Stormwater Pollution Prevention Plan

Sanger Substation Expansion Project

LUP Project Risk Type 1

WDID#: 5F10C384810

Property Address: E. Jensen Avenue and McCall Avenue, Sanger, California

Estimated Construction Project Dates:
Start of Construction October 1, 2018
Completion of Construction December 31, 2019

Qualified SWPPP Practitioner (QSP)

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Prepared for

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Date: September 10, 2018
Revision Date:

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Qualified SWPPP Developer Certification

Approval and Certification of the Stormwater Pollution Prevention Plan

Project Name: **Sanger Substation Expansion Project**

"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."

Sarah McIlroy	**9/25/2018**
QSD Signature	Date
Sarah McIlroy	**121**
QSD Name	QSD Certificate Number
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Amendment Log

Project Name: **Sanger Substation Expansion Project**

Amendment No.	Date	Amendment Description

Section 1 SWPPP Requirements

1.1 Introduction

The Sanger Substation Expansion Project (Project) is located at the intersection of E. Jensen Avenue and McCall Avenue, approximately 2 miles west of Sanger, California. The property is owned by PG&E and various landowners and is being developed by PG&E.

This Stormwater Pollution Prevention Plan (SWPPP) is designed to comply with California's General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit) Order No. 2009-0009-DWQ as amended in 2010 and 2012 (NPDES No. CAS000002) issued by the State Water Resources Control Board (State Water Board). In accordance with the General Permit this SWPPP is designed to address the following objectives:

- Control all pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity;
- Identify and control, eliminate, or treat all non-stormwater discharges where not otherwise required to be under a Regional Water Quality Control Board (Regional Water Board) permit; and
- Site BMPs are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity to the Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology (BAT/BCT) standard.

1.2 Permit Registration Documents

Required Permit Registration Documents (PRDs) shall be provided to the State Water Board via the Stormwater Multi Application and Report Tracking System (SMARTS) by the Legally Responsible Person (LRP), or authorized personnel under the direction of the LRP. The project-specific PRDs include:

- Notice of Intent (NOI);
- Risk Assessment (Construction Site Sediment and Receiving Water Risk Determination) Including Individual Method Calculation Documentation if applicable;
- Site Maps;
- Annual Fee;
- Signed Certification Statement; and
- SWPPP.

Site Maps are located in Appendix A. A copy of the applicable PRDs, including the NOI, Risk Assessment Documentation, Post Construction Documentation, and Waste Discharge Identification (WDID) Receipt Letter are available in Appendix B.

1.3 SWPPP Availability and Implementation

The SWPPP shall be available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Municipal

inspector. When the SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, current copies of the BMPs and map/drawing will be left with the field crew and the SWPPP shall be made available via a request by radio/telephone.

The SWPPP shall be implemented concurrently with the start of ground disturbing activities.

1.4 SWPPP Amendments

The SWPPP should be revised when:

- There is an applicable General Permit violation;
- There is a reduction or increase in total disturbed acreage;
- BMPs do not meet the objectives of reducing or eliminating pollutants in stormwater discharges;
- There is a change in construction or operations which may affect the discharge of pollutants to surface waters, groundwater(s), or municipal separate storm sewer system (MS4);
- There is a change in the project duration; or
- Deemed necessary by the QSD or PG&E Water Quality Group.

Each amendment must include the date, a description of the change(s) and the QSD's signature. Amendments shall be recorded in the Amendment Log near the front of the SWPPP and include certifications in Appendix C. The SWPPP text and/or figures shall be revised, replaced, inserted, and/or hand annotated as necessary to properly convey the amendment. SWPPP amendments must be made by or at the direction of a QSD. The QSP, LRP, Contractor, or appropriate field personnel shall notify the QSD when an amendment or revision is needed.

1.5 Annual Report

Annual Reports for the reporting year beginning July 1st and ending June 30th shall be prepared and certified/submitted no later than September 1st of each year in accordance with information required by the on-line forms.

1.6 Changes to Permit Coverage

The General Permit allows for the reduction or increase of the total acreage covered by the WDID number. When a change occurs, the SWPPP should be modified appropriately and modified PRDs shall be filed electronically within 30 days of the reduction or increase in total disturbed area as a Change of Information (COI) in SMARTS.

1.7 Notice of Termination

A Notice of Termination (NOT) must be submitted electronically by the LRP via SMARTS to terminate coverage under the General Permit. The NOT must include a final Site Map and representative photographs of the project site that demonstrate final stabilization has been achieved. The NOT shall be submitted within 90 days of completion of construction. The Regional Water Board will consider a construction site complete and approve the NOT when the conditions of the General Permit have been met.

1.8 Required Non-Compliance Reporting

If a General Permit discharge violation occurs (including un-authorized non-stormwater discharges) or if the project receives a written Notice of Violation (NOV) or order from a regulatory agency, the contractor will immediately notify the QSP, the Environmental Field Specialist (EFS), and the PG&E Stormwater Work Supervisor. The contractor will provide a written report to the QSP (Section 6.1), the PG&E Stormwater Work Supervisor, and the EFS within 24 hours. The QSP will then notify the Project Manager and will file a written report to them within 7 days of occurrence, or as specified in the Special Provisions. After hours EFS, call: (800) 874-4043.

If a Notice of Non-Compliance is necessary, it will be submitted by PG&E personnel only. If planned changes in construction activity will result in non-compliance with the CGP, the discharger is required to give advance notice to the RWQCB and local storm water management agency.

The report to PG&E will contain the following items:

- The date, time, location, nature of operation, and type of unauthorized discharge, including the cause or nature of the notice or order;
- The control measures (BMPs) deployed before the discharge event, or prior to receiving the notice or order;
- The date of deployment and type of control measures (BMPs) deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent re-occurrence; and
- An implementation and maintenance schedule for any affected BMPs.

Section 2 Project Information

2.1 Project and Site Description

2.1.1 Site Description

The Project comprises approximately 24.660 acres of project area, 24.660 acres of ground disturbance, and is located at the intersection of E. Jensen Avenue and McCall Avenue, approximately 2 miles west of Sanger, California. The Project is considered a Linear Utility Project (LUP) and is comprised of one segment. The site is bounded by agricultural land to the north and west, McCall Avenue to the east, East Jensen Avenue to the south. The site is located approximately nine miles east of Highway 99 and approximately four miles west the Lower Kings River. The project is located at latitude 36.70724 longitude -119.61109 and is identified on the Site Maps in Appendix A. Access to the project site is provided by travelling east on Jensen Avenue from Highway 99 to the intersection with McCall Avenue.

2.1.2 Existing Conditions

As of the initial preparation date of the SWPPP, the site is currently developed with a substation with agricultural land to the north and west. The project site was previously developed with a substation and agricultural land. There are no known historic sources of contamination.

2.1.3 Existing Drainage

The site is relatively flat. The elevation of the site ranges from 346 feet to 350 feet above mean sea level (msl). Surface drainage within the existing substation currently flows toward a detention pond. Surface drainage within the substation expansion area flows to the west. Stormwater is conveyed as surface runoff to an unnamed agricultural ditch and ultimately to the Lower Kings River. Stormwater discharges, from the site are not considered direct discharges, as defined by the State Water Board to the Lower Kings River. Existing site topography, drainage patterns, and stormwater conveyance systems are shown in Appendix A.

The project discharges to Lower Kings River (Pine Flat Reservoir to Island Weir) which is listed for water quality impairments on the most recent 303(d) list for:

- Alkalinity as CaCO3
- Unknown Toxicity

2.1.4 Geology, Groundwater, and Rainfall

The site is underlain by well drained Greenfield sandy loam and well drained Ramona sandy loam. The typical profile for the Greenfield sandy loam is as follows: 0 to 16 inches – sandy loam, 16 to 38 inches – sandy loam, 38 to 48 inches – cemented. The typical profile for the Ramona sandy loam is as follows: 0 to 12 inches – sandy loam, 12 to 24 inches – sandy loam, 24 to 40 inches – sandy clay loam, 40 to 50 inches – cemented. Groundwater is expected to be encountered at a depth greater than 80 inches below ground surface and the annual average precipitation at the project site is 9 to 17 inches. Ponding and flooding is not expected to occur at the project site and the available water capacity of both soil types is moderately low.

Based on Isopluvial Maps, the 5-year, 24-hour event for the project is 1.94 inches. This information should be considered during the selection and design of related BMPs.

2.1.5 Project Description

The purpose of the Project is to increase reliability of electric service by upgrading the equipment at the existing substation to be in conformance with PG&E internal design standards as well as industry standards. The scope of work includes the following activities:

- Expansion of the existing substation 6.57 acres to the north;
- Construction of two driveways for the expanded substation;
- Expansion of the existing substation 0.60 acres to the west for the construction of a new retaining pond;
- Removal of obsolete circuit breakers, switches, steel support structures, and the concrete control building at the existing substation;
- Removal of 17 wood poles and 17 lattice steel towers; and
- Installation of 29 steel poles.

The Project will also require the construction of temporary access roads and the use of Pull/Tension sites.

2.1.6 Developed Condition

Post construction surface drainage will be directed to the existing onsite stormwater detention basin.

Post construction drainage patterns and/or conveyance systems are presented in Appendix A and a summary of drainage information is located in the following table.

Construction Site Estimates

Percent Impervious Before Construction	15	%
Runoff Coefficient Before Construction	0.20	
Percent Impervious After Construction	30	%
Runoff Coefficient After Construction	0.30	

Final stabilization will be achieved on the project by meeting the 70% final cover method. Stabilization will be achieved within 90 days of completion of construction activities by vegetative and non-vegetative stabilization and replacing with cover equivalent to pre-construction conditions where existing landscaping is disturbed.

2.2 Stormwater Run-On from Offsite Areas

There is no anticipated offsite run-on to this construction site because the site is relatively flat with no significant upgradient sub-basins.

2.3 Construction Site Sediment and Receiving Water Risk Determination

A construction site risk assessment has been performed for the project and the resultant risk level is:

Type 1

Project Type is based on the analytical results of two components: Sediment Risk and Receiving Water Risk. Sediment Risk calculations include analysis of project duration, location, and soil conditions. Receiving Water Risk is based on proximity to impaired receiving waters. Additionally, Linear Underground/Overhead Projects (LUPs) utilize a flow chart to determine either LUP Type 1 status or Receiving Water Risk. Risk Type determination documentation is included in Appendix B and summarized in the table(s) below.

Summary of Sediment Risk

RUSLE Factor	Value	Method for Establishing Value
R	35.01	US EPA, Construction Rainfall Erosivity Factor Calculator
K	0.32	GIS Map Method
LS	0.11	GIS Map Method
Total Predicted Sediment Loss (tons/acre)		R x K x LS = 1.23
Overall Sediment Risk Low: < 15 tons/acre Medium: ≥ 15 and < 75 tons/acre High: ≤ 75 tons/acre		☒ **Low** ☐ **Medium** ☐ **High**

Medium and High Receiving Water Risk is assigned to a project where the disturbed area discharges directly or indirectly to a 303(d)-listed waterbody impaired by sediment, siltation, or turbidity, has a USEPA approved TMDL implementation plan for sediment, siltation, or turbidity OR has designated beneficial uses of Spawn, Cold, and Migratory (Sensitive Receiving Water Body).

Summary of Receiving Water Risk			
Receiving Water (direct or indirect)	**303(d) Listed for Sediment Related Pollutant**	**TMDL for Sediment Related Pollutant**	**Beneficial Uses of Cold, Spawn, and Migratory**
Lower Kings River	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No
Is the project area or segment located within the flood plain or flood prone area of a Sensitive Receiving Water Body?			☐ Yes ☒ No
Overall Receiving Water Risk			☒ **Low** ☐ **Medium** ☐ **High**

2.4 Construction Schedule

The site sediment risk shall be determined based on construction taking place between the dates listed on the cover of this SWPPP. Modification or extension of the schedule may affect risk determination and permit requirements and therefore project personnel shall contact the QSD regarding any schedule changes.

2.5 Potential Construction Activity and Pollutant Sources

A list of construction activities and associated materials that are anticipated to be used onsite are included in Appendix D. The activities and associated materials will or could potentially contribute pollutants, other than sediment, to stormwater runoff.

The anticipated activities and associated pollutants were used in Section 3 to select the BMPs for the project. The location of pollutants and/or associated BMPs are shown on the Site Map(s) in Appendix A.

Sampling requirements for non-visible pollutants are described in Section 7. Additional pollutants and/or more specific products may be onsite. Refer to the Safety Data Sheets (SDS), which shall be retained onsite, likely at the construction trailer.

2.6 Identification of Non-Stormwater Discharges

Non-stormwater discharges consist of discharges which do not originate from precipitation events. The General Permit provides allowance for specified non-stormwater discharges that do not cause erosion or carry other pollutants. Authorized non-stormwater discharges will be managed with the stormwater and non-stormwater BMPs described in Section 3 and/or shown in Appendix A and will be minimized to the extent feasible.

Non-stormwater discharges that may be authorized from this project site include de-chlorinated potable water sources such as:

- Irrigation of Vegetative Erosion Control Measures
- Pipe Flushing and Testing
- Water to Control Dust
- Uncontaminated Groundwater from Dewatering
- Atmospheric Condensate from Refrigeration, Air Conditioners, Compressors, etc.
- Irrigation Drainage
- Landscape Watering

Non-stormwater discharges into storm drainage systems or waterways, which are not authorized under the General Permit or authorized under a separate NPDES permit, are prohibited. If an unauthorized non-stormwater discharge situation is observed, the QSP will initiate actions, including the implementation of appropriate BMPs, to ensure that unauthorized discharges are eliminated, controlled, disposed, or treated on-site.

Activities at the site that may result in unauthorized non-stormwater discharges include:

- Improper Dumping
- Spills

- Wet Utility Line Breaks
- Leaks from Tanks, Containers, or Equipment
- Improper Cleaning of Vehicles, Equipment, Impervious Surfaces, etc.
- Improper Use or Application of Construction or Landscape Related Materials
- Inadequate Containment of Potential Pollutants

Discharges of construction materials and wastes, such as fuel or paint, resulting from dumping, spills, or direct contact with rainwater or stormwater runoff, are also prohibited.

2.7 Required Site Map Information

The construction project Site Map(s) showing the project location, surface water boundaries, geographic features, construction site perimeter, general topography, and/or other map requirements are located in Appendix A.

Section 3 Best Management Practices

3.1 Schedule for BMP Implementation

BMPs must be implemented, modified, and maintained to reflect the phase of construction and the weather conditions. In order to be effective, some BMPs must be installed before the site is disturbed and other may require multiple applications or installations. The schedule for deployment of BMPs in identified in Section 3.6.

The following BMP and A-ESCP selection tables indicate the BMPs that should be implemented on the construction site; alternate methods may be implemented if effective and approved by the QSP. Fact Sheets/Cut Sheets for BMPs which describe the purpose, application, limitations, implementation, inspection, and maintenance are provided in Appendix H. Additionally, PG&E has Activity Specific Erosion and Sediment Control Plans (A-ESCPs) that provide information for preventing pollution when conducting regular construction and/or maintenance operations. Copies of the applicable A-ESCPs for this project are included in Appendix H. The QSD shall be contacted in the event of a conflict between the SWPPP, the Site Map(s), Fact Sheets or other documents.

3.2 Erosion and Sediment Control

Erosion and sediment controls are required to provide effective reduction or elimination of sediment related pollutants in stormwater discharges and authorized non-stormwater discharges from the site. Applicable BMPs are identified in this section for erosion control, sediment control, tracking, and wind erosion control.

3.2.1 Erosion Control

Erosion control, also referred to as soil stabilization, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in stormwater runoff. Erosion control BMPs protect the soil surface by covering, binding soil particles, and/or strengthening the subsurface.

This construction project will implement the following practices to provide effective temporary and/or final erosion control during construction:

1. Preserve existing vegetation where required and when feasible.
2. Control the area of soil disturbing operations shall be such that the Contractor is able to implement erosion control BMPs quickly and effectively.
3. Provide effective soil cover for inactive areas. Inactive is defined as areas of construction activity that have been disturbed and are not scheduled to be re-disturbed for at least 14 days.
4. Implement BMPs to prevent the off-site tracking of loose construction and landscape materials.
5. Control erosion in concentrated flow paths by applying erosion control blankets, check dams, erosion control seeding, or alternate effective methods.

6. Apply permanent erosion control to remaining disturbed soil areas prior to the completion construction.
7. Maintain sufficient erosion control materials onsite to allow implementation in conformance with this SWPPP and the General Permit.
8. Limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist.

Erosion Control BMPs

Fact Sheet	BMP Name	Project Specific Notes/Instructions
EC-1	Scheduling	Entire project, at all times, limit or stop soil disturbance activities and pollutant use during precipitation.
EC-2	Preservation of Existing Vegetation	The overall footprint of the site will be minimized.
EC-4	Hydroseeding	Hand apply seed to stabilize areas around pole and tower removal/replacement sites within grass, as necessary.
EC-15	Soil Preparation and Roughening	To be used around tower/pole replacements.
EC-16	Non-Vegetative Stabilization	Non-vegetative stabilization to be used within the expanded substation.
WE-1	Wind Erosion Control	At all times.

3.2.2 Sediment Controls

Sediment controls are measures that are intended to complement the selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are typically temporary but permanent measures also exist. Sediment controls are designed to intercept, filter, and/or settle out soil particles that have been detached and are transported by the force of water.

This construction project will implement the following practices to provide effective sediment control during construction:

1. Establish and maintain effective perimeter controls.
2. Stabilize all construction entrances and exits and ensure that construction traffic to and from the project is limited to the entrances and exits.
3. Ensure that all storm drain inlets and perimeter controls, runoff controls, and pollutant controls are maintained and effective.

Sediment Control BMPs

Fact Sheet	BMP Name	Project Specific Notes/Instructions
SE-1	Silt Fence	Install silt fence around the perimeter of the northern and western substation expansion areas.

SE-5	Fiber Rolls	Place fiber rolls around the tower removal sites and Pull Sites as necessary based on site and/or weather conditions, and around the base of temporary stockpiles. Use biodegradable fiber rolls only.
SE-7	Street Sweeping and Vacuuming	All paved surface, as often as necessary to remove accumulated sediment from paved surfaces.
TC-1	Stabilized Construction Entrance/Exit	Corrugated steel panels (i.e. rumble racks) and crushed aggregate before and after rumble rack (3” to 6” in diameter) to be installed at the construction entrances/exits. Maintain Stabilized Construction Exit as needed based on daily inspections.
TC-2	Stabilized Construction Roadway	Trucks are to drive single file to preserve vegetation. Highly disturbed access roads will be hydroseeded (or stabilized like-for-like) to prevent erosion.

3.3 Non-Stormwater Controls and Waste and Materials Management

3.3.1 Non-Stormwater Controls

Non-stormwater discharges into storm drain systems or waterways, which are not authorized, are prohibited. The selection of non-stormwater BMPs is based on the list of construction activities with a potential for non-stormwater discharges identified in Appendix D.

This construction project will implement the following practices to provide effective non-stormwater management during construction:

1. Prevent oil, grease, or fuel to leak into the ground, storm drains, or surface waters. Clean leaks immediately and dispose of leaked materials properly.
2. Place all equipment or vehicles which are to be fueled, maintained, and stored in a designated area, fitted with appropriate BMPs.
3. Clean streets in such a manner as to prevent unauthorized non-storm water discharges.
4. Wash vehicles (if necessary) in such a manner as to prevent non-stormwater discharges.

Non-Stormwater BMPs

Fact Sheet	BMP Name	Project Specific Notes/Instructions
NS-1	Water Conservation Practices	Entire project at all times. Limit water use (i.e. use for adequate dust control but do not overwater to create erosion issues). Check water truck for leaks.

NS-3	Paving and Grinding Operations	Schedule all paving activities for after storm events.
NS-6	Illicit Connection/Discharge	Report illicit connection or discharge immediately to site superintendent, EFS, and SWWS.
NS-7	Potable Water/Irrigation	Limit water use for landscape irrigation.
NS-8	Vehicle and Equipment Cleaning	On-site construction equipment cleaning is not anticipated to occur; however, in the event on-site cleaning is required, ensure that appropriate containment of cleaning operations is provided. Cleaning shall only occur in a designated area.
NS-9	Vehicle and Equipment Fueling	On-site fueling is not anticipated. Ensure that drip pans, absorbent materials, and spill kits are on-site and readily available in the event of a spill or leak. Fueling shall be in a designated area with appropriate BMPs in place. Immediately clean and dispose of leaked material properly. Ensure that all on-site fuel containers are stored within secondary containment systems.
NS-10	Vehicle and Equipment Maintenance	Vehicle and equipment maintenance is not expected to occur on-site. However, if on-site maintenance is required, ensure that drip pans, absorbent materials, and spill kits are available in the event of a spill or leak. Maintenance of construction equipment should also be conducted over plastic sheeting or temporary secondary containment systems.
NS-12	Concrete Curing	Concrete washout will be contained so there is no discharge into the underlying soil and onto the surrounding areas. Schedule all paving activities for after storm events.
NS-13	Concrete Finishing	Concrete washout will be contained so there is no discharge into the underlying soil and onto the surrounding areas. Schedule all paving activities for after storm events.

3.3.2 Material Management and Waste Management

Material management control practices consist of implementing procedural and structural BMPs for handling, storing, and using construction materials to prevent the release of those materials into stormwater discharges.

Waste management consists of implementing procedural and structural BMPs for handling, storing, and ensuring proper disposal of waste to prevent the release of those wastes into stormwater discharges. If applicable to the project site, waste management should be conducted in accordance with the Project's Construction Waste Management Plan.

Material and waste management pollution control BMPs shall be implemented to minimize stormwater contact with construction material, waste, and service areas; and to prevent materials and wastes from being discharged off-site. This construction project will implement the following practices to provide effective waste and materials management during construction:

1. Inventory products.
2. Cover and berm loose stockpiled construction materials that are not actively being used. Contain and securely protect stockpiled waste material from wind and rain at all times unless actively being used. Contain stockpiled landscape materials such as mulches and topsoil when they are not actively being used.
3. Store chemicals in watertight containers in appropriate secondary containment to prevent any spillage or leakage or in a completely enclosed storage shed.
4. Minimize exposure of construction material to precipitation.
5. Ensure the containment of concrete washout areas and other washout areas that may contain additional pollutants so that there is no discharge into the underlying soil and onto surrounding areas.
6. Prevent disposal of any rinse or wash waters or materials on impervious or pervious site surface or into the storm drain system.
7. Ensure the containment of sanitation facilities, clean or replace regularly, and inspect for leaks and spills.
8. Cover waste disposal containers at the end of every business day and during a rain event. Prevent discharges from waste disposal containers.
9. Contain fertilizer and other landscape materials when they are not actively being used.
10. Discontinue the application of any erodible landscape material within 2 days before a forecast rain event or during periods of precipitation.
11. Stack erodible landscape material on pallets and cover or store such materials when not being used or applied.
12. Control the air deposition of site materials and from site operations.

Waste and Material Management BMPs

Fact Sheet	BMP Name	Project Specific Notes/Instructions
WM-1	Material Delivery and Storage	Properly store and protect all materials from the elements (bulk or packaged) on-site. Refer to WM-3 below for stockpile of materials management.
WM-2	Material Use	Follow manufacturer's instructions for all materials to be used during the course of the project. Train all on-site crews for proper materials handling, storage, and cleanup measures.
WM-3	Stockpile Management	Stockpiles will be bermed with fiber rolls (SE-5) while inactive and during rain events (Refer to PG&E Stockpile A-ESCP for minimum standards).

WM-4	Spill Prevention and Control	Spill kits shall be kept on-site during the project scope and all spills will be reported to the EFS and SWWS.
WM-5	Solid Waste Management	Collect site trash daily. Cover dumpsters at the end of each day and during wind and rain events.
WM-6	Hazardous Waste Management	Hazardous materials, if used during the project activities, shall be stored in a covered area, over secondary containment, and properly labeled.
WM-7	Contaminated Soil Management	Should contaminated soil be uncovered during the project, stop work and notify PM, EFS, and SWWS immediately. Do not proceed to remove contaminated soils prior to testing soils for chemical compounds.
WM-8	Concrete Waste Management	Concrete truck washout shall be conducted in designated temporary concrete washout facility. Concrete waste shall be contained and covered at designated facility until removed from the project site.
WM-9	Sanitary-Septic Waste Management	If temporary sanitary facilities are installed at the project site, ensure they are located where spills will not enter on-site drainages. Anchor down temporary sanitary facilities to prevent tip over during inclement weather.
WM-10	Liquid Waste Management	Liquid wastes, if generated during the project activities, shall be placed in a leak proof container and closed at the end of each day or prior to inclement weather. Liquid waste containers should be stored over secondary containment or within a covered area.

3.3.3 Spill Response and Implementation

Prevention and control of spills minimizes or eliminates the discharge of hazardous and non-hazardous material and waste to the storm drain system or surface waters. All material storage and handling should be located away from natural water courses and storm drains, and should be stored in areas not susceptible to rain if possible.

Employees, contractors, subcontractors, and any other site personnel shall use Good Housekeeping practices at all times and implement other containment controls as a secondary line of defense. Personnel handling any hazardous materials shall be knowledgeable about such materials and shall take proper steps in notifying the EFS and PG&E Stormwater Work Supervisor immediately if a spill occurs. After hours EFS, call: **(800) 874-4043.**

This construction project will implement the following practices to provide effective spill prevention and management during construction:

1. Equipment and materials for cleanup of spills shall be available on site.

2. Spills and leaks shall be cleaned up immediately and disposed properly.
3. Appropriate spill response personnel are to be assigned and trained.
4. If a spill occurs, document all steps taken and submit a written report to the EFS and the PG&E Stormwater Work Supervisor within 7 days.

3.4 Post Construction Stormwater Management Measures

Post construction BMPs are permanent measures designed to reduce or eliminate pollutant discharges from the site after construction is complete and are installed during construction. LUPs are not subject to post-construction water balance requirements due to the nature of their construction to return project sites to pre-construction conditions, however, permanent BMPs listed in the following table are anticipated to remain after construction is complete.

Seeded areas are expected to be maintained until final stabilization is achieved. The following post construction BMPs have been identified for this site:

BMP Name	Project Specific Notes/Instructions
Permanent Vegetation	Consult with Project Biologist regarding the seed mix. In cases when the biologist does not have any site specific requirements for a seed mix, the QSD is expected to specify the use of a certified weed-free, fast-germinating, native seed mix.
Non-Vegetative Stabilization	Use gravel in the substation expansion areas.

3.5 Activity Specific Erosion and Sediment Control Plans (A-ESCPs)

PG&E has developed Activity Specific Erosion and Sediment Control Plans for activities typical to many PG&E Construction Sites. At a minimum, the Good Housekeeping and Stockpile Management Plans shall be used on every job. The following table indicates the A-ESCPs that are to be implemented on this site.

A-ESCP Name	Project Specific Notes/Instructions
Good Housekeeping	Entire project, every day.
Stockpile Management	Every temporary stockpile, every day.
Laydown/Staging Area Construction	Through duration of project.
Sawcutting, Grinding, and Paving	Where applicable during paving operations.

3.6 BMP Installation Schedule

BMPs shall be installed and maintained during specific phases and timing. A-ESCPs shall also be followed as described. The tables below illustrate the schedule for the installation and maintenance schedule for specific BMPs and A-ESCPs. BMP's shall be installed, maintained, repaired, and/or replaced as necessary during the phase in which they are to be used. Unless BMPs are used for multiple phases or post construction, BMPs shall be removed and properly discarded following the intended phase(s).

Erosion Control BMPs							
BMP No.	**BMP**	**Prior to Land Disturbance**	**Grading and Land Development**	**Streets and Utilities**	**Vertical Construction**	**Landscaping and Site Stabilization**	**Post Construction**
EC-1	Scheduling	✓	✓	✓	✓	✓	
EC-2	Preservation of Existing Vegetation	✓	✓	✓	✓	✓	
EC-4	Hydroseeding		✓	✓		✓	
EC-15	Soil Preparation/Roughening		✓				
EC-16	Non-Vegetation Stabilization		✓	✓	✓	✓	

Wind Erosion Control BMPs							
BMP No.	**BMP**	**Prior to Land Disturbance**	**Grading and Land Development**	**Streets and Utilities**	**Vertical Construction**	**Landscaping and Site Stabilization**	**Post Construction**
WE-1	Wind Erosion Control	✓	✓	✓	✓	✓	

Sediment Control BMPs							
BMP No.	**BMP**	**Prior to Land Disturbance**	**Grading and Land Development**	**Streets and Utilities**	**Vertical Construction**	**Landscaping and Site Stabilization**	**Post Construction**
SE-1	Silt Fence		✓	✓	✓	✓	
SE-5	Fiber Rolls (as necessary)		✓	✓	✓	✓	
SE-7	Street Sweeping and Vacuuming	✓	✓	✓	✓	✓	

Tracking Control BMPs							
BMP No.	**BMP**	**Prior to Land Disturbance**	**Grading and Land Development**	**Streets and Utilities**	**Vertical Construction**	**Landscaping and Site Stabilization**	**Post Construction**
TC-1	Stabilized Construction Entrance/Exit	✓	✓	✓	✓	✓	
TC-2	Stabilized Construction Roadway	✓	✓	✓	✓	✓	

Non-Stormwater Management BMPs							
BMP No.	**BMP**	**Prior to Land Disturbance**	**Grading and Land Development**	**Streets and Utilities**	**Vertical Construction**	**Landscaping and Site Stabilization**	**Post Construction**
NS-1	Water Conservation Practices		✓	✓	✓	✓	
NS-3	Paving and Grinding Operations		✓	✓			
NS-6	Illicit Connection/Discharge		✓	✓	✓	✓	
NS-7	Potable Water/Irrigation					✓	
NS-8	Vehicle and Equipment Cleaning	✓	✓	✓	✓	✓	
NS-9	Vehicle and Equipment Fueling	✓	✓	✓	✓	✓	
NS-10	Vehicle and Equipment Maintenance	✓	✓	✓	✓	✓	
NS-12	Concrete Curing			✓	✓		
NS-13	Concrete Finishing			✓	✓		

Waste Management and Materials Pollution Control BMPs							
BMP No.	**BMP**	**Prior to Land Disturbance**	**Grading and Land Development**	**Streets and Utilities**	**Vertical Construction**	**Landscaping and Site Stabilization**	**Post Construction**
WM-1	Material Delivery and Storage		✓	✓	✓	✓	
WM-2	Material Use		✓	✓	✓	✓	
WM-3	Stockpile Management		✓	✓	✓	✓	
WM-4	Spill Prevention and Control		✓	✓	✓	✓	
WM-5	Solid Waste Management	✓	✓	✓	✓	✓	
WM-6	Hazardous Waste Management		✓	✓	✓	✓	
WM-7	Contaminated Soil Management	✓	✓	✓	✓	✓	
WM-8	Concrete Waste Management		✓	✓	✓	✓	
WM-9	Sanitary/Septic Waste Management	✓	✓	✓	✓	✓	
WM-10	Liquid Waste Management		✓	✓	✓	✓	

A-ESCPs						
A-ESCP	**Prior to Land Disturbance**	**Grading and Land Development**	**Streets and Utilities**	**Vertical Construction**	**Landscaping and Site Stabilization**	**Post Construction**
Good Housekeeping	✓	✓	✓	✓	✓	
Stockpile Management		✓	✓	✓	✓	
Laydown/Staging Area Construction	✓	✓	✓	✓	✓	
Sawcutting, Grinding, and Paving		✓	✓	✓	✓	

Section 4 BMP Inspection and Maintenance

4.1 BMP Inspection and Maintenance

Routine daily unrecorded inspections of BMPs, along with any other inspections as designated in Section 7.4 are required on this project. A BMP inspection form must be completed for each recorded inspection and maintained on-site with the SWPPP. A blank inspection checklist can be found in Appendix E. Completed checklists shall be kept in Appendix J or in an accompanying binder.

BMPs shall be maintained regularly to ensure proper and effective functionality. Work to address corrective actions shall begin within 72 hours of identified deficiencies, and be completed as soon as possible. Any associated amendments to the SWPPP shall be prepared by a QSD.

Details for maintenance, inspection, and repair of construction site BMPs are located in the BMP Fact Sheets in Appendix H.

Section 5 Training

All persons responsible for implementing requirements of the General Permit shall be appropriately trained. Training should be both formal and informal, occur on an ongoing basis, and should include training offered by recognized governmental agencies or professional organizations. To promote stormwater management awareness specific for this project, periodic training of job-site personnel should be included as part of routine project meetings (e.g. daily/weekly tailgate safety meetings), or task specific trainings as needed. The QSP and Contractor can provide stormwater training information at the meetings, and subsequently complete a training log as provided in Appendix E.

PG&E's stormwater training expectations include the following:

- The QSP provide a SWPPP training session to site personnel at the start of the project.
- All site personnel attend a site orientation that includes storm water pollution prevention topics specific to the site.
- Annual onsite classroom or formal training prior to the rainy season for all personnel who are on-site regularly.
- The QSD, QSP, Designated Inspector(s), and Site Manager attend a formal classroom training provided by a governmental agency or professional organization annually.

The QSP may delegate activities to personnel trained to do the task(s) appropriately but shall ensure adequate performance. The QSP is responsible for ensuring that all persons working on construction related activities on-site have SWPPP training. A copy of the training record sign in sheet is filed with the on-site SWPPP immediately after the training. In cases where the initial training does not reach all members of the crew, the QSP must ensure additional training is provided. Additional training may be delegated; however, the initial training must be conducted by the QSP. The QSP is also expected to be available to train and assist those individuals conducting daily inspections. The primary and secondary daily unrecorded inspectors must be trained at the same time to ensure that the secondary contact is able to immediately step in, should the primary contact be unavailable.

Substations have specific training requirements that must be completed prior to conducting a site visit by the QSD, QSP, and all designated Inspectors. Training modules will be provided to each vendor. Completion of the relevant training must be provided to the PG&E Contract Work Supervisor prior to performing a site visit.

Retain formal and informal training documentation, including copies of QSD and QSP certificates for designated personnel, in Appendix I.

Section 6 Responsible Parties and Operators

6.1 Responsible Parties

6.1.1 Legally Responsible Person

The Legally Responsible Person (LRP) is the person, company, agency, or other entity that possess a real property interest in the land upon which the construction or land disturbance activities will occur for the regulated site. The LRP's information is listed below.

LRP Name:	Isabella Johannes
Title:	Manager, Environmental Programs
Company:	PG&E
Address:	3401 Crow Canyon Road San Ramon, CA 94583
Phone:	925-519-9672

6.1.2 Qualified SWPPP Practitioner

The QSP is the individual assigned responsibility for non-stormwater and stormwater visual observations, sampling and analysis, and responsibility to ensure compliance with the General Permit, implementation of all elements of the SWPPP, including the preparation of the Annual Report, and elimination of unauthorized discharges. If there are unresolved compliance issues, the QSP must escalate them to the PG&E Contract Work Supervisor. The QSP has primary responsibility and significant authority for General Permit compliance and may delegate activities to appropriately trained personnel for whom he/she ensures adequate performance. The QSP is expected to regularly communicate with their delegated Inspector(s) and all documented inspections performed by a delegate must be reviewed by the QSP. The QSP and Designated Inspector's (if applicable) information is listed below.

QSP Name:	Miguel Cisneros
Title:	Geologist
Company:	Stantec Consulting Services Inc.
Address:	3475 W. Shaw Ave Suite 104, Fresno CA 93711
Phone:	559-305-9555
Designated Inspector:	TBD
Title:	
Company:	

Address:

Phone:

6.1.3 Qualified SWPPP Developer

The QSD is the individual who is authorized to develop and revise the SWPPP. The QSD should be contacted regarding questions or concerns with this document. The QSD's information is listed below.

QSD Name:	Sarah McIlroy
Title:	Engineer
Company:	Stantec Consulting Services Inc.
Address:	3875 Atherton Road, Rocklin, CA 95765
Phone:	916-717-9635

6.1.4 Other Significant Responsible Parties

Project Role	**Name**	**Company**	**Phone**
Stormwater Work Supervisor	Marty Bell	PG&E	925-967-8080
Project Manager	Patty Healy	PG&E	559-263-5049
Environmental Field Specialist (EFS)	Mike Harbick	PG&E	559-269-5217
Land Planner	Michael Calvillo	PG&E	559-263-5780
Biologist			
Land Agent			
Cultural Resource Specialist			
Responsible for Implementing BMPs			
Environmental Inspector (EI)			
Primary Daily Inspector			
Backup Inspector			
Sampling Agent			

6.2 Contractor and Subcontractors

All contractors, subcontractors, and individuals who will be directed by the QSP shall be listed in Appendix F. Contractor and Subcontractor information shall include telephone numbers, work addresses, areas of responsibility, and emergency contact numbers. The list shall be updated as contractors, subcontractors, and individuals change.

Section 7 Monitoring and Reporting Program

7.1 Purpose

This Monitoring and Reporting Program (M&RP) was developed to address the following objectives:

- Implement the M&RP at the start of construction.
- Implement the M&RP at the appropriate level to protect water quality at all times throughout the life of the project.

7.2 Weather and Storm Event Tracking

Visual monitoring and inspection requirements are triggered by any amount of rainfall. A minimum of 48 hours of dry weather will be used to distinguish between separate storm events.

7.2.1 Weather Tracking

The QSP should consult the National Oceanographic and Atmospheric Administration (NOAA) for the weather forecasts. NOAA forecasts can be obtained at http://www.srh.noaa.gov/. NOAA weather reports are expected to be checked daily, preferably between the hours of 7 and 9am.

Print NOAA weather reports for pre-, during, and post-storm events and insert in Appendix J.

7.2.2 Rain Gauges

The following National Weather Service weather station will be used for forecasting monitoring and precipitation measurements:

- Fresno, Fresno Air Terminal (KFAT) (http://forecast.weather.gov/MapClick.php?CityName=Fresno&state=CA&site=HNX&textField1=36.7478&textField2=-119.771&e=1#.We-7dItSxyx)

The Fresno, Fresno Air Terminal (KFAT) weather station is located at latitude 36.78, longitude -119.71944, and is 331 feet above sea level. The station is approximately 7 miles due northwest of the project site. Due to the topography of the region, this weather station is representative of the project site.

7.3 Safety and Monitoring Exemptions

Safety practices will be in accordance with the Contractor's Health and Safety Plan for the project. A summary of the safety concerns that apply to the project are provided below.

- Trip and Fall Hazards
- Active Construction Equipment
- Wet or Muddy Surfaces
- Open Trenches
- Hazardous Material and Waste

- Traffic
- Wild Animals, Domestic Dogs, Snakes, Bees, Ticks, etc.

This project is not required to collect samples or conduct visual observations (inspections) under the following conditions:

- During dangerous weather conditions such as flooding and electrical storms.
- Outside of scheduled site business hours.

If monitoring of the site is unsafe because of the dangerous conditions noted above or other dangerous situations that may arise, the QSP or designated inspector shall document the conditions for why an exception to performing the monitoring was necessary. The exemption documentation shall be filed in Appendix J.

7.4 Visual Monitoring

Visual monitoring includes observations and inspections. Inspections 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. Visual observations of the site are required to observe storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources. The frequency of visual observations and inspections is identified in the table below.

Summary of Visual Monitoring and Inspections

Type of Inspection	Frequency
Routine Inspections	
Routine Visual Inspection	Daily (unrecorded)
QSP Inspection	Monthly
Storm Event Triggered Inspections	
During Storm Inspection	During each Storm Event
Prior to a Storm Event	Within 48 hours prior to any event that is forecast at 50% or greater probability of precipitation
During an Extended Storm Event	Once each 24-hour period during extended storm events
Following a Storm Event	Within 48 hours after any measurable rainfall

7.4.1 Routine Observations and Inspections

Routine site inspections and visual monitoring are necessary to ensure that the project is in compliance with the requirements of the General Permit and are conducted regardless of time of year or storm events. Regardless of who installs BMPs, the QSP or their delegate is expected to verify and correct installation through routine inspections. When a delegated inspector is assigned, the QSP is expected to conduct at least one inspection per month (every 30 days). This monthly inspection may not be delegated.

BMP inspections are conducted to identify and/or record:

- BMPs that are properly installed;

- BMPs that need maintenance to operate effectively;
- BMPs that failed; or
- BMPs that could fail to operate as intended.

A BMP is defined as deficient when it is not doing what it was designed to do or when it is not performing to the manufacturer's specifications.

Daily Visual Inspections along active construction zones are conducted to verify that:

- Appropriate BMPs for stormwater and non-stormwater are being implemented in areas where active construction is occurring;
- Project excavations are closed, with properly protected spoils and that road surfaces are cleaned of excavated material and construction materials such as chemicals by either removing or storing the material in protective storage containers at the end of every construction day; and
- Land areas disturbed during construction are returned to pre-construction condition or an equivalent protection is used at the end of each workday to eliminate or minimize erosion and the possible discharge of sediment or other pollutants during a storm event.

A double-sided laminated flashcard has been prepared which includes a checklist and site map (or details of the most commonly used BMPs) and is located in the front of the SWPPP binder to assist with daily inspections.

The QSP may delegate daily unrecorded inspection but remains responsible for identifying the individual, ensuring that they understand how to conduct the inspections and confirming that the inspections are done correctly. The primary and secondary daily unrecorded inspector shall be identified in Section 6. The QSP is responsible for periodically checking in with the delegated daily inspector to ensure that the SWPPP is being appropriately implemented and verify that daily unrecorded inspections are taking place. The periodic checks can be accomplished during monthly site visits and through phone calls.

Non-Stormwater Discharge Observations are conducted to inspect each drainage area for the presence of or indications of prior or current unauthorized and authorized non-stormwater discharges.

- 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 the discharge(s).

Inspections are expected to continue until final stabilization has been achieved.

7.4.2 Storm Event Triggered Observations and Inspections

Prior to Storm Events

Within two business days (48-days) prior to any event that is forecast at 50% or greater probability or precipitation, a stormwater visual monitoring site inspection will include observations of the following:

- Stormwater drainage areas to identify any spills, leaks, or uncontrolled pollutant sources;
- BMPs to identify if they have been properly implemented;

- Any stormwater storage or containment areas to detect leaks and ensure maintenance of adequate freeboard.

A pre-storm inspection is expected to occur when the NOAA forecast indicates a 50 percent or greater probability of precipitation, regardless of the forecast amount of precipitation.

During Storm Events

During an extended storm event, BMP inspections will be conducted to identify and/or record:

- BMPs that are properly installed;
- BMPs that need maintenance to operate effectively;
- BMPs that have failed; or
- BMPs that could fail to operate as intended.

If the construction site, or portions of the site, is not accessible during the storm event, list the results of visual inspections at all relevant outfalls, discharge points, downstream locations, and any project maintenance activities.

QSP is expected to perform at least one of the monthly inspections during each storm event (e.g., will require two or more QSP visits if there are two or more storm events in a month).

After Storm Events

Within two business days (48 hours) following any measurable rainfall, a stormwater visual monitoring site inspection is required to observe:

- Stormwater drainage areas to identify any spills, leaks, or uncontrolled pollutants sources;
- BMPs to identify if they have been properly designed, implemented, and effective;
- The need for additional BMPs, contact QSD if the SWPPP needs to be revised;
- Any stormwater storage and containment areas to detect leaks and ensure maintenance of adequate freeboard; and
- Discharge of stored or contained rain water.

Photographs

Photographs of the site shall be taken during inspections before, during, and after storm events, and submitted through the SMARTS website once every three storm events. Photographs from every third storm event shall be attached to the associated Inspection Form during the next site visit.

7.4.3 Visual Monitoring Procedures, Locations, Following-Up, and Reporting

Visual monitoring shall be conducted by the QSP or delegated personnel as identified in Section 6. Stormwater observations and BMP inspections shall be documented on the Inspection Form/Checklist provided in Appendix E. Any photographs used to document observations will be referenced on the inspection report and maintained with the Completed Forms in Appendix J.

Inspections and observations will be conducted at the following locations:

- BMP locations;
- Drainage area(s);

- Discharge location(s);
- Stormwater storage or containment area(s);

If failures or shortcomings are identified during visual monitoring, repairs or design changes to BMPs shall begin within 72 hours of identification and be completed as soon as possible. If a BMP deficiency is observed during a documented inspection, it must be noted on the inspection form and include the inspection date, repair start date, corrective action, individual assigned to the action, and action complete date. This shall occur even if the deficiency is remedied immediately. The QSP is expected to use the inspection form to verify that corrective actions are being implemented. If the QSP identifies that no action has occurred to remedy a deficiency, it must be escalated to the project team and PG&E Contract Work Supervisor. It is the Contractor's responsibility to initial and date the "date addressed" column provided in the Deficiency/Corrective Action table of the Inspection Form.

7.5 Non-Visible Pollutant Sampling and Analysis

The construction materials, existing contamination, wastes, and/or activities identified in Appendix D and Section 2.6 are potential sources of non-visible pollutants to stormwater discharges from the project. Storage, use, and operation locations are shown on the Site Maps in Appendix A, are described in the other sections of the SWPPP, or can be assumed given the nature of the project.

Sampling for non-visible pollutants will be conducted when the following occur:

- A breach, leakage, malfunction, or spill is observed;
- The leak or spill has not been cleaned up prior to the storm event; and
- There is potential for discharge of non-visible pollutants to a surface water or storm drain system.

Non-visible pollutant samples will typically be collected and delivered to the laboratory by the QSP or delegated inspector. If a different entity, such as a Sampling Agent, is responsible for non-visible pollutant sampling, the Sampling Agent's contact information shall be included in Section 6 and the QSP or the delegated inspector should contact the Sampling Agent 24 hours prior to a predicted sampling event or a soon as possible to ensure samples are collected in accordance with the sampling schedule.

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the project site or available by phone call prior to a sampling event. Monitoring supplies and equipment should be stored in a cool temperature environment that should 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 site or readily available by phone call may include, but are not limited, clean powder-free nitrile gloves, sample collection equipment, sample analysis equipment, cooler(s), appropriate number and volume of sample bottles, identification labels, re-sealable storage bags, paper towels, personal rain gear, ice, and Effluent Sampling Field Log Sheets and Chain of Custody (CoC) forms which are provided in Appendix E.

7.5.1 Non-Visible Pollutant Sampling Schedule

If necessary, samples for non-visible pollutant(s) and an unaffected background sample shall be collected during the first two hours of discharge from storm events which general runoff.

Samples shall be collected during the scheduled site business hours, regardless of the time of year and phase of construction.

Collection of discharge samples for non-visible pollutant monitoring will be triggered when any of the following conditions are observed during site inspections and have potential to discharge non-visible pollutants to surface waters or a storm drain system:

- Materials or wastes containing potential non-visible pollutants are not stored under watertight conditions. Watertight conditions are defined as (1) storage in a watertight container, (2) storage under watertight roof or within a building, or (3) protected by temporary cover and containment that prevents stormwater contact and runoff from the storage area.
- Materials or wastes containing potential non-visible pollutants are stored under watertight conditions, but a breach, malfunction, leakage, or spill is observed and the leak or spill is not cleaned up prior to the storm event.
- A construction activity with the potential to contribute non-visible pollutants was occurring during or within 24 hours prior to the storm event and BMP was observed to be breached, malfunctioning, or improperly implemented.
- Soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied.
- Stormwater runoff from an area contaminated by historical usage of the site has been observed to combine with stormwater runoff from the site.

7.5.2 Non-Visible Pollutant Sampling Locations

Non-visible pollutant sampling locations will be determined in the field at the time of sampling. The sample with potential non-visible pollutants shall be taken at the location of the discharge, at the project boundary, or closest accessible point. The background sample should be taken upstream of all site related potential pollution impacts or where run-on enters the site. Non-visible pollutant sampling locations shall be added to the Site Map(s) in Appendix A when/if non-visible pollutant sampling is required.

Non-visible pollutant sampling locations should be identified by the QSP or designated inspector on the pre-storm inspection form prior to a storm event.

7.5.3 Non-Visible Pollutant Sample Collection and Analysis

Non-visible pollutant samples shall be collected, preserved, stored, transported, and analyzed in accordance with the methods provided by the designated laboratory, Surface Water Ambient Monitoring Program (SWAMP) field methods, Standard Methods for the Examination of Water and Wastewater (American Public Health Association), and/or analytical methods for each constituent. Appendix D lists the specific sources and types of potential non-visible pollutants on the project site and water quality indicator constituent(s) for each pollutant.

7.5.4 Non-Visible Pollutant Data Evaluation and Reporting

The QSP shall complete an evaluation of the water quality sample analytical results. Runoff/down-gradient results shall be compared with the associated up-gradient/unaffected sample results and any run-on results. Should the runoff/down-gradient sample show an increased level of the tested analyte relative to the unaffected background sample, which

cannot be explained by run-on results, the BMPs, site conditions, and surrounding influences shall be assessed to determine the probable cause for the increase.

As determined by the site and data evaluation, appropriate BMPs shall be repaired or modified to mitigate discharges of non-visible pollutant concentrations. The QSD shall be notified regarding any revisions to the BMPs which should be recorded as an amendment to the SWPPP.

Discharges that contain hazardous substances equal to or in excess of reportable quantities established in 40 C.F.R § 117.3 and 302.4 are prohibited. The results of any non-stormwater discharge results that indicate the presence of a hazardous substance in excess of established reportable quantities shall be immediately report to the appropriate agencies as required by 40 C.F.R § 117.3 and 302.4.

