



Simple Tools for Storm Water  
compliance

New Development and Existing  
Construction Site Pollution  
Control Program

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

**Phase II – March 2003**

1+ Acres Sites Must Have a Permit

**Construction Storm Water  
Pollution Prevention**



Hay Bales are  
good for only  
one thing:

**AND SEDIMENT CONTROL  
AIN'T IT!**

This small low-energy  
flow has easily undercut  
these hay bales, and is  
now damaging the  
environment with  
sediment.



Here's another disaster.

The lack of erosion control on the slope, coupled with ineffective sediment control measures, has led to uncontrolled sediment discharges.



Poor Planning



Causes sediment and pollutant discharge into surface waters

Which in turn causes:



Flooding

Sediment Discharge Impact On Creeks



Dept. of Fish & Game  
States Board's Concern



Splash Erosion



## Rates of Erosion

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

Rates of Erosion from Various Land Uses

Land Use	Estimated Erosion Rate (tons per acre)	Number of Acres
Forest	20	1
Grassland	200	10
Disturbed Surface Areas	2,000	100
Urban	2,000	100
Highway	2,000	100
Construction	2,000	100

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

Comparative Rates of Erosion

Activity	Estimated Erosion Rate (tons per acre)	Number of Acres
Disturbed Surface Areas	2,000	100
Urban	2,000	100
Highway	2,000	100
Construction	2,000	100
Grassland	200	10
Forest	20	1

## Ineffective Erosion Protection



Storm Drain



## Ineffective Storm Water Control



## More Ineffective Controls



Storm Drain

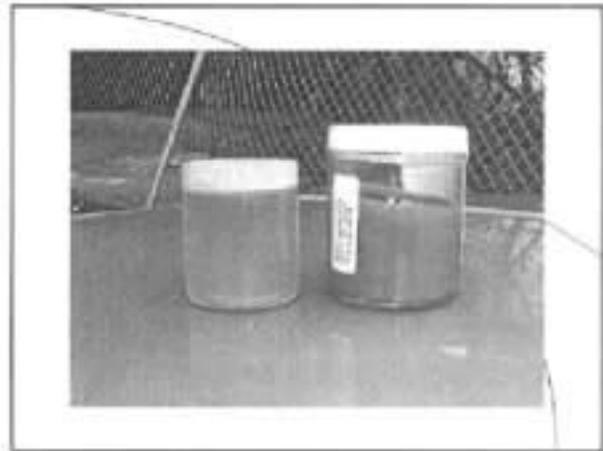


### Silt fences

Silt fences are widely misused:

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





Effective Best Management Practices for All Construction Phases

**Best & Cheapest Solution  
Straw Hydromulch**

**Three step hydro-seeding with mulch**

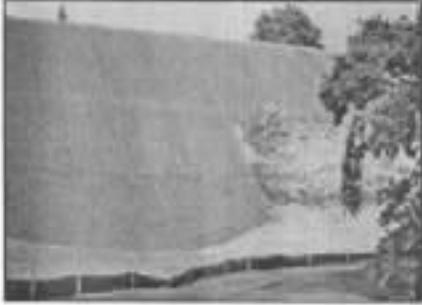
- Step One: Apply seed and fertilizer
- Step Two: Apply mulch (2 tons per acre)
- Step Three: Apply fertilizer (again)

**Proper Slope Stabilization**

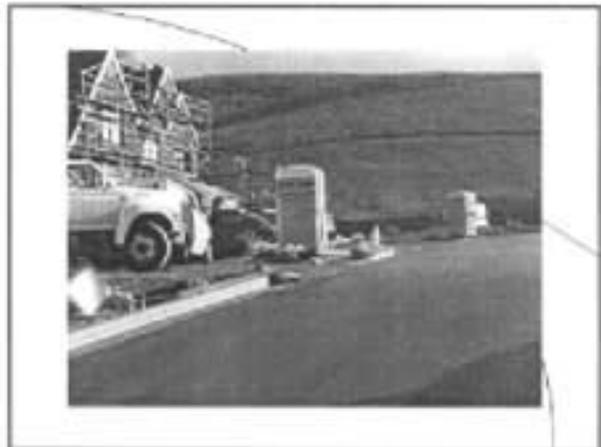
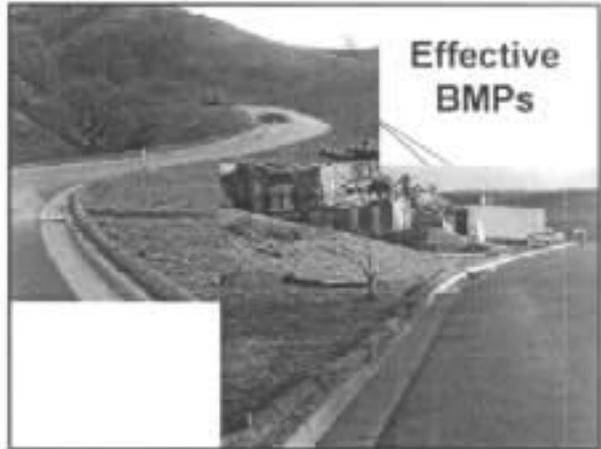
This crew is uniformly stabilizing this slope using a bonded fiber matrix hydro-seeding process with a liquid tackifier with seeds. In the foreground you can see that they have also seeded the hillside vertically to increase runoff and allow the seeds to take hold properly.

### Erosion Control Blankets

Properly installed erosion control blankets are recommended for areas across conditions, where the slope is greater than 2 to 1, or for any slope where the soil is sandy or silty.



### Effective BMPs



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



Proper Erosion Control

Results in Clear Runoff



The fiber rolls with straw mulch on this hillside are an effective erosion and sediment control measure.

