
Name of [Duly Authorized Representative of] Legally Responsible Person or Approved Signatory [if applicable]

____________________________
Telephone Number
# Amendment Log

Facility Name: 

Waste Discharge Identification (WDID): 

<table>
<thead>
<tr>
<th>Amendment No.</th>
<th>Date</th>
<th>Page and Section No.</th>
<th>Requested By</th>
<th>Brief Description of Amendment; include reason for change, site location, and BMP modifications.</th>
<th>Prepared and Approved By</th>
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Section 1  SWPPP Requirements

1.1 INTRODUCTION

INSTRUCTIONS

- Identify the facility size, location, LRP and operator, if applicable.
- Reference site or vicinity map(s) for location.
- State that the SWPPP has been prepared to comply with the California’s General Permit for Stormwater Discharges Associated with Industrial Activities (General Permit).
- State the major objectives of the SWPPP as identified in the General Permit (Section X).

RECOMMENDED TEXT

The following text should be modified accordingly. The highlighted text must be updated with project specific information throughout template.

The [facility name] site comprises approximately [acres] and is located [address or description of location] in [city or County, if in unincorporated area], California. The property is owned by [LRP or if different specify owner] and is being operated by [operator]. The facility location is shown on the Site Map(s) in Appendix A.

This Stormwater Pollution Prevention Plan (SWPPP) is designed to comply with California’s General Permit for Stormwater Discharges Associated with Industrial Activities (General Permit) Order No. 2014-0057-DWQ (NPDES No. CAS000001) issued by the State Water Resources Control Board (State Water Board). This SWPPP has been prepared following the SWPPP Template provided on the California Stormwater Quality Association Stormwater Best Management Practice Handbook Portal: Industrial and Commercial (CASQA 2014). In accordance with the General Permit, Section X.A, this SWPPP contains the following required elements:

- Facility Name and Contact Information;
- Site Map;
- List of Significant Industrial Materials;
- Description of Potential Pollution Sources;
- Assessment of Potential Pollutant Sources;
- Minimum BMPs;
- Advanced BMPs, if applicable;
- Monitoring Implementation Plan (MIP);
- Annual Comprehensive Facility Compliance Evaluation (Annual Evaluation); and,
- Date that SWPPP was Initially Prepared and the Date of Each SWPPP Amendment, if Applicable.
1.2 PERMIT REGISTRATION DOCUMENTS

INSTRUCTIONS

- State that the Permit Registration Documents (PRDs) were submitted and confirmation is in Appendix B.
- Project-related PRDs must be submitted to the State Water Board via the Stormwater Multi Application and Report Tracking System (SMARTS) by the Legally Responsible Person (LRP) or their designated Duly Authorized Representative (General Permit Sections I.A.17, II.A, XXI.K and Attachment D).
- Include the project Waste Discharge Identification (WDID) confirmation in SWPPP Appendix B.

RECOMMENDED TEXT

*The following text should be modified accordingly*

Required Permit Registration Documents (PRDs) were submitted to the State Water Board via the Stormwater Multi Application and Report Tracking System (SMARTS) by the Legally Responsible Person (LRP), or authorized personnel (i.e., Approved Signatory) under the direction of the LRP. The project-specific PRDs include:

1. Notice of Intent (NOI);
2. Signed Certification Statement (LRP Certification is provided electronically with SMARTS PRD submittal);
3. Site Map(s);
4. SWPPP; and
5. Annual Fee.

- The Site Map(s) can be found in Appendix A. A copy of the submitted PRDs are also kept in Appendix B of the SWPPP along with the Waste Discharge Identification (WDID) confirmation.
- The SWPPP uploaded into SMARTS should not include a copy of the General Permit.
- In the event of future significant changes to the facility layout, the Discharger will certify and submit new PRDs via SMARTS.

1.3 SWPPP AVAILABILITY AND IMPLEMENTATION

INSTRUCTIONS

Include a statement regarding the SWPPP availability and implementation. (General Permit Section X.B)

If industrial activity commences after July 1, 2015, revise the date to the start of operations.

RECOMMENDED TEXT

*The following text should be modified accordingly*

The SWPPP is available on-site to all employees during all hours of operation (see Section 2.5 for the Operations Schedule), and will be made available upon request by a State or Municipal inspector. The SWPPP will be implemented by July 1, 2015.
1.4 POLLUTION PREVENTION TEAM

INSTRUCTIONS

- The General Permit (Section X.D.1) requires each facility to have a Pollution Prevention Team established and responsible for assisting with the implementation of the requirements in this SWPPP. The Discharger shall include in the SWPPP detailed information about its Pollution Prevention Team including:
  - The positions within the facility organization (collectively, team members) who assist in implementing the SWPPP and conducting all monitoring requirements in the General Permit;
  - The responsibilities, duties, and activities of each of the team members; and
  - The procedures to identify alternate team members to implement the SWPPP and conduct required monitoring when the regularly assigned team members are temporarily unavailable (due to vacation, illness, out of town business, or other absences).

RECOMMENDED TEXT

The following text should be modified accordingly

Facility staff that have been designated as Pollution Prevention Team members are listed below in Table 1.1., along with their responsibilities and duties. A list of alternate team members is also provided, and these personnel will perform SWPPP activities when regular members of the Pollution Prevention Team are absent or unavailable. This table will be updated as needed when there are changes to staff and staff responsibilities. All team members will be trained to perform the duties assigned to them. Employee training logs are provided in Appendix C.

[QISPs identified for the project are identified in Appendix D. The QISP will have primary responsibility for providing training to the appropriate team members assigned to perform the activities required in this SWPPP.]

Table 1.1 Pollution Prevention Team

<table>
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<th>Name</th>
<th>Title</th>
<th>Phone Number</th>
<th>Responsibilities and Duties</th>
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1.5 DULY AUTHORIZED REPRESENTATIVES

INSTRUCTIONS

- PRDs must be certified and submitted via SMARTS by the LRP or their designated Duly Authorized Representative. The Discharger must authorize via SMARTS any person designated as a Duly Authorized Representative (General Permit Section XXI.K).
• Authorized Representatives should be provided in this section or in Appendix D. This list should include the names, contact information, and titles of the individuals granted authority to certify and submit PRDs.

RECOMMENDED TEXT

The following text should be modified accordingly

Duly Authorized Representative[s] who are responsible for SWPPP implementation and have authority to sign PRDs [is/are] listed below in Table 1.2. Written authorizations from the LRP for these individuals are provided in Appendix D.

Table 1.2 Duly Authorized Representatives

<table>
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1.6 PERMITS AND GOVERNING DOCUMENTS

INSTRUCTIONS

Include a list of permits and other governing documents relevant to the facility and identify key requirements associated with water quality that affect practices employed to control the discharge of pollutants associated with industrial activities.

RECOMMENDED TEXT

In addition to the General Permit, the following documents have been taken into account while preparing this SWPPP:

• Regional Water Board requirements;
• Basin Plan requirements;
• TMDL Requirements;
• Spill Prevention Control and Countermeasures Plan;
• Hazardous Material Business Plan;
• Hazardous Waste Regulations and Permits;
• Air Quality Regulations and Permits; and
• Clean Water Act Section 401 Water Quality Certifications and 404 Permits.

1.7 SWPPP AMENDMENTS

INSTRUCTIONS
The General Permit requires that the SWPPP be amended or revised as necessary (Section X.B) and that the SWPPP include a listing of the date of initial preparation and the date of each amendment. SWPPP revisions will be submitted by the LRP via SMARTS. In addition, the General Permit specifies that the SWPPP will be amended under the following circumstances:

- “The Discharger will revise BMPs as necessary when the visual observations indicate pollutant sources have not been adequately addressed in the SWPPP. (General Permit Section XI.4).

- “Based upon the above (Level 1 ERA) evaluation, the Discharger will, as soon as practicable but no later than January 1 following commencement of Level 1 status subsequent reporting year, Revise the SWPPP as necessary and implement any additional BMPs identified in the evaluation. (General Permit Section XII.C.2)

- “The Discharger will revise the SWPPP, as appropriate, and implement the revisions within 90 days of the Annual Evaluation” (General Permit Section XV).

- “The Regional Water Boards may require a Discharger to revise its SWPPP, ERA Reports, or monitoring programs to achieve compliance with this General Permit. In this case, the Discharger will implement these revisions in accordance with a schedule provided by the Regional Water Board (General Permit Section XIX.D).

**RECOMMENDED TEXT**

*The following text should be modified accordingly*

This SWPPP will be amended or revised as needed. A list of amendments (Amendment Log) is included in the front of this SWPPP (page 7), and amendment certifications are included in Appendix E. The Amendment Log will include the date of initial preparation and the date of each amendment. The SWPPP should be revised when:

- There is a General Permit violation;
- There is a reduction or increase in the total industrial area exposed to stormwater;
- BMPs do not meet the objectives of reducing or eliminating pollutants in stormwater discharges;
- There is a change in industrial operations which may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4);
- There is a change to the parties responsible for implementing the SWPPP; or
- Otherwise deemed necessary by the QISP.

The following items will be included in each amendment:

- Who requested the amendment;
- The location of proposed change;
- The reason for change;
- The original BMP(s) proposed, if any; and
• The new BMP(s) proposed.

Amendments will be logged at the front of the SWPPP and certification kept in Appendix E. The SWPPP text will be revised replaced, and/or hand annotated as necessary to properly convey the amendment. SWPPP amendments must be certified and submitted by the LRP or their designated Duly Authorized Representative via SMARTS within 30 days whenever the SWPPP contains significant revisions. With the exception of significant revisions, SWPPP changes will be certified and uploaded to SMARTS once every three (3) months in the reporting year.

1.8 RETENTION OF RECORDS

INSTRUCTIONS

• Include a statement regarding the retention and availability of records.

• The General Permit (Sections XX.I.J.4) requires that Dischargers maintain for a period of at least five (5) years a paper or electronic copy of stormwater monitoring information, records, data, and reports required by the General Permit. Copies will be available for review by Water Board staff during scheduled operating hours.

• The General Permit (Section X.H.g.iii) requires that Dischargers maintain the BMP implementation records, training records, and records related to any spills and clean-up related response activities for a minimum of five (5) years.

• State in the SWPPP where documents will be kept and how this requirement will be met. Regional Water Board’s may require records to be retained for longer periods.

RECOMMENDED TEXT

The following text should be modified accordingly

Paper or electronic records of documents required by this SWPPP will be retained for a minimum of five (5) years from the date generated or date submitted, whichever is later, for the following items:

• Employee Training Records;

• BMP Implementation Records;

• Spill and Clean-up Related Records;

• Records of Sampling and Analysis Information
  • The date, exact location, and time of sampling or measurement;
  • The date(s) analyses were performed;
  • The individual(s) that performed the analyses;
  • The analytical techniques or methods used; and
  • The results of such analyses;

• Records of Visual Observations
  • The date
  • The industrial areas/drainage areas of the facility observed during
the inspection (Location);

- The approximate time of the observation;
- Presence and probable source of observed pollutants; and
- Name of the individual(s) that conducted the observations;

- Response to the observations including identification of SWPPP revisions if needed.

Level 1 ERA Reports;

- Level 2 ERA Action Plan;
- Level 2 ERA Technical Report; and
- Annual Reports from SMARTS (checklist and any explanations).

Copies of these records will be available for review by the Water Board’s staff at the facility during scheduled facility operating hours. Upon written request by U.S. EPA or the local MS4, Dischargers will provide paper or electronic copies of requested records to the Water Boards, U.S. EPA, or local MS4 within ten (10) working days from receipt of the request.

1.9 EXCEEDANCE RESPONSE ACTIONS (ERAs)

**INSTRUCTIONS**

Include a brief statement or language regarding required ERAs.

The General Permit identifies ERAs for NAL exceedances (Section XII). It is the responsibility of the LRP to properly document these exceedances using the SMARTS system and to submit NAL exceedance documentation to the Regional Water Board upon request.

A Discharger’s Baseline status for any given parameter will change to Level 1 status if sampling results indicate an NAL exceedance for that parameter in any subsequent reporting year. A Discharger’s Level 1 status for any parameter will change to Level 2 status if sampling results indicate an NAL exceedance in any subsequent reporting year for the same parameter while the Discharger is in Level 1.

If exceedances occur that place the Discharger in a Level 1 status for the following year, or in a Level 2 status for the subsequent year, a Level 1 ERA Evaluation and a Level 1 ERA Report, or a Level 2 ERA Action Plan and a Level 2 ERA Report will be required in accordance with the General Permit. The results of either of these reports may require that the SWPPP be amended. Documentation of the evaluation and reports will be provided in separate reports.

**RECOMMENDED TEXT**

If a General Permit NAL exceedance occurs in a given reporting year, a Level 1 ERA Evaluation and a Level 1 ERA Report will be required in the following year, or, if in a subsequent year, a Level 2 ERA Action Plan and a Level 2 ERA Report will be required in accordance with the General Permit. The results of either of the ERA reports may require that the SWPPP be amended.
1.10 ANNUAL COMPREHENSIVE FACILITY COMPLIANCE EVALUATION

INSTRUCTIONS

• Dischargers covered under the General Permit will conduct Annual Comprehensive Facility Compliance Evaluations (Annual Evaluations) once during each reporting year (General Permit Section XV).

• Include a statement or language regarding annual evaluation requirements with the goal of making site personnel aware of required data collection and reporting elements.

• It is recommended that the Discharger state the planned evaluation window.

RECOMMENDED TEXT

The following text should be modified accordingly

The General Permit (Section XV) requires the Discharger to conduct one Annual Comprehensive Facility Compliance Evaluation (Annual Evaluation) for each reporting year (July 1 to June 30). Annual Evaluations will be conducted at least eight (8) months and not more than sixteen (16) months after the previous Annual Evaluation. The planned window for conducting the Annual Evaluation is between April and June of each year. The SWPPP will be revised, as appropriate based on the results of the Annual Evaluation, and the revisions will be implemented within 90 days of the Annual Evaluation.

At a minimum, Annual Evaluations will consist of:

• A review of all sampling, visual observation, and inspection and monitoring records and sampling and analysis results conducted during the previous reporting year;

• A visual inspection of all areas of industrial activity and associated potential pollutant sources for evidence of, or the potential for, pollutants entering the stormwater conveyance system;

• A visual inspection of all drainage areas previously identified as having no exposure to industrial activities and materials in accordance with the definitions in Section XVII;

• A visual inspection of equipment needed to implement the BMPs;

• A visual inspection of any BMPs;

• A review and effectiveness assessment of all BMPs for each area of industrial activity and associated potential pollutant sources to determine if the BMPs are properly designed, implemented, and are effective in reducing and preventing pollutants in industrial stormwater discharges and authorized NSWDs; and

• An assessment of any other factors needed to comply with the Annual Reporting requirements in General Permit Section XVI.B.

1.11 ANNUAL REPORT

INSTRUCTIONS

• Dischargers will prepare and electronically submit an Annual Report no later than July 15th of each year.
• Include a statement or language regarding annual report requirements with the goal of making site personnel aware of required data collection and reporting elements.

**RECOMMENDED TEXT**

*The following text should be modified accordingly*

The Annual Report will be prepared, certified, and electronically submitted no later than July 15th following each reporting year using the standardized format and checklists in SMARTS based on the reporting requirements identified in Section XVI of the General Permit. Annual reports will be submitted in SMARTS and in accordance with information required by the online forms.

**1.12 TERMINATION AND CHANGES TO GENERAL PERMIT COVERAGE**

**INSTRUCTIONS**

Include a statement acknowledging requirements related to termination and changes in permit coverage. 
(General Permit Section II.C)

**RECOMMENDED TEXT**

*The following text should be modified accordingly*

When any of the following conditions occur, termination of coverage under the General Permit will be requested by certifying and submitting a Notice of Termination (NOT) via SMARTS:

- Operation of the facility has been transferred to another entity;
- The facility has ceased operations, completed closure activities, and removed all industrial related pollutant generating sources;
- The facility’s operations have changed and are no longer subject to the General Permit.

The SWPPP and all of the provisions of the General Permit will be complied with until a valid NOT is received and accepted by the Board.

If ownership changes, the new owner of the facility will be notified of the General Permit and regulatory requirements for permit coverage.
Section 2  Facility Information

2.1  FACILITY DESCRIPTION

INSTRUCTIONS

Include facility description information. General guidelines are provided below.

- The SWPPP should include a description of the facility, industrial activities, and existing conditions.

- The facility description should include the project location, total area of exposed industrial activities and references to applicable SWPPP drawings or “As-Built” plans that fulfill the General Permit site Map(s) requirements. (General Permit Attachment D.F.2).

- Information regarding existing site conditions should include site topography, general drainage patterns and drainage areas.

- Receiving water information (including receiving water quality and applicable designations – Total Maximum Daily Loads (TMDLs), 303(d) listings, or other designations as an environmentally sensitive area [ESA]).

- For sites that have significant unpaved areas exposed to industrial activity, the site description should also include general information on soils and geologic conditions, including the approximate thickness of each material if known and reference applicable soils reports as well as information on the depth to groundwater.

- Describe general rainfall patterns and the anticipated rainy season for the project area.

Note: Dischargers located in a drainage area where a TMDL has been adopted or approved by the Regional Water Board or EPA may be required by a separate Regional Water Board action to implement additional BMPs, conduct additional monitoring activities, and/or comply with an applicable waste load allocation and implementation schedule. Such Dischargers may also be required to obtain an individual Regional Water Board permit specific to the area.

RECOMMENDED TEXT

The following text should be modified accordingly

2.1.1 Facility Location

The [name] facility comprises approximately [acres] and is located at [address or description of location], in [City or County if in unincorporated area], California. The facility is located approximately [distance and direction] of [describe major roads (e.g., Interstate-5), and/or community areas], and is approximately [distance and direction] of [describe nearby water bodies (e.g., San Diego Bay)]. The facility is located at [Latitude/Longitude] and is identified on the Site Map(s) in Appendix A.

The project discharges to [list name of receiving water body] that [does/does not] have adopted TMDLs or that [is/is not] listed for water quality impairment on the most recent 303(d)-list [for the following impairments:

- [LIST]
- [LIST]
2.1.2 Facility Operations

Operations at the [name] facility consist of all activities required to [describe product(s) made or service(s) provided by facility]. A list of specific [industrial] activities is provided below:

- [Specific Industrial Activity 1]
- [Specific Industrial Activity 2]
- [Specific Industrial Activity 3]
- [Specific Industrial Activity 4]
- [Specific Industrial Activity 5]

Add or remove bullets as necessary.

2.1.3 Existing Conditions

The facility site consists of [describe existing development and structures; also include description of vegetated areas, erodible surfaces, or impervious areas such as parking lots]. Of the developed area, [acres] of [industrial/commercial] activities are directly exposed to precipitation and stormwater runoff. Existing BMPs at this facility are described in Section 3.

Existing sources of contamination at the site include: [describe known or potential contamination sources (e.g., contaminated soil, underground storage tanks or former industrial operations) or state “there are no known historic sources of contamination at the site”].

2.1.4 Description of Drainage Areas and Existing Drainage

The facility is divided into [number of drainage areas] drainage areas: [insert names or reference to drainage areas], as shown on the Site Map(s) in Appendix A. The Site Map(s) shows the area layout, including the general site topography, storm drainage system, drainage inlets, its respective drainage areas, and discharge locations.

The facility site is [describe topography (e.g., relatively level, slopes to the west, etc.)]. The elevation of the project site ranges from [elevation or range of elevations] feet above mean sea level (msl). Surface drainage at the site currently flows to the [direction or multiple directions], towards [describe discharge locations [storm drain inlet, river, bay, ocean, etc.]]. Stormwater is conveyed through [surface runoff, storm drain systems, etc.] to [describe BMPs or outfall].

Detailed descriptions of all drainage areas are provided below.

**Drainage Area 1**

[Provide a description of the activities and materials in each drainage area, and describe the drainage from the area including surface flow and storm drain systems. Add or delete drainage areas as needed.]

**Drainage Area 2**

**Drainage Area 3**

2.1.5 Stormwater Run-On from Offsite Areas

INSTRUCTIONS
Run-on is defined as discharges that originate offsite and flow onto the property of a separate facility or property, or discharges that originate onsite from areas not related to industrial activities and flow onto areas on the property with industrial activity.

The General Permit (Sections X.H.1.a.viii, X.H.1.d.iv., and X.H.1.e.iv) requires Dischargers to divert run-on from offsite or non-industrial sources away from all industrial areas, erodible surfaces, and material stockpiles.

Identify and provide estimates of anticipated locations of site run-on. BMPs to control run-on should be described in the BMP section and shown on the SWPPP site Map(s).

Show the run-on area on the vicinity Map(s) and/or site Map(s).

If there is no anticipated stormwater run-on to the site, describe the existing conditions that preclude run-on.

If run-on diversion is infeasible or unrealistic, describe the limiting conditions and possible consequences.

**RECOMMENDED TEXT**

*Select appropriate scenario and modify accordingly*

**No anticipated offsite run-on**

There is no anticipated offsite run-on to this site because [Describe reasons for no offsite run-on (e.g., existing BMPs or stormwater conveyance system to prevent on-site flow, no up-gradient drainage area, etc.)].

**Anticipated offsite run-on**

Run-on to the site is generated by [describe sources of offsite run-on to the site, such sources may include one or more of the following: point source discharges from upgradient developed land uses; creeks, streams or other water bodies that run through or discharge from the site; and upgradient non-point source discharges (dry weather and stormwater runoff)].

The stormwater runoff drainage area contributing to offsite run-on is estimated to be approximately [acreage/square-feet]. The anticipated runoff coefficients range from [range of runoff coefficients]. The anticipated off-site run-on to the project site is estimated to be [flow/volume]; calculations are included in Appendix F.

The General Permit requires that BMPs be implemented to direct offsite and non-industrial run-on away from industrial areas and erodible surfaces. The following BMPs will be implemented to meet this requirement: [description of existing or proposed BMPs (e.g., berms or lined channel) including flow capacity if appropriate]. These BMPs will be located [describe location of BMP]. The off-site drainage areas and associated stormwater conveyance facilities or BMPs are shown on [figure name and number] in Appendix A.

**2.1.6 Geology and Groundwater**

[This section is reserved for sites that have significant unpaved areas exposed to industrial activity (as determined by the QISP or other qualified person) and sites where infiltration BMPs are being proposed].
The site is underlain by [describe underlying soil and geologic conditions (e.g., fill material, clay, sandy loam, alluvium, etc.), including approximate thickness of each material if known. Provide permeability rates and reference soils reports if available]. Groundwater occurs beneath the site at approximately [depth] feet below ground surface. The groundwater gradient is toward [direction].

[Provide a description of aquifers in the vicinity of the site and corresponding beneficial uses, if applicable].