Results of non-visible pollutant monitoring shall be uploaded to SMARTS as an AdHoc Report, included in the Annual Report, and recorded on the Discharge Reporting Form in Appendix E.

7.8 Non-Stormwater Sampling and Analysis

This project is not subject to non-stormwater sampling and analysis requirements.

7.9 Sampling and Analysis for Other Pollutants Required by the Regional Water Board

The Regional Water Board has not specified monitoring for additional pollutants for this project.

7.10 Training of Sampling Personnel

All sampling personnel shall be trained to collect, maintain, and ship samples in accordance with the SWAMP 2008 Quality Assurance Program Plan (QAPrP) and Standard Methods for the Examination of Water and Wastewater (American Public Health Association). Training documentation shall be located in Appendix I.

7.11 Sample Collection and Handling

Samples shall be collected, maintained, preserved, and shipped in accordance with the SWAMP 2008 Quality Assurance Program Plan (QAPrP) and Standard Methods for the Examination of Water and Wastewater (American Public Health Association), analytical constituent specific methods, and/or methods as directed by the laboratory.

To maintain sample integrity and prevent cross-contamination, sample collection personnel should follow the protocols below when applicable.

- Collect samples (for laboratory analysis) only in analytical laboratory-provided sample containers;
- Wear clean, powder-free nitrile gloves when collecting samples;
- Change gloves whenever contamination may have occurred;
- Change gloves between sites;

- Decontaminate all equipment (e.g. bucket, tubing) prior to sample collection using 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 eat, drink, or smoke while collecting samples;
- Never sample near a running vehicle;
- Do not park vehicles in the immediate sample collection area; and
- Do not breathe, sneeze, or cough in the direction of an open sample container.

The Sampler should collect a sample that represents the entire runoff stream. Typically, samples are collected by dipping the collection container in the runoff flow path or stream as noted below.

- For small streams and flow paths, simply dip the bottle facing upstream until full.
- Avoid collection samples from ponded, sluggish, or stagnant water.
- Do not enter manholes or drain inlets; use a pole-sampler.
- Use the capture and transfer method to collect samples in very shallow or sheet flow.

Depending upon the specific analytical test, some containers may contain preservatives. These containers should not be dipped into the stream, but filled indirectly from a collection container.

7.12 Sample Handling

pH measurements must be conducted immediately, do not store pH samples for later measurement. Turbidity measurements may be conducted immediately or in a laboratory. Samples for laboratory analysis should be handled as follows. Immediately following sample collection:

- Cap sample containers;
- Prepare sample container labels;
- Seal containers in re-sealable storage bags;
- Place sample containers into an ice-chilled cooler;
- Document sample information on a Sample Log sheet; and
- Complete the CoC.

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 the time of sample collection through delivery to the laboratory. Ensure sample bottles are well packaged to prevent breakage and secure cooler lids with packaging tape.

Ship samples that will be laboratory analyzed to the 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 laboratory within 48 hours of the sampling (unless required sooner by the laboratory).

This project anticipates sending any required laboratory samples to the location listed below.

Laboratory Name:	BSK Labs
Address:	1414 Stanislaus Street
City, State, Zip:	Fresno, CA 93706
Telephone Number:	(559) 497-2888
Point of Contact:	Michael Brechmann

7.13 Sample Documentation Procedures

Data documented on sample bottle identification labels, field log sheets, and CoCs should be recorded using waterproof ink. Sample documentation shall be considered accountable documents and therefore if an error is made on an accountable document, corrections should be made by lining through the error and entering the correct information. Erroneous information should not be obliterated and corrections should be initialed and dated.

Sample documentation procedures include the following:

- Sample Bottle Identification Labels: Attach an identification label to each sample bottle and uniquely identify each location. Duplicate samples shall be identified consistent with the numbering system for other samples to prevent the laboratory from identifying duplicate samples. Duplicate samples shall be identified on the field log sheets.
- Field Log Sheets: Complete a field log sheet for each sampling event.
- Chain of Custody (CoC): Complete for each sampling event for which samples are collected for laboratory analysis. Sign the CoC when the sample(s) is(are) turned over to the testing laboratory or courier.

7.14 Active Treatment System Monitoring

This project does not require a project specific sampling and analysis plan for an ATS because deployment of an ATS is not anticipated for this project.

7.15 Bioassessment Monitoring

This project is not subject to bioassessment monitoring.

7.16 Watershed Monitoring Option

This project is not participating in a watershed monitoring program.

7.17 Quality Assurance and Quality Control

An effective Quality Assurance and Quality Control (QA/QC) plan shall be implemented as part of the CSMP 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.

7.17.1 Field Logs

The purpose of field logs is to recording sampling information and field observations during monitoring that may explain any uncharacteristic analytical results. Sampling information to be included in the field log includes the date and time of water quality sample collections, sampling personnel, sample 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. An example Sampling Log is included in Appendix E.

7.17.2 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. A clean sampling approach will minimize the chance of field contamination and questionable data results.

7.17.3 Chain of Custody

The CoC is an important documentation step that tracks samples from collection through analysis to ensure the validity of the sample. Analytical laboratories usually provide CoC forms to be completed for sample containers. An example CoC is included in Appendix E.

7.17.4 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. QA/QC samples include field duplicates, equipment blanks, field blanks, and travel blanks.

Field Duplicates

Field duplicates provide verification of laboratory or field analysis and sample collection. Duplicate samples shall be collected, handled, and analyzed using the same protocols as primary samples. The sample location where field duplicates are collected shall be randomly selected from the discharge locations. Duplicate samples shall be collected immediately after the primary sample, must be collected in the same manner. Duplicate samples shall not influence any evaluations or conclusion. Field Duplicates are required at a frequency of 5 percent (1 of 20) or 1 duplicate minimum per sampling event.

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.

Field Blanks

Field blanks assess potential sample contamination levels that occur during field sampling activities. De-ionized water filled 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. Field Blanks are required at a frequency as required by the laboratory for the test method as required.

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. Travel Blanks, at a frequency determined by that laboratory, are required for sampling plans that include VOC laboratory analysis.

7.18 Data Verification

After results are received from the analytical laboratory, the QSP shall 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 shall include:

- Check the CoC and laboratory reports. Ensure all requested analyses were performed and all samples are accounted for in the reports.
- Check Laboratory reports to make sure hold times were met.
- Check Laboratory report to make sure analysis meets or is lower than reporting levels.
- 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. The QSP should note data that is an order of magnitude or more different than similar locations, or is inconsistent with previous data from the same location. 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.
- Check the laboratory QA/QC results. Evaluate the reported data to check for contamination, precision, and accuracy. When QA/QC checks are outside acceptable ranges, the laboratory must flag the data, and usually provide an explanation of the potential impact to the sample results.

Field data, including inspections and observations should be verified as soon as the field logs are received; typically at the end of the sampling event. Field data verification should include:

- Checking field logs to make sure all required measurements were completed and appropriately documented;
- Checking reported values that appear out of the typical range or inconsistent and follow up immediately to identify potential reporting or equipment problems, if appropriate, recalibrate equipment;
- Verifying equipment calibrations;
- Reviewing observations noted on the field logs; and
- Reviewing notations of any errors and actions taken to correct the equipment or recording errors.

7.19 Records Retention

All records of stormwater monitoring information and copies of reports, including annual reports, must be retained for a period of at least three years from the date of submittal or longer if required by the Regional Water Board.

Results of visual monitoring, field measurements and laboratory analyses must be kept in the SWPPP along with CoCs, and other documentation related to the monitoring.

Records are to be kept onsite while construction is ongoing. Records to be retained include:

- The date, place, and time of inspections, sampling, visual observations, and/or field measurements, including precipitation;
- Names of the individual(s) who performed the inspections, sampling, visual observations, and/or field measurements;
- The date and approximate time of field measurements and laboratory analyses;
- The names of the individual(s) who performed the analyses;
- A summary of all analytical results, the method detection limits and reporting limits, and the analytical techniques or methods used;
- Rain gauge readings from site inspections;
- QA/QC records and results;
- Non-stormwater discharge inspections and visual observations and stormwater discharge visual observation records;
- Visual observation and sample collection exemption records; and
- Records of any corrective actions and follow-up activities that resulted from analytical results, visual observations, or inspections.

Section 8 References

The following plans, specifications, permits, and/or other documents are included in this SWPPP by reference.

- Revised Project Overview Figure 2, dated October 2017, prepared by Haley and Aldrich.
- State of California Public Utilities Commission website, dated July 17, 2017 http://www.cpuc.ca.gov/environment/info/ene/sanger/sanger.html
- The State Water Resources Control Board, Surface Water Ambient Monitoring Program, Quality Assurance Program Plan, Version 1.0 date September 1, 2008.
- Standard Methods for the Examination of Water and Wastewater, American Public Health Association.
- CASQA 2009, Stormwater BMP Handbook Portal: Construction, November 2009

Appendix A

Vicinity Maps, Site Maps, and Daily Inspection Flashcard

PACIFIC GAS & ELECTRIC COMPANY

Sanger Substation Expansion Project

Storm Water Pollution Prevention Plan Drawings

Order No. 74001710

BMP ID	BMP Name	Notes
EC-1	Scheduling	Entire project, at all times, limit or stop soil disturbance activities and pollutant use during precipitation.
EC-2	Preservation of Existing Vegetation	Entire project, at all times, the overall footprint of the project will be minimized.
EC-4	Hydroseeding	Hand apply seed to stabilize areas around pole and tower removal/replacement sites within grass, as necessary.
EC-15	Soil Preparation and Roughening	To be used around tower/pole placements.
EC-16	Nonvegetative Stabilization	Non-vegetative stabilization to be used within the expanded substation.
WE-1	Wind Erosion Control	At all times.
SE-1	Silt Fence	Install silt fence around the perimeter of the northern, eastern, and western substation expansion areas and the southern side of the proposed ponding basin.
SE-5	Fiber Rolls	Place fiber rolls around tower removal sites, new pole installation sites, and Pull Sites as necessary based on weather and/or site conditions, and around the base of all temporary soil stockpiles. Use biodegradable fiber rolls only.
SE-7	Street Sweeping	Street sweeping and vacuuming with the use of hand brooms or mechanical sweepers on paved roads will be performed as needed based on daily inspections.
TC-1	Stabilized Construction Entrance	Corrugated steel panels (i.e. rumble racks) and crushed aggregate before and after rumble rack (3" to 6" in diameter) to be installed at construction entrances/exits. Maintain as needed based on daily inspections.
TC-2	Stabilized Construction Roadway	Trucks are to drive single file to preserve vegetation. Highly disturbed access roads will be hydroseeded (or stabilized like-for-like) to prevent erosion.
NS-1	Water Conservation Practices	Entire project at all times. Limit water use (i.e. use for adequate dust control but do not overwater to create erosion issues). Check water truck for leaks.
NS-3	Paving and Grinding Operations	Schedule all paving activities for after storm events.
NS-6	Illicit Connection or Discharge	Report illicit connection or discharge immediately to site superintendent.
NS-7	Potable Water Irrigation	Limit water use for landscape irrigation.
NS-8	Vehicle and Equipment Cleaning	On-site construction equipment cleaning is not anticipated to occur; however, in the event on-site cleaning is required, ensure that appropriate containment of cleaning operations is provided. Cleaning shall only occur in a designated area.
NS-9	Vehicle and Equipment Fueling	Ensure that drip pans, absorbent materials, and spill kits are on-site and readily available in the event of a spill or leak. Fueling shall be in a designated area with appropriate BMPs in place. Immediately clean and dispose of leaked material properly. Ensure that all on-site fuel containers are stored within secondary containment systems.
NS-10	Vehicle and Equipment Maintenance	Vehicle and equipment maintenance is not expected to occur on-site. However, if on-site maintenance is required, ensure that drip pans, absorbent materials, and spill kits are available in the event of a spill or leak. Maintenance of construction equipment should also be conducted over plastic sheeting or temporary secondary containment systems.
NS-12	Concrete Curing	Concrete washout will be contained so there is no discharge into the underlying soil and onto the surrounding areas. Schedule all paving activities for after storm events.
NS-13	Concrete Finishing	Concrete washout will be contained so there is no discharge into the underlying soil and onto the surrounding areas. Schedule all paving activities for after storm events.

BMP ID	BMP Name	Notes
WM-1	Material Delivery and Storage	Properly store and protect all materials from the elements (bulk or packaged) on-site. Refer to WM-3 below for stockpile of materials management.
WM-2	Material Use	Follow manufacturer's instructions for all materials to be used during the course of the project. Train all on-site crews for proper materials handling, storage, and cleanup measures.
WM-3	Stockpile Management	Stockpiles will be bermed with fiber rolls (SE-5) while inactive and during rain events (Refer to PG&E Stockpile A-ESCP for minimum standards).
WM-4	Spill Prevention and Control	Spill kits shall be kept on-site during the project scope and all spills will be reported to the EFS.
WM-5	Solid Waste Management	Collect site trash daily. Cover waste containers at the end of each work day and when it is raining.
WM-6	Hazardous Waste Management	Hazardous materials, if used during the project activities, shall be stored in a covered area, over secondary containment, and properly labeled.
WM-7	Contaminated Soil Management	Should contaminated soil be uncovered during the project, stop work and notify PM and EFS immediately. Do not proceed to remove contaminated soils prior to testing soils for chemical compounds.
WM-8	Concrete Waste Management	Concrete truck washout shall be conducted in designated temporary concrete washout facility. Concrete waste shall be contained and covered at designated facility until removed from the project site.
WM-9	Sanitary Septic Waste Management	If temporary sanitary facilities are installed at the project site, ensure they are located where spills will not enter on-site drainages. Anchor down temporary sanitary facilities to prevent tip-over during inclement weather.
WM-10	Liquid Waste Management	Liquid wastes, if generated during the project activities, shall be placed in a leak proof container and closed at the end of each day or prior to inclement weather. Liquid waste containers should be stored over secondary containment or within a covered area.

A-ESCP Name	Notes
Good Housekeeping	Entire project, every day.
Stockpile Management	Every temporary soil stockpile, every day.
Laydown/Staging Area Construction	Through duration of project.
Sawcutting, Grinding, and Paving	Where applicable during paving operations.

Permanent Stabilization

BMP	Notes
Permanent Vegetation	Use a certified weed-free, fast-germinating, native seed mix.
Non-vegetative Stabilization	Use gravel in the substation expansion areas.

GENERAL EROSION AND SEDIMENT CONTROL DRAWING NOTES:

1. THESE DRAWINGS ARE AN ATTACHMENT TO AND MEANT TO BE USED WITH THE PG&E PROJECT PLANS.
2. THE INFORMATION ON THESE DRAWINGS IS ACCURATE FOR STORM WATER POLLUTION PREVENTION PURPOSES ONLY. SITE AND WEATHER CONDITIONS MAY CHANGE THE EFFECTIVENESS OF THE SUGGESTED BMPS. SITE PERSONNEL RESPONSIBLE FOR DAILY ACTIVITIES SHALL MONITOR THE EFFECTIVENESS OF APPLIED BMPS AND MODIFY OR APPLY ADDITIONAL BMPS AS NEEDED.
3. WORK VEHICLES SHALL BE RESTRICTED TO WORK AREAS OR ACCESS ROUTES ONLY.
4. ALL CREWS, CONTRACTORS AND SUBCONTRACTORS WILL IMPLEMENT A POLICY OF "ZERO EXPOSURE" OF NON-VISIBLE POLLUTANTS TO STORM WATER RUN-ON OR RUNOFF.
5. CONSTRUCTION MATERIALS AND WASTE MATERIALS SHALL BE PROTECTED FROM CONTACT WITH STORM WATER. EXPOSED SURFACES SHALL BE COVERED PRIOR TO RAIN EVENTS.
6. THE SITE SHALL BE KEPT FREE FROM LITTER AND DEBRIS. CONSTRUCTION WASTE AND HAZARDOUS WASTE SHALL BE CONTAINED IN APPROPRIATE WASTE RECEPTACLES AND DISPOSED OF ON A REGULAR SCHEDULE. ALL TRASH MUST BE REMOVED AT THE END OF EACH WORK DAY. WASTE MUST BE COVERED DURING RAIN EVENTS.

DRAWING INDEX

Client/Project

Pacific Gas & Electric Company
Sanger Substation Expansion Project
Storm Water Pollution Prevention Plan Drawings
Order No. 74001710

Sanger, CA 93657
Latitude: 36.70724
Longitude: -119.61109
Disturbance Area: 24.660 ac

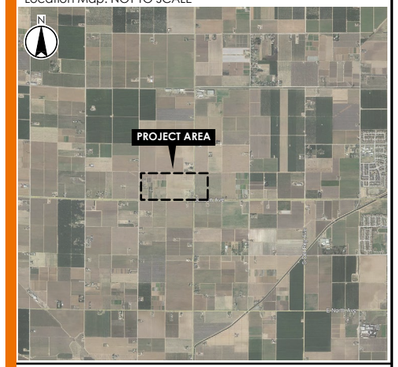
WDID Information

WDID # **5F10C384810**

Contact Information

PG&E Contract Work Supervisor
Marty Bell 925-967-8080
Project Manager
Carl Lindberg 559-240-4748
Environmental Lead
Michael Calvillo 559-263-5780
Land Planner
Michael Calvillo 559-263-5780
EFS
Mike Harbick 559-269-5217
QSD
Sarah McIlroy 916-717-9635

Location Map: NOT TO SCALE



Vicinity Map: NOT TO SCALE

Stantec

Stantec Consulting Services Inc.
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3875 Atherton Road
Rocklin, CA 95765
Tel. 916.773.8100
Fax 916.773.8448

Title

Title Sheet, Notes & BMP Fact Sheet

Project Number	Scale	
185704218	AS SHOWN	
Drawing Number	Sheet	Revision
1.0	1 of 3	0

N

0 80 160 240 320 400
APPROXIMATE SCALE IN FEET

BMPs:
EC-1, EC-2, EC-4, EC-15, EC-16, WE-1, SE-1, SE-5, SE-7, TC-1, TC-2, NS-1, NS-3, NS-6, NS-7, NS-8, NS-9, NS-10, NS-12, NS-13, WM-1, WM-2, WM-3, WM-4, WM-5 WM-6, WM-7, WM-8, WM-9, WM-10

TEMPORARY LAYDOWN AREA, APPROXIMATELY 112'x974'

SE-1
SE-7
TC-1
SE-7
TC-1
SE-7
SE-1

E JENSEN AVE
S THOMPSON AVE
McCALL AVE

LEGEND

- EXISTING POLE TO REMAIN
- EXISTING TOWER TO BE REMOVED
- EXISTING POLE TO BE REMOVED
- EXISTING POLE TO BE TOPPED
- NEW POLE TO BE INSTALLED
- NEW POWER LINE
- EXISTING POWER LINE TO REMAIN
- POWER LINE TO BE REMOVED (UNDERBUILD TO REMAIN)
- POLE PROTECTION DETAIL SEE DETAIL 5/DWG 3
- FIBER ROLL, SEE DETAIL 2/DWG 3
- EXISTING SUBSTATION FOOTPRINT
- SUBSTATION EXPANSION FOOTPRINT
- PULL AND TENSION SITES
- TEMPORARY ACCESS ROAD
- EXISTING FARM ROAD
- STORMWATER BASIN
- DRAINAGE FLOW PATH
- SILT FENCE, SEE DETAIL 3/DWG 3
- STABILIZED CONSTRUCTION ENTRANCE SEE DETAIL 4/DWG 3
- TEMPORARY LAYDOWN AREA, SEE NOTE 5

NOTES:

1. Transition from paved to unpaved access roads to be stabilized (TC-1).
2. Paved streets to be swept (SE-7) during active construction.
3. Hydroseeding (EC-4) may be used around pole and tower removal/replacement sites within grass.
4. Fiber rolls (SE-5) to be used around tower removal sites and Pull Sites as necessary based on site and/or weather conditions.
5. The temporary laydown area will be in place and temporarily fenced during the entire project. For the laydown area, mirafi fabric will be placed on top of the soil, and then 8 to 10 inches of baserock will be placed on top of the fabric followed by a light compaction to level the surface. At the end of construction, the temporary fencing, rock and fabric will be removed and the area underneath will be restored to pre-existing conditions.

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Location Map: NOT TO SCALE

Vicinity Map: NOT TO SCALE

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Title

SWPPP Site Plan

Project Number	Scale	
185704218	AS SHOWN	
Drawing Number	Sheet	Revision
2.0	2 of 3	0

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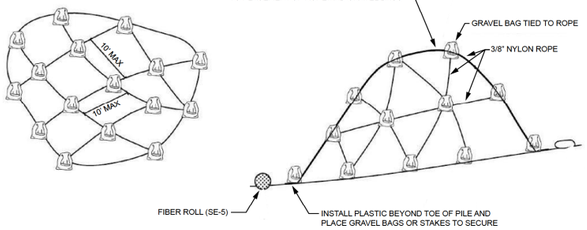
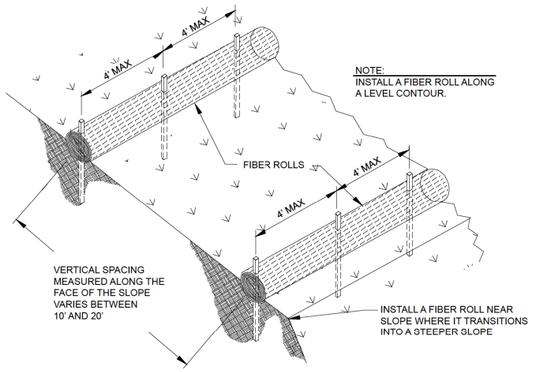
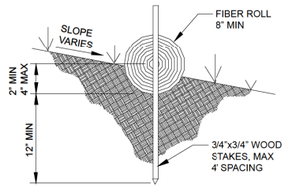


STOCKPILES DETAIL

1



TYPICAL FIBER ROLL INSTALLATION, NTS



ENTRENCHMENT DETAIL, NTS

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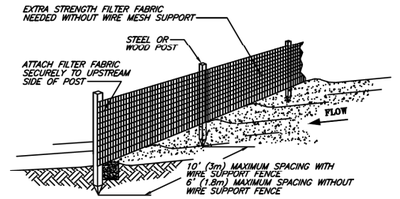
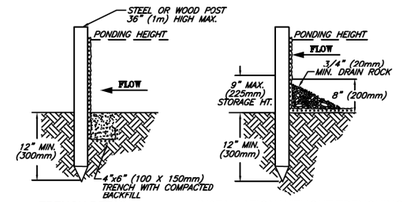
FIBER ROLL DETAIL

2





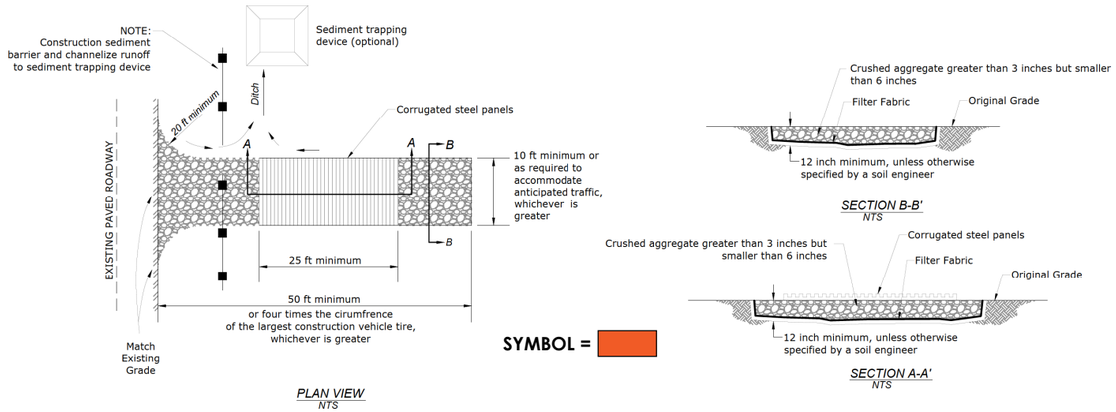
TRENCH DETAIL — INSTALLATION WITHOUT TRENCHING

NOTES:
1. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
2. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY. 9" (225mm) MAXIMUM RECOMMENDED STORAGE HEIGHT.
3. REMOVED SEDIMENT SHALL BE I ...OSITED TO AN AREA THAT WILL NOT CONTI ...TE SEDIMENT OFFSITE AND CAN BE PI ...ANENTLY STABILIZED.

SYMBOL =

SILT FENCE DETAIL

3



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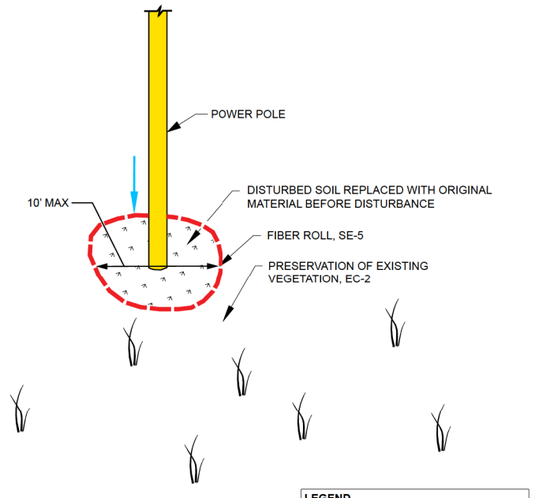
STABILIZED CONSTRUCTION ENTRANCE/EXIT DETAIL

4



SYMBOL =

TYPICAL POLE PROTECTION DETAIL

5

Client/Project

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Sanger Substation Expansion Project
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Order No. 74001710

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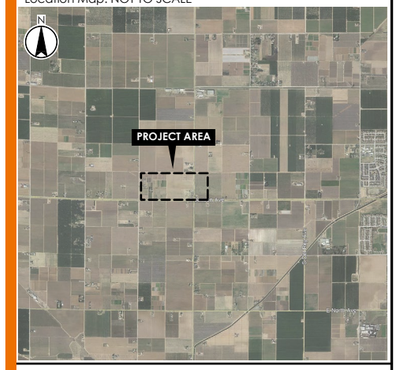

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SWPPP Details

Project Number	Scale	
185704218	AS SHOWN	
Drawing Number	Sheet	Revision
3.0	3 of 3	0

LUP TYPE 1 BMP VISUAL INSPECTION CHECK LIST

Circle All That Apply:

LUP Type 1	Daily Site BMP	Pre-Storm Event Baseline	Daily Storm BMP	Post Storm
Visual Inspection	X			
Photographic Records [1]		X	X	X

[1] Photo-documentation transmitted to QSD (brian.wickes@stantec.com)

Good Housekeeping for Construction Materials	Y	N	N/A
1. Inventory of products up to date.			
2. Stockpiled construction materials not actively in use are covered and bermed.			
3. All chemicals are stored in water tight containers with appropriate secondary containment.			
4. Construction materials are minimally exposed to precipitation.			
5. BMPs preventing the off-site tracking of materials are implemented and effective.			

Good Housekeeping for Waste Management	Y	N	N/A
1. Portable toilets are contained to prevent discharge of waste.			
2. Sanitation facilities are clean with no apparent leaks or spills.			
3. BMPs are in place to cover waste disposal containers at the end of the day and during rain events.			
4. Discharges from waste disposal containers are prevented from entering storm drain inlets or receiving waters.			
5. Stockpiled waste material is securely protected from wind and rain if not actively in use.			
6. Procedures are in place to address hazardous and non-hazardous spills.			
7. Appropriate spill response personnel are assigned and trained.			
8. Equipment and materials for spill clean-up are available onsite.			
9. Washout areas are contained appropriately to prevent discharge or infiltration to soil.			

Good Housekeeping for Vehicle Storage & Maintenance	Y	N	N/A
1. Measures are in place to prevent oil and fuel from leaking into ground, storm drain inlets, or surface waters.			
2. All equipment or vehicles are fueled, maintained, and stored in designated areas with appropriate BMPs.			
3. Vehicle and equipment leaks are cleaned immediately and disposed of properly.			

Good Housekeeping for Landscape Materials	Y	N	N/A
1. Stockpiled materials such as mulches and topsoil are contained and covered when not in use.			
2. Erodible landscape materials have not been applied 2 days prior to a forecasted rain event.			
3. Erodible landscape materials are applied at quantities and rates with manufacturer recommendations.			
4. Bagged erodible landscape materials are stored on pallets and covered.			

Non-Stormwater Management	Y	N	N/A
1. Non-Stormwater discharges are properly controlled.			
2. Vehicles are washed in a manner to prevent non-stormwater discharges to surface waters or drainage systems.			
3. Streets are cleaned in a manner to prevent unauthorized non-stormwater discharges to surface waters or drainage systems.			

SWPPP	Y	N	N/A
1. The project SWPPP and BMP plans are up to date, available on-site and properly implemented.			

Erosion Controls	Y	N	N/A
1. Wind erosion controls are effectively implemented.			
2. Effective soil cover is provided for disturbed areas that are inactive as well as finished slopes, open space, utility backfill and completed areas.			
3. Measures are implemented on-site to control the air deposition of site materials and from site operations.			
4. The use of plastic materials is limited in cases when a more sustainable, environmentally friendly alternative exists.			

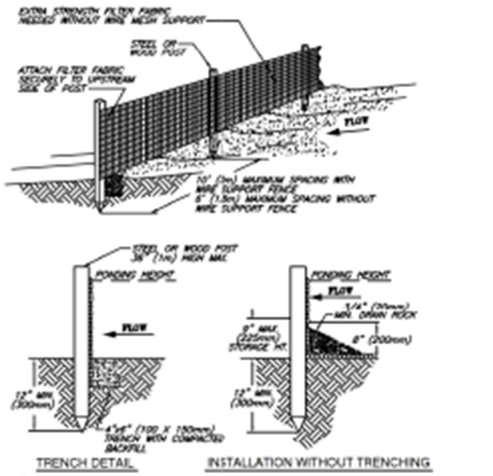
Sediment Controls	Y	N	N/A
1. Perimeter controls are established and effective at controlling erosion and sediment discharges from the site.			
2. Entrances and exits are stabilized to control erosion and sediment discharges from the site.			
3. Sediment basins are properly maintained.			

Run-On and Run-Off Controls	Y	N	N/A
1. Run-on to the site is effectively managed and directed away from all disturbed areas.			

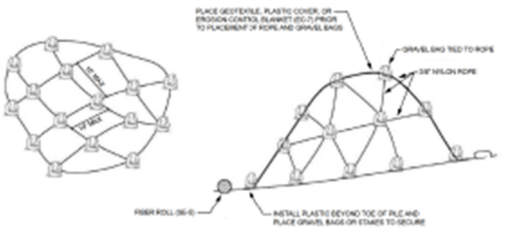
NOTES

1. Is entrance to staging area swept?
2. Are roadways clean of litter and construction material?
3. Are stockpiles covered or removed if not actively being used?
4. Are trash cans and dumpsters covered at the end of the day?
5. Are trenches backfilled and/or protected at end of each work day?
6. Are all construction materials under cover or stored on secondary containment during rain events?

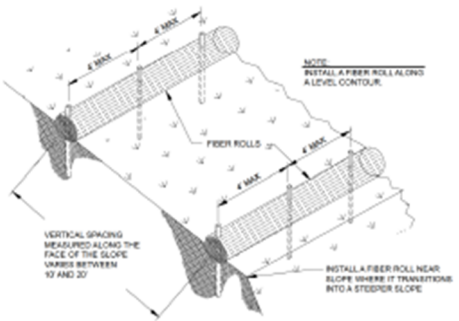
Details of Prominent BMPs



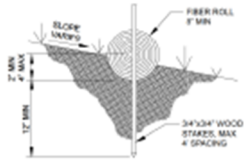
SILT FENCE DETAIL 5



STOCKPILES DETAIL 1



TYPICAL FIBER ROLL INSTALLATION, NTS



ENTRENCHMENT DETAIL, NTS

SYMBOL =

FIBER ROLL DETAIL 2

	PACIFIC GAS AND ELECTRIC COMPANY Sanger Substation Expansion Sanger, California PRO.ECT NO. DA1E DRAWN BY APPRCMD B'I'	DAILY VISUAL NOTES

Appendix B

Applicable Permit Registration Documents

Sanger Substation Expansion F **Order #:** 74001710

Calculating Soil Disturbance Areas of Construction Projects

The State Water Resources Control Board requires permitting under the New State General Storm Water Construction Permit for construction activities, where soil disturbance is one acre or greater. To determine whether a construction project or activity disturbs an acre or more of soil, the surface area (square feet) for the following activities* must be determined. Items numbered below refer to activities occurring on **unpaved** surfaces unless otherwise specified. If the sum of these activities equals or exceeds 43,560 square feet or 1 acre, then permit coverage and a Storm Water Pollution Prevention Plan (SWPPP) must be obtained before commencement of the construction activity. (Cells into which data should be entered are shaded green.)

ACTIVITIES - type in description of activity and put dimensions in green area			Width	Length	AREA IN FT2
1. Surface areas of trenches and laterals (includes trenches within paved areas)					
					0
					0
					0
2. Unpaved areas adjacent to trench (consider permanent easement plus temporary construction easement)					
					0
					0
					0
					0
3. Ancillary facilities, such as jack/bore pits, HDD areas, poles, tension/pull sites, pads, and access vaults that are outside of the areas calculated in 1 or 2 above.					
Pull/tension sites			2.6	43560	113256
					0
					0
4. Area of the base of stockpiles on unpaved surfaces not included in 1-3 above.					
					0
					0
					0
					0
5. Borrow areas not included in 1-3 above.					
					0
					0
					0
					0
6. Area of equipment and material storage, staging, and preparation areas (laydown) not on paved surfaces and outside of 1-3 above.					
					0
					0
					0
					0
7. Vehicle parking if unpaved outside of 1-3 & 5 above					
					0
					0
					0
					0
8. Poles/ towers footprints of work areas	Enter the number of poles or towers here ▼				
	Tubular Steel Poles - 40 ft x 40 ft	29			46400
	Wood Poles - 10 ft x 10 ft	17			1700
	Towers - 50 ft x 50 ft	17			42500
9. Improved helicopter landing sites (e.g., graded and/or rocked) and sites where helicopter refueling will occur. (Vegetated areas used for touchdowns in the dry season should not be included if soil disturbance and refueling will not occur there.)					
					0
					0
					0
					0
11. New road construction, upgrades to existing roads that would change composition (e.g., unpaved to paved), or change dimension of road (e.g., widening). Overland access where no roads are present, such as across grasslands would be included especially if use is during wet season. The exclusion of this activity can be evaluated by the Storm Water Team for dry season, limited drive-in and drive-out use as long as the activity does not cause soil disturbance (this needs to be confirmed with the Storm Water Team before excluding from the calculation).					
Temporary access roads (12.71 acres)			12.71	43560	553647.6
					0
12. Areas of paved surfaces constructed for the project other than roads included above.					
Two new driveways (0.1 acres)			0.1	43560	4356
					0
					0
					0
13. Other:					
New retaining ponds area (0.6 acres)			0.6	43560	26136
New Sub area (6.57 acres)			6.57	43560	286189.2
					0
					0
Total Surface Area in Acres					**24.660**

General Information			
Project/Site Name:	Sanger Substation Expansion Project	Segment Name:	Segment 1
Assessment Date:	8/20/2018	Completed By:	Shawn Agarwal
Construction Start Date:	10/1/2018	End Date:	12/31/2019

Segment 1 - Sediment Risk	
R-Factor:	35.01
K-Factor:	0.32
LS-Factor:	0.11
RxKxLS:	1.23
Sediment Risk:	**Low**

Start Date:	10/1/2018
End Date:	12/31/2019
Latitude:	36.7072
Longitude:	-119.6111

RxKxLS	
<15	Low
15-75	Medium
>75	High

Segment 1 - Receiving Water Risk			
Receiving Water Risk:	**Low**	Project is not in a Sediment Sensitive Watershed.	Low
		In a Sediment Sensitive Watershed but not in the flood plain or flood prone area.	Medium
		In the flood plain or flood prone area of a Sediment Sensitive Watershed.	High

Segment 1 - Combined Risk	
Project Type:	**1**

	Low	Med	High
Low	1	1	2
Med	1	2	3
High	2	3	3

Sediment Risk Calculation

United States Environmental Protection Agency

Rainfall Erosivity Factor Calculator for Small Construction Sites

EPA's stormwater regulations allow NPDES permitting authorities to waive NPDES permitting requirements for stormwater discharges from small construction sites if:

- the construction site disturbs less than five acres, and
- the rainfall erosivity factor ("R" in the revised universal soil loss equation, or RUSLE) value is less than five during the period of construction activity.

If your small construction project is located in an area where EPA is the permitting authority and your R factor is less than five, you qualify for a low erosivity waiver (LEW) from NPDES stormwater permitting. LEW certifications are submitted through the electronic Notice of Intent (eNOI) system. Several states that are authorized to implement the NPDES permitting program also accept LEWs. Check with your state NPDES permitting authority for more information.

- List of states, Indian country, and territories where EPA's 2012 Construction General Permit (CGP) and Multi-Sector General Permit (MSGP) Apply
- EPA's CGP eNOI System

The period during which small construction sites qualify for the waiver generally occurs during a relatively short time in arid and semi-arid areas. If your small construction project does not qualify for a waiver, then NPDES stormwater permit coverage is required.

To use the Rainfall Erosivity Factor Calculator to determine your eligibility for the LEW, you will need your project's location (either latitude/longitude or address) and the estimated start and end dates of construction. The period of construction activity begins at initial earth disturbance and ends with final stabilization.

- Construction Rainfall Erosivity Waiver Fact Sheet
- Appendix C of the 2017 CGP – Small Construction Waivers and Instructions

For questions or comments, email EPA's CGP staff at cgp@epa.gov.

Facility Information

- Start Date: 10/01/2018
- End Date: 12/31/2019
- Latitude: 36.7072
- Longitude: -119.6111

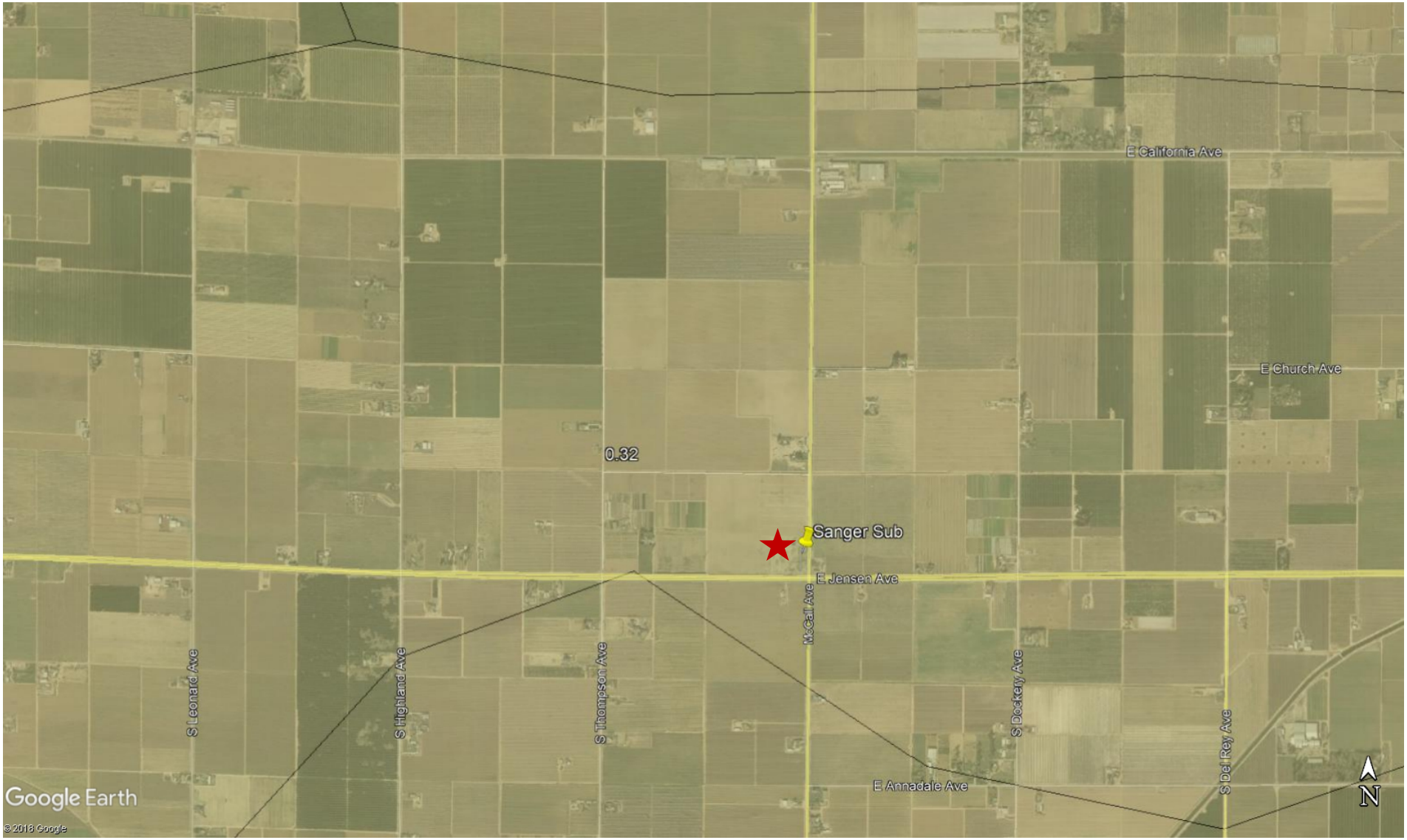
Erosivity Index Calculator Results

An erosivity index value Of **35.01** has been determined for the construction period of **10/01/2018** - **12/31/2019**.

A rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction. **You do NOT qualify for a waiver from NPDES permitting requirements**.

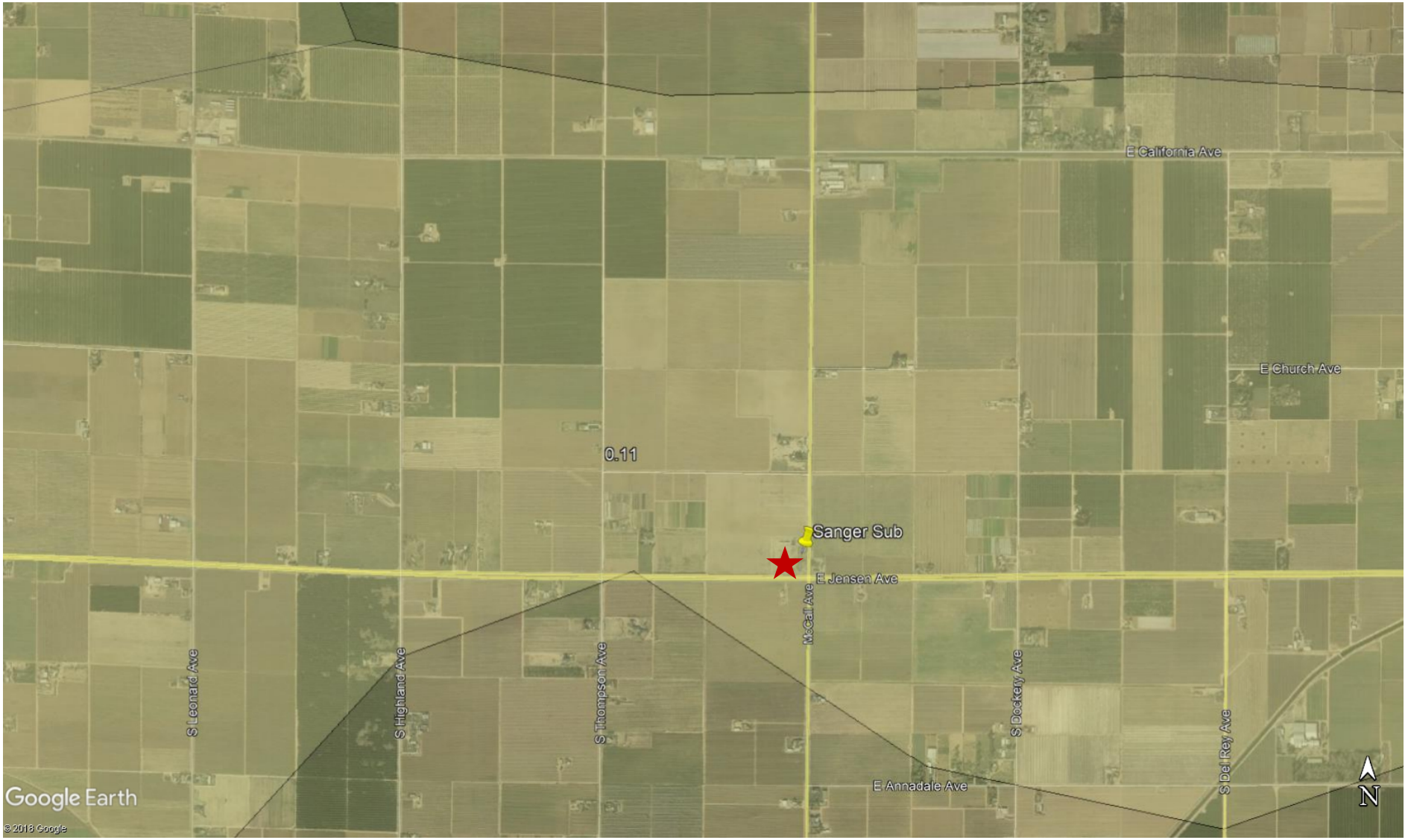
Start Over

K-Factor Documentation



Source: SWRCB GIS files via Google Earth overlay; dated September 2011

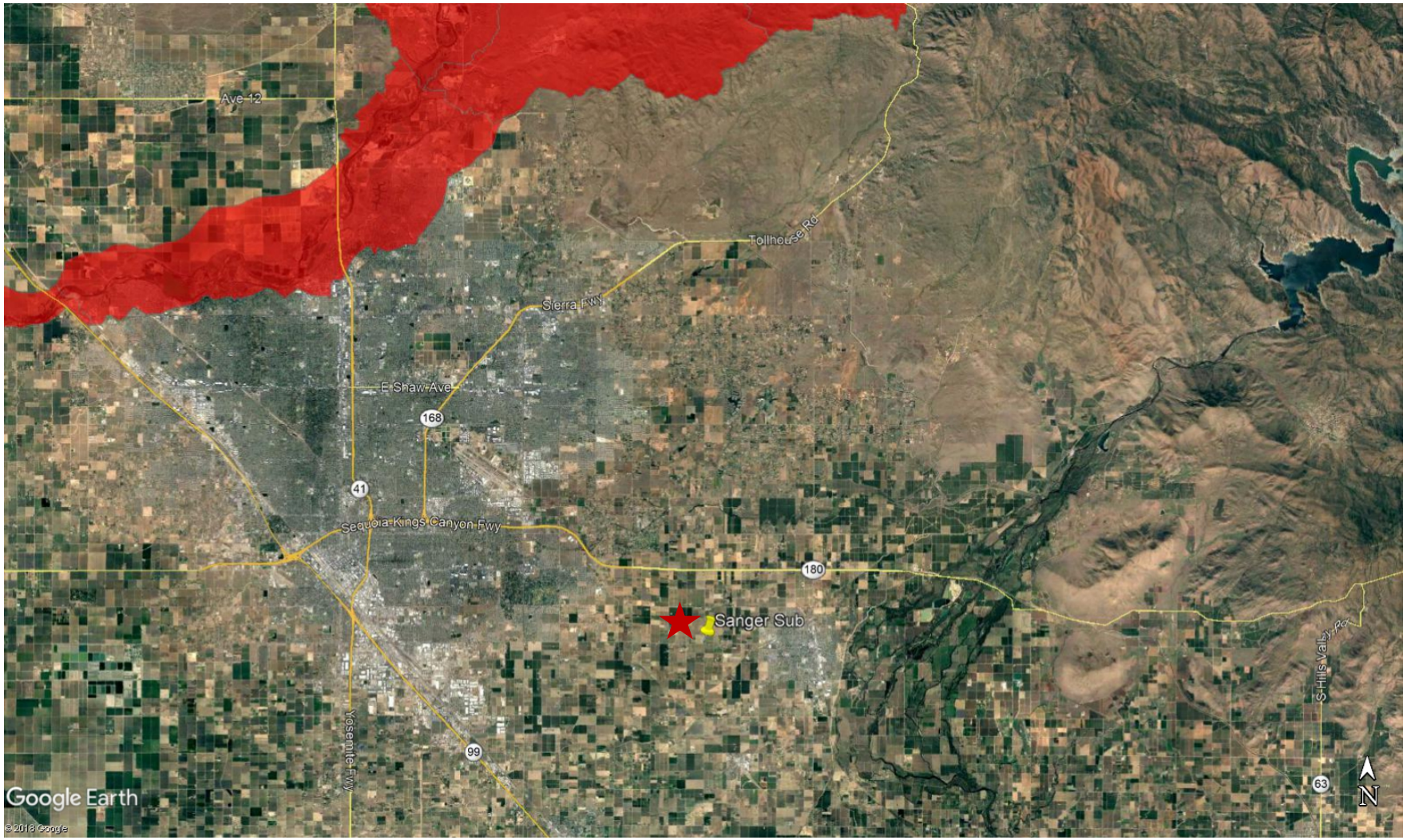
LS-Factor Documentation



Source: SWRCB GIS files via Google Earth overlay; dated September 2011

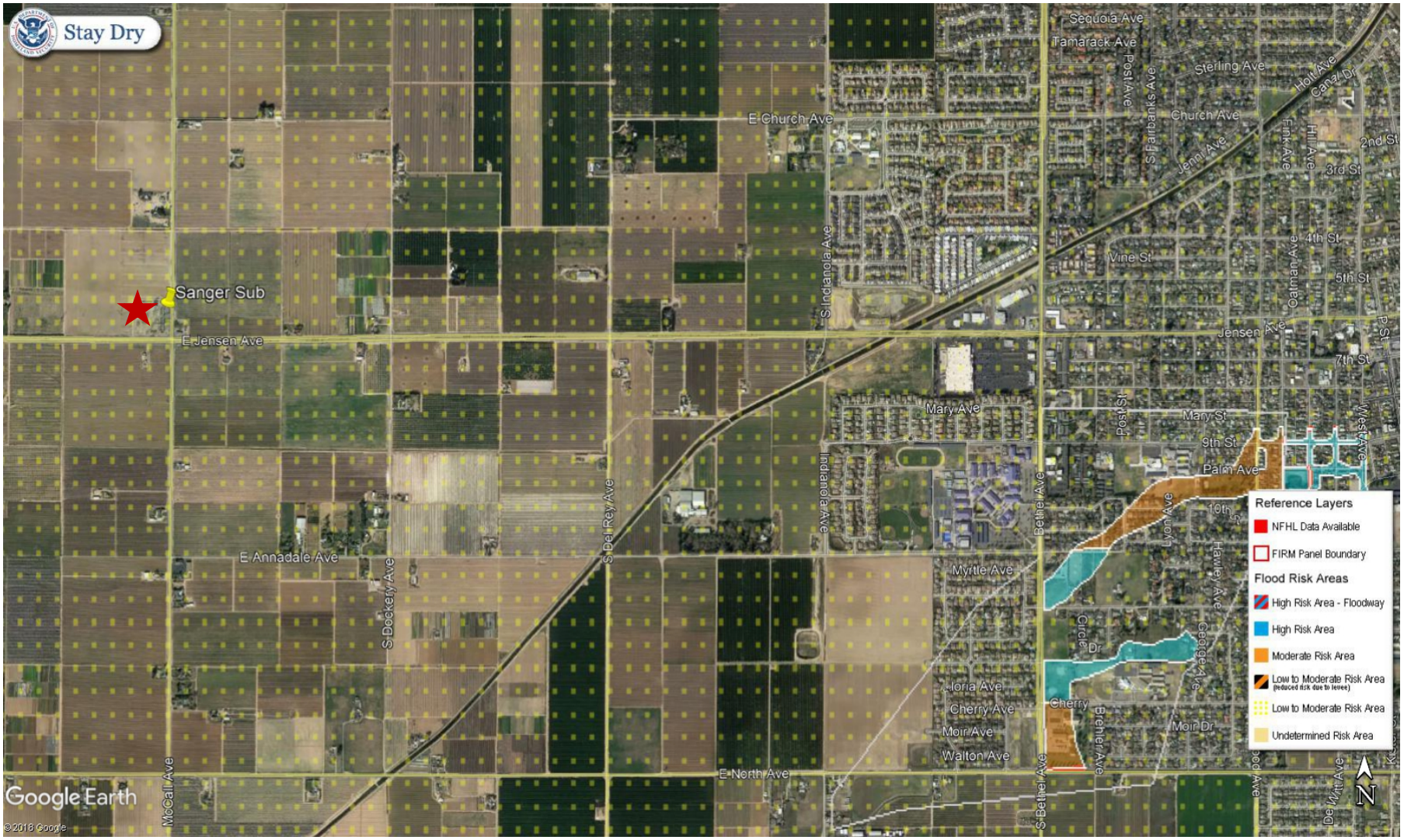
Receiving Water Risk Documentation

Sediment Sensitive Receiving Water Map



Source: SWRCB GIS files via Google Earth overlay; dated February 2017

Flood Plain or Flood Prone Area Map



Source: FEMA Stay Dry KMZ; dated August 2017

Appendix C

Amendment Certifications

Pacific Gas and Electric Company®

Amendment Certification

General Information	
Project/Site Name:	**Sanger Substation Expansion Project**
Project Location:	**E. Jensen Ave and McCall Ave, Sanger, CA**
Amendment Number:	

QSD Certification of the SWPPP Amendment

By signing below, the QSD certifies the following statement, “I certify under penalty of law that this amendment 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.” Additionally, the QSD certifies that, “I am a Qualified SWPPP Developer in good standing as of the date signed below.”

