



SWPPP

STORM WATER POLLUTION PREVENTION PLAN

Santa Monica College Bundy Campus Tennis / Pickleball Courts
Santa Monica, CA 90405

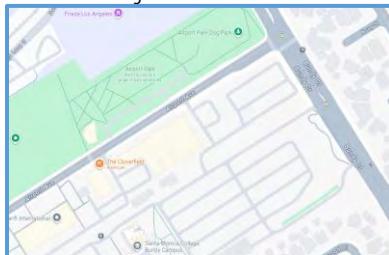
Nazerian Group
01/05/2026





STORMWATER POLLUTION PREVENTION PLAN
for
Santa Monica College Bundy Campus Tennis - Pickleball Courts

Project Location:



WDID: _____

Risk Level 2

Legally Responsible Person (LRP):

Santa Monica College

1900 Pico Blvd

Santa Monica, CA 90405

Charlie Yen

(310) 434-3002

Yen_Charlie@smc.edu

Project Address:

3400 Airport Ave

Santa Monica, CA 90405

Site Operating Hours:

Monday - Friday

6:00 am – 3:00 pm

Estimated Project Dates:

Start of Construction: 01/05/2026

End of Construction: 07/09/2027

SWPPP Prepared by:

CAL-Storm Compliance, Inc.

28562 Oso Parkway, D-508

Rancho Santa Margarita, CA 92688

SWPPP Preparation Date:

1/5/2026

QSD Name and Signature:



Ken Kristoffersen – QSD/QSP# 00207





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Qualified SWPPP Developer

Approval and Certification of the Stormwater Pollution Prevention Plan

Project Name: Santa Monica College Bundy Campus Tennis - Pickleball Courts

Project Number/ID: 03-124602

“This Stormwater Pollution Prevention Plan and its appendices were prepared under my direction to meet the requirements of the California Construction Stormwater General Permit (Order No. 2022-0057-DWQ). I certify that I am a Qualified SWPPP Developer in good standing as of the date signed below and will maintain up to date credentials for the duration of the project.”



QSD/Signature

1/5/2026

Date

Ken Kristoffersen

00207

QSD Name

QSD Certificate Number

President – CAL-Storm Compliance, Inc.

(949) 354-5530

Title and Affiliation

Telephone Number

Kkristoffersen@calstormcompliance.com

Email



Amendment Log

Project Name: Santa Monica College Bundy Campus Tennis - Pickleball Courts

Project Number/ID: 03-124602

Amendment No.	Date	Brief Description of Amendment (include section and page number)	Prepared and Approved By
			Name: QSD#
			Name: QSD#
			Name: QSD#

The SWPPP will be revised when:

- There is a 2022 CGP violation (2022 CGP Section VI.Q.1);
- There is a reduction or increase in total disturbed acreage (2022 CGP Section III.F.2. and F.4);
- BMPs are not effective and are not resulting in a reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges (2022 CGP Section VI.Q.1 and Attachment E Section III.C.5);
- There is a change in the project duration that changes the project Risk Type (2022 CGP Section III.F.1);
- Dischargers with projects where all construction activities (including passive treatment, active treatment systems, and/or active equipment) will be suspended for 30 days or more (2022 CGP Section III.G);
- There is a change in construction or operations that may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4) (2022 CGP Sections IV.O. and VI.Q.1); or

When deemed necessary by the QSD. The QSD has determined that the changes listed in Table 1-1 can be field determined by the QSP. All other changes will be made by the QSD as formal amendments to the SWPPP. **Note that the 2022 CGP requires that the QSD “revise the SWPPP to address potential problems identified by visual inspections, sampling data, comments from a QSP, or their own site observations (2022 CGP Section V.C.2.).**

SWPPP Amendment QSD Certifications are located in Appendix C.



Section 1 SWPPP Requirements

1.1 INTRODUCTION

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* (2022 CGP), State Water Resources Control Board (State Water Board) Order No. 2022-0057-DWQ (NPDES No. CAS000002) (Appendix S). This SWPPP has been prepared following the 2022 CGP SWPPP Template for Traditional Projects provided in the California Stormwater Quality Association (CASQA) *Stormwater Best Management Practice (BMP) Handbook: Construction* (CASQA 2023).

This project is considered a traditional construction project.

In accordance with the 2022 CGP, Section IV.O, this SWPPP is designed to address the following:

- Identification of all pollutants, their sources, and control mechanisms, including sources of sediment associated with all construction activities (e.g., sediment, paint, cement, stucco, cleaners, site erosion);
- Pollutant source assessments, including a list of potential pollutant sources and identification of site areas where additional BMPs are necessary to reduce or prevent pollutants in stormwater and authorized non-stormwater discharges, per the minimum requirements when developing the pollutant source assessment;
- Description of site-specific BMPs implemented to reduce or eliminate stormwater pollution;
- Where not otherwise required to be under a Regional Water Quality Control Board (Regional Water Board) permit, all non-stormwater discharges are identified and either eliminated, controlled, or treated;
- 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/Best Control Technology (BAT/BCT) standard; and;
- Stabilization BMPs are installed to reduce or eliminate pollutants after construction is completed are effective and maintained; and
- Calculations and design details, as well as BMP controls, are complete and correct.

The Santa Monica College Bundy Campus Tennis - Pickleball Courts project comprises approximately 3.21 acres, of which 2.06 acres will be disturbed. The Project is located at 3400 Airport Ave in Santa Monica, California. The property is owned and being developed by Santa Monica College. **The project's location is shown on the E&SC Plan in Appendix A.**

1.2 PERMIT REGISTRATION DOCUMENTS

Required Permit Registration Documents (PRDs) shall be submitted to the State Water Board via the Stormwater Multi Application and Report Tracking System (SMARTS) by the LRP or DAR. The project-specific PRDs include (2022 CGP Section III.A):

1. Notice of Intent (NOI);
2. Risk Level Determination (Construction Site Sediment and Receiving Water Risk Determination);



3. Site Drawings and Map;
4. SWPPP;
5. Applicable plans, calculations, and other supporting documentation for compliance with the Phase I or Phase II municipal separate storm sewer system (MS4) post construction requirements or the post-construction standards of the 2022 CGP;
6. Additional PRDs may be required depending on the construction type and location.
 - Attachment or web-source containing the applicable Phase I or Phase II MS4 post construction requirements and/or;
 - The post construction plans and calculations submitted to or approved by the applicable Phase I or Phase II MS4 and/or;
 - The Post-construction water balance calculation.
7. Dischargers proposing an alternate K-factor or LS-factor must submit documentation to support the site-specific factors, (Provide if applicable to this project);
8. Active Treatment System (ATS) Plan, (Provide if applicable to this project);
9. Passive Treatment Plan, (Provide if applicable to this project);
10. Dewatering Plan, (Provide if applicable to this project);
11. Annual Fee per the current 23 California Code of Regulations Chapter 9 fee schedule for National Pollutant Discharge Elimination System (NPDES) stormwater permits; and
12. Signed Certification Statement (LRP Certification is provided electronically with SMARTS PRD submittal).

Site Maps can be found in Appendix A. A copy of the submitted PRDs shall also be kept in Appendix B along with the Waste Discharge Identification (WDID) confirmation.

1.3 SWPPP AVAILABILITY AND IMPLEMENTATION

The SWPPP will be available at the construction site during working hours list on the title sheet and Section 7.5, while construction is occurring and shall be made available upon request by a federal, state, or municipal inspector. A current copy of the site-specific SWPPP and any site inspection reports required by the 2022 CGP may be kept in electronic format at the site so long as the information requested by a federal, state, or municipal inspector can be made available during an inspection. Legible maps in hard copy must be available at the site (2022 CGP Section IV.O.1.).

The SWPPP must be implemented at the appropriate level to protect water quality at all times throughout the life of the project. The SWPPP must remain on the site during construction activities, commencing with the initial mobilization and ending with the termination of coverage under the 2022 CGP.

1.4 SWPPP AMENDMENTS

The SWPPP will be revised when:

- If there is a 2022 CGP violation (2022 CGP Section VI.Q.1);
- There is a reduction or increase in total disturbed acreage (2022 CGP Section III.F.2 and F.4.);





- BMPs are not effective and are not resulting in a reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges (2022 CGP Section VI.Q.1 and Attachment D Section III.C.5);
- **There is a change in the project duration that changes the project's risk level** (2022 CGP Section III.F.1); or
- Dischargers with projects where all construction activities (including passive treatment, active treatment systems, and/or active equipment) will be suspended for 30 days or more (2022 CGP Section III.G.).

Additionally, the SWPPP will be amended when:

- There is a change in construction or operations that may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4) (2022 CGP Sections IV.O. and VI.Q.1); or

When deemed necessary by the QSD. The QSD has determined that the changes listed in Table 1-1 can be field determined by the QSP. All other changes will be made by the QSD as formal amendments to the SWPPP. Note that the 2022 CGP requires that the QSD revise the SWPPP to address potential problems identified by visual inspections, sampling data, comments from a QSP, or their own site observations (2022 CGP Section V.C.2.).

The following items shall be included in each amendment:

- Who requested the amendment;
- The location of proposed change;
- The reason for change;
- The original BMP(s) proposed, if any;
- The new BMP(s) proposed; and
- QSD certification.

SWPPP amendments will be logged at the front of the SWPPP and SWPPP Amendment QSD certifications will be located in Appendix C. The SWPPP text will be revised, replaced and/or hand annotated as necessary to properly convey the amendment. SWPPP amendments must be made by a QSD. The following changes have been designated by the QSD as “to be field determined” and constitute minor changes that the QSP may implement based on field conditions.

Table 1-1 List of Changes to be Field Determined

Candidate changes for field location or determination by QSP ⁽¹⁾	Check changes that can be field located or field determined by QSP
Increase quantity of an Erosion or Sediment Control Measure	✓
Relocate/add stockpiles or stored materials	✓
Relocate or add toilets	✓
Relocate vehicle storage and/or fueling locations	✓





Table 1-1 List of Changes to be Field Determined

Candidate changes for field location or determination by QSP ⁽¹⁾	Check changes that can be field located or field determined by QSP
Relocate areas for waste storage	✓
Relocate water storage and/or water transfer location	✓
Changes to access points (entrance/exits)	✓
Change type or location of Erosion or Sediment Control Measure	✓
Minor changes to schedule or phases	✓
Changes in construction materials	✓

(1) Any field changes not identified for field location or field determination by the QSP must be made as an amendment by the QSD.

1.5 RETENTION OF RECORDS

Paper or electronic records of documents required by this SWPPP will be retained for a minimum of three years from the date generated or date submitted, whichever is later, for the following items:

- SWPPP;
- Visual monitoring reports;
- Sampling equipment calibration records;
- pH and turbidity sampling field sheets;
- Analytical laboratory reports; and

These records will be available at the Site until construction is complete. Records assisting in the determination of compliance with the 2022 CGP will be made available within a reasonable time to the Regional Water Board, State Water Board, or U.S. Environmental Protection Agency (EPA) upon request. Requests by the Regional Water Board for retention of records for a period longer than three years will be adhered to.

1.6 REPORTING

1.6.1 General Reporting Requirements

Completed inspection checklists are not required to be submitted to the Regional Water Board. However, completed inspection checklists will be kept with the SWPPP on-site or electronically. The 2022 CGP requires that permittees prepare, certify, and electronically submit an Annual Report no later than September 1 of each year. Reporting requirements are identified in 2022 CGP Section VI.P. Annual reports will be filed in SMARTS and in accordance with information required by the online forms.

Planned changes in site construction activities that may result in non-compliance with the 2022 CGP are required to be provided in writing to the Regional Water Board and local stormwater agency in advance of the changes.





If a 2022 CGP discharge violation occurs, the QSP will immediately notify the LRP. The LRP will include information on the violation with the Annual Report. Corrective measures will be implemented immediately following identification of the discharge or written notice of non-compliance from the Regional Board. Discharges and corrective actions must be documented and include the following items:

- The date, time, location, nature of operation, and type of unauthorized discharge;
- The cause or nature of the notice or order;
- The BMPs deployed before the discharge event, or prior to receiving notice or order; and
- The date of deployment and type of 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.

Results of (pH and turbidity, etc.) monitoring will be electronically submitted through SMARTS for all field sampling results within 30 days of the completion of the precipitation event or within 10 days if the field sampling results demonstrate the exceedance of the pH and/or turbidity NALs. See Section 7.7.2.7 for additional discussion of the reporting requirements.

1.6.2 TMDL NAL and/or NELs Reporting Requirements

- Results of non-visible pollutant monitoring and corrective actions will be electronically submitted within 30 days after obtaining analytical results or within 10 days if the analytical results demonstrate the exceedance of an applicable TMDL-related NAL or NEL or Basin Plan parameter. See Section 7.7.1.7 for additional discussion of the reporting requirements.
- A NAL exceedance report will be prepared when requested, in writing, by the Regional Water Board.
- In the event of a TMDL NEL exceedance, by the end of each reporting year the project will submit and certify, in SMARTS, documentation of the site assessment, SWPPP evaluation, and implementation of the corrective actions.

1.6.3 ATS Reporting Requirements

If ATS is required for the site, the following reporting requirements apply:

- Results of monitoring (pH, turbidity, flowrate, volume discharged, and freeboard storage) will be electronically submitted monthly during the project. See the ATS Plan for additional discussion of the reporting requirements (if applicable).
- In the event of an ATS NEL exceedance results will be electronically certified and submitted to SMARTS within 24-hours of obtaining the results (if applicable).

If the project has dewatering discharges, the following reporting requirements apply:

- The Regional Water Board will be notified via email 24 hours prior to the beginning of a planned dewatering discharge.
- In the event of an emergency dewatering, the Regional Water Board and applicable MS4 are to be notified within 24 hours of a discharge occurring. An emergency is defined as the need to protect human life and health or prevent severe property damage.
- Results of (pH and turbidity, etc.) monitoring will be electronically submitted through SMARTS for all field sampling results within 30 days of the completion of the





precipitation event or within 10 days if the field sampling results demonstrate the exceedance of the pH and/or turbidity NALs.

- See Section 7.7.4.5 for additional discussion of the reporting requirements including contacts for Regional Water Board and MS4 notifications.

1.6.5 Passive Treatment Reporting Requirements

If the project has a Passive Treatment Plan, the following reporting requirements apply:

- A Passive Treatment Plan will be submitted electronically 14 days before passive treatment chemicals are used on site. See the Passive Treatment Plan for additional discussion of the reporting requirements.

1.7 CHANGES TO PERMIT COVERAGE

The 2022 CGP allows for the reduction or increase of the total acreage covered under the 2022 CGP when: a portion of the project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the project is purchased by a different entity; or when new acreage is added to the project.

Modified PRDs will be filed electronically through a Change of Information (COI) within 30 days of a reduction or increase in total disturbed area if a change in permit-covered acreage is to be sought. The SWPPP will be modified appropriately and will be logged at the front of the SWPPP. SWPPP Amendments QSD Certifications will be located in Appendix C. COIs submitted electronically via SMARTS can be found in Appendix D.

1.8 NOTICE OF TERMINATION

A Notice of Termination (NOT) must be submitted electronically by the LRP or DAR via SMARTS to terminate coverage under the 2022 CGP.

According to the requirements of 2022 CGP Section III.H.4., one of the following final stabilization methods will be used to satisfy final stabilization condition requirements:

1. 70 percent final cover method supported by pre- and post-project photographs demonstrating stabilization or;
2. RUSLE or RUSLE2 method with computation proof supported by pre- and post-project photographs demonstrating stabilization or;
3. Custom method for which Regional Water Board approval has been obtained, supported by documentation required by the Regional Water Board and pre- and post- project photographs demonstrating stabilization.

The Regional Water Board will consider a construction site complete when the conditions of the 2022 CGP Section III.H., have been met.

The discharger is required to submit the following in SMARTS:

- NOT SMARTS Form;
- QSP-prepared final NOT inspection which includes the QSP name and valid QSP certificate number;
- Final site map with photo orientation references;
- Photos demonstrating final stabilization and the applicable post-construction BMPs and/or low impact development; and





- A long-term maintenance plan for the post-construction stormwater runoff BMPs and/or low impact development features being implemented.

According to the 2022 CGP, the NOT will be automatically approved within 30 calendar days after the date the NOT was submitted, unless, within the 30 calendar days the Regional Water Board notifies the discharger through SMARTS that the Notice of Termination has been denied, returned, or accepted for review (2022 CGP Section III.H.7).

Note: If an Annual Report has not been filed in the current reporting year, an Annual Report will need to be submitted prior to the NOT.





Section 2 Project Information

2.1 PROJECT AND SITE DESCRIPTION

2.1.1 Site Description

The Santa Monica College Bundy Campus Tennis - Pickleball Courts project is Risk Level 2 site that comprises approximately 3.21 acres, of which 2.06 acres will be disturbed, and is located at 3400 Airport Ave in Santa Monica, California. The project site is located approximately 0.90 miles southeast of the 10 Freeway. The project site is located approximately 2.63 miles northeast of the Santa Monica Bay Offshore/Nearshore. The project is located at: Latitude: 34.0169 and Longitude: -118.4442 and is identified on the E&SC Plans in Appendix A.

2.1.2 Existing Conditions

As of the initial date of this SWPPP, the project site is an existing college facility with classrooms, asphalt parking lot, and vegetated planters.

Historic sources of contamination include: There are no known historic sources of contamination at the site. Soil sampling and analysis is required when soil contamination is found or suspected. If applicable the results of this analysis are in Appendix Q.

2.1.3 Existing Drainage

The project site is moderately sloped to the southwest perimeter which discharges into the street gutter. The elevations of the project site range from 157 feet to 134 feet above mean sea level (msl). Existing site topography, drainage patterns, and stormwater conveyance systems are shown on E&SC Plans in Appendix A.

The project discharges to the Santa Monica Bay Offshore/Nearshore. The water quality impairments 303 (d) list and TMDLs identified in the 2022 CGP Table H-1 for the receiving waters are identified in Table 2-1.

Table 2-1 Applicable 303(d) List Impairments and TMDLs

Receiving Water	Water Quality Impairment	
	303(d) list	TMDL (2022 CGP Table H-1)
Santa Monica Bay Offshore/Nearshore	Arsenic, DDT, Mercury, PCBs, Trash	N/A
Santa Monica Bay	N/A	Santa Monica Bay DDT's and PCBs TMDL
Santa Monica Bay	N/A	Santa Monica Bay Beaches Bacteria TMDL

Additional compliance actions applicable to the project are discussed in more detail in Section 7.7.

2.1.4 Geology and Groundwater

The site is underlain by Urban land-windfetch Centinela complex. Groundwater is not expected to be encountered during construction.



2.1.5 Project Description

The total size of the project area is 3.21 acres and grading will occur on approximately 2.06 acres of the site, which comprises approximately 65 percent of the total area. The limits of grading are shown on the E&SC Plan in Appendix A. Grading will include both cut and fill activities. Soil will be stockpiled onsite as shown on the E&SC Plan in Appendix A. Construction activities will not be phased.

2.1.6 Developed Condition

Post-construction surface drainage will flow to newly constructed concrete swales which lead to new catch basins. The catch basins lead to a new stormwater retention system. All stormwater discharges from the site will be into the city of Santa Monica's **stormwater conveyance system**.

Post-construction drainage patterns and conveyance systems are presented on the E&SC Plans in Appendix A.

Table 2-2 Construction Site Estimates

Construction site area	3.21	acres
Total area of disturbance	2.06	acres
Percent impervious before construction	95	%
Runoff coefficient before construction (calculation below from figure 000.2A or 000.2B)	0.95	
<i>Relief</i>	N/A	
<i>Soil Infiltration</i>	N/A	
<i>Vegetal Cover</i>	N/A	
<i>Surface Storage</i>	N/A	
<i>(From Table 000.2A or 000.2B) Total</i>	0.95	
Percent impervious after construction	95	%
Runoff coefficient after construction (From Table 000.2B)	0.95	

2.2 PERMITS AND GOVERNING DOCUMENTS

In addition to the 2022 CGP, the following documents have been taken into account while preparing this SWPPP:

- Regional Water Board requirements
- Contract Documents
- Air Quality regulations and permits





2.3 STORMWATER RUN-ON FROM OFFSITE AREAS

There is no significant anticipated offsite run-on to this construction site because there is no upgradient drainage area. In the event of significant stormwater run-on contact the QSD as additional BMP's may be required.

2.4 FINDINGS OF THE 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 Risk Level 2.

The risk level was determined through the use of the following methods:

- R-value determined from EPA's Rainfall Erosivity Factor Calculator for Small Construction Sites at: <https://lew.epa.gov/> in accordance with the State Water Board Guidance for multi-year projects at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/smarts/construction/docs/rfactor_guide.pdf
- K factor is provided in SMARTS auto populated feature.
- LS factor is provided in SMARTS auto populated feature.

The risk level is based on project duration, location, proximity to impaired receiving waters, and soil conditions. A copy of the Risk Level determination submitted on SMARTS with the PRDs is included in Appendix B.

Table 2-3 and Table 2-4 summarize the sediment and receiving water risk factors and document the sources of information used to derive the factors.

Table 2-3 Summary of Sediment Risk

RUSLE Factor	Value	Method for Establishing Value
R	65.35	EPA's Rainfall Erosivity Factor Calculator
K	0.37	SMARTS Sediment Risk Factor Worksheet
LS	0.80	SMARTS Sediment Risk Factor Worksheet
Total Predicted Sediment Loss (tons/acre)	19.35	
Overall Sediment Risk Low Sediment Risk < 15 tons/ acre Medium Sediment Risk >= 15 and < 75 tons/acre High Sediment Risk >= 75 tons/acre	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High	

Runoff from the project site discharges into the City of Santa Monica's **stormwater conveyance** system, and eventually discharges into the Santa Monica Bay Offshore/Nearshore.





Table 2-4 Summary of Receiving Water Risk

Receiving Water Name	303(d) Listed for Sediment Related Pollutant ⁽¹⁾	TMDL for Sediment Related Pollutant ⁽¹⁾	Beneficial Uses of COLD, SPAWN, and MIGRATORY ⁽¹⁾
Santa Monica Bay Offshore/Nearshore	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Overall Receiving Water Risk			<input checked="" type="checkbox"/> Low <input type="checkbox"/> High
(1) If yes is selected for any option the Receiving Water Risk is High			

Risk Level 2 sites are subject to both the narrative effluent limitations and numeric action limitations (NALs). The narrative effluent limitations require stormwater discharges associated with construction activity to minimize or prevent pollutants in stormwater and authorized non-stormwater through the use of controls, structures and best management practices (BMPs). Discharges from Risk Level 2 site are subject to NALs for pH and turbidity shown in Table 2-5. This SWPPP has been prepared to address Risk Level 2 requirements (2022 CGP Attachment D).

Table 2-5 Numeric Action Levels and Numeric Effluent Limits

Parameter	Unit	Numeric Action Level	Numeric Effluent Limit
pH	pH units	Lower NAL < 6.5 Upper NAL > 8.5	Not Applicable
Turbidity	NTU	> 250 NTU	Not Applicable

Projects that discharge to a water body and or watershed listed in Table H-2 are subject to both the narrative and numeric effluent limitations imposed by the TMDL requirements in Attachment H. Narrative effluent limitations applicable to this project are listed in Table H-2 of the CGP. Numeric Effluent Limitations applicable to this project are listed in Table 2-7. This SWPPP has been prepared to address the TMDL requirements (2022 CGP Attachment H).

Table 2-7 TMDL Numeric Action Levels, Numeric Effluent Limits

TMDL	Parameter	Numeric Action Level	Numeric Effluent Limit
Santa Monica Bay DDT's and PCB's TMDL	DDT and PCBs	None	None
Santa Clara River Bacteria TMDL	Enterococcus, Fecal Coliform, Total Coliform	None	None





2.5 CONSTRUCTION SCHEDULE

The site sediment risk was determined based on construction taking place between 01/05/2026 and 07/09/2027. Modification or extension of the schedule (start and end dates) may affect risk determination and permit requirements. The LRP shall contact the QSD if the schedule changes during construction to address potential impact to the SWPPP. The estimated schedule for planned work can be found in Appendix E.

2.6 POTENTIAL CONSTRUCTION ACTIVITY AND POLLUTANT SOURCES

Appendix F includes a list of construction activities and associated materials that are anticipated to be used onsite as well as the pollutant source assessment form that was completed for the project. These 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. Locations of anticipated pollutants and associated BMPs are shown on the Site Map in Appendix A.

Additionally, proper measures will be taken to ensure that trench spoils or any other soils disturbed during construction activities that are contaminated are not discharged with stormwater or non-stormwater discharges into storm drains or water bodies (except pursuant to a separate NPDES Permit). If contaminated soils are found on site, and the responsible party cannot be identified or fails to take action, soils will be sampled to determine proper handling and protect public safety. The appropriate local, State, and federal agencies along with the appropriate Regional Water Board will be notified when contaminated soils are observed.

For sampling requirements for non-visible pollutants associated with construction activity, please refer to Section 7.7.1. For a full and complete list of onsite pollutants, refer to the Safety Data Sheets (SDS), which are retained onsite at the construction trailer or are available electronically at the site.





2.7 TMDL REQUIREMENTS

Based on the project's receiving water and the pollutant source assessment, the following TMDLs are applicable to the project (See 2022 CGP Attachment H).

Table 2-8 Project TMDLs

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related NAL or NEL	Compliance Actions
Santa Monica Bay DDT's and PCB's TMDL	Santa Monica Bay	DDT and PCBs	None	Comply with General Permit and the additional TMDL Requirements in Section I.A
Santa Clara River Bacteria TMDL	Santa Monica Bay Watershed Management Area	Enterococcus, Fecal Coliform, Total Coliform	None	Comply with General Permit and the additional TMDL Requirements in Section I.G.2

These TMDLs are also identified in Section 2.1.3. The applicable NALs and NELs are also identified in Section 2.4. BMP requirements related to TMDLs are discussed in Section 3.4. Monitoring requirements related to TMDLs are discussed further in Section 7.7.

2.8 IDENTIFICATION OF NON-STORMWATER DISCHARGES

Non-stormwater discharges into storm drainage systems or waterways, which are not authorized under the 2022 CGP and listed in the SWPPP, or authorized under a separate NPDES permit, are prohibited.

Non-stormwater discharges that are authorized from this project site include the following:

- None – Contact the QSD if a Non-Stormwater discharge is required for the project site.

These authorized non-stormwater discharges will be managed with the stormwater and non-stormwater BMPs described in Section 3 of this SWPPP and will be minimized under the direction of the QSP. Additionally, the non-stormwater discharges not applicable to this project are still allowable granted they do not contact potential pollutant sources.

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

- Demolition activities
- Grading
- Trenching
- Wastewater from concrete washout areas
- Dust control
- Paint





- Asphalt paving

Steps will be taken, including the implementation of appropriate BMPs, to ensure that unauthorized discharges are eliminated, controlled, disposed, or treated on-site.

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.

2.9 REQUIRED SITE MAP INFORMATION

The construction project's Site Map(s) showing the project location, surface water boundaries, geographic features, construction site perimeter and general topography, locations of storm drain inlets that receive runoff from the project, and other requirements identified in 2022 CGP Sections IV.O.2. k. and l are located in Appendix A. Table 2-9 identifies Maps or Sheet Nos. where required elements are illustrated.

Table 2-9 Required Map Information

Included on Map/Plan Sheet No. ⁽¹⁾	Required Element
Pre-Earthwork Drawings	
E&SC Plan	Site and project boundaries
E&SC Plan	Areas disturbed during geotechnical or other preconstruction investigation work
E&SC Plan	Existing roads and trails
E&SC Plan	Drainage areas
E&SC Plan	Discharge locations
E&SC Plan	Existing storm drain system if applicable
E&SC Plan	Proposed locations of storage areas for waste
E&SC Plan	Proposed locations of construction materials
E&SC Plan	Proposed locations of project staging areas
E&SC Plan	Proposed locations of stockpiles
E&SC Plan	Proposed locations of vehicles, equipment staging and vehicle maintenance
E&SC Plan	Proposed locations of loading/unloading materials
E&SC Plan	Proposed locations of site access (entrance/exits)
E&SC Plan	Proposed locations of fueling, water storage, water transfer for dust control
E&SC Plan	Proposed locations of demolition
E&SC Plan	Proposed locations of other construction support activities
Construction and Earthwork Drawing(s)	
E&SC Plan	Site layout (grading plans) including roads
E&SC Plan	Site and project boundaries
E&SC Plan	Drainage areas



Table 2-9 Required Map Information

Included on Map/Plan Sheet No. ⁽¹⁾	Required Element
E&SC Plan	Discharge locations
E&SC Plan	Sampling locations
E&SC Plan	Areas of soil disturbance (temporary or permanent)
E&SC Plan	Proposed active areas of soil disturbance (cut or fill)
E&SC Plan	Proposed locations of erosion control BMPs
E&SC Plan	Proposed locations of sediment control BMPs
E&SC Plan	Proposed locations of run-off BMPs
E&SC Plan	Temporary and/or permanent run-on conveyance (if applicable)
E&SC Plan	Proposed locations of active treatment systems(s) (if applicable)
E&SC Plan	Proposed locations of storage areas for waste
E&SC Plan	Proposed locations of construction materials
E&SC Plan	Proposed locations of project staging areas
E&SC Plan	Proposed locations of stockpiles
E&SC Plan	Proposed locations of vehicles, equipment and vehicle maintenance
E&SC Plan	Proposed locations of loading/unloading materials
E&SC Plan	Proposed locations of site access (entrance/exits)
E&SC Plan	Proposed locations of fueling, water storage, water transfer for dust control
E&SC Plan	Proposed locations of demolition
E&SC Plan	Proposed locations of other construction support activities
E&SC Plan	Site-specific procedures to implement final stabilization BMPs as soon as reasonably practicable

Notes: (1) Indicate maps or drawings that information is included on (e.g., Vicinity Map, Site Map, Drainage Plans, Grading Plans, Progress Maps.)





Section 3 Best Management Practices

3.1 SCHEDULE FOR BMP IMPLEMENTATION

BMPs will be implemented as per the schedule indicated in Table 3-1.

Table 3-1 BMP Implementation Schedule

	BMP	Location	Implementation	Duration
Erosion Control BMPs	EC-1, Scheduling	N/A	Prior to Construction	Entirety of Project
	EC-2, Preservation of Existing Vegetation	Sections where possible	Start of Construction	Entirety of Project
	EC-5, Soil Binder	Disturbed Soils	Prior to a forecasted QPE	Entirety of Project
Sediment Control BMPs	SE-5, Fiber Rolls	Slope grade breaks	Prior to a forecasted QPE	Entirety of Project
	SE-6, Gravel Bags (2 Rows High)	Perimeters	Start of Construction	Entirety of Project
	SE-10, Storm Drain Inlet Protection	Storm drain inlets	Start of Construction	Entirety of Project
Wind Erosion Control BMPs	WE-1, Wind Erosion Control	Disturbed soils	Start of Construction	Entirety of Project



Table 3-1 BMP Implementation Schedule

	BMP	Location	Implementation	Duration
Tracking Control BMPs	TC-1, Stabilized Construction Entrance/Exit	All egress locations	Start of Construction	Entirety of Project
	SE-7, Street Sweeping	All hardscapes	Start of Construction	Entirety of Project
Non-Stormwater Control BMPs	NS-1, Water Conservation Practices	N/A	Start of Construction	Entirety of Project
	NS-6, Illicit Connection/Discharge	N/A	Start of Construction	Entirety of Project
	NS-7, Potable Water/Irrigation	N/A	Start of Construction	Entirety of Project
	NS-9, Vehicle and Equipment Fueling	Equipment staging areas	Start of Construction	Entirety of Project
	NS-12, Concrete Curing	Site	Start of concrete operations	Entirety of Project
	NS-13, Concrete Finishing	Site	Start of concrete operations	Entirety of Project
	NS-10, Vehicle and Equipment Maintenance	Equipment staging areas	Start of Construction	Entirety of Project
Construction Material Control BMPs	WM-01, Material Delivery and Storage	Contractors laydown/storage yards	Start of Construction	Entirety of Project
	WM-02, Material Use	Contractors laydown/storage yards	Start of Construction	Entirety of Project





Table 3-1 BMP Implementation Schedule

	BMP	Location	Implementation	Duration
Waste Management Control BMPs	WM-03, Stockpile Management	Onsite	Start of Construction	Entirety of Project
	WM-04, Spill Prevention and Control	All locations	Start of Construction	Entirety of Project
Waste Management Control BMPs	WM-05, Solid Waste Management	Onsite	Start of Construction	Entirety of Project
	WM-06, Hazardous Waste Management	Onsite	Start of Construction	Entirety of Project
	WM-08, Concrete Waste Management	Onsite	Start of Construction	Entirety of Project
	WM-09, Sanitary-Septic Waste Management	Onsite	Start of Construction	Entirety of Project





3.2 EROSION AND SEDIMENT CONTROL

Erosion and sediment controls are required by the 2022 CGP 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 control, 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 and/or binding soil particles.

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

1. Preserve existing vegetation where required and when feasible.
2. The area of soil disturbing operations shall be controlled such that the Contractor is able to implement erosion control BMPs quickly and effectively.
3. Stabilize non-active areas within 14 days of cessation of construction activities or sooner if stipulated by local requirements.
4. Control erosion in concentrated flow paths by applying erosion control blankets, check dams, erosion control seeding, or alternate methods.
5. Prior to the completion of construction, apply permanent erosion control to remaining disturbed soil areas.

Sufficient erosion control materials shall be maintained onsite to allow implementation in conformance with this SWPPP.

The following erosion control BMP selection table, Table 3-2 indicates the BMPs that will be implemented to control erosion on the construction site. Fact Sheets for temporary erosion control BMPs are provided in Appendix G.

These temporary erosion control BMPs shall be implemented in conformance with the following guidelines and as outlined in the BMP Factsheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.





Table 3-2 Erosion Control BMPs

CASQA Fact Sheet	BMP Name	Considered for the Project ⁽¹⁾	BMP Used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
EC-1	Scheduling	✓	✓		
EC-2	Preservation of Existing Vegetation	✓	✓		
EC-3	Hydraulic Mulch	✓ ⁽²⁾		✓	Not needed for this project
EC-4	Hydroseed	✓ ⁽²⁾		✓	Not needed for this project
EC-5	Soil Binders	✓ ⁽²⁾	✓		
EC-6	Straw Mulch	✓ ⁽²⁾		✓	Not needed for this project
EC-7	Geotextiles and Mats	✓ ⁽²⁾		✓	Not needed for this project
EC-8	Wood Mulching	✓ ⁽²⁾		✓	Not needed for this project
EC-9	Earth Dike and Drainage Swales	✓ ⁽³⁾		✓	Not needed for this project
EC-10	Velocity Dissipation Devices	✓ ⁽³⁾		✓	Not needed for this project
EC-11	Slope Drains	✓ ⁽³⁾		✓	Not needed for this project
EC-12	Stream Bank Stabilization			✓	Not needed for this project
EC-14	Compost Blankets	✓ ⁽²⁾		✓	Not needed for this project
EC-15	Soil Preparation-Roughening	✓		✓	Not needed for this project
EC-16	Non-Vegetated Stabilization	✓ ⁽²⁾		✓	Not needed for this project
WE-1	Wind Erosion Control	✓	✓		

(1) The 2022 CGP Fact Sheet Section I.R.1.d.through I.R.1.i.describes various BMPs that should be considered for use on the construction site.

(2) The QSD shall ensure implementation of one of the minimum measures listed or a combination thereof to achieve and maintain the Risk Level requirements.

(3) All run-on and runoff from the construction site shall be managed for Risk Level 2 and 3 and Risk Level 1 if the evaluation of quantity and quality of run-on and runoff deems them necessary or visual inspections show that the site requires these controls. Run-on from offsite shall be directed away from all disturbed areas, diversion of offsite flows may require design/analysis by a licensed civil engineer and/or additional environmental permitting.





EC-1 Scheduling

Scheduling will be used as practical to reduce areas of inactive soil disturbance per BMP Detail EC-1.

EC-2 Preservation of Existing Vegetation

Vegetation/trees will be preserved when practical on site per BMP Detail EC-2.

EC-5 Soil Binders

Soil binders shall be applied to areas requiring temporary stabilization per BMP Detail EC-5.

WE-1 Wind Erosion Control

Potable water will be used for dust control/wind erosion control on all areas of the project when needed per BMP Detail WE-1.

3.2.2 Sediment Controls

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

The following sediment control BMP selection table indicates the BMPs that will be implemented to control sediment on the construction site. Fact Sheets for temporary sediment control BMPs are provided in Appendix G.

These temporary sediment control BMPs will be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.





Table 3-3 Temporary Sediment Control BMPs

CASQA Fact Sheet	BMP Name	Considered for the Project ⁽¹⁾	BMP used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
SE-1	Silt Fence	✓ ⁽²⁾⁽³⁾		✓	Not needed for this project
SE-2	Sediment Basin			✓	Not needed for this project
SE-3	Sediment Trap			✓	Not needed for this project
SE-4	Check Dams			✓	Not needed for this project
SE-5	Fiber Rolls	✓ ⁽²⁾⁽³⁾	✓		
SE-6	Gravel Bag Berm	✓ ⁽³⁾	✓		
SE-7	Street Sweeping	✓	✓		
SE-8	Sandbag Barrier			✓	Not needed for this project
SE-9	Straw Bale Barrier			✓	Not needed for this project
SE-10	Storm Drain Inlet Protection	✓ RL2&3	✓		
SE-11	ATS			✓	Not needed for this project
SE-12	Manufactured Linear Sediment Controls			✓	Not needed for this project
SE-13	Compost Sock and Berm	✓ ⁽³⁾		✓	Not needed for this project
SE-14	Biofilter Bags	✓ ⁽³⁾		✓	Not needed for this project
NA	Passive Treatment System			✓	Not needed for this project
TC-1	Stabilized Construction Entrance and Exit	✓	✓		
TC-2	Stabilized Construction Roadway			✓	Not needed for this project
TC-3	Entrance Outlet Tire Wash			✓	Not needed for this project

⁽¹⁾ The 2022 CGPs Fact Sheet Section I.R.1.d through I.R.1.i describes various BMPs that should be considered for use on the construction site.

⁽²⁾ The QSD shall ensure implementation of one of the minimum measures listed or a combination thereof to achieve and maintain the Risk Level requirements.

⁽³⁾ All run-on and runoff from the construction site shall be managed. Risk Level 2 and 3 shall provide linear sediment control along toe of slope, face of slope, and at the grade breaks of exposed slope.





SE-5 Fiber Rolls

Install fiber rolls as grade breaks on disturbed slopes prior to a forecasted qualifying precipitation event and or after 14 days of inactivity on the disturbed soils. Install the fiber rolls per BMP Detail SE-5.

SE-6 Gravel Bag Berm

Place a temporary 2 high gravel bag berm along the perimeter of the project site per BMP Detail SE-6.

SE-7 Street Sweeping

Streets will be swept throughout **all phases of construction via street sweepers or by laborer's brooms** per BMP Detail SE-7.

SE-10 Storm Drain Inlet Protection

If needed, protect storm drain inlets downstream of the project as well as within the project perimeter per BMP Detail SE-10. **(Safety Hazard Note: BMP's installed on off-site storm drains must be monitored during rain events as flooding may occur due to the BMP slowing discharge into the drain).**

TC-1 Stabilized Construction Entrance & Exit

A temporary Stabilized Construction Entrance and Exit is required at all egress locations for the site per BMP Detail TC-1.

3.3 NON-STORMWATER CONTROLS AND WASTE AND MATERIALS MANAGEMENT

3.3.1 Non-Stormwater Controls

Non-stormwater discharges into storm drainage systems or waterways which are not authorized under the 2022 CGP are prohibited. Non-stormwater discharges for which a separate NPDES permit is required by the local Regional Water Board are prohibited unless coverage under the separate NPDES permit has been obtained for the discharge. The selection of non-stormwater BMPs is based on the list of construction activities with a potential for non-stormwater discharges identified in Section 2.7 of this SWPPP.

The following non-stormwater control BMP selection table indicates the BMPs that will be implemented to control sediment on the construction site. Fact Sheets for temporary non-stormwater control BMPs are provided in Appendix G.

Non-stormwater BMPs will be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.





Table 3-4 Temporary Non-Stormwater BMPs

CASQA Fact Sheet	BMP Name	Considered for the Project ⁽¹⁾	BMP used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
NS-1	Water Conservation Practices	✓	✓		
NS-2	Dewatering Operation	✓		✓	Not needed for this project
NS-3	Paving and Grinding Operation		✓		
NS-4	Temporary Stream Crossing			✓	Not needed for this project
NS-5	Clear Water Diversion			✓	Not needed for this project
NS-6	Illicit Connection/Discharge	✓	✓		
NS-7	Potable Water/Irrigation	✓	✓		
NS-8	Vehicle and Equipment Cleaning	✓		✓	Not needed for this project
NS-9	Vehicle and Equipment Fueling	✓	✓		
NS-10	Vehicle and Equipment Maintenance	✓	✓		
NS-11	Pile Driving Operation			✓	Not needed for this project
NS-12	Concrete Curing		✓		
NS-13	Concrete Finishing		✓		
NS-14	Material and Equipment Use Over Water			✓	Not needed for this project
NS-15	Demolition Removal Adjacent to Water			✓	Not needed for this project
NS-16	Temporary Batch Plants			✓	Not needed for this project

⁽¹⁾ The 2022 CGP Fact Sheet Section I.R.1.d through I.R.1.i describes various BMPs that should be considered for use on the construction site.





NS-1 Water Conservation Practices

Follow water conservation practices throughout the duration of the project per BMP Detail NS-1.

NS-3 Paving and Grinding Operations

The contractor will follow the guidelines under Detail NS-3 for the duration of the paving and grinding operations stage of the project.

NS-6 Illicit Connection- Illegal Discharge Connection

Contractor will follow the guidelines under Detail NS-6 for duration of the project.

NS-7 Potable Water Irrigation Discharge Detection

The Contractor will follow the guidelines under Detail NS-7 for duration of the project.

NS-9 Vehicle and Equipment Fueling

Vehicle and equipment fueling – Onsite vehicle and equipment fueling shall only be used in cases where offsite fueling is impractical. A fueling area shall be dedicated if fueling onsite. The designated fueling area shall be located on level – grade at a minimum of 50 feet away from downstream drainage facilities and watercourses. In addition, the designated fueling area shall be protected with berms and/or dikes to prevent run-on and runoff, and to contain spills. Absorbent spill clean-up materials and spill kits shall be made available at the dedicated fueling area. **Fuel tanks will not be “topped off”. Use of drip pans, absorbent pads, or similar** impermeable surfaces shall be used to prevent oil, grease, and fuel from leaking to the ground, storm drains or surface waters. Vehicles and equipment shall be inspected daily for leaks. Fluid and oil leaks will be repaired immediately. Leaked material shall not be hosed down and shall be disposed of properly per Detail NS-9.

NS-10 Vehicle and Equipment Maintenance

The contractor shall follow the vehicle and equipment maintenance guidelines under BMP Detail NS-10 for the duration of the project.

NS-12 Concrete Curing

Concrete Curing – If curing compounds are used, overspray will be avoided, i.e., the applied amount will not result in compound runoff. Downstream drain inlets shall be protected prior to application of curing compound. The drift of the curing compound will be minimized by applying the compound close to the concrete surface. Cure water will be directed away from inlets and watercourses to collection areas for proper removal per Detail NS-12.

NS-13 Concrete Finishing

The contractor will follow the guidelines under Detail NS-13 for the duration of the concrete finishing stage of the project.

3.3.2 Materials Management and Waste Management

Materials 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. The amount and type of construction materials to be utilized at the Site will depend upon the type of construction and the length of the construction period. The materials may be used continuously, such as fuel for vehicles and equipment, or the materials may be used for a discrete period, such as soil binders for temporary stabilization.





Waste management consists of implementing procedural and structural BMPs for handling, storing, and ensuring proper disposal of wastes to prevent the release of those wastes into stormwater discharges.

Materials and waste management pollution control BMPs will be implemented to minimize stormwater contact with construction materials, wastes, and service areas; and to prevent materials and wastes from being discharged off-site. The primary mechanisms for stormwater contact that shall be addressed include:

- Direct contact with precipitation
- Contact with stormwater run-on and runoff
- Wind dispersion of loose materials
- Direct discharge to the storm drain system through spills or dumping
- Extended contact with some materials and wastes, such as asphalt cold mix and treated wood products, which can leach pollutants into stormwater.

A list of construction activities is provided in Section 2.6. The following Materials and Waste Management BMP selection table, Table 3-5, indicates the BMPs that shall be implemented to handle materials and control construction site wastes associated with these construction activities. Fact Sheets for Materials and Waste Management BMPs are provided in Appendix G.

Material management BMPs will be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.





Table 3-5 Temporary Materials Management BMPs

CASQA Fact Sheet	BMP Name	Considered for Project ⁽¹⁾	BMP used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
WM-01	Material Delivery and Storage	✓	✓		
WM-02	Material Use	✓	✓		
WM-03	Stockpile Management	✓	✓		
WM-04	Spill Prevention and Control	✓	✓		
WM-05	Solid Waste Management	✓	✓		
WM-06	Hazardous Waste Management	✓	✓		
WM-07	Contaminated Soil Management			✓	Not needed for this project
WM-08	Concrete Waste Management	✓	✓		
WM-09	Sanitary-Septic Waste Management	✓	✓		
WM-10	Liquid Waste Management	✓		✓	Not needed for this project

⁽¹⁾ The 2022 CGP Fact Sheet Section I.R.1.d through I.R.1.i describes various BMPs that should be considered for use on the construction site.





WM-O1 Material Delivery and Storage

A staging area will be designated at the project site by the Construction Manager. The staging area will be used for storage, as needed. Construction materials will be delivered to the site and used quickly. Chemicals will be stored in watertight containers (with appropriate secondary containment to prevent any spillage or leakage) or in a completely enclosed storage shed. Spills and leaks will be contained and cleaned immediately.

The exposure of construction materials to precipitation will be minimized. 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.).

WM-O2 Material Use

An ample supply of clean-up material will be kept near use areas.

WM-O3 Stockpile Management

Any stockpiles will be located at a minimum of 50 feet away from concentrated flows of stormwater, drainage courses, and inlets. All stockpiles will be bermed. Inactive stockpiles shall be covered at all times to ensure wind and precipitation protection. Destabilized stockpiles will be sprayed with water as needed for dust control.

WM-O4 Spill Prevention and Control

The contractor will assign and train appropriate spill response personnel. Oil, grease, and fuel shall be managed in a manner that will prevent leakage into the ground, storm drains or surface waters. All spills and leaks shall be contained, cleaned, and properly disposed of. The property Manager and the Engineering Project Manager shall immediately be notified of any spills and leaks. Proper clean-up materials will be located near storage, unloading and use areas.

WM-O5 Solid Waste Management

Solid wastes will be loaded directly into trucks and/or waste disposal containers for offsite disposal. Waste disposal containers shall be stored in a manner that prevents discharge into stormwater drainage systems or receiving waters. Spills shall be contained and cleaned immediately upon discovery. Construction debris and litter shall not be placed near drain or drainage systems. The construction debris and litter shall be removed weekly and by project completion.

WM-O6 Hazardous Waste Management

If hazardous materials are encountered or used, such materials will be handled, treated, stored, and disposed of per the project's **Special Provisions and all applicable laws and regulations**. Hazardous spills will be reported, contained and cleaned up immediately.

WM-O8 Concrete Waste Management

All PCC material shall be covered and located away from drainage systems when not actively used. If onsite washing of concrete trucks or equipment are required, an above grade or mobile concrete washout shall be constructed or placed at the staging area. The washout shall be located a minimum of 50 feet from concentrated flows of stormwater, drainage courses, and inlets with proper perimeter controls to prevent discharge into underlying soils and surrounding areas. Additional washouts will be utilized as needed. All PCC wastes, including temporary concrete washouts, shall be collected and contained by sweeping, shoveling, and/or other mechanical means in accordance with federal, state, or local regulations.

WM-O9 Sanitary-Septic Waste Management

Delivery and regular maintenance of onsite portable restrooms shall be conducted by a licensed service. Restrooms shall be located on level, hard packed, or paved surfaces away from traffic





and drainage facilities. Drip pans underneath the portable toilets will be utilized to contain and prevent pollutant discharge into drainage systems or receiving waters. In addition, the restrooms shall be firmly secured in the event of high winds. Portable restrooms shall be regularly inspected for cleanliness, leaks, and spills. Leaks and/or spills shall be contained and cleaned immediately upon discovery in accordance with federal, state, and local regulations.

3.4 TMDL-RELATED BMPs

Bacteria TMDL BMPs:

- The QSP shall conduct training for construction site staff on routine housekeeping and sanitary waste management of identified sources of bacteria.

Metals and Toxics TMDL BMPs:

- RUSLE2 modeling was used to demonstrate that the erosion and sediment control BMP design will yield less sediment delivery during construction than pre-construction conditions. RUSLE2 computational proof is included in Appendix B of this SWPPP.

3.5 POST CONSTRUCTION STORMWATER MANAGEMENT MEASURES

Post construction BMPs are permanent measures installed during construction, designed to reduce or eliminate pollutant discharges from the site after construction is completed.