2.2 OPERATIONS SCHEDULE

INSTRUCTIONS

• Provide the scheduled facility operating hours and the individual industrial activities to be performed. In the General Permit, operating hours are defined as the time periods when the facility is staffed to conduct any function related to industrial activity, but excluding time periods where only routine maintenance, emergency response, security, and/or janitorial services are performed.

• Describe variations in operating hours according to season, month, demand, etc., as applicable.

RECOMMENDED TEXT

The following text should be modified accordingly

The [name] facility operates [days of the week] from the hours of [provide time range]. Industrial activities during this time period consist of [describe daily industrial activities]. Variations in actual operating hours may occur as necessary. [If applicable, describe variations in operating hours associated with factors such as season, month, demand, etc.].

This SWPPP will be implemented, and a copy made available to all facility staff at all times. A copy will be available to regulatory agency personnel upon request.

If industrial activities are temporarily suspended for ten (10) or more consecutive calendar days during a reporting year, BMPs that are necessary to achieve compliance with this General Permit during the temporary suspension of the industrial activity will be identified and incorporated into the SWPPP.

2.3 POLLUTANT SOURCE ASSESSMENT

INSTRUCTIONS

Industrial material includes, but is not limited to: raw materials, recyclable materials, intermediate products, final products, by product, waste products, fuels, materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under Section 101(14) of Comprehensive Environmental Response, Compensation, and Liability Act (CERLCA); any chemical the facility is required to report pursuant to Section 313 of Title III of Superfund Amendments and Reauthorization Act (SARA); fertilizers; pesticides; and waste products such as ashes, slag, and sludge and that are used, handled, stored, or disposed in relation to a facility’s industrial activity.

All industrial materials and potential pollutant sources must be described as required by the General Permit (Sections X.F and X.G.1).

RECOMMENDED TEXT
This section presents a list of all industrial materials and potential pollutant sources at the [Name] facility. It identifies specific pollutants associated with these sources and pollutant sources that are most susceptible to stormwater exposure. A summary of significant spill and leaks that have occurred onsite is also provided.

### 2.3.1 Description of Potential Pollutant Sources

**INSTRUCTIONS**

- Complete Table 2.1 by listing industrial processes, material handling and storage areas, and dust and particulate generating activities that will have the potential to contribute to the discharge of pollutants to stormwater (see General Permit Section X.F and X.G).
- Develop a list of pollutants likely to be present in industrial stormwater discharges (see General Permit Table 1 plus list any pollutants that may be unique to the facility).
- Provide the approximate quantity, physical characteristics (e.g., liquid, powder, solid, etc.), and locations of each significant industrial material handled, produced, stored, recycled, or disposed.
- Insert as many lines to Table 2.1 as necessary to complete the list. Use Table 1 of the General Permit to assist in the completion of Table 2.1. Also refer to the facility Material Safety Data Sheets (MSDSs).
- Estimate degree to which the pollutants associated with industrial activities and materials may be exposed to, and mobilized by contact with, stormwater and summarize in Table 2.1.
- For sampling and analysis requirements refer to Section 5.6.

**RECOMMENDED TEXT**

Table 2.1 includes a list of industrial activities and associated materials that are anticipated to be used onsite. These activities and associated materials will or could potentially contribute pollutants to stormwater runoff. The anticipated activities and associated pollutants provided in Table 2.1 are the basis for selecting the BMPs for the facility as described in Section 3. Locations of all material stockpiles, storage areas, anticipated pollutants, and associated BMPs are show on the Site Map(s) in Appendix A.
Table 2.1  Industrial Activities and Associated Materials

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Associated Industrial Materials</th>
<th>Material Quantity</th>
<th>Material Physical Characteristics</th>
<th>Material Location</th>
<th>Associated Pollutants</th>
<th>Stormwater Exposure Pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
2.3.2 Significant Spills and Leaks

INSTRUCTIONS

- Evaluate the facility for areas where spills and leaks have potential to occur and list in Table 2.2.
- Describe significant leaks and spills that have occurred at the site in the previous five-year period as required by the General Permit (Section X.G.1.d). Summarize this information in Table 2.3.

RECOMMENDED TEXT

*The following text should be modified accordingly*

Table 2.2 includes a list of industrial materials where spills and leaks have potential to occur, and includes material characteristics, quantities, locations, and containers. Spills and leaks will be prevented by implementing the BMPs described in Section 3.

If applicable, provide a detailed description of significant spills or leaks that have occurred onsite within the previous five-year period including the following: the location, characteristics, and approximate quantity of the materials spilled or leaked; approximate quantity of the materials discharged from the facility’s storm water conveyance system; the cleanup or remedial actions that have occurred or are planned; the approximate remaining quantity of materials that have the potential to be discharged; and the preventive measures taken to ensure spills or leaks of the material do not reoccur. Summarize information in Table 2.3

<table>
<thead>
<tr>
<th>Industrial Material</th>
<th>Material Physical Characteristics</th>
<th>Material Quantity</th>
<th>Material Container</th>
<th>Material Location</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
Table 2.3  Spills and Leaks within Previous Five-Year Period

<table>
<thead>
<tr>
<th>Industrial Material</th>
<th>Material Physical Characteristics</th>
<th>Location of Spill or Leak</th>
<th>Quantity Spilled or Leaked</th>
<th>Quantity Discharged from Site</th>
<th>Remaining Quantity with Potential for Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

2.4  IDENTIFICATION OF NON-STORMWATER DISCHARGES (NSWDs)

**INSTRUCTIONS**

- List non-stormwater discharges (NSWDs) that do not originate from precipitation events. Examples include, but are not limited to, discharges of process water, air conditioner condensate, non-contact cooling water, vehicle wash water, sanitary wastes, concrete washout water, paint wash water, irrigation water, or pipe testing water;

- Describe the source, quantity, frequency, and characteristics of the NSWDs, associated drainage area, and whether it is an authorized or unauthorized NSWD in accordance with General Permit Section IV.

- Develop a list of pollutants likely to be present in authorized NSWDs

- Regional Water Boards and local jurisdictions may prohibit, require a separate NPDES permit, or require specific monitoring and reporting requirements for the non-stormwater discharges identified in the General Permit as authorized. If either of these is true, the General Permit does not authorize the discharge even if it is listed as an authorized discharge. Check with the Regional Water Board and local jurisdiction on what discharges may or may not be regionally or locally authorized.

- Except for NSWDs authorized in the General Permit (Section IV), discharges of liquids or materials other than stormwater, either directly or indirectly to waters of the United States, are
Non-stormwater discharges (NSWDs) consist of discharges which do not originate from precipitation events. The General Permit provides allowances for specified NSWDs provided they:

- Do not cause erosion;
- Do not carry other pollutants;
- Are not prohibited by the local MS4; and
- Do not require a separate NPDES Permit from the Regional Water Board.

NSWDs into storm drainage systems or waterways, which are not authorized under the General Permit and listed in the SWPPP, or authorized under a separate NPDES permit, are prohibited.

Non-stormwater discharges that are authorized at this facility include the following:

- [LIST or State NONE]
- [LIST or State NONE]

These authorized NSWDs will be managed with the stormwater and non-stormwater BMPs described in Section 3 of this SWPPP. These BMPs are implemented to:

- Reduce or prevent the contact of authorized NSWDs with materials or equipment that are potential sources of pollutants;
- Reduce, to the extent practicable, the flow or volume of authorized NSWDs;
- Ensure that authorized NSWDs do not contain quantities of pollutants that cause or contribute to an exceedance of a water quality standards; and
- Reduce or prevent discharges of pollutants in authorized NSWDs in a manner that reflects best industry practice considering technological availability and economic practicability and achievability.

Monthly visual observations will be conducted according to the General Permit (Section XI.A.1) for NSWDs and sources to ensure adequate BMP implementation and effectiveness. Monthly visual observations include observations for evidence of unauthorized NSWDs.

Activities at this site that may result in unauthorized non-stormwater discharges include:

- [LIST or State NONE]
- [LIST or State NONE]
Steps will be taken, including the implementation of appropriate BMPs as defined in Section 3, to ensure that unauthorized NSWDS are eliminated, controlled, disposed off-site, or treated on-site.

Consider including the following text if the facility has discharges authorized by other permits.

The following discharge(s) are authorized by (a) regional NPDES permit(s):

- [LIST Discharge and Governing Permit or State NONE]

2.5 REQUIRED SITE MAP(S) INFORMATION

INSTRUCTIONS

The General Permit has specific requirements for the site map(s) submitted with the PRDs and included in the SWPPP. Required information may be provided on multiple site maps. Prepare site map(s) in conformance with the requirements of the General Permit (Section X.E and Attachment B.F.2). Include the site map(s) in Appendix A.

For the site map(s), use grading sheets, drainage sheets as base sheets for the site map(s). Prepare site map(s) that includes notes, legends, a north arrow, and other data as appropriate to ensure each map is clear, legible, and understandable.

Use Table 2.4 as a checklist to ensure that all required information is included on the site map(s).

RECOMMENDED TEXT

The following text should be modified accordingly

The facility’s Site Map(s) is (are) provided in Appendix A, and include(s) all information required by the General Permit. The maps include information regarding the facility boundary and stormwater drainage areas, nearby water bodies, locations of stormwater collection and conveyance systems including outfalls, locations and descriptions of all industrial activities and materials, and locations and descriptions of all structural control measures.

A summary of all information provided in the Site Map(s) is provided in Table 2.4 below.

<table>
<thead>
<tr>
<th>Included on Site Map(s)? Yes/No/NA</th>
<th>Required Element</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The facility boundary</td>
</tr>
<tr>
<td></td>
<td>Stormwater drainage areas within the facility boundary</td>
</tr>
<tr>
<td></td>
<td>Portions of any drainage area impacted by discharges from surrounding areas</td>
</tr>
<tr>
<td></td>
<td>Flow direction of each drainage area</td>
</tr>
<tr>
<td></td>
<td>On-facility surface water bodies</td>
</tr>
<tr>
<td></td>
<td>Areas of soil erosion</td>
</tr>
<tr>
<td></td>
<td>Location(s) of nearby water bodies (such as rivers, lakes, wetlands, etc.)</td>
</tr>
<tr>
<td>Included on Site Map(s)?</td>
<td>Required Element</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Yes/No/NA</td>
<td>Location(s) of municipal storm drain inlets that may receive the facility’s industrial stormwater discharges and authorized NSWDs</td>
</tr>
<tr>
<td></td>
<td>Locations of stormwater collection and conveyance systems and associated points of discharge, and direction of flow</td>
</tr>
<tr>
<td></td>
<td>Any structural control measures (that affect industrial stormwater discharges, authorized NSWDs, and run-on)</td>
</tr>
<tr>
<td></td>
<td>All impervious areas of the facility, including paved areas, buildings, covered storage areas, or other roofed structures</td>
</tr>
<tr>
<td></td>
<td>Locations where materials are directly exposed to precipitation</td>
</tr>
<tr>
<td></td>
<td>Locations where significant spills or leaks (Section X.G.1.d of the General Permit) have occurred</td>
</tr>
<tr>
<td></td>
<td>Areas of industrial activity subject to the General Permit</td>
</tr>
<tr>
<td></td>
<td>All storage areas and storage tanks</td>
</tr>
<tr>
<td></td>
<td>Shipping and receiving areas</td>
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<td>Fueling areas</td>
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<td>Vehicle and equipment storage/maintenance areas</td>
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<tr>
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<td>Material handling and processing areas</td>
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<tr>
<td></td>
<td>Waste treatment and disposal areas</td>
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<tr>
<td></td>
<td>Dust or particulate generating areas</td>
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<tr>
<td></td>
<td>Cleaning and material reuse areas</td>
</tr>
<tr>
<td></td>
<td>Any other areas of industrial activity which may have potential pollutant sources</td>
</tr>
</tbody>
</table>
Section 3  Best Management Practices

3.1  MINIMUM BMPs

INSTRUCTIONS

- The General Permit requires all Dischargers to implement and maintain, to the extent feasible, all minimum BMPs described in the General Permit (Section X.H.1) to reduce or prevent pollutants in industrial stormwater discharges.

- The requirement to implement BMPs “to the extent feasible” requires Dischargers to select, design, install and implement BMPs that reduce or prevent discharges of pollutants in their stormwater discharge in a manner that reflects best industry practice considering technological availability and economic practicability and achievability.

- All facilities that have been in operation and covered under the previous IGP will have a number of existing source control BMPs already in place and being implemented. These BMPs will generally fall under one or more of the categories listed below. Discharges should include all of these BMPs under the appropriate category and locate them on the site map(s) as applicable, and add additional BMPs as necessary to meet the minimum requirements.

- Identify BMPs for good housekeeping, preventative maintenance, spill and leak prevention and response, material handling and waste management, erosion and sediment controls, employee training, and quality assurance and record keeping that meet the minimum requirements for each BMP as required in the General Permit (Section X.H.1).

- Identify BMPs in the SWPPP, and reference BMP Fact Sheets included in the CASQA Stormwater BMP Handbook Portal: Industrial and Commercial or other sources as applicable. Include copies of Fact Sheets in SWPPP Appendix G.

- See Section 3 of the CASQA Stormwater BMP Handbook Portal: Industrial and Commercial for a list of source control BMPs for consideration in a site-specific suite of minimum BMPs.

- Provide a narrative description of the how BMPs selected will be used to achieve the goals of this SWPPP.

- If a non-standard BMP will be used, identify it in the BMP implementation table and provide a narrative description of its use and implementation.

RECOMMENDED TEXT

The following text should be modified accordingly. Note that the General Permit does not require use of CASQA BMP Fact Sheets; they are referenced in this section to facilitate SWPPP development. The fact sheets were developed as guidance documents, and contain control measures that are above and beyond those required in the General Permit. Dischargers are responsible for understanding the Minimum BMP requirements in the General Permit (Section X.H.1) and implementing BMPs that effectively reduce or prevent pollutants in industrial stormwater discharges.

All minimum BMPs that are required by the General Permit and necessary to meet the facility conditions will be implemented. Guidance for BMP implementation is provided in the CASQA Stormwater BMP Handbook Portal: Industrial and Commercial Fact Sheets and the relevant fact sheets are included in Appendix G. Sections 3.1.1 through 3.1.5 list the requirements for each of these minimum BMPs. Minimum BMPs will be implemented for additional targeted industrial
activities, equipment, and materials as necessary. If any of the required minimum BMPs are applicable but cannot be implemented, an explanation and alternative approach will be provided in the following sections.

Table 3.1 provides a list of the five minimum General Permit BMP elements that are included in the relevant BMP fact sheets and indicates which BMPs are implemented at the facility. Employee Training, described in Section 3.1.6, and Quality Assurance and Record Keeping, described in Section 3.1.7, are additional minimum BMPs that will be implemented.

As required by the General Permit, a summary of all implemented BMPs is included in Section 3.3. The schedule for BMP implementation and the requirements for inspection and maintenance are contained in Section 4.
<table>
<thead>
<tr>
<th>CASQA Fact Sheet Number</th>
<th>CASQA BMP Fact Sheet Name</th>
<th>Addresses Minimum General Permit BMP Requirements</th>
<th>BMP to be Implemented?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Good Housekeeping Preventative Maintenance</td>
<td>Spill and Leak Prevention and Response</td>
</tr>
<tr>
<td>SC-10</td>
<td>Non-Stormwater Discharges</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC-11</td>
<td>Spill Prevention, Control, and Cleanup</td>
<td></td>
<td></td>
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<tr>
<td>SC-20</td>
<td>Vehicle and Equipment Fueling</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC-21</td>
<td>Vehicle and Equipment Cleaning</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC-22</td>
<td>Vehicle and Equipment Maintenance and Repair</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC-30</td>
<td>Outdoor Loading and Unloading</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC-31</td>
<td>Outdoor Liquid Container Storage</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC-32</td>
<td>Outdoor Equipment Operations</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC-33</td>
<td>Outdoor Storage of Raw Materials</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC-34</td>
<td>Waste Handling and Disposal</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC-35</td>
<td>Safer Alternative Products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC-40</td>
<td>Contaminated or Erodible Surfaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC-41</td>
<td>Building and Grounds Maintenance</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC-42</td>
<td>Building Repair, Remodeling, and Construction</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC-43</td>
<td>Parking Area Maintenance</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC-44</td>
<td>Drainage System Maintenance</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Additional BMPs Implemented:**

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**Table 3.1 Minimum BMPs**
3.1.1 Good Housekeeping
The following good housekeeping measures will be implemented in accordance with the General Permit (Section X.H.1.a):

- Observe all outdoor areas associated with industrial activity including stormwater discharge locations, drainage areas, conveyance systems, waste handling/disposal areas, and perimeter areas impacted by off-facility materials or stormwater run-on to determine housekeeping needs. Any identified debris, waste, spills, tracked materials, or leaked materials will be cleaned and disposed of properly;
- Minimize or prevent material tracking;
- Minimize dust generated from industrial materials or activities;
- Ensure that all facility areas impacted by rinse/wash waters are cleaned as soon as possible;
- Cover all stored industrial materials that can be readily mobilized by contact with stormwater;
- Contain all stored non-solid industrial materials or wastes (e.g., particulates, powders, shredded paper, etc.) that can be transported or dispersed via the wind or contact with stormwater;
- Prevent disposal of any rinse/wash waters or industrial materials into the stormwater conveyance system;
- Minimize stormwater discharges from non-industrial areas (e.g., stormwater flows from employee parking area) that contact industrial areas of the facility; and
- Minimize authorized NSWDs from non-industrial areas (e.g., potable water, fire hydrant testing, etc.) that contact industrial areas of the facility.

BMPs to be implemented are summarized in Table 3.1 and the BMP fact sheets are included in Appendix G.

[Include descriptions of any additional specific good housekeeping BMPs that will be implemented onsite that are targeted to site-specific industrial activities, equipment, and materials. Reasoning must be provided if any standard good housekeeping BMP listed in Table 3.1 is not implemented. All non-standard BMPs must be clearly described.]

3.1.2 Preventative Maintenance
The following preventative maintenance measures will be implemented in accordance with the General Permit (Section X.H.1.b):

- Identify all equipment and systems used outdoors that may spill or leak pollutants;
- Observe the identified equipment and systems to detect leaks, or identify conditions that may result in the development of leaks;
- Establish an appropriate schedule for maintenance of identified equipment and systems; and
• Establish procedures for prompt maintenance and repair of equipment, and maintenance of systems when conditions exist that may result in the development of spills or leaks.

Specific preventative maintenance BMPs to be implemented at the facility are provided in Table 3.1 and the BMP fact sheets are included in Appendix G.

[Include descriptions of any additional specific preventative maintenance BMPs that will be implemented onsite that are targeted to site-specific industrial activities, equipment, and materials. Reasoning must be provided if any standard preventative maintenance BMP listed in Table 3.1 is not implemented. All non-standard BMPs must be clearly described.]

3.1.3 Spill and Leak Prevention and Response

The following spill and leak prevention and response measures will be implemented in accordance with the General Permit (Section X.H.1.c):

• Establish procedures and/or controls to minimize spills and leaks;
• Develop and implement spill and leak response procedures to prevent industrial materials from discharging through the stormwater conveyance system. Spilled or leaked industrial materials will be cleaned promptly and disposed of properly;
• Identify and describe all necessary and appropriate spill and leak response equipment, location(s) of spill and leak response equipment, and spill or leak response equipment maintenance procedures; and
• Identify and train appropriate spill and leak response personnel.

Specific spill and leak prevention and response BMPs to be implemented at the [name] facility are provided in Table 3.1 and the BMP fact sheets are included in Appendix G.

[Include descriptions of any additional specific spill and leak prevention and response BMPs that will be implemented onsite that are targeted to site-specific industrial activities, equipment, and materials. Reasoning must be provided if any standard spill and leak prevention and response BMP listed in Table 3.1 is not implemented. All non-standard BMPs must be clearly described.]

3.1.4 Material Handling and Waste Management

The following material handling and waste management measures will be implemented in accordance with the General Permit (Section X.H.1.d):

• Prevent or minimize handling of industrial materials or wastes that can be readily mobilized by contact with stormwater during a storm event;
• Contain all stored non-solid industrial materials or wastes (e.g., particulates, powders, shredded paper, etc.) that can be transported or dispersed by the wind or contact with stormwater during handling;
• Cover industrial waste disposal containers and industrial material storage containers that contain industrial materials when not in use;
• Divert run-on and stormwater generated from within the facility away from all stockpiled materials;
• Clean all spills of industrial materials or wastes that occur during handling in accordance with the spill response procedures (Section X.H.1.c); and

• Observe and clean as appropriate, any outdoor material or waste handling equipment or containers that can be contaminated by contact with industrial materials or wastes.

Specific material handling and waste management BMPs to be implemented at the [name] facility are provided in Table 3.1 and the BMP fact sheets are included in Appendix G.

[Include descriptions of any additional specific material handling and waste management BMPs that will be implemented onsite that are targeted to site-specific industrial activities, equipment, and materials. Reasoning must be provided if any standard material handling and waste management BMP listed in Table 3.1 is not implemented. All non-standard BMPs must be clearly described.]

3.1.5 Erosion and Sediment Controls

The following erosion and sediment control measures will be implemented in accordance with the General Permit (Section X.H.1.e):

• Implement effective wind erosion controls;

• Provide effective stabilization for all disturbed soils and other erodible areas prior to a forecasted storm event;

• Maintain effective perimeter controls and stabilize all site entrances and exits to sufficiently control discharges of erodible materials from discharging or being tracked off the site;

• Divert run-on and stormwater generated from within the facility away from all erodible materials; and

• If sediment basins are implemented, ensure compliance with the design storm standards in Section X.H.6. of the General Permit.

Specific erosion and sediment control BMPs to be implemented at the [name] facility are provided in Table 3.1 and the BMP fact sheets are included in Appendix G.

[Include descriptions of any additional specific erosion and sediment control BMPs that will be implemented onsite that are targeted to site-specific industrial activities, equipment, and materials. Reasoning must be provided if any standard erosion and sediment control BMP listed in Table 3.1 is not implemented. All non-standard BMPs must be clearly described. Erosion and sediment control BMPs presented on the CASQA Stormwater BMP Handbook Portal: Construction may also be applicable and should be referenced in this section.]

3.1.6 Employee Training Program

An employee training program will be implemented in accordance with the following requirements in the General Permit (Section X.H.1.f):

• Ensure that all team members implementing the various compliance activities of this SWPPP are properly trained in topics including but not limited to: BMP implementation, BMP effectiveness evaluations, visual observations, and monitoring activities;
• Prepare or acquire appropriate training manuals or training materials;
• Identify which personnel need to be trained, their responsibilities, and the type of training they will receive;
• Provide a training schedule; and
• Maintain documentation of all completed training classes and the personnel that received training in the SWPPP.

The Pollution Prevention Team will be trained in implementing the various compliance activities specified in this SWPPP, and documentation of training activities is retained in SWPPP Appendix C. To promote stormwater management awareness specific for this facility, refresher training will be provided [specify frequency].