QSD Signature	Date
Sarah McIlroy	121
QSD Name	QSD Certification Number
Engineer	916-717-9635
Title and Affiliation	Telephone Number
3875 Atherton Rd, Rocklin, CA 95765	Sarah.McIlroy@stantec.com
Address	Email Address

Appendix D

Construction Activities, Materials Used, and Associated Pollutants

Pacific Gas and Electric Company®

Activities, Materials, and Pollutants

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Asphalt Products	Hot Asphalt	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
	Asphalt Emulsion				
	Liquid Asphalt (tack coat)				
	Cold Mix				
	Crumb Rubber	Yes – Black, solid material	Visually Observable - No Testing Required		
	Asphalt Concrete (Any Type)	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
Cleaning Products	Acids	No	**pH** Acidity Anions (acetic acid, phosphoric acid, sulfuric acid, nitric acid, hydrogen chloride)	pH Meter Acidity Test Kit	EPA 150.1 (pH) SM 2310B (Acidity) EPA 300.0 (Anion)
	Bleaches	No	**Residual Chlorine**	Chlorine	SM 4500-CL G (Res. Chlorine)
	Detergents	Yes - Foam	Visually Observable - No Testing Required		
	TSP	No	**Phosphate**	Phosphate	EPA 365.3 (Phosphate)
	Solvents	No	**VOC**	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)
Contaminated Soil [5]	Aerially Deposited Lead[3]	No	**Lead**	None	EPA 200.8 (Metal)
	Petroleum	Yes – Rainbow Surface Sheen and Odor	Visually Observable - No Testing Required		
	Mining or Industrial Waste, etc.	No	**Contaminant Specific**	Contaminant Specific – Check with laboratory	Contaminant Specific – Check with laboratory

Portland Concrete Cement & Masonry Products	Portland Cement (PCC)	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Masonry products	No	**pH**	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
			Alkalinity		SM 2320 (Alkalinity)
	Sealant (Methyl Methacrylate - MMA)	No	**Methyl Methacrylate**	None	EPA 625 (SVOC)
			Cobalt		EPA 200.8 (Metal)
			Zinc		
	Incinerator Bottom Ash Bottom Ash Steel Slag Foundry Sand Fly Ash Municipal Solid Waste	No	**Aluminum** **Calcium** **Vanadium** **Zinc**	Calcium Test	EPA 200.8 (Metal) EPA 200.7 (Calcium)
	Mortar	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Concrete Rinse Water	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Non-Pigmented Curing Compounds	No	Acidity	pH Meter Alkalinity or Acidity Test Kit	SM 2310B (Acidity)
			Alkalinity		SM 2320 (Alkalinity)
			pH		EPA 150.1 (pH)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
Adhesives	Adhesives	No	COD	None	EPA 410.4 (COD)
			Phenols	Phenol	EPA 420.1 (Phenol)
			SVOC	None	EPA 625 (SVOC)

Landscaping and Other Products	Aluminum Sulfate	No	Aluminum	TDS Meter Sulfate	EPA 200.8 (Metal)
			TDS		EPA 160.1 (TDS)
			Sulfate		EPA 300.0 (Sulfate)
	Sulfur-Elemental	No	**Sulfate**	Sulfate	EPA 300.0 (Sulfate)
	Fertilizers-Inorganic [4]	No	**Nitrate**	Nitrate	EPA 300.0 (Nitrate)
			Phosphate	Phosphate	EPA 365.3 (Phosphate)
			Organic Nitrogen	None	EPA 351.3 (TKN)
			Potassium	None	EPA 200.8 (Metal)
	Fertilizers-Organic	No	TOC	Nitrate	EPA 415.1 (TOC)
			Nitrate		EPA 300.0 (Nitrate)
			Organic Nitrogen		EPA 351.3 (TKN)
			COD		EPA 410.4 (COD)
	Natural Earth (Sand, Gravel, and Topsoil)	Yes - Cloudiness and turbidity	Visually Observable - No Testing Required		
	Herbicide	No	**Herbicide**	None	Check lab for specific herbicide or pesticide
	Pesticide		**Pesticide**		
	Lime		Alkalinity	pH Meter Alkalinity or Acidity Test Kit	SM 2320 (Alkalinity)
			pH		EPA 150.1 (pH)
Line Flushing Products	Chlorinated Water	No	**Total chlorine**	Chlorine	SM 4500-CL G (Res. Chlorine)
Portable Toilet Waste Products	Portable Toilet Waste	Yes	Visually Observable - No Testing Required		

Painting Products	Paint	Yes	Visually Observable - No Testing Required		
	Paint Strippers	No	**VOC**	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)
	Resins	No	**COD**	None	EPA 410.4 (COD)
			SVOC		EPA 625 (SVOC)
	Sealants	No	**COD**	None	EPA 410.4 (COD)
	Solvents	No	**COD**	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
	Lacquers, Varnish, Enamels, and Turpentine	No	**COD**	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
	Thinners	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			COD		EPA 410.4 (COD)
			Chloride		EPA 300.0 (Chloride)
			TDS		EPA 160.1 (TDS)
			Cations (Sodium, Magnesium, Calcium)		EPA 200.7 (Cations)

Vehicle	Antifreeze and Other Vehicle Fluids	Yes - Colored Liquid	Visually Observable - No Testing Required		
	Batteries	No	Sulfuric Acid	None	EPA 300.0 (Sulfate)
			Lead	None	EPA 200.8 (Metal)
			pH	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
	Fuels, Oils, Lubricants	Yes - Rainbow Surface Sheen and Odor	Visually Observable - No Testing Required		
Treated Wood Products	Ammoniacal-Copper-Zinc-Arsenate (ACZA) Copper-Chromium-Arsenic (CCA) Ammoniacal-Copper-Arsenate (ACA) Copper Naphthenate	No	Arsenic	Total Chromium	EPA 200.8 (Metal)
			Total Chromium		
			Copper		
			Zinc		
	Creosote	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		

Soil Amendment/Stabilization Products	Polymer/Copolymer [6, 7]	No	**Organic Nitrogen**	None	EPA 351.3 (TKN)
			BOD	None	EPA 405.1 (BOD)
			COD	None	EPA 410.4 (COD)
			DOC	None	EPA 415.1 (DOC)
			Nitrate	Nitrate	EPA 300.0 (Nitrate)
			Sulfate	Sulfate	EPA 300.0 (Sulfate)
			Nickel	None	EPA 200.8 (Metal)
	Straw/Mulch	Yes - Solids	Visually Observable - No Testing Required		
	Lignin Sulfonate	No	Alkalinity	Alkalinity	SM 2320 (Alkalinity)
			TDS	TDS Meter	EPA 160.1 (TDS)
	Psyllium	No	COD	None	EPA 410.4 (COD)
			TOC		EPA 415.1 (TOC)
	Guar/Plant Gums	No	COD	None	EPA 410.4 (COD)
			TOC		EPA 415.1 (TOC)
			Nickel		EPA 200.8 (Metal)
	Gypsum	No	pH	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
			Calcium	Calcium	EPA 200.7 (Calcium)
			Sulfate	Sulfate	EPA 300.0 (Sulfate)
			Aluminum	None	EPA 200.8 (Metal)
			Barium		
			Manganese		
			Vanadium		

Notes:

1. If specific pollutant is known, analyze only for that specific pollutant. See Material SDS to verify.
2. For each construction material, test for one of the pollutant indicators. Bolded pollutant indicates lowest analysis cost or best indicator. However, the composition of the specific construction material, if known, is the first criterion for selecting which analysis to use.
3. See www.hach.com, www.lamotte.com, www.ysi.com and www.chemetrics.com for some of the test kits.
4. If the type of inorganic fertilizer is unknown, analyze for all pollutant indicators listed.
5. Only if special handling requirements are required in the Caltrans Standard Special Provisions for aerially deposited lead (ADL)
6. If used with a dye or fiber matrix, it is considered visually observable and no testing is required.
7. Based upon research conducted by Caltrans, the following copolymers/polymers do not discharge pollutants and water quality sampling and analysis is not required: Super Tak™, M-Binder™, Fish Stik™, Pro40dc™, Fisch-Bond™, and Soil Master WR™.

Acronyms:

- BOD – Biochemical Oxygen Demand
- COD – Chemical Oxygen Demand
- DOC – Dissolved Organic Carbon
- EPA – Environmental Protection Agency
- HACH – Worldwide company that provides advanced analytical systems and technical support for water quality testing.
- SM – Standard Method
- SVOC – Semi-Volatile Organic Compounds
- TDS – Total Dissolved Solids
- TKN – Total Kjeldahl Nitrogen
- TOC – Total Organic Carbon
- TSP – Tri-Sodium Phosphate
- VOC - Volatile Organic Compounds

References:

- Construction Storm Water Sampling and Analysis Guidance Document, California Stormwater Quality Task Force, October 2001.
- Environmental Impact of Construction and Repair Materials on Surface and Ground Waters, Report 448, National Cooperative Highway Research Program, 2001
- Soil Stabilization for Temporary Slopes, Environmental Programs, California Department of Transportation, October 1, 1999.
- Statewide Storm Water Management Plan, Division of Environmental Analysis, California Department of Transportation, April 2002.
- Statewide Storm Water Quality Practice Guidelines, Environmental Program, California Department of Transportation, August 2000.
- Soil Stabilization for Temporary Slopes and District 7 Erosion Control Pilot Study, June 2000.
- Stormwater Monitoring Protocols, Guidance Manual, California Department of Transportation, May 2000.

Appendix E

Example Forms

Pacific Gas and Electric Company®

Stormwater Inspection Form

Inspection Information						
Project Name/Location: *Sanger Substation Expansion/ Sanger, CA*					WDID #:	
Inspection Date:	Inspection Time:			Project Type: ☐ Traditional ☑ LUP Risk Type/Level: ☑ 1 ☐ 2 ☐ 3		
Inspection Type:	Weekly ☐	Before Predicted Rain ☐	During Rain Event ☐	After Qualifying Rain Event ☐	Contained Stormwater Release ☐	Quarterly Non-Stormwater & Date of Last ☐

BMPs			
Are BMPs for current activities implemented as shown or described in the SWPPP?	☐ Yes	☐ No	☐ N/A
Are BMPs effective for current activities?	☐ Yes	☐ No	☐ N/A
Are there corrective actions? The Contractor/Client is responsible for completing the "Date Addressed" & "Initials" columns of the Corrective Actions below when complete.	☐ Yes	☐ No	☐ N/A

Deficiencies/Corrective Actions

Action #	Deficiency/Corrective Action	Date Addressed	Initials

Notes/Comments/Concerns

Pacific Gas and Electric Company®

Stormwater Inspection Form

Site Information

Construction Phase(s)/Stage(s):	Recently Completed and Current Activities:	Approximate Area of Site Exposed:
☐ Grading & Land Disturbance ☐ Streets & Utilities ☐ Vertical Construction ☐ Final Stabilization & Landscaping ☐ Inactive		*Acres*

SWPPP Onsite? ☐ Yes ☐ No ☐ N/A	Rain Gauge Onsite? ☐ Yes ☐ No ☐ N/A

Weather and Observations

Estimated Storm Begin:	Estimated Storm Length:	End of Last Precipitation:	Rain Gauge Reading:	Predicted Chance of Rain:	
				Today	Future NOAA Forecast
Date: Time:	☐ Days ☐ Hours	Date: Time:	☐ Today ☐ Final Total	%	% Date:

Were any discharges observed? (describe below)	☐ Yes (if yes, →) ☐ No	☐ Authorized ☐ Un-Authorized	☐ Stormwater ☐ Non-Stormwater	☐ Dewatering ☐ Non-Visible Pollutant

Discharge Observations: (location, description, source, samples, etc.)	

Odors:	☐ Yes	☐ No	☐ N/A	Sheen:	☐ Yes	☐ No	☐ N/A
Floating Material:	☐ Yes	☐ No	☐ N/A	Discolorations:	☐ Yes	☐ No	☐ N/A
Suspended Material:	☐ Yes	☐ No	☐ N/A	Turbidity:	☐ Yes	☐ No	☐ N/A

On-Site Observations: (location, description, source, samples, etc.)	

Photos Taken: ☐ Yes ☐ No	LUPs Only: ☐ 1st Storm ☐ 2nd Storm ☐ 3rd Storm

Inspector Information

Inspector Name:	Inspector Title:
Signature:	Report Date:

Pacific Gas and Electric Company®

Stormwater Inspection Form

BMP Checklist				
Housekeeping – Construction Materials	Implemented? **Yes**	**No**	**N/A**	Action #
Is there an inventory of products used and/or expected to be used and the end products that are produced and/or expected to be produced? (This does not include materials and equipment that are designed to be outdoors.)	☐	☐	☐	
Are loose stockpiled construction materials that are not actively being used covered or bermed? (i.e. Soil, Spoils, Aggregate, Fly-ash, Stucco, Hydrated Lime, etc.)	☐	☐	☐	
Are chemicals stored in watertight containers with appropriate secondary containment to prevent any spillage or leakage or in a completely enclosed storage shed?	☐	☐	☐	
Is exposure of construction materials to precipitation minimized? (This does not include materials and equipment that are designed to be outdoors.)	☐	☐	☐	
Are BMPs to prevent the off-site tracking of loose construction and landscape materials implemented?	☐	☐	☐	
Housekeeping – Waste Management	Implemented? **Yes**	**No**	**N/A**	Action #
Is the disposal of any rinse or wash waters or materials on impervious or pervious site surfaces or into the storm drain system prevented?	☐	☐	☐	
Are sanitation facilities (e.g., portable toilets) contained to prevent discharges of pollutants to the storm drain system or receiving water?	☐	☐	☐	
Are sanitation facilities cleaned, replaced, and/or inspected regularly for leaks and spills?	☐	☐	☐	
Are waste disposal containers covered at the end of every business day and during rain events?	☐	☐	☐	
Are discharges from waste disposal containers to the storm drain system or receiving water prevented?	☐	☐	☐	
Is stockpiled waste material contained and securely protected from wind and rain at all times unless actively being used?	☐	☐	☐	
Are procedures that effectively address hazardous and nonhazardous spills implemented?	☐	☐	☐	
Are equipment and materials for the cleanup of spills available on site and are spills or leaks cleaned up immediately and are they disposed of properly?	☐	☐	☐	
Are concrete washout and other washout areas that may contain additional pollutants contained such that there is no discharge into the underlying soil and onto the surrounding areas?	☐	☐	☐	
Housekeeping – Landscape Materials	Implemented? **Yes**	**No**	**N/A**	Action #
Are stockpiled materials such as mulches and topsoil contained when not actively being used?	☐	☐	☐	
Are fertilizers and other landscape materials contained when they are not actively being used?	☐	☐	☐	
Is the application of any erodible landscape material discontinued within 2 days before a forecasted rain event or during periods of precipitation?	☐	☐	☐	
Is erodible landscape material applied at quantities and application rates according to manufacturers recommendations of based on written specification by knowledgeable and experienced field personnel?	☐	☐	☐	
Is erodible landscape material stacked on pallets and covered or stored when not being used or applied?	☐	☐	☐	

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Stormwater Inspection Form

Housekeeping – Vehicle Storage and Maintenance	Implemented? Yes	No	N/A	Action #
Is oil, grease, or fuel prevented from leaking in to the ground, storm drains or surface waters?	☐	☐	☐	
Is all equipment or vehicles, which are to be fueled, maintained and stored placed in a designated area fitted with appropriate BMPs (Traditional Projects)?	☐	☐	☐	
Are leaks cleaned immediately and leaked materials disposed properly?	☐	☐	☐	
Housekeeping – Air Deposition	**Implemented? Yes**	**No**	**N/A**	***Action #***
Is the air deposition of site materials and from site operations controlled? (Particulates include, but are not limited to; sediment, nutrients, trash, metals, bacteria, oil and grease, and organics.)	☐	☐	☐	
Non-Storm Water Management	**Implemented? Yes**	**No**	**N/A**	**Action #**
Are measures to control all non-storm water discharges during construction implemented?	☐	☐	☐	
Are vehicles washed in such a manner as to prevent non-storm water discharges to surface waters or MS4 drainage systems?	☐	☐	☐	
Are streets cleaned in such a manner as to prevent unauthorized non-storm water discharges from reaching surface water or MS4 drainage systems?	☐	☐	☐	
Sediment Controls	**Implemented? Yes**	**No**	**N/A**	**Action #**
Are effective perimeter controls established and maintained?	☐	☐	☐	
Are all construction entrances and exits stabilized to sufficiently control erosion and sediment discharges from the site?	☐	☐	☐	
Are appropriate erosion control BMPs (runoff control and soil stabilization) implemented in conjunction with sediment control BMPs for areas under active construction? (Risk Level 2/3 Only)	☐	☐	☐	
Is construction activity to and from the project limited to entrances and exits that employ effective controls to prevent the off-site tracking of sediment. (Risk Level 2/3 Only)	☐	☐	☐	
Are all storm drain inlets and perimeter controls, runoff control BMPs, and pollutant controls at entrances and exits (e.g. tire wash-off locations) maintained and protected from activities that reduce their effectiveness? (Risk Level 2/3 Only)	☐	☐	☐	
Are all immediate access roads inspected on a daily basis? At a minimum daily (when necessary) and prior to any rain event, the discharger shall remove any sediment or other construction activity related materials that are deposited on the roads (by vacuuming or sweeping).	☐	☐	☐	
Are linear sediment controls applied along the toe of the slope, face of the slope, and at the grade breaks of exposed slopes to comply with sheet flow lengths in accordance with the information below? (Risk Level 2/3 Only)	☐	☐	☐	

Slope Percentage	Sheet flow length not to exceed
0-25%	20 feet
25-50%	15 feet
Over 50%	10 feet

Pacific Gas and Electric Company®

Stormwater Inspection Form

Erosion Control	Implemented? Yes	No	N/A	Action #
Is effective wind erosion control implemented?	☐	☐	☐	
Is effective soil cover for inactive areas and all finished slopes, open space, utility backfills, and completed lots provided?	☐	☐	☐	
Is the use of plastic material limited when more sustainable, environmentally friendly alternatives exist? (Where plastic materials are deemed necessary, the discharger shall consider the use of plastic materials resistant to solar degradation.)	☐	☐	☐	
Run-on and Runoff Controls	Implemented? Yes	No	N/A	Action #
Is all run-on, all runoff within the site and all runoff that discharges off the site effectively managed? (Run-on from off-site shall be directed away from all disturbed areas or shall collectively be in compliance with the effluent limitations in the CGP.	☐	☐	☐	

Pacific Gas and Electric Company®

Sampling Log

General Information			
Project/Site Name:	Sanger Substation Expansion		
Date:		Event Start Time:	
Sampler:		Rainfall Amount:	
Sampling Event Type:	☐ Storm Water	☐ Non-storm water	☐ Non-visible pollutant

Field Meter Calibration			
pH Meter ID:		Turbidity Meter ID:	
Calibration Date/Time:		Calibration Date/Time:	

Field pH and Turbidity Measurements

Were field duplicates taken? ☐ Yes ☐ No

Discharge Location	% Total Daily Flow	pH	Turbidity	Time
Sum % Flow (Must = 100)	**0**			

Calculated Averages	
pH:	**#NUM!**
Turbidity:	**0.00**

Additional Sampling Notes

(weather, color, odor, BMPs, other samples etc.)

Estimated Event End:	

Pacific Gas and Electric Company®

Discharge Reporting Form

General Information			
Project/Site Name:	**Sanger Substation Expansion**		
Date:		Event Start Time:	
Inspector:		Event Rainfall Amount:	
Sampling Event Type:	☐ Unauthorized Discharge	☐ Non-Visible Pollutant Discharge	☐ Other

Sample Results

Describe any sampling results, including daily average and specific locations with high values.
Record analytical methods, method reporting units, method detection limits, and time of sampling.

Cause

Describe visual observations, the BMPs, and the situation leading to the exceedance or discharge.

Solution

Describe corrective actions taken or planned to be taken to remedy the situation.

Report By (Name/Title): **Signature:**

Chain of Custody

Report To:
Name:
Address:
Phone #:
Project Name: Sanger Substation Expansion
Sampled By:

Pacific Gas and Electric Company®

Date	Time	Sample ID	Container No.	Container Type	Preservative	Analysis Requested						Destination Laboratory: Turn Around Days	Destination Laboratory: Special Instructions

Suspected Constituents:

Relinquished by (sign)	Print Name/Company	Date	Time	Received by (sign)	Print Name/Company

Method of Shipment:	Hand Delivery ☐	Fed-Ex ☐	US Mail ☐	Other _____ ☐

Pacific Gas and Electric Company®

Training Log

Note: Training will be reported in the Annual Report. This form is provided to record training information. Copies of completed forms and training certifications should be included in Appendix I.

General Information			
Project/Site Name:	Sanger Substation Expansion		
Project Location:	E. Jensen Avenue and McCall Avenue, Sanger, CA		
Specific Training Objective:			
Location:		Date:	
Instructor:		Telephone:	
Course Length:	☐ hours ☐ minutes		

Training Topic(s)	
☐ Erosion Control	☐ Sediment Control
☐ Wind Erosion Control	☐ Tracking Control
☐ Non-stormwater management	☐ Waste Management and Materials Pollution Control
☐ Storm Water Sampling	☐ Other:

Attendees
Attach additional forms if necessary

Name & Title	Company	Phone

Training Log

Attendees Attach additional forms if necessary		
Name & Title	**Company**	**Phone**

COMMENTS:

Pacific Gas and Electric Company®

Inspection Log

General Information	
Project/Site Name:	Sanger Substation Expansion
Project Location:	E. Jensen Ave and McCall Avenue, Sanger, CA

Inspection Information			
Date	**Time**	**Inspector Name**	**Notes**
	☐ am ☐ pm		
	☐ am ☐ pm		
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*An Inspection Log is only required on LUP Type 2 and 3 projects.

Appendix F

Contractors and Subcontractors

Pacific Gas and Electric Company®

Contractors and Subcontractors

Company Name	Contact Name	Work Address	Telephone Number	Emergency Contact Number	Area of Responsibility
Stantec	Sarah McIlroy	3875 Atherton Rd, Rocklin CA	916-717-9635	916-717-9635	QSD
Stantec	Miguel Cisneros	3475 W. Shaw Ave Suite 104, Fresno CA	559-305-9555	559-305-9555	QSP

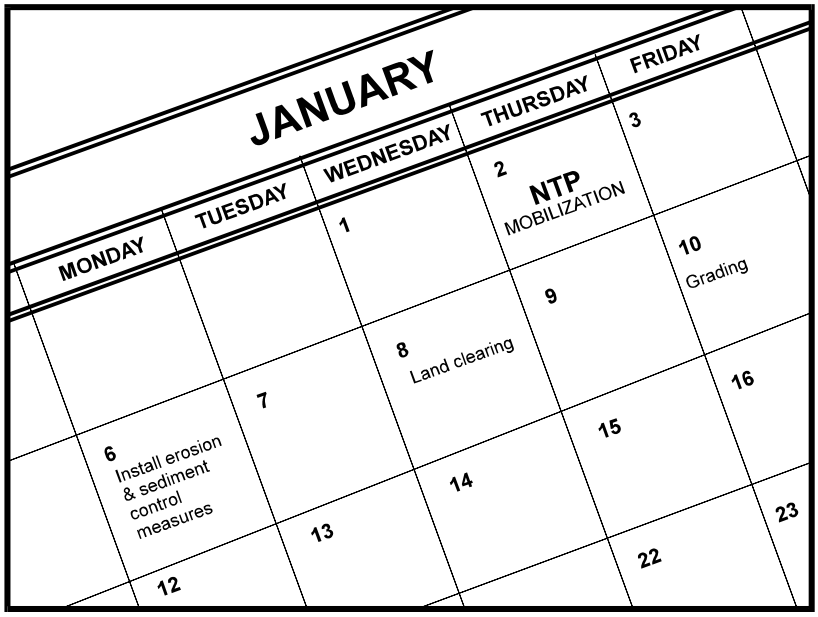
Appendix G

General Permit

Appendix H

BMP Fact Sheets and A-ESCPs

Scheduling EC-1



Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase of construction. Clearly show how the rainy season relates

Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	☒
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.

- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition.
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.

Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques should be compared with the other less effective erosion and sedimentation controls to achieve a cost effective balance.

Inspection and Maintenance

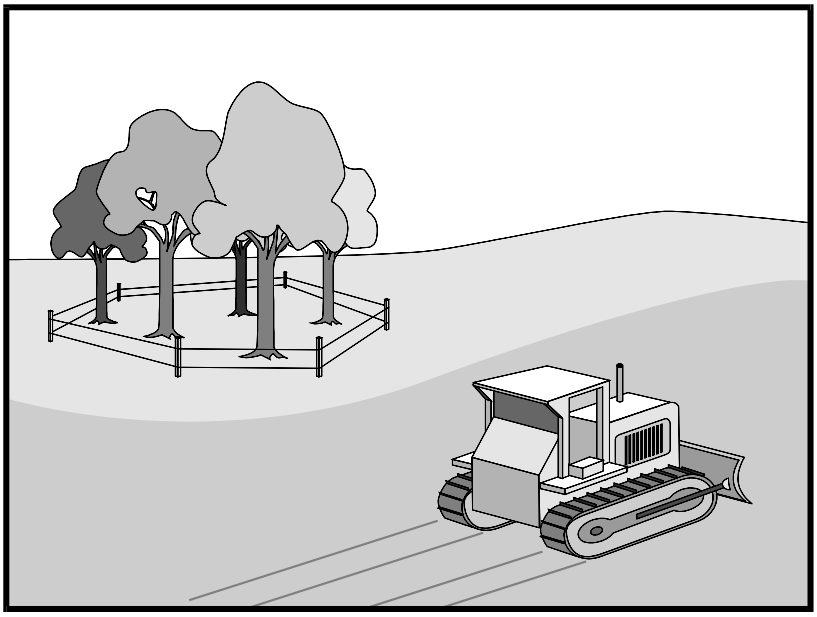
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.

Preservation Of Existing Vegetation EC-2



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

If User/Subscriber modifies this fact sheet in any way, the CASQA name/logo and footer below must be removed from each page and not appear on the modified version.

Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Preservation Of Existing Vegetation EC-2

Limitations

- Requires forward planning by the owner/developer, contractor, and design staff.
- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

Implementation

The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site's landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

Timing

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

Design and Layout

- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
  - Orange colored plastic mesh fencing works well.
  - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.

Costs

There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of $10,000 per tree.

Inspection and Maintenance

During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar, and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization
  - Fertilize stressed or damaged broadleaf trees to aid recovery.
  - Fertilize trees in the late fall or early spring.

- Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.

- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

References

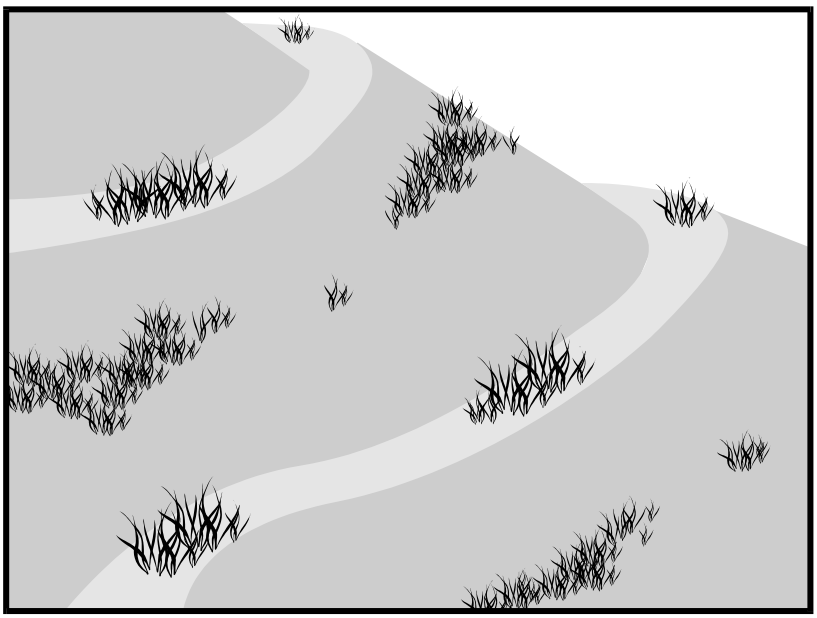
County of Sacramento Tree Preservation Ordinance, September 1981.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Hydroseeding EC-4



Description and Purpose

Hydroseeding typically consists of applying a mixture of a hydraulic mulch, seed, fertilizer, and stabilizing emulsion with a hydraulic mulcher, to temporarily protect exposed soils from erosion by water and wind. Hydraulic seeding, or hydroseeding, is simply the method by which temporary or permanent seed is applied to the soil surface.

Suitable Applications

Hydroseeding is suitable for disturbed areas requiring temporary protection until permanent stabilization is established, for disturbed areas that will be re-disturbed following an extended period of inactivity, or to apply permanent stabilization measures. Hydroseeding without mulch or other cover (e.g. EC-7, Erosion Control Blanket) is not a stand-alone erosion control BMP and should be combined with additional measures until vegetation establishment.

Typical applications for hydroseeding include:

- Disturbed soil/graded areas where permanent stabilization or continued earthwork is not anticipated prior to seed germination.
- Cleared and graded areas exposed to seasonal rains or temporary irrigation.
- Areas not subject to heavy wear by construction equipment or high traffic.

Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch
EC-5 Soil Binders
EC-6 Straw Mulch
EC-7 Geotextiles and Mats
EC-8 Wood Mulching
EC-14 Compost Blanket
EC-16 Non-Vegetative Stabilization

Limitations

- Availability of hydroseeding equipment may be limited just prior to the rainy season and prior to storms due to high demand.
- Hydraulic seed should be applied with hydraulic mulch or a stand-alone hydroseed application should be followed by one of the following:
    - Straw mulch (see Straw Mulch EC-6)
    - Rolled erosion control products (see Geotextiles and Mats EC-7)
    - Application of Compost Blanket (see Compost Blanket EC-14)

  Hydraulic seed may be used alone only on small flat surfaces when there is sufficient time in the season to ensure adequate vegetation establishment and coverage to provide adequate erosion control.
- Hydraulic seed without mulch does not provide immediate erosion control.
- Temporary seeding may not be appropriate for steep slopes (i.e., slopes readily prone to rill erosion or without sufficient topsoil).
- Temporary seeding may not be appropriate in dry periods without supplemental irrigation.
- Temporary vegetation may have to be removed before permanent vegetation is applied.
- Temporary vegetation may not be appropriate for short term inactivity (i.e. less than 3-6 months).
- This BMP consists of a mixture of several constituents (e.g., fibers/mulches, tackifiers, and other chemical constituents), some of which may be proprietary and may come pre-mixed by the manufacturer. The water quality impacts of these constituents are relatively unknown and some may have water quality impacts due to their chemical makeup. Additionally these constituents may require non-visible pollutant monitoring. Refer to specific chemical properties identified in the product Material Safety Data Sheet; products should be evaluated for project-specific implementation by the SWPPP Preparer. Refer to factsheet EC-05 for further guidance on selecting soil binders.

Implementation

In order to select appropriate hydraulic seed mixtures, an evaluation of site conditions should be performed with respect to:

- Soil conditions
- Site topography and exposure (sun/wind)
- Season and climate
- Vegetation types
- Maintenance requirements
- Sensitive adjacent areas
- Water availability
- Plans for permanent vegetation

The local office of the U.S.D.A. Natural Resources Conservation Service (NRCS), Resource Conservation Districts and Agricultural Extension Service can provide information on appropriate seed mixes.

The following steps should be followed for implementation:

- Where appropriate or feasible, soil should be prepared to receive the seed by disking or otherwise scarifying (See EC-15, Soil Preparation) the surface to eliminate crust, improve air and water infiltration and create a more favorable environment for germination and growth.
- Avoid use of hydraulic seed in areas where the BMP would be incompatible with future earthwork activities.
- Hydraulic seed can be applied using a multiple step or one step process.
  - In a multiple step process, hydraulic seed is applied first, followed by mulch or a Rolled Erosion Control Product (RECP).
  - In the one step process, hydraulic seed is applied with hydraulic mulch in a hydraulic matrix. When the one step process is used to apply the mixture of fiber, seed, etc., the seed rate should be increased to compensate for all seeds not having direct contact with the soil.
- All hydraulically seeded areas should have mulch, or alternate erosion control cover to keep seeds in place and to moderate soil moisture and temperature until the seeds germinate and grow.
- All seeds should be in conformance with the California State Seed Law of the Department of Agriculture. Each seed bag should be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer's guarantee, and dates of test. The container should be labeled to clearly reflect the amount of Pure Live Seed (PLS) contained. All legume seed should be pellet inoculated. Inoculant sources should be species specific and should be applied at a rate of 2 lb of inoculant per 100 lb seed.
- Commercial fertilizer should conform to the requirements of the California Food and Agricultural Code, which can be found at http://www.leginfo.ca.gov/.html/fac_table_of_contents.html. Fertilizer should be pelleted or granular form.
- Follow up applications should be made as needed to cover areas of poor coverage or germination/vegetation establishment and to maintain adequate soil protection.
- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Costs

Average cost for installation and maintenance may vary from as low as $1,900 per acre for flat slopes and stable soils, to $4,000 per acre for moderate to steep slopes and/or erosive soils. Cost of seed mixtures vary based on types of required vegetation.

BMP	Installed Cost per Acre
Hydraulic Seed	$1,900-$4,000

Source: Cost information received from individual product manufacturers solicited by Geosyntec Consultants (2004).

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Where seeds fail to germinate, or they germinate and die, the area must be re-seeded, fertilized, and mulched within the planting season, using not less than half the original application rates.
- Irrigation systems, if applicable, should be inspected daily while in use to identify system malfunctions and line breaks. When line breaks are detected, the system must be shut down immediately and breaks repaired before the system is put back into operation.
- Irrigation systems should be inspected for complete coverage and adjusted as needed to maintain complete coverage.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.

Soil Preparation/Roughening EC-15

Description and Purpose

Soil Preparation/Roughening involves assessment and preparation of surface soils for BMP installation. This can include soil testing (for seed base, soil characteristics, or nutrients), as well as roughening surface soils by mechanical methods (including sheepsfoot rolling, track walking, scarifying, stair stepping, and imprinting) to prepare soil for additional BMPs, or to break up sheet flow. Soil Preparation can also involve tilling topsoil to prepare a seed bed and/or incorporation of soil amendments, to enhance vegetative establishment.

Suitable Applications

Soil preparation: Soil preparation is essential to proper vegetative establishment. In particular, soil preparation (i.e. tilling, raking, and amendment) is suitable for use in combination with any soil stabilization method, including RECPs or sod. Soil preparation should not be confused with roughening.

Roughening: Soil roughening is generally referred to as track walking (sometimes called imprinting) a slope, where treads from heavy equipment run parallel to the contours of the slope and act as mini terraces. Soil preparation is most effective when used in combination with erosion controls. Soil Roughening is suitable for use as a complementary process for controlling erosion on a site. Roughening is not intended to be used as a stand-alone BMP, and should be used with perimeter controls, additional erosion control measures, grade breaks, and vegetative establishment for maximum effectiveness. Roughening is intended to only affect surface soils and should not compromise slope stability or overall compaction. Suitable applications for soil roughening include:

Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-5 Soil Binders

EC-7 Geotextiles and Mats

- Along any disturbed slopes, including temporary stockpiles, sediment basins, or compacted soil diversion berms and swales.

- Roughening should be used in combination with hydraulically applied stabilization methods, compost blanket, or straw mulch; but should not be used in combination with RECPs or sod because roughening is intended to leave terraces on the slope.

Limitations

- Preparation and roughening must take place prior to installing other erosion controls (such as hydraulically applied stabilizers) or sediment controls (such as fiber rolls) on the faces of slopes.

- In such cases where slope preparation is minimal, erosion control/revegetation BMPs that do not require extensive soil preparation - such as hydraulic mulching and seeding applications - should be employed.

- Consideration should be given to the type of erosion control BMP that follows surface preparation, as some BMPs are not designed to be installed over various types of tillage/roughening, i.e., RECPs (erosion control blankets) should not be used with soil roughening due to a "bridging" effect, which suspends the blanket above the seed bed.

- Surface roughness has an effect on the amount of mulch material that needs to be applied, which shows up as a general increase in mulch material due to an increase in surface area (Topographic Index -see EC-3 Hydraulic Mulching).

Implementation

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

General

A roughened surface can significantly reduce erosion. Based on tests done at the San Diego State Erosion Research Laboratory, various roughening techniques on slopes can result in a 12 - 76% reduction in the erosion rate versus smooth slopes.

Materials

Minimal materials are required unless amendments and/or seed are added to the soil. The majority of soil roughening/preparation can be done with equipment that is on hand at a normal construction site, such as bull dozers and compaction equipment.

Installation Guidelines

Soil Preparation

- Where appropriate or feasible, soil should be prepared to receive the seed by disking or otherwise scarifying the surface to eliminate crust, improve air and water infiltration and create a more favorable environment for germination and growth.

- Based upon soil testing conducted, apply additional soil amendments (e.g. fertilizers, additional seed) to the soil to help with germination. Follow EC-4, Hydroseeding, when selecting and applying seed and fertilizers.

Cut Slope Roughening:

- Stair-step grade or groove the cut slopes that are steeper than 3:1.
- Use stair-step grading on any erodible material soft enough to be ripped with a bulldozer. Slopes consisting of soft rock with some subsoil are particularly suited to stair-step grading.
- Make the vertical cut distance less than the horizontal distance, and slightly slope the horizontal position of the "step" in toward the vertical wall.
- Do not make individual vertical cuts more than 2 feet (0.6 m) high in soft materials or more than 3 feet (0.9 m) high in rocky materials.
- Groove the slope using machinery to create a series of ridges and depressions that run across the slope, on the contour.

Fill Slope Roughening:

- Place on fill slopes with a gradient steeper than 3:1 in lifts not to exceed 8 inches (0.2 m), and make sure each lift is properly compacted.
- Ensure that the face of the slope consists of loose, uncompacted fill 4-6 inches (0.1-0.2 m) deep.
- Use grooving or tracking to roughen the face of the slopes, if necessary.
- Do not blade or scrape the final slope face.

Roughening for Slopes to be Mowed:

- Slopes which require mowing activities should not be steeper than 3:1.
- Roughen these areas to shallow grooves by track walking, scarifying, sheepsfoot rolling, or imprinting.
- Make grooves close together (less than 10 inches), and not less than 1 inch deep, and perpendicular to the direction of runoff (i.e., parallel to the slope contours).
- Excessive roughness is undesirable where mowing is planned.

Roughening With Tracked Machinery:

- Limit roughening with tracked machinery to soils with a sandy textural component to avoid undue compaction of the soil surface.
- Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Do not back-blade during the final grading operation.
- Seed and mulch roughened areas as soon as possible to obtain optimum seed germination and growth.

Costs

Costs are based on the additional labor of tracking or preparation of the slope plus the cost of any required soil amendment materials.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check the seeded slopes for signs of erosion such as rills and gullies. Fill these areas slightly above the original grade, then reseed and mulch as soon as possible.
- Inspect BMPs weekly during normal operations, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Non-Vegetative Stabilization EC-16

Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TR	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Non-vegetative stabilization methods are used for temporary or permanent stabilization of areas prone to erosion and should be used only 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.

Decomposed Granite (DG) is a permanent erosion protection method that consists of a layer of stabilized decomposed granite placed over an erodible surface.

Degradable Mulches of various types (see EC-3, EC-6, EC-8) can be used for temporary non-vegetative stabilization; examples include straw mulch, compost, wood chips or hydraulic mulch.

Geotextiles and Mats can be used for temporary non-vegetative stabilization (see EC-7). These BMPs are typically manufactured from degradable or synthetic materials and are

designed and specified based on their functional longevity, i.e., how long they will persist and provide erosion protection. All geotextiles and mats should be replaced when they exceed their functional longevity or when permanent stabilization methods are instituted.

Gravel Mulch is a non-degradable erosion control product that is composed of washed and screened coarse to very coarse gravel, 16 mm to 64 mm (0.6" - 2.5"), similar to an AASHTO No. 3 coarse aggregate.

Rock Slope Protection consists of utilizing large rock or rip-rap (4"- 24") to stabilize slopes with a high erosion potential and those subject to scour along waterways.

Soil Binders can be used for temporary non-vegetative stabilization (see EC-5). The key to their use is functional longevity. In most cases, the soil binder will need to be routinely monitored and re-applied to maintain an erosion-resistant coverage.

Suitable Applications

Non-vegetated stabilization methods are suitable for use on disturbed soil areas and on material stockpiles that need to be temporarily or permanently protected from erosion by water and wind. Non-vegetated stabilization should only be utilized when vegetation cannot be established in the required timeframe, due to soil or climactic conditions, or where vegetation may be a potential fire hazard.

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 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 mos – 1 year) or long-term (1-2 years) temporary stabilization method. For more information on geotextiles and mats see EC-7 Geotextiles and Mats.

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.

Limitations

General

- Refer to EC-3, EC-6, EC-8, and EC-14 for limitations on use of mulches. Refer to EC-7 for limitations on use of geotextiles and mats. Refer to EC-5 for limitations on use of Soil Binders.

Decomposed Granite

- Not available in some geographic regions.
- If not tackified, material may be susceptible to erosion even on slight slopes (e.g., 30:1 [H:V]).
- Installed costs may be more expensive than vegetative stabilization methods.

Gravel Mulch

- Availability is limited in some geographic regions.
- If not properly screened and washed, can contain fine material that can erode and/or create dust problems.
- If inadequately sized, material may be susceptible to erosion on sloped areas.
- Pore spaces fill with dirt and debris over time; may provide a growing medium for weeds.

Rock Slope Protection

- Installation is labor intensive.
- Installed costs can be significantly higher than vegetative stabilization methods.
- Rounded stones may not be used on slopes greater than 2:1 [H:V].

Implementation

General

Non-vegetated stabilization should be used in accordance with the following general guidance:

- Should be used in conjunction with other BMPs, including drainage, erosion controls and sediment controls.
- Refer to EC-3, EC-6, EC-8, and EC-14 for implementation details for mulches. Refer to EC-7 for implementation details for geotextiles and mats. Refer to EC-5 for implementation details for soil binders.
- Non-vegetated stabilization measures should be implemented as soon as the disturbance in the areas they are intended to protect has ceased.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Decomposed Granite Stabilization

- If used for a road or path should be installed on a prepared base.
- Should be mixed with a stabilizer if used for roads or pathways, or on slope applications.
- Though porous it is recommended to prevent standing water on or next to a decomposed granite road or pathway.

Gravel Mulch

- Should be sized based on slope, rainfall, and upgradient run-on conditions. Stone size should be increased as potential for erosion increases (steeper slopes, high intensity rainfall).
- If permanent, a weed control fabric should be placed prior to installation.
- Should be installed at a minimum 2" depth.
- Should completely cover all exposed surfaces.

Rock Slope Protection

- Rock slope protection installation should follow Caltrans Standard Specification 72-2: Rock Slope Protection. Refer to the specification for rock conformity requirements and installation methods.
- When using rock slope protection, rock size and installation method should be specified by an Engineer.
- A geotextile fabric should be placed prior to installation.

Costs

- Costs are highly variable depending not only on technique chosen, but also on materials chosen within specific techniques. In addition, availability of certain materials will vary by region/location, which will also affect the cost. Costs of mulches, geotextiles and mats, and soil binders are presented in their respective fact sheets. Costs for decomposed granite, gravel mulch stabilization and rock slope protection may be higher depending on location and availability of materials. Caltrans has provided an estimate for gravel mulch of \$10 - \$15/yd^2 in flat areas and \$11 - \$23/yd^2 on side slopes.

Inspection and Maintenance

General

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- For permanent installation, require inspection periodically and after major storm events to look for signs of erosion or damage to the stabilization.
- All damage should be repaired immediately.
- Refer to EC-3, EC-6, EC-8, and EC-14 for inspection and maintenance requirements for mulches. Refer to EC-7 for inspection and maintenance requirements for geotextiles and mats. Refer to EC-5 for inspection and maintenance requirements for soil binders.

Decomposed Granite and Gravel Mulch Stabilization

- Rake out and add decomposed granite or gravel as needed to areas subject to rill erosion. Inspect upgradient drainage controls and repair/modify as necessary.

- Should remain stable under loose surface material. Any significant problem areas should be repaired to restore uniformity to the installation.

References

Arid Zone Forestry: A Guide for Field Technicians. Food and Agriculture Organization of the United Nations, 1989.

Design of Roadside Channels with Flexible Linings, Hydraulic Engineering Circular Number 15, Third Edition, Federal Highway Administration, 2007.

Design Standards for Urban Infrastructure - Soft Landscape Design, Department of Territory and Municipal Services - Australian Capital Territory http://www.tams.act.gov.au/work/standards_and_procedures/design_standards_for_urban_infrastructure

Erosion and Sediment Control Handbook: A Guide for Protection of State Waters through the use of Best Management Practices during Land Disturbing Activities, Tennessee Department of Environment and Conservation, 2002.

