Appendix L

Powerpoint Slides Used in Training Programs

Powerpoint Presentation Slides Used for BMPs 4-2.a and 4-3.a Training of Staff on Construction Site Plan Review and Inspection Procedures

Monterey Regional
Stormwater
Management Plan

Submitted to RWQCB in 2003
Adopted by the RWQCB in 2006

The NPDES Stormwater Permit

The permit has six elements:

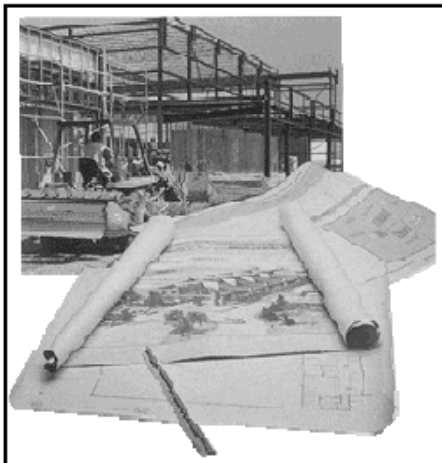
1. Public Education
2. Public Involvement
3. Illicit Discharge Detection /Elimination
4. **Construction**
5. New Development
6. Good Housekeeping

Member Agencies

City of Pacific Grove
City of Monterey
City of Seaside
City of Sand City
City of Del Rey Oaks
City of Marina
County of Monterey
Carmel By The Sea

Annual Meeting of Inspectors From All Participating Entities

The Inspection



Begin With Reviewing The StormWater Pollution Prevention Plan (1 Acre +), Grading Plan or Erosion Control Plan

Get To Know The Site Superintendent

Employees and Subcontractors Need To Be Informed About SWPPP

Make Sure Contractor/Subs Aware of All Drains, Swales and Creeks

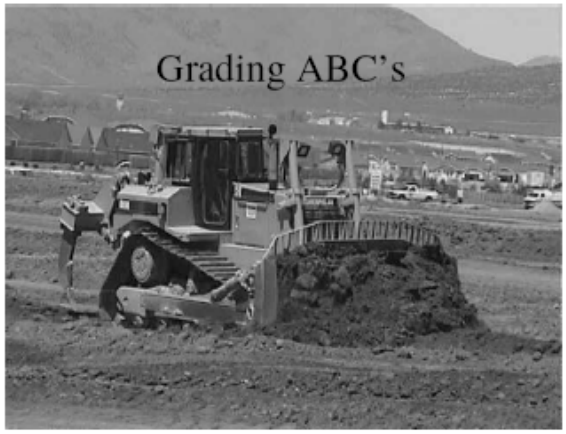
Remember Everything Leads To The Sanctuary

99% Of The Problem Is Sediment

Check All Drainage Points For Signs Of Trouble

Construction Site Entrance Protection

Grading ABC's



Are They Really Planning To Do Grading During The Wet Season?

If Major Grading Occurs Before Winter And Then Work Stops The Site Needs to Be <u>Fully Protected</u>.

Preserve Natural Vegetation

Erosion Control Basics

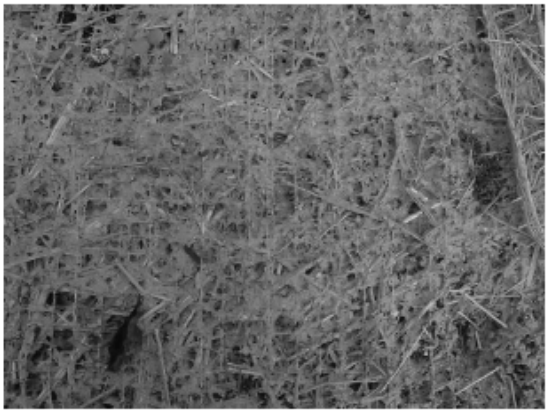
Many Sites Need More Than Just Sediment Capture BMP's

Not Acceptable

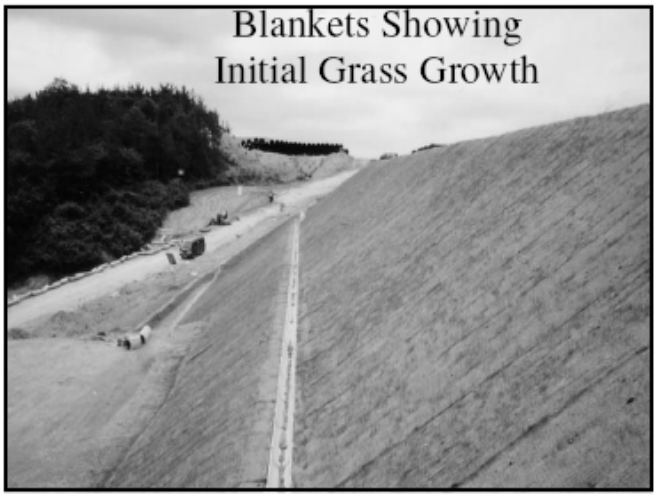
Stockpiles and Bare Slopes Must Be Protected

Perhaps The Best Technique Erosion Control Blankets.

Blanket With Binder and Seed



Blankets Showing Initial Grass Growth



Hydroseeding

Install During September and Irrigate Until Rains Begin

Wattles For Long Slopes

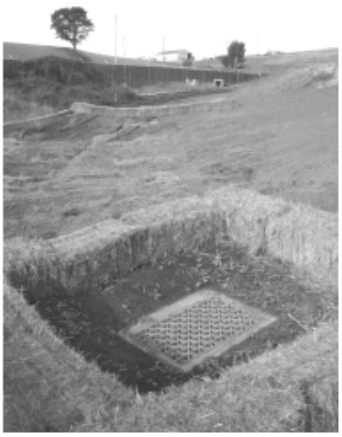
Plastic Can Be Used But…..