This site is subject to the post-construction requirements of an existing NPDES Phase I or Phase II MS4. Yes No

The post construction runoff reduction requirements have been satisfied through compliance with 2022 CGP Provision IV.N.3 and use of the SMARTS water balance calculator. The post construction requirements were uploaded as part of the PRDs as required by 2022 CGP Provision IV.N.2.

The following source control, site design, and treatment control post-construction BMPs to comply with 2022 CGP Section IV.N.3 have been identified for the site:

- Source Control: Underground Stormwater Retention Chamber System

A plan for the post construction funding and maintenance of these BMPs has been developed to address at minimum five years following construction. The post construction BMPs that are described above will be funded and maintained as described in the Operations and Maintenance Plan that will be uploaded with the NOT.





Section 4 BMP Inspection and Maintenance

4.1 BMP INSPECTION AND MAINTENANCE

The 2022 CGP requires routine weekly inspections of BMPs, along with inspections before, during, and after qualifying precipitation events. A BMP inspection checklist must be filled out for inspections and maintained on-site with the SWPPP. The inspection checklist must include the necessary information covered in Section 7.6. A blank BMP Inspection Form can be found in Appendix H. Completed forms will be kept in Appendix N.

Maintenance, repair, or design and implementation of new BMPs alternatives will begin within 72 hours of the identification of failures or other shortcomings. Corrections will be completed as soon as possible, prior to the next forecasted precipitation event (2022 CGP Appendix D Section II.J).

The QSP will verify that all BMP maintenance and repairs were appropriately implemented during the next visual inspection following completion.

The QSP may delegate BMP maintenance and repair verification to an appropriately trained QSP Delegate.

Specific details for maintenance, inspection, and repair of Construction Site BMPs can be found in the BMP Factsheets in Appendix G.





Section 5 Training

Appendix J identifies the QSPs and QSP Delegates for the project. To promote stormwater management awareness specific for this project, periodic training of job-site personnel will be included as part of routine project meetings (e.g., daily/weekly tailgate safety meetings), or task specific training as needed. Refresher training will be provided as necessary.

The QSP will be responsible for providing this information at the meetings, and subsequently completing the Training Reporting Form shown in Appendix I, which identify the site-specific stormwater topics covered as well as the names of site personnel who attended the meeting.

The QSP may delegate specific tasks to trained QSP Delegates who have received the following training based on the guidelines developed by the Construction General Permit Training Team.

1. Foundational training for all QSP Delegate(s) regarding stormwater compliance roles and responsibilities, forecast information, and documentation and reporting procedures; and
2. Site-specific training regarding visual inspections, sampling procedures, and/or SWPPP and BMP implementation activities relevant to the responsibilities assigned to the QSP Delegate(s).

The delegate cannot perform the QSD and QSP inspections required in Section V.C.4 or Section V.D.2, respectively.

Documentation of training activities will be retained in Appendix I.





Section 6 Responsible Parties and Operators

6.1 RESPONSIBLE PARTIES

DAR(s) who are responsible for SWPPP implementation and have authority to sign permit-related documents is/are listed below. The DAR(s) assigned to this project is/are:

Name	Title	Phone Number

QSD(s) identified for the project are identified in Appendix J. The QSD will have primary responsibility for assessing how construction activities will affect sediment transport, erosion, and other discharges of pollutants in stormwater runoff throughout the project. The QSD is required to revise the SWPPP to address potential problems identified by visual inspections, sampling data, comments from a QSP, or their own site observations. The QSD is required to perform the following on-site visual inspections:

- Within 30 days of construction activities commencing on site;
- Within 30 days when a new QSD is assigned to the project;
- Twice annually, once August through October and once January through March;
- Within 14 calendar days after a numeric action level exceedance; and
- Within the time period requested in writing from Regional Water Board staff.

QSPs and QSP Delegates identified for the project are identified in Appendix J. The QSP will have primary responsibility and significant authority for the implementation, maintenance, and inspection/monitoring of SWPPP requirements. The QSP will be available at all times throughout the duration of the project.

Duties of the QSP include but are not limited to:

- Implementing all elements of the 2022 CGP and SWPPP, including, but not limited to:
 - Performing the following on-site visual inspections:
 - One inspection per calendar month; other weekly inspections in the month can be delegated to a trained QSP Delegate under the specific direction of the QSP.
 - Within 72 hours prior to a forecasted qualifying precipitation event, to inspect any areas of concern and to verify the status of any deficient BMPs, or other identified issues at the site. If extended forecast precipitation data (greater than 72 hours) is available from the *National Weather Service*, then the Pre-Precipitation Event inspection may be done up to 120 hours in advance.
 - Within 14 days after a NAL exceedance, the QSP shall visually inspect the drainage area for exceedance and document any areas of concern.
 - Prior to the submittal for the NOT or COI (for acreage changes) for all or part of the site.
 - Ensuring that all BMPs are implemented, inspected, and properly maintained;



- Ensure that the SMARTS generated WDID Number Notification form is posted on-site, in a location viewable by the public or readily available upon request, and the dates are correct and match the dates listed in SMARTS.
- Implementing non-stormwater management, and materials and waste management activities such as: monitoring discharges; general Site clean-up; vehicle and equipment cleaning, fueling and maintenance; spill control; ensuring that no materials other than stormwater are discharged in quantities which will have an adverse effect on receiving waters or storm drain systems, etc.;
- Ensuring elimination of unauthorized discharges.
- The QSPs shall be assigned authority by the LRP to mobilize crews in order to make immediate repairs to the control measures.
- Coordinate with the Contractor(s) to assure the necessary corrections/repairs are made immediately and that the project complies with the SWPPP, the 2022 CGP, and approved plans at all times.
- Notifying the LRP or Duly Authorized Representative immediately of off-site discharges or other non-compliance events.
- Providing foundation and site-specific training to QSP Delegates and overseeing QSP Delegate work. Tasks that may be delegated to appropriately trained QSP-delegates include:
 - Performing non-stormwater and stormwater visual observations and inspections;
 - Performing stormwater sampling and analysis, as required; and
 - Performing routine inspections and observations.

Table 6-1. QSP and QSP Delegate Authorized Inspections

	Weekly BMP and NSW	Pre-QPE	Daily-QPE Visual Inspections	Post-QPE Visual Inspections	Post NAL Exceedances	Monthly BMP and NSW	NOT
QSP	X	X	X	X	X	X	X
QSP Delegate	X		X	X			





Section 7 Construction Site Monitoring Program

7.1 Purpose

This Construction Site Monitoring Program was developed to address the following objectives:

1. To demonstrate that the site is in compliance with the Discharge Prohibitions and Numeric Action Levels (NALs);
2. **To demonstrate that the site is in compliance with TMDL NALs (if TMDL's are applicable to the project site);**
3. To determine whether non-visible pollutants discharged from the construction site and are causing or contributing to exceedances of water quality objectives;
4. To determine whether immediate corrective actions, additional BMP implementation, or SWPPP revisions are necessary to reduce pollutants in stormwater discharges and authorized non-stormwater discharges;
5. To determine whether BMPs included in the SWPPP are effective in preventing or reducing pollutants in stormwater discharges and authorized non-stormwater discharges.

7.2 Applicability of Permit Requirements

This project has been determined to be a Risk Level 2 project. The 2022 CGP identifies the following types of monitoring as being applicable for a Risk Level 2 project.

Risk Level 2

- Visual inspections of BMPs;
- Visual monitoring of the site related to qualifying precipitation events;
- Visual monitoring of the site for non-stormwater discharges;
- Sampling and analysis of construction site runoff for pH and turbidity;
- Sampling and analysis of construction site runoff for non-visible pollutants [including TMDL pollutants] identified during the pollutant source assessments when applicable; and
- Sampling and analysis of construction site runoff as required by the Regional Water Board when applicable.

7.3 Weather and Precipitation Event Tracking

Visual monitoring and inspections requirements of the 2022 CGP are triggered by a Qualifying Precipitation Event. The 2022 CGP defines a Qualifying Precipitation Event as any weather pattern that is forecast to have a 50 percent or greater Probability of Precipitation (PoP) and a Quantitative Precipitation Forecast (QPF) of 0.5 inches or more within a 24-hour period. The event begins with the 24-hour period when 0.5 inches has been forecast and continues on subsequent 24-hour periods when 0.25 inches of precipitation or more is forecast.

7.3.1 Weather Tracking

The QSP should daily consult the National Oceanographic and Atmospheric Administration (NOAA) for the Forecast Weather Table Interface. These forecasts can be obtained at <http://forecast.weather.gov>. Weather reports should be printed and maintained with the SWPPP in Appendix M. Record the date and time the forecast was printed.





7.3.2 Rain Gauges

The QSP shall install one (1) rain gauge on the project site. Locate the gauge in an open area away from obstructions such as trees or overhangs. Mount the gauge on a post at a height of 3 to 5 feet with the gauge extending several inches beyond the post. Make sure that the top of the gauge is level. Make sure the post is not in an area where rainwater can indirectly splash from sheds, equipment, trailers, etc.

The rain gauge shall be read daily during normal site scheduled hours. The rain gauge should be read at approximately the same time every day and the date and time of each reading recorded. An example rain gauge log sheet is provided in Appendix O. Retain rain gauge readings in Appendix N. Follow the rain gauge instructions to obtain accurate measurements.

Once the rain gauge reading has been recorded, accumulated rain shall be emptied, and the gauge reset.

For comparison with the site rain gauge, the nearest appropriate governmental rain gauge(s) is located at:

Santa Monica Pier

<https://www.weather.gov/wrh/climate>

7.4 Monitoring Locations

Monitoring locations are shown on the Site Maps in Appendix A. Monitoring locations are described in Sections 7.6 and 7.7.

Whenever changes in the construction site might affect the appropriateness of sampling locations, the sampling locations shall be revised accordingly. All such revisions shall be implemented as soon as feasible and the SWPPP amended. Temporary changes that result in a one-time additional sampling location do not require a SWPPP amendment.

7.5 Safety and Monitoring Exemptions

Safety practices for sample collection will be in accordance with the **contractor's health and safety plan** for the project. A summary of the safety requirements that apply to sampling personnel is provided below.

- Rain gear
- Boots
- Hard Hat
- Safety Glasses
- Sampling equipment

This project is not required to collect samples or conduct visual observations (inspections) under the following conditions (see Section III.B of the 2022 CGP):

- During dangerous weather conditions such as electrical storms, flooding, and high winds above 40 miles per hour;
- Outside of scheduled site operating hours; or
- When the site is not accessible to personnel.

Scheduled site business hours are: Monday - Friday/ 6:00 am – 3:00 pm

If monitoring (visual monitoring or sample collection) of the site is unsafe because of the dangerous conditions noted above, then the QSP shall document the conditions for why an exception to performing the monitoring was necessary. The exemption documentation will be filed in Appendix N and must be included in the Annual Report.





7.6 Visual Monitoring

Per Section III.B.2. of Attachment D in the 2022 CGP, “For inactive projects, dischargers may reduce the visual inspection frequency and suspend sampling per Section III.G of the 2022 CGP. Dischargers shall provide an explanation with supporting information for all missed visual inspections or sampling required by this Attachment, to be included in the Annual Report.”

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.

Table 7-1 identifies the required frequency of visual observations and inspections. Inspections and observations will be conducted at the locations identified in Section 7.6.3.

Table 7-1 Summary of Visual Monitoring and Inspections

Type of Inspection	Frequency
<i>Routine Inspections¹</i>	
BMP Inspections	Weekly ²
Tracking Control	Daily
Tracking	Daily
Wind Erosion Control	Daily
<i>Qualifying Precipitation Event Triggered Inspections</i>	
Site Inspections Prior to a Qualifying Precipitation Event	Within 72 hours of a qualifying precipitation event or up to 120 hours prior if supported with forecast ²
BMP Inspections During an Extended Qualifying Precipitation Event	Once every 24-hour period of a qualifying precipitation event ³
Site Inspections Following a Qualifying Precipitation Event	Within 96 hours of a qualifying precipitation event ²

¹ Inspections are required during scheduled site operating hours.

² Most BMPs must be inspected weekly; those identified below must be inspected more frequently.

³ Inspections are required during scheduled site operating hours on days that the forecast predicts at least 0.25 inches of precipitation once the qualifying precipitation event commences.

7.6.1 Routine Observations and Inspections

Routine site inspections and visual monitoring are necessary to confirm that the project is in compliance with the requirements of the 2022 CGP.

7.6.1.1 Routine BMP Inspections

Inspections of BMPs are conducted to identify and 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.





7.6.1.2 *Non-Stormwater Discharge Observations*

Each drainage area will be inspected for the presence of or indications of prior unauthorized and authorized non-stormwater discharges. Inspections will record:

- Presence or evidence of any non-stormwater discharge (authorized or unauthorized);
- Identification and elimination of unauthorized non-stormwater discharges
- Pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.); and
- Source of discharge.

7.6.2 *Qualifying Precipitation Event Triggered Observations and Inspections*

Visual observations of the site and inspections of BMPs are required prior to a qualifying precipitation event; following a qualifying precipitation event, and every 24-hour period during a qualifying precipitation event. Pre-Qualifying Precipitation Event inspections will be conducted after consulting NOAA and determining that a precipitation event with a 50 percent or greater PoP and a QPF of 0.5 inches or more precipitation within a 24-hour period has been predicted by the National Weather Service Forecast Office.

7.6.2.1 *Visual Observations Prior to a Forecasted Qualifying Precipitation Event*

Within 72 hours prior to a qualifying precipitation event or up to 120 hours prior if extended forecast precipitation data is available, a stormwater visual monitoring site inspection will include observations of the following locations:

- All stormwater drainage areas to identify leaks, spills, or uncontrolled pollutant sources and when necessary, implement appropriate corrective actions.
- All BMPs to identify whether they have been properly implemented per the SWPPP and implement appropriate corrective actions, as necessary.
- All stormwater storage and containment areas to detect leaks and check for available capacity to prevent overflow.

The QSP must conduct the inspection prior to the qualifying precipitation event. Consistent with the requirements for a qualifying precipitation event, pre-rain BMP inspections and visual monitoring will be triggered by a NOAA forecast that indicates a 50 percent or greater probability of 0.5 inches of precipitation or more in a 24-hour period in the project area.

7.6.2.2 *BMP Inspections During a Qualifying Precipitation Event*

During an extended qualifying precipitation event BMP inspections will be conducted at least once every 24 hours. Qualifying precipitation events are extended for each subsequent 24-hour period forecast to have at least 0.25 inches of precipitation. The BMP inspections are to identify and record:

- If BMPs were adequately designed, implemented and effective.
- BMPs that require repair or replacement due to damage.
- Additional BMPs that need to be implemented and revise the SWPPP accordingly.

If the construction site is not accessible during the rain event, the visual inspections shall be performed at all relevant outfalls, discharge points, downstream locations. The inspections should record any projected maintenance activities.





7.6.2.3 Visual Observations Following a Qualifying Precipitation Event

Within 96 hours following the end of a qualifying precipitation event a stormwater visual monitoring site inspection is required to observe:

- If BMPs were adequately designed, implemented and effective.
- BMPs that require repair or replacement due to damage.
- Additional BMPs that need to be implemented and revise the SWPPP accordingly.

7.6.3 Visual Monitoring Procedures

Visual monitoring shall be conducted by the QSP or QSP Delegates.

The name(s) and contact number(s) of the QSPs or QSP Delegates assigned to conduct visual observations are listed below and their training qualifications are provided in Appendix J.

Assigned QSP: Ken Kristoffersen	Contact Phone: (949) 354-5530
Assigned QSP: Jeff Woolston	Contact Phone: (909) 262-7265
Assigned QSP: Victor Chu	Contact Phone: (949) 685-0101
Assigned QSP: Alan Parks	Contact Phone: (951) 963-5323
Assigned QSP: Jan Heppert	Contact Phone: (949) 233-5348
Assigned QSP: Anthony Appel	Contact Phone: (949) 685-0127
Assigned QSP: Will Tisdale	Contact Phone: (310) 781-0736
Assigned QSP: Tanner Schnicke	Contact Phone: (949) 690-5227
Assigned QSP: Brett Woolston	Contact Phone: (949) 338-0743

Stormwater observations shall be documented on the Visual Inspection Field Log Sheet (see Appendix O). BMP inspections shall be documented on the site-specific BMP inspection checklist and include photographs **of areas of concern along with the QSP's description of the problem**.

The QSP shall within 1 day of the inspection submit copies of the completed inspection report to the contractor or person responsible for SWPPP and BMP maintenance.

The completed reports will be kept in Appendix N. Results of visual monitoring must be summarized and reported in the Annual Report.

7.6.4 Visual Monitoring Follow-Up and Reporting

Maintenance, repairs, and correction of deficiencies, including design changes to BMPs, identified by the observations or inspections, including required repairs or maintenance of BMPs, shall be initiated within 72 hours of identification and completed as soon as possible, prior to the next forecasted precipitation event.

When design changes to BMPs are required, the SWPPP shall be amended to reflect the changes.

Deficiencies identified in site inspection reports and correction of deficiencies will be tracked on the *Inspection Field Log Sheet* or *BMP Inspection Report* shall be kept in Appendix N. QSP Delegates shall report issues identified during inspections that require corrective action to the QSP within 24 hours of the observation.



The QSP shall within 1 day of the inspection submit copies of the completed *Inspection Field Log Sheet* or *BMP Inspection Report* with the corrective actions to contractor or person responsible for SWPPP and BMP maintenance.

Results of visual monitoring must be summarized and reported in the Annual Report.

7.6.5 Visual Monitoring Locations

The inspections and observations identified in Sections 7.6.1 and 7.6.2 will be conducted at the locations identified in this section.

BMP locations are shown on the Site Maps in Appendix A.

There is 1 **drainage area(s) on the project site and the contractor's yard, staging areas, and storage areas**. Drainage area(s) are shown on the Site Maps in Appendix A and Table 7-2 identifies each drainage area by location.

Table 7-2 Site Drainage Areas

Location No.	Location
Area 1	See E&SC Plan

There are no stormwater storage or containment area(s) on the project site from which stormwater will be dewatered. A stormwater retention system will be installed during construction, but There are no plans to use it as a temporary storage system. Stormwater storage or containment area(s) are shown on the Site Maps in Appendix A and Table 7-3 identifies each stormwater storage or containment area by location.

Table 7-3 Stormwater Storage and Containment Areas (Dewatering Locations)

Location No.	Location
	None

There are 3 discharge location(s) on the project site. Site stormwater discharge location(s) are shown on the Site Maps in Appendix A and Table 7-4 identifies each stormwater discharge location.

Table 7-4 Site Stormwater Discharge Locations

Location No.	Location
D1	See the E&SC Plan
D2	See the E&SC Plan
D3	See the E&SC Plan



7.7 Water Quality Sampling and Analysis

7.7.1 *Sampling and Analysis Plan for Non-Visible Pollutants in Stormwater Runoff Discharges*

This Sampling and Analysis Plan for Non-Visible Pollutants describes the sampling and analysis strategy and schedule for monitoring non-visible pollutants in stormwater runoff discharges from the project site.

Sampling for non-visible pollutants, including those associated with TMDLs will be conducted when (1) a breach, leakage, malfunction, or spill is observed; and (2) the leak or spill has not been cleaned up prior to the rain event; and (3) there is the potential for discharge of non-visible pollutants to surface waters or drainage system.

Table 7-5 summarizes the potential non-visible pollutants identified in the pollutant source assessment Sections 2.6 and 2.7 and the water quality constituent or indicator for that pollutant. Drainage areas where the source is present are shown on the E&SC Plans in Appendix A.





Table 7-5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents Based on the Pollutant Source Assessment

Pollutant	Water Quality Indicator or Constituent	Source/Reason from Pollutant Source Assessment	TMDL Pollutant	Site Drainage Area
Adhesives	COD, Phenols, SVOCs	General construction material	No	N/A
Asphalt Work	VOCs	Parking lot and street work	No	N/A
Acids	pH	Cleaning	No	N/A
Bleaches	Residual chlorine	Cleaning	No	N/A
TSP	Phosphate	Cleaning	No	N/A
Solvents	VOCs, SVOCs	Cleaning	No	N/A
Detergents	MBAS	Cleaning	No	N/A
Concrete / Masonry Work			No	N/A
Sealant (Methyl methacrylate)	SVOC	Concrete / Masonry Work	No	N/A
Curing compounds	VOCs, SVOCs, pH	Concrete / Masonry Work	No	N/A
Ash, slag, sand	pH, Al, Ca, Va, Zn	Concrete / Masonry Work	No	N/A
Drywall	Cu, Al, General Minerals		No	N/A
Treated Wood	Cu, Cr, As, Zn	Framing / Carpentry	No	N/A





Table 7-5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents Based on the Pollutant Source Assessment

Pollutant	Water Quality Indicator or Constituent	Source/Reason from Pollutant Source Assessment	TMDL Pollutant	Site Drainage Area
Particle board	Formaldehyde	Framing / Carpentry	No	N/A
Untreated wood	BOD	Framing / Carpentry	No	N/A
Gypsum / Lime amendments	pH	Grading / Earthworks	No	N/A
Contaminated Soil	Constituents specific to known contaminants, check with Laboratory	Grading / Earthworks	No	N/A
Demolition debris buildings from 1950-1980	PCBs	Building Demolition	Yes	Area 1
Demolition debris buildings with lead paint	Pb	Building Demolition	No	N/A
Heating, Ventilation, Air Conditioning	Freon	HVAC Installation	No	N/A
Insulation	Al, Zn	Insulation Installation	No	N/A
Pesticides/Herbicides	Product dependent, see label and check with Laboratory	Landscaping	No	N/A
Fertilizers	TKN, NO ₃ , BOD, COD, DOC, Sulfate, NH ₃ ,	Landscaping	No	N/A





Table 7-5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents Based on the Pollutant Source Assessment

Pollutant	Water Quality Indicator or Constituent	Source/Reason from Pollutant Source Assessment	TMDL Pollutant	Site Drainage Area
	Phosphate, Potassium			
Aluminum sulfate	Al, TDS, Sulfate	Landscaping	No	N/A
Liquid Waste	Constituents specific to materials, check with Laboratory		No	N/A
Resins	COD, SVOCs	Painting	No	N/A
Thinner	COD, VOCs	Painting	No	N/A
Paint strippers	VOCs, SVOCs, metals	Painting	No	N/A
Lacquers, varnishes, enamels	COD, VOCs, SVOCs	Painting	No	N/A
Sealants	COD	Painting	No	N/A
Adhesives	Phenols, SVOCs	Painting	No	N/A
Planting / Vegetation Management			No	N/A
Vegetation stockpiles	BOD	Planting / Vegetation Management	No	N/A
Fertilizers	TKN, NO ₃ , BOD, COD, DOC, sulfate, NH ₃ ,	Planting / Vegetation Management	No	N/A





Table 7-5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents Based on the Pollutant Source Assessment

Pollutant	Water Quality Indicator or Constituent	Source/Reason from Pollutant Source Assessment	TMDL Pollutant	Site Drainage Area
	Phosphate, Potassium			
Pesticides/Herbicides	Product dependent, see label and check with Laboratory	Planting / Vegetation Management	No	N/A
Plumbing			No	N/A
Solder, flux, pipe fitting	Cu, Pb, Sn, Zn	Plumbing	No	N/A
Pools and Fountains	Residual chlorine, Cu, chloramines	Pool and Fountain Installation	No	N/A
Removal of existing structures	Zn, VOCs, PCBs (see also other applicable activity categories, e.g., grading, painting)	Removal of existing structures	Yes	Area 1
Roofing	Cu, Pb, VOCs	Roofing construction	No	N/A
Sanitary Waste Sewer line breaks and Portable Toilets (using clear fluid – blue fluid is visible if discharged)	BOD, Total/Fecal coliform	Portable toilets	No	N/A
Polymer/Co-polymers	TKN, NO ₃ , BOD, COD, DOC, Sulfate, Ni	Soil Preparation / Amendments/Dust Control	No	N/A





Table 7-5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents Based on the Pollutant Source Assessment

Pollutant	Water Quality Indicator or Constituent	Source/Reason from Pollutant Source Assessment	TMDL Pollutant	Site Drainage Area
Lignin sulfate	TDS, alkalinity	Soil Preparation / Amendments/Dust Control	No	N/A
Psyllium	COD, TOC	Soil Preparation / Amendments/Dust Control	No	N/A
Guar/Plant Gums	COD, TOC, Ni	Soil Preparation / Amendments/Dust Control	No	N/A
Solid Waste (leakage)	BOD	Waste Bins	No	N/A
Utility Line Testing and Flushing	Residual chlorine, chloramines	Utility construction	No	N/A
Batteries	Sulfuric acid; Pb, pH	Onsite vehicles	No	N/A
TMDLs (See Attachment H)				
Santa Monica Bay Beaches Bacteria TMDL	Enterococcus Fecal, Coliform, Total Coliform	Portable Toilets	Yes	Area 1
Santa Monica Bay DDT's and PCBs TMDL	DDT and PCBs	Demolition Debris	Yes	Area 1





The project does not have any significant stormwater run-on locations with the potential to contribute non-visible pollutants to stormwater discharges from the project. If significant run-on is present on the project, contact the QSD.

Table 7-6 Potential Stormwater Run-On Locations

Location No.	Location
	None

7.7.1.1 *Sampling Schedule*

Samples for the potential non-visible pollutant(s) and a sufficiently large unaffected background sample shall be collected during the first eight hours of discharge from rain events that result in **a sufficient discharge for sample collection. Samples shall be collected during the site's** scheduled hours and shall be collected regardless of the time of year and phase of the construction.

Collection of discharge samples for non-visible pollutant monitoring will be triggered only when any of the following conditions are observed during site inspections conducted prior to or during a rain event.

- 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 a 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 (1) a breach, malfunction, leakage, or spill is observed, (2) the leak or spill is not cleaned up prior to the rain event, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- A construction activity, including but not limited to those in Section 2.6, with the potential to contribute non-visible pollutants (1) was occurring during or within 24 hours prior to the rain event, (2) BMPs were observed to be breached, malfunctioning, or improperly implemented, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- Soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied, and there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- Stormwater runoff from an area contaminated by historical usage of the site has been observed to combine with stormwater runoff from the site, and there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.

7.7.1.2 *Sampling Locations*

Sampling locations are based on proximity to planned non-visible pollutant storage, occurrence or use, accessibility for sampling, and personnel safety. Planned non-visible pollutant sampling locations are shown on the E&SC Plans in Appendix A and include the locations identified in Table 7-7.





Three (3) **sampling location(s) on the project site and the contractor's yard have been identified** for the collection of samples of runoff from planned material and waste storage areas and areas where non-visible pollutant producing construction activities are planned.

No sampling locations have been identified for the collection of samples of runoff from drainage areas where soil amendments will be applied that have the potential to affect water quality.

No sampling locations have been identified for the collection of samples of runoff from drainage areas contaminated by historical usage of the site.

One (1) sampling location(s) has been identified for the collection of an uncontaminated sample of runoff as a background sample for comparison with the samples being analyzed for non-visible pollutants. This location(s) was selected such that the sample will not have come in contact with the operations, activities, or areas identified in Section 7.7.1 or with disturbed soils areas.

No sampling locations have been identified for the collection of samples of run-on to the project site. Run-on from these locations has the potential to combine with discharges from the site being sampled for non-visible pollutants. These samples are intended to identify potential sources of non-visible pollutants that originate off the project site.

Table 7-7 Non-Visible Pollutant Sample Locations

Sample Location Identifier	Sample Location Description	Sample Location Latitude and Longitude (Decimal Degrees)	Runoff or Run-on
D1	See the E&SC Plan	To be Field Determined	Run-off
D2	See the E&SC Plan	To be Field Determined	Run-off
D3	See the E&SC Plan	To be Field Determined	Run-off
B1	See the E&SC Plan	To be Field Determined	Background

If a stormwater visual monitoring site inspection conducted prior to or during a storm event identifies the presence of a material storage, waste storage, operations area with spills, or the potential for the discharge of non-visible pollutants to surface waters or a storm drain system that is at a location not listed above and has not been identified on the Site Maps, sampling locations will be selected by the QSP using the same rationale as that used to identify planned locations. Non-visible pollutant sampling locations shall be documented by the QSP on the pre-rain event inspection form prior to a forecasted qualifying precipitation event and the *Effluent Sampling Field Log Sheet*, which are provided in Appendix O.

7.7.1.3 Monitoring Preparation

Non-visible pollutant samples will be collected by:

QSP Yes No

QSP Delegate Yes No

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool temperature environment that will not come into contact with rain or direct sunlight. The QSP or QSP Delegates responsible for sampling will be available to





collect samples in accordance with the sampling schedule. Supplies maintained at the project site will include, but are not limited to, clean powder-free nitrile gloves, sample collection equipment, coolers, 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 O.

7.7.1.4 *Analytical Constituents*

Table 7-7 lists the specific sources and types of potential non-visible pollutants based on the project pollutant source assessment and the water quality indicator constituent(s) for that pollutant. Table 7-7 provides the specific analytical methods and reporting limits for the potential non-visible pollutants. Analytical methods were selected in compliance with U.S. EPA sufficiently sensitive method requirements in 40 Code of Federal Regulations Part 136, as evidenced by the method detection limit and minimum level.

7.7.1.5 *Sample Collection*

Samples of discharge shall be collected at the designated non-visible pollutant sampling locations identified in Table 7-6 and shown on the Site Maps in Appendix A or in the locations determined by observed breaches, malfunctions, leakages, spills, operational areas, soil amendment application areas, and historical site usage areas that triggered the sampling event.

Grab samples shall be collected and preserved in accordance with the methods identified in the Table 7-7, “**Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants**” provided in Section 7.7.1.6. Only the QSP, or QSP Delegates trained on sample collection identified in Section 7.7.1.3 shall collect samples.

Sample collection and handling requirements are described in Section 7.7.7.





Table 7-8 Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants

Constituent	Analytical Method	Minimum Sample Volume	Sample Containers	Sample Preservation	Minimum Level	Method Detection Limit	Maximum Holding Time
VOCs-Solvents	EPA 8260B	3x40 mL	VOA-glass	Store at 4° C, HCl to pH<2	1 ug/L		14 days
SVOCs	EPA 8270C	1x1 L	Glass-Amber	Store at 4° C	10 ug/L		7 days
Pesticides/PCBs	EPA 8081A/8082	1x1 L	Glass-Amber	Store at 4° C	0.1 ug/L		7 days
Herbicides	EPA 8151A	1x1 L	Glass-Amber	Store at 4° C	Check Lab		7 days
BOD	EPA 405.1	1x500 mL	Polypropylene	Store at 4° C	1 mg/L		48 hours
COD	EPA 410.4	1x250 mL	Glass-Amber	Store at 4° C, H ₂ SO ₄ to pH<2	5 mg/L		28 days
DO	SM 4500-O.G.	1x250 mL	Glass-Amber	Store at 4° C	Check Lab		8 hours
pH	EPA 150.1	1x100 mL	Polypropylene	None	Unitless		Immediate
Alkalinity	SM 2320B	1x250 mL	Polypropylene	Store at 4° C	1 mg/L		14 days
Metals (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, Se, Na, Th, Va, Zn)	EPA 6010B/7470A	1x250 mL	Polypropylene	Store at 4° C, HNO ₃ to pH<2	0.1 mg/L		6 months
Metals (Chromium VI)	EPA 7199	1x500 mL	Polypropylene	Store at 4° C	1ug/L		24 hours

Notes:

°C – Degrees Celsius

BOD – Biological Oxygen Demand

COD – Chemical Oxygen Demand

DO – Dissolved Oxygen

EPA – Environmental Protection Agency

HCl – Hydrogen Chloride

H₂SO₄ – Hydrogen Sulfide

HNO₃ – Nitric Acid

L – Liter

Mg/L – milligrams per liter

Ug/L – Micrograms per liter

mL – Milliliter

SVOC – Semi-Volatile Organic Compound

SM – Standard Method

VOC – Volatile Organic Compound





7.7.1.6 *Sample Analysis*

Samples shall be analyzed using the analytical methods identified in Table 7-8.

Samples will be analyzed by:

Laboratory Name: **Anachem Laboratories, LLC**
Street Address: **140 Standard Street**
City, State Zip: **El Segundo, CA 90245**
Telephone Number: **(310) 322-4993**
Point of Contact: **Staff**
ELAP Certification Number: **1164**

Samples will be delivered to the laboratory by:

Driven by QSP/QSP Delegate/Contractor	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
Picked up by Laboratory Courier	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Shipped	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No

7.7.1.7 *Data Evaluation and Reporting*

The QSP shall complete an evaluation of the water quality sample analytical results based on a comparison of the results to the unaffected sample [and to the TMDL NALs or NELs].

Runoff/downgradient results shall be compared with the associated upgradient/unaffected results and any associated run-on results. Should the runoff/downgradient 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. Any revisions to the BMPs shall be recorded as an amendment to the SWPPP.

Analytical results of non-visible pollutant monitoring shall be submitted to SMARTS within 30 days of obtaining the analytical results.

Results demonstrating an exceedance of an applicable TMDL-related NAL or NEL or Basin Plan parameter shall be submitted to SMARTS within 30 days of obtaining the analytical results (If applicable to the project).

The 2022 CGP prohibits stormwater discharges that contain hazardous substances equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4. 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 reported to the Regional Water Board and other agencies as required by 40 C.F.R. §§ 117.3 and 302.4.

7.7.1.8 *Data Evaluation and Reporting (For Projects Subject to TMDLs only)*

The QSP shall compare the runoff sample results to the applicable TMDL NALs and NELs to determine whether the TMDL NALs and NELs have been exceeded, see Table 7-9.





Table 7-9 TMDL NAL and NEL Exceedances

Standard	Exceedance Evaluation
TMDL NAL	An exceedance occurs on the second, and each subsequent, analytical result for samples taken from any and all discharge location(s) within the same drainage area, during the same reporting year and taken in accordance with Attachment D Section III.D.3, that is above the concentration set forth in an applicable NAL.
TMDL NEL	An exceedance occurs on the second, and each subsequent, analytical result for samples taken from any and all discharge location(s) within the same drainage area, during the same reporting year and taken in accordance with Attachment D Section III.D.3, that is above the concentration set forth in an applicable NEL.

In the event that the TMDL NAL or NEL is exceeded, the QSP shall immediately notify Charlie Yen and investigate the cause of the exceedance and identify corrective actions.

The LRP or DAR shall electronically report all analytical results to the State Water Board by the through SMARTS within 30 days of receiving the results. Exceedances of TMDL NALs and NELs shall be electronically reported to the State Water Board by the LRP or DAR through SMARTS within 10 days of receiving the results.

If requested by the Regional Water Board in writing, a TMDL NAL Exceedance report will be submitted within 30 days of the request. The TMDL NAL Exceedance Report must contain the following information:

- Analytical method(s), method reporting unit(s), and Method Detection Limit(s) of each parameter;
- Date, place, time of sampling, visual observation, and/or measurements, including precipitation; and
- Description of the current BMPs associated with the sample that exceeded the TMDL NAL, a description of each corrective action taken including photographs, and date of implementation.

In the event of a TMDL NEL exceedance, by the end of each reporting year, project shall implement the following water quality based corrective actions:

- Conducting a site assessment to identify pollutant source(s) within the site that are associated with construction activity and whether the BMPs described in the SWPPP have been properly implemented;
- Evaluating the SWPPP and its implementation to determine whether additional BMPs or SWPPP implementation measures are necessary to reduce or prevent pollutants in all regulated discharges to comply applicable NELs, and
- Certifying and submitting through SMARTS a report of the above site assessment and SWPPP evaluation that:
 - Additional BMPs or SWPPP implementation measures have been identified and included in the SWPPP, or
 - No additional BMPs or SWPPP implementation measures are required to reduce or prevent pollutants in all regulated discharges to comply with applicable NELs.



7.7.2 Sampling and Analysis Plan for pH and Turbidity in Stormwater Runoff Discharges

Sampling and analysis of runoff for pH and turbidity is required for this project. This Sampling and Analysis Plan describes the strategy for monitoring turbidity and pH levels of stormwater runoff discharges from the project site and run-on that may contribute to an exceedance of a Numeric Action Level (NAL).

Samples for pH and turbidity will be collected at all discharge points where stormwater is discharged off-site.

7.7.2.1 Sampling Schedule

Stormwater runoff samples shall be collected for pH and turbidity from each day of a qualifying precipitation event that results in a discharge from the project site. One sample from each discharge location will be collected each 24 hour period of active discharge during a qualifying precipitation event. Samples should be representative of the discharge flow and characteristics.

Run-on samples shall be collected whenever the QSP identifies that run-on has the potential to contribute to an exceedance of a NAL.

7.7.2.2 Sampling Locations

Sampling locations are based on the site runoff discharge locations and locations where run-on enters the site, accessibility for sampling, and personnel safety. Planned pH and turbidity sampling locations are shown on the Site Maps in Appendix A. **There are three (3) sampling location(s) on the project site and the contractor's yard have been identified for the collection of runoff samples.**

Table 7-10 Turbidity and pH Runoff Sample Locations

Sample Location Identifier	Sample Location Description	Sample Location Latitude and Longitude (Decimal Degrees)
D1	See the E&SC Plan	To be Field Determined
D2	See the E&SC Plan	To be Field Determined
D3	See the E&SC Plan	To be Field Determined

No sampling location(s) have been identified for the collection of run-on samples where the run-on has the potential to contribute to an exceedance of a NAL or a Receiving Water Monitoring Trigger. Table 7-11 identifies the run-on sample locations.

Table 7-11 Turbidity and pH Run-On Sample Locations

Sample Location Identifier	Sample Location Description	Sample Location Latitude and Longitude (Decimal Degrees)
	None	





7.7.2.3 Monitoring Preparation

Turbidity and pH samples will be collected and analyzed by:

QSP: Ken Kristoffersen	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
QSP: Jeff Woolston	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
QSP: Victor Chu	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
QSP: Alan Parks	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
QSP: Jan Heppert	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
QSP: Anthony Appel	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
QSP: Will Tisdale	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
QSP: Tanner Schnicke	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
QSP: Brett Woolston	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No

An adequate stock of monitoring supplies and equipment for monitoring turbidity and will be available on the project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool temperature environment that will not come into contact with rain or direct sunlight. The QSP or QSP Delegates will be available to collect samples in accordance with the sampling schedule. Supplies maintained at the project site will include, but are not limited to, field meters, extra batteries, clean powder-free nitrile gloves, sample collection equipment, appropriate sample containers, paper towels, personal rain gear, and *Effluent Sampling Field Log Sheets* and CoC forms provided in Appendix O.

The QSP or QSP Delegates will obtain and maintain the field-testing instruments, as identified in Section 7.7.2.6, for analyzing samples in the field. Field meter instructions are provided in Appendix P.



7.7.2.4 Field Parameters

Samples shall be analyzed for the constituents indicated in Table 7-12.

Table 7-12 Sample Collection and Analysis for Monitoring Turbidity and pH

Parameter	Test Method	Minimum Sample Volume ⁽¹⁾	Sample Collection Container Type	Detection Limit (minimum)
Turbidity	Field meter/probe with calibrated portable instrument	500 mL	Polypropylene or glass (Do not collect in meter sample cells)	1 NTU
pH	Field meter/probe with calibrated portable instrument or calibrated pH test kit	100 mL	Polypropylene	0.2 pH units

Notes: ⁽¹⁾Minimum sample volume recommended. Specific volume requirements will vary by instrument; check instrument manufacturer instructions.
L – Liter
mL – Milliliter
NTU – Nephelometric Turbidity Unit

7.7.2.5 Sample Collection

Samples of discharge shall be collected at the designated runoff and run-on sampling locations listed in Tables 7-10 and 7-11 shown on the Site Maps in Appendix A. Run-on samples shall be collected within close proximity of the point of run-on to the project.

Sample collection and handling requirements are described in Section 7.7.7.

7.7.2.6 Field Measurements

The collection and analysis of samples for field analysis, collection, analysis and the calibration of equipment shall be in accordance with the field instrument manufacturer's specifications.

Immediately following collection, samples for field analysis shall be tested in accordance with the field instrument manufacturer's instructions and results recorded on the *Effluent Sampling Field Log Sheet*.

The field instrument(s) listed in Table 7-13 will be used to analyze the following constituents:

Table 7-13 Field Instruments

Field Instrument (Manufacturer and Model)	Constituent
Oakton	pH
Lamott / Geotech	Turbidity

The manufacturers' instructions are included in Appendix P. Field sampling staff shall review the instructions prior to each sampling event and follow the instructions in completing measurement of the samples.

- The instrument(s) shall be maintained in accordance with manufacturer's instructions.
- The instrument(s) shall be calibrated before each sampling and analysis event.



- Maintenance and calibration records shall be maintained with the SWPPP.

The QSP may authorize alternate equipment provided that the equipment meets the 2022 CGP's **requirements and the manufacturers' instructions for calibration and use are added to Appendix P.**

7.7.2.7 *Data Evaluation and Reporting*

The LRP or DAR shall electronically report all stormwater pH and turbidity results to the State Water Board by the through SMARTS within 30 days of receiving the results. Exceedances of NALs shall be electronically reported to the State Water Board by the LRP or DAR through SMARTS within 10 days of receiving the results.

Numeric Action Levels

Compliance with the NALs for pH and turbidity is based on a single sample evaluation. A NAL exceedance occurs when any sample exceeds the turbidity NAL or is outside of the pH range shown in Table 7-14.

Table 7-14 Numeric Action Levels

Parameter	Unit	NAL
pH	pH units	Lower NAL < 6.5 Upper NAL > 8.5
Turbidity	NTU	>250

The QSP shall within 2 days of the sample collection submit copies of the completed *Effluent Sampling Field Log Sheets* to Charlie Yen's representative.

In the event that the pH or turbidity NAL is exceeded, the QSP shall immediately notify Charlie Yen's **representative** and investigate the cause of the exceedance and identify corrective actions. Exceedances of NALs shall be electronically reported to the State Water Board by the LRP or DAR through the SMARTS within 10 days of the conclusion of the storm event.

If requested by the Regional Water Board in writing, a NAL Exceedance report will be submitted within 30 days of the request. The NAL Exceedance Report must contain the following information:

- Analytical method(s), method reporting unit(s), and Method Detection Limit(s) of each parameter;
- Date, place, time of sampling, visual observation, and/or measurements, including precipitation; and
- An assessment of the existing BMPs associated with the sample that exceeded the NAL, a description of each corrective action taken including photographs, and date of implementation.

Receiving Water Monitoring Triggers

This project is not subject to Receiving Water Monitoring.

7.7.4 *Sampling and Analysis Plan for Dewatering Discharges*

No dewatering activities are planned for this project.

In the event that dewatering activities are required for the project, contact the QSD to revise the SWPPP accordingly.





7.7.5 *Sampling and Analysis Plan for Other Pollutants Required by the Regional Water Board*

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

7.7.6 *Training of Sampling Personnel*

QSP Delegates assigned to conduct sampling shall be trained by the QSP to collect, maintain, and ship samples in accordance with the 2022 CGP Sample Collection and Handling Instructions and supplemental information as needed. Training records of QSP Delegates assigned to sample are provided in Appendix I.

The QSP and QSP Delegates have received the following stormwater sampling training:

Name	Training
Jeff Woolston	QSP/QSD/CISEC/CPESC/WPCM
Ken Kristoffersen	QSP/QSD/CISEC/CPESC/ToR
Victor Chu	QSP/QSD/CISEC/CPESC
Alan Parks	QSP/CISEC
Jan Heppert	QSP/CISEC
Anthony Appel	QSP / CISEC
Will Tisdale	QSP / MS Hatch
Tanner Schnick	QSP / MS Hatch
Brett Woolston	QSP / MS Hatch

The QSP and QSP Delegates have the following stormwater sampling experience:

Name	Experience
Jeff Woolston	14 Years
Ken Kristoffersen	24 Years
Victor Chu	8 Years
Alan Parks	12 Years
Jan Heppert	10 Years
Anthony Appel	3 Years
Will Tisdale	~2 Years
Tanner Schnick	~2 Years
Brett Woolston	~2 Years





7.7.7 *Sample Collection and Handling*

7.7.7.1 *Sample Collection*

Samples shall be collected at the designated sampling locations shown on the Site Maps and listed in the preceding sections. Samples shall be collected, maintained and shipped in accordance with the 2022 CGP Sample Collection and Handling Instructions.

Grab samples shall be collected and preserved in accordance with the methods identified in preceding sections.

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

- Collect samples (for laboratory analysis) in analytical laboratory-provided or specified sample containers;
 - Use of any other type of containers could cause sample contamination and may result in NAL or NEL exceedances.
- Wear clean, powder-free nitrile gloves when collecting samples;
- Change gloves whenever something not known to be clean has been touched;
- Change gloves between sampling locations;
- Decontaminate all equipment (e.g., bucket, tubing) prior to sample collection;
 - using a trisodium phosphate water wash, distilled water rinse, and final rinse with distilled water..
 - Dispose of wash and rinse water appropriately (i.e., do not discharge to storm drain or receiving water).
 - Do not decontaminate laboratory provided sample containers;
- Do not smoke during sampling events;
- Never sample near a running vehicle;
- Do not park vehicles in the immediate sample collection area (even non-running vehicles);
- Do not eat or drink during sample collection; and
- Do not breathe, sneeze, or cough in the direction of an open sample container.

The most important aspect of grab sampling is to collect a sample that represents the entire runoff stream. Typically, samples are collected by dipping the collection container in the runoff flow paths and streams as noted below.

- i. For small streams and flow paths, simply dip the bottle facing upstream until full.
- ii. For larger stream that can be safely accessed, collect a sample in the middle of the flow stream by directly dipping the mouth of the bottle. Once again making sure that the opening of the bottle is facing upstream as to avoid any contamination by the sampler.
- iii. For larger streams that cannot be safely waded, pole-samplers may be needed to safely access the representative flow.
- iv. Avoid collecting samples from ponded, sluggish or stagnant water.
- v. Avoid collecting samples directly downstream from a bridge as the samples can be affected by the bridge structure or runoff from the road surface.

Note, that depending upon the specific analytical test, some containers may contain preservatives. These containers should never be dipped into the stream but filled indirectly from the collection container.





7.7.7.2 *Sample Handling*

Turbidity and pH measurements must be conducted immediately. Do not store turbidity or pH samples for later measurement.

Samples for laboratory analysis must be handled as follows. Immediately following sample collection:

- Cap sample containers;
- Complete sample container labels;
- Place sealed containers in a re-sealable storage bag;
- Place sample containers into an ice-chilled cooler;
- Document sample information on the *Effluent Sampling Field Log Sheet* (Appendix O); and
- Complete the CoC.

All samples for laboratory analysis must be maintained between 0-6 degrees Celsius during delivery to the laboratory. Samples must be kept on ice, or refrigerated, from sample collection through delivery to the laboratory. Place samples to be shipped inside coolers with ice. Make sure the sample bottles are well packaged to prevent breakage and secure cooler lids with packaging tape.

Ship samples that will be laboratory analyzed to the analytical laboratory right away. Hold times are measured from the time the sample is collected to the time the sample is analyzed. The 2022 CGP requires that samples be received by the analytical laboratory within 48 hours of the physical sampling (unless required sooner by the analytical laboratory to meet all hold times).

Laboratory Name: **Anachem Laboratories, LLC**

Address: **140 Standard Street**

City, State Zip: **El Segundo, CA 90245**

Telephone: **(310) 322-4993**

Point of Contact: **Staff**

ELAP: **1164**

7.7.7.3 *Sample Documentation Procedures*

All original data documented on sample container identification labels, *Effluent Sampling Field Log Sheet* (Appendix O), and CoCs shall be recorded using waterproof ink. These shall be considered accountable documents. If an error is made on an accountable document, the individual shall make corrections by lining through the error and entering the correct information. The erroneous information shall not be obliterated. All corrections shall be initialed and dated.

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 in the *Effluent Sampling Field Log Sheet*.

Sample documentation procedures include the following:

Sample Bottle Identification Labels: Sampling personnel shall attach an identification label to each sample bottle. Sample identification shall uniquely identify each sample location. (These location identifiers should be listed in the tables in the SWPPP.)





Field Log Sheets: Sampling personnel shall complete the *Effluent Sampling Field Log Sheet* and *Receiving Water Sampling Field Log Sheet* (Appendix O) for each sampling event, as appropriate.

Chain of Custody: Sampling personnel shall complete the CoC for each sampling event for which samples are collected for laboratory analysis. The sampler will sign the CoC (Appendix O) when the sample(s) is turned over to the testing laboratory or courier.

7.8 Active Treatment System Monitoring

Will an Active Treatment System (ATS) be deployed on the site?

Yes No

This project does not require a project specific Sampling and Analysis Plan for an ATS because deployment of an ATS is not planned.

7.9 Passive Treatment Monitoring

Will passive treatment technologies be deployed on the site?

Yes No

This project does not require a project specific Sampling and Analysis Plan for passive treatment because deployment of passive treatment is not planned.

7.10 Watershed Monitoring Option

This project is not participating in a watershed monitoring option.

7.11 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.