Gravel Mulch, Landscape Architecture Non-Standard Specification 10-2, California Department of Transportation (Caltrans), http://www.dot.ca.gov/hq/LandArch/roadside/detail-gm.htm

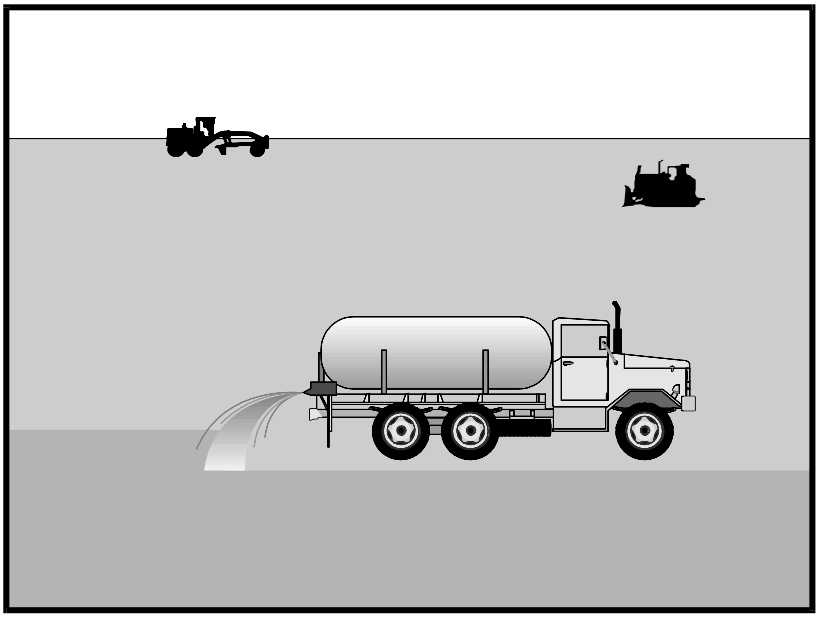
Maine Erosion and Sediment Control BMPs, DEPLW0588, Maine Department of Environmental Protection: Bureau of Land and Water Quality, 2003.

National Menu of Best Management Practices, US Environmental Protection Agency, 2006.

Standard Specification 72-2: Rock Slope Protection. California Department of Transportation, 2006.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Wind Erosion Control WE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	☑
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

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- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

Implementation

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyls, acrylic), clay additives (e.g. bentonite, montimorillonite) and electrochemical products (e.g. enzymes, ionic products).

Site Condition	Dust Control Practices							
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt	Temporary Gravel Construction Entrances/Equipment Wash Down	Synthetic Covers	Minimize Extent of Disturbed Area
Disturbed Areas not Subject to Traffic	x	x	x	x	x			x
Disturbed Areas Subject to Traffic			x	x	x	x		x
Material Stockpiles		x	x	x			x	x
Demolition			x			x	x	
Clearing/ Excavation			x	x				x
Truck Traffic on Unpaved Roads			x	x	x	x	x	
Tracking					x	x		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of these measures are effective for only a few hours to a few days.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

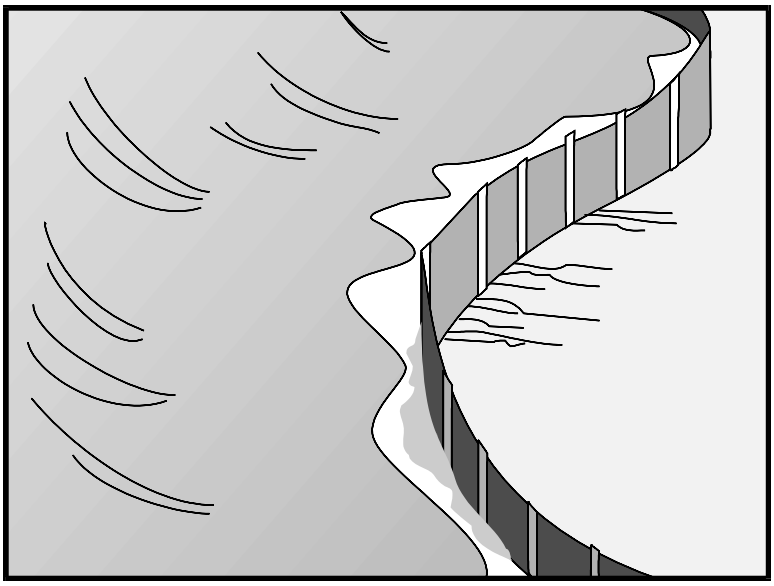
California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Silt Fence SE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Description and Purpose

A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains water, promoting sedimentation of coarse sediment behind the fence. Silt fence does not retain soil fine particles like clays or silts.

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). Silt fences should not be used in locations where the flow is concentrated. Silt fences should always be used in combination with erosion controls. Suitable applications include:

- At perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

Targeted Constituents

Sediment (coarse sediment)	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm SE-12 Manufactured Linear Sediment Controls

SE-13 Compost Socks and Berms

SE-14 Biofilter Bags

Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard.
- Do not use silt fence to divert water flows or place across any contour line.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Must be trenched and keyed in.
- Not intended for use as a substitute for Fiber Rolls (SE-5), when fiber rolls are being used as a slope interruption device.
- Do not use on slopes subject to creeping, slumping, or landslides.

Implementation

General

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap coarse sediment by intercepting and detaining sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

The following layout and installation guidance can improve performance and should be followed:

- Silt fence should be used in combination with erosion controls up-slope in order to provide the most effective sediment control.
- Silt fence alone is not effective at reducing turbidity. (Barrett and Malina, 2004)
- Designers should consider diverting sediment laden water to a temporary sediment basin or trap. (EPA, 2012)
- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft at any point along the silt fence.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft^2 of ponding area should be provided for every acre draining to the fence.
- Efficiency of silt fences is primarily dependent on the detention time of the runoff behind the control. (Barrett and Malina, 2004)
- The drainage area above any fence should not exceed a quarter of an acre. (Rule of Thumb-100-feet of silt fence per 10,000 square feet of disturbed area.) (EPA 2012)

- The maximum length of slope draining to any point along the silt fence should be 100 ft per foot of silt fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.
- Silt fences should remain in place until the disturbed area draining to the silt fence is permanently stabilized, after which, the silt fence fabric and posts should be removed and properly disposed.
- J-Hooks, which have ends turning up the slope to break up long runs of fence and provide multiple storage areas that work like mini-retention areas, may be used to increase the effectiveness of silt fence.
- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

Design and Layout

In areas where high winds are anticipated the fence should be supported by a plastic or wire mesh. The geotextile fabric of the silt fence should contain ultraviolet inhibitors and stabilizers to provide longevity equivalent to the project life or replacement schedule.

- Layout in accordance with the attached figures.
- For slopes that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to protect silt fence from rocks (e.g., rockfall netting) ensure the integrity of the silt fence installation.

Standard vs. Heavy Duty Silt Fence

Standard Silt Fence

- Generally applicable in cases where the area draining to fence produces moderate sediment loads.

Heavy Duty Silt Fence

- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
  - Fabric is reinforced with wire backing or additional support.
  - Posts are spaced closer than pre-manufactured, standard silt fence products.
- Use is generally limited to areas affected by high winds.
- Area draining to fence produces moderate sediment loads.

Materials

Standard Silt Fence

- Silt fence material should be woven geotextile with a minimum width of 36 in. The fabric should conform to the requirements in ASTM designation D6461.
- Wooden stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the

thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.

- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15 gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts instead of wood stakes.

Installation Guidelines – Traditional Method

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).
- Bottom of the silt fence should be keyed-in a minimum of 12 in.
- Posts should be spaced a maximum of 6 ft apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.
- When standard strength geotextile is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy–duty wire staples at least 1 in. long. The mesh should extend into the trench.
- When extra-strength geotextile and closer post spacing are used, the mesh support fence may be eliminated.
- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.
- The trench should be backfilled with native material and compacted.
- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case should the reach exceed 500 ft.
- Cross barriers should be a minimum of 1/3 and a maximum of ½ the height of the linear barrier.
- See typical installation details at the end of this fact sheet.

Installation Guidelines - Static Slicing Method

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 inches into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the geotextile is installed, the soil is compacted using tractor tires.
- This method will not work with pre-fabricated, wire backed silt fence.
- Benefits:
    - Ease of installation (most often done with a 2 person crew).
    - Minimal soil disturbance.
    - Better level of compaction along fence, less susceptible to undercutting
    - Uniform installation.
- Limitations:
    - Does not work in shallow or rocky soils.
    - Complete removal of geotextile material after use is difficult.
    - Be cautious when digging near potential underground utilities.

Costs

- It should be noted that costs vary greatly across regions due to available supplies and labor costs.
- Average annual cost for installation using the traditional silt fence installation method (assumes 6 month useful life) is $7 per linear foot based on vendor research. Range of cost is $3.50 - $9.10 per linear foot.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair undercut silt fences.
- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches 1/3 of the barrier height.
- Silt fences should be left in place until the upgradient area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.

- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

References

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Monitoring Data on Effectiveness of Sediment Control Techniques, Proceedings of World Water and Environmental Resources Congress, Barrett M. and Malina J. 2004.

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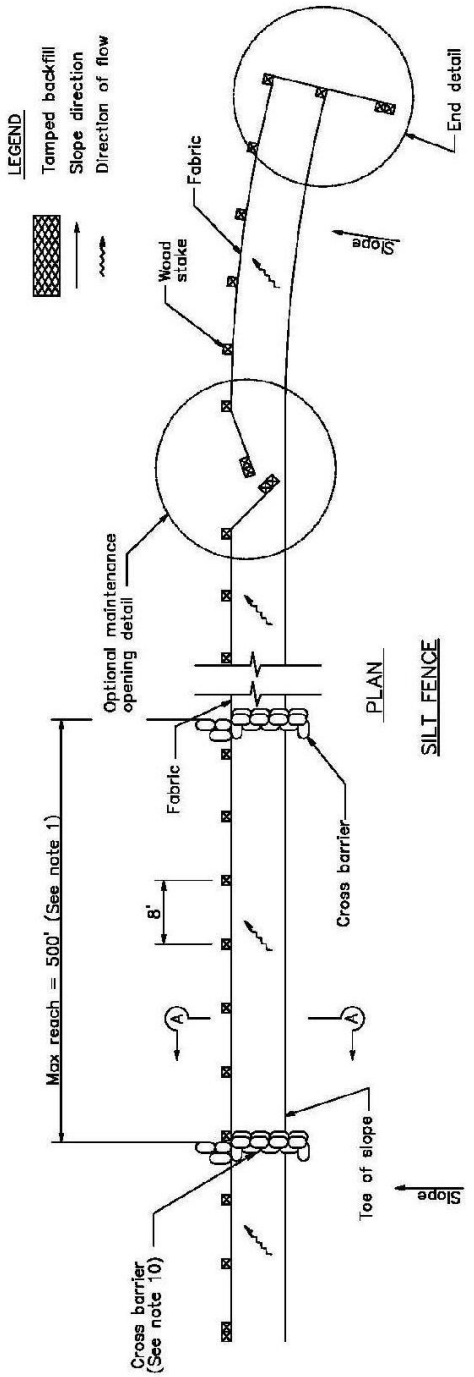
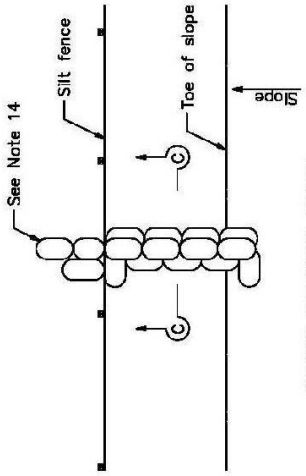
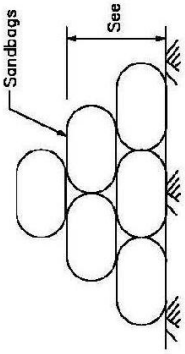
Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

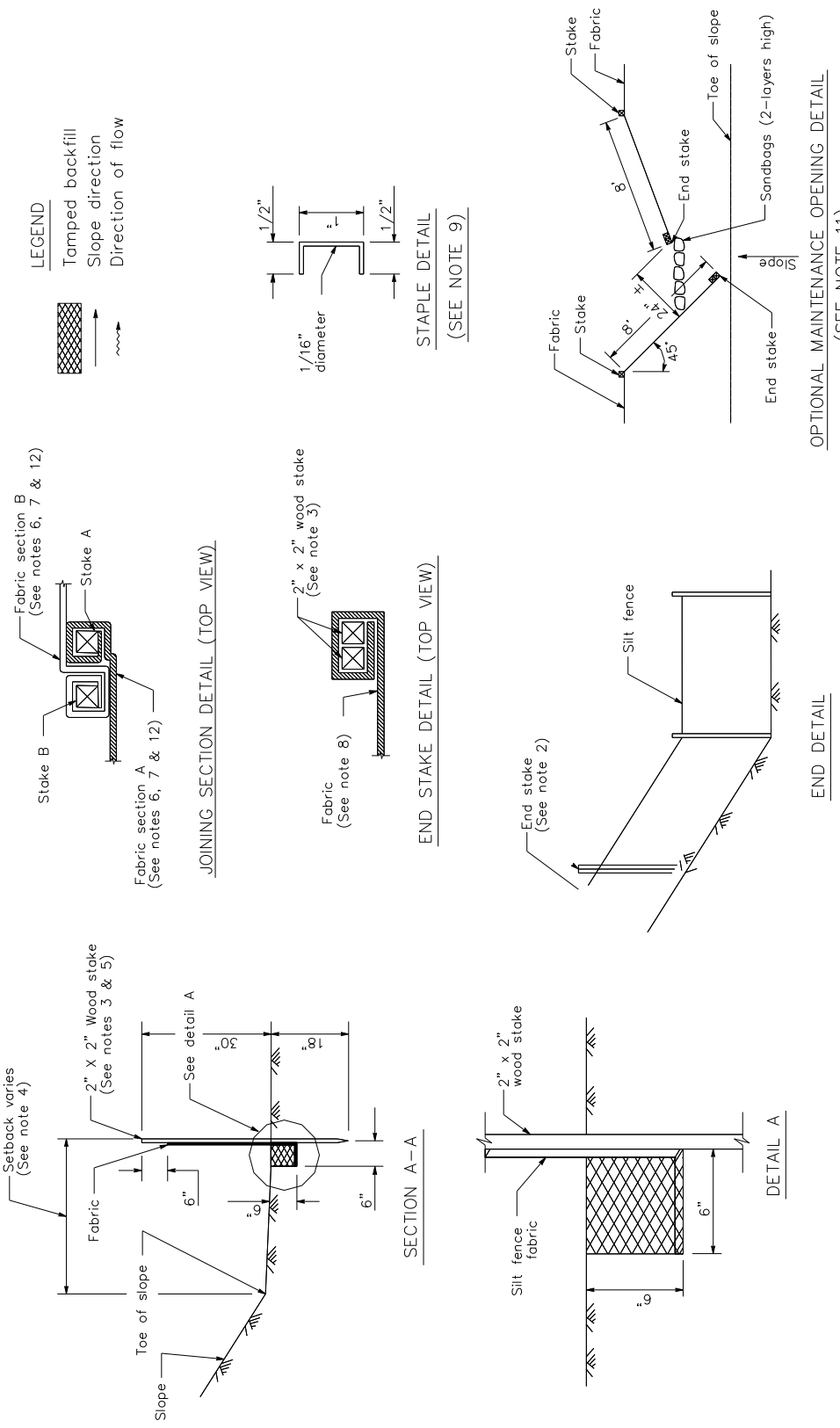


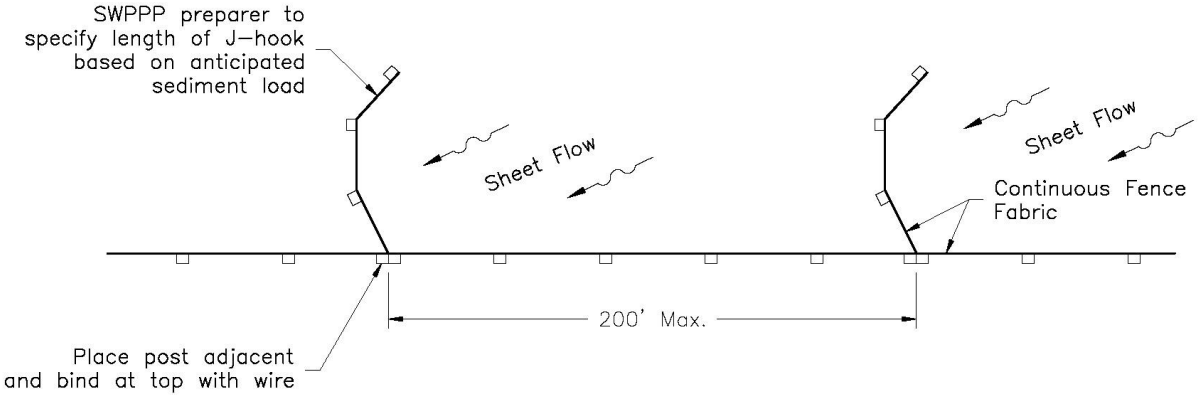




NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. The last 8'–0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'–0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow–through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stake, fence fabric shall be folded around two stakes one full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Dimensions shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Joining sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset to eliminate gaps.
14. Add 3–4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as allowable based on site limits of disturbance.

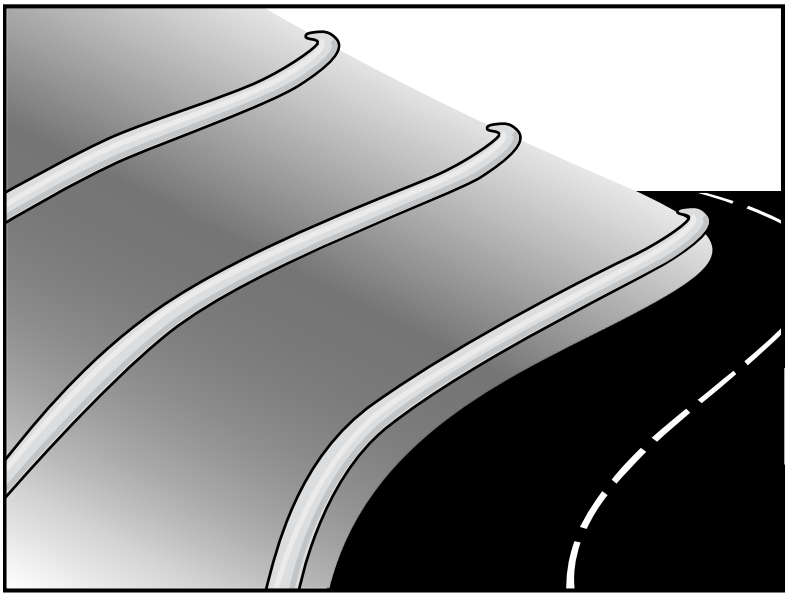

LEGEND
Tamped backfill
Slope direction
Direction of flow
1/2"
1"
1/2"
1/16" diameter
STAPLE DETAIL
(SEE NOTE 9)
Stake
Fabric
Toe of slope
8'
End stake
Sandbags (2-layers high)
Slope
Fabric
Stake
8'
4'
2'
45°
End stake
OPTIONAL MAINTENANCE OPENING DETAIL
(SEE NOTE 11)
Fabric section B
(See notes 6, 7 & 12)
Stake A
Stake B
Fabric section A
(See notes 6, 7 & 12)
JOINING SECTION DETAIL (TOP VIEW)
2" x 2" wood stake
(See note 3)
Fabric
(See note 8)
END STAKE DETAIL (TOP VIEW)
Silt fence
End stake
(See note 2)
END DETAIL
Setback varies
(See note 4)
2" X 2" Wood stake
(See notes 3 & 5)
See detail A
30"
18"
Fabric
6"
6"
6"
Toe of slope
Slope
SECTION A-A
2" x 2"
wood stake
Silt fence
fabric
6"
6"
DETAIL A


SWPPP preparer to specify length of J–hook based on anticipated sediment load
Sheet Flow
Sheet Flow
Continuous Fence Fabric
200' Max.
Place post adjacent and bind at top with wire

Plan

J–HOOK

Fiber Rolls SE-5



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-12 Manufactured Linear Sediment Controls

SE-14 Biofilter Bags

- Around temporary stockpiles.

Limitations

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months depending upon local conditions.

Implementation

Fiber Roll Materials

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

Installation

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
  - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
  - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be ¼ to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.
  - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradeable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

Costs

Material costs for regular fiber rolls range from $20 - $30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-$9.00 per linear foot, based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed

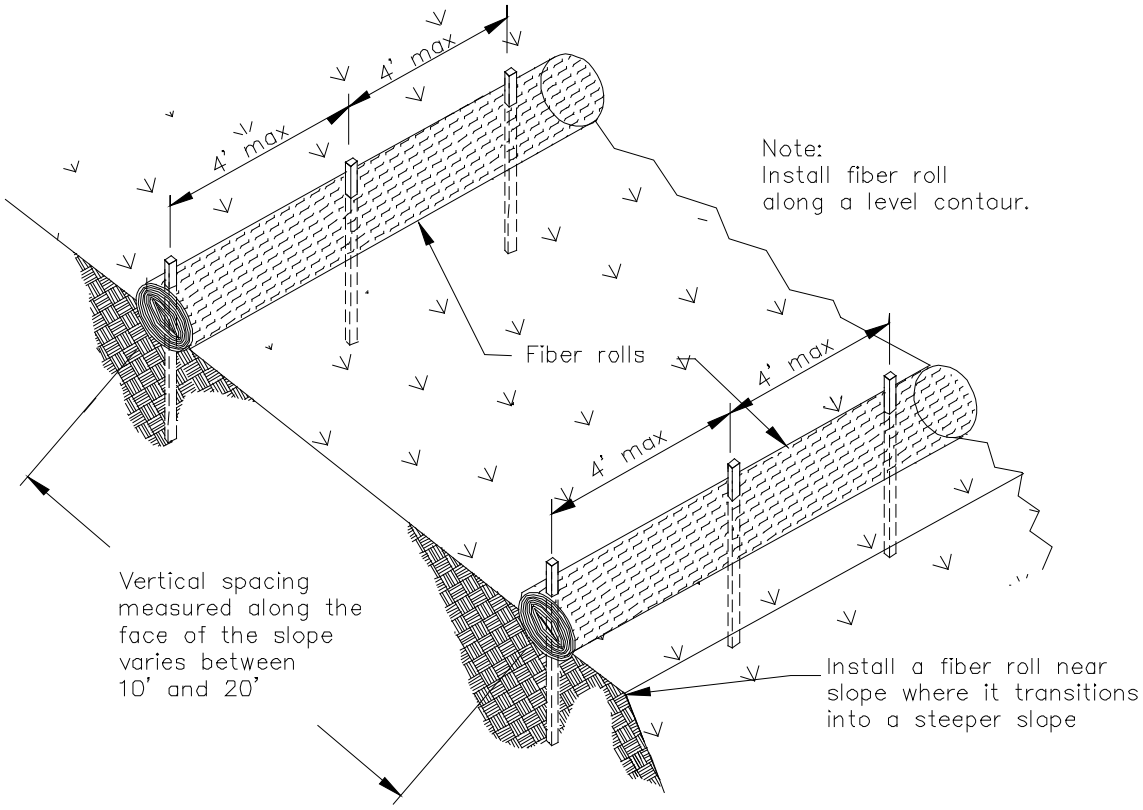
in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
- Repair any rills or gullies promptly.

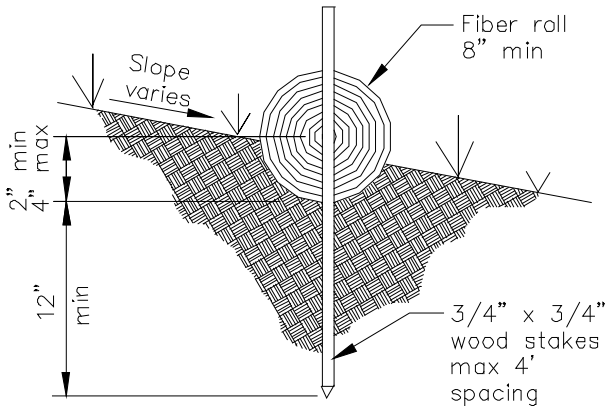
References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



TYPICAL FIBER ROLL INSTALLATION
N.T.S.



ENTRENCHMENT DETAIL
N.T.S.

Street Sweeping and Vacuuming SE-7

Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None

Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.

- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.
- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from $58/hour (3 yd^3 hopper) to $88/hour (9 yd^3 hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

Inspection and Maintenance

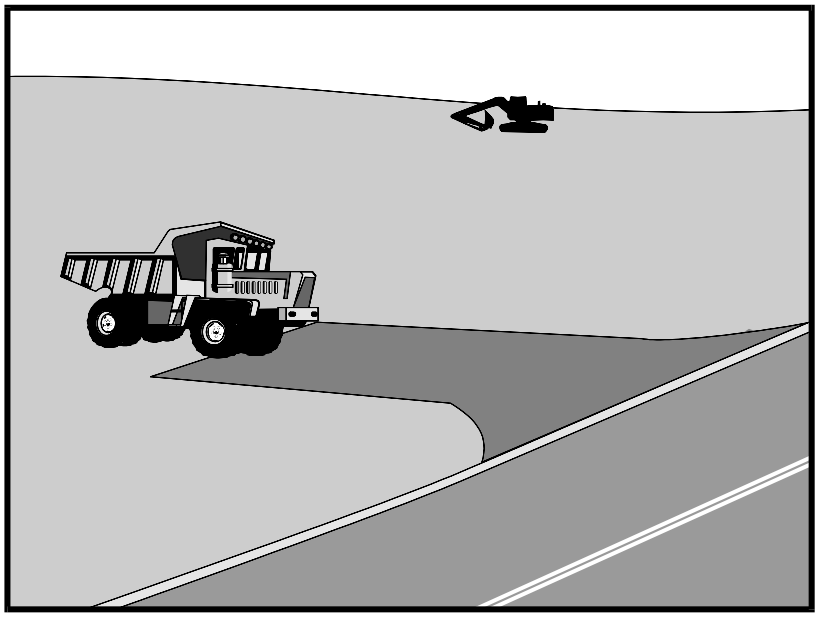
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.

Stabilized Construction Entrance / Exit TC-1



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.

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Implementation

General

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. NPDES permits require that appropriate measures be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

Design and Layout

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils engineer.
- Construct length of 50 ft or maximum site will allow, and 10 ft minimum width or to accommodate traffic.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.

- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement SE-7, Street Sweeping and Vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMPs are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

Costs

Average annual cost for installation and maintenance may vary from $1,200 to $4,800 each, averaging $2,400 per entrance. Costs will increase with addition of washing rack, and sediment trap. With wash rack, costs range from $1,200 - $6,000 each, averaging $3,600 per entrance.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, USEPA Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

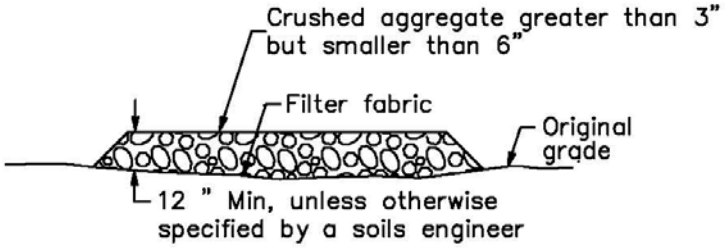
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

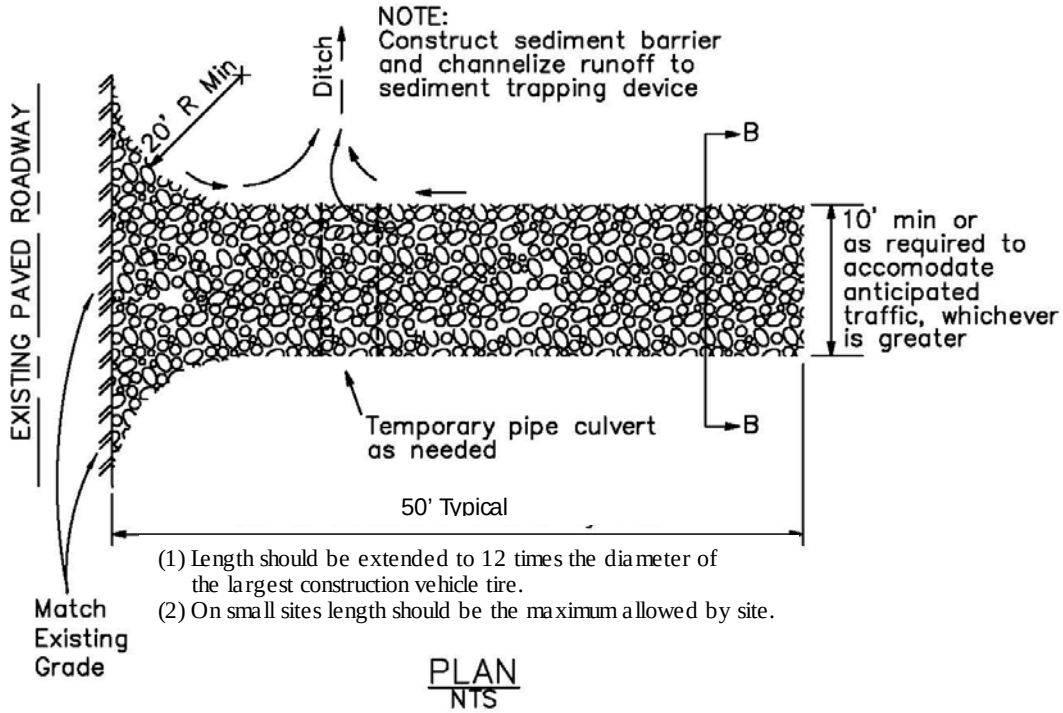
Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Stabilized Construction Entrance / Exit TC-1

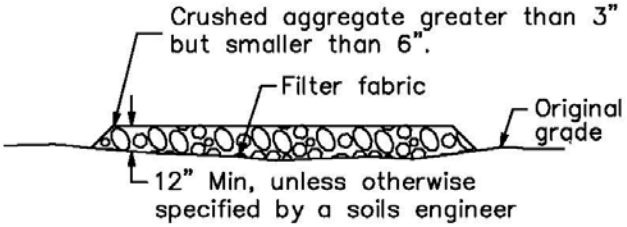


SECTION B–B
NTS



(1) Length should be extended to 12 times the diameter of the largest construction vehicle tire.
(2) On small sites length should be the maximum allowed by site.

PLAN
NTS



SECTION B–B
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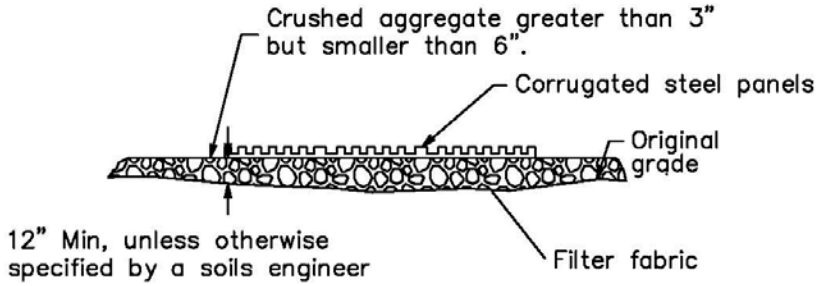
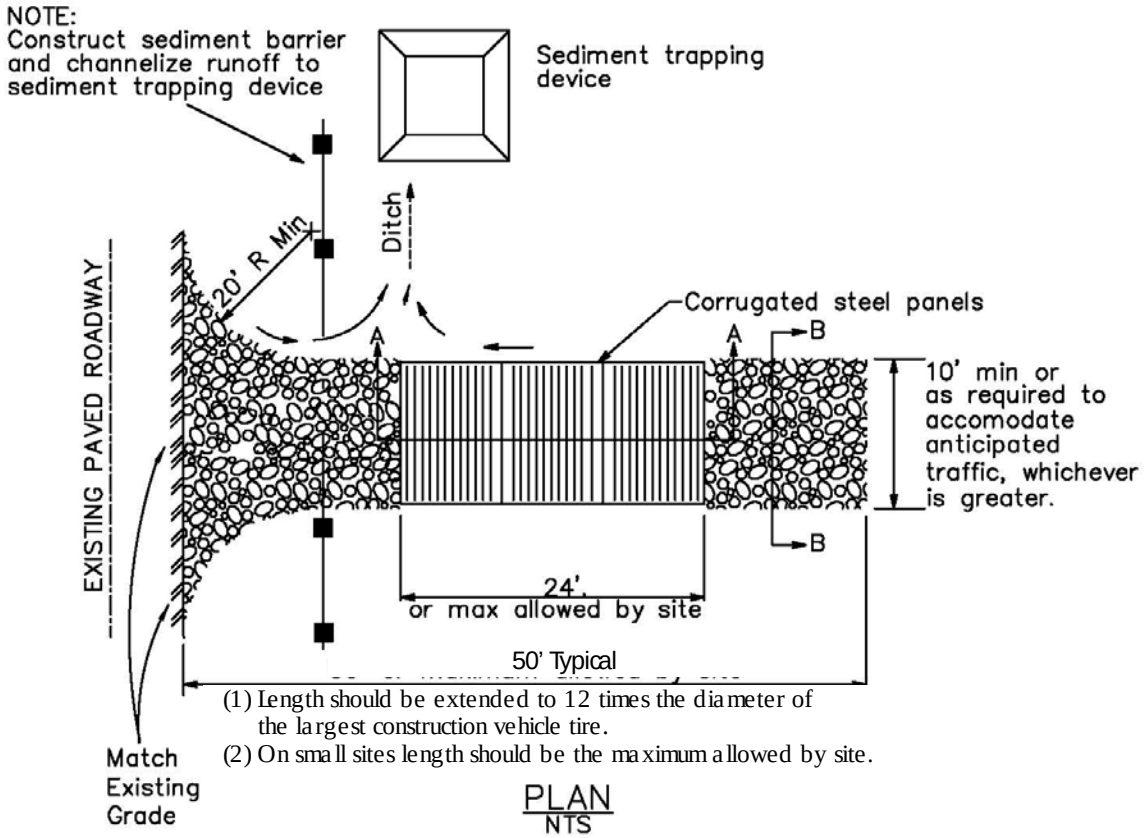


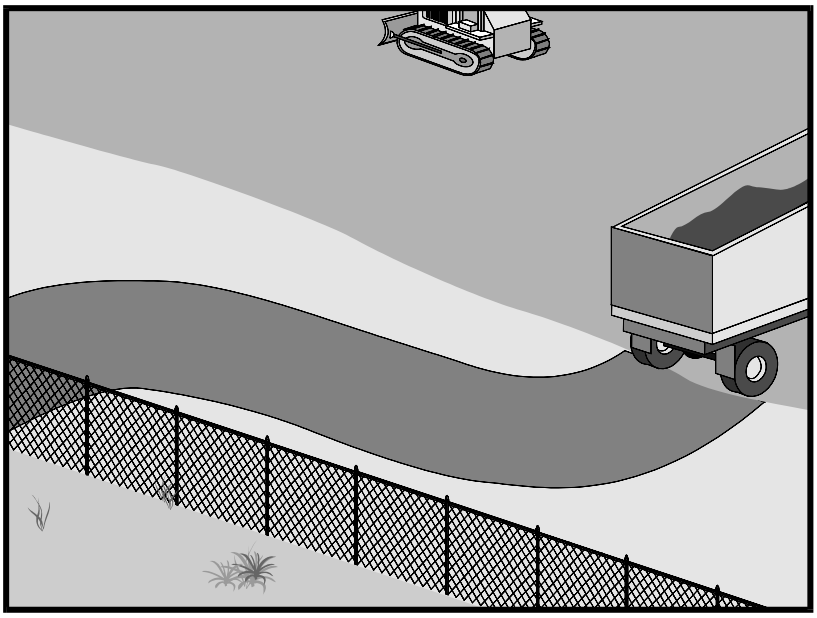
SECTION A–A
NOT TO SCALE



(1) Length should be extended to 12 times the diameter of the largest construction vehicle tire.
(2) On small sites length should be the maximum allowed by site.

PLAN
NTS

Stabilized Construction Roadway TC-2



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Access roads, subdivision roads, parking areas, and other onsite vehicle transportation routes should be stabilized immediately after grading, and frequently maintained to prevent erosion and control dust.

Suitable Applications

This BMP should be applied for the following conditions:

- Temporary Construction Traffic:
  - Phased construction projects and offsite road access
  - Construction during wet weather
- Construction roadways and detour roads:
  - Where mud tracking is a problem during wet weather
  - Where dust is a problem during dry weather
  - Adjacent to water bodies
  - Where poor soils are encountered

Limitations

- The roadway must be removed or paved when construction is complete.

- Certain chemical stabilization methods may cause stormwater or soil pollution and should not be used. See WE-1, Wind Erosion Control.
- Management of construction traffic is subject to air quality control measures. Contact the local air quality management agency.
- Materials will likely need to be removed prior to final project grading and stabilization.
- Use of this BMP may not be applicable to very short duration projects.

Implementation

General

Areas that are graded for construction vehicle transport and parking purposes are especially susceptible to erosion and dust. The exposed soil surface is continually disturbed, leaving no opportunity for vegetative stabilization. Such areas also tend to collect and transport runoff waters along their surfaces. During wet weather, they often become muddy quagmires that generate significant quantities of sediment that may pollute nearby streams or be transported offsite on the wheels of construction vehicles. Dirt roads can become so unstable during wet weather that they are virtually unusable.

Efficient construction road stabilization not only reduces onsite erosion but also can significantly speed onsite work, avoid instances of immobilized machinery and delivery vehicles, and generally improve site efficiency and working conditions during adverse weather

Installation/Application Criteria

Permanent roads and parking areas should be paved as soon as possible after grading. As an alternative where construction will be phased, the early application of gravel or chemical stabilization may solve potential erosion and stability problems. Temporary gravel roadway should be considered during the rainy season and on slopes greater than 5%.

Temporary roads should follow the contour of the natural terrain to the maximum extent possible. Slope should not exceed 15%. Roadways should be carefully graded to drain transversely. Provide drainage swales on each side of the roadway in the case of a crowned section or one side in the case of a super elevated section. Simple gravel berms without a trench can also be used.

Installed inlets should be protected to prevent sediment laden water from entering the storm sewer system (SE-10, Storm Drain Inlet Protection). In addition, the following criteria should be considered.

- Road should follow topographic contours to reduce erosion of the roadway.
- The roadway slope should not exceed 15%.
- Chemical stabilizers or water are usually required on gravel or dirt roads to prevent dust (WE-1, Wind Erosion Control).
- Properly grade roadway to prevent runoff from leaving the construction site.
- Design stabilized access to support heaviest vehicles and equipment that will use it.

- Stabilize roadway using aggregate, asphalt concrete, or concrete based on longevity, required performance, and site conditions. The use of cold mix asphalt or asphalt concrete (AC) grindings for stabilized construction roadway is not allowed.
- Coordinate materials with those used for stabilized construction entrance/exit points.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep all temporary roadway ditches clear.
- When no longer required, remove stabilized construction roadway and re-grade and repair slopes.
- Periodically apply additional aggregate on gravel roads.
- Active dirt construction roads are commonly watered three or more times per day during the dry season.

Costs

Gravel construction roads are moderately expensive, but cost is often balanced by reductions in construction delay. No additional costs for dust control on construction roads should be required above that needed to meet local air quality requirements.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

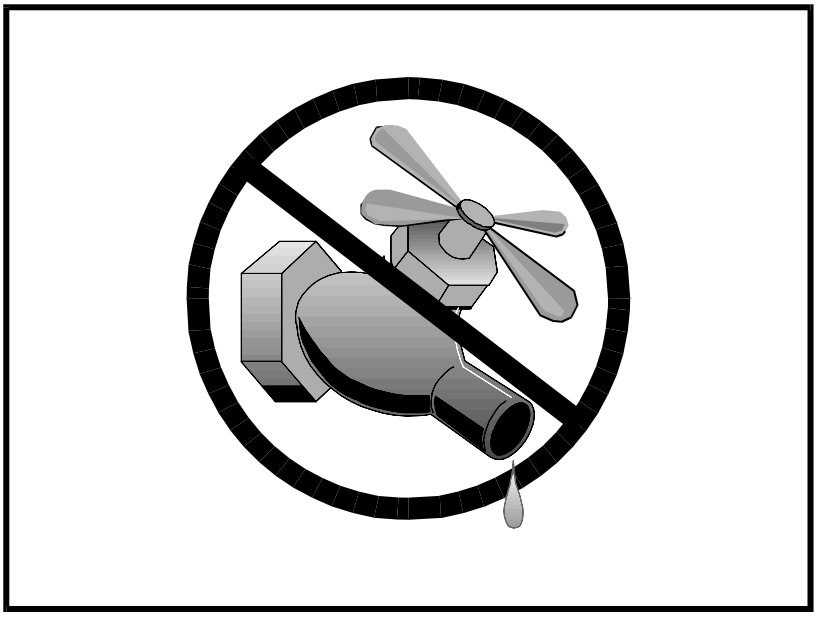
Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Water Conservation Practices NS-1



Categories		
EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.

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

Potential Alternatives

None

- Direct construction water runoff to areas where it can soak into the ground or be collected and reused.
- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

Costs

The cost is small to none compared to the benefits of conserving water.

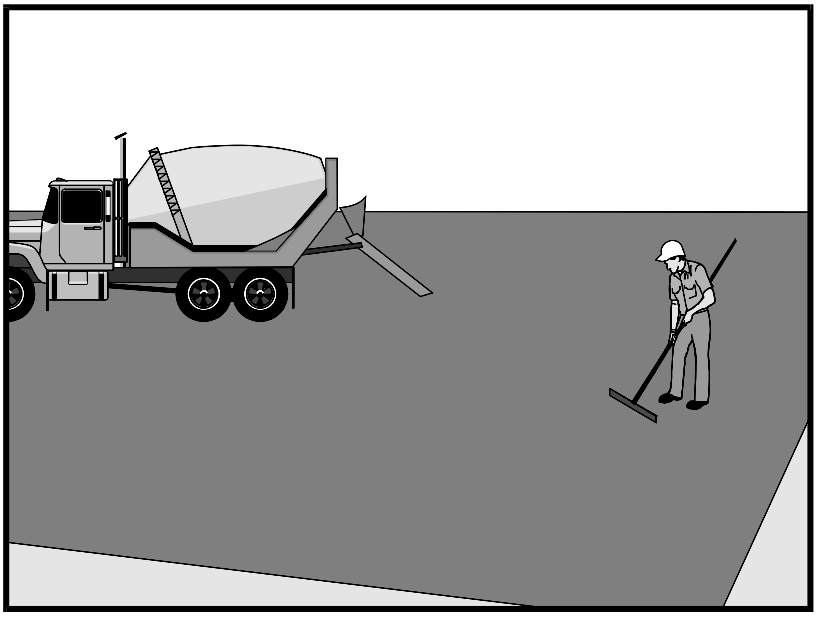
Inspection and Maintenance

- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occuring.
- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Paving and Grinding Operations NS-3



Categories

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SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☒

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent runon and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

The General Permit incorporates Numeric Action Levels (NAL) for pH and turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials associated with paving and grinding operations, including mortar, concrete, and cement and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

Limitations

- Paving opportunities may be limited during wet weather.

  Discharges of freshly paved surfaces may raise pH to environmentally harmful levels and trigger permit violations.

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Implementation

General

- Avoid paving during the wet season when feasible.
- Reschedule paving and grinding activities if rain is forecasted.
- Train employees and sub-contractors in pollution prevention and reduction.
- Store materials away from drainage courses to prevent stormwater runon (see WM-1, Material Delivery and Storage).
- Protect drainage courses, particularly in areas with a grade, by employing BMPs to divert runoff or to trap and filter sediment.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses. These materials should be stored consistent with WM-3, Stockpile Management.
- Disposal of PCC (Portland cement concrete) and AC (asphalt concrete) waste should be in conformance with WM-8, Concrete Waste Management.

Saw Cutting, Grinding, and Pavement Removal

- Shovel or vacuum saw-cut slurry and remove from site. Cover or barricade storm drains during saw cutting to contain slurry.
- When paving involves AC, the following steps should be implemented to prevent the discharge of grinding residue, uncompacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
  - AC grindings, pieces, or chunks used in embankments or shoulder backing should not be allowed to enter any storm drains or watercourses. Install inlet protection and perimeter controls until area is stabilized (i.e. cutting, grinding or other removal activities are complete and loose material has been properly removed and disposed of)or permanent controls are in place. Examples of temporary perimeter controls can be found in EC-9, Earth Dikes and Drainage Swales; SE-1, Silt Fence; SE-5, Fiber Rolls, or SE-13 Compost Socks and Berms
  - Collect and remove all broken asphalt and recycle when practical. Old or spilled asphalt should be recycled or disposed of properly.
- Do not allow saw-cut slurry to enter storm drains or watercourses. Residue from grinding operations should be picked up by a vacuum attachment to the grinding machine, or by sweeping, should not be allowed to flow across the pavement, and should not be left on the surface of the pavement. See also WM-8, Concrete Waste Management, and WM-10, Liquid Waste Management.
- Pavement removal activities should not be conducted in the rain.
- Collect removed pavement material by mechanical or manual methods. This material may be recycled for use as shoulder backing or base material.

- If removed pavement material cannot be recycled, transport the material back to an approved storage site.

Asphaltic Concrete Paving

- If paving involves asphaltic cement concrete, follow these steps:

  - Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks. Vacuum or sweep loose sand and gravel and properly dispose of this waste by referring to WM-5, Solid Waste Management.

  - Old asphalt should be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.

Portland Cement Concrete Paving

- Do not wash sweepings from exposed aggregate concrete into a storm drain system. Collect waste materials by dry methods, such as sweeping or shoveling, and return to aggregate base stockpile or dispose of properly. Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in WM-8, Concrete Waste Management, or pump the water to the sanitary sewer if authorized by the local wastewater authority.

Sealing Operations

- During chip seal application and sweeping operations, petroleum or petroleum covered aggregate should not be allowed to enter any storm drain or water courses. Apply temporary perimeter controls until structure is stabilized (i.e. all sealing operations are complete and cured and loose materials have been properly removed and disposed).

- Inlet protection (SE-10, Storm Drain Inlet Protection) should be used during application of seal coat, tack coat, slurry seal, and fog seal.

- Seal coat, tack coat, slurry seal, or fog seal should not be applied if rainfall is predicted to occur during the application or curing period.

Paving Equipment

- Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drip pans or absorbent materials under paving equipment when not in use. Clean up spills with absorbent materials and dispose of in accordance with the applicable regulations. See NS-10, Vehicle and Equipment Maintenance, WM-4, Spill Prevention and Control, and WM-10, Liquid Waste Management.

- Substances used to coat asphalt transport trucks and asphalt spreading equipment should not contain soap and should be non-foaming and non-toxic.

- Paving equipment parked onsite should be parked over plastic to prevent soil contamination.

- Clean asphalt coated equipment offsite whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in WM-5, Solid Waste Management. Any cleaning onsite should follow NS-8, Vehicle and Equipment Cleaning.

Thermoplastic Striping

- Thermoplastic striper and pre-heater equipment shutoff valves should be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the stormwater drainage system, or watercourses.
- Pre-heaters should be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave six inches of space at the top of the pre-heater container when filling thermoplastic to allow room for material to move.
- Do not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible, recycle thermoplastic material.

Raised/Recessed Pavement Marker Application and Removal

- Do not transfer or load bituminous material near drain inlets, the stormwater drainage system, or watercourses.
- Melting tanks should be loaded with care and not filled to beyond six inches from the top to leave room for splashing.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large-scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.

Costs

- All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of paving and grinding operations.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Sample stormwater runoff required by the General Permit.
- Keep ample supplies of drip pans or absorbent materials onsite.
- Inspect and maintain machinery regularly to minimize leaks and drips.