BMP's To Minimize Soil Movement

Sweeping of Streets and Paved Areas? Should Be On A Regular Schedule and Just Before A Storm

Make Sure You Know Where They Will Dump The Load And Clean The Hopper

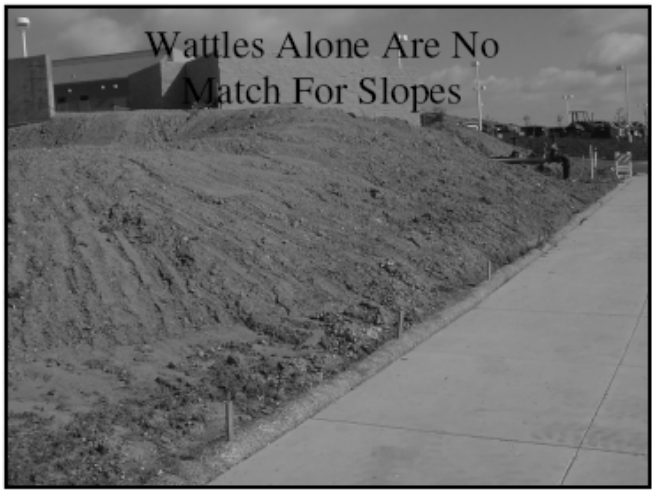
Sometimes You Need More Than A Sweeper. The Contractor Needs To Be able To Respond Quickly



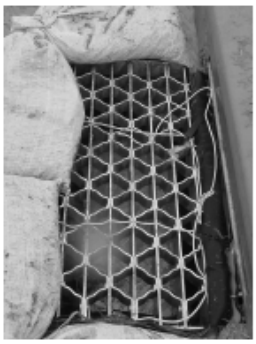
Straw Bales The Old Way To Manage Sediments

Chinese New Year?

If It's Flat,Wrap it With Wattles



Drain Inlet Protection



Gravel/Sand Bags Need Constant Attention

How Is Runoff Controlled and Conveyed?

You Can Route it With Fabric And Wattles

Vegetated Swales

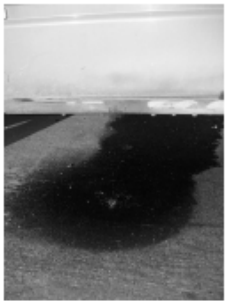
Trash Management

Dumpsters and cans are preferable. If infeasible, hauler must pick up materials daily and provide tarps to avoid getting wastes wet.

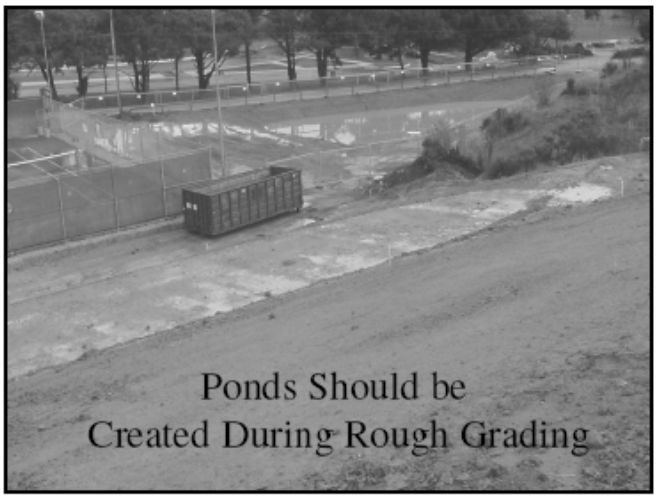
Sites With Paved Access Can Usually Use Debris Boxes

No Comment

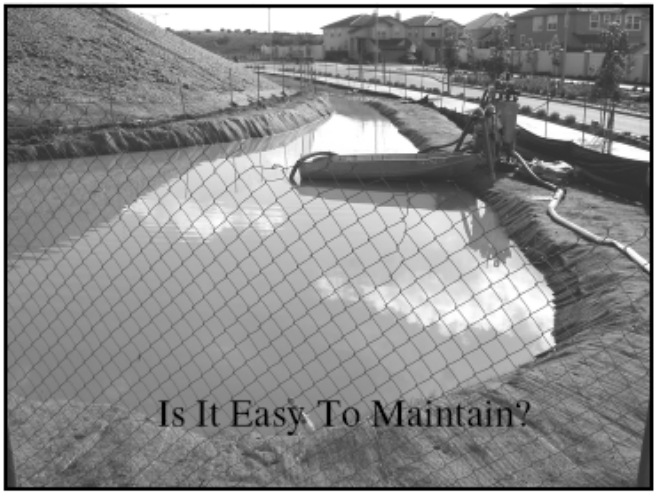
Equipment Properly Maintained?



Detention Ponds



Make Sure the Ponds are Properly Designed and Maintained



The Other 1%

Its not necessary to freak out about chemical and other wastes.

Make sure the contractor knows that the storm drain is not a disposal device and that all chemicals need to be kept out of the rain.

Cement Truck Washout Facility

Road Surfaces Only Applied During Dry Weather?

Stucco Is Messy. Plastic Sheets and Daily Cleanup Needed

Paint Disposal

It Happens

Correct PPE, but…..

The 2 Most Important Pieces Of Inspection Equipment

Powerpoint Presentation Slides Used for BMP 4-4.b Construction Contractor Educational Presentations

Construction Site Storm Water Pollution Prevention Requirements Under the Monterey Regional Storm Water Management Program

Presentation to the National Association of the Remodeling Industry
June 11, 2008

National Storm Water Regulations

- EPA Storm Water Regulations
  - Stem from the Clean Water Act administered by EPA
  - Phase 1: Cities over 100,000 population
    - Permits required in 1999
  - Phase 2: Most other cities and urbanized areas
    - Permits now being issued

Washington, D.C.

