

The background of the entire page is a high-contrast, black and white image of water ripples. The ripples are of various sizes and are scattered across the frame, creating a textured, organic pattern. The lighting is dramatic, with bright highlights on the peaks of the ripples and deep shadows in the troughs, giving the water a sense of movement and depth.

GOT SWPPP

QSP & QSD TRAINING NOTES

got swppp?

QSD/QSP Training

Module 1
Training Overview and Regulations






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It all started with the Clean Water Act!


- Watershed assessment
- Beneficial uses
- Water Quality Standards
- BAT/BCT
- NPDES Permits
- Impairments
- TMDLs
- Waste Load Allocations



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It all started with the Clean Water Act!


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- Waste Load Allocations



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It all started with the Clean Water Act!

- Delegated permitting and oversight authority to the States
- Sets the standards for permit issuance
- Establishes the USEPA as the oversight agency



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It all started with the Clean Water Act!



- Sect. 301 Effluent Limits
- Sect. 303 Water Quality Standards and Effluent Plans
- Sect. 401 Water Quality Certifications
- Sect. 402 NPDES Permits
- Sect. 404 Permits for Dredged or Fill Material
- Sect. 505 Citizen Suits

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California Construction General Permit



- Originally issued in 1992 for sites with soil disturbance \geq 5 acres
- Re-issued in 1999 for sites with soil disturbance \geq 1 acre
- Re-issued as Order 2009-0014-DWQ in September 2009 as the current permit.
- Significant changes from the previous permit.

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Qualified SWPPP Developer

In addition, a QSD shall have attended a 3-day State Water Board-approved QSD training course and pass the State's on-line exam.

B. SWPPP Certification Requirements

1. **Qualified SWPPP Developer:** The discharger shall ensure that SWPPPs are written, amended and certified by a Qualified SWPPP Developer (QSD). A QSD shall have one of the following registrations or certifications, and appropriate experience, as required for:
 - a. A California registered professional civil engineer;
 - b. A California registered professional geologist or engineering geologist;
 - c. A California registered landscape architect;
 - d. A professional hydrologist registered through the American Institute of Hydrology;
 - e. A Certified Professional in Erosion and Sediment Control (CPESC)TM registered through Enviro Cert International, Inc.;
 - f. A Certified Professional in Storm Water Quality (CPSWQ)TM registered through Enviro Cert International, Inc.; or
 - g. A professional in erosion and sediment control registered through the National Institute for Certification in Engineering Technologies (NICET).

got swppp? got SWPPP?
Fact Sheet

New QSD Option

Effective 7/01/13, a PE, PG, or Land Surveyor who is registered through the California Dept. of Consumer Affairs

Qualified Storm Water Pollution Prevention Plan Developer (QSD) Training Program for Professionals Licensed by the California Board of Professional Engineers, Land Surveyors and Geologists

Background:
 The State Water Resources Control Board's (State Water Board) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Land Disturbance (Construction General Permit) includes training and certification requirements for individuals developing and implementing Storm Water Pollution Prevention Plans. The Construction General Permit requires that a QSD possess underlying professional licenses or certifications, and, effective September 2, 2011, have attended a State Water Board approved or approved QSD training course. Three of the required licenses are administered by the California Board of Professional Engineers, Land Surveyors and Geologists at the Department of Consumer Affairs. The Construction General Permit provides two routes for QSDs to comply with the training requirements. State Water Board approved or State Water Board approved training, Professional civil engineers, geologists, and engineering geologists in good standing with the California Board of Professional Engineers, Land Surveyors and Geologists are transferred to licenses (CPESLUSG) and, effective July 1, 2013, may obtain their required QSD training in an alternative manner. A fact sheet illustrating the alternatives and steps required for a licensee candidate to obtain their QSD training is included in this fact sheet on page 4.

The State Water Board has approved the California Stormwater Quality Association to provide training with input and oversight by State Water Board staff. The California Stormwater Quality Association has trained over a hundred Trainers of Record who have trained thousands of QSDs. The California Stormwater Quality Association also developed a management structure, course materials, testing criteria, and fees commensurate to the costs of administering the training program. The training includes a review of the Construction General Permit requirements and provides common technical guidance to assist in storm water pollution prevention plans in compliance with the Construction General Permit.

* The applicable professional registration or certification requirements for QSDs are set forth in Section V(B.1) of the Construction General Permit, as a Nationally Registered Professional Civil Engineer, California Registered Professional Geologist or Engineering Geologist, California Registered Professional Architect, Professional Photographer registered through the California State Board of Photography, Certified Professional in Erosion and Sediment Control (CPESC), Registered Professional Geologist or the National Board of Professional Surveying and Mapping (NBPSM), Professional Engineer and Sediment Control registered through the National Institute for Certification in Engineering Technologies (NICET), or Professional Engineer, Professional Geologist, and Professional Engineering Geologist.
 † Qualified SWPPP Practitioner

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QSD Underlying Cert.

www.CPESC.org

Certified Professional in Erosion and Sediment Control™

Home | Certification | Exam Content | Registration Fees | Policies & Procedures

CONTACT US | CARRIER | COURSES | CERTIFICATION INTERNATIONAL | LEGAL NOTICE | QUICK FORMS | FAQ

Welcome

Welcome to the CPESC® home page, your official source for information and resources supporting the Certified Professional in Erosion and Sediment Control™ program. If you cannot find the information you need, please contact us. We will be happy to assist you.

Important! Individuals interested in certification should check with the appropriate regulatory authorities to determine acceptance of this certification. Note that certification is not a substitute for any required professional license.

Phone: (828) 655-1600 Email: info@cpesc.org Fax: (828) 655-1622

The following links provide information specific to the CPESC certification program:
HOW DO I BECOME CERTIFIED?
HOW DO I SETUP A REVIEW COURSE OR EXAM?

• Mission Statement	• CPESC Registrar Directory
• State of Practice	• Certification Procedures & Standards
• Benefits of Certification	• CPESC Test Process (FOP)
• Code of Conduct and Ethics	• Professional Development Requirements
• Application Packet	• Professional Development Audit Process
• Application Process	• CPESC Procedure
• CPESC Exam Review Outline	• CPESC Products
• Top 5 Session Applications And Databases	• Fees

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Qualified SWPPP Practitioner

In addition, a QSP shall have attended a 2-day State Water Board-approved QSP training course and pass the State's on-line exam.

- Qualified SWPPP Practitioner:** The discharger shall ensure that all BMPs required by this General Permit are implemented by a Qualified SWPPP Practitioner (QSP). A QSP is a person responsible for non-storm water and storm water visual observations, sampling and analysis. Effective two years from the date of adoption of this General Permit, a QSP shall be either a QSD or have one of the following certifications:
 - A certified erosion, sediment and storm water inspector registered through Enviro Cert International, Inc.; or
 - A certified inspector of sediment and erosion control registered through Certified Inspector of Sediment and Erosion Control, Inc.

	QSP / QSD Modules	QSD Only Modules	
Day 1	1. Training Overview and Regulations (2 hours)	6. Project Planning and Site Assessment (4 hours)	Day 3
	2. Erosion Processes and Sediment Control (2 hours)	7. SWPPP Development and PRDs (2 hours)	
	3. SWPPP Implementation (3 hours)	8. Project Closeout (1 hour)	
Day 2	4. Monitoring (4 hours)		
	5. Reporting (2 hours)		

The Process ...

1. Successfully complete this course and receive an email from WGR with a link to your exam.
2. Make sure that you have obtained the appropriate pre-requisite registration / certification (i.e. PE, PG, CPESC, etc.)
3. Pay \$125 fee then take and pass the QSP / QSD portions of the on-line exam.
4. Obtain your QSP/QSD 2-year certification from CASQA.

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And a certificate like this ...

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OK, let's look at the permit ...

CGP Components:

- Fact Sheet
- Order
- Attachments & Appendices
- FAQs

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The Fact Sheet:

State Water Resources Control Board
 1001 I Street • Sacramento, California 95814 • (916) 341-5400
 Mailing Address: P.O. Box 100 • Sacramento, California • 95812-0100
 Fax: (916) 341-5403 • <http://www.waterboards.ca.gov>

Linda S. Adams
Secretary for Environmental Protection

Arnold Schwarzenegger
Governor

CONSTRUCTION GENERAL PERMIT FACT SHEET TABLE OF CONTENTS

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FAQs:




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Significant Features:

Rainfall Erosivity Waiver:
 Allows small construction sites (>1 acre and < 5 acres) to self-certify if the rainfall erosivity value (R value) is less than or equal to 5.


Revisited in Module 2

 **got SWPPP?**

Significant Features:

Emergency Construction:
 In case of a public emergency that requires immediate construction activities, a discharger shall submit a brief description of the emergency activity within **5 days** of the onset of construction, and then shall submit all PRDs within **30 days**.

Revisited later in this Module

 **got SWPPP?**

Significant Features:

Numeric Action Levels (NALs):
 The following NALs apply to Risk Level / LUP Type 2 & 3 sites:

- pH <6.5 and >8.5
- Turbidity > 250 NTU

Revisited later in this Module & in Module 3

got SWPPP?

Significant Features:

Receiving Water Monitoring Triggers:
 For Risk Level / LUP Type 3 sites:

- pH <6.0 and >9.0
- Turbidity > 500 NTU

Must perform receiving water monitoring if there is a direct discharge.

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Significant Features:

Risk Based Permit Structure:

Combined Risk Level Matrix

		Sediment Risk		
		Low	Medium	High
Receiving Water Risk	Low	Level 1	Level 2	
	High	Level 2		Level 3


Project Sediment Risk: Low
 Project RW Risk: High
 Project Combined Risk: Level 2

Revisited in Module 3

got SWPPP?

Significant Features:

Incorporation of LUPs:
 Linear underground / overhead projects (LUPs) have been incorporated into this permit in Attachment A. Many requirements are similar to the analogous risk levels (Types 1 – 3). We will compare and contrast LUP and “traditional” requirements in these Modules.


 **got SWPPP?**

Significant Features:

Minimum BMPs:
The CGP includes minimum BMPs for each of the Risk / Type levels.

Also, there is NO storm season in this permit!


Revisited in Module 3

 **got SWPPP?**

Significant Features:

Project Specific Soil Characteristics:
The CGP provides the option for dischargers to monitor and report the soil characteristics at their project location. The primary purpose of this requirement is to provide better risk determination and, eventually, better program evaluation.


Revisited in Module 2

 **got SWPPP?**

Significant Features:

Effluent Monitoring & Reporting:
The CGP requires effluent monitoring and reporting for pH and turbidity. A minimum of **3 samples per day** of discharges from a **“qualifying event”** is required. A “qualifying event” is one that produces ½” over a period of time in which there is not a break in rain > 48 hours.


Revisited in Module 4

 **got SWPPP?**

Significant Features:

Bioassessment Monitoring:
Applies to Risk Level / Type 3 sites:


- Bioassessment is required for a site that is >=30 acres & has a freshwater direct discharge into a wadeable stream.

 **got SWPPP?**

Significant Features:

Post-Construction Storm Water Performance Standards:
The CGP specifies runoff reduction requirements for all sites not covered by a Phase 1 or Phase 2 MS4 NPDES permit.


Revisited in Module 6

 **got SWPPP?**

Significant Features:

Rain Event Action Plans (REAPs):
The CGP requires Risk Level 2 and 3 sites to prepare a REAP within 48 hours prior to any likely precipitation event. *Does not apply to LUPs.*

Revisited in Module 3


 **got SWPPP?**

Significant Features:

Annual Report:
The CGP requires all projects that are enrolled for more than three months to submit an annual report on the SMARTS system.

Revisited in Module 5

Order p. 4

 **got SWPPP?**

What is Covered by the CGP?


B. Activities Covered Under the General Permit

18. Any construction or demolition activity, including, but not limited to, clearing, grading, grubbing, or excavation, or any other activity that results in a land disturbance of equal to or greater than one acre.

19. Construction activity that results in land surface disturbances of less than one acre if the construction activity is part of a larger common plan of development or the sale of one or more acres of disturbed land surface.


20. Construction activity related to residential, commercial, or industrial development on lands currently used for agriculture including, but not limited to, the construction of buildings related to agriculture that are considered industrial pursuant to U.S. EPA regulations, such as dairy barns or food processing facilities.

Order p. 4

 **got SWPPP?**

What is Covered by the CGP?


21. Construction activity associated with Linear Underground/Overhead Utility Projects (LUPs) including, but not limited to, those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities) and include, but are not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/borrow locations.


Order p. 4


What is Covered by the CGP?


22. Discharges of sediment from construction activities associated with oil and gas exploration, production, processing, or treatment operations or transmission facilities.²
23. Storm water discharges from dredge spoil placement that occur outside of U.S. Army Corps of Engineers jurisdiction (upland sites) and that disturb one or more acres of land surface from construction activity are covered by this General Permit. Construction sites that intend to disturb one or more acres of land within the jurisdictional boundaries of a CWA § 404 permit should contact the appropriate Regional Water Board to determine whether this permit applies to the site.

² Pursuant to the Ninth Circuit Court of Appeals' decision in *NRDC v. EPA* (9th Cir. 2008) 526 F.3d 591, and subsequent denial of the U.S. EPA's petition for reconsideration in November 2008, oil and gas construction activities discharging storm water contaminated only with sediment are no longer exempt from the NPDES program.


Order p. 5

What about Caltrans?





Order p. 5

What is Not Covered?

C. Activities Not Covered Under the General Permit

24. Routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility.
25. Disturbances to land surfaces solely related to agricultural operations such as disking, harrowing, terracing and leveling, and soil preparation.
26. Discharges of storm water from areas on tribal lands; construction on tribal lands is regulated by a federal permit.
27. Construction activity and land disturbance involving discharges of storm water within the Lake Tahoe Hydrologic Unit. The Lahontan Regional Water Board has adopted its own permit to regulate storm water discharges from construction activity in the Lake Tahoe Hydrologic Unit (Regional Water Board 6SLT). Owners of construction sites in this watershed must apply for the Lahontan Regional Water Board permit rather than the statewide Construction General Permit.

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What is Not Covered?

- 28. Construction activity that disturbs less than one acre of land surface, and that is not part of a larger common plan of development or the sale of one or more acres of disturbed land surface.
- 29. Construction activity covered by an individual NPDES Permit for storm water discharges.
- 30. Discharges from small (1 to 5 acre) construction activities with an approved Rainfall Erosivity Waiver authorized by U.S. EPA Phase II regulations certifying to the State Board that small construction activity will occur only when the Rainfall Erosivity Factor is less than 5 ("R" in the Revised Universal Soil Loss Equation).
- 31. Landfill construction activity that is subject to the Industrial General Permit.
- 32. Construction activity that discharges to Combined Sewer Systems.

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What is Not Covered?

- 33. Conveyances that discharge storm water runoff combined with municipal sewage.
- 34. Discharges of storm water identified in CWA § 402(l)(2), 33 U.S.C. § 1342(l)(2). From oil, gas, and mining operations.
- 35. Discharges occurring in basins that are not tributary or hydrologically connected to waters of the United States (for more information contact your Regional Water Board).

Attach. A2
p.2



got SWPPP?

What is Not Covered?


Projects and Activities Not Defined As Construction Activity

1. LUP construction activity does not include routine maintenance projects to maintain original line and grade, hydraulic capacity, or original purpose of the facility. Routine maintenance projects are projects associated with operations and maintenance activities that are conducted on existing lines and facilities and within existing right-of-way, easements, franchise agreements or other legally binding agreements of the discharger. Routine maintenance projects include, but are not limited to projects that are conducted to:
 - Maintain the original purpose of the facility, or hydraulic capacity.
 - Update existing lines³ and facilities to comply with applicable codes, standards and regulations regardless if such projects result in increased capacity.
 - Repairing leaks.

Routine maintenance does not include construction of new⁴ lines or facilities resulting from compliance with applicable codes, standards and regulations.

³ Update existing lines includes replacing existing lines with new materials or pipes.
⁴ New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines.

Attach. A2
p.3




got SWPPP?

What is Not Covered?

Routine maintenance projects do not include those areas of maintenance projects that are outside of an existing right-of-way, franchise, easements, or agreements. When a project must acquire new areas, those areas may be subject to this General Permit based on the area of disturbed land outside the original right-of-way, easement or agreement.

2. LUP construction activity does not include field activities associated with the planning and design of a project (e.g., activities associated with route selection).
3. Tie-ins conducted immediately adjacent to "energized" or "pressurized" facilities by the discharger are not considered small construction activities where all other LUP construction activities associated with the tie-in are covered by a NOI and SWPPP of a third party or municipal agency.

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got SWPPP?

Obtaining Permit Coverage Legally Responsible Person (LRP)

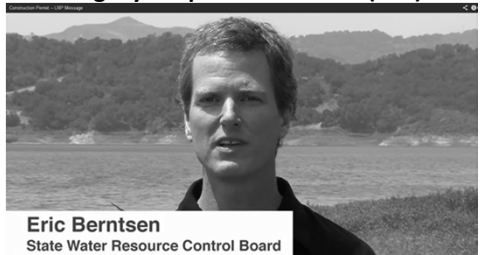
- The LRP must electronically file PRDs prior to the commencement of construction activity.
- Must be the **owner** or a high level officer of the organization.
 - For a corporation: a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (a) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or (b) the manager of the facility if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
 - For a municipality, State, Federal, or other public agency: either a principal executive officer or ranking elected official.

Order p. 24



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Obtaining Permit Coverage Legally Responsible Person (LRP)




Eric Berntsen
State Water Resource Control Board

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Approved Signatory


Approved Signatory
 A person who has legal authority to sign, certify, and electronically submit Permit Registration Documents and Notices of Termination on behalf of the Legally Responsible Person. The Approved Signatory must be one of the following:

1. For a corporation: a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (a) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or (b) the manager of the facility if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
2. For a partnership or sole proprietorship: a general partner or the proprietor, respectively;

 **got SWPPP?**


Approved Signatory

3. For a municipality, State, Federal, or other public agency: a principle executive officer, ranking elected official, city manager, council president, or other public employee with managerial responsibility over the construction or land disturbance project (including, but not limited to, project manager, project superintendent, or resident engineer);
4. For the military: any military officer who has been designated;
5. For a public university: an authorized university official;
6. For an individual: the individual, because the individual acts as both the Legally Responsible Person and the Approved Signatory.

 **got SWPPP?**

LRP

Legally Responsible Person
 A person, company, agency, or other entity that possesses a real property interest (including, but not limited to, fee simple ownership, easement, leasehold, or rights of way) in the land upon which the construction or land disturbance activities will occur for the regulated site. If the land is controlled by an estate or similar entity, the person who has day-to-day control over the land (including, but not limited to, a bankruptcy trustee, receiver, or conservator) is considered to possess a real property interest. The Legally Responsible Person will typically be the project proponent. A contractor who does not possess a real property interest is not qualified to be a Legally Responsible Person.



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Obtaining Permit Coverage

Two Exceptions to the LRP Requirement

- LUP projects that cross over multiple properties (LRP can be the person in charge of the utility company, municipality, or other public / private company or agency that owns the LUP. *(Attach. A p.10)*)
- The leaseholder of a mineral estate *(Append. 5)*



got SWPPP?


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Obtaining Permit Coverage

Permit Registration Documents (PRDs) need to be submitted before start of construction

- Notice of Intent (NOI)
- Risk Assessment
- Post-Construction BMP Information
- Site Map
- Storm Water Pollution Prevention Plan
- Annual Fee
- Signed Certification Statement

Revisited in Module 5



got SWPPP?


Order p. 17

Modifying Permit Coverage

C. Revising Permit Coverage for Change of Acreage or New Ownership

1. The discharger may reduce or increase the total acreage covered under this General Permit when a portion of the site is complete and/or conditions for termination of coverage have been met (See Section II.D Conditions for Termination of Coverage); when ownership of a portion of the site is sold to a different entity; or when new acreage, subject to this General Permit, is added to the site.
2. Within 30 days of a reduction or increase in total disturbed acreage, the discharger shall electronically file revisions to the PRDs that include:
 - a. A revised NOI indicating the new project size;
 - b. A revised site map showing the acreage of the site completed, acreage currently under construction, acreage sold/transferred or added, and acreage currently stabilized in accordance with the Conditions for Termination of Coverage in Section II.D below;
 - c. SWPPP revisions, as appropriate; and
 - d. Certification that any new landowners have been notified of applicable requirements to obtain General Permit coverage. The certification shall include the name, address, telephone number, and e-mail address of the new landowner.
 - e. If the project acreage has increased, dischargers shall mail payment of revised annual fees within 14 days of receiving the revised annual fee notification.

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Discharge Prohibitions

III. DISCHARGE PROHIBITIONS

A. Dischargers shall not violate any discharge prohibitions contained in applicable Basin Plans or statewide water quality control plans. Waste discharges to Areas of Special Biological Significance (ASBS) are prohibited by the California Ocean Plan, unless granted an exception issued by the State Water Board.

B. All discharges are prohibited except for the storm water and non-storm water discharges specifically authorized by this General Permit or another NPDES permit.

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Discharge Prohibitions

C. Authorized non-storm water discharges may include those from de-chlorinated potable water sources such as: fire hydrant flushing, irrigation of vegetative erosion control measures, pipe flushing and testing, water to control dust, uncontaminated ground water from dewatering, and other discharges not subject to a separate general NPDES permit adopted by a Regional Water Board. The discharge of non-storm water is authorized under the following conditions:

1. The discharge does not cause or contribute to a violation of any water quality standard;
2. The discharge does not violate any other provision of this General Permit;
3. The discharge is not prohibited by the applicable Basin Plan;
4. The discharger has included and implemented specific BMPs required by this General Permit to prevent or reduce the contact of the non-storm water discharge with construction materials or equipment.
5. The discharge does not contain toxic constituents in toxic amounts or (other) significant quantities of pollutants;
6. The discharge is monitored and meets the applicable NALs and NELs; and
7. The discharger reports the sampling information in the Annual Report.

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got SWPPP?

Discharge Prohibitions

D. Debris resulting from construction activities are prohibited from being discharged from construction sites.


E. When soil contamination is found or suspected and a responsible party is not identified, or the responsible party fails to promptly take the appropriate action, the discharger shall have those soils sampled and tested to ensure proper handling and public safety measures are implemented. The discharger shall notify the appropriate local, State, and federal agency(ies) when contaminated soil is found at a construction site, and will notify the appropriate Regional Water Board.

got SWPPP? **got SWPPP?**

What are the Standards?

Receiving Water Standards


- Specified in the Basin Plan
- Water body specific
- Applies to the receiving water



Enforcement – How the Regional Board Responds to Storm Water Violations

Informal Enforcement

- Verbal Warning
- Staff Enforcement Letter
- Notice of Violation – compels action within a timeframe



Extracted from a presentation by Andrew Jensen, M.S., Environmental Scientist
Storm Water and Water Quality Certification Unit
Central Valley RWQCB, Redding Office
November 18, 2009

Administrative Civil Liability

Fines - Maximum Amounts

- State – Maximum Amounts are **\$10,000 per day**, plus **\$10/gallon** of sediment-laden or polluted water discharged for each violation
- Federal – Amounts of up to **\$27,500 per day**, can be imposed for UNINTENTIONAL violation, up to **\$55,000 per day** for knowing violation, in addition to criminal liability and responsibility for cleanup costs

Extracted from a presentation by Andrew Jensen, M.S., Environmental Scientist
Storm Water and Water Quality Certification Unit
Central Valley RWQCB, Redding Office
November 18, 2009

got SWPPP? **got SWPPP?**

Local Municipalities

- Some overlap
- Local municipalities have no authority to enforce the State's CGP
- Local municipalities enforce via storm water ordinances
- Local municipalities may have conditions requiring review of SWPPP items, but they cannot approve the SWPPP

got SWPPP? **got SWPPP?**

Other Permits?

- Yes, you may need other water permits for your project.
- Take the following real life example ...

got SWPPP? **got SWPPP?**

401 / 404 Permits ... when are they needed?

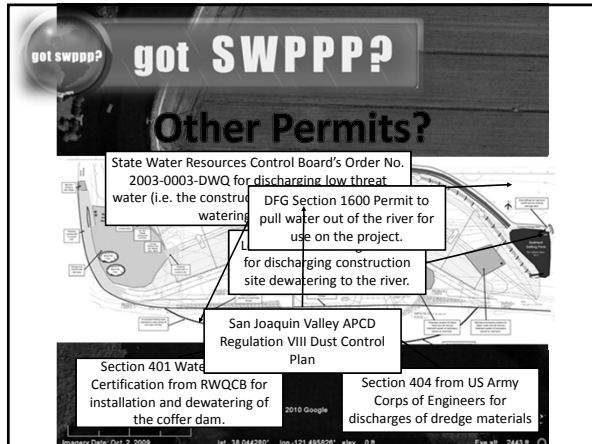
CORPS OF ENGINEERS REGULATORY JURISDICTION

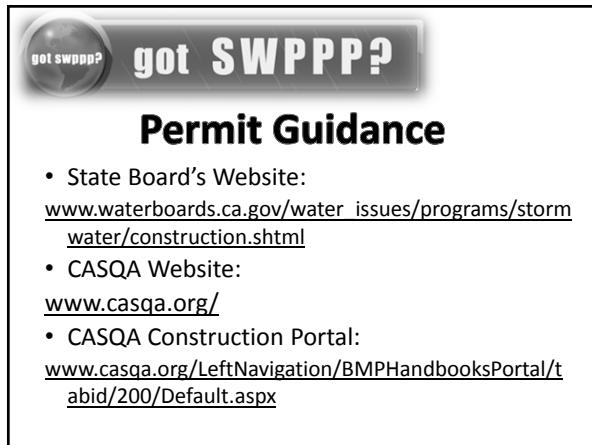
The diagram illustrates the regulatory jurisdiction of the Corps of Engineers across different water environments. It is divided into 'Tidal Waters' and 'Fresh Waters'. In Tidal Waters, Section 404 covers the area between the Mean High Water and the High Tide Line, while Section 10 covers the area between the Mean High Water and the Ordinary High Water. In Fresh Waters, Section 404 covers the area between the Ordinary High Water and the Uplands. Section 10 covers the area between the Ordinary High Water and the Uplands. Section 103 covers the area between the Ground Water Line and the Mean High Water. The diagram also shows 'Tidlands' and 'Coastal Wetlands' in the tidal area, and 'Fresh Water Wetlands' in the fresh water area.

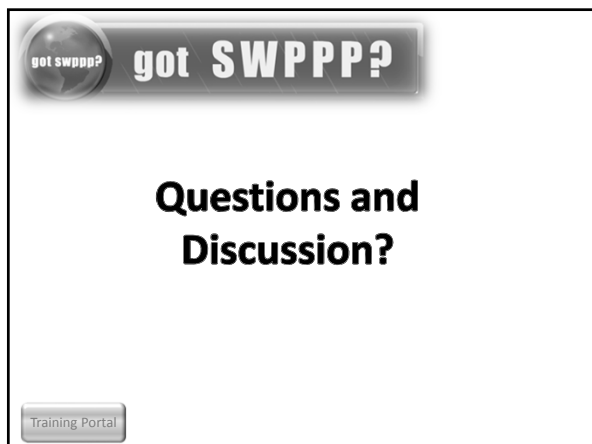
Section 103
Ocean Disposal of Dredged Material
Typical examples of regulated activities: Ocean discharge of dredged material

Section 404
Discharge of Dredged or Fill Material (all waters of the U.S.)
All filling activities, utility lines, coastal structures, road crossings, beach nourishment, diking, jetties, some excavation activities, etc.

Section 10
All Structures and Work (navigable waters)
Dredging, mooring, piers, wharves, dams, levees / coastal piers, piers, bulkheads, bridge fills, ditches, etc.







got swppp?

QSD/QSP Training

Module 2
Erosion Theory

got swppp? got SW

Erosion can be beautiful



got swppp? got SW

Erosion can be beautiful



got swPPP? **got SW**

Erosion can be beautiful



got swPPP? **got SW**


But not on your project!



got swPPP? **got SWPPP?**

What is Erosion?


Soil erosion is the process by which soil particles become **detached** by water, wind, or gravity and are transported from their original location.



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Geologic Erosion


- Natural process
- Can be beneficial
- Tempered by natural forces
- Typically causes little damage



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Accelerated Erosion


= natural erosion + human activities

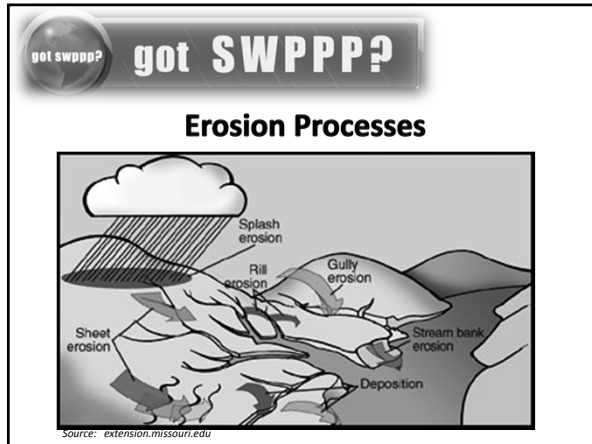


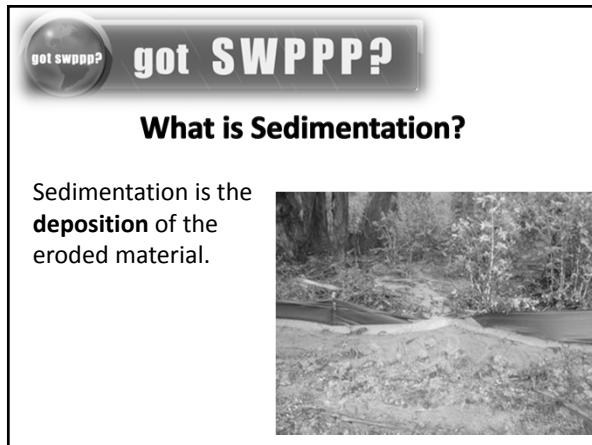
got SWPPP? **got SWPPP?**

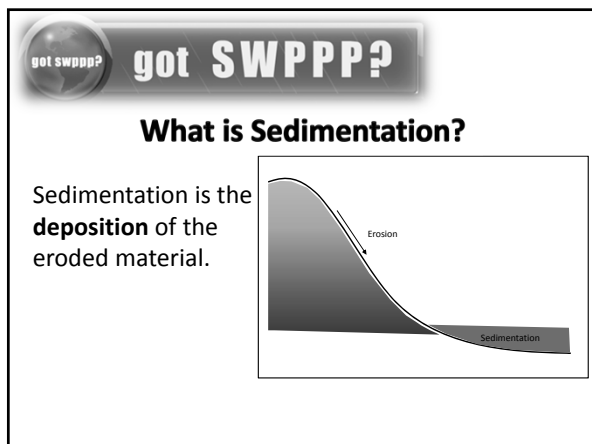
Erosion Accelerators

- Removal of surface cover
- Increased imperviousness
- Exposure of more erodible soil
- Uncontrolled offsite runoff flowing through disturbed areas










got SWPPP? **got SWPPP?**

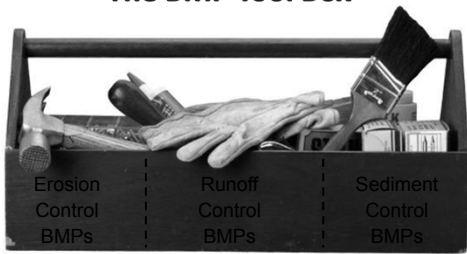
Erosion Processes



Source: The United States Department of Agriculture Forest Service, 1948

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The BMP Tool Box



Erosion Control BMPs Runoff Control BMPs Sediment Control BMPs

got SWPPP? **got SWPPP?**


The BMP Tool Box



Erosion Control BMPs Runoff Control BMPs Sediment Control BMPs

Erosion Control Tools

BMP#	BMP Name
EC-1	Scheduling
EC-2	Preservation of Existing Vegetation
EC-3	Hydraulic Mulch ¹
EC-4	Hydroseeding ¹
EC-5	Soil Binders ¹
EC-6	Straw Mulch ¹
EC-7	Geotextiles & Mats ¹
EC-8	Wood Mulching
EC-9	Earth Dikes and Drainage Swales
EC-10	Velocity Dissipation Devices
EC-11	Slope Drains
EC-12	Streambank Stabilization
EC-13	Reserved ²
EC-14	Compost Blankets ³
EC-15	Soil Preparation / Roughenings
EC-16	Non-Vegetative Stabilization ³



The BMP Tool Box



Runoff Control Tools

Table 3-1 Erosion Control BMPs	
BMP#	BMP Name
EC-1	Scheduling
EC-2	Preservation of Existing Vegetation
EC-3	Hydraulic Mulch ¹
EC-4	Hydroseeding ²
EC-5	Soil Binders ³
EC-6	Straw Mulch ⁴
EC-7	Geotextiles & Mats ⁵
EC-8	Wood Mulching
EC-9	Earth Dikes and Drainage Swales
EC-10	Velocity Dissipation Devices
EC-11	Slope Drains
EC-12	Streambank Stabilization
EC-13	Reserved ⁶
EC-14	Compost Blankets ⁷
EC-15	Soil Preparation / Roughening ⁸
EC-16	Non-Vegetative Stabilization ⁹




The BMP Tool Box




Sediment Control Tools

Table 3-2 Temporary Sediment Control BMPs	
BMP#	BMP Name
SE-1	Silt Fence ¹
SE-2	Sediment Basin ²
SE-3	Sediment Trap ³
SE-4	Check Dam ⁴
SE-5	Fiber Rolls ⁵
SE-6	Gravel Bag Berm ⁶
SE-7	Street Sweeping and Vacuuming
SE-8	Sandbag Barrier ⁷
SE-9	Straw Bale Barrier ⁸
SE-10	Storm Drain Inlet Protection ⁹
SE-11	Active Treatment Systems ¹⁰
SE-12	Temporary Silt Dike ¹¹
SE-13	Compost Socks and Berms ¹²
SE-14	Biofilter Bags ¹³
WE-1	Wind Erosion Control ¹⁴
TC-1	Stabilized Construction Entrance/Exit
TC-2	Stabilized Construction Roadway
TC-3	Entrance/Outlet Tire Wash



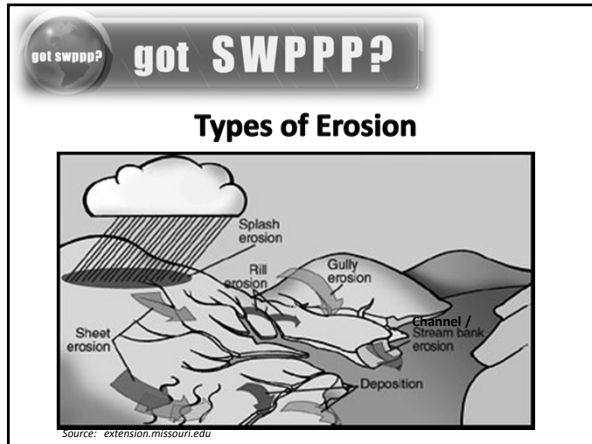
The BMP Tool Box



Question:
Which tool should you reach for first?

Answer: Erosion Control BMPs

- Keep the soil in place
- An ounce of prevention is worth a pound of cure!



got SWPPP? **got SWPPP?**

Splash Erosion

Rain drops strike bare soil directly at 5 – 20 mph!

- Detaches soil particles
- Particles can then be transported by the action of water or wind

The BMP Tool Box

Erosion Control BMPs	Runoff Control BMPs	Sediment Control BMPs
----------------------	---------------------	-----------------------

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Splash Erosion

- Primary source of erosion
- Often imperceptible
- Indicators include: pedestals, stains, & graveling or lag
- Splash detachments carry away fine soil particles
- Protect against splash erosion with soil stabilization tools

The BMP Tool Box

Erosion Control BMPs	Runoff Control BMPs	Sediment Control BMPs
----------------------	---------------------	-----------------------


got SWPPP? **got SWPPP?**

The BMP Tool Box

- Runoff Control BMPs
- Sediment Control BMPs

Sheet Erosion

- The removal of a uniform thin layer of soil by splash erosion
- Surface film of water is 1/16" to 1/8" deep
- May go unnoticed even though large quantities of soil is leaving the site
- Leads to the formation of rills and gullies




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The BMP Tool Box

- Runoff Control BMPs
- Sediment Control BMPs

Rill Erosion

- Shallow surface flows that become condensed
- Well defined tiny channels, small enough to step across
- Often end part way up the slope
- Increased velocity and turbulence
- Rill erosion is as much as 100x that of sheet erosion




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The BMP Tool Box

- Runoff Control BMPs
- Sediment Control BMPs

Rill Erosion

- Rill formation affected by: distance, slope, and surface texture
- Will need to add another tool from our BMP tool box – Runoff Control BMPs




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The BMP Tool Box

Gully Erosion

- The accumulation of runoff from rills and sheet flow into concentrated flow paths
- Large deep cuts, too big to step across, many times big enough to stand in
- 100x the erosion of rills
- Add sediment control to the mix of tools




Remember, rill and gully erosion are symptoms, not the problem!

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The BMP Tool Box

Channel Erosion

- Results from increased volume, velocity, and duration of the flow
- Primarily from increased impervious surfaces

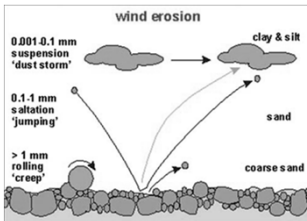


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The BMP Tool Box

Wind Erosion


- Depending on wind velocity and particle size, soil particles can move by:
 - Saltation,



SALTATION: Movement of particles by a series of short bounces along the surface of the ground, and dislodging additional particles with each impact. The bouncing particles ranging in size from 0.1 to 0.5 mm usually remain within 30 cm of the surface. Depending on conditions, this process accounts for 50 to 90% of the total movement of soil by wind.

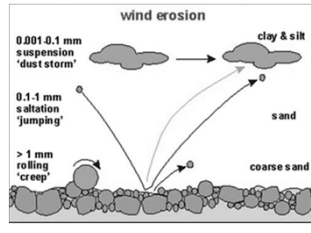


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Wind Erosion


- Depending on wind velocity and particle size, soil particles can move by:
 - Saltation,
 - Soil creep,



SOIL CREEP: The rolling and sliding of larger soil particles along the ground surface. The movement of these particles is aided by the bouncing impacts of the saltating particles described above. Soil creep can move particles ranging from 0.5 to 1 mm in diameter, and accounts for 5 to 25% of total soil movement by wind.

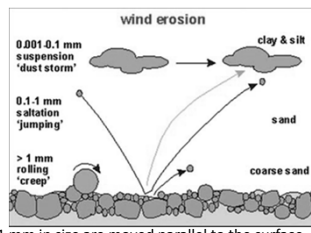


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Wind Erosion


- Depending on wind velocity and particle size, soil particles can move by:
 - Saltation,
 - Soil creep, and
 - Suspension.



SUSPENSION: Fine particles less than 0.1 mm in size are moved parallel to the surface and upward into the atmosphere by strong winds. The most spectacular of erosive processes, these particles can be carried high into the atmosphere, returning to earth only when the wind subsides or they are carried downward with precipitation. Suspended particles can travel hundreds of miles.



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Wind Erosion

Wind Erosion Equation (WEQ):

Wind erosion equation (WEQ). An erosion model designed to predict long-term average annual soil losses from a field having specific characteristics. [NAM-S8]

WEQ is $E = f(IRCLV)$, where:


- E = Estimated average annual soil loss expressed in tons per acre per year
- I = Soil erodibility factor
- K = Soil ridge roughness factor
- C = Climatic factor
- L = Equivalent unsheltered distance across the field along the prevailing wind erosion direction
- V = Equivalent vegetative cover

Source: USDA National Agronomy Manual (NAM)

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Wind Erosion Control

- Reduce wind speed on the soil surface
 - Cover stockpiles
 - Change stockpile orientation and shape
 - Scarify the soil surface
- Form a new, less erodible soil surface
 - Spray water to compact and weight soil particles
 - Apply a chemical dust suppressant or soil binder
 - Establish vegetation



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Erosion Pop Quiz



Type of Erosion:


- A - Splash
- B - Sheet
- C - Rill
- D - Gully
- E - Channel

Tools Needed:



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Erosion Pop Quiz



Type of Erosion:


- A - Splash
- B - Sheet
- C - Rill
- D - Gully
- E - Channel

Tools Needed:




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Erosion Pop Quiz




Type of Erosion:
 A - Splash
 B - Sheet
 C - Rill
 D - Gully
 E - Channel

Tools Needed:




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Erosion Pop Quiz



Type of Erosion:
 A - Splash
 B - Sheet
 C - Rill
 D - Gully
 E - Channel

Tools Needed:




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Erosion Prediction

What we will cover in this Module:


1. Factors that affect erosion
2. Benefits of good site planning of temporary and permanent erosion control

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Erosion Prediction


What we will **not** cover in this Module:

1. How to conduct the Risk Assessment when submitting PRDs (Module 7 for QSDs)
2. How to demonstrate proof of site soil stabilization when applying for a NOT (Module 8 for QSDs)

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Erosion Prediction

- Estimates average annual acre tons of soil loss (A)
- Usually expressed as the average soil loss for the entire site, soil loss for various parts of the site may vary greatly
- Do not confuse with Sediment Yield!
- Apply erosion prediction when:
 - Planning temporary and permanent erosion control measures,
 - Sizing sediment controls, and
 - Comparing pre and post construction erosion rates.

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Sediment Yield

- Do not confuse with erosion, the terms are not interchangeable
- It is the amount of eroded soil that settles out at a specific point, in the watershed, that is remote from the origin of the detached particles
- Includes erosion from slopes, channels, and mass wasting minus sediment deposited before reaching the point of interest
- Calculate sediment yield to size sediment control measures

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<p>Erosion Prediction</p> <ul style="list-style-type: none"> • RUSLE <p>$A=R \times K \times LS \times C \times P$</p> <ul style="list-style-type: none"> • Annual (or a portion of a year) • Only includes the following forms of erosion: <ul style="list-style-type: none"> • Raindrop • Sheet • Rill 	<p>Sediment Yield</p> <ul style="list-style-type: none"> • MUSLE <p>$T=95(V \times Q_p)^{0.56} \times K \times LS \times C \times P$</p> <ul style="list-style-type: none"> • Storm event specific • All forms of erosion minus what had already settled out
---	---

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Prediction Tools

Models available to predict erosion include:

- Universal Soil Loss Equation (USLE)
- Revised Universal Soil Loss Equation (RUSLE)

Models available to predict sediment yield include:

- Modified Universal Soil Loss Equation (MUSLE)

The following can do both:

- RUSLE₂

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RUSLE - Revised Universal Soil Loss Equation ...