References

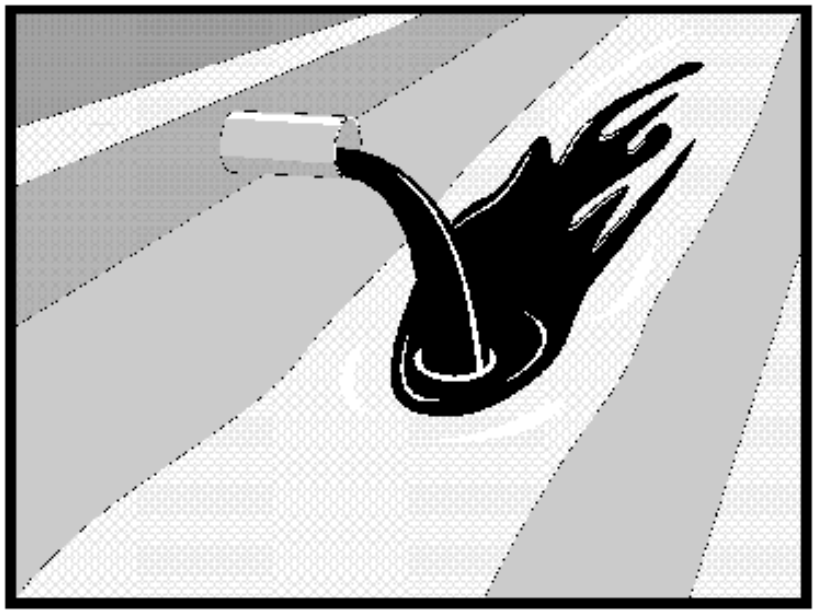
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Hot Mix Asphalt-Paving Handbook AC 150/5370-14, Appendix I, U.S. Army Corps of Engineers, July 1991.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Illicit Connection / Discharge NS-6



Description and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

Limitations

Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation

Planning

- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None

- Inspect site regularly during project execution for evidence of illicit connections, illegal dumping or discharges.
- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of Illicit Connections and Illegal Dumping or Discharges

- **General –** unlabeled and unidentifiable material should be treated as hazardous.
- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids** - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season
- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

Reporting

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

Cleanup and Removal

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

Costs

Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

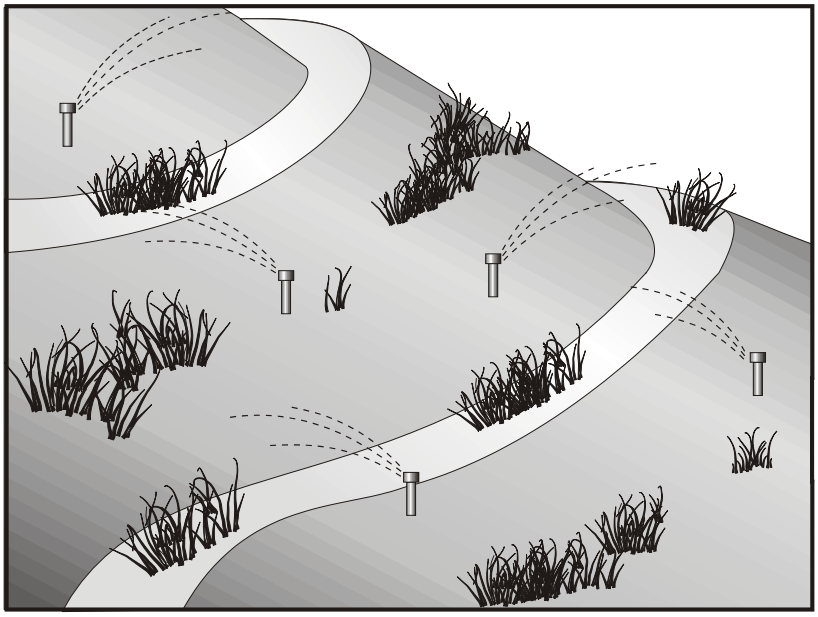
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Potable Water / Irrigation NS-7



Categories

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SE	Sediment Control	
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Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None

Description and Purpose

Potable Water/Irrigation consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

Suitable Applications

Implement this BMP whenever potable water or irrigation water discharges occur at or enter a construction site.

Limitations

None identified.

Implementation

- Direct water from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
- Discharges from water line flushing should be reused for landscaping purposes where feasible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.

- Inspect irrigated areas within the construction limits for excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

Costs

Cost to manage potable water and irrigation are low and generally considered to be a normal part of related activities.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Repair broken water lines as soon as possible.
- Inspect irrigated areas regularly for signs of erosion and/or discharge.

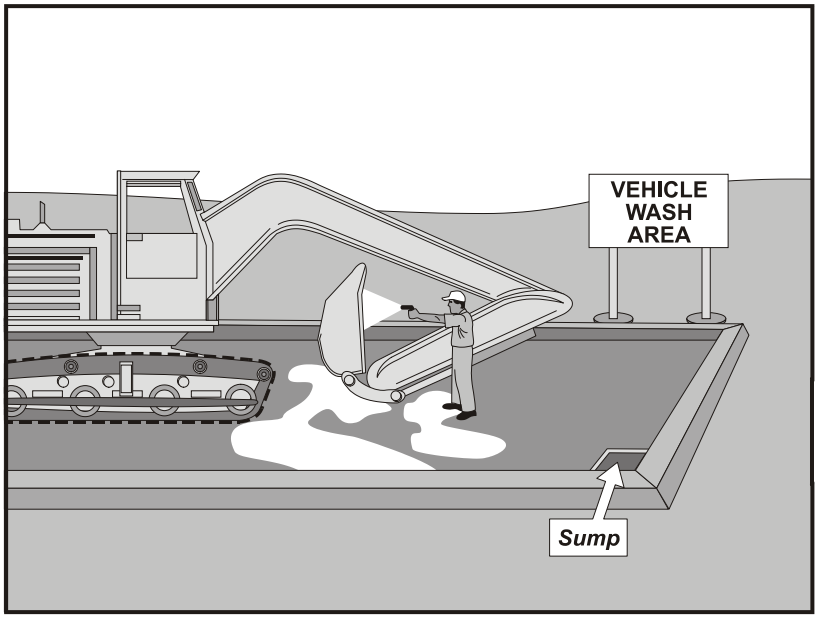
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle and Equipment Cleaning NS-8



Categories

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Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None

If User/Subscriber modifies this fact sheet in any way, the CASQA name/logo and footer below must be removed from each page and not appear on the modified version.

Description and Purpose

Vehicle and equipment cleaning procedures and practices eliminate or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning operations. Procedures and practices include but are not limited to: using offsite facilities; washing in designated, contained areas only; eliminating discharges to the storm drain by infiltrating the wash water; and training employees and subcontractors in proper cleaning procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment cleaning is performed.

Limitations

Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Implementation

Other options to washing equipment onsite include contracting with either an offsite or mobile commercial washing business. These businesses may be better equipped to handle and dispose of the wash waters properly. Performing this work offsite can also be economical by eliminating the need for a separate washing operation onsite.

If washing operations are to take place onsite, then:

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- Use phosphate-free, biodegradable soaps.
- Educate employees and subcontractors on pollution prevention measures.
- Do not permit steam cleaning onsite. Steam cleaning can generate significant pollutant concentrates.
- Cleaning of vehicles and equipment with soap, solvents or steam should not occur on the project site unless resulting wastes are fully contained and disposed of. Resulting wastes should not be discharged or buried, and must be captured and recycled or disposed according to the requirements of WM-10, Liquid Waste Management or WM-6, Hazardous Waste Management, depending on the waste characteristics. Minimize use of solvents. Use of diesel for vehicle and equipment cleaning is prohibited.
- All vehicles and equipment that regularly enter and leave the construction site must be cleaned offsite.
- When vehicle and equipment washing and cleaning must occur onsite, and the operation cannot be located within a structure or building equipped with appropriate disposal facilities, the outside cleaning area should have the following characteristics:
  - Located away from storm drain inlets, drainage facilities, or watercourses
  - Paved with concrete or asphalt and bermed to contain wash waters and to prevent runon and runoff
  - Configured with a sump to allow collection and disposal of wash water
  - No discharge of wash waters to storm drains or watercourses
  - Used only when necessary
- When cleaning vehicles and equipment with water:
  - Use as little water as possible. High-pressure sprayers may use less water than a hose and should be considered
  - Use positive shutoff valve to minimize water usage
  - Facility wash racks should discharge to a sanitary sewer, recycle system or other approved discharge system and must not discharge to the storm drainage system, watercourses, or to groundwater

Costs

Cleaning vehicles and equipment at an offsite facility may reduce overall costs for vehicle and equipment cleaning by eliminating the need to provide similar services onsite. When onsite cleaning is needed, the cost to establish appropriate facilities is relatively low on larger, long-duration projects, and moderate to high on small, short-duration projects.

Inspection and Maintenance

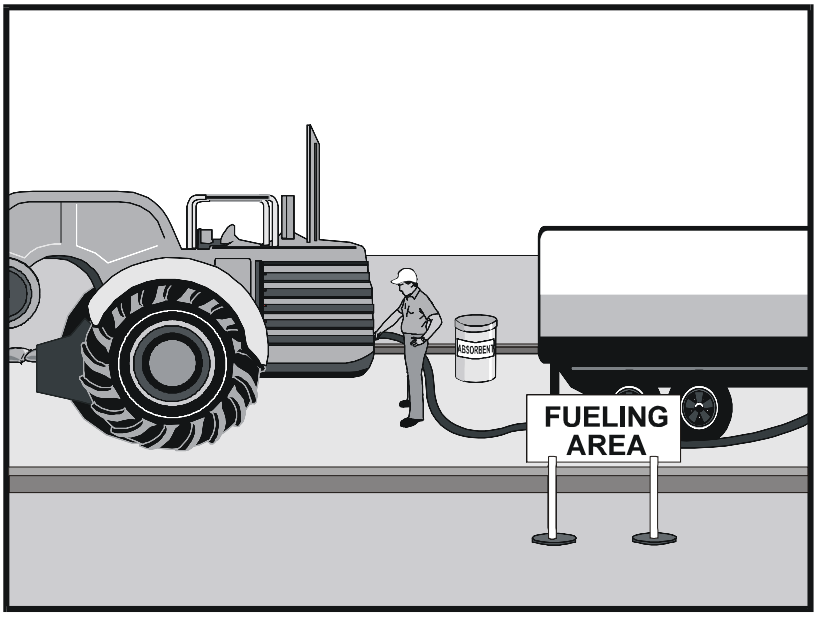
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspection and maintenance is minimal, although some berm repair may be necessary.
- Monitor employees and subcontractors throughout the duration of the construction project to ensure appropriate practices are being implemented.
- Inspect sump regularly and remove liquids and sediment as needed.
- Prohibit employees and subcontractors from washing personal vehicles and equipment on the construction site.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Swisher, R.D. Surfactant Biodegradation, Marcel Decker Corporation, 1987.

Vehicle and Equipment Fueling NS-9



Categories

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Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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Description and Purpose

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

Limitations

Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/ Exit.

Implementation

- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage "topping-off" of fuel tanks.

- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should be disposed of properly after use.
- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- Train employees and subcontractors in proper fueling and cleanup procedures.
- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.
- Dedicated fueling areas should be protected from stormwater runon and runoff, and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent runon, runoff, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

Costs

- All of the above measures are low cost except for the capital costs of above ground tanks that meet all local environmental, zoning, and fire codes.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately or problem vehicles or equipment should be removed from the project site.
- Keep ample supplies of spill cleanup materials onsite.

- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

References

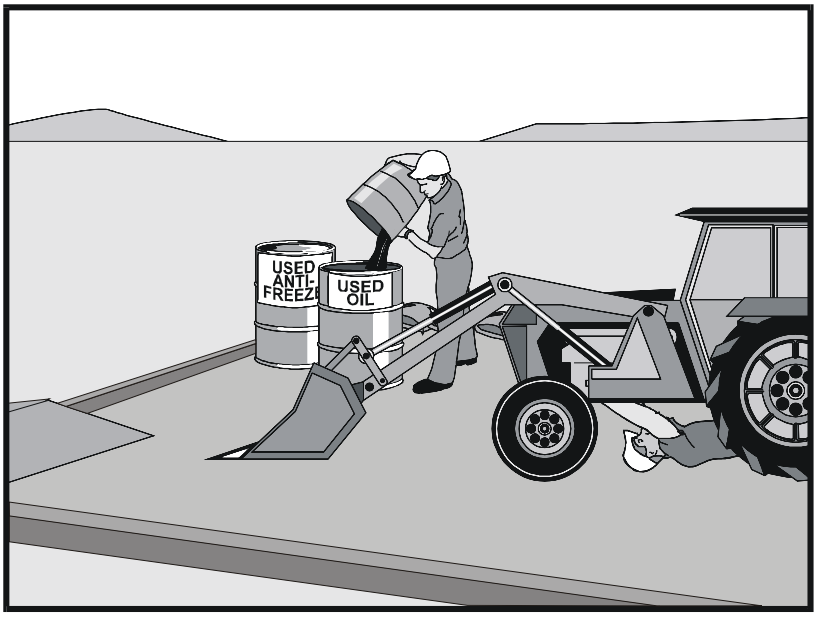
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle & Equipment Maintenance NS-10



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None

Description and Purpose

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site". The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

Suitable Applications

These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Limitations

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8,

Vehicle and Equipment Cleaning, and NS-9, Vehicle and Equipment Fueling.

Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runon and runoff, and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.

- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

Safer Alternative Products

- Consider products that are less toxic or hazardous than regular products. These products are often sold under an "environmentally friendly" label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturers label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturers label for details on specific uses.

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. 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. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, 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 the list of active ingredients to see whether it contains chlorinated solvents. The "chlor" term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

Recycling and Disposal

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like,-trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

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.

Costs

All of the above are low cost measures. Higher costs are incurred to setup and maintain onsite maintenance areas.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately or the problem vehicle(s) or equipment should be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

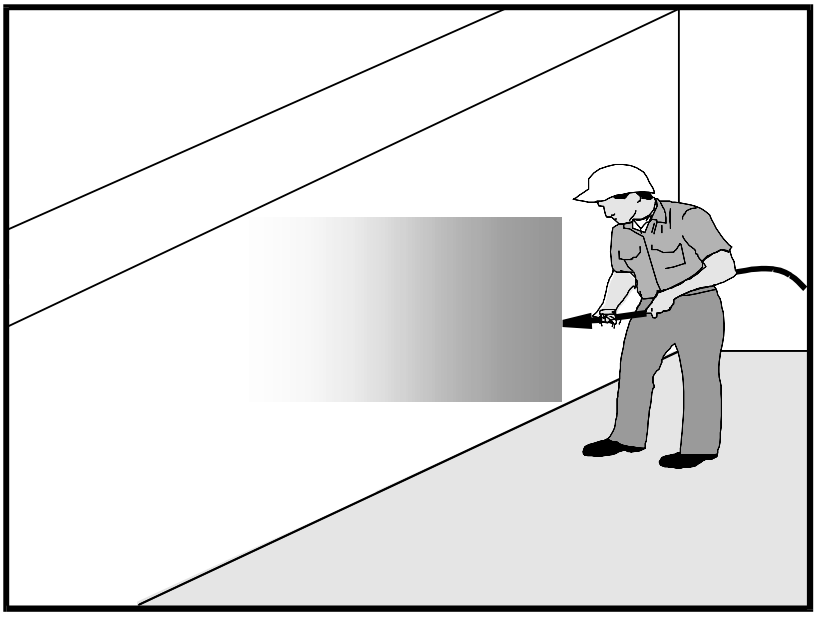
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Concrete Curing NS-12



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

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

Potential Alternatives

None

Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of the permitted range. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Proper procedures and care should be taken when managing concrete curing materials to prevent them from coming into contact with stormwater flows, which could result in a high pH discharge.

Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

Chemical Curing

- Avoid over spray of curing compounds.
- Minimize the drift by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1, Material Delivery and Storage.
- Protect drain inlets prior to the application of curing compounds.
- Refer to WM-4, Spill Prevention and Control.

Water Curing for Bridge Decks, Retaining Walls, and other Structures

- Direct cure water away from inlets and watercourses to collection areas for evaporation or other means of removal in accordance with all applicable permits. See WM-8 Concrete Waste Management.
- Collect cure water at the top of slopes and transport to a concrete waste management area in a non-erosive manner. See EC-9 Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

Education

- Educate employees, subcontractors, and suppliers on proper concrete curing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete curing procedures.

Costs

All of the above measures are generally low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.

- Sample non-stormwater discharges and stormwater runoff that contacts uncured and partially cured concrete as required by the General Permit.
- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

References

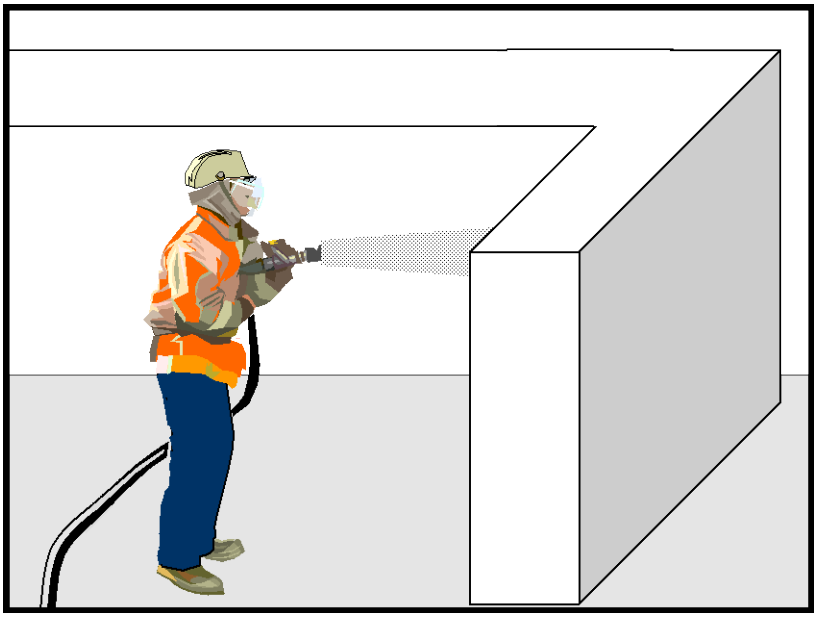
Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non Point Source Pollution Control Program, 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Concrete Finishing NS-13



Categories

EC	Erosion Control	
SE	Sediment Control	
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NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

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

Potential Alternatives

None

Description and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Concrete and its associated curing materials have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

- Collect and properly dispose of water from high-pressure water blasting operations.
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water while using BMPs such as those for erosion control. Refer to EC-9, Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering). Refer to NS-2 Dewatering Operations.
- Protect inlets during sandblasting operations. Refer to SE-10, Storm Drain Inlet Protection.
- Refer to WM-8, Concrete Waste Management for disposal of concrete debris.
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to WM-6, Hazardous Waste Management.

Education

- Educate employees, subcontractors, and suppliers on proper concrete finishing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete finishing procedures.

Costs

These measures are generally of low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts concrete dust and debris as required by the General Permit.

- Sweep or vacuum up debris from sandblasting at the end of each shift.
- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
- Inspect containment structures for damage prior to use and prior to onset of forecasted rain.

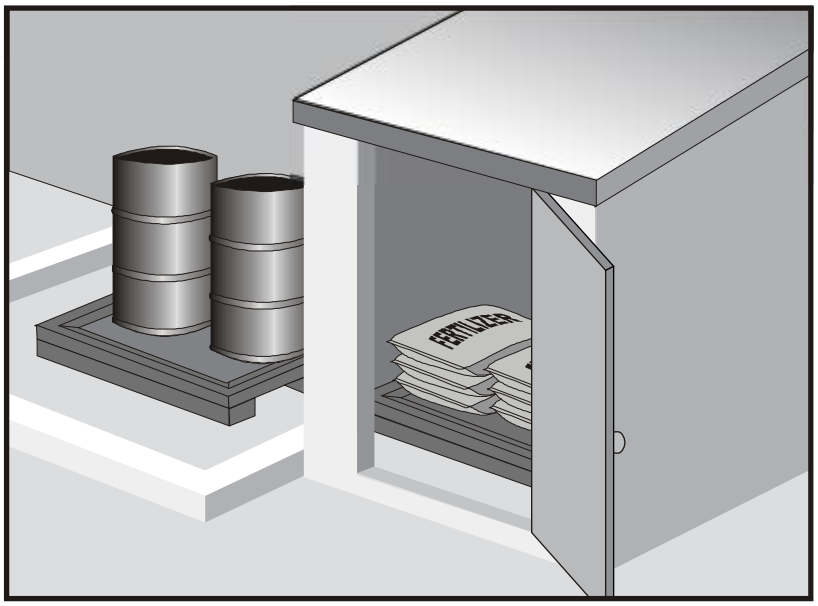
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Material Delivery and Storage WM-1



Categories

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TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

Targeted Constituents

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

Potential Alternatives

None

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Asphalt and concrete components
- Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Concrete compounds
- Other materials that may be detrimental if released to the environment

Limitations

- Space limitation may preclude indoor storage.
- Storage sheds often must meet building and fire code requirements.

Implementation

The following steps should be taken to minimize risk:

- Chemicals must be stored in water tight containers with appropriate secondary containment or in a storage shed.
- When a material storage area is located on bare soil, the area should be lined and bermed.
- Use containment pallets or other practical and available solutions, such as storing materials within newly constructed buildings or garages, to meet material storage requirements.
- Stack erodible landscape material on pallets and cover when not in use.
- Contain all fertilizers and other landscape materials when not in use.
- Temporary storage areas should be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) should be available on-site for all materials stored that have the potential to effect water quality.
- Construction site areas should be designated for material delivery and storage.
- Material delivery and storage areas should be located away from waterways, if possible.
    - Avoid transport near drainage paths or waterways.
    - Surround with earth berms or other appropriate containment BMP. See EC-9, Earth Dikes and Drainage Swales.
    - Place in an area that will be paved.
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- An up to date inventory of materials delivered and stored onsite should be kept.

- Hazardous materials storage onsite should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- Keep ample spill cleanup supplies appropriate for the materials being stored. Ensure that cleanup supplies are in a conspicuous, labeled area.
- Employees and subcontractors should be trained on the proper material delivery and storage practices.
- Employees trained in emergency spill cleanup procedures must be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose of materials and any contaminated soil. See WM-7, Contaminated Soil Management. If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

Material Storage Areas and Practices

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 should be stored in approved containers and drums and should not be overfilled. Containers and drums should be placed in temporary containment facilities for storage.
- A temporary containment facility should provide for a spill containment volume able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
- A temporary containment facility should be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be collected and placed into drums. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids should be sent to an approved disposal site.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Materials should be covered prior to, and during rain events.
- Materials should be stored in their original containers and the original product labels should be maintained in place in a legible condition. Damaged or otherwise illegible labels should be replaced immediately.

- Bagged and boxed materials should be stored on pallets and should not be allowed to accumulate on the ground. To provide protection from wind and rain throughout the rainy season, bagged and boxed materials should be covered during non-working days and prior to and during rain events.
- Stockpiles should be protected in accordance with WM-3, Stockpile Management.
- Materials should be stored indoors within existing structures or completely enclosed storage sheds when available.
- Proper storage instructions should be posted at all times in an open and conspicuous location.
- An ample supply of appropriate spill clean up material should be kept near storage areas.
- Also see WM-6, Hazardous Waste Management, for storing of hazardous wastes.

Material Delivery Practices

- Keep an accurate, up-to-date inventory of material delivered and stored onsite.
- Arrange for employees trained in emergency spill cleanup procedures to be present when dangerous materials or liquid chemicals are unloaded.

Spill Cleanup

- Contain and clean up any spill immediately.
- Properly remove and dispose of any hazardous materials or contaminated soil if significant residual materials remain on the ground after construction is complete. See WM-7, Contaminated Soil Management.
- See WM-4, Spill Prevention and Control, for spills of chemicals and/or hazardous materials.
- If spills or leaks of materials occur that are not contained and could discharge to surface waters, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

Cost

- The largest cost of implementation may be in the construction of a materials storage area that is covered and provides secondary containment.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep storage areas clean and well organized, including a current list of all materials onsite.
- Inspect labels on containers for legibility and accuracy.

- Repair or replace perimeter controls, containment structures, covers, and liners as needed to maintain proper function.

References

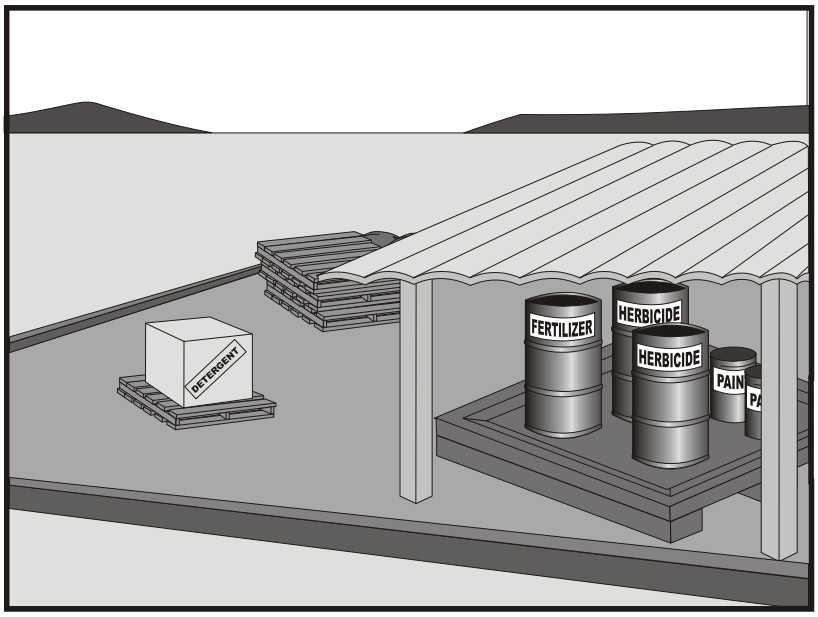
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Material Use WM-2



Categories

EC	Erosion Control	
SE	Sediment Control	
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WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

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

Potential Alternatives

None

If User/Subscriber modifies this fact sheet in any way, the CASQA name/logo and footer below must be removed from each page and not appear on the modified version.

Description and Purpose

Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

Limitations

Safer alternative building and construction products may not be available or suitable in every instance.

Implementation

The following steps should be taken to minimize risk:

- Minimize use of hazardous materials onsite.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- The preferred method of termiticide application is soil injection near the existing or proposed structure foundation/slab; however, if not feasible, soil drench application of termiticides should follow EPA label guidelines and the following recommendations (most of which are applicable to most pesticide applications):
  - Do not treat soil that is water-saturated or frozen.
  - Application shall not commence within 24-hours of a predicted precipitation event with a 40% or greater probability. Weather tracking must be performed on a daily basis prior to termiticide application and during the period of termiticide application.
  - Do not allow treatment chemicals to runoff from the target area. Apply proper quantity to prevent excess runoff. Provide containment for and divert stormwater from application areas using berms or diversion ditches during application.
  - Dry season: Do not apply within 10 feet of storm drains. Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds).
  - Wet season: Do not apply within 50 feet of storm drains or aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds) unless a vegetative buffer is present (if so, refer to dry season requirements).
  - Do not make on-grade applications when sustained wind speeds are above 10 mph (at application site) at nozzle end height.
  - Cover treatment site prior to a rain event in order to prevent run-off of the pesticide into non-target areas. The treated area should be limited to a size that can be backfilled and/or covered by the end of the work shift. Backfilling or covering of the treated area shall be done by the end of the same work shift in which the application is made.
  - The applicator must either cover the soil him/herself or provide written notification of the above requirement to the contractor on site and to the person commissioning the

application (if different than the contractor). If notice is provided to the contractor or the person commissioning the application, then they are responsible under the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA) to ensure that: 1) if the concrete slab cannot be poured over the treated soil within 24 hours of application, the treated soil is covered with a waterproof covering (such as polyethylene sheeting), and 2) the treated soil is covered if precipitation is predicted to occur before the concrete slab is scheduled to be poured.

- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydraulic application. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals before predicted rainfall.
- Train employees and subcontractors in proper material use.
- Supply Material Safety Data Sheets (MSDS) for all materials.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint indoors or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted, or contain for proper disposal off site. For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials onsite when practical.
- Document the location, time, chemicals applied, and applicator's name and qualifications.
- Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Discontinue use of erodible landscape material within 2 days prior to a forecasted rain event and materials should be covered and/or bermed.

- Provide containment for material use areas such as masons' areas or paint mixing/preparation areas to prevent materials/pollutants from entering stormwater.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure employees and subcontractors throughout the job are using appropriate practices.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

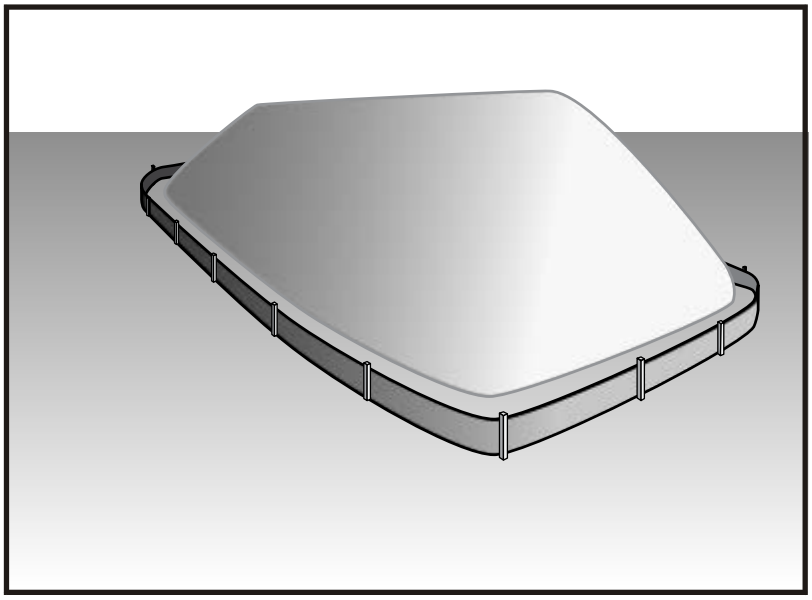
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Comments on Risk Assessments Risk Reduction Options for Cypermethrin: Docket No. OPP–2005–0293; California Stormwater Quality Association (CASQA) letter to USEPA, 2006.Environmental Hazard and General Labeling for Pyrethroid Non-Agricultural Outdoor Products, EPA-HQ-OPP-2008-0331-0021; USEPA, 2008.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Stockpile Management WM-3



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of Plastic materials and photodegradable plastics should be avoided.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

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

Potential Alternatives

None

- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- After 14 days of inactivity, a stockpile is non-active and requires further protection described below. All stockpiles are required to be protected as non-active stockpiles immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater runon using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

A stockpile is considered non-active if it either is not used for 14 days or if it is scheduled not to be used for 14 days or more. Stockpiles need to be protected immediately if they are not scheduled to be used within 14 days. Non-active stockpiles of the identified materials should be protected as follows:

Soil stockpiles

- Soil stockpiles should be covered or protected with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Temporary vegetation should be considered for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Stockpiles should be covered and protected with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cold mix stockpiles should be placed on and covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Stockpiles of fly ash, stucco, hydrated lime

- Stockpiles of materials that may raise the pH of runoff (i.e., basic materials) should be covered with plastic and surrounded by a berm.

Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate

- Treated wood should be covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Protection of Active Stockpiles

A stockpile is active when it is being used or is scheduled to be used within 14 days of the previous use. Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Costs

For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

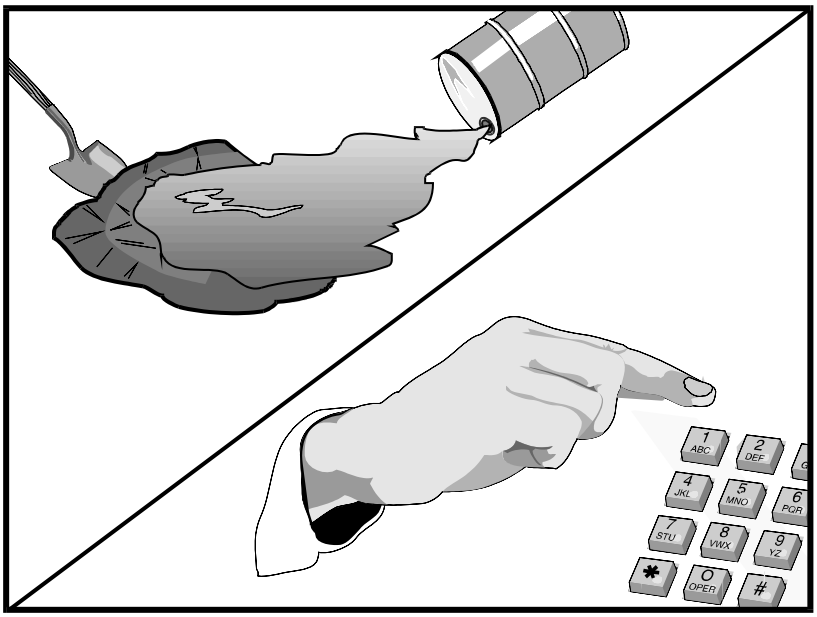
Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Spill Prevention and Control WM-4



Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None

- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, 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 either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Regularly inspect onsite 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.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent 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 pollute 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 the 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

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

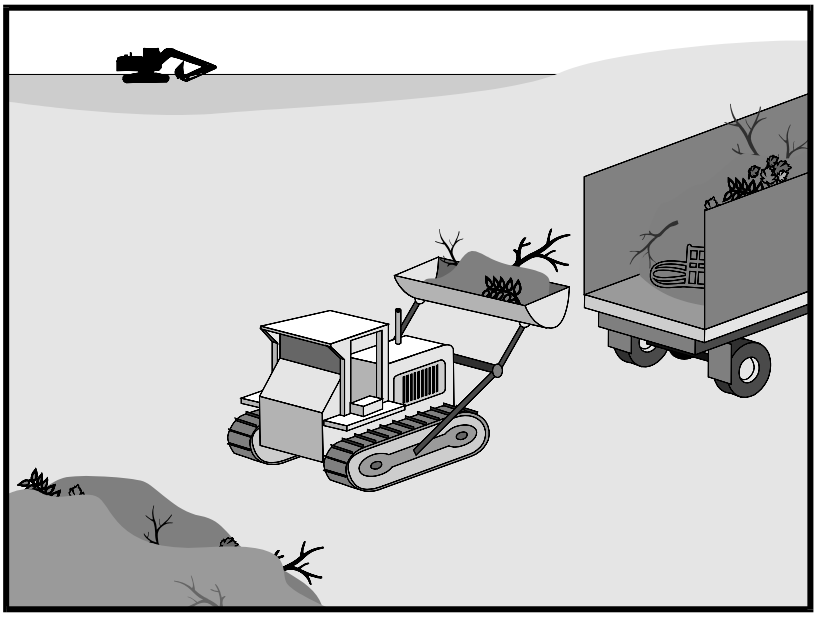
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Solid Waste Management WM-5



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

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

Potential Alternatives

None

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Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials

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- Highway planting wastes, including vegetative material, plant containers, and packaging materials

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Cover waste containers at the end of each work day and when it is raining.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

Collection, Storage, and Disposal

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runon should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.

- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur

- Inspect construction waste area regularly.

- Arrange for regular waste collection.

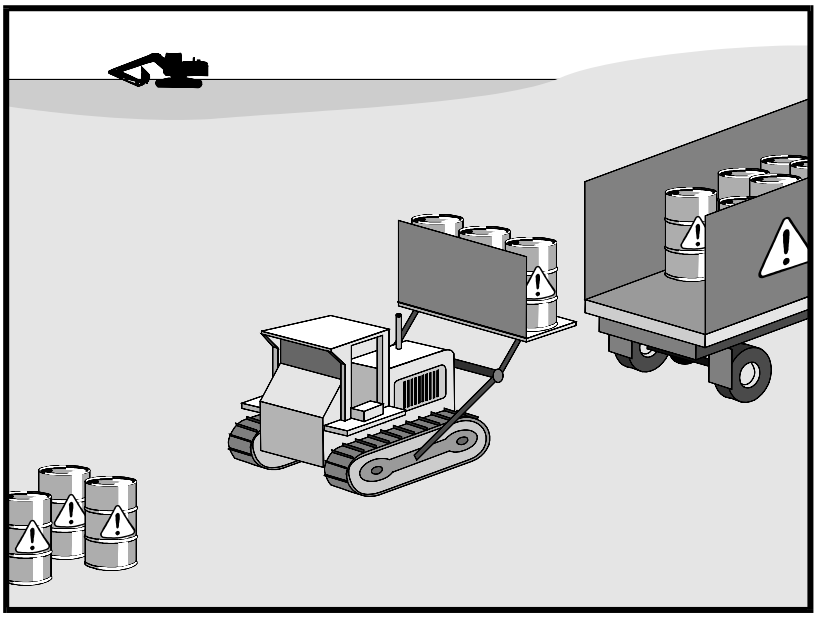
References

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Hazardous Waste Management WM-6



Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products
- Asphalt Products
- Concrete Curing Compounds
- Pesticides
- Palliatives
- Acids
- Septic Wastes
- Paints
- Stains
- Solvents
- Wood Preservatives
- Roofing Tar
- Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None

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In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

Limitations

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Nothing in this BMP relieves the contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aerially deposited lead (ADL) soils. For ADL soils refer to WM-7, Contaminated Soil Management.

Implementation

The following steps will help reduce stormwater pollution from hazardous wastes:

Material Use

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers should be stored in temporary containment facilities that should comply with the following requirements:
  - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
  - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
  - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
  - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.

- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.

- Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.

- Drums should not be overfilled and wastes should not be mixed.

- Unless watertight, containers of dry waste should be stored on pallets.

- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.

- Paint brushes and equipment for water and oil based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.

- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.

- The following actions should be taken with respect to temporary contaminant:

  - Ensure that adequate hazardous waste storage volume is available.

  - Ensure that hazardous waste collection containers are conveniently located.

  - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.

  - Minimize production or generation of hazardous materials and hazardous waste on the job site.

  - Use containment berms in fueling and maintenance areas and where the potential for spills is high.

  - Segregate potentially hazardous waste from non-hazardous construction site debris.

  - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.

- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Do not mix wastes.
- Use all of the product before disposing of the container.
- Do not remove the original product label; it contains important safety and disposal information.

Waste Recycling Disposal

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

Disposal Procedures

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

Education

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The contractor's superintendent or representative should oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Hazardous waste should be regularly collected.
- A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures.
- Waste storage areas should be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

- Hazardous spills should be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.
- The National Response Center, at (800) 424-8802, should be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302. Also notify the Governors Office of Emergency Services Warning Center at (916) 845-8911.
- A copy of the hazardous waste manifests should be provided.

References

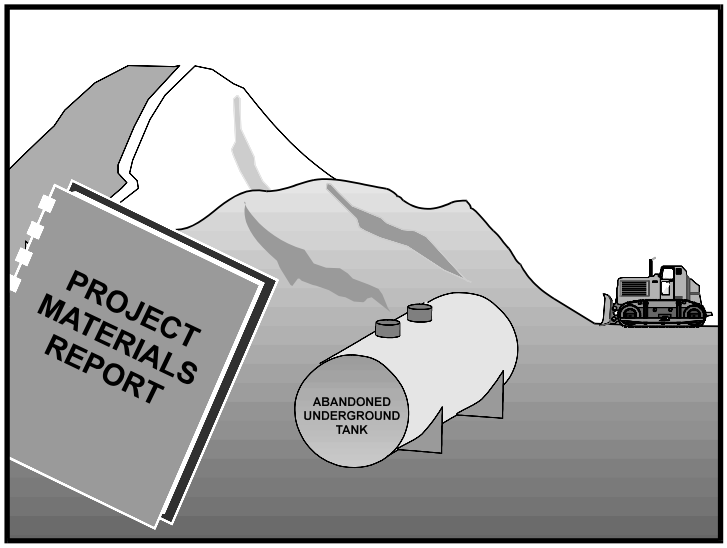
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Contaminated Soil Management WM-7



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

Suitable Applications

Contaminated soil management is implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, aerial deposition, past use and leaks from underground storage tanks.

Limitations

Contaminated soils that cannot be treated onsite must be disposed of offsite by a licensed hazardous waste hauler. The presence of contaminated soil may indicate contaminated water as well. See NS-2, Dewatering Operations, for more information.

The procedures and practices presented in this BMP are general. The contractor should identify appropriate practices and procedures for the specific contaminants known to exist or discovered onsite.

Implementation

Most owners and developers conduct pre-construction environmental assessments as a matter of routine. Contaminated soils are often identified during project planning and development with known locations identified in the plans, specifications and in the SWPPP. The contractor should review applicable reports and investigate appropriate call-outs in the

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

Potential Alternatives

None

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

plans, specifications, and SWPPP. Recent court rulings holding contractors liable for cleanup costs when they unknowingly move contaminated soil highlight the need for contractors to confirm a site assessment is completed before earth moving begins.

The following steps will help reduce stormwater pollution from contaminated soil:

- Conduct thorough, pre-construction inspections of the site and review documents related to the site. If inspection or reviews indicated presence of contaminated soils, develop a plan before starting work.
- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
- Prevent leaks and spills. Contaminated soil can be expensive to treat and dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place.
- The contractor may further identify contaminated soils by investigating:
  - Past site uses and activities
  - Detected or undetected spills and leaks
  - Acid or alkaline solutions from exposed soil or rock formations high in acid or alkaline forming elements
  - Contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
  - Suspected soils should be tested at a certified laboratory.

Education

- Have employees and subcontractors complete a safety training program which meets 29 CFR 1910.120 and 8 CCR 5192 covering the potential hazards as identified, prior to performing any excavation work at the locations containing material classified as hazardous.
- Educate employees and subcontractors in identification of contaminated soil and on contaminated soil handling and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

Handling Procedures for Material with Aerially Deposited Lead (ADL)

- Materials from areas designated as containing (ADL) may, if allowed by the contract special provisions, be excavated, transported, and used in the construction of embankments and/or backfill.
- Excavation, transportation, and placement operations should result in no visible dust.
- Caution should be exercised to prevent spillage of lead containing material during transport.

- Quality should be monitored during excavation of soils contaminated with lead.

Handling Procedures for Contaminated Soils

- Minimize onsite storage. Contaminated soil should be disposed of properly in accordance with all applicable regulations. All hazardous waste storage will comply with the requirements in Title 22, CCR, Sections 66265.250 to 66265.260.
- Test suspected soils at an approved certified laboratory.
- Work with the local regulatory agencies to develop options for treatment or disposal if the soil is contaminated.
- Avoid temporary stockpiling of contaminated soils or hazardous material.
- Take the following precautions if temporary stockpiling is necessary:
  - Cover the stockpile with plastic sheeting or tarps.
  - Install a berm around the stockpile to prevent runoff from leaving the area.
  - Do not stockpile in or near storm drains or watercourses.
- Remove contaminated material and hazardous material on exteriors of transport vehicles and place either into the current transport vehicle or into the excavation prior to the vehicle leaving the exclusion zone.
- Monitor the air quality continuously during excavation operations at all locations containing hazardous material.
- Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work, including registration for transporting vehicles carrying the contaminated material and the hazardous material.
- Collect water from decontamination procedures and treat or dispose of it at an appropriate disposal site.
- Collect non-reusable protective equipment, once used by any personnel, and dispose of at an appropriate disposal site.
- Install temporary security fence to surround and secure the exclusion zone. Remove fencing when no longer needed.
- Excavate, transport, and dispose of contaminated material and hazardous material in accordance with the rules and regulations of the following agencies (the specifications of these agencies supersede the procedures outlined in this BMP):
  - United States Department of Transportation (USDOT)
  - United States Environmental Protection Agency (USEPA)
  - California Environmental Protection Agency (CAL-EPA)

- California Division of Occupation Safety and Health Administration (CAL-OSHA)
- Local regulatory agencies

Procedures for Underground Storage Tank Removals

- Prior to commencing tank removal operations, obtain the required underground storage tank removal permits and approval from the federal, state, and local agencies that have jurisdiction over such work.
- To determine if it contains hazardous substances, arrange to have tested, any liquid or sludge found in the underground tank prior to its removal.
- Following the tank removal, take soil samples beneath the excavated tank and perform analysis as required by the local agency representative(s).
- The underground storage tank, any liquid or sludge found within the tank, and all contaminated substances and hazardous substances removed during the tank removal and transported to disposal facilities permitted to accept such waste.

Water Control

- All necessary precautions and preventive measures should be taken to prevent the flow of water, including ground water, from mixing with hazardous substances or underground storage tank excavations. Such preventative measures may consist of, but are not limited to, berms, cofferdams, grout curtains, freeze walls, and seal course concrete or any combination thereof.
- If water does enter an excavation and becomes contaminated, such water, when necessary to proceed with the work, should be discharged to clean, closed top, watertight transportable holding tanks, treated, and disposed of in accordance with federal, state, and local laws.

Costs

Prevention of leaks and spills is inexpensive. Treatment or disposal of contaminated soil can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for contractor's Water Pollution Control Manager, foreman, and/or construction supervisor to monitor onsite contaminated soil storage and disposal procedures.
- Monitor air quality continuously during excavation operations at all locations containing hazardous material.
- Coordinate contaminated soils and hazardous substances/waste management with the appropriate federal, state, and local agencies.

- Implement WM-4, Spill Prevention and Control, to prevent leaks and spills as much as possible.

References

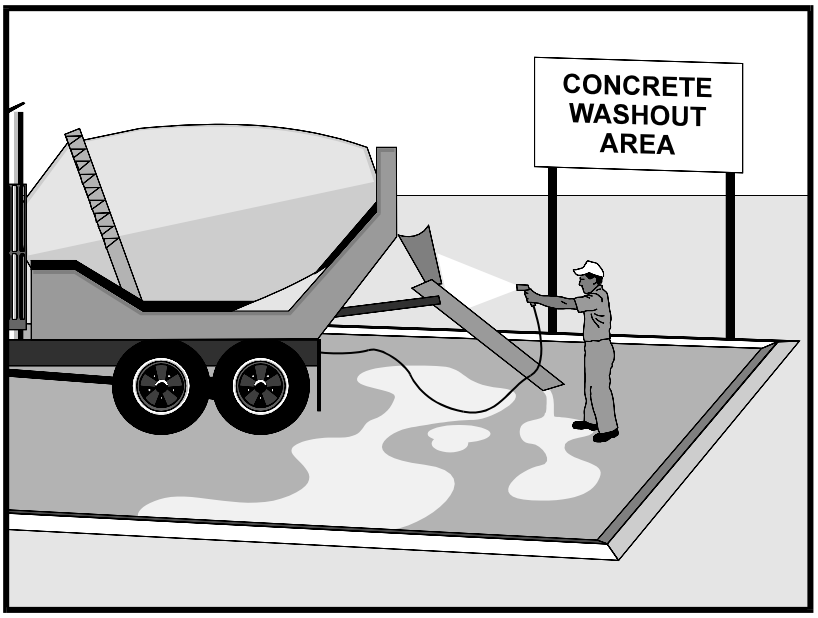
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Concrete Waste Management WM-8



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.
- Concrete trucks and other concrete-coated equipment are washed onsite.

- Mortar-mixing stations exist.
- Stucco mixing and spraying.
- See also NS-8, Vehicle and Equipment Cleaning.

Limitations

- Offsite washout of concrete wastes may not always be possible.
- Multiple washouts may be needed to assure adequate capacity and to allow for evaporation.

Implementation

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
- Store dry and wet materials under cover, away from drainage areas. Refer to WM-1, Material Delivery and Storage for more information.
- Avoid mixing excess amounts of concrete.
- Perform washout of concrete trucks in designated areas only, where washout will not reach stormwater.
- Do not wash out concrete trucks into storm drains, open ditches, streets, streams or onto the ground. Trucks should always be washed out into designated facilities.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- For onsite washout:
  - On larger sites, it is recommended to locate washout areas at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
  - Washout wastes into the temporary washout where the concrete can set, be broken up, and then disposed properly.
  - Washouts shall be implemented in a manner that prevents leaching to underlying soils. Washout containers must be water tight and washouts on or in the ground must be lined with a suitable impervious liner, typically a plastic type material.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.
- See typical concrete washout installation details at the end of this fact sheet.

Education

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.

- Arrange for contractor's superintendent or representative to oversee and enforce concrete waste management procedures.

- Discuss the concrete management techniques described in this BMP (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.

Concrete Demolition Wastes

- Stockpile concrete demolition waste in accordance with BMP WM-3, Stockpile Management.

- Dispose of or recycle hardened concrete waste in accordance with applicable federal, state or local regulations.

Concrete Slurry Wastes

- PCC and AC waste should not be allowed to enter storm drains or watercourses.

- PCC and AC waste should be collected and disposed of or placed in a temporary concrete washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below).

- A foreman or construction supervisor should monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.

- Saw-cut concrete slurry should not be allowed to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine or by sweeping. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement. See also NS-3, Paving and Grinding Operations; and WM-10, Liquid Waste Management.

- Concrete slurry residue should be disposed in a temporary washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below) and allowed to dry. Dispose of dry slurry residue in accordance with WM-5, Solid Waste Management.

Onsite Temporary Concrete Washout Facility, Transit Truck Washout Procedures

- Temporary concrete washout facilities should be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking.

- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.

- Temporary concrete washout facilities should be constructed above grade or below grade at the option of the contractor. Temporary concrete washout facilities should be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

- Temporary washout facilities should have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.
- Temporary washout facilities should be lined to prevent discharge to the underlying ground or surrounding area.
- Washout of concrete trucks should be performed in designated areas only.
- Only concrete from mixer truck chutes should be washed into concrete wash out.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of or recycled offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per WM-5, Solid Waste Management. Dispose of or recycle hardened concrete on a regular basis.
- Temporary Concrete Washout Facility (Type Above Grade)
  - Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft; however, smaller sites or jobs may only need a smaller washout facility. With any washout, always maintain a sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
  - Materials used to construct the washout area should conform to the provisions detailed in their respective BMPs (e.g., SE-8 Sandbag Barrier).
  - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
  - Alternatively, portable removable containers can be used as above grade concrete washouts. Also called a “roll-off”; this concrete washout facility should be properly sealed to prevent leakage, and should be removed from the site and replaced when the container reaches 75% capacity.
- Temporary Concrete Washout Facility (Type Below Grade)
  - Temporary concrete washout facilities (type below grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
  - Lath and flagging should be commercial type.
  - Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

- The base of a washout facility should be free of rock or debris that may damage a plastic liner.