Task specific training for all employees engaged in activities that have the potential to cause stormwater pollution will be conducted when new employees are hired and refresher training will be provided [specify frequency].

The following text should be modified accordingly. Training at facilities with ERA Level 1 and Level 2 status must be performed by a QISP.

This facility has [Baseline/ERA Level 1/ERA Level 2] Training will be performed by a [qualified team member/QISP]. The [qualified team member/QISP] will be responsible for providing information during training sessions and subsequently completing the training logs shown in Appendix C, which identifies the site-specific stormwater topics covered as well as the names of site personnel who attended the meeting. Each team member will be trained in the specific role they are responsible to undertake.

3.1.7 Quality Assurance and Record Keeping

The following quality assurance and record keeping activities will be performed in accordance with the requirements in the General Permit (Section X.H.1.g):

• Develop and implement management procedures to ensure that appropriate staff implements all elements of the SWPPP, including the Monitoring Implementation Plan (SWPPP Section 5);
• Develop a method of tracking and recording the implementation of BMPs identified in the SWPPP; and
• Maintain the BMP implementation records, training records, and records related to any spills and clean-up related response activities for a minimum of five (5) years as required in the General Permit (Section XXI.J.4).

BMPs will be implemented according to the schedule and procedures presented in SWPPP Section 4. BMPs will be implemented by properly trained team members as documented in Appendix C.

Visual observations will be performed as described in SWPPP Section 5.5. Potential pollutant sources and BMPs will be inspected during visual observations, and new BMPs will be implemented as needed. Records of visual observations of BMP implementation will be retained in Appendix H.
Describe site specific management procedures and methods for tracking and recording the implementation of BMPs identified in the SWPPP.

Paper or electronic records of documents required by this SWPPP will be retained for a minimum of five (5) years from the date generated or date submitted, whichever is later, for the following items:

- Employee Training Records;
- BMP Implementation Records;
- Spill and Clean-up Related Records;
- Records of Monitoring Information
  - The date, exact location, and time of sampling or measurement;
  - The date(s) analyses were performed;
  - The individual(s) that performed the analyses;
  - The analytical techniques or methods used; and
  - The results of such analyses;
- Level 1 ERA Reports;
- Level 2 ERA Action Plan;
- Level 2 ERA Technical Report; and
- Annual Reports.

3.2 ADVANCED BMPs

INSTRUCTIONS

- Where the minimum BMPs described above will not adequately reduce or prevent pollutants in stormwater discharges, the General Permit (Section X.H.2) requires dischargers, to the extent feasible, implement and maintain advanced BMPs necessary to reduce or prevent discharges of pollutants in its stormwater discharge in a manner that reflects best industry practice considering technological availability and economic practicability and achievability.
- Identify BMPs for exposure minimization, stormwater containment and discharge reduction, treatment control, and other advanced BMPs as described in the General Permit (Section X.H.2).
- Identify BMPs in the SWPPP, and reference BMP Fact Sheets included in the CASQA Stormwater BMP Handbook Portal: New Development and Redevelopment for planning and design guidance. The CASQA Stormwater BMP Handbook: Industrial and Commercial provides operations and maintenance guidance for certain Advanced BMPs that may be installed at certain sites. Other sources as applicable. Include copies of Fact Sheets in SWPPP Appendix G.
- See Section 4 of the CASQA Stormwater BMP Handbook Portal: Industrial and Commercial for a list of treatment control BMPs for consideration in a site-specific suite of advanced BMPs.
- Dischargers are encouraged to utilize BMPs that infiltrate or reuse stormwater where feasible.
• Provide a narrative description of the how BMPs selected will be used to achieve the goals of this SWPPP.
• If a non-standard BMP will be used, identify it in the BMP implementation table and provide a narrative description of its use and implementation.
• All new treatment control BMPs employed by the Discharger shall be designed to comply with the design storm standards in Section X.H.6 of the General Permit.

RECOMMENDED TEXT

The following text should be used if Advanced BMPs are required and modified accordingly

3.2.1 Exposure Minimization BMPs
Storm resistant shelters are installed onsite to prevent the contact of stormwater with industrial activities and material. The locations of these shelters and associated industrial activities and materials are presented in Table 3.2.

Table 3.2 Exposure Minimization BMPs

<table>
<thead>
<tr>
<th>Shelter Location/Description</th>
<th>Associated Industrial Activity/Material</th>
</tr>
</thead>
</table>

[Describe any site locations where storm resistant shelters are not in place and industrial activities and materials are exposed to stormwater. Explain why exposure minimization BMPs are not feasible or practical in these locations].

3.2.2 Stormwater Containment and Discharge Reduction BMPs
Stormwater containment and discharge reduction BMPs include BMPs that divert, reuse, contain, or reduce the volume of stormwater runoff. Specific stormwater containment and discharge reduction BMPs to be implemented at the [name] facility are provided in Table 3.3 and the BMP fact sheets are included in Appendix G.

[Include additional descriptions of specific stormwater containment and discharge reduction BMPs that will be implemented onsite. This should include BMP locations, stormwater runoff sources, and potential pollutants. All non-standard BMPs should be clearly described]
### Table 3.3  Stormwater Containment and Discharge Reduction BMPs

<table>
<thead>
<tr>
<th>CASQA Fact Sheet Number</th>
<th>CASQA BMP Factsheet Name</th>
<th>Meets Advanced BMP Requirement</th>
<th>BMP Used</th>
<th>BMP Location, Runoff Sources, and Potential Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC-10</td>
<td>Infiltration Trench</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-11</td>
<td>Infiltration Basin</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-12</td>
<td>Harvest and Reuse</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-20</td>
<td>Wet Pond</td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
<td>TC-21</td>
<td>Constructed Wetland</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-22</td>
<td>Extended Detention Basin</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-30</td>
<td>Vegetated Swale</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>TC-31</td>
<td>Vegetated Buffer Strip</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-32</td>
<td>Bioretention</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-40</td>
<td>Media Filter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-50</td>
<td>Water Quality Inlet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-60</td>
<td>Multiple Systems</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP-20</td>
<td>Biotreatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP-40</td>
<td>Stormwater Filter</td>
<td></td>
<td></td>
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<tr>
<td>MP-50</td>
<td>Wet Vault</td>
<td></td>
<td></td>
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<tr>
<td>MP-51</td>
<td>Gravity Separator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP-52</td>
<td>Drain Inlet Insert</td>
<td></td>
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</tr>
</tbody>
</table>

**Alternate BMPs Used:** If used, state reason:

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**CASQA Industrial SWPPP Template** 32  September 2014
3.2.3 Treatment Control BMPs

Treatment control BMPs include one or more mechanical, chemical, biologic, physical, or any other treatment process technology and is sized to meet the treatment control design storm standard. Specific treatment control BMPs to be implemented at the [name] facility are provided in Table 3.4 and the BMP fact sheets are included in Appendix G.

Include additional descriptions of treatment control BMPs that will be implemented onsite. This should include BMP locations, stormwater runoff sources, and potential pollutants. Include calculations that show how each BMP meets the design storm standard specified in Section X.H.6 of the General Permit. Clearly describe non-standard BMPs and manufactured proprietary systems.

3.2.4 Other Advanced BMPs

Clearly describe any additional advanced BMPs implemented on site that are not included in Sections 3.2.1 through 3.2.3. This should include BMP locations, stormwater runoff sources, and potential pollutants. State “NONE” if not applicable.
### Table 3.4 Treatment Control BMPs

<table>
<thead>
<tr>
<th>CASQA Fact Sheet Number</th>
<th>CASQA BMP Factsheet Name</th>
<th>Addresses O&amp;M for Advanced BMPs</th>
<th>BMP Used</th>
<th>BMP Location, Runoff Sources, and Potential Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC-10</td>
<td>Infiltration Trench</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>TC-11</td>
<td>Infiltration Basin</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>TC-12</td>
<td>Harvest and Reuse</td>
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<tr>
<td>TC-20</td>
<td>Wet Pond</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>TC-21</td>
<td>Constructed Wetland</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>TC-22</td>
<td>Extended Detention Basin</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>TC-30</td>
<td>Vegetated Swale</td>
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<tr>
<td>TC-31</td>
<td>Vegetated Buffer Strip</td>
<td>✓</td>
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<tr>
<td>TC-32</td>
<td>Bioretention</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>TC-40</td>
<td>Media Filter</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>TC-50</td>
<td>Water Quality Inlet</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>TC-60</td>
<td>Multiple Systems</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>MP-20</td>
<td>Biotreatment</td>
<td>✓</td>
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<tr>
<td>MP-40</td>
<td>Stormwater Filter</td>
<td>✓</td>
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<tr>
<td>MP-50</td>
<td>Wet Vault</td>
<td>✓</td>
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<tr>
<td>MP-51</td>
<td>Gravity Separator</td>
<td>✓</td>
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<tr>
<td>MP-52</td>
<td>Drain Inlet Insert</td>
<td>✓</td>
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</tr>
</tbody>
</table>

**Alternate BMPs Used:**

If used, state reason:
3.3 BMP SUMMARY TABLE

INSTRUCTIONS

- The General Permit (Section X.H.5) requires Dischargers to prepare a table that summarizes each identified area of industrial activity, the associated industrial pollutant sources, the industrial pollutants, and the BMPs being implemented.

- Ensure BMPs are implemented for all industrial activities and associated industrial pollutants.

RECOMMENDED TEXT

The following text should be modified accordingly

Table 3.5 summarizes the industrial activities, materials, pollutant sources, potential pollutants, and BMPs being implemented to prevent discharge of pollutants in stormwater runoff. Descriptions of the specific BMPs being implemented were provided in previous subsections. Implementation and maintenance of BMPs is described in Section 4.
Table 3.5  BMP Summary Table

<table>
<thead>
<tr>
<th>Industrial Activity/Material</th>
<th>Pollutant Sources</th>
<th>Potential Pollutants</th>
<th>BMPs Implemented</th>
<th>CASQA BMP Fact Sheet Number</th>
<th>Required Equipment and Tools</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
Section 4   BMP Implementation

4.1  BMP IMPLEMENTATION SCHEDULE

INSTRUCTIONS

The BMP implementation schedule is the component of the SWPPP that shows the timeline for when BMPs will be installed so that the facility is in compliance with the General Permit. The schedule provides information necessary to plan for adequate materials and crews to implement BMPs at the right time so that they are effective. Use Table 4.1 to identify BMP and their schedule for implementation.

Identify the schedule for deployment of BMPs. BMPs must be implemented, modified, and maintained to reflect industrial activities and weather conditions.

The BMP implementation schedule shall show implementation by location for all minimum BMPs and advanced BMPs.

RECOMMENDED TEXT

The following text should be modified accordingly

The schedule for implementing all minimum and advanced BMPs is presented in Table 4.1. BMPs will be implemented as necessary to reduce or prevent transport of industrial pollutants in stormwater runoff. Slight modifications to this schedule may be necessary to achieve this goal. Records of BMP implementation will be included in Appendix H.

Table 4.1   BMP Implementation Schedule

<table>
<thead>
<tr>
<th>Industrial Activity/Material and Location</th>
<th>BMP Description</th>
<th>Person Responsible for Implementing BMP</th>
<th>Date and Time of Implementation</th>
<th>Implementation Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

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4.2 BMP INSPECTION AND MAINTENANCE

INSTRUCTIONS

- Include a description of BMP inspection and maintenance requirements including frequency and necessary equipment and tools.
- Include the location of blank and completed inspection checklists/forms. Provide a blank inspection form in the SWPPP (in SWPPP Appendix I) that will be used to record results of the inspection and assessment.
- Completed inspection forms should be included in SWPPP Appendix I or in an accompanying file/binder that is referenced in the SWPPP and readily accessible onsite.

RECOMMENDED TEXT

The following text should be modified accordingly

The General Permit requires, at a minimum, monthly observations of BMPs, along with inspections during sampling events. Monthly observations will be conducted during daylight hours of scheduled facility operating hours and on days without precipitation. A BMP observation checklist must be filled out for and maintained on-site with the SWPPP. The observation checklist includes the necessary information as discussed in Section 5.5. A blank observation checklist can be found in Appendix I, and completed checklists will be kept in Appendix H or in an accompanying file/binder that is referenced in the SWPPP and readily accessible on site.

BMPs will be maintained regularly to ensure proper and effective functionality. If necessary, corrective actions will be implemented within 72 hours of identified deficiencies and associated amendments to the SWPPP will be prepared and documented.

Specific guidance for maintenance, observation, and repair of advanced BMPs can be found in the BMP Factsheets in Appendix G.

[Provide additional inspection and maintenance requirements that are specific to the BMPs being implemented onsite. This should include identification of BMPs that require more frequent inspection beyond the monthly requirement, and the equipment and tools necessary to properly maintain each BMP.]
Section 5 Monitoring Implementation Plan

5.1 Purpose

INSTRUCTIONS

The purpose of this document is to provide general information to assist dischargers through the process of developing a MIP. Sampling and analysis strategies must be site-specific for each individual project. RWQCBs and local agencies may require additional monitoring that is not addressed by this document. Dischargers should consult with the RWQCB and local agencies to determine if there are additional requirements.

The sampling and analysis requirements of General Permit are governed by National Pollutant Discharge Elimination System (NPDES) regulations. These regulations and state regulations implementing the NPDES program contain significant requirements regarding quality assurance, quality control, qualifications of analytical laboratories, etc., which may not be explicitly addressed in this document. Consult with the NPDES regulations or RWQCB staff to determine any additional requirements.

The Monitoring Implementation Plan must include a description of discharge locations, visual observation procedures, and visual observation response procedures related to monthly visual observations and sampling event visual observations.

The MIP must also include justifications for any of the following that are applicable to the facility:

- Alternative discharge locations in accordance with General Permit Section XI.C.3;
- Representative Sampling Reduction (RSR) in accordance with General Permit Section XI.C.4; or,
- Qualified Combined Samples (QCS) in accordance with General Permit Section XI.C.5.

The Monitoring Implementation Plan also provides procedures for field instrument calibration instructions, including calibration intervals specified by the manufacturer, and an example Chain of Custody form used when handling and shipping water quality samples to the lab.

Sample collection and handling instructions are provided in Attachment H of the General Permit. Guidance for developing the MIP is provided in Appendix X of the Best Management Practice Handbook Portal: Industrial and Commercial.

The General Permit (Section XI.C) allows Dischargers to identify alternate discharge locations, reduce the number of sample locations within a drainage area, and combine samples from similar drainage areas as long as sufficient justification is provided. If there are modifications to any of the monitoring procedures that deviate from the General Permit requirements, these are described in the respective section below.

The scope of this document is limited to providing guidance on developing a basic Monitoring Implementation Plan (MIP) required by the General Permit. In particular, this document does not address monitoring required for Subchapter N facilities or facilities subject to the California Ocean Plan, which includes discharges into Areas of Special Biological Significance (ASBS).

The purpose of this document is to provide general information to assist dischargers through the process of developing a MIP. Sampling and analysis strategies must be site-specific for each individual project.

RECOMMENDED TEXT

The following text should be modified accordingly
This Monitoring Implementation Plan was developed to address the following objectives:

1. Identify the monitoring team;
2. Describe weather and rain event tracking procedures;
3. Describe discharge locations, visual observations procedures
4. Describe visual observation response procedures;
5. Describe sample collection and handling procedures;
6. Describe field instrumentation calibration instructions and intervals;
7. Provide justification for alternative discharge locations, Representative Sample Reduction (RSR), and Qualified Combined Samples (QCS), as applicable; and
8. Provide an example Chain of Custody form to be used when handling and shipping water quality samples to the laboratory.

5.2. Weather and Rain Event Tracking

INSTRUCTIONS

Tracking the weather and predicted rain events is a critical element of collecting stormwater samples from Qualified Storm Events (QSEs).

Describe what procedures and resources will be used to track weather forecasts.

RECOMMENDED TEXT

Stormwater sampling and visual observations will be conducted during Qualified Storm Events (QSEs). A QSE is defined as any precipitation event that produces a discharge for at least one drainage area and is preceded by 48 hours with no discharge from any drainage area. Weather and precipitation forecasts will be tracked to identify potential QSEs.

When targeting a QSE for stormwater sampling, the appropriate team member will weekly consult the National Oceanographic and Atmospheric Administration (NOAA) for weather forecasts. These forecasts can be obtained at [http://www.srh.noaa.gov/](http://www.srh.noaa.gov/). If weekly forecasts indicate potential for significant precipitation, the weather forecast will be closely monitored during the 48 hours preceding the event. Weather reports with precipitation data should be printed and maintained with the SWPPP in MIP Attachment 1 “Weather Reports” to document precipitation totals and antecedent conditions.

5.3 Monitoring Locations

INSTRUCTIONS

Map(s) and descriptions must be provided for each of the facility’s observation and/or sample collection locations. Instructions or criteria for access shall be included.

Reference SWPPP Appendix A where map(s) are provided or include a figure in this section of the MIP.

For smaller and less complex sites, all monitoring locations can be identified in this section. As currently structured, this template suggests that the locations be defined in the section where each type of sampling is discussed.
If applicable, state what alternate monitoring locations are being proposed that deviate from General Permit requirements. Each modification requires proper justification as outlined in General Permit Section XI.C

**RECOMMENDED TEXT**

Monitoring locations are shown on the Site Map(s) in Appendix A. Monitoring locations are described in Section 5.6.

Whenever changes in facility operations might affect the appropriateness of sampling locations, the sampling locations will be revised accordingly. All such revisions will be implemented as soon as feasible and the SWPPP amended.

**5.4 Sample Collection and Visual Observation Exceptions**

**INSTRUCTIONS**

Identify governing safety documents, such as a site safety plan or provide specific safety requirements.

A description of site hazards and safety information related to conducting visual observations or sample collection, particularly in inclement weather, will be included in the Monitoring Implementation Plan.

Identify permit-specified sampling/observation exceptions.

**RECOMMENDED TEXT**

Safety practices for sample collection will be in accordance with the [ENTER TITLE AND PUBLICATION DATE OF CONTRACTOR'S HEALTH AND SAFETY PLAN FOR THE PROJECT OR PROVIDE SPECIFIC REQUIREMENTS IN THIS SECTION]. A summary of the safety requirements that apply to sampling personnel is provided below.

- 
- 
- 
- 

The collection of samples or conduct visual observations is not required under the following conditions:

- During dangerous weather conditions such as flooding and electrical storms.
- Outside of scheduled site business hours.

Scheduled site business hours are presented in Section 2.2.

If monitoring (visual observations or sample collection) of the site is unsafe because of the dangerous conditions noted above then the appropriate team member will document the conditions for why an exception to performing the monitoring was necessary. The exception documentation will be filed in MIP Attachment 2 “Monitoring Records”.

- 
- 
- 

5.5 Visual Observation Procedures

INSTRUCTIONS

All Dischargers are required to conduct visual observations. Visual observations include routine monthly observations and sampling event observations.

Visual observations are required at least once per calendar month with the goal of confirming that appropriately selected BMPs have been implemented, are being maintained, and are effective in preventing potential pollutants from coming in contact with stormwater. Visual observations will be performed more frequently when specified in the SWPPP.

Identify whether records are to be provided to the LRP or Approved Signatory and the timeframe to provide these records.

Identify visual monitoring requirements and frequencies; provide forms for non-stormwater and stormwater observations; and BMP inspection checklists.

If applicable, state what visual observation procedures are being proposed that deviate from General Permit requirements (i.e. alternate monitoring locations). Each modification requires proper justification as outlined in General Permit Section XI.C.

RECOMMENDED TEXT

Visual monitoring includes observations of drainage areas, BMPs, and discharge locations.

- Observations of BMPs are required to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended.
- Observations of the drainage areas are required to identify any spills, leaks, uncontrolled pollutant sources, and non-stormwater discharges.
- Observations of discharge locations are required to identify the presence of visible pollutants in stormwater discharged from the facility.

Visual observations will be performed at least once every calendar month during dry conditions. Visual observations will also be performed during stormwater sampling events when discharge is occurring.

5.5.1 Monthly Visual Observations

RECOMMENDED TEXT

Monthly visual observations are necessary to document the presence of and to identify the source of any pollutants and non-stormwater flows. These should consist of observations of the outdoor facility operations, BMPs, and NSWD observations.

In the event that monthly visual observations are not performed, an explanation must be provided in the annual report.

5.5.1.1 Outdoor Facility Operations Observations

Observe potential sources of industrial pollutants including industrial equipment and storage areas, and outdoor industrial activities. Record observations of:

- Spills or leaks; and
• Uncontrolled pollutant sources

5.5.1.2 **BMP Observations**

Observe BMPs to identify and record:

- BMPs that are properly implemented;
- BMPs that need maintenance to operate effectively;
- BMPs that have failed; or
- BMPs that could fail to operate as intended.

5.5.1.3 **Non-Stormwater Discharge Observations**

Observe each drainage area for the presence of or indications of prior unauthorized and authorized non-stormwater discharges. Record:

- Presence or evidence of any non-stormwater discharge (authorized or unauthorized);
- Pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.); and
- Source of discharge.

For authorized non-stormwater discharges, also document whether BMPs are in place and are functioning to prevent contact with materials or equipment that could introduce pollutants.

5.5.2 **Sampling Event Visual Observations**

Sampling event visual observations evaluate the general appearance of the stormwater as an indicator of potential pollutants. These observations will be conducted at the same time sampling occurs at the discharge locations identified in Section 5.6.2. At each discharge location where a sample is obtained, record observations of:

- Floating and suspended materials;
- Oil and grease;
- Discoloration;
- Turbidity;
- Odors; and
- Trash.

When pollutants are observed in the discharged stormwater, follow-up observations of the drainage area will be conducted to identify the probable source of the pollutants.

In the event that a discharge location is not visually observed during the sampling event, the location of the discharge and reasoning for not obtaining observations must be recorded.
5.5.3 **Visual Monitoring Procedures**

**RECOMMENDED TEXT**

Visual monitoring will be conducted by trained team members. The name(s) and contact number(s) of the site visual monitoring personnel are listed below and their training qualifications are provided in Appendix C.

- **Assigned inspector:** NAME OF INSPECTOR  
  Contact phone: TELEPHONE NUMBER
- **Alternate inspector:** NAME OF INSPECTOR  
  Contact phone: TELEPHONE NUMBER

Visual observations will be documented on the *Visual Observation Log* (see MIP Attachment 3 “Example Forms”). Visual observations will be supplemented with a site specific BMP inspection checklist. Photographs used to document observations will be referenced on the *Visual Observation Log* and maintained with the Monitoring Records in Attachment 2.

The completed logs and checklists will be kept in MIP Attachment 2 “Monitoring Records”.