A = (R) (K) (LS) (C) (P)

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got SWPPP?

RUSLE - Revised Universal Soil Loss Equation ...

$$A = (R) (K) (LS) (C) (P)$$


A = Average Annual Acre Tons of soil loss
 R = Rainfall runoff erosivity factor
 K = Soil erodibility factor which represents both susceptibility of soil to erosion and the rate of runoff
 LS = A function of the:
 Slope length, representing the effect of slope length on erosion
 The slope steepness, representing the effect of slope steepness on erosion
 C = Cover management factor
 P = Erosion control practice factor

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Rainfall Erosivity (R) Factor:

When factors other than rainfall are held constant, soil loss is directly proportional to the energy of the rainfall. Need to know the start and ending dates and the location.



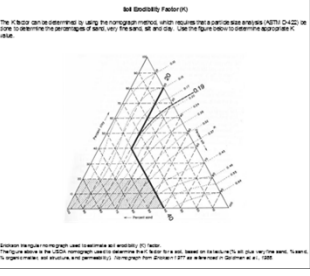
<http://cfpub.epa.gov/npdes/stormwater/lew/lewcalculator.cfm>

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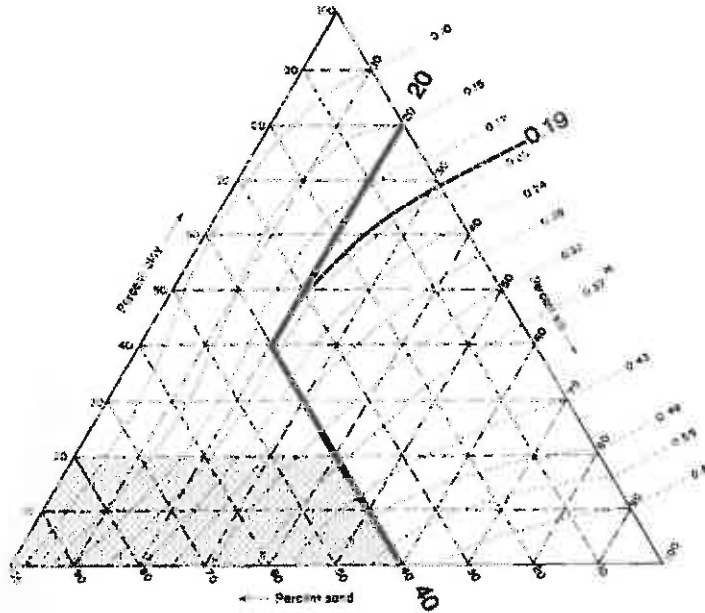
Soil Erodibility (K) Factor:

The soil loss rate per erosion index unit for a specified soil.



Soil Erodibility Factor (K)

The K factor can be determined by using the nomograph method, which requires that a particle size analysis (ASTM D-422) be done to determine the percentages of sand, very fine sand, silt and clay. Use the figure below to determine appropriate K value.

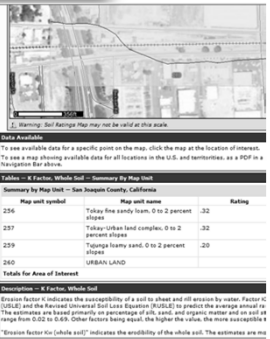


Erickson triangular nomograph used to estimate soil erodibility (K) factor.

The figure above is the USDA nomograph used to determine the K factor for a soil, based on its texture (% silt plus very fine sand, % sand, % organic matter, soil structure, and permeability). *Nomograph from Erickson 1977 as referenced in Goldman et. al., 1986.*

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**Soil Erodibility (K)
Factor:**
The soil loss rate per
erosion index unit for
a specified soil.

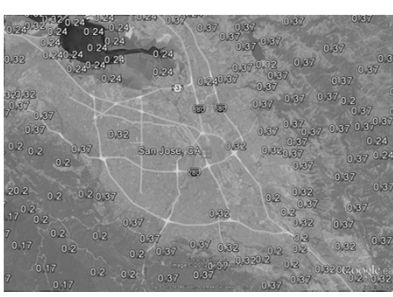


Map unit symbol	Map unit name	Rating
256	Taluga fine sandy loam, 0 to 2 percent slopes	.32
257	Taluga Urban land complex, 0 to 2 percent slopes	.32
259	Taluga loamy sand, 0 to 2 percent slopes	.20
260	URBAN LAND	

<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

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Soil Erodibility (K) Factor:
The soil loss rate per
erosion index unit for a
specified soil.



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**Slope Length &
Slope Steepness
(LS) Factor:**
A factor of soil loss as
a function of the
average field slope
length and steepness.

Sheet Flow Length (ft)	0.2	0.5	1.0	10.0	20.0	30.0	40.0	50.0	60.0
<3	0.05	0.07	0.23	0.30	0.41	0.48	0.53	0.58	0.63
6	0.05	0.07	0.23	0.37	0.56	0.72	0.85	0.97	1.0
9	0.05	0.07	0.23	0.38	0.67	0.91	1.13	1.31	1.4
12	0.05	0.07	0.23	0.39	0.76	1.08	1.37	1.62	1.8
15	0.05	0.07	0.23	0.40	0.84	1.24	1.58	1.91	2.1
20	0.05	0.07	0.31	0.57	1.24	1.80	2.41	2.91	3.4
30	0.05	0.08	0.46	0.91	2.10	3.22	4.24	5.16	5.9
40	0.05	0.08	0.58	1.20	2.86	4.44	5.89	7.20	8.3
50	0.05	0.09	0.68	1.48	3.57	5.58	7.44	9.13	10.6
60	0.05	0.09	0.80	1.62	4.85	7.70	10.35	12.75	14.8
75	0.06	0.10	1.02	2.34	6.04	9.67	13.07	16.16	18.9
100	0.06	0.10	1.16	2.72	7.16	11.55	15.67	19.42	22.7
125	0.06	0.10	1.28	3.09	8.23	13.35	18.17	22.57	26.5
150	0.06	0.11	1.51	3.75	10.24	16.77	22.95	28.60	33.0
200	0.06	0.12	1.91	4.95	13.84	23.14	31.89	39.95	47.4
300	0.06	0.12	2.25	6.03	17.35	29.07	40.29	50.63	59.9
400	0.06	0.13	2.55	7.02	20.37	34.71	48.29	63.84	75.1

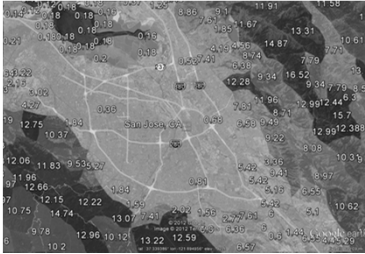
Average Watershed Slopes (%)


Sheet Flow Length (ft)	0.2	0.5	1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	20.0	25.0	30.0	40.0	50.0	60.0
<3	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.35	0.36	0.38	0.39	0.41	0.45	0.48	0.53	0.58	0.63
6	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.37	0.41	0.45	0.49	0.56	0.64	0.72	0.85	0.97	1.07
9	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.38	0.45	0.51	0.56	0.67	0.80	0.91	1.13	1.31	1.47
12	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.39	0.47	0.55	0.62	0.76	0.93	1.08	1.37	1.62	1.84
15	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.40	0.49	0.58	0.67	0.84	1.04	1.24	1.59	1.91	2.19
25	0.05	0.07	0.10	0.16	0.21	0.26	0.31	0.36	0.45	0.57	0.71	0.85	0.98	1.24	1.56	1.86	2.41	2.91	3.36
50	0.05	0.08	0.13	0.21	0.30	0.38	0.46	0.54	0.70	0.91	1.15	1.40	1.64	2.10	2.67	3.22	4.24	5.16	5.97
75	0.05	0.08	0.14	0.25	0.36	0.47	0.58	0.69	0.91	1.20	1.54	1.87	2.21	2.86	3.67	4.44	5.89	7.20	8.37
100	0.05	0.09	0.15	0.28	0.41	0.55	0.68	0.82	1.10	1.46	1.88	2.31	2.73	3.57	4.59	5.58	7.44	9.13	10.63
150	0.05	0.09	0.17	0.33	0.50	0.68	0.86	1.05	1.43	1.92	2.51	3.09	3.68	4.85	6.30	7.70	10.35	12.75	14.89
200	0.06	0.10	0.18	0.37	0.57	0.79	1.02	1.25	1.72	2.34	3.07	3.81	4.56	6.04	7.88	9.67	13.07	16.16	18.92
250	0.06	0.10	0.19	0.40	0.64	0.89	1.16	1.43	1.99	2.72	3.60	4.48	5.37	7.16	9.38	11.55	15.67	19.42	22.78
300	0.06	0.10	0.20	0.43	0.69	0.96	1.28	1.60	2.24	3.09	4.09	5.11	6.15	8.23	10.81	13.35	18.17	22.57	26.51
400	0.06	0.11	0.22	0.48	0.80	1.14	1.51	1.90	2.70	3.75	5.01	6.30	7.60	10.24	13.53	16.77	22.95	28.60	33.67
600	0.06	0.12	0.24	0.56	0.96	1.42	1.91	2.43	3.52	4.95	6.67	8.45	10.26	13.94	18.57	23.14	31.89	39.95	47.18
800	0.06	0.12	0.26	0.63	1.10	1.65	2.25	2.89	4.24	6.03	8.17	10.40	12.69	17.35	23.24	29.07	40.29	50.63	59.93
1000	0.06	0.13	0.27	0.69	1.23	1.86	2.55	3.30	4.91	7.02	9.57	12.23	14.96	20.57	27.66	34.71	48.29	60.84	72.15

LS Factors for Construction Sites. Table from Renard et. al., 1997.



Slope Length & Slope Steepness (LS) Factor:
 A factor of soil loss as a function of the average field slope length and steepness.






Cover (C) Factor:
 Reflects the effect of plant cover and management practices on erosion rates. It is used to compare the relative impacts of management options on conservation plans.

TYPE OF COVER	FACTOR C _c	%*	
None (fallow ground)	1.0	0.0	
Temporary Seedings (90% Stand):			
Ryegrass (perennial type)	0.05	95	
Ryegrass (annual)	0.1	90	
Small grain	0.05	95	
Millet or sudan grass	0.05	95	
Field bromegrass	0.03	97	
Permanent Seedings (90% stand)			
Sod (laid immediately)	0.01	99	
Mulch:			
Hay rate of application tons per acre:			
1/2	0.25	75	
1	0.13	87	
1-1/2	0.07	93	
2	0.02	98	
Small grain straw	2	0.02	98
Wood chips	6	0.06	94
Wood cellulose	1-3/4	0.1	90
Fiberglass	1/2	0.05	95
Asphalt emulsion (1250 gals/acre)	0.02	98	

Fiber matting, excelsior, gravel and stone may also be used as protective cover.
 *Percent soil loss reduction as compared with fallow ground.

USDA NRCS Davis, CA Guides for Erosion & Sediment Control, 1991



Erosion Control Practice (P) Factor:
 The ratio of soil loss with certain conservation practices compared to that of no practice.

SURFACE CONDITION WITH NO COVER	FACTOR P _c *
Compact and smooth, stropped with bulldozer or scraper on and down hill	1.3
Same condition except raked with bulldozer root rake up and down hill	1.2
Compact and smooth, stropped with bulldozer or scraper across the slope	1.2
Same condition except raked with bulldozer root rake across the slope	0.9
Loose as a tilled plow layer	1.0
Rough irregular surface equipment tracks in all directions	0.9
Loose with rough surface greater than 12" depth	0.8
Loose with smooth surface greater than 12" depth	0.9

*Values based on estimates

Erosion Control Treatment	C Factor	P Factor
Open Soil	1.00	1.00
Graded Bare Soil	1.00	0.90
Equipment Bare Soil	1.00	0.90
Grass Bare Soil	1.00	0.80
Soil Compaction	0.50	0.50
Asphalt/Concrete Pavement	0.05	1.00
Permanent Grass Layer	0.05	0.50
Established Native Grass (100% coverage)	0.05	1.00
Soil Cover	0.05	1.00
Agroforestry Strip	0.05	1.00
Erosion Control Structures	0.002 to 0.003	1.00
Turf Reinforcement Mats	0.002 to 0.003	1.00

USDA NRCS Davis, CA Guides for Erosion & Sediment Control, 1991

Table-7

COVER INDEX FACTOR C_c
CONSTRUCTION SITES

(2)

TYPE OF COVER	FACTOR C_c	%*
None (fallow ground)	1.0	0.0
Temporary Seedings (90% Stand):		
Ryegrass (perennial type)	0.05	95
Ryegrass (annuals)	0.1	90
Small grain	0.05	95
Millet or sudan grass	0.05	95
Field brome grass	0.03	97
Permanent Seedings (90% stand)	0.01	99
Sod (laid immediately)	0.01	99
Mulch:		
Hay rate of application tons per acre:		
	1/2	75
	1	87
	1-1/2	93
	2	98
Small grain straw	2	98
Wood chips	6	94
Wood cellulose	1-3/4	90
Fiberglass	1/2	95
Asphalt emulsion (1250 gals/acre)	0.02	98

Fiber matting, excelsior, gravel and stone may also be used as protective cover.

*Percent soil loss reduction as compared with fallow ground.

Table-8 .**(2)****PRACTICE FACTOR P_c OR SURFACE CONDITION FOR CONSTRUCTION SITES**

SURFACE CONDITION WITH NO COVER	FACTOR P_c^*
Compact and smooth, scraped with bulldozer or scraper up and down hill	1.3
Same condition except raked with bulldozer root rake up and down hill	1.2
Compact and smooth, scraped with bulldozer or scraper across the slope	1.2
Same condition except raked with bulldozer root rake across the slope	0.9
Loose as a disced plow layer	1.0
Rough irregular surface equipment tracks in all directions	0.9
Loose with rough surface greater than 12" depth	0.8
Loose with smooth surface greater than 12" depth	0.9

***Values based on estimates**


got SWPPP? **got SWPPP?**

Risk Determination is a Two Step Process:

- First Half of the Risk Determination factor – Sediment Discharge Risk
 - Calculate soil loss using the RUSLE equation
 - **A = (R) (K) (LS) (C) (P)**
- **Second Half** of the Risk Determination factor – Receiving Water Risk
 - Sediment sensitive water; 303(d) listed or TMDL for sediment-related pollutant; or beneficial Uses of COLD, SPAWN, and MIGRATORY

got SWPPP? **got SWPPP?**

Receiving Water Risk Determination:



got SWPPP? **got SWPPP?**

Receiving Water Risk Determination:

COUNTY	AGR	MUN	INDU	CONR	INDU	CONR	INDU	CONR	INDU	CONR	INDU	CONR	INDU	CONR	INDU	CONR	INDU	CONR	INDU	CONR	
SANTA CLARA BASIN																					
Waterbody																					
Barrett Canyon Creek																					
Coyote Creek																					
Lower Penitencia Creek																					
Herreros Creek																					
Upper Penitencia Creek																					
Cherry Flat Reservoir																					
Arroyo Aguirre Creek																					
Haltz Valley Reservoir																					
Silver Creek																					
Tremont Lagoon																					
Sandy Wood Lake																					
Cotton Wood Lake																					
Anderson Lake																					
San Felipe Creek																					
Otis Canyon Creek																					
Coyote Lake																					
Soda Springs Canyon Creek																					

E: Existing beneficial use L: Limited beneficial use P: Potential beneficial use

got SWPPP?

Combined Risk Level Matrix

		Sediment Risk		
		Low	Medium	High
Receiving Water Risk	Low	Level 1	Level 2	
	High	Level 2		Level 3

Project Sediment Risk: Low
 Project RW Risk: High
 Project Combined Risk: Level 2

got SWPPP?

Estimating Gross Erosion


Gross Erosion =
 Sheet and Rill Erosion (RUSLE) + Other Erosion

- Calculate Sheet and Rill Erosion using RUSLE (average annual acre tons)
- Other Erosion is soil loss (annual tons) from gullies, channels, or other areas of concentrated flow.

got SWPPP?


Estimating Gross Erosion

Soil Texture Class	Dry Density (lbs./ft ³)
clay	70 – 95
silty clay, silty clay loam	75 – 100
sandy clay, loam, sandy loam	80 – 105
clay loam, silt loam	85 – 100
sandy clay loam, loamy sand, sand	95 - 110

 **got SWPPP?**


Erosion Prediction Problem #1

- A new residential development is going to be built in Lockeford, California (38.16618, -121.14306)
- The project will disturb 42 acres.
- The project will last from Jan. 1 - Dec. 31, 2015
- The average slope is 2% and the average slope length is 300 feet.
- The entire site will be grubbed and rough graded at the beginning of the project.

 **got SWPPP?**

Erosion Prediction Problem #1

How much soil will be eroded from the entire site during the course of the project?

 **got SWPPP?**

Erosion Prediction Problem #1

RUSLE - Revised Universal Soil Loss Equation ...

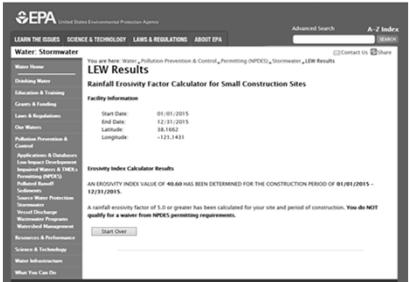
A = (R) (K) (LS) (C) (P)

A = **Average Annual Acre Tons** of soil loss
 R = Rainfall runoff erosivity factor
 K = Soil erodibility factor which represents both susceptibility of soil to erosion and the rate of runoff
 LS = Slope length and steepness function
 C = Cover management factor
 P = Erosion control practice factor

got swppp? got SWPPP?

Erosion Prediction Problem #1

To find R:



The screenshot shows the EPA website interface for a 'Runoff Erosivity Factor Calculator for Small Construction Sites'. It displays 'LEW Results' with the following information:

- Start Date:** 01/01/2015
- End Date:** 12/31/2015
- Latitude:** 38.582
- Longitude:** -121.1431


The calculator results state: "AN EROSIVITY INDEX VALUE OF 40.86 HAS BEEN DETERMINED FOR THE CONSTRUCTION PERIOD OF 01/01/2015 - 12/31/2015." It further notes that a rainfall erosivity factor of 5.0 or greater has been calculated for the site and period of construction, indicating that the site does not qualify for a waiver from NPDES permitting requirements.

got swppp? got SWPPP?

Erosion Prediction Problem #1

To Find K, determine the soil type

- Option 1 – Use the Websoil Survey



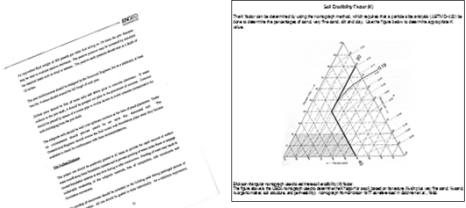
The screenshot shows the USDA Web Soil Survey homepage. It includes a search bar, a 'START WSS' button, and a 'Welcome to Web Soil Survey (WSS)' message. The page is titled 'The simple yet powerful way to access and use soil data.'

got swppp? got SWPPP?

Erosion Prediction Problem #1

To Find K, determine the soil type

- Option 2 – Soils Report and the Erikson Triangle



The image shows a soil report document on the left and an Erikson Triangle diagram on the right. The Erikson Triangle is a ternary plot used in soil science to determine soil texture based on percentages of sand, silt, and clay. It is a large equilateral triangle with smaller lines inside, dividing it into various soil texture classes.


got SWPPP? got **SWPPP?**

Erosion Prediction Problem #1

To Find **K**, look up K Factor rating for that soil

- Option 3 – Use the SMARTS default.

K Factor = 0.37



got SWPPP? got **SWPPP?**

Erosion Prediction Problem #1

To find **LS**: Option 1 – Actual average conditions:

The average slope is 2% and the average slope length is 300 feet

Sheet Flow Length (ft)	0.2	0.5	1.0	2.0	3.0	4.0	5.0
3	0.05	0.07	0.09	0.13	0.17	0.20	0.23
6	0.05	0.07	0.09	0.13	0.17	0.20	0.23
9	0.05	0.07	0.09	0.13	0.17	0.20	0.23
12	0.05	0.07	0.09	0.13	0.17	0.20	0.23
15	0.05	0.07	0.09	0.13	0.17	0.20	0.23
25	0.05	0.07	0.10	0.16	0.21	0.26	0.31
50	0.05	0.08	0.13	0.21	0.30	0.38	0.46
75	0.05	0.08	0.14	0.25	0.36	0.47	0.58
100	0.05	0.09	0.15	0.28	0.41	0.55	0.68
150	0.05	0.09	0.17	0.33	0.50	0.68	0.88
200	0.06	0.10	0.18	0.37	0.57	0.79	1.02
250	0.06	0.10	0.19	0.40	0.64	0.89	1.16
300	0.06	0.10	0.20	0.43	0.69	0.99	1.28
400	0.06	0.11	0.22	0.49	0.80	1.14	1.51
600	0.06	0.12	0.24	0.56	0.98	1.42	1.91
800	0.06	0.12	0.26	0.63	1.10	1.65	2.25
1000	0.06	0.13	0.27	0.69	1.23	1.88	2.55


got SWPPP? got **SWPPP?**


Erosion Prediction Problem #1

To find **LS**: Option 2 – SMARTS default:

The average slope is 2% and the average slope length is 300 feet

LS Factor = 0.41



 **got SWPPP?**


Erosion Prediction Problem #1

Now put it together

A = (R) (K) (LS) (C) (P)

R = 40.60
K = 0.37
LS = 0.41
C = 1.0
P = 1.0

A = ??? average annual acre tons

 **got SWPPP?**

Erosion Prediction Problem #1


Now put it together

A = (R) (K) (LS) (C) (P)

R = 40.60
K = 0.37
LS = 0.41
C = 1.0
P = 1.0

A = 6.16 average annual acre tons

Soil loss for the entire site during the project =
A x 42 acres = 258.7 tons

 **got SWPPP?**

Erosion Prediction Problem #2

How much soil will be eroded from the same site and project if they quickly hydroseed disturbed areas, covering it with blown straw and tackifier and also if they install a sediment basin/trap prior to the project's outfall?

got SWPPP? **got SWPPP?**

Erosion Prediction Problem #2

Find **C** & **P**:
Assume bare soil

Table 1 Erosion Management Factors		
Erosion Control Treatment	C Factor	P Factor
Bare Soil	1.00	1.00
Disked Bare Soil	1.00	0.50
Sediment Basin/Trap	1.00	0.50
Straw Bale Barrier	1.00	0.80
Silt Fence Barrier	1.00	0.50
Asphalt/Concrete Pavement	0.10	1.00
Compacted Gravel Layer	0.05	1.00
Established Native Grass (100% coverage)	0.03	1.00
Sod Grass	0.01	1.00
Agricultural Crop	0.45	1.00
Erosion Control Blankets	0.002 to 0.003	1.00
Turf Reinforcement Mats	0.002 to 0.003	1.00

got SWPPP? **got SWPPP?**

Erosion Prediction Problem #2

Now put it together

A = (R) (K) (LS) (C) (P)

R = 40.60
K = 0.37
LS = 0.41
C = 0.03
P = 0.5

A = ??? average annual acre tons

got SWPPP? **got SWPPP?**

Erosion Prediction Problem #2

Now put it together


A = (R) (K) (LS) (C) (P)

R = 40.60
K = 0.37
LS = 0.41
C = 0.03
P = 0.5

A = 0.09 average annual acre tons


A reduction in erosion of over 254 tons or 98.5%

Soil loss for the entire site during the project =
A x 42 acres = 3.9 tons



got SWPPP?

Questions and Discussion?



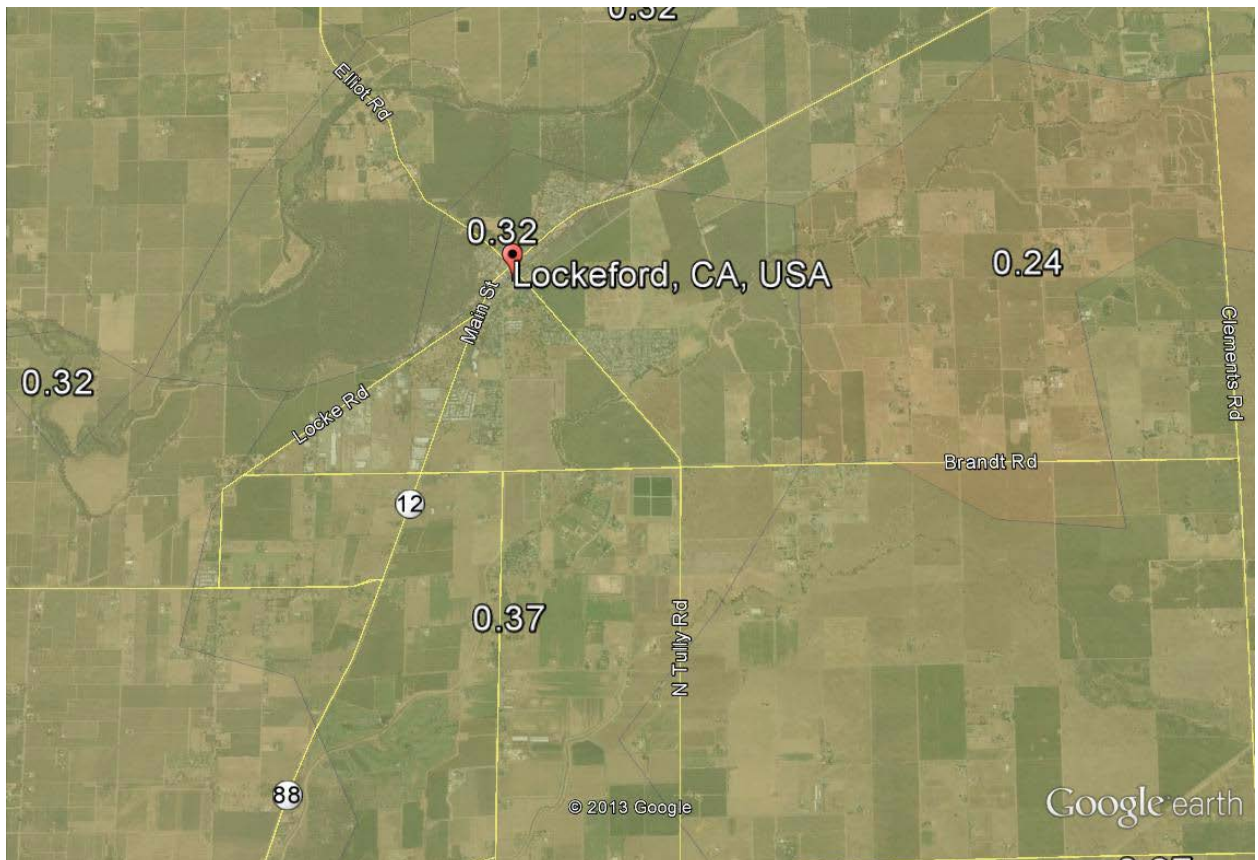
Lockeford Residential Subdivision
Hwy. 88 between Bush St. and View Ln. (38.16618, -121.14306)
Lockeford, CA

Soil Disturbance and Receiving Water Risk (red shaded is High):

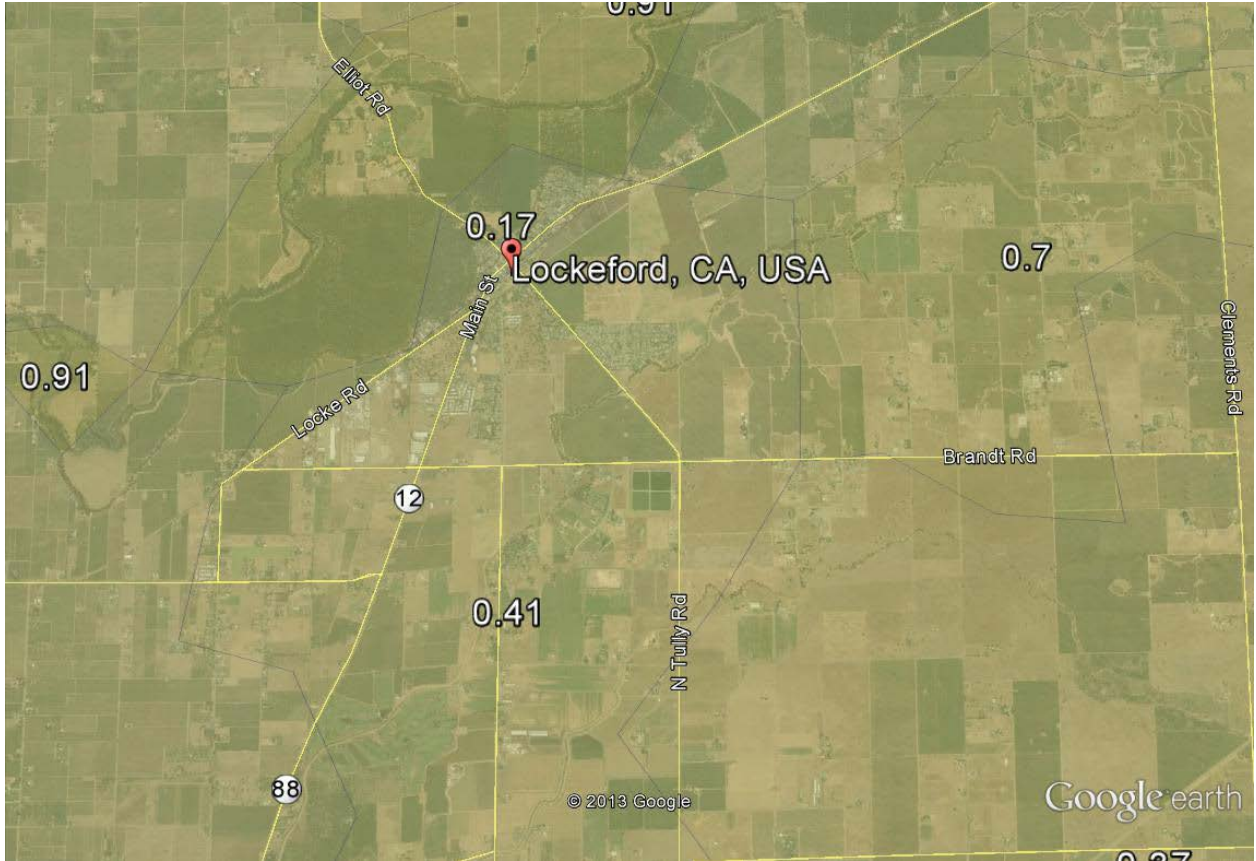
Soil disturbance is 42 acres. The project has a high receiving water risk.



K Factor = 0.37



LS Factor = 0.41



R=40.60

EPA United States Environmental Protection Agency

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LEW Results

Rainfall Erosivity Factor Calculator for Small Construction Sites

Facility Information

Start Date:	01/01/2015
End Date:	12/31/2015
Latitude:	38.1662
Longitude:	-121.1431

Erosivity Index Calculator Results

AN EROSIIVITY INDEX VALUE OF **40.60** HAS BEEN DETERMINED FOR THE CONSTRUCTION PERIOD OF 01/01/2015 – 12/31/2015.

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

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[Water Infrastructure](#)
[What You Can Do](#)

Sediment Risk Determination:

$$\begin{aligned} A &= R * K * LS \\ &= (40.60) * (0.37) * (0.41) \\ &= 6.16 \text{ tons/acre (Low)} \end{aligned}$$

Site Sediment Risk Factor

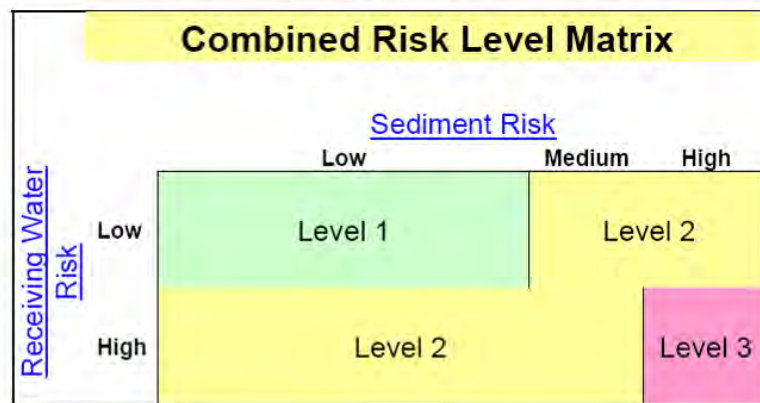
Low Sediment Risk: < 15 tons/acre


Medium Sediment Risk: >=15 and <75 tons/acre

High Sediment Risk: >= 75 tons/acre

Overall Combined Risk Determination:

High Receiving Water Risk + Low Sediment Risk = Risk Level 2






QSD/QSP Training

Module 3

SWPPP Implementation




got SWPPP?

Learning Objectives

To understand:

1. The role of the SWPPP
2. Proper BMP use and installation, by category, for each Risk Level / LUP Type
3. SWPPP Inspections
4. Rain Event Action Plans
5. The difference between Traditional and LUP projects

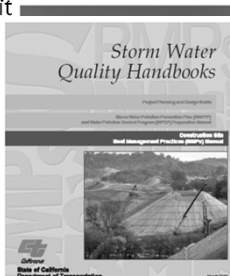



got SWPPP?

Resources

- Construction General Permit (Order 2009-0009-DWQ)
- Attachments A, C, D & E
- CASQA BMP Manual
- Caltrans BMP Manual


Attached
Attached
Attached
Attached
Attached
Attached
Attached
Attached
Attached



 **got SWPPP?**

Acronyms and Glossary

Turn to CGP Appendices 5 & 6

 **got SWPPP?** Order p. 37


SWPPP Requirements

For traditional projects . . .

XIV. SWPPP REQUIREMENTS

A. The discharger shall ensure that the Storm Water Pollution Prevention Plans (SWPPPs) for all traditional project sites are developed and amended or revised by a QSD. The SWPPP shall be designed to address the following objectives:

1. All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity are controlled;
2. Where not otherwise required to be under a Regional Water Board permit, all non-storm water discharges are identified and either eliminated, controlled, or treated;


 **got SWPPP?** Order p. 37

SWPPP Requirements

For traditional projects ...

3. Site BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the BAT/BCT standard;
4. Calculations and design details as well as BMP controls for site run-on are complete and correct, and
5. Stabilization BMPs installed to reduce or eliminate pollutants after construction are completed.

Order p. 37




SWPPP Requirements

For traditional projects . . .

B. To demonstrate compliance with requirements of this General Permit, the QSD shall include information in the SWPPP that supports the conclusions, selections, use, and maintenance of BMPs.

C. The discharger shall make the SWPPP available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Municipal inspector. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, current copies of the BMPs and map/drawing will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone.

Attachment A
p. 28



SWPPP Requirements

For LUP projects:


K. STORM WATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS

1. Objectives

SWPPPs for all LUPs shall be developed and amended or revised by a QSD. The SWPPP shall be designed to address the following objectives:

- All pollutants and their sources, including sources of sediment, associated with construction activities associated with LUP activity are controlled;
- All non-storm water discharges are identified and either eliminated, controlled, or treated;
- BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from LUPs during construction, and
- Stabilization BMPs installed to reduce or eliminate pollutants after construction is completed are effective and maintained.

Attachment A
p. 28




SWPPP Requirements

For LUP projects:

2. SWPPP Implementation Schedule

- LUPs for which PRDs have been submitted to the State Water Board shall develop a site/project location SWPPP prior to the start of land-disturbing activity in accordance with this Section and shall implement the SWPPP concurrently with commencement of soil-disturbing activities.
- For an ongoing LUP involving a change in the LRP, the new LRP shall review the existing SWPPP and amend it, if necessary, or develop a new SWPPP within 15 calendar days to conform to the requirements set forth in this General Permit.


Attachment A
p. 28



SWPPP Requirements
For LUP projects:


3. Availability

The SWPPP shall be available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Municipal inspector. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, copies of the BMPs and map/drawing will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone.



SWPPP Basics - Elements

- Identify the WDID #, author and their credential, and that the LRP has signed the certification statement on the SMARTS system
- Call out BMPs on the plan
- Details of proper installation
- Identify run-on & run-off points for monitoring and inspection
- Provide a custom inspection checklist that meets the appropriate Risk Level / Type requirements



SWPPP Basics - Elements

- For Risk/Type 2 & 3 projects, the REAPs must be included in the SWPPP
- The SWPPP is a living document that is amended to reflect current conditions and pollutants. All amendments and updates are to be made in the SWPPP by a QSD.

got swPPP? got SWPPP?

SWPPP Basics - Strategies

In order of descending priority

- Prevent storm water from flowing across the construction site (run-on diversion)
- Protect disturbed soil areas (DSAs) from erosion
- Minimize sediment in storm water before it discharges
- Prevent storm water from coming into contact with other pollutants
- Prevent non-storm water discharges

got swPPP? got SWPPP?


SWPPP Basics – Site Planning

- Minimize disturbance & maximize natural features
- Preserve existing vegetation
- Clearing limits and buffer zones
- Protect trees and Environmentally Sensitive Areas (ESAs)
- Scheduling and sequencing; try to perform grading during dry weather

got swPPP? got SWPPP?


BMP Implementation & Maintenance

Traditional Risk Level	Location of Requirements	LUP Type	Location of Requirements
Risk Level 1	Attachment C	Type 1	Attachment A p. 20 - 27
Risk Level 2	Attachment D	Type 2	Attachment A p. 20 - 27
Risk Level 3	Attachment E	Type 3	Attachment A p. 20 - 27

 **got SWPPP?**

BMP Implementation & Maintenance


We will be noting the differences between **Traditional** and **LUP** projects. The first difference is traditional projects have only one risk level (i.e. Risk Level 2), but LUP projects may have multiple types (i.e. Type 1 in one watershed and Type 3 in another watershed.)

 **got SWPPP?**

BMP Implementation & Maintenance

The CGP identifies 5 different BMP categories:

1. Good Site Management – “Housekeeping”
2. Non-Storm Water Management
3. Erosion Control
4. Sediment Control
5. Run-on / Run-off Controls

 **got SWPPP?**

BMP Implementation & Maintenance

Risk Level & Type Level 1

Please turn to Attachment C of your CGP copy.

Construction General Permit



Conduct an inventory of the products used and/or expected to be used and the end products that are produced and/or expected to be produced.

1. The quantity, physical characteristics (e.g., liquid, powder, solid), and locations of each potential pollutant source handled, produced, stored, recycled, or disposed of at the site
2. The degree to which pollutants associated with those materials may be exposed to and mobilized by contact with stormwater
3. The direct and indirect pathways that pollutants may be exposed to stormwater or authorized non-stormwater discharges
4. The effectiveness of BMPs to reduce or prevent pollutants in stormwater discharges and authorized non-stormwater discharges.

Construction General Permit



Cover and berm loose stockpiled construction materials that are not actively being used (i.e. soil, spoils, aggregate, fly-ash, stucco, hydrated lime, etc.).



Construction General Permit




Store chemicals in watertight containers (with appropriate secondary containment to prevent any spillage or leakage).







Construction General Permit 


Minimize exposure of construction materials to precipitation.






Construction General Permit 

Implement BMPs to prevent the off-site tracking of loose construction and landscape materials.



Construction General Permit 


Prevent disposal of any rinse or wash waters or materials on impervious or pervious site surfaces or into the storm drain system.






Construction General Permit 

Ensure the containment of sanitation facilities. Clean or replace sanitation facilities and inspect them regularly for leaks and spills.



Construction General Permit 

Cover waste disposal containers at the end of every business day and during a rain event. Prevent discharges from waste disposal containers to the storm water drainage system or receiving water.




Construction General Permit 

Contain and securely protect stockpiled waste material from wind and rain at all times unless actively being used.



Construction General Permit



Implement procedures that effectively address hazardous and nonhazardous spills.

Spill Prevention and Control Measures – (CASQA Sheet WM-4) Spill prevention and control will minimize and/or eliminate the potential discharge of hazardous and non-hazardous materials into the storm drains.


Cleanup
Clean up leaks and spills immediately.

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.

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.

Significant/Hazardous Spills
For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:


Construction General Permit






Develop a spill response and implementation element of the SWPPP prior to commencement of construction activities. The SWPPP shall require that:

Spill Prevention and Response BMPs				
Best Management Practices	CASQA Detail Sheet	Scheduled Implementation	Type of Maintenance	Responsible Person
Train all employees and subcontractors on correct spill prevention and control methods.	WM-4	During construction	Monthly tailgate meetings	QSP
Assign responsible individuals to oversee proper spill response.	WM-4	Prior to construction	On-going	QSP
Store and register absorbents and/or spill kits onsite and have them readily accessible.	WM-4	During construction	As needed	QSP
In the event of a spill, first protect the storm drains; clean up spills quickly, and dispose of used absorbent or absorbent materials properly.	WM-4	During construction	During spill event	QSP
Never wash down or bury chemical, fuel, or building material spills. Clean promptly and dispose of properly.	WM-4	During construction	After spill event	QSP
In the event of a large spill of hazardous materials call 911.	WM-4	During construction	After spill event	QSP


Construction General Permit







Equipment and materials for cleanup of spills shall be available on site and that spills and leaks shall be cleaned up immediately and disposed of properly; and appropriate spill response personnel are assigned and trained.


Construction General Permit






Ensure the containment of concrete washout areas and other washout areas that may contain additional pollutants so there is no discharge into the underlying soil and onto the surrounding areas.




Construction General Permit



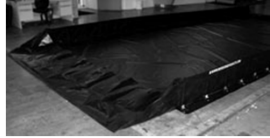

Prevent oil, grease, or fuel to leak in to the ground, storm drains or surface waters.



Construction General Permit

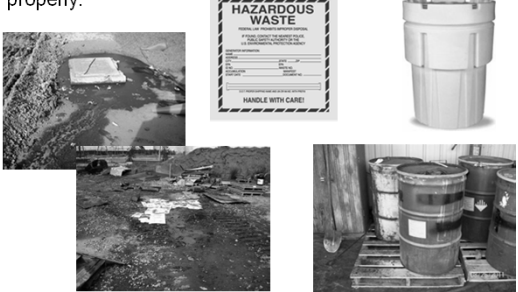


Place all equipment or vehicles, which are to be fueled, maintained and stored in a designated area fitted with appropriate BMPs.