Removal of Temporary Concrete Washout Facilities

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and properly disposed or recycled in accordance with federal, state or local regulations. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and properly disposed or recycled in accordance with federal, state or local regulations..

- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

Costs

All of the above are low cost measures. Roll-0ff concrete washout facilities can be more costly than other measures due to removal and replacement; however, provide a cleaner alternative to traditional washouts. The type of washout facility, size, and availability of materials will determine the cost of the washout.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials should be removed and properly disposed or recycled in accordance with federal, state or local regulations.

- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.

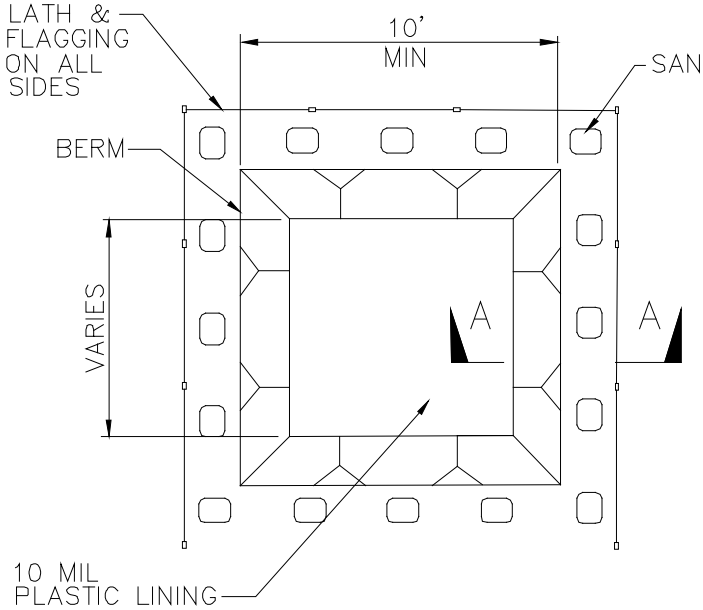
- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

References

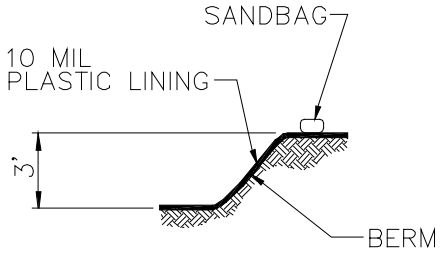
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000, Updated March 2003.

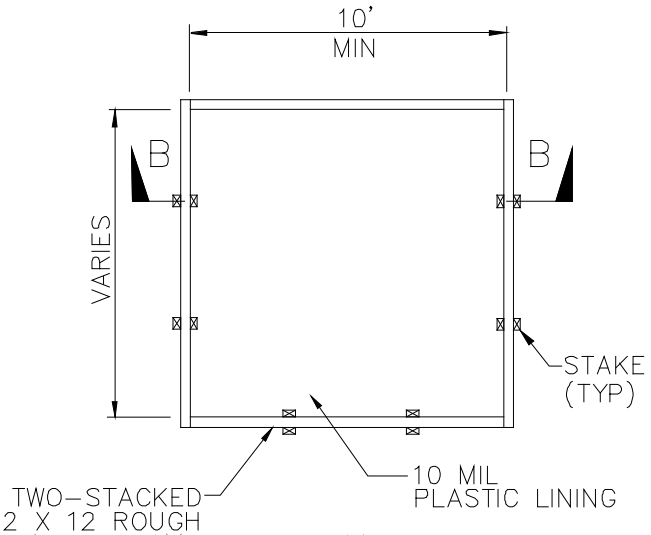
Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



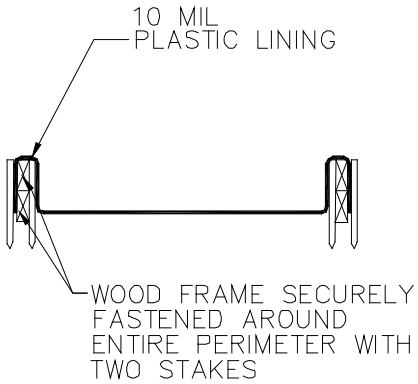
PLAN
NOT TO SCALE
TYPE "BELOW GRADE"



SECTION A–A
NOT TO SCALE



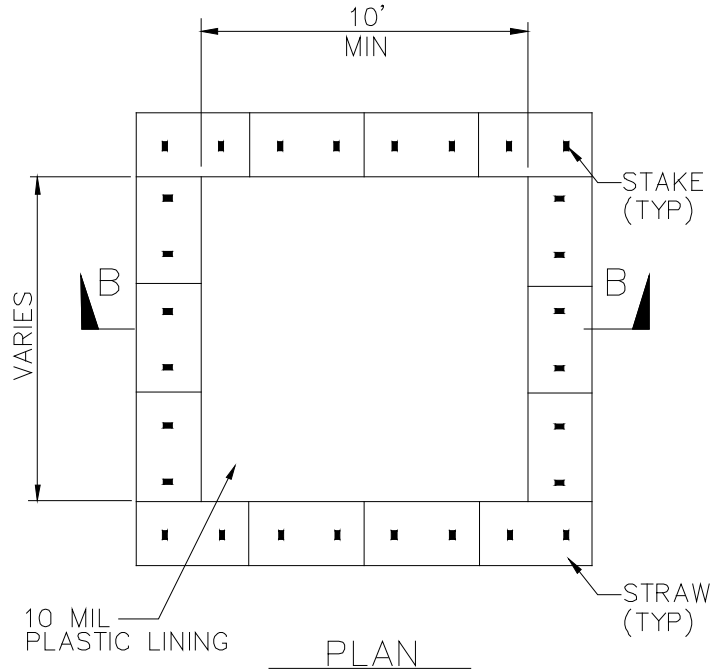
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"



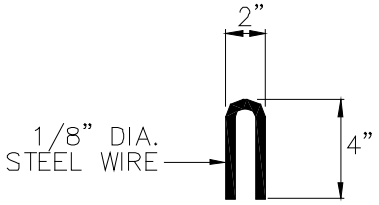
SECTION B–B
NOT TO SCALE

NOTES

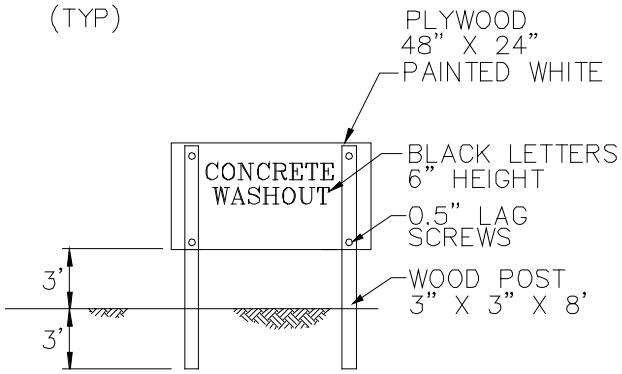
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.



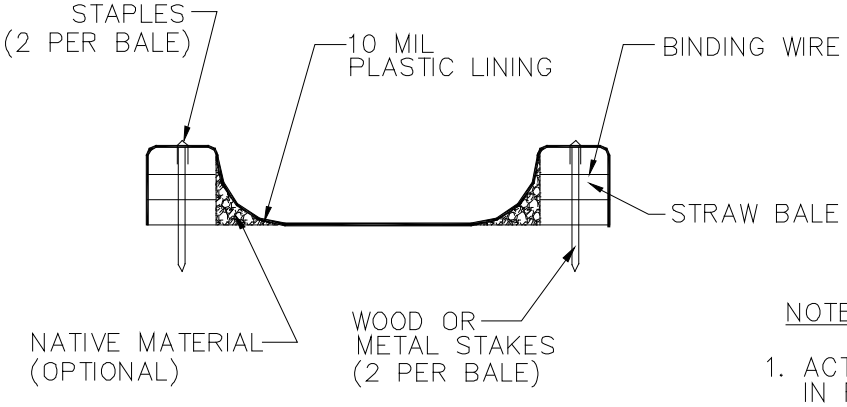
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"
WITH STRAW BALES



STAPLE DETAIL



CONCRETE WASHOUT
SIGN DETAIL
(OR EQUIVALENT)

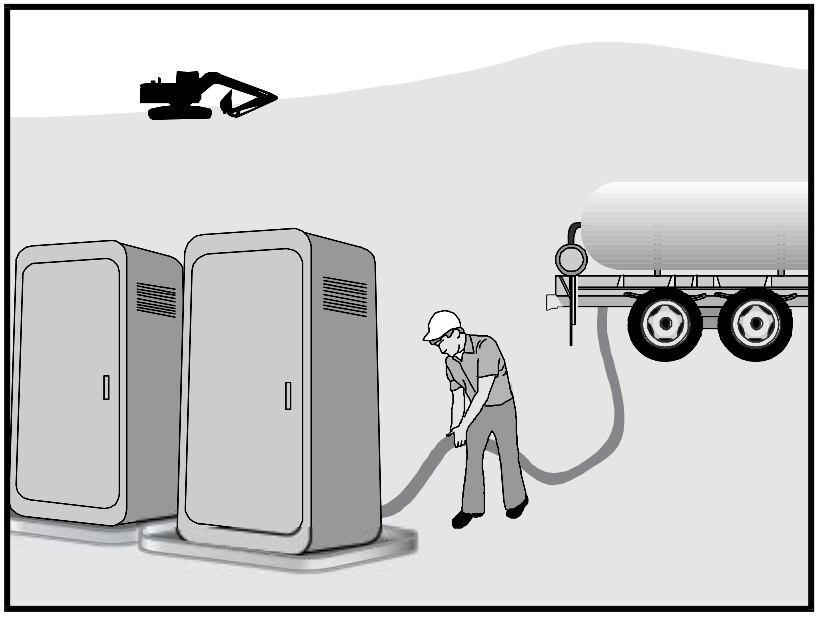


SECTION B–B
NOT TO SCALE

NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

Sanitary/Septic Waste Management WM-9



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

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

Potential Alternatives

None

Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

Education

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Costs

All of the above are low cost measures.

Inspection and Maintenance

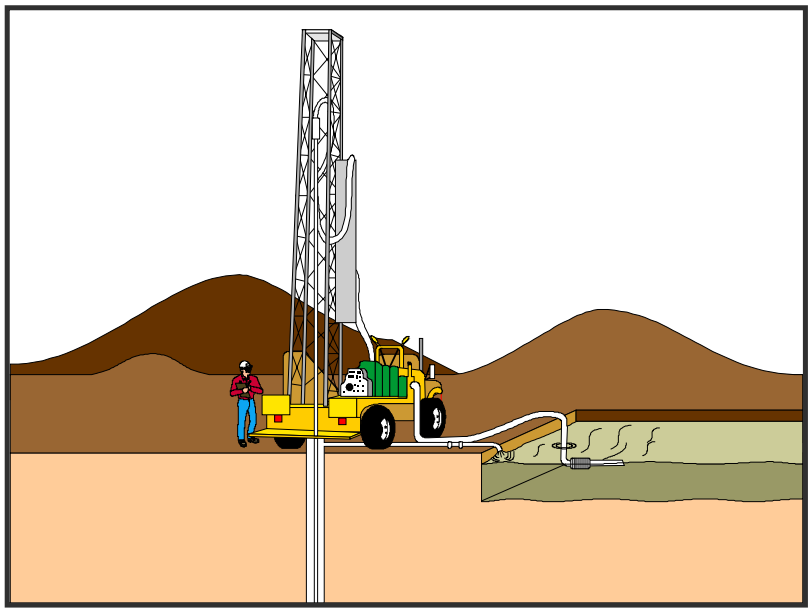
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Liquid Waste Management WM-10



Description and Purpose

Liquid waste management includes procedures and practices to prevent discharge of pollutants to the storm drain system or to watercourses as a result of the creation, collection, and disposal of non-hazardous liquid wastes.

Suitable Applications

Liquid waste management is applicable to construction projects that generate any of the following non-hazardous by-products, residuals, or wastes:

- Drilling slurries and drilling fluids
- Grease-free and oil-free wastewater and rinse water
- Dredgings
- Other non-stormwater liquid discharges not permitted by separate permits

Limitations

- Disposal of some liquid wastes may be subject to specific laws and regulations or to requirements of other permits secured for the construction project (e.g., NPDES permits, Army Corps permits, Coastal Commission permits, etc.).
- Liquid waste management does not apply to dewatering operations (NS-2 Dewatering Operations), solid waste management (WM-5, Solid Waste Management), hazardous wastes (WM-6, Hazardous Waste Management), or

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None

concrete slurry residue (WM-8, Concrete Waste Management).

- Typical permitted non-stormwater discharges can include: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; irrigation water; springs; water from crawl space pumps; footing drains; lawn watering; flows from riparian habitats and wetlands; and discharges or flows from emergency fire fighting activities.

Implementation

General Practices

- Instruct employees and subcontractors how to safely differentiate between non-hazardous liquid waste and potential or known hazardous liquid waste.
- Instruct employees, subcontractors, and suppliers that it is unacceptable for any liquid waste to enter any storm drainage device, waterway, or receiving water.
- Educate employees and subcontractors on liquid waste generating activities and liquid waste storage and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Verify which non-stormwater discharges are permitted by the statewide NPDES permit; different regions might have different requirements not outlined in this permit.
- Apply NS-8, Vehicle and Equipment Cleaning for managing wash water and rinse water from vehicle and equipment cleaning operations.

Containing Liquid Wastes

- Drilling residue and drilling fluids should not be allowed to enter storm drains and watercourses and should be disposed of.
- If an appropriate location is available, drilling residue and drilling fluids that are exempt under Title 23, CCR § 2511(g) may be dried by infiltration and evaporation in a containment facility constructed in conformance with the provisions concerning the Temporary Concrete Washout Facilities detailed in WM-8, Concrete Waste Management.
- Liquid wastes generated as part of an operational procedure, such as water-laden dredged material and drilling mud, should be contained and not allowed to flow into drainage channels or receiving waters prior to treatment.
- Liquid wastes should be contained in a controlled area such as a holding pit, sediment basin, roll-off bin, or portable tank.
- Containment devices must be structurally sound and leak free.
- Containment devices must be of sufficient quantity or volume to completely contain the liquid wastes generated.

- Precautions should be taken to avoid spills or accidental releases of contained liquid wastes. Apply the education measures and spill response procedures outlined in WM-4, Spill Prevention and Control.

- Containment areas or devices should not be located where accidental release of the contained liquid can threaten health or safety or discharge to water bodies, channels, or storm drains.

Capturing Liquid Wastes

- Capture all liquid wastes that have the potential to affect the storm drainage system (such as wash water and rinse water from cleaning walls or pavement), before they run off a surface.

- Do not allow liquid wastes to flow or discharge uncontrolled. Use temporary dikes or berms to intercept flows and direct them to a containment area or device for capture.

- Use a sediment trap (SE-3, Sediment Trap) for capturing and treating sediment laden liquid waste or capture in a containment device and allow sediment to settle.

Disposing of Liquid Wastes

- A typical method to handle liquid waste is to dewater the contained liquid waste, using procedures such as described in NS-2, Dewatering Operations, and SE-2, Sediment Basin, and dispose of resulting solids per WM-5, Solid Waste Management.

- Methods of disposal for some liquid wastes may be prescribed in Water Quality Reports, NPDES permits, Environmental Impact Reports, 401 or 404 permits, and local agency discharge permits, etc. Review the SWPPP to see if disposal methods are identified.

- Liquid wastes, such as from dredged material, may require testing and certification whether it is hazardous or not before a disposal method can be determined.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management.

- If necessary, further treat liquid wastes prior to disposal. Treatment may include, though is not limited to, sedimentation, filtration, and chemical neutralization.

Costs

Prevention costs for liquid waste management are minimal. Costs increase if cleanup or fines are involved.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.

- Remove deposited solids in containment areas and capturing devices as needed and at the completion of the task. Dispose of any solids as described in WM-5, Solid Waste Management.
- Inspect containment areas and capturing devices and repair as needed.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Good Housekeeping

Activity Specific Erosion and Sediment Control Plan
(A-ESCP)

If Cumulative Soil Disturbance Changes,
Contact the Environmental Field Specialists (EFS)
For Re-Evaluation of Storm Water Protection Needs

Prepared by

PG&E Water Quality Group

February 2013

TABLE OF CONTENTS

Attachments

1.0 WHAT IS COVERED UNDER THIS A-ESCP?

1.1 Good Housekeeping

This A-ESCP sets forth minimum Best Management Practices (BMPs) for Good Housekeeping[1] at all PG&E construction projects (which includes all permitted, non-permitted, and maintenance projects). If specific environmental concerns are encountered, or if the procedures contained within this A-ESCP prove ineffective, contact your local Environmental Field Specialist (EFS).

1.2 Typical Good Housekeeping BMPs

Minimum BMPs for Housekeeping on all PG&E projects include the following:

- Product and Materials Inventory (See Section 2.1)
- Stockpile Management (See Stockpile Management A-ESCP)
- Liquid Pollutant Storage (See Section 2.2)
- Construction Material Storage (See Section 2.3)
- Tracking Controls (See Section 2.4)
- Concrete and Other Rinse and Wash Waters (See Section 2.5)
- Sanitation Facilities (See Section 2.6)
- Waste Disposal Containers (See Section 2.7)
- Hazardous and Non-Hazardous Spills (See Section 2.8)
- Spill Kits and Clean Up Materials (See Section 2.9)
- Vehicle and Equipment Storage and Maintenance (See Section 2.10)
- Airborne Pollution Control (See Section 2.11)

1.3 Site Conditions Covered in this A-ESCP

This document is applicable to all PG&E projects, and must be used as a reference for specific Good Housekeeping Practices.

1.4 Scheduling Good Housekeeping BMP Installation

Planning for storm water pollution prevention is required for all PG&E construction projects throughout the year. Good Housekeeping BMPs must be implemented on all projects, regardless of time of year.

[1] Landscape Materials have additional requirements. If the construction project includes such materials, contact the Stormwater Group

2.0 BEST MANAGEMENT PRACTICES

The purpose of this A-ESCP is to specify appropriate Good Housekeeping BMPs for all construction projects that are exempt from coverage under the CGP. It is recommended that construction activities are scheduled to minimize soil disturbing activities during rain events.

The BMPs for the project should be installed in areas similar to those shown on the Typical BMP Use Detail, Attachment A.

Detailed cut-sheets on each BMP are provided in Attachment B.

Good Housekeeping BMPs should be followed to protect storm water runoff from construction associated chemicals and/or pollutants and to maintain a clean construction site.

2.1 Product and Materials Inventory

Description:
Consider this BMP if there are products or end products are produced, used, or expected to be used on site that are not designed to be outdoors.

Requirements:

- Conduct an inventory of the products and materials and consider delivery, storage, spill prevention, and cleanup requirements for those products.
- Consider the quantity, physical characteristics (e.g., liquid, powder, solid), and locations of each potential pollutant source handled, produced, stored, recycled, or disposed of at the site.
- Consider the degree to which pollutants associated with those materials may be exposed to and mobilized by contact with storm water.
- Consider the direct and indirect pathways that pollutants may be exposed to storm water or authorized non-storm water discharges.
- This shall include an assessment of past spills or leaks, non-storm water discharges, and discharges from adjoining areas.
- Ensure retention of sampling, visual observation, and inspection records.
- Ensure effectiveness of existing BMPs to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- WM-1 – Materials Delivery and Storage
- WM-2 – Material Use

Materials properly contained

Materials needing covered storage

2.2 Liquid Pollutant Storage

Description:
Consider this BMP if there are any of the following on the construction site:

- Petroleum products such as oils, fuels, grease, cold mix asphalt, and tar
- Glues, adhesives, and solvents
- Cleaning products
- Herbicides, pesticides, and fertilizers
- Paints, stains, and curing compounds
- Vehicle and equipment fluids such as anti-freeze, exhaust fluid, washer fluid, or battery acid
- Soil binders or amendments
- Sewage or line flushing/sanitizing agents
- Other hazardous or toxic substances

Requirements:

- Minimize the amount of hazardous materials stored at the construction site.
- Store hazardous liquids, wastes, and all chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage, or in a completely enclosed storage shed.
- Cover all temporary containment facilities prior to forecast rain, at the end of each day, and during non-work days.
- Do not mix waste or hazardous materials. Doing so may complicate or inhibit disposal and recycling options and can result in dangerous chemical reactions.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- NS-9 – Vehicle and Equipment Fueling
- WM-1 – Material Delivery and Storage
- WM-2 – Material Use
- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-10 – Liquid Waste Management

Properly contained in secondary containment

Improperly placed and stored on the ground

2.3 Construction Material Storage

Description:
Consider this BMP if any of the following are expected to be on the construction site:

- Asphalt
- Cement
- Dry mix concrete
- Fertilizer, Herbicides, or Pesticides
- Grease
- Soil amendments
- Any other construction materials not designed to be exposed to weather or rain.

Requirements:

- Minimize exposure of construction materials to precipitation. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks etc.).

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- Stockpile Management A-ESCP
- WM-1 – Material Delivery and Storage
- WM-2 – Material Use
- WM-3 – Stockpile Management
- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-7 – Contaminated Soil Management

Properly wrapped in plastic, on pallet, and on plastic

Improperly Placed and stored on the ground

2.4 Tracking Controls

Description:
Consider this BMP if the following occurs on the construction site:

- Vehicle or equipment traffic to or from a construction, laydown, borrow, disposal, or staging area has the potential to contaminate the vehicle's tires with mud or sediment.
- Connections of non-stabilized access roads or any of the above connect to a paved roadway.
- Internal traffic areas, within a construction site, may lead to sediment laden discharge into storm drain systems or surface waters.

Requirements:

- Use 3" to 6" rock as much as 12" thick in the Construction Entrance to dislodge sediment and contain the sediment within the void areas of the rock.
- Limit traffic to using the entrance at all times. Block all other potential access locations.
- Slope entrance away from the adjoining roadway or provide drainage to prevent stormwater from conveying trapped sediments to the roadway.
- Build entrance with adequate length (50' min), width, (20') and turning radii (25').
- Inspect adjacent roadways daily and sweep or vacuum (SE-7) as needed.
- Include a sediment trap where water runs off of the entrance.
- Maintain the entrance by replacing or freshening rock as needed.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- SE-7 – Street Sweeping and Vacuuming
- SE-10 – Storm Drain Inlet Protection
- TC-1 – Stabilized Construction Entrance
- TC-2 – Stabilized Construction Roadway
- TC-3 – Tire Wash

Effective large angular material

Small ineffective material

2.5 Concrete and Other Rinse and Wash Waters

Description:
Consider this BMP if rinsing or washing any of the following is required on the construction site:

- Concrete, stucco, plaster, mortar, grout, tile, or gunite delivery, placement, finishing, pumping, or transporting equipment.
- Paint containers, sprayers, brushes, rollers, mixers, pumps, or cleaning supplies.
- Drywall materials, tools, texture guns and pumps, hoses, and waste.
- Tile mastic, grout, cuttings, or cleaning tools and equipment.
- Construction equipment, vehicles, tools, and materials.
- Cutting, grinding, coring, drilling, or re-finishing of any construction materials using water as a lubricant or coolant.
- Any other materials or equipment that may need to be washed or rinsed.

Requirements:

- Do not allow rinse or wash water to come into contact with the ground or paved surfaces.
- Rinse and wash water shall not be conveyed or dumped into any drain, inlet, or surface water.
- All concrete washout materials, including the water, cement, sand, and gravel shall be disposed of at a proper facility.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- NS-3 – Paving and Grinding Operations
- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-8 – Concrete Waste Management
- WM-10 – Liquid Waste Management

Commercially available washout

Poorly located, installed, and maintained

2.6 Sanitation Facilities

Description:
Consider this BMP if the following are located at the construction site:

- Portable toilets
- Sanitary waste storage
- Hand wash stations

Requirements:

- Locate away from drainages and inlets (50' if possible).
- Provide a tray to contain spills and minor leaks.
- Service and maintain facilities regularly to avoid overuse and overfilling.
- Protect from tipping, especially in high wind areas.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-9 – Sanitary/Septic Waste Management
- WM-10 – Liquid Waste Management

Properly placed on tray and tied down

Poor location and protection

2.7 Waste Disposal Containers

Description:
Consider this BMP if the following present at the construction site:

- Construction debris
- Garbage
- Contaminated soil
- Demolition waste
- Concrete, stucco, mortar, drywall, or any other waste

Requirements:

- Cover waste disposal containers at the end of every day and prior to the onset of precipitation.
- Prevent discharges from waste disposal containers to the storm drain system or surface waters.
- Contain and securely protect stockpiled waste materials form wind and rain at all times unless actively being used.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- WM-5 – Solid Waste Management
- WM-6 – Hazardous Materials/Waste Management
- WM-7 – Contaminated Soil Management
- WM-8 – Concrete Waste Management

Large properly covered dumpster

Overused and improperly covered even during rain

2.8 Hazardous and Non-Hazardous Spills

Description:
Consider this BMP if the following occur on the construction site:

- Any breach, malfunction, leakage, or spill of a potential pollutant.

Requirements:

- Keep spill cleanup kits on-site and with fueling and maintenance vehicles at all times.
- If safe to do so, stop the spill, and begin cleanup immediately.
- Clean the contaminated area and any soil or materials contaminated by the spill.
- Notify the EFS and project foreman.
- If rain is forecast, cover the spill and contaminated areas prior to the onset of precipitation.
- Clean the spill with absorbents. Do not wash the spill with water.
- Store and dispose of cleanup materials, contaminated materials, and recovered spilled material in accordance with federal, state, can local requirements.

To determine if the spill is reportable, contact the EFS. After hours or if the local EFS are unavailable, call the following 800 number: **800-874-4043.**

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- NS-3 – Paving and Grinding Operations
- NS-9 – Vehicle and Equipment Fueling
- WM-1 – Material Delivery and Storage
- WM-2 – Material Use
- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-8 – Concrete Waste Management
- WM-9 – Sanitary/Septic Waste Management
- WM-10 – Liquid Waste Management

Large, hazardous spill

Contaminated soil properly prepared for disposal

2.9 Spill Kits and Clean-up Materials

Description:
Consider this BMP if the following are located or performed at the construction site:

- Any construction activity
- Any stored equipment or liquids
- Any equipment or vehicle maintenance, repair, or fueling

Requirements:

- Equipment and materials for cleanup of spills shall be available on site and spills and leaks shall be cleaned up immediately and disposed of properly.
- All personnel must be trained to know where Spill Kits are kept.
- Have Spill Kit within reach during activities with potential to release pollutants, such as vehicle and equipment fueling and maintenance.
- All fueling and maintenance vehicles are required to have Spill Kits on board.
- Spill Kits should have a combination of All Absorbent (typically gray) pads and booms to absorb and retain oils, coolants, solvents and water and Oil Only (typically white) booms and pads to absorb only oil along with dry absorbent (kitty litter), gloves, and disposal bags.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- NS-3 – Paving and Grinding Operations
- NS-9 – Vehicle and Equipment Fueling
- WM-1 – Material Delivery and Storage
- WM-2 – Material Use
- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-8 – Concrete Waste Management
- WM-9 – Sanitary/Septic Waste Management
- WM-10 – Liquid Waste Management

Typical Spill Kit contents

Hydraulic hose leak and absorbent deployment

2.10 Vehicle and Equipment Storage and Maintenance

Description:
Consider this BMP if there are any of the following on the construction site:

- Any vehicles or equipment being stored, fueled, or maintained.

Requirements:

- Allow only properly maintained vehicles and equipment onto the site.
- Place all equipment and vehicles, which are to be fueled, maintained, or stored in a designated area fitted with appropriate BMPs.
- Clean leaks immediately and properly dispose of leaked material or contaminated soil.
- A Spill Kit should be on each site and on every fueling or maintenance truck, and be easily accessible during fueling or maintenance activities.
- All site personnel should know where the Spill Kit is located.
- Designate one area for fueling and maintenance activities and inspect regularly for spills.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-10 – Liquid Waste Management
- NS-9 – Vehicle and Equipment Fueling

Generator on secondary containment

Hydraulic tank leaking onto ground

2.11 Airborne Pollution Control

Description:
Consider this BMP if the following occurs on the construction site:

- Any construction activity with the ability to create any airborne pollution, including:
  - Sediment
  - Nutrients
  - Trash
  - Metals
  - Bacteria
  - Oil and grease
  - Organics

Requirements:

- Control all sources of potential airborne pollutants.
- Provide a water truck on-site during any time there is potential for dust (including winter).
- Cover or wet all stockpiles with potential for wind erosion.
- Respond quickly if dust or airborne pollutants are observed.
- Properly contain trash.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- EC-2 – Preservation of Existing Vegetation
- EC-7 – Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats
- EC-16 – Non-Vegetative Stabilization
- NS-3 – Paving and Grinding Operations
- SE-7 – Street Sweeping and Vacuuming
- WM-3 – Stockpile Management
- WM-5 – Solid Waste Management


Water truck filling station


Uncontrolled dust

2.12 Where to Obtain BMP Materials

BMP products in Table 1 can be obtained through PG&E materials warehouses using project order numbers and established materials codes. Should the materials be unavailable from PG&E warehouses, BMP materials and products may be obtained from sources shown below, but may be obtained elsewhere depending on location and urgency of need.

TABLE 1
BMP PRODUCTS INFORMATION

Category	Product Name	Units
Certified Weed-Free Straw Mulch (EC-6)	Weed-Free Straw	Bales
Geotextiles and Mats (EC-7) Geotextile Fabric	Mirafi 600	Rolls: 12.5' x 360' 17.5' x 238'
Geotextiles and Mats (EC-7) Jute Mat	Eco-Jute	Rolls: 4' x 225'
Geotextiles and Mats (EC-7) Plastic Sheeting	Visqueen	Rolls: 20 or 40'x 100'; 10ml thick
Silt Fence (SE-1)	Caltrans Grade Silt Fence	100 feet with 36-inch wood posts at 6 foot spacing
Fiber Roll (SE-5)	Sediment Log Type II	25 foot rolls x 6 or 9" diameter
Gravel Bags (SE-6)	Roc Soc	mono filament
Inlet Protection (SE-10) Gravel Bag	Same as SE-6	
Inlet Protection (SE-10)	Same as SE-5	

Example suppliers include Reed & Graham, White Cap, and Curlex. Other options may include feed stores, retail building supply stores, or hardware stores.

3.0 BMP INSPECTION AND MAINTENANCE

BMP installation, inspection and maintenance will be performed by the PG&E construction crew. BMPs should be inspected daily during construction activities. In the event that BMPs appear to require maintenance or are not functioning as expected, the BMP will be maintained, repaired, or replaced to correct the deficiency.

4.0 WHOM TO CALL

If the project receives a written notice or order from any regulatory agency, immediately contact your local EFS for further direction.

Contact the local EFS if any of the following conditions occur:

- Visually cloudy/muddy water is observed leaving the work or staging area
- Discharge or spill of hazardous substance

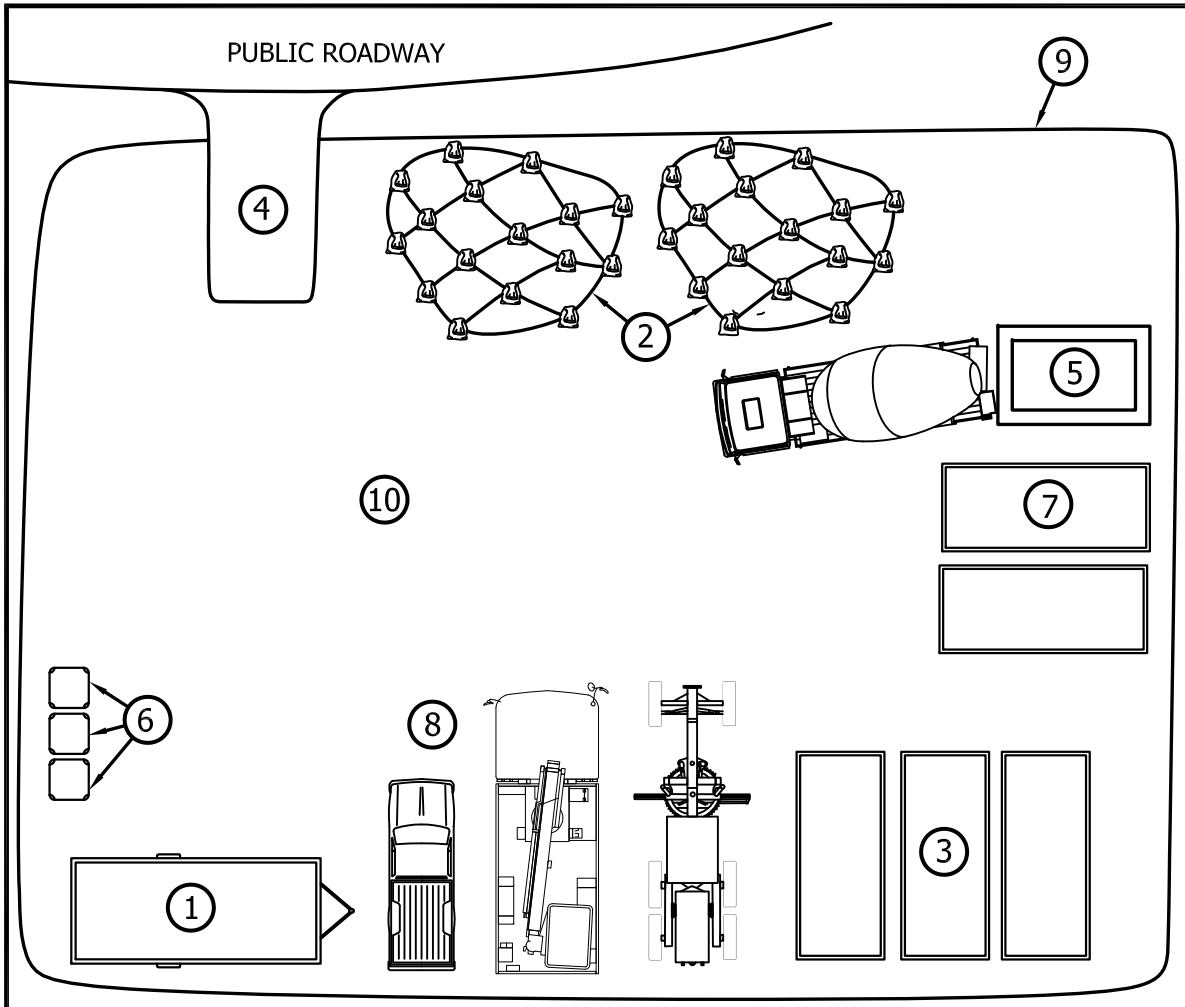
After hours or if the local EFS are unavailable, call the following 800 number:
800-874-4043.

5.0 POST-CONSTRUCTION

Upon completion of construction within the project area:

- Remove all temporary, non-biodegradable BMPs.
- Remove all construction equipment from the site.
- Clear all staging areas of any debris, construction materials, and contaminants.
- Return all drainage ways to their pre-construction line and grade.
- Cover disturbed soil areas with a combination of temporary and permanent vegetative stabilization.

Attachment A Typical BMP Installation Map



1. CONSTRUCTION TRAILER:
KEEP PRODUCT INVENTORY, SPILL KIT, MSDS SHEETS, SWPPP OR ESCP AND INSPECTION REPORTS, AND EMERGENCY CONTACT PHONE NUMBERS. REFER TO SECTIONS 2.1, 2.8, AND 2.9

2. COVERED STOCKPILES:
REFER TO STOCKPILE MANAGEMENT A-ESCP.

3. CONSTRUCTION STORAGE CONTAINERS:
KEEP LIQUID POLLUTANTS AND MATERIALS NOT MEANT FOR OUTSIDE STORAGE. ALTERNATIVES INCLUDE STORING SUCH MATERIALS ON SECONDARY CONTAINMENT WITH WEATHERPROOF COVER. REFER TO SECTIONS 2.2 AND 2.3.

4. STABILIZED CONSTRUCTION ENTRANCE
REFER TO SECTION 2.4.

5. WASHOUT
CONCRETE, PAINT OR OTHER RINSE WATERS. REFER TO SECTION 2.5.

6. SANITATION FACILITIES
REFER TO SECTION 2.6.

7. WASTE DISPOSAL CONTAINERS
REFER TO SECTION 2.7.

8. VEHICLE STORAGE AND MAINTENANCE
REFER TO SECTION 2.10.

9. PERIMETER CONTROL
SILT FENCE (SE-1), FIBER ROLL (SE-5), GRAVEL BAG BERM (SE-6) OR OTHER FUNCTIONING ALTERNATIVE.

10. AIR POLLUTION CONTROL/STABILIZED ROADWAY
CONTROL ALL AIRBORNE POLLUTANTS AT ALL TIMES AND MAINTAIN GRAVEL SURFACE TO SUPPORT CONSTRUCTION TRAFFIC WITHOUT TRACKING OR SEDIMENT LADEN DISCHARGE. REFER TO SECTION 2.11.

NOT TO SCALE

Planning-Engineering-Surveying-SWPPP
BT Consulting Incorporated
phone: (530) 672-2316 www.gobtc.net
P.O. Box 304 Shingle Springs, CA 95682

TYPICAL BMP USE DETAIL

A-ESCP - GOOD HOUSEKEEPING

GH-01

Attachment B PG&E Best Management Practice (BMP) Cut-sheets

The following BMP Fact Sheets are included in the Plan by reference only and can be found in Appendix C of the Field Manual. A full version of the Field Manual that includes the cut-sheets is located on SharePoint.

EC-2	Preservation of Existing Vegetation
EC-6	Straw Mulch
EC-7	Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats
EC-16	Non-Vegetative Stabilization
SE-1	Silt Fence
SE-5	Fiber Rolls
SE-6	Gravel Bag Berm
SE-7	Street Sweeping and Vacuuming
SE-10	Storm Drain Inlet Protection
NS-3	Paving and Grinding Operations
NS-9	Vehicle and Equipment Fueling
TC-1	Stabilized Construction Entrance/Exit
TC-2	Stabilized Construction Roadway
TC-3	Tire Wash
WM-1	Material Delivery and Storage
WM-2	Material Use
WM-3	Stockpile Management
WM-4	Spill Prevention and Control
WM-5	Solid Waste Management
WM-6	Hazardous Materials and Waste Management
WM-7	Contaminated Soil Management
WM-8	Concrete Waste Management
WM-9	Sanitary/Septic Waste Management
WM-10	Liquid Waste Management

Attachment C Requirement Summary Table

Good Housekeeping

Pacific Gas and Electric Company®

Best Management Practices to Reduce Environmental Impacts

Good Housekeeping practices apply to all PG&E projects throughout the year. Employees and Contractors shall follow good housekeeping Best Management Practices (BMPs) to protect storm water runoff from construction associated chemicals and/or pollutants and to maintain a clean construction site. Additional detail is provided in the Good Housekeeping Activity Specific Erosion and Sediment Control Plan (A-ESCP).

No.	Good Housekeeping Requirement	A-ESCP Section
1	Inventory products and materials and consider delivery, storage, spill prevention, and cleanup requirements.	2.1
2	Use effective BMPs to reduce or prevent pollutants in all water discharges.	2.1
3	Minimize the amount of hazardous materials at the site and store hazardous liquids, wastes, and all chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage, or store in a completely enclosed storage shed.	2.2
4	Cover liquid pollutant containment BMPs prior to rain, at the end of each day, and during non-work days.	2.2
5	Do not mix wastes and/or hazardous materials.	2.2
6	Minimize exposure of materials that have potential to emit pollutants to precipitation.	2.3
7	Install, monitor, and maintain a stabilized entrance/exit, ensure that traffic uses the stabilized entrance/exit and monitor adjacent roadways for tracking.	2.4
8	Do not allow rinse or wash water (concrete rinse, paint wash, etc.) to contact the ground and/or paved surfaces nor allow rinse or wash water to be directed or dumped into any drain inlet or surface water and properly dispose of all rinse and/or wash water.	2.5
9	Properly locate, secure, and maintain sanitation facilities which includes providing a spill/leak tray.	2.6
10	Cover waste disposal containers at the end of each day and prior to and during precipitation.	2.7, 2.10
11	Monitor, maintain, and prevent discharges from waste disposal containers to the storm drain system or surface waters.	2.7
12	Contain and protect stockpiled waste materials.	2.7, 2.10
13	Keep spill cleanup kits on-site, with fueling and maintenance vehicles, and accessible at all times and train all personnel with regard to the location, use, and contents of the spill kit(s). If safe, stop and clean spills (with absorbents) immediately, notify the Environmental Field Specialist (EFS), dispose of materials properly, and cover the spill or contaminated area prior to precipitation.	2.8, 2.9, 2.10
14	Properly maintain vehicles, clean leaks immediately, and dispose of materials properly. Fuel and maintain vehicles and equipment in a proper, designated area and monitor the area regularly.	2.10
15	Control dust and other airborne pollutants and respond quickly to airborne pollutant observation. Provide a water truck if there is potential for dust and cover or wet stockpiles that have potential for wind erosion.	2.11
16	Monitor BMPs daily during construction activity and repair, replace, and/or maintain BMPs to correct any deficiencies.	3.0
17	Upon completion, remove temporary, non-biodegradable BMPs and equipment from the site. Clear debris, construction materials, and contaminants and return drainage ways to their pre-construction line and grade, and cover disturbed soil areas with a combination of temporary and permanent vegetative stabilization measures.	5.0

Stockpile Management

Activity Specific Erosion and Sediment Control Plan
(A-ESCP)

For questions or concerns, please contact your assigned PG&E Environmental Field Specialist (EFS)

Prepared by:
PG&E Construction Stormwater Group

March 2017

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Attachments

References

Referenced BMP Fact Sheets

EC-3 Temporary Hydraulic Mulch
EC-5 Soil Binders
EC-6 Straw Mulch
EC-7 Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats
EC-9 Earth Dikes and Drainage Swales
SE-1 Silt Fence
SE-5 Fiber Rolls
SE-6 Gravel Bag Berm
TC-1 Stabilized Construction Entrance/Exit
TC-2 Stabilized Construction Roadway
WE-1 Wind Erosion Control
WM-3 Stockpile Management
WM-5 Solid Waste Management
WM-7 Contaminated Soil Management
WM-8 Concrete Waste Management

1.0 WHAT IS STOCKPILE MANAGEMENT?

1.1 Introduction

Stockpile management includes Best Management Practices (BMPs) to minimize erosion and sediment transport originating from stockpiles.

All PG&E Project Teams, Crews, and Subcontractors are **required** to be familiar with the information contained within this A-ESCP

Stockpiles may include, but are not limited to, the following materials: soil, aggregate base, construction debris, demolition debris, any metal debris, or a combination thereof.

GOAL: Prevent rainfall from contacting stockpile materials and transporting sediment and other pollutants offsite or to surface waters.

Sediment in stormwater is pollution!

1.2 Requirements for All Stockpiles

- Have BMP materials on site **before** rain events!
- Stockpile protection must take place year-round
- Perimeter controls must be installed around stockpiles (may include earthen berms, straw wattles, or silt fence)
- Cover soil stockpiles with soil binders (such as Gorillasnot) or plastic sheeting
- Locate stockpile away from drainage systems such as swales and drainage inlets

1.3 Planning for Work Involving Stockpiles

- If using soil binders, ensure binders and a water source are present on site at all times during the project including a water truck or water buffalo used to spray the stockpiles.
- If using plastic sheeting, ensure plastic sheeting and associated tie down materials are available on site at all times.

1.4 Definitions

High Risk Stockpiles Specific types of stockpiles that require additional protection because they contain any of the following materials: contaminated soil (TPH, PCBs, etc.), Portland cement, concrete rubble, fly ash, stucco, hydrated lime, and cut back or cold mix asphalt. Specific management for these and similar materials are located in Section 2.2.

Active Stockpiles Active stockpiles are defined as scheduled to be used or accessed within 14 days.

Inactive Stockpiles If a pile is not scheduled to be used within 14 days, it immediately becomes inactive and must be stabilized.

Soil Binders Soil binders are glue-like products sprayed onto soil stockpiles and is the preferred

method to stabilize stockpiles. Soil binders may be combined with hydromulch per the manufacturer's specifications. Many soil binders require a minimum curing time to be fully effective and typically need at least 24 hours to cure prior to a rain event. Do not use soil binders within 100' of any surface water source, including diches and storm drain inlets without contacting your assigned EFS.

Plastic Sheeting Plastic sheeting is a rolled product held down using ropes or other means to cover stockpiles. Plastic sheeting should be avoided when possible as it is hard to manage, increases runoff, breaks down quickly in sunlight, and can become airborne during high winds causing damage to power lines and other substation equipment.

2.0 STOCKPILE MANAGEMENT PROCEDURES

The following procedures are intended to address activities related to most stockpile management situations. Although your project may not include all such activities, the project shall follow the procedures contained within this section that apply to your project.

2.1 Active and Inactive Stockpiles

Requirements:

- Inactive stockpiles must be stabilized **at all times.**
- All active stockpiles must be stabilized prior to and during a rain event

Protect From Rain

- Stockpiles must be stabilized to protect from rainfall (splash) erosion, and surface flow erosion.
- Stabilization materials include:
    - Soil Binders (EC-5), or combined with Temporary Hydraulic Mulch (EC-3) if necessary
    - Plastic Covers (EC-7)
    - Erosion Control Blankets (EC-7)

Stockpile Perimeter Controls

- All stockpiles should be protected with perimeter controls such as:
    - Silt Fences (SE-1)
    - Fiber Rolls (SE-5), commonly called Straw Wattle
    - Gravel Bag Berms (SE-6)
    - Earth Dikes and Drainage Swales (EC-9)
- Provide a minimum 50' separation from concentrated flows of stormwater, drainage courses, and storm drain inlets. If space is limited to less than 50', provide additional diversion or protection adjacent to the concentrated flow.

Protect From Wind

- In windy areas for stockpiles susceptible to wind erosion, stockpiles should be securely and temporarily stabilized at the end of every day, and kept wet during working hours to minimize wind erosion. **Do not apply so much water that runoff occurs.**
- Consider if plastic sheeting may come into contact with electrical equipment if it dislodges from the stockpile, and use alternatives if necessary.

Example Photos

Figure 1. Cover pulled back for access during use

Figure 2. Soil binder and mulch application prior to rain

Figure 3. Stockpile stabilized with soil binder and temporary hydraulic mulch

Figure 4. Stockpile stabilized with erosion control blanket

2.2 High Risk Stockpiles

Description:

High risk stockpiles may include visible and non-visible pollutants including, but not limited to:

- Concrete (pH and metals) and asphalt (petroleum) rubble
- Contaminated soil (TPH, PCBs, etc.)
- Cold mix asphalt, aka “cut-back” (petroleum based contaminates)
- Hazardous construction materials
    - Construction waste such as retired transformers
    - New construction materials waiting for installation such as liming agents or gypsum
- Treated wood waste (TWW)
- Soil amendments
    - Fly ash or Hydrated lime
- Fertilizers (ammonium nitrate, urea, anhydrous ammonia, etc.)

Requirements:

High risk stockpiles require additional considerations, some of which include:

- Placing stockpiles in areas that will not have any run-on. If such a location is unavailable, protect from run-on using a diversion ditch or gravel bag berm;
- Containing any possible run-off from the pile by creating a berm or basin to collect stormwater runoff downslope of the stockpile;
- Containing any runoff from piles likely to include non-visible pollutants prior to leaving the project site. If run-off cannot be contained, contact the EFS and collect samples of the runoff for laboratory analysis;
- Bagging and placing contaminated materials on pallets to be stored under cover until they can be moved to a legal collection facility, if possible; and
- Place stockpile on an impervious surface such as pavement, trench plate, or plastic sheeting.

Example Photos

Figure 5. Contaminated stockpile under cover

Figure 6. Concrete rubble stockpile in need of cover

2.3 Where to Obtain BMP Materials

BMP products should be obtained through PG&E materials warehouses using project order numbers and established materials codes. Should the materials be unavailable from PG&E warehouses, BMP materials and products shown below can be obtained from sources shown, but may be obtained elsewhere depending on location and urgency of need.

TABLE 1
BMP PRODUCTS INFORMATION

Category	Product Name	Units
Hydraulic Mulch (EC-3)	Flexterra FGM	Bales
Soil Binders (EC-5)	Soiltac, Gorillasnot	5 gallon buckets
Straw Mulch (EC-6)	Certified Weed-Free Straw	Bales
Geotextiles and Mats (EC-7) Geotextile Fabric	Mirafi 600	Rolls: 12.5' x 360' 17.5' x 238'
Geotextiles and Mats (EC-7) Jute Mat	Eco-Jute	Rolls: 4' x 225'
Geotextiles and Mats (EC-7) Plastic Sheeting	Visqueen	Rolls: 20 or 40'x 100'; 10ml thick
Silt Fence (SE-1)	Caltrans Grade Silt Fence	100 feet with 36-inch wood posts at 6 foot spacing
Fiber Roll (SE-5)	Curlex Sediment Log Type II	25 foot rolls x 6" or 9" diameter
Gravel Bags (SE-6)	Roc Soc or Monofilament Bags	Each
3/8" Nylon Rope	3/8" Nylon Rope	100' or 500'

Example suppliers include Reed & Graham, White Cap, and Curlex. Other options may include feed stores, retail building supply stores, or hardware stores. If you are still having trouble contact your project EFS for assistance.