California Storm Water Regulations

- SWRCB Administers the Regulations in California
  - Developed "General Permit" for Use by Most Phase 2 Entities
  - RWQCB Issues and Enforces the Permits for the SWRCB
- Permits are Issued for 5-Year Terms
  - Regional Permit Issued to Peninsula Cities and the County in September 2006

Sacramento (SWRCB) and San Luis Obispo (RWQCB)

Phase 2 Requirements for Storm Water Management Programs

Six "Minimum Control Measures"

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Storm Water Runoff Control
5. Post-Construction Storm Water Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations

Impacts

- Sediment is the number one pollutant of the nations rivers and lakes
- "An estimated 80 Millions Tons of solids are discharged annually from construction sites into receiving waters"

Impacts

"On a unit basis, construction sites export sediment at 20 to 1,000 times the rates of other land uses."

Impacts

One gallon of oil has the potential to contaminate up to one million gallons of water

Monterey Regional Storm Water Management Program (MRSWMP)

- MRSWMP establishes the core requirements of the Regional permit (issued in September 2006)
- Permit issued to the cities of:
  - Pacific Grove
  - Monterey
  - Seaside
  - Sand City
  - Del Rey Oaks
  - Marina
  - Carmel-by-the-Sea

  And certain of the unincorporated portions of Monterey County
- Contains BMPs for each Minimum Control Measure

= Portions of Unincorporated Monterey County Covered by the Regional Permit

MRSWMP BMPs for Construction Site Storm Water Runoff Control

- Each entity to adopt an ordinance with standards for storm water pollution prevention from construction activities
- Implement procedures for site plan review, taking into account potential water quality impacts
- Implement procedures for site inspection and enforcement of BMP control measures
- These BMPs went into effect September 8, 2007

Ordinance Requirements Pertaining to Construction Sites

- Permitting
- Local Ordinance Requirements

Permitting Required by Ordinance

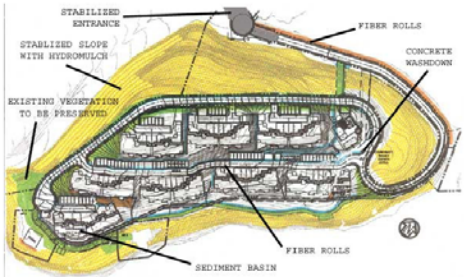
- Projects disturbing 1 or more acres of soil must obtain coverage under the SWRCB's "General Permit for Discharges of Storm Water Associated with Construction Activity" (1998 – new draft now being circulated)
- Permitting under the General Construction Permit is handled by the SWRCB [Sacramento (916) 341-5537]
- Local enforcement handled by the RWQCB [San Luis Obispo (805) 549-3334]
- Website for detailed info regarding the General Permit, as well as templates for preparing an SWPPP, are:
  - http://www.swrcb.ca.gov/stormwtr/docs/finalconstpermit.pdf
  - http://www.cabmphandbooks.com/Construction.asp#SWPPP

SWRCB General Construction Permit Requirements

Requires that the contractor develop and implement a Storm Water Pollution Prevention Plan (SWPPP), which must contain:

- Site map showing:
  - Construction to be performed
  - Storm water collection and discharge points
  - Drainage patterns across the site
- List of BMPs to be used to protect storm water runoff
- Monitoring program to ensure the SWPPP is being effective

EXAMPLE OF AN SWPPP SITE MAP SHOWING BMPs & OTHER FEATURES



Local Ordinance Requirements

- Any project subject to the SWRCB's General Permit must comply with all provisions of such permit
  - Proof of compliance with the General permit is required in a form acceptable to the Public Works Director
- The City will adopt a separate "*BMP Guidance Series*" containing required BMPs to reduce pollutants in storm water runoff from construction activities
  - These requirements form the core of the construction-related MRSWMP requirements
  - Will be included in any construction or building-related permits that the City issues

BMP Guidance Series for Construction Sites

- The BMP Guidance Series is adopted by each entity along with the Ordinance
- BMPs grouped under these categories:
  - Construction Site Planning
  - Erosion and Sediment Control
  - General Site and Materials Management
- Every construction site must employ the applicable BMPs listed in the BMP Guidance Series

Some Principle Construction Site Planning BMPs

- Remove existing vegetation only when absolutely necessary
- Avoid excavation and grading during wet weather
- Prepare to winterize construction site

Erosion and Sediment Control BMPs

- Soil Cover (minimize erosion)
- Tracking Control (keeping mud and debris from being tracked off the site)
- BMPs to Capture Sediment
- Other Controls (as required)

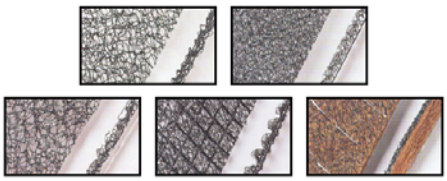
Soil Cover BMPs

- Install cover materials such as:
  - Vegetative debris
  - Mulch
  - Crushed stone
  - Geotextile fabric
  - Erosion control blankets
- Use soil stabilizers as appropriate
- Use temporary seeding and planting to reduce erosion potential

Erosion Control Blankets

Erosion Control Blankets

Nylon Blankets



Properly Employed Erosion Control Blankets

Improperly Employed Erosion Control Blankets

Proper Application of Straw Mulch

Proper Use of Hydroseeding

Tracking Control BMPs

- Construct stabilized access roads and entrances
- Construct entrance/exit tire wash
- When cleaning paved areas on construction sites, use dry sweeping methods where possible
  - If water must be used to flush pavement, collect runoff in temporary storage tanks to settle out sediments prior to discharge to the storm drains, and protect storm drain inlets