7.11.1 *Field Logs*

The purpose of field logs is to record sampling information and field observations during monitoring that may explain any uncharacteristic analytical results. Sampling information to be included in the field log include the date and time of water quality sample collection, sampling personnel, sample container identification numbers, and types of samples that were collected. Field observations should be noted in the field log for any abnormalities at the sampling location (color, odor, BMPs, etc.). Field measurements for pH and turbidity should also be recorded in the field log. A Visual Inspection Field Log, an Effluent Sampling Field Log Sheet, are included in Appendix O.

7.11.2 *Clean Sampling Techniques*

Clean sampling techniques involve the use of certified clean containers for sample collection and clean powder-free nitrile gloves during sample collection and handling. As discussed in





Section 7.7.7, adoption of a clean sampling approach will minimize the chance of field contamination and questionable data results.

7.11.3 *Chain of Custody*

The sample CoC is an important documentation step that tracks samples from collection through analysis to ensure the validity of the sample. Sample CoC procedures include the following:

- Proper labeling of samples;
- Use of CoC forms for all samples; and
- Prompt sample delivery to the analytical laboratory.

Analytical laboratories usually provide CoC forms to be filled out for sample containers. An example CoC is included in Appendix O.

7.11.4 *QA/QC Samples*

QA/QC samples provide an indication of the accuracy and precision of the sample collection; sample handling; field measurements; and analytical laboratory methods. The following types of QA/QC will be conducted for this project:

- Field Duplicates at a frequency of 1 duplicate minimum per sampling event
(Required for all sampling plans with field measurements or laboratory analysis)
- Equipment Blanks at a frequency of 1 duplicate minimum per sampling event
(Only needed if the equipment used to collect samples could add the pollutants to sample)
- Field Blanks at a frequency of 1 duplicate minimum per sampling event
(Only required if sampling method calls for field blanks)
- Travel Blanks at a frequency of 1 duplicate minimum per sampling event
(Required for sampling plans that include VOC laboratory analysis)

7.11.4.1 *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 has been collected. Duplicate samples must be collected in the same manner and as close in time as possible to the original sample. Duplicate samples shall not influence any evaluations or conclusion.

7.11.4.2 *Equipment Blanks*

Equipment blanks provide verification that equipment has not introduced a pollutant into the sample. Equipment blanks are typically collected when:

- New equipment is used;
- Equipment that has been cleaned after use at a contaminated site;
- Equipment that is not dedicated for surface water sampling is used; or
- Whenever a new lot of filters is used when sampling metals.

7.11.4.3 *Field Blanks*

Field blanks assess potential sample contamination levels that occur during field sampling activities. De-ionized water field blanks are taken to the field, transferred to the appropriate



container, and treated the same as the corresponding sample type during the course of a sampling event.

7.11.4.4 *Travel Blanks*

Travel blanks assess the potential for cross-contamination of volatile constituents between sample containers during shipment from the field to the laboratory. De-ionized water blanks are taken along for the trip and held unopened in the same cooler with the VOC samples.

7.11.5 *Data Verification*

After results are received from the analytical laboratory, the QSP or QSP Delegates 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.
Make sure all requested analyses were performed and all samples are accounted for in the reports.
- Check laboratory reports to make sure hold times were met and that the reporting levels meet or are lower than the reporting levels agreed to in the contract.
- Check data for outlier values and follow up with the laboratory.
Occasionally typographical errors, unit reporting errors, or incomplete results are reported and should be easily detected. These errors need to be identified, clarified, and corrected quickly by the laboratory. The QSP or QSP Delegates should especially note data that is an order of magnitude or more different than similar locations or is inconsistent with previous data from the same location.
- Check laboratory QA/QC results.
EPA establishes QA/QC checks and acceptable criteria for laboratory analyses. These data are typically reported along with the sample results. The QSP or QSP Delegates shall evaluate the reported QA/QC data to check for contamination (method, field, and equipment blanks), precision (laboratory matrix spike duplicates), and accuracy (matrix spikes and laboratory control samples). When QA/QC checks are outside acceptable ranges, the laboratory must flag the data, and usually provides an explanation of the potential impact to the sample results.
- Check the data set for outlier values and, accordingly, confirm results and re-analyze samples where appropriate.
Sample re-analysis should only be undertaken when it appears that some part of the QA/QC resulted in a value out of the accepted range. Sample results may not be discounted unless the analytical laboratory identifies the required QA/QC criteria were not met and confirms this in writing.

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

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





7.12 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 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 measurements, including precipitation;
- The individual(s) who performed the inspections, sampling, visual observation, and/or field measurements;
- The date and approximate time of field measurements and laboratory analyses;
- The individual(s) who performed the laboratory analyses;
- A summary of all analytical results, the method detection limits and reporting limits, and the analytical techniques or methods used;
- Rain gauge readings from site inspections;
- QA/QC records and results;
- Calibration records;
- Visual observation and sample collection exception records;
- The records of any corrective actions and follow-up activities that resulted from analytical results, visual observations, or inspections;
- Dewatering notifications to the Regional Water Board (if applicable to this project);
- Dewatering exception notifications to the Regional Water Board and local stormwater agency (if applicable to this project);
- NAL Exceedance Report (if applicable to project);
- NEL water quality based corrective action reports (if applicable to this project); and
- Add specific records required by TMDLs (if applicable to project).





Section 8 References

Project Plans prepared by RJR Engineering and Consulting, Inc. dated 06/27/2025.

SWRCB (State Water Resources Control Board). (2022). Order 2022-0057-DWQ, NPDES General Permit No. CAS000002: Stormwater Discharges Associated with Construction and Land Disturbing Activities. Available online at:

https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html.

CASQA 2023. *Stormwater BMP Handbook: Construction*. Available online at: www.casqa.org

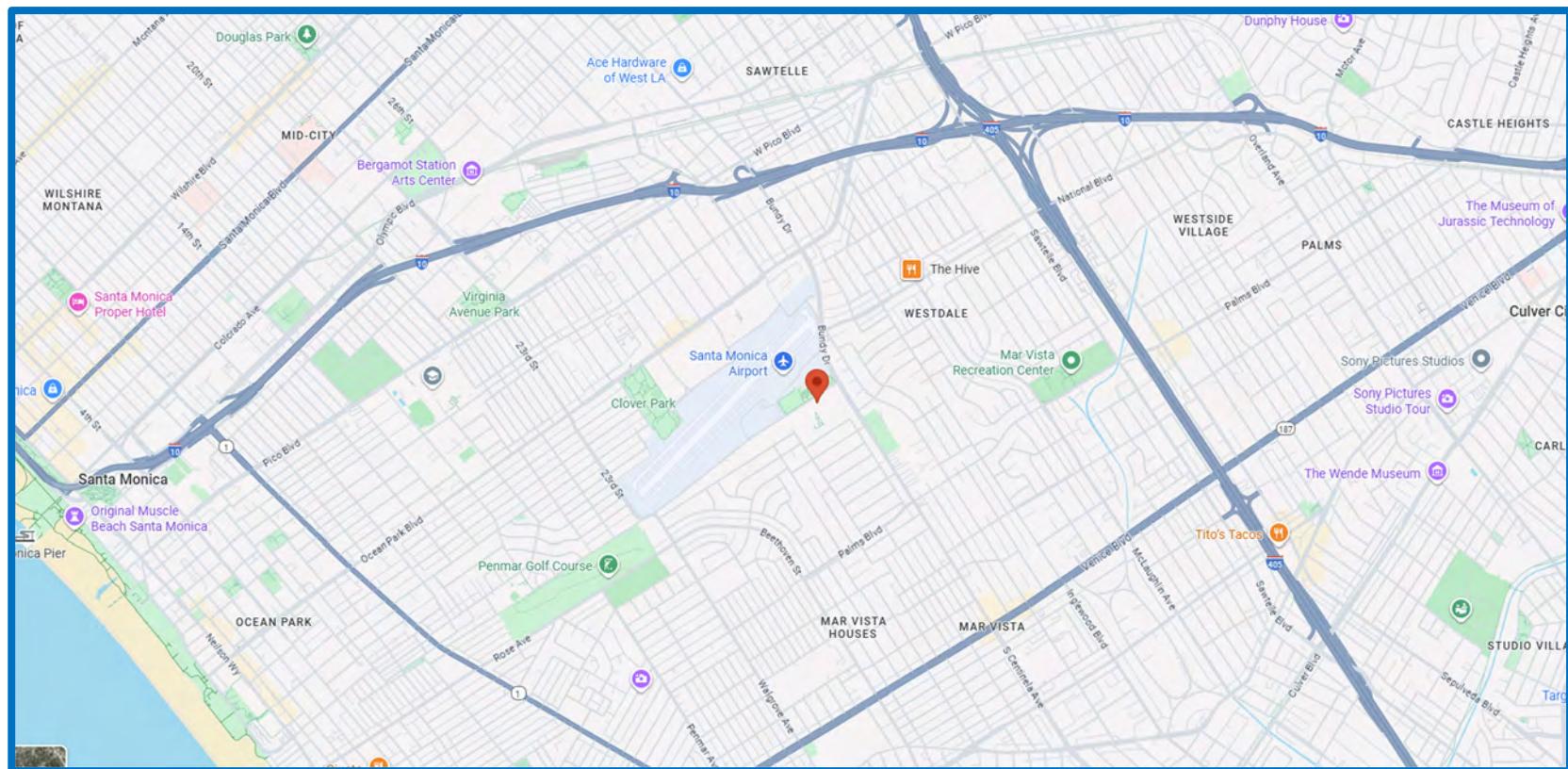




Appendix A: Site Maps and Drawings



Vicinity Map

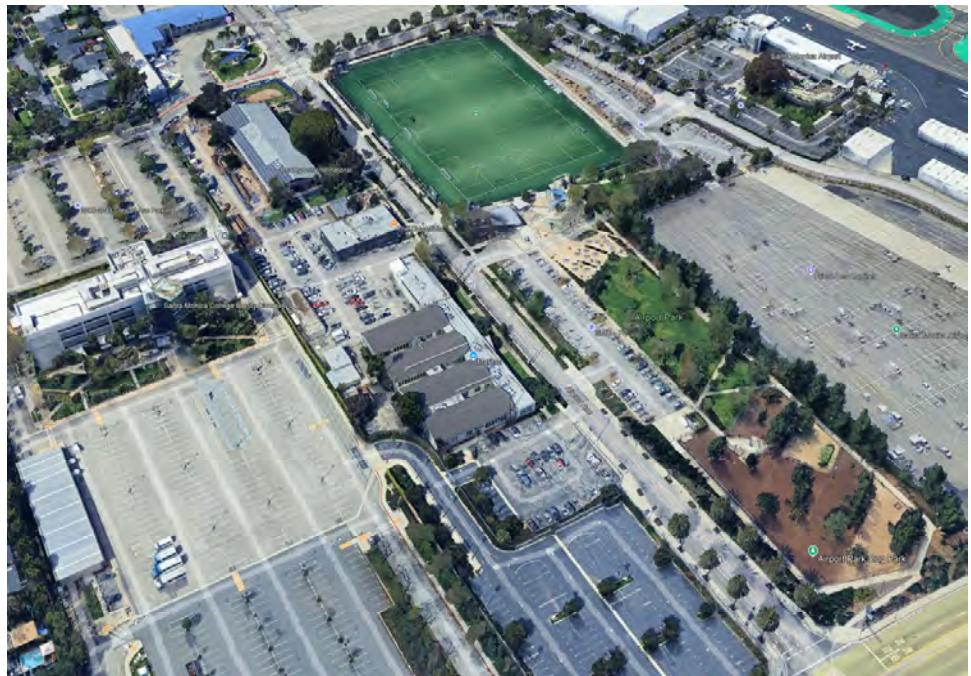


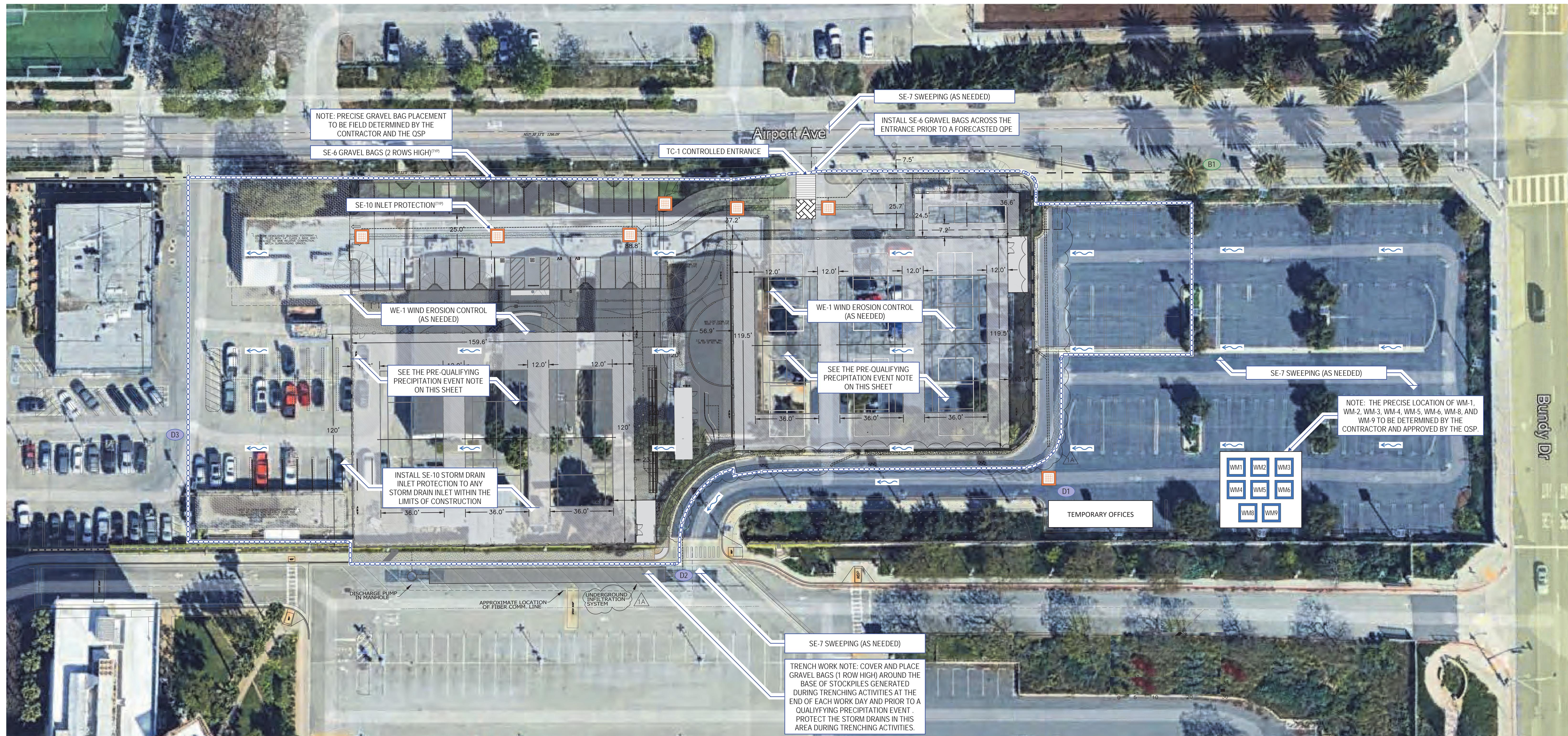
Aerial Photos



3400 Airport Ave, Santa Monica, CA 90405





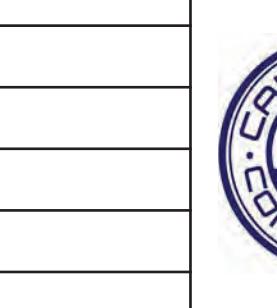


BMP LEGEND:	
	DIRECTION OF FLOW
	POTENTIAL DISCHARGE LOCATION
	POTENTIAL BACKGROUND SAMPLING LOCATION
	SE-6 GRAVEL BAGS (2 ROWS HIGH)
	SE-10 DRAIN INLET PROTECTION
	TC-1 CONTROLLED ENTRANCE/EXIT
	WM-1 MATERIAL DELIVERY AND STORAGE
	WM-2 MATERIAL USE
	WM-3 STOCKPILE MANAGEMENT
	WM-4 SPILL PREVENTION AND CONTROL
	WM-5 WASTE MANAGEMENT
	WM-6 HAZARDOUS WASTE MANAGEMENT
	WM-7 SANITARY WASTE MANAGEMENT
	WM-8 LIQUID WASTE MANAGEMENT
	WM-9 SANITARY WASTE MANAGEMENT
	WM-10 LIQUID WASTE MANAGEMENT

SEDIMENT & EROSION CONTROL NOTES:

- PROJECT IS A RISK LEVEL 2
- ENSURE EFFECTIVE TRACKING CONTROL
- ENSURE EFFECTIVE INLET PROTECTION
- ENSURE EFFECTIVE PERIMETER CONTROL
- ENSURE EFFECTIVE WASTE MGMT
- ENSURE EFFECTIVE CONCRETE WASTE MGMT
- ENSURE EFFECTIVE SANITARY WASTE MGMT
- ENSURE EFFECTIVE STOCKPILE MANAGEMENT
- ENSURE EFFECTIVE DUST CONTROL

REVISION	DATE	DESCRIPTION

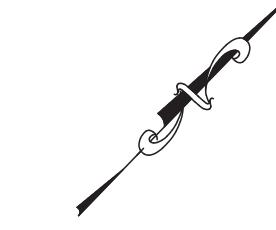


PREPARED BY:
CAL-STORM COMPLIANCE, INC.
28562 OSO PKWY, D-508
RANCHO SANTA MARGARITA, CA 92688
(949) 354-5530
DESIGNED BY: JEFF WOOLSTON, QSD 26764
REVIEWED BY: KEN KRISTOFFERSEN, QSD 00207

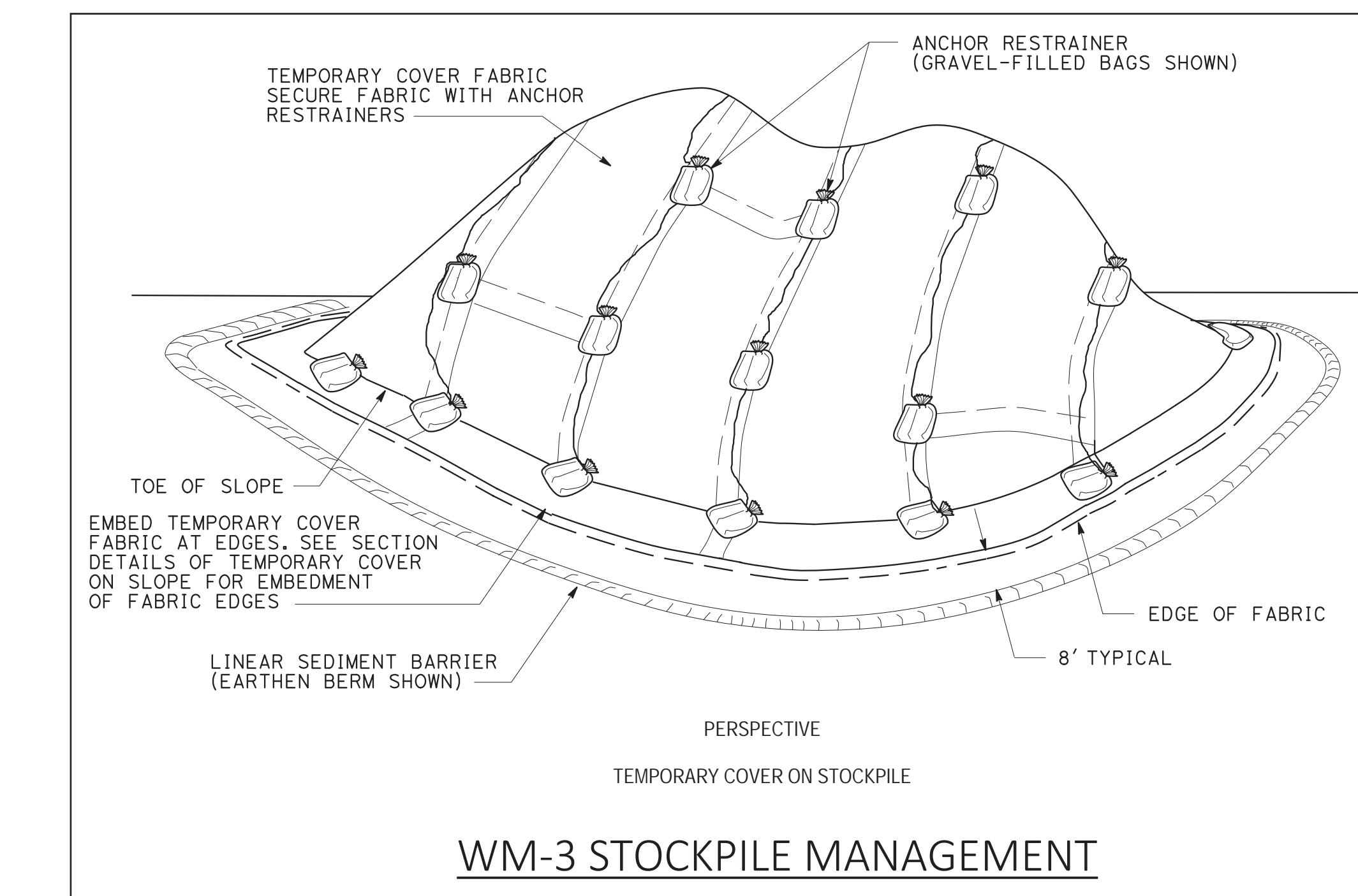
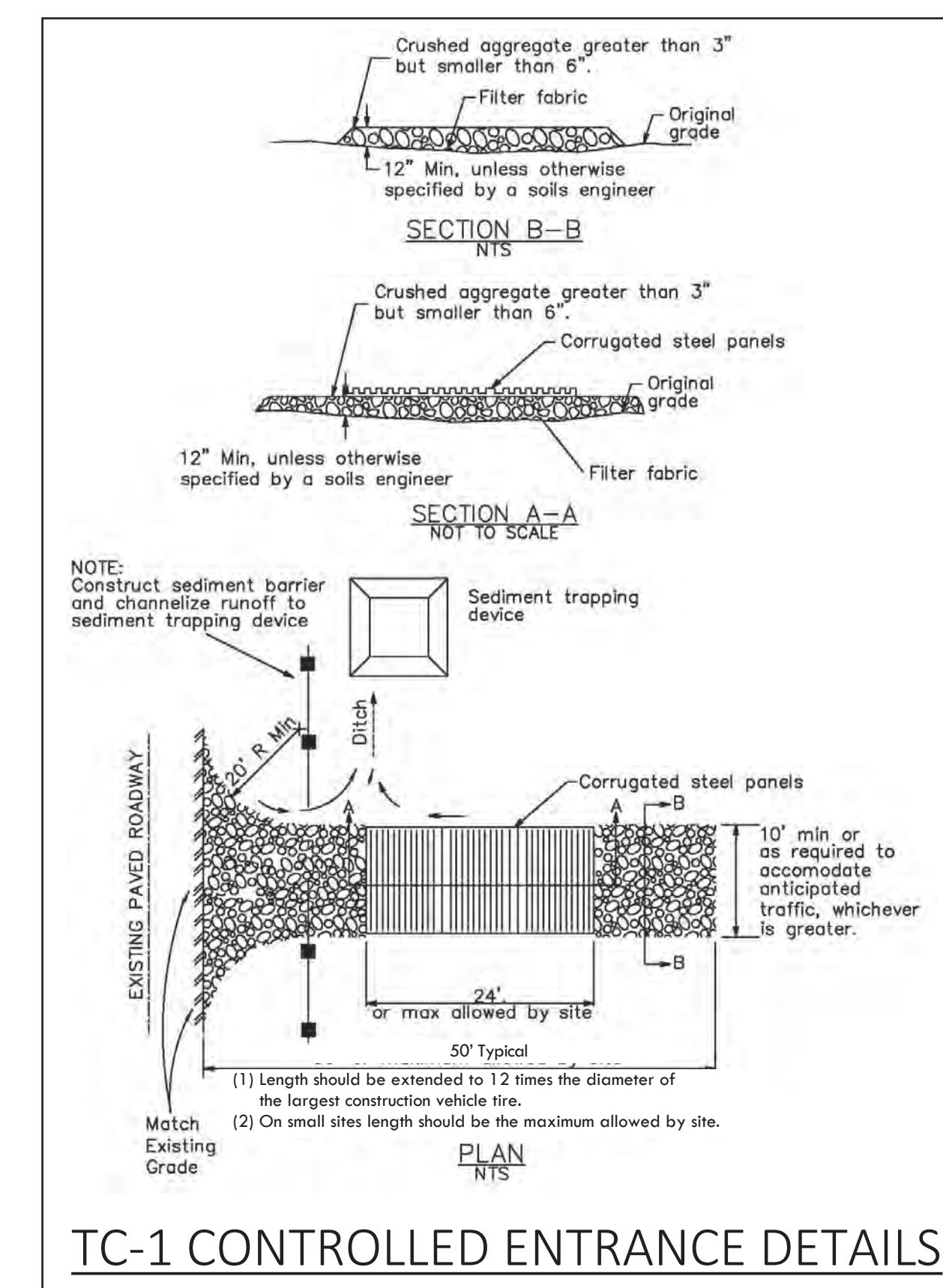
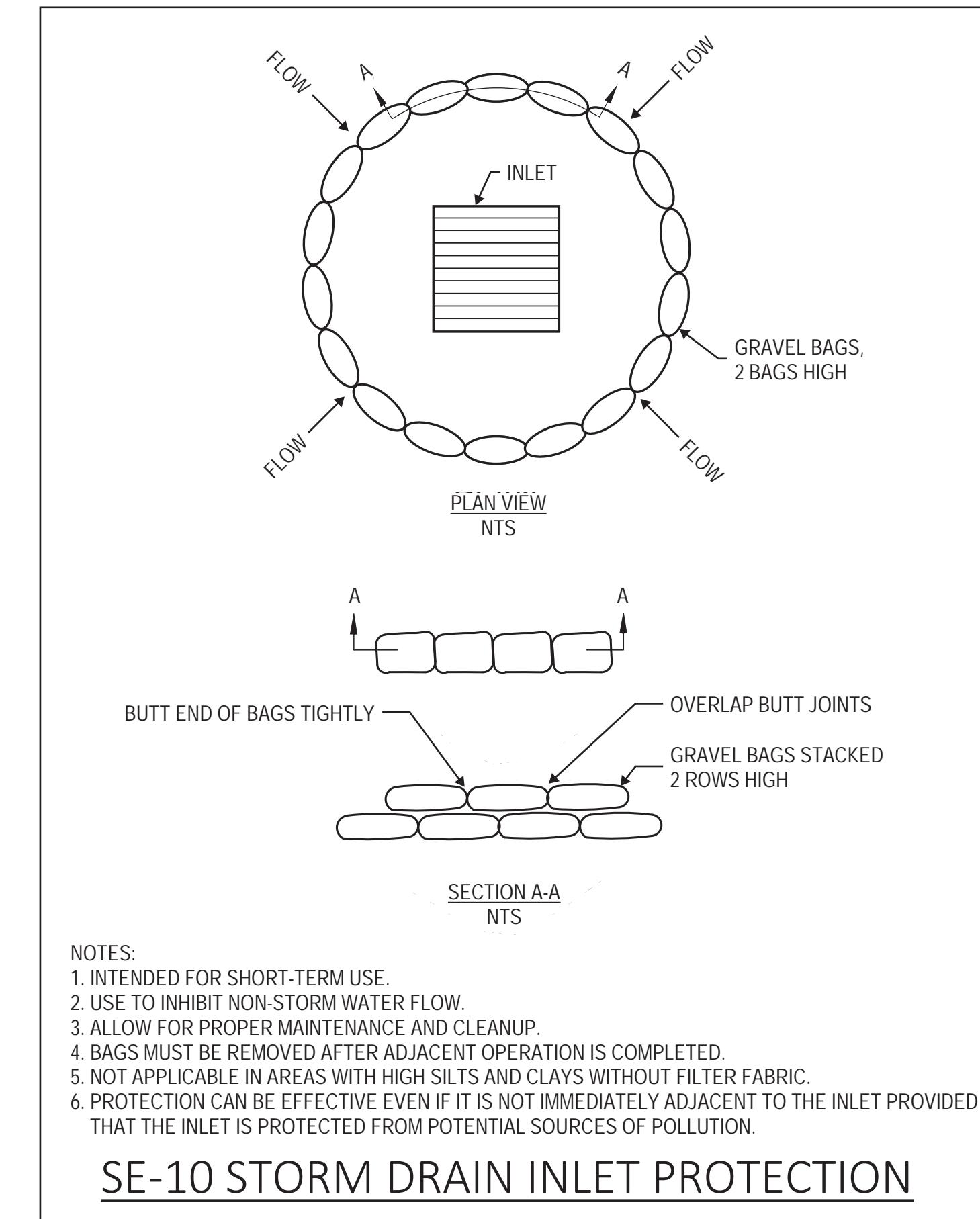
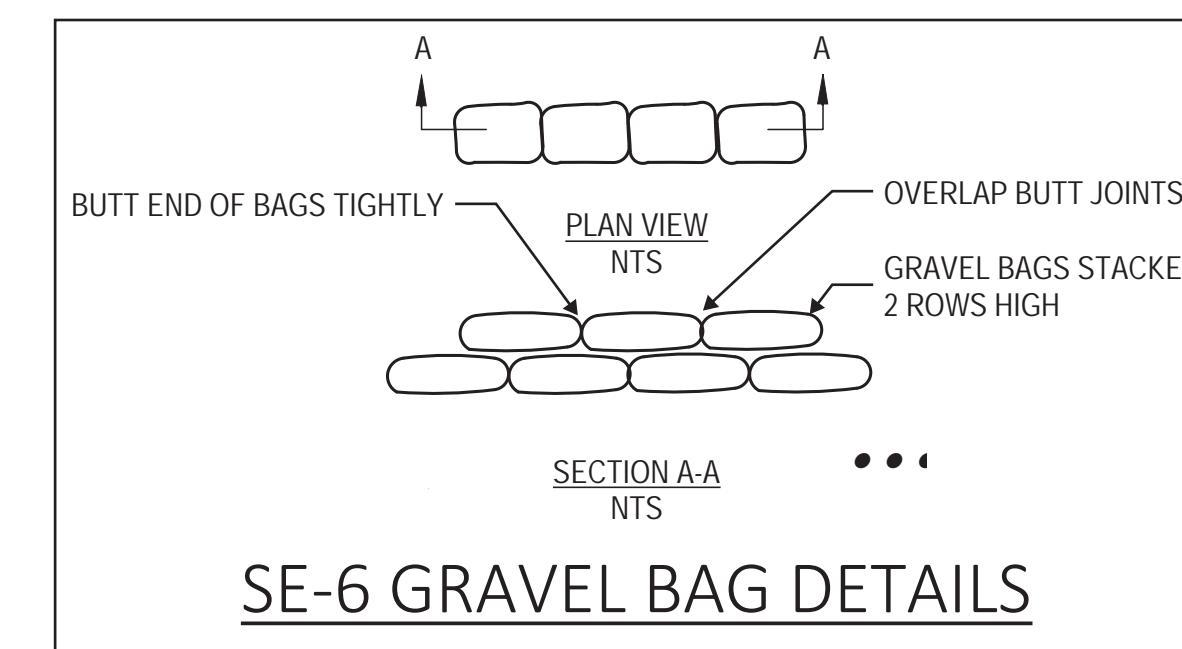
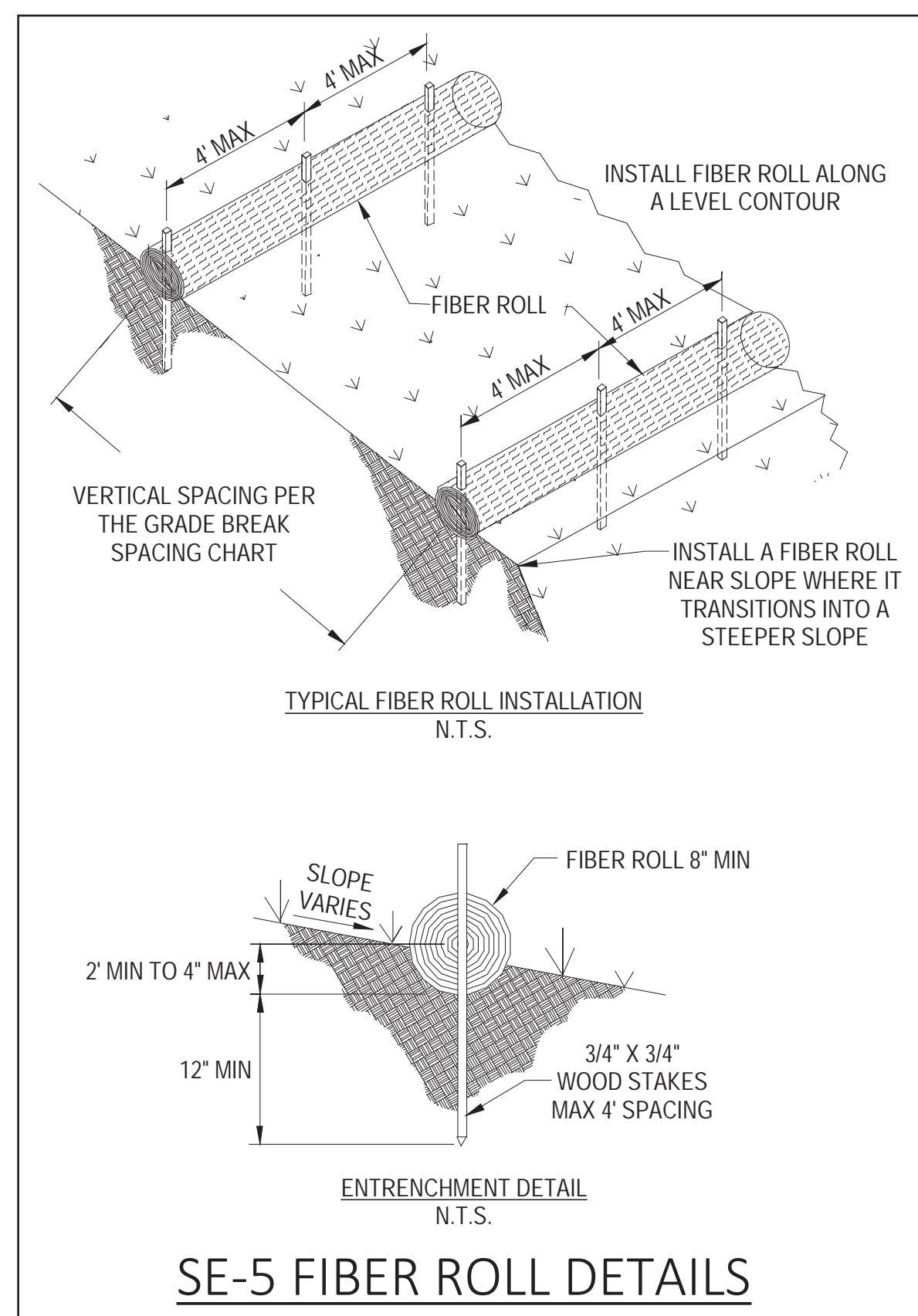
SANTA MONICA COLLEGE
1900 PICO BLVD
SANTA MONICA, CA 90405
(310) 434-3002

EROSION AND SEDIMENT CONTROL PLAN
SANTA MONICA COLLEGE BUNDY CAMPUS TENNIS / PICKLEBALL COURTS
3400 AIRPORT AVE
SANTA MONICA, CA 90405
BMP PLANS

DATE PREPARED:
01/05/2026
SHEET
1 OF 2



0 5 10 20 30



REVISION	DATE	DESCRIPTION



PREPARED BY:
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(949) 354-5530
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EROSION AND SEDIMENT CONTROL PLAN
SANTA MONICA COLLEGE BUNDY CAMPUS TENNIS / PICKELBALL COURTS
3400 AIRPORT AVE
SANTA MONICA, CA 90405

BMP DETAILS

DATE PREPARED:
01/05/2026
SHEET
2 OF 2



Appendix B: Permit Registration Documents

Permit Registration Documents included in this Appendix:

Location in SWPPP	Permit Registration Document (in addition to a copy of the SWPPP)
Appendix B	Notice of Intent
Appendix L	Risk Level Determination
Appendix B	Certification
Appendix B	Post-Construction Requirements, if applicable
Appendix B	Post-Construction Water Balance Calculator, if applicable
Appendix B	Copy of Annual Fee Receipt
N/A	ATS Design Documents, if applicable
N/A	Passive Treatment Design Documents, if applicable
Appendix A	Site Maps and Drawings, see Appendix A

INPUT FOR DRAINAGE AREA: Enter drainage area details and click on the 'Compute & Save' button.

I.a. Name:

I.b. County:

I.c. Closest Rain Gauge Location:

I.d. Size of Drainage Area (acres):

Pre-Construction:

I.e. Dominant Soil Type:

I.f. Existing Dominant Non-built Land Use Type:

I.g. Existing Rooftop Impervious Area (acres):

I.h. Existing Non-rooftop Impervious Area (acres):

Existing Imperviousness (%):

Post-Construction:

I.i. Proposed Dominant Non-built Land Use Type:

I.j. Proposed Rooftop Impervious Area (acres):

I.k. Proposed Non-rooftop Impervious Area (acres):

Proposed Imperviousness (%):



Annual Fee for Stormwater Permits – 2025/26
Stormwater Construction Annual Fees by Acre

Partial acreage rounded to the nearest whole number

Acres	FY 2025 26						
0	\$511	51	\$3,265	101	\$5,965	151	\$8,665
1	\$565	52	\$3,319	102	\$6,019	152	\$8,719
2	\$619	53	\$3,373	103	\$6,073	153	\$8,773
3	\$673	54	\$3,427	104	\$6,127	154	\$8,827
4	\$727	55	\$3,481	105	\$6,181	155	\$8,881
5	\$781	56	\$3,535	106	\$6,235	156	\$8,935
6	\$835	57	\$3,589	107	\$6,289	157	\$8,989
7	\$889	58	\$3,643	108	\$6,343	158	\$9,043
8	\$943	59	\$3,697	109	\$6,397	159	\$9,097
9	\$997	60	\$3,751	110	\$6,451	160	\$9,151
10	\$1,051	61	\$3,805	111	\$6,505	161	\$9,205
11	\$1,105	62	\$3,859	112	\$6,559	162	\$9,259
12	\$1,159	63	\$3,913	113	\$6,613	163	\$9,313
13	\$1,213	64	\$3,967	114	\$6,667	164	\$9,367
14	\$1,267	65	\$4,021	115	\$6,721	165	\$9,421
15	\$1,321	66	\$4,075	116	\$6,775	166	\$9,475
16	\$1,375	67	\$4,129	117	\$6,829	167	\$9,529
17	\$1,429	68	\$4,183	118	\$6,883	168	\$9,583
18	\$1,483	69	\$4,237	119	\$6,937	169	\$9,637
19	\$1,537	70	\$4,291	120	\$6,991	170	\$9,691
20	\$1,591	71	\$4,345	121	\$7,045	171	\$9,745
21	\$1,645	72	\$4,399	122	\$7,099	172	\$9,799
22	\$1,699	73	\$4,453	123	\$7,153	173	\$9,853
23	\$1,753	74	\$4,507	124	\$7,207	174	\$9,907
24	\$1,807	75	\$4,561	125	\$7,261	175	\$9,961
25	\$1,861	76	\$4,615	126	\$7,315	176	\$10,015
26	\$1,915	77	\$4,669	127	\$7,369	177	\$10,069
27	\$1,969	78	\$4,723	128	\$7,423	178	\$10,123
28	\$2,023	79	\$4,777	129	\$7,477	179	\$10,177
29	\$2,077	80	\$4,831	130	\$7,531	180	\$10,231
30	\$2,131	81	\$4,885	131	\$7,585	181	\$10,285
31	\$2,185	82	\$4,939	132	\$7,639	182	\$10,339
32	\$2,239	83	\$4,993	133	\$7,693	183	\$10,393
33	\$2,293	84	\$5,047	134	\$7,747	184	\$10,447
34	\$2,347	85	\$5,101	135	\$7,801	185	\$10,501
35	\$2,401	86	\$5,155	136	\$7,855	186	\$10,555
36	\$2,455	87	\$5,209	137	\$7,909	187	\$10,609
37	\$2,509	88	\$5,263	138	\$7,963	188	\$10,663
38	\$2,563	89	\$5,317	139	\$8,017	189	\$10,717
39	\$2,617	90	\$5,371	140	\$8,071	190	\$10,771
40	\$2,671	91	\$5,425	141	\$8,125	191	\$10,825
41	\$2,725	92	\$5,479	142	\$8,179	192	\$10,879
42	\$2,779	93	\$5,533	143	\$8,233	193	\$10,933
43	\$2,833	94	\$5,587	144	\$8,287	194	\$10,987
44	\$2,887	95	\$5,641	145	\$8,341	195	\$11,041
45	\$2,941	96	\$5,695	146	\$8,395	196	\$11,095
46	\$2,995	97	\$5,749	147	\$8,449	197	\$11,149
47	\$3,049	98	\$5,803	148	\$8,503	198	\$11,203
48	\$3,103	99	\$5,857	149	\$8,557	199	\$11,257
49	\$3,157	100	\$5,911	150	\$8,611	200+	\$11,311





Appendix C: SWPPP Amendment QSD Certifications



SWPPP Amendment
No. _____

Project Name: Santa Monica College Bundy Campus Tennis - Pickleball Courts

Project Number: 03-124602

Qualified SWPPP Developer's Certification of the
Stormwater Pollution Prevention Plan Amendment

“This Stormwater Pollution Prevention Plan and its appendices were prepared under my direction to meet the requirements of the 2022 CGP (SWRCB Order No. 2022-0057-DWQ). I certify that I am a Qualified SWPPP Developer in good standing as of the date signed below.”

QSD's Signature

Date

QSD Name

QSD Certificate Number

Title and Affiliation

Telephone

Address

Email



Appendix D: Submitted Changes of Information





Log of Updated PRDs

The 2022 CGP allows for the reduction or increase of the total acreage when a portion of the project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the project is purchased by a different entity; or when new acreage is added to the project.

A Change of Information (COI) shall be filed electronically within the timeframe shown in the table below. The SWPPP shall be modified appropriately, with revisions and amendments recorded in the SWPPP Amendment Log at the front of the SWPPP. COIs submitted electronically via SMARTS can be found in this Appendix.

Reason for Filing COI	Timeline for Filing COI
Reduction or increase in total disturbed area	Within 30 days of the reduction or increase
Updating site specific BMPs	Within 14 days of design change
Change construction start or end date	At least 14 days prior to the date to be changed
Post-construction plans updated or approved by the municipal stormwater permittee	Within 14 days of approval

This appendix includes all of the following updated PRDs (check all that apply):

- Change of Information;
- Revised Site Map;
- Revised Risk Assessment;
- New landowner's information (name, address, phone number, email address); and
- New signed certification statement.

Signature of Legally Responsible Person, or
Authorized Representative of Legally Responsible
Person or Duly Authorized Representative

Date

Name of Legally Responsible Person, or Authorized
Representative of Legally Responsible Person or
Duly Authorized Representative

Telephone Number



Appendix E: Construction Schedule





Appendix F: Construction Activities, Materials Used, and Associated Pollutants





Table F.1 Pollutant Source Assessment Form

Phase	Activity	Associated Materials or Pollutants	Pollutant Category ⁽¹⁾
Demolition and Pre- Development Site Preparation Phase	Removal of existing structures	Demolition of asphalt, concrete, masonry, framing, roofing, metal structures.	Metals, Oil and Grease, Synthetic Organics
	Sanitary waste	Portable toilets, Disturbance of existing sewer lines.	Nutrients
	Solid waste	Litter, trash and debris, Vegetation	Gross Pollutants
	Vehicle and equipment use	Equipment operation, Equipment maintenance, Equipment washing, Equipment fueling	Oil and Grease
	Building Demolition	Demolition debris built between 1950-1980. Demolition debris from buildings with lead paint	Lead PCBs
Grading and Land Development	Sanitary waste	Portable toilets, Disturbance of existing sewer lines.	Nutrients
	Soil preparation/amendments	Use of soil additives/amendments	Nutrients
	Solid waste	Litter, trash and debris, Vegetation	Gross Pollutants
	Vehicle and equipment use	Equipment operation, Equipment maintenance, Equipment washing, Equipment fueling	Oil and Grease
Streets and Utilities Phase	Asphalt Paving	Hot and cold mix asphalt	Oil and Grease
	Concrete / Masonry	Cement and brick dust, Colored chalks, Concrete curing compounds, Glazing compounds, Surfaces cleaners, Saw cut slurries, Tile cutting,	Metals, Synthetic Organics
	Sanitary waste	Portable toilets	Nutrients



		Disturbance of existing sewer lines.	
	Solid waste	Litter, trash and debris, Vegetation	Gross Pollutants
	Utility line testing and flushing	Hydrostatic test water, Pipe flushing	Synthetic Organics
	Vehicle and equipment use	Equipment operation, Equipment maintenance, Equipment washing, Equipment fueling	Oil and Grease
Vertical Construction Phase	General Construction	Adhesives, glues, resins, epoxy synthetics, PVC cement, Caulks, sealers, putty, sealing agents and Coal tars (naphtha, pitch)	Oil and Grease, Synthetic Organics1
	General Construction	Polishes (metal, ceramic, tile), Etching agents, Cleaners, ammonia, lye, caustic sodas, bleaching agents and chromate salts	Metals, Synthetic Organics
	Drywall	Saw-cutting drywall	Metals
	Framing/Carpentry	Sawdust, particle board dust, and treated woods, Saw cut slurries	Metals, Synthetic Organics
	Heating, Ventilation, Air Conditioning	Demolition or construction of air condition and heating systems	Metals, Synthetic Organics
	Insulation	Demolition or construction involving insulation, venting systems	Metals, Synthetic Organics
	Painting	Paint thinners, acetone, methyl ethyl ketone, stripper paints, lacquers, varnish, enamels, turpentine, gum spirit, solvents, dyes, stripping pigments and sanding	Metals, Synthetic Organics
	Plumbing	Solder (lead, tin), flux (zinc chloride), pipe fitting, Galvanized metal in nails, fences, and electric wiring	Metals, Synthetic Organics
	Sanitary waste	Portable toilets, Disturbance of existing sewer lines.	Nutrients



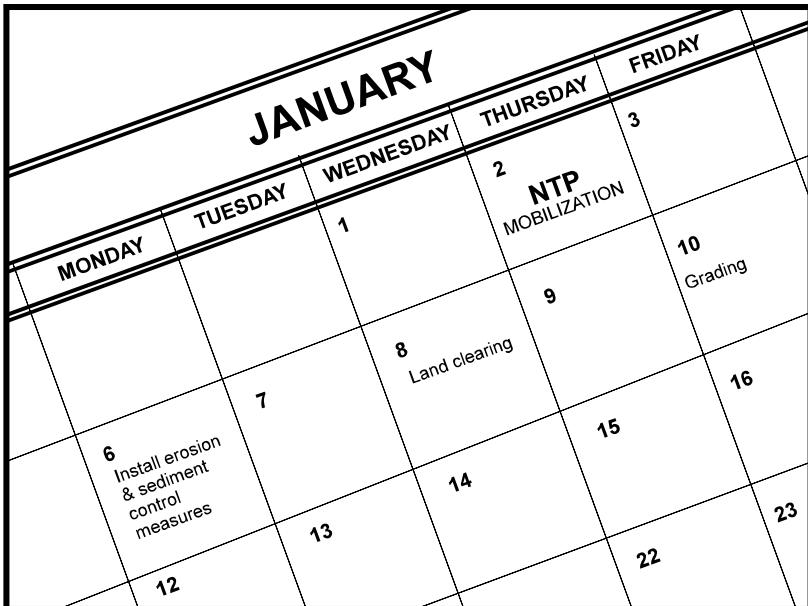


Final Landscaping and Site Stabilization Phase	Landscape construction	Wash waters, Irrigation line, testing/flushing	Metals, Synthetic Organics
	Planting / Vegetation Management	Vegetation control (pesticides/herbicides), Planting, Plant maintenance, Vegetation removal	Nutrients, Metals, Synthetic Organics
	Pools/fountains	Chlorinated water	Synthetic Organics
	Sanitary waste	Portable toilets, Disturbance of existing sewer lines.	Nutrients
	Vehicle and equipment use	Equipment operation, Equipment maintenance, Equipment washing, Equipment fueling	Oil and Grease
Synthetic Organics are defined in Table 1.2 of the CASQA Stormwater BMP Handbook: Construction as adhesives, cleaners, sealants, solvents, etc. These are generally categorized as VOCs or SVOCs.			
(1) Categories per CASQA BMP Handbook (i.e., Sediment, Nutrients, Bacteria and Viruses, Oil and Grease, Metals, Synthetic Organics, Pesticides, Gross Pollutants, and Vector Production)			





Appendix G: CASQA Stormwater BMP Handbook: Construction Fact Sheets



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.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	<input checked="" type="checkbox"/>
WE	Wind Erosion Control	<input checked="" type="checkbox"/>
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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- Plan the project and develop a schedule showing each phase of construction. Clearly show how the rainy season relates 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.
- Avoid soil disturbance during periods with high wind velocities.