5.5.4 **Visual Monitoring Follow-Up and Reporting**

**RECOMMENDED TEXT**

Correction of deficiencies identified by the observations, including required repairs or maintenance of BMPs, will be initiated and completed as soon as possible. Response actions will include the following:

- Report observations to the Pollution Prevention Team Leader or designated individual;
- Identify and implement appropriate response actions;
- Determine if SWPPP update is needed;
- Verify completion of response actions; and
- Document response actions.

If identified deficiencies require design changes, including additional BMPs, the implementation of changes will completed as soon as possible, and the SWPPP will be amended to reflect the changes.

BMP deficiencies identified in site observation reports and correction of deficiencies will be tracked on the *BMP Observation Checklist* and will be retained in Appendix I.

Results of visual monitoring must be summarized and reported in the Annual Report.

5.5.5 **Visual Monitoring Locations**

**INSTRUCTIONS**

For smaller or less complex sites, the tables for identifying the site locations can be simplified and combined.
The observations identified in Sections 5.5.1 and 5.5.2 will be conducted at the locations identified in this section.

Visual monitoring locations are shown on the Site Map(s) in SWPPP Appendix A.

There are [Enter Number] drainage area(s) onsite. Drainage area(s) are shown on the Site Map(s) in Appendix A and are identified in Table 5.1.

<table>
<thead>
<tr>
<th>Location Identifier</th>
<th>Drainage Area Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are [Enter Number] discharge location(s) onsite. Site stormwater discharge location(s) are shown on the Site Map(s) in Appendix A and Table 5.2 identifies each stormwater discharge location.

<table>
<thead>
<tr>
<th>Location Identifier</th>
<th>Discharge Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Note Drainage Area that the discharge location drains)</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are [Enter Number] stormwater storage or containment area(s) onsite. Stormwater storage or containment area(s) are shown on the Site Map(s) in Appendix A and Table 5.3 identifies each stormwater storage or containment area by location.

<table>
<thead>
<tr>
<th>Location Identifier</th>
<th>Description of Containment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Note Drainage Area in which the containment is located)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**5.6 Sampling and Analysis Procedures**

Describe specific details about sample collection frequency; sample constituents; sample collection methodologies (including clean sample collection techniques); use of pH field meters; and field quality assurance/quality control.

Describe sample procedures for laboratory analysis. Identify which laboratory will perform the sample analysis; how samples will be delivered to the laboratory; laboratory analytical methods and reporting
This section describes the methods and procedures that will be followed for stormwater sampling and analysis. It contains information for sampling schedule, sampling locations, monitoring preparation, analytical constituents, sample collection, sample analysis, and data evaluation and reporting.

5.6.1 Sampling Schedule

Stormwater samples at each discharge location will be collected and analyzed from two (2) QSEs within the first half of each reporting year (July 1 to December 31), and two (2) QSEs within the second half of each reporting year (January 1 to June 30).

A QSE is a precipitation event that:

- Produces a discharge for at least one drainage area; and
- Is preceded by 48 hours with no discharge from any drainage area.

5.6.2 Sampling Locations

Sampling locations include all locations where stormwater is discharged from the site. Discharge locations are shown on the Site Map(s) in Appendix A and are included in Table 5.4. A total of [Enter Number] discharge location(s) have been identified on the project site for the collection of stormwater runoff samples.

<table>
<thead>
<tr>
<th>Sample Location Number</th>
<th>Sample Location Description</th>
<th>Sample Location Latitude and Longitude (Decimal Degrees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Enter Number]</td>
<td>[Enter Location]</td>
<td>[Enter Latitude]</td>
</tr>
<tr>
<td>[Enter Number]</td>
<td>[Enter Location]</td>
<td>[Enter Longitude]</td>
</tr>
<tr>
<td>[Enter Number]</td>
<td>[Enter Location]</td>
<td>[Enter Latitude]</td>
</tr>
</tbody>
</table>
### Table 5.4  Sample Locations

<table>
<thead>
<tr>
<th>Sample Location Number</th>
<th>Sample Location Description</th>
<th>Sample Location Latitude and Longitude (Decimal Degrees)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>[Enter Longitude]</td>
</tr>
</tbody>
</table>

#### 5.6.3  Monitoring Preparation

**RECOMMENDED TEXT**

Samples on the project site will be collected by the following sampling personnel:

- **Name/Telephone Number:**
- **Alternate(s)/Telephone Number:**

An adequate stock of monitoring supplies and equipment for sampling will be available onsite prior to a sampling event. Monitoring supplies and equipment will be stored in a cool temperature environment that will not come into contact with rain or direct sunlight. Sampling personnel will be available to collect samples in accordance with the sampling schedule. Supplies maintained at the facility will include, but are not limited to: clean powder-free nitrile gloves; sample collection equipment; coolers; appropriate number and volume of sample containers; identification labels; re-sealable storage bags; paper towels; personal rain gear; ice; and **Sampling Field Log Sheets** and **Chain of Custody (CoC) forms**, which are provided in MIP Attachment 3 “Example Forms”.

#### 5.6.4  Analytical Constituents

**INSTRUCTIONS**

All facilities are required to analyze stormwater samples for total suspended solids (TSS), oil & grease (O&G), and pH per the requirements in the General Permit (Section XI.B.6).

All facilities must analyze for any potential industrial pollutants identified in the facility-specific assessment of pollutant sources in the SWPPP.

Facilities with SIC codes listed in Table 1 of the General Permit must analyze for the additional analytical parameters listed in that table.

Facilities that discharge to receiving waters with 303(d) listed impairments or TMDLs must analyze for the constituent causing the impairment, if industrial activities are a potential source of the constituent. Test methods with lower detection limits may be necessary when discharging to receiving waters with 303(d) listed impairments or TMDLs.

Facilities subject to federal Subchapter N requirements must analyze for the constituents identified in the federal regulations.

Facilities must also analyze for additional constituents required by the RWQCB.

Dischargers will contact the Regional Water Board to determine appropriate analytical methods for parameters not listed in Table 2 of the General Permit.
Table 5.5 identifies the constituents identified for sampling and analysis.

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>Basic required constituent</td>
</tr>
<tr>
<td>Oil and grease</td>
<td>Basic required constituent</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>Basic required constituent</td>
</tr>
<tr>
<td></td>
<td>Pollutant Source Assessment constituent</td>
</tr>
<tr>
<td></td>
<td>Pollutant Source Assessment constituent</td>
</tr>
<tr>
<td></td>
<td>SIC Code constituent</td>
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<td></td>
<td>SIC Code constituent</td>
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<tr>
<td></td>
<td>SIC Code constituent</td>
</tr>
<tr>
<td></td>
<td>TMDL/303(d) list constituent</td>
</tr>
<tr>
<td></td>
<td>TMDL/303(d) list constituent</td>
</tr>
<tr>
<td></td>
<td>Regional Water Board required constituent</td>
</tr>
<tr>
<td></td>
<td>Regional Water Board required constituent</td>
</tr>
<tr>
<td></td>
<td>Subchapter N constituent</td>
</tr>
</tbody>
</table>

5.6.5 Sample Collection

Samples of discharge will be collected at the designated sampling locations shown on the Site Map(s) in Appendix A. Samples from each discharge location will be collected within four (4) hours of:

- The start of the discharge; or
- The start of facility operations if the QSE occurs within the previous 12 hour period.

Sample collection is required during scheduled facility operating hours and when sampling conditions are safe.

Grab samples will be collected and preserved in accordance with the methods identified in Table 5.6, “Sample Collection, Preservation and Analysis for Water Quality Samples” provided in Section 5.6.6. Only team members properly trained in water quality sampling will collect samples.

The facility [is/is not] subject to Subchapter N ELGs mandating pH analysis and [has/has not] entered Level 1 Status for pH. Grab samples will be collected and analyzed for pH using [Describe method to analyze samples for pH. The General Permit (Section XI.C.2) requires Dischargers subject to Subchapter N ELGs or ERA Level 1 requirements to use calibrated portable pH instruments. Dischargers not subject to these requirements can use wide range litmus]
paper or other equivalent pH test kits. If portable pH meters are used, provide instrument calibration requirements and manufacturer information in MIP Attachment 4 “Field Meter Instructions.” The pH analysis will be performed as soon as practicable, but no later than 15 minutes after sample collection.

Samples from different discharge locations will not be combined or composited prior to shipment to the analytical laboratory. [unless proper justification for Qualified Combined Samples was provided. Qualified Combined Samples of equal volume may be combined, by an analytical laboratory only, from up to four (4) discharge locations if the industrial activities and physical characteristics (grade, surface materials, etc.) within each of the drainage areas are substantially similar to one another. See General Permit Section XI.C.5 for details on Qualified Samples.] Sample collection and handling requirements are described in Section 5.8.

### 5.6.6 Sample Analysis

Samples will be analyzed using the analytical methods identified in the Table 5.6.

Samples will be analyzed by:

| Laboratory Name: |  |
| Street Address: |  |
| City, State Zip: |  |
| Telephone Number: |  |
| Point of Contact: |  |
| ELAP Certification Number: |  |

Samples will be delivered to the laboratory by:

- Facility Personnel
  - Yes
  - No
- Picked up by Laboratory Courier
  - Yes
  - No
- Shipped
  - Yes
  - No

**INSTRUCTIONS**

Provide instructions for specific arrangements of delivering samples to the laboratory. If delivered by facility personnel – identify who will deliver them. If picked up by courier, provide courier contact information and when contact needs to be made. If shipped, provide shipping instructions (e.g. location of shipping materials) and shipper contact information.
### Table 5.6  Sample Collection, Preservation and Analysis for Water Quality Samples

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Analytical Method</th>
<th>Minimum Sample Volume</th>
<th>Sample Containers</th>
<th>Sample Preservation</th>
<th>Reporting Limit</th>
<th>Maximum Holding Time</th>
</tr>
</thead>
<tbody>
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</table>

**Notes:**
5.6.7 Data Evaluation and Reporting

**RECOMMENDED TEXT**

The designated member of the Pollution Prevention Team will complete an evaluation of the water quality sample analytical results.

All sampling and analytical results for all individual [or Qualified Combined Samples (QCS)] samples will be submitted via SMARTS within 30 days of obtaining all results for each sampling event.

The method detection limit will be provided when an analytical result from samples taken is reported by the laboratory as a “non-detect” or less than the method detection limit. A value of zero will not be reported.

Analytical results that are reported by the laboratory as below the minimum level (often referred to as the reporting limit) but above the method detection limit will be provided.

Reported analytical results will be averaged automatically by SMARTS at the end of the reporting year. For any calculations required by the General Permit a value of zero shall be used, all effluent sampling analytical results that are reported by the laboratory as “non-detect” or less than the Method Detection Limit (MDL).

5.7 Training of Sampling Personnel

**INSTRUCTIONS**

List names of samplers who will conduct water quality sampling. Field crews should be trained in the appropriate site specific methods specified in the sampling plan.

Provide training records in Appendix C.

**RECOMMENDED TEXT**

Sampling personnel will be trained to collect, maintain, and ship samples in accordance with the General Permit and this SWPPP. Training records of designated sampling personnel are provided in Appendix C.

The stormwater sampler(s) and alternate(s) have received the following stormwater sampling training:

<table>
<thead>
<tr>
<th>Name</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INSERT LIST OF TRAINING COURSES</td>
</tr>
<tr>
<td></td>
<td>INSERT LIST OF TRAINING COURSES</td>
</tr>
</tbody>
</table>

The stormwater sampler(s) and alternates have the following stormwater sampling experience:

<table>
<thead>
<tr>
<th>Name</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INSERT LIST OF STORMWATER SAMPLING EXPERIENCE</td>
</tr>
<tr>
<td></td>
<td>INSERT LIST OF STORMWATER SAMPLING EXPERIENCE</td>
</tr>
</tbody>
</table>
5.8 Sample Collection and Handling

INSTRUCTIONS

Use of correct methods to collect and handle samples help to ensure the samples are valid. While the handling requirements apply primarily to grab samples collected for laboratory analysis, field measurements can be affected by sample collection procedures.

- Describe sample collection procedures to be used for sampling.
- Describe sample handling procedures.
- Describe container decontamination waste disposal requirements.
- Describe sample collection documentation procedures.

The following provides general direction on sample collection and handling that should be made site specific.

RECOMMENDED TEXT

5.8.1 Sample Collection

Samples will be collected at the designated sampling locations shown on the Site Map(s) and listed in the preceding sections. Samples will be collected, maintained and shipped in accordance with the requirements in the following sections.

Grab samples will be collected and preserved in accordance with the methods identified in preceding sections.

To maintain sample integrity and prevent cross-contamination, sample collection personnel will follow the protocols below.

- Collect samples (for laboratory analysis) only in analytical laboratory-provided sample containers;
- Wear clean, powder-free nitrile gloves when collecting samples;
- Change gloves whenever something not known to be clean has been touched;
- Change gloves between sites;
- Decontaminate all equipment (e.g. bucket, tubing) prior to sample collection using a trisodium phosphate water wash, distilled water rinse, and final rinse with distilled water. (Dispose of wash and rinse water appropriately, i.e., do not discharge to storm drain or receiving water). Do not decontaminate laboratory provided sample containers;
- Do not smoke during sampling events;
- Never sample near a running vehicle;
- Do not park vehicles in the immediate sample collection area (even non-running vehicles);
- Do not eat or drink during sample collection; and
- Do not breathe, sneeze, or cough in the direction of an open sample container.

The most important aspect of grab sampling is to collect a sample that represents the entire runoff stream. Typically, samples are collected by dipping the collection container in the runoff flow paths and streams as noted below.
• For small streams and flow paths, simply dip the bottle facing upstream until full.
• For larger stream that can be safely accessed, collect a sample in the middle of the flow stream by directly dipping the mouth of the bottle. Once again making sure that the opening of the bottle is facing upstream as to avoid any contamination by the sampler.
• For larger streams that cannot be safely waded, pole-samplers may be needed to safely access the representative flow.
• Avoid collecting samples from ponded, sluggish or stagnant water.
• Avoid collecting samples directly downstream from a bridge as the samples can be affected by the bridge structure or runoff from the road surface.
• Do not stand upstream of the sampling point within the flow path.

Note, that depending upon the specific analytical test, some containers may contain preservatives. These containers should never be dipped into the stream, but filled indirectly from the collection container.

5.8.2 Sample Handling

Field pH measurements must be conducted immediately. Do not store pH samples for later measurement.

Samples for laboratory analysis must be handled as follows. Immediately following sample collection:

• Cap sample containers;
• Complete sample container labels;
• Sealed containers in a re-sealable storage bag;
• Place sample containers into an ice-chilled cooler;
• Document sample information on the Sampling Field Log Sheet; and
• Complete the CoC.

All samples for laboratory analysis must be maintained between 0-6 degrees Celsius during delivery to the laboratory. Samples must be kept on ice, or refrigerated, from sample collection through delivery to the laboratory. Place samples to be shipped inside coolers with ice. Make sure the sample bottles are well packaged to prevent breakage and secure cooler lids with packaging tape.

Ship samples that will be laboratory analyzed to the analytical laboratory right away. Hold times are measured from the time the sample is collected to the time the sample is analyzed. The General Permit requires that samples be received by the analytical laboratory within 48 hours of the physical sampling (unless required sooner by the analytical laboratory).

5.8.3 Sample Documentation Procedures

All original data documented on sample bottle identification labels, Sampling Log, and CoCs will be recorded using waterproof ink. If an error is made on a document, sampling personnel
will make corrections by lining through the error and entering the correct information. The erroneous information will not be obliterated. All corrections will be initialed and dated.

Duplicate samples will be identified consistent with the numbering system for other samples to prevent the laboratory from identifying duplicate samples. Duplicate samples will be identified in the Sampling Log.

Sample documentation procedures include the following:

**Sample Bottle Identification Labels:** Sampling personnel will attach an identification label to each sample bottle. Sample identification will uniquely identify each sample location.

**Field Log Sheets:** Sampling personnel will complete the *Effluent Sampling Field Log Sheet* and *Receiving Water Sampling Field Log Sheet* for each sampling event, as appropriate.

**Chain of Custody:** Sampling personnel will complete the CoC for each sampling event for which samples are collected for laboratory analysis. The sampler will sign the CoC when the sample(s) is turned over to the testing laboratory or courier.

### 5.9 Quality Assurance and Quality Control

#### INSTRUCTIONS

Basic quality assurance and quality control (QA/QC) requirements are identified in this section. Additional QA/QC may be required based upon site specific conditions, owner/LRP requirements, or the planned monitoring. The discharger should consider consulting a QISP to review and augment the basic information as needed.

#### RECOMMENDED TEXT

An effective Quality Assurance and Quality Control (QA/QC) plan will be implemented as part of the IMP to ensure that analytical data can be used with confidence. QA/QC procedures to be initiated include the following:

- Field logs;
- Clean sampling techniques;
- CoCs;
- QA/QC Samples; and
- Data verification.

Each of these procedures is discussed in more detail in the following sections.

#### 5.9.1 Field Logs

The purpose of field logs is to record sampling information and field observations during monitoring that may explain any uncharacteristic analytical results. Sampling information to be included in the field log include the date and time of water quality sample collection, sampling personnel, sample container identification numbers, and types of samples that were collected. Field observations should be noted in the field log for any abnormalities at the sampling location (color, odor, BMPs, etc.). Field measurements for pH and turbidity should also be recorded in the field log. A Visual Inspection Field Log, an Effluent Sampling Field Log Sheet, and a Receiving Water Sampling Field Log Sheet are included in MIP Attachment 3 “Example Forms”.
5.9.2 Clean Sampling Techniques

Clean sampling techniques involve the use of certified clean containers for sample collection and clean powder-free nitrile gloves during sample collection and handling. As discussed in Section 6.8, adoption of a clean sampling approach will minimize the chance of field contamination and questionable data results.

5.9.3 Chain of Custody

The sample CoC is an important documentation step that tracks samples from collection through analysis to ensure the validity of the sample. Sample CoC procedures include the following:

- Proper labeling of samples;
- Use of CoC forms for all samples; and
- Prompt sample delivery to the analytical laboratory.

Analytical laboratories usually provide CoC forms to be filled out for sample containers. An example CoC is included in MIP Attachment 3 “Example Forms”.

5.9.4 QA/QC Samples

QA/QC samples provide an indication of the accuracy and precision of the sample collection; sample handling; field measurements; and analytical laboratory methods. The following types of QA/QC will be conducted for this project:

- Field Duplicates at a frequency of [5 percent or 1 duplicate minimum per sampling event] (Required for all sampling plans with field measurements or laboratory analysis)
- Equipment Blanks at a frequency of [Insert frequency required by method] (Only needed if equipment used to collect samples could add the pollutants to sample)
- Field Blanks at a frequency of [Insert frequency required by method] (Only required if sampling method calls for field blanks)
- Travel Blanks at a frequency of [Insert frequency required by method] (Required for sampling plans that include VOC laboratory analysis)

5.9.4.1 Field Duplicates

Field duplicates provide verification of laboratory or field analysis and sample collection. Duplicate samples will be collected, handled, and analyzed using the same protocols as primary samples. The sample location where field duplicates are collected will be randomly selected from the discharge locations. Duplicate samples will be collected immediately after the primary sample has been collected. Duplicate samples must be collected in the same manner and as close in time as possible to the original sample. Duplicate samples will not influence any evaluations or conclusion.

5.9.4.2 Equipment Blanks

Equipment blanks provide verification that equipment has not introduced a pollutant into the sample. Equipment blanks are typically collected when:

- New equipment is used;
- Equipment that has been cleaned after use at a contaminated site;
• Equipment that is not dedicated for surface water sampling is used; or
• Whenever a new lot of filters is used when sampling metals.

5.9.4.3 **Field Blanks**

Field blanks assess potential sample contamination levels that occur during field sampling activities. De-ionized water field blanks are taken to the field, transferred to the appropriate container, and treated the same as the corresponding sample type during the course of a sampling event.

5.9.4.4 **Travel Blanks**

Travel blanks assess the potential for cross-contamination of volatile constituents between sample containers during shipment from the field to the laboratory. De-ionized water blanks are taken along for the trip and held unopened in the same cooler with the VOC samples.

5.9.5 **Data Verification**

After results are received from the analytical laboratory, the discharger will verify the data to ensure that it is complete, accurate, and the appropriate QA/QC requirements were met. Data must be verified as soon as the data reports are received. Data verification will include:

- Check the CoC and laboratory reports.
  Make sure all requested analyses were performed and all samples are accounted for in the reports.
- Check laboratory reports to make sure hold times were met and that the reporting levels meet or are lower than the reporting levels agreed to in the contract.
- Check data for outlier values and follow up with the laboratory.
  Occasionally typographical errors, unit reporting errors, or incomplete results are reported and should be easily detected. These errors need to be identified, clarified, and corrected quickly by the laboratory. Especially note data that is an order of magnitude or more different than similar locations, or is inconsistent with previous data from the same location.
- Check laboratory QA/QC results.
  EPA establishes QA/QC checks and acceptable criteria for laboratory analyses. These data are typically reported along with the sample results. Evaluate the reported QA/QC data to check for contamination (method, field, and equipment blanks), precision (laboratory matrix spike duplicates), and accuracy (matrix spikes and laboratory control samples). When QA/QC checks are outside acceptable ranges, the laboratory must flag the data, and usually provides an explanation of the potential impact to the sample results.
- Check the data set for outlier values and accordingly, confirm results and re-analyze samples where appropriate.
  Sample re-analysis should only be undertaken when it appears that some part of the QA/QC resulted in a value out of the accepted range. Sample results may not be discounted unless the analytical laboratory identifies the required QA/QC criteria were not met and confirms this in writing.
Field data including pH measurements and visual observations must be verified as soon as the Visual Observation and Sampling Logs are received, typically at the end of the monitoring event. Field data verification will include:

- Check logs to make sure all required measurements were completed and appropriately documented;
- Check reported values that appear out of the typical range or inconsistent; *Follow-up immediately to identify potential reporting or equipment problems, if appropriate, recalibrate equipment after sampling;*
- Verify equipment calibrations;
- Review observations noted on the logs; and
- Review notations of any errors and actions taken to correct the equipment or recording errors.

5.10 Records Retention

Records of stormwater monitoring information and copies of reports (including Annual Reports) must be retained for a period of at least five (5) years from date of submittal or longer if required by the Regional Water Board.

Results of visual observations, field measurements, and laboratory analyses must be kept in the SWPPP along with CoCs, and other documentation related to the monitoring.

