

## Storm Water Pollution Prevention

### It's the Law

Best Management Practices (BMPs) for All construction Activities

Instructor: Kazem

Stormwater Compliance Specialists

## Background

- Erosion control and pollution prevention reduce impacts
- Local Agency role
- Pollutants – Sediment, Concrete waste, others

## Current Efforts

- Significant Outreach and Training
- Enforcement – Focus on Local Agency Responsibility

Phase I  
5+ Acres Must Have a Permit

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Phase II – March 2003  
1+ Acres Sites

## **Effective Storm Water Program**

### **Cooperative Partnership**

- ✓ Train Inspectors
- ✓ Inspect Sites in Your Jurisdiction
- ✓ Enforce Local EC/SWC Ordinances
- ✓ Contact Regional Board on Problem Sites

## **Effective Local Programs**

- ✓ Evaluate the Site's SWPPP
- Inspect & Follow-up
- Enforce

## RWQCB Expectations

Construction Projects – Minimize Water Quality Impacts From Land Development

All Construction Activities > 5 acres

Must Have An NPDES Permit:

- Notice Of Intent (NOI)
- SWPPP (Living Document, Dynamic and Defensible);
- Implementation of Effective Erosion and Sediment measures (BMPs)
- Inspection and Documentation

## EXAMPLES OF Ineffective Storm Water Control MEASURES



DISASTER HAS STRUCK.....DUE TO INEFFECTIVE BMP IMPLEMENTATION..



"But I've Got My Silt Fences in"....NOT ACCEPTABLE IN RAINY SEASON



Too late.....SSSSSSSSSS



**Ineffective  
Erosion  
Control  
Measure**



**NO EROSION MEASURES**



**UNPROTECTED FINISHED LOTS**



**More Ineffective Controls**



**Lack of BMPs**





Ineffective BMPs causes...



...sediment and pollutants discharge into surface waters

Which in turn causes:



Flooding

### Sediment Discharge Impact On Creeks



## Rates of Erosion

Here are the rates of erosion caused by different industries and land uses.

As you can see, active surface mines and construction top the list, causing 2,000 times as much erosion as is normally present in a forest.

Rates of Erosion from Various Land Uses

Land Use	Rates of erosion tons per acre	Relative to forest = 1
Forest	10	1
Grassland	210	21
Residential/Landfill/Mines	2,400	240
Construction	4,000	400
Highway Projects	11,000	1,100
Active Surface Mine	30,000	3,000
Construction	40,000	4,000

Comparative Rates of Erosion

Area	Rates of erosion ton/acre/year	Relative
Urbanized Residential	20	1
Urban Residential	100	5
Open Park	2,000	100
Open Field	10,000	500

## Splash Erosion



Simple Tools to Consider all Phases of construction Activities FROM ONE +...

## Timing is crucial

- Minimize soil exposure
- Reduce total area
- Protect critical areas
- Monitor before during and after rain event

## General State construction Permit Objective:

Eliminate Pollutant Discharges from Construction Activities

First Prepare A Living Document, Dynamic And Defensible, SWPPP



## A general outline of a SWPPP

- I. Title Page
- II. Certification Page
- III. Amendments
- IV. Table of Contents
- V. Introduction
- VI. Source Identification
  - I. Topography Map
  - II. Site Map

## A general outline of a SWPPP

- 1. Site/Other Description(s)
  - i. Site Estimates and Descriptions of On-Site Soil
  - ii. Pollutants Likely to be Present in Storm Water Discharges
  - iii. Toxic Materials
  - iv. Erosion and Sediment Control Practices
  - v. Non-Storm Water Management
  - vi. Maintenance, Inspection and Repair of Structural Controls
  - vii. Spill Prevention and Control
  - viii. Post-Construction Storm Water Management (Permanent) Training Document
  - ix. List of Contractors/Sub-Contractors
  - x. Annual Certification due July 1 each year
  - xi. Monitoring, Sampling and Documentation
  - xii. New Modification-Required Sampling And Analysis
- Effective on August 1, 2001