3.0 INSPECTION AND MAINTENANCE REQUIREMENTS

- It is required that at a minimum, active stockpiles be inspected weekly, prior to forecast rain events, daily during extended rain events, and after the conclusion of rain events.
- During certain conditions it may be necessary to inspect stockpiles covered with plastic sheeting or rolled product more frequently (for example, high winds or extreme heat).

- Repair, re-apply, and/or replace linear sediment barriers, stabilization, and/or covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the perimeter control height.
- Contaminated soil stockpiles or stockpiles with the potential to discharge visible and/or non-visible pollutants offsite should be inspected for signs of potential contaminate or pollutant discharge.
    - Should a discharge be observed that is likely to contain pollutants, notify the EFS for sampling requirements.
- If spilled or leaking hazardous materials contact soil stockpiles, implement appropriate spill control equipment and procedures to completely clean up the pollutant to prohibit additional soil contamination or pollutant discharge from the site. If the extent of the impact of the pollutant is unknown, contact your EFS as soil testing may be necessary.

4.0 TROUBLESHOOTING

Contact your local EFS if any of the following conditions occur:

- Visually cloudy/muddy water is observed leaving the work area;
- Observed sheen, discoloration, foam, odor, or other pollutant indicator;
- Hazardous substance(s) is/are discharged or spilled; or
- There is potential for a non-visible or any other pollutant discharge.

After hours, call: **(800) 874-4043.**

If the project receives a written notice or order from any regulatory agency, immediately contact your local EFS for further direction.

Troubleshooting Guide	
Field Condition – Stockpile Management	**Common Solutions Are:**
Soil stockpile erodes	Cover stockpile with plastic sheeting or spray with a soil stabilizer. Protect with a temporary perimeter sediment barrier around the stockpile
Stockpile is in flow line	Remove stockpile from drainage path or protect with a berm, dike, or temporary diversion device
Storm water run-on impacts the stockpile	Protect the stockpile by using temporary perimeter sediment barriers such as berms, dikes, silt fencing, or sandbags
Wind causes erosion and or blowing dust	Cover stockpile or spray with a soil stabilizer. Use a water application to suppress dust
Field Condition – Soil Binders	**Common Solutions Are:**
Slope was improperly dressed before application	Roughen embankment and fill areas by rolling with a crimping or punching type roller or track walking where rolling is impractical. Pre-wet the areas of application.

Troubleshooting Guide	
Coverage is inadequate	Follow recommended application rates. Count the number of bags of the product to ensure the correct amount of material is implemented. Reapply to the areas
Sprayed areas degrade or become ineffective	Follow recommended application rates. Consider other or additional BMPs. Reapply binder as necessary
Sprayed slope has spot failures	Repair slopes and re-spray damaged areas
Portions of the sprayed area have been disturbed	Keep workers and equipment off sprayed areas. Repair and re-spray areas that have been damaged
Binder fails to penetrate soil	Roughen soil and pre-wet to manufacturer's recommendations. Reapply to areas where necessary
Soil binder is washed off slope	Allow at least 24 hours for the materials to dry before a rain event. Follow manufacturer's recommendations. Reapply as necessary
Excessive water flows across stabilized surface.	Use other BMPs to limit flow onto stabilized area. Use other BMPs to reduce slope lengths. Do not use to stabilize areas with swift moving concentrated flows
Field Condition – Erosion control blankets	**Common Solutions Are:**
Improper anchoring	Dig trench along the top and bury the blankets. Use staples to anchor according to manufacturer's recommendations
Undercutting due to inadequate preparation	Prepare the soil surface. Remove rocks, clods and other obstructions. Fill in rills in uneven areas to promote good contact between mat and soil
Excessive water flow across stabilized surface	Use other BMPs to limit flow onto stabilized area. Use other BMPs to reduce slope lengths. Do not use to stabilize areas with swift moving concentrated flows
Field Condition – Straw wattle	**Common Solutions Are:**
Runoff flows under the fiber roll or daylight shows under fiber roll	Trench-in rolls to a depth of 4 in and stake. Place compacted soil along the uphill side of the fiber roll
Runoff flows between fiber rolls	Ensure that fiber rolls are butted tightly together and staked
There is excessive sediment accumulation	Remove accumulated sediment. Apply soil stabilization measures to contributing areas
Field Condition – Wind Erosion	**Common Solutions Are:**
Excessive dust leaves the site	Increase frequency of water application. Consider using a palliative or binder on inactive areas
Watering for dust control causes erosion	Reduce water pressure on the water truck. Check watering equipment to ensure that it has a positive shutoff. Water less frequently
Sprayed areas are ineffective at limiting dust	Re-spray areas and ensure that the application rate is proper

5.0 POST-CONSTRUCTION

Upon completion of construction within the project area:

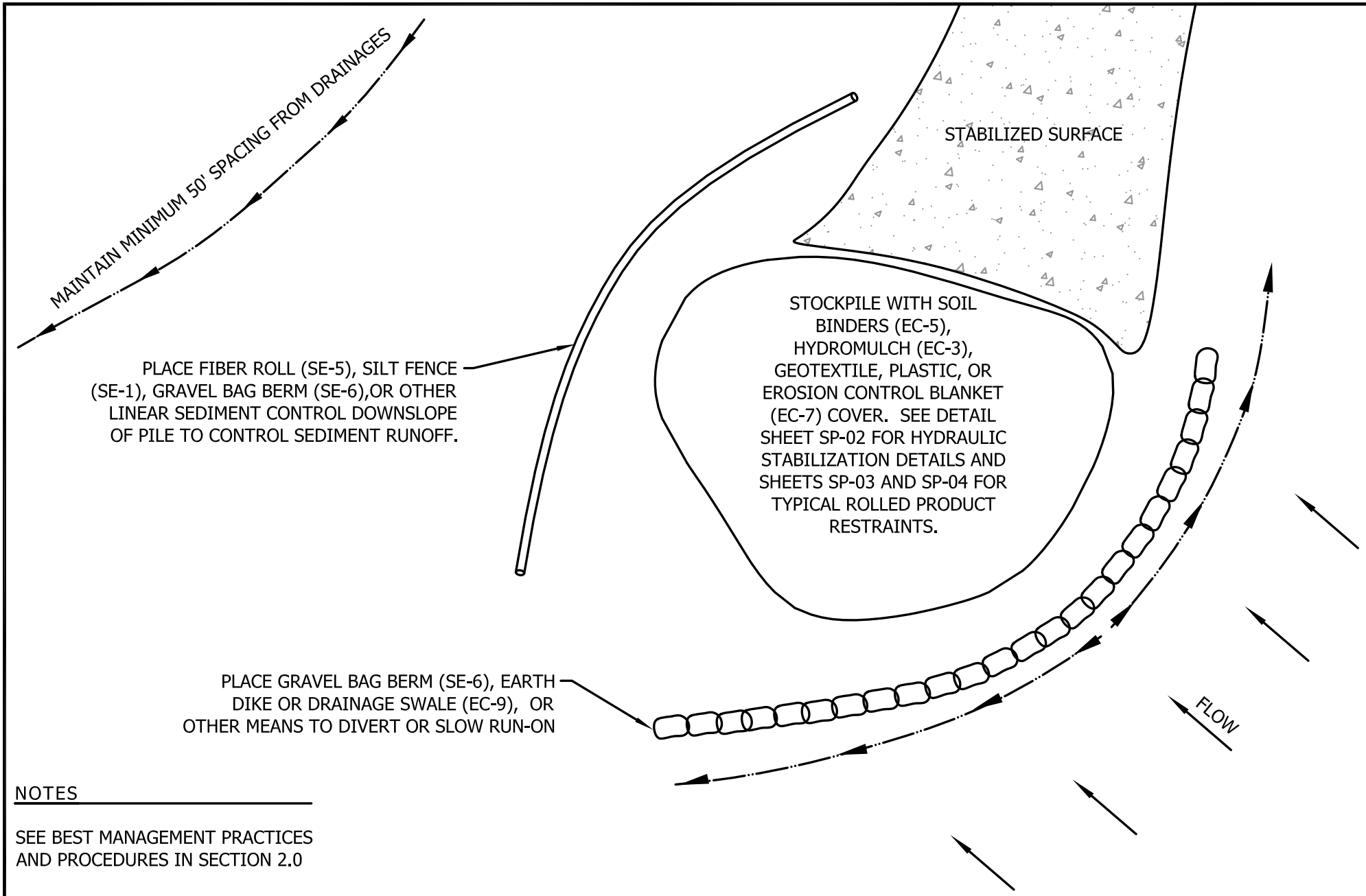
- Remove all temporary, non-biodegradable BMPs;
- Remove all construction equipment from the site;
- Clear all staging areas of any debris, construction materials, and contaminants;
- Return all drainage ways affected by any stockpiles or stockpile to their pre-construction line and grade; and
- Cover disturbed soil areas with temporary and/or permanent stabilization.

Attachment A Activity Specific Installation Details

The following installation details are included to illustrate installation techniques. It is noted that specific installation of any facility must consider the restrictions of the installation site, and that modifications to the following may be required given local conditions.

The following details are included in this Plan

SP-01 Typical Stockpile Placement
SP-02 Hydraulic Stabilization
SP-03 Typical Plastic or Fabric Cover Restraints



NOTES

SEE BEST MANAGEMENT PRACTICES AND PROCEDURES IN SECTION 2.0

NOT TO SCALE

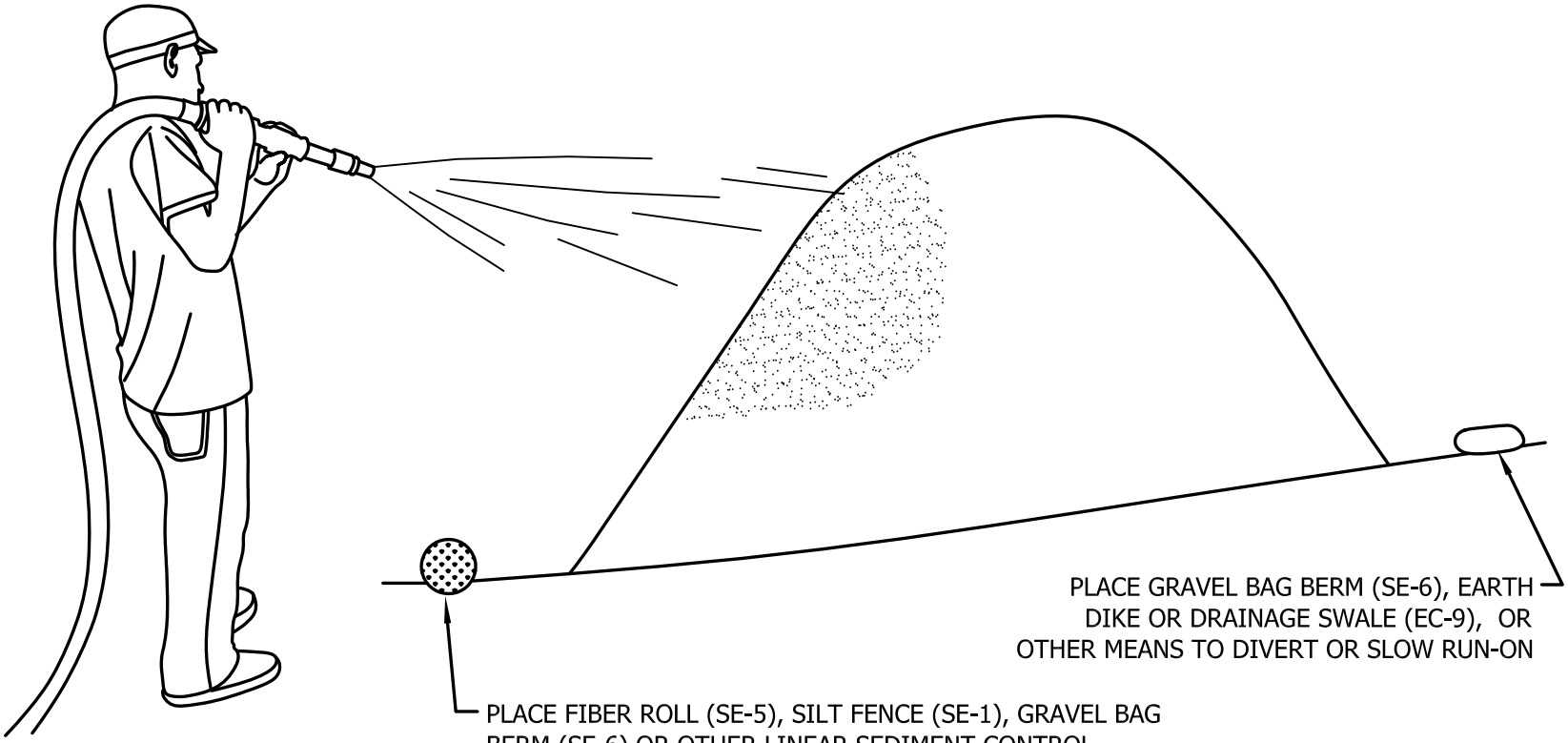
Pacific Gas and Electric Company

TYPICAL STOCKPILE PLACEMENT

A-ESCP - STOCKPILE MANAGEMENT

SP-01

PRODUCT	DURATION	APPLICATION RATE	DILUTION RATE	NOTES
SOILTAC	6 MONTHS	1 GAL / 220 S.F.	9 PARTS WATER TO 1 PART PRODUCT	APPLY IN 2 PASSES
FLEXTERRA FGM	6 MONTHS	1 BALE / 800 S.F.	1 BALE TO 125 GAL WATER	SPECIAL EQUIPMENT / VENDOR REQUIRED



NOTES

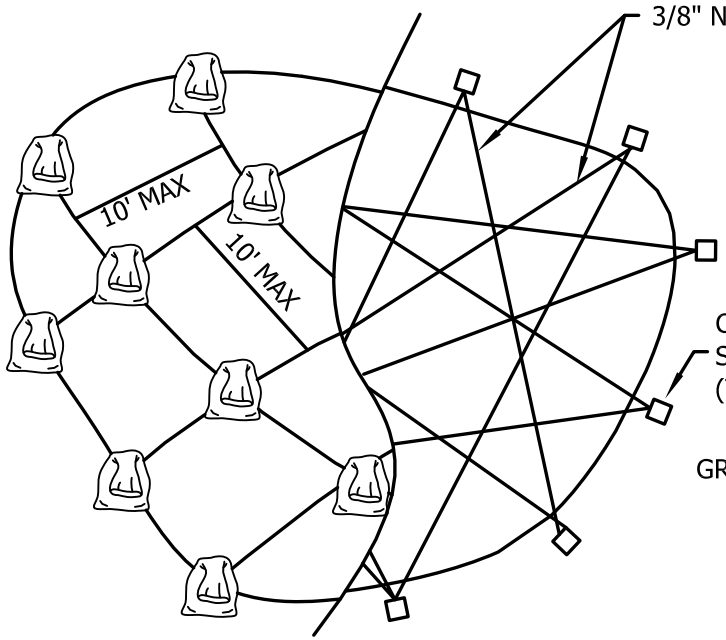
1. SEE BEST MANAGEMENT PRACTICES AND PROCEDURES IN SECTION 2.0.
2. SPRAY FROM MULTIPLE DIRECTIONS TO AVOID SHADOWING.
3. FOLLOW MANUFACTURERS MIXING AND APPLICATION GUIDES.
4. ENSURE THE PRODUCT IS APPLIED WITH ADEQUATE TIME TO CURE.
5. IF SOIL BINDERS ARE USED IN ON-SITE WATER TRUCKS OR TRAILERS, MAKE SURE TO CLEAN ALL BINDER RESIDUE FROM EQUIPMENT AFTER SPRAYING.

Pacific Gas and Electric Company

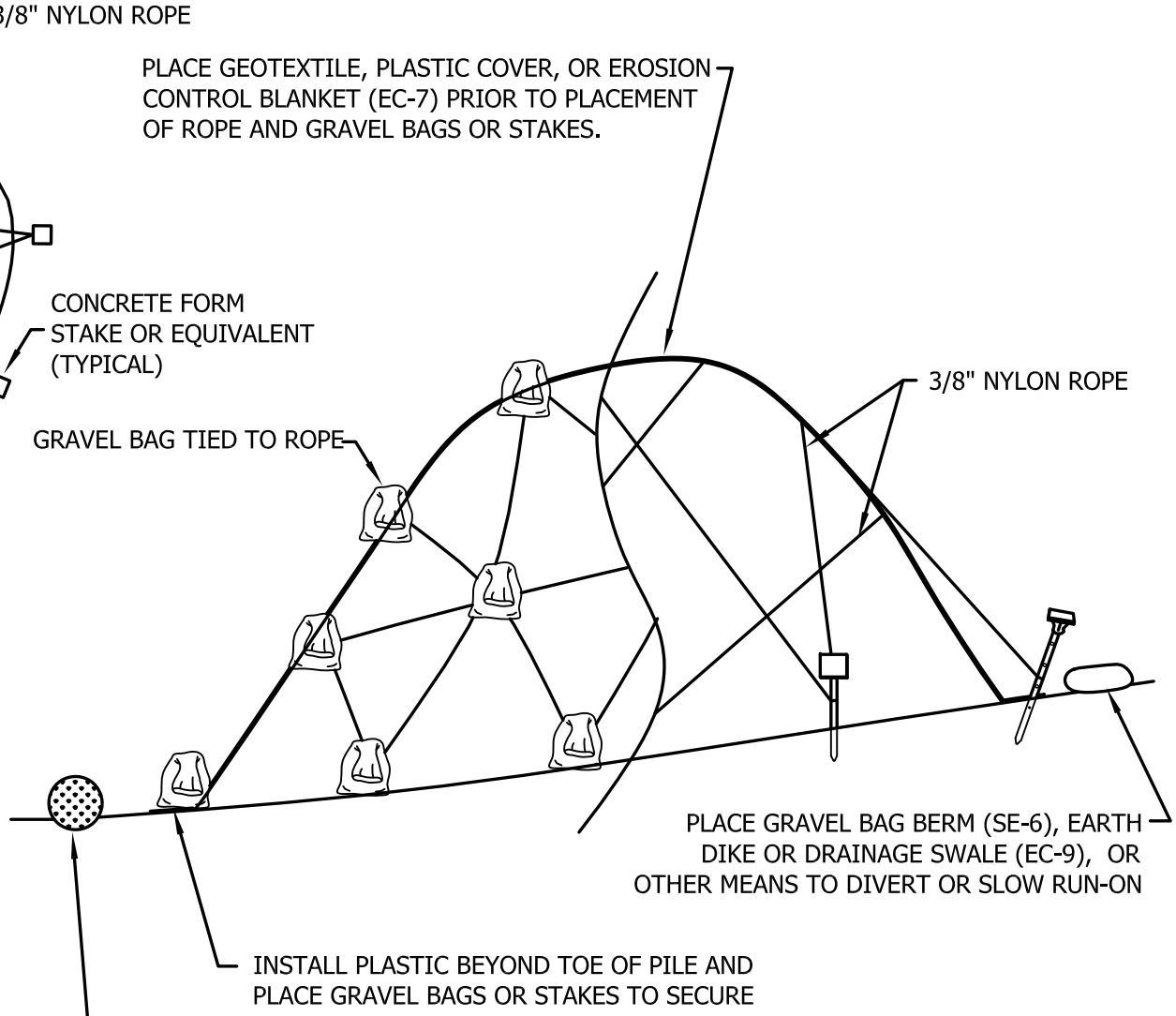
HYDRAULIC STABILIZATION

SOIL BINDER OR HYDROMULCH
A-ESCP - STOCKPILE MANAGEMENT

SP-02



PLAN VIEW



PROFILE VIEW

NOTES

SEE BEST MANAGEMENT PRACTICES AND PROCEDURES IN SECTION 2.0

PLACE BAGS AT 10' ON CENTER BOTH WAYS

NOT TO SCALE

Pacific Gas and Electric Company

PLASTIC OR FABRIC COVER

GRAVEL BAG OR CONCRETE FOR STAKES AND ROPE
A-ESCP - STOCKPILE MANAGEMENT

SP-03

Laydown/Staging Area Construction

Activity Specific Erosion and Sediment Control Plan
(A-ESCP)

If Cumulative Soil Disturbance Changes,
Contact PG&E Environmental Operations - Environmental Field Specialists (EFS)
For Re-Evaluation of Storm Water Protection Needs

Prepared by

PG&E Storm Water Program Group

January 2011

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Attachments

1.0 WHAT IS COVERED UNDER THIS A-ESCP?

1.1 Laydown/Staging Area Construction

This Activity Specific Erosion and Sediment Control Plan (A-ESCP) is applicable to routine laydown/staging area construction activities that are not near sensitive habitat, surface waters or wetlands, or located along steep slopes. If you encounter one of those conditions, contact your local Environmental Field Specialist (EFS). This A-ESCP sets forth minimum Best Management Practices (BMPs) for laydown/staging area construction.

1.2 Project Activities

Typical activities performed might include the following:

- Trim vegetation as needed to clear work area
- Mobilize equipment and materials
- Blade to establish level base
- Install perimeter fencing
- Install gravel at entrance/exit and/or laydown surface
- Demobilize

1.3 Site Conditions Not Covered in this A-ESCP

This is a small project that should not include nearby site conditions such as:

- Nearby water bodies
- Wetlands/vernal pools
- Environmentally sensitive areas or protectable vegetation
- Steep slopes

Should any of these conditions be visible or become apparent in the near vicinity during mobilization activity, contact your local EFS for further direction.

1.4 Scheduling BMP Installation

Planning for storm water pollution prevention is required for all PG&E construction and maintenance projects throughout the year. However during the dryer summer months between June and September, for short duration projects (projects less than one week in duration), erosion and sediment control BMPs may not have to be implemented unless there is a possibility of precipitation. Storm water pollution prevention planning must be done prior to starting the project and erosion and sediment control BMPs must be on hand in the event there is a sudden rain event, but only need to be deployed if

precipitation occurs. Good housekeeping and tracking control BMPs must be implemented for all projects, regardless of time of year.

For longer duration projects, and all small construction projects from October to May, BMPs shall be installed prior to the soil disturbing activities, maintained during soil disturbing activities and removed at the conclusion of soil disturbing activities.

2.0 BEST MANAGEMENT PRACTICES

The purpose of this A-ESCP is to specify appropriate stormwater BMPs for laydown/staging area construction. It is recommended that construction activities are scheduled to minimize soil disturbing activities during rain events.

The BMPs for the project should be installed in areas similar to those shown on the Typical BMP Installation Map; Attachment A.

Detailed cut-sheets on each BMP are provided in Attachment B.

In addition to the activity specific erosion and sediment control BMPs recommended in this A-ESCP, good housekeeping BMPs should be followed to minimize contamination of stormwater runoff with construction associated chemicals and to maintain a clean construction site (refer to the Good Housekeeping A-ESCP).

2.1 Where to Obtain BMP Materials

BMP products in Table 1 can be obtained through PG&E materials warehouses using project order numbers and established materials codes.

TABLE 1
BMP PRODUCTS INFORMATION

Category	Supplier	Product Name	Units
Certified Weed-Free Straw Mulch (EC-6)	Reed & Graham	Weed-Free Straw	Bales
Geotextiles and Mats (EC-7) Geotextile Fabric	Reed & Graham	Mirafi 600	Rolls: 12.5' x 360' 17.5' x 238'
Geotextiles and Mats (EC-7) Jute Mat	Reed & Graham	Eco-Jute	Rolls: 4' x 225'
Geotextiles and Mats (EC-7) Plastic Sheeting	Reed & Graham	Visqueen	Rolls: 20 or 40'x 100'; 10ml thick
Silt Fence (SE-1)	Reed & Graham	Caltrans Grade Silt Fence	100 feet with 36-inch wood posts at 6 foot spacing
Fiber Roll (SE-5)	Curlex	Sediment Log Type II	25 foot rolls x 6 or 9" diameter
Gravel Bags (SE-6)	Reed & Graham	Roc Soc	mono filament
Inlet Protection (SE-10) Gravel Bag	Reed & Graham	Same as SE-6	
Inlet Protection (SE-10)	Curlex	Same as SE-5	

2.2 Erosion Control

Erosion control practices consist of source control measures designed to prevent soil particles from becoming dislodged and transported in storm water runoff.

Soil-disturbing activities will be addressed as follows:

TABLE 2

BMP Number	BMP Name
EC-2	Preservation of Existing Vegetation
EC-7	Geotextiles and Mats
EC-16	Non-Vegetative Stabilization

For BMP installation procedures refer to the cut-sheets in Attachment B.

EC-2 Preservation of Existing Vegetation

Vegetation is one of the most effective erosion controls. Protecting existing vegetative cover on the site is a cost-effective, beneficial erosion control measure. For small construction projects, preservation of existing vegetation is most easily accomplished by limiting the work area and disturbed soil areas to the extent practicable. Details for implementation of this BMP are in the cut-sheets found in Attachment B. Key points are:

- Install fencing, barriers, or other markings to delineate vegetated areas to be preserved
- Suitable areas include but are not limited to: slopes, areas on site where no construction activity is planned, and areas near watercourses
- Locate staging and laydown areas outside of the drip line of existing trees
- Remove any fencing, barriers, or markings after the project is completed

Preserve vegetation between construction areas and sensitive areas whenever possible.

Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities.

EC-7 Geotextiles and Mats

Geotextiles and mats come in many different types. This plan covers the use of three types:

- Geotextile fabrics – for shielding soil from flowing water
- Plastic sheeting – for covering stockpiles from rain impacts
- Jute mats – for shielding soil from rain impacts on steep slopes and embankments

Geotextile Fabrics – Geotextile fabrics are used to protect soil from flowing water. Fabric is laid over the soil in areas where the flowing water is concentrated and moving fast enough to cause erosion. Details for installation of this product are in the cut-sheets found in Attachment B. Key points are:

- Can be used on slopes or in channels
- Must prepare the site to ensure complete contact of the fabric with the soil
- Should be installed vertically down-slope and overlapped
- Must be properly anchored using anchor trenches and pins/nails
- Can be left in place at the end of the project if it is covered by rock or gravel, otherwise it should be removed

Plastic Sheeting – Generally, plastic sheeting should be used only as a covering for stockpiles or for very small graded areas for short periods of time (e.g., to protect against an imminent storm). Details for installation of this product are in the cut-sheets found in Attachment B. Key points are:

- Plastic sheeting should have a minimum thickness of 6 mils
- Secure with gravel bags or other weights placed no more than 10 ft apart
- Inspect frequently because plastic degrades quickly and is easily damaged by wind
- Keep secure so fragments will not be blown into electrical equipment
- Must be removed at the end of the project

Plastic sheeting over stockpiles properly and improperly secured.

Jute Mats – Jute is used mostly to protect slopes and embankments. It is made of natural fiber and can be left in place at the completion of the project to maintain protection of slopes until vegetation is reestablished. Jute is less effective than geotextiles and is usually used in conjunction with vegetation. The details of installation are the same as geotextile fabrics.

Jute mat used to protect soil on slope and embankment.

EC-16 Non-Vegetative Stabilization (Gravel)

Non-vegetative stabilization methods are used for temporary or permanent stabilization of areas where vegetative options are not feasible due to proposed use, soil/climate conditions, time constraints, or other factors. There are many methods of non-vegetative stabilization. This section covers gravel mulch. Also see previous discussion of geotextiles and mats, above.

Gravel mulch is a non-degradable erosion control product, as opposed to degradable straw and wood mulch, composed of washed and screened coarse to very coarse gravel. Details of installation and practices are provided on the cut-sheets in Attachment B. Key points are:

- Gravel should be sized based on slope, rainfall, and upgradient run-on conditions. Inadequately sized gravel mulch may wash away with runoff
- Should be installed at a minimum 2” depth
- If permanent, a weed control fabric should be placed prior to installation

Gravel stabilization being installed.

2.1 Sediment Controls

Sediment controls filter storm water and trap soil particles before they move offsite. Table 3 has a selection of BMPs used to filter storm water.

TABLE 3

BMP Number	BMP Name
SE-1	Silt Fence
SE-6	Gravel Bag Berm
TC-1/2	Stabilized Construction Entrance/Exit/Roadway
WM-3	Stockpile Management
WM-8	Concrete Waste Management

For BMP installation procedures refer to the cut-sheets in Attachment B.

SE-1 Silt Fence

Silt fence is one of the most commonly used BMPs. It traps sediment by intercepting and detaining small amounts of sediment laden sheet flow runoff from disturbed areas to promote sedimentation behind the fence. It can be used in the following applications:

- Along the perimeter of a staging/laydown area
- Below the toe or down-slope of exposed erodible slopes
- Along drainage ways and channels to prevent sediment from entering these areas
- Around stockpiles

Details for installation of this product are in the cut-sheets found in Attachment B. Key points are:

- Used principally in areas where sheet flow occurs
- Install along a level contour, perpendicular to slope, so water does not flow along fence causing a concentrated flow
- Provide room for runoff to pond behind fence
- Bury bottom of fencing material to prevent water from running underneath
- Overlap ends of fence so flow is not concentrated in gaps between adjacent sections
- Stakes should be on the down-slope side of the fence
- Turn the ends of the fence uphill to prevent storm water from flowing around fence

Silt fence reinforced with gravel bags.

SE-6 Gravel Bag Berm

Gravel bags are a good option for use in concentrated flow areas because their weight will keep them in place. Gravel bags can be formed into berms or check dams in channels. They may be suitable for:

- Diverting water running onto or off of the project site
- Slowing water on disturbed slopes
- Below the toe of slopes
- As sediment traps in channels
- Around temporary stockpiles including those on paved areas

The details for installation of this product are in the cut-sheets found in Attachment B. Key points are:

- Installation can be labor intensive
- Degraded gravel bags may rupture when removed, spilling contents
- Easily damaged by construction equipment
- Must be removed at end of project

Gravel bags used to slow sheet flow run-on into the lined swale, and as check dams to slow flow within the swale.

2.2 Tracking Controls

Tracking of mud and dirt onto public roads must always be controlled at construction sites. Access roads, parking lots, and other onsite vehicle transportation routes should be stabilized after they are graded if they will be used during or after periods of rain. The tracking control measures are:

TABLE 4

BMP Number	BMP Name
TC-1/2	Tracking Control

For BMP installation procedures refer to the cut-sheets in Attachment B.

TC-1/TC-2 Tracking Control

Tracking of mud and dirt onto public roads must always be controlled at construction sites. Access roads, parking lots, and other onsite vehicle transportation routes should be stabilized after they are graded if they will be used during or after periods of rain.

Tracking controls consist of preventing or reducing the tracking of sediment off-site by vehicles leaving the construction area. Tracking control BMPs include TC-1 Stabilized Construction Entrance/Exit and TC-2 Stabilized Construction Roadway. Details of tracking control BMPs are in the cut-sheets found in Attachment B.

Tracking control is important for any construction project large or small. Track-out of mud, rock, or dirt onto paved streets is visible to the public and any city or county staff will identify this as a storm water violation. Pictured below is an example of a construction entrance/exit that is well maintained in which no muddy wheel tracks are visible on the pavement.

Clean and well maintained construction entrance/exit.

Depending on the size of your project, tracking control can be accomplished in various ways. If you are working on a very small, short duration project, tracking control can be as simple as sweeping during and at the end of the day. Sites that have a construction entrance/exit that transitions from dirt to pavement may require more attention. Pictured here is an example of a construction entrance before and after stabilization.

Construction entrance/exit before and after installation.

Larger sites may require the use of temporary construction roadways. Temporary roads should follow the contours of the natural terrain to the maximum extent possible. Roadways should be graded to prevent runoff from leaving the construction site. Drainage should flow across the roadway width to one or both sides of the roadway, where a trench may be dug and stabilized to direct concentrated flow or a gravel bag berm may be installed along the perimeter of the road.

Make the tracking control fit the size of the project.

2.3 Good Housekeeping BMPs

Good housekeeping covers general practices that keep a construction site clean and neat. It also designates specific areas where such things as refueling can be done safely so that any incidental spills will not end up in storm water runoff from the site. The good housekeeping practices covered in this plan are:

TABLE 5

BMP Number	BMP Name
WM-3	Stockpile Management
WM-8	Concrete Waste Management

WM-3 Stockpile Management

Stockpile management procedures are designed to reduce or eliminate air and storm water pollution from soil, paving and construction materials stockpiles. Details for implementing stockpile management practices are on the cut-sheets provided in Attachment B. Stockpile management requirements include:

- Protection of stockpiles must be implemented during the entire year, not just during the rainy season
- All stockpiles should be covered prior to the onset of rain and in windy conditions
- Protect the perimeter of stockpiles from storm water run-on
- Inspect frequently because plastic degrades quickly and is easily damaged by wind
- Keep secure so fragments will not be blown into electrical equipment

Proper securing of plastic sheeting.

WM-8 Concrete Waste Management

Concrete waste can alter the chemical properties of stormwater; therefore it's important to manage concrete washout and cutting operations to minimize contact with site run-on and runoff. Where offsite washout of concrete wastes is not possible, designated on-site washouts should be provided. Details for implementing WM-8 Concrete Waste Management are provided on the cut-sheets found in Attachment B. Key points are:

- Contain wash out of concrete wastes to evaporate and properly dispose of solids
- Washout areas should be lined to protect the ground and constructed with sufficient volume to contain wastes, washout, and rainwater
- Do not allow excess concrete to be dumped onsite, except in designated areas
- Must have adequate volume so rain events do not overfill containment

Two alternatives for containing concrete washout water.

Adequate volume and maintenance are essential to prevent a release of high pH water from temporary concrete washout containments.

3.0 BMP INSPECTION AND MAINTENANCE

BMP installation, inspection and maintenance will be performed by the PG&E construction crew. BMPs should be inspected daily during construction activities. In the event that BMPs appear to require maintenance or are not functioning as expected, the BMP will be repaired or replaced to correct the deficiency.

4.0 WHOM TO CALL

If the project receives a written notice or order from any regulatory agency, contact your local EFS for further direction immediately.

Contact the local EFS if any of the following conditions occur:

- Visually cloudy/muddy water is observed leaving the work area
- Discharge or spill of hazardous substance

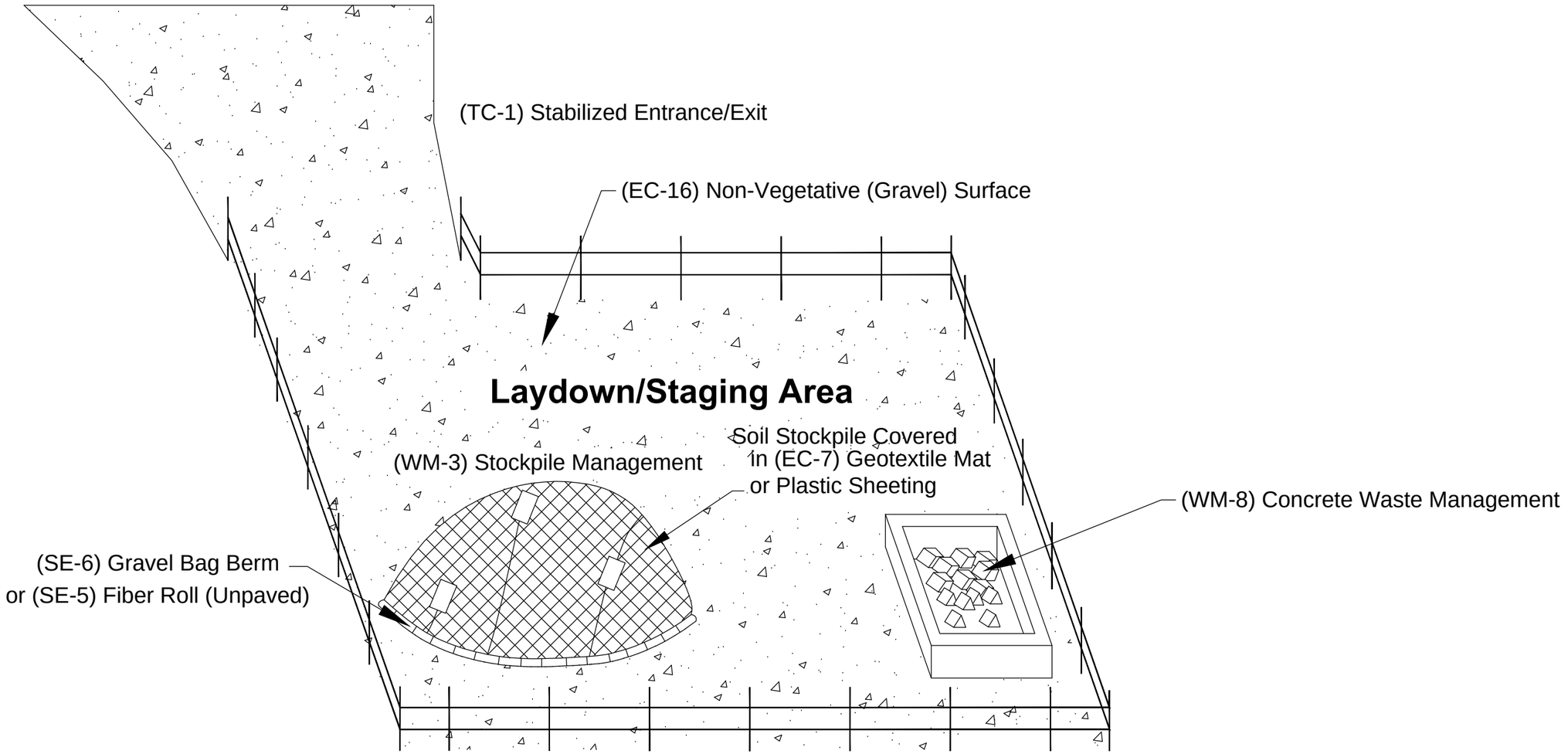
After hours or if the local EFS are unavailable, call the following 800 number: **800-874-4043.**

Contact your local EFS if any release of fuels or waste occurs.

5.0 POST-CONSTRUCTION

Upon completion of construction within the project area, all temporary, non-biodegradable BMPs will be removed. All construction equipment will be demobilized and removed from the site.

Attachment A Typical BMP Installation Map



ETIC ENGINEERING

A-ESCP LAYDOWN/STAGING AREA TYPICAL BMP USE MAP
PACIFIC GAS AND ELECTRIC COMPANY

FIGURE:
1

Attachment B PG&E Best Management Practice (BMP) Cut-sheets

Cut-sheets for BMPs described in this A-ESCP are included in this attachment, as follows:

EC-2 Preservation of Existing Vegetation
EC-7 Geotextiles and Mats
EC-16 Non-Vegetative Stabilization
SE-1 Silt Fence
SE-6 Gravel Bag Berm
TC-1 Stabilized Construction Entrance/Exit
TC-2 Stabilized Construction Roadway
WM-3 Stockpile Management
WM-8 Concrete Waste Management

When

This BMP is applicable to projects when:

- There are areas onsite where no construction activity is planned or will occur later
- Areas to be preserved are in the immediate vicinity of the construction site. Mark as appropriate before clearing and grubbing or other soil disturbance activities begin
- Areas with vegetation that can be preserved to protect against soil erosion, such as on steep slopes, watercourses, and building sites in wooded areas
- Areas designated as Environmentally Sensitive Areas (ESAs), or where federal, state, or local government regulations require preservation, such as wetlands, vernal pools, marshes, etc. These areas are typically flagged by a qualified biologist

How

Use the following measures as applicable:

- Preserve existing vegetation whenever possible
- If necessary, contact the project Environmental Representative for clarification regarding areas to be preserved
- Whenever possible, minimize disturbed areas by locating temporary roadways to avoid stands of trees and shrubs, and follow existing contours to reduce cutting and filling
- Locate construction materials, equipment storage, and parking areas outside the drip line of any tree to be retained
- Consider the impact of grade changes to existing vegetation and the root zone
- Remove any markings, barriers, or fencing after project is completed

Maintenance and Inspection

To preserve vegetation, maintain the clearly marked limits of disturbance during construction.

- Routinely inspect barriers during construction
- Repair or replace barriers as needed during construction

Mark vegetated area to be preserved

This slope should have been protected and will now be susceptible to erosion.

Ensure that vegetation protection barriers are adequate in length and delineation.

When

Use the following methods when disturbed soils may be particularly difficult to stabilize or access, including the following situations:

- Steep slopes, generally steeper than 1:3 (V:H)
- Slopes where the erosion hazard is high
- Slopes and disturbed soils where mulch must be anchored
- Disturbed areas where plants are slow to develop adequate protective cover
- Channels with high flows
- Channels intended to be vegetated
- Slopes adjacent to water bodies of Environmentally Sensitive Areas (ESAs)
- Blankets and mats are generally not suitable for excessively rocky sites or areas where the final vegetation will be mowed (because staples and netting can catch in mowers)

Plastic results in 100 percent runoff; their use is limited to:

  - o Covering stockpiles
  - o Covering small graded areas for short periods, such as through an imminent storm event, until an alternative protection measure is implemented

How

Proper site preparation is essential to ensure complete contact of the blanket or matting with the soil:

- Grade and shape the area of installation
- Remove all rocks, clods, vegetation, or other obstructions, so that the installed blankets or mats have complete, direct contact with the soil
- Prepare seedbed by loosening topsoil
- Seed the area before blanket installation for erosion control and re-vegetation. Seeding after mat installation is often specified for turf reinforcement application. When seeding before blanket installation, re-seed all check slots and other areas disturbed during installation. Where soil filling is specified, seed the matting and the entire disturbed area after installation and before filling the mat with soil
- Use u-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes to anchor mats and blankets to the ground surface
- Drive wire staples and metal stakes flush to the soil surface
- All anchors should be 6 inches to 18 inches long and have sufficient ground penetration to resist pullout. Longer anchors may be required for loose soils
- For installation on slopes, consult the manufacturer's recommendations. Generally:
  - o Begin at the top of the slope and anchor the blanket in a 6 inch deep by 6 inch wide trench. Backfill trench and tamp earth firmly

- Unroll the blanket down slope in the direction of water flow
- Overlap the edges of adjacent parallel rolls 2 inches to 3 inches and staple every 3 feet
- When blankets must be spliced, place blankets end-over-end (shingle style) with 6-inch overlap. Staple through overlapped area, approximately 12 inches apart
- Lay blankets loosely and maintain direct contact with the soil. Do not stretch
- Staple blankets sufficiently to anchor blanket and maintain contact with the soil. Place staples down the center and stagger with the staples placed along the edges

- Remove and dispose of blankets and mats before applying permanent soil stabilization measures

Maintenance and Inspection

- Routinely inspect areas treated with temporary soil stabilization before and after significant forecasted storm events. Immediately repair any failures. Maintain areas treated with temporary soil stabilization to provide adequate erosion control. Re-apply or replace temporary soil stabilization on exposed soils when greater than 10 percent of the previously treated area becomes exposed or exhibits visible erosion
- If washout or breakage occurs, reevaluate the original materials installation. Repair damage to the slope or channel. If appropriate, re-install the material or implement a revised BMP

Several types of Erosion Control Blankets.

Remove all rocks, clods, vegetation, or other obstructions to install the blankets or mats.

Installed blankets or mats need to have direct contact with the soil in order to be effective.

Be sure to use enough staples to adequately secure the blankets or mats.

When

Non-vegetative stabilization methods are used for temporary or permanent stabilization of areas prone to erosion and should be used only where vegetative options are not feasible; examples include:

- Areas of vehicular or pedestrian traffic such as roads or paths
- Temporary heliport pads
- 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
- 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.

- **Decomposed Granite** is a permanent erosion protection method that consists of a layer of stabilized decomposed granite placed over an erodible surface. This material is most often used for roadways and walkways
- **Degradable Mulches** of various types can be used for temporary non-vegetative stabilization; examples include straw mulch, compost, wood chips, or hydraulic mulch
- **Geotextiles and Mats** can be used for temporary non-vegetative stabilization; an example includes items such as jute netting. These BMPs are typically manufactured from degradable or synthetic materials and are designed and specified based on their functional longevity, i.e., how long they will persist and provide erosion protection. All geotextiles and mats should be replaced when they exceed their functional longevity or when permanent stabilization methods are instituted
- **Gravel Mulch** is a non-degradable erosion control product that is composed of washed and screened coarse to very coarse gravel

See also EC-6 Straw Mulch, EC-7 Geotextiles and Mats, and EC-8 Wood Mulching.

How

Non-vegetated stabilization should be used in accordance with the following general guidance:

- Should be used in conjunction with other BMPs, including drainage, erosion controls, and sediment controls
- Non-vegetated stabilization measures should be implemented as soon as the disturbance in the areas they are intended to protect has ceased

Jute Netting

- Used where project construction activities have exposed soils through the removal of existing vegetation and other permanent stabilization techniques such as revegetation, gravel or paving

will not be implemented

- Used for additional stabilization in areas where it is expected that the native vegetation will re-establish itself over time
- Remove large clods of dirt and stones and do not over compact the soil
- If being used in conjunction with seeding (revegetation), seed mix and fertilizer (if used) should be applied before installing the jute netting
- On slopes:
    - Apply jute netting by unrolling it down the slope and terminate at level area
    - Secure jute at top by laying at least 6 inches of material below grade at least 6 inches deep
    - Fold 6 inches of netting under itself and secure with staples or stakes
- Secure with staples every 18 to 24 inches. The steeper the slope the closer the staples should be placed to each other
- Overlap all seams at least 2 to 6 inches

Decomposed Granite Stabilization

- If used for a road or path should be installed on a prepared base
- Should be mixed with a stabilizer if used for roads or pathways, or on slope applications
- Though porous it is recommended to prevent standing water on or next to a decomposed granite road or pathway

Gravel Mulch

- Should be sized based on slope, rainfall, and upgradient run-on conditions. Stone size should be increased as potential for erosion increases (steeper slopes, high intensity rainfall)
- If permanent, a weed control fabric should be placed prior to installation
- Should be installed at minimum 2 inch depth
- Should completely cover all exposed surfaces
- If not properly screened and washed, can contain fine material that can erode and/or create dust problems

Rock Slope Protection

- When using rock slope protection, rock size and installation method should be specified by an engineer

Maintenance and Inspection

- For temporary and permanent installations, require inspection periodically and after major storm events to look for signs of erosion or damage to the stabilization
- All damage should be repaired immediately
- Rake out and add decomposed granite or gravel as needed to areas subject to rill erosion. Inspect upgradient drainage controls and repair/modify as necessary to control run-on to stabilized areas

Place filter fabric down before installing gravel or decomposed granite for stabilization.

Compact gravel or decomposed granite for additional stability.

When

Silt fences are temporary linear sediment barriers of permeable fabric designed to intercept and slow the flow of sediment-laden sheet flow runoff. Silt fences allow sediment to settle from runoff before water leaves the construction site.

Silt fences are placed:

- Below the toe of exposed and erodible slopes
- Down slope of exposed soil areas
- Around temporary stockpiles
- Along streams and channels
- Along the perimeter of a project

How

Construct silt fences with a setback of at least 3 feet from the toe of a slope in areas suitable for temporary ponding or deposition of sediment. Where a 3-foot setback is not practicable, construct as far from the toe of the slope as practicable.

- Generally, use silt fences in conjunction with erosion controls up slope to provide effective control, particularly for slopes adjacent to water bodies or Environmentally Sensitive Areas
- Construct the length of each reach (length of fence) so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; each reach should not exceed 500 feet. The last 6 feet of the reach should be turned up slope
- The maximum length of slope draining to the silt fence should be 200 feet or fewer
- Excavate a trench for the bottom of the silt fence that is not wider or deeper than necessary
- Key in, or bury the bottom of silt fence fabric at least 12 inches deep in trench and tamp into place. If it is not feasible to trench along the slope contour, use sand bags or backfilling to key in the bottom of the fabric
- Install fence post at least 12 inches below grade on down slope side of trench
- Silt fences should not be considered for installation below slopes steeper than 1:1 (horizontal:vertical) or that contain a high number of rocks or loose dirt clods

Maintenance and Inspection

- Repair or replace split, torn, slumping, undercut, or weathered fabric
- Inspect silt fences before and after each storm event and routinely throughout the rainy season
- Remove accumulated sediment when it reaches 1/3 of the barrier height. Incorporate removed sediment into the project at appropriate locations or dispose of at a PG&E-approved site

- Remove and dispose of silt fences that are damaged and become unsuitable for the intended purpose and replace with new silt fence barriers
- Remove silt fence when the upgradient area is stabilized. Fill and compact post-holes and anchorage trench, remove sediment accumulation, and grade fence alignment to blend with adjacent ground

Silt fence installed at the toe of an erodible slope for perimeter control.

Silt fence needs to be properly keyed in 12 inches below the ground surface.

When

A gravel bag berm consists of a single row of gravel bags that are installed end-to-end to form a barrier across a slope to intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide some sediment removal. Gravel bags can also be used where flows are moderately concentrated, such as ditches, swales, and storm drain inlets (Storm Drain Inlet Protection to divert and/or detain flows). Gravel bag berms are appropriate for perimeter site control or along streams, channels, storm drain inlets, or around stockpiles to intercept sediment laden storm water and non-storm water runoff.