Records to be retained include:

- The date, place, and time of inspections, sampling, visual observations, and/or measurements, including precipitation;
- The individual(s) who performed the inspections, sampling, visual observation, and/or field measurements;
- The date and approximate time of field measurements and laboratory analyses;
- The individual(s) who performed the laboratory analyses;
- A summary of all analytical results, the method detection limits and reporting limits, and the analytical techniques or methods used;
- Weather reports;
- QA/QC records and results;
- Calibration records;
- Visual observation and sample collection exception records; and
- The records of any corrective actions and follow-up activities that resulted from analytical results, visual observations, or inspections.
MIP Attachment 1: Weather Reports

INSTRUCTIONS
Place printed weather forecasts and precipitation data in this Attachment.
**MIP Attachment 2: Monitoring Records**

**INSTRUCTIONS**
Place Visual Observations Logs, and Sampling Logs, and Laboratory Reports in this Attachment or describe where they are maintained.
INSTRUCTIONS

Place forms and check lists (e.g., visual observation logs, sampling logs, chain of custody, etc.) in this Attachment.
## Visual Observation Log - Monthly

### Date and Time of Inspection:

### Report Date:

### Facility Name:

### Weather

#### Antecedent Conditions (last 48 hours):

#### Current Weather:

### NSWD Observations

Were any authorized non-stormwater discharges observed?  
Yes □  No □

Were any **unauthorized** non-stormwater discharges observed?  
Yes □  No □

If yes to either, identify source:

### Outdoor Industrial Equipment and Storage Area Observations

<table>
<thead>
<tr>
<th>Drainage Area</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage Area 1:</td>
<td>Were any deficiencies or any other potential source of industrial pollutants observed?</td>
</tr>
<tr>
<td></td>
<td>Yes □  No □</td>
</tr>
<tr>
<td>Drainage Area 2:</td>
<td>Were any deficiencies or any other potential source of industrial pollutants observed?</td>
</tr>
<tr>
<td></td>
<td>Yes □  No □</td>
</tr>
<tr>
<td>Drainage Area 3:</td>
<td>Were any deficiencies or any other potential source of industrial pollutants observed?</td>
</tr>
<tr>
<td></td>
<td>Yes □  No □</td>
</tr>
</tbody>
</table>

If yes to any, describe:

### Exception Documentation (explanation required if inspection could not be conducted).

### Inspector Information

<table>
<thead>
<tr>
<th>Inspector Name:</th>
<th>Inspector Title:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Date:</td>
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<tr>
<td></td>
<td>Signature:</td>
</tr>
</tbody>
</table>
# Visual Observation Log – Sampling Events

<table>
<thead>
<tr>
<th>Date and Time of Inspection</th>
<th>Report Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility Name</td>
<td></td>
</tr>
</tbody>
</table>

## Weather

<table>
<thead>
<tr>
<th>Antecedent Conditions (last 48 hours):</th>
<th>Weather:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precipitation Total:</td>
<td>Predicted % chance of rain:</td>
</tr>
</tbody>
</table>

**Estimate storm beginning:**

(date and time)

**Estimate storm duration:**

(hours)

**Estimate time since last storm:**

(days or hours)

**Rain gauge reading:**

(inches)

## Sampling Event Observations

Observations: If yes identify location and observe drainage area to identify probable cause

<table>
<thead>
<tr>
<th>Odors</th>
<th>Yes □  No □</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floating material</td>
<td>Yes □  No □</td>
</tr>
<tr>
<td>Suspended Material</td>
<td>Yes □  No □</td>
</tr>
<tr>
<td>Sheen</td>
<td>Yes □  No □</td>
</tr>
<tr>
<td>Discolorations</td>
<td>Yes □  No □</td>
</tr>
<tr>
<td>Turbidity</td>
<td>Yes □  No □</td>
</tr>
</tbody>
</table>

## NSWD Observations

<table>
<thead>
<tr>
<th>Were any authorized non-stormwater discharges observed?</th>
<th>Yes □  No □</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were any <strong>unauthorized</strong> non-stormwater discharges observed?</td>
<td>Yes □  No □</td>
</tr>
</tbody>
</table>

If yes to either, identify source

## Drainage Area Observations

<table>
<thead>
<tr>
<th>Drainage Area</th>
<th>Deficiencies Noted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
**Exception Documentation (explanation required if inspection could not be conducted).**

<table>
<thead>
<tr>
<th>Inspector Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspector Name:</td>
</tr>
<tr>
<td>Signature:</td>
</tr>
</tbody>
</table>
### Sampling Log

<table>
<thead>
<tr>
<th>Facility Name:</th>
<th>Date:</th>
<th>Time Start:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampler Name:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Field Meter Calibration

**pH Meter ID No./Description:**

**Calibration Date/Time:**

#### Field pH Measurements

<table>
<thead>
<tr>
<th>Discharge Location Identifier</th>
<th>pH</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

#### Samples Collected

<table>
<thead>
<tr>
<th>Discharge Location Identifier</th>
<th>Constituent</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oil and Grease</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Suspended Solids</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Sampling Notes:**

**Time End:**
# Chain of Custody Form

**DATE:**

**DESTINATION LAB:**

**ATTN:**

**ADDRESS:**

**Office Phone:**

**Cell Phone:**

**SAMPLED BY:**

**Contact:**

**Facility Name**

<table>
<thead>
<tr>
<th>Client Sample ID</th>
<th>Sample Date</th>
<th>Sample Time</th>
<th>Sample Matrix</th>
<th>Container #</th>
<th>Type</th>
<th>Pres.</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**REQUESTED ANALYSIS**

**Notes:**

**SENDING COMMENTS:**

**RELINQUISHED BY**

Signature: 
Print: 
Company: 
Date: 
TIME:

**LABORATORY COMMENTS:**

**RECEIVED BY**

Signature: 
Print: 
Company: 
Date: 
TIME:
MIP Attachment 4: Field Meter Instructions

INSTRUCTIONS

Place instructions for field meters that will be used by sampling personnel in this Attachment.
INSTRUCTIONS

Place documents related to Regional Board required monitoring, TMDLs, compliance groups, etc. in this Attachment. Provide descriptions of these requirements in the appropriate sections of the Monitoring Implementation Plan.
Section 6 References


[Include additional references as needed]

Example

Appendix A: Site Map(s)

INSTRUCTIONS

• Include Site Map(s) here
Appendix B: Permit Registration Documents

INSTRUCTIONS

- Include Copies of Permit Registration Documents submitted to SMARTS, other than the SWPPP itself
  - Notice Of Intent (NOI)
  - Signed Certification Statement
  - Copy of Annual Fee Receipt
  - Site Map(s), see Appendix A
- Include the project Waste Discharge Identification (WDID) confirmation
## Recommended Text

Permit Registration Documents included in this Appendix

<table>
<thead>
<tr>
<th>Y/N</th>
<th>Permit Registration Document</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Notice of Intent</td>
</tr>
<tr>
<td></td>
<td>Certification</td>
</tr>
<tr>
<td></td>
<td>Copy of Annual Fee Receipt</td>
</tr>
<tr>
<td></td>
<td>Site Map(s), see Appendix A</td>
</tr>
</tbody>
</table>

Trained Team Member Log
Stormwater Management Training Log and Documentation

Facility Name: ________________________________

WDID #: ________________________________
Stormwater Management Topic: (check as appropriate)

☐ Good Housekeeping    ☐ Preventative Maintenance
☐ Spill and Leak Prevention and Response ☐ Material Handling and Waste Management
☐ Erosion and Sediment Controls ☐ Quality Assurance and Record Keeping
☐ Advanced BMPs ☐ Visual Monitoring
☐ Stormwater Sampling and Analysis

Specific Training Objective: ________________________________

Location: __________________ Date: __________________

Instructor: __________________ Telephone: __________________

Course Length (hours): __________

**Attendee Roster (Attach additional forms if necessary)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
<th>Phone</th>
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<tbody>
<tr>
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</tbody>
</table>

As needed, add proof of external training (e.g., course completion certificates, credentials for QISP).
OPTIONAL

Appendix D: Responsible Parties

---

CASQA Industrial SWPPP Template 74 September 2014
**OPTIONAL**

Authorization of Duly Authorized Representatives

Facility Name: ______________________________

WDID #: ______________________________

<table>
<thead>
<tr>
<th>Name of Personnel</th>
<th>Project Role</th>
<th>Company</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

____________________________ ______________________________
LRP’s Signature  Date

____________________________ ______________________________
LRP Name and Title  Telephone Number
OPTIONAL

Identification of QISP

Facility Name: ________________________________
WDID #: ________________________________

The following are QISPs associated with this project

<table>
<thead>
<tr>
<th>Name of Personnel(1)</th>
<th>Company</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

(1) If additional QISPs are required, add additional lines and include information here
Appendix E: SWPPP Amendment Certifications

INSTRUCTIONS

- Include certification statements for each SWPPP amendment.
- The LRP or Duly Authorized Representative may sign the certification.
SWPPP Amendment No.

Project Name:

Project Number:

Legally Responsible Person’s Certification of the
Stormwater Pollution Prevention Plan Amendment

“This Stormwater Pollution Prevention Plan and attachments were prepared under my direction to meet the requirements of the California Industrial General Permit (SWRCB Order No. 2014-0057-DWQ).”

__________________________  __________________________
LRP’s Signature                 Date

__________________________  __________________________
LRP Name                     LRP Title

__________________________  __________________________
Title and Affiliation          Telephone

__________________________  __________________________
Address                    Email
Appendix F: Calculations

INSTRUCTIONS

• Include Calculations here
INSTRUCTIONS

• Include Fact Sheets for BMPs identified in Section 3 of this SWPPP

• Note that it is not necessary to upload the Fact Sheets into SMARTS, but the Fact Sheets must be in the SWPPP at the industrial facility site.
Appendix H: BMP Implementation Log
INSTRUCTIONS

*Fill out Table H.1 for each minimum or advanced BMP implemented onsite. Add additional rows to table as needed.*

Table H.1  BMP Implementation Log

<table>
<thead>
<tr>
<th>Industrial Activity/Material and Location</th>
<th>BMP Description</th>
<th>Implementation Frequency</th>
<th>Implementation Description or Fact Sheet Reference</th>
<th>Person Responsible for Implementing BMP</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
Appendix I: BMP Observation Forms
# MONTHLY BMP INSPECTION REPORT

<table>
<thead>
<tr>
<th>Date and Time of Inspection:</th>
<th>Date Report Written:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Part I. General Information

### Site Information

- **Facility Name:**
- **Facility Address:**
- **Photos Taken:** (Circle one) Yes No
- **Photo Reference IDs:**

### Weather

<table>
<thead>
<tr>
<th>Estimate storm beginning: (date and time)</th>
<th>Estimate storm duration: (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimate time since last runoff from any drainage area: (days or hours)</th>
<th>Rain gauge reading and location: (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Is a "Qualifying Storm Event" predicted or did one occur (i.e., discharge from site preceded by 48-hrs without discharge)? (Y/N)

If yes, summarize forecast:

### Exception Documentation (explanation required if inspection could not be conducted).

<table>
<thead>
<tr>
<th>Inspector Name:</th>
<th>Inspector Title:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Signature:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Part II. BMP Observations. Describe deficiencies in Part III.

<table>
<thead>
<tr>
<th>Minimum BMPs (List and Inspect all BMPs Implemented)</th>
<th>Failures or other Deficiencies (yes, no, N/A)</th>
<th>Action Required (yes/no)</th>
<th>Action Implemented (Date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good Housekeeping</td>
<td></td>
<td></td>
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<tr>
<td>Preventative Maintenance</td>
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<tr>
<td>Spill and Leak Prevention and Response</td>
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<tr>
<td>Materials Handling and Waste Management</td>
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</tr>
<tr>
<td>Erosion and Sediment Controls</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
### Part II. BMP Observations Continued. Describe deficiencies in Part III.

<table>
<thead>
<tr>
<th>Advanced BMPs (List and Inspect all BMPs Implemented)</th>
<th>Adequately designed, implemented and effective (yes, no, N/A)</th>
<th>Action Required (yes/no)</th>
<th>Action Implemented (Date)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exposure Minimization BMPs</strong></td>
<td></td>
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<td></td>
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<tr>
<td><strong>Stormwater Containment and Discharge Reduction BMPs</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td><strong>Treatment Control BMPs</strong></td>
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<tr>
<td><strong>Other Advanced BMPs</strong></td>
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</tr>
</tbody>
</table>
# Part III. Descriptions of BMP Deficiencies

<table>
<thead>
<tr>
<th>Deficiency</th>
<th>Repairs Implemented:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Note - Repairs must be completed as soon as possible.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Repaired (Y/N)</th>
<th>Corrective Action Implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
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<tr>
<td>3.</td>
<td></td>
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<tr>
<td>4.</td>
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</tr>
</tbody>
</table>

# Part IV. Additional Corrective Actions Required

Identify additional corrective actions not included with BMP Deficiencies (Part III) above. Identify BMPs that need more frequent inspection. Note if SWPPP change is required.

<table>
<thead>
<tr>
<th>Required Actions</th>
<th>Implementation Date</th>
</tr>
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<tbody>
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</tbody>
</table>
INSTRUCTIONS

- Include a copy of the General Permit, or reference permanent location of General Permit that is kept on the industrial facility.

- Note that the SWPPP uploaded into SMARTS should not include a copy of the General Permit.
Appendix D Monitoring Guidance
Appendix D
Monitoring and Analysis Guidance

1.0 Purpose of Document, Compliance Notification, and Limitations

The purpose of this guidance document is to assist dischargers subject to the General Permit to develop monitoring programs. Dischargers who have questions about specific requirements of the General Permit are advised to consult with the appropriate Regional Water Quality Control Board (RWQCB). Failure to comply with the General Permit can result in significant administrative, civil, and criminal penalties.

Users of this document should note the following:

- The scope of this document is limited to providing guidance on developing a basic Monitoring Implementation Plan (MIP) required by the General Permit.
  - In particular, this document does not address monitoring required for Subchapter N facilities; facilities subject to the California Ocean Plan, which includes discharges into Areas of Special Biological Significance (ASBS).

- The purpose of this document is to provide general information to assist dischargers through the process of developing a MIP. Sampling and analysis strategies must be site-specific for each individual facility.

- Regulatory interpretations may change over time as a result of new information, new court cases, or new laws. Dischargers should consult with their regulators for current interpretations.

- RWQCBs and local agencies may require additional monitoring that is not addressed by this document. Dischargers should consult with the RWQCB and local agencies to determine if there are additional requirements.

- The sampling and analysis requirements of General Permit are governed by National Pollutant Discharge Elimination System (NPDES) regulations. These regulations and state regulations implementing the NPDES program contain significant requirements regarding quality assurance, quality control, qualifications of analytical laboratories, etc., which may not be explicitly addressed in this document. Consult with the NPDES regulations or RWQCB staff to determine additional requirements.

- Compliance with this guidance document does not automatically equate to compliance with the General Permit.

1.1 Document Structure

This document is organized to assist a Discharger through the process of developing a facility-specific MIP and provides tools to assist the Discharger conducting monitoring. Table D-1 provides a quick reference to the sections of the document. Section 5 of this handbook provides a regulatory summary of the General Permit monitoring, reporting, and program evaluation requirements. Readers interested in a more detailed discussion of the monitoring requirements are directed to Section 5.
2.0 Industrial Monitoring Implementation Program

The General Permit requires that industrial facilities develop and implement a MIP. The MIP must identify and describe:

- The Pollution Prevention Team (PPT) members responsible for monitoring;
- The discharge locations;
- Visual observation procedures;
- Visual observation response procedures;
- Sample collection and handling procedures;
- Field equipment calibration procedures;
- An example a Chain-of Custody (COC); and
- Justifications for exceptions as authorized by the General Permit.

The MIP is developed and incorporated into the facility SWPPP. Like the SWPPP, the MIP may need to be revised to reflect and adapt to changes at the facility over time. The MIPs must be tailored to the unique circumstances of each facility to account for differences such as industrial processes, materials, drainage patterns, and the watershed in which the facility is located. While details will differ between facilities, each MIP is designed to:

- Determine whether BMPs are effective for compliance with the effluent and receiving water limitations of the General Permit;
- Determine whether the presence of pollutants in the industrial stormwater discharges and any commingled authorized non-stormwater discharges (NSWDs) exceed numeric action levels (NALs) and trigger implementation of additional actions; and
- Assess the effectiveness of BMPs in reducing or preventing pollutants in industrial stormwater discharges and authorized NSWDs.

2.1 Types of Monitoring Required by the General Permit

Two types of monitoring are required by the General Permit: visual observations and stormwater sampling and analysis. Visual observations assess the current state and effectiveness of BMPs, the presence of authorized and unauthorized NSWDs, and the presence of visible contaminants in stormwater discharge. Two categories of visual observations are required by the General Permit: monthly visual observations and sampling event visual observations. Sampling and analysis assesses the concentrations of constituents in stormwater discharged from the facility and is used to determine whether NALs have been exceeded. Table D-1 summarizes the frequency and objectives of the monitoring types.
### Table D-1 Summary of Monitoring Types, Frequencies, and Objectives

<table>
<thead>
<tr>
<th>Type of Monitoring</th>
<th>Frequency</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Visual Observations</td>
<td>Monthly</td>
<td>Observe each industrial activity drainage area for:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Facility operations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- BMPs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- NSWDs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Other potential sources of industrial pollutants.</td>
</tr>
<tr>
<td>Storm Event Observations</td>
<td>During sampling events</td>
<td>Observe stormwater discharges during each sampling event for presence/absence of pollutants.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- When pollutants are observed, document their probable sources.</td>
</tr>
</tbody>
</table>
| Stormwater Sampling and Analysis           | Individual Dischargers: 4 Events/Year  
  - 2 events July 1 - December 31  
  - 2 events January 1 - June 30  
  Compliance Group Dischargers: 2 Events/Year  
  - 1 event July 1 - December 31  
  - 1 event January 1 - June 30 | Sample each drainage area during a Qualifying Storm Event (QSE).  
  - Compare results to NALs. |

#### 3.0 Visual Observation Procedures

Facilities are required to conduct visual observations of outdoor facility operations, BMPs, NSWDs, and stormwater discharges to document the presence and to identify the source of pollutants and non-stormwater flows.

#### 3.1 Monthly Visual Observations

Monthly visual observations are conducted during daylight hours of scheduled facility operating hours, on days with no precipitation or stormwater discharges. A key objective of monthly visual observations is to identify and correct deficiencies and potential issues. Routine observations of drainage areas and BMPs allow Dischargers to identify maintenance needs, BMP failures, or activity changes that may have exposed new pollutant sources. Correction of identified issues before a rain event reduces the chance of pollutant discharge and NAL exceedances.

- **Outdoor Facility Operations** – observe potential sources of industrial pollutants including industrial equipment and storage areas, and outdoor industrial activities.
- **BMPs** – observe BMPs to determine maintenance needs, failures, and conditions that could lead to failure.
- **Authorized NSWDs** – observe to determine whether BMPs are in place and are functioning to prevent contact with materials or equipment that could introduce pollutants.
3.2 Sample Event Observations

Sample Event Observations are conducted during sampling events. The purpose of the sample event observation is to use the general appearance of the stormwater as an indicator of potential pollutants and allow the Discharger to identify potential sources in response to the observation and implement corrections to minimize pollutant discharges and NAL exceedances or reoccurrences of exceedances.

Observations are made at the discharge location. When the presence of a pollutant is identified, follow-up may involve observations of the drainage area to locate potential sources. Observe for the presence or absence of the following:

- Floating and suspended materials – Observe materials floating at or near the top of the bottle, or in the stormwater flow, take note of what the materials appear to be;
- Oil and grease – check the surface of the water for a rainbow color or sheen; this would indicate the presence of oil or other hydrocarbons in the discharge;
- Discoloration – Observe the discharge for unusual color, such as reddish, brown, or yellow, this may indicate pollutants or suspended sediment;
- Turbidity – Observe the discharge of water collected in the sample bottle for turbidity or cloudiness this may indicate the presence of suspended sediment;
- Odors – if the discharge has a noticeable odor, for instance if it smells like gasoline, rotten eggs, raw sewage, or solvents, or has a sour smell, this could be indicative of pollutants in the discharge; and
- Trash/debris – Observe the discharge for litter, trash, or other debris, this could indicate a failure of trash management BMPs.

In addition to the presence or absence of pollutants in the discharge use the sampling event observations to note and document the absence of discharge (no flow) at discharge locations.

3.3 Documenting Visual Observations

Visual observations must be documented and records of the observations maintained. Visual observation records must contain the following information at minimum:

- Date;
- Approximate time of the observation;
- Locations observed;
- Presence and probable source of observed pollutants;
- Name of the individual(s) that conducted the observations; and
- Response to the observations including identification of SWPPP revisions if needed.

An example Visual Observation Log is included in the SWPPP Template in Appendix C and a Microsoft Word™ version can be downloaded from the CASQA BMP Handbook Portal at www.casqa.org.
This form is suitable to document the basic information needed for monthly visual observations and may be supplemented with a BMP inspection checklist. Photographs can be a useful tool in documenting observations especially in cases where several individuals may be involved in the assessments of the observation data.

### 3.4 Visual Observation Response Procedures

Visual observations are intended to provide feedback to the facility on the performance of the stormwater program and effectiveness of BMPs. Visual evidence of the discharge of pollutants from the facility or visual evidence of failed BMPs require response from the facility. The General Permit requires BMPs to be revised as needed when visual observations indicate that pollutant sources have not been adequately addressed in the SWPPP. Response procedures include the following actions:

- Report observations to the PPT Leader or the designated PPT member;
- Identify and implement appropriate response actions;
- Determine if SWPPP update is needed;
- Verify completion of response actions; and
- Document response actions.

### 4.0 Water Quality Sampling and Analysis Procedures

Facilities are required to conduct sampling and analysis of stormwater runoff. This section details the procedures necessary to collect and analyze stormwater samples.

#### 4.1 Determining Required Sampling Parameters

The General Permit requires that all dischargers monitor for three indicator parameters regardless of facility type:

- pH – a measurement of hydrogen-ion concentration that indicates the presence of acidic or alkaline compounds;
- Total Suspended Sediments (TSS) – a measurement of solids that indicates the presence of sediment or other particulates and may indirectly indicate other pollutants that adhere to sediment particles; and
- Oil and Grease (O&G) – a measurement that indicates the presence of hydrocarbons or other forms of oils or greases.

Additional parameters may be identified as part of the evaluation of potential pollutant sources, previously established water quality regulations, or based on the nature of the industrial activity. The following subsections detail factors that may require the monitoring of additional parameters.

#### 4.1.1 Pollutant Source Assessment Constituents

As part of the development of the facility SWPPP, the Discharger must evaluate potential pollutant sources on their property. The potential pollutant source assessment will outline the areas on the property where industrial activities will occur, including areas where materials are stored, shipping and receiving locations, disposal areas, NSWDs, and dust generating activities. The assessment will then
link the identified industrial locations and activities with potential pollutants that may be mobilized by stormwater and carried to discharge locations. **Table 2-4 in Section 2** summarizes potential pollutants by activity or facility type. **Table D-2** links the potential pollutant categories to the general laboratory analyses. Later in this appendix, **Table D-8**, identifies analytical methods for the analyses.