Inspection and Maintenance

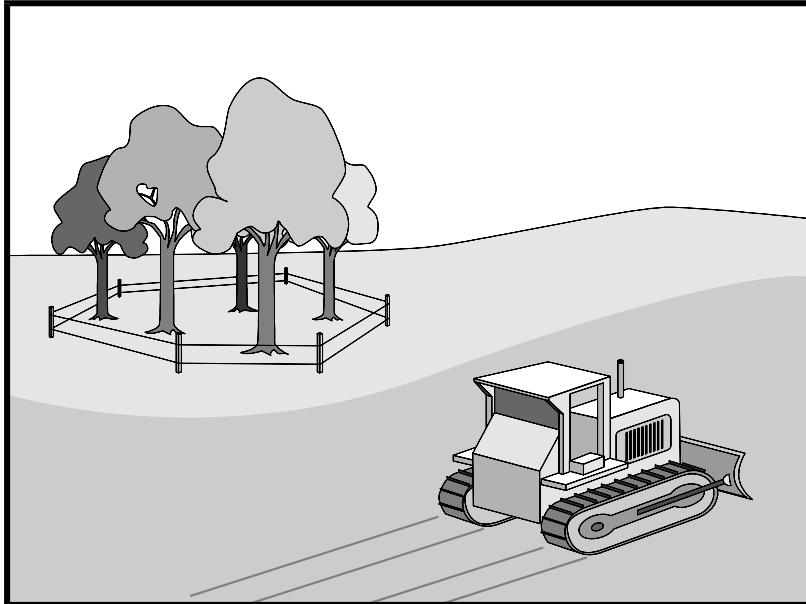
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Storm Water 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	<input checked="" type="checkbox"/>
SE	Sediment Control	<input type="checkbox"/>
TC	Tracking Control	<input type="checkbox"/>
WE	Wind Erosion Control	<input type="checkbox"/>
NS	Non-Stormwater Management Control	<input type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input type="checkbox"/>

Legend:

Primary Objective
 Secondary Objective

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.
- Protecting existing vegetation buffers and swales.

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input type="checkbox"/>
Trash	<input type="checkbox"/>
Metals	<input type="checkbox"/>
Bacteria	<input type="checkbox"/>
Oil and Grease	<input type="checkbox"/>
Organics	<input type="checkbox"/>

Potential Alternatives

None

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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.

Preservation of Existing Vegetation EC-2

- Consider pruning or mowing vegetation instead of removing it to allow for regrowth.
- If possible, retain vegetation buffer around the site and adjacent waterways.

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 trees in the late fall or early spring. Although to note, many native species do not require fertilization.
 - 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.

Preservation of Existing Vegetation EC-2

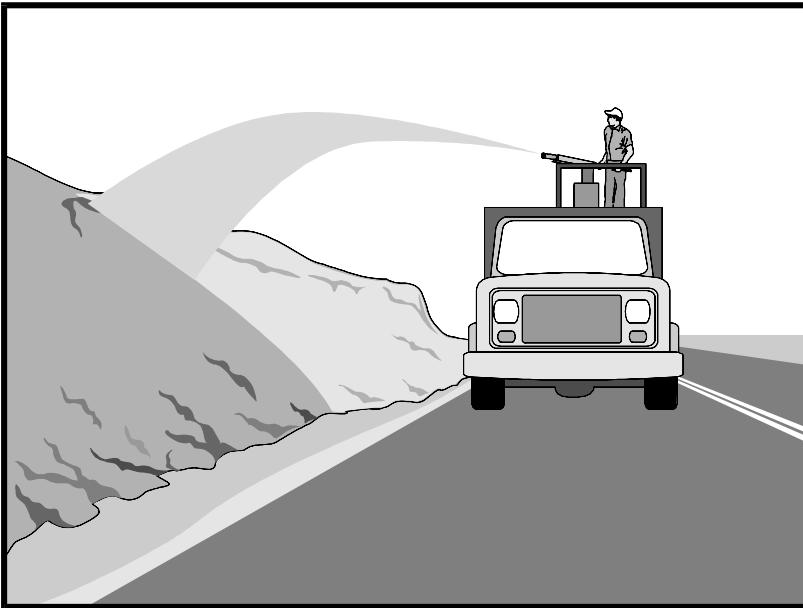
References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

County of Sacramento Tree Preservation Ordinance, September 1981.

Storm Water 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.



Description and Purpose

Hydraulic Mulch consists of various types of fibrous materials mixed with water and sprayed onto the soil surface in slurry form to provide a layer of temporary protection from wind and water erosion.

Suitable Applications

Hydraulic mulch as a temporary, stand alone, erosion control BMP is suitable for disturbed areas that require temporary protection from wind and water erosion until permanent soil stabilization activities commence. Examples include:

- Rough-graded areas that will remain inactive for longer than permit-required thresholds (e.g., 14 days) or otherwise require stabilization to minimize erosion or prevent sediment discharges.
- Soil stockpiles.
- Slopes with exposed soil between existing vegetation such as trees or shrubs.
- Slopes planted with live, container-grown vegetation or plugs.
- Slopes burned by wildfire.
- To stabilize earthen berms

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input type="checkbox"/>
TC	Tracking Control	<input type="checkbox"/>
WE	Wind Erosion Control	<input checked="" type="checkbox"/>
NS	Non-Stormwater Management Control	<input type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input type="checkbox"/>

Legend:

Primary Category
 Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input type="checkbox"/>
Trash	<input type="checkbox"/>
Metals	<input type="checkbox"/>
Bacteria	<input type="checkbox"/>
Oil and Grease	<input type="checkbox"/>
Organics	<input type="checkbox"/>

Potential Alternatives

EC-4 Hydroseeding
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

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- Areas seeded by broadcasting or drilling
- Temporary stabilization during high wind conditions

Hydraulic mulch can also be applied to augment other erosion control BMPs such as:

- In conjunction with straw mulch (see EC-6 Straw Mulch) where the rate of hydraulic mulch is reduced to 100-500 lbs per acre and the slurry is applied over the straw as a tackifying agent to hold the straw in place.
- Supplemental application of soil amendments, such as fertilizer, lime, gypsum, soil bio-stimulants or compost.

Limitations

In general, hydraulic mulch is not limited by slope length, gradient or soil type. However, the following limitations typically apply:

- Most hydraulic mulch applications, particularly bonded fiber matrices (BFMs), require at least 24 hours to dry before rainfall occurs.
- Temporary applications (i.e., without a vegetative component) may require a second application in order to remain effective for an entire rainy season.
- Treatment areas must be accessible to hydraulic mulching equipment.
- Availability of water sources in remote areas for mixing and application.
- As a stand-alone temporary BMP, hydraulic mulches may need to be re-applied to maintain their erosion control effectiveness, typically after 6-12 months depending on the type of mulch used.
- Availability of hydraulic mulching equipment may be limited just prior to the rainy season and prior to storms due to high demand.
- Cellulose fiber mulches alone may not perform well on steep slopes or in coarse soils.
- This BMP consists of a mixture of several constituents (e.g., fibers/mulches, compost, 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. Refer to specific chemical properties identified in the product Safety Data Sheet (may not include ecological information); products should be evaluated for project-specific implementation by the SWPPP Preparer. Refer to factsheet EC-05 for further guidance on selecting soil binders.
- A water supply is needed to refill hydro mulch equipment tank.
- Cannot be disturbed by walking or driving on the surface after application.
- Recommend using in conjunction with other BMPs (i.e., fiber rolls, etc.).

Implementation

- Where feasible, it is preferable to prepare soil surfaces prior to application by roughening embankments and fill areas with a crimping or punching type roller or by track walking.
- The majority of hydraulic mulch applications do not necessarily require surface/soil preparation (See EC-15 Soil Preparation) although in almost every case where re-vegetation is included as part of the practice, soil preparation can be beneficial. One of the advantages of hydraulic mulch over other erosion control methods is that it can be applied in areas where soil preparation is precluded by site conditions, such as steep slopes, rocky soils, or inaccessibility.
- Avoid mulch over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Hydraulic mulching is generally performed utilizing specialized machines that have a large water-holding/mixing tank and some form of mechanical agitation or other recirculation method to keep water, mulch and soil amendments in suspension. The mixed hydraulic slurry can be applied from a tower sprayer on top of the machine or by extending a hose to areas remote from the machine.
- Where possible apply hydraulic mulch from multiple directions to adequately cover the soil. Application from a single direction can result in shadowing, uneven coverage and failure of the BMP.
- Hydraulic mulch can also include a vegetative component, such as seed, rhizomes, or stolons (see EC-4 Hydraulic Seed).
- Typical hydraulic mulch application rates range from 2,000 pounds per acre for standard mulches (SMs) to 3,500 lbs. per acre for BFM. However, the required amount of hydraulic mulch to provide adequate coverage of exposed topsoil may appear to exceed the standard rates when the roughness of the soil surface is changed due to soil preparation methods (see EC-15 Soil Preparation) or by slope gradient.
- Other factors such as existing soil moisture and soil texture can have a profound effect on the amount of hydraulic mulch required (i.e. application rate) applied to achieve an erosion-resistant covering.
- Avoid use of mulch without a tackifier component, especially on slopes.
- Mulches used in the hydraulic mulch slurry can include:
 - Cellulose fiber (paper- or corn-based)
 - Wood fibers
 - Cotton
 - Synthetics
 - Compost (see EC-14, Compost Blanket)
 - Straw

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

Categories of Hydraulic Mulches

Standard Hydraulic Mulch (SM)

Standard hydraulic mulches are generally applied at a rate of 2,000 lbs. per acre and are manufactured containing around 5% tackifier (i.e. soil binder), usually a plant-derived guar or psyllium type. Most standard mulches are green in color derived from food-color based dyes.

Hydraulic Matrices (HM) and Stabilized Fiber Matrices (SFM)

Hydraulic matrices and stabilized fiber matrices are slurries which contain increased levels of tackifiers/soil binders; usually 10% or more by weight. HMs and SFMs have improved performance compared to a standard hydraulic mulch (SM) because of the additional percentage of tackifier and because of their higher application rates, typically 2,500 – 4,000 lbs. per acre. Hydraulic matrices can include a mixture of fibers, for example, a 50/50 blend of paper and wood fiber. In the case of an SFM, the tackifier/soil binder is specified as a polyacrylamide (PAM).

Bonded Fiber Matrix (BFM)

Bonded fiber matrices (BFMs) are hydraulically-applied systems of fibers, adhesives (typically guar- or polymer-based) and chemical cross-links. Upon drying, the slurry forms an erosion-resistant blanket that prevents soil erosion and promotes vegetation establishment. The cross-linked adhesive in the BFM should be biodegradable and should not dissolve or disperse upon re-wetting. BFMs are typically applied at rates from 3,000 to 4,000 lbs. per acre based on the manufacturer's recommendation. BFMs should not be applied immediately before, during or immediately after rainfall or if the soil is saturated. Depending on the product, BFMs typically require 12 to 24 hours to dry and become effective.

Hydraulic Compost Matrix (HCM)

Hydraulic compost matrix (HCM) is a field-derived practice whereby finely graded or sifted compost is introduced into the hydraulic mulch slurry. A guar-type tackifier can be added for steeper slope applications as well as any specified seed mixtures. An HCM can help to accelerate seed germination and growth. HCMs are particularly useful as an in-fill for three-dimensional re-vegetation geocomposites, such as turf reinforcement mats (TRM) (see EC-7 Geotextiles and Mats).

Inspection and Maintenance

- Maintain an unbroken, temporary mulched ground cover throughout the period of construction when the soils are not being reworked.
- 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.

- Compare the number of bags or weight of applied mulch to the area treated to determine actual application rates and compliance with specifications.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Controlling Erosion of Construction Sites, Agricultural Information #347, U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service – SCS).

Guidance for Temporary Soil Stabilization, California Department of Transportation (Caltrans), July 2003.

Guides for Erosion and Sediment Control in California, USDA Soils Conservation Service, January 1991.

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

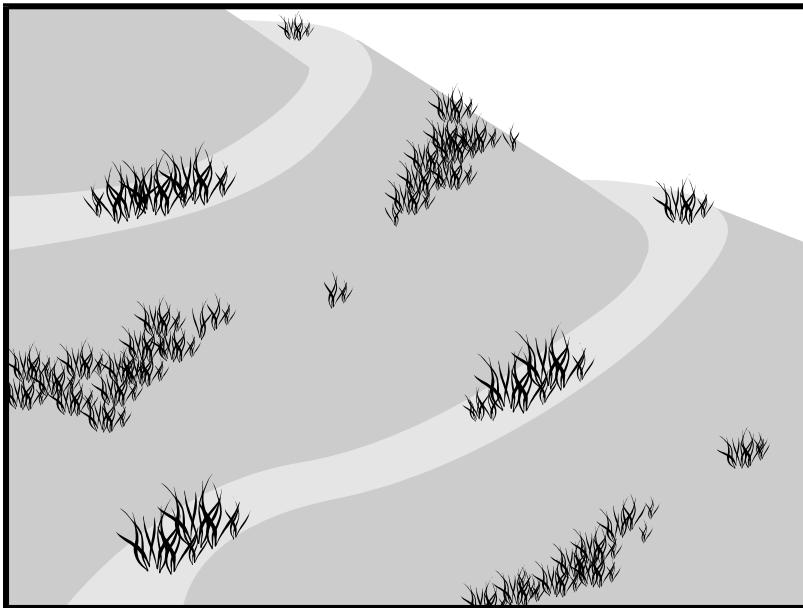
Sedimentation and Erosion Control, an Inventory of Current Practices Draft, US EPA, April 1990.

Soil Erosion by Water, Agriculture Information Bulletin #513, U.S. Department of Agriculture, Soil Conservation Service.

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

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.



Description and Purpose

Hydroseeding typically consists of applying a mixture of a hydraulic mulch, seed, and water with the possible addition of tackifier, compost, mycorrhizae inoculant, fertilizer, and/or soil conditioner, 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 and temporary erosion control is established by means of the mulch component.

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, Geotextiles and Mats) 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.
- To vegetate swales and earthen berms.
- Areas not subject to heavy wear by construction equipment or high traffic.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input type="checkbox"/>
TC	Tracking Control	<input type="checkbox"/>
WE	Wind Erosion Control	<input checked="" type="checkbox"/>
NS	Non-Stormwater Management Control	<input type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input type="checkbox"/>

Legend:

Primary Category
 Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input type="checkbox"/>
Trash	<input type="checkbox"/>
Metals	<input type="checkbox"/>
Bacteria	<input type="checkbox"/>
Oil and Grease	<input type="checkbox"/>
Organics	<input type="checkbox"/>

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

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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).
- Vegetation may not establish when hydroseed is applied to very compact soils.
- Mulch may inhibit germination when applied at high rates.
- 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's Safety Data Sheet (SDS), although, note that not all SDS's provide ecological information; products should be evaluated for project-specific implementation by the QSD. Refer to fact sheet EC-05, Soil Binders, 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)
- Maintenance requirements
- Sensitive adjacent areas

- Season and climate
- Vegetation types
- 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: https://www.cdfa.ca.gov/is/docs/Fertilizer_Law_and_Regs.pdf. 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 B “Guidance on Selection of Temporary Slope Stabilization Techniques” of the CASQA Construction BMP Handbook.

Inspection and Maintenance

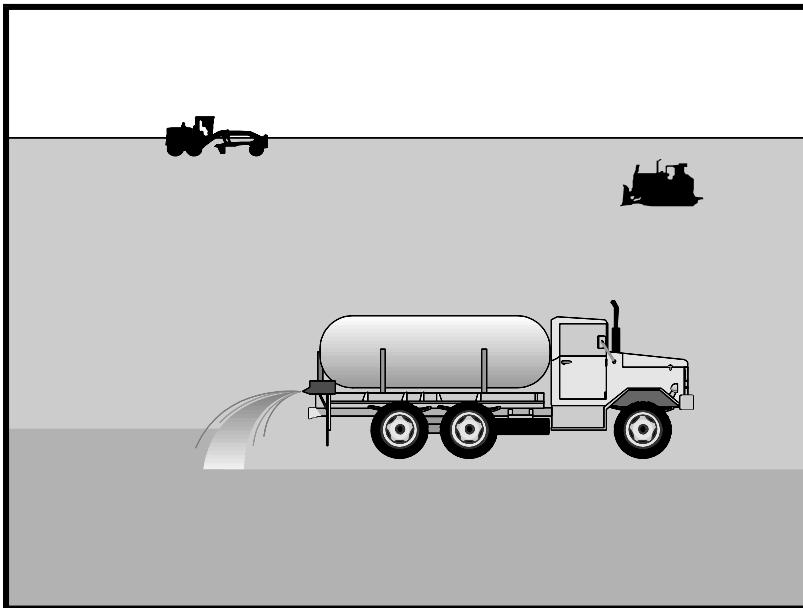
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where 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 and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Guidance for Temporary Soil Stabilization, California Department of Transportation (Caltrans), July 2003.

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



Description and Purpose

Soil binding consists of application and maintenance of a soil stabilizer to exposed soil surfaces. Soil binders are materials applied to the soil surface to temporarily prevent water and wind induced erosion of exposed soils on construction sites.

Suitable Applications

Soil binders are typically applied to disturbed areas requiring temporary protection. Because soil binders, when used as a stand-alone practice, can often be incorporated into the soil, they are a good alternative to mulches in areas where grading activities will soon resume. Soil binders are commonly used in the following areas:

- Rough graded soils that will be inactive for a short period of time.
- Soil stockpiles.
- Temporary haul roads prior to placement of crushed rock.
- Compacted soil road base.
- Construction staging, materials storage, and layout areas.
- Slopes and areas requiring stabilization prior to rain.
- Disturbed areas subject to high winds.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input type="checkbox"/>
TC	Tracking Control	<input type="checkbox"/>
WE	Wind Erosion Control	<input checked="" type="checkbox"/>
NS	Non-Stormwater Management Control	<input type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input type="checkbox"/>

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input type="checkbox"/>
Trash	<input type="checkbox"/>
Metals	<input type="checkbox"/>
Bacteria	<input type="checkbox"/>
Oil and Grease	<input type="checkbox"/>
Organics	<input type="checkbox"/>

Potential Alternatives

- EC-3 Hydraulic Mulch
- EC-4 Hydroseeding
- EC-6 Straw Mulch
- EC-7 Geotextiles and Mats
- EC-8 Wood Mulching

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Limitations

- Soil binders are temporary in nature and may need reapplication.
- Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer. Curing time may be 24 hours or longer. Soil binders may need reapplication after a storm event.
- Soil binders will generally experience spot failures during heavy rainfall events. If runoff penetrates the soil at the top of a slope treated with a soil binder, it is likely that the runoff will undercut the stabilized soil layer and discharge at a point further down slope.
- Plant-material-based soil binders do not generally hold up to pedestrian or vehicular traffic across treated areas as well as polymeric emulsion blends or cementitious-based binders.
- Soil binders may not sufficiently penetrate compacted soils.
- Some soil binders are soil texture specific in terms of their effectiveness. For example, polyacrylamides (PAMs) work very well on silt and clayey soils but their performance decreases dramatically in sandy soils.
- Some soil binders may not perform well with low relative humidity. Under rainy conditions, some agents may become slippery or leach out of the soil.
- Soil binders may not cure if low temperatures occur within 24 hours of application.
- The water quality impacts of some chemical soil binders are relatively unknown, and some may have water quality impacts due to their chemical makeup. Additionally, these chemicals may require non-visible pollutant monitoring. Products should be evaluated for project-specific implementation by the QSD preparing SWPPP. Refer to the product Material Safety Data Sheet for chemical properties.

Implementation

General Considerations

- Soil binders should conform to local municipality specifications and requirements.
- Site soil types will dictate appropriate soil binders to be used.
- A soil binder must be environmentally benign (non-toxic to plant and animal life), easy to apply, easy to maintain, economical, and should not stain paved or painted surfaces. Soil binders should not pollute stormwater when cured. Obtain a Safety Data Sheet (SDS) from the manufacturer to ensure non-toxicity (note however, the SDS may not include ecological information).
- Stormwater runoff from PAM treated soils should pass through one of the following sediment control BMP prior to discharging to surface waters.
 - When the total drainage area is greater than or equal to 5 acres, PAM treated areas should drain to a sediment basin.

- Areas less than 5 acres should drain to sediment control BMPs, such as a sediment trap, or a series of check dams. The total number of check dams used should be maximized to achieve the greatest amount of settlement of sediment prior to discharging from the site. Each check dam should be spaced evenly in the drainage channel through which stormwater flows are discharged off site.
- Performance of soil binders depends on temperature, humidity, and traffic across treated areas.
- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Some soil binders are designed for application to roads.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Selecting a Soil Binder

Properties of common soil binders used for erosion control are provided on Table 1 at the end of this Fact Sheet. Use Table 1 to select an appropriate soil binder. Refer to WE-1, Wind Erosion Control, for dust control soil binders.

Factors to consider when selecting a soil binder include the following:

- Suitability to situation - Consider where the soil binder will be applied, if it needs a high resistance to leaching or abrasion, and whether it needs to be compatible with any existing vegetation. Determine the length of time soil stabilization will be needed, and if the soil binder will be placed in an area where it will degrade rapidly. In general, slope steepness is not a discriminating factor for the listed soil binders.
- Soil types and surface materials - Fines and moisture content are key properties of surface materials. Consider a soil binder's ability to penetrate, likelihood of leaching, and ability to form a surface crust on the surface materials.
- Frequency of application - The frequency of application is related to the functional longevity of the binder, which can be affected by subgrade conditions, surface type, climate, and maintenance schedule.
- Frequent applications could lead to high costs. Application frequency may be minimized if the soil binder has good penetration, low evaporation, and good longevity. Consider also that frequent application will require frequent equipment clean up.

Plant-Material-Based (Short Lived, <6 months) Binders

Guar: Guar is a non-toxic, biodegradable, natural galactomannan-based hydrocolloid treated with dispersant agents for easy field mixing. It should be mixed with water at the rate of 11 to 15 lb per 1,000 gallons. Recommended minimum application rates are as follows:

Application Rates for Guar Soil Stabilizer

Slope (H:V):	Flat	4:1	3:1	2:1	1:1
lb/acre:	40	45	50	60	70

Psyllium: Psyllium is composed of the finely ground muciloid coating of plantago seeds that is applied as a dry powder or in a wet slurry to the surface of the soil. It dries to form a firm but rewettable membrane that binds soil particles together but permits germination and growth of seed. Psyllium requires 12 to 18 hours drying time. Application rates should be from 80 to 200 lb/acre, with enough water in solution to allow for a uniform slurry flow.

Starch: Starch is non-ionic, cold water soluble (pre-gelatinized) granular cornstarch. The material is mixed with water and applied at the rate of 150 lb/acre. Approximate drying time is 9 to 12 hours.

Plant-Material-Based (Long Lived, 6-12 months) Binders

Pitch and Rosin Emulsion: Generally, a non-ionic pitch and rosin emulsion has a minimum solids content of 48%. The rosin should be a minimum of 26% of the total solids content. The soil stabilizer should be non-corrosive, water dilutable emulsion that upon application cures to a water insoluble binding and cementing agent. For soil erosion control applications, the emulsion is diluted and should be applied as follows:

- For clayey soil: 5 parts water to 1-part emulsion
- For sandy soil: 10 parts water to 1-part emulsion

Application can be by water truck or hydraulic seeder with the emulsion and product mixture applied at the rate specified by the manufacturer.

Polymeric Emulsion Blend Binders

Acrylic Copolymers and Polymers: Polymeric soil stabilizers should consist of a liquid or solid polymer or copolymer with an acrylic base that contains a minimum of 55% solids. The polymeric compound should be handled and mixed in a manner that will not cause foaming or should contain an anti-foaming agent. The polymeric emulsion should not exceed its shelf life or expiration date; manufacturers should provide the expiration date. Polymeric soil stabilizer should be readily miscible in water, non-injurious to seed or animal life, non-flammable, should provide surface soil stabilization for various soil types without totally inhibiting water infiltration, and should not re-emulsify when cured. The applied compound typically requires 12 to 24 hours drying time. Liquid copolymer should be diluted at a rate of 10 parts water to 1-part polymer and the mixture applied to soil at a rate of 1,175 gallons/acre.

Liquid Polymers of Methacrylates and Acrylates: This material consists of a tackifier/sealer that is a liquid polymer of methacrylates and acrylates. It is an aqueous 100% acrylic emulsion blend of 40% solids by volume that is free from styrene, acetate, vinyl, ethoxylated surfactants or silicates. For soil stabilization applications, it is diluted with water in accordance with the manufacturer's recommendations and applied with a hydraulic seeder at the rate of 20 gallons/acre. Drying time is 12 to 18 hours after application.

Copolymers of Sodium Acrylates and Acrylamides: These materials are non-toxic, dry powders that are copolymers of sodium acrylate and acrylamide. They are mixed with water and applied to the soil surface for erosion control at rates that are determined by slope gradient:

Slope Gradient (H:V)	lb/acre
Flat to 5:1	3.0 – 5.0
5:1 to 3:1	5.0 – 10.0
2:1 to 1:1	10.0 – 20.0

Poly-Acrylamide (PAM) and Copolymer of Acrylamide: Linear copolymer polyacrylamide for use as a soil binder is packaged as a dry flowable solid, as a liquid. Refer to the manufacturer's recommendation for dilution and application rates as they vary based on liquid or dry form, site conditions and climate.

- Limitations specific to PAM are as follows:

- Do not use PAM on a slope that flows into a water body without passing through a sediment trap or sediment basin.
- The specific PAM copolymer formulation must be anionic. Cationic PAM should not be used in any application because of known aquatic toxicity problems. Only the highest drinking water grade PAM, certified for compliance with ANSI/NSF Standard 60 for drinking water treatment, should be used for soil applications.
- PAM designated for erosion and sediment control should be "water soluble" or "linear" or "non-cross linked".
- PAM should not be used as a stand-alone BMP to protect against water-based erosion. When combined with mulch, its effectiveness increases dramatically.

Hydro-Colloid Polymers: Hydro-Colloid Polymers are various combinations of dry flowable poly-acrylamides, copolymers and hydro-colloid polymers that are mixed with water and applied to the soil surface at rates of 55 to 60 lb/acre. Drying times are 0 to 4 hours.

Cementitious-Based Binders

Gypsum: This is a formulated gypsum-based product that readily mixes with water and mulch to form a thin protective crust on the soil surface. It is composed of high purity gypsum that is ground, calcined and processed into calcium sulfate hemihydrate with a minimum purity of 86%. It is mixed in a hydraulic seeder and applied at rates 4,000 to 12,000 lb/acre. Drying time is 4 to 8 hours.

Applying Soil Binders

After selecting an appropriate soil binder, the untreated soil surface must be prepared before applying the soil binder. The untreated soil surface must contain sufficient moisture to assist the agent in achieving uniform distribution. In general, the following steps should be followed:

- Follow manufacturer's written recommendations for application rates, pre-wetting of application area, and cleaning of equipment after use.
- Prior to application, roughen embankment and fill areas.
- Consider the drying time for the selected soil binder and apply with sufficient time before anticipated rainfall. Soil binders should not be applied during or immediately before rainfall.
- Avoid over spray onto roads, sidewalks, drainage channels, sound walls, existing vegetation, etc.
- Soil binders should not be applied to frozen soil, areas with standing water, under freezing or rainy conditions, or when the temperature is below 40°F during the curing period.
- More than one treatment is often necessary, although the second treatment may be diluted or have a lower application rate.
- Generally, soil binders require a minimum curing time of 24 hours before they are fully effective. Refer to manufacturer's instructions for specific cure time.
- For liquid agents:
 - Crown or slope ground to avoid ponding.
 - Uniformly pre-wet ground at 0.03 to 0.3 gal/yd² or according to manufacturer's recommendations.
 - Apply solution under pressure. Overlap solution 6 to 12 in.
 - Allow treated area to cure for the time recommended by the manufacturer; typically, at least 24 hours.
 - Apply second treatment before first treatment becomes ineffective, using 50% application rate.
 - In low humidities, reactivate chemicals by re-wetting with water at 0.1 to 0.2 gal/yd².

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.
- Reapply the selected soil binder as needed to maintain effectiveness.

Table 1 Properties of Soil Binders for Erosion Control

Evaluation Criteria	Binder Type			
	Plant Material Based (Short Lived)	Plant Material Based (Long Lived)	Polymeric Emulsion Blends	Cementitious-Based Binders
Relative Cost	Low	Moderate to High	Low to High	Low to Moderate
Resistance to Leaching	High	High	Low to Moderate	Moderate
Resistance to Abrasion	Moderate	Low	Moderate to High	Moderate to High
Longevity	Short to Medium	Medium	Medium to Long	Medium
Minimum Curing Time before Rain	9 to 18 hours	19 to 24 hours	0 to 24 hours	4 to 8 hours
Compatibility with Existing Vegetation	Good	Poor	Poor	Poor
Mode of Degradation	Biodegradable	Biodegradable	Photodegradable/Chemically Degradable	Photodegradable/Chemically Degradable
Labor Intensive	No	No	No	No
Specialized Application Equipment	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher
Liquid/Powder	Powder	Liquid	Liquid/Powder	Powder
Surface Crusting	Yes, but dissolves on rewetting	Yes	Yes, but dissolves on rewetting	Yes
Clean Up	Water	Water	Water	Water
Erosion Control Application Rate	Varies ⁽¹⁾	Varies ⁽¹⁾	Varies ⁽¹⁾	4,000 to 12,000 lbs/acre

(1) See Implementation for specific rates.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Erosion Control Pilot Study Report, State of California Department of Transportation (Caltrans), June 2000.

Guidance for Temporary Soil Stabilization, California Department of Transportation (Caltrans), July 2003.

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

Sedimentation and Erosion Control, An Inventory of Current Practices Draft, US EPA, April 1990.

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



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 sheepfoot 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 Rolled Erosion Control Products (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	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
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	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch
EC-5 Soil Binders
EC-7 Geotextiles and Mats

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- 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 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 Mulch).

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 ft. (0.6 m) high in soft materials or more than 3 ft. (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 in. (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 in. (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 that require mowing activities should not be steeper than 3:1.
- Roughen these areas to shallow grooves by track walking, scarifying, sheepfoot rolling, or imprinting.
- Make grooves close together (less than 10 in.), and not less than 1 in. 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.

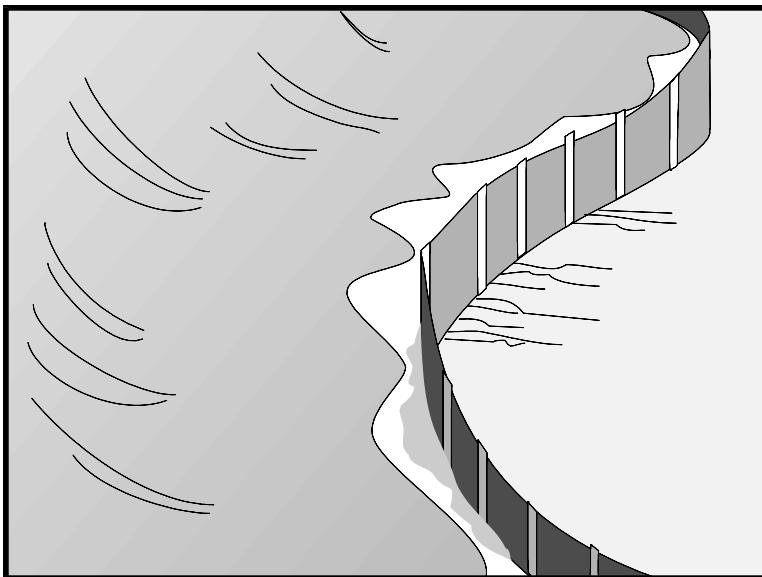
Inspection and Maintenance

- 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 and Additional Resources

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

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



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 (Storm Drain Inlet Protection, 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 (although they should not be installed up and down slopes).
- 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.

Categories

EC	Erosion Control
SE	Sediment Control <input checked="" type="checkbox"/>
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 (coarse sediment)	<input checked="" type="checkbox"/>
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

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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.
- According to the State Water Board's *CGP Review, Issue #2* (2014), silt fences reinforced with metal or plastic mesh should be avoided due to plastic pollution and wildlife concerns.
- 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 ft.² of disturbed area.) (EPA, 2012)
- The maximum length of slope draining to any point along the silt fence should be 100 ft. per ft 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 1/2 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 in. 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.

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 and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

CGP Review #2, State Water Resources Control Board, 2014. Available online at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/training/cgp_review_issue2.pdf.

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

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

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

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

Sedimentation and Erosion Control Practices, and Inventory of Current Practices (Draft), USEPA, 1990.

Southeastern Wisconsin Regional Planning Commission (SWRPC). Costs of Urban Nonpoint Source Water Pollution Control Measures. Technical Report No. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI. 1991.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

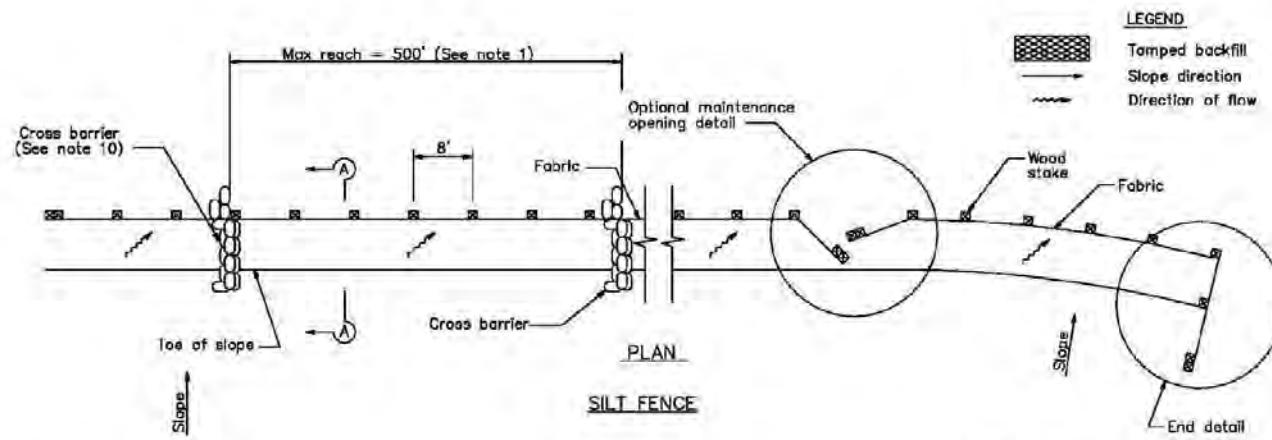
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Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

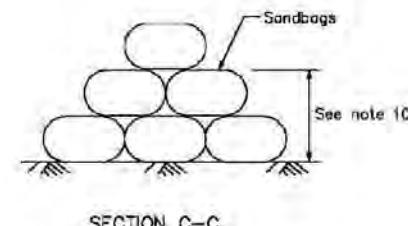
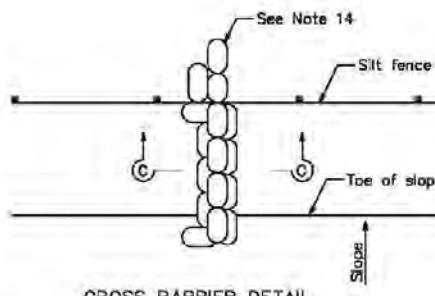
Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

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



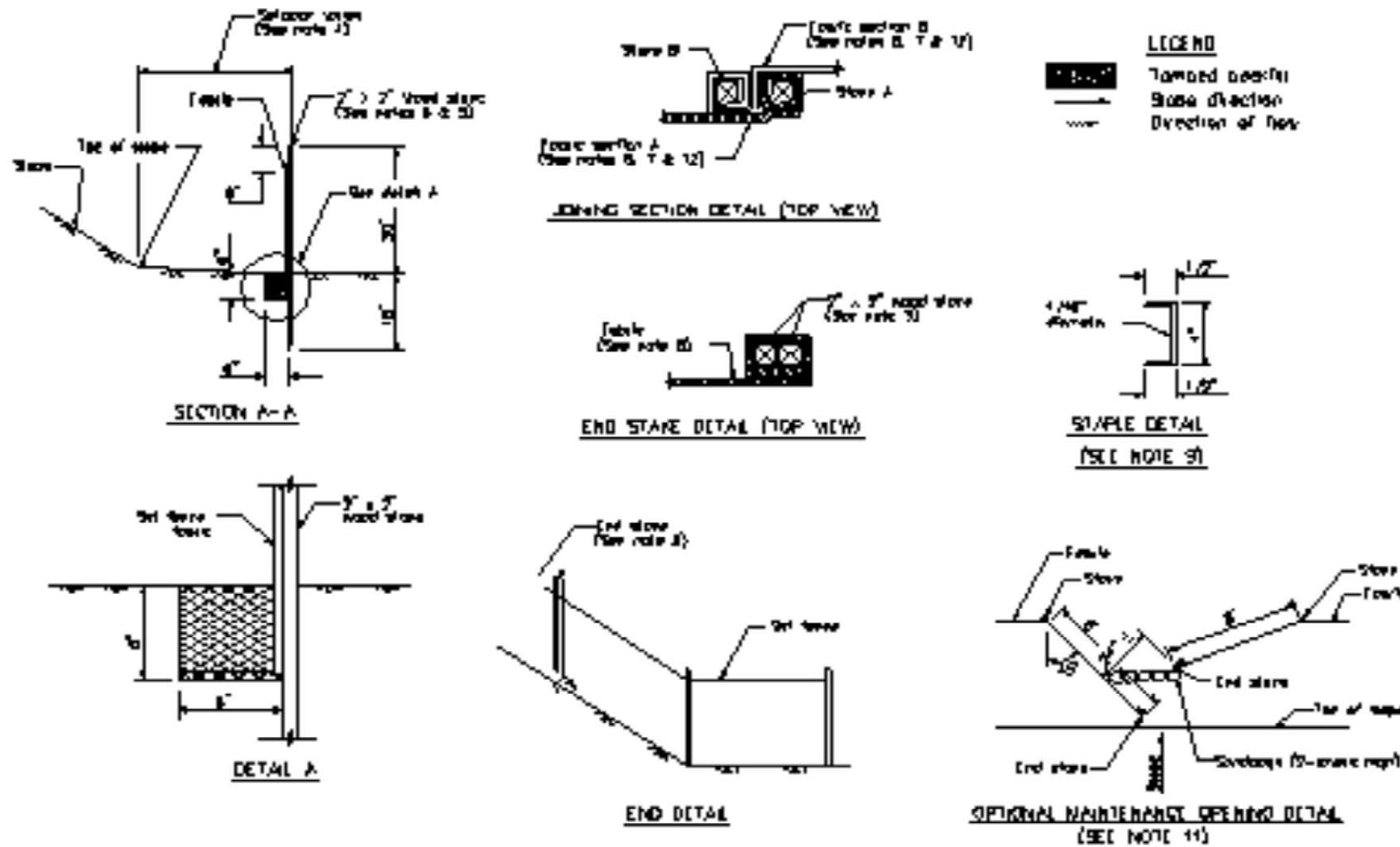
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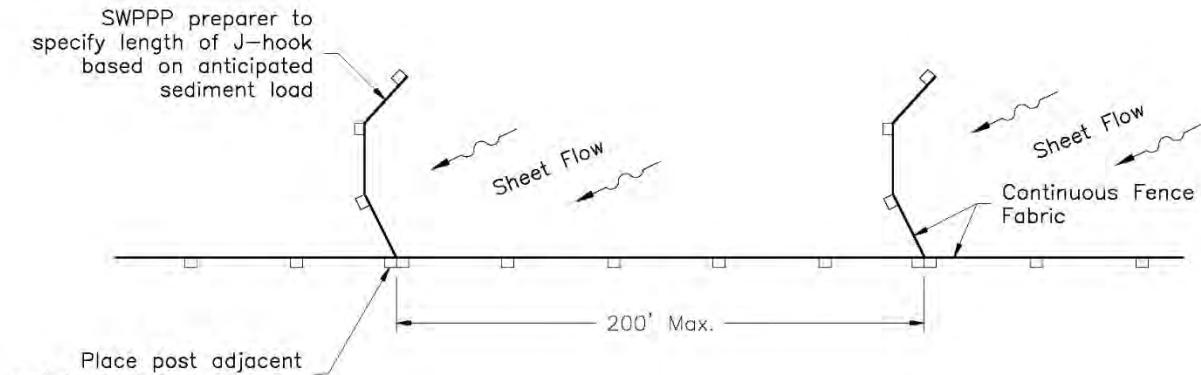
1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier. in no case shall the reach length exceed 500'.
2. The last 8'-0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to 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 slit fence as needed to prevent bypass or undermining and as allowable based on site limits of disturbance.



Silt Fence

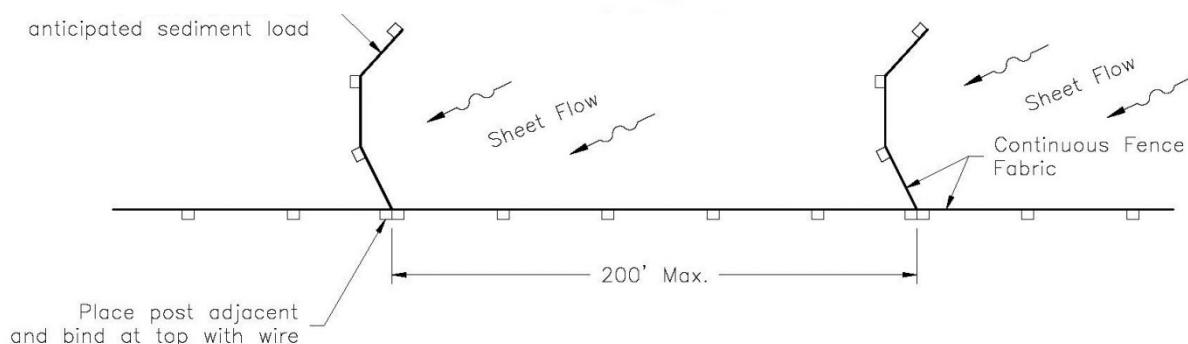
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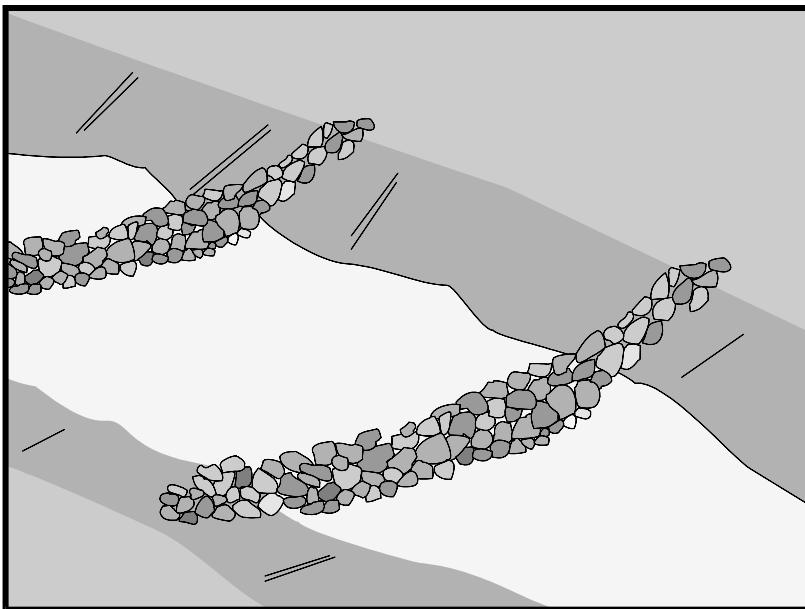
Plan

J-HOOK



Plan

J-HOOK



Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
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 check dam is a small barrier constructed of rock, gravel bags, sandbags, fiber rolls, or other proprietary products, placed across a constructed swale or drainage ditch. Check dams reduce the effective slope of the channel, thereby reducing scour and channel erosion by reducing flow velocity and increasing residence time within the channel, allowing sediment to settle.

Suitable Applications

Check dams may be appropriate in the following situations:

- To promote sedimentation behind the dam.
- To prevent erosion by reducing the velocity of channel flow in small intermittent channels and temporary swales.
- In small open channels that drain 10 acres or less.
- In steep channels where stormwater runoff velocities exceed 5 ft/s.
- During the establishment of grass linings in drainage ditches or channels.
- In temporary ditches where the short length of service does not warrant establishment of erosion-resistant linings.
- To act as a grade control structure.

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls
SE-6 Gravel Bag Berm
SE-8 Sandbag Barrier
SE-12 Manufactured Linear Sediment Controls
SE-14 Biofilter Bags

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Limitations

- Not to be used in live streams or in channels with extended base flows.
- Not appropriate in channels that drain areas greater than 10 acres.
- Not appropriate in channels that are already grass-lined unless erosion potential or sediment-laden flow is expected, as installation may damage vegetation.
- Require extensive maintenance following high velocity flows.
- Promotes sediment trapping which can be re-suspended during subsequent storms or removal of the check dam.
- Do not construct check dams with straw bales or silt fence.
- Water suitable for mosquito production may stand behind check dams, particularly if subjected to daily non-stormwater discharges.

Implementation

General

Check dams reduce the effective slope and create small pools in swales and ditches that drain 10 acres or less. Using check dams to reduce channel slope reduces the velocity of stormwater flows, thus reducing erosion of the swale or ditch and promoting sedimentation. Thus, check dams are dual-purpose and serve an important role as erosion controls as well as sediment controls. Note that use of 1-2 isolated check dams for sedimentation will likely result in little net removal of sediment because of the small detention time and probable scour during longer storms. Using a series of check dams will generally increase their effectiveness. A sediment trap (SE-3) may be placed immediately upstream of the check dam to increase sediment removal efficiency.

Design and Layout

Check dams work by decreasing the effective slope in ditches and swales. An important consequence of the reduced slope is a reduction in capacity of the ditch or swale. This reduction in capacity should be considered when using this BMP, as reduced capacity can result in overtopping of the ditch or swale and resultant consequences. In some cases, such as a “permanent” ditch or swale being constructed early and used as a “temporary” conveyance for construction flows, the ditch or swale may have sufficient capacity such that the temporary reduction in capacity due to check dams is acceptable. When check dams reduce capacities beyond acceptable limits, either:

- Don’t use check dams. Consider alternative BMPs, or.
- Increase the size of the ditch or swale to restore capacity.

Maximum slope and velocity reduction is achieved when the toe of the upstream dam is at the same elevation as the top of the downstream dam (see “Spacing Between Check Dams” detail at the end of this fact sheet). The center section of the dam should be lower than the edge sections (at least 6 inches), acting as a spillway, so that the check dam will direct flows to the center of

the ditch or swale (see “Typical Rock Check Dam” detail at the end of this fact sheet). Bypass or side-cutting can occur if a sufficient spillway is not provided in the center of the dam.

Check dams are usually constructed of rock, gravel bags, sandbags, and fiber rolls. A number of products can also be used as check dams (e.g. HDPE check dams, temporary silt dikes (SE-12)), and some of these products can be removed and reused. Check dams can also be constructed of logs or lumber and have the advantage of a longer lifespan when compared to gravel bags, sandbags, and fiber rolls. Check dams should not be constructed from straw bales or silt fences, since concentrated flows quickly wash out these materials.

Rock check dams are usually constructed of 8 to 12 in. rock. The rock is placed either by hand or mechanically, but never just dumped into the channel. The dam should completely span the ditch or swale to prevent washout. The rock used should be large enough to stay in place given the expected design flow through the channel. It is recommended that abutments be extended 18 in. into the channel bank. Rock can be graded such that smaller diameter rock (e.g. 2-4 in) is located on the upstream side of larger rock (holding the smaller rock in place); increasing residence time.

Log check dams are usually constructed of 4 to 6 in. diameter logs, installed vertically. The logs should be embedded into the soil at least 18 in. Logs can be bolted or wired to vertical support logs that have been driven or buried into the soil.

See fiber rolls, SE-5, for installation of fiber roll check dams.

Gravel bag and sand bag check dams are constructed by stacking bags across the ditch or swale, shaped as shown in the drawings at the end of this fact sheet (see “Gravel Bag Check Dam” detail at the end of this fact sheet).

Manufactured products, such as temporary silt dikes (SE-12), should be installed in accordance with the manufacturer’s instructions. Installation typically requires anchoring or trenching of products, as well as regular maintenance to remove accumulated sediment and debris.

If grass is planted to stabilize the ditch or swale, the check dam should be removed when the grass has matured (unless the slope of the swales is greater than 4%).

The following guidance should be followed for the design and layout of check dams:

- Install the first check dam approximately 16 ft from the outfall device and at regular intervals based on slope gradient and soil type.
- Check dams should be placed at a distance and height to allow small pools to form between each check dam.
- For multiple check dam installation, backwater from a downstream check dam should reach the toes of the upstream check dam.
- A sediment trap provided immediately upstream of the check dam will help capture sediment. Due to the potential for this sediment to be resuspended in subsequent storms, the sediment trap should be cleaned following each storm event.

- High flows (typically a 2-year storm or larger) should safely flow over the check dam without an increase in upstream flooding or damage to the check dam.
- Where grass is used to line ditches, check dams should be removed when grass has matured sufficiently to protect the ditch or swale.