## NEW SAMPLING MODIFICATION AND SAMPLING REQUIREMENTS APPLIES TO Phase I Only

1. Sediment Sampling
  - Required if there is a direct discharge to a 301(d)-Impaired Storm Water Area or the State General Construction NPDES Permit (Order 99-14)
2. Non-Volatile Pollutant Sampling
  - This includes
    - Soil/sediment handling of all storage materials
    - During all phases of grading and basic construction phases
    - Examples: Lanes/By Axis/Gypsum amendments - pH  
Concrete Washout - pH  
Cementitious acid - neutralization

SOLUTION: NO EXPOSURE OF MATERIALS TO RAIN TO EXTENT FEASIBLE

## Divert Clean Water Around Your Site



Any clean water running on to the site must be diverted away from disturbed or denuded areas (areas of potential erosion).

## Implement Effective BMPs



It is also important to control erosion from small lots prior to rainy season.



Another example of well stabilized disturbed area  
Using three step hydro-seeding...And adjacent swale protection



## By Machine or By Hand You Choose !!

Wet Conditions May Prevent Automated Straw Application



## Bonded Fiber Matrix - BFM

This crew is uniformly stabilizing this steepening a bonded fiber matrix hydroseeding process with a liquid backfiller in place of straw. In the foreground you can see that they have also increased the fibrate density to decrease runoff and allow the seeds to take hold properly.



- Erosion Control Matting
- Slopes over 20%
- Trench in at the top
  - one foot down
  - pin it with 1 foot long pins
  - backfill the trench
- Lay it like shingles
  - overlap by 6"
- Run it at least a couple feet past the toe of the slope
- Use additional controls along slopes and at the bottom of the slope

... results in successful erosion and sedimentation control.



#### Good Combination of BMPs on Flat Lots

- Seeding
- Straw Mulch
- Silt fence
- Wood chip bags



#### Proper Erosion Control

#### Results in Clear Runoff



#### Advantage of Erosion Protection

Straw mulch with Tackifier on a disturbed area absorbs the impact of raindrops. As you can see, the runoff on this disturbed area is clear.



## Sediment Control Measures (BMPs)

The most important thing to remember about sediment control:

**It doesn't work without erosion control.**

It is easy to see that the silt fence at the bottom of this hill has been completely overwhelmed.

**This is a disaster.**



## Ineffective Erosion AND SEDIMENT CONTROL MEASURES



### Silt fences

Silt fences are widely misused:

- No erosion control on the slope above
- Improper BMP maintenance



### Fiber Rolls

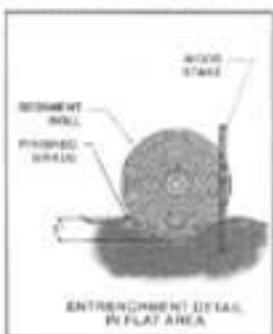
Fiber Rolls are preferable and is a good alternative to hay bales including silt fence in almost every situation.

Place rolls into key trench 3 inches deep.

Place excavated soil on uphill or low side of the roll.

Rods should be staked at the ends, not overlapped.

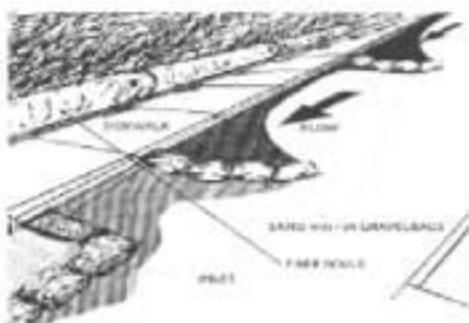
Alternate stakes on both sides of the roll; every six inches.



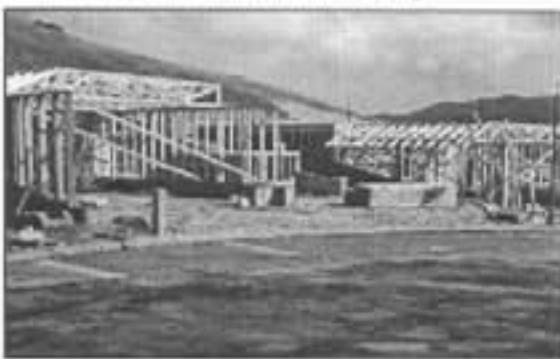
Another example of drain inlet protection, which is not on a roadway, a combination of multiple levels of fiber rolls and gravel beds, in concert with mulch and tackifier, was effective to filter sediment from runoff.