Unstable Site Exit

Stabilized Site Exit

BMPs to Control and Convey Runoff

- Earth dikes, drainage swales and ditches
- Slope drains and subsurface drains
- Velocity dissipation devices
- Flared culvert end sections
- Check dams

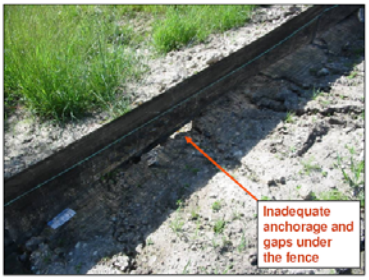
Erosion Caused by Lack of Energy Dissipaters

Properly Installed Energy Dissipater

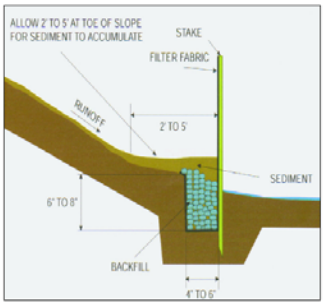
BMPs to Capture Sediment

- Use terracing, riprap, sand bags, rocks, straw bales, and/or temporary vegetation on slopes to reduce runoff velocity and trap sediments (do not use asphalt rubble or other demolition debris for this purpose)
- Protect storm drain inlets from sediment-laden runoff
- When dewatering the site, remove sediment from the discharge (mobile units specifically designed for construction site dewatering can be rented for this purpose)
- Some other controls include:
  - Silt fence
  - Straw bale barrier
  - Temporary sediment basin

Improperly Installed Silt Fencing



Proper Installation of Silt Fencing



Improper Use of Hay Bales

Contractor intended these to prevent erosion and to capture sediments

Actual effect: Erosion and sediment runoff

Correct Uses of Hay Bales

Strengthen Silt Fence

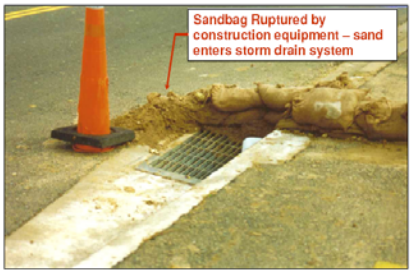
Apply as Mulch

Build Concrete Washout

Effective Uses of Fiber Rolls

Ineffective Use of Fiber Rolls

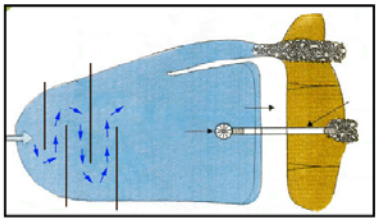
Improper Use of Sand Bags



Instead Use Gravel Bags

Properly Designed Sediment Basins

- Elongated
- Has Baffles
- Outlet Structure
- Overflow Structure



Properly Constructed Sediment Basin

Settling Tank

Filtration

General Site and Materials Management BMPs

- Certain BMPs Apply to All Construction Sites
- Other BMPs Apply to Construction Projects Involving:
  - Paint Work
  - Cement and Concrete Work
  - Roadwork/Pavement Construction

Some of the Principle General Site and Materials Management BMPs Required of All Construction Sites

- Identify all storm drains and prevent pollutants from entering them
- Clean up leaks, drips, and other spills immediately using dry cleanup methods
- Wash vehicles at an appropriate off-site facility. If not feasible, prevent wash water from entering the storm drain
- Use berms and ditches to avoid contaminating clean runoff from areas adjacent to the site
- Cover exposed piles of soil, construction materials and wastes with plastic sheeting or temporary roofs.
- Dispose of all wastes properly and offsite

Proper Use of Temporary Cover

Improper Use of Temporary Cover

For Construction Projects Involving Paint Work

- Sweep up and properly dispose of paint chips and sand blasting debris
- When performing cleaning with high-pressure water, keep runoff out of storm drain inlets - if allowed by local wastewater authority, collect and discharge to the sanitary sewer
- Never clean brushes or rinse paint containers into a street, gutter, storm drain, or creek
- Properly dispose of unused thinners, residues, and paints
- Dried latex paint may be disposed of in the garbage

Example of Construction Storm Water Enforcement Action by the RWQCB

10/28/2003 - Discharge of paint wash water, $12,500.

For Construction Projects Involving Cement and Concrete Work

- Avoid mixing excess amounts of fresh concrete or cement mortar on-site
- Store dry and wet materials under cover, protected from rainfall and runoff
- Wash out concrete transit mixers only in designated wash-out areas with proper disposal of washout water – after settling out the solids, if allowed by local wastewater authority, collect and discharge to the sanitary sewer
- Never dispose of washout into the street, storm drains, drainage ditches, or creeks
- Whenever possible, return contents of mixer barrel to the yard for recycling
- Dispose of small amounts of excess concrete, grout, and mortar in the trash

For Construction Projects Involving Roadwork/Pavement Construction

- Perform paving and seal coating only during dry weather
- Cover storm drain inlets and manholes when performing paving and seal coating
- Park paving machines over drip pans or absorbent materials - they tend to drip continuously
- When saw-cutting pavement cover each storm drain inlet with filter fabric and contain the slurry – properly dispose of the residue offsite
- Keep water used to wash down exposed aggregate concrete out of the storm drain
- Do not wash sweepings from exposed aggregate concrete into a street or storm drain
- Recycle broken concrete and asphalt

Components of Good Housekeeping

- Timing
- BMP Maintenance
- Concrete Washout
- Street Sweeping
- Containment
- Waste Management
- Water Conservation
- Prevent Non-Stormwater Discharges

Timing

BMP Maintenance

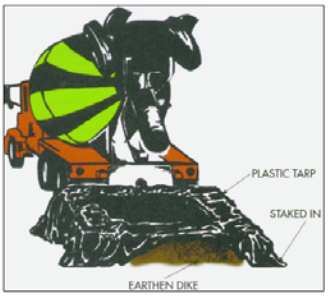
Example of Construction Storm Water Enforcement Action by the RWQCB

12/5/2003 - Failure to implement an effective combination of erosion and sediment control measures, $58,500.