Materials

- Rock used for check dams should typically be 8-12 in rock and be sufficiently sized to stay in place given expected design flows in the channel. Smaller diameter rock (e.g. 2 to 4 in) can be placed on the upstream side of larger rock to increase residence time.
- Gravel bags used for check dams should conform to the requirements of SE-6, Gravel Bag Berms.
- Sandbags used for check dams should conform to SE-8, Sandbag Barrier.
- Fiber rolls used for check dams should conform to SE-5, Fiber Rolls.
- Temporary silt dikes used for check dams should conform to SE-12, Temporary Silt Dikes.

Installation

- Rock should be placed individually by hand or by mechanical methods (no dumping of rock) to achieve complete ditch or swale coverage.
- Tightly abut bags and stack according to detail shown in the figure at the end of this section (pyramid approach). Gravel bags and sandbags should not be stacked any higher than 3 ft.
- Upper rows or gravel and sand bags shall overlap joints in lower rows.
- Fiber rolls should be trenched in, backfilled, and firmly staked in place.
- Install along a level contour.
- HDPE check dams, temporary silt dikes, and other manufactured products should be used and installed per manufacturer specifications.

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.
- Replace missing rock, bags, rolls, etc. Replace bags or rolls that have degraded or have become damaged.
- If the check dam is used as a sediment capture device, sediment that accumulates behind the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.

- If the check dam is used as a grade control structure, sediment removal is not required as long as the system continues to control the grade.
- Inspect areas behind check dams for pools of standing water, especially if subjected to daily non-stormwater discharges.
- Remove accumulated sediment prior to permanent seeding or soil stabilization.
- Remove check dam and accumulated sediment when check dams are no longer needed.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

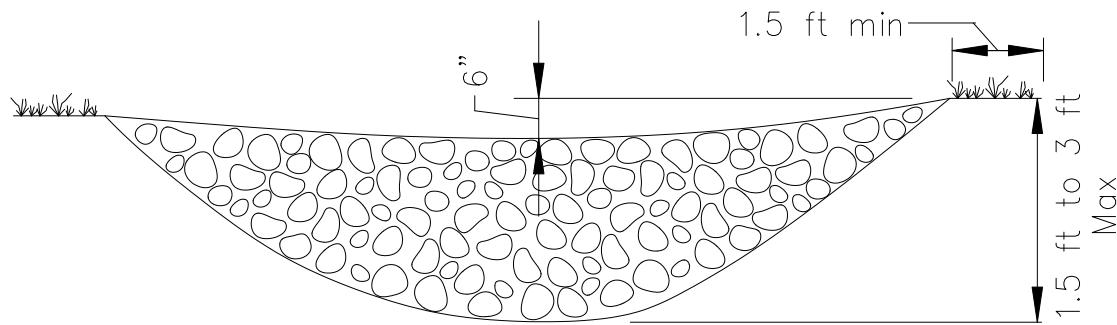
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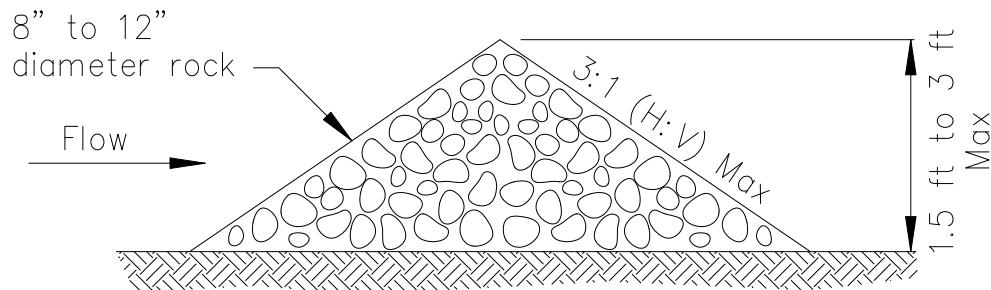
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Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Metzger, M.E. 2004. Managing mosquitoes in stormwater treatment devices. University of California Division of Agriculture and Natural Resources, Publication 8125. On-line: <http://anrcatalog.ucdavis.edu/pdf/8125.pdf>

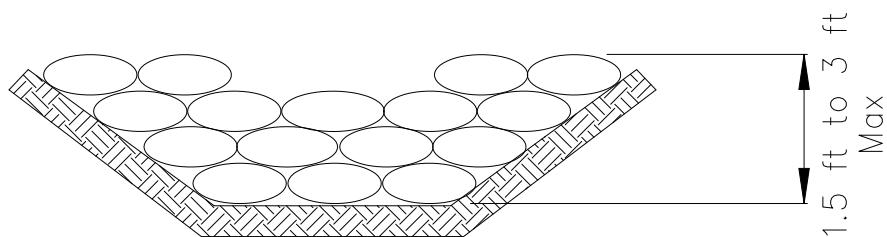


ELEVATION

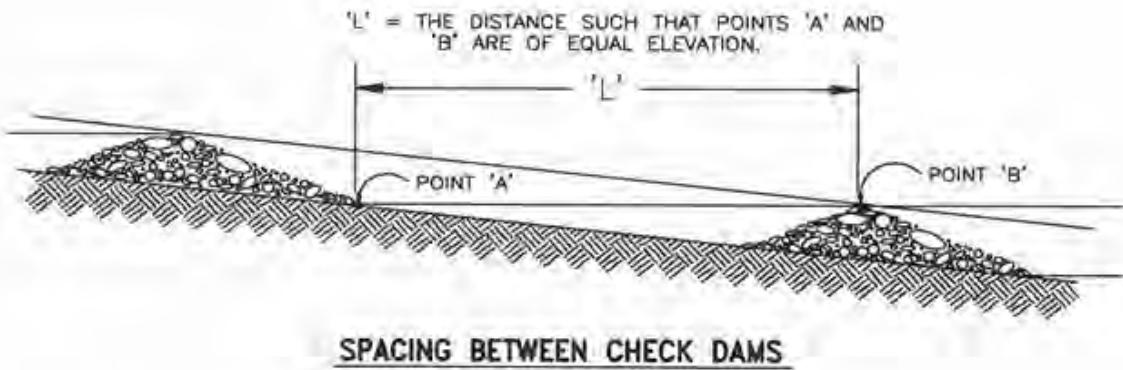


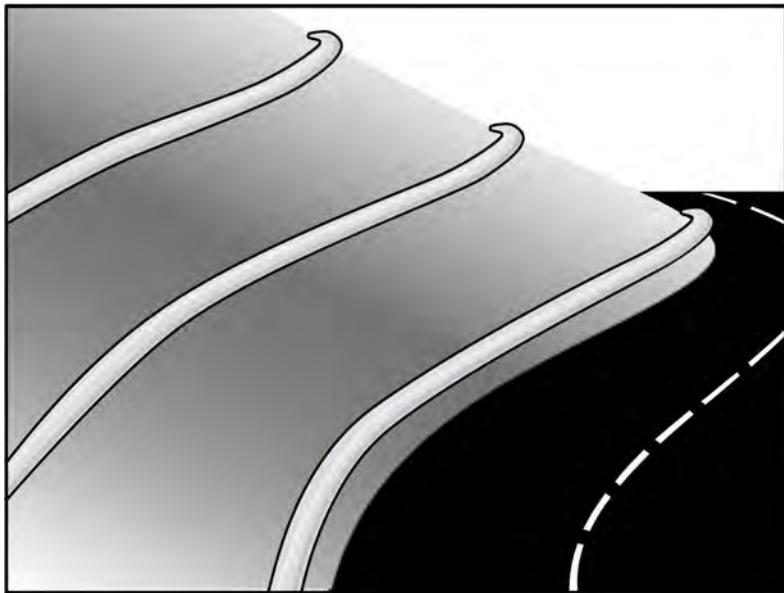
TYPICAL ROCK CHECK DAM SECTION

ROCK CHECK DAM
NOT TO SCALE



GRAVEL BAG CHECK DAM ELEVATION
NOT TO SCALE





Description and Purpose

A fiber roll (also known as a wattle or log) consists of straw, coir, curled wood fiber, or other biodegradable materials bound into a tight tubular roll wrapped by netting. 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 top, toe, and on the face of slopes along the contours, fiber rolls intercept runoff, reduce flow velocity, release runoff as sheet flow, and provide sediment removal 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 top, toe, 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.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
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	<input checked="" type="checkbox"/>
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-13 Compost Socks and Berms
SE-14 Biofilter Bags

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- At operational storm drains as a form of inlet protection.
- Around temporary stockpiles.

Limitations

- Fiber rolls are to be used in conjunction with erosion control, such as hydroseed, mulch, rolled erosion control products (RECPs), etc.
- Only biodegradable fiber rolls containing no plastic can remain on a site when applying for a Notice of Termination (NOT) due to plastic pollution and wildlife concerns. There may be further limitations on the use of plastic wrapped fiber rolls in wildlife sensitive areas. Fiber rolls containing plastic must be removed and disposed of prior to final stabilization.
- Do not install fiber rolls in high traffic areas where vehicles and equipment will displace or damage them.
- Do not use fiber rolls on paved surfaces where they cannot be staked and trenched in. Only gravel core rolls may be effective in this situation. See Gravel Bags (SE-6), Manufactured Linear Sediment Controls (SE-12), Compost Socks and Berms (SE-13), and Biofilter Bags (SE-14) for situations where staking or trenching is not possible.
- Do not use fiber rolls on slopes subject to creep, slumping, or landslides.
- Improper installation of a fiber roll such as not being trenched in, not staked appropriately, or not sufficiently overlapping at the ends, may cause undercutting and increased erosion.
- Fiber rolls installed by the Type 1 method are not effective unless trenched in and staked. If not properly staked and trenched in, fiber rolls will not work as intended and could be transported by high flows.
- Fiber rolls installed by the Type 2 method are not effective unless staked. If not properly staked in, fiber rolls will not work as intended and could be transported by high flows.
- Not intended for use in concentrated flows.
- Not intended to contain stormwater. See Sediment Basin (SE-2) or Sediment Trap (SE-3) for stormwater containment BMPs.
- Difficult to move once saturated.
- Difficult to repair when a small section of the fiber roll is damaged. Replacement of the entire fiber roll or installation of an additional fiber roll adjacent to the damage is often required.
- Fiber rolls are susceptible to damage from wildlife.
- Fiber rolls have a limited sediment capture zone.
- Fiber rolls typically function for 12-24 months, depending upon local conditions, roll material, and installation method. For example, the Type 2 installation method may last longer than the Type 1 installation method because the fiber roll is not penetrated.

- Fiber rolls that come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll, are considered passive treatment technologies and are subject to additional requirements, see Passive Treatment (SE-15).

Implementation

Fiber Roll Materials

- Fiber rolls are to be prefabricated.
- Fiber rolls are made from weed-free rice straw, flax, curled wood fiber, or coir bound into a tight tubular roll by netting or wrap (see Limitations above regarding plastic netting).
- Typical fiber rolls vary in diameter from 6 in. to 20 in. Larger diameter rolls are available as well. The larger the roll diameter, the higher the sediment retention capacity.
- Typical fiber rolls lengths are 4, 10, 20 and 25 ft., although other lengths may be available.

Installation

- Locate fiber rolls on level contours spaced as follows:
 - Slope inclination between 20:1 and 4:1 -20 (H:V): Place fibers rolls at a maximum interval of 35 ft.
 - Slope inclination of 4:1 (H:V): Place fiber rolls at a maximum interval of 20 ft.
 - Slope inclination between 4:1 and 2:1 (H:V): Place fiber rolls at a maximum interval of 15 ft. (a closer spacing is more effective).
 - Slope inclination 2:1 (H:V) or greater: Place fiber rolls at a maximum interval of 10 ft. (a closer spacing is more effective).
- It is critical that fiber rolls are installed perpendicular to water flow and parallel to the slope contour.
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth is to be $\frac{1}{4}$ to $\frac{1}{3}$ of the thickness of the roll, and the width is to be equal to the roll diameter, in order to provide area to backfill the trench.
- Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- For Type 1 installations:
 - Place in a trench that is from 2 to 4 inches deep.
 - Fasten with wood stakes every 4 feet along the length of the fiber roll.
 - Fasten the ends of the fiber roll by placing a stake 6 inches from the end of the roll.

- Drive the stakes into the soil so the top of the stake is less than 2 inches above the top of the fiber roll.
- For Type 2 installations (Caltrans, 2024):
 - Trenching in the fiber rolls is optional.
 - J-hook the ends of the fiber roll up-slope to prevent runoff from going around the fiber roll.
 - Drive stakes along alternating sides of each fiber roll, spaced 2 ft. apart. Stakes are to alternate between upslope and downslope of the fiber roll.
 - Lace the rope tightly around the stakes and over the fiber roll. Knot the rope at each stake.
 - Tighten the fiber roll to the surface of the slope by driving the stakes further into the soil.
- If more than one fiber roll is placed in a row, the rolls should overlap, not abut at the ends. Stagger overlapping joints in adjacent rows by 5 to 10 feet.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or be removed depending on the type of fiber roll and its application (temporary vs. permanent installation).
- For temporary installations, only remove fiber rolls when upgradient areas are stabilized per General Permit requirements, and/or pollutant sources are no longer present. Remove fiber rolls before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.
- For permanent installations for final stabilization, fiber rolls encased with plastic netting or containing any plastic material are to be removed from the site. If a fiber roll is to be left in place as part of a final stabilization design, the fiber roll must be non-plastic, made of plant-based materials (e.g., burlap-wrapped, coconut jute netting, and any other plant-based netting), and fully biodegradable.
- Fiber rolls can be an effective component of a final stabilization system, if all components of the fiber rolls are plant-based, fully biodegradable, and the fiber rolls are coupled with fully biodegradable effective erosion control measures (hydroseeding, RECPs, etc.) properly applied/installed per manufacturer's specifications and/or per the current CASQA BMP Fact Sheets. Removal of fiber rolls that are used as part of a final stabilization system can result in greater disturbance; therefore, during the BMP planning phase, only specify fiber rolls wrapped in non-plastic fully biodegradable materials for areas where fiber rolls will be used on final slopes.

Inspection and Maintenance

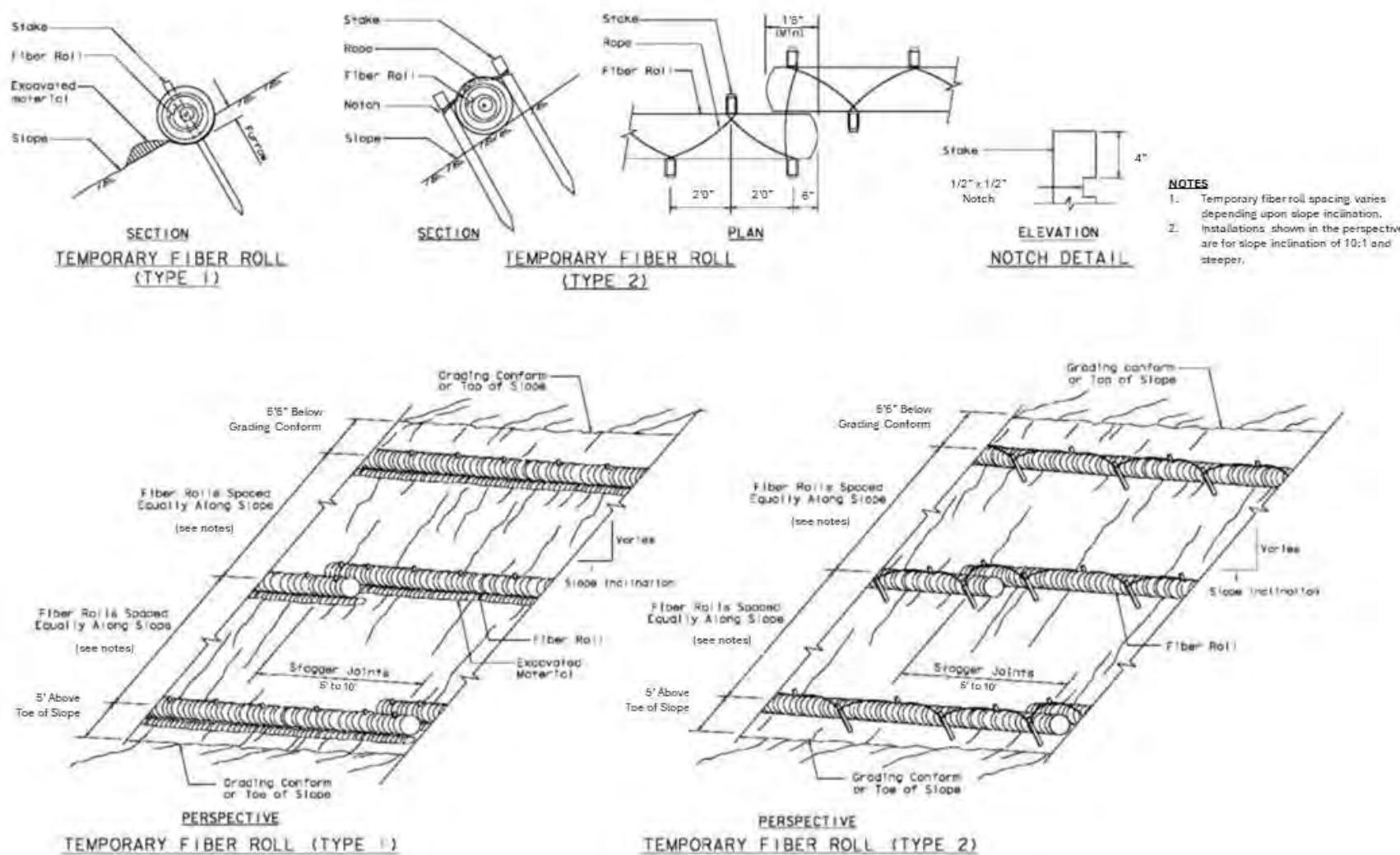
- BMPs are to be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that BMPs be inspected weekly at a minimum and prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair/replace split, torn, unraveling, or slumping fiber rolls as needed.
- Replace fiber rolls when they are disintegrated, flattened, and no longer effective.
- If construction activities or access to a work area are impaired by a fiber roll, move the fiber roll to avoid its damage or disintegration. Reinstall the fiber roll once active work is complete.
- If a fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, periodically remove sediment that accumulates upgradient of the fiber roll to maintain BMP effectiveness. Remove sediment when sediment accumulation reaches one-third of the height of the fiber roll.
- If fiber rolls are used for erosion control, such as in a check dam, sediment removal may not be required as long as the system continues to control the grade. Sediment control BMPs will be implemented in conjunction with this type of application.
- Repair any undercutting, rills, and gullies promptly.

References and Additional Resources

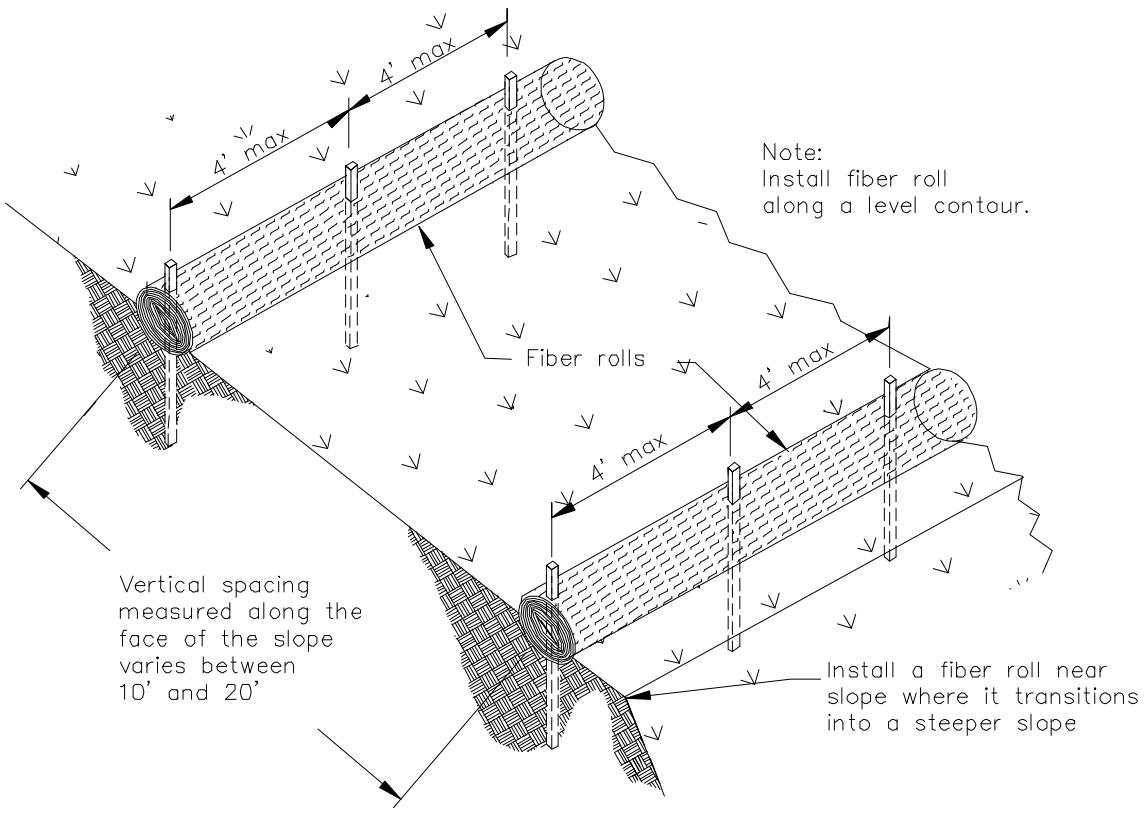
Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425-11.1, Section 4, Fiber Rolls SC-5, California Department of Transportation (Caltrans), March 2024.

Construction Stormwater Program website, State Water Resources Control Board, online at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html

Order 2022-0057-DWQ, NPDES General Permit No. CASooooo2: National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit), California State Water Resources Control Board (State Water Board), September 2022.

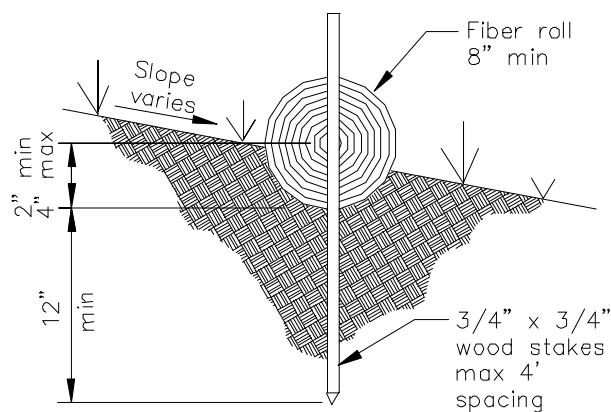


Reference: Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425-11.1, Section 4, Fiber Rolls SC-5, California Department of Transportation (Caltrans), March 2024.



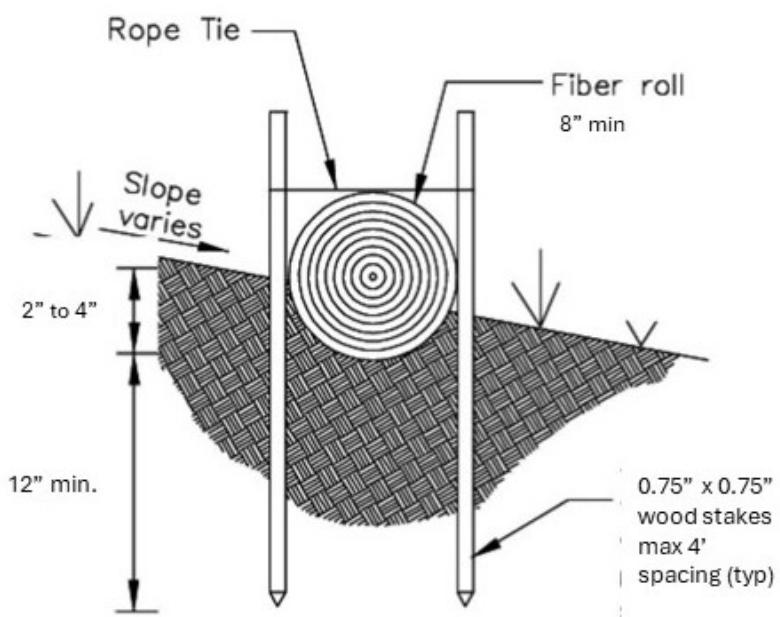
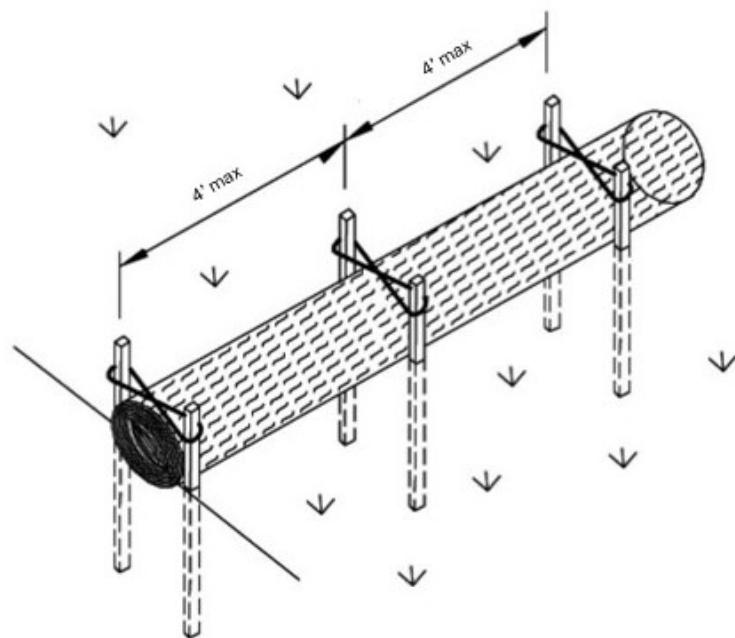
TYPICAL FIBER ROLL INSTALLATION

N.T.S.



ENTRENCHMENT DETAIL

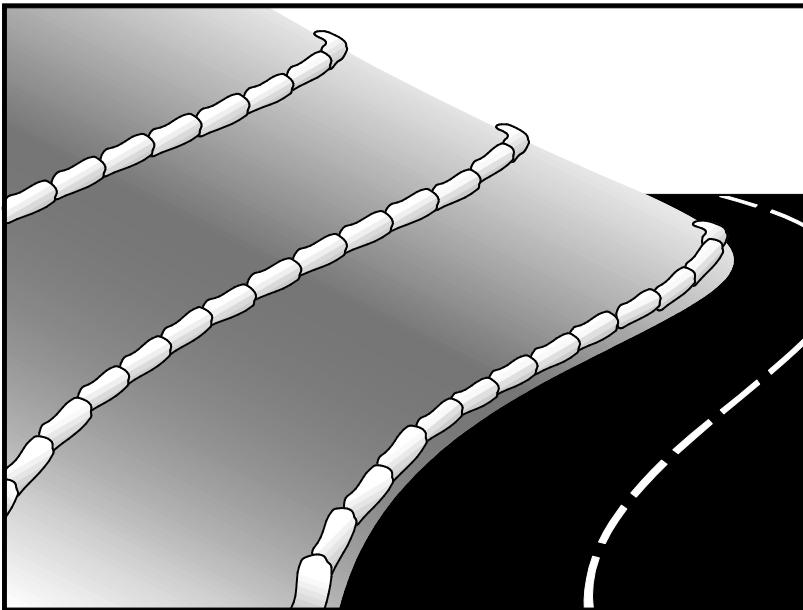
N.T.S.



OPTIONAL ENTRENCHMENT DETAIL

N.T.S.

Reference: Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425-11.1, Section 4, Fiber Rolls SC-5, California Department of Transportation (Caltrans), March 2024.



Description and Purpose

A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flow, preventing erosion.

Suitable Applications

Gravel bag berms may be suitable:

- As a linear sediment control measure:
 - Below the toe of slopes and erodible slopes
 - As sediment traps at culvert/pipe outlets
 - Below other small cleared areas
 - Along the perimeter of a site
 - Down slope of exposed soil areas
 - Around temporary stockpiles and spoil areas
 - Parallel to a roadway to keep sediment off paved areas
 - Along streams and channels
- As a linear erosion control measure:
 - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
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	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-1 Silt Fence
- SE-5 Fiber Roll
- SE-8 Sandbag Barrier
- SE-12 Temporary Silt Dike
- SE-14 Biofilter Bags

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- At the top of slopes to divert runoff away from disturbed slopes.
- As chevrons (small check dams) across mildly sloped construction roads. For use check dam use in channels, see SE-4, Check Dams.

Limitations

- Gravel berms may be difficult to remove.
- Removal problems limit their usefulness in landscaped areas.
- Gravel bag berm may not be appropriate for drainage areas greater than 5 acres.
- Runoff will pond upstream of the berm, possibly causing flooding if sufficient space does not exist.
- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor intensive.
- Durability of gravel bags is somewhat limited, and bags may need to be replaced when installation is required for longer than 6 months.
- Easily damaged by construction equipment.
- When used to detain concentrated flows, maintenance requirements increase.

Implementation

General

A gravel bag berm consists of a row of open graded gravel-filled bags placed on a level contour. When appropriately placed, a gravel bag berm intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. The open graded gravel in the bags is porous, which allows the ponded runoff to flow slowly through the bags, releasing the runoff as sheet flows. Gravel bag berms also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils. Gravel bag berms are similar to sand bag barriers but are more porous. Generally, gravel bag berms should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate gravel bag berms on level contours.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
 - Slope inclination of 4:1 (H:V) or flatter: Gravel bags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
 - Slope inclination between 4:1 and 2:1 (H:V): Gravel bags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

Slope inclination 2:1 (H:V) or greater: Gravel bags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the gravel bag barriers up slope to prevent runoff from going around the berm.
- Allow sufficient space up slope from the gravel bag berm to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, gravel bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the gravel bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- In Non-Traffic Areas:
 - Height = 18 in. maximum
 - Top width = 24 in. minimum for three or more-layer construction
 - Top width = 12 in. minimum for one- or two-layer construction
 - Side slopes = 2:1 (H:V) or flatter
- In Construction Traffic Areas:
 - Height = 12 in. maximum
 - Top width = 24 in. minimum for three or more-layer construction.
 - Top width = 12 in. minimum for one- or two-layer construction.
 - Side slopes = 2:1 (H:V) or flatter.
- Butt ends of bags tightly.
- On multiple row, or multiple layer construction, overlap butt joints of adjacent row and row beneath.
- Use a pyramid approach when stacking bags.

Materials

- **Bag Material:** Bags should be woven polypropylene, polyethylene or polyamide fabric or burlap, minimum unit weight of 4 ounces/yd², Mullen burst strength exceeding 300 lb/in² in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.

- **Bag Size:** Each gravel-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal and may vary based on locally available materials.
- **Fill Material:** Fill material should be 0.5 to 1 in. Crushed rock, clean and free from clay, organic matter, and other deleterious material, or other suitable open graded, non-cohesive, porous gravel.

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.
- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.
- Reshape or replace gravel bags as needed.
- Repair washouts or other damage as needed.
- 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 one-third of the barrier height.
- Remove gravel bag berms when no longer needed and recycle gravel fill whenever possible and properly dispose of bag material. Remove sediment accumulation and clean, re-grade, and stabilize the area.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Handbook of Steel Drainage and Highway Construction, American Iron and Steel Institute, 1983.

Stormwater Pollution Plan Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials and Research, October 1992.

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



Categories

EC	Erosion Control
SE	Sediment Control <input checked="" type="checkbox"/>
TC	Tracking Control <input checked="" type="checkbox"/>
WE	Wind Erosion Control
NS	Non-Stormwater Management Control
WM	Waste Management and Materials Pollution Control

Legend:

Primary Objective
 Secondary Objective

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).
- Sweeping may be less effective for fine particle soils (i.e., clay).

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.

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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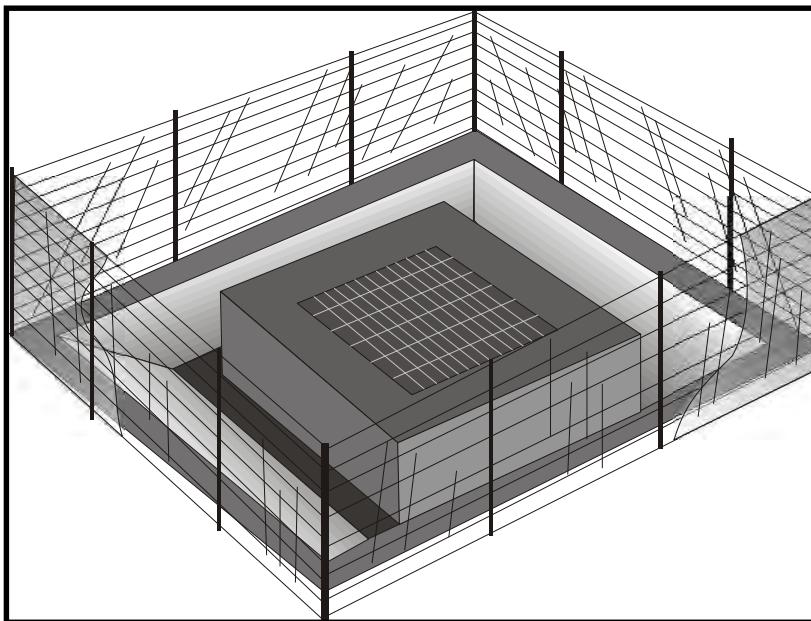
- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.
- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

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 and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.



Description and Purpose

Storm drain inlet protection consists of a sediment filter or an impounding area in, around or upstream of a storm drain, drop inlet, or curb inlet. Storm drain inlet protection measures temporarily pond runoff before it enters the storm drain, allowing sediment to settle. Some filter configurations also remove sediment by filtering, but usually the ponding action results in the greatest sediment reduction. Temporary geotextile storm drain inserts attach underneath storm drain grates to capture and filter storm water.

Suitable Applications

- Every storm drain inlet receiving runoff from unstabilized or otherwise active work areas should be protected. Inlet protection should be used in conjunction with other erosion and sediment controls to prevent sediment-laden stormwater and non-stormwater discharges from entering the storm drain system.

Limitations

- Drainage area should not exceed 1 acre.
- In general straw bales should not be used as inlet protection.
- Requires an adequate area for water to pond without encroaching into portions of the roadway subject to traffic.
- Sediment removal may be inadequate to prevent sediment discharges in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use

Categories

EC	Erosion Control
SE	Sediment Control <input checked="" type="checkbox"/>
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	<input checked="" type="checkbox"/>
Nutrients	
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-1 Silt Fence
- SE-5 Fiber Rolls
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-14 Biofilter Bags
- SE-13 Compost Socks and Berms

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other onsite sediment trapping techniques in conjunction with inlet protection.

- Frequent maintenance is required.
- Limit drainage area to 1 acre maximum. For drainage areas larger than 1 acre, runoff should be routed to a sediment-trapping device designed for larger flows. See BMPs SE-2, Sediment Basin, and SE-3, Sediment Traps.
- Excavated drop inlet sediment traps are appropriate where relatively heavy flows are expected, and overflow capability is needed.

Implementation

General

Inlet control measures presented in this handbook should not be used for inlets draining more than one acre. Runoff from larger disturbed areas should be first routed through SE-2, Sediment Basin or SE-3, Sediment Trap and/or used in conjunction with other drainage control, erosion control, and sediment control BMPs to protect the site. Different types of inlet protection are appropriate for different applications depending on site conditions and the type of inlet. Alternative methods are available in addition to the methods described/shown herein such as prefabricated inlet insert devices, or gutter protection devices.

Design and Layout

Identify existing and planned storm drain inlets that have the potential to receive sediment-laden surface runoff. Determine if storm drain inlet protection is needed and which method to use.

- The key to successful and safe use of storm drain inlet protection devices is to know where runoff that is directed toward the inlet to be protected will pond or be diverted as a result of installing the protection device.
 - Determine the acceptable location and extent of ponding in the vicinity of the drain inlet. The acceptable location and extent of ponding will influence the type and design of the storm drain inlet protection device.
 - Determine the extent of potential runoff diversion caused by the storm drain inlet protection device. Runoff ponded by inlet protection devices may flow around the device and towards the next downstream inlet. In some cases, this is acceptable; in other cases, serious erosion or downstream property damage can be caused by these diversions. The possibility of runoff diversions will influence whether or not storm drain inlet protection is suitable; and, if suitable, the type and design of the device.
- The location and extent of ponding, and the extent of diversion, can usually be controlled through appropriate placement of the inlet protection device. In some cases, moving the inlet protection device a short distance upstream of the actual inlet can provide more efficient sediment control, limit ponding to desired areas, and prevent or control diversions.
- Seven types of inlet protection are presented below. However, it is recognized that other effective methods and proprietary devices exist and may be selected.

- Silt Fence: Appropriate for drainage basins with less than a 5% slope, sheet flows, and flows under 0.5 cfs.
- Excavated Drop Inlet Sediment Trap: An excavated area around the inlet to trap sediment (SE-3).
- Gravel bag barrier: Used to create a small sediment trap upstream of inlets on sloped, paved streets. Appropriate for sheet flow or when concentrated flow may exceed 0.5 cfs, and where overtopping is required to prevent flooding.
- Block and Gravel Filter: Appropriate for flows greater than 0.5 cfs.
- Temporary Geotextile Storm drain Inserts: Different products provide different features. Refer to manufacturer details for targeted pollutants and additional features.
- Biofilter Bag Barrier: Used to create a small retention area upstream of inlets and can be located on pavement or soil. Biofilter bags slowly filter runoff allowing sediment to settle out. Appropriate for flows under 0.5 cfs.
- Compost Socks: Allow filtered run-off to pass through the compost while retaining sediment and potentially other pollutants (SE-13). Appropriate for flows under 1.0 cfs.
- Select the appropriate type of inlet protection and design as referred to or as described in this fact sheet.
- Provide area around the inlet for water to pond without flooding structures and property.
- Grates and spaces around all inlets should be sealed to prevent seepage of sediment-laden water.
- Excavate sediment sumps (where needed) 1 to 2 ft with 2:1 side slopes around the inlet.

Installation

- **DI Protection Type 1 - Silt Fence** - Similar to constructing a silt fence; see BMP SE-1, Silt Fence. Do not place fabric underneath the inlet grate since the collected sediment may fall into the drain inlet when the fabric is removed or replaced and water flow through the grate will be blocked resulting in flooding. See typical Type 1 installation details at the end of this fact sheet.
 1. Excavate a trench approximately 6 in. wide and 6 in. deep along the line of the silt fence inlet protection device.
 2. Place 2 in. by 2 in. wooden stakes around the perimeter of the inlet a maximum of 3 ft apart and drive them at least 18 in. into the ground or 12 in. below the bottom of the trench. The stakes should be at least 48 in.
 3. Lay fabric along bottom of trench, up side of trench, and then up stakes. See SE-1, Silt Fence, for details. The maximum silt fence height around the inlet is 24 in.

4. Staple the filter fabric (for materials and specifications, see SE-1, Silt Fence) to wooden stakes. Use heavy-duty wire staples at least 1 in. in length.
5. Backfill the trench with gravel or compacted earth all the way around.

- **DI Protection Type 2 - Excavated Drop Inlet Sediment Trap** - Install filter fabric fence in accordance with DI Protection Type 1. Size excavated trap to provide a minimum storage capacity calculated at the rate 67 yd³/acre of drainage area. See typical Type 2 installation details at the end of this fact sheet.
- **DI Protection Type 3 - Gravel bag** - Flow from a severe storm should not overtop the curb. In areas of high clay and silts, use filter fabric and gravel as additional filter media. Construct gravel bags in accordance with SE-6, Gravel Bag Berm. Gravel bags should be used due to their high permeability. See typical Type 3 installation details at the end of this fact sheet.
 1. Construct on gently sloping street.
 2. Leave room upstream of barrier for water to pond and sediment to settle.
 3. Place several layers of gravel bags – overlapping the bags and packing them tightly together.
 4. Leave gap of one bag on the top row to serve as a spillway. Flow from a severe storm (e.g., 10-year storm) should not overtop the curb.
- **DI Protection Type 4 – Block and Gravel Filter** - Block and gravel filters are suitable for curb inlets commonly used in residential, commercial, and industrial construction. See typical Type 4 installation details at the end of this fact sheet.
 1. Place hardware cloth or comparable wire mesh with 0.5 in. openings over the drop inlet so that the wire extends a minimum of 1 ft beyond each side of the inlet structure. If more than one strip is necessary, overlap the strips. Place woven geotextile over the wire mesh.
 2. Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so that the open ends face outward, not upward. The ends of adjacent blocks should abut. The height of the barrier can be varied, depending on design needs, by stacking combinations of blocks that are 4 in., 8 in., and 12 in. wide. The row of blocks should be at least 12 in. but no greater than 24 in. high.
 3. Place wire mesh over the outside vertical face (open end) of the concrete blocks to prevent stone from being washed through the blocks. Use hardware cloth or comparable wire mesh with 0.5 in. opening.
 4. Pile washed stone against the wire mesh to the top of the blocks. Use 0.75 to 3 in.
- **DI Protection Type 5 – Temporary Geotextile Insert (proprietary)** – Many types of temporary inserts are available. Most inserts fit underneath the grate of a drop inlet or inside of a curb inlet and are fastened to the outside of the grate or curb. These inserts are

removable, and many can be cleaned and reused. Installation of these inserts differs between manufacturers. Please refer to manufacturer instruction for installation of proprietary devices.

- ***DI Protection Type 6 - Biofilter bags*** – Biofilter bags may be used as a substitute for gravel bags in low-flow situations. Biofilter bags should conform to specifications detailed in SE-14, Biofilter bags.
 1. Construct in a gently sloping area.
 2. Biofilter bags should be placed around inlets to intercept runoff flows.
 3. All bag joints should overlap by 6 in.
 4. Leave room upstream for water to pond and for sediment to settle out.
 5. Stake bags to the ground as described in the following detail. Stakes may be omitted if bags are placed on a paved surface.
- ***DI Protection Type 7 – Compost Socks*** – A compost sock can be assembled on site by filling a mesh sock (e.g., with a pneumatic blower). Compost socks do not require special trenching compared to other sediment control methods (e.g., silt fence). Compost socks should conform to specification detailed in SE-13, Compost Socks and Berms.

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.
- Silt Fences. If the fabric becomes clogged, torn, or degrades, it should be replaced. Make sure the stakes are securely driven in the ground and are in good shape (i.e., not bent, cracked, or splintered, and are reasonably perpendicular to the ground). Replace damaged stakes. At a minimum, remove the sediment behind the fabric fence when accumulation reaches one-third the height of the fence or barrier height.
- Gravel Filters. If the gravel becomes clogged with sediment, it should be carefully removed from the inlet and either cleaned or replaced. Since cleaning gravel at a construction site may be difficult, consider using the sediment-laden stone as fill material and put fresh stone around the inlet. Inspect bags for holes, gashes, and snags, and replace bags as needed. Check gravel bags for proper arrangement and displacement.
- 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 one-third of the barrier height.
- Inspect and maintain temporary geotextile insert devices according to manufacturer's specifications.
- Remove storm drain inlet protection once the drainage area is stabilized.

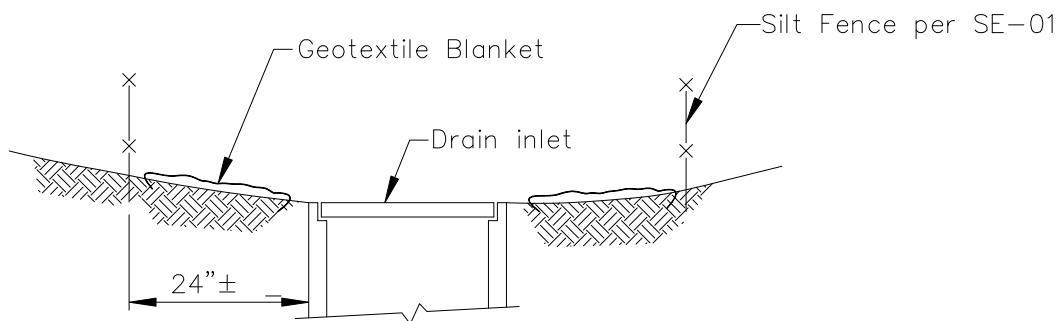
- Clean and regrade area around the inlet and clean the inside of the storm drain inlet, as it should be free of sediment and debris at the time of final inspection.

References and Additional Resources

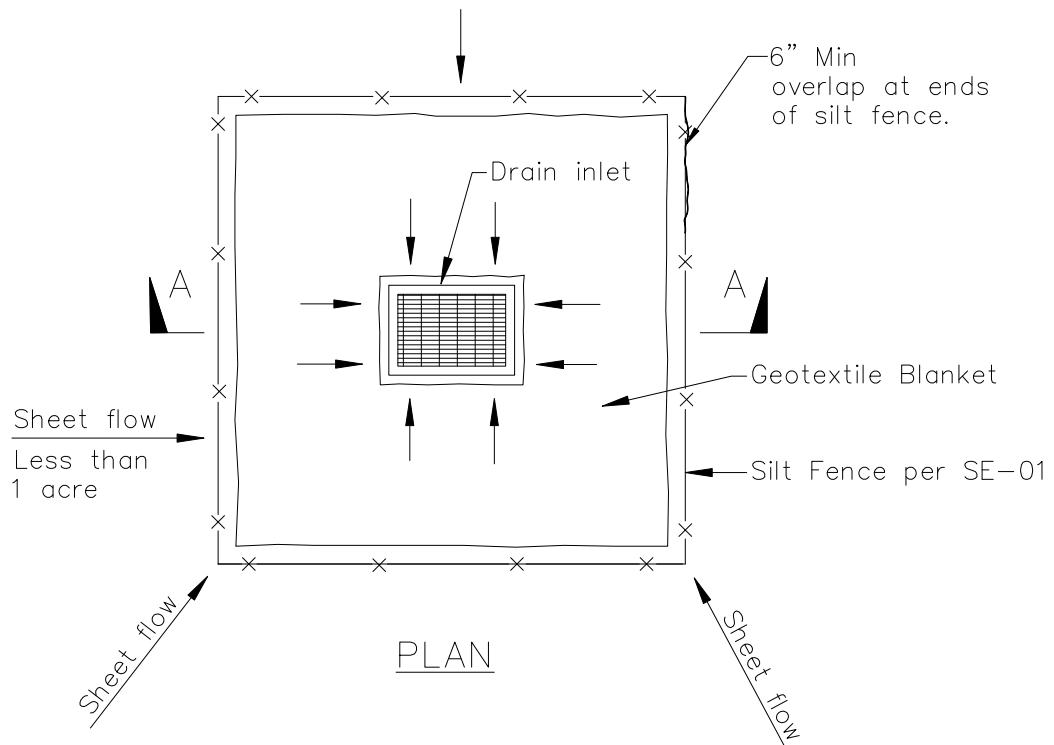
Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

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



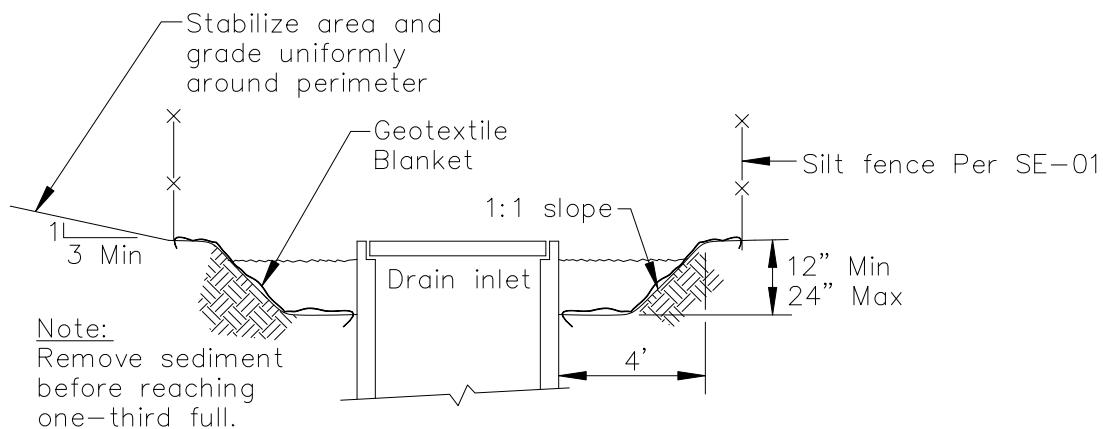
SECTION A-A



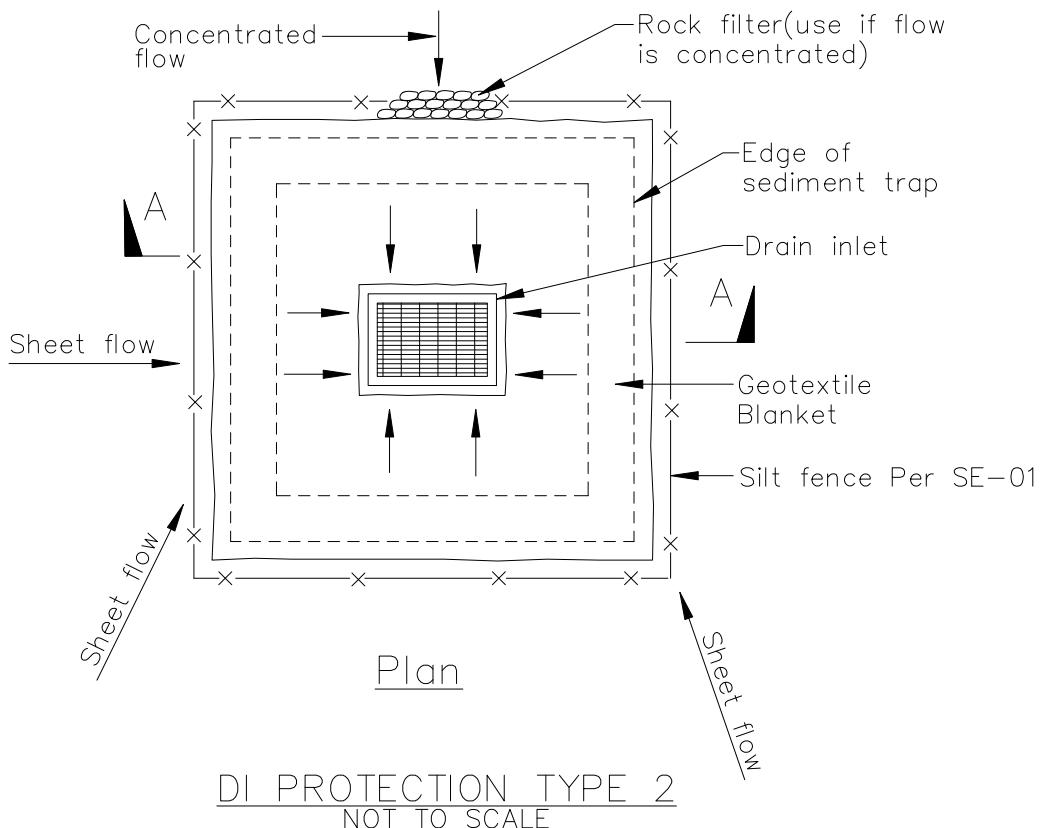
DI PROTECTION TYPE 1
NOT TO SCALE

NOTES:

1. For use in areas where grading has been completed and final soil stabilization and seeding are pending.
2. Not applicable in paved areas.
3. Not applicable with concentrated flows.