Schematic lay out of curb and inlet protection for finished lot



Fiber rolls installed properly here, and used in conjunction with erosion control measures, has minimized tracking of mud onto paved street. Such measures minimize cost of street cleaning.



A good example  
of protecting  
finished lot and  
storm drain



## Non -Visual and Non-Storm Water Control Measures (BMPs)

Poor Housekeeping  
Red Flag !!!



Improperly designed construction entrances ...



... can cause as much damage as any other kind of violation.



Here is an inadequately protected construction entrance ...



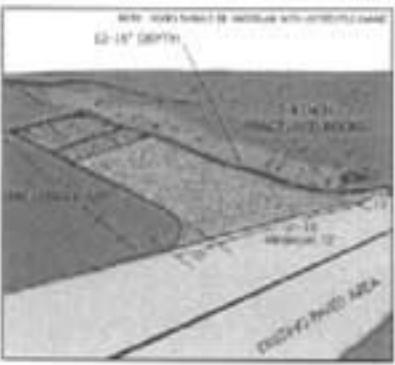
And here it is after the proper application of the BMP's for construction entrances. This entrance is now very stable by using large rocks 3 to 4 inches.



### Construction Entrance Controls

A very significant source of non-storm water pollutants discharge is tracking mud from construction site entrances.

This is very easy to mitigate, as shown to the right.



Here is a well designed construction entrance (using large rocks) which shows minimal tracking of sediment outside the job site.



Concrete wash out must be located at designated area and away from storm drains, and drainage ditches.



### Materials Handling and Storage

The following materials must be stored under cover and surrounded by containment berms:

Soil, Dirt and Fill Materials  
Paints and Solvents  
Pesticides and Herbicides  
Fertilizers  
Detergents  
Plaster or related products  
Concrete compounds  
Asphalt compounds  
Petroleum products like fuel, oil, and grease  
Hazardous chemicals like acids, lime, glues, adhesives, and curing compounds  
Any other commonly used construction materials or byproducts.

Any chemicals or materials which get outside the containment become pollutants.



Proper management of fuel tanks with secondary containment eliminates or minimizes discharge of pollutants and costly cleanup.



Here is a drainage ditch with totally inadequate BMP's, which caused a massive discharge of sediment, clean-up costs and civil liability.



### Swales and Drainage Ditch Protection

Protection of swales and drainage ditches is especially important because they concentrate flow, creating high energy and high potential for erosion of the banks and sediment discharge.

Often all of the methods we have discussed so far are required to adequately protect a drainage ditch.



Washing is OK, but you must collect and filter the runoff, not just let it go down the drain.



Protect All clean and Contaminated Stockpile Soil ...



#### Paint and Concrete

- Have a specified plan for paint disposal
  - reuse
  - haul off-site for other disposal
- Have a dedicated concrete washout area

They also must be located well away from storm drains, receiving waters, and drainage ditches.



#### Stockpile BMP, improper installation



This stockpile is properly managed, and will have a minimal problems should a storm event occur.



## DO IT RIGHT...



## Saw Cutting BMP

Don't just wash saw cutting debris into the storm drains!



## Take the time to do it right!

This may not seem like very much pollution, but every little bit counts.

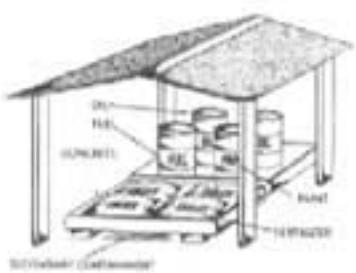


## Materials Handling and Storage

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Pesticides and Herbicides  
Fertilizers  
Detergents  
Plaster or related products  
Concrete compounds  
Asphalt compounds  
Petroleum products like fuel, oil, and grease  
Hazardous chemicals like acids, lime, glues, adhesives, and curing compounds  
Any other commonly used construction materials or byproducts.