Example of Construction Storm Water Enforcement Action by the RWQCB

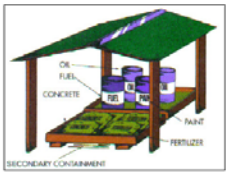
12/5/2003 - Failure to maintain erosion and sediment control measures, $135,000 plus $30,000 for a third party to monitor the site and report to the Regional Board for the duration of the project.

Concrete Washout



Street Sweeping

Use Proper Containment



Inadequate Containment

Poor Waste Management

Avoid Non-Stormwater Discharges

Regularly Inspect Your Best Management Practices

- Proper Installation
- Being Maintained
- Effectiveness

Areas to Examine in Your Inspections Include:

- Storage areas
- Active disturbed soil areas
- Site entrance/exit
- Storm drains
- Areas of applied vegetation
- Disposal areas

Questions and Answers

5-2.a

Powerpoint Presentation Slides Used for BMP 5-4.a Design Professionals Educational Presentation on New Development/Redevelopment Project Requirements

Pollution Prevention Requirements for New Development and Redevelopment Projects Under the Monterey Regional Storm Water Management Program

Presentation to the California Society of Professional Engineers June 12, 2007

Storm Water Regulations

- Stem from the Clean Water Act administered by U.S. EPA
- Require public entities to eliminate sources of storm water pollution to the maximum extent practicable
- In California
  - SWRCB Administers the Regulations
  - RWQCB Issues and Enforces the Permits for the SWRCB

Sacramento (SWRCB) and San Luis Obispo (RWQCB)

- RWQCB Issued Regional NPDES Permit to:
  - *Pacific Grove* - *Monterey* - *Seaside* - *Sand City* - *Marina* - *Del Rey Oaks* - *Carmel-by-the-Sea* - *Monterey County*

Phase 2 Requirements for Storm Water Management Programs

Six "Minimum Control Measures"

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Storm Water Runoff Control
5. Post-Construction Storm Water Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations

Jurisdictions and Areas Covered by the Regional Storm Water Permit

Monterey Regional Storm Water Management Program (MRSWMP)

- MRSWMP establishes the core requirements of the Regional NPDES permit
- Contains BMPs to carry out the Program
  - BMPs = Methods of fulfilling the requirements
- One BMP was to adopt a Storm Water Ordinance with pollution prevention requirements
- Requirements applicable to New Development and Redevelopment Projects contained in the "BMP Guidance Series" of the MRSWMP
  - Incorporated into the Storm Water Ordinance by reference
  - Will be periodically updated by Public Works staff

BMP Guidance Series for New Development and Redevelopment

- There are some basic BMPs required for all projects (both Ministerial and Discretionary projects)
- There are additional BMPs required for certain types of projects (Discretionary projects)
- There are Mandatory Design Standards for certain types of projects

Types of Projects

- Ministerial = Small Infill Projects
  - Conform to existing site zoning
    - New single family dwellings
    - Minor modifications to existing dwellings
  - Typically only require a Building Permit or Grading Permit
- Discretionary = All Other Projects
  - Involves design review process
  - May also include
    - Use Permit
    - Subdivision map approval
    - Zoning change

BMPs for All Types of Projects

(apply to both Ministerial & Discretionary Projects)

- Incorporate low-maintenance landscaping
- Where possible direct runoff to landscaped areas
  - Increases on-site percolation
  - Reduces runoff

More BMPs for All Types of Projects

(apply to both Ministerial & Discretionary Projects)

- Label storm drains "No dumping-flows to Bay" (or similar language)

More BMPs for All Types of Projects

(apply to both Ministerial & Discretionary Projects)

- Use alternate paving materials where possible
  - Reduces impervious area
  - Reduces runoff

Example of Alternative Paving Materials

One type of alternative paver consists of a concrete lattice structure for support with grass growing in the void spaces (Source: Lo Gioco Landscaping, Inc., no date)

BMPs for Discretionary Projects

- BMPs grouped under these categories:
  - Site Planning
  - Pollution Prevention & Source Control
  - Treatment Measures
- May also have ongoing BMP maintenance requirements

Examples of Site Planning BMPs

- Cluster the development
  - Minimize site disturbance
  - Minimize building footprints (roof areas)
- Preserve natural drainage ways
  - Maintain conveyance and percolative capacities

Traditional Community Designs
- *More compact and connected*
- *Have mixed uses that allow for more walking trips instead of car trips*
- *Reduce the need for additional traffic lanes and parking spaces*
- *Less impervious surface*
- *More natural areas are left undeveloped*

Conventional Community Designs
- *Consume more land per unit*
- *Less connected*
- *Separate land uses that require more car trips*
- *More road and parking infrastructure*
- *More impervious surface*
- *Fewer natural areas protected*

More Examples of Site Planning BMPs

- Use vegetated swales in lieu of curb and gutter
  - Reduces runoff
  - Only applicable where flooding will not result

Developers can eliminate curbs and gutters to disconnect impervious surfaces and promote infiltration of stormwater on vegetated areas (such as this grass-lined channel in a residential neighborhood)

More Examples of Site Planning BMPs

- Use alternative paving materials (reduces runoff)
  - Porous asphalt and pavers
  - Grass pavement systems
  - Pavers, gravels, and other porous materials for driveways, walkways, & patios

Porous Asphalt and Pavers for Roads and Parking Areas

Porous pavers in parking area

Porous asphalt in parking area

A porous pavement parking lot (Source: Invisible Structures, no date)