Construction General Permit


Clean leaks immediately and dispose of leaked materials properly.



The collage includes: a spill of liquid on a paved surface; a rectangular label with 'HAZARDOUS WASTE' and other text; a white plastic bucket; and several metal drums stacked on a wooden pallet.

Construction General Permit

Contain stockpiled materials such as mulches and topsoil when they are not actively being used. Contain fertilizers and other landscape materials when they are not actively being used.



The images show two large, conical piles of dark material (mulch or topsoil) completely covered with clear plastic sheeting to prevent erosion.

Construction General Permit

Stack erodible landscape material on pallets and covering or storing such materials when not being used or applied.



The images show: stacks of landscape material (possibly mulch) neatly stacked on wooden pallets; and a large pile of material covered with plastic sheeting.

Construction General Permit



Conduct an assessment and create a list of potential pollutant sources and identify any areas of the site where additional BMPs are necessary to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges.

Construction General Permit



Potential Construction Site Pollutant Sources

The following is a list of potential construction materials that will be used and activities that will be performed that have the potential to contribute pollutants, other than sediment, to storm water runoff. Control practices for each activity are identified in the narrative of the Erosion and Sediment Control Plan.

- Interior demolition
- Interior construction
- Framing
- Vehicle fluids, including oil, grease, petroleum products, and coolants
- Sanitary facilities
- Stockpiling
- Material use
- Material delivery and storage
- Concrete paving
- Concrete curing / finishing products
- Concrete waste management
- Hazardous waste management
- Solid waste management

Construction General Permit



Implement good housekeeping measures on the construction site to control the air deposition of site materials and from site operations.



Construction General Permit Non-Storm Water Management



Implement measures to control all non-stormwater discharges during construction.

- vehicle and equipment wash water, including concrete washout water;
- slurries from concrete cutting and coring operations, PCC grinding or asphalt concrete (AC) grinding operations;
- slurries from concrete or mortar mixing operations;
- blast residue from high-pressure washing of structures or surfaces;
- wash water from cleaning painting equipment;
- runoff from dust control applications of water or dust palliatives;
- sanitary and septic wastes; and
- chemical leaks and/or spills of any kind including but not limited to petroleum, paints, cure compounds.

Examples of common construction activities that may result in non-stormwater discharges on a project are:

- vehicle and equipment cleaning, fueling and maintenance; surface water diversions;
- dewatering operations; saw-cutting; drilling; boring; AC and PCC grinding; AC and PCC recycling; concrete mixing; washout of concrete equipment; crushing; bridge cleaning;
- blasting; painting; hydro-demolition; mortar mixing; and air-blown mortar.

Construction General Permit Erosion Control



Implement effective wind erosion control.



Construction General Permit



Provide effective soil cover for inactive areas and all finished slopes, open space, utility backfill, and completed lots.



Construction General Permit
Sediment Controls



Establish and maintain effective perimeter controls and stabilize all construction entrances and exits to sufficiently control erosion and sediment discharges from the site.








Construction General Permit
Sediment Controls



Perimeter Control Options:

1. Silt Fence
2. Fiber Roll
3. Compost Sock
4. Curb Cutback



Construction General Permit
Sediment Controls



Silt Fence:

1. How to install
2. How to inspect
3. How to maintain



Construction General Permit
Sediment Controls

Fiber Rolls:

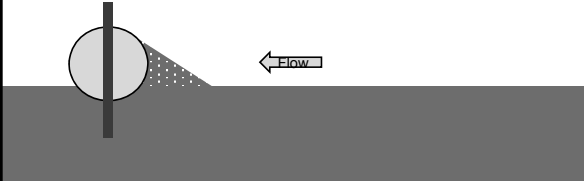
1. How to install
2. How to inspect
3. How to maintain



Construction General Permit
Sediment Controls

Fiber Rolls vs. Compost Socks:

Fiber Roll



Construction General Permit
Sediment Controls

Fiber Rolls vs. Compost Socks:

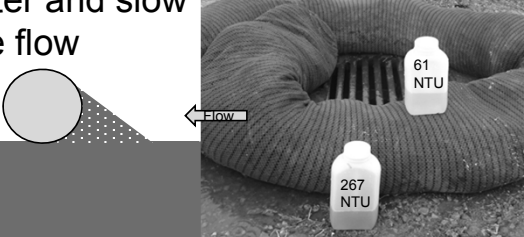
Compost Sock



Construction General Permit
Sediment Controls

Fiber Rolls vs. Compost Socks:

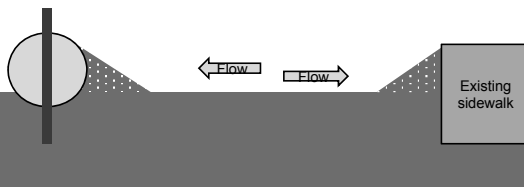
Compost Socks
Filter and slow the flow



Construction General Permit
Sediment Controls

Fiber Rolls vs. Curb Cutback:

Fiber Roll **Curb Cutback**



Construction General Permit
Sediment Controls

Chain Link Perimeter Control? Not Recommended!



got SWPPP?

BMP Implementation & Maintenance

Risk Level / Type 1 Differences		
Area of difference		LUP Type
Fueling of vehicles	Must be performed within a "designated area fitted with appropriate BMPs".	Is not required to be done within a designated area, but still must have appropriate BMPs.
Manage run-on and run-off	Must effectively manage all run-on and run-off	Only need to manage run-on and run-off if visual inspections show that it is needed.
Routine inspections	Perform and document weekly inspections	Perform daily inspection, but no need to document.


got SWPPP?

BMP Implementation & Maintenance


Risk Level & Type Level 2

Please turn to Attachment D of your CGP copy.


Construction General Permit




Risk Level 2 dischargers shall implement appropriate erosion control BMPs (runoff control and soil stabilization) in conjunction with sediment control BMPs for areas under active construction.


Construction General Permit 


Risk Level 2 dischargers shall provide effective soil covers, linear controls, and erosion controls for inactive areas and all finished slopes, open space, utility backfill, and completed lots.




Construction General Permit 


Risk Level 2 dischargers shall ensure that construction activity traffic to and from the project is limited to entrances and exits that employ effective controls to prevent offsite tracking of sediment.




Construction General Permit 

Risk Level 2 dischargers shall ensure that all storm drain inlets and perimeter controls, runoff control BMPs, and pollutant controls at entrances and exits (e.g. tire wash off locations) are maintained and protected from activities that reduce their effectiveness.



Construction General Permit 

Risk Level 2 dischargers shall inspect on a daily basis all immediate access roads daily. At a minimum daily (when necessary) and prior to any rain event, the discharger shall remove any sediment or other construction activity related materials that are deposited on the roads (by vacuuming or sweeping).



got SWPPP? got SWPPP?

BMP Implementation & Maintenance

Risk Level / Type 2 & 3 Differences		
Area of difference	Traditional Projects	LUP Type
Rain Event Action Plans	Need to prepare and document REAPs	Not required of Types 1, 2, and 3
Erosion control for active areas	Implement appropriate erosion control in conjunction with sediment controls for active areas	Only inactive areas are required to have erosion control


got SWPPP? got SWPPP?

BMP Implementation & Maintenance

Risk Level & Type Level 3

Please turn to Attachment E of your CGP copy.

Attachment D
p. 6-7




Inspection, Maintenance & Repair
For traditional projects (same for all Levels) . . .

G. Inspection, Maintenance and Repair

1. Risk Level 2 dischargers shall ensure that all inspection, maintenance repair and sampling activities at the project location shall be performed or supervised by a Qualified SWPPP Practitioner (QSP) representing the discharger. The QSP may delegate any or all of these activities to an employee appropriately trained to do the task(s).
2. Risk Level 2 dischargers shall perform weekly inspections and observations, and at least once each 24-hour period during extended storm events, to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Inspectors shall be the QSP or be trained by the QSP.
3. Upon identifying failures or other shortcomings, as directed by the QSP, Risk Level 2 dischargers shall begin implementing repairs or design changes to BMPs within 72 hours of identification and complete the changes as soon as possible.


Attachment D
p. 6-7



Inspection, Maintenance & Repair
For traditional projects (same for all Levels) . . .

4. For each inspection required, Risk Level 2 dischargers shall complete an inspection checklist, using a form provided by the State Water Board or Regional Water Board or in an alternative format.
5. Risk Level 2 dischargers shall ensure that checklists shall remain onsite with the SWPPP and at a minimum, shall include:
 - a. Inspection date and date the inspection report was written.
 - b. Weather information, including presence or absence of precipitation, estimate of beginning of qualifying storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall in inches.
 - c. Site information, including stage of construction, activities completed, and approximate area of the site exposed.


Attachment D
p. 6-7



Inspection, Maintenance & Repair
For traditional projects (same for all Levels) . . .

- d. A description of any BMPs evaluated and any deficiencies noted.
- e. If the construction site is safely accessible during inclement weather, list the observations of all BMPs: erosion controls, sediment controls, chemical and waste controls, and non-storm water controls. Otherwise, list the results of visual inspections at all relevant outfalls, discharge points, downstream locations and any projected maintenance activities.
- f. Report the presence of noticeable odors or of any visible sheen on the surface of any discharges.
- g. Any corrective actions required, including any necessary changes to the SWPPP and the associated implementation dates.
- h. Photographs taken during the inspection, if any.
- i. Inspector's name, title, and signature.

Attachment A
p. 26-27




Inspection, Maintenance & Repair

For LUP projects . . .

7. Inspection, Maintenance and Repair

- a. All inspection, maintenance repair and sampling activities at the discharger's LUP location shall be performed or supervised by a QSP representing the discharger. The QSP may delegate any or all of these activities to an employee trained to do the task(s) appropriately, but shall ensure adequate deployment.
- b. LUP dischargers shall conduct visual inspections and observations daily during working hours (not recorded). At least once each 24-hour period during extended storm events, **LUP Type 2 & 3 dischargers** shall conduct visual inspections to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Inspectors shall be the QSP or be trained by the QSP.

Attachment A
p. 26-27




Inspection, Maintenance & Repair

For LUP projects . . .

- c. Upon identifying failures or other shortcomings, as directed by the QSP, LUP dischargers shall begin implementing repairs or design changes to BMPs within 72 hours of identification and complete the changes as soon as possible.
- d. For each pre- and post-rain event inspection required, LUP dischargers shall complete an inspection checklist, using a form provided by the State Water Board or Regional Water Board or in an alternative format that includes the information described below.
- e. The LUP discharger shall ensure that the checklist remains on-site or with the SWPPP. At a minimum, an inspection checklist should include:
 - i. Inspection date and date the inspection report was written.
 - ii. Weather information, including presence or absence of precipitation, estimate of beginning of qualifying storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall in inches.

Attachment A
p. 26-27



Inspection, Maintenance & Repair


For LUP projects . . .

- iii. Site information, including stage of construction, activities completed, and approximate area of the site exposed.
- iv. A description of any BMPs evaluated and any deficiencies noted.
- v. If the construction site is safely accessible during inclement weather, list the observations of all BMPs: erosion controls, sediment controls, chemical and waste controls, and non-storm water controls. Otherwise, list the results of visual inspections at all relevant outfalls, discharge points, downstream locations and any projected maintenance activities.
- vi. Report the presence of noticeable odors or of any visible sheen on the surface of any discharges.
- vii. Any corrective actions required, including any necessary changes to the SWPPP and the associated implementation dates.
- viii. Photographs taken during the inspection, if any.
- ix. Inspector's name, title, and signature.

got swppp? got SWPPP?

Types of Inspections / Observations:

- Baseline (initial) & Weekly
- Pre-storm
- During-storm
- Post-storm
- Quarterly Non-Storm Water



I. Risk Level 2 Monitoring and Reporting Requirements


Risk Level	Visual Inspections				Sample Collection
	Quarterly Non-storm Water Discharge	Pre-storm	Event Storm BMP	Post Storm Discharge	
2	X	X	X	X	X



got swppp? got SWPPP?

Rain Event Action Plan


- Required of Risk Levels 2 & 3, not LUPs
- QSP must develop a REAP 48 hours prior to any likely precipitation event. A likely precipitation event is any weather pattern that is forecast to have a 50% or greater probability of producing precipitation in the project area. The QSP must obtain a printed copy of precipitation forecast information from the National Weather Service Forecast Office entering the zip code of the project's location at <http://www.srh.noaa.gov/forecast>



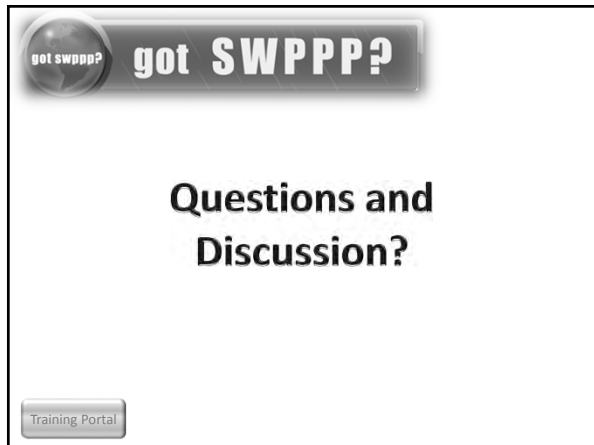

got swppp? got SWPPP?

Rain Event Action Plan

- Must be in place 24 hours before storm event
- Must be done during all phases of the construction project
- Required for inactive sites
- List activities associated with that phase
- List trades which are active
- List contractor / sub-contractor information and emergency contact information
- List preventative action needed
- Keep REAP copies in the SWPPP





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"/> Before predicted rain	<input type="checkbox"/> During rain event	<input type="checkbox"/> Following qualifying rain event	<input type="checkbox"/> Contained stormwater release	<input type="checkbox"/> Quarterly non-stormwater
Site Information						
Construction Site Name:						
Construction stage and completed activities:					Approximate area of exposed site:	
Weather and Observations						
Date Rain Predicted to Occur:				Predicted % chance of rain:		
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:	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Photo Reference IDs:			
Corrective Actions Identified (note if SWPPP/REAP change is needed)						
Inspector Information						
Inspector Name:				Inspector Title:		
Signature:					Date:	

Risk Level 2 Effluent Sampling Field Log Sheets			
Construction Site Name:		Date:	Time Start:
Sampler:			
Sampling Event Type:	<input type="checkbox"/> Stormwater	<input type="checkbox"/> Non-stormwater	<input type="checkbox"/> Non-visible pollutant
Field Meter Calibration			
pH Meter ID No./Desc.:		Turbidity Meter ID No./Desc.:	
Calibration Date/Time:		Calibration Date/Time:	
Field pH and Turbidity Measurements			
Discharge Location Description	pH	Turbidity	Time
Grab Samples Collected			
Discharge Location Description	Sample Type		Time
Additional Sampling Notes:			
Time End:			

Risk Level 3 Effluent Sampling Field Log Sheets				
Construction Site Name:		Date:	Time Start:	
Sampler:				
Sampling Event Type:	<input type="checkbox"/> Stormwater	<input type="checkbox"/> Non-stormwater	<input type="checkbox"/> Non-visible pollutant	<input type="checkbox"/> Post NEL Exceedance
Field Meter Calibration				
pH Meter ID No./Desc.:		Turbidity Meter ID No./Desc.:		
Calibration Date/Time:		Calibration Date/Time:		
Field pH and Turbidity Measurements				
Discharge Location Description	pH	Turbidity	Time	
Grab Samples Collected				
Discharge Location Description	SSC	Other (specify)	Time	
Additional Sampling Notes:				
Time End:				

Risk Level 3 Receiving Water Sampling Field Log Sheets			
Construction Site Name:		Date:	Time Start:
Sampler:			
Receiving Water Description and Observations			
Receiving Water Name/ID:			
Observations:			
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"/>	
Field Meter Calibration			
pH Meter ID No./Desc.:		Turbidity Meter ID No./Desc.:	
Calibration Date/Time:		Calibration Date/Time:	
Field pH and Turbidity Measurements and SSC Grab Sample			
Upstream Location			
Type	Result	Time	Notes
pH			
Turbidity			
SSC	Collected Yes <input type="checkbox"/> No <input type="checkbox"/>		
Downstream Location			
Type	Result	Time	Notes
pH			
Turbidity			
SSC	Collected Yes <input type="checkbox"/> No <input type="checkbox"/>		
Additional Sampling Notes:			
Time End:			

Rain Event Action Plan (REAP)

Date:		WDID Number:	
Date Rain Predicted to Occur:		Predicted % chance of rain:	

Site Information:

Site Name, City and Zip Code _____ Project Risk Level: Risk Level 2 Risk Level 3

Site Stormwater Manager Information:

Name, Company, Emergency Phone Number (24/7) _____

Erosion and Sediment Control Contractor – Labor Force contracted for the site:

Name, Company, Emergency Phone Number (24/7) _____

Stormwater Sampling Agent:

Name, Company, Emergency Phone Number (24/7) _____

Current Phase of Construction

Check ALL the boxes below that apply to your site.

- | | | |
|---|---|--|
| <input type="checkbox"/> Grading and Land Development | <input type="checkbox"/> Vertical Construction | <input type="checkbox"/> Inactive Site |
| <input type="checkbox"/> Streets and Utilities | <input type="checkbox"/> Final Landscaping and Site Stabilization | <input type="checkbox"/> Other: |

Activities Associated with Current Phase(s)

Check ALL the boxes below that apply to your site (some apply to all Phases).

Grading and Land Development:

- | | | |
|---|--|---|
| <input type="checkbox"/> Demolition | <input type="checkbox"/> Vegetation Removal | <input type="checkbox"/> Vegetation Salvage-Harvest |
| <input type="checkbox"/> Rough Grade | <input type="checkbox"/> Finish Grade | <input type="checkbox"/> Blasting |
| <input type="checkbox"/> Soil Amendment(s): | <input type="checkbox"/> Excavation (_____ ft) | <input type="checkbox"/> Soils Testing |
| <input type="checkbox"/> Rock Crushing | <input type="checkbox"/> Erosion and Sediment Control | <input type="checkbox"/> Surveying |
| <input type="checkbox"/> Equip. Maintenance/Fueling | <input type="checkbox"/> Material Delivery and Storage | <input type="checkbox"/> Other: |

Streets and Utilities:

- | | | |
|--|---|--|
| <input type="checkbox"/> Finish Grade | <input type="checkbox"/> Utility Install: water-sewer-gas | <input type="checkbox"/> Paving Operations |
| <input type="checkbox"/> Equip. Maintenance/Fueling | <input type="checkbox"/> Storm Drain Installation | <input type="checkbox"/> Material Delivery & Storage |
| <input type="checkbox"/> Curb and Gutter/Concrete Pour | <input type="checkbox"/> Masonry | <input type="checkbox"/> Other: |

Vertical Construction:

- | | | |
|---|-------------------------------------|--|
| <input type="checkbox"/> Framing | <input type="checkbox"/> Carpentry | <input type="checkbox"/> Concrete/Forms/Foundation |
| <input type="checkbox"/> Masonry | <input type="checkbox"/> Electrical | <input type="checkbox"/> Painting |
| <input type="checkbox"/> Drywall/Interior Walls | <input type="checkbox"/> Plumbing | <input type="checkbox"/> Stucco |
| <input type="checkbox"/> Equip. Maintenance/Fueling | <input type="checkbox"/> HVAC | <input type="checkbox"/> Tile |
| <input type="checkbox"/> Exterior Siding | <input type="checkbox"/> Insulation | <input type="checkbox"/> Landscaping & Irrigation |
| <input type="checkbox"/> Flooring | <input type="checkbox"/> Roofing | <input type="checkbox"/> Other: |

Final Landscaping & Site Stabilization:

- | | | |
|--|---|--|
| <input type="checkbox"/> Stabilization | <input type="checkbox"/> Vegetation Establishment | <input type="checkbox"/> E&S Control BMP Removal |
| <input type="checkbox"/> Finish Grade | <input type="checkbox"/> Storage Yard/ Material Removal | <input type="checkbox"/> Landscape Installation |
| <input type="checkbox"/> Painting and Touch-Up | <input type="checkbox"/> Irrigation System Testing | <input type="checkbox"/> Other: |
| <input type="checkbox"/> Drainage Inlet Stencils | <input type="checkbox"/> Inlet Filtration | <input type="checkbox"/> Perm. Water Quality Ponds |
| <input type="checkbox"/> Other: | <input type="checkbox"/> Other: | <input type="checkbox"/> Other: |

Inactive Construction Site:

- | | | |
|--|--|--|
| <input type="checkbox"/> E & S Control Device Installation | <input type="checkbox"/> Routine Site Inspection | <input type="checkbox"/> Trash Removal |
| <input type="checkbox"/> E & S Control Device Maintenance | <input type="checkbox"/> Street Sweeping | <input type="checkbox"/> Other: |

Rain Event Action Plan (REAP)

Date:		WDID Number:	
--------------	--	---------------------	--

Trades Active on Site during Current Phase(s)

Check ALL the boxes below that apply to your site

- | | | |
|--|---|---|
| <input type="checkbox"/> Storm Drain Improvement | <input type="checkbox"/> Grading Contractor | <input type="checkbox"/> Surveyor- Soil Technician |
| <input type="checkbox"/> Street Improvements | <input type="checkbox"/> Water Pipe Installation | <input type="checkbox"/> Sanitary Station Provider |
| <input type="checkbox"/> Material Delivery | <input type="checkbox"/> Sewer Pipe Installation | <input type="checkbox"/> Electrical |
| <input type="checkbox"/> Trenching | <input type="checkbox"/> Gas Pipe Installation | <input type="checkbox"/> Carpentry |
| <input type="checkbox"/> Concrete Pouring | <input type="checkbox"/> Electrical Installation | <input type="checkbox"/> Plumbing |
| <input type="checkbox"/> Foundation | <input type="checkbox"/> Communication Installation | <input type="checkbox"/> Masonry |
| <input type="checkbox"/> Demolition | <input type="checkbox"/> Erosion and Sediment Control | <input type="checkbox"/> Water, Sewer, Electric Utilities |
| <input type="checkbox"/> Material Delivery | <input type="checkbox"/> Equipment Fueling/Maintenance | <input type="checkbox"/> Rock Products |
| <input type="checkbox"/> Tile Work- Flooring | <input type="checkbox"/> Utilities, e.g., Sewer, Electric | <input type="checkbox"/> Painters |
| <input type="checkbox"/> Drywall | <input type="checkbox"/> Roofers | <input type="checkbox"/> Carpenters |
| <input type="checkbox"/> HVAC installers | <input type="checkbox"/> Stucco | <input type="checkbox"/> Pest Control: e.g., termite prevention |
| <input type="checkbox"/> Exterior Siding | <input type="checkbox"/> Masons | <input type="checkbox"/> Water Feature Installation |
| <input type="checkbox"/> Insulation | <input type="checkbox"/> Landscapers | <input type="checkbox"/> Utility Line Testers |
| <input type="checkbox"/> Fireproofing | <input type="checkbox"/> Riggers | <input type="checkbox"/> Irrigation System Installation |
| <input type="checkbox"/> Steel Systems | <input type="checkbox"/> Utility Line Testers | <input type="checkbox"/> Other: |

Trade Contractor Information Provided

Check ALL the boxes below that apply to your site.

- | | | |
|---|--|--|
| <input type="checkbox"/> Educational Material Handout | <input type="checkbox"/> Tailgate Meetings | <input type="checkbox"/> Training Workshop |
| <input type="checkbox"/> Contractual Language | <input type="checkbox"/> Fines and Penalties | <input type="checkbox"/> Signage |
| <input type="checkbox"/> Other: | <input type="checkbox"/> Other: | <input type="checkbox"/> Other: |

Continued on next page.

Rain Event Action Plan (REAP)

Date of REAP

WDID Number:

Date Rain Predicted to Occur:

Predicted % chance of rain:

Predicted Rain Event Triggered Actions

Below is a list of suggested actions and items to review for this project. Each active Trade should check all material storage areas, stockpiles, waste management areas, vehicle and equipment storage and maintenance, areas of active soil disturbance, and areas of active work to ensure the proper implementation of BMPs. Project-wide BMPs should be checked and cross-referenced to the BMP progress map.

Trade or Activity	Suggested action(s) to perform / item(s) to review prior to rain event
<input type="checkbox"/> Information & Scheduling	<input type="checkbox"/> Inform trade supervisors of predicted rain <input type="checkbox"/> Check scheduled activities and reschedule as needed <input type="checkbox"/> Alert erosion/sediment control provider <input type="checkbox"/> Alert sample collection contractor (if applicable) <input type="checkbox"/> Schedule staff for extended rain inspections (including weekends & holidays) <input type="checkbox"/> Check Erosion and Sediment Control (ESC) material stock <input type="checkbox"/> Review BMP progress map <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<input type="checkbox"/> Material storage areas	<input type="checkbox"/> Material under cover or in sheds (ex: treated woods and metals) <input type="checkbox"/> Perimeter control around stockpiles <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<input type="checkbox"/> Waste management areas	<input type="checkbox"/> Dumpsters closed <input type="checkbox"/> Drain holes plugged <input type="checkbox"/> Recycling bins covered <input type="checkbox"/> Sanitary stations bermed and protected from tipping <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<input type="checkbox"/> Trade operations	<input type="checkbox"/> Exterior operations shut down for event (e.g., no concrete pours or paving) <input type="checkbox"/> Soil treatments (e.g., fertilizer) ceased within 24 hours of event <input type="checkbox"/> Materials and equipment (ex: tools) properly stored and covered <input type="checkbox"/> Waste and debris disposed in covered dumpsters or removed from site <input type="checkbox"/> Trenches and excavations protected <input type="checkbox"/> Perimeter controls around disturbed areas <input type="checkbox"/> Fueling and repair areas covered and bermed <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<input type="checkbox"/> Site ESC BMPs	<input type="checkbox"/> Adequate capacity in sediment basins and traps <input type="checkbox"/> Site perimeter controls in place <input type="checkbox"/> Catch basin and drop inlet protection in place and cleaned <input type="checkbox"/> Temporary erosion controls deployed <input type="checkbox"/> Temporary perimeter controls deployed around disturbed areas and stockpiles <input type="checkbox"/> Roads swept; site ingress and egress points stabilized <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<input type="checkbox"/> Concrete rinse out area	<input type="checkbox"/> Adequate capacity for rain <input type="checkbox"/> Wash-out bins covered <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<input type="checkbox"/> Spill and drips	<input type="checkbox"/> All incident spills and drips, including paint, stucco, fuel, and oil cleaned <input type="checkbox"/> Drip pans emptied <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____

Continued on next page.

Other / Discussion /
Diagrams

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

Attach a printout of the weather forecast from the NOAA website to the REAP.


I certify under penalty of law that this Rain Event Action Plan (REAP) will be performed in accordance with the General Permit by me or under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ Date: _____
Qualified SWPPP Practitioner (Use ink please)



QSD/QSP Training


Module 4
Construction Site Monitoring



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Learning Objectives

1. To understand the various monitoring activities required by the CGP.
2. Provide QSDs with the information needed to establish a compliant and effective monitoring program.
3. To help QSPs understand their role in site monitoring and documentation.



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Module Organization

Part 1 – Active Treatment Systems
(9:30 – 10:30 AM)

Part 2 – Inspections and Monitoring Requirements (10:45 – 12:15 PM)

Part 3 – Instruments and Analysis
(1:15 to 2:15 PM)

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Active Treatment Systems

Notes:

- Sometimes you will see the term Advanced Treatment Systems, they are the same terms.
- This course does not meet the 40-hour certification detailed in Attachment F of the permit.

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What is an ATS?

- An ATS is **any** “treatment system that employs chemical coagulation, chemical flocculation, or electrocoagulation in order to reduce turbidity caused by fine suspended sediment.

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What is an ATS?

- Typical systems include pumps, tanks, filters, polymers, instrumentation, valves, pipe, and hoses.



got swPPP? **got SWPPP?**

What is an ATS?

- Even this is an ATS. However, as shown, it is not compliant with Attachment F.

Flow
The light, oily and sediment composite of stormwater runoff is held and contained in the tank. The tank is designed to separate the oil and sediment from the water. The tank is designed to separate the oil and sediment from the water. The tank is designed to separate the oil and sediment from the water.

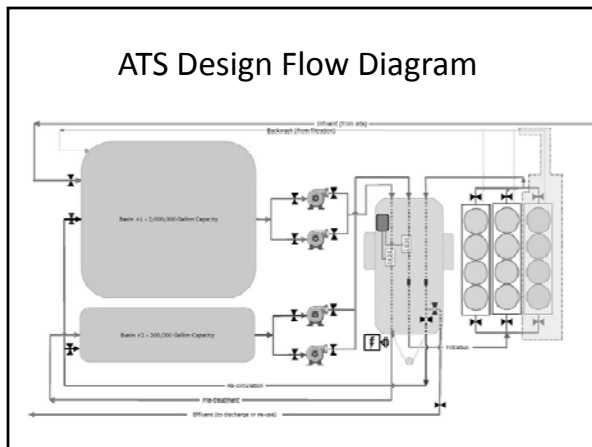
Filtration
Thermally Felted™ wood utilizes its natural properties to create the fibers designed to separate surface oils and water retention. These materials are designed to separate surface oils and water retention. These materials are designed to separate surface oils and water retention.

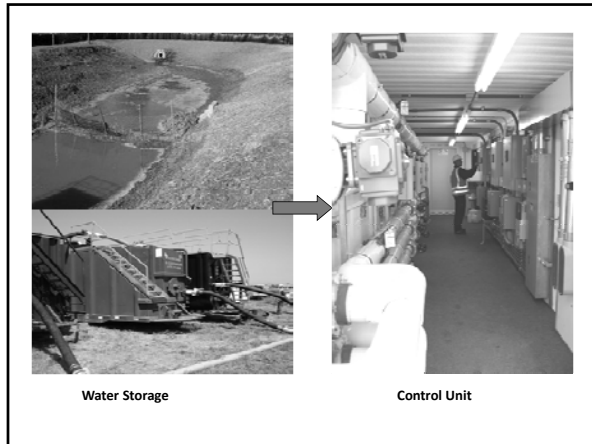
Flocculation
Integrated flocculants are directly dissolved and released by the flow energy of water flowing through the tank. This flow through porous particles is a superior pollution control system to most sedimentation systems. The flocculation tank with integrated particles provides complete and appropriate. The tank is designed to separate the oil and sediment from the water.

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ATS Treatment Technologies

- Chemical Coagulation / Flocculation
- Filtration
- Polishing / Absorbing
- pH adjustments





got swPPP? **got SWPPP?** Attachment F

ATS Permit Requirements

Let's review the permit language.

Type of Activity	Permitting Authority	Permitting Process	Permitting Fee	Permitting Agency
Construction	State	Permitting	Yes	State
Manufacturing	State	Permitting	Yes	State
Storage	State	Permitting	Yes	State
Transportation	State	Permitting	Yes	State
Other	State	Permitting	Yes	State

1. Introduction

2. Purpose

3. Scope

4. Definitions

5. Requirements

6. Enforcement

7. Other

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ATS Guidelines

- ATS are used in conjunction with traditional BMPs.
- ATS are not “stand alone” technologies.
- Very high contaminate loads add complexity, cost, and risk of non-compliance.
- ATS are modular in design and can be sized to meet the needs of your project.
- ATS are subject to Attachment F in the CGP.

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ATS Professional Requirements

- The ATS must be designed by someone with one of the following professional certifications: CPESC, CPSWQ, or a California PE.
- The lead person who installs and operates the ATS must have 5 years of construction storm water experience or hold a Class A contractors license.

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ATS Professional Requirements

- A California State certified laboratory must validate any field tests for residual chemicals.
- ATS operators are required to have attended a certificate training course which includes a minimum of 8 hours classroom time and 32 hours of field training.
- A QSP must perform all inspections, monitoring, testing, and recordkeeping.

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ATS Modes of Operation

Batch

Treat

Hold

Test

Release

If the residual chemical testing requirement cannot be met, the ATS must be operated in the Batch Mode.


Chitosan is the only approved residual test.

Flow Through

Treat

Release


Treatment, Testing, and Filtration

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ATS Required Documents

- A written ATS Plan, which includes the following:
 - Operation & Maintenance (O&M) Manual
 - Monitoring, Sampling, & Reporting Plan (MSRP), including QA/QC
 - Health and Safety Plan
 - Spill Prevention Plan


Submitted to the State Water Board 14 days prior to planned operation and kept on-site during ATS operation.

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ATS Required Documents


- ATS specifications
- Instrumentation, testing, and calibration records
- Calibration procedures
- Daily inspection records
- Training records
- Operation and data log book

All field data must be kept on site during the project. Records must be kept for 3 years after the project is completed.

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ATS Required Instrumentation

- Influent and effluent turbidity
- Influent and effluent pH
- Residual chemical
- Effluent flow rate and volume
- PLC controls
- Electronic data logger (with readings every 15 mins.)

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ATS Monitoring Requirements


- Daily on-site visual monitoring
- Continuous flow rate with flow totalizer
- Continuous influent & effluent pH
- Continuous influent & effluent turbidity
- Type, amount, and dose rates of any chemicals used for treatment
- Residual chemical tests OR toxicity testing

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ATS Reporting Requirements

- At a minimum, every 30 days upload all field data onto SMARTS
- **NEL violations** – upload onto SMARTS a Violation Report within **24 hours**
- Toxicity or water quality standard exceedances report **immediately** to the RWQCB

Turbidity NELs for ATS:
 10 NTU for daily flow weighted avg.
 20 NTU for any single sample


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Module Organization

Part 1 – Active Treatment Systems
(9:30 – 10:30 AM)

Part 2 – Inspections and Monitoring Requirements (10:45 – 12:15 PM)


Part 3 – Instruments and Analysis
(1:15 to 2:15 PM)




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Site Specific Monitoring Factors

- Risk Level / LUP Type
- Project size and number of outfalls
- BMPs selected
- Site activities or BMP failures
- Use of an ATS
- Effluent quality





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Attachment C
p. 8 - 13


Monitoring and Sampling for **Risk Level 1**

- Quarterly non-storm water observations
- Weekly baseline, pre-, during, and after storm observations
- Plus, conditional sampling for non-visible pollutants

I. Risk Level 1 Monitoring and Reporting Requirements

Table 1- Summary of Monitoring Requirements

Risk Level	Quarterly Non-storm Water Discharge	Visual Inspections			Sample Collection		
		Pre-storm Event Baseline	REAP	Daily Storm BMP	Post Storm	Storm Water Discharge	Receiving Water
1	X	X		X	X		



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Attachment D
p. 10 - 19


Monitoring and Sampling for **Risk Level 2**

- Same as Level 1 . . . **but add:**
 - REAP Preparation
 - Sample and analyze 3 times per day for pH and

Qualifying Rain Event:
Any event that produces 0.5 inches or more precipitation with a 48 hour or greater period between rain events.


Risk Level	Non-storm Water Discharge	Event Baseline	REAP	Daily Storm BMP	Post Storm	Storm Water Discharge	Receiving Water
2	X	X	X	X	X	X	

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Visual Observations 

- Daily (LUP) and weekly (traditional) inspections
- Pre-(baseline), during, and post storm inspections
- Visually observe storm water discharges of each qualifying rain event
- Quarterly non-storm water inspections
- Visual records include: observations, personnel performing inspections, date/time, weather conditions, locations observed, & corrective actions taken

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Field Tests 

- Turbidity and pH – Risk Level / Type 2 & 3:
 - Collect grab samples at all discharge points
 - Collect a minimum of 3 samples per day during the qualifying event
 - Use a calibrated pH and turbidity field instrument


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Qualifying Rain Event

- A qualifying event produces 0.5 inches or more precipitation with a 48 hour or greater period between rain events.
- Use an on-site rain gauge to measure the amount of precipitation on your project site and document the daily readings.




Honeywell T8511W Wireless Weather Station with Rain Gauge, Wind Gauge, Thermometer, Altimeter, Clock, Barometer, and Humidity
\$115.01 (10% off) \$103.51 (10% off)
Free Shipping
In Stock
Order by 11:59 PM PT today to get it by tomorrow, 1/2/14. Order in the next 6 hours and 23 minutes, and we'll ship it today. Shipping to: 00000
© 2014 Amazon.com, Inc. or its affiliates. All rights reserved.

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Rules of Engagement for Qualifying Events

1. No discharge = No sample
2. A minimum of 3 samples per day for the entire site
3. Every point of discharge must be sampled at least once per day

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Testing Scenario #1

Your project has one place where water flows off site, it starts raining at 9:00 AM and discharge starts at 10:00 AM. It rains all day. What is the minimum number of grab samples you should take?

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Testing Scenario #2

Your project has one place where water flows off site, at 3:00 PM you get a cloud burst and the rain and discharge stop within 45 minutes. How many samples should be taken?

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Testing Scenario #3

Your project has a sediment basin upstream of the outfall. It rains all day but no water is released from the sediment basin. How many samples should be taken?

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Testing Scenario #4

The project is completed and you need to drain the sediment basin to the City's storm drainage system. It has been hot and sunny all week. Do you need to sample and, if so, how many samples should be taken?

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Testing Scenario #5

Your project has five places where water flows off site, it starts raining at 9:00 AM and discharge starts at 10:00 AM. It rains all day. What is the minimum number of grab samples you should take?

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Testing Scenario #6

Your project has five places where water flows off site, it starts raining on Monday and 0.1" is recorded in the rain gauge; Tuesday has 0.15"; Wednesday is dry; Thursday has 0.25"; and Friday 0.1". The weekend is nice and sunny. When and where should samples be collected and how many each day?

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Monitoring Exceptions

- Non-qualifying storm events with < 0.5" (But, how do you know it will not be qualifying?)
- During dangerous weather conditions
- Outside of scheduled site business hours (which should be specified in the SWPPP)

If you claim any of these exemptions, you must document why the monitoring was not performed and include that explanation in the annual report.



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Types of Sampling

Risk Level / Type	Runoff	Run-on	Non-Visible	Non-Storm Water	Receiving Water
Risk Level 1			Conditional		
LUP Type 1			Conditional		
Risk Level 2	✓	Conditional	Conditional	✓	
LUP Type 2	✓	Optional	Conditional		
Risk Level 3	✓	Conditional	Conditional	✓	Conditional
LUP Type 3	✓	Optional	Conditional		Conditional

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Types of Analyses

Analysis	Runoff	Run-on	Non-Visible	Non-Storm Water	Receiving Water
pH (field)	✓	✓	Conditional	✓	✓
Turbidity (field)	✓	✓	Conditional	✓	✓
SSC (Suspended Sediment Concentration)	Conditional for Risk / Type 3				Conditional for Risk / Type 3
Toxics and other exposed contaminants			Conditional	Conditional	
TMDLs	If applicable			If applicable	

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Runoff Sampling

- Required of Risk Level / LUP Types 2 & 3
- Grab samples – a single sample collected at a particular time and place which represents the runoff at that point in time at that place.
- Field test collected sample for pH and turbidity
- Only collect if there is a discharge or runoff
- Must collect from discharges of impounded storm water

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pH

- Measure of acidity or alkalinity (how caustic)
- 7 is neutral
- Measured in “pH units”
- NALs are 6.5 and 8.5
- RW sampling triggers are 6.0 and 9.0

pH Scale


Courtesy of Environment Canada (<http://www150.nc.gc.ca>)

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pH www.wgr-sw.com/pH

Will daily average pH values be calculated linearly or through the logarithmic method? (T) (L) (C)

Daily average pH values must be calculated through the logarithmic method. In order to calculate an average, you must: (1) Convert the pH measurements from logarithms to real numbers; (2) Take the average of the real numbers; and (3) Convert the average of the real numbers back to a logarithm.

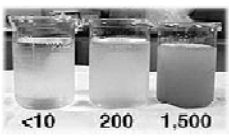


Excel Spreadsheet

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Turbidity


- Indirect measurement using reflected light to indicate how much suspended solids is in the water
- Measured in nephelometric turbidity units (NTU)
- NAL is 250 NTU
- RW sampling trigger is 500 NTU



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Suspended Sediment Concentration (SSC)


- It is not equal to TSS!
- It is the measure of the dry weight of all the sediment from a known volume of a water-sediment mixture (mg dry sediment/liter of mixture)
- It is required of Risk Level 3 / Type 3 sites when there is a RW sampling trigger for turbidity
- Used to calculate sediment loading (and fines)
- Once triggered, must continue to test for SSC and turbidity



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Non-Visible Sampling

- This requirement is not new with this permit
- Required of all Risk Levels and LUP Types
- Samples must be collected within 2 hours of the start of discharge
- Two samples required for comparison purposes: one of the affected runoff, one of unaffected runoff
- All sites must have a written plan (CSMP / M&RP) which address non-visible sampling.