- Where it is desirable to filter sediment in runoff. Note that gravel bag berms are generally more permeable than sand bags. Sand bag barriers should be used where it is desirable to block and pond flows (e.g., for containment of non-storm water flows)
- Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow
- On a project-by-project basis to maximize effectiveness
- With other BMPs to maximize sediment containment

How

When used as a linear control for sediment removal:

- Install along a level contour
- Space rows 8 to 20 feet apart
- Turn ends of gravel bag row up slope to prevent flow around the ends
- Use in conjunction with temporary soil stabilization controls up slope to provide effective control

- When used for concentrated flows:
  - Stack gravel bags to required height. When the height requires 3 rows or more, use a pyramid approach
  - Overlap upper rows of gravel bags with overlap joints in lower rows
- Construct gravel bag barriers with a setback of at least 3 feet from the toe of a slope. Where a 3-foot setback is not practicable, construct as far from the toe of the slope as practicable

Maintenance and Inspection

- Inspect gravel bag berms before and after each storm event and routinely throughout the rainy season
- Reshape or replace gravel bags as needed
- Repair washouts or other damages as needed
- Inspect gravel bag berms for sediment accumulation and remove sediments when accumulation reaches 1/3 of the berm height. Incorporate removed sediment into the project at appropriate locations or dispose of it at a PG&E-approved site
- Remove gravel bag berms when no longer needed. Remove

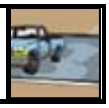
sediment accumulation, and clean, re-grade, and stabilize the area. Incorporate removed sediment into the project at appropriate locations or dispose of it at a PG&E-approved site

Gravel bag berm used for perimeter control.

Gravel bag check dams installed to slow the water down and encourage sediments to drop out.

TRACKING CONTROLS
Stabilized Construction Entrance/Exit

TC-1



When

Tracking controls reduce offsite tracking of sediment and other pollutants by providing a stabilized entrance at defined construction site entrances and exits and/or providing methods to clean up sediment or other materials to prevent them from entering a storm drain by sweeping or vacuuming.

- Stabilize entrances on a project-by-project basis in addition to other BMPs
- Implement sweeping or vacuuming when sediment is tracked from the project site onto public or private paved roads, typically at points of site exit
- Use stabilized entrances and/or sweeping at construction sites:
    - Where dirt or mud is tracked onto public roads adjacent to water bodies
    - Where poor soils are encountered, such as soils containing clay
    - Where dust is a problem during dry weather conditions

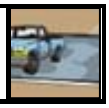
How

Stabilized Construction Entrances

- Limit the points of entrance/exit to the construction site by designating combination or single-purpose entrances and exits. Require all employees, subcontractors, and others to use them. Limit speed of vehicles to control dust
- Grade each construction entrance/exit to prevent runoff from leaving the construction site
- Route runoff from stabilized entrances/exits through a sediment-trapping device before discharge
- Design stabilized entrance/exit to support the heaviest vehicles and equipment that will use it
- Select construction access stabilization (aggregate, asphaltic concrete, and concrete) based on longevity, required performance, and site conditions
- Use of constructed or constructed/manufactured steel plates with ribs for entrance/exit access is permitted
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 inches deep, or place aggregate to a depth recommended by a geotechnical engineer. Use crushed aggregate of more than 3 inches but fewer than 6 inches
- If possible, construct aggregate area with a minimum length of 50 feet and width of 30 feet

Street Sweeping and Vacuuming

- Routinely inspect potential sediment tracking locations, at least daily
- Sweep or vacuum visible sediment tracking as needed
- Manual sweeping is appropriate for small projects. For larger



projects, use sweeping methods that collect removed sediment and material

- If not mixed with debris or trash, incorporate the removed sediment into the project or dispose of it at a PG&E-approved disposal site

Maintenance and Inspection

Stabilized Construction Entrance

- Inspect routinely for damage and assess effectiveness. Repair if access is clogged with sediment
- Sweep where tracking has occurred on roadways, on the same day. Do not use water to wash sediment off the streets. If water must be used, it should be captured to prevent sediment-laden water from running off the site
- Keep all temporary roadway ditches clear

Street Sweeping and Vacuuming

- Inspect inlet and outlet access points routinely and sweep tracked sediment as needed
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous
- After sweeping, properly dispose of sweeper wastes

Depending on the project area soil types, these metal plates may be sufficient enough to prevent track out onto paved roads.

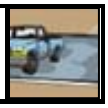
Regularly clean the plates to prevent buildup of sediments, mud, or construction debris from being tracked onto the paved road.

Manufactured metal plates knock dirt off vehicles before exiting a site.

One way to prevent bypassing would be to install a barrier such as safety cones or K-rails.

For rocked construction entrances/exits, use crushed aggregate of more than 3 inches but fewer than 6 inches.

Traditional rocked construction entrance/exit.



When

Access roads, subdivision roads, parking areas, and other onsite vehicle transportation routes should be stabilized immediately after grading, and frequently maintained to prevent erosion and control dust.

This BMP should be applied for the following conditions:

- Temporary Construction Traffic:
  - Phased construction projects and offsite road access
  - Construction during wet weather
- Construction roadways and detour roads:
  - Where mud tracking is a problem during wet weather
  - Where dust is a problem during dry weather
  - Adjacent to water bodies
  - Where poor soils are encountered

How

Areas that are graded for construction vehicle transport and parking purposes are especially susceptible to erosion and dust. The exposed soil surface is continually disturbed, leaving no opportunity for vegetative stabilization. Such areas also tend to collect and transport runoff waters along their surface. During wet weather, they often become muddy and can generate significant quantities of sediment that may pollute nearby streams or be transported offsite on the wheels of construction vehicles. Dirt roads can become so unstable during wet weather that they are virtually unusable.

Efficient construction road stabilization not only reduces onsite erosion but also can significantly speed onsite work, avoid instances of immobilized machinery and delivery vehicles, and generally improve site efficiency and working conditions during adverse weather.

Permanent roads and parking areas should be paved as soon as possible after grading. As an alternative where construction will be phased, the early application of gravel or chemical stabilization may solve potential erosion and stability problems. Temporary gravel roadway should be considered during the rainy season and on slopes greater than 5 percent.

Temporary roads should follow the contour of the natural terrain to the maximum extent possible. Slope should not exceed 15 percent. Roadways should be carefully graded to drain transversely. Provide drainage swales on each side of the roadway in the case of the crowned section or one side in the case of the super elevated section. Simple gravel berms without a trench can also be used.

Installed inlets should be protected to prevent sediment laden water from entering the storm sewer system (see SE-10, Storm Drain Inlet Protection). In addition, the following criteria should be considered:

- Road should follow topographic contours to reduce erosion of the roadway

- The roadway slope should not exceed 15 percent
- Chemical stabilizers or water are usually required on gravel or dirt roads to prevent dust
- Properly grade roadway to prevent runoff from leaving the construction site
- Design stabilized access to support heaviest vehicles and equipment that will use it
- Stabilized roadway using aggregate, asphalt concrete, or concrete based on longevity, required performance, and site conditions. The use of cold mix asphalt or asphalt concrete grindings for stabilized construction roadway is not allowed
- Coordinate materials with those used for stabilized construction entrance/exit points
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 inch depth

Maintenance and Inspection

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, impact weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation
- Keep all temporary roadway ditches clear
- When no longer required, removed stabilized construction roadway and re-grade and repair slopes
- Periodically apply additional aggregate on gravel roads
- Active dirt construction roads are commonly watered three or more times per day during the dry season

Install filter fabric, place stabilization materials and compact.

In areas where run-on onto the road may be an issue install BMPs such as fiber rolls or silt fence to protect the road.

Stabilized construction road.

When

Use this BMP when projects require stockpiled soil and paving materials. The stockpile management practices differ based on forecasted weather or terrain.

- Protection of stockpiles must be implemented whenever there is a potential for transport of materials by a water source (forecast precipitation, windy conditions, or any non-storm water runoff)

How

Use one or more of the following options to manage stockpiles and prevent stockpile erosion and sediment discharges for storm water and non-storm water runoff/run-on:

  - Return stockpile to the excavation if precipitation is forecast
  - Protect stockpiles from storm water run-on with temporary perimeter sediment barriers such as berms, silt fences, fiber rolls, covers, sand/gravel bags, or straw bale barriers, as appropriate
  - Remove or temporarily store stockpiles in a protected location offsite

- **Stockpiles should be covered, stabilized, or protected with a perimeter sediment barrier before the onset of precipitation**
- Secure plastic coverings tightly. Ensure no plastic is blown into electrical equipment
- Keep stockpiles organized and surrounding areas clean
- Protect storm drain inlets, watercourses, and water bodies from stockpiles, as appropriate
- Implement dust control practices as appropriate on all stockpiled material

Maintenance and Inspection

Repair and/or replace covers and perimeter containment structures as needed. Plastic sheeting requires frequent inspection for sun and wind damage.

This stockpile should have perimeter control around it. Such as, fiber rolls, a gravel bag berm, or silt fencing.

Stockpile covered with plastic and secured with large rocks. Where more than one sheet of covering is required, overlap sheets and secure at seam.

This stockpile should be covered even though it has perimeter control.

Silt fence as stockpile perimeter control.

When

Use for projects where concrete, mortar, cement, and stucco are used or where slurry or concrete wastes are generated by construction activities, including:

- Sawcutting
- Coring/drilling
- Grinding, re-finishing, or patching
- Encasing conduit in concrete
- Tower footings

For managing concrete curing compounds, see the BMPs on Material Use (WM-2) and Hazardous Waste Management (WM-6). For managing paving, grinding, and sawcutting operations, see NS-3 Paving and Grinding Operations.

How

Install storm drain protection at any down gradient inlets that the activity might impact. See SE-10 Storm Drain Inlet Protection.

- Avoid mixing excess amounts of concrete
- **Do not wash residue or particulate matter into a storm drain inlet or watercourse**
- The following options should be used for concrete truck chute and/or pump and hose washout:
  - If available, arrange to use an existing concrete washout station. Upon entering the site, concrete truck drivers should be instructed about onsite practices
  - **Concrete Washouts:** Washout stations can be plastic lined temporary bermed areas designed with sufficient volume to completely contain all liquid and waste concrete materials plus enough capacity for rainwater. The designated area must be located away from storm drain inlets or watercourses
  - **Bucket Washout:** Manually rinse the chute into a wheelbarrow, plastic bucket, or pail, and then empty the bucket into the concrete truck barrel or on top of the placed concrete
- Locate washout at least 50 feet from storm drains, open ditches, or water bodies if possible
- Stockpile concrete demolition waste in accordance with WM-3 Stockpile Management

Maintenance and Inspection

- Responsible personnel should ensure that all concrete truck drivers are instructed about project practices when the trucks arrive onsite
- Clean designated washout areas as needed, or minimally when the washout is 75 percent full, to maintain sufficient capacity throughout the project duration
- Clean any designated onsite washout areas and remove all debris upon project completion. Dispose of concrete waste according to WM-5 Solid Waste Management

- Inspect routinely, when applicable activities are underway, to ensure that concrete washout does not overflow

Portable self contained concrete washouts are easy to maintain.

Cover during rain events.

Service the washout when approximately 75% full.

Self contained concrete washout.

Construct a concrete washout by placing a support structure (such as hay bales) to form a basin and line with a thick (minimum 6 mil) plastic.

Service the washout when approximately 75% full.

Make sure the washout doesn't become a waste bin for other construction debris.

Inspect concrete washout regularly for holes and integrity of the hay bales or support features.

Replace plastic after each servicing and replace hay bales as needed.

Lined concrete washout.

Sawcutting, Grinding, and Paving

Activity Specific Erosion and Sediment Control Plan
(A-ESCP)

If Cumulative Soil Disturbance Changes,
Contact the Environmental Field Specialists (EFS)
For Re-Evaluation of Storm Water Protection Needs

Prepared by

PG&E Water Quality Group

November 2013

TABLE OF CONTENTS

Attachments

1.0 WHAT IS COVERED UNDER THIS A-ESCP?

1.1 Sawcutting, Grinding, and Paving

Clearing, grading, site preparation, pavement removal, and other land disturbance and pollution generating activities associated with sawcutting, grinding, and paving operations have the potential to release sediment and other pollutants, potentially causing negative impacts to the environment.

This Activity Specific Erosion and Sediment Control Plan (A-ESCP) sets forth minimum Best Management Practices (BMPs) for Sawcutting, Grinding, and Paving activities at all Pacific Gas and Electric Company (PG&E) construction projects. Construction projects include all permitted, non-permitted, and maintenance operations/projects.

If specific environmental concerns are encountered, or if the procedures contained within this A-ESCP prove ineffective, contact your local Environmental Field Specialist (EFS).

1.2 Typical A-ESCPs Related to Sawcutting, Grinding, and Paving

In many cases, sawcutting, grinding, and paving activities involve procedures, requirements, or prohibition of practices covered under existing A-ESCPs which include:

- Good Housekeeping
- Stockpile Management
- Small Excavation, Construction, and Potholing
- Pavement Rehabilitation

1.3 Site Conditions Covered in this A-ESCP

This A-ESCP is applicable to all sawcutting, grinding, or paving project that disturb less than 0.9 acres, including all access roadways, staging areas that include the disturbance of soil, excavations, and any other land disturbance associated with the project. Such sawcutting, grinding, and paving projects can include minor paved area sawcutting and patching associated with facility repairs, new area paving, surfacing, resurfacing, as well as large pavement repair projects such as parking lots and access roads that may extend beyond 0.9 acres, but do not involve disturbing the underlying soil or base. The Small Excavation, Construction, and Potholing A-ESCP on SharePoint should be referenced for any construction, demolition, potholing or excavation work associated with the sawcutting, grinding, and/or paving project. If the paving project is expected to include Cement Treated Base (CTB), refer to the Pavement Rehabilitation A-ESCP available on SharePoint.

This document is intended to apply to all PG&E Sawcutting, Grinding, and Paving projects as well as any sawcutting, grinding, or paving activities being completed as a result of a larger project, and must be used as a reference for specific BMPs.

1.4 Scheduling Sawcutting, Grinding, and Paving BMP Installation

Planning for storm water pollution prevention is required for all PG&E construction projects throughout the year. The applicable BMPs described in this A-ESCP shall be implemented on all projects, regardless of the time of year and weather forecast.

2.0 BEST MANAGEMENT PRACTICES

The purpose of this A-ESCP is to specify appropriate BMPs for all Sawcutting, Grinding, and Paving projects. BMPs are scheduling of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

All PG&E Projects, Crews, and Subcontractors are required to be familiar with and follow, at a minimum, housekeeping and stockpile management standards as detailed in the Good Housekeeping A-ESCP and Stockpile Management A-ESCP prior to starting work. Should site personnel be unfamiliar with the requirements for Good Housekeeping or Stockpile Management, PG&E expects that they will obtain a copy of the A-ESCPs which are available on SharePoint. Good Housekeeping and Stockpile Management A-ESCP requirements may apply to all activities within this Plan, and therefore are not mentioned in each subsection.

Construction activities should be scheduled to minimize soil disturbing activities during rain events, if possible.

The BMPs for the project should be installed in areas similar to those shown on the Typical BMP Use Detail, Attachment A.

Existing A-ESCPs related to this activity are referenced in Attachment B and can be found in the Field Manual. A full version of the Field Manual is located on SharePoint.

PG&E has detailed Cut-Sheets for specific BMPs which include: when to use the BMP, how to use and install the BMP, and maintenance and inspection guidance for the BMP. BMP Cut-Sheets associated with Small Excavation, Construction, and Potholing are referenced in Attachment C and can be found in the Field Manual which is located on SharePoint.

The following activity specific procedures are intended to address activities related to any sawcutting, grading, or paving activity. Although the project may not include all such activities, the project shall follow the procedures contained within this Section that relate to the project.

2.1 Perimeter, Inlet, and Runoff Control

Description:
All sites where there is potential for the discharge of sediment or pollutant laden discharge, either from stormwater or other site related sources (broken waterlines, leaking hoses, run-on, tracking, etc.) shall establish effective perimeter control for all discharges, including vehicle and equipment tracking.

Requirements:

- All downhill areas where sheet flow may exit the project area should be protected with Silt Fence (SE-1) or Fiber Rolls (SE-5).
- All downhill areas where concentrated flow may exit the site should be protected with Gravel Bag Berms (SE-6) or similar.
- Protect downslope drainage inlets, including culvert inlets with Gravel Bag Berms (SE-6) and/or Storm Drain Inlet Protection (SE-10), or other effective combination.
- All equipment and vehicle access points shall include a Stabilized Construction Entrance (TC-1) or Stabilized Construction Roadway (TC-2).
- All adjacent roadways shall be monitored daily for tracking.
- All track-out shall be cleaned immediately by Street Sweeping and Vacuuming (SE-7).

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- TC-1 - Stabilized Construction Entrance
- SE-1 - Silt Fence
- SE-5 - Fiber Rolls
- SE-6 - Gravel Bag Berms
- SE-10 – Storm Drain Inlet Protection

Stabilized Entrance to Staging Area

Runoff and sediment/perimeter control

2.2 Sawcutting and Grinding

Description:
Pavement, whether asphaltic or concrete, is typically sawcut or ground at transition areas, adjacent to buildings, where existing surfaces remain in good repair, entrances to public or existing roadways, at utility vaults, where existing asphalt needs to be removed to provide for re-paving, or other similar areas. Saw cutting and grinding processes can be performed wet or dry, and may lead to either wet slurry runoff, or dust, that is considered a pollutant, and must be collected or controlled to prevent pollutant discharge.

Requirements:

- Perform sawcutting and grinding during dry weather and monitor weather for changes.
- Protect all adjacent drainages, waterways, and surface waters, from the accidental discharge of pollutants, including dust (dry cutting or grinding) or slurry (wet cutting or grinding).
- Cover or barricade storm drains during sawcutting and grinding operations.
- When practical, use wet cutting and grinding to better control dust.
- Vacuum all slurry, grindings, and dust from all surfaces concurrently with sawcutting or grinding activities.
- Collect and dispose of dust, grindings, and slurry in a manner to prevent any discharge of collected material to surface waters or drain inlets.
- Protect downslope drainage inlets, including culvert inlets with Gravel Bag Berms (SE-6) and/or Storm Drain Inlet Protection (SE-10), or other effective combination.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- SE-6 – Gravel Bag Berms
- SE-10 – Storm Drain Inlet Protection

Grinding of existing asphalt

Sawcutting in preparation of excavation

2.3 Asphalt Pavement

Description:
Prevent or reduce the discharge of pollutants from paving operations by using measures to prevent run-on and run-off pollution, properly disposing of wastes, and training employees and subcontractors. Many associated materials contain chemicals and therefore additional care should be taken to prevent contact with stormwater flow.

Requirements:

- Only perform asphalt paving work during dry weather, and monitor weather for changes.
- Collect all old, removed asphalt from the site and recycle whenever possible.
- Leaks or spills from paving equipment can contain toxic levels of metals, oil, and grease. Place drip pans or absorbent materials under paving equipment when not in use. Clean spills with absorbent material and dispose in accordance with applicable regulations.
- Substances used to coat asphalt transport trucks and asphalt spreading equipment should not contain soap and should be non-foaming and non-toxic.
- Keep an adequate supply of drip pans and absorbent materials on-site during paving operations and use when fueling and as necessary to clean leaks and spills.
- Cover or barricade storm drains during paving, seal coat, slurry seal, and fog seal operations.
- Protect downslope drainage inlets, including culvert inlets with Gravel Bag Berms (SE-6) and/or Storm Drain Inlet Protection (SE-10), or other effective combination.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- WM-2 – Material Use
- SE-6 – Gravel Bag Berms
- SE-10 – Storm Drain Inlet Protection

Active Asphalt Paving

Active Asphalt Paving

2.4 Concrete Pavement

Description:
High traffic and loading areas may require the additional service life and strength of concrete pavement. This application requires consideration for additional BMPs to protect from the discharge of water high in contaminants, including metals and high pH.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of an allowable range. Discharges of stormwater and non-stormwater exposed to concrete during curing and for some time thereafter may have a high pH and may contain chemicals, metals, and fines.

Requirements:

- Cover or barricade storm drains within reasonable proximity to the work area.
- Re-schedule concrete work when rain is forecast.
- Avoid mixing or ordering excess amounts of concrete.
- Do not wash equipment or any concrete materials into footing excavations.
- Do not allow excess concrete to be dumped onsite, except in appropriate washout facilities.
- Protect downslope drainage inlets, including culvert inlets with Gravel Bag Berms (SE-6) and/or Storm Drain Inlet Protection (SE-10), or other effective combination.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- Sawcutting and Paving A-ESCP
- WM-2 – Material Use
- SE-6 – Gravel Bag Berms
- SE-10 – Storm Drain Inlet Protection

Concrete washout system

Concrete placement

2.5 Signage and Striping

Description:
After pavement projects are complete, pavement markings are painted, signs, wheel stops, and other removed items are returned or installed. Signage and striping activities have the potential to discharge pollutants such as paint, glue, and concrete to surface waters.

Requirements:
Striping Paint

- Clean spills immediately, do not wash spilled material, dispose of waste properly.

Thermoplastic Striping

- Thermoplastic striper and pre-heater equipment shutoff valves should be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the stormwater drainage system, or watercourses.
- Pre-heaters should be filled carefully to prevent splashing or spilling of hot thermoplastic.

Raised/Recessed Pavement Marker Application and Removal

- Do not transfer or load bituminous material near drain inlets, the stormwater drainage system, or watercourses.
- Melting tanks should be loaded with care and not filled to beyond six inches from the top to leave room for splashing.

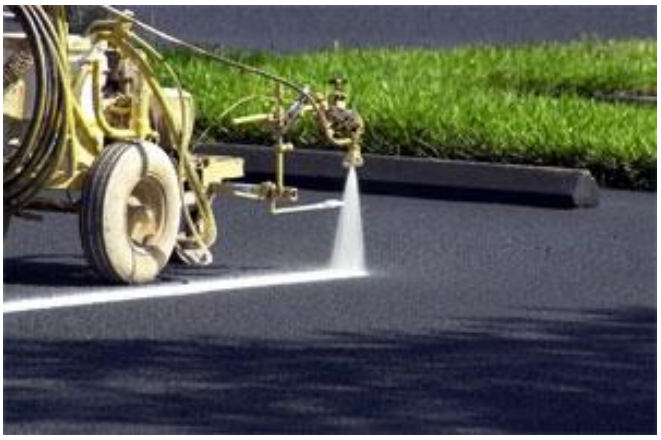
Signage

- See Small Excavation, Construction, and Potholing A-ESCP

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- Small Excavation, Construction, and Potholing A-ESCP
- WM-2 – Material Use

Finished parking area with striping and signs


Striping activities

2.6 Site Stabilization

Description:
Consider site stabilization BMPs soil disturbance occurs on the construction site.

Requirements:

- Upon completion of sawcutting, grinding, and/or paving, stabilize all project related disturbed soil to return the area to pre-project condition which may include gravel/rock, landscaping, soil cover, seeding, or agricultural conditions.
- Cover disturbed soil areas with a combination of temporary and permanent vegetative stabilization.
- Soil stabilization may be in the form of Erosion Control Blankets (EC-7), Straw Mulch (EC-6), or Hydraulic Mulch (EC-3) along with Hydroseed (EC-4) or hand spread seed.
- Install biodegradable fiber rolls and blankets to protect against any transport of sediment offsite or to environmentally sensitive areas.
- Some projects require stabilization on non-PG&E property. In some cases the landowner may request that PG&E does not re-stabilize the disturbed soil. In an effort to avoid conflicts with landowners, property specific agreements can be established. These agreements will be coordinated by the PG&E Land Agent.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- EC-3 – Hydraulic Mulch
- EC-4 - Hydroseed
- EC-6 - Straw Mulch
- EC-7 - Erosion Control Blankets
- EC-16 - Non-Vegetative Stabilization
- TC-2 - Stabilized Construction Roadway

Planter area in need of soil stabilization

Stabilized disturbed soil area

2.7 Where to Obtain BMP Materials

BMP products in Table 1 can be obtained through PG&E materials warehouses using project order numbers and established materials codes. Should the materials be unavailable from PG&E warehouses, BMP materials and products may be obtained from sources shown below, but may be obtained elsewhere depending on location and urgency of need.

TABLE 1
BMP PRODUCTS INFORMATION

Category	Product Name	Units
Certified Weed-Free Straw Mulch (EC-6)	Weed-Free Straw	Bales
Geotextiles and Mats (EC-7) Geotextile Fabric	Mirafi 600	Rolls: 12.5' x 360' 17.5' x 238'
Geotextiles and Mats (EC-7) Jute Mesh	jmesh-4225	4'x225' (staples required)
Geotextiles and Mats (EC-7) Plastic Sheeting	Visqueen	Rolls: 20 or 40'x 100'; 10ml thick
Silt Fence (SE-1)	sfo-b-6	100 feet with 36-inch wood posts at 6 foot spacing
Fiber Roll (SE-5)	Sediment Log Type II	25 foot rolls x 6 or 9" diameter
Fiber Roll (SE-5) Animal Friendly Wattle	BioFiber Roll	8"x12' or 8"x24' (wood stakes required)
Fiber Roll (SE-5) HDPE Wattle	ERTEC ProWattle	5" x 7' (wood stakes and rebar j-hooks required at 5' spacing)
Gravel Bags (SE-6)	Roc Soc	mono filament
Inlet Protection (SE-10) Gravel Bag	Same as SE-6	
Inlet Protection (SE-10) Filter Guard	ERTEC Gr8 Guard	Each (UV stable zip ties required)
Inlet Protection (SE-10) Hard Surface Guard	Product #344321	6.5" x 7' (nails with pre-mounted steel washers required)

Example suppliers include Reed & Graham and White Cap. Other options may include feed stores, retail building supply stores, or hardware stores.

3.0 BMP INSPECTION AND MAINTENANCE

BMP installation, inspection and maintenance will be performed by the PG&E construction crew. BMPs should be inspected daily during construction activities. In the event that BMPs appear to require maintenance or are not functioning as expected, the BMP will be maintained, repaired, or replaced to correct the deficiency.

4.0 WHOM TO CALL

If the project receives a written notice or order from any regulatory agency, immediately contact your local EFS for further direction.

Contact the local EFS if any of the following conditions occur:

- Visually cloudy/muddy water is observed leaving the work or staging area.
- Discharge or spill of hazardous substance.
- Project area increases.
- Procedures within this A-ESCP are ineffective.
- An environmental Regulator visits the site.
- An underground storage tank is discovered.
- A subsurface component related to site remediation activities (e.g., monitoring well, recovery well, injection well) is discovered.

After hours or if the local EFS are unavailable, call the following 800 number:
800-874-4043.

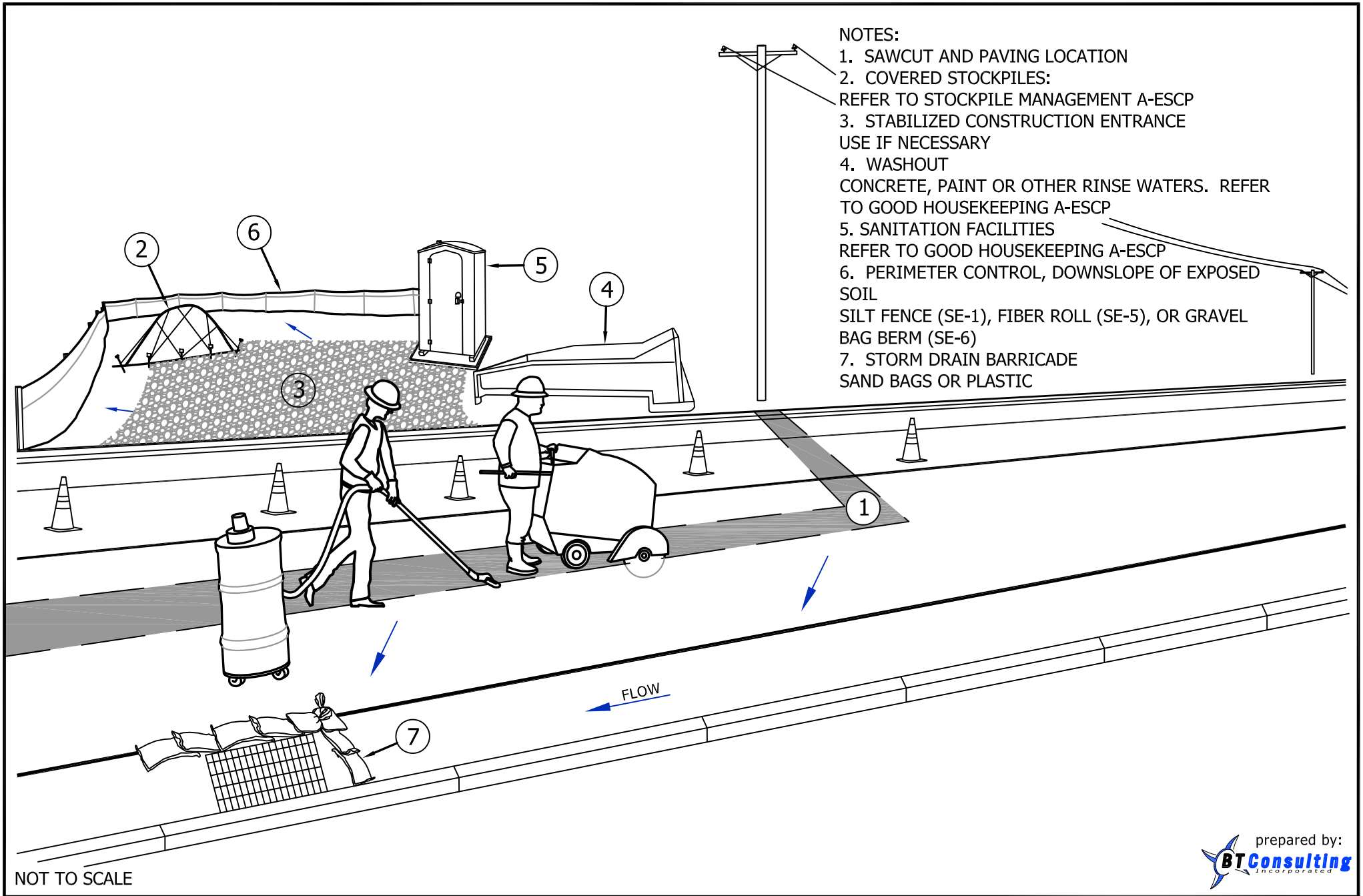
5.0 POST-CONSTRUCTION

Upon completion of construction within the project area:

- Remove all temporary, non-biodegradable BMPs.
- Remove all construction equipment from the site.
- Clear all staging areas of any debris, construction materials, and contaminants.
- Return all drainage ways to their pre-construction line and grade.
- Cover disturbed soil areas with a combination of temporary and permanent vegetative stabilization.

Attachment A
Activity Specific Installation Details

SGP-01 Typical BMP Use Detail (Sawcutting)
SGP-02 Typical BMP Use Detail (Grinding)
SGP-03 Typical BMP Use Detail (Paving)



NOTES:

1. SAWCUT AND PAVING LOCATION
2. COVERED STOCKPILES:
   REFER TO STOCKPILE MANAGEMENT A-ESCP
3. STABILIZED CONSTRUCTION ENTRANCE
   USE IF NECESSARY
4. WASHOUT
   CONCRETE, PAINT OR OTHER RINSE WATERS. REFER TO GOOD HOUSEKEEPING A-ESCP
5. SANITATION FACILITIES
   REFER TO GOOD HOUSEKEEPING A-ESCP
6. PERIMETER CONTROL, DOWNSLOPE OF EXPOSED SOIL
   SILT FENCE (SE-1), FIBER ROLL (SE-5), OR GRAVEL BAG BERM (SE-6)
7. STORM DRAIN BARRICADE
   SAND BAGS OR PLASTIC

NOT TO SCALE

prepared by: BT Consulting Incorporated

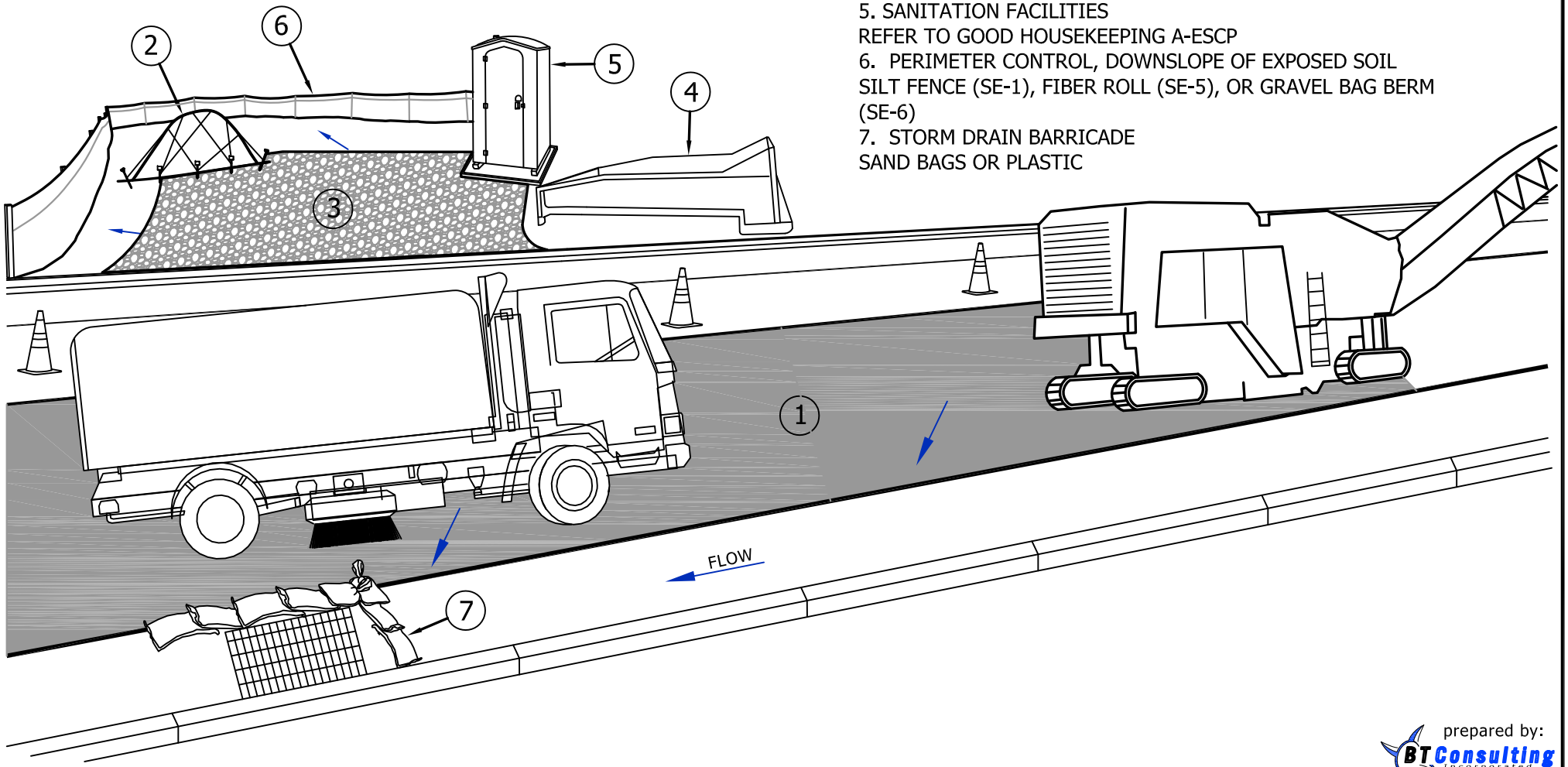
Pacific Gas and Electric Company®

TYPICAL BMP USE DETAIL

A-ESCP - SAWCUTTING, GRINDING, AND PAVING

SGP-01

NOTES:
1. GRINDING AND SWEEPING LOCATION
2. COVERED STOCKPILES:
REFER TO STOCKPILE MANAGEMENT A-ESCP
3. STABILIZED CONSTRUCTION ENTRANCE
USE IF NECESSARY
4. WASHOUT
CONCRETE, PAINT OR OTHER RINSE WATERS. REFER TO GOOD HOUSEKEEPING A-ESCP
5. SANITATION FACILITIES
REFER TO GOOD HOUSEKEEPING A-ESCP
6. PERIMETER CONTROL, DOWNSLOPE OF EXPOSED SOIL
SILT FENCE (SE-1), FIBER ROLL (SE-5), OR GRAVEL BAG BERM (SE-6)
7. STORM DRAIN BARRICADE
SAND BAGS OR PLASTIC



NOT TO SCALE

BMPs AS SHOWN ARE ALSO APPLICABLE IN PARKING AREAS AND YARDS

prepared by:
BT Consulting incorporated

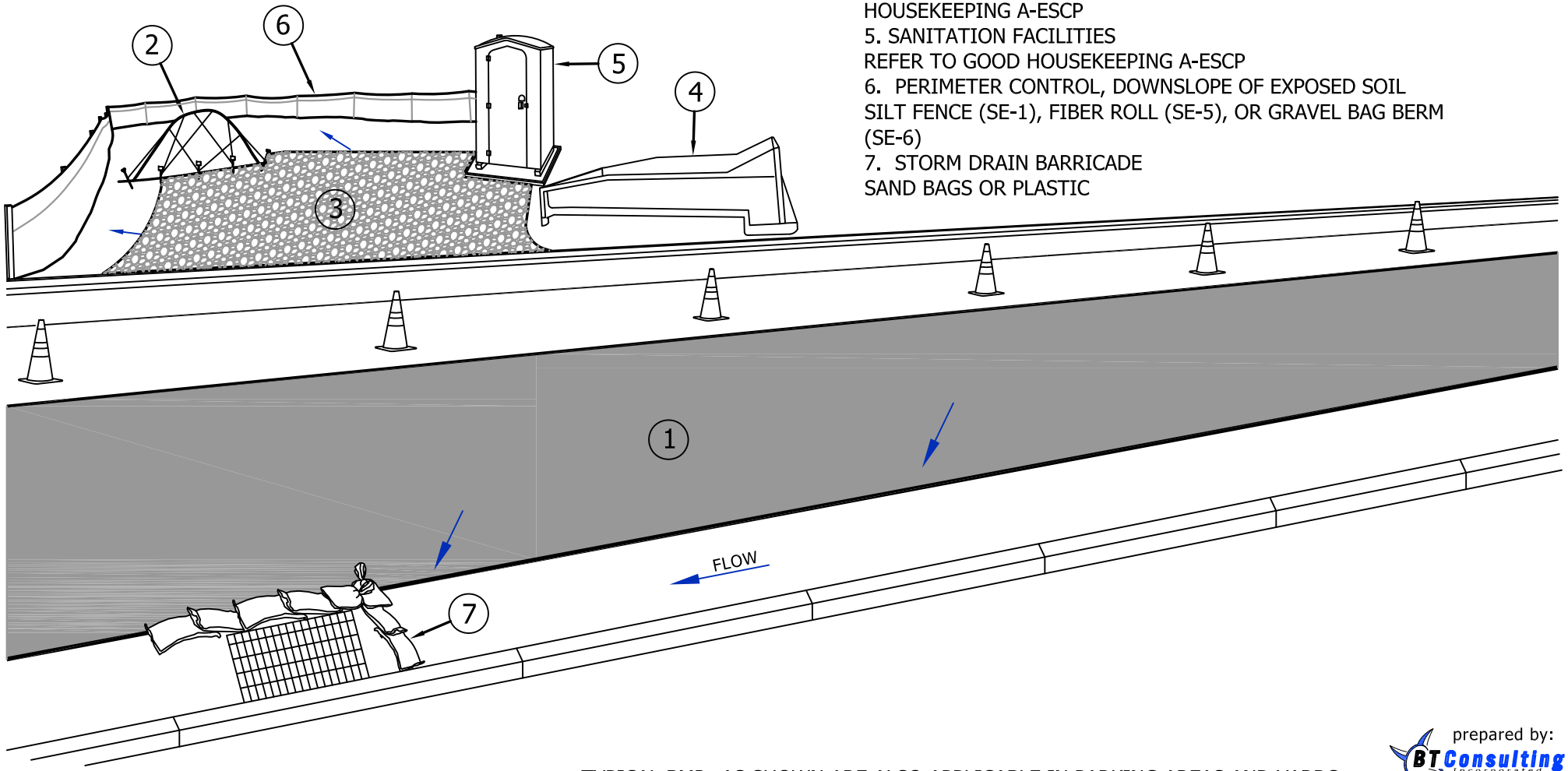
Pacific Gas and Electric Company®

TYPICAL BMP USE DETAIL

A-ESCP - SAWCUTTING, GRINDING, AND PAVING

SGP-02

NOTES:
1. PAVING (CONCRETE OR ASPHALT), STRIPING, AND/OR SEAL LOCATION
2. COVERED STOCKPILES:
REFER TO STOCKPILE MANAGEMENT A-ESCP
3. STABILIZED CONSTRUCTION ENTRANCE
USE IF NECESSARY
4. WASHOUT
CONCRETE, PAINT OR OTHER RINSE WATERS. REFER TO GOOD HOUSEKEEPING A-ESCP
5. SANITATION FACILITIES
REFER TO GOOD HOUSEKEEPING A-ESCP
6. PERIMETER CONTROL, DOWNSLOPE OF EXPOSED SOIL
SILT FENCE (SE-1), FIBER ROLL (SE-5), OR GRAVEL BAG BERM (SE-6)
7. STORM DRAIN BARRICADE
SAND BAGS OR PLASTIC



NOT TO SCALE

TYPICAL BMPs AS SHOWN ARE ALSO APPLICABLE IN PARKING AREAS AND YARDS

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BT Consulting incorporated

Pacific Gas and Electric Company®

TYPICAL BMP USE DETAIL

A-ESCP - SAWCUTTING, GRINDING, AND PAVING

SGP-03

Attachment B
Activity Specific Erosion & Sediment Control Plans (A-ESCPs)

The following A-ESCPs are included in the Plan by reference only and can be found in the Field Manual. A full version of the Field Manual that includes the A-ESCPs is located on SharePoint.

GH	Good Housekeeping
SM	Stockpile Management
SC	Small Excavation, Construction, and Potholing
PR	Pavement Rehabilitation

Attachment C
PG&E Best Management Practice (BMP) Cut-Sheets

The following BMP Fact Sheets are included in the Plan by reference only and can be found in Appendix C of the Field Manual. A full version of the Field Manual that includes the cut-sheets is located on SharePoint.

EC-3	Hydraulic Mulch
EC-4	Hydroseed
EC-6	Straw Mulch
EC-7	Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats
EC-16	Non-Vegetative Stabilization
SE-1	Silt Fence
SE-5	Fiber Rolls
SE-6	Gravel Bag Berm
SE-10	Storm Drain Inlet Protection
TC-1	Stabilized Construction Entrance/Exit
TC-2	Stabilized Construction Roadway
WM-2	Material Use

Attachment D
Requirement Summary Table

Sawcutting, Grinding, and Paving

Pacific Gas and Electric Company®

Best Management Practices to Reduce Environmental Impacts

Proper implementation of Best Management Practices (BMP) during Sawcutting, Grinding, and Paving projects can reduce adverse effects to water resources by reducing pollutant migration from facilities.

No.	Sawcutting, Grinding, and Paving	A-ESCP Section
1	Be familiar with and follow the requirments of the Good Housekeeping A-ESCP	2.0
2	Be familiar with and follow the requirments of the Stockpile Management A-ESCP	2.0
3	Schedule activities to minimize soil disturbance during rain.	2.0
4	Protect all areas that may receive sheet or concentrated runoff.	2.1
5	Protect downslope drainage inlets.	2.1, 2.2
6	Install a Stabilized Construction Entrnace of observe daily for any tracking. Clean if found.	2.1
7	Perform sawcutting, grinding, and paving in dry weather only.	2.2, 2.3
8	Cover or barricade storm drains during sawcutting, grinding, and paving operations.	2.2, 2.3, 2.4
9	Vacuum all slurry, grindings, or dust from all surfaces concurrently with sacutting or grinding activities.	2.2
10	Recycle asphalt or waste concrete materials when possible.	2.3
11	Pay particular attention to drips from paving equipment.	2.3
12	Re-schedule concrete work if rain is forecast.	2.4
13	Avoid mixing or ordering excess amount of concrete.	2.4
14	Do not wash equipment or any concrete materials into footing excavations.	2.4
15	Use extreme care to avoid spills when working with striping paint or thermoplastic to avois any leaks or spills.	2.5
16	Stabilize all project disturbed soils to return the area to pre-project condition at end of project.	2.6, 5.0
17	Cover disturbed soils with a combination of temporary and permanent vegetative stabilization.	2.6
18	When a landowner does not want disturbed soils stabilized, contact the PG&E Land Agent to corredinate a specific agreement with the landowner.	2.6
19	Inspect BMPs daily and maintain, replace, or repair as necessary.	3.0

Appendix I

Training Documentation

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

Sarah McIlroy

Dec 08, 2016 - Dec 15, 2018

Certificate # 00121

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

California Stormwater Quality Association and
California Construction General Permit Training Team

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP PRACTITIONER (QSP)

Miguel Cisneros

Nov 13, 2017 - Nov 13, 2019

Certificate # 26531

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

California Stormwater Quality Association and
California Construction General Permit Training Team

What Can You Do?

Wind Erosion Control WE-1
- Limit traffic speed
- Water applied to minimize runoff

Stabilized Entrance TC-1
- 3"-6" crushed aggregate and/or corrugated steel panels
- Use only the designated access for going to and from the site
- Clean vehicles and equipment free of mud before leaving the site

Illicit Discharge NS-6
- Report leaks, spills, or required repairs immediately to the PM and EFS
- Put drip pan or cardboard under leaking cars or equipment

Vehicle/Equipment Cleaning, Fueling, Maintenance NS-8 to NS-10
- Limit on-site cleaning
- Perform in designated area with drip pans, spill kit
- Ensure all on-site fuel containers are stored with secondary containment

Spill Prevention and Control WM-4
- Know where the spill response materials are
- All spills to be reported to PM and EFS

Contaminated Soil Management WM-7
- Should contaminated soil be uncovered during construction, stop work and notify the PM and EFS immediately

The Problem
As stormwater flows across the ground, it "collects" any materials on the ground such as dirt, concrete, oil, paint, trash, landscaping materials, vehicle fluids, etc. Stormwater is **not treated** and flows **directly** to the creeks and rivers in the area.

The consequences of pollution in the creeks and rivers are reduced fisheries, habitat disruption, and restrictions on recreation such as boating, fishing and swimming.

The Regulation
The Clean Water Act (CWA) was passed in 1972 to regulate the discharge of pollutants into watersheds throughout the nation. Section 402(p) of the act establishes a framework for regulating stormwater discharges (including construction sites) under the National Pollutant Discharge Elimination System (NPDES) program.

The State Water Resources Control Board regulates the program in California and has issued a General Permit (Order No. 2009-0009-DWQ) for all construction sites one acre or larger.

The Purpose
The purpose of the construction site program is to keep the creeks and rivers free of pollution.

The Consequence
Violation of the CWA may result in fines of up to $10,000 per day and/or imprisonment.

Everyone working on a construction site must be aware of how his or her job can impact stormwater quality

Sanger Substation Expansion Project
E. Jensen Ave and McCall Ave
Sanger, California

WDID # 5F10C384810

Stormwater Pollution Prevention Training

Contact List

PG&E Project Manager
Patt Healy /(559) 263-5049

PG&E Environmental Lead/Land Planner
Michael Calvillo / (559) 263-5780

PG&E EFS
Mike Harbick / (599) 269-5217

PG&E Stormwater Work Supervisor
Marty Bell / (925) 967-8080

Qualified SWPPP Developer (QSD)
Sarah McIlroy / (916) 717-9635

Qualified SWPPP Inspector (QSP)
Miguel Cisneros / (559) 305-9555

Stantec

Scheduling EC-1
- Schedule activities to avoid rain

Preserve Existing Vegetation EC-2
- Stay within the designated disturbed/ construction area

Hydroseeding EC-4,
- Use weed-free native seed mix

Silt Fence SE-1
- Install on level contour
- Do not use in concentrated flow areas
- Must be trenched and keyed in
- Remove sediment build up when 1/3 of fence height

Fiber Rolls SE-5
- Install on level contour
- Must be trenched in (~1/3 of fiber roll thickness) and staked or weighted down
- Remove sediment build up when 1/3 of sediment storage depth

Street Sweeping SE-7
- Keep streets, driveways, and sidewalks clean – sweep, don't hose

Material Delivery, Storage, WM-1, WM-2
- Store materials in central location, elevated and with cover as feasible
- Follow manufacturer's instructions for all materials

Stockpile Management WM-3
- Stockpiles to be bermed (e.g., fiber roll or silt fence)
- Stockpiles to be covered and weighted down

Best Management Practices

Manage Stockpiles

Cover Trash Containers

Use Drip Pans

Know Spill Kit Location

Solid, Hazardous, Liquid Waste WM-5, 6, and 10
- Collect trash daily
- Use water tight dumpsters and cover at end of day and during rain events
- Hazardous materials to be stored in a covered area with secondary containment and properly labeled
- Liquid wastes to be placed in leak proof container and closed at end of each day and prior to inclement weather
- Store in covered area or provide secondary containment

Concrete Waste Management WM-8
- Concrete washout to be conducted in a designated location
- Concrete waste to be contained and covered until removed from site

Sanitary Waste Management WM-9
- Locate temporary sanitary facilities where spills will not enter on-site drainage
- Locate away from traffic and construction areas
- Anchor to prevent tip-over during inclement weather

Final Stabilization
- Vegetated
- Non-vegetated (e.g., DG, gravel, paved)

Appendix J

Completed Forms