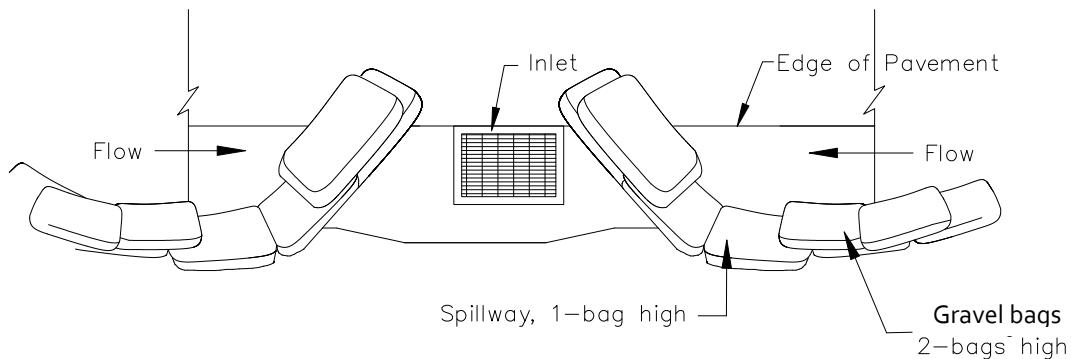


Section A-A

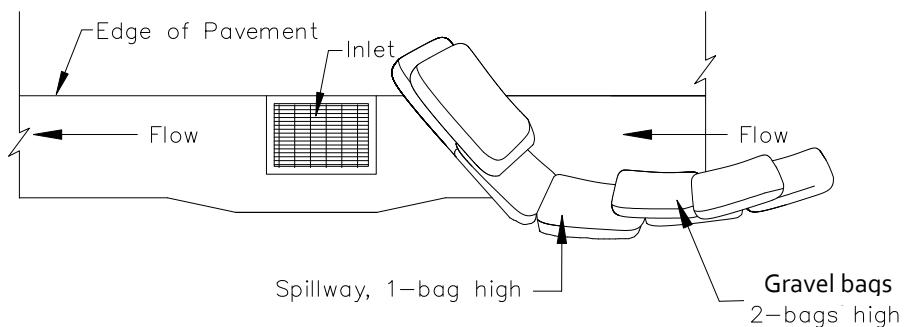


Notes

1. For use in cleared and grubbed and in graded areas.
2. Shape basin so that longest inflow area faces longest length of trap.
3. For concentrated flows, shape basin in 2:1 ratio with length oriented towards direction of flow.



TYPICAL PROTECTION FOR INLET ON SUMP

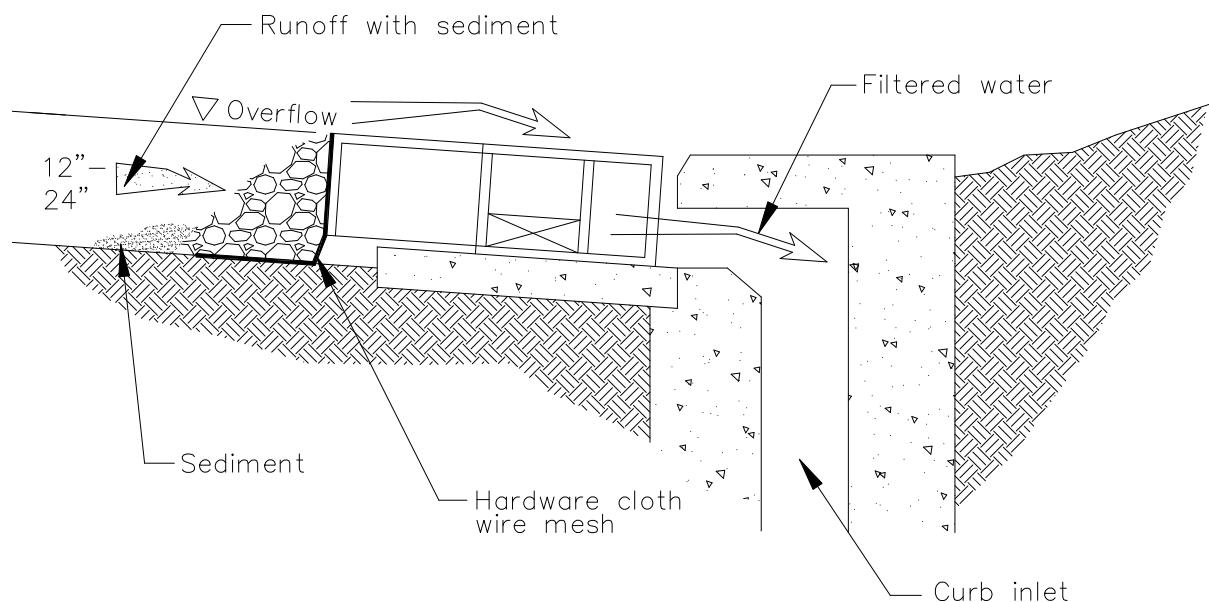
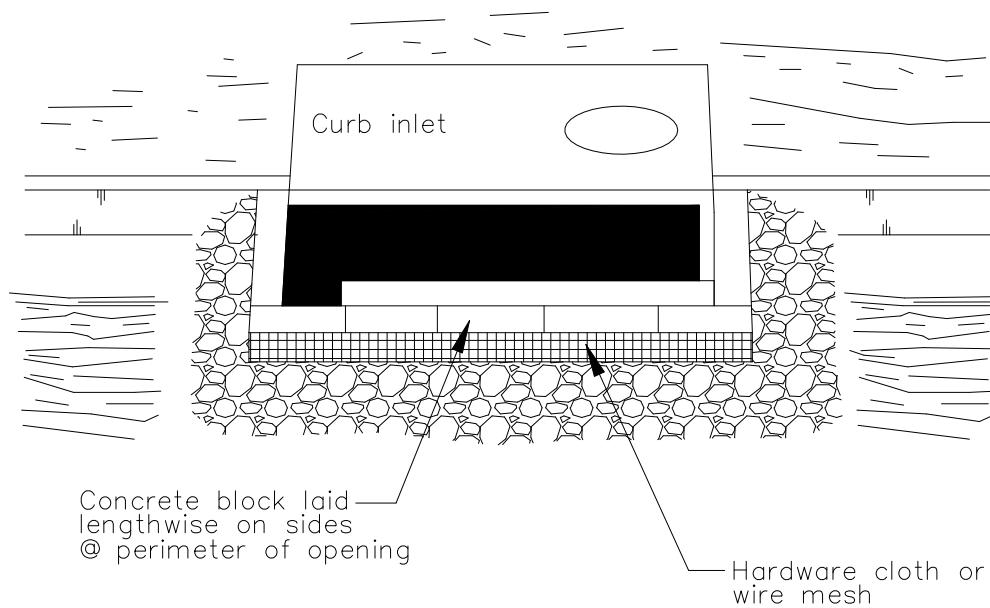


TYPICAL PROTECTION FOR INLET ON GRADE

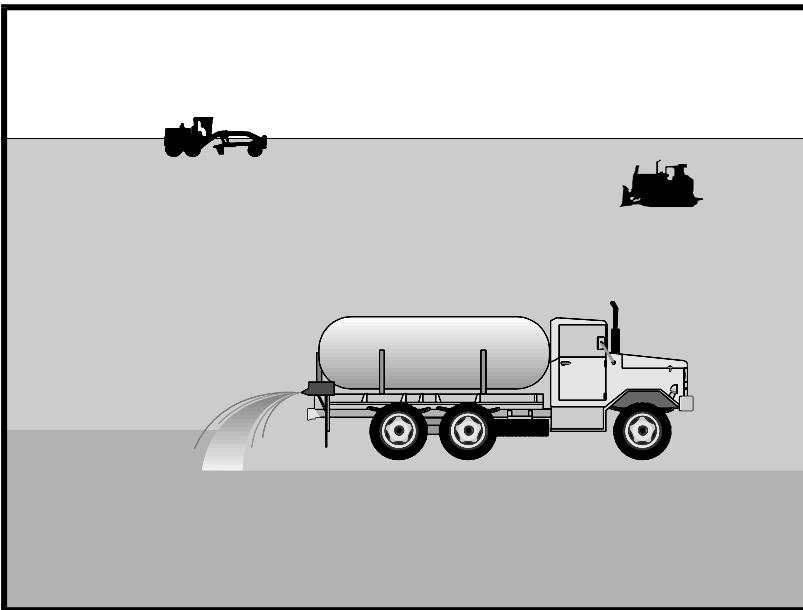
NOTES:

1. Intended for short-term use.
2. Use to inhibit non-storm water flow.
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed.
5. Not applicable in areas with high silts and clays without filter fabric.
6. Protection can be effective even if it is not immediately adjacent to the inlet provided that the inlet is protected from potential sources of pollution.

DI PROTECTION TYPE 3
NOT TO SCALE



DI PROTECTION – TYPE 4
NOT TO SCALE



Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	<input checked="" type="checkbox"/>
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

Primary Category
 Secondary Category

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:

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

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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 repellent, 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, vinyl, acrylic), clay additives (e.g. bentonite, montmorillonite) 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.

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 and Additional Resources

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

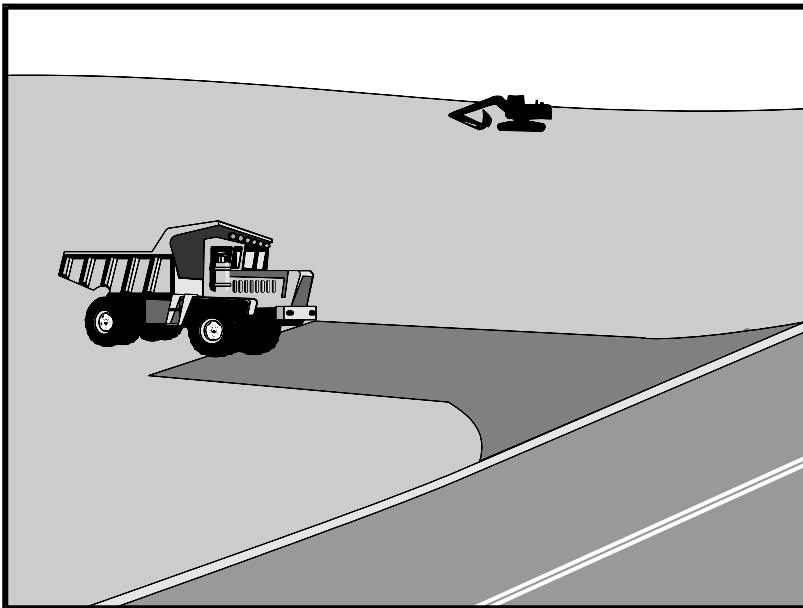
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Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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.

Stabilized Construction Entrance/Exit TC-1



Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	<input checked="" type="checkbox"/>
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

Primary Objective
 Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
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.

Stabilized Construction Entrance/Exit TC-1

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.

Stabilized Construction Entrance/Exit TC-1

- 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

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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.

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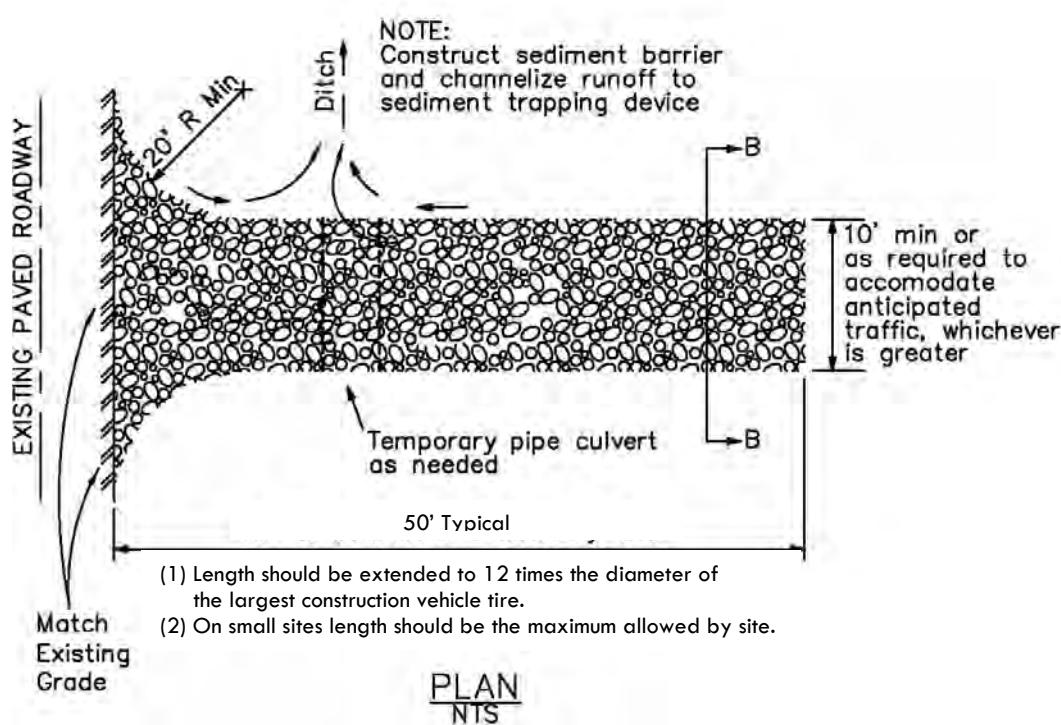
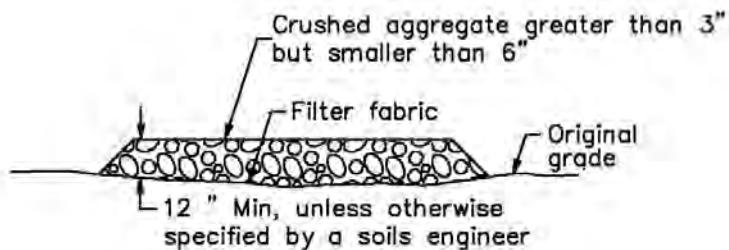
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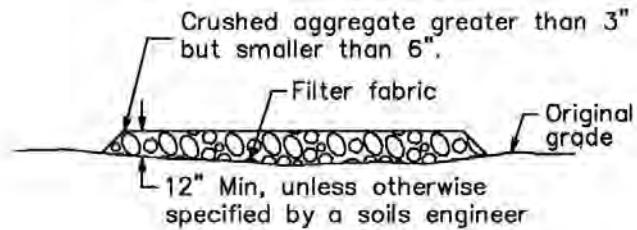
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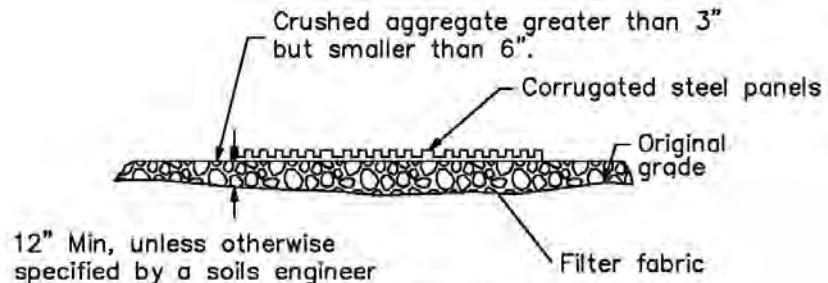
Stabilized Construction Entrance/Exit TC-1



Stabilized Construction Entrance/Exit TC-1

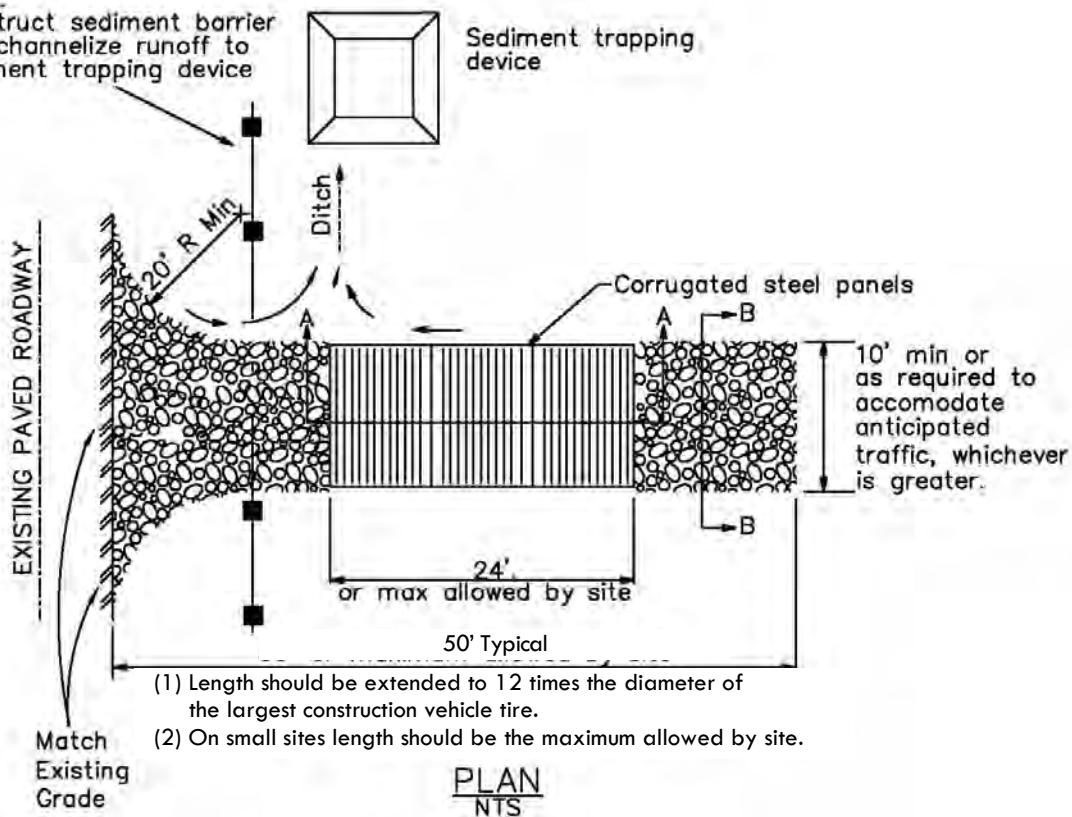


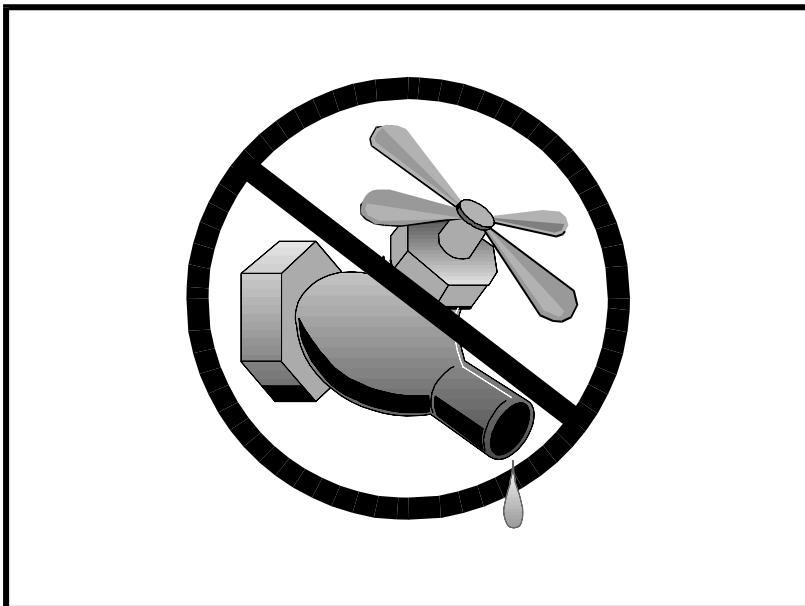
SECTION B-B
NTS



SECTION A-A
NOT TO SCALE

NOTE:
Construct sediment barrier and channelize runoff to sediment trapping device





Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
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	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- None

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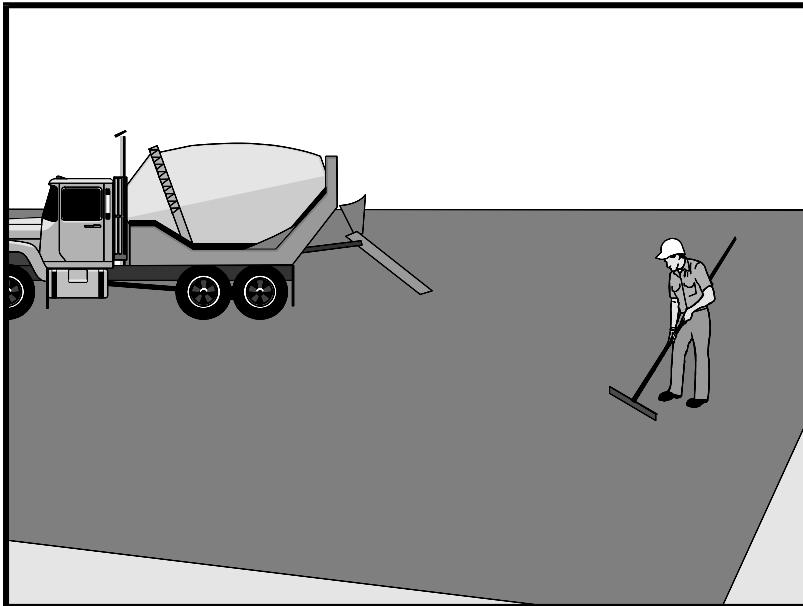
- Direct construction water runoff to areas where it can soak into the ground or be collected and used.
- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized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

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 occurring.
- Repair water equipment as needed to prevent unintended discharges.
 - Water trucks
 - Water reservoirs (water buffalos)
 - Irrigation systems
 - Hydrant connections

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

Primary Category
 Secondary Category

Description and Purpose

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent runoff 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.

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

Potential Alternatives

None

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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.

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 runoff (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.

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.

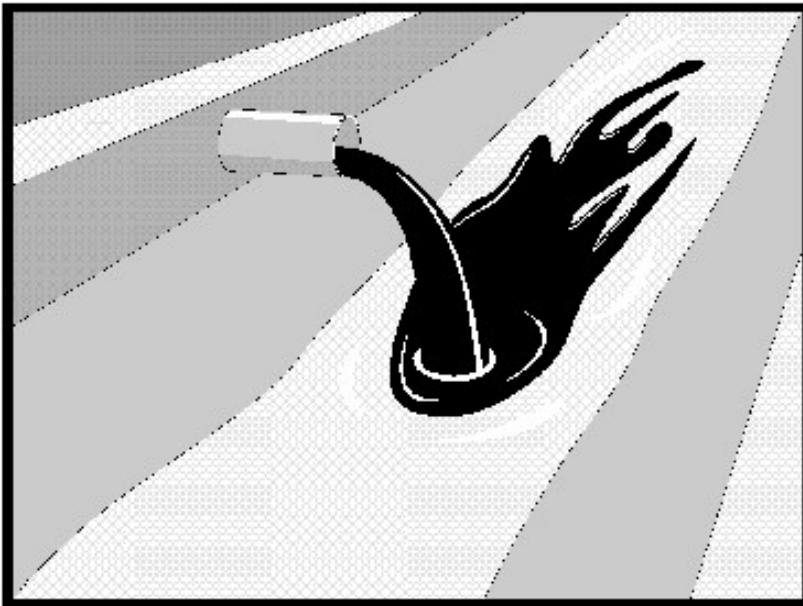
References and Additional Resources

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.

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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

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



Categories

EC	Erosion Control
SE	Sediment Control
TC	Tracking Control
WE	Wind Erosion Control
NS	Non-Stormwater Management Control <input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control

Legend:

Primary Objective
 Secondary Objective

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.

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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- 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.

Inspection and Maintenance

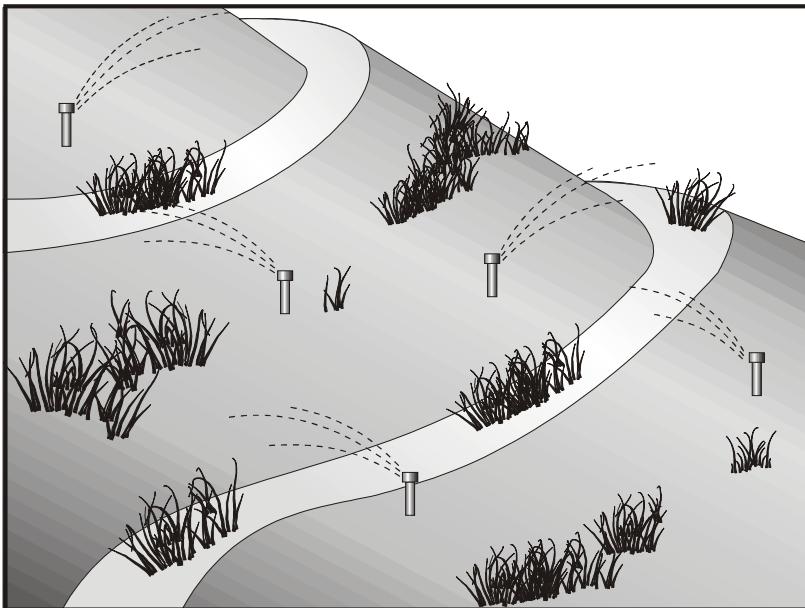
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at 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 and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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



Categories

EC	Erosion Control
SE	Sediment Control
TC	Tracking Control
WE	Wind Erosion Control
NS	Non-Stormwater Management Control <input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control

Legend:

Primary Objective
 Secondary Objective

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.

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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- 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.

Inspection and Maintenance

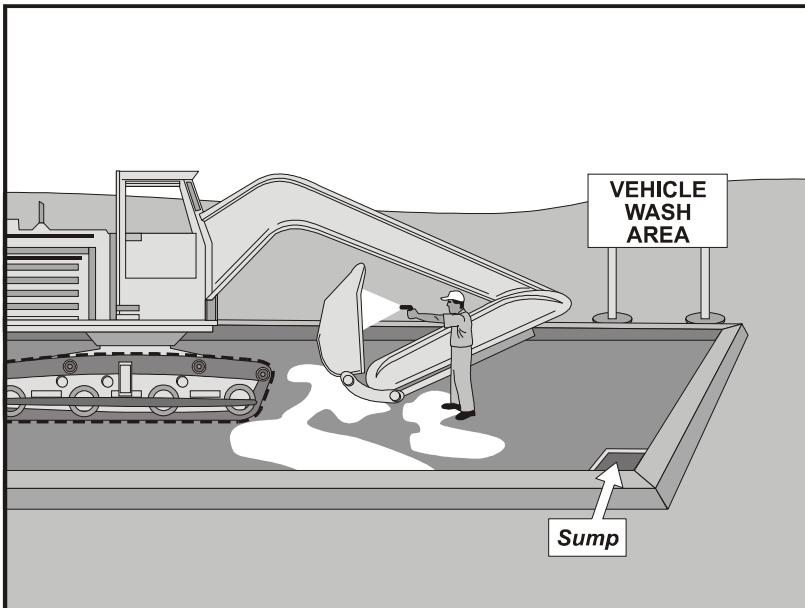
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at 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 and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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



Categories

EC	Erosion Control
SE	Sediment Control
TC	Tracking Control
WE	Wind Erosion Control
NS	Non-Stormwater Management Control <input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control

Legend:

- Primary Objective
- Secondary Objective

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.

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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If washing operations are to take place onsite, then:

- 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 runoff 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

Inspection and Maintenance

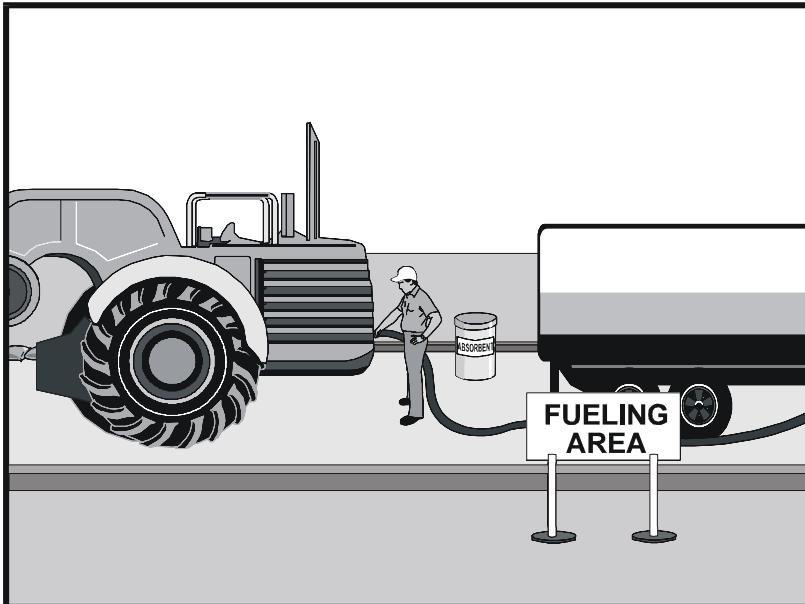
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at 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 are 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 and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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



Categories

EC	Erosion Control
SE	Sediment Control
TC	Tracking Control
WE	Wind Erosion Control
NS	Non-Stormwater Management Control <input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control

Legend:

- Primary Objective
- Secondary Objective

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.

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

Potential Alternatives

None

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- 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.

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 and Additional Resources

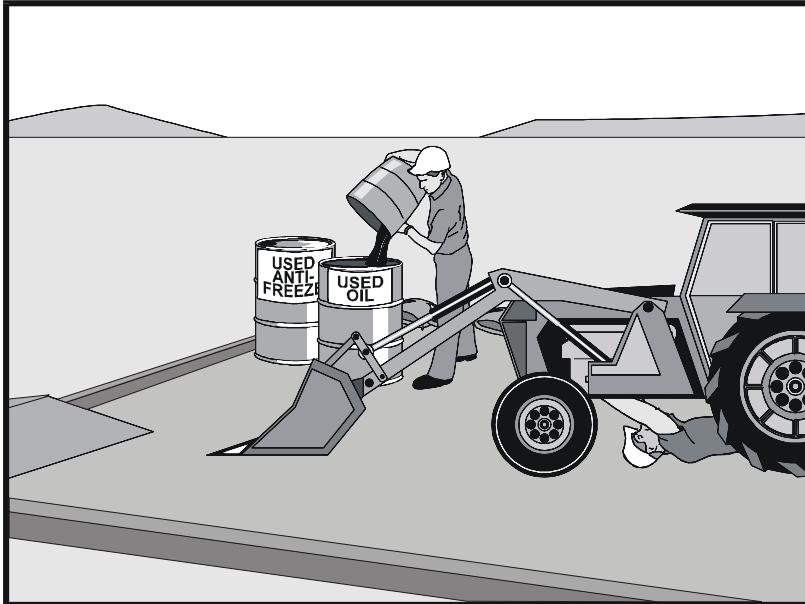
Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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 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 <input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control

Legend:

Primary Objective
 Secondary Objective

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,

Targeted Constituents

Sediment	
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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Vehicle & Equipment Maintenance NS-10

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 runoff 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.

Vehicle & Equipment Maintenance NS-10

- 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.

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

Vehicle & Equipment Maintenance NS-10

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.

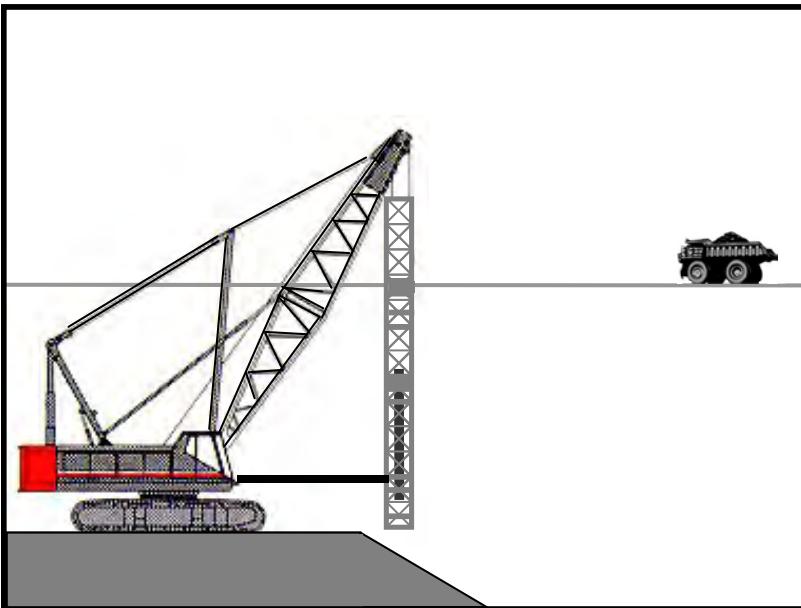
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired 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 and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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.



Categories

EC	Erosion Control
SE	Sediment Control
TC	Tracking Control
WE	Wind Erosion Control
NS	Non-Stormwater Management Control <input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control

Legend:

Primary Objective
 Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

Potential Alternatives

None

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Description and Purpose

The construction and retrofit of bridges and retaining walls often include driving piles for foundation support and shoring operations. Driven piles are typically constructed of precast concrete, steel, or timber. Driven sheet piles are also used for shoring and cofferdam construction. Proper control and use of equipment, materials, and waste products from pile driving operations will reduce or eliminate the discharge of potential pollutants to the storm drain system, watercourses, and waters of the United States.

Suitable Applications

These procedures apply to all construction sites near or adjacent to a watercourse or groundwater where permanent and temporary pile driving (impact and vibratory) takes place, including operations using pile shells as well as construction of cast-in-steel-shell and cast-in-drilled-hole piles.

Limitations

None identified.

Implementation

- Use drip pans or absorbent pads during vehicle and equipment operation, maintenance, cleaning, fueling, and storage. Refer to NS-8, Vehicle and Equipment Cleaning, NS-9, Vehicle and Equipment Fueling, and NS-10, Vehicle and Equipment Maintenance.

- Have spill kits and cleanup materials available at all locations of pile driving. Refer to WM-4, Spill Prevention and Control.
- Equipment that is stored or in use in streambeds, or on docks, barges, or other structures over water bodies should be kept leak free.
- Park equipment over plastic sheeting or equivalent where possible. Plastic is not a substitute for drip pans or absorbent pads. The storage or use of equipment in streambeds or other bodies of water must comply with all applicable permits.
- Implement other BMPs as applicable, such as NS-2, Dewatering Operations, WM-5, Solid Waste Management, WM-6, Hazardous Waste Management, and WM-10, Liquid Waste Management.
- When not in use, store pile-driving equipment away from concentrated flows of stormwater, drainage courses, and inlets. Protect hammers and other hydraulic attachments from runoff and runoff by placing them on plywood and covering them with plastic or a comparable material prior to the onset of rain.
- Use less hazardous products, e.g., vegetable oil, when practicable.

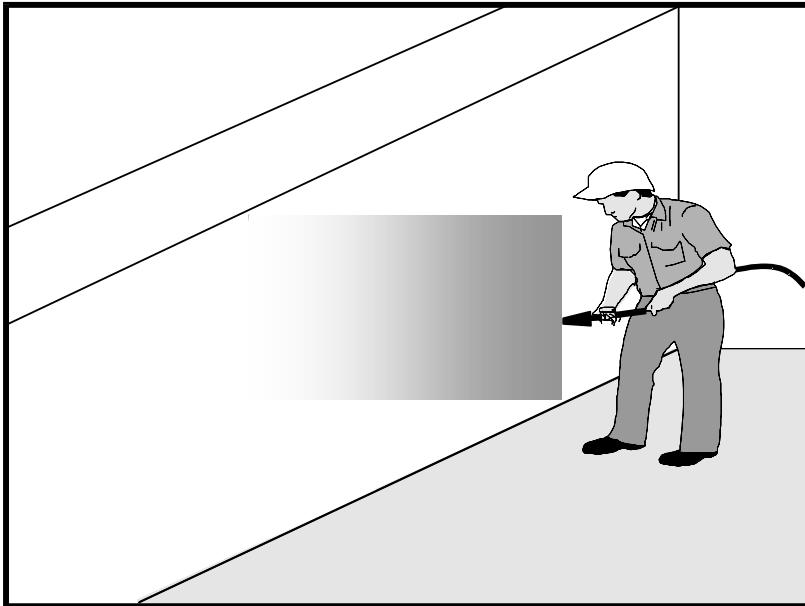
Inspection and Maintenance

- 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.
- Inspect equipment every day at startup and repair equipment as needed (i.e., worn or damaged hoses, fittings, and gaskets). Recheck equipment at shift changes or at the end of the day and scheduled repairs as needed.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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



Categories

EC	Erosion Control
SE	Sediment Control
TC	Tracking Control
WE	Wind Erosion Control
NS	Non-Stormwater Management Control <input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control <input checked="" type="checkbox"/>

Legend:

Primary Category
 Secondary Category

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.

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

Potential Alternatives

None

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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.

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.

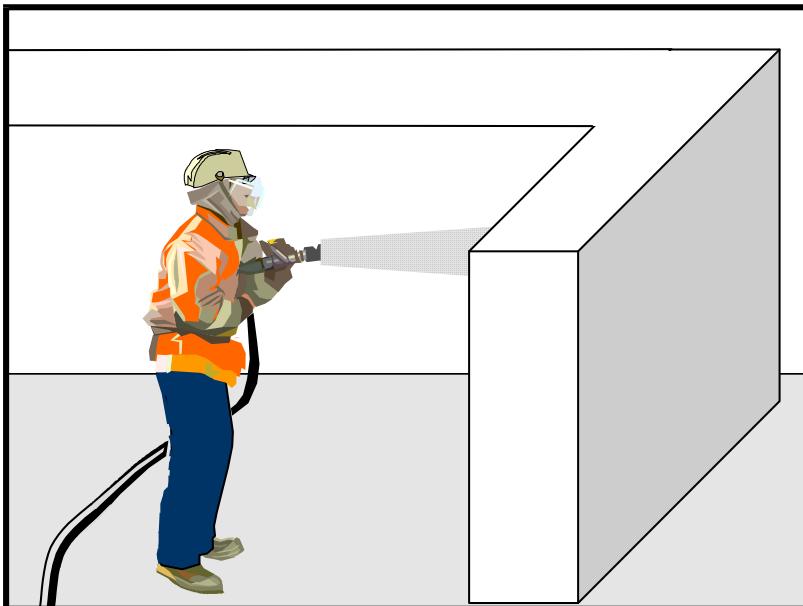
References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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 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.



Categories

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Legend:

Primary Category
 Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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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.

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.

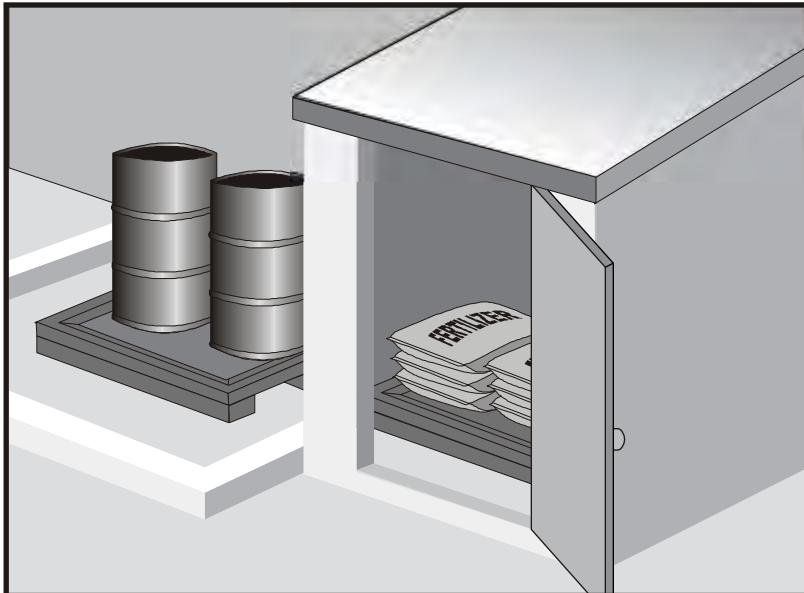
- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
- Inspect containment structures for damage prior to use and prior to onset of forecasted rain.

References and Additional Resources

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.

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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



Categories

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NS	Non-Stormwater Management Control
WM	Waste Management and Materials Pollution Control <input checked="" type="checkbox"/>

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	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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- 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.

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.

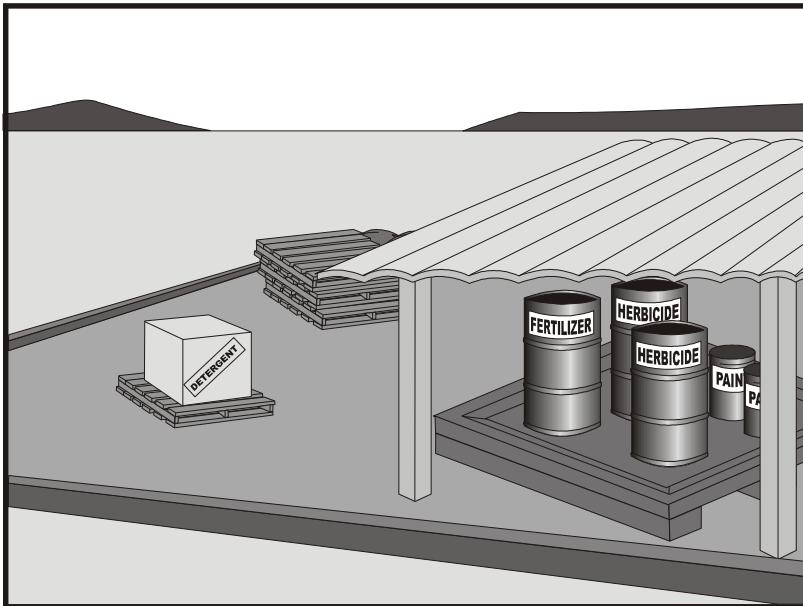
References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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



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 <input checked="" type="checkbox"/>

Legend:

Primary Category
 Secondary Category

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.

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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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.

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 and Additional Resources

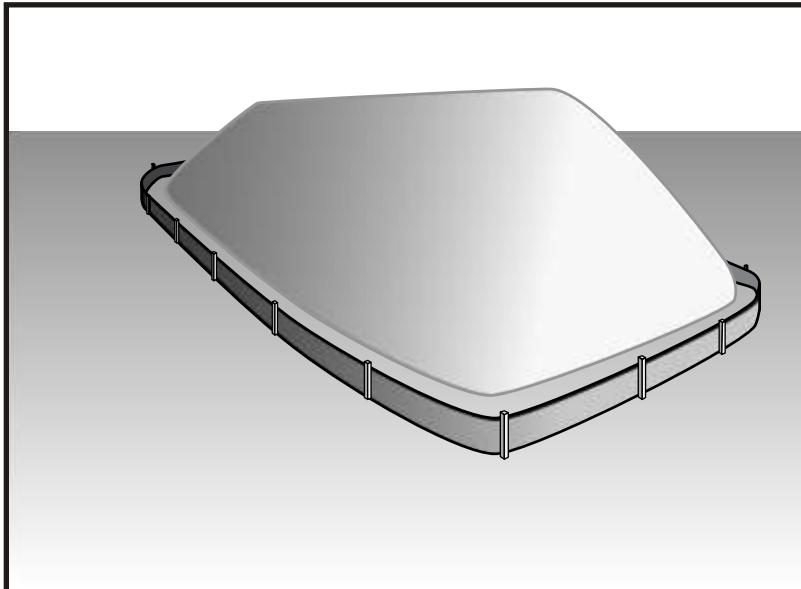
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

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.

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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



Treat Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

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 mender (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	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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- 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 run-on 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 treated wood

- 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:

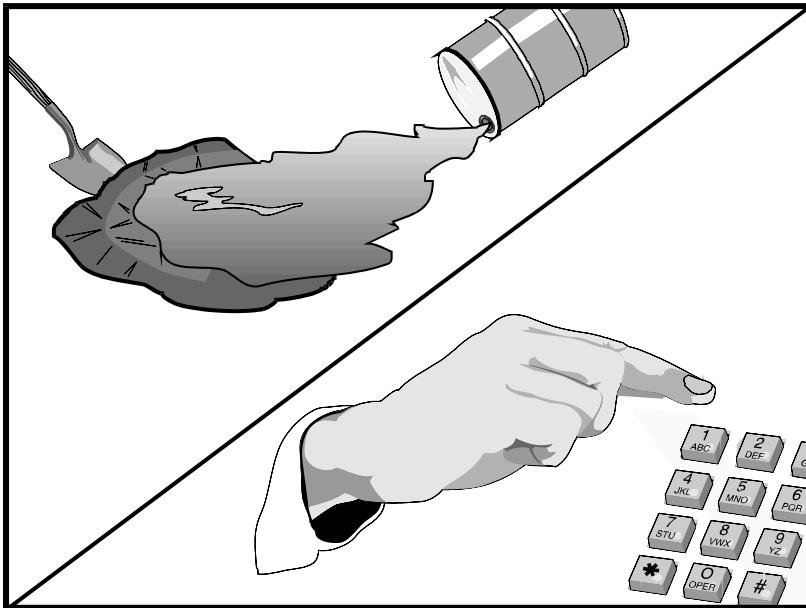
- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of “cold mix” and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to 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.

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 and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.



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 <input checked="" type="checkbox"/>

Legend:

Primary Objective
 Secondary Objective

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

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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- 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 runoff 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 spill's 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 runoff 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 runoff 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.

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.

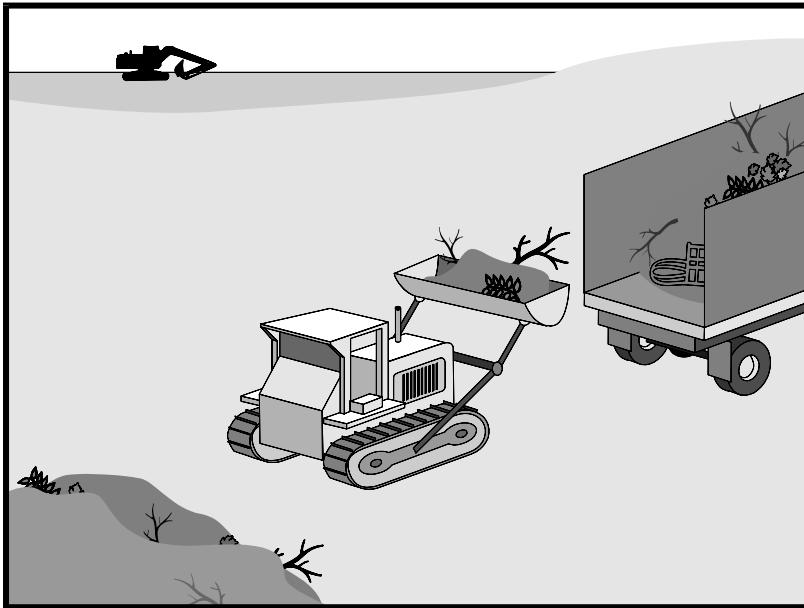
- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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



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 <input checked="" type="checkbox"/>

Legend:

Primary Objective
 Secondary Objective

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

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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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.