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Non-Visible Sampling

Table D-6 Potential Non-Visible Pollutants based on Common Construction Activities

Activity	Potential Pollutant Source	Laboratory Analysis
Yield line finishing	Chlorinated water	Residual chlorine
Portable toilets	Bacteria, disinfectants	Total fecal coliform
Concrete & Masonry	Acid wash	pH
	Curing compounds	pH, alkalinity, Volatile organic compounds (VOCs)
	Concrete rinse water	pH
Painting	Resins	Semi-volatile organic compounds (SVOCs)
	Thinners	Fluoride, VOCs
	Paint Strippers	VOCs
	Solvents	Fluoride, VOCs
	Adhesives	Fluoride, SVOCs
Scalting	Scalting	SVOCs
	Scalting	SVOCs
Cleaning	Detergents	Mercury-free Activated Substances (MESA), phosphate
	Disinfectants	Residual chlorine
Landscaping	Fertilizers	VOCs
	Lime and gypsum	Chloride with analytical laboratory
Treated wood	Lime and gypsum	NO ₃ /NH ₄ -N
	Aluminum sulfate, sulfur	Acidity/alkalinity
Soil encrustments & dust control	Copper, arsenic, selenium	Total dissolved solids (TDS), alkalinity
	Lime, gypsum	Metals
	Plant grass	pH
	Magnesium chloride	Biochemical oxygen demand (BOD)
	Calcium chloride	alkalinity, TDS
Lime/sulfur	Sulfur	alkalinity, TDS
	Lime/sulfur	alkalinity, TDS

Source: Appendix D of the CASQA California Stormwater Handbook for Construction



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Receiving Water Monitoring

- Required at Risk Level 3 / LUP Type 3 sites, if and when the RW sampling trigger has been exceeded.
- Required only for sites with a direct discharge
- Test the sample for pH and turbidity; if the turbidity trigger is exceeded, suspended sediment concentration (laboratory)
- Sample a location upstream of the site and downstream of the site

Attachment E
p. 13 & 14
Attachment A
p. 37 & 38

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Receiving Water Monitoring

“Direct discharge” is defined by the following:

- **CGP Glossary** – “A discharge that is routed directly to waters of the United States by means of a pipe, channel, or ditch (including a municipal storm sewer system), or through surface runoff.”
- **State Board’s FAQ Clarification** – “Discharges from a construction site to a MS4 where commingling with upstream and/or downstream discharges can occur are not considered ‘direct discharges.’”

got SWPPP? Order
p. 30

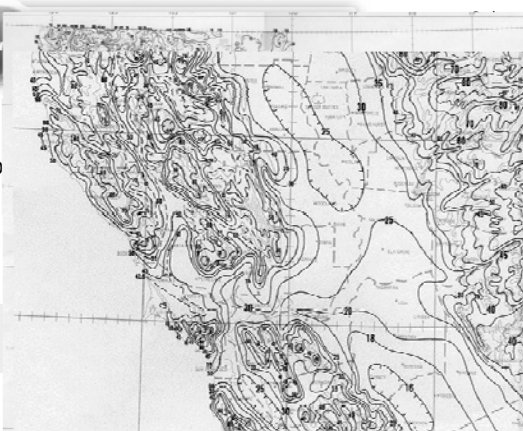
RW Sampling Exemption

You are not required to do RW sampling if the storm exceeds a 5 year – 24 hour rain event :

- To take the “Sampling Exemption”, the discharger shall report an on-site rain gauge **and** a nearby governmental rain gauge for verification.

www.wrcc.dri.edu/pcpnfreq/nca5y24.gif
www.wrcc.dri.edu/pcpnfreq/sca5y24.gif

got sw



Yo

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Record Keeping

- Daily rain gauge readings
- Observation records
- Field analysis records of calibration and testing
- Laboratory reports, chain-of-custody records and QA/QC records
- REAPs
- Annual and non-compliance reports
- Corrective action and follow-up records
- Training records

Keep for 3 Years

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Module Organization

Part 1 – Active Treatment Systems
(9:30 – 10:30 AM)


Part 2 – Inspections and Monitoring Requirements (10:45 – 12:15 PM)

Part 3 – Instruments and Analysis
(1:15 to 2:15 PM)

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Analytical Laboratories

- Select a laboratory with a State of California ELAP certification: www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx
- Consider proximity of the lab to the site; it is required to get samples to the lab within 48 hours of collection
- Consider lab services:
 - EDDs – electronic data formats
 - Courier service
 - Free sample containers / kits
 - Turnaround times and detection levels
 - Customer service



Reading and Understanding a Lab Report

- Results
- Methods (40 CFR Part 136)
- Detection terms
- Dilution factors
- Travel blanks & field blanks
- Holding times
- QA/QC terms and practices



BSK ANALYTICAL LABORATORIES 1418 STANISLAKE ST. IRVING, CA 92614
 (714) 962-1000 • FAX (714) 962-1001 • www.bsklab.com

ANALYTICAL

Client/Company Name: _____ Report Attention: _____ Project: _____

Address: _____ City: _____ State: _____ Zip: _____

Report Information: PCB Lead Other: _____

How would you like the raw sampled materials? 8/500 1/2 Pint 800 1/2 Gallon

Sample Name/Label/Tag: _____

Matrix Type: Storm Water Wastewater Surface Water Groundwater Sediment Soil Other

Sample # _____ Sample Name _____ Sample Description/Location _____

Requested by: _____ Date: _____ Received by: _____ Date: _____

Shipping Method: _____ Cooling Method: _____ Packing Material: _____

Laboratory Report

BSK Analytical Laboratories

Certificate of Analysis


Client Name: _____ Report Issue Date: 10/14/2010 8:07
 Client Address: _____ Received Date: 10/04/2010
 City, CA Zip Code: _____ Received Time: 16:55

Lab Sample ID: A001714-01 Sampled by: Client
 Sample Date: 10/04/2010 08:30 Matrix: Water
 Sample Type: Grab

Sample Description(s): First Storm Sample


General Chemistry									
Analysis	Method	Result	RL	Units	RL	Batch	Prepared	Analyst	Qualifier
Conductivity @ 25C	SR 2611 B	87	1.0	µmhos/cm	1	A009370	10/08/10	10/08/10	
pH (25)	SR 4205-01 B	5.8		pH Units	1	A009370	10/08/10	10/08/10	
pH Temperature @ 25	SR 2611 C	71.7			1	A009888	10/08/10	10/08/10	
Total Dissolved Solids	SR 2611 C	140	5.0	mg/L	10	A009370	10/08/10	10/08/10	
Total Organic Carbon	SR 5313 C	82	2.0	mg/L	10	A009370	10/08/10	10/08/10	
*Total Suspended Solids	SR 2011 D	54	5.0	mg/L	1	A009518	10/08/10	10/07/10	

Organics									
Analysis	Method	Result	RL	Units	RL	Batch	Prepared	Analyst	Qualifier
Hexachlorocyclopentadiene, In. EPA 8160A	SR 1054A	2.8	1.0	µg/L	1	A009370	10/04/10	10/04/10	

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Using Your Data - Runoff

- Check pH and Turbidity against NALs and RW triggers
 - NALs: pH <6.5>8.5; turbidity >250 NTU
 - RW triggers (Risk / Type 3): pH <6.0>9.0, turbidity >500 NTU
- Initiate reporting as required
- No limit for SSC, information only

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Using Your Data – Receiving Water

- CGP does not specify limits for receiving water
- Check for water body specific “Water Quality Objectives” in the basin plan
- Compare upstream and downstream results to see if there is evidence of the site causing an increase
- Compare analytical results with visual observations

 **got SWPPP?**


Using Your Data – Non-Visible


- Limits are not specified in the permit, consult the RWQCB
- Evaluate whether the discharge may be a threat to receiving water quality objectives. Consult the Basin Plan and the California Toxics Rule (CTR)
- Compare results of the affected area with the unaffected area
- Take corrective action and re-test

 **got SWPPP?**

Smart Sampling


- Don't shoot yourself in the foot! It hurts and it's expensive!
- Samples carelessly collected can cause big problems.
- So, practice smart sampling practices.



 **got SWPPP?**

Smart Sampling

- Collect representative samples . . . not cleaner than average, not dirtier than average
- Sample flow, not puddles
- Don't muddy the water
- Try to stabilize the sampling locations
- Don't overfill sample bottles which have preservatives
- Legal flush

 **got SWPPP?**

Smart Sampling

Avoid contaminating the sample by doing the following:

- Only use clean collection equipment and sample bottles
- Store collection equipment and bottles in a clean location
- Use nitrile gloves, changing them at each location
- No smoking, eating, or drinking while sampling
- Never collect samples near a running vehicle; avoid collecting around a parked vehicle
- Don't breathe, sneeze, or cough in the direction of an open sample container
- Only store collected samples in a clean ice chest (with ice)
- Test for pH and turbidity ASAP

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Smart Receiving Water Sampling

- Capture flow of runoff stream:
 - Small streams: dip container into stream with the opening facing upstream
 - Larger streams: wade into flow, dip container into stream with opening facing upstream
- Sampler must be downstream of the container
- Get as close to the site as is safely possible
- Avoid sampling downstream of a bridge
- Document the sampling location
- Reach away from the bank and avoid ponded or slow water
- In-stream measurements are usually preferable

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Sampler Training

- Anyone collecting sampling must be trained. Training documentation must be maintained for 3 years.
- Samplers must be trained to sample in accordance with the State's *SWAMP Quality Assurance Program Plan* and the American Public Health Association's "*Standard Methods for the Examination of Water and Wastewater*".



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Sampling Preparation (before it starts raining)

- Confirm access to sampling sites
- Gather and store needed equipment
- Prepare sample labels, chain-of-custody documents, and field log sheets
- Coordinate sample pickups or delivery to the laboratory

got SWPPP? **got SWPPP?**


Monitoring Demonstration

- Calibration
- Operation
- Maintenance & Care




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pH Calibration



pH Pen Calibration
With Aaron Ortiz



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Sampling Kit Contents

- Field meters (pH & turbidity)
- Calibration standards
- Digital camera
- Sample location map and field log (laminated)
- New plastic buckets, pitchers, dust pans, tubing, rope, jars, or whatever is being used to grab the sample.
- Sample pump
- Powder free nitrile gloves
- Rain gear, boots, waders
- Pole sampler
- Containers provided by the laboratory for non-visible pollutants
- Coolers and ice
- Pens, permanent markers, grease pens
- COCs, labels, and field logs
- Deionized water in spray bottle
- Rags / paper towels
- PPE

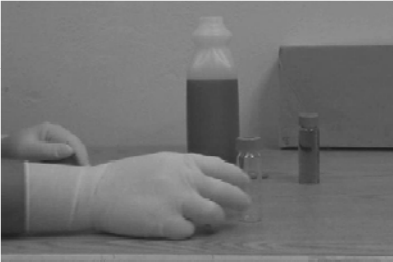
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Sample Handling

- For VOCs and Oil & Grease, collect samples in the containers provided by the laboratory
- Use gloves, change gloves often
- Decontaminate all equipment before and after use (spray bottle with deionized water)
- Immediately cap containers, dry outside, label, and pack into a cooler with ice
- Ship to the laboratory ASAP
- Be careful with preservatives

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VOA Sample Collection




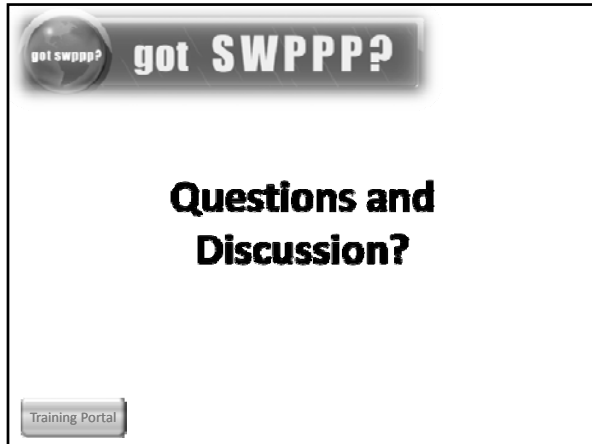
got SWPPP?

Sampling Forms & Documents

- Field Log
- Chain-of-Custody (COC)
- Weather report printouts from NOAA
- Rain gauge record
- Laboratory reports

Keep all records on-site with the SWPPP, and maintain for 3 years.





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"/> Before predicted rain	<input type="checkbox"/> During rain event	<input type="checkbox"/> Following qualifying rain event	<input type="checkbox"/> Contained stormwater release	<input type="checkbox"/> Quarterly non-stormwater
Site Information						
Construction Site Name:						
Construction stage and completed activities:					Approximate area of exposed site:	
Weather and Observations						
Date Rain Predicted to Occur:				Predicted % chance of rain:		
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:	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Photo Reference IDs:			
Corrective Actions Identified (note if SWPPP/REAP change is needed)						
Inspector Information						
Inspector Name:				Inspector Title:		
Signature:					Date:	

Risk Level 2 Effluent Sampling Field Log Sheets			
Construction Site Name:		Date:	Time Start:
Sampler:			
Sampling Event Type:	<input type="checkbox"/> Stormwater	<input type="checkbox"/> Non-stormwater	<input type="checkbox"/> Non-visible pollutant
Field Meter Calibration			
pH Meter ID No./Desc.:		Turbidity Meter ID No./Desc.:	
Calibration Date/Time:		Calibration Date/Time:	
Field pH and Turbidity Measurements			
Discharge Location Description	pH	Turbidity	Time
Grab Samples Collected			
Discharge Location Description	Sample Type		Time
Additional Sampling Notes:			
Time End:			

Risk Level 3 Effluent Sampling Field Log Sheets				
Construction Site Name:		Date:	Time Start:	
Sampler:				
Sampling Event Type:	<input type="checkbox"/> Stormwater	<input type="checkbox"/> Non-stormwater	<input type="checkbox"/> Non-visible pollutant	<input type="checkbox"/> Post NEL Exceedance
Field Meter Calibration				
pH Meter ID No./Desc.:		Turbidity Meter ID No./Desc.:		
Calibration Date/Time:		Calibration Date/Time:		
Field pH and Turbidity Measurements				
Discharge Location Description	pH	Turbidity	Time	
Grab Samples Collected				
Discharge Location Description	SSC	Other (specify)	Time	
Additional Sampling Notes:				
Time End:				

Risk Level 3 Receiving Water Sampling Field Log Sheets			
Construction Site Name:	Date:	Time Start:	
Sampler:			
Receiving Water Description and Observations			
Receiving Water Name/ID:			
Observations:			
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"/>	
Field Meter Calibration			
pH Meter ID No./Desc.:	Turbidity Meter ID No./Desc.:		
Calibration Date/Time:	Calibration Date/Time:		
Field pH and Turbidity Measurements and SSC Grab Sample			
Upstream Location			
Type	Result	Time	Notes
pH			
Turbidity			
SSC	Collected Yes <input type="checkbox"/> No <input type="checkbox"/>		
Downstream Location			
Type	Result	Time	Notes
pH			
Turbidity			
SSC	Collected Yes <input type="checkbox"/> No <input type="checkbox"/>		
Additional Sampling Notes:			
Time End:			

Rain Event Action Plan (REAP)

Date:		WDID Number:	
Date Rain Predicted to Occur:		Predicted % chance of rain:	

Site Information:

Site Name, City and Zip Code _____ Project Risk Level: Risk Level 2 Risk Level 3

Site Stormwater Manager Information:

Name, Company, Emergency Phone Number (24/7) _____

Erosion and Sediment Control Contractor – Labor Force contracted for the site:

Name, Company, Emergency Phone Number (24/7) _____

Stormwater Sampling Agent:

Name, Company, Emergency Phone Number (24/7) _____

Current Phase of Construction

Check ALL the boxes below that apply to your site.

- | | | |
|---|---|--|
| <input type="checkbox"/> Grading and Land Development | <input type="checkbox"/> Vertical Construction | <input type="checkbox"/> Inactive Site |
| <input type="checkbox"/> Streets and Utilities | <input type="checkbox"/> Final Landscaping and Site Stabilization | <input type="checkbox"/> Other: |

Activities Associated with Current Phase(s)

Check ALL the boxes below that apply to your site (some apply to all Phases).

Grading and Land Development:

- | | | |
|---|--|---|
| <input type="checkbox"/> Demolition | <input type="checkbox"/> Vegetation Removal | <input type="checkbox"/> Vegetation Salvage-Harvest |
| <input type="checkbox"/> Rough Grade | <input type="checkbox"/> Finish Grade | <input type="checkbox"/> Blasting |
| <input type="checkbox"/> Soil Amendment(s): | <input type="checkbox"/> Excavation (_____ ft) | <input type="checkbox"/> Soils Testing |
| <input type="checkbox"/> Rock Crushing | <input type="checkbox"/> Erosion and Sediment Control | <input type="checkbox"/> Surveying |
| <input type="checkbox"/> Equip. Maintenance/Fueling | <input type="checkbox"/> Material Delivery and Storage | <input type="checkbox"/> Other: |

Streets and Utilities:

- | | | |
|--|---|--|
| <input type="checkbox"/> Finish Grade | <input type="checkbox"/> Utility Install: water-sewer-gas | <input type="checkbox"/> Paving Operations |
| <input type="checkbox"/> Equip. Maintenance/Fueling | <input type="checkbox"/> Storm Drain Installation | <input type="checkbox"/> Material Delivery & Storage |
| <input type="checkbox"/> Curb and Gutter/Concrete Pour | <input type="checkbox"/> Masonry | <input type="checkbox"/> Other: |

Vertical Construction:

- | | | |
|---|-------------------------------------|--|
| <input type="checkbox"/> Framing | <input type="checkbox"/> Carpentry | <input type="checkbox"/> Concrete/Forms/Foundation |
| <input type="checkbox"/> Masonry | <input type="checkbox"/> Electrical | <input type="checkbox"/> Painting |
| <input type="checkbox"/> Drywall/Interior Walls | <input type="checkbox"/> Plumbing | <input type="checkbox"/> Stucco |
| <input type="checkbox"/> Equip. Maintenance/Fueling | <input type="checkbox"/> HVAC | <input type="checkbox"/> Tile |
| <input type="checkbox"/> Exterior Siding | <input type="checkbox"/> Insulation | <input type="checkbox"/> Landscaping & Irrigation |
| <input type="checkbox"/> Flooring | <input type="checkbox"/> Roofing | <input type="checkbox"/> Other: |

Final Landscaping & Site Stabilization:

- | | | |
|--|---|--|
| <input type="checkbox"/> Stabilization | <input type="checkbox"/> Vegetation Establishment | <input type="checkbox"/> E&S Control BMP Removal |
| <input type="checkbox"/> Finish Grade | <input type="checkbox"/> Storage Yard/ Material Removal | <input type="checkbox"/> Landscape Installation |
| <input type="checkbox"/> Painting and Touch-Up | <input type="checkbox"/> Irrigation System Testing | <input type="checkbox"/> Other: |
| <input type="checkbox"/> Drainage Inlet Stencils | <input type="checkbox"/> Inlet Filtration | <input type="checkbox"/> Perm. Water Quality Ponds |
| <input type="checkbox"/> Other: | <input type="checkbox"/> Other: | <input type="checkbox"/> Other: |

Inactive Construction Site:

- | | | |
|--|--|--|
| <input type="checkbox"/> E & S Control Device Installation | <input type="checkbox"/> Routine Site Inspection | <input type="checkbox"/> Trash Removal |
| <input type="checkbox"/> E & S Control Device Maintenance | <input type="checkbox"/> Street Sweeping | <input type="checkbox"/> Other: |

Rain Event Action Plan (REAP)

Date:		WDID Number:	
--------------	--	---------------------	--

Trades Active on Site during Current Phase(s)

Check ALL the boxes below that apply to your site

- | | | |
|--|---|---|
| <input type="checkbox"/> Storm Drain Improvement | <input type="checkbox"/> Grading Contractor | <input type="checkbox"/> Surveyor- Soil Technician |
| <input type="checkbox"/> Street Improvements | <input type="checkbox"/> Water Pipe Installation | <input type="checkbox"/> Sanitary Station Provider |
| <input type="checkbox"/> Material Delivery | <input type="checkbox"/> Sewer Pipe Installation | <input type="checkbox"/> Electrical |
| <input type="checkbox"/> Trenching | <input type="checkbox"/> Gas Pipe Installation | <input type="checkbox"/> Carpentry |
| <input type="checkbox"/> Concrete Pouring | <input type="checkbox"/> Electrical Installation | <input type="checkbox"/> Plumbing |
| <input type="checkbox"/> Foundation | <input type="checkbox"/> Communication Installation | <input type="checkbox"/> Masonry |
| <input type="checkbox"/> Demolition | <input type="checkbox"/> Erosion and Sediment Control | <input type="checkbox"/> Water, Sewer, Electric Utilities |
| <input type="checkbox"/> Material Delivery | <input type="checkbox"/> Equipment Fueling/Maintenance | <input type="checkbox"/> Rock Products |
| <input type="checkbox"/> Tile Work- Flooring | <input type="checkbox"/> Utilities, e.g., Sewer, Electric | <input type="checkbox"/> Painters |
| <input type="checkbox"/> Drywall | <input type="checkbox"/> Roofers | <input type="checkbox"/> Carpenters |
| <input type="checkbox"/> HVAC installers | <input type="checkbox"/> Stucco | <input type="checkbox"/> Pest Control: e.g., termite prevention |
| <input type="checkbox"/> Exterior Siding | <input type="checkbox"/> Masons | <input type="checkbox"/> Water Feature Installation |
| <input type="checkbox"/> Insulation | <input type="checkbox"/> Landscapers | <input type="checkbox"/> Utility Line Testers |
| <input type="checkbox"/> Fireproofing | <input type="checkbox"/> Riggers | <input type="checkbox"/> Irrigation System Installation |
| <input type="checkbox"/> Steel Systems | <input type="checkbox"/> Utility Line Testers | <input type="checkbox"/> Other: |

Trade Contractor Information Provided

Check ALL the boxes below that apply to your site.

- | | | |
|---|--|--|
| <input type="checkbox"/> Educational Material Handout | <input type="checkbox"/> Tailgate Meetings | <input type="checkbox"/> Training Workshop |
| <input type="checkbox"/> Contractual Language | <input type="checkbox"/> Fines and Penalties | <input type="checkbox"/> Signage |
| <input type="checkbox"/> Other: | <input type="checkbox"/> Other: | <input type="checkbox"/> Other: |

Continued on next page.

Rain Event Action Plan (REAP)

Date of REAP

WDID Number:

Date Rain Predicted to Occur:

Predicted % chance of rain:

Predicted Rain Event Triggered Actions

Below is a list of suggested actions and items to review for this project. Each active Trade should check all material storage areas, stockpiles, waste management areas, vehicle and equipment storage and maintenance, areas of active soil disturbance, and areas of active work to ensure the proper implementation of BMPs. Project-wide BMPs should be checked and cross-referenced to the BMP progress map.

Trade or Activity	Suggested action(s) to perform / item(s) to review prior to rain event
<input type="checkbox"/> Information & Scheduling	<input type="checkbox"/> Inform trade supervisors of predicted rain <input type="checkbox"/> Check scheduled activities and reschedule as needed <input type="checkbox"/> Alert erosion/sediment control provider <input type="checkbox"/> Alert sample collection contractor (if applicable) <input type="checkbox"/> Schedule staff for extended rain inspections (including weekends & holidays) <input type="checkbox"/> Check Erosion and Sediment Control (ESC) material stock <input type="checkbox"/> Review BMP progress map <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<input type="checkbox"/> Material storage areas	<input type="checkbox"/> Material under cover or in sheds (ex: treated woods and metals) <input type="checkbox"/> Perimeter control around stockpiles <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<input type="checkbox"/> Waste management areas	<input type="checkbox"/> Dumpsters closed <input type="checkbox"/> Drain holes plugged <input type="checkbox"/> Recycling bins covered <input type="checkbox"/> Sanitary stations bermed and protected from tipping <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<input type="checkbox"/> Trade operations	<input type="checkbox"/> Exterior operations shut down for event (e.g., no concrete pours or paving) <input type="checkbox"/> Soil treatments (e.g., fertilizer) ceased within 24 hours of event <input type="checkbox"/> Materials and equipment (ex: tools) properly stored and covered <input type="checkbox"/> Waste and debris disposed in covered dumpsters or removed from site <input type="checkbox"/> Trenches and excavations protected <input type="checkbox"/> Perimeter controls around disturbed areas <input type="checkbox"/> Fueling and repair areas covered and bermed <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<input type="checkbox"/> Site ESC BMPs	<input type="checkbox"/> Adequate capacity in sediment basins and traps <input type="checkbox"/> Site perimeter controls in place <input type="checkbox"/> Catch basin and drop inlet protection in place and cleaned <input type="checkbox"/> Temporary erosion controls deployed <input type="checkbox"/> Temporary perimeter controls deployed around disturbed areas and stockpiles <input type="checkbox"/> Roads swept; site ingress and egress points stabilized <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<input type="checkbox"/> Concrete rinse out area	<input type="checkbox"/> Adequate capacity for rain <input type="checkbox"/> Wash-out bins covered <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<input type="checkbox"/> Spill and drips	<input type="checkbox"/> All incident spills and drips, including paint, stucco, fuel, and oil cleaned <input type="checkbox"/> Drip pans emptied <input type="checkbox"/> Other: _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____

Continued on next page.

Other / Discussion /
Diagrams

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

Attach a printout of the weather forecast from the NOAA website to the REAP.

I certify under penalty of law that this Rain Event Action Plan (REAP) will be performed in accordance with the General Permit by me or under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Qualified SWPPP Practitioner (Use ink please)

Date: _____



* Required Fields

Temp _____

Client/Company Name*:		Report Attention*:		Phone*:	Fax*:
Address* City* State* Zip*				Email:	
Project Information:				PO#	Carbon Copies: (Circle One) CDHS Fresno Co EPA Merced Co Tulare Co Other:
				Quote#	
How would you like your completed results sent? <input type="checkbox"/> E-Mail <input type="checkbox"/> Fax <input type="checkbox"/> EDD <input type="checkbox"/> Mail Only-				REGULATORY COMPLIANCE Electronic Data Transfer: Y N System No.*	
Sampler Name Printed / Signature*		QC Request	Result Request **Surcharge		
		STD Level II	STD 5Day** 2Day** 1 Day**		

ANALYSIS REQUESTED											

Matrix Types: RSW= Raw Surface Water CFW= Chlorinated Finished Water CWW= Chlorinated Waste Water BW= Bottled Water
 RGW = Raw Ground Water FW = Finished Water WW = Waste Water SW = Storm Water DW = Drinking Water SO = Solid

Sample #	# Btls	Sampled*		Sample Description/Location*	Matrix*	Comments / Station Code
		Date	Time			

Relinquished by: (Signature and Printed Name)	Company	Date	Time	Received by (Signature and Print Name)	Company
Relinquished by: (Signature and Printed Name)	Company	Date	Time	Received by (Signature and Print Name)	Company
Received for lab by: (Signature and Printed Name)	Date	Time	Payment Received at Delivery:		
			Date:	Amount:	Check/Cash/Card PIA# Init.

Shipping Method: CAO UPS GSO WALK-IN SJVC FED EX OTHER Cooling Method: WET BLUE NONE Packing Material:

Notice: Payment for services rendered as noted herein are due in full within 30 days from when invoiced. If not so paid, account balances are deemed delinquent. Delinquent balances are subject to monthly service/re-billings charges and interest calculated at 1 1/2% per month, 18% per annum. BSK & Associates shall be entitled to recover on delinquent accounts, cost of collections, including attorneys' fees incurred prior to or in litigation whether concluded by judgment, settlement, compromise or otherwise. The person signing for the client/Company expressly acknowledges that they are either the Client or authorized agent to the Client, and the Client agrees to be responsible for payment for analytical services on this Chain of Custody. Any modification of the analysis requested, either type or quantities, will be noted and agreed upon this Chain of Custody. The turn around time for any samples received after 3:00pm will begin the next business day.

Client Name
Client Address
City, CA Zip Code

Dear Client,

Thank you for selecting BSK Analytical Laboratories for your analytical testing needs. We have prepared this report in response to your request for analytical services. Enclosed are the results of analyses for samples received by the laboratory on 10/04/2010 16:55.

If additional clarification of any information is required, please contact your Client Services Representative, Mamie Zamora at (800) 877-8310 or (559) 497-2888.

BSK ANALYTICAL LABORATORIES

Mamie J Zamora

Mamie Zamora
Client Services Representative

Case Narrative

Work Order Information

Client Name: Name
Client Code: ;
Work Order: A0J0174
Project: Storm Water

Submitted by: Name
Shipped by: Walk-In
COC Number:
TAT: 10
PO #:

Sample Receipt Conditions

Cooler: Default Cooler **Temp. °C:** 9
Containers Intact
COC/Labels Agree
Received On Blue Ice
Sample(s) arrived at lab on same day sampled.
Packing Material - Bubble Wrap
Packing Material - Foam
Sample(s) were received in temperature range.
Initial receipt at BSK-FAL

Report Manager

Client Name

Report Format

FAL Final Report.rpt



Certificate of Analysis

Report Issue Date: 10/14/2010 8:07
Received Date: 10/04/2010
Received Time: 16:55

Client Name
 Client Address
 City, CA Zip Code

Lab Sample ID: A0J0174-01
Sample Date: 10/04/2010 09:30
Sample Type: Grab

Sampled by: Client
Matrix: Water

Sample Description: First Storm Sample

General Chemistry

Analyte	Method	Result	RL	Units	RL		Prepared	Analyzed	Qualifiers
					Mult	Batch			
Conductivity @ 25C	SM 2510 B	97	1.0	umhos/cm	1	A009767	10/08/10	10/08/10	
pH (1)	SM 4500-H+ B	5.8		pH Units	1	A009767	10/08/10	10/08/10	
pH Temperature in °C		21.7							
Total Dissolved Solids	SM 2540C	130	5.0	mg/L	1	A009665	10/06/10	10/08/10	
Total Organic Carbon	SM 5310 C	82	2.0	mg/L	10	A009750	10/08/10	10/08/10	
*Total Suspended Solids	SM 2540D	54	5.0	mg/L	1	A009616	10/05/10	10/07/10	

Organics

Analyte	Method	Result	RL	Units	RL		Prepared	Analyzed	Qualifiers
					Mult	Batch			
Hexane Extractable Material by EPA 1664A									
*Total Oil & Grease	EPA 1664A	2.9	1.0	mg/L	1	A009570	10/04/10	10/05/10	



General Chemistry Quality Control Report

Analyte	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
---------	--------	----	-------	-------------	---------------	------	-------------	-----	-----------	------------

Batch: A009616 Analyst: DEH Prepared: 10/05/2010 Analyzed: 10/07/2010

Blank (A009616-BLK1) SM 2540D - Quality Control

Total Suspended Solids ND 5.0 mg/L

Blank (A009616-BLK2) SM 2540D - Quality Control

Total Suspended Solids ND 5.0 mg/L

Duplicate (A009616-DUP1) SM 2540D - Quality Control

Source: A0J0072-01

Total Suspended Solids 160 5.0 mg/L 160 2 20

Duplicate (A009616-DUP2) SM 2540D - Quality Control

Source: A0J0150-01

Total Suspended Solids 6.0 5.0 mg/L 6.0 0 20

Batch: A009665 Analyst: DEH Prepared: 10/06/2010 Analyzed: 10/08/2010

Blank (A009665-BLK1) SM 2540C - Quality Control

Total Dissolved Solids ND 5.0 mg/L

Blank (A009665-BLK2) SM 2540C - Quality Control

Total Dissolved Solids ND 5.0 mg/L

Duplicate (A009665-DUP1) SM 2540C - Quality Control

Source: A0J0190-01

Total Dissolved Solids 1600 5.0 mg/L 1600 0.6 20

Duplicate (A009665-DUP2) SM 2540C - Quality Control

Source: A0J0182-02

Total Dissolved Solids 800 5.0 mg/L 770 3 20

Batch: A009750 Analyst: SAB Prepared & Analyzed: 10/08/2010

Blank (A009750-BLK1) SM 5310 C - Quality Control

Total Organic Carbon ND 0.20 mg/L

Blank Spike (A009750-BS1) SM 5310 C - Quality Control

Total Organic Carbon 10 0.20 mg/L 10 100 80-120

Blank Spike Dup (A009750-BSD1) SM 5310 C - Quality Control

Total Organic Carbon 10 0.20 mg/L 10 100 80-120 0.2 20

Matrix Spike (A009750-MS1) SM 5310 C - Quality Control

Source: A0J0274-01

Total Organic Carbon 11 0.20 mg/L 10 0.73 99 80-120

Matrix Spike (A009750-MS2) SM 5310 C - Quality Control

Source: A0J0297-08

Total Organic Carbon 11 0.20 mg/L 10 0.91 100 80-120

Matrix Spike Dup (A009750-MSD1) SM 5310 C - Quality Control

Source: A0J0274-01

Total Organic Carbon 11 0.20 mg/L 10 0.73 99 80-120 0.2 20

Matrix Spike Dup (A009750-MSD2) SM 5310 C - Quality Control

Source: A0J0297-08

Total Organic Carbon 11 0.20 mg/L 10 0.91 100 80-120 0.8 20

A0J0174 FINAL 10142010 0807

1414 Stanislaus Street

Fresno, CA 93706

(559) 497-2888

FAX (559) 485-6935

www.bsklabs.com

An Employee-Owned Company | Analytical Testing | Construction Observation
Environmental Engineering | Geotechnical Engineering | Materials Testing

General Chemistry Quality Control Report

Analyte	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
---------	--------	----	-------	-------------	---------------	------	-------------	-----	-----------	------------

Batch: A009767

Analyst: CEG

Prepared: 10/07/2010 Analyzed: 10/08/2010

Blank (A009767-BLK1) SM 2510 B - Quality Control

Conductivity @ 25C ND 1.0 umhos/cm

Duplicate (A009767-DUP1) SM 2510 B - Quality Control

Source: A0J0177-01

Conductivity @ 25C 140 1.0 umhos/cm 140 1 20
pH (1) 7.4 pH Units 7.4 0.3 20

Duplicate (A009767-DUP2) SM 2510 B - Quality Control

Source: A0J0200-01

Conductivity @ 25C 500 1.0 umhos/cm 500 0.4 20
pH (1) 7.5 pH Units 7.5 0.3 20

Organics Quality Control Report

Analyte	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
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Batch: A009570

Analyst: AMR

Prepared: 10/04/2010 Analyzed: 10/05/2010

Blank (A009570-BLK1) EPA 1664A - Quality Control

Total Oil & Grease ND 1.0 mg/L

Blank Spike (A009570-BS1) EPA 1664A - Quality Control

Total Oil & Grease 38 1.0 mg/L 40 95 78-114

Blank Spike Dup (A009570-BSD1) EPA 1664A - Quality Control

Total Oil & Grease 38 1.0 mg/L 40 95 78-114 0.3 30

Matrix Spike (A009570-MS1) EPA 1664A - Quality Control

Source: A012274-01

Total Oil & Grease 38 1.0 mg/L 40 0.70 92 78-114

Notes:

- The Chain of Custody document and Sample Integrity Sheet are part of the analytical report.
- Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
- Sample(s) received, prepared, and analyzed within the method specified criteria unless otherwise noted within this report.
- The results relate only to the samples analyzed in accordance with test(s) requested by the client on the Chain of Custody document. Any analytical quality control exceptions to method criteria that are to be considered when evaluating these results have been flagged and are defined in the data qualifiers section.
- All results are expressed on wet weight basis unless otherwise specified.
- All positive results for EPA Methods 504.1, 502.2, and 524.2 require the analysis of a Field Reagent Blank (FRB) to confirm that the results are not a contamination error from field sampling steps. If Field Reagent Blanks were not submitted with the samples, this method requirement has not been performed.
- Results contained in this analytical report must be reproduced in its entirety.
- Samples collected by BSK Analytical Laboratories were collected in accordance with the BSK Sampling and Collection Standard Operating Procedures.
- BSK Analytical Laboratories certifies that the test results contained in this report meet all requirements of the NELAC Standards for applicable certified drinking water chemistry analyses unless qualified or noted in the Case Narrative.
- Analytical data contained in this report may be used for regulatory purposes to meet the requirements of the Federal or State drinking water, wastewater, and hazardous waste programs.
- J-value is equivalent to DNQ (Detected, not quantified) which is a trace value. A trace value is an analyte detected between the MDL and the laboratory reporting limit. This result is of an unknown data quality and is only qualitative (estimated). Baseline noise, calibration curve extrapolation below the lowest calibrator, method blank detections, and integration artifacts can all produce apparent DNQ values, which contribute to the un-reliability of these values.
- (1) - Residual chlorine and pH analysis have a 15 minute holding time for both drinking and waste water samples as defined by the EPA and 40 CFR 136. Waste water and ground water (monitoring well) samples must be field filtered to meet the 15 minute holding time for dissolved metals. Samples submitted to the laboratory have been analyzed outside of this holding time requirement.
- * - This is not a NELAP accredited analyte.
- Summations of analytes (i.e. Total Trihalomethanes) may appear to add individual amounts incorrectly, due to rounding of analyte values occurring before or after the total value is calculated, as well as rounding of the total value.
- (2) The digestion used to produce this result deviated from EPA 200.2 by excluding hydrochloric acid in order to produce acceptable recoveries for affected metals.
- RL Multiplier is the factor used to adjust the reporting limit (RL) due to variations in sample preparation procedures and dilutions required for matrix interferences.

Certifications:

State of California - CDPH - ELAP	1180
State of California - CDPH - NELAP	04227CA
State of New Mexico - NMED-DWB	
State of Nevada - NDEP	CA000792009A

Definitions and Flags for Data Qualifiers

mg/L:	Milligrams/Liter (ppm)	M:	Method Detection Limit	MDA:	Min. Detected Activity
mg/Kg:	Milligrams/Kilogram (ppm)	RL:	Reporting Limit	MPN:	Most Probable Number
µg/L:	Micrograms/Liter (ppb)		:DL x Dilution	CFU:	Colony Forming Unit
µg/Kg:	Micrograms/Kilogram (ppb)	ND:	None Detected at RL	Absent:	Less than 1 CFU/100mLs
%:	Percent Recovered (surrogates)	pCi/L:	Picocuries per Liter	Present:	1 or more CFU/100mLs
				RL Mult:	RL Multiplier



* Required Fields

TEMP: 9.

Client/Company Name *		Report Attention *		Phone * #		FAX * #	
Address *		City *		State *		Zip *	
Project Information:		PO #		Carbon Copies: (Circle One)		Storm water:	
Storm Water 2010		Quote #		CDHS <input type="checkbox"/> Fresno Co <input type="checkbox"/> EPA <input type="checkbox"/>		EC, pH, TSS, EPA 1664, TOC	
How would you like your completed results sent?		QC Request		Merced Co <input type="checkbox"/> Tulare Co <input type="checkbox"/>		TDS	
<input checked="" type="checkbox"/> E-Mail <input type="checkbox"/> Fax <input type="checkbox"/> EDD <input type="checkbox"/> Mail Only		Result Request ** Surcharge		Other:			
Sampler Name Printed / Signature		<input checked="" type="checkbox"/> STD <input type="checkbox"/> Level II		Regulatory Compliance			
		<input checked="" type="checkbox"/> 5 Day** <input type="checkbox"/> 2 Day** <input type="checkbox"/> 1 Day**		Electronic Data Transfer: <input type="checkbox"/> Y <input type="checkbox"/> N			
Matrix Types:		Result Request ** Surcharge		System No. *			
RSW = Raw Surface Water		CFW = Chlorinated Finished Water		CW = Chlorinated Waste Water		BW = Bottled Water	
RGW = Raw Ground Water		FW = Finished Water		WW = Waste Water		DW = Drinking Water	
				SW = Storm Water		SO = Solid	
Sample	Bottles	Date	Time	Sample Description / Location	Matrix	Comments / Station Code	
	7	10/4/10	9:30	First storm sample			
			1:01			X	X
Relinquished by: (Signature and Printed Name)				Company	Date	Time	Received by: (Signature and Print Name)
					10/4/10	1:05	
Relinquished by: (Signature and Printed Name)				Company	Date	Time	Received by: (Signature and Print Name)
Received for Lab by: (Signature and Printed Name)				Company	Date	Time	Payment Received at Delivery
					10/4/10	1:05	
Shipping Method:				COOLING METHOD:	PACKING MATERIAL:		
CAO UPS GSO WALK-IN SVC FEDEX OTHER				WET BLUE NONE	Foam/Box		

Notice: Payment for services rendered as noted herein are due in full within 30 days from when invoiced. If not so paid, account balances are deemed delinquent. Delinquent balances are subject to monthly service-billing charges and interest calculated at 1 1/2 % per month, 18% per annum. BSK & Associates shall be entitled to recover on delinquent accounts, costs of collections, including attorney's fees incurred prior to or in litigation whether concluded by judgement, settlement, compromise or otherwise. The person signing for the client/Company expressly acknowledges that they are either the Client or authorized agent to the Client, and the Client agrees to be responsible for payment for analytical services on this Chain of Custody. Any modification of the analysis requested, either type or quantities, will be noted and agreed upon this Chain of Custody. The turn around time for any samples received after 3:00 pm will begin the next business day.

Appendix D

Field Monitoring and Analysis Guidance

1.0 Purpose of Document, Compliance Notification, and Limitations

The purpose of this guidance document is to assist dischargers subject to the General Permit. Dischargers who have questions about specific requirements of the General Permit, or this guidance document are advised to consult with the appropriate Regional Water Quality Control Board (RWQCB). Failure to comply with the General Permit can result in significant administrative, civil, and criminal penalties.

Users of this document should note the following:

- The scope of this document is limited to providing guidance on developing a Construction Site Monitoring Program (CSMP) required by the General Permit.
- The scope of this document is limited to traditional construction projects and does not address the monitoring requirements for Linear Underground/Overhead Projects (LUPs). While general information such as sampling techniques is transferrable, LUP operators should refer to Attachment A of the General Permit for details of the monitoring requirements.
- The purpose of this document is to provide general information to assist dischargers through the process of developing a CSMP. Sampling and analysis strategies must be site-specific for each individual project.
- This guidance document identifies the key elements of Active Treatment System (ATS) monitoring. Dischargers choosing to implement an ATS should work with the ATS provider to develop and implement a detailed ATS monitoring program tailored to the site specific ATS design.
- Bioassessment monitoring is covered briefly in the text of this guidance document. Additional details are provided in Appendix E of the handbook.
- Regulatory interpretations may change over time as a result of new information, new court cases, or new laws. Dischargers should consult with their regulators for current interpretations.
- RWQCBs and local agencies may require additional monitoring that is not addressed by this document. Dischargers should consult with the RWQCB and local agencies to determine if there are additional requirements.
- The sampling and analysis requirements of General Permit are governed by National Pollutant Discharge Elimination System (NPDES) regulations. These regulations and state regulations implementing the NPDES program contain significant requirements regarding quality assurance, quality control, qualifications of analytical laboratories, etc., which may not be explicitly addressed in this document. Consult with the NPDES regulations or RWQCB staff to determine any additional requirements.

- Compliance with this guidance document does not automatically equate to compliance with the General Permit.

1.1 Structure of Document

This document is organized to assist a discharger through the process of developing a site-specific CSMP and provides tools to assist the discharger conducting monitoring. Table D-1 provides a quick reference to the sections of the document.

A CSMP outline is included in the annotated Stormwater Pollution Prevention Plan (SWPPP) outline in Appendix B of this handbook.

Table D-1 Quick Section Reference

Topic	Section
Traditional construction site monitoring	3
Active treatment system monitoring	4
Quality assurance/quality control	5
Reporting and records retention	6
Guidance on field measurements	7
Example data collection forms	8

2.0 Summary of Construction Site Monitoring Requirements and Purpose of Monitoring

The General Permit requires that all construction projects develop and implement a site-specific CSMP. The CSMP must include the monitoring procedures and instructions, location maps, forms, and checklists necessary to implement the visual and water quality monitoring required for the site. The CSMP is developed prior to the start of construction activities and is part of the SWPPP. Like the [SWPPP](#), the CSMP may need to be revised to reflect and adapt to changes in the project.