Grass Pavement Systems for Parking & Access Roads

Porous Pavement System Components
- *Sandy gravel base*
- *Polymer-fertilizer mixture*
- *Ring and grid structure*
- *Sand and grass seed or sod*

High compressive strength makes it suitable for a variety of uses:

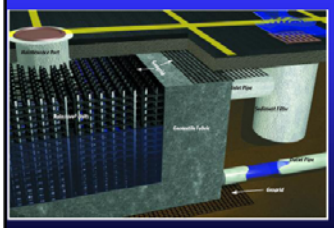
Green spaces that also serve as fire lanes

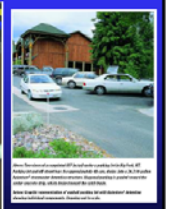
Parking lots of all sizes

A green parking lot at the Orange Bowl in Miami, Florida (Source: Invisible Structures, no date)

Porous Materials for Driveways, Walkways, Patios

Underground Retention





More Examples of Site Planning BMPs

- Minimize driveway lengths
  - If not feasible, slope to drain to landscaped areas
- Minimize street and alley widths
  - Eliminate need for on-street parking
  - Improves access for more effective street sweeping

A narrow street in a residential neighborhood. Cars can be parked in driveways or along the road shoulder

More Examples of Site Planning BMPs

- Set aside open space
  - Minimizes site disturbance
  - Reduces runoff

Rather than having a fully paved cul-de-sac bulb, site designers can incorporate pervious circles with vegetation that reduce the site's overall impervious area

Trees can be incorporated into urban landscapes for water quality benefits in addition to aesthetic and shade benefits (Sources: Tree City USA, no date)

Examples of Pollution Prevention & Source Control BMPs

- Provide green pet walking/exercise areas
  - Keep pet waste off of paved areas
  - Reduces bacterial content of runoff
- Minimize erosion from graded areas
  - Use native plants (low maintenance)
  - Reduces fertilizer and pesticide/insecticide pollution
- Consider underground parking
  - Reduces runoff
- Berm waste storage areas
  - To keep storm water away from waste-reduces pollution
  - Provide cover and drainage to sanitary sewer

More Examples of Pollution Prevention & Source Control BMPs

- Provide vehicle wash area
  - Drain to sanitary sewer or percolate

- Provide valves on storm drain inlets in loading dock areas
  - To prevent discharge of spills to storm drain system

Design Considerations for Treatment BMPs

- Design to treat given volume of runoff or peak flowrate
- Typically design for small storms – not flood control
  - Minimizes size of treatment facility
  - Capture "first flush" pollutants
- Excess flows bypass the treatment facilities

Examples of Treatment BMPs

- Rooftop catchment systems
  - Store and/or evaporate runoff from roof
  - Reduces total runoff
  - Reduces peak runoff flowrates

A rain barrel is used to collect rooftop runoff using a gutter/downspout system

Green Roofs effectively reduce stormwater runoff:
- *Absorb, store, and later evapotranspire initial precipitation*
- *Reduce overall peak flow discharge to a storm sewer system*
- *Reduce contamination of toxic pollutants from conventional roofing materials*

An intensive green roof at the Schwab Rehabilitation Hospital, Chicago, Illinois

An extensive green roof at the Dearborn Michigan, Ford Assembly Plant

More Examples of Treatment BMPs

- Vegetated filter strips
  - Often 100' to 300' wide
  - Capture runoff and percolates
  - Provides some treatment
  - Useable in low density developments in flat terrain

Grassed swales can be used along roadsides and parking lots to collect and treat stormwater runoff

More Examples of Treatment BMPs

- Infiltration basins
  - Store and percolate runoff
  - Reduces total runoff
  - Reduces peak runoff flowrates
  - Useable in porous soils with low water table

Infiltration basins are designed to collect stormwater from impervious areas and provide pollutant removal benefits through detention and filtration

More Examples of Treatment BMPs

- Dry or wet basins
  - Store runoff
  - Reduces peak runoff flowrates
  - May allow sedimentation to remove solids

Wet Basins

Dry Basin

More Examples of Treatment BMPs

- Infiltration trenches
  - Shallow drains filled with gravel
  - Store and percolate runoff

Even More Examples of Treatment BMPs

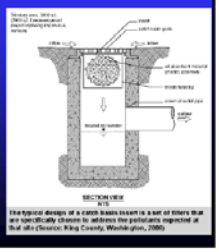
- Wetlands
  - Percolate runoff
  - Reduces nutrients and sediments
  - Provides biological stabilization
  - Requires considerable space – may only be useable in low-density developments
  - Requires O&M for proper performance

A stormwater wetland detains stormwater, removes pollutants, and provides habitat and aesthetic benefits (Source: The Bioengineering Group, Inc., no date)

Yet More Examples of Treatment BMPs

- Filtration systems
  - Filter media typically sand, compost, charcoal, etc.
  - Can reduce fine sediments, hydrocarbons, organics, nutrients, and/or metals
  - Can be:
    - Inserts in storm drain inlets
    - Linear units along parking lots
    - Large (1 to 2 acre) sand filters
  - Requires frequent cleaning and maintenance to be effective

A worker inserts a catch basin insert for oil and grease, trash, debris, and sediment removal from stormwater as it enters the storm drainage system (Source: Ab Tech Industries, 2001)



The typical design of a catch basin insert is a set of filters that are specifically chosen to address the pollutants expected at that site (Source: King County, Washington, 2005)

Amazingly Even More Examples of Treatment BMPs

- Oil & grit separators
  - Typically are multi-chambered
  - Provide gravity separation
  - Trap floatables and grit
  - Remove hydrocarbons
  - Excess flows bypass the unit
  - Use for areas:
    - Where gas or oil spills may occur
    - Vehicle storage and maintenance areas

Post-Construction O&M BMPs

(If development is required to install Treatment facilities)