Inspection and Maintenance

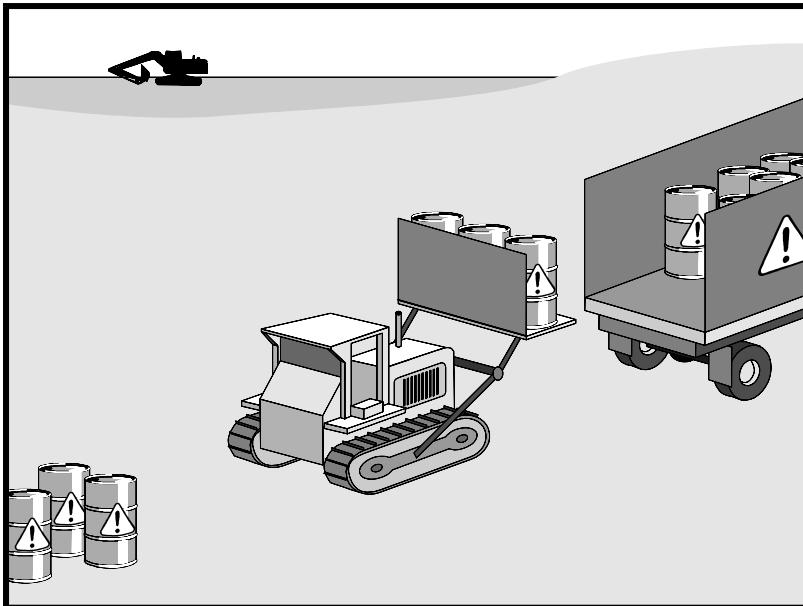
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at 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 and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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

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



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 <input checked="" type="checkbox"/>

Legend:

Primary Objective
 Secondary Objective

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	

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

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.

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 and Additional Resources

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.

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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

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



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 <input checked="" type="checkbox"/>

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	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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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.

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.

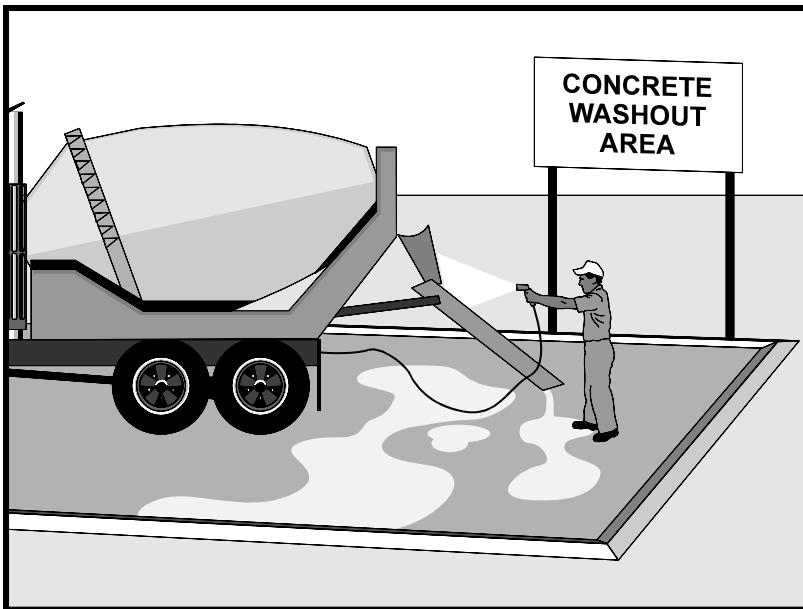
References and Additional Resources

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.

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

Primary Category
 Secondary Category

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.

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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- 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.

Inspection and Maintenance

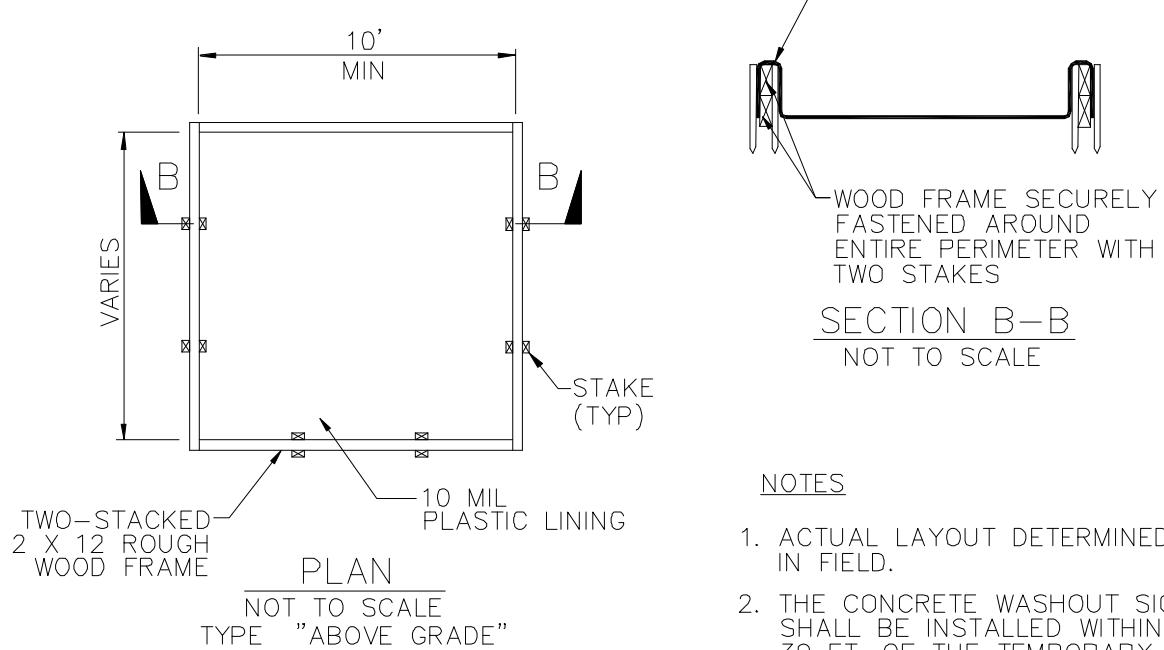
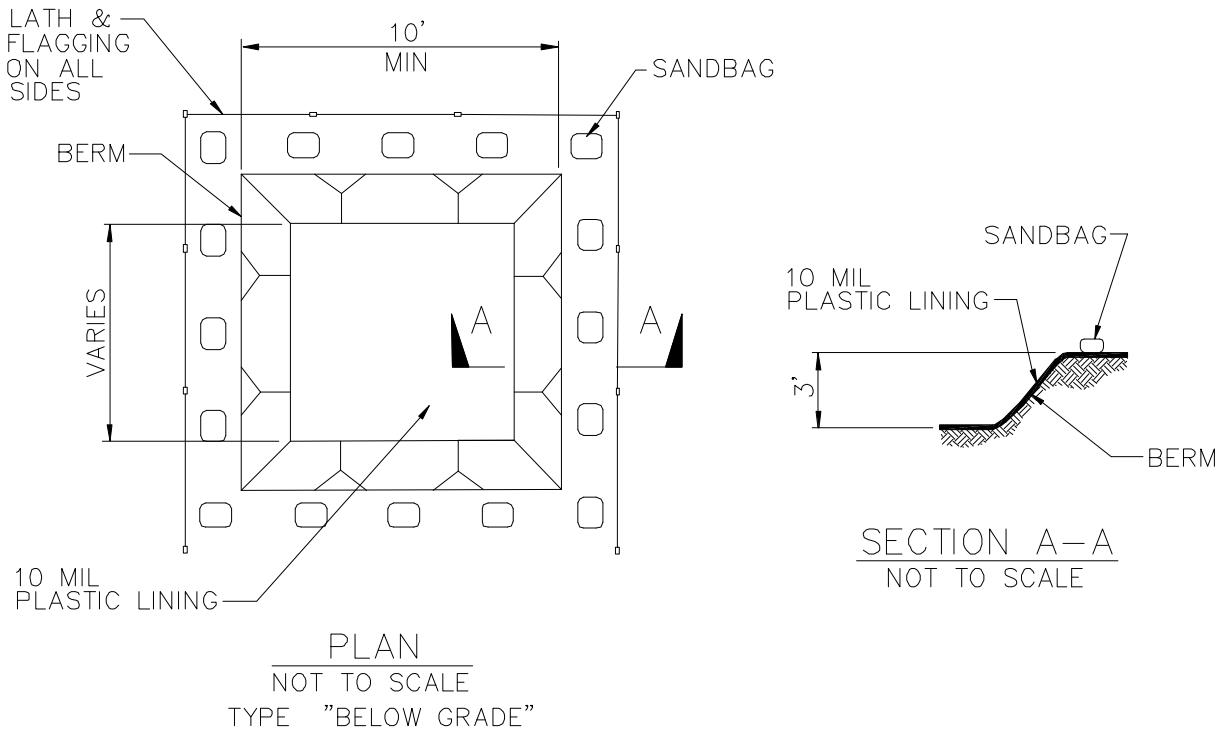
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Temporary 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 and Additional Resources

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.

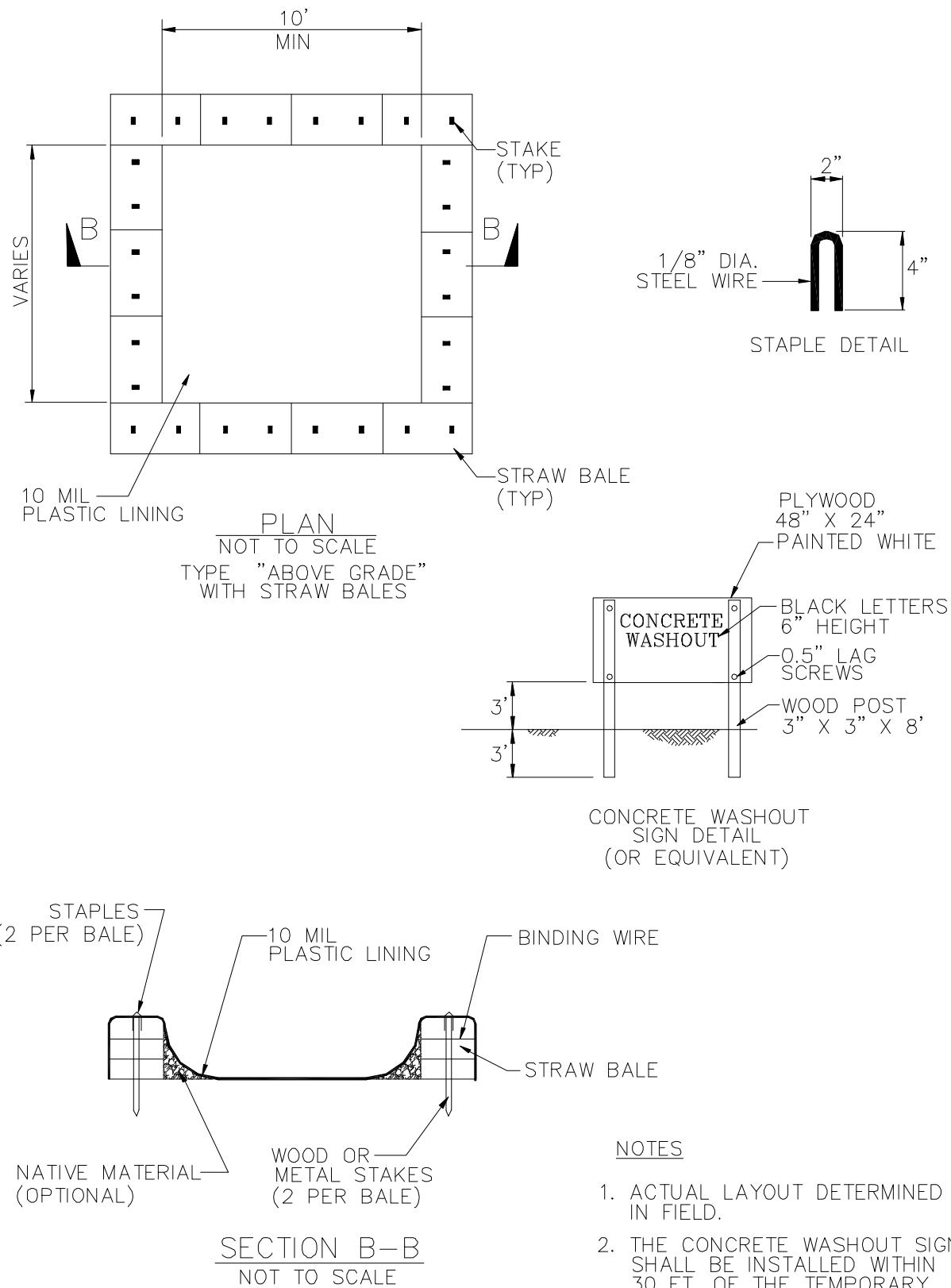
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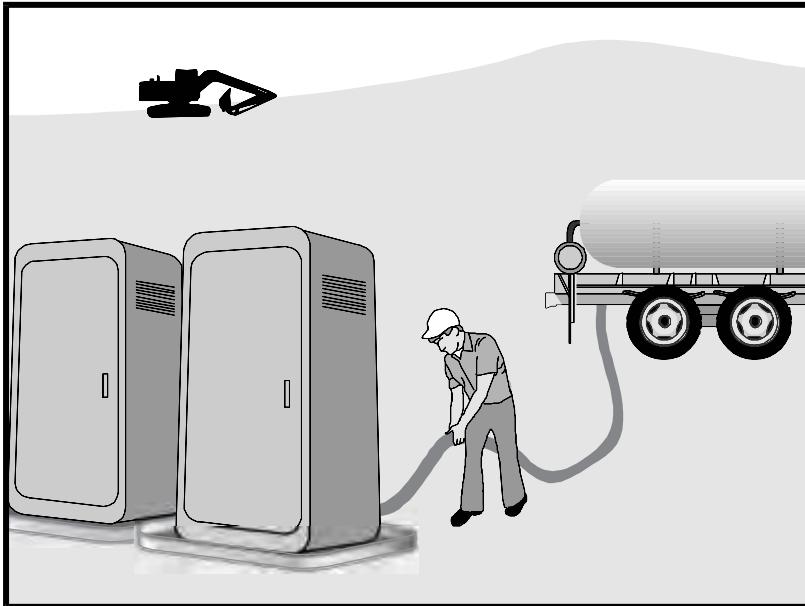


NOTES

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 <input checked="" type="checkbox"/>

Legend:

Primary Category
 Secondary Category

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.

Targeted Constituents

Sediment	
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None

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Sanitary/Septic Waste Management WM-9

- 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.

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

Sanitary/Septic Waste Management WM-9

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 and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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

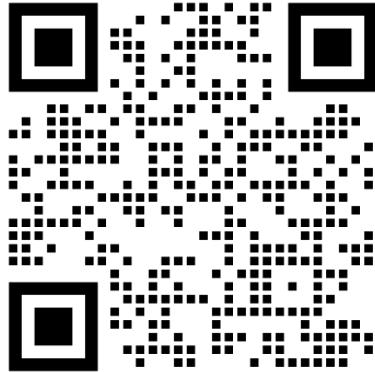
Construction Stormwater General Permit

Copies of the Construction Stormwater General Permit may be downloaded from the State Water Board website at:

https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html

Additional Construction Stormwater Program Information can be found at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml





Appendix H: BMP Inspection Form





BMP INSPECTION REPORT

Date and Time of Inspection:		Date Report Written:			
Inspection Type: (Circle one)	Weekly Complete Parts I,II,III and VII	Pre-Qualifying Precipitation Event (QPE) Complete Parts I,II,III,IV and VII	During QPE Complete Parts I, II, III, V, and VII	Post-QPE Complete Parts I,II,III,VI and VII	Inactive Project Complete Parts I,II,III and VII
Part I. General Information					
Site Information					
Construction Site Name: Santa Monica College Bundy Campus Tennis - Pickleball Courts					
Construction stage and completed activities:			Approximate area of site that is exposed:		
Photos Taken: (Circle one)	Yes	No	Photo Reference IDs:		
Weather					
Estimate storm beginning: (date and time)		Estimate storm duration: (hours)			
Estimate time since last storm: (days or hours)		Rain gauge reading and location: (in)			
Is a "Qualifying Precipitation Event" predicted or did one occur (i.e., any weather pattern with a 50% chance of 0.5" or more within a 24-hr period when 0.5" has been forecast and continues on subsequent 24-hour periods when 0.25" of precipitation or more is forecast)? (Y/N) If yes, summarize forecast:					
Exception Documentation (explanation required if inspection could not be conducted). Visual inspections are not required outside of business hours or during dangerous weather conditions such as electrical storms, flooding, and high winds above 40 miles per hour.					
Inspector Information					
Inspector Name:			Inspector Title:		
Inspector Certification:				Date:	

**Part II. BMP Observations. Describe deficiencies in Part III.**

Minimum BMPs for Risk Level _____ Sites	Adequately designed, implemented and effective (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Construction Materials			
Inventory of products (excluding materials designed to be outdoors)			
Stockpiled construction materials not actively in use are covered and bermed			
All chemicals are stored in watertight containers with appropriate secondary containment, or in a completely enclosed storage shed			
Construction materials are minimally exposed to precipitation			
BMPs preventing the off-site tracking of materials are implemented and properly effective			
Good Housekeeping for Waste Management			
Wash/rinse water and materials are prevented from being disposed into the storm drain system			
Portable toilets are contained to prevent discharges of waste			
Sanitation facilities are clean and with no apparent for leaks and spills			
Equipment is in place to cover waste disposal containers at the end of business day and during rain events			
Discharges from waste disposal containers are prevented from discharging to the storm drain system / receiving water			
Stockpiled waste material is securely protected from wind and rain if not actively in use			
Procedures are in place for addressing hazardous and non-hazardous spills			
Appropriate spill response personnel are assigned and trained			
Equipment and materials for cleanup of spills is available onsite			
Washout areas (e.g., concrete) are contained appropriately to prevent discharge or infiltration into the underlying soil			
Good Housekeeping for Vehicle Storage and Maintenance			
Measures are in place to prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters			
All equipment or vehicles are fueled, maintained, and stored in a designated area with appropriate BMPs			
Vehicle and equipment leaks are cleaned immediately and disposed of properly			



**Part II. BMP Observations Continued. Describe deficiencies in Part III.**

Minimum BMPs for Risk Level _____ Sites	Adequately designed, implemented and effective (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Landscape Materials			
Stockpiled landscape materials such as mulches and topsoil are contained and covered when not actively in use			
Erodible landscape material has not been applied 2 days before a forecasted rain event or during an event			
Erodible landscape materials are applied at quantities and rates in accordance with manufacturer recommendations			
Bagged erodible landscape materials are stored on pallets and covered			
Good Housekeeping for Air Deposition of Site Materials			
Good housekeeping measures are implemented onsite to control the air deposition of site materials and from site operations			
Non-Stormwater Management			
Non-Stormwater discharges are properly controlled			
Vehicles are washed in a manner to prevent non-stormwater discharges to surface waters or drainage systems			
Streets are cleaned in a manner to prevent unauthorized non-stormwater discharges to surface waters or drainage systems.			
Erosion Controls			
Wind erosion controls are effectively implemented			
Effective soil cover is provided for disturbed areas inactive (i.e., not scheduled to be disturbed for 14 days) as well as finished slopes, open space, utility backfill, and completed lots			
The use of plastic materials is limited in cases when a more sustainable, environmentally friendly alternative exists.			
Sediment Controls			
Perimeter controls are established and effective at controlling erosion and sediment discharges from the site			
Entrances and exits are stabilized to control erosion and sediment discharges from the site			
Sediment basins are properly maintained			
Inspect immediate access roads prior to forecasted precipitation			
Linear sediment control along toe of slope, face of slope and at grade breaks (Risk Level 2 & 3 Only)			
Limit construction activity to and from site to entrances and exits that employ effective controls to prevent offsite tracking (Risk Level 2 & 3 Only)			





Ensure all storm, drain inlets and perimeter controls, runoff control BMPs and pollutants controls at entrances and exits are maintained and protected from activities that reduce their effectiveness (Risk Level 2 & 3 Only)			
Run-On and Run-Off Controls			
Run-on to the site is effectively managed and directed away from all disturbed areas.			
Other			
Are the project SWPPP and BMP plan up to date, available onsite and being properly implemented?			
Is the posting of the project's unique WDID number, waiver identification number, and site and project contact information publicly accessible?			

Part III. Descriptions of BMP Deficiencies

Deficiency	Repairs Implemented: Note - Repairs must begin within 72 hours of identification and, complete repairs as soon as possible.	
	Start Date	Action
1.		
2.		
3.		

Part IV. Additional Pre-QPE Observations. Note the presence or absence of floating and suspended materials, sheen, discoloration, turbidity, odors, and source(s) of pollutants(s).

	Yes, No, N/A
Do stormwater storage and containment areas have adequate freeboard? If no, complete Part III.	
Are drainage areas free of spills, leaks, or uncontrolled pollutant sources? If no, complete Part VII and describe below.	
Notes:	
Are stormwater storage and containment areas free of leaks? If no, complete Parts III and/or VII and describe below.	
Notes:	



Part V. Additional During-QPE Observations. If BMPs cannot be inspected during inclement weather, list the results of visual inspections at all relevant outfalls, discharge points, and downstream locations. Note odors or visible sheen on the surface of discharges. Complete Part VII (Corrective Actions) as needed.

Outfall, Discharge Point, or Other Downstream Location

Location	Description
Location	Description
Location	Description
Location	Description

Part VI. Additional Post-QPE Observations. Visually observe (inspect) stormwater discharges at all discharge locations within 96 hours after each qualifying precipitation event, and observe (inspect) the discharge of stored or contained stormwater that is derived from and discharged subsequent to a qualifying precipitation event producing precipitation of $\frac{1}{2}$ inch or more at the time of discharge. Complete Part VII (Corrective Actions) as needed.

Discharge Location, Storage or Containment Area	Visual Observation

Part VII. Additional Corrective Actions Required. Identify additional corrective actions not included with BMP Deficiencies (Part III) above. Note if SWPPP change is required.

Required Actions	Implementation Date





Appendix I: Training Forms





Contractor Personnel Training Log

Stormwater Management Training Log and Documentation

Project Name: Santa Monica College Bundy Campus Tennis - Pickleball Courts

WDID #:

Stormwater Management Topic: (check as appropriate)

<input type="checkbox"/> Good Housekeeping BMPs	<input type="checkbox"/> Erosion Control BMPs
<input type="checkbox"/> Sediment Control BMPs	<input type="checkbox"/> Tracking Control
<input type="checkbox"/> Non-Stormwater Management BMPs	<input type="checkbox"/> Waste Management & Pollution Control BMPs
<input type="checkbox"/> BMP Implementation Activities	<input type="checkbox"/> Advanced BMPs
<input type="checkbox"/> Identification of QSPs and QSP Delegates	

Training Objective: _____

Date: _____ Instructor: _____

Training Length (hours): _____

Attendee Roster (Attach additional forms if necessary)

Name	Company	Phone





QSP Delegate Training Log

Stormwater Management Training Log and Documentation

Project Name: Santa Monica College Bundy Campus Tennis - Pickleball Courts

WDID #:

QSP Delegate Name:

Delegated Responsibilities:

- Stormwater Visual Inspections
- Sampling
- BMP Inspections
- BMP Maintenance and Repair

Foundational Training

Topic	Date Completed	QSP Trainer
<input type="checkbox"/> Roles and Responsibilities		
<input type="checkbox"/> Forecast Information		
<input type="checkbox"/> Documentation and Reporting Procedures		

Site-Specific Training

Topic	Date Completed	QSP Trainer
<input type="checkbox"/> Visual Inspections		
<input type="checkbox"/> Sample Collection Procedures		
<input type="checkbox"/> Sample Reporting Procedures		
<input type="checkbox"/> BMP Implementation		

As needed, attach proof of external training (e.g., course completion certificates, credentials for the QSP Delegate).





Appendix J: Responsible Parties





Identification of QSP and QSP Delegates

Project Name: Santa Monica College Bundy Campus Tennis - Pickleball Courts

WDID #:

The following are QSPs and QSP Delegates associated with this project

Name of Personnel ⁽¹⁾	QSP Number, or state "Delegate"	Company	Date
Jeff Woolston	26764	CAL-Storm Compliance, Inc.	1/5/2026
Ken Kristoffersen	00207	CAL-Storm Compliance, Inc.	1/5/2026
Victor Chu	28612	CAL-Storm Compliance, Inc.	1/5/2026
Alan Parks	22654	CAL-Storm Compliance, Inc.	1/5/2026
Jan Heppert	25403	CAL-Storm Compliance, Inc.	1/5/2026
Anthony Appel	28899	CAL-Storm Compliance, Inc.	1/5/2026
Will Tisdale	29062	CAL-Storm Compliance, Inc.	1/5/2026
Tanner Schnicke	29063	CAL-Storm Compliance, Inc.	1/5/2026
Brett Woolston	29058	CAL-Storm Compliance, Inc.	1/5/2026

(1) If additional QSPs or QSP Delegates are required on the job site add additional lines



CERTIFICATE OF TRAINING
CALIFORNIA CONSTRUCTION GENERAL PERMIT

**Qualified SWPPP Developer (QSD)
AND
Qualified SWPPP Practitioner (QSP)**

Jeffrey Woolston

October 1, 2025 - October 12, 2027
Certificate #26764



California Stormwater Quality Association and
California Construction General Permit Training Team





CERTIFICATE OF TRAINING
CALIFORNIA CONSTRUCTION GENERAL PERMIT

Qualified SWPPP Developer (QSD)
AND
Qualified SWPPP Practitioner (QSP)

Ken Kristoffersen

December 18, 2024 - December 25, 2026
Certificate #207



California Stormwater Quality Association and
California Construction General Permit Training Team





CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP PRACTITIONER (QSP)

Alan Parks

Feb 27, 2024 - Mar 20, 2026

Certificate # 22654



California Stormwater Quality Association and
California Construction General Permit Training Team





CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP PRACTITIONER (QSP)

Jan Heppert

Nov 13, 2024 - Feb 04, 2027

Certificate # 25403



California Stormwater Quality Association and
California Construction General Permit Training Team





CERTIFICATE OF TRAINING
CALIFORNIA CONSTRUCTION GENERAL PERMIT

Qualified SWPPP Developer (QSD)
AND
Qualified SWPPP Practitioner (QSP)

Victor Chu

October 16, 2025 - October 23, 2027
Certificate #28612



California Stormwater Quality Association and
California Construction General Permit Training Team





CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP PRACTITIONER (QSP)

Brett Woolston

Nov 13, 2024 - Nov 13, 2026

Certificate # 29058



California Stormwater Quality Association and
California Construction General Permit Training Team





CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP PRACTITIONER (QSP)

Tanner Schnicke

Nov 14, 2024 - Nov 14, 2026

Certificate # 29063



California Stormwater Quality Association and
California Construction General Permit Training Team





CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP PRACTITIONER (QSP)

William Tisdale

Nov 14, 2024 - Nov 14, 2026

Certificate # 29062



California Stormwater Quality Association and
California Construction General Permit Training Team





Appendix K: Contractors and Subcontractors





Contractor Name:	Wartan Vartkessian
Title:	Superintendent
Contractor Company:	The Nazerian Group
Address	17514 Ventura Blvd #204, Encino, CA 91316
Phone Number:	(862) 438-3805
Phone Number (24/7):	(862) 438-3805
Email:	wartan@nazerian.net

Contractor Name:	
Title:	
Contractor Company:	
Address	
Phone Number:	
Phone Number (24/7):	
Email:	

Contractor Name:	
Title:	
Contractor Company:	
Address	
Phone Number:	
Phone Number (24/7):	
Email:	





Appendix L:

Calculations

RUSLE2 Calculations

Project: Santa Monica College Bundy Campus, Pickle Ball & Tennis Courts

Pre-Existing Condition Details:

For the pre-existing conditions a RUSLE2 calculation was performed.

During Construction Condition Details:

The project “During Construction” conditions consist of the grading and improvements to the existing site.

Results:

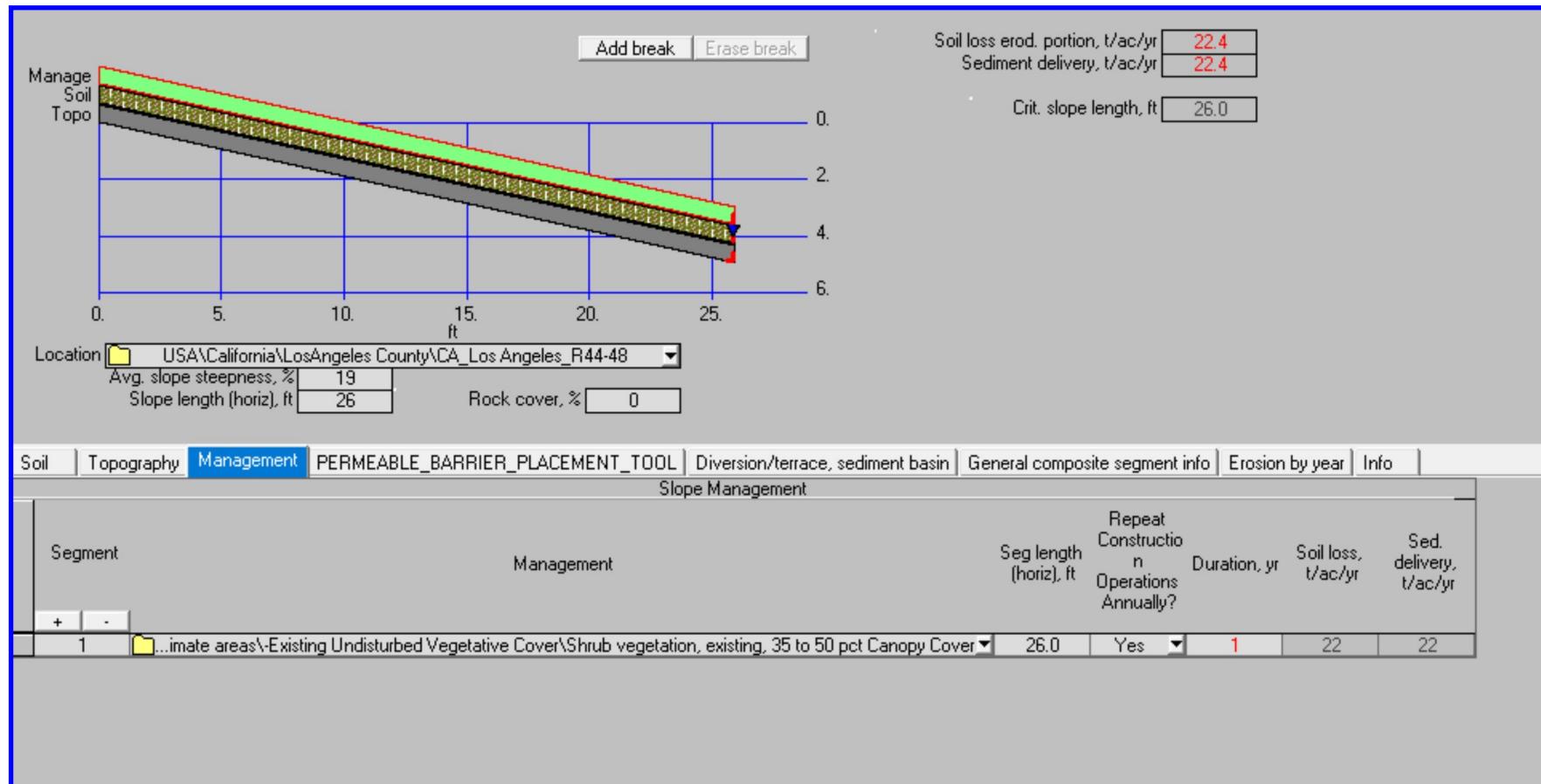
The During Construction Soil Loss is equal to or less than the pre-existing condition indicates a **16.43** Tons/Acre/Year.

RUSLE2: RISK Level 2 Project

Calculations on the following pages...



Pre-Disturbance Site Condition RUSLE2



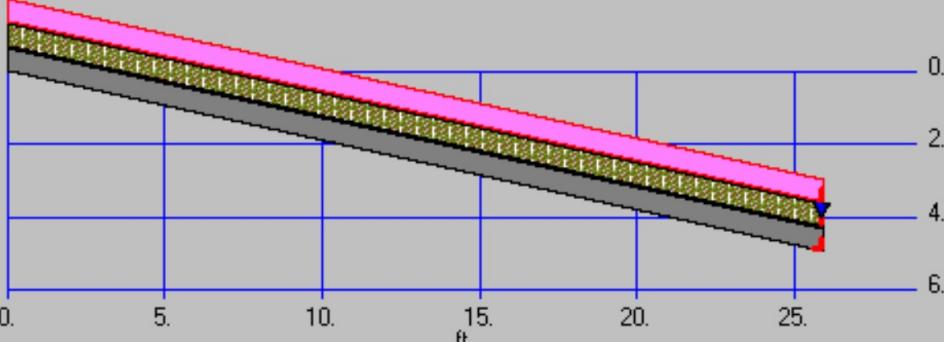
Phase 1 Demolition, Clearing, Grubbing, Grading Condition RUSLE2

Manage
Soil
Topo

Add break | Erase break

Soil loss erod. portion, t/ac/yr **16.7**
Sediment delivery, t/ac/yr **16.7**

Crit. slope length, ft **26.0**



Location USA\California\Los Angeles County\CA_Los Angeles_R44-48

Avg. slope steepness, % **19**
Slope length (horiz), ft **26**
Rock cover, % **0**

Diversion/terrace, sediment basin	General composite segment info	Erosion by year	Info
Soil	Management	PERMEABLE_BARRIER_PLACEMENT_TOOL	

How set barriers? Num barriers **1** Barrier spacing, ft Barrier at bottom?

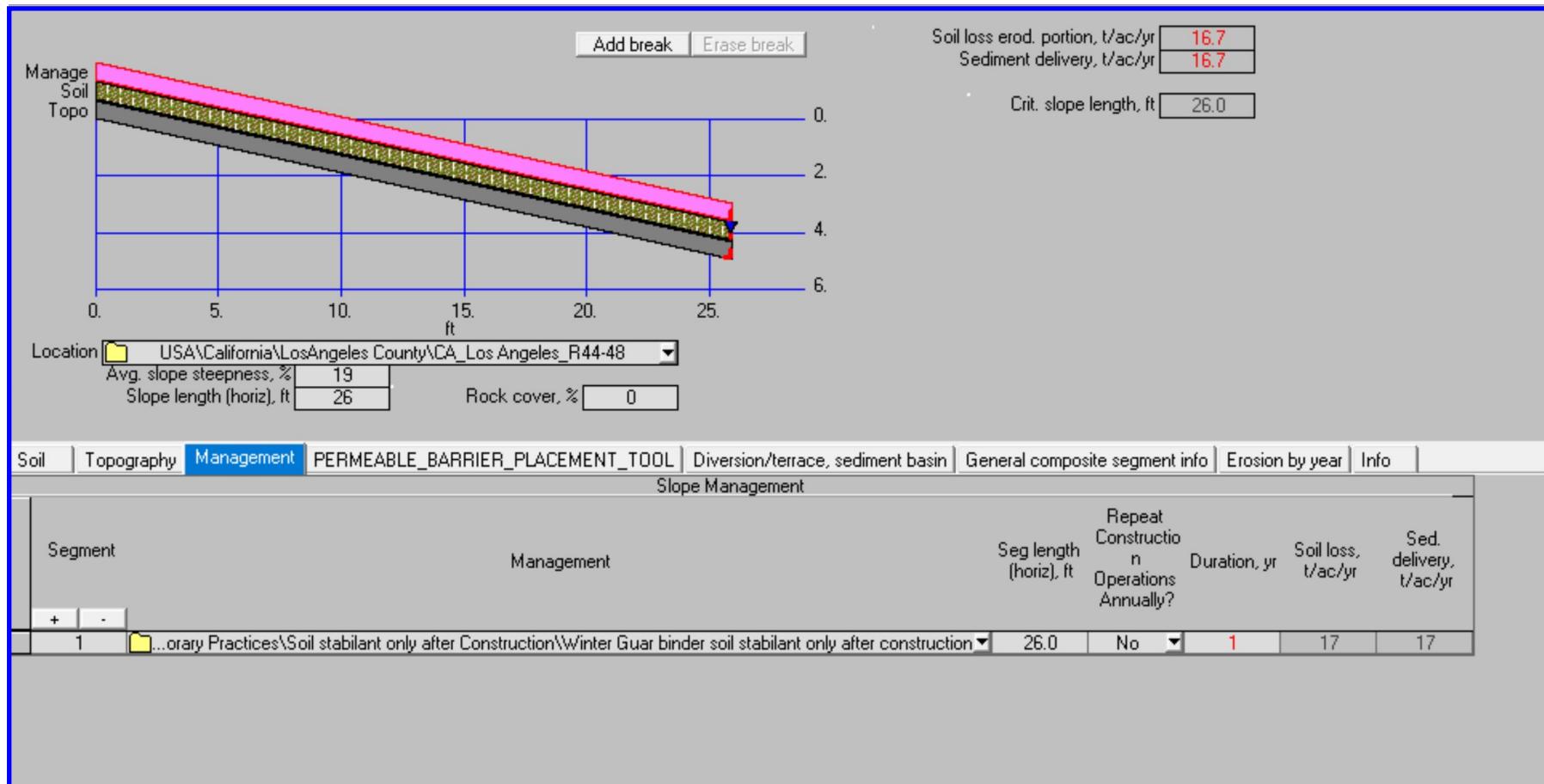
Barrier type Gravel Bag Berm SE-6 Op install barriers Date barriers on, m/d/y **1/5/26**
Op remove barriers Date barriers off, m/d/y **7/9/27**

Apply Sed. barrier system

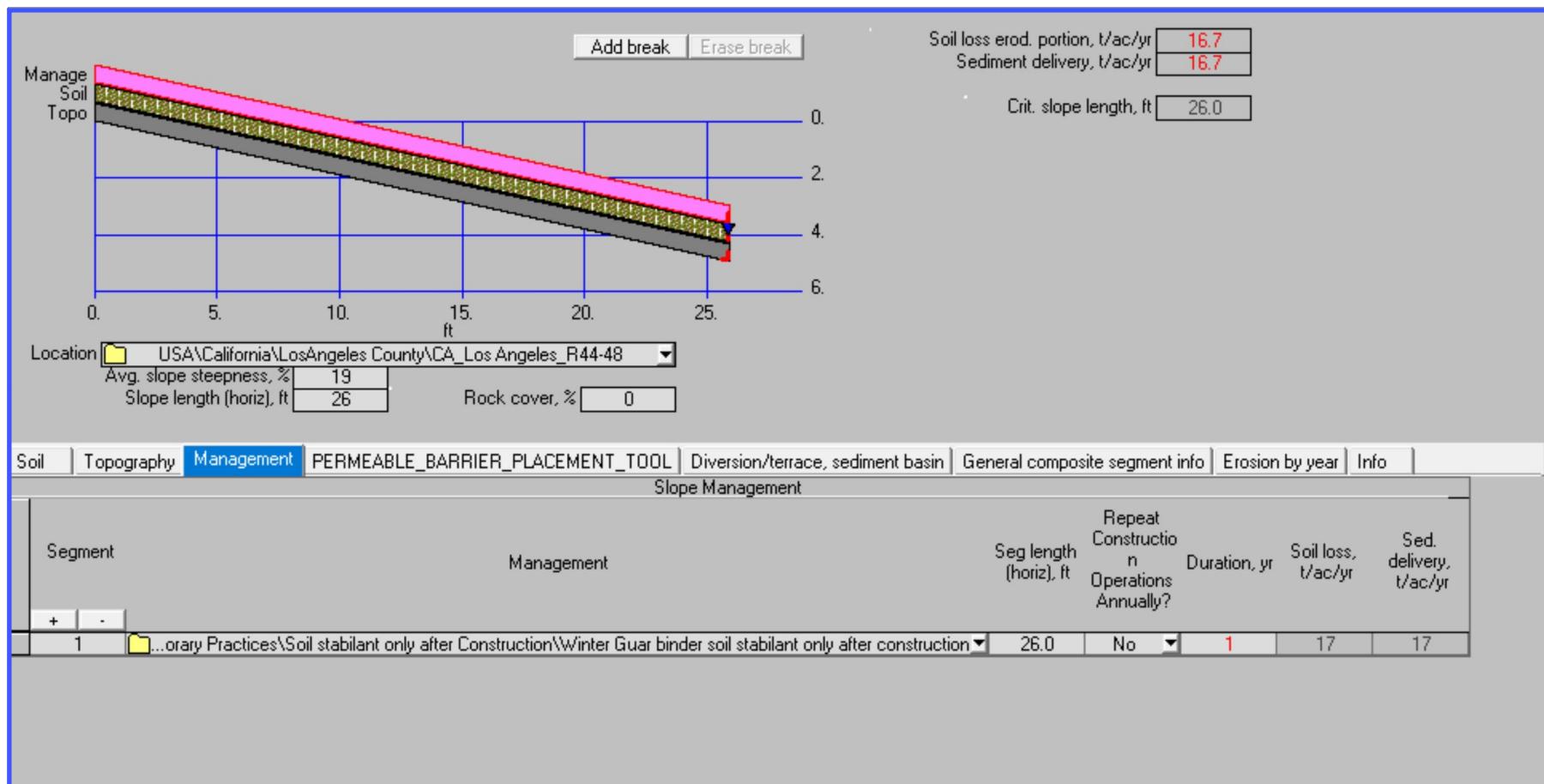
Sediment barrier set Sediment barrier set



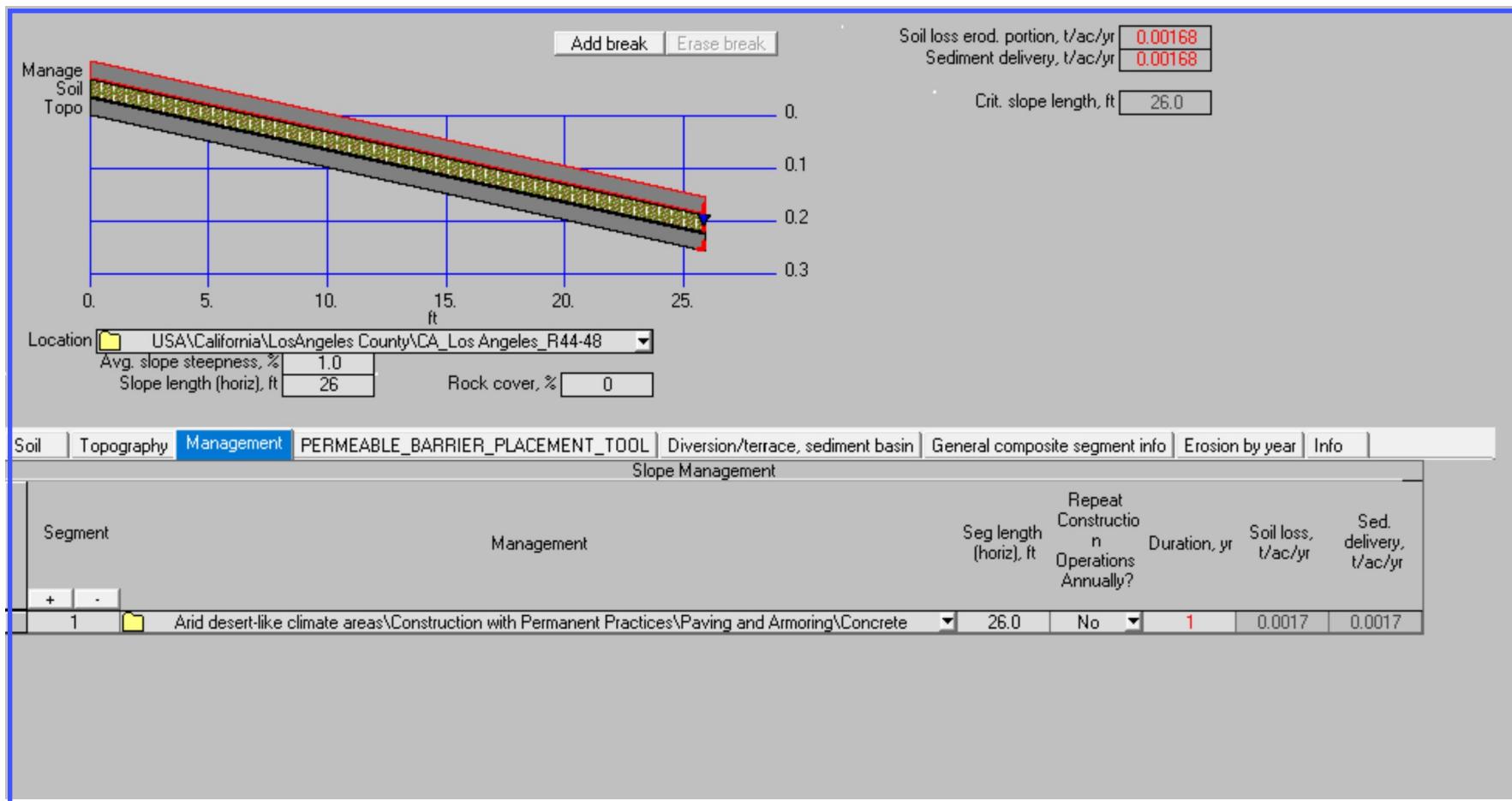
Phase 2 Streets/Utilities Condition RUSLE2



Phase 3 Vertical Condition RUSLE2



Phase 4 Final Stabilization RUSLE2



Risk Analysis

Summary

RUSLE: $R \times K \times LS \times C \times P$

Sediment Risk = $R = 65.35 \times K = 0.37 \times LS = 0.68 \times 1 \times 1 = 16.43 = \text{Medium}$

Receiving Water Risk = **Low**

Sediment Risk & Receiving Water Risk = **Risk Level 2**

1. SEDIMENT RISK FACTOR CALCULATION

Instructions: Enter R, K, and LS factor values. System will calculate watershed erosion estimates and segment sediment risk factor.

A) R Factor Value: *(What's this?)

65.35

[Erosivity Calculator Help](#)

[Populate K and LS using GIS layer data](#)

B) K Factor Value: (weighted average, by area, for all site soils) *(What's this?)

0.37

C) LS Factor: (weighted average, by area, for all slopes) *(What's this?)

0.6793555

Watershed Erosion Estimate ($=R \times K \times LS$) in tons/acre

16.42647631225

Project Sediment Risk Factor: (What's this?) **Medium**

3. COMBINED RISK LEVEL MATRIX

		Sediment Risk		
		Low	Medium	High
Receiving Water	Low	Level1	Level2	
	High	Level2		Level3

Project Sediment Risk: **Medium**

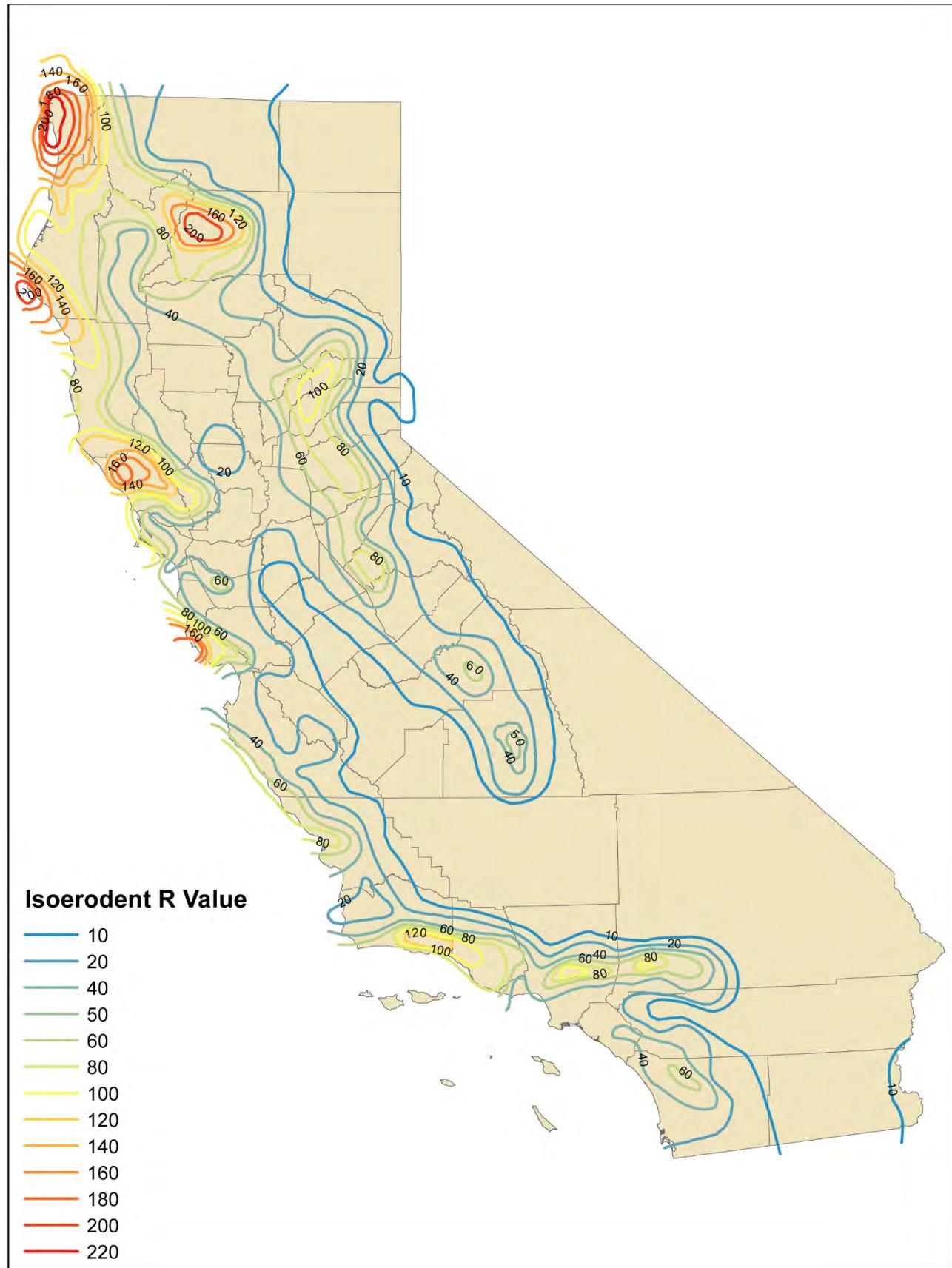
Project Receiving Water Risk: **Low**

Project Combined Risk: **Level2**

R Factor

The rainfall-runoff erosivity factor (R-Factor) quantifies the average amount of rainfall and reflects the amount of rain that can fall within a given amount of time. The R-factor is one of the parameters used by the Revised Unified Soil Loss Equation (RUSLE) to estimate annual rates of erosion.