2.1 Types of Monitoring Required by the General Permit

The General Permit requires the following types of monitoring:

- Visual inspections of [Best Management Practices \(BMPs\)](#);
- Visual monitoring of the site related to [qualifying storm events](#);
- Visual monitoring of the site for [non-stormwater discharges](#);
- Sampling and analysis of construction site runoff;
- Sampling and analysis of [receiving waters](#);
- Sampling and analysis of non-stormwater discharges;
- Bioassessment monitoring of receiving waters;
- Sampling and analysis of ATS operations; and
- Soil particle size analysis.

The specific monitoring required for each construction site depends upon the project risk level, project size, BMPs implemented and effluent quality. Tables D-2, D-3, and D-4 summarize the monitoring requirements by risk level.

Table D-2 Summary of Risk Level 1 Monitoring Requirements

Type of Monitoring		When
Sampling & Analysis	Non-visible pollutants: spill/BMP failure based on pollutant source assessment	Within first two hours of discharge from site. Collect samples of runoff affected by the spilled or released material(s) and runoff that is unaffected by the spilled or released material(s).
	Particle size	When sediment basins are used. If needed to justify site specific sediment risk using the Revised Universal Soil Loss Equation (RUSLE).
	Other	RWQCB or Total Maximum Daily Loads (TMDLs) may require other monitoring.
Visual Inspections	Non-stormwater inspection	Quarterly for each drainage area.
	Qualifying rain event: Pre-rain inspection	All drainage areas, BMPs, and stormwater containments within two business days of each qualifying rain event.
	Qualifying rain event: Post-rain inspection	All discharge locations within two business days after each qualifying rain event. Visually observe discharge of contained stormwater when discharged.
	During rain inspection	See BMP inspection below.
	BMP	Weekly and every 24 hours during extended storm events.

Table D-3 Summary of Risk Level 2 Monitoring

Type of Monitoring		When
Sampling & Analysis	Effluent sampling: Turbidity	Collect a minimum of three samples per day. Collect runoff samples representative of site discharges.
	Effluent sampling: pH	During <u>construction phases with high risk of high pH discharge</u> . Collect a minimum of three samples per day. Collect runoff samples representative of site discharges.
	Non-visible pollutants: spill/BMP failure based on pollutant source assessment	Within first two hours of discharge from site. Collect samples of runoff affected by the spilled or released material(s) and runoff unaffected by the spilled or released material(s).
	Contained rain water	At time of discharge.
	Non-stormwater	At locations where discharged off the site.
	Particle size	When sediment basins are used. If needed to justify site specific sediment risk using RUSLE.
	Other	RWQCB or <u>TMDLs</u> may require other monitoring.
Visual Inspections	Non-stormwater inspection	Quarterly for each drainage area.
	Qualifying rain event: Pre-rain inspection	All drainage areas, BMPs, and stormwater containments within two business days of each qualifying rain event.
	Qualifying rain event: Post-rain inspection	All discharge locations within two business days after each qualifying rain event. Visually observe discharge of contained stormwater when discharged.
	During rain inspection	See BMP inspection below.
	BMP	Weekly and every 24 hours during extended storm events.

Table D-4 Summary of Risk Level 3 Monitoring

	Type of Monitoring	When
Sampling & Analysis	Effluent sampling: pH, Turbidity	Collect a minimum of three samples per day. Collect runoff samples representative of site discharges.
	Effluent sampling: pH	During <u>construction phases</u> with <u>high risk of high pH discharge</u> . Collect a minimum of three samples per day. Collect runoff samples representative of site discharges.
	Effluent sampling: Suspended Sediment Concentration (SSC)	<u>SSC</u> required only if turbidity exceeds Numeric Effluent Limitation (NEL). Collect a minimum of three samples per day. Collect runoff samples representative of site discharges.
	Non-visible pollutants: spill/BMP failure based on pollutant source assessment	Within first two hours of discharge from site. Collect samples of runoff affected by the spilled or released material(s) and runoff unaffected by the spilled or released material(s).
	Contained rain water	At time of discharge.
	Receiving water sampling	If an <u>NEL</u> is exceeded at a project that has a <u>direct discharge</u> to the receiving water, subsequently sample receiving water for turbidity and SSC (if turbidity NEL exceeded), and pH (if pH NEL exceeded). Sample upstream and downstream of point of discharge in to receiving water.
	Bioassessment	Projects 30 acres or greater that directly discharge to wadeable stream. See Appendix E of the handbook for more information on bioassessment monitoring. Conduct monitoring up- and down-stream of point of runoff discharge into the receiving water. Conduct monitoring before start of construction activity and after completion.
	Non-stormwater	At locations where discharged off the site.
	Particle size	When sediment basins are used. If needed to justify site specific sediment risk using RUSLE.
	Other	RWQCB or TMDLs may require other monitoring.

Continued

Table D-4 Summary of Risk Level 3 Monitoring

	Type of Monitoring	When
Visual Inspections	Non-stormwater inspection	Quarterly for each drainage area.
	Qualifying rain event: Pre-rain inspection	All drainage areas, BMPs, and stormwater containments within two business days of each qualifying rain event.
	Qualifying rain event: Post-rain inspection	All discharge locations within two business days after each qualifying rain event. Visually observe discharge of contained stormwater when discharged.
	During rain inspection	See BMP inspection below.
	BMP	Weekly and every 24 hours during extended storm events.

2.2 Purpose of the Construction Site Monitoring Program

The purpose of the CSMP is to address the following objectives:

- To demonstrate that the site is in compliance with the applicable discharge prohibitions, Numeric Action Levels (NALs), or Numeric Effluent Limitations (NELs);
- To determine whether non-visible pollutants are present at the construction site and are causing or contributing to exceedances of water quality objectives;
- 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; and
- To determine whether BMPs included in the SWPPP and/or Rain Event Action Plan (REAP) are effective in preventing or reducing pollutants in stormwater discharges and authorized non-stormwater discharges.

2.3 Implementing a CSMP

The General Permit includes specific requirements regarding the implementation of SWPPPs and CSMPs. Each construction site must have a Qualified SWPPP Practitioner (QSP) to oversee the implementation of the CSMP including the BMP inspections, rain-event triggered inspections, and the collection of water quality samples. The QSP may delegate any or all of these activities to an employee trained to do the task(s) but the QSP must supervise the delegated tasks.

3.0 Traditional Construction Site Monitoring

The General Permit distinguishes between traditional construction projects and LUPs. This section addresses the requirements of traditional site monitoring (as identified in General Permit Attachments C, D, and E). While general information such as sampling techniques is transferrable, LUP operators should refer to General Permit Attachment A for details of the LUP monitoring requirements. Requirements specific to ATS, as identified in General Permit Attachment F, are addressed in Section 4 of this guidance document.

Monitoring at construction sites includes visual monitoring (inspections) and sampling and analysis. As noted in Section 2, monitoring requirements vary based on the project risk level.

3.1 Visual Monitoring (Inspection)

All sites (Risk Levels 1, 2, and 3) are required to conduct visual monitoring (inspections). Visual monitoring includes inspections of BMPs, inspections before and after qualifying rain events, and inspection for non-stormwater discharges. Visual inspections are required for the duration of the project with the goal of confirming that appropriately selected BMPs have been implemented, are being maintained, and are effective in preventing potential pollutants from coming in contact with stormwater.

3.1.1 BMP Inspections

The General Permit requires that BMPs be inspected weekly and once each 24-hour period during extended storm events. The purpose of these inspections is to identify BMPs that:

- Need maintenance to operate effectively;
- Failed; or
- Could fail to operate as intended.

If deficiencies are identified during BMP inspections, repairs or design changes to BMPs must be initiated within 72 hours of identification and need to be completed as soon as possible.

All BMP inspections must be documented on an inspection checklist. Check with the State Water Resources Control Board (SWRCB) or local RWQCB to see if they have a preferred inspection checklist to use as a template or guide for the BMP checklist. The checklist should be made site specific based on the BMPs and outfalls for each construction project, but at minimum the form should include:

- Inspection date and date the inspection report was written;
- Weather information, including presence or absence of precipitation, estimate of the beginning of qualifying storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall in inches;
- Site information, including stage of construction, activities completed, and approximate area of the site exposed;
- A description of the BMPs evaluated and any deficiencies noted;
- If the construction site is safely accessible during inclement weather, list the observations of all BMPs: erosion controls, sediment controls, chemical and waste controls, and non-stormwater controls. Otherwise, list the results of visual inspections at all relevant outfalls, discharge points, downstream locations, and identify any projected maintenance activities;
- Report the presence of noticeable odors or any visible sheen on the surface of any dischargers;
- Any corrective actions required, including any necessary changes to the SWPPP and the associated implementation dates;
- Photographs taken during the inspection, if any; and
- Inspector's name, title, and signature.

An example Visual Inspection Field Log Sheet is included in Section 8.0 of this guidance document, and an electronic copy of the form (Microsoft Word®) can be downloaded from the CASQA BMP Handbook web site at <http://www.casqa.org>. This form is suitable to document the basic information needed for BMP inspection, but must be supplemented with a site-specific BMP inspection checklist.

3.1.2 Qualifying Rain Event Inspections

The General Permit requires that the construction site be inspected within two days prior to a predicted qualifying rain event and within two days after a qualifying rain event. These inspections are only required during normal business hours of the construction site.

The General Permit requires that dischargers only use weather forecasts from the National Oceanographic and Atmospheric Administration (NOAA). Pre-project inspections should be initiated after consulting NOAA for a qualifying rain event with 50% or greater probability of precipitation (PoP). These forecasts can be obtained at <http://www.srh.noaa.gov/>.

Qualifying Rain Event

The General Permit defines a *qualifying rain event* as one that produces ½-inch or more of precipitation with a 48 hour or greater period between rain events.

Records must be kept of all qualifying rain event inspections. Records need to be maintained on site and document:

- Personnel performing the observations;
- Observation dates (time and date);
- Weather conditions (including the rain gauge reading for the qualifying rain event);
- Locations observed; and
- Corrective actions taken in response to observations.

An example of a Visual Inspection Field Log Sheet is included in Section 8.0 of this guidance document.

3.1.2.1 *Pre-Rain Event Inspection*

The purpose of the pre-rain event inspection is to make sure the site and the BMPs are ready for the predicted rain. The pre-rain event inspection needs to cover:

- All stormwater drainage areas to identify any spills, leaks, or uncontrolled pollutant sources;
- All BMPs to identify whether they have been properly implemented per the SWPPP and/or REAP;
- Stormwater storage and containment areas to detect leaks and ensure maintenance of adequate freeboard; and
- The presence or absence of floating and suspended materials, a sheen on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants within stored stormwater.

3.1.2.2 *Post-Rain Event Inspection*

The purpose of the post-rain event inspection is to observe the discharge locations and the discharge of any stored or contained rainwater; determine if BMPs functioned as designed; and identify if any additional BMPs are required. The post-rain event inspection needs to cover:

- All stormwater discharge locations;
- The discharge of stored or contained stormwater that is derived from and discharged subsequent to a qualifying rain event; and
- All BMPs to determine if they were adequately designed, implemented, and effective. After assessing BMPs it should be noted on the inspection form whether the BMPs need maintenance.

3.1.3 Non-Stormwater Discharges Inspections

The General Permit requires that construction sites, regardless of risk level, be inspected quarterly for the presence of non-stormwater discharges. Records must be kept of all inspections and must be maintained on site.

Non-stormwater discharge inspections are only required during normal business hours of the construction site. The purpose of these inspections is to detect unauthorized non-stormwater discharges and observe authorized non-stormwater discharges. Quarterly inspections need to include each drainage area of the project and document:

- Presence or indications of unauthorized and authorized non-stormwater discharges and their sources;
- Pollutant characteristics of the non-stormwater discharge (floating and suspended material, sheen, discoloration, turbidity, odor, etc);
- Personnel performing the observations;
- Dates and approximate time each drainage area and non-stormwater discharge was observed; and
- Response taken to observations.

If the site is Risk Level 2 or 3 and there are non-stormwater discharges, then samples must be collected and analyzed.

An example Visual Inspection Field Log Sheet is included in Section 8.0 of this guidance document.

3.2 Water Quality Sampling and Analysis Procedures

The purpose of sampling is to determine whether BMPs implemented on a construction site are effective in controlling potential construction site pollutants, which come in contact with stormwater or non-stormwater, and to demonstrate compliance with the applicable NALs or NELs.

This section discusses the procedures and the information that need to be included in the CSMP for water quality sampling and analysis. This section is divided into the following:

- Potential pollutant sources;
- Monitoring constituents by risk level;
- Sampling locations;
- Sample collection and handling; and
- Analytical methods, laboratories, and field meters.

Water quality sampling and analysis is required for all Risk Level 2 and 3 projects. Typically, Risk Level 1 projects are not required to conduct water quality sampling and analysis unless there is a risk of non-visible pollutant discharge.

3.2.1 Potential Pollutant Sources

3.2.1.1 Sediment and Turbidity

Conditions or areas at a construction site that may cause sediment, silt, and/or turbidity in site runoff include:

- Exposed soil areas with inadequate erosion control measures;
- Areas of active grading;
- Poorly stabilized slopes;
- Lack of perimeter sediment controls;
- Areas of concentrated flow on unprotected soils;
- Poorly maintained erosion and sediment control measures;
- Tracking sediment onto roads and paved surfaces;
- Unprotected soil stockpiles; and
- Failure of an erosion or sediment control measure.

3.2.1.2 High pH

Conditions or areas at a construction site that may cause high pH in site discharges include:

- Concrete pours and curing;
- Concrete waste management areas;
- Soil amendments (e.g. fly ash and lime); and
- Mortar and stucco mixing, application, and waste management areas.

3.2.1.3 Non-Visible Pollutants

Monitoring for pollutants not visually detectable is only required if those pollutants are determined to be potentially present in stormwater leaving the construction site; and is typically the result of a BMP failure or spill on the construction site. This determination is documented in the pollutant source assessment in the SWPPP.

Projects should attempt to eliminate the exposure of construction materials to prevent stormwater pollution and limit sampling and analysis requirements. It is important to note that covered construction materials or those that are in their final constructed form, do not need to be monitored. Materials that are stored exposed to precipitation and may generate runoff need to be considered for non-visible pollutant monitoring.

Non-visible pollutants may also exist on the project site as a result of the land use prior to the start of the construction activity. To determine the potential of pollutants to exist on the construction site as a result of past land use activities, dischargers should review existing environmental and real estate documentation. Good sources of information on previously existing contamination and past land uses include, but are not limited to, the following:

- Initial Studies or Environmental Impact Reports (EIRs) prepared under the requirements of the California Environmental Quality Act (CEQA);
- Environmental Assessments or Environmental Impact Statements (EIS) prepared under the requirements of the National Environmental Policy Act (NEPA); and
- Phase I Assessments prepared for property transfers.

Non-visible pollutants in site discharges may result from materials that:

- Are being used in construction activities;
- Are stored on the construction site;
- Were spilled during construction operations and not cleaned up;
- Were stored (or used) in a manner that presented the potential for a release of the material during past land use activities;
- Were spilled during previous land use activities and not cleaned up; or
- Were applied to soil as part of past land use activities.

3.2.2 Monitoring Constituents by Risk Level

Risk Level 1

- Risk Level 1 projects are only required to collect water quality samples if there is a BMP breach, malfunction, leakage, or spill. Water quality samples should be taken for non-visible pollutants that may have been discharged from the site as identified in the site pollutant source assessment (see Section 3.2.1 of this guidance document).
- Particle size analysis may be needed if a Risk Level 1 project is using a sediment basin or if needed to justify a site specific risk level calculation using the Revised Universal Soil Loss Equation (RUSLE). The particle size analysis provides the information needed to determine the K-factor.

Risk Level 2

- At a minimum, Risk Level 2 projects are required to collect water quality samples for pH (during construction phases with a high risk of high pH discharge) and turbidity (all phases). Additional monitoring may be required by the RWQCB.
- Risk Level 2 projects are required to collect water quality samples if there is a BMP breach, malfunction, leakage, or spill. Water quality samples should be taken for non-visible pollutants that may have been discharged from the site as identified in the site pollutant source assessment (see Section 3.2.1 of this guidance document).
- Particle size analysis may be needed if a Risk Level 2 project is using a sediment basin or if needed to justify a site specific risk level calculation using RUSLE. The particle size analysis provides the information needed to determine the K-factor.

Risk Level 3

- Risk Level 3 projects are required to collect water quality samples for pH (during construction phases with a high risk of high pH discharge) and turbidity (all phases). Additional monitoring may be required by the RWQCB.

- Risk Level 3 projects are required to collect water quality samples if there is a BMP breach, malfunction, leakage, or spill. Water quality samples should be taken for non-visible pollutants that may have been discharged from the site as identified in the site pollutant source assessment (see Section 3.2.1 of this guidance document).
- Particle size analysis may be needed if a Risk Level 3 project is using a sediment basin or if needed to justify a site specific risk level calculation using RUSLE. The particle size analysis provides the information needed to determine the K-factor.
- Risk Level 3 projects must collect water quality samples for suspended sediment concentration (SSC) if the turbidity NEL is exceeded. Once triggered, SSC monitoring must continue until the project has been completed.
- Additionally, Risk Level 3 projects must conduct a bioassessment study consistent with the General Permit (See Appendix E of the handbook for more information on bioassessment monitoring.)

3.2.3 Sampling Locations

3.2.3.1 Stormwater Runoff

Risk Level 2 and 3 projects are required to collect water quality samples of runoff that is discharged off-site. Samples must be representative of the runoff associated with construction activity from the entire project disturbed area. Samples locations representative of runoff in each drainage area should be considered to ensure adequate representation of the flow and characteristics of the site's discharges.

3.2.3.2 Non-Stormwater Runoff

Risk Level 2 and 3 projects are also required to collect water quality samples to characterize authorized and unauthorized non-stormwater discharged from the site.

3.2.3.3 Receiving Water

Following the exceedance of a NEL at a Risk Level 3 project that has a direct discharge to the receiving water, the project is required to collect receiving water samples for the duration of the construction project. Samples must be taken at representative upstream/upgradient and downstream/downgradient locations as close as possible to the point where the site's runoff enters the receiving water. If there are two or more discharge locations discharging to the same receiving water, only one upstream and one downstream sampling locations is required. Samples should only be collected from safe accessible locations.

Projects required to conduct bioassessment monitoring must identify monitoring locations upstream and downstream of the point where construction site runoff enters the wadeable stream. Sampling events must occur before the start of ground disturbing activities during the appropriate index period and must be repeated after the completion of construction (at least one winter season after project related ground disturbance has ceased).

3.2.3.4 Non-Visible Pollutant Monitoring

In situations where a breach, malfunction, leakage, or spill has occurred, dischargers must collect a sample of runoff that has come into contact with the no come in contact with the materials and must also collect a runoff sample that has not come into contact materials (uncontaminated sample) for comparison.

3.2.4 Sample Collection and Handling

It is important to use the correct methods to collect and handle samples to ensure the samples are valid. While the handling requirements apply primarily to grab samples collected for laboratory analysis, field measurements can be affected by sample collection procedures.

The General Permit requires dischargers to designate and train personnel to collect, maintain, and ship water quality samples in accordance with the *Surface Water Ambient Monitoring Program (SWAMP) 2008 Quality Assurance Program Plan (QAPrP)*, which is available at http://www.swrcb.ca.gov/water_issues/programs/swamp/tools.shtml#qa.

Sampling methods, handling procedures, and locations should be identified in advance of the sampling event in order to provide sufficient time to gather the supplies and equipment necessary to sample and plan for safe access by the sampling crew(s).

Adherence to SWAMP sampling guidance and proper development of a sampling plan provides for consistent, reproducible, and accurate results. For some constituents, especially trace metals, trace organics, and organic carbon, sampling protocols are very important as contamination of samples due to incorrect sampling protocols is possible. Design of the field sampling procedures should carefully consider contamination potential from sample location (e.g., sediment disturbances, equipment exhaust), sampling techniques, and sample handling. Field crews should be trained in the appropriate site specific methods specified in the sampling plan. “Clean sampling” based on the US Environmental Protection Agency (EPA) Method 1669 should be used when sufficiently low detection concentrations are expected for at least trace metals and mercury. However, it is recommended that all sampling plans incorporate a “clean technique” approach including the following protocols:

- Samples (for laboratory analysis) are collected only in analytical laboratory-provided sample containers;
- Clean, powder-free nitrile gloves should be worn for collection of samples;
- Gloves are changed whenever something not known to be clean has been touched;
- Decontaminate all equipment (e.g. bucket, tubing) except laboratory provided sample containers, prior to sample collection using a trisodium phosphate (TSP)-soapy 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); and
- To reduce potential contamination, sample collection personnel must adhere to the following rules while collecting samples:
 - No smoking;
 - 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.

Water quality samples should be collected in appropriate sample containers and be of adequate volume to conduct the required measurements or laboratory analyses.

The most important aspect of grab sampling is to make sure that the sample best represents the entire runoff stream. Typically, samples are collected by dipping the collection container in the runoff flow paths and streams as noted below. Note, however that depending upon the specific test that is required, some bottles may contain preservatives. These bottles should never be dipped into the stream, but filled indirectly from the collection container.

- 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.

All sampling and sample preservation must be in accordance with the current edition of *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association).

SSC samples should be taken as a normal grab sample, where the bottle is submerged facing upstream and filled. SSC samples need to be collected in a separate bottle because the analysis requires the entire volume of the bottle. Many grab samples can be partitioned out of a larger container used to collect the samples for various analyses but that is not the case for SSC.

All samples 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. Shipped samples should be placed 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. Many analytical methods have short hold-times before which the analysis must be started. Hold times are measured from the time the sample is collected to the time the sample is analyzed. The General Permit requires that samples be received by the analytical laboratory within 48 hours of the physical sampling (unless otherwise required by the analytical laboratory).

Most sites will require the use of some sort of field meter to measure turbidity and pH. Some field meters can be placed directly in the flow of water and gather instantaneous data. Meters with probes that can be directly placed into the flow are ideal, however low flow conditions may not allow for this type of measurement. In this case, grab samples can be collected and placed within the field meter's recording container. Section 7.0 of this guidance document provides step-by-step instructions using an example field meter.

All monitoring instruments and equipment (including a discharger's own field instruments for measuring pH and turbidity) should be calibrated and maintained in accordance with manufacturers' specifications to ensure accurate measurements. Many manufacturers provide step-by-step instructions for the use and calibration of their meters and these instructions should be followed.

If using field meters, pH and turbidity measurements should be conducted immediately (i.e. samples should not be stored for later measurement).

Collect proper information regarding time and sampling conditions, appropriately label the bottles, and fill out the required chain of custody forms and field logs.

3.2.5 Analytical Methods, Laboratories, and Field Meters

All laboratory analyses must be conducted according to analytical procedures specified in 40 Code of Federal Regulations (CFR) Part 136, unless other analytical procedures have been specified in the General Permit or by the RWQCB. With the exception of field analyses conducted by the discharger for turbidity and pH, all analyses must be sent to and conducted by a state-certified analytical laboratory. Currently, the SSC method is not state certified and a limited number of laboratories have the capability of doing this analysis.

Analytical laboratories should be contacted and a contract should be worked out before the wet season to minimize potential disruptions during the critical sampling period. A laboratory should be chosen foremost by their accreditation, ability to perform the required samples in the desired turn-around-time, and then by their proximity for ease of sample delivery. Although with overnight mail delivery, proximity is less important, it may still be an important factor to avoid bottle breakage during shipment.

State-certified analytical laboratories can be found by using the Environmental Laboratory Accreditation Program's (ELAP) website at:

<http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx>.

The analytical method/protocol, minimum detection limits, and reporting units for the water quality constituents specifically identified in the General Permit are presented in Table D-5.

Table D-5 Water Quality Constituent Analytical Method/Protocol, Minimum Detection Limits, Sample Size and Container Requirements

Parameter	Test Method/Protocol	Minimum Detection Limit	Minimum Sample Volume	Container Type
pH	Field meter or pH test kit	0.2 pH Units	NA	Plastic
Turbidity	Field meter or EPA 180.1	1 NTU	500 mL	Plastic
SSC	<u>ASTM Method D 3977-97</u>	5 mg/L	200 mL	Contact Lab

Non-visible pollutants may include a wide range of analytical methods. A list of potential non-visible pollutants based on common construction activities is shown in Table D-6. This list is not meant to be inclusive but to provide general guidance for projects. Consult with the analytical laboratory or 40 CFR Part 136 to identify specific analytical methods, sample volume, and containers needed for the expected non-visible pollutants.

Dischargers can perform pH analysis on site with a calibrated pH meter, or pH test kit. Dischargers can perform turbidity analysis using a calibrated turbidity meter (turbidimeter), either on site or at an accredited analytical laboratory.

Many manufacturers offer single parameter meters or multiple parameter meters with various optional probes. Dischargers will need to determine the best type of meter for their individual situation. Any meter selected for field monitoring should have the ability to be calibrated, be accompanied by detailed operation instructions, and should be ruggedly designed for field use and long term storage (you are unlikely to need it during the dry season).

Table D-6 Potential Non-Visible Pollutants based on Common Construction Activities

Activity	Potential Pollutant Source	Laboratory Analysis
Water line flushing	Chlorinated water	Residual chlorine
Portable toilets	Bacteria, disinfectants	Total/fecal coliform
Concrete & Masonry	Acid wash	pH
	Curing compounds	pH, alkalinity, Volatile organic compounds (VOCs)
	Concrete rinse water	pH
Painting	Resins	Semi-volatile organic compounds (SVOCs)
	Thinners	Phenols, VOCs
	Paint Strippers	VOCs
	Solvents	Phenols, VOCs
	Adhesives	Phenols, SVOCs
	Sealants	SVOCs
Cleaning	Detergents	Methylene Blue Activated Substances (MBAS), phosphates
	Bleaches	Residual chlorine
	Solvents	VOCs
Landscaping	Pesticides/Herbicides	Check with analytical laboratory
	Fertilizers	NO ₃ /NH ₃ /P
	Lime and gypsum	Acidity/alkalinity
	Aluminum sulfate, sulfur	Total dissolved solids (TDS), alkalinity
Treated wood	Copper, arsenic, selenium	Metals
Soil amendments & dust control	Lime, gypsum	pH
	Plant gums	Biochemical oxygen demand (BOD)
	Magnesium chloride	Alkalinity, TDS
	Calcium chloride	Alkalinity, TDS
	Natural brines	Alkalinity, TDS
	Lignosulfonates	Alkalinity, TDS

Hand held single parameters are usually the least costly and are designed with a user friendly interface. Multi-parameter meters are more costly, but provide increased versatility, have user friendly interfaces, and can provide instantaneous readings of multiple parameters. Probes for the multi-parameter meters can be attached to cables of varying lengths that make it possible to sample at a greater distance from the runoff flow.

Hach, Hydrolab, Global Water, Fisher Scientific, and LaMott are some known manufacturers and/or vendors of turbidity and pH meters. Whichever turbidimeter is selected, it is important to use the same meter; different meters may have different results even if properly calibrated. If you need to use several turbidimeters, then assign to each meter to a specific location.

Bioassessment sampling and analysis is conducted according to Appendix 5 of the General Permit. Bioassessment sampling protocols are defined by *Standard Operating Procedures for Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California* (Ode, 2007). Bioassessment laboratory protocols are defined by Standard Taxonomic Effort (STE) Level I of the Southwestern Association of Freshwater Invertebrate Taxonomists (Richards and Rogers, 2006). Bioassessments are conducted before the start of ground disturbing activities and after these activities are completed. More information on bioassessment monitoring is provided in Appendix E of this handbook.

Dischargers utilizing a sediment basin are required to conduct a soil particle analysis. Dischargers may also want to conduct this analysis to establish site-specific particle size information, which can be used to justify the project risk level using RUSLE. (The particle size analysis provides the K factor.) The soil particle analysis is conducted using the American Society for Testing and Materials (ASTM) test method ASTM D-422 (Standard Test Method for Particle-Size Analysis of Soils), as revised, to determine the percentages of sand, very fine sand, silt, and clay on the site. The percentages of particles less than 0.02 mm in diameter must also be determined. This analysis is conducted before construction starts and is reported with the Permit Registration Documents (PRDs).

3.3 Watershed Monitoring Option

Dischargers who are part of a qualified regional watershed-based monitoring program may be eligible for relief from the sampling and analysis requirements. The RWQCB may approve proposals to substitute an acceptable watershed-based monitoring program by determining if the watershed-based monitoring program will provide substantially similar monitoring information in evaluating discharger compliance with the requirements of the General Permit.

3.4 Monitoring Exemptions

Dischargers are not required to physically collect samples or conduct visual observations during dangerous weather conditions (flooding, electrical storms, etc.) or outside of scheduled construction site business hours. An explanation must be provided in the Annual Report if a project was unable to collect required samples or visual observations because of dangerous weather conditions.

4.0 Active Treatment System Monitoring

4.1 Introduction

Projects choosing to use ATS are subject to additional monitoring requirements specific to operation of the ATS. An ATS is defined in the General Permit as any system that utilizes chemical coagulation, chemical flocculation, or electrocoagulation to reduce turbidity caused by fine suspended sediment. Typically an ATS is considered for use as a BMP at sites with sediment sensitive receiving waters, high concentrations of fine clayey soils, limited space for sediment control structures, or long and steep slopes.

The General Permit specifies a turbidity NEL for ATS discharge that is different than the NEL for Risk Level 3 sites, and sets limits for chemical residual and toxicity (Table D-7).

Table D-7 Summary of ATS discharge limitations

Parameter	Limitation	ATS Type
Turbidity	10 NTU daily flow-weighted average and 20 NTU single sample maximum	All
Chemical residual	10% or less of Maximum Allowable Threshold Concentration (MATC)	Flow-through systems
Toxicity	no allowable toxic effects	Batch systems

This section identifies special inspection and sampling requirements, protocols, and methodologies required for operation of an ATS. These generally include:

- Influent and effluent flow, turbidity, and pH monitoring;
- Effluent toxicity and chemical residuals testing;
- Dose-rates and adjustments for chemical treatment and pH adjustment;
- Laboratory and field Quality Assurance (QA) requirements specific to ATS; and
- Recordkeeping and reporting requirements.

4.1.1 Types of ATS

An ATS can be designed as a batch treatment system using either ponds or portable trailer-mounted tanks, or as a flow-through system using any number of proprietary system designs.

4.1.1.1 Batch Treatment

Batch treatment systems consist of the stormwater collection system (either temporary diversion or the permanent site drainage system); a sediment basin, trap or holding tanks for untreated runoff; pumps; a chemical feed system; treatment cells; and, interconnecting piping. Batch treatment systems should use a minimum of two lined treatment cells. Generally, untreated runoff is pumped from the holding basins/tanks, through a chemical injection system into treatment cells. Multiple treatment cells allow for clarification of treated water while other cells are being filled or emptied. Treatment cells may be basins, traps, or tanks. Portable tanks may also be suitable for some sites. The General Permit requires that batch treatment systems have a filtration step to remove residual floc prior to discharge.

4.1.1.2 Flow-through Treatment

At a minimum, a flow-through ATS system consists of the stormwater collection system (either temporary diversion or the permanent site drainage system), an untreated stormwater storage pond or holding tank, and a chemically enhanced filtration system.

Stormwater is collected throughout the site and is diverted by gravity or by pumping to an untreated stormwater storage pond or other untreated stormwater holding area. The stormwater is stored until treatment occurs. It is important that the holding pond be large enough to provide adequate storage.

Stormwater is then pumped from the untreated stormwater storage pond to the chemically enhanced filtration system where polymer is added. Adjustments to pH may be necessary before chemical addition. The filtration system continually monitors the stormwater for

turbidity and pH. If the discharge water is out of the acceptable turbidity or pH range, the water is recycled to the untreated stormwater pond (or holding tank) where it can be retreated.

Figure D-1 provides a schematic of a typical flow-through ATS.

In order to use a flow through system, the General Permit requires that there be a chemical residual test for the coagulation that provides a level of detection at least 10% below than the maximum allowable threshold concentration (MATC). See Section 4.3.1 below.

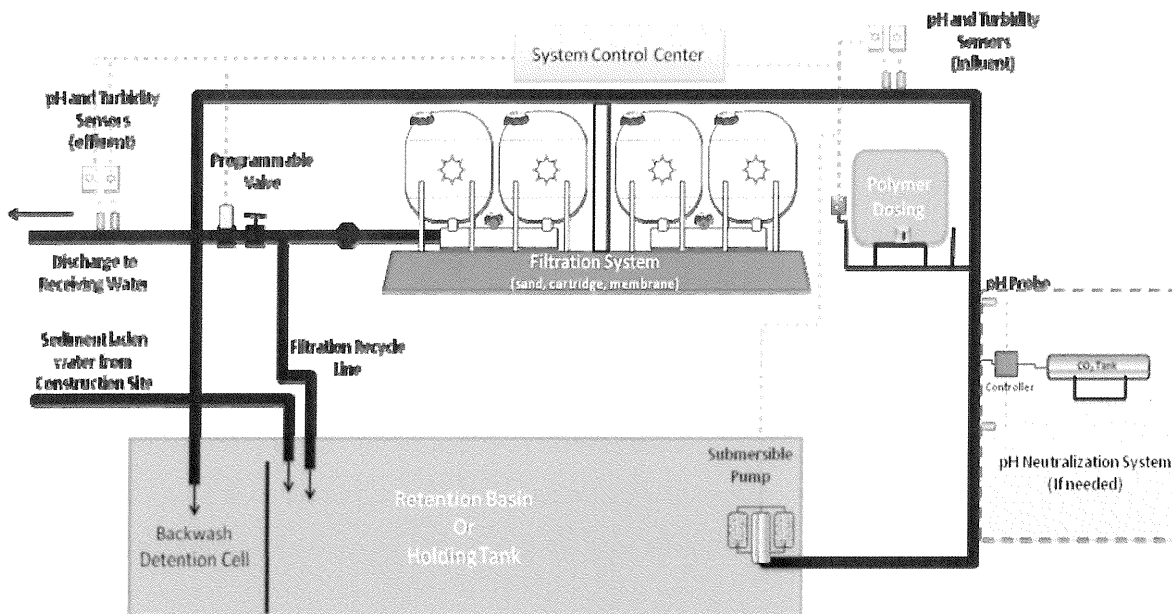


Figure D-1. Typical Flow Through ATS. (Figure adapted from Feldman, 2006.)

4.1.2 ATS Plan

Prior to utilizing an ATS system, the discharger is required to submit an ATS Plan to the SWRCB, which contains the following components:

- ATS Operation and Maintenance Manual for All Equipment;
- ATS Monitoring, Sampling & Reporting Plan (MSRP), including Quality Assurance (QA)/Quality Control (QC);
- ATS Health and Safety Plan;
- ATS Spill Prevention Plan.

As part of the ATS MSRP, and prior to implementing an ATS on a construction site, jar tests are required to be conducted for any chemical/coagulant proposed to be utilized. Jar tests must be conducted according to ASTM D-2035-08, which generally requires simultaneous introduction of an aqueous chemical solution (in different concentrations) to turbid water samples created with site-specific soils contained in six jars set at a specified distance apart, all being actively mixed. Time until particle settling is recorded, and samples from each jar are tested for turbidity, pH, and chemical residual (if test is available). Refer to the ASTM standard for specific requirements. Commercial ATS providers will generally perform jar testing on site-specific soils prior to ATS set-up to determine the appropriate chemical and dosage to optimize settling.

A QA/QC Plan should be prepared as part of the MSRP that is consistent with the QA/QC elements that apply to general field monitoring identified in Section 5.0 of this guidance document. Additional QA/QC requirements specific to ATS include monthly laboratory duplicates to verify chemical residual levels obtained from field measurements, calibration schedules of automated instrumentation (see Section 7.1 of this guidance document), and method detection limits for chemicals being used. These elements should also be included in the required QA/QC Plan.

4.1.3 Required Training for ATS Operation and Monitoring

The General Permit requires that ATS Operators have training specific to using an ATS and liquid coagulants for stormwater discharges. The training is required to consist of a formal class with a certificate and requirements for testing and certificate renewal and include a minimum of eight hours classroom and 32 hours field training. Within the classroom training, the following monitoring components are required:

- ATS Control Systems;
- Coagulant Selection – Jar testing, dose determination, etc.;
- Aquatic Safety/Toxicity of Coagulants – proper handling and safety;
- Monitoring, Sampling, and Analysis;
- Reporting and Recordkeeping; and
- Emergency Response.

4.2 Visual Monitoring (Inspection)

A designated responsible person is required to be on site daily at all times during treatment operations. Daily on site visual monitoring of the system for proper performance is required to be conducted and recorded in a project field data log. Minimum requirements for the log include:

- Name and phone number of the person responsible for system operation and monitoring;
- Documentation of required training;
- Visual observations of system operation and discharge;
- Date and time of sample collection and flow measurements; and
- Results of field-measured parameters.

4.3 Operational and Compliance Monitoring Procedures

All ATS systems (both batch and flow-through) must have instrumentation that automatically measures and records effluent water quality and flow data. This instrumentation typically will include (1) mounted submersible pH and turbidity probes; (2) data loggers (field-read or internet-based); and (3) a system control panel that provides automatic shut off or recirculation in case of water quality or effluent limitation violation, power-loss, or other catastrophic event. The system control panel must also control coagulant dosing to prevent accidental overdosing. The majority of ATS (including both flow-through and batch systems) will likely be designed, supplied, or monitored by established commercial ATS providers, and these systems must be designed and instrumented to meet the General Permit criteria. Dischargers choosing to implement a non-proprietary ATS must obtain appropriate equipment to ensure all requirements of the General Permit are met. The following parameters must be monitored

continuously and recorded in the project field data log (see Section 5.1 of this guidance document) in no less than 15 minute intervals:

- Flow rate and volume of treated discharge;
- Influent and effluent pH; and
- Influent and effluent turbidity.

The following additional parameters must also be monitored and recorded at the intervals specified below:

- Cumulative flow volume – daily;
- Type and amount of pH adjustment chemical – as utilized;
- Dose rate of treatment chemical – 15 minutes after startup and every 8 hours of operation;
- Residual chemical/additive levels – as proposed in ATS Plan for flow-through systems (see Section 4.3.1 below); and
- Effluent toxicity – for each proposed batch discharge (see Section 4.3.2 below).

All instrumentation used for continuous monitoring must be calibrated on a regular basis with calibration requirements stated in the QA/QC section of the ATS Plan. Calibration is further described in Section 7.1 of this guidance document.

4.3.1 Effluent Residual Chemical Testing – Flow-through systems

The General Permit requires that the effluent from a flow-through system be tested for residual treatment chemicals; however, sample collection frequency is not specified. The residual chemical treatment test must be conducted in accordance with a methodology that is approved by a state-certified laboratory. All sample collection for residual chemical testing should be performed in accordance with sample collection procedures outlined in Section 3.2.4 of this guidance document and should be representative of the discharge from the ATS. Specific protocol for performing the residual test, including required frequency and method detection limits, will need to be developed for each proposed chemical and provided as part of the ATS Plan.

The General Permit requires that a residual chemical test method shall be used that has a method detection limit (MDL) of 10% or less than the maximum allowable threshold concentration (MATC) for the species that is most sensitive to the chemical used and that the test be able to be completed within one hour of sample collection (i.e., a short-duration field test). The MATC is equal to the geometric mean of the No Observed Effect Concentration (NOEC) and Lowest Observed Effect Concentration (LOEC) Acute and Chronic toxicity results for the most sensitive species determined for the specific chemical.

4.3.2 Effluent Toxicity Testing – Batch systems

For batch treatment systems that typically use coagulants for which no chemical residual test has currently been developed (and therefore dischargers cannot use flow-through treatment), dischargers are required to perform Whole Effluent Toxicity (WET) testing on the treated water prior to discharge. All samples collected and shipped for WET testing should be performed in accordance with sample collection and shipping procedures outlined in Section 3.2.4 of this guidance document and other requirements specified by the toxicity laboratory and should be representative of the batch discharge. Samples must be sent to a laboratory certified by the Department of Public Health ELAP to perform WET testing (identifier - E113) in accordance

with the 96-hour acute test in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, EPA-841-R-02-012 (USEPA, 2002)* for Fathead minnow (*Pimephales promelas*). Acute toxicity testing for Rainbow trout (*Oncorhynchus mykiss*) may be substituted.

The General Permit only requires that the toxicity test be initiated prior to discharging each treated batch.

4.4 Reporting and Record Retention

The General Permit requires the electronic submission of all ATS related field monitoring data, including chemical residual and effluent toxicity testing, to the SWRCB's Stormwater Multi-Application and Report Tracking System (SMARTS) every 30 days, at minimum.

Any monitoring data that violate water quality standards must be reported to the RWQCB. An NEL Violation Report must be electronically filed in SMARTS within 24 hours of identifying an exceedance of an NEL. See Section 6.2 of this guidance document for a discussion of NEL Violation Reports.

All ATS records must also be kept for a minimum of three years after the conclusion of the project (see discussion in Section 6.4 of this guidance document).

5.0 Quality Assurance/Quality Control

An effective QA/QC plan will 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;
- Sample Chains of Custody (COCs); and
- Data verification.

Each of these procedures is discussed in more detail in the following sections.

5.1 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.

Examples of field logs to record visual inspections and sample collection and field measurements are provided in Section 8.0 of this guidance document and electronic copies of the forms (Microsoft Word®) can be downloaded from the CASQA BMP Handbook web site at <http://www.casqa.org>.

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

5.3 Sample 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.

5.4 Data Verification

After analytical results are received from the analytical laboratory, the data should be verified to ensure that it is complete, accurate, and the appropriate QA/QC requirements were met. Data should be verified as soon as the data reports are received.

The COC and laboratory reports need to be checked to make sure all requested analysis 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. Attention should be paid to data that is an order of magnitude or more different than similar locations, or is inconsistent with previous data from the same location.

For laboratory analyses, EPA establishes QA/QC checks and acceptable criteria. These data are typically reported along with the sample results. Data reviewers should evaluate the reported QA/QC data to check for contamination (look at 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 expected range. Initial data, even if outside the expected range may not be discounted unless the analytical laboratory identifies the required QA/QC criteria were not met. If this occurs, the project should obtain a written statement from the analytical laboratory regarding the validity of the sample result.

Similarly, field data needs to be checked as soon as possible to identify potential errors. Reported data and observations should be verified to ensure that it is complete and accurate and as soon as the field logs are received.

Field logs should be checked to make sure all required measurements were completed and appropriately documented. Crews may occasionally miss-record a value. Reported values that appear out of the typical range or inconsistent, should be followed up on immediately to identify potential reporting or equipment problems.