- Developer must provide written verification of ongoing O&M of the facilities
  - Initial Agreement between the developer and the City
  - Requires that any subsequent owners assume these responsibilities

Mandatory Design Standards

(applies to the following types of Discretionary Projects)

- Single-family hillside residences
  - Grading on slopes >25% in erosive soils
- 100,000 square foot commercial developments
- Auto repair shops
- Retail gasoline outlets
- Restaurants
- Subdivisions of 10 or more housing units
- Parking lots exposed to storm water runoff
  - Greater than 5,000 square feet or
  - 25 or more parking spaces

Design Standards

(applicable to all Mandatory Design Standards Projects)

- Peak runoff must be less than or equal to pre-development runoff
  - If there is a risk of downstream erosion
- Conserve natural areas
  - Cluster development
  - Limit clearing and grading
  - Maximize vegetative planting
- Minimize "pollutants of concern"
  - Adversely impact beneficial uses of receiving water
  - Cause buildup of sediments in receiving water
  - Potentially toxic to humans, flora, or fauna

Design Standards (Continued)

(applicable to all Mandatory Design Standards Projects)

- Protect slopes and channels
  - To reduce risk of downstream erosion
- Properly design outdoor materials storage and trash enclosure areas
  - To reduce risk of polluting storm water runoff
- Properly design Treatment facilities
  - Volumetric Design Standard
  - Flow-based Design Standard
  - Based on local rainfall intensity-duration characteristics

Additional Design Standards
(for Specific Types of Commercial Developments)

- 100,000 square foot commercial developments
  - Loading docks
  - Repair/maintenance bays
  - Vehicle/equipment wash areas
- Restaurants
  - Equipment washing/steam cleaning areas
- Retail gasoline outlets
  - Fueling areas
- Automotive repair shops
  - Fueling areas
  - Repair/maintenance bays
  - Vehicle/equipment washing areas
  - Loading/unloading docks
- Parking lots
  - Parking areas
  - Treat to remove hydrocarbons

Some Flexibility

- Cities can waive requirements that are impractical
  - Extreme space limitations
  - Unsuitable soil conditions
  - Risk of contaminating groundwater (through runoff percolation)
- Can accept signed certification by licensed Civil Engineer or Architect that the Development meets these criteria
  - Demonstrate they have been recently (within 2 years) trained on BMP design
  - Acceptable training may be from:
    - University
    - ASCE
    - APWA
    - CWEA
    - Etc.

Questions and Answers

Powerpoint Presentation Slides Used for BMP 5-2.a Staff Training on New Development/Redevelopment Project Requirements

Pollution Prevention Requirements for New Development and Redevelopment Projects Under the Monterey Regional Storm Water Management Program (MRSWMP)

Jurisdictions and Areas Covered by the MRSWMP Regional Storm Water Permit

Requirements for Storm Water Management Programs

Six "Minimum Control Measures"

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Storm Water Runoff Control
5. **Post-Construction Storm Water Management in New Development and Redevelopment**
6. Pollution Prevention/Good Housekeeping for Municipal Operations

Monterey Regional Storm Water Management Program(MRSWMP)

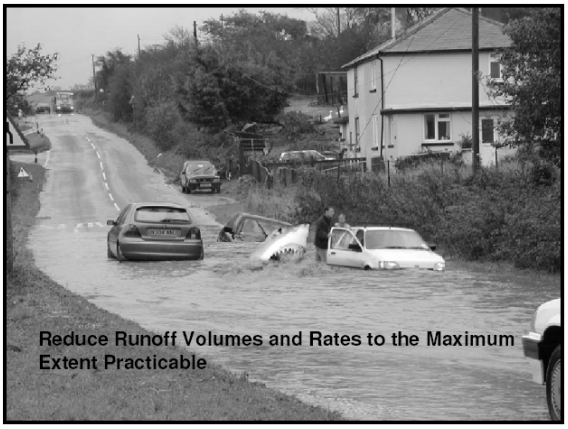
Requirements applicable to New Development and Redevelopment Projects contained in the "BMP Guidance Series" of the MRSWMP

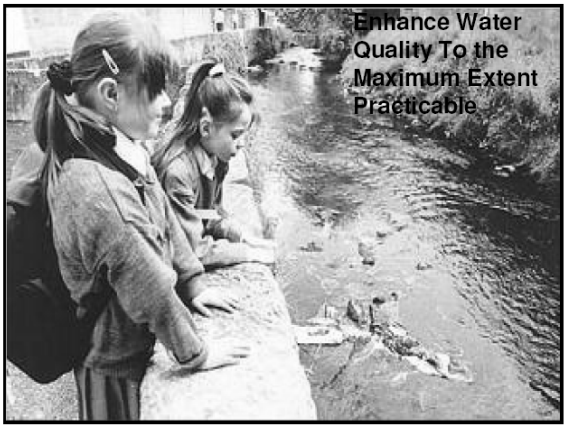
- Incorporated into the Storm Water Ordinance by reference
- Will be periodically updated by Public Works staff

Types of Projects

- Ministerial = Small Infill Projects
  - Conform to existing site zoning
    - New single family dwellings
    - Minor modifications to existing dwellings
  - Typically only require a Building Permit or Grading Perr....