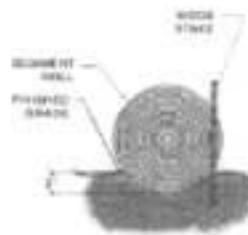


## Fiber Rolls

Fiber Rolls are alternative to hay bales and silt fences in almost every situation.

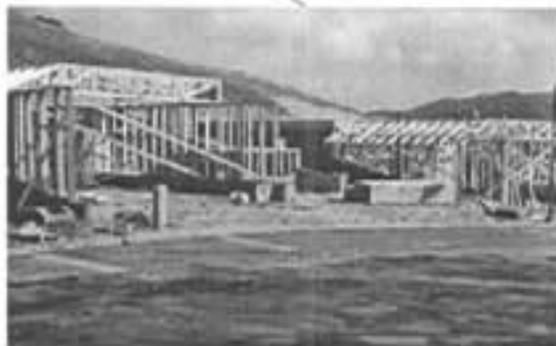
### Installation Instructions:

- Place rolls into key trench 3 inches deep
- Place excavated soil on uphill or low side of the roll
- Rolls should be abutted at the ends, not overlapped
- Alternate stakes on both sides of the roll, every six inches



ENTRENCHMENT DETAIL IN FLAT AREA

Fiber rolls installed properly here, and used in conjunction with erosion control measures, have minimized tracking of mud on the paved areas. This is a successful job site.



For this drain inlet, which is up on a roadway, a combination of multiple levels of fiber rolls and gravel beds, in concert with mulch and tackifier, was sufficient to minimize sediment discharges.



Non-Storm Water Control

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 ...



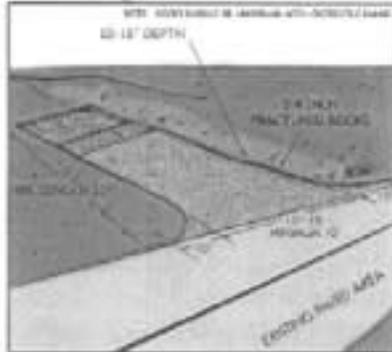
And here it is after the proper application of the  
BMP's for construction entrances. This entrance is  
now very stable by using large rocks 3 to 4 inches.



## Construction Entrance Controls

A very significant source of non-point 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
  - Flammable related products
  - Concrete components
  - Asphalt compounds
  - Flammable products like fuel, oil, and grease
  - Hazardous chemicals like acids, bases, glues, adhesives, and roofing compounds
- Any other materials 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.



## Success!!

As you can see here, proper installation of blankets on creek banks will reduce erosion.



## Sediment Basin

### Design considerations for sediment basins.

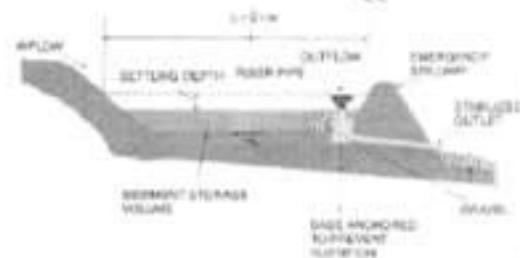
Sediment basins must be large enough for effective sedimentation to occur, based on anticipated water volume, soil particle size and anticipated erosion load.

Minimum design calculation should either be based on a 10 year, six hour rain event, or allow for 3,600 cubic feet of reservoir volume per acre disturbed.

Special attention must be paid to the inlet and outlet to avoid secondary erosion.

### Design considerations for sediment basins.

Here are the features of a well designed sediment basin:



### Design considerations for sediment basins.

Sediment basins must be large (at least 3,000 cubic feet per drainage acre) to be effective in allowing sediment to settle.



## Dewatering Methods

### Dewatering Methods

#### Filtering

- Sand and Gravel Bags
- Rock Filter Caisson
- Filtering Systems

#### Sedimentation

- Baker Tank
- Sediment Basin

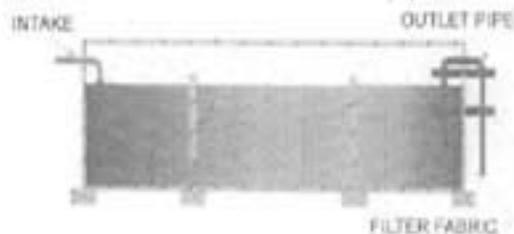
**Dewatering an excavation or sediment basin without filtration is prohibited!!**

### Dewatering

Dewatering can be used to filter sediment from water to surface waters by using a combination of filtering and sedimentation methods.



Portable clarifying systems may also be used for dewatering, provided they are maintained and monitored properly.



Here is a two-step filtration unit which uses both a sand filter and a cloth filter to remove fine sediments, such as clay silt, from water before releasing it to the environment.



In Summary

Improper BMP Management ...



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 David Azzoni  
Fremont News-Observer  
In an emergency action Tuesday  
Alameda County supervisors ap-  
proved spending \$75,000 to remove  
all the silt expected to be washed  
into Fremont creek and could  
have flooding during a heavy rain-  
storm.

ALL INFORMATION CONTAINED  
HEREIN IS UNCLASSIFIED

**EMPIRE NEWS**

Thursday, June 4, 1975

**Vineyard owner sentenced to 30 days in jail**

Scheduled man destroyed vegetation, oak trees

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.



## 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
- Enforcement

### General Permit Objective:

Eliminate Pollutant Discharges from Construction Sites

A Good SWPPP is Critical







### RWQCB's Role

- ✓ Educate City Staff and Regulated Public
- ✓ Backup City Staff in Enforcement
- ✓ Audit City's Storm Water Program
- ✓ Review Reporting and Monitoring Information Required by Permit

### 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



### Conclusion

- Local agencies must effectively regulate stormwater pollution prevention at construction sites.