Equipment calibration notations should be verified for outlier data, and if appropriate equipment calibrations should be checked after sampling. Observations noted on the field logs can also help to identify potential interferences. Notations should be made of any errors and actions taken to correct the equipment or recording errors.

When using a field meter it is important to record the value and then make note of any possible meter failures or interferences that could have led to an exceedance. Some possible instrument problems may include the need to recalibrate; the need to replace the battery; problems with the sample container (such as scratches on glass or plastic optical sample cells or particles on the outside of the optical sample cells); or fouled probes.

6.0 Reporting and Records Retention

Most reporting will typically occur in the Annual Report. However, Risk Level 3 dischargers must electronically submit all storm event sampling results (pH and turbidity) to the SWRCB's SMARTS no later than five days after the conclusion of the storm event. Field data related to ATS monitoring must be filed every 30 days.

Additional reporting is required if NALs or NELs are exceeded. The requirements for NAL Exceedance Reports and NEL Violation Reports as well as records retention are discussed in the following sections.

6.1 Numeric Action Level Exceedance Report

In the event that the storm event average of the samples exceeds an applicable NAL, Risk Level 2 and 3 dischargers must electronically submit all storm event sampling results to the SWRCB's SMARTS no later than 10 days after the conclusion of the storm event. (Note, however that Risk Level 3 dischargers must submit all field data regardless of exceedance status within five days of the storm event conclusion.) In addition, the RWQCBs may request the submittal of an NAL Exceedance Report. The discharger must certify each NAL Exceedance Report in accordance with the General Permit's Special Provisions for Construction Activity.

An NAL Exceedance Report must contain the following information:

- Analytical method(s), method reporting unit(s), and MDL(s) of each analytical parameter;
- Date, place, time of sampling, visual observation (inspections), and/or measurements, including precipitation; and
- Description of the current BMPs associated with the sample that exceeded the NAL and the proposed corrective actions taken.

6.2 Numeric Effluent Limitation Violation Report

In the event that the daily average of the samples exceed an applicable NEL, Risk Level 3 dischargers must electronically submit a NEL Violation Report to the SWRCB's SMARTS within 24 hours of identifying the exceedance. ATS dischargers must submit an NEL Violation Report to the SWRCB's SMARTS within 24 hours after the NEL exceedance has been identified. The discharger must certify each NEL Violation Report in accordance with the General Permit's Special Provisions for Construction Activity.

Similar to the NAL Exceedance Report, an NEL Violation Report contains the following information:

- Analytical method(s), method reporting unit(s), and MDL(s) of each analytical parameter;
- Date, place, time of sampling, visual observation (inspections), and/or measurements, including precipitation; and

- Description of the current BMPs associated with the effluent sample that exceeded the NEL and the proposed corrective actions taken.

In the event that an applicable NEL was exceeded during a storm event equal to or larger than the Compliance Storm Event (5-year, 24-hour event), Risk Level 3 and ATS dischargers must report the on-site rain gauge reading and nearby governmental rain gauge readings for verification. Projects affected by run-on from a natural disaster (such as a forest fire) are not subject to NELs. Exemption justifications must be entered in to SMARTS.

Risk Level 3 projects and sites using ATS are required to subsequently sample receiving waters for pH, turbidity, and SSC for the duration of coverage under the General Permit if an NEL contained in the General Permit is violated.

6.3 Annual Report

All dischargers are required to prepare and electronically submit an Annual Report no later than September 1 each year. The Annual Reports must be certified in accordance with the Special Provisions in the General Permit. The Annual Report must include the following stormwater monitoring information:

- A summary and evaluation of all sampling and analysis results, including original laboratory reports;
- The analytical method(s), method reporting unit(s), and MDL(s) of each analytical parameter (analytical results that are less than the MDL must be reported as “less than the MDL” or “<MDL”);
- A summary of all corrective actions taken during the compliance year;
- Identification of any compliance activities or corrective actions that were not implemented;
- A summary of all violations of the General Permit;
- The individual(s) who performed facility inspections, sampling, visual observation (inspections), and/or measurements;
- The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation (rain gauge); and
- The visual observations and sample collection exception records and reports.

6.4 Records Retention

Dischargers must retain records of all stormwater monitoring information and copies of all reports (including Annual Reports) for a period of at least three years from date of submittal or longer if required by the RWQCB. ATS dischargers must retain all records for three years after the completion of the construction project. Records are to be kept on site while construction is ongoing. These records include:

- The date, place, and time of facility inspections, sampling, visual observations (inspections), and/or measurements, including precipitation;
- The individual(s) who performed the facility inspections, sampling, visual observation (inspections), and/or measurements;
- The date and approximate time of analyses;

- The individual(s) who performed the analyses;
- A summary of all analytical results from the last three years, the method detection limits and reporting limits, and the analytical techniques or methods used;
- Rain gauge readings from site inspections;
- QA/QC records and results;
- Non-stormwater discharge inspections and visual observations (inspections) and stormwater discharge visual observation records;
- Visual observation and sample collection exemption records
- NAL Exceedance Reports and NEL Violation Reports; and
- The records of any corrective actions and follow-up activities that resulted from analytical results, visual observations (inspections), or inspections.

Results of field measurements and laboratory analyses must be kept in the SWPPP. It is also recommended that training logs, COCs, and other documentation related to sampling and analysis be kept with the project's SWPPP.

7.0 Guidance on Field Measurements

This section details the general practices for sampling using field meters. Before any sampling begins it is imperative to wear proper clothing and equipment. This includes the appropriate sampling safety equipment and powder-free nitrile gloves.

7.1 Instrument Calibration

Calibrate field meters and equipment before any sampling. Follow the calibration instructions provided by the manufacturer with your instrument. Calibration standards should be purchased with your instrument and repurchased as needed. The standards have limited shelf life and should not be used beyond the expiration date.

Most pH meters require a two or three point calibration curve; therefore you will need to purchase two or three different standard solutions. Typical solutions have pH values of 4, 7, and 10.

Turbidity measurements are also based on a two or three point curve and should include a zero value. It is very important to make sure that the turbidity standard solution is well mixed before meter calibration. Since turbidity standards sometimes contain suspended solids, inaccurate calibration can result if the standards are not properly mixed.

7.2 Field Meter Sampling

Measurement of turbidity and pH using a field meter is very similar. Figure D-2 shows an example of an all-in-one field meter, which among other things, records pH and turbidity. Since methods for specific field meters vary from model to model carefully follow the instructions provided by the manufacturer. This pictorial guide provides an outline for the methods appropriate for an all-in-one meter.

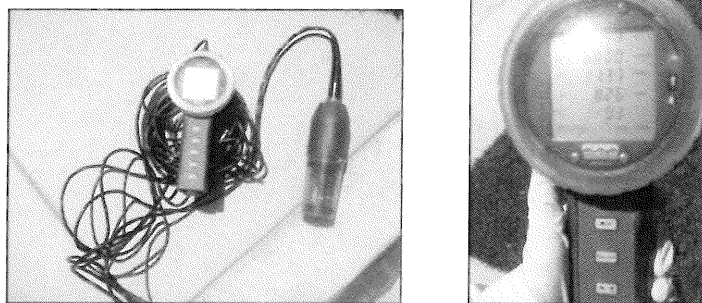


Figure D-2 Example of an All-In-One meter

7.2.1 Measurements in-stream

The simplest method is to place the sensor directly into the waterway or flow path (Figure D-3) and record the results. This will only work if there is significant runoff with a depth greater than six inches, which may not be the case at a construction site. With this method, it is important to not only to have runoff with a significant depth but to sample in a location that is representative of the entire flow. Avoid puddles that might have formed off of the main drainage.



Figure D-3 Measuring pH and turbidity in-stream measurements

7.2.2 Measurements in a sample container

Most likely the sampling will take place in low flow conditions so an intermediate container must be used. The container should be clean and decontaminated. Make sure to obtain a grab sample that represents site runoff conditions.

If two or more runoff streams originating from the site converge at one location downstream from the construction site, then collect a grab sample at this location.

Collect the field sample by holding the container in the flow path (Figure D-4) until enough water is obtained to fill the field meter's receiving container. In some cases, small, clean cups or sampling syringes may be needed to collect an adequate sample volume.



Figure D-4 Collecting grab samples



Figure D-5 Transferring sample to field meter sample container

Next pour the grab sample into the field meter's receiving container (Figure D-5).



Figure D-6 Inserting meter into sample container

Insert field meter into receiving container with the sample water (Figure D-6). This step will differ based on the design of the meter.



Figure D-7 Measuring pH and turbidity in the sample container

Wait for the pH and turbidity values to stabilize before recording the results, which may take few moments.

Complete the field logs (see examples provided in Section 8.0 of this guidance document) with results and any important information to describe the sampling settings. Include in the documentation any apparent odor, color, clarity, sheen, and other visual characteristics of the water sample.

8.0 Example Data Collection Forms

The following are sample field forms that can be used during inspections and sampling events. These forms should be used as guidelines for the development of site specific forms.

Dischargers should customize the forms for each project. Customized information can include listing the sampling or observation locations, identifying specific non-visible pollutants, and other site specific notations for field crews.

When modifying the forms make sure that the minimum information required by the General Permit is listed.

Note that the visual observation sample form is not intended to serve as a detailed BMP inspection checklists. The provided form is intended to be a field log to track the general project and rain event information. Detailed BMP inspection forms should be developed as part of the SWPPP based on the planned BMPs.

Electronic copies of the forms (Microsoft Word®) can be downloaded from the CASQA BMP Handbook web site at <http://www.casqa.org>.

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"/> Before predicted rain	<input type="checkbox"/> During rain event	<input type="checkbox"/> Following qualifying rain event	<input type="checkbox"/> Contained stormwater release	<input type="checkbox"/> Quarterly non-stormwater
Site Information						
Construction Site Name:						
Construction stage and completed activities:				Approximate area of exposed site:		
Weather and Observations						
Date Rain Predicted to Occur:				Predicted % chance of rain:		
Estimate storm beginning: <hr style="width: 100%; border: none; border-top: 1px solid black; margin: 0;"/> (date and time)	Estimate storm duration: <hr style="width: 100%; border: none; border-top: 1px solid black; margin: 0;"/> (hours)		Estimate time since last storm: <hr style="width: 100%; border: none; border-top: 1px solid black; margin: 0;"/> (days or hours)	Rain gauge reading: <hr style="width: 100%; border: none; border-top: 1px solid black; margin: 0;"/> (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:	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Photo Reference IDs:			
Corrective Actions Identified (note if SWPPP/REAP change is needed)						
Inspector Information						
Inspector Name:				Inspector Title:		
Signature:					Date:	

Risk Level 2 Effluent Sampling Field Log Sheets			
Construction Site Name:		Date:	Time Start:
Sampler:			
Sampling Event Type:	<input type="checkbox"/> Stormwater	<input type="checkbox"/> Non-stormwater	<input type="checkbox"/> Non-visible pollutant
Field Meter Calibration			
pH Meter ID No./Desc.:		Turbidity Meter ID No./Desc.:	
Calibration Date/Time:		Calibration Date/Time:	
Field pH and Turbidity Measurements			
Discharge Location Description	pH	Turbidity	Time
Grab Samples Collected			
Discharge Location Description	Sample Type		Time
Additional Sampling Notes:			
Time End:			

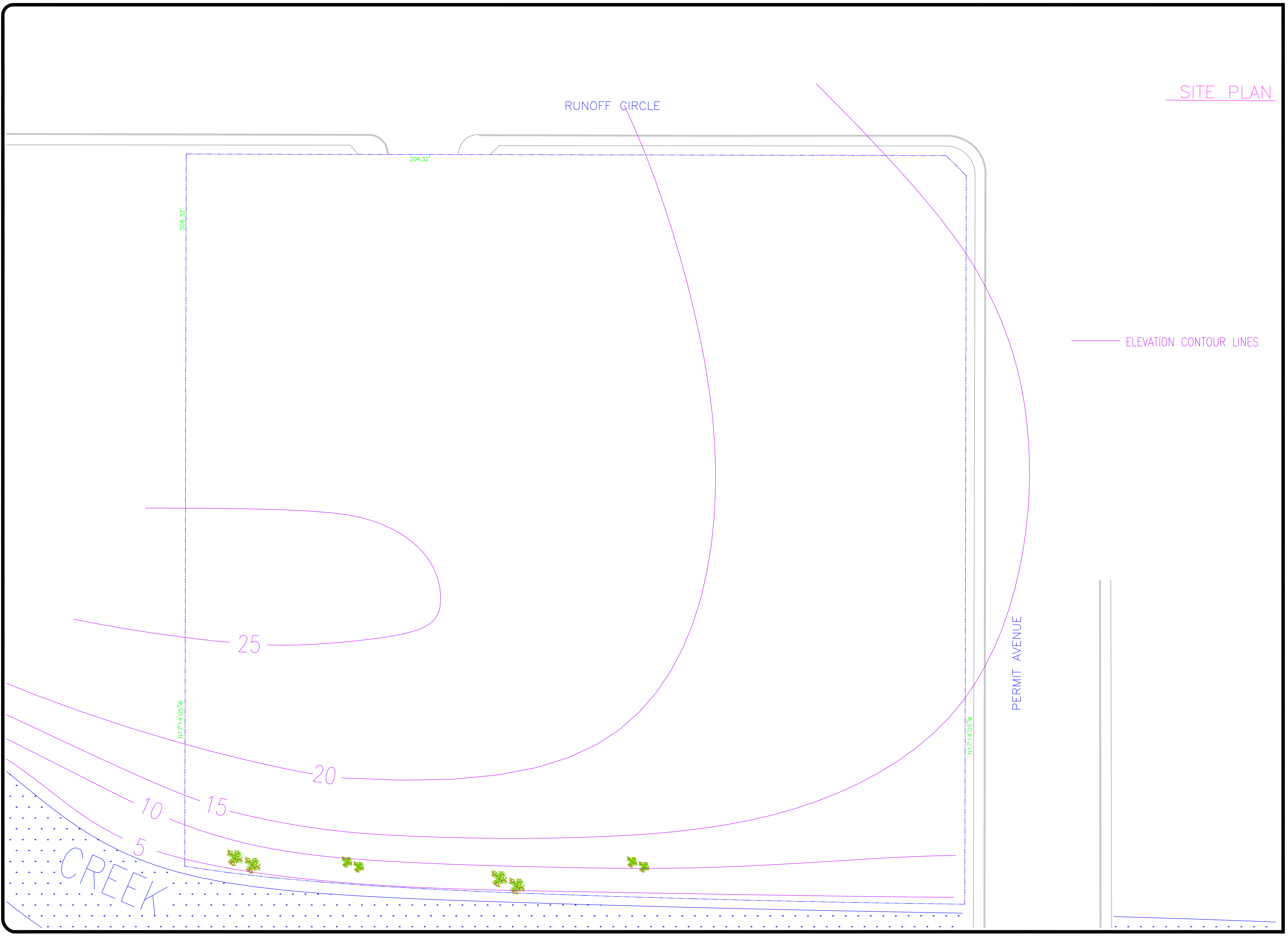
Risk Level 3 Effluent Sampling Field Log Sheets				
Construction Site Name:		Date:	Time Start:	
Sampler:				
Sampling Event Type:	<input type="checkbox"/> Stormwater	<input type="checkbox"/> Non-stormwater	<input type="checkbox"/> Non-visible pollutant	<input type="checkbox"/> Post NEL Exceedance
Field 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	SSC	Other (specify)	Time	
Additional Sampling Notes:				
Time End:				

Risk Level 3 Receiving Water Sampling Field Log Sheets			
Construction Site Name:		Date:	Time Start:
Sampler:			
Receiving Water Description and Observations			
Receiving Water Name/ID:			
Observations:			
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"/>	
Field Meter Calibration			
pH Meter ID No./Desc.:		Turbidity Meter ID No./Desc.:	
Calibration Date/Time:		Calibration Date/Time:	
Field pH and Turbidity Measurements and SSC Grab Sample			
Upstream Location			
Type	Result	Time	Notes
pH			
Turbidity			
SSC	Collected Yes <input type="checkbox"/> No <input type="checkbox"/>		
Downstream Location			
Type	Result	Time	Notes
pH			
Turbidity			
SSC	Collected Yes <input type="checkbox"/> No <input type="checkbox"/>		
Additional Sampling Notes:			
Time End:			



Project Details Sheet:

- Project Name: Got SWPPP? Medical Complex
- Address: 2010 Permit Ave., Stockton, California
- 3 Buildings (total 23,200 sq. ft.)
- Parking lot 53,400 sq. ft.
- Undeveloped lot (0% Impervious)
- Total disturbed soil = 150,000 sq. ft. (3.44 acres)
- New impervious area = 85,000 sq. ft (57%)
- Construction start date: January 1
- Grading completion date: February 15
- Project completion date: December 31 (one year project length)
- Receiving water is the Stockton MS4 and a tributary creek to the San Joaquin River
- CGP applies; site is a Risk Level 2.



SITE PLAN

— ELEVATION CONTOUR LINES

RUNOFF CIRCLE

PERMIT AVENUE

CREEK

REVISIONS	BY

WGIR
SOUTHWEST, INC.
315 W. PINE ST
LODI, CALIFORNIA 95240
PHONE (209) 334-5363

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DESIGN ASSOCIATES
P.O. BOX 55105 STOCKTON, CA 95205
3039 WATERLOO ROAD STOCKTON, CA 95205
209-943-3000 FAX # 209-943-3003

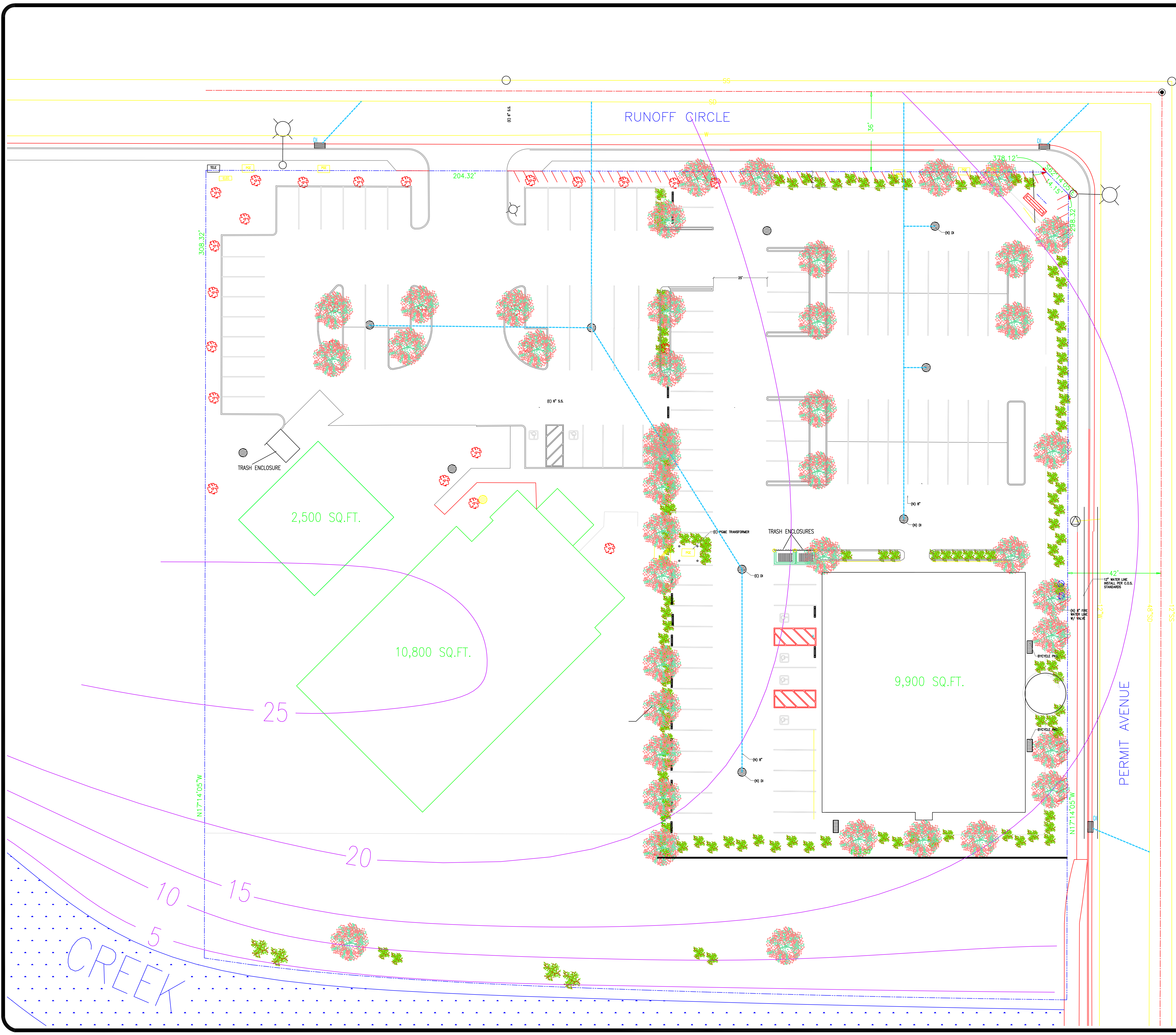
"GOTSWPPPP?"
BUSINESS PARK

DATE:	1-14-05
SCALE:	1"=20'
DRAWN:	
JOB:	

SHEET
C-2
C-2

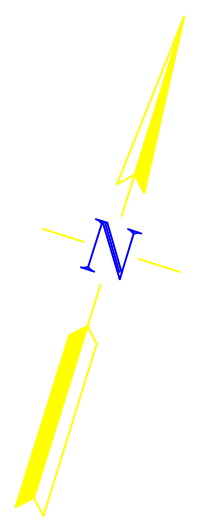
REVISIONS	BY

SITE PLAN



SCALE: 1" = 20'

STORM DRAIN LINES
ELEVATION CONTOUR LINES



WGIR
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315 W. PINE ST
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PHONE (209) 334-5363


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Southwest, Inc.

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3039 WATERLOO ROAD STOCKTON, CA 95205
209-943-3000 FAX # 209-943-3003

"GOTSWPPP?"
BUSINESS PARK


DATE:	1-14-05
SCALE:	1"=20'
DRAWN:	
JOB:	

SHEET
C-1



QSD/QSP Training


Module 5
Reporting



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Learning Objectives

1. Understand how to use SMARTS
2. Define roles of those who have access to SMARTS
3. Understand when and how to complete the required Annual Reports
4. Understand when to update the SWPPP
5. Understand when to complete other required reports



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Module Organization

Part 1 – SMARTS

Part 2 – Types of Reports

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What is SMARTS?

Storm water Multiple Application & Record Tracking System

- **Purpose:**
Provide a platform where dischargers, regulators, and the public can enter, regulate, and/or comment on storm water data including NOIs, NOTs, compliance, and monitoring data.
- Internet-based
- Available 24/7
- Reports
 - SWRCB/RWQCB prioritize regulatory tasks (i.e. inspections, view trends in compliance, provide data to the Legislature)
 - Public reports - NOI, Inspections, Violations, and Enforcement data

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PRD Process

- Register for SMARTS account
- Link Approved Signatories / Data Submitters
- Re-certify and file new NOIs
- Upload attachments
- Enter Sampling/Monitoring data
- Notice of Termination

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SMARTS Access Layers

The diagram is a pyramid divided into four horizontal sections. From top to bottom, the sections are:

- LRP Primary Account Holder** (top, smallest section)
- Approved Signatory Enter & Certify Data**
- Data Submitter Enter Data Only**
- General Public View Only** (bottom, largest section)

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SIGN UP FOR THE STATE WATER RESOURCES CONTROL BOARD

Home | About Us | Public Notices | Board Bills | Board Decisions | Water Issues | Public Information | Press Room

Welcome to the State Water Resources Control Board

WATERBOARD

SMARTS LOGIN

User ID:

Password:

Log In

Forgot your password?

Reset your password here

Help

smarts.waterboards.ca.gov

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Module Organization


Part 1 – SMARTS

Part 2 – Types of Reports

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Types of Reports

- Routine site inspection reports
- Storm event related site inspection reports
- NAL Exceedance reports
- REAPs
- Quarterly non-storm water reports
- Annual reports



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Type of Inspection	When it is due	Enter into SMARTS	Revise SWPPP	Certification	Retain for 3 years
Weekly / Daily Inspections	The day the inspection is performed		If necessary		✓
Storm Inspections	The day the inspection is performed		If necessary		✓
NAL Exceedance	Into SMARTS 10 days after storm	✓		✓	✓
REAPs	In place 24 hours before storm				✓
Quarterly Non-Storm Water	With Annual Report				✓
Annual Report	September 1	✓		✓	✓



Attachment D, p. 19
Attachment E, p. 20

NAL Exceedance Reports

- Risk Level 2 & 3 must electronically submit all storm event sampling results and exceedance reports onto SMARTS within 10 days of the storm event
- LUP Type 2 & 3 may be required by the RWQCB to submit exceedance reports onto SMARTS
- All exceedance reports must be certified.




Attachment D, p. 19
Attachment E, p. 20

NAL Exceedance Reports

Reports must include the following:

- Analytical methods, reporting units, and detection limits
- Date, time of sampling, place, visual observations, and all measurements (including rain gauge readings)
- Description of current BMPs associated with the exceedance and proposed corrective actions




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Attachment C, p. 10
Attachment D, p. 16
Attachment E, p. 17

Quarterly Non-Storm Water Report

Required of Traditional Sites (not LUPs):

- Do them once per calendar quarter.
- Inspect each drainage area
- Document the presence or evidence of non-storm water discharges (authorized and unauthorized)
- Note pollutant characteristics and sources
- Document responses take to eliminate unauthorized discharges
- Describe existing and proposed BMPs




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Attachment C, p. 10
Attachment D, p. 16
Attachment E, p. 17

Quarterly Non-Storm Water Report

Required of Traditional sites (not LUPs):

- Include the analytical results of the sample collected at the point of discharge
- Note that all non-storm water samples must be analyzed at a State certified laboratory
- Must sample and report run-on if it contributes to a NAL or NEL exceedance




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Order
p. 39 & 40

Annual Reports

Required of all Risk Levels and LUP Types:

- Due September 1st of each year.
- Even Caltrans sites must submit an Annual Report
- Reporting period is July 1 – June 30, the storm water year
- Not required for periods of less than 3 months
- Submitted onto SMARTS
- Reports must be signed and certified by LRP

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Order
p. 39 & 40

Annual Reports


Report must include:

- Summary of all sampling and analysis
- Summary of corrective actions
- Identify compliance activities or corrective actions not taken
- Summary of all violations
- Names of those who performed inspections and details about the inspections
- Visual observation records
- Sample collection exception records
- Training records

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Questions and Discussion?





QSD Training


Module 6
Project Planning & Risk Determination



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Learning Objectives

1. Provide an overview of the water balance requirements and related BMP selection
2. Provide basic information on bioassessment
3. Provide information on soil sampling and environmental assessment
4. Review the sediment risk portion of the Risk Worksheet
5. Review the receiving water risk portion of the Risk Worksheet
6. Provide basic tools and information for identifying receiving waters
7. Provide information on final site stabilization



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Module Organization

Part 1 – Pre-Construction Water Balance
(8:00 – 9:00 AM)

Part 2 – Post Construction Standards
(9:00 – 10:30 AM)

Part 3 – Soil Particle Size Analysis
(10:30 to 10:35 AM)

Part 4 – Bioassessment
(10:50 to 11:15 AM)

Part 5 – Risk Assessment
(11:15 to 12:15 PM)

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Pre-Construction Water Balance

Stream Flow & Sediment Hydrology Basics

Thank you to Eric Berntsen of the SWRCB for providing slides on stream theory, LID, and hydromodification.

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Stream Flow

There are four basic sources of stream flow:

- Groundwater
- Shallow subsurface flow
- Direct channel precipitation
- Surface runoff

Fig. 2.10 - Flow paths of water into a waterbody. The position of groundwater flow is dependent on the position of the water table. The position of the water table is dependent on the position of the water table. The position of the water table is dependent on the position of the water table.

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Normal Stream Flow

All streams accomplish three basic geomorphic tasks:

- Erosion
- Sediment transport
- Sediment deposition

These determine the size and shape of the stream channel, both laterally and longitudinally.

Fig. 1.12 - Cross section of a stream channel. The thalweg is the deepest part of the channel.

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Geomorphic Definitions

- Erosion – the detachment of soil particles along the stream bed and banks
- Sediment transport – the movement of eroded soil particles in stream flow
- Sediment deposition – the settling of eroded soil particles in the water or on land as water recedes

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Dynamic Equilibrium

- Sediment particles that erode are transported downstream
- Replaced by particles of the same size and shape from upstream

$$(Q_s * D) \propto (Q_w * S)$$

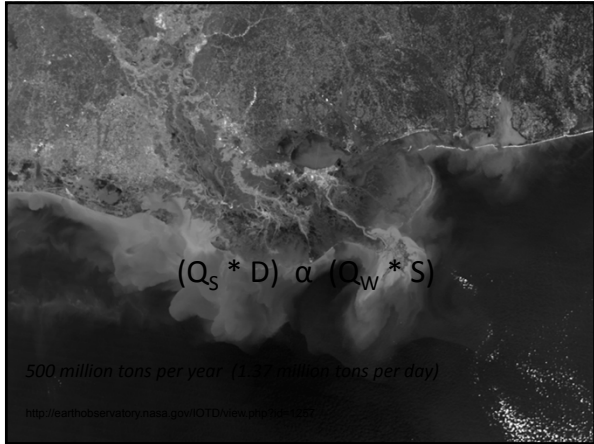
Where:
 Q_s = Sediment Discharge Q_w = Stream flow
 D = Sediment particle size S = Stream slope

When all 4 variables are in balance, the channel is stable.

$(Q_s * D) \propto (Q_w * S)$

(Sediment LOAD) x (Sediment SIZE) \propto (Stream SLOPE) x (Stream DISCHARGE)

After Lane (1955) as cited in Rosgen (1996)






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Aggradation involves the raising of the streambed elevation, an increase in width/depth ratio, and a corresponding decrease in channel capacity. Over-bank flows occur more frequently with less-than-high-water events. Excess sediment deposition in the channel and on floodplains is characteristic of the aggrading river. Often, the cause of aggradation is an increase in upstream sediment load and/or size of sediment exceeding the transport capacity of the channel.

Source: <http://water.epa.gov/scitech/dataat/fools/warss/channel.cfm>

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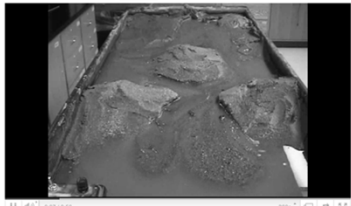


Degradation is the removal of sediment from the streambed. Field evidence of degradation is a combination of a lowered width/depth ratio and an increased bank height ratio. Bank height ratio is defined as the height of the lowest bank divided by the maximum depth at the bankfull stage (Rosgen 2001b).

Source:
http://water.epa.gov/scitech/datait/hoob/warss/channel.cfm

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YouTube Stream Erosion - Erosion changing the landscape



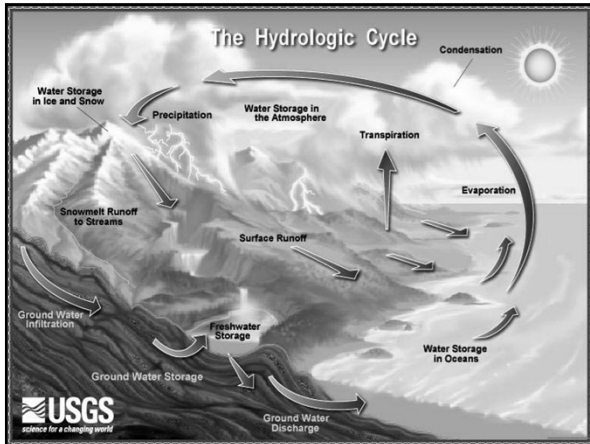
Where are the following actions happening?

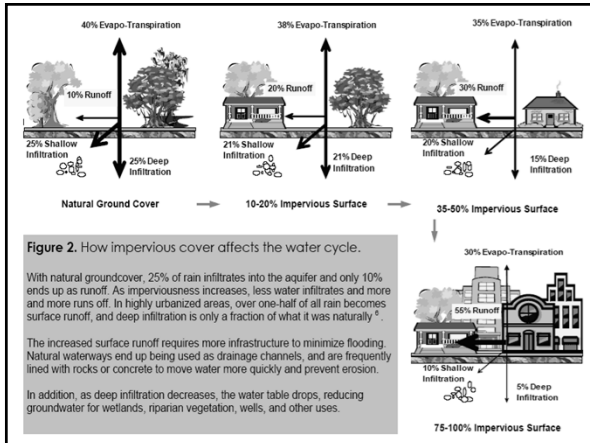
- Erosion
- Sediment transport
- Sediment deposition
- Aggradation
- Degradation

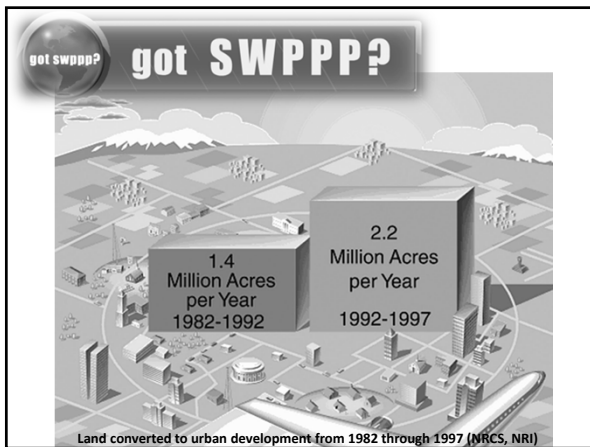
got SWPPP?

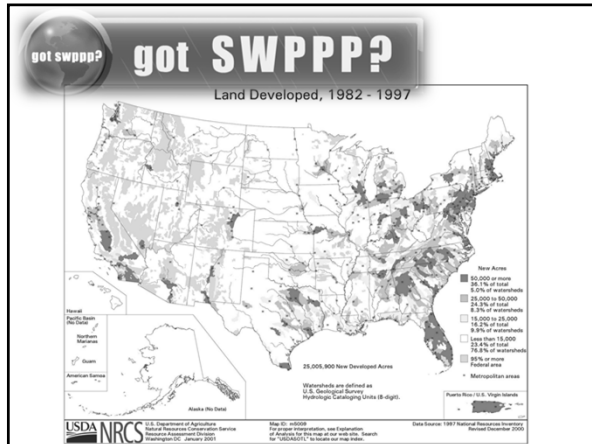
Pre-Construction Water Balance

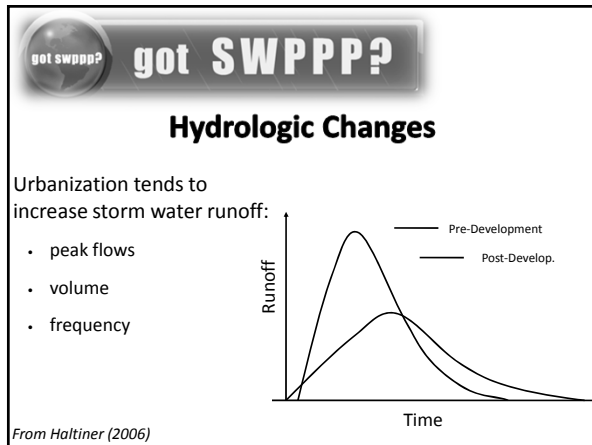
Post-Construction Impacts

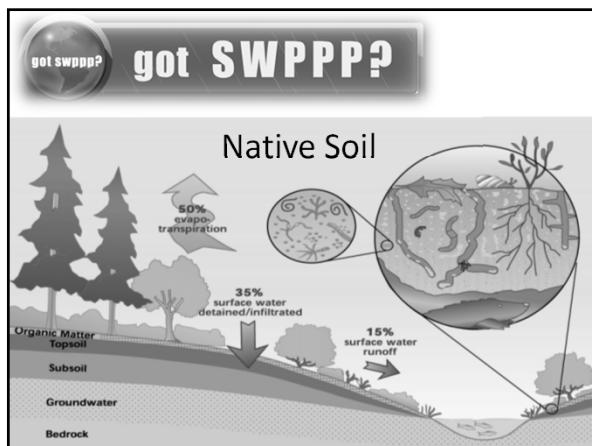


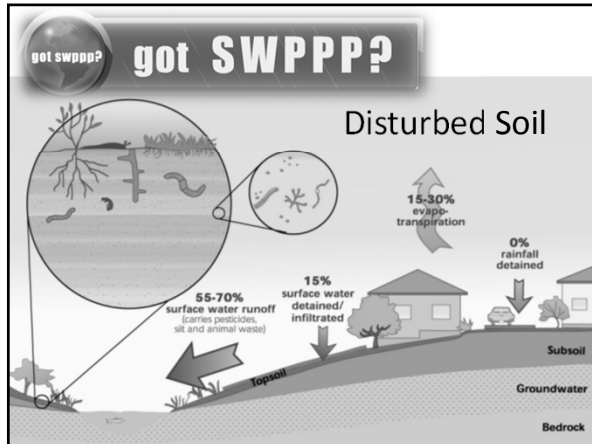


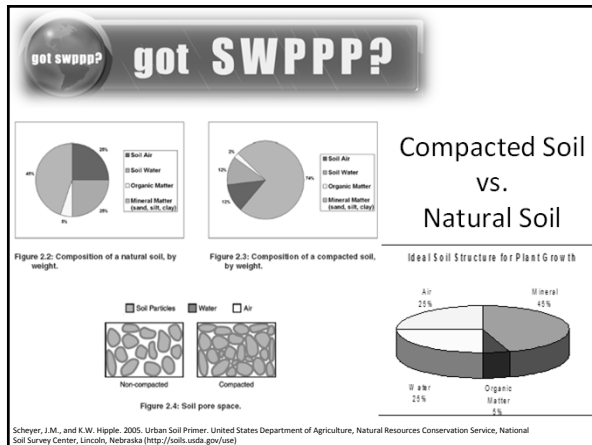


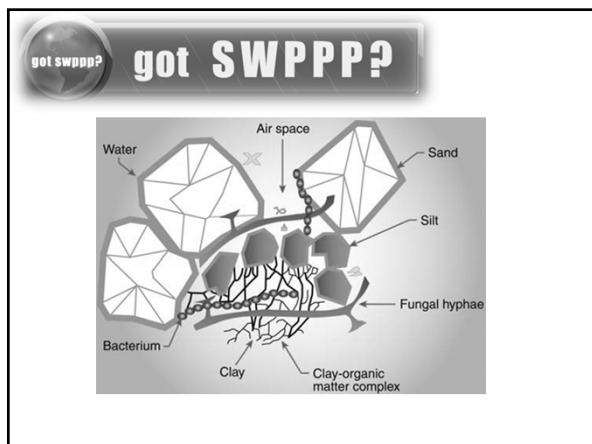








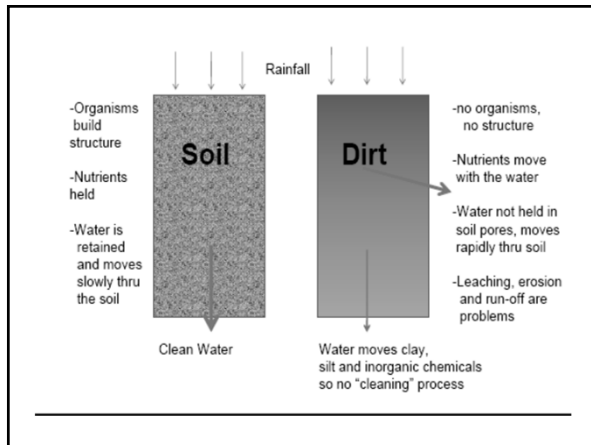


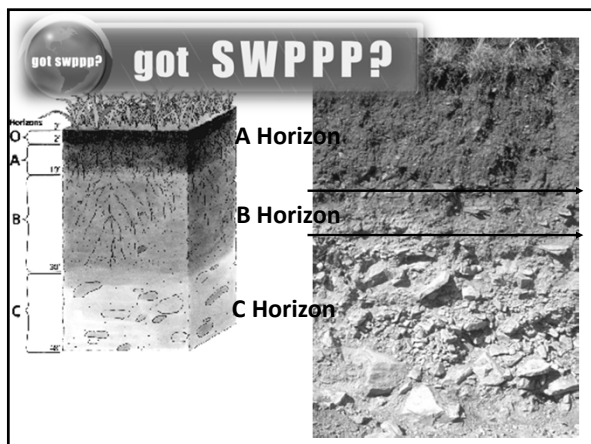


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What happens when we maintain soil quality?


- More nutrient and water retention
- Less need for fertilizer, pesticides, etc.
- Filtering and decomposition of toxins





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Urban Soil Primer
 For homeowners and renters, landscaping interests, property managers, students, and educators



A Primer for Healthy Soils

[http://soils.usda.gov/use/urban/downloads/primer\(for_printing\).pdf](http://soils.usda.gov/use/urban/downloads/primer(for_printing).pdf)


Scheyer, J.M., and K.W. Hipple. 2005. Urban Soil Primer. United States Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska (<http://soils.usda.gov/soil>)

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Construction Impacts

Construction projects present a two-fold impact to beneficial uses of water:

- During – accelerated erosion
- After – increased imperviousness and hydromodification



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Post-Construction Impacts

Sources of Impairment (USEPA 2006)

	Rivers and Streams	Lakes, Ponds, and Reservoirs	Estuaries
Sources ^a	Agriculture (48%) ^b	Agriculture (41%)	Municipal Point Sources (37%)
	Hydrologic Modification (20%) ^c	Hydrologic Modification (18%)	Urban Runoff/Storm Sewers (32%)
	Habitat Modification (14%) ^d	Urban Runoff/Storm Sewers (18%)	Industrial Discharges (26%)
	Urban Runoff /Storm Sewers (13%)	Nonpoint Sources (14%)	Atmospheric Deposition (23%)
	Forestry (10%)	Atmospheric Deposition (13%)	Agriculture (18%)
	Municipal Point Sources (10%)	Municipal Point Sources (12%)	Hydrologic Modification (14%)
	Resource Extraction (10%)	Land Disposal (10%)	Resource Extraction (12%)

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Pre-Construction Water Balance

Hydromodification

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p. 5

What is Hydromodification

“Hydromodification is the alteration of the hydrologic characteristics of coastal and non-coastal waters, which in turn could cause degradation of water resources. Hydromodification can cause excessive erosion and/or sedimentation rates, causing excessive turbidity, channel aggradation and/or degradation.”