### Table D-2 Industrial Activities Potential Pollutants and Laboratory Analyses

<table>
<thead>
<tr>
<th>Pollutant Categories</th>
<th>Common Constituents for Laboratory Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sediment</td>
<td>TSS</td>
</tr>
<tr>
<td>Nutrients</td>
<td>Nutrients (e.g., Nitrate as N, Nitrite as N, Ammonia, Total Phosphorus)</td>
</tr>
<tr>
<td>Bacteria</td>
<td>Total Fecal Coliform</td>
</tr>
<tr>
<td></td>
<td>Fecal Coliform</td>
</tr>
<tr>
<td></td>
<td>E. Coli</td>
</tr>
<tr>
<td>O&amp;G</td>
<td>O&amp;G</td>
</tr>
<tr>
<td></td>
<td>Total Petroleum Hydrocarbons (TPH)</td>
</tr>
<tr>
<td>Metals</td>
<td>Metals</td>
</tr>
<tr>
<td>Synthetic Organics</td>
<td>Methylene Blue Activated Substances (MBAS)</td>
</tr>
<tr>
<td></td>
<td>Volatile Organic Compound (VOCs)</td>
</tr>
<tr>
<td></td>
<td>Semi-Volatile Organic Compounds (SVOCs)</td>
</tr>
<tr>
<td>Pesticides</td>
<td>Check with laboratory</td>
</tr>
</tbody>
</table>

#### 4.1.2 SIC Code Constituents

The General Permit requires additional monitoring parameters related to each Standard Industrial Classification (SIC) code. SIC codes are used to help categorize similar business types. If the Discharger’s operation qualifies for the listed SIC codes, the specified parameters (**Table D-3**) must be monitored.

### Table D-3 SIC Codes Monitoring Parameters

<table>
<thead>
<tr>
<th>SIC code</th>
<th>SIC Code Description</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>102X</td>
<td>Copper Ores</td>
<td>COD; N+N</td>
</tr>
<tr>
<td>12XX</td>
<td>Coal Mines</td>
<td>Al; Fe</td>
</tr>
<tr>
<td>144 XX</td>
<td>Sand and Gravel</td>
<td>N+N</td>
</tr>
<tr>
<td>207X</td>
<td>Fats and Oils</td>
<td>BOD; COD; N+N</td>
</tr>
<tr>
<td>2421</td>
<td>Sawmills &amp; Planning Mills</td>
<td>COD; Zn</td>
</tr>
<tr>
<td>2426</td>
<td>Hardwood Dimension</td>
<td>COD</td>
</tr>
<tr>
<td>2429</td>
<td>Special Product Sawmills</td>
<td>COD</td>
</tr>
<tr>
<td>243X</td>
<td>Millwork, Veneer, Plywood</td>
<td>COD</td>
</tr>
<tr>
<td>244X</td>
<td>Wood Containers</td>
<td>COD</td>
</tr>
<tr>
<td>245X</td>
<td>Wood Buildings &amp; Mobile Homes</td>
<td>COD</td>
</tr>
<tr>
<td>2491</td>
<td>Wood Preserving</td>
<td>As; Cu</td>
</tr>
<tr>
<td>2493</td>
<td>Reconstituted Wood Products</td>
<td>COD</td>
</tr>
<tr>
<td>263X</td>
<td>Paperboard Mills</td>
<td>COD</td>
</tr>
</tbody>
</table>
### Table D-3 SIC Codes Monitoring Parameters

<table>
<thead>
<tr>
<th>SIC code</th>
<th>SIC Code Description</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>281X</td>
<td>Industrial Inorganic Chemicals</td>
<td>Al; Fe; N+N</td>
</tr>
<tr>
<td>282X</td>
<td>Plastic Materials, Synthetics</td>
<td>Zn</td>
</tr>
<tr>
<td>284X</td>
<td>Soaps, Detergents, Cosmetics</td>
<td>N+N; Zn</td>
</tr>
<tr>
<td>287X</td>
<td>Fertilizers, Pesticides, etc.</td>
<td>Fe; N+N; Pb; Zn; P</td>
</tr>
<tr>
<td>301X</td>
<td>Tires, Inner Tubes</td>
<td>Zn</td>
</tr>
<tr>
<td>302X</td>
<td>Rubber and Plastic Footwear</td>
<td>Zn</td>
</tr>
<tr>
<td>305X</td>
<td>Rubber &amp; Plastic Sealers &amp; Hoses</td>
<td>Zn</td>
</tr>
<tr>
<td>306X</td>
<td>Misc. Fabricated Rubber Products (Except 3274)</td>
<td>Fe</td>
</tr>
<tr>
<td>325X</td>
<td>Structural Clay Products</td>
<td>Al</td>
</tr>
<tr>
<td>326X</td>
<td>Potter &amp; Related Products</td>
<td>Al</td>
</tr>
<tr>
<td>3297</td>
<td>Non-Clay Refractories</td>
<td>Al</td>
</tr>
<tr>
<td>327X</td>
<td>Concrete, Gypsum, Plaster Products (Except 3274)</td>
<td>Fe</td>
</tr>
<tr>
<td>3295</td>
<td>Minerals &amp; Earth</td>
<td>Fe</td>
</tr>
<tr>
<td>331X</td>
<td>Steel Works, Blast Furnaces, Rolling and Finishing Mills</td>
<td>Al; Zn</td>
</tr>
<tr>
<td>332X</td>
<td>Iron and Steel Foundries</td>
<td>Al; Cu; Fe; Zn</td>
</tr>
<tr>
<td>335X</td>
<td>Metals Rolling, Drawing, Extruding</td>
<td>Cu; Zn</td>
</tr>
<tr>
<td>366X</td>
<td>Nonferrous Foundries (Castings)</td>
<td>Cu; Zn</td>
</tr>
<tr>
<td>34XX</td>
<td>Fabricated Metal Products (Except 3479)</td>
<td>Zn; N+N; Fe; Al</td>
</tr>
<tr>
<td>3479</td>
<td>Casting and Engraving</td>
<td>Zn; N+N</td>
</tr>
<tr>
<td>4953</td>
<td>Hazardous Waste Facilities</td>
<td>NH3; Mg; COD; As; Cn; Pb; Hg; Se; Ag</td>
</tr>
<tr>
<td>44XX</td>
<td>Water Transportation</td>
<td>Al; Fe; Pb; Zn</td>
</tr>
<tr>
<td>45XX</td>
<td>Air Transportation Facilities¹</td>
<td>BOD; COD; NH3</td>
</tr>
<tr>
<td>4911</td>
<td>Steam Electric Power Generating Facilities</td>
<td>Fe</td>
</tr>
<tr>
<td>4953</td>
<td>Landfills and Land Application Facilities</td>
<td>Fe</td>
</tr>
<tr>
<td>5015</td>
<td>Dismantling or Wrecking Yards</td>
<td>Fe; Pb; Al</td>
</tr>
<tr>
<td>5093</td>
<td>Scrap and Waste Materials (not including source-separate recycling)</td>
<td>Fe; Pb; Al; Zn; COD</td>
</tr>
</tbody>
</table>

¹ Only airports (SIC 4512-4581) where a single Discharger, or a combination of permitted facilities use more than 100,000 gallons of glycol-based de-icing chemicals and/or 100 tons or more of urea on an average annual basis, are required to monitor these parameters for those outfalls that collect runoff from areas where de-icing activities occur.

### 4.1.3 Other Constituents

#### 4.1.3.1 TMDLs and 303(d) Listings Constituents

Facilities that discharge to receiving waters with 303(d) listed impairments or TMDLs must analyze for the constituent causing the impairment, if industrial activities or materials are a potential source of the constituent.

As part of the development of the SWPPP, the Discharger will have identified the receiving waters that ultimately receive stormwater discharge from the property. The pollutant source assessment completed for the SWPPP will identify the potential pollutants associated with industrial activity at the facility. Cross reference this list of potential pollutants with the TMDLs and 303(d) listings for the receiving...
water to identify if any of the potential pollutants are constituents identified as causing impairments of the receiving waters.

Several tools are available to Dischargers to help identify impaired receiving waters.

- U.S. Environmental Protection Agency (EPA) developed an interactive tool, the Water Locator Tool, which identifies impaired receiving waters based on an address or coordinates. However, if stormwater runoff from the facility enters the storm drainage system, it may be necessary to contact the system operator (e.g., local public works department, stormwater coordinator or manager) to identify the receiving water that the storm drainage system flows into.

- The SWRCB provides a listing of the water bodies on the 303(d) list, referred to as the Integrated Report. The Integrated Report website includes an interactive map.

- The RWQCBs maintain lists of TMDLs that are in development and those that have been approved. Links to each RWQCB’s TMDL page can be found on the SWRCB’s TMDL page.

If a Discharger determines that a TMDL or 303(d) listed constituent is a potential pollutant at the facility, the Discharger must include that constituent in the MIP. The Discharger may need to identify analytical methods with lower detection limits than specified in the General Permit for NAL monitoring. Dischargers should consult with the appropriate RWQCB to select and obtain their approval of appropriate analytical methods for constituents not already included in the General Permit.

The SWRCB plans to reopen the General Permit by July 1, 2016, to include specific TMDL requirements. These changes may include additional monitoring requirements that will need to be incorporated into the MIP.

### 4.1.3.2 Facilities Subject to Federal Stormwater Effluent Limitation Guidelines (ELGs)

Eleven of the forty industrial categories listed in 40 Code of Federal Regulations, Chapter 1, Subchapter N (“Subchapter N”) include narrative or numeric ELGs related to industrial stormwater discharges. Industries listed in Subchapter N must conduct additional volume or mass based effluent monitoring. Attachment F of the General Permit lists those industrial sectors subject to ELGs. **Table D-4** lists the industrial sectors identified in Attachment F of the General Permit that are subject to ELGs. Dischargers subject to Subchapter N must consult with the RWQCB to select and obtain their approval of appropriate analytical methods.

<table>
<thead>
<tr>
<th>Point Source Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 411 – Cement Manufacturing</td>
</tr>
<tr>
<td>Part 418 – Fertilizer Manufacturing</td>
</tr>
<tr>
<td>Part 419 – Petroleum Refining</td>
</tr>
<tr>
<td>Part 422 – Phosphate Manufacturing</td>
</tr>
<tr>
<td>Part 423 – Steam Electric Power Generation</td>
</tr>
<tr>
<td>Part 429 – Wetting of logs at wet deck storage areas</td>
</tr>
<tr>
<td>Part 434 – Coal Mining</td>
</tr>
<tr>
<td>Part 436 – Mineral Mining and Processing</td>
</tr>
</tbody>
</table>
Table D-4 Industrial Sectors Subject to ELGs

<table>
<thead>
<tr>
<th>Point Source Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 440 – Ore Mining and Dressing</td>
</tr>
<tr>
<td>Part 443 – Paving and Roofing Materials (Tars and Asphalt)</td>
</tr>
<tr>
<td>Part 445 – Landfills</td>
</tr>
<tr>
<td>Part 449 – Airport De-icing</td>
</tr>
</tbody>
</table>

**4.1.3.3 RWQCB Required Constituents**

In addition to the other monitoring required by the General Permit, the RWQCB may direct the Discharger to include additional constituents in the MIP. RWQCBs will inform Dischargers of these requirements.

**4.2 Sampling Frequencies and Locations**

**4.2.1 Sampling Frequencies and Timing**

The General Permit establishes the minimum number of events that must be sampled during the reporting year. (See Table D-5.) Dischargers may qualify for reduced sampling frequency after the first permit year based on effluent quality and RWQCB approval.

Table D-5 Minimum Number of Required Sampling Events

<table>
<thead>
<tr>
<th>Type of Discharger</th>
<th>Standard Frequency Minimum Number of QSEs per Discharge Location</th>
<th>Sample Frequency Reduction Certification Minimum Number of QSEs per Discharge Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Discharger</td>
<td>Jul 1 to Dec 31</td>
<td>Jul 1 to Dec 31</td>
</tr>
<tr>
<td></td>
<td>Jan 1 to Jun 30</td>
<td>Jan 1 to Jun 30</td>
</tr>
<tr>
<td>Compliance Group</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Participant</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Stormwater samples must be collected from every stormwater outfall within four hours of the start of discharge. If the QSE started within the 12-hour period preceding the start of operations, the samples may be collected at the start of facility operations.

Dischargers may choose to collect samples from additional QSEs than the minimum specified in the permit. There are a variety of reasons why additional samples may be desirable, including providing a better representation of the pollutant profile or demonstrating effluent quality improvements following implementation of additional BMPs.

In addition to sampling runoff during QSEs, contained stormwater must be sampled when it is released. These releases typically occur after the rain event has ended.

Qualifying Storm Event

- Produces a discharge from at least one drainage area at the facility; and
- Is preceded by at least 48 hours with no discharge from any drainage area at the facility.
4.2.1.1 Sampling Frequency Reduction Certification

The Sampling Frequency Reduction Certification allows eligible Dischargers to reduce the number of QSEs sampled each year. Dischargers are eligible to apply for the Certification if they have met the following criteria:

1. Results from four consecutive QSEs did not exceed any NALs. Consecutive QSEs may be from different reporting years.
2. The Discharger is in full compliance with the requirements of the General Permit and has updated, certified, and submitted via SMARTS, documents, data, and reports required by the General Permit during the time period in which samples were collected.

Table D-5 summarizes the number of samples required once the Sampling Frequency Reduction becomes effective. Facilities must resume the standard sampling frequency if there is if NAL exceedances occur.

Compliance Group participants qualify for Sampling Frequency Reduction based upon the results from their site. That is, if one Compliance Group participant exceeds the NAL it does not affect the validity of the Sampling Frequency Reduction at other group member sites.

The Sampling Frequency Reduction becomes effective once an application and supporting documentation is submitted, unless the RWQCB notifies the Discharge that the request has been rejected or additional documentation is required.

4.2.2 Sample Locations

The General Permit requires that stormwater runoff samples be collected at discharge locations receiving flow from areas exposed to industrial activities including storage of industrial materials and wastes.

4.2.2.1 Selecting Locations

Using the site map, topographic map, and visual surveys, identify the facility drainage areas and the discharge location or locations from each drainage area. If not depicted on the SWPPP site map, the drainage areas and discharge locations identified during the MIP development should be added to the SWPPP site map. The best method for determining drainage areas is to walk around the facility during a rain event and make note of runoff flow patterns, outfalls (storm drains, downspouts, drainage ditches, swales, etc.), and nature of activities in each area. Additionally, identify locations where contained stormwater is discharged.

Once the drainage area evaluation is completed, develop a list of the outfalls. Each outfall should be evaluated for its appropriateness for sample collection. The General Permit requires all outfalls that discharge stormwater associated industrial activities to be sampled unless a justification for one of the three allowed exceptions is developed. The three exceptions allowed by the General Permit are discussed in Sections 4.2.2.2-4.2.2.4.

4.2.2.2 Alternative Discharge Locations

Alternative Discharge Locations must be designated by a facility when a discharge location is affected by stormwater run-on from surrounding areas that cannot be controlled or when the discharge is difficult
to observe or sample, such as submerged outfalls or dangerous locations. In these cases, the Discharger must identify alternative locations in the MIP.

### 4.2.2.3 Representative Sampling Reduction

Representative Sampling Reduction can be proposed by a Discharger in cases where a single drainage area has multiple discharge locations and the industrial activities, BMPs, and the physical conditions in the drainage area are substantially similar. The Discharger can propose to sample a reduced number of outfalls based on the similarity of the conditions influencing the outfalls. Representative sampling reduction justifications must be documented in the MIP. Facilities can proceed to implement the reduced sampling locations unless notified otherwise by the RWQCB.

### 4.2.2.4 Qualified Combined Samples

Qualified Combined Samples entails combining equal volume samples from up to four drainage areas into one sample for analysis. Combining samples does not reduce the number of samples collected, but reduces the number of samples analyzed. Combined samples can be proposed by a facility when drainage areas have similar industrial activities, BMPs, and physical conditions. Qualified combined sample justifications must be documented in the MIP and certified in SMARTS. Only laboratories may combine the samples. Facilities implementing qualified combined sampling need to provide direction to the laboratory on which samples to combine. Once submitted in SMARTS, facilities can direct their laboratories to combine samples unless notified otherwise by the RWQCB. RWQCB approval is required if a Discharger proposes to combine more than four samples for analysis.

### 4.3 Preparing for Monitoring and Sample Collection

Advanced planning and preparation for sampling events is crucial to being prepared for and meeting the short timeframe required to collect samples. Samples for compliance with the General Permit must be collected in a manner appropriate for the specific analytical methods to be used. The steps described in this section will assist the PPT prepare for sampling events.

#### 4.3.1 Sampling Event Preparation

Sampling event preparation includes preparation of field equipment, placing sample container orders, and contacting the necessary personnel regarding site access and schedule. The following steps should be completed prior to each sampling event:

1. Contact laboratories to order sample containers and to coordinate sample transportation details.
2. Confirm scheduled monitoring date with field crew(s), and set-up sampling day itinerary including sample drop-off.
3. Prepare equipment.
4. Prepare sample container labels and apply to bottles.
5. Prepare the field log sheets and visual observation logs to indicate the type of field measurements, visual observations, and samples to be collected at each of the monitoring sites.
6. Verify that field measurement equipment is operating properly (e.g., check batteries, calibrate equipment, and verify expiration dates on pH strips).

**Table D-6** provides an example checklist of field equipment to prepare prior to each monitoring event.
### Table D-6 Field Equipment Checklist

<table>
<thead>
<tr>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring Implementation Plan</td>
</tr>
<tr>
<td>Sample Containers plus Extras with Extra Lids</td>
</tr>
<tr>
<td>Pre-Printed, Waterproof Labels (extra blank sheets)</td>
</tr>
<tr>
<td>Field Log Sheets</td>
</tr>
<tr>
<td>Visual Observation Logs</td>
</tr>
<tr>
<td>Chain of Custody Forms</td>
</tr>
<tr>
<td>Bubble Wrap</td>
</tr>
<tr>
<td>Coolers with Ice</td>
</tr>
<tr>
<td>Tape Measure</td>
</tr>
<tr>
<td>Paper Towels or &quot;Rags in a Box&quot;</td>
</tr>
<tr>
<td>Safety Equipment and Personal Protective Equipment</td>
</tr>
<tr>
<td>First Aid Kit</td>
</tr>
<tr>
<td>Cellular Telephone</td>
</tr>
<tr>
<td>Gate Keys</td>
</tr>
<tr>
<td>Manhole Hooks</td>
</tr>
<tr>
<td>Wet Weather Gear</td>
</tr>
<tr>
<td>Plastic Trash Bags</td>
</tr>
<tr>
<td>Sealable Plastic Bags</td>
</tr>
<tr>
<td>Grab Sample Pole</td>
</tr>
<tr>
<td>Clean Secondary Container(s)</td>
</tr>
<tr>
<td>Field Measurement Equipment</td>
</tr>
<tr>
<td>pH paper, kit, or probe</td>
</tr>
<tr>
<td>New Powder-Free Nitrile Gloves</td>
</tr>
<tr>
<td>Indelible Pens</td>
</tr>
<tr>
<td>Stop Watch</td>
</tr>
<tr>
<td>Camera</td>
</tr>
<tr>
<td>Blank Water</td>
</tr>
</tbody>
</table>

#### 4.3.2 Sample Container Order and Preparation

Place sample container orders with the analytical laboratory well in advance of each sampling event.

Order sufficient containers for planned water samples, including quality control samples. Order extra containers in case the need arises for replacements. The containers must be the proper type and size and contain preservative as appropriate for the specified analytical methods. See Table D-7 for a list of container types and preservatives for typical analytical tests required by the General Permit. Inventory sample containers upon receipt from the laboratory to confirm the necessary containers have been received and check to make sure the containers are not damaged.

Sample containers must be pre-cleaned and certified free of contamination according to the EPA specification for the appropriate methods. Sample container, storage and preservation, and holding time requirements are provided in Table D-7. After collection, samples must be stored at 4°C until arrival at the analytical laboratory.
### Table D-7 Container Types, Sample Volume, Initial Preservation, and Holding Time Requirements for Parameters Analyzed at a Laboratory

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sample Container</th>
<th>Sample Volume$^1$</th>
<th>Immediate Processing and Storage</th>
<th>Holding Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil and Grease, (O&amp;G)</td>
<td>Glass</td>
<td>1 L</td>
<td>HCl and Store at 4°C</td>
<td>28 days</td>
</tr>
<tr>
<td>Suspended Solids, Total (TSS)</td>
<td>PE$^2$</td>
<td>250 mL</td>
<td>Store at 4°C</td>
<td>7 days</td>
</tr>
<tr>
<td>Alkalinity</td>
<td>PE</td>
<td>500 mL</td>
<td>H$_2$SO$_4$ and Store at 4°C</td>
<td>14 days</td>
</tr>
<tr>
<td>Ammonia Nitrogen</td>
<td>Glass</td>
<td>250-mL</td>
<td>H$_2$SO$_4$ and Store at 4°C</td>
<td>28 days</td>
</tr>
<tr>
<td>Biochemical Oxygen Demand</td>
<td>PE</td>
<td>1 L</td>
<td>Store at 4°C</td>
<td>48 hours</td>
</tr>
<tr>
<td>Chemical Oxygen Demand</td>
<td>PE</td>
<td>500 mL</td>
<td>H$_2$SO$_4$ and Store at 4°C</td>
<td>28 days</td>
</tr>
<tr>
<td>Chloride</td>
<td>PE</td>
<td>250 mL</td>
<td>Store at 4°C</td>
<td>28 days</td>
</tr>
<tr>
<td>Cyanide</td>
<td>Amber PE</td>
<td>1 L</td>
<td>NaOH, and Store at 4°C in the dark</td>
<td>14 days$^3$</td>
</tr>
<tr>
<td>Fluoride</td>
<td>PE</td>
<td>500 mL</td>
<td>HNO$_3$, and Store at 4°C</td>
<td>28 days</td>
</tr>
<tr>
<td>Hardness</td>
<td>PE</td>
<td>500 mL</td>
<td>HNO$_3$, and Store at 4°C</td>
<td>180 days</td>
</tr>
<tr>
<td>MBAS</td>
<td>PE</td>
<td>1 L</td>
<td>Store at 4°C</td>
<td>48 hours</td>
</tr>
<tr>
<td>Mercury</td>
<td>Glass</td>
<td>500 mL</td>
<td>Store at 4°C</td>
<td>48 hours</td>
</tr>
<tr>
<td>Metals</td>
<td>PE</td>
<td>500 mL</td>
<td>HNO$_3$, and Store at 4°C</td>
<td>6 months</td>
</tr>
<tr>
<td>Nitrate + Nitrite (as N)</td>
<td>Glass</td>
<td>250-mL</td>
<td>H$_2$SO$_4$ and Store at 4°C</td>
<td>28 days</td>
</tr>
<tr>
<td>Nitrate Nitrogen</td>
<td>PE</td>
<td>250 mL</td>
<td>Store at 4°C</td>
<td>48 hours</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>Glass</td>
<td>250-mL</td>
<td>H$_2$SO$_4$, and Store at 4°C</td>
<td>28 days</td>
</tr>
<tr>
<td>Dissolved Solids, Total (TDS)</td>
<td>PE</td>
<td>250 mL</td>
<td>Store at 4°C</td>
<td>7 days</td>
</tr>
<tr>
<td>Petroleum Hydrocarbon, Total (TPH)</td>
<td>Glass</td>
<td>1 L</td>
<td>HCl, and Store at 4°C</td>
<td>7/40 days$^4$</td>
</tr>
</tbody>
</table>

1 Additional volume may be required for QC analyses.
2 PE – Polyethylene
3 If sulfide is present, maximum holding time is 24 hours
4 7/40 = 7 days to extract and 40 days from extraction to analysis.