Facility Information	
Start Date: 01/05/2026	Latitude: 34.0169
End Date: 01/04/2027	Longitude: -118.4442
Calculation Results	
Rainfall erosivity factor (R Factor) = 39.43	
Facility Information	
Start Date: 01/05/2027	Latitude: 34.0169
End Date: 07/09/2027	Longitude: -118.4442
Calculation Results	
Rainfall erosivity factor (R Factor) = 25.92	

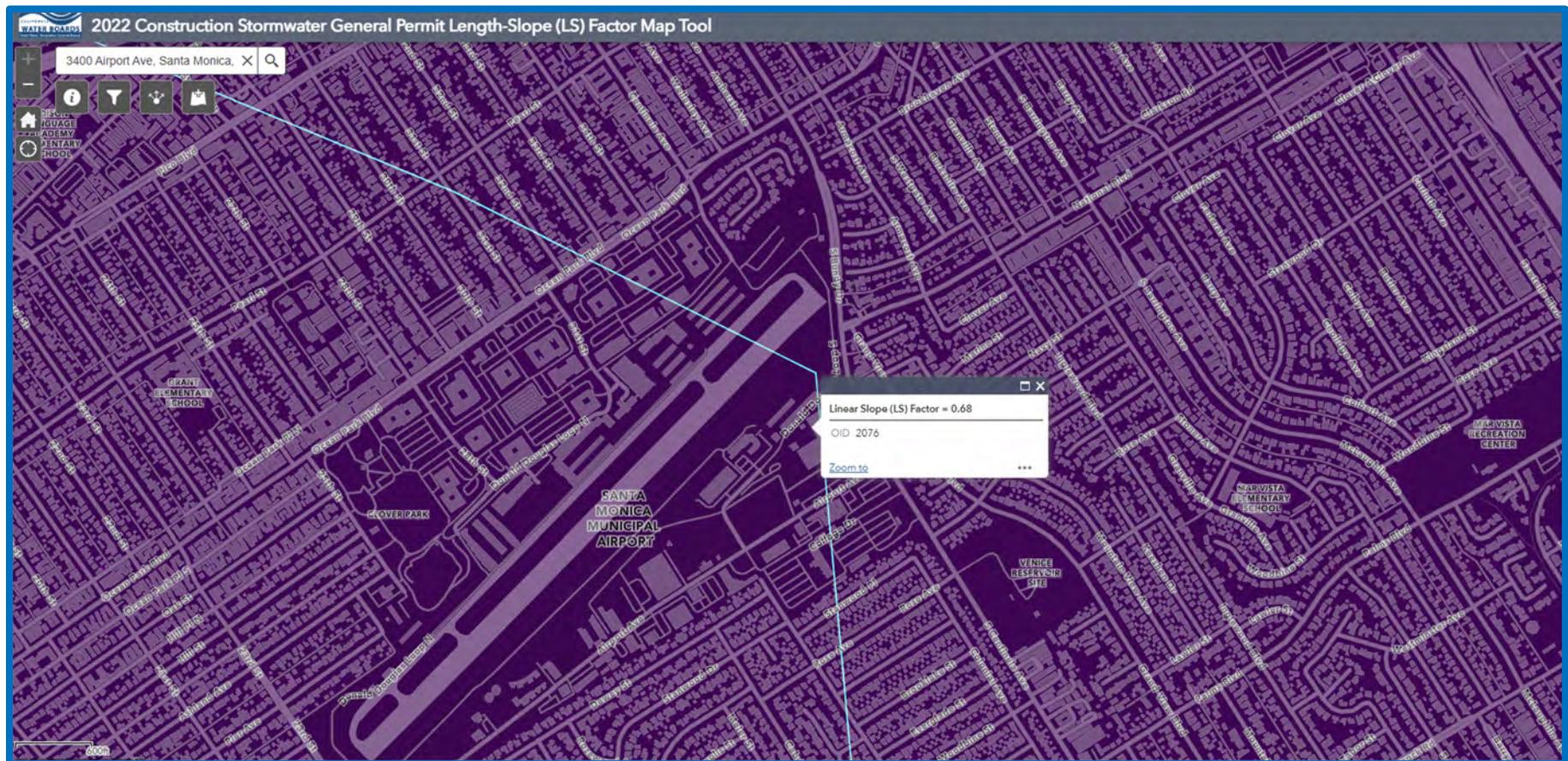


K Factor



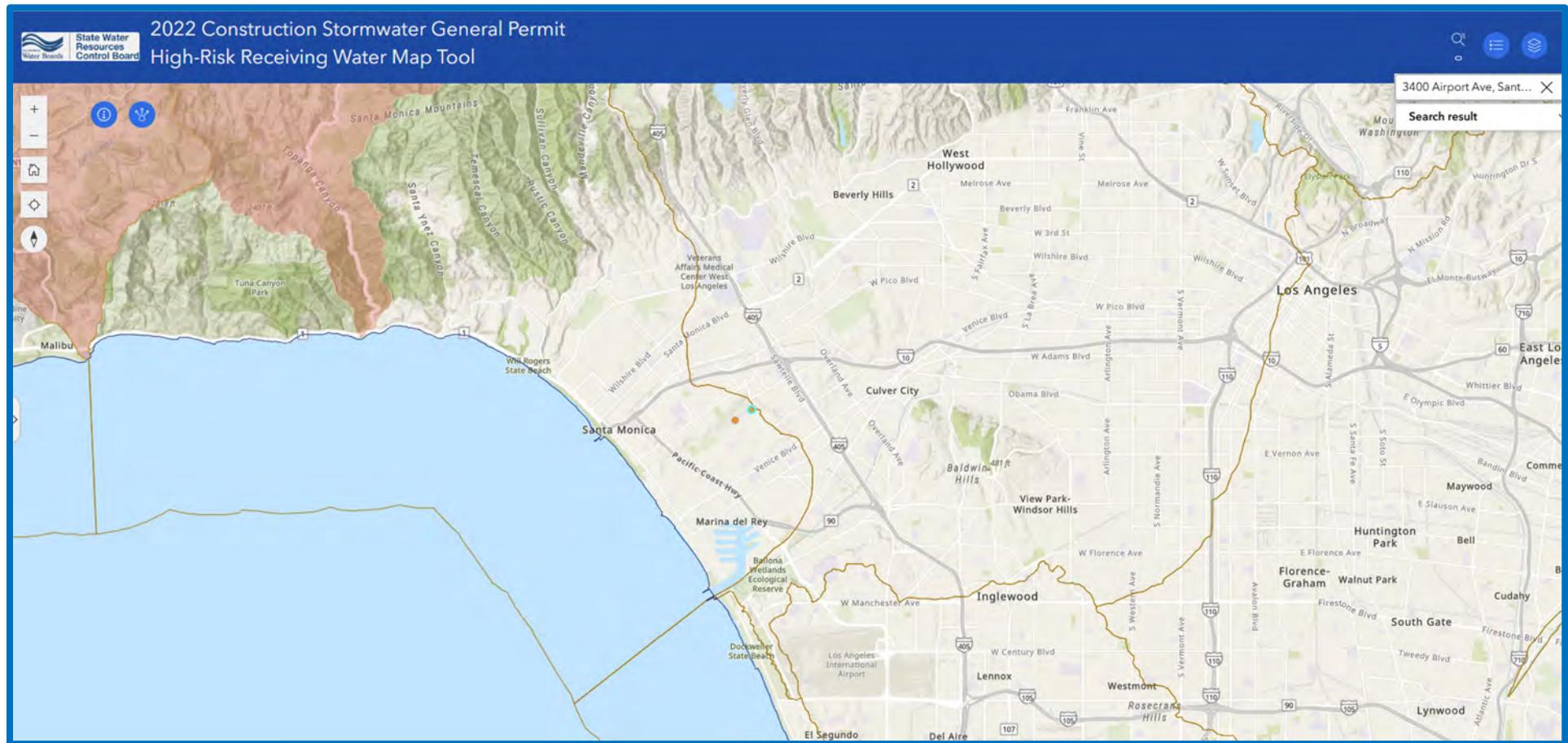


LS Factor





High Risk Receiving Watersheds



Computation Sheet for Determining Run-off Discharges

Existing Site Conditions

Area Runoff Coefficient	=	0.70	(A)	
Area Rainfall Intensity	=	0.630 in/hr	(B)	
Drainage Area	=	3.21 Acres	(C)	
Site Area Run-off Discharge	(A) x (B) x (C)	=	1.42/sec	(D)

NOAA Atlas 14, Volume 6, Version 2										
Location name: Santa Monica, California, USA* Latitude: 34.0169°, Longitude: -118.4442° Elevation: 167 ft** * source: ESRI Maps ** source: USGS										
POINT PRECIPITATION FREQUENCY ESTIMATES										
PF tabular										
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.142 (0.119-0.172)	0.187 (0.156-0.226)	0.247 (0.206-0.299)	0.297 (0.246-0.363)	0.367 (0.293-0.465)	0.423 (0.330-0.548)	0.480 (0.365-0.639)	0.541 (0.399-0.741)	0.625 (0.441-0.895)	0.692 (0.470-1.03)
10-min	0.204 (0.171-0.246)	0.268 (0.224-0.323)	0.354 (0.295-0.429)	0.426 (0.352-0.521)	0.527 (0.420-0.667)	0.606 (0.472-0.785)	0.688 (0.523-0.915)	0.775 (0.571-1.06)	0.896 (0.632-1.28)	0.991 (0.674-1.47)
15-min	0.247 (0.206-0.297)	0.324 (0.271-0.391)	0.428 (0.357-0.519)	0.515 (0.426-0.630)	0.637 (0.508-0.807)	0.733 (0.571-0.949)	0.832 (0.632-1.11)	0.937 (0.691-1.28)	1.08 (0.764-1.55)	1.20 (0.815-1.78)
30-min	0.333 (0.279-0.401)	0.437 (0.366-0.528)	0.578 (0.482-0.700)	0.696 (0.575-0.850)	0.860 (0.686-1.09)	0.989 (0.771-1.28)	1.12 (0.853-1.49)	1.26 (0.933-1.73)	1.46 (1.03-2.09)	1.62 (1.10-2.40)
60-min	0.480 (0.402-0.578)	0.630 (0.527-0.761)	0.833 (0.695-1.01)	1.00 (0.829-1.22)	1.24 (0.988-1.57)	1.42 (1.11-1.85)	1.62 (1.23-2.15)	1.82 (1.34-2.50)	2.11 (1.49-3.02)	2.33 (1.59-3.47)
2-hr	0.700 (0.587-0.844)	0.918 (0.769-1.11)	1.22 (1.01-1.47)	1.46 (1.21-1.79)	1.81 (1.44-2.29)	2.08 (1.62-2.69)	2.36 (1.79-3.14)	2.66 (1.96-3.64)	3.08 (2.17-4.40)	3.41 (2.32-5.06)
3-hr	0.865 (0.725-1.04)	1.14 (0.950-1.37)	1.50 (1.25-1.82)	1.80 (1.49-2.20)	2.23 (1.78-2.82)	2.57 (2.00-3.32)	2.92 (2.22-3.88)	3.28 (2.42-4.50)	3.80 (2.68-5.44)	4.21 (2.86-6.25)
6-hr	1.22 (1.02-1.48)	1.60 (1.34-1.94)	2.12 (1.77-2.57)	2.55 (2.11-3.12)	3.15 (2.51-3.99)	3.63 (2.83-4.70)	4.12 (3.13-5.48)	4.65 (3.42-6.37)	5.37 (3.79-7.70)	5.96 (4.05-8.85)
12-hr	1.59 (1.33-1.92)	2.09 (1.75-2.52)	2.76 (2.30-3.35)	3.33 (2.75-4.06)	4.11 (3.28-5.21)	4.74 (3.69-6.14)	5.38 (4.09-7.16)	6.07 (4.47-8.32)	7.02 (4.95-10.1)	7.78 (5.29-11.6)
24-hr	2.05 (1.81-2.36)	2.71 (2.39-3.13)	3.59 (3.17-4.16)	4.33 (3.79-5.06)	5.37 (4.54-6.47)	6.19 (5.13-7.62)	7.04 (5.70-8.88)	7.94 (6.25-10.3)	9.20 (6.95-12.4)	10.2 (7.45-14.2)
2-day	2.52 (2.23-2.91)	3.37 (2.98-3.89)	4.52 (3.98-5.23)	5.49 (4.80-6.41)	6.85 (5.79-8.28)	7.93 (6.57-9.76)	9.06 (7.33-11.4)	10.3 (8.08-13.3)	11.9 (9.02-16.1)	13.3 (9.70-18.6)
3-day	2.83 (2.50-3.26)	3.83 (3.38-4.42)	5.20 (4.58-6.02)	6.36 (5.56-7.43)	8.00 (6.77-9.65)	9.32 (7.73-11.5)	10.7 (8.66-13.5)	12.2 (9.59-15.8)	14.3 (10.8-19.3)	16.0 (11.7-22.3)
4-day	3.05 (2.70-3.52)	4.17 (3.68-4.81)	5.69 (5.02-6.59)	6.99 (6.11-8.16)	8.84 (7.48-10.7)	10.3 (8.56-12.7)	11.9 (9.63-15.0)	13.6 (10.7-17.6)	16.0 (12.1-21.6)	17.9 (13.1-25.0)
7-day	3.48 (3.08-4.01)	4.76 (4.20-5.49)	6.52 (5.74-7.55)	8.02 (7.01-9.36)	10.2 (8.61-12.3)	11.9 (9.87-14.7)	13.8 (11.1-17.3)	15.7 (12.4-20.4)	18.6 (14.0-25.1)	20.9 (15.2-29.2)
10-day	3.79 (3.36-4.37)	5.19 (4.59-6.00)	7.13 (6.28-8.26)	8.79 (7.68-10.3)	11.2 (9.45-13.5)	13.1 (10.9-16.1)	15.2 (12.3-19.1)	17.4 (13.7-22.5)	20.5 (15.5-27.7)	23.1 (16.9-32.3)
20-day	4.49 (3.97-5.18)	6.16 (5.44-7.12)	8.50 (7.49-9.84)	10.5 (9.19-12.3)	13.4 (11.4-16.2)	15.8 (13.1-19.5)	18.4 (14.9-23.2)	21.1 (16.6-27.4)	25.1 (19.0-33.9)	28.4 (20.8-39.7)
30-day	5.30 (4.69-6.11)	7.28 (6.43-8.40)	10.1 (8.86-11.6)	12.5 (10.9-14.5)	16.0 (13.5-19.3)	18.8 (15.6-23.2)	21.9 (17.7-27.7)	25.3 (19.9-32.8)	30.2 (22.8-40.8)	34.2 (25.0-47.8)
45-day	6.15 (5.44-7.09)	8.43 (7.45-9.74)	11.7 (10.3-13.5)	14.5 (12.6-16.9)	18.5 (15.7-22.4)	21.9 (18.2-27.0)	25.6 (20.7-32.2)	29.5 (23.3-38.3)	35.3 (26.7-47.7)	40.1 (29.3-56.1)
60-day	6.95 (6.15-8.02)	9.52 (8.41-11.0)	13.1 (11.6-15.2)	16.3 (14.2-19.0)	20.9 (17.7-25.2)	24.7 (20.5-30.4)	28.8 (23.3-36.3)	33.3 (26.2-43.2)	39.8 (30.1-53.8)	45.2 (33.0-63.2)

Figure 000.1B

Runoff Coefficients for Undeveloped Areas Watershed Types

Extreme		High		Normal		Low			
Relief	.28 -.35		.20 -.28		.14 -.20		.08 -.14		
	Steep, rugged terrain with average slopes above 30%		Hilly, with average slopes of 10 to 30%		Rolling, with average slopes of 5 to 10%		Relatively flat land, with average slopes of 0 to 5%		
Soil Infiltration	.12 -.16		.08 -.12		.06 -.08		.04 -.06		
	No effective soil cover, either rock or thin soil mantle of negligible infiltration capacity		Slow to take up water, clay or shallow loam soils of low infiltration capacity, imperfectly or poorly drained		Normal; well drained light or medium textured soils, sandy loams, silt and silt loams		High; deep sand or other soil that takes up water readily, very light well drained soils		
Vegetal Cover	.12 -.16		.08 -.12		.06 -.08		.04 -.06		
	No effective plant cover, bare or very sparse cover		Poor to fair; clean cultivation crops, or poor natural cover, less than 20% of drainage area over good cover		Fair to good; about 50% of area in good grassland or woodland, not more than 50% of area in cultivated crops		Good to excellent; about 90% of drainage area in good grassland, woodland or equivalent cover.		
Surface Storage	.10 -.12		.08 -.10		.06 -.08		.04 -.06		
	Negligible surface depression few and shallow; drainageways steep and small, no marshes		Low; well defined system of small drainageways; no ponds or marshes		Normal; considerable surface depression storage; lakes and pond marshes		High; surface storage, high; drainage system not sharply defined; large flood plain storage or large number of ponds or marshes.		
Given	An undeveloped watershed consisting of;				Solution:				
	1) rolling terrain with average slopes of 5%, 2) clay type soils, 3) good grassland area, and 4) normal surface depressions.				Relief	0.14			
					Soil Infiltration	0.08			
					Vegetal Cover	0.04			
					Surface Storage	0.06			
Find	The runoff coefficient, C, for the above watershed.				C=	0.32			

Figure 000.2B**Runoff Coefficients for Developed Areas**

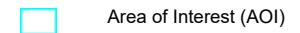
Type of Drainage Area	Runoff Coefficient
Business:	
Downtown areas	0.70 - 0.95
Neighborhood areas	0.50 - 0.70
Residential:	
Single-family areas	0.30 - 0.50
Multi-units, detached	0.40 - 0.60
Multi-units, attached	0.60 - 0.75
Suburban	0.25 - 0.40
Apartment dwelling areas	0.50 - 0.70
Industrial:	
Light areas	0.50 - 0.80
Heavy areas	0.60 - 0.90
Parks, cemeteries:	0.10 - 0.25
Playgrounds:	0.20 - 0.40
Railroad yard areas:	0.20 - 0.40
Unimproved areas:	0.10 - 0.30
Lawns:	
Sandy soil, flat, 2%	0.05 - 0.10
Sandy soil, average, 2-7%	0.10 - 0.15
Sandy soil, steep, 7%	0.15 - 0.20
Heavy soil, flat, 2%	0.13 - 0.17
Heavy soil, average, 2-7%	0.18 - 0.25
Heavy soil, steep, 7%	0.25 - 0.35
Streets:	
Asphaltic	0.70 - 0.95
Concrete	0.80 - 0.95
Brick	0.70 - 0.85
Drives and walks	0.75 - 0.85
Roofs:	0.75 - 0.95

Soil Map—Los Angeles County, California, Southeastern Part



MAP LEGEND

Area of Interest (AOI)



Area of Interest (AOI)

Soils



Soil Map Unit Polygons



Soil Map Unit Lines



Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole

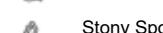


Slide or Slip



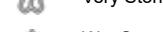
Sodic Spot

Spoil Area



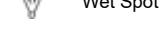
Spoil Area

Stony Spot



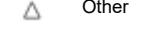
Stony Spot

Very Stony Spot



Very Stony Spot

Wet Spot



Wet Spot

Other



Other

Special Line Features



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Los Angeles County, California, Southeastern Part

Survey Area Data: Version 12, Sep 8, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 14, 2022—Apr 23, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1124	Urban land-Windfetch-Centinela complex, 0 to 5 percent slopes	2.2	100.0%
Totals for Area of Interest		2.2	100.0%



Appendix M: Weather Reports

The discharger must obtain the precipitation forecast information from the National Weather Service Forecast Office (<http://forecast.weather.gov>). A printed copy with the date and time of printing should be retained in this Appendix.



Weather Guide

As required by the CGP, weather should be printed daily.

<https://www.weather.gov/wrh/wxtable>

1. Go to this link

NATIONAL WEATHER SERVICE

Weather Table

Western Region Headquarters

Number of Days and Intervals: 8 days (click the radio button for 8 days)

Number of Days: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 80 91 92 93 94 95 96 97 98 99 100

Number of Hours: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 80 91 92 93 94 95 96 97 98 99 100

Submit

2. Locate project site on map then "double click." This will fill in Latitude and Longitude.

3. Select 6 Hour Intervals

4. Select "submit" when finished.

NATIONAL WEATHER SERVICE

Weather Table

Western Region Headquarters

Number of Days and Intervals: 8 days (click the radio button for 8 days)

Number of Days: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 80 91 92 93 94 95 96 97 98 99 100

Number of Hours: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 80 91 92 93 94 95 96 97 98 99 100

Submit

Printer Friendly Link

Print Page | Print Page (PDF) | Heavy Tabular Forecast | Heavy Weather Diagram | Weather Summary

NATIONAL WEATHER SERVICE

Forecast for 01 Dec 16, 12Z (0000Z on 02 Dec 16) | 0000Z on 02 Dec 16 (0000Z on 03 Dec 16)

Number of Days and Intervals: 8 days (click the radio button for 8 days)

Number of Days: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 80 91 92 93 94 95 96 97 98 99 100

Number of Hours: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 80 91 92 93 94 95 96 97 98 99 100

Submit

Print Page | Print Page (PDF) | Heavy Tabular Forecast | Heavy Weather Diagram | Weather Summary

Date	Fri Dec 16	Sat Dec 17	Sun Dec 18	Mon Dec 19	Tue Dec 20	Wed Dec 21	Thu Dec 22	Fri Dec 23	Sat Dec 24
High	70	71	77	77	81	88	88	87	87
Low	60	60	69	69	71	81	81	80	80
Wind	NE								
Wind Speed (mph)	10	10	15	15	18	20	20	20	20
Wind Gust (mph)	15	15	20	20	22	25	25	25	25
Wind Direction (deg)	15	15	15	15	15	15	15	15	15
Cloud (%)	20	20	20	20	20	20	20	20	20
Frost of Precip (%)	—	—	—	—	—	—	—	—	—
FIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Precip (in)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wind (mph)	150	150	150	150	150	150	150	150	150
Wind Level	100	100	100	100	100	100	100	100	100

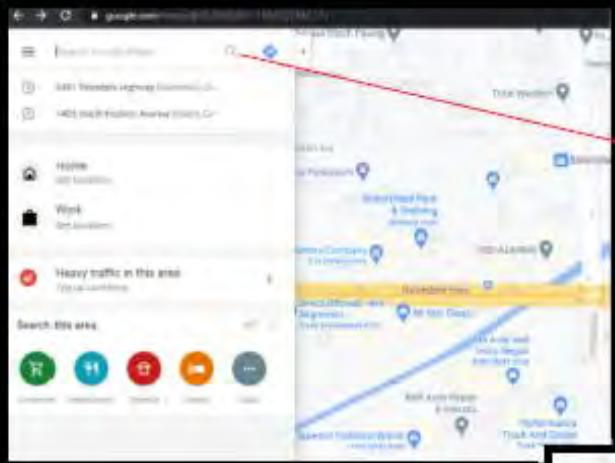
6. To easily access your project's weather forecast again, bookmark this link.



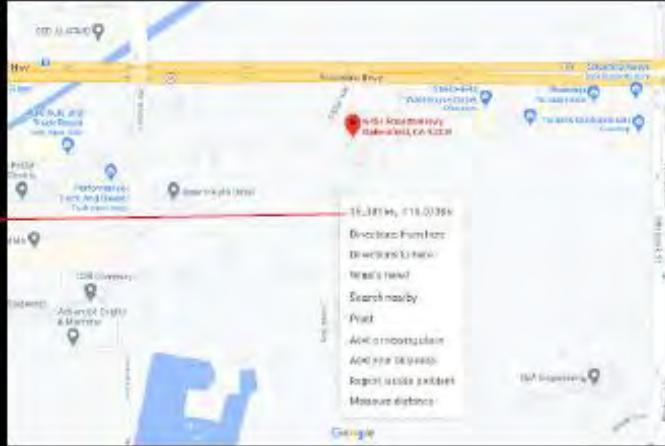


Latitude and Longitude Alternatives

Method 1: Google Maps



Enter in project address, press "enter".



Using your mouse, "Right Click" on exact location. Lat and Long will display at top.

Method 2: Latitude and Longitude Finder

www.latlong.net

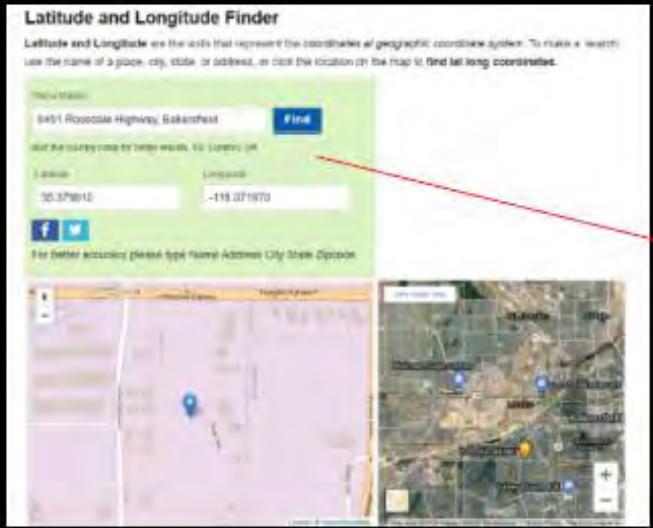
Latitude and Longitude Finder

Latitude and Longitude are the sets of coordinates that represent the coordinates of geographic coordinate system. To make a search use the name of a place, city, state, or address, or click the location on the map to find lat long coordinates.

Project Address: 6401 Rossacea Highway, Bakchis

Lat: 33.81145 Long: -118.01398

For better accuracy please type Normal Address/City/State/Zipcode



Enter project address, click "Find"

Lat and Long will display here





Appendix N: Monitoring Records

Place completed BMP Inspection Forms, photographic documentation, Effluent Sampling, Receiving Water, and Dewatering Field Logs, Monitoring Exceptions, NAL Exceedance Reports, and Receiving Water Monitoring Trigger Exceptions in this appendix.



Appendix O: Example Storm Event Monitoring Forms



Rain Gauge Log Sheet

Construction Site Name: Santa Monica College Bundy Campus Tennis - Pickleball Courts

WDID #:





Risk Level 1, 2, 3
Visual Inspection Field Log Sheet

Date and Time of Inspection: _____ Report Date: _____					
Inspection Type:	<input type="checkbox"/> Weekly	<input type="checkbox"/> Pre Qualifying Precipitation Event (QPE)	<input type="checkbox"/> During QPE	<input type="checkbox"/> Post QPE	<input type="checkbox"/> Dewatering Discharge
Site Information					
Construction Site Name: Santa Monica College Bundy Campus Tennis - Pickleball Courts					
Construction stage and completed activities:				Approximate area of exposed site:	
Weather and Observations					
Date Rain Predicted to Occur:			Predicted % chance of precipitation (PoP): _____ Predicted quantity of precipitation (QPF): _____		
Estimate storm beginning: (date and time)		Estimate storm duration: _____ (hours)	Estimate time since last storm: _____ (days or hours)	Rain gauge reading: _____ (inches)	
Observations: If yes identify location					
Odors	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
Floating material	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
Suspended Material	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
Sheen	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
Discolorations	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
Turbidity	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
Site Inspections					
Outfalls or BMPs Evaluated		Deficiencies Noted			
(add additional sheets or attached detailed BMP Inspection Checklists)					
Photos Taken:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Photo Reference IDs: _____		
Corrective Actions Identified (note if SWPPP/REAP change is needed)					
Inspector Information					
Inspector Name: _____			Inspector Title: _____		
Signature: _____				Date: _____	





Risk Level 1, 2, 3
Effluent Sampling Field Log Sheets

<p>Construction Site Name: Santa Monica College Bundy Campus Tennis - Pickleball Courts</p> <p>Date:</p> <p>Time Start:</p> <p>Sampler:</p>			
Sampling Event Type:	<input type="checkbox"/> Stormwater	<input type="checkbox"/> Dewatering Discharge	<input type="checkbox"/> Non-visible pollutant
Field Meter Calibration			
pH Meter ID No./Desc.: Calibration Date/Time:	Turbidity Meter ID No./Desc.: Calibration Date/Time:		
Field pH and Turbidity Measurements			
Discharge Location Description	pH	Turbidity	Time
Grab Samples Collected			
Discharge Location Description	Sample Type	Time	
<p>Additional Sampling Notes:</p>			
Time End:			

**NAL Exceedance Evaluation Summary Report**

Page ____ of ____

Project Name	
Project WDID	
Project Location	
Date of Exceedance	
Type of Exceedance	<input type="checkbox"/> NAL <input type="checkbox"/> pH <input type="checkbox"/> Turbidity <input type="checkbox"/> Other (specify) _____
Measurement or Analytical Method	<input type="checkbox"/> Field meter (Sensitivity: _____) <input type="checkbox"/> Lab method (specify) _____ (Minimum Level: _____) (MDL: _____)
Calculated Daily Average	<input type="checkbox"/> pH _____ pH units <input type="checkbox"/> Turbidity _____ NTU
Rain Gauge Measurement	_____ inches
Visual Observations on Day of Exceedance	
Description of BMPs in Place at Time of Event	



**NAL Exceedance Evaluation Summary Report**

Page ____ of ____

Initial Assessment of Cause	
Corrective Actions Taken (deployed after exceedance)	
Additional Corrective Actions Proposed	
Report Completed By	<hr/> (Print Name, Title)
Signature	<hr/>

**CHAIN-OF-CUSTODY****DATE:****Lab ID:**

DESTINATION LAB: ATTN: ADDRESS: Office Phone: Cell Phone:							REQUESTED ANALYSIS			Notes:
SAMPLED BY:										
Contact:										
Santa Monica College Bundy Campus Tennis - Pickleball Courts										
Client Sample ID	Sample Date	Sample Time	Sample Matrix	Container						
				#	Type	Pres.				
SENDER COMMENTS:							RELINQUISHED BY			
							Signature: Print: Company: Date:			
LABORATORY COMMENTS:							RECEIVED BY			
							Signature: Print: Company: Date:			





Appendix P: Field Meter Instructions





2020we/wi QUICK START GUIDE

- » Read the manual before using the meter.
- » For the most accurate results, follow calibration and blanking procedures before testing.
- » To change settings refer to the Options and Set Up section in the manual.
- » Perform a turbidity calibration daily.

Factory Settings

Averaging:	Disabled
Turbidity Units:	NTU
Turbidity Calibration:	Formazin
Date Format:	MM-DD-YYYY
Power Save:	5 minutes
Backlight:	10 seconds
Language:	English

Calibration

Perform a calibration over the smallest range possible. Use a standard that will bracket the sample range. Calibrate meter daily.

1. Press  to turn meter on.
2. Select **Measure**.
3. Select **Turbidity - With Blank**.
4. Rinse tube. Fill with BLANK. Dry tube.
5. Scan Blank.
6. Rinse tube. Fill with STANDARD. Dry tube.
7. Scan Sample.
8. Press  and select **Calibrate**.
9. Press  to adjust display to match standard value.
10. Press  to accept the calibration.
11. Press  to set the calibration.
12. Proceed to Analysis.

High Range Analysis - Over 10 NTU - Without Blank

1. Press  to turn meter on.
2. Select **Measure**.
3. Select **Turbidity - No Blank**.
4. Rinse tube. Fill with SAMPLE. Dry tube.
5. Scan Sample.
6. Press  to turn meter off.

Analysis - With Blank

1. Press  to turn meter on.
2. Select **Measure**.
3. Select **Turbidity - With Blank**.
4. Rinse tube. Fill with BLANK. Dry tube.
5. Scan Blank.
6. Rinse tube. Fill with SAMPLE. Dry tube.
7. Scan Sample.
8. Press  to turn meter off.



PO Box 329 • Chestertown • Maryland • 21620 • USA
800-344-3100 • 410-778-3100 (Outside U.S.A.) • Fax: 410-778-6394 • www.lamotte.com

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This Instruction Manual is also available for download on our Web-site: eutechtest.com or 4oakton.com

**EUTECH
INSTRUMENTS** **OAKTON**
Technology Made Easy...
Part of Thermo Fisher Scientific

INSTRUCTION MANUAL

pHTestr 10, 20, 30, 10BNC, Spear

Large Screen
Waterproof pH / Temperature Testr
Double Junction

Introduction

Thank you for selecting our waterproof pH Testr. This manual serves the following (5) models:

- pHTestr 10 (Eutech PHTEST10 / 01X366901 / Oakton 35634-10)
- pHTestr 20 (Eutech PHTEST20 / 01X366902 / Oakton 35634-20)
- pHTestr 30 (Eutech PHTEST30 / 01X366903 / Oakton 35634-30)
- pHTestr 10BNC (Eutech PHTEST10BNC / 01X366904 / Oakton 35634-14)
- pH Spear (Eutech PHSPEAR / 01X366920 / Oakton 35634-40)

This manual provides a step-by-step guide to operate the Testrs.

Before You Begin

Condition your pHTestr 10, 20, 30 electrodes by immersing it in electrode storage solution or tap water for at least 30 minutes before use. DO NOT use de-ionized water.

Ensure that your pHSpear electrode is always soaked in the electrode storage solution or tap water via its protective cap.

Note: For pHTestr 10BNC, please refer to the pH electrode's instruction manual.

pH Buffer Set Selection

Your Testr features USA (pH 4.01, pH 7.00 and pH 10.01) or NIST (pH 4.01, pH 6.86, and pH 9.18) standards. Select either one to suit your requirements:

1. While pressing the HOLD/ENT button, switch on the Testr by pressing the ON/OFF button.
2. Release the HOLD/ENT button. The display will flash either USA or NIST.
3. Press CAL button to toggle between the two buffer set standards.
4. Press the HOLD/ENT button to confirm the selection of the buffer set.

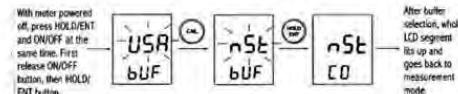


Figure 1: Buffer Selection Sequence

pH Calibration

Calibration should be done regularly, preferably once a week. You can calibrate up to three points using either the USA or the NIST buffer set standards.

1. Press ON/OFF button to switch unit on.
2. Dip electrode about 2 to 3 cm into the pH standard buffer solution.

3. Press the CAL button to enter calibration mode. The 'CAL' indicator will be shown. The upper display will show the measured reading based on the last calibration while the lower display will indicate the pH standard buffer solution.

Note: All Testrs have dual display during calibration mode.

Note: To abort calibration, press the 'CAL' button.

4. Allow about 2 minutes for the Testr reading to stabilize before pressing the HOLD/ENT button to confirm the first calibration point. The upper display will be calibrated to the pH standard buffer solution and the lower display will then be toggling in between readings of the next pH standard buffer solution.
5. Repeat with other buffers if necessary. Rinse electrode in tap water before dipping into next buffer.

Note: The calibration mode allows you to perform up to three calibration points before returning to the measurement mode automatically. However, if you opted to have only one or two calibration points, simply skip the remaining calibration points by exiting the measurement mode by pressing the CAL button.

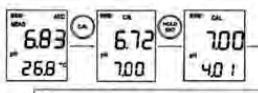


Figure 2: Example of pH Calibration Sequence

pH Measurement

1. Press the ON/OFF button to switch the Testr on.
2. Dip the electrode about 2 to 3 cm into the test solution. Stir and let the reading stabilize. For semi-solid samples using pHspear, rotation is ideal for sample contact. CAUTION: Testing dry samples is not accurate and can lead to sensor damage or breakage. Soils must be wet and free of particulates that may scratch the glass sensor. Excessive force into dry samples can cause glass breakage.
3. Note the pH value or press HOLD/ENT button to freeze the reading. To release the reading, press HOLD/ENT again.
4. Press ON/OFF to turn off Testr. If you do not press a button for 8.5 minutes, the Testr will automatically shut off to conserve batteries.

HOLD Function

This feature lets you freeze the display for a delayed observation

1. Press HOLD/ENT button to freeze the measurement. A 'HOLD' indicator will be displayed and the measurement will be frozen.
2. Press HOLD/ENT again to release the measurement. The 'HOLD' indicator will not be displayed anymore indicating the held measurement is released.

User Reset

You can reset the pH calibration to the factory default by using the user reset function. Buffer set selection and temperature user calibration (pHTestr30) are not affected by the user reset function.

1. Switch off the Testr.
2. While pressing the 'CAL' button, press and release the ON/OFF button to enter the 'User Reset' selection menu. The screen will display 'rSt' on the bottom display with a flashing 'rSt' selection.
3. Use the 'CAL' button to toggle between 'nO' and 'YES' selection.
 - * nO deactivates reset selection
 - * YES activates the reset selection
4. Press the HOLD/ENT button to confirm the selection made.
5. If you have selected 'YES', the unit will show 'CO' momentarily and proceed to the measurement mode with the calibration reset back to factory default value.
6. If 'nO' is selected, the unit will proceed to the measurement mode without any calibration reset performed.



Figure 4: Example of HOLD Function

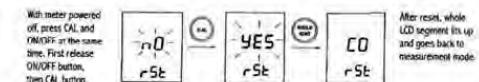


Figure 5: User Reset Sequence

ATC - Automatic Temperature Compensation (Only for pHTestr 10, pHTestr 20 and pHTestr 30)

Through its in-built temperature sensor, the measurement error due to the changes in electrode sensitivity due to changes in temperature is compensated to give the actual pH reading of the sample measured.

MTC - Manual Temperature Compensation (Only for pHTestr 10BNC, pH Spear)

The MTC range is 0 to 50.0 °C (32.0 to 122.0 °F). User reset will set temperature to default value 25°C or 77°F.

While in the measurement mode,

1. Press the HOLD/ENT button to bring the Testr to the 'HOLD' mode.
2. Press the CAL button continuously to switch to the °C or °F mode setting selection screen.
3. Release the CAL button to confirm your mode selection and the display will go to the manual temperature calibration mode with the upper display flashing. The upper display shows the adjustable temperature value and the lower display shows the last set temperature offset.
4. Press the HOLD/ENT button to set the upper display to the temperature value of your sample.
5. Once the setting is reached, release the HOLD/ENT button. The new value is automatically confirmed and returns to the measurement mode if no button is pressed after 5 seconds.

Notes: To exit this program without confirming the calibration, press the CAL button before the automatic confirmation takes place.





Temperature Calibration (Only For pHTestr 30)

From the measurement mode,

1. Press the HOLD/ENT button to bring the Testr to the "HOLD" mode.
2. Press the CAL button for 3 seconds to switch to the °C or °F mode setting selection screen. Pressing the CAL button continuously for 3 seconds allows you to toggle in between the °C and °F mode setting selection screen.
3. Release the CAL button to confirm your mode selection and the display will go to the temperature calibration mode with the upper display flashing. The upper display shows the current measured temperature reading based on the last set offset and the lower display shows the current measured temperature reading based on factory default calibration.
4. Dip the Testr into a solution of known temperature and allow time for the in built temperature sensor to stabilize.
5. Press the HOLD/ENT button to set the upper display to the temperature value of the solution.
6. Once the new temperature setting is reached, the new value is automatically confirmed and returns to the measurement mode if no button is pressed after 5 seconds.

Notes: To exit this program without confirming the calibration, press the CAL button before the automatic confirmation takes place.

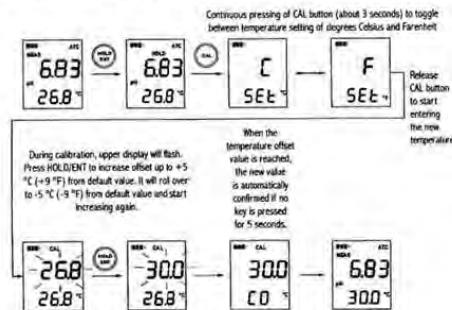


Figure 6: Temperature Calibration Sequence (Only for pHTestr 30)

Electrode Maintenance

1. Before measuring soil pH with the pHSpear, wet your soil sample with distilled water and ensure that the soil is free of particulates. Even though the pHSpear is ruggedized, hard surfaces such as stones and pebbles can still cause breakage.
2. Rinse the electrode with tap water or electrode storage solution after each measurement. Care has to be taken not to damage the sensor's glass electrode especially while rinsing the pHSpear penetrating tip electrode.
3. In aggressive chemicals, dirty or viscous solutions, and solutions with heavy metals or proteins, take readings quickly and rinse electrode immediately afterward. For the pHSpear, the remnants of the semi solid samples on the penetrating electrode can be removed by rubbing it with some table salt and then rinsing. Mild detergent can be used to wash the penetrating electrode clean.
4. If possible, keep a small piece of paper or sponge in the electrode cap – moistened with clear water or electrode storage solution (NOT de-ionized water) – and close the cap over the electrode. For pHSpear, ensure that the electrode is kept soaked in electrode storage solution or tap water via its protective cap.

Changing Batteries

1. Open battery compartment lid (with attached lanyard loop).
2. Remove old batteries; replace with fresh ones. Note polarity.



Warranty

The waterproof Testrs are warranted to be free from manufacturing defects for 1 year and electrode module for 6 months, unless otherwise specified. If repair, adjustment or replacement is necessary and has not been the result of abuse or misuse within the time period specified, please contact your local distributor for assistance.

Return Of Items

Authorization must be obtained from your distributor before returning items for any reason. When applying for authorization, please include information regarding the reason the item(s) are to be returned.

Note: We reserve the right to make improvements in design, construction and appearance of products without notice. Prices are subject to change without notice.

Self-Diagnostic Messages

		3 Bars indicates battery is full (100%)
Low Battery Indicator		2 Bars indicates 50% of the battery life is left
		1 Bar indicates 25% of the battery life is left
		Blinking battery casing indicates the need to replace batteries with fresh ones as specified by manufacturer
Over Range / Under Range Signal	Or / Ur (Solid)	Electrode is not in contact with solution or electrode is failing
	Or / Ur (Blinking)	Replacement sensor is not connected properly to the Testr during sensor replacement
	ATC / Or / Ur (Blinking)	Measured pH value or temperature value (pHTestr 30) exceeds its specified maximum or minimum value
Error Message	Ec0	Blinking ATC, 'Or' or 'Ur' indicates that there is a short or open circuit at the bulb in temperature sensor
	Ec1	Temperature calibration error of attempting to calibrate Testr to a value which is out of range or under range
	Ec2	pH calibration error of attempting to confirm a calibration value which is not within the specified calibration window

Electrode Replacement

You can replace the electrode module at the fraction of the cost of a new Testr. When the Testr fails to calibrate or gives fluctuating readings in calibration standards, you need to change the electrode.

1. With dry hands, grip the ribbed Testr collar with electrode facing you. Twist the collar counter clockwise (see picture A). Save the ribbed Testr collar and O-ring for later use.
2. Pull the old electrode module away from the Testr.
3. Align the four tabs on the new module so that they match the four slots on the Testr (see picture B).
4. Gently push the module onto the slots to sit it in position. Push the smaller O-ring fully into the new electrode module. Push the collar over the module and thread it into place by firmly twisting clockwise.

Note: It is necessary that you recalibrate your Testr prior to measurement after an electrode replacement.

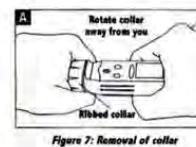


Figure 7: Removal of collar from tester

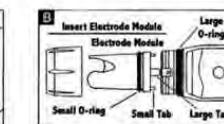


Figure 8: Example of electrode module fitting alignment

Applications

Water quality testing • pools • spas • aquariums • aquaculture • hydroponics • ecology studies • water and wastewater treatment • boilers • steam generators • car washes • sanitation plants • labs • food sectors and more!

Accessories

Item	Endee Instruments Order Code	Oaktree Instruments Order Code
pHTestr 10,20,30 Replacement Sensor	PHSENSGR101	35624-38
pHSpear Replacement Sensor	PHSENSGR04	35634-50
Carrying Pouch pH Testr 10, 20, 30	ECPOUCH01	35624-45

Testr Specifications

Large Screen Testr	pHTestr 10	pHTestr 20	pHTestr 30	pHTestr 10BNC	pH Spear
pH Range	-1.0 to 15.0 pH			-1.0 to 15.0 pH	
Resolution	0.1 pH			0.01 pH	
Relative Accuracy	0.1 pH			0.01 pH	
Calibration Points	Up to 3 points			Up to 3 points	
	100			100	
Buffer Set Standard Selection	4.0/7.0/10.0 NIST 4.0/6.9/9.2			USA - 4.0/7.0/10.0 NIST - 4.0/6.9/9.2	
Calibration Window (USA Buffer Set Standard)	±1.0 pH (pH 4.0 & pH 10.0), ±1.5 pH (pH 7.0)			±1.00 pH (pH 4.01 & pH 10.01), ±1.50 pH (pH 7.00)	
Calibration Window (NIST Buffer Set Standard)	±1.0 pH (pH 4.0 & pH 9.2), ±1.2 pH (pH 6.9)			±1.00 pH (pH 4.01 & pH 9.18), ±1.25 pH (pH 6.86)	
Temperature	No Display			0-50.0°C or 32.0-122.0°F	
Temperature Compensation	ATC			MTC	
Temperature Resolution	No			0.1 °C / °F	
Temperature Accuracy	No			±0.5 °C / 0.9 °F	No
Temperature Calibration Window	No			±(5°C / 9°F)	0-50.0°C or from default value
Auto Off				After 8.5 minutes from last key press	
User Reset				Yes	
Non Volatile Memory Backup				Yes	
LCD Display				Dual	
Power Requirement	4 x 1.5V "A" 76" micro Alkaline Batteries				
Battery Life	More than 500 hrs				
Operating Temperature	0 - 50 °C				
Testr Dimensions	6.5" x 1.5" dia. (165 x 38 mm)			9.75" x 1.5" dia. (247 x 38 mm)	
Weight	3.25 oz (90 gm)				
Penetrating Electrode Total Length	Not applicable			91 mm	
Shaft Length	Not applicable			31 mm	
Penetrating Electrode Upper Diameter	Not applicable			12 mm	
Shaft Diameter	Not applicable			7 mm	

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Appendix Q: Supplemental Information



Appendix R: Active Treatment System and Passive Treatment Plans





Appendix S: Construction General Permit

Copies of the Construction Stormwater General Permit may be downloaded from the State Water Board website at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.



Environmental **FINES**

10 Ways To Avoid NPDES Phase II Fines

- 1 Submit a Notice of Intent before starting work.
- 2 Obtain an NPDES permit before starting work.
- 3 Prepare a Storm Water Pollution Prevention Plan (SWPPP) for your site.
- 4 Keep a signed copy of your SWPPP on site and update it regularly.
- 5 Implement all parts of your SWPPP throughout the project.
- 6 Properly train all involved contractors.
- 7 Correctly install and maintain Best Management Practices.
- 8 Perform timely inspections and correct problems within 48 hours.
- 9 Maintain complete records of all SWPPP activities.
- 10 Never discharge muddy water or other pollutants from the site.

CSC... your essential
Best Management Practice

10 Maneras de Evitar Multas de las Fase II de NPDES

- 1 Entregue un Aviso de Intención (Notice of Intent) antes de empezar a trabajar.
- 2 Obtenga un permiso del Sistema Nacional de Eliminación de Deshechos Contaminados Fase II (NPDES Phase II) antes de empezar a trabajar.
- 3 Prepare un Plan de Prevención Contra la Contaminación por Agua de Tormenta (SWPPP) para su sitio.
- 4 Mantenga una copia firmada de su SWPPP en sitio y póngala al día regularmente.
- 5 Implemente todos los puntos de su SWPPP durante el transcurso de su proyecto.
- 6 Entrene apropiadamente a todos los contratistas implicados.
- 7 Instale y mantenga correctamente las Mejores Prácticas de Administración (BMP's).
- 8 Inspeccione la construcción frecuentemente y corrija los problemas dentro de 48 horas.
- 9 Mantenga registros completos de todas las actividades de SWPPP.
- 10 Nunca desche del sitio agua lodoso ni otros contaminantes.

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Administración esencial





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