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Hydromodification

The USEPA categorizes hydromod activities into three categories:

- Channel modification
- Dams
- Stream bank erosion




Fig. 2.10 – Stream channelization. Stream modification, such as uniform cross section and entering, leads to ecological decline.
In Stream Channel Restoration: Principles, Processes, and Practices (2009).
By the Federal Emergency Stream Restoration Working Group (FESRWG) (U.S. Federal agencies of the U.S.)

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Channel Modification

Channel Changes Associated with Urbanization

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Channel Modification

Causes:

- Increased imperviousness in watershed
- Increased imperviousness of channel
- Loss of vegetation
- Increased velocities

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Channel Modification


Results:

- Channel deepened and widened
- Increased sediment transport capacity and decreased sediment supply
- Disturbs the stream stability
- Disturbs the associated habitats
- Flooding
- Increased ability to transport toxic pollutants

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Dams Modification

Channel Changes Associated with Urbanization



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Dams Modification


- Retains water by design
- Range in size from berms across small streams creating farm ponds to large concrete structures
- Changes the down river characteristics
- Dams can lead to sediment accumulation in a reservoir
- Must be carefully managed:
<http://cdec.water.ca.gov/cgi-progs/current/RES>

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Streambank Modification

- Stream banks and shorelines erode naturally
- Water flowing along a stream bank dislodges sediment
- Accelerators: livestock grazing, roads, increased imperviousness (development / fires), changes in climate




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So, what does this have to do with the CGP?

To address hydromodification concerns and impacts, the new CGP includes:

- Post-construction standards
- Post-construction Water Balance Calculator
- Increased sampling and monitoring for projects with higher sediment or receiving water risk levels
- Bioassessment monitoring

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Module Organization


Part 1 – Pre-Construction Water Balance
(8:00 – 9:00 AM)

Part 2 – Post Construction Standards
(9:00 – 10:30 AM)

Part 3 – Soil Particle Size Analysis
(10:30 to 10:35 AM)

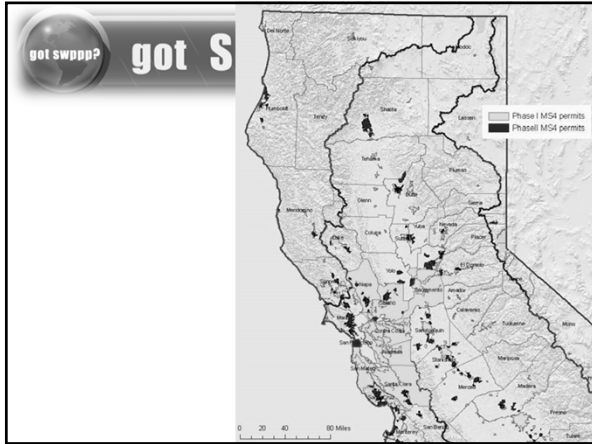
Part 4 – Bioassessment
(10:50 to 11:15 AM)

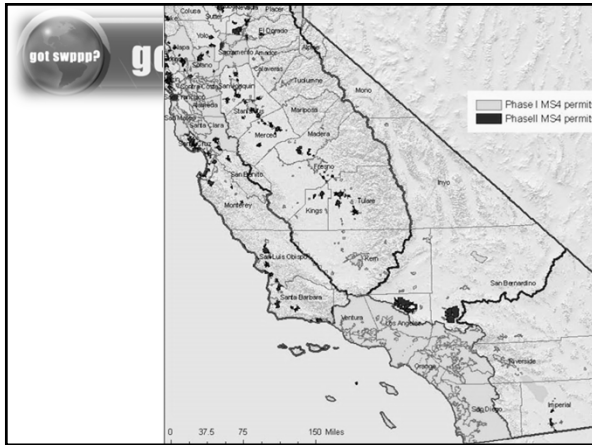
Part 5 – Risk Assessment
(11:15 to 12:15 PM)

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Post-Construction Standards

- Are measures to mitigate post-construction storm water runoff impacts
- Specifically address water quality and quantity
- Are currently required for all new projects in areas covered by an active Phase I or II MS4 permit
- As of 9/02/2012, the CGP requires post-construction measures of new projects in areas not covered by an MS4 permit





Region	MS4 Area	Type
SS	Lodi	City
SS	Calaveras	County
SS	Mountain House CSD	Non-Traditional
SS	Tracy USD	Non-Traditional
SS	Marysville	City
SS	Lathrop	City
SS	Ripon	City
SS	San Joaquin	County
SS	Ceres	City
SS	Turlock	City
SS	Tracy	City
SS	Yuba	County
SS	Manteca	City
SS	Yuba City	City
SS	Sutter	County
SS	Olivehurst	CDP
SS	Kennedy	CDP
SS	Hughson	City
SS	Stanislaus	County
SS	South Yuba City	CDP
SS	French Camp	CDP
SS	Riverbank	City
SS	North Woodbridge	CDP
SS	Morada	CDP
SS	Linda	CDP
SS	Keyes	CDP
SS	Salida	CDP
SS	Empire	CDP
SS	Patterson	City
SS	Oakdale	City

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Local MS4s with Post-Construction Standards

- Stockton
- San Joaquin County
- Lodi
- Lathrop
- Tracy
- Ripon
- Manteca
- Modesto
- Stanislaus County
- Sacramento County
- Sacramento
- Port of Stockton

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Name Confusion?

- WQMP
- DSP
- SWDSP
- SUSMP
- SWQCCP
- C3
- Post-Construction Design Measures
- Post-Construction Standards
- Post-Construction Control Measures

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Order
p.35-36

XIII. POST-CONSTRUCTION STANDARDS

What does the CGP Require?

A. All dischargers shall comply with the following runoff reduction requirements unless they are located within an area subject to post-construction standards of an active Phase I or II municipal separate storm sewer system (MS4) permit that has an approved Storm Water Management Plan.

1. This provision shall take effect three years from the adoption date of this permit, or later at the discretion of the Executive Officer of the Regional Board.
2. The discharger shall demonstrate compliance with the requirements of this section by submitting with their NOI a map and worksheets in accordance with the instructions in Appendix 2. The discharger shall use non-structural controls unless the discharger demonstrates that non-structural controls are infeasible or that structural controls will produce greater reduction in water quality impacts.
3. The discharger shall, through the use of non-structural and structural measures as described in Appendix 2, replicate the pre-project water balance (for this permit, defined as the volume of rainfall that ends up as runoff) for the smallest storms up to the 85th percentile storm event (or the smallest storm event that generates runoff, whichever is larger). Dischargers shall inform Regional Water Board staff at least 30 days prior to the use of any structural control measure used to comply with this requirement. Volume that cannot be addressed using non-structural practices shall be captured in structural practices and approved by the Regional Water Board. When seeking Regional Board approval for the use of structural practices, dischargers shall document the infeasibility of using non-structural practices on the project site, or document that there will be fewer water quality impacts through the use of structural practices.




Order p.35-36

What does the CGP Require?

4. For sites whose disturbed area exceeds two acres, the discharger shall preserve the pre-construction drainage density (miles of stream length per square mile of drainage area) for all drainage areas within the area serving a first order stream¹⁴ or larger stream and ensure that post-project time of runoff concentration is equal or greater than pre-project time of concentration.

¹⁴ A first order stream is defined as a stream with no tributaries.

B. All dischargers shall implement BMPs to reduce pollutants in storm water discharges that are reasonably foreseeable after all construction phases have been completed at the site (Post-construction BMPs).



Appendix 2 p. 2


Non-structural Controls

Non-structural Practices Available for Crediting

- Porous Pavement
- Tree Planting
- Downspout Disconnection
- Impervious Area Disconnection
- Green Roof
- Stream Buffer
- Vegetated Swales
- Rain Barrels and Cisterns
- Landscaping Soil Quality

Subtotal Runoff Volume Reduction: 0.425 Cu Ft
Total Runoff Volume Reduction Credit: 0.425 Cu Ft

Buttons: Porous Pavement, Tree Planting, Downspout Disconnection, Impervious Area Disconnection, Green Roof, Stream Buffer, Vegetated Swale, Rain Barrel



SMARTS

The Calculator

NOTICE OF INTENT - Post Construction

WGR Southwest, Inc. 310 W. Pine Street Suite 2100 CA 92404
310 W. Pine Street Suite 2100 CA 92404
310 W. Pine Street Suite 2100 CA 92404

Project Name: [Blank]
County: San Diego
Location: [Blank]


Pre-Construction INPUT
1.1. Proposed Disturbed Land Use Type: [Blank]
1.2. Proposed runoff impervious area(ies): [Blank]
1.3. Proposed non-roofing impervious area(ies): [Blank]

Post-Construction INPUT
1.1. Proposed Disturbed Land Use Type: [Blank]
1.2. Proposed runoff impervious area(ies): [Blank]
1.3. Proposed non-roofing impervious area(ies): [Blank]

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Actual Developed Property




Courtesy of Google Earth

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Low Impact Development (LID) Principles

LID's goal is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source.




Thank you to Eric Berntsen of the SWRCB for providing slides on stream theory, LID, and hydromodification.

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LID Benefits

- **Multifunctionality** – landscaping costs also serve as storm water treatment costs, etc.
- **Lower lifetime costs** – e.g., lower overall operation, repair, maintenance, and decommissioning costs
- **Additional environmental and social benefits** – multiple objectives met
- **Reduced offsite costs** – fewer offsite sewer collection and treatment costs
- **Functional use of open space land** – LID practices can be put in open space, thereby not reducing developable land



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LID Example Project

YouTube

Decatur Street Stormwater Low Impact Development Demonstration Project

- A. Asphalt with Catch Basin Filters
- B. Porous Asphalt
- C. Asphalt with Rain Garden

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LID Example Project

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TRADITIONAL DEVELOPMENT		LID
\$ Pay to Pipe / Pump offsite	➔	Treat onsite
\$ Risk onsite WQ violations / fines		
\$ Pay to treat at end of Pipe	➔	Reduced piping / pumping costs
\$ Excavate, grade site and haul away materials	➔	Utilize natural terrain / preserve natural channels

can be
LID IS Cost Effective

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Reports of Reduced Costs


- Case studies show reduction of 25-30% over conventional projects.
- Somerset Rain Gardens¹
 - Original retention ponds - \$400,000
 - Implementation using natural drainage - \$100,000
- Pembroke subdivision²
 - Used LID practices to eliminate stormwater ponds
 - Saved \$200,000

Sources: 1: "Low-impact Development" by Mary Catherine Hager
2: "Stormwater Strategies: Community Responses to Runoff Pollution" NRDC

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Ways to mimic predevelopment hydrology

- Soil quality improvement (porosity)
- Native and drought tolerant vegetation
- Trees
- Permeable pavement
- Riparian buffers
- A general reduction of connected, impervious surfaces in runoff pathways
- Bioretention
- Disconnected downspouts/rain chains/rain barrels



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Post-Construction Solutions



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Module Organization

Part 1 – Pre-Construction Water Balance
(8:00 – 9:00 AM)

Part 2 – Post Construction Standards
(9:00 – 10:30 AM)

Part 3 – Soil Particle Size Analysis
(10:30 to 10:35 AM)

Part 4 – Bioassessment
(10:50 to 11:15 AM)

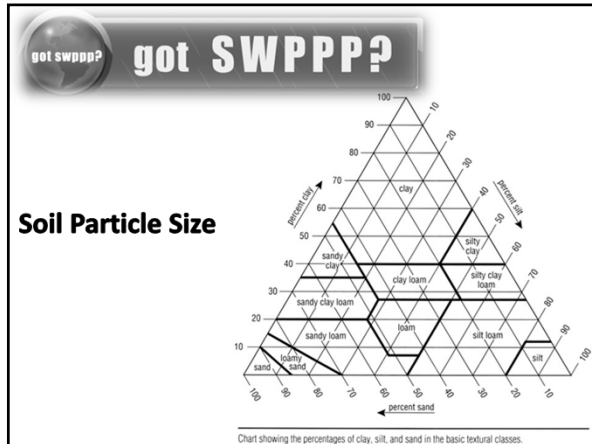
Part 5 – Risk Assessment
(11:15 to 12:15 PM)

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Soil Particle Size Analysis

Performing a soil particle size analysis by American Society for Testing and Materials (ASTM) Test Method D422 will assist in:

- Determining soil compatibility for plantings of native plants or broadcasting native seed mixes.
- Determining effective non-structural and structural BMPs to be implemented during and after construction.
- Determining K Factors for Risk Levels.



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Soil Report

ENSEO
INCORPORATED

An equivalent fluid weight of 300 pounds per cubic foot acting on 14 times the pier diameter may be used to evaluate pier settlements. The pier pressure may be increased by one-third for treated beds such as wind or silted. The pier pressure should start at a depth of 12 inches.

The pier reinforcement should be designed by the Structural Engineer, but as a minimum, at least two No. 4 rebar should extend the full length of each pier.

Drilled piers should be free of loose soils and debris prior to concrete placement. If water enters in the pier shaft, it should be pumped out prior to the placement of concrete. Concrete should be placed by means of a tremie pipe or similar device to avoid concrete contamination by soils dislodging from the pier shaft.

The subgrade soils should be well over optimum moisture at the time of pier placement. Under no circumstance should pre-cast piers be set upon dry, dedicated soil. The Geotechnical Engineer should review the final record wall foundation plans when they become available to check for conformance with these recommendations.

Site Surface Drainage

The project site should be positively graded at all times to provide for rapid removal of surface water runoff away from foundation systems and to prevent ponding of water under floors or seepage toward foundation systems at any time during or after construction. Ponding of water may result in undesirable weakening of the subgrade materials, loss of compaction, slab movement and foundation movement.

No ponding of stormwater should be permitted on the building pads during prolonged periods of inclement weather. All lots should be graded to drain individually. As a minimum requirement,

0918.1.001.00
November 3, 2005

21

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Soil Report

ENSEO
INCORPORATED

Finished grades should provide a slope of at least 3 percent within 5 feet from the exterior walls at right angles to them to allow surface water to drain positively away from the structures. Care should be maintained to provide that landscape mounds will not interfere with the above requirements.

No uncontrolled discharge of roof stormwater should be allowed within 5 feet from foundation systems or walls. Stormwater from roof downspouts should be carried away in closed conduits to the curb or an approved outlet structure.

Requirements for Landscaping Irrigation

Planted areas should be avoided immediately adjacent to the foundations. If planting adjacent to the foundation is desired, the use of plants that require very little irrigation is recommended.

Sprinkler systems should not be installed where they may create ponding or saturation of foundation soils within 5 feet from walls or under the structures.

Irrigation of landscape areas should be limited entirely to the necessary for plant growth. Excessive irrigation could result in progressive erosion and weakening of the foundation soils. The Landscape Architect should be aware of these requirements. Water that is allowed to saturate foundation soils may have adverse effects on the structures.

The project Landscape Architect and prospective owners and their landscape maintenance personnel should be informed of the grading and surface drainage requirements included in this report.

0918.1.001.00
November 3, 2005

22

An equivalent fluid weight of 300 pounds per cubic foot acting on $1\frac{1}{2}$ times the pier diameter may be used to evaluate passive resistance. The passive pressure may be increased by one-third for transient loads such as wind or seismic. The passive earth pressure should start at a depth of 12 inches.

The pier reinforcement should be designed by the Structural Engineer, but as a minimum, at least two No. 4 rebars should extend the full length of each pier.

Drilled piers should be free of loose soils and debris prior to concrete placement. If water collects in the pier shaft, it should be pumped out prior to the placement of concrete. Concrete should be placed by means of a tremie pipe or similar device to avoid concrete contamination by soils dislodging from the pier shaft.

The subgrade soils should be well over optimum moisture at the time of panel placement. Under no circumstance should pre-cast panels be set upon dry, desiccated soil. The Geotechnical Engineer should review the final sound wall foundation plans when they become available to check for conformance with these recommendations.

Site Surface Drainage

The project site should be positively graded at all times to provide for rapid removal of surface water runoff away from foundation systems and to prevent ponding of water under floors or seepage toward foundation systems at any time during or after construction. Ponding of water may result in undesirable weakening of the subgrade materials, loss of compaction, slab movements and foundation movements.

No ponding of stormwater should be permitted on the building pads during prolonged periods of inclement weather. All lots should be graded to drain individually. As a minimum requirement,

finished grades should provide a slope of at least 3 percent within 5 feet from the exterior walls at right angles to them to allow surface water to drain positively away from the structures. Care should be exercised to provide that landscape mounds will not interfere with the above requirements.

No concentrated discharge of roof stormwater should be allowed within 3 feet from foundation systems or slabs. Stormwater from roof downspouts should be carried away in closed conduits to the curb or an approved outlet structure.

Requirements for Landscaping Irrigation

Planted areas should be avoided immediately adjacent to the residences. If planting adjacent to the residences is desired, the use of plants that require very little moisture is recommended.

Sprinkler systems should not be installed where they may cause ponding or saturation of foundation soils within 3 feet from walls or under the structures.

Irrigation of landscape areas should be limited strictly to that necessary for plant growth. Excessive irrigation could result in progressive saturation and weakening of the foundation soils. The Landscape Architect should be aware of these requirements. Water that is allowed to saturate foundation soils may have adverse effects on the structures.

The project Landscape Architect and prospective owners and their landscape maintenance personnel should be informed of the grading and surface drainage requirements included in this report.

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Module Organization

Part 1 – Pre-Construction Water Balance
(8:00 – 9:00 AM)

Part 2 – Post Construction Standards
(9:00 – 10:30 AM)


Part 3 – Soil Particle Size Analysis
(10:30 to 10:35 AM)

Part 4 – Bioassessment
(10:50 to 11:15 AM)

Part 5 – Risk Assessment
(11:15 to 12:15 PM)

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Bioassessment

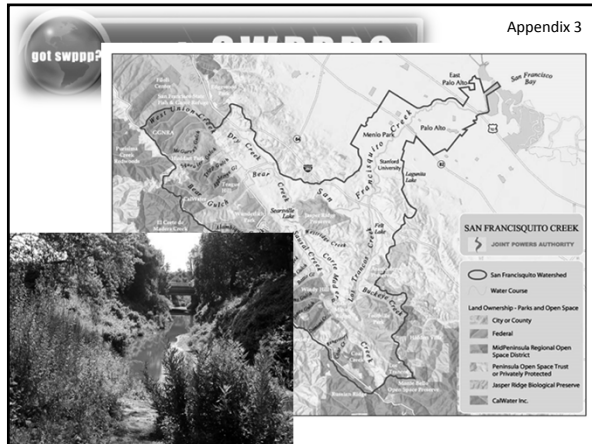


got SWPPP? Appendix 3

Bioassessment

Required for projects that meet all of the following:

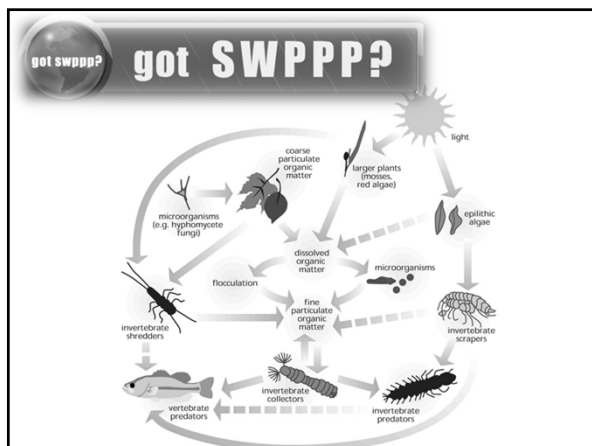
- Rated Risk Level 3 or LUP Type 3
- Directly discharges runoff to a freshwater wadeable stream that is either:
 - Listed by the State Water Board or USEPA as impaired due to sediment, and/or
 - Tributary to any downstream water body that is listed for sediment, and/or with the beneficial uses of SPAWN, COLD, & Migratory
- Total project-related ground disturbance > 30 acres




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Bioassessment

- Bioassessment monitoring is performed by taking samples to measure the population of freshwater benthic macroinvertebrates
- Is utilized to assess the effect of the project on the biological index (health) of the receiving water
- Includes invertebrates such as crayfish, mollusks, snails, worms, and immature forms of aquatic insects



Appendix 3




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Bioassessment Monitoring

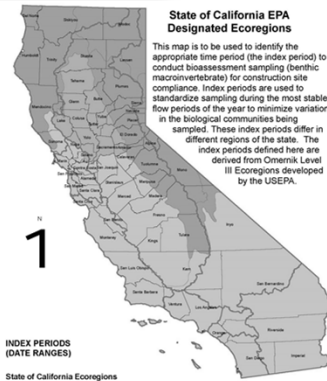
Index Period:

- Bioassessment is not required if the construction is performed outside of the sampling index period
- Index periods are regional
- Map of bioassessment ecoregions can be found at: www.swrcb.ca.gov/water_issues/programs/stormwater/docs/constpermits/cgp_biomap.pdf



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Designated Ecoregions Map



State of California EPA Designated Ecoregions


This map is to be used to identify the appropriate time period (the index period) to conduct bioassessment sampling (benthic macroinvertebrate) for construction site compliance. Index periods are used to standardize sampling during the most stable flow periods of the year to minimize variation in the biological communities being sampled. These index periods differ in different regions of the state. The index periods defined here are derived from Ontario Level III Ecoregions developed by the USEPA.

INDEX PERIODS (DATE RANGES)

State of California Ecoregions

- May-July
- Central Valley Sacramento: June-August
- Modoc: June-September; North Coast: June-August; Sierra: June-September
- Regional Board Waters

Appendix 3



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Bioassessment Monitoring

Sampling Frequency:

- Samples are to be collected within the sampling index period for both:
 - Before ground disturbance is initiated, and
 - After the project is completed
- The “after” sample shall be collected at least one winter season resulting in surface runoff after the project ground disturbance has ceased.

Note: NOT can be filed before the “after” sample is collected.

Appendix 3




Bioassessment Monitoring

Site Locations and Frequency:

- “Before” and “after” samples must be collected both upstream and downstream of the project’s discharge
- Upstream samples should be taken immediately before the site’s outfall and downstream samples immediately after the outfall
- From a freshwater, wadeable, listed for sediment water body
- Habitat assessment data must be collected concurrently with the sampling.

Appendix 3




Bioassessment Monitoring Exception

If construction commences out of an index period for the site location, the discharger shall:

- Receive RWQCB approval for the sampling exception
- Make a check payable to: Cal State Chico Foundation (SWAMP bank account)
- Send a copy of the check to the RWQCB
- Invest into the SWAMP program \$7,500 x the number of samples required
- Conduct bioassessment as described in Appendix 3

Appendix 3




Bioassessment Monitoring

Planning for monitoring:

- Schedule sampling to coincide with the Index Period.
- Hire a qualified consultant – don’t do it yourself!
- Use qualified laboratories. (Your qualified consultant will take care of this.)
- Make sure your consultant has a QA Plan.
- Budget adequate funding; up to \$30,000 or more!
- Each taxon id must be stored for 3 years. (more costs)
- DFG may perform external QA checks. (more costs to facilitate)

Appendix 3




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Bioassessment Monitoring

Data submittal:

- Data is submitted to the State Water Board in electronic format.
- SWAMP is currently developing standardized formats for reporting bioassessment data; until then use a MS Excel format.
- The physical / habitat data must be reported using the standard *SWAMP Stream Habitat Characterization Form – Full Version*. (See your consultant.)

Appendix 3

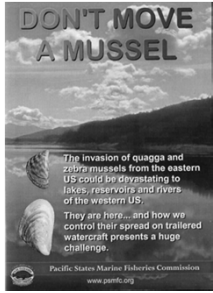



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Bioassessment Monitoring

Invasive Species Protection:

- Those conducting the monitoring must take precautions to prevent the introduction of invasive species.
- Follow the recommendations of California DFG.
- Once again, use a reputable and experienced consultant who has a big insurance policy!





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Module Organization

Part 1 – Pre-Construction Water Balance
(8:00 – 9:00 AM)

Part 2 – Post Construction Standards
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Part 4 – Bioassessment
(10:50 to 11:15 AM)

Part 5 – Risk Assessment
(11:15 to 12:15 PM)

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RUSLE - Revised Universal Soil Loss Equation ...


$$A = (R) (K) (LS)$$

A = **Average Annual Acre Tons** of soil loss
 R = Rainfall runoff erosivity factor
 K = Soil erodibility factor which represents both susceptibility of soil to erosion and the rate of runoff
 L = Slope length factor, representing the effect of slope length on erosion
 S = The slope steepness factor, representing the effect of slope steepness on erosion

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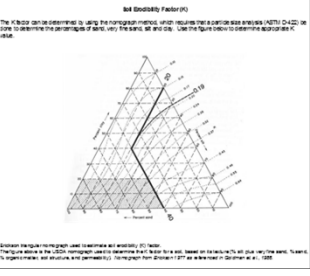
Rainfall Erosivity (R) Factor:
 When factors other than rainfall are held constant, soil loss is directly proportional to the energy of the rainfall. Need to know the start and ending dates and the location. <http://cfpub.epa.gov/npdes/stormwater/lewcalculator.cfm> Size is not a factor!



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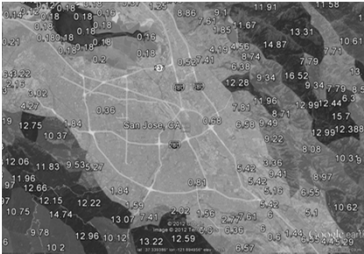
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Soil Erodibility (K) Factor:
 The soil loss rate per erosion index unit for a specified soil.



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Slope Length & Slope Steepness (LS) Factor:
 A factor of soil loss as a function of the average field slope length and steepness.




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Risk Determination is a Two Step Process:

- First Half of the Risk Determination factor – Sediment Discharge Risk
 - Calculate soil loss using the RUSLE equation
 - **A = (R) (K) (LS) (C) (P)**
- Second Half of the Risk Determination factor – Receiving Water Risk
 - Sediment sensitive water; 303(d) listed or TMDL for sediment-related pollutant; or beneficial Uses of COLD, SPAWN, **and** MIGRATORY

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Receiving Water Risk Determination:



Red shading indicates high receiving water risk

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Type Determination for LUP Projects

ATTACHMENT A.1
LUP Project Area or Project Section Area Type Determination

Calculate the Sediment Risk Based on the Attachment C Risk Factor Worksheet

Project Sediment Risk:
"LOW" - 15 factors
"MEDIUM" - 17 and 19 factors
"HIGH" - 20 factors

* See Definition of Terms

RECEIVING WATER RISK	PROJECT SEDIMENT RISK		
	LOW	MEDIUM	HIGH
LOW	Type 1	Type 1	Type 2
MEDIUM	Type 1	Type 2	Type 3
HIGH	Type 2	Type 3	Type 3

2009-0009-DWG 2 September 2, 2009

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Questions and Discussion

Training Portal

Appendix E

Bioassessment Summary and Resources

Bioassessment is a method of evaluating the structure of a biological community (e.g., invertebrates, fish, and algae) in a receiving water body to determine its ecological condition, compared to an applicable reference condition. Bioassessments have been conducted for decades in many states, and more recently have gained popularity in California as indicators of ecological condition in wadeable streams. Specifically, benthic macroinvertebrate bioassessments are currently conducted in California by the State Water Resources Control Board's (SWRCB) Surface Water Ambient Monitoring Program (SWAMP) and many Phase I municipal stormwater programs.

The General Permit requires that projects meeting all of the following requirements must conduct or participate in a benthic macroinvertebrate bioassessment of the receiving waters:

- Risk Level 3 or Linear Underground/Overhead Projects (LUP) Type 3 project; and
- Project disturbs 30 acres or more; and
- Project directly discharges runoff to a freshwater wadeable stream (or streams) that has all of the following three existing beneficial uses: SPWN and COLD and MIGR; and/or is either (a) listed by the SWRCB or US Environmental Protection Agency (EPA) as impaired due to sediment or (b) is tributary to any downstream water body that is so listed.

Projects required to conduct bioassessment monitoring must select sites upstream and downstream of the point where runoff from the construction site enters the wadeable stream. Sampling events must occur **before the start** of ground disturbing activities and **must be repeated after the completion of construction** (at least one winter season that generates runoff after project related ground disturbance has ceased).

The bioassessment includes the collection of in-stream biological data and in-stream physical habitat data.

Macroinvertebrate samples must be taken during the during the appropriate index period, that is the time of year most appropriate for bioassessment sampling. The index period depends upon the ecoregion. In general, the index period is in the late spring to early fall. The SWRCB maintains an index period map at:

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

Projects that begin outside of the appropriate index period for their area may qualify for a sampling exception and pay into the SWAMP program. The Regional Water Quality Control Board (RWQCB) must approve the sampling exception. To qualify for an exception projects must:

1. Receive RWQCB approval for the sampling exception.

2. Make a check payable to: Cal State Chico Foundation (SWAMP Bank Account) or San Jose State Foundation (SWAMP Bank Account) and include the Waste discharger Identification (WDID) number on the check for the amount calculated for the exempted project.
3. Send a copy of the check to the RWQCB office for the site's region.
4. Invest **\$7,500 times the number of samples required** into the SWAMP program as compensation.

Bioassessment sampling must be performed in according to the protocols identified in Appendix 5 of the General Permit covering field collection and laboratory methods, quality assurance, data reporting, and invasive species control.

Field data collection methods for macroinvertebrates

Bioassessment field data collection methods are identified in the *Reachwide Benthos (Multi-habitat) Procedure*, specified in *Standard Operating Procedures for Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California* (Ode, 2007). Available at: http://swamp.mpsl.mlml.calstate.edu/wp-content/uploads/2009/04/swamp_sop_bioassessment_collection_020107.pdf.

Anyone who collects fish, amphibians, or invertebrates from the waters of the state must have a California Department of Fish and Game (DFG) Scientific Collecting Permit (SCP) in their possession. The SCP can be obtained from the DFG License and Revenue Branch in Sacramento (916) 928-5849. Additional information and the SCP application can be obtained from: http://www.dfg.ca.gov/wildlife/nongame/research_permit/. For additional information on bioassessment contractors, please contact the RWQCB or a Phase I municipal stormwater program representative in your project area.

Habitat assessment methods

Concurrent with the collection of macroinvertebrates the full suite of physical habitat characteristics must be measured according to *Standard Operating Procedures for Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California* (Ode, 2007). These requirements are summarized in the *Surface Water Ambient Monitoring Program's Stream Habitat Characterization Form – Full Version*. The most recent update, March 2009, is available at: http://swamp.mpsl.mlml.calstate.edu/wp-content/uploads/2009/03/swamp_ba_field_data_sheets_v25_033009.pdf.

Laboratory methods

Macroinvertebrates should be identified and classified using a fixed-count of 600 organisms per sample according to the Standard Taxonomic Effort (STE) Level I of the Southwestern Association of Freshwater Invertebrate Taxonomists (SAFIT), which is available at: http://www.safit.org/Docs/ste_list.pdf.

Only trained and professional entomologists should conduct the identification and classification of macroinvertebrates. For a list of trained professional entomologists familiar with the California STE, see <http://www.safit.org>.

Quality assurance

The bioassessment monitoring plan must include a bioassessment quality assurance (QA) plan that includes an external QA check performed by the DFG Aquatic Bioassessment Laboratory (<http://www.dfg.ca.gov/abl/>) on one sample per calendar year or 10% of the samples, whichever is greater. An alternative laboratory with equivalent of better expertise and performance may be used if approved in writing by the SWRCB staff.

The SWAMP recently released a Quality Assurance Project Plan for bioassessment monitoring, available at http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/smcqappfinal.pdf.

Sample preservation and archiving

Original samples must be archived pending the completion of QA sampling, including the external QA checks. The remaining sample after completing the recommended reanalysis must be archived and preserved for three years and must be relinquished to the SWRCB upon request. See Appendix 5 of the General Permit for additional information on archiving requirements.

Data reporting and submittal

Data must be submitted in an electronic form to the SWRCB. Standardized formats for reporting bioassessment data to the SWAMP are currently in development. All bioassessment data collected after those formats become available must be submitted using the SWAMP formats. Until those formats are available, the biological data should be submitted in Microsoft Excel ® (2000 or later) format.

Physical/habitat data must be reported using the standard format titled *SWAMP Stream Habitat Characterization Form – Full Version*, http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/reports/fieldforms_fullversion052908.pdf.


Invasive species prevention

Special care must be taken when conducting bioassessment monitoring to prevent the introduction and spread of aquatic invasive species. In particular, to prevent the spread of the New Zealand Mudsnail, samplers conducting bioassessments must follow DFG's recommendations to prevent the spread of this invasive species. Available at: <http://www.dfg.ca.gov/invasives/mudsnail>.

Other information on aquatic invasive species is available at: http://www.waterboards.ca.gov/water_issues/programs/swamp/ais/.


Most of the above noted references are maintained at the SWRCB's SWAMP website. These references and additional information on bioassessment are available at: http://www.waterboards.ca.gov/water_issues/programs/swamp/.

Much of the bioassessment work and development of sampling protocols are developed and maintained by SAFIT. SAFIT is a nonprofit organization of scientists and citizen volunteers collaboratively working to standardize the taxonomy of inland freshwater invertebrates in the southwest United States. SAFIT maintains the documents and tools it develops on its website: <http://www.safit.org/>.



QSD Training


Module 7
SWPPP Development & PRDs



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Learning Objectives

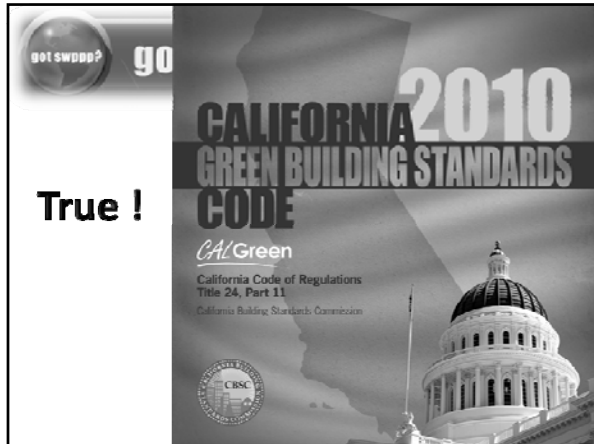
1. To understand the use of Risk Analysis in the building of the SWPPP
2. To determine BMP selection based on Risk Level / LUP Type minimum requirements
3. To understand how to write a REAP using the SWPPP as a guideline
4. To understand what documents are required to be filed electronically, when they must be filed, and who must certify the documents

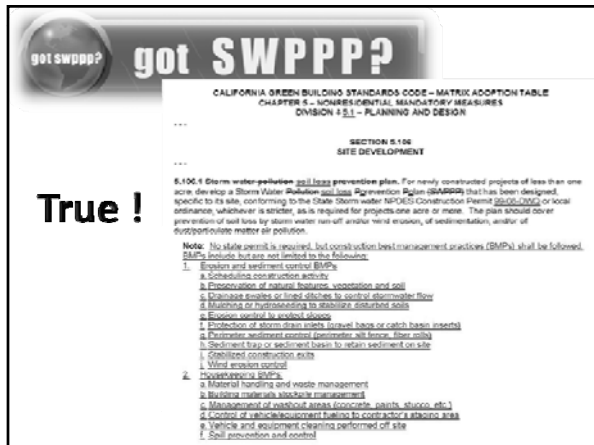


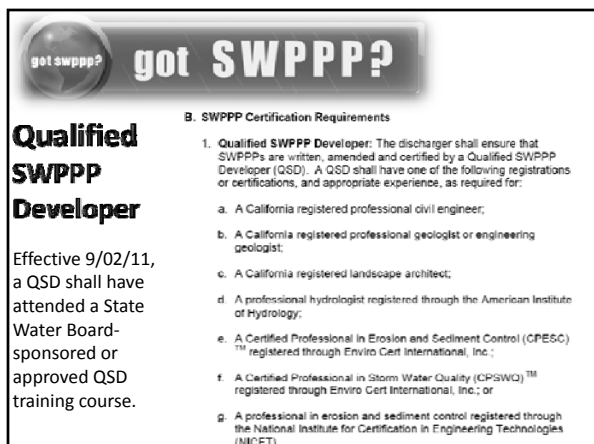
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True or False?

Construction projects with soil disturbance under 1 acre are required to have a SWPPP.









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QSD Role

Order p.37

XIV. SWPPP REQUIREMENTS


A. The discharger shall ensure that the Storm Water Pollution Prevention Plans (SWPPPs) for all traditional project sites are developed and amended or revised by a QSD. The SWPPP shall be designed to address the following objectives:

Attachment A p. 28

K. STORM WATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS

1. Objectives

SWPPPs for all LUPs shall be developed and amended or revised by a QSD. The SWPPP shall be designed to address the following objectives:




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The SWPPP Developer

The SWPPP must contain the following information about the QSD:

- Name
- Telephone number
- Certification statement
- QSD signature and date
- Qualifications of the QSD (i.e. PE, CPESC, PG, etc.)

Order p.33




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The SWPPP Developer

Recommended QSD Certification Statement:

“Company” certifies that this Storm Water Pollution Prevention Plan and all attachments were prepared by a Qualified SWPPP Developer (QSD) to meet the requirements of the California Construction NPDES General Permit (Order No. 2009-0009-DWQ).

Appendix 5
p.5 & 6



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Legally Responsible Person (LRP)

Legally Responsible Person
A person, company, agency, or other entity that possesses a real property interest (including, but not limited to, fee simple ownership, easement, leasehold, or rights of way) in the land upon which the construction or land disturbance activities will occur for the regulated site. If the land is controlled by an estate or similar entity, the person who has day-to-day control over the land (including, but not limited to, a bankruptcy trustee, receiver, or conservator) is considered to possess a real property interest. The Legally Responsible Person will typically be the project proponent. A contractor who does not possess a real property interest is not qualified to be a Legally Responsible Person.

Appendix 5
p. 1 & 2




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Approved Signatory

Approved Signatory
A person who has legal authority to sign, certify, and electronically submit Permit Registration Documents and Notices of Termination on behalf of the Legally Responsible Person. The Approved Signatory must be one of the following:

1. For a corporation: a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (a) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or (b) the manager of the facility if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
2. For a partnership or sole proprietorship: a general partner or the proprietor, respectively;

Appendix 5
p. 1 & 2




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Approved Signatory

3. For a municipality, State, Federal, or other public agency: a principle executive officer, ranking elected official, city manager, council president, or other public employee with managerial responsibility over the construction or land disturbance project (including, but not limited to, project manager, project superintendent, or resident engineer);
4. For the military: any military officer who has been designated;
5. For a public university: an authorized university official;
6. For an individual: the individual, because the individual acts as both the Legally Responsible Person and the Approved Signatory.

Order p.38




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What Goes into the SWPPP?

- LRP name, title, certification statement, and signature.

LRP SWPPP Certification:
 I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. I am not my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, to the best of my knowledge and belief, is true, accurate, and complete.
 I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature _____	Date _____
Name (print) _____	Office Telephone # _____
Title _____	Cell # _____




got SWPPP?

What Goes into the SWPPP?

Contact information for:

- LRP
- QSD
- QSPs and delegated inspectors
- All contractors and subcontractors
- Sampling and analysis consultant
- Analytical testing laboratory



got SWPPP?

What Goes into the SWPPP?

Project Information:

- Name and location
- Acreage estimates (*total project & disturbed*)
- Pre-construction land use, runoff characteristics (*runoff coefficient and discharge intensity*), imperviousness, and drainage patterns (*run-on & runoff*)
- Topography and soil type information
- Receiving water and MS4 information

got SWPPP? **got SWPPP?**

What Goes into the SWPPP?

Project Information:

- Post-construction land use, runoff characteristics (*runoff coefficient and discharge intensity*), imperviousness, and drainage patterns (*run-on & runoff*)
- Construction schedule, sequencing, and phases (*narrative & graphic*)
- Construction activities

got SWPPP? **got SWPPP?**

What Goes into the SWPPP?

Identify pollutant sources from:

- Clearing, grubbing, excavation, and grading
- Exposed soils and slopes
- Track out
- Import and export operations
- Utility installations
- Concrete work
- Vertical construction activities
- Landscaping

got SWPPP? **got SWPPP?**

What Goes into the SWPPP?

Associate specific pollutants with specific activities:

Sanitary Facilities – (CAGQA 3100-3) On-site portable toilets will be provided during the project and located within the construction staging yard. All sanitary facilities will be placed 25 feet from any storm drain, creek or water body and inspected weekly for leaks and prior to any forecasted storm event. In the event of high winds ensure that the facilities are walked down to prevent them from blowing over and falling.

On days on which storm systems are expected, workers shall not enter and containers with storm water that discharges from the site, non-vehicle washings of the discharge is required. The Construction Site Monitoring Plan indicates available sampling locations.

Inspect weekly, prior to forecasted rain events, daily during individual rain events, and after the conclusion of rain events.


The following are the potential storm water pollutants associated with this activity:

Sanitary Waste
Bacteria
Solids
Nutrients
Pathogens

The following table lists the BMPs planned for this activity along with potential CAGQA references in **Appendix B** of the implementation schedule. Required rain forecasts, and the responsible person.

Note: CAGQA best stream sediment tubes are not meant to be an exclusive list of BMPs, other BMPs may be used, which are listed in the reference.


Best Management Practices	CAGQA Detail Sheet	Scheduled Implementation	Type of Implementation	Responsible Party
Placement of portable toilet/washing facilities should be easily accessed and not on a roadway easement	3100-3	During Construction	Only	QSP

 **got SWPPP?**

What Goes into the SWPPP?

Types of pollutants:


- Sediment
- Concrete slurries
- Asphalt
- Fuels
- Equipment fluids
- Sanitary wastes
- Soil amendments
- Paints and solvents
- Sealers
- Pesticides
- Herbicides
- Contaminated soil
- Treated wood
- Construction Materials

 **got SWPPP?**

What Goes into the SWPPP?

All risk levels and LUP types have minimum BMP requirements for the following:

- Good Housekeeping / Materials Management
- Erosion Control
- Sediment Control
- Non-Storm Water
- Runoff Controls
- Inspections, Maintenance & Repairs
- Active Treatment Systems

 **got SWPPP?**

What Goes into the SWPPP?

So, make sure you incorporate all of the requirements found in:


- Attachment A – LUP projects
- Attachment C – Risk Level 1 projects
- Attachment D – Risk Level 2 projects
- Attachment E – Risk Level 3 projects
- Attachment F – Projects having an ATS

These attachments are your best guide for determining the "guts" to your SWPPP.

got SWPPP? **got SWPPP?**

What Goes into the SWPPP?