### 4.4 Sample Collection and Handling

It is important to use the correct methods to collect and handle samples to ensure the samples are valid. Samples and field measurements can be affected by improper sample collection procedures.

Adherence to EPA sampling protocols and proper development of a sampling plan provides for consistent, reproducible, and accurate results. For some constituents, especially trace metals, sampling protocols are very important as contamination of samples can occur from incorrect sampling protocols. Design field sampling procedures to carefully consider contamination potential from the sample location (e.g., sediment disturbances, equipment exhaust), sampling techniques, and sample handling. The sampling team must be trained on the facility specific procedures specified in the sampling plan. Proper sample collection and handling employs clean techniques including the following protocols:
1. Do not touch the inner surfaces or lip edges of the sample bottle or cap.

2. Do not breathe, sneeze, or cough in the direction of the container.

3. Use clean, powder-free, nitrile gloves.
   a. Change gloves at each sampling location.
   b. Change gloves if they are soiled, if the potential for cross-contamination exists from handling sampling materials or samples.

4. Do not place the container lid on the ground.

5. Do not eat or drink during sample collection.

6. Do not smoke during sample collection.

7. Each person on the field crew should wear clean clothing that is free of dirt, grease, or other substances that could contaminate the sampling apparatus or sample containers.

8. Avoid entering the stream of water to be sampled, if it is necessary to stand in the water, collect samples upstream.

9. Do not collect samples near a running vehicle.

10. Do not park vehicles within the immediate sample collection area, even non-running vehicles.

11. Do not over-fill containers.

12. Cap the sample container immediately after collection.

13. Immediately record sample collection and the time of collection on the field log sheet.

14. Record Quality Assurance/Quality Control (QA/QC) samples that are collected on the field log sheet.

15. Immediately store the sample in the cooler with ice.

16. Complete the COC forms.

17. Deliver or arrange for transport of the samples to the appropriate laboratory as soon as feasible.

Trace metal and mercury sampling requires a more rigorous clean sampling technique, which is described in [EPA Method 1669](https://www.epa.gov).

### 4.4.1 Sampling Techniques for the Collection of Runoff Samples

#### 4.4.1.1 Grab Sampling - Direct Collection Technique

Sample stormwater flow that is discharging from the facility; do not collect samples from ponded water or puddles. Where practical, collect grab samples by direct submersion at central part of the flow path. Avoid touching or scraping the bottom or sides of the pipe or flow path. Sample containers with
preservatives, (e.g., metals) should not be dipped into the stream. For these samples use an intermediate container.

1. Remove the lid, place the container submerge the container to mid-stream/mid-depth, let the container fill and secure the lid.
2. Place the sample on ice.
3. Collect the remaining samples, including quality control samples, if required, using the same protocols described above.
4. Follow the General Permit and EPA method handling procedures for each sample.

### 4.4.1.2 Grab Sampling - Intermediate Container Technique

Samples may be collected with the use of a clean intermediate container, if necessary, following the steps listed below. An intermediate container may include a container that is similar in composition to the sample container, such as a pre-cleaned pitcher made of the same material as the sample container. Preferably, the intermediate pre-cleaned containers should be obtained from the laboratory. An intermediate container should not be reused at a different sampling location without appropriate cleaning.

Runoff flows may be too shallow to fill a container without using an intermediate container. When collecting samples from shallow sheet flows it is very important to not scoop up sediment or other particulate matter on the bottom because such debris is not representative of flowing water. To prevent scooping up such debris: (1) find a spot where the bottom is relatively clean and allow the sterile intermediate container to fill without scooping; or (2) lay a clean sterile plastic (polyethylene) bag on the bottom and collect the water sample from on top of the bag. A new plastic (polyethylene) bag must be used at each sampling location.

Oil and grease samples cannot be collected with intermediate containers. Oily residue collects onto the sides of sampling containers, therefore EPA sampling methods require that oil and grease be collected directly into a glass container and not transferred from an intermediate container into the laboratory container.

### 4.4.1.3 Grab Sampling – Autosampling Technique

Use of autosamplers to collect grab samples may be appropriate in some locations, especially locations that are difficult to access. These samplers can be set up in advance of the storm or may be installed permanently. Follow the manufactures instructions setting up the autosampler. In particular, note that clean tubing must be used at each discharge location to minimize contamination.

pH samples must be analyzed within 15 minutes of collection. Only autosamplers with the capability to measure pH within 15 minutes of sample collection can be used to collect valid pH samples. Alternatively, the sampling team must be at the sampler to conduct the measurement upon collection.

Oil and grease samples cannot be collected with an autosampler unless it has been specifically designed for this parameter and adheres to EPA sample collection protocols for oil and grease. The oily residue collects onto the sides of sampling containers and will also collect on the insides of the sample tubing.

The General Permit requires the use of laboratory provided containers and does not allow Dischargers to split samples in the field. Therefore if the autosampler used is designed with a single larger container, the entire container must be shipped to the laboratory. In these cases field preservation of
samples is not possible so the shorter hold times for unpreserved samples must be considered when planning for sample retrieval and shipping.

4.5 Analytical Laboratories, Methods, and pH Measurements

The General Permit specifies the analytical methods that must be used for each required sampling parameter. With the exception of the allowed use of pH paper, the General Permit requires sampling and analysis to be conducted in accordance with 40 Code of Federal Regulations (CFR) Part 136 and the current edition of *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association) by a laboratory certified for the constituent to be analyzed.

4.5.1 Selecting a Laboratory

Analytical laboratories should be contacted and a contract should be worked out when designing the MIP. A laboratory should be chosen foremost by their accreditation, ability to perform the required analytical tests in the desired turn-around-time, and then by their proximity for ease of sample delivery. Although overnight mail delivery renders proximity as less important, it may still be important to avoid bottle breakage during shipment.

- State-certified analytical laboratories can be found by using the Environmental Laboratory Accreditation Program’s (ELAP) website at: http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx.

During the contracting process, discuss and make arrangements for acquisition of sample containers from the laboratory; sampling procedures; methods of shipping samples to the laboratory, the timing, content and format of data reports, and the ability of laboratory to achieve the required and desired method detection limits (MDLs) and reporting limits (RLs).

4.5.2 Analytical Methods and Method Detection and Reporting Limits

Table D-8 lists required analytical methods for the parameters identified in the General Permit. In cases where the General Permit does not specify a method for a constituent, the Discharger must consult with the RWQCB to confirm the appropriate method.

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Method</th>
<th>Reporting Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>1. pH paper/test kits</td>
<td>Standard units</td>
</tr>
<tr>
<td></td>
<td>2. EPA 150.1 or SM 4500-H^ B or calibrated meter</td>
<td></td>
</tr>
<tr>
<td>Suspended Solids (TSS), Total</td>
<td>SM 2540-D</td>
<td>mg/L</td>
</tr>
<tr>
<td>Oil &amp; Grease (O&amp;G), Total</td>
<td>EPA 1664A</td>
<td>mg/L</td>
</tr>
<tr>
<td>Aluminum, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Ammonia (as N)</td>
<td>SM 4500-NH3 B+ C or E</td>
<td>mg/L</td>
</tr>
<tr>
<td>Arsenic, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Biochemical Oxygen Demand (BOD)</td>
<td>SM 5210B</td>
<td>mg/L</td>
</tr>
<tr>
<td>Cadmium, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Chemical Oxygen Demand (COD)</td>
<td>SM 5220C</td>
<td>mg/L</td>
</tr>
<tr>
<td>Copper, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
</tbody>
</table>
### Table D-8 General Permit Constituents and Required Methods

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Method</th>
<th>Reporting Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyanide, Total</td>
<td>SM 4500–CN C, D, or E</td>
<td>mg/L</td>
</tr>
<tr>
<td>Iron, Total</td>
<td>EPA 200.7</td>
<td>mg/L</td>
</tr>
<tr>
<td>Lead, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Magnesium, Total</td>
<td>EPA 200.7</td>
<td>mg/L</td>
</tr>
<tr>
<td>Nickel, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Mercury, Total</td>
<td>EPA 245.1</td>
<td>mg/L</td>
</tr>
<tr>
<td>Nitrate + Nitrite Nitrogen</td>
<td>SM 4500–NO3– E</td>
<td>mg/L as N</td>
</tr>
<tr>
<td>Phosphorus, Total</td>
<td>SM 4500–P B+E</td>
<td>mg/L as P</td>
</tr>
<tr>
<td>Selenium, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Silver, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
<tr>
<td>Zinc, Total</td>
<td>EPA 200.8</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

1. Only available to facilities that have never entered Level 1 status for pH or are not subject to Subchapter N
2. Required for facilities that have either entered Level 1 status for pH or are subject to Subchapter N

SM=Standard Methods for the Examination of Water and Wastewater, 18th edition

EPA=U.S. EPA Method

When developing the MIP, confirm that the analytical laboratory can meet the required MDLs and the necessary RLs.

- The MDL is the minimum concentration of a parameter that can be measured and reported with a 99% confidence that the concentration is greater than zero.
- The RL represents the concentration of a parameter that can be routinely measured in the sampled matrix within stated limits and with confidence in both identification and quantitation.

MDLs are specified by EPA in the analytical method. RLs are determined by the laboratory. Dischargers should communicate data needs to the laboratory to establish appropriate RLs to meet the objectives of the monitoring program. RLs must be low enough to determine whether the NALs have been exceeded. RLs may need to be lower if the data will be used for TMDLs or 303(d) monitoring.

MDLs and RLs must be reported with the data analysis. Detections between the MDL and RL are considered detected but not quantified or DNQ. Laboratories report estimated values for DNQ data. This data will have a flag (referred to as a J flag) on the data report.

#### 4.5.3 pH Measurements

The General Permit allows for the use of pH strips, pH meters, or pH kits to obtain immediate field measurements. Facilities subject to Subchapter N requirements may not use pH paper or pH kits. If a facility using paper or kits measures pH above or below exceeds the instantaneous pH NAL, they must switch to a calibrated meter for all subsequent pH monitoring events.

The simplest method to measure pH is to dip the pH strip or meter probe directly into the waterway or flow path. This will only work if there is significant runoff with a depth greater than six inches (for sensors). As with grab samples it is important sample in a location that is representative of the entire flow. Avoid puddles or ponded water that might have formed off of the main drainage. If direct
sampling is not feasible, collect a grab sample and make the measurements from the container. When using a pH meter, allow the probe to equilibrate for at least one minute before recording the measurement. For test strips and kits, follow the manufacturer’s instructions for reading the colorimetric results.

pH test strips or other equivalent pH test kits are not as accurate as a calibrated pH meter. However, test strips provide a low cost tool for screening pH and can determine if more-accurate pH sampling is necessary for subsequent sampling events. Select wide range pH strips and kits that provide the full pH range, preferably with the ability to distinguish 0.5 pH increments. Note that test strips and reagents expire and cannot be used for sampling beyond the expiration date. Follow manufacturer’s instructions for handling and storage of the strips and kits.

Portable pH Probes/ Meters require calibration prior to every sampling event. Calibration following the sampling event is recommended to determine if the meter drifted outside of acceptable criteria. Calibrate field meters and equipment before sampling. Follow the calibration instructions provided by the manufacturer with the instrument. Calibration standards should be purchased with the instrument and repurchased as needed. The standards have limited shelf life and cannot be used beyond the expiration date.

Most pH meters require a two or three point calibration curve; therefore two or three different standard solutions will be needed. Typical standard solutions have pH values of 4, 7, and 10.

Table D-9 summarizes pH meter calibration details suitable for incorporation into MIPs.

<table>
<thead>
<tr>
<th>Calibration and Verification Description</th>
<th>Frequency of Calibration</th>
<th>Frequency of Calibration Verification</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration for pH measurement is accomplished using standard buffer solutions.</td>
<td>Prior sampling event</td>
<td>Following the sampling event</td>
<td>Sampling Team</td>
</tr>
</tbody>
</table>

5.0 Quality Assurance/Quality Control

QA/QC is an integrated system of planning, implementation, assessment, reporting and quality improvement that supports confidence in the data. The MIP must include QA/QC procedures. The key elements of the QA/QC program include:

- Field logs;
- Clean sampling techniques;
- Sample COCs; and
- Data verification.

5.1 Field Logs

Field crews should keep a field log book for each sampling event that contains: a calibration log sheet, a field log sheet for each site, and appropriate contact information. The following items should be recorded on the field log sheet for each sampling event:
- Monitoring station location (Station ID);
- Date and time(s) of sample collection;
- Name(s) of sampling personnel;
- Sample ID numbers and unique IDs for replicate or blank samples;
- QC sample type (if appropriate);
- Requested analyses (specific parameters or method references);
- Sample type;
- The results of field measurements (e.g., pH) and the time that measurements were made;
- Qualitative descriptions of relevant water conditions (e.g., water color, flow level, clarity) or weather (e.g., wind, rain) at the time of sample collection;
- Trash observations (presence/absence);
- A description of unusual occurrences associated with the sampling event, particularly those that may affect sample or data quality.

Scanning field logs into a PDF at the conclusion of each sampling event is recommended. Alternatively, the log and measurements could be collected on an electronic device such as laptop or tablet computer. An example of a field log sheet is included in the SWPPP Template in Appendix C and Microsoft Word™ versions of the form is provided on the CASQA BMP Handbook Portal at http://www.casqa.org.

5.2 Chain-of-Custody and Handling

The sample COC is an important documentation step that tracks samples from collection through analysis to ensure the validity of the sample. Sample COC procedures include the following:

- Proper labeling of samples;
- Use of COC forms; and
- Prompt sample delivery to the analytical laboratory.

The sampling team has custody of samples during each monitoring event and completes the COC. The COC accompanies samples during shipment to analytical laboratories to identify the shipment contents. The original COC form will accompany the shipment to the laboratory and the laboratory returns a signed copy of the COC with the results.

A typical COC form is included in the SWPPP Template in Appendix C and Microsoft Word™ versions are provided on the CASQA BMP Handbook Portal at http://www.casqa.org.

While in the field, store all samples on ice in an insulated container. Examine containers to ensure that lids are tight and the containers are placed on ice to maintain the appropriate temperature. The ice packed with samples must be approximately two inches deep at the top and bottom of the cooler, and
must contact each sample to maintain temperature. Double bag the original COC in re-sealable plastic bags and tape it to either the outside of the cooler or to the inside lid. Samples must be shipped to the contract laboratory according to transportation standards. The method(s) of shipment, courier name, and other pertinent information should be entered in the “Received By” or “Remarks” section of the COC form.

Seal coolers with packing tape before shipping, unless transported by field or lab personnel. It is assumed that samples in tape-sealed ice chests are secure when being transported by common carrier or by commercial package delivery. The laboratory’s sample receiving department will examine the shipment of samples for correct documentation, proper preservation and compliance with holding times. The following procedures are used to prevent bottle breakage and cross-contamination:

- Bubble wrap or foam pouches are used to keep glass bottles from contacting one another to prevent breakage.
- Place each container in a re-sealable bag.
- Transport samples inside hard plastic coolers or other contamination-free shipping containers.
- If arrangements are not made in advance, the laboratory’s sample receiving personnel must be notified prior to sample shipment.

5.5 Data Verification

Data verification involves verifying that required methods and procedures have been followed, including sample collection, sample receipt, sample preparation, sample analysis, and documentation review for completeness. Data are checked for a variety of factors, including transcription errors, correct application of dilution factors, correct methods, and appropriate RLs and MDLs. Verification of data may also include laboratory qualifiers, if assigned.

Data verification should occur in the field and the laboratory at each level (i.e., personnel should verify their own work) and as information is passed from one level to the next (i.e., supervisors should verify the information produced by their staff). Records commonly examined during the verification process include field and sample collection logs, COC forms, sample preparation logs, instrument logs, raw data, and calculation worksheets.

In addition, laboratory personnel will verify that the measurement process was "in control" (i.e., specified data quality objectives were met or acceptable deviations explained) for each batch of samples before proceeding with the analysis of a subsequent batch. Each laboratory will also establish a system for detecting and reducing transcription and/or calculation errors prior to reporting data.

6.0 Data Reporting

The reporting of analytical and monitoring data has been streamlined through the use of SMARTS. Dischargers submit monitoring data and reports required by the General Permit into SMARTS, which can be accessed at: [https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp](https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp).

6.1 Data Reporting

The General Permit requires that the Discharger submit sampling and analytical results for samples into SMARTS within 30 days of obtaining the results from the sampling event. Note that the time line starts when the Discharger receives the results, not from the date of the sampling event.
The data report must include the MDL for values that are reported as “non-detect” by the laboratory. For values that are detected but not quantified, that is, detections below the RL and above the MDL, the Discharger must report the laboratory estimated value.

6.2 Annual Report

The Discharger is required to submit an Annual Report via SMARTS no later than July 15th following each reporting year. The Annual Report must include the following to facilitate a meaningful evaluation of the SWPPP:

- A Compliance Checklist that indicates whether a Discharge complies with, and has addressed applicable requirements of the General Permit;
- An explanation for non-compliance with requirements, as indicated in the Compliance Checklist;
- An identification, including page numbers and/or sections, of revisions made to the SWPPP within the reporting year;
- The dates of the Annual Evaluation; and
- Documentation, including the justification, of deviations from the General Permit requirements (e.g., uncompleted monthly or sampling event visual observations, insufficient number of sampling events, discharge locations without flow during QSEs).

7.0 Example Data Collection Forms

Examples of the following data collection forms are included in the SWPPP Template in Appendix C and Microsoft Word ™ versions are provided on the CASQA BMP Handbook Portal at http://www.casqa.org:

- Monthly Visual Observation Form;
- Sample Event Visual Observation Form;
- Field Data Log form; and
- COC Form.
Appendix E.1   ERA Level 1 Evaluation and Report
Appendix E.1
Exceedance Response Action Level 1 Evaluation and Report

California’s NPDES General Permit for Storm Water Discharges Associated with Industrial Activity – CAS000001, Water Quality Order: General Permit 2014:0057-DWQ (General Permit) requires an Exceedance Response Action (ERA) Level 1 Evaluation and Report to be developed if there are Numeric Action Level (NAL) exceedances as defined in the General Permit. By October 1 following commencement of Level 1 status, the discharger must obtain the assistance of a Qualified Industrial Stormwater Practitioner (QISP) to evaluate industrial pollutant sources that may be related to the NAL exceedance and to evaluate the opportunity to implement additional BMPs to address the exceedance, if appropriate. Additional Best Management Practices (BMPs) will need to be implemented as appropriate, and the Storm Water Pollution Prevention Plan (SWPPP) revised. As soon as practicable, but no later than January 1 following the commencement of ERA Level 1 status, the discharger must prepare and submit an ERA Level 1 Report that describes the evaluation conducted. The ERA Level 1 Report must include a detailed description of SWPPP revisions and any additional BMPs implemented for each parameter that exceeded an NAL. The template below can be used as a guide for preparing the ERA Level 1 Report. *Examples in the template are provided in italicized blue text.*

1.0 Site information

<table>
<thead>
<tr>
<th>Facility Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>Waste Discharge Identification Number</td>
<td></td>
</tr>
<tr>
<td>SIC Code(s)</td>
<td></td>
</tr>
<tr>
<td>Designated Legally Responsible Person (LRP)</td>
<td></td>
</tr>
<tr>
<td>Discharger Contact Person</td>
<td></td>
</tr>
<tr>
<td>Phone Number</td>
<td></td>
</tr>
<tr>
<td>E-mail Address</td>
<td></td>
</tr>
</tbody>
</table>

2.0 QISP Information

The General Permit requires the discharger to enlist the services of a QISP to assist with the ERA Level 1 Evaluation and prepare the ERA Level 1 Report. Information related to the QISP assisting with this evaluation and report are included below.

<table>
<thead>
<tr>
<th>Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>QISP Cert. Number</td>
<td></td>
</tr>
<tr>
<td>Affiliation</td>
<td></td>
</tr>
<tr>
<td>Phone Number</td>
<td></td>
</tr>
</tbody>
</table>
### 3.0 Summary of Numeric Action Level (NAL) Exceedances

The following table summarizes the NAL exceedance(s) being addressed in this Level 1 ERA Evaluation and Report. The preparer of this report can use analytical results and NAL exceedance information generated from SMARTS to populate this table. When evaluating NAL exceedances, particularly annual NAL exceedances, the QISP/Discharger should consider the results for each discharge location when evaluating potential pollutant sources.

<table>
<thead>
<tr>
<th>Parameter Exceeded</th>
<th>Analytical Results²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual NAL Exceedance (average of all sample results in a reporting year)</td>
</tr>
<tr>
<td></td>
<td>Result</td>
</tr>
<tr>
<td>Example</td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>390 µg/L</td>
</tr>
<tr>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>410 mg/L</td>
</tr>
</tbody>
</table>

1. NAL exceedances summarized in this table should be consistent with SMARTS.
2. Annual and instantaneous NAL values are summarized in Handbook Table 5-2.

### 4.0 SWPPP Review

Review the SWPPP to assess compliance with requirements outlined in Section X of the General Permit. This review should include all sections of the SWPPP, including the site map, monitoring implementation plan, potential pollutant generating activities, and BMP selection and implementation. This review should identify deficiencies with the SWPPP, if any, and help complete the evaluations discussed below.
## 5.0 Evaluation/Identification of Potential Pollutant Sources

Perform a pollutant source evaluation for each parameter exceeding an NAL, as summarized in Section 3.0 above. Document the findings related to the evaluation below. Guidance on evaluating potential pollutant sources is included in Handbook Section 2.4.2.