COVER ALL CONSTRUCTION MATERIALS UNDER A ROOF OR OTHER APPROPRIATE COVER MATERIALS TO PREVENT CONTACT AND WASHOUT



## Inspection and Monitoring

## **Inspection Is Not Optional !!**

The General NPDES Permit Requires Inspections

Before, during and after storm events

Documentation per Annual Certification (July 1)

Before Termination

Recommendation

Weekly during all construction phases



.....Even Non Storm Water control measures such as concrete washout



### **What needs to be inspected?**

**Disturbed areas of the site**

**Material storage areas**

**Vehicle entrances and exits**

**Erosion controls**

**Sediment controls**

**Vegetation establishment and maintenance**

Problem areas must be documented, and corrective control measures must be identified and promptly implemented.

## **Municipality Must Have Pollution Prevention Standards to Include Inspection & Enforcement**



## **IN SUMMARY.....**

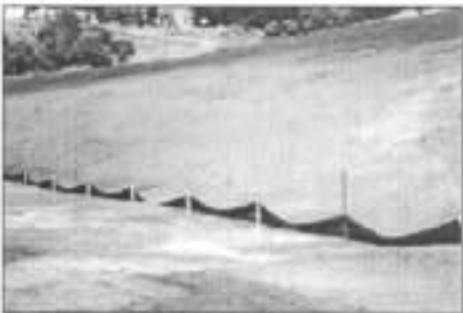
Another example of improper BMP management ...



Still another example ...



... which leads to uncontrolled sediment discharges ...



... and financial and legal problems.

**■ Fremont: Silt in creek to be removed at once.**

By DENNIS ALLEN  
Alameda Journal Staff

In an emergency order Tuesday, Alameda County supervisors approved spending \$75,000 to remove silt that experts said is blocking a small Fremont creek and could trigger flooding during a heavy rain storm.

## EMPIRE NEWS

Planned June 4, 2001

Vineyard owner sentenced to 30 days in jail  
(Associated Press via AP Wirephoto, file photo)

Proper implementation of Erosion and Sediment Control BMP's ...



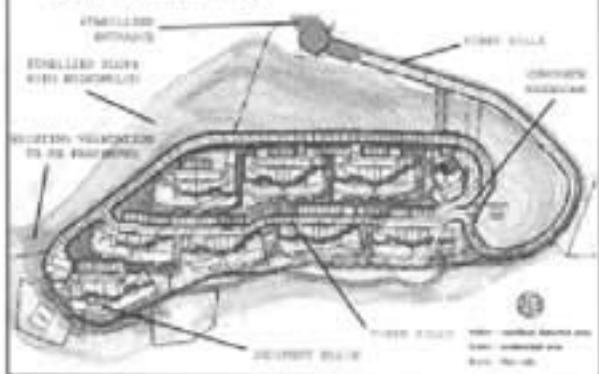
... results in successful erosion and sediment control.



A successful project requires a combination of all these techniques, working together to protect the environment.



## COLOR CODED SWPPP-SITE MAP (BMP'S HIGHLIGHTED)



<p><b>STOP WORK</b></p> <p>Reason for Stop Work:</p> <p>Stop Work Date:</p> <p>Stop Work Duration:</p> <p>Stop Work Location:</p> <p>Stop Work Description:</p> <p>Stop Work Status:</p> <p>Stop Work Remarks:</p>	 <p><b>THE CITY OF PLEASANTON</b></p>
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## RWQCB's Role

- ✓ Educate City Staff and Regulated Public
  - ✓ Backup City Staff in Enforcement
  - ✓ Audit City's Storm Water Program
  - ✓ Review Reporting and

## **Board Oversight of Municipal Program**

#### **Board Staff Observes Stormwater Pollution from a Construction Site**

- ✓ Issue Notice To Comply To Site Operator
  - ✓ Notify Municipality of Observation(s) & NTC
  - ✓ Notice of Violation Letter to Municipality
  - ✓ ACL against Developer and/or Local Government



ANY QUESTIONS OR  
SUGGESTIONS??  
GO AHEAD MAKE  
MY DAY  
OTHERWISE  
HAVE A NICE DAY