Another great resource for the QSD:




Stormwater Best Management Practice Handbook (Form) Construction

www.casqa.org/

got SWPPP? **got SWPPP?**

What Goes into the SWPPP?

A Caltrans BMP guidance:




<http://www.dot.ca.gov/hq/construct/stormwater/>

got SWPPP? **got SWPPP?**

What Goes into the SWPPP?

Other stuff that goes into the SWPPP:


- Information about the NOT process
- Information about preparing REAPs (not LUP)
- Inspection requirements
- Construction Site Monitoring Program (CSMP) / Monitoring & Reporting Program (M&RP)
- Training requirements
- Vicinity maps
- Construction site maps

 **got SWPPP?**

What Goes into the SWPPP?

Other stuff that goes into the SWPPP:


- Inspection checklists and forms
- For Risk 3 sites, information about bioassessment
- Information about when an ATS would be needed and resources for utilizing an ATS as the site
- Copy of the permit

 **got SWPPP?** Attachment B
p. 3

What Goes into the SWPPP?

The SWPPP map should include:

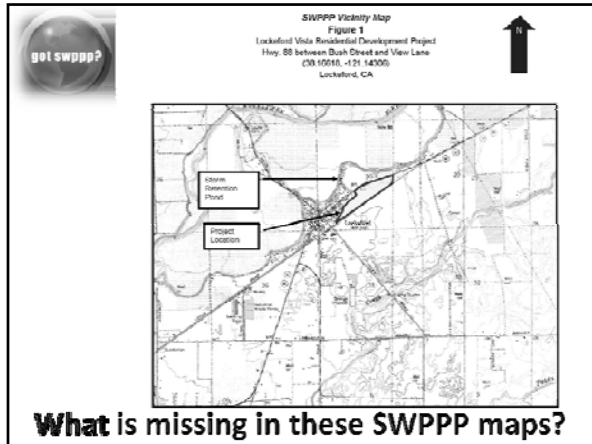
- Site layout and boundaries
- Drainage areas, flow patterns, and direction
- Discharge locations
- Sampling locations
- Areas of soil disturbance
- Storage areas of materials and vehicles
- Vehicle fueling and service areas
- Site access (ingress and egress)
- Waste disposal areas
- BMP locations
- Protected areas

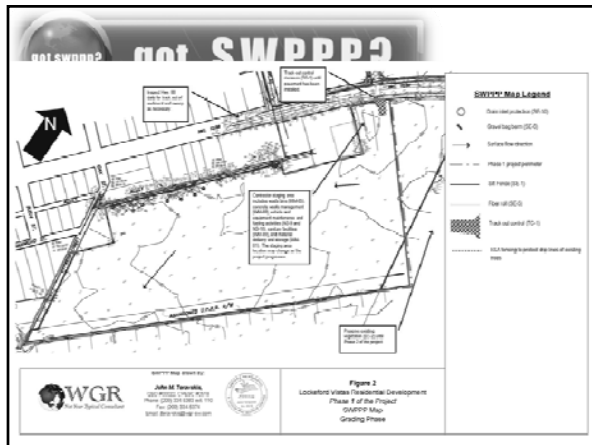
 **got SWPPP?** Attachment A
p. 3 & 4

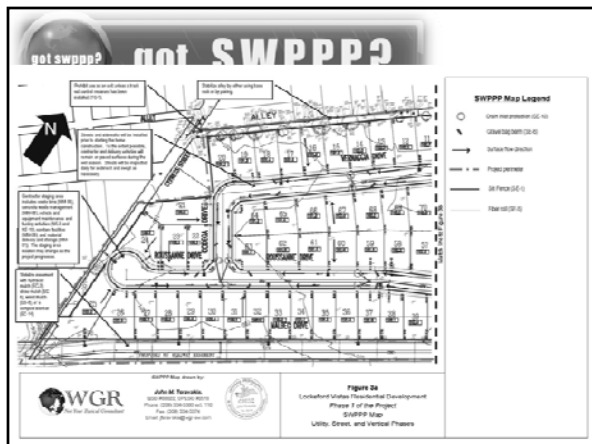
What Goes into the SWPPP?

The LUP SWPPP maps should also include:

- At least 3 maps showing the start and end of the linear work and the overall project footprint
- Storm drain inlets
- Segments / watershed basins associated with MS4s
- LUP Type boundaries



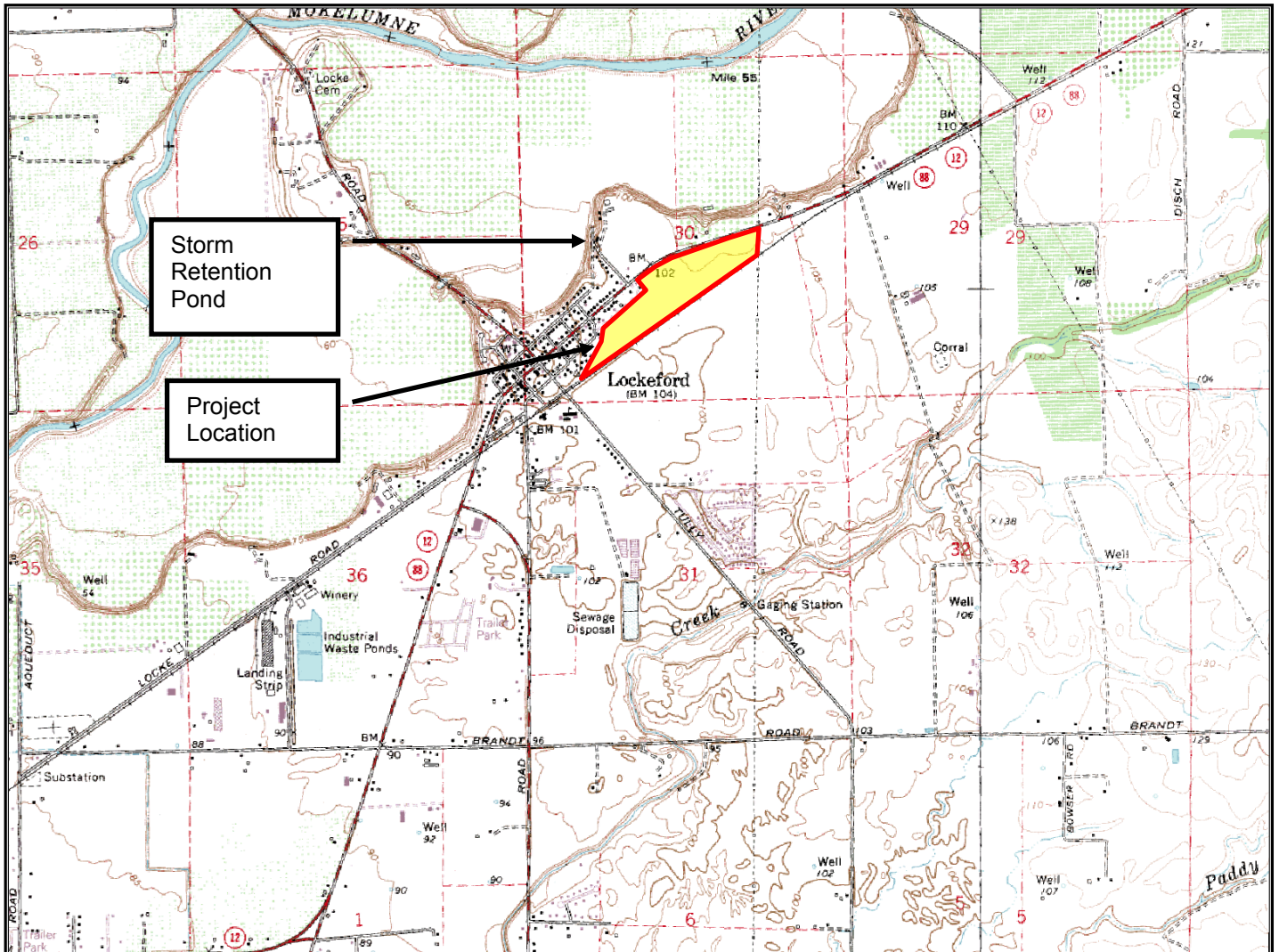


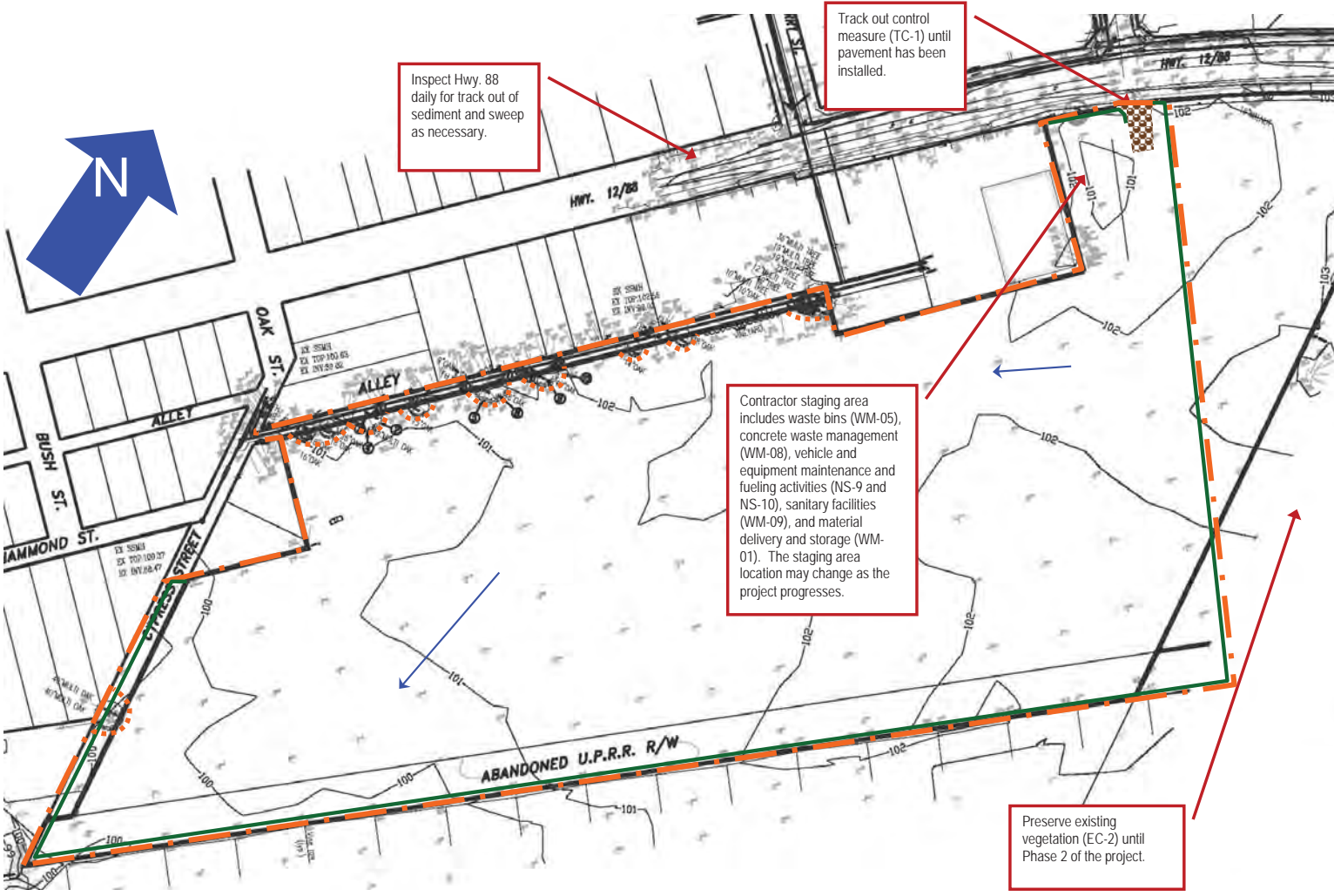


SWPPP Vicinity Map









Figure 1

Lockeford Vista Residential Development Project
Hwy. 88 between Bush Street and View Lane
(38.16618, -121.14306)
Lockeford, CA





SWPPP Map Legend

-  Drain inlet protection (SE-10)
-  Gravel bag berm (SE-6)
-  Surface flow direction
-  Phase 1 project perimeter
-  Silt Fence (SE-1)
-  Fiber roll (SE-5)
-  Track out control (TC-1)
-  ESA fencing to protect drip lines of existing trees

SWPPP Map drawn by:



John M. Teravskis,
 QSD #00022, CPESC #0518
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 Fax: (209) 334-5374
 Email: jteravskis@wgr-sw.com



Figure 2
 Lockeford Vistas Residential Development
 Phase 1 of the Project
 SWPPP Map
 Grading Phase

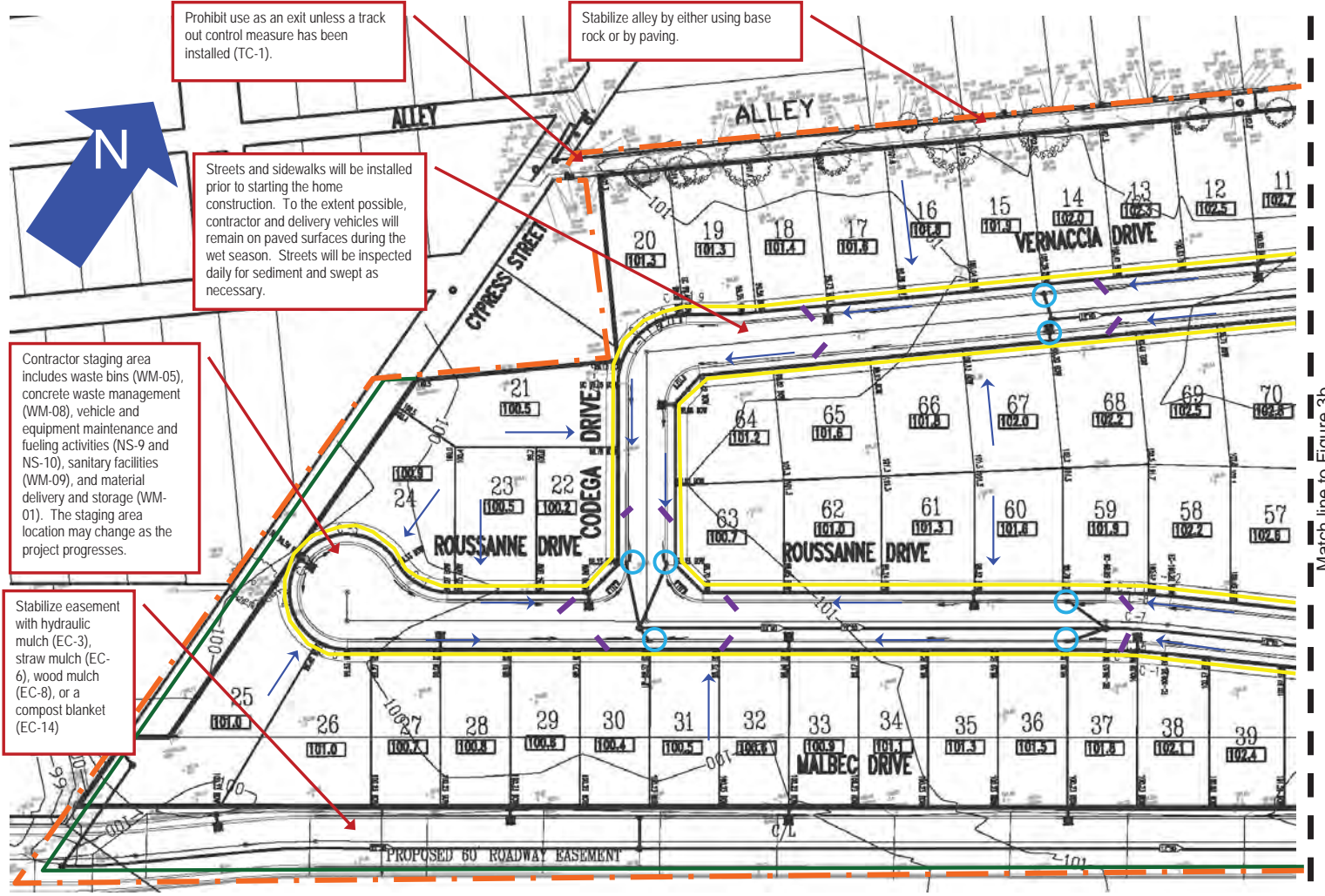
Prohibit use as an exit unless a track out control measure has been installed (TC-1).

Stabilize alley by either using base rock or by paving.







Streets and sidewalks will be installed prior to starting the home construction. To the extent possible, contractor and delivery vehicles will remain on paved surfaces during the wet season. Streets will be inspected daily for sediment and swept as necessary.

Contractor staging area includes waste bins (WM-05), concrete waste management (WM-08), vehicle and equipment maintenance and fueling activities (NS-9 and NS-10), sanitary facilities (WM-09), and material delivery and storage (WM-01). The staging area location may change as the project progresses.

Stabilize easement with hydraulic mulch (EC-3), straw mulch (EC-6), wood mulch (EC-8), or a compost blanket (EC-14)



SWPPP Map Legend

-  Drain inlet protection (SE-10)
-  Gravel bag berm (SE-6)
-  Surface flow direction
-  Project perimeter
-  Silt Fence (SE-1)
-  Fiber roll (SE-5)

Match line to Figure 3b

SWPPP Map drawn by:



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 QSD #00022, CPESC #0518
 Phone: (209) 334-5363 ext. 110
 Fax: (209) 334-5374
 Email: jteravskis@wgr-sw.com



Figure 3a
 Lockeford Vistas Residential Development
 Phase 1 of the Project
 SWPPP Map
 Utility, Street, and Vertical Phases



Stabilize alley by either using base rock or by paving.

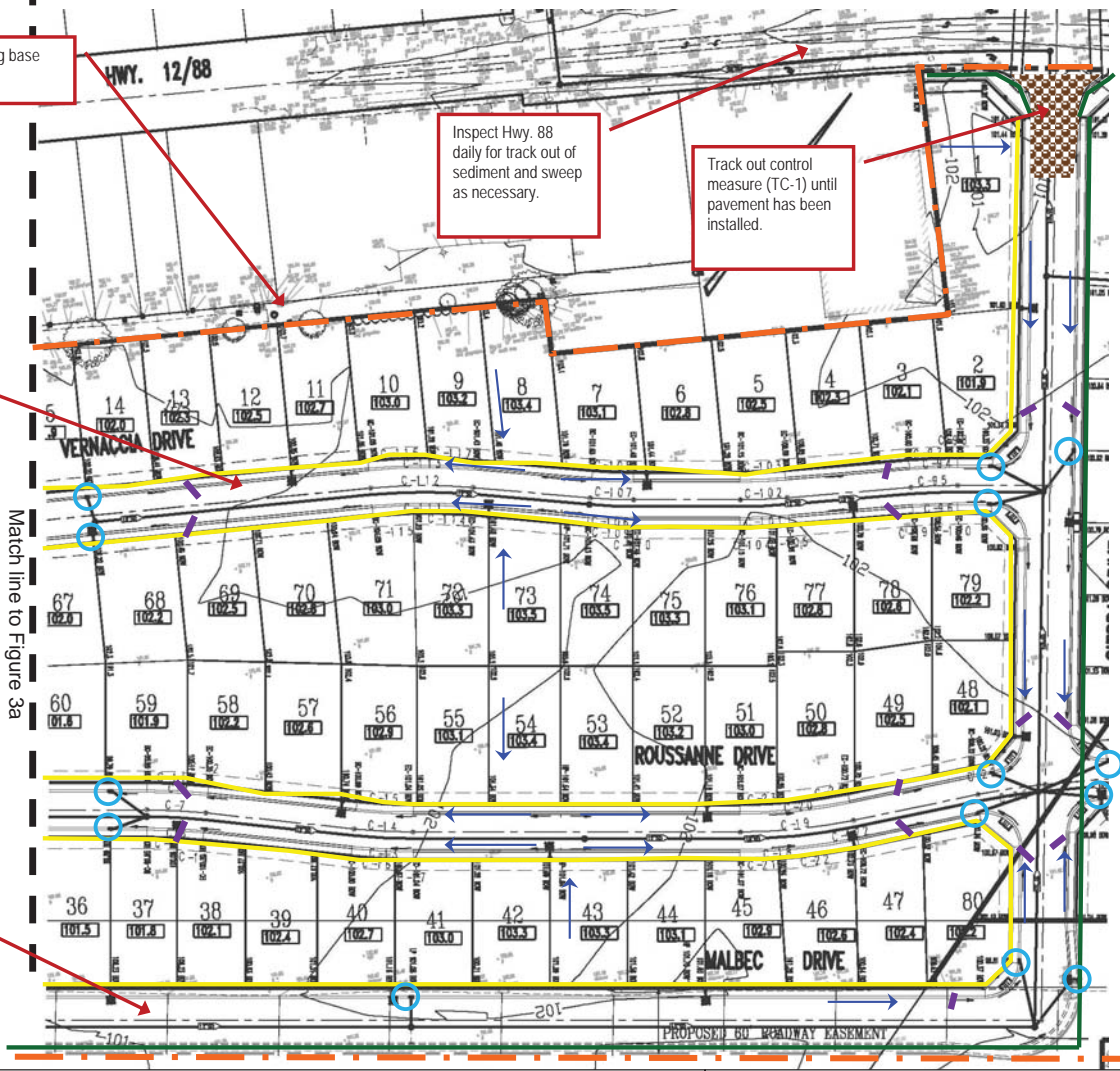
Inspect Hwy. 88 daily for track out of sediment and sweep as necessary.

Track out control measure (TC-1) until pavement has been installed.








Streets and sidewalks will be installed prior to starting the home construction. To the extent possible, contractor and delivery vehicles will remain on paved surfaces during the wet season. Streets will be inspected daily for sediment and swept as necessary.

Stabilize easement with hydraulic mulch (EC-3), straw mulch (EC-6), wood mulch (EC-8), or a compost blanket (EC-14)

Preserve existing vegetation (EC-2) until Phase 2 of the project.



SWPPP Map Legend

-  Drain inlet protection (SE-10)
-  Gravel bag berm (SE-6)
-  Surface flow direction
-  Project perimeter
-  Silt Fence (SE-1)
-  Fiber roll (SE-5)
-  Track out control (TC-1)

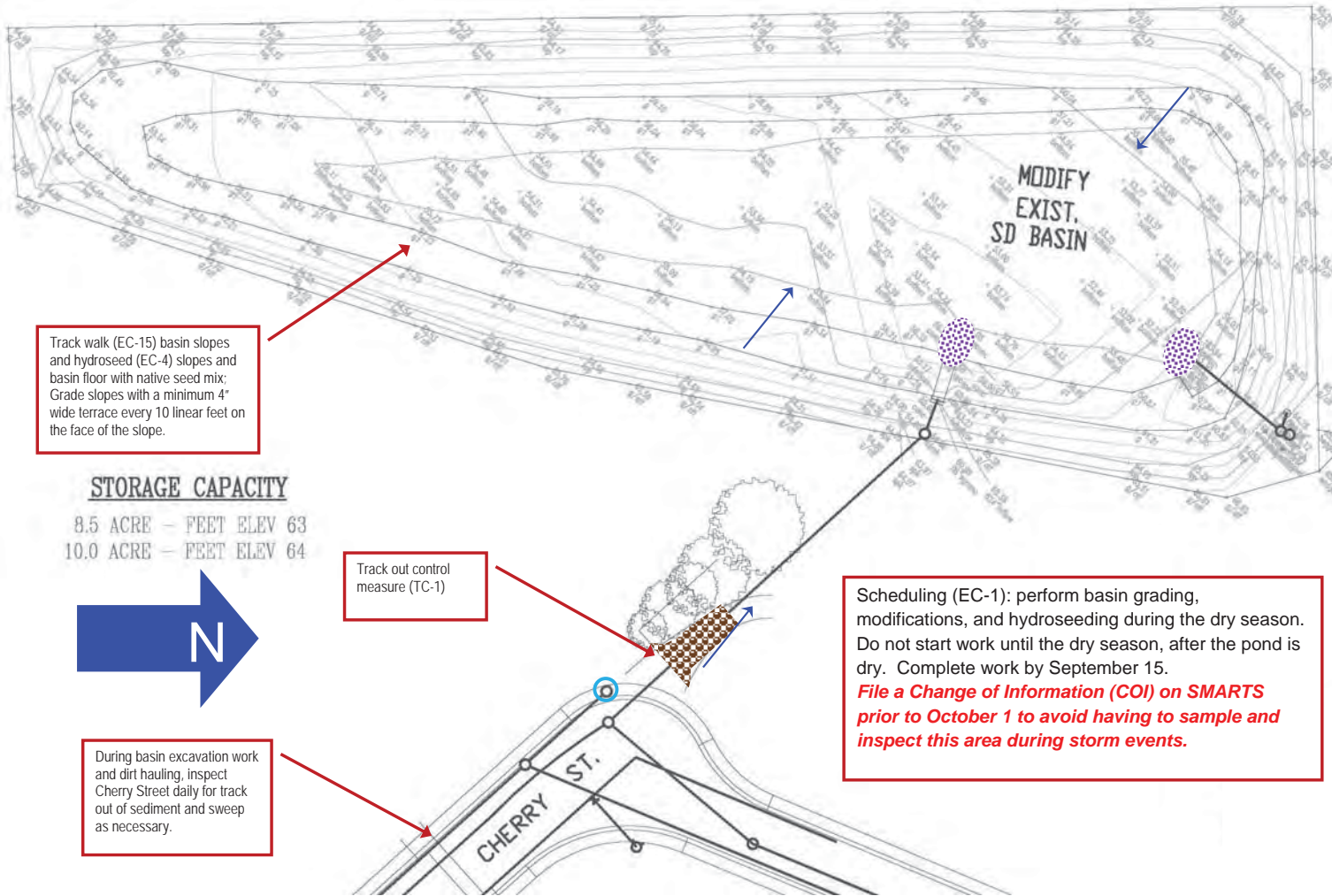
SWPPP Map drawn by:



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 Fax: (209) 334-5374
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Figure 3b
 Lockeford Vistas Residential Development
 Phase 1 of the Project
 SWPPP Map
 Utility, Street, and Vertical Phases



Track walk (EC-15) basin slopes and hydroseed (EC-4) slopes and basin floor with native seed mix; Grade slopes with a minimum 4" wide terrace every 10 linear feet on the face of the slope.

STORAGE CAPACITY

8.5 ACRE - FEET ELEV 63
10.0 ACRE - FEET ELEV 64







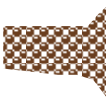




Track out control measure (TC-1)

During basin excavation work and dirt hauling, inspect Cherry Street daily for track out of sediment and sweep as necessary.

Scheduling (EC-1): perform basin grading, modifications, and hydroseeding during the dry season. Do not start work until the dry season, after the pond is dry. Complete work by September 15.
File a Change of Information (COI) on SMARTS prior to October 1 to avoid having to sample and inspect this area during storm events.

SWPPP Map Legend

-  Drain inlet protection (SE-10)
-  Gravel bag berm (SE-6)
-  Surface flow direction
-  Phase 1 project perimeter
-  Silt Fence (SE-1)
-  Fiber roll (SE-5)
-  Track out control (TC-1)
-  ESA fencing to protect drip lines of existing trees
-  Install rip rap velocity dissipater / stabilization (EC-10) at the basin inlet and pump outlet locations.

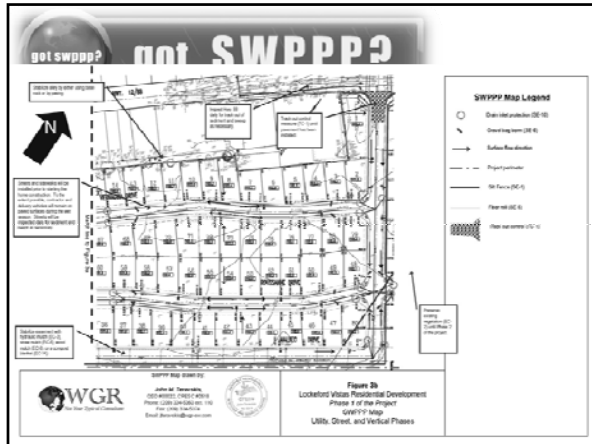
SWPPP Map drawn by:

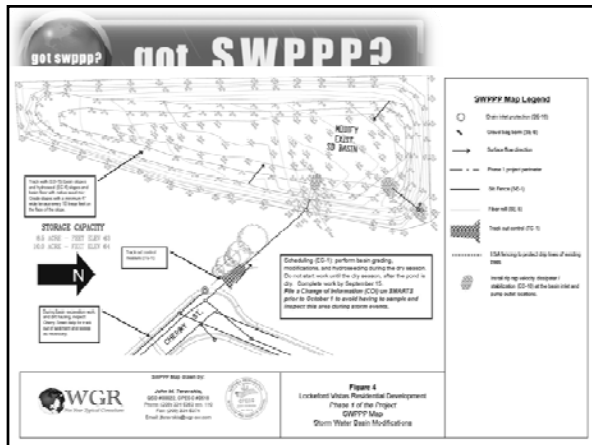


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Figure 4
Lockeford Vistas Residential Development
Phase 1 of the Project
SWPPP Map
Storm Water Basin Modifications





What Goes

Need a template?

- CASQA Outline / Template

www.casqa.org/

Appendix B
Stormwater Pollution Prevention Plan Outline

Construction Activities of SWPPP, Stormwater, or other Stormwater Runoff Control Measures

This appendix provides a recommended structure for a construction site Stormwater Pollution Prevention Plan (SWPPP) with associated content. The structure and content is based on a combination of specific design, regulatory, and other project content to meet the project specific requirements. It is intended to provide a general outline of the SWPPP content and structure that can be modified to meet the specific requirements of the project. The SWPPP should be tailored to the specific project based on the judgment of the SWPPP Developer (SWPPP-D). Specific General Format SWPPP requirements can also be found in the SWPPP-D. The SWPPP-D should be reviewed and approved by the SWPPP-D and the SWPPP-D should be approved by the SWPPP-D.

The suggested SWPPP outline is defined in the outline presented with suggested content for SWPPP.

B.1 Suggested SWPPP Outline
SWPPP Outline by (SWPPP-D) SWPPP Developer


SECTION 1 - SWPPP Requirements

- 1.1 Introduction
- 1.2 Stormwater Management
- 1.3 SWPPP applicability and implementation
- 1.4 SWPPP Amendments
- 1.5 Revision of SWPPP
- 1.6 Regional Site Specific Reporting
- 1.7 Annual Report
- 1.8 Changes to Stormwater Management
- 1.9 Notice of Termination

SECTION 2 - Project Information

- 2.1 Project and Site Description
- 2.2 Stormwater Runoff from Urban Areas
- 2.3 Potential for Construction Site Sediment and Erosion/Year-Round Discharge
- 2.4 Construction Schedule
- 2.5 Stormwater Management Site Pollution Sources
- 2.6 Identification of Non-Stormwater Discharges


November 2013 SWPPP-D SWPPP-D SWPPP-D


Attachment B
p. 2


List of PRDs

Permit Registration Documents (PRDs) need to be submitted before start of construction

- Notice of Intent (NOI)
- Risk Assessment
- Post Construction Water Balance Calculator and Post Construction Plans
- Alternate risk level justification documentation
- Site Map
- Storm Water Pollution Prevention Plan
- Annual Fee
- Signed Certification Statement



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CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
STATE WATER RESOURCES CONTROL BOARD

Home
About Us
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Water Issues
Publications/Forms
Press Room

Welcome to the State Water Resources Control Board!

Water Board, Storm Water Multiple Applications & Report Tracking System 2

Jerry Brown

- Home
- Water Board
- Storm Water Multiple Applications & Report Tracking System 2
- Public Notices
- Board Info
- Board Operations
- Water Issues
- Publications/Forms
- Press Room

Welcome to Storm Water Multiple Application and Report Tracking System - SMARTS!
The Storm Water program includes storm water discharges from facilities such as industrial facilities, construction sites, and small linear projects. The Storm Water program is also responsible for processing, reviewing, updating, terminating Notices of Intent (NOI), annual reports, and maintaining the listing status of each discharge.

SMARTS has been developed to provide an online tool to assist dischargers in submitting their NOIs, NOIs, NOIs, and Annual Reports, as well as, viewing/creating/Updating Licenses, monitoring the status of submitted discharges, and viewing their applications/annual fee status. The system will also allow the Regional Board and State Board staff to process and track the discharge submitted documents.

To submit the **Industrial Annual Report** in SMARTS, please fill out the **100% Registration Form** and mail it to:
 SWRCSB
 Storm Water Section
 P.O. Box 1917
 Sacramento, CA 95812-1917

SMARTS is a user account and password protected system where a valid user account and password is needed to access the system. To create an account, please click the "Sign Up" button on the right side of the screen.

SMARTS LOGIN

Username:

Password:


Has signed up with SMARTS yet?
To submit NOIs, NOIs, Annual Reports, and View/Print annual forms, please click the "Sign Up" button.

[Sign Up](#) | [Help](#)

Forgot your password?
[Click here to reset your password](#)

Interested in viewing submitted NOIs/SWPPP documents or annual Report data?
[View SW Data](#)

smarts.waterboards.ca.gov Staff at: 1-800-563-3376



Water Board, Storm Water Multiple Applications & Report Tracking System 2

Home Logout

This site is provided by Allen Technology, WGR Southwest, Inc. Navigate To


This document does not represent the views of the Board.

Welcome to Storm Water Multiple Application Reporting and Tracking System - SMARTS

- **Recently Expired NOIs:**
Please click "View" to view details with NOIs that have expired.
- **Approved/Terminated NOIs:**
View details of all approved, water board issues, and NOIs that have been approved or terminated.
- **Pending NOIs:**
Review and update your NOIs that are pending review but not submitted to complete and submit.
- **Annual Reports:**
View and update your annual reports.
- **Profiles:**
View details of your NOIs.
- **Change Password:**
Change your user account's password.
- **Update User profile:**
View and update your user account details.
- **Manage Data Submitters:**
View, add, and delete your data submitters and manage their privileges with respect to each NOI.


smarts.waterboards.ca.gov

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got SWPPP?

Questions and Discussion?

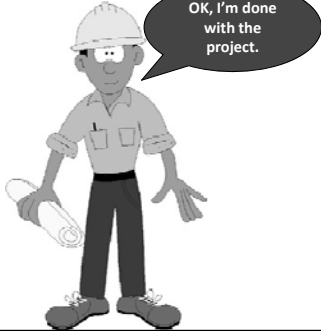


got swPPP?

QSD Training

Module 8
Project Close Out

got swPPP? **got SWPPP?**




So, you think you are ready for a **NOT?**

got swPPP? **got SWPPP?**

Learning Objectives

1. To understand what is necessary to deem a project complete
2. To understand what documents are required to be filed electronically, when they are required to be filed, and who must certify them




got SWPPP?

Order
p. 18 & 19

Basis of Termination

A project may be terminated if any one of the following are satisfied:

- The project is entirely completed;
- Construction activities have been suspended (*Note if you re-start the project, you will have to re-file for permit coverage.*);
- The site cannot discharge to waters of the United States (*Check with your Regional Board*);




got SWPPP?

Order
p. 18 & 19

Basis of Termination

A project may be terminated if any one of the following are satisfied (*continued*):

- The project is now subject to **another** NPDES Permit that includes the CGP requirements;
- The permitted construction property is sold prior to project completion; or
- Other Basis for Termination




got SWPPP?

Construction Project is Entirely Completed

Prior to Termination, the site must meet the following:


- All elements of the SWPPP have been completed.
- For purposes of “final stabilization,” the site will not pose any additional sediment discharge risk than it did prior to the commencement of construction activity;
- There is no potential for construction-related storm water pollutants to be discharged into site runoff;
- Final stabilization has been reached;
- Construction materials and wastes have been disposed of properly;

 **got SWPPP?**

Construction Project is Entirely Completed


Prior to Termination, the site must meet the following:

- Compliance with the post-construction requirements has been demonstrated and post-construction storm water management measures have been installed and a long-term maintenance plan has been established (a long-term maintenance plan should be designed for a minimum of five years, and describe the procedures to ensure that the post-construction storm water management measures are adequately maintained); and
- All construction-related equipment, materials and any temporary BMPs no longer needed are removed from the site.

 **got SWPPP?**


Construction Site Cannot Discharge to Water of the United States

- Check with your Regional Board if you want to terminate on this basis. If approved by your Regional Board, the site must meet one of the following conditions:
 - All storm water is retained on site.
 - All storm water is discharged to evaporation or percolation ponds offsite.

 **got SWPPP?**

The Permitted Construction Project is now subject to another NPDES Permit that includes the CGP requirements

- Must provide WDID
- Must provide date of coverage




got SWPPP?

The Permitted Construction Project is sold prior to project completion

Prior to Termination, the site must meet the following:

- NOT must be filed within 90 days of ownership transfer
- Ownership transfer form completed
- Certify the new owner has been notified of permit requirements
- Provide name, address, telephone number and email address of new owner




got SWPPP?

Order
p. 19

Project is Sold

FAQ #12 Can I terminate or sell a portion of my project? Yes, the 2009-0009-DWQ Permit allows a discharger to terminate portions of a construction project if those portions have been sold to another owner. **The permit is not transferable**, so the responsibility to obtain permit coverage, update the Storm Water Pollution Prevention Plan (SWPPP), and comply with permit requirements becomes that of the new owner. The seller must notify the new owner about his/her responsibilities concerning the permit, and must notify the State Water Board by submitting the new owner's name, address, and phone number on the Change of Information (COI) form for the termination to be processed. The seller must also disclose the state of construction, primarily if construction activity is ongoing, or if the post-construction requirements are completed.




got SWPPP?

Order
p. 19


Project is Sold

FAQ #13 What if I sell the property prior to completing the construction? The new owner must submit new PRDs within 30 days of the date of change of ownership. For ongoing construction activity involving a change of ownership, the new owner must review the existing Storm Water Pollution Prevention Plan (SWPPP), determine if it is appropriate for the construction activity being undertaken. If it is not in compliance, then the SWPPP must be amended, or a new SWPPP developed.



Other Basis for Termination

- Explain any other basis / reasons that are not covered above




Notice of Termination

NOTICE OF INTENT - NOT A BID

The Notice of Intent (NOI) is organized into different sections. Please complete all applicable sections before submitting the form. If you want to complete the NOI at a later time, please click on the "Add New NOI" button.

NOI ID: [] WQID: [] Status: [] Station Date: [] Basis of Termination: []



Notice of Termination

NOTICE OF INTENT - NOT A BID

Please fill in the information below you want the contractor to complete. If you want to complete the NOI at a later time, please click on the "Add New NOI" button.

Project Name: [] Project Address: [] City/State/Zip: []

Contractor Name: [] Contract Address: [] City/State/Zip: []


NOI ID: [] WQID: [] Status: [] Station Date: [] Basis of Termination: []

The contractor provided a complete and satisfactory completion of the work.

The contractor provided a complete and satisfactory completion of the work, but the contractor is not in compliance with all of the following conditions:

The contractor provided a complete and satisfactory completion of the work, but the contractor is not in compliance with all of the following conditions:


The contractor provided a complete and satisfactory completion of the work, but the contractor is not in compliance with all of the following conditions:



got SWPPP?

Methods to Demonstrate Final Stabilization

- 70% vegetative coverage
- RUSLE or RUSLE² method computational proof
- Custom method




got SWPPP?

Order
p. 19

70% Vegetative Coverage

- Project applicant must demonstrate 70% vegetative coverage based on pre-project conditions
 - Example: If pre-project vegetative coverage equals 50%, standard equals 0.7 x 50%, or 35%
- Erosion controls (e.g., blankets) can be used to demonstrate 70% coverage (LUPs, Attachment A, p.5)



got SWPPP?

Order
p. 19

Stabilization

FAQ #49 Can straw wattles be left at a project site applying for a Notice of Termination (NOT)?

- Only biodegradable wattles containing no plastic can remain on a site applying for a NOT. Wattles containing plastic netting (including plastic specified as photo-degradable) become “trash” in the environment and/or a trap for wildlife. These are also considered “construction materials and waste” and must be disposed per Section II.D.1.d of the CGP.

got SWPPP? got SWPPP?

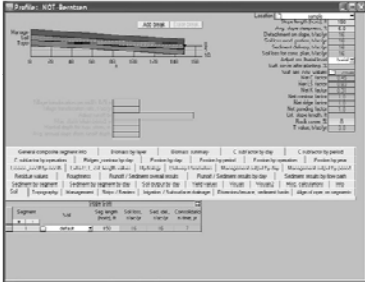
RUSLE computational proof

Demonstrate that post-construction conditions do not have a higher predicted erosion than the pre-construction conditions. To do this, a calculation using the RUSLE equation ($A=R*K*LS*C*P$) can be performed with pre-construction site conditions and the developed conditions.

- The R value should be held constant using an R value for one full year for both pre and post calculations.
- Typically, the K value would remain constant unless a significant amount of fill dirt was imported to the project.
- Possibly a change in LS (if grading was significant),
- But most likely a new C and P.

got SWPPP? got SWPPP?

RUSLE 2 method computational proof



Pre- and Post Construction Soil Loss equals 16 tons/ac/yr

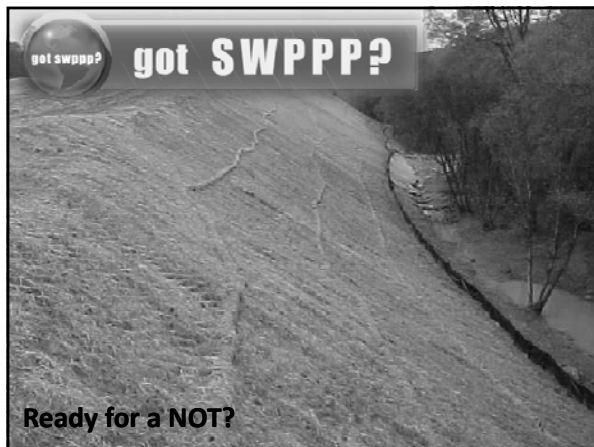
got SWPPP? got SWPPP?

Custom method

- Applicant may use site-specific or literature data to show that post-construction turbidity values are equal to or less than pre-construction values.
- Example: Two years of pre-construction water quality sampling data show that turbidity values do not exceed 100 NTU. If post-construction turbidity values are less than or equal to 100 NTU for a similar set of storm conditions, applicant may use this data to demonstrate that project has been stabilized.















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