<table>
<thead>
<tr>
<th>Parameter Exceeded</th>
<th>Potential Source/Activity Generating Exceedance¹</th>
<th>Likely Source²</th>
<th>Existing BMPs to Address the Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>Vehicle traffic, Loading and unloading activities, galvanized roofing material</td>
<td>Industrial, Non-industrial</td>
<td>Inspections, Sweeping, Vehicle maintenance</td>
</tr>
<tr>
<td>Total suspended solids</td>
<td>Vehicle traffic, Unpaved trailer parking area</td>
<td>Industrial, Background</td>
<td>Inspections, Sweeping</td>
</tr>
</tbody>
</table>

Baseline on the evaluation is additional investigation and/or monitoring necessary to identify potential pollutants source(s)?  □ Yes  □ No

If yes, document the specific parameter and the additional investigation/monitoring needed to establish the pollutant source.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Additional Investigation/Monitoring</th>
<th>Goal/Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>Collect additional samples to segregated flow from the loading/unloading area and from roof drain downspouts to establish whether these area(s) are the primary contributing area.</td>
<td>Confirm the primary area contributing zinc in storm water discharge and assess whether the roof (non-industrial) is a contributing source.</td>
</tr>
</tbody>
</table>

---

¹ Identify industrial (or non-industrial) activity or material associated with the pollutant source. If unknown, please indicate and document additional investigation/monitoring to be performed below.

² Likely sources include: industrial, non-industrial, off-site, natural background, and/or unknown.
6.0 Minimum BMP Evaluation

Evaluate the Minimum BMPs (Handbook Section 2.2 and General Permit Section X.H.1) included in the SWPPP were adequately implemented at the site, particularly for those areas identified as potential pollutant sources in Section 4.0 of this report. Worksheet 7 – Checklist for Consideration of Minimum BMPs (Handbook Section 2) may be used to evaluate and identify deficiencies. If used, include the completed checklist as an Attachment to the Report. Document Minimum BMP deficiencies below.

<table>
<thead>
<tr>
<th>Deficiency Noted</th>
<th>Associated Tributary Area/Discharge Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td></td>
</tr>
<tr>
<td>Tracking of pigment material observed from warehouse to southern portion of site.</td>
<td>Outfall 1</td>
</tr>
<tr>
<td>Additional erosion and sediment control needed for unpaved areas on southern portion of site.</td>
<td>Outfall 2</td>
</tr>
</tbody>
</table>

7.0 Advanced BMPs

Evaluate any Advanced BMPs (Handbook Section 2.2 and General Permit Section X.H.2) implemented at the site and note any deficiencies observed below.

<table>
<thead>
<tr>
<th>Deficiency Noted</th>
<th>Associated Tributary Area/Discharge Point</th>
</tr>
</thead>
</table>

8.0 Additional BMPs Selected for Implementation

Based on the pollutant source evaluation and evaluation of existing BMPs implemented at the site, the following additional BMPs or improvements to existing BMPs will be implemented to control pollutants generated from on-site industrial activities. Revise the SWPPP for the site to reflect the additional BMPs identified below.

<table>
<thead>
<tr>
<th>Parameter Exceeded</th>
<th>Additional BMP(s) Implemented to Address Exceedance</th>
<th>Date Implemented or Schedule for Implementation¹</th>
<th>SWPPP Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>Implement daily inspections of the loading/unloading area</td>
<td>January 1, 2016</td>
<td>Section H</td>
</tr>
<tr>
<td>Zinc</td>
<td>Utilize vacuum sweeper to clean tire related dust/debris form the loading/unloading activities.</td>
<td>December 1, 2015</td>
<td>Section J</td>
</tr>
<tr>
<td>Total</td>
<td>Install additional sediment and</td>
<td>December 15, 2015</td>
<td>Section I</td>
</tr>
</tbody>
</table>
### 9.0 Modification to Existing Monitoring Implementation Program (MIP)

Document changes or modifications made to the monitoring program, if any, in response to this evaluation. Modifications could be related to monitoring locations, sampling methodology, sampling frequency, and analytical parameters. Identify goals/objectives of monitoring program changes and how they relate to potential BMP improvements.

#### Additional Investigation(s)/Modification(s)  
**Example**

- **Added Outfall 1A to monitoring implementation plan and site map. Outfall 1A receives flow from a warehouse roof constructed using galvanized metal.**
  - **Goal/Objective**: Identify whether the galvanized roof is contributing to the zinc NAL exceedance. Outfall 1A will isolate roof runoff to better understand contribution from non-industrial sources at the site.

### 10.0 Evaluation and Report Completion/Submittal Information

- **Date ERA Level 1 Evaluation Completed:**
- **Date SWPPP Revisions Completed:**
- **Date BMP Implementation Complete:**
- **Date ERA Level 1 Report Certified and Submitted:**
Appendix E.2 ERA Level 2 Action Plan and Technical Report
Appendix E.2
Exceedance Response Action Level 2 Action Plan and Technical Report

1.0 Level 2 Exceedance Response Action Timeline

Figure E-1 depicts an example timeline for an industrial site to complete the Level 2 ERAs set forth in the General Permit. The dates shown are for illustrative purposes and assume a discharger enters Level 2 at the earliest possible date. Each of the required Level 2 actions are discussed below.

2.0 Entering Level 2

A Discharger will enter Level 2 when the following occurs:

- The Discharger has previously exceeded an NAL and is in Level 1 ERA, and
- The Discharger exceeds an NAL for the same parameter that prompted their entry into the Level 1 ERA process.

**EXAMPLE:** A Discharger is currently in Level 1 for a zinc NAL exceedance. They will move to Level 2 for zinc if there is another NAL exceedance for zinc the following year. If the Discharger does not exceed the zinc NAL the following year, they will remain in Level 1. If the Discharger exceeds an NAL for a different parameter, such as TSS, they will enter the Level 1 ERA process for the new parameter.

- The Discharger has not exceeded an NAL(s), but based on historical information collected for their site, decides to submit a Level 2 ERA Action Plan and the Level 2 ERA Technical Report.

**EXAMPLE:** A Discharger has performed studies and collected data to show natural background sources will cause consistent exceedances of the NAL for iron. Rather than
wait to exceed NAL values and move through the ERA process, the Discharger may decide to submit a Level 2 ERA Natural Background Pollutant Source Demonstration based on previously collected information. Submittal of this Technical Report will automatically place the Discharger into Level 2.

3.0 Level 2 ERA Action Plan

Upon entering Level 2, the Discharger must develop and submit a plan to the SWRCB (through SMARTS) indicating what action(s) the Discharger will take to address the NAL exceedance and a schedule for implementing the action(s) being taken. This evaluation should build on the Level 1 ERA Evaluation and Report previously submitted by the Discharger for the parameter(s) exceedance and must be prepared under the direction of a QISP. The key differentiator between the Level 1 and Level 2 evaluation is that the Level 2 evaluation must consider structural and treatment controls. As described in the General Permit Fact Sheet (Section K.5), these controls include:

- Enclosing and/or covering outdoor pollutant sources within a building or under a roofed or tarped outdoor area.
- Physically separating the pollutant sources from contact with run-on of uncontaminated storm water.
- Devices that direct contaminated storm water to appropriate treatment BMPs (e.g., discharge to sanitary sewer as allowed by local sewer authority).
- Treatment BMPs including, but not limited to, detention ponds, oil/water separators, sand filters, sediment removal controls, and constructed wetlands.

The Level 2 ERA Action Plan must be submitted to the SWRCB through SMARTS and must include the following for each drainage area with Level 2 NAL exceedances:

- A schedule and description of the tasks required to complete the selected technical demonstration, and
- Information about the QISP assisting with preparation of the Action Plan (QISP identification number, name, and contact information).

The Discharger must implement all elements of the Action Plan as soon as practicable, but no later than 1 year after submitting the Level 2 Action Plan (see Figure E-1).

A Discharger in Level 2 has three Demonstration options to include in their Technical Report as described in Section 4.0 below. When identifying which of the three Demonstration options the Discharger will pursue, it is important to plan ahead and provide sufficient time to properly plan, design, and implement proposed actions. This is particularly important if the Discharger plans to install structural and/or treatment controls at their site.
4.0 **Level 2 ERA Technical Report**

The Discharger must implement the Demonstration option(s) selected and previously included in the Level 2 ERA Action Plan submitted in SMARTS. The Technical Report must be prepared by a QISP. This Technical Report must be recertified each year in the Annual Report. If new exceedances occur for the parameter that prompted their entry into Level 2, updates to this Technical Report are to be made in the Annual Report. The Discharger has three options to demonstrate compliance with Level 2 ERAs:

1. **Industrial Activity BMP Demonstration** (two potential options under this Demonstration)
2. **Non-Industrial Pollutant Source Demonstration**
3. **Natural Background Pollutant Source Demonstration**

Guidance on each of the Demonstration options is included below. The Discharger can include one or more of the Demonstrations in their Technical Report. If Demonstrations are combined, the Discharger will not be eligible to return to Baseline Status (see **Section 5.0**). If the Discharger chooses to add Demonstrations to their Technical Report in the future, this is considered a Technical Report update. The Discharger is required to submit a new Technical Report if they enter Level 2 ERA for a different parameter.

If the Discharger needs additional time to complete the Level 2 ERA Technical Report, a one-time 6-month extension request can be submitted (See General Permit Section XII.D.5). For extensions longer than 6 months, the Discharger must obtain written approval from their RWQCB.

**4.1 Industrial Activity BMP Demonstration (BMP Demonstration)**

There are two potential demonstration options under the BMP Demonstration, but under both options the Discharger must include:

- A description of the industrial pollutant sources and corresponding industrial pollutants that are or may be related to the NAL exceedance(s)
- An evaluation of all pollutant sources associated with industrial activity that are or may be related to the NAL exceedance(s)
- If an alternative design standard was developed for the treatment control installed, provide analysis and basis for the alternative design storm standard

Much of the pollutant source identification information required in the BMP Demonstration may have been initially evaluated and incorporated into the ERA Level 1 Evaluation and Report and can be used in conjunction with additional information gathered at the site.

**Sections 4.1.1** and **4.1.2** describes the two BMP Demonstration options.
4.1.1 BMP Demonstration Option 1

Option 1 applies to Dischargers who are implementing additional control measures to achieve compliance with effluent limits in the General Permit and NALs.

Under this option the Discharger must provide a complete description and analysis of the additional control measures. This analysis must specifically address the drainage areas where the NAL exceedance(s) responsible for the Discharger’s Level 2 status occurred. The description/analysis of the implemented BMP(s) should consider the following:

- A description of the BMPs implemented to address and meet the effluent limits and NALs in the General Permit. Include information related to the design capacity, particularly when installing a treatment system, and the physical or chemical processes employed to remove the subject pollutants. If structural controls are employed to enclose, contain or cover the pollutant source, include a detailed description of the structural control measures and include procedures employed to maintain operational effectiveness of the controls.

- Physical and other practical reasons for selection of the implemented controls. This could include considerations related to technical feasibility and cost to implement and maintain.

- The appropriateness of the BMP to specifically address the identified pollutant and pollutant source attributing to the NAL exceedance. Is there research or studies showing the effectiveness of the BMP or technology at industrial sites or for similar industrial sources?

- Is there site-specific data to show storm water discharges are meeting General Permit NALs? Provide a summary of the data collected.

- If the expectation that storm water discharge data will meet NALs is based on vendor claims, is the data based on laboratory bench-scale testing or field data collected at industrial sites? Provide appropriate references.

- If low impact design controls such as infiltration or use of collected storm water are employed, provide sufficient information regarding the design.

If after collection of storm water discharge samples, the controls put in place are not meeting NALs, the Discharger will have the option to implement additional control measures and submit an update to the Technical Report that included the BMP Demonstration under Option 1 or submit an additional Level 2 ERA Action Plan and Technical Report including the BMP Demonstration utilizing Option 2 described in Section 4.1.2.

4.1.2 BMP Demonstration Option 2

Option 2 applies to Dischargers who have implemented BMPs that achieve compliance with effluent limits in the General Permit, but are not eliminating NAL exceedances.

Under this option, the General Permit requires the following:
1. A complete description and analysis of implemented BMPs. This description/analysis should include the same considerations described in Section 4.1.1.

2. An evaluation of any additional BMPs that would reduce or prevent NAL exceedances, but were not selected for implementation.

   This evaluation should include a description of additional BMPs considered, but not implemented due to cost or technical feasibility. The evaluation should consider:

   o Discharge elimination and/or reduction BMPs to reduce volume and/or flow rate of runoff. Are these types of BMPs technically and/or economically feasible based on site constraints and conditions?

   o Structural controls that have the ability to prevent exposure of the industrial activity causing the NAL exceedance (i.e., roofs, buildings, containment).

   o Additional treatment technologies with improved pollutant removal capabilities.

   See Handbook Sections 3 and 4 for additional guidance/options related to BMPs. If the Discharger is unable to identify a viable technology, this should also be described.

3. Estimated costs of the additional BMPs evaluated but not implemented. Dischargers should consider the costs associated with the BMPs evaluated and described in Item 2 above.

   Evaluate both the capital costs and on-going O&M costs associated with the BMP.

   Can the BMP be reasonably maintained and/or are there significant costs associated with proprietary components (i.e., filter media material)?

   Consistent with guidance in USEPA’s NPDES Permit Writers’ Manual, the Discharger should look at the economic achievability of implementing the technology and the incremental costs in relation to the pollutant reduction benefits.

   What is the magnitude of the NAL exceedance compared to the costs to meet the NAL?

   Are there costs associated with loss of production or storage space at the site?

   Provide sufficient backup for the cost estimates. Consider vendor/contractor quotes and publically available resources for BMP cost estimates.

4. An analysis describing the basis for the selection of BMPs implemented in lieu of the additional BMPs evaluated but not implemented. This analysis should incorporate the technical evaluation and estimated costs described in items 2 and 3 above. The Discharger should consider the following.

   Can the cost versus benefit be quantified as it relates to the expected pollutant reduction?
Will there be significant capital expenditure for relatively small reduction in pollutant discharge concentrations? This evaluation should also consider downstream receiving water impairments, and the magnitude of the NAL exceedance.

Are there non-water quality related effects related to the additional BMPs evaluated? Examples might include energy requirements, air emissions, and waste by-product generation.

What types of BMPs are other similar industrial sites implementing? This may be available from trade associations, Compliance Groups, or other industrial organizations.

4.2 Non-Industrial Pollutant Source Demonstration (Non-Industrial Demonstration)

If the Discharger has determined that non-industrial sources are contributing to the NAL exceedance, the Discharger can select the Non-Industrial Demonstration option for the Level 2 ERA Technical Report. This Demonstration option can only be used if the pollutant contribution from non-industrial sources is the primary reason for the NAL exceedance. If industrial activities at the site could cause the NAL exceedance without the non-industrial source contribution, this option is not appropriate and another of the demonstration options must be selected.

The General Permit (Section XII.D.2.c) requires the Non-Industrial Demonstration option to include the following statements/conclusions regarding the non-industrial pollutants source(s) identified and the evaluation performed:

- A statement that the Discharger has determined the exceedance of the NAL is solely attributable to the presence of non-industrial pollutant sources.

- A statement that the Discharger has identified and evaluated all potential pollutant sources that may have commingled with storm water associated with the Discharger’s industrial activity and may be contributing to the NAL exceedance.

*Example Statement:* XYZ Enterprises has demonstrated that the annual NAL exceedances for total suspended solids (TSS) are solely attributable to off-site run-on from an unimproved drainage ditch that is not associated with on-site industrial activities. Based on review of: potential industrial activity pollutant sources, BMPs implemented at the site, and storm water analytical results of run-on and discharge from industrial activity areas, the determination may be made that on-site industrial activities are not the source of the TSS NAL exceedances.

To support the conclusion statement above, the Discharge must have developed a strategy and plan to gather appropriate information to clearly demonstrate the results. The Non-Industrial Demonstration should include a clear explanation of any studies/research used, sampling/studies performed, and any other backup information used to support the conclusion. A list of other information the General Permit requires to be incorporated into this demonstration report are summarized below.
1. A description of any on-site industrial pollutant sources and corresponding industrial pollutants that are contributing to the NAL exceedance. Dischargers should consider the following:

- Describe the types of industrial activities conducted at the site that have the potential to contribute the pollutant exceeding the NAL. This should build on information previously provided in the ERA Level 1 Evaluation and Report for the site.

2. An assessment of the relative contributions of the pollutant from (1) storm water run-on to the facility from adjacent properties or non-industrial portions of the Discharger’s property or from aerial deposition and (2) the storm water associated with the Discharger’s industrial activity. This assessment will typically involve collection of data to support the Demonstration that a non-industrial source is the primary reason for the NAL exceedance. The following provides examples of data that could be collected to assess relative contribution from the non-industrial source(s):

- Storm Water Run-on - To assess relative contribution from off-site run-on, samples of run-on and site storm water discharge should be collected under similar conditions (same general storm intensity and timing) from the same storm event.

- Collect and analyze samples at location(s) where off-site run-on enters the site. The run-on sample should be collected prior to flow into the Discharger’s site or commingling with flow from industrial activity areas. Samples should be collected following the same QA/QC procedures outlined in the Dischargers MIP.

- Aerial Deposition (from man-made sources) – There are a variety of methods that could be utilized to assess whether NAL exceedances are a result of aerial deposition from off-site man-made sources. Contribution from aerial deposition can be caused by a number of factors, including prevailing wind direction, antecedent dry period, and proximity of the site to the source. The type of samples collected can affect the outcome of the assessment. When developing a strategy to assess relative contribution or decide on an appropriate data collection methodology, the Discharger should consider the following:
  - Evaluate neighboring operations to assess whether they have the potential to contribute pollutants that are a concern for the Discharger.
  - Are there existing local or regional studies that could be used to assess potential contribution?
  - What type of samples might be useful in assessing aerial deposition? (dry deposition, wet deposition, direct rainfall, deposition plates). How can samples/data be correlated to storm water discharge data from industrial activities to support the demonstration report?
3. A summary of existing BMPs for the parameter.
   - This summary should be consistent with the BMPs identified in the SWPPP for the site and the Level 1 ERA Evaluation and Report previously completed.

4. An evaluation of all on-site and off-site analytical monitoring data showing the NAL exceedance is caused by non-industrial sources.
   - This step will involve evaluating data collected or reviewed as part of item 2 above. The Discharger will need to quantify the relative contribution to show the non-industrial source is the primary contributing factor to the NAL exceedance. If the evaluation shows the industrial activities at the site exceed NAL values, without the non-industrial contribution, this Demonstration Option is not appropriate and another option should be selected.

4.3 Natural Background Pollutant Source Demonstration (Natural Background Demonstration)

If the Discharger has determined that natural background sources are the primary contributing factor to the NAL exceedance, the Discharger can select the Natural Background Demonstration option for the Level 2 ERA Technical Report. If industrial activities at the site could cause an NAL exceedance without the natural background contribution, this option is not appropriate and another Demonstration option must be selected. As described in the General Permit Fact Sheet, natural background pollutants include those substances that are naturally occurring in soils or groundwater that have not been disturbed by industrial activities. Natural background pollutants do not include legacy pollutants from earlier activity on a site, or pollutants in run-on from neighboring sources which are not naturally occurring.

The General Permit (Section XII.D.2.c) requires the Natural Background Demonstration include the following:

A statement that the NAL exceedance is solely attributable to the presence of the pollutant in the natural background associated with the site. This statement should be the result of research and/or data collection discussed below.

Example statement: **XYZ Enterprises has demonstrated that the annual NAL exceedance for Iron during the 2016 reporting year is solely attributable to natural background contributions associated with the unimproved area adjacent to the manufacturing building and is not associated with industrial activities at the site.**

To support the conclusion statement above, the Discharger must have developed a strategy and plan to gather appropriate information to clearly demonstrate their results. The Natural Background Demonstration should include a clear explanation of studies and research utilized, sampling performed, and any information (site maps, photographs, regional geology, etc.) used to support the conclusion. A list of information the General Permit requires to be incorporated into this Demonstration report is summarized below.

1. A summary of all data collected by the Discharger or others that describes the levels of natural background pollutants in the storm water discharge. Dischargers should
consider the following when developing a sampling plan and/or providing a data summary to show the NAL exceedance is solely attributable to natural background sources.

- Confirm the sample source (reference site) truly represents natural background conditions and is not influence by on-site industrial sources, off-site industrial sources or other non-industrial sources (see Section 4.2).
  - Is the natural background reference site potentially impacted by historic industrial operations or other human activities (see item 8 below)?

- Confirm the reference site is located in proximity to the Discharger’s industrial site and has potential to influence storm water dischargers from industrial areas.
  - Is the site at a lower elevation?
  - What are prevailing wind conditions?

- Were the samples collected using appropriate sampling techniques and sample collection equipment?
  - This should be evaluated for both liquid and solids samples, if used for the demonstration.

- Were the samples collected is a manner that could contribute to cross-contamination with non-natural background sources or pollutant contribution from sample collection equipment (improper decontamination)?
  - Were appropriate QA/QC procedures in place?

- Do the sample collection locations and data clearly distinguish contribution from industrial activities versus natural background sources? The samples collected should provide valid points of reference for comparison. Samples could include:
  - Soil sample(s) collected directly from natural background source (i.e., unimproved area adjacent to manufacturing building). Obtain appropriate approvals/clearance before collection of samples from off-site locations, if needed.
  - Storm water discharge sample(s) from natural background source prior to commingling with industrial activity areas.
  - Sample(s) collected from industrial storm water discharge point after commingling with run-on from natural background source.

2. A summary of all research and published literature used when making the Natural Background Demonstration. Research and literature that are from other geographic areas, or are clearly based on different topographies or soils, are not sufficient to meet
this requirement. Dischargers should consider the following when evaluating the appropriateness of existing research/literature.

- Is the research in a peer-reviewed publication or from a local, state, federal government publication?
- When was the research conducted? Does it represent current or historic conditions in the area?
- Does the sample data collected/referenced in the research or literature generally meet the considerations discussed in item 1 above?

3. A map showing the reference site location in relation to the facility. The map (or aerial photo) should include the type of land cover (i.e., paved surface, natural vegetation, forest land, landscaped area, sand dunes, etc.).

4. The reference site and test site elevation. Include the elevation of the area being used to demonstrate the natural background contribution and the industrial site (or particular drainage area of the industrial site).

5. Available geology and soil information for reference and test sites. Potential sources for information include:

- Geology and soils data can be obtained from various sources, including the United States Geologic Service (USGS), United States Department of Agriculture, Natural Resources Conservation Service (NRCS) web soil survey, and the SWRCB’s Geotracker Database

6. Photographs showing site (both industrial site and reference site) vegetation.

7. Site reconnaissance survey data regarding presence of roads, outfalls, or other human-made structures. This information can be incorporated on the map discussed above.

8. Records from relevant state or federal agencies indicating that no known mining, forestry, or other human activities are upstream of the proposed reference site. Dischargers can consider use of the historical aerial photographs or USGS maps to assess historical upstream land uses.

5.0 Returning to Baseline Status

The General Permit allows Dischargers to return to Baseline status from ERA Level 2 under the following conditions (both must be met):

- The Discharger submitted a BMP Demonstration stating that implemented BMPs are expected to meet NAL values in the General Permit (See Section 4.1.1); and

- The Discharger has storm water sample results from 4 subsequent consecutive QSEs that indicated there were no NAL exceedances for the subject parameter(s).