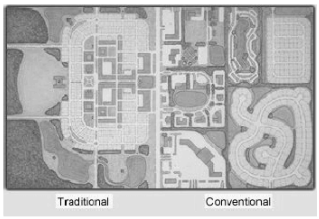
- Discretionary = All Other Projects
  - Involves design review process
  - May also include
    - Use Permit
    - Subdivision map approval
    - Zoning change





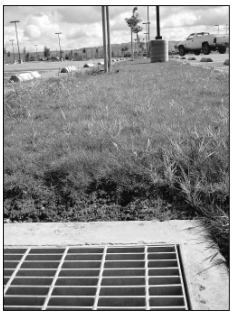
It All Starts With Site Planning

- Cluster the development
  - Minimize site disturbance
  - Minimize building footprints (roof areas)
- Preserve natural drainage ways
  - Maintain conveyance and percolation capacities



Open Space

Bioswales



Potential Alternatives To Asphalt and Concrete

Pervious Concrete

Photos Courtesy of California Cement Promotion Council

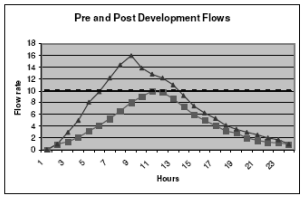
Narrow Streets

Get Ready To Hear From the Fire Department..

Flow Control

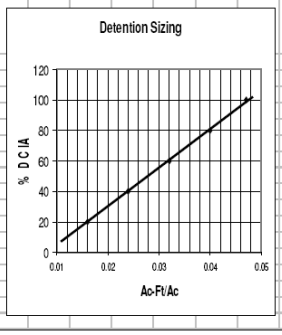
Peak Flow Management
The Old Way of Managing Runoff

Q=C.I.A

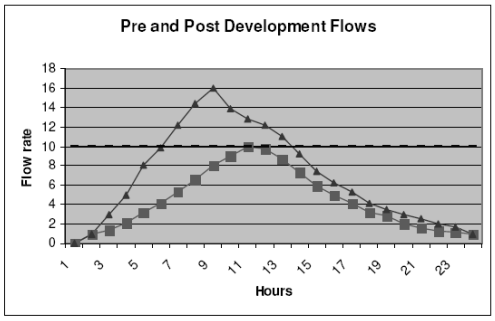


80% Annual Percent Capture

Directly Connected Impervious Area	Unit Basin Storage Volume
(%)	(Ac-ft/Ac)
20	0.016
40	0.024
60	0.032
80	0.04
100	0.047



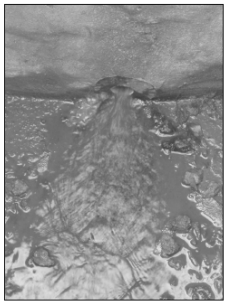
Hydromodfication



Rooftop Catchment Systems

Infiltration

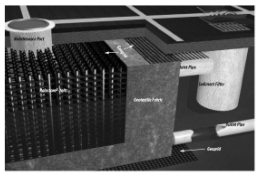
Extended Detention Basins



Infiltration Basins

Wet Ponds

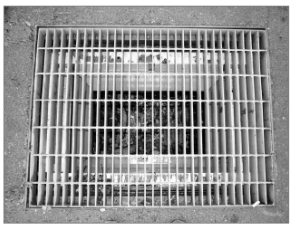
Created Wetlands

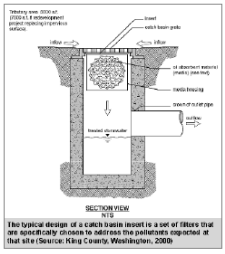


Underground Detention/Retention

Not Always A Good Idea

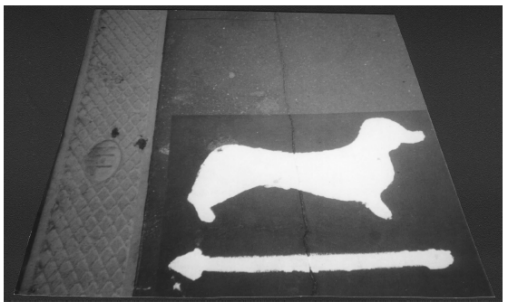
Catch Basin Inserts





The typical design of a catch basin insert is a set of filters that are specifically chosen to address the pollutants expected at that site (Source: King County, Washington, 2009)

Label storm drains "No dumping-flows to Bay" (or similar language)



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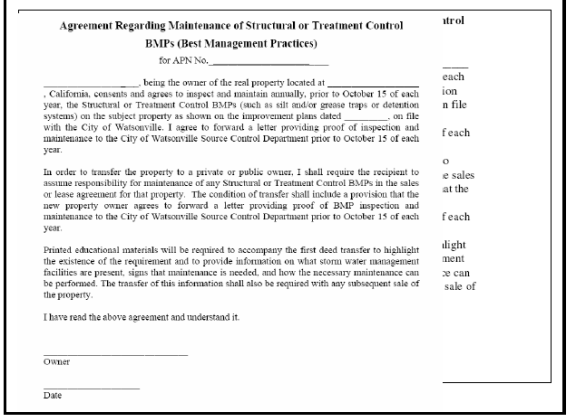

Agreement Regarding Maintenance of Structural or Treatment Control BMPs (Best Management Practices)

for APN No. _____

_____, being the owner of the real property located at _____, California, consents and agrees to inspect and maintain annually, prior to October 15 of each year, the Structural or Treatment Control BMPs (such as silt and/or grease traps or detention systems) on the subject property as shown on the improvement plans dated _____, on file with the City of Watsonville. I agree to forward a letter providing proof of inspection and maintenance to the City of Watsonville Source Control Department prior to October 15 of each year.

In order to transfer the property to a private or public owner, I shall require the recipient to assume responsibility for maintenance of any Structural or Treatment Control BMPs in the sales or lease agreement for that property. The condition of transfer shall include a provision that the new property owner agrees to forward a letter providing proof of BMP inspection and maintenance to the City of Watsonville Source Control Department prior to October 15 of each year.

Printed educational materials will be required to accompany the first deed transfer to highlight the existence of the requirement and to provide information on what storm water management facilities are present, signs that maintenance is needed, and how the necessary maintenance can be performed. The transfer of this information shall also be required with any subsequent sale of the property.

I have read the above agreement and understand it.

_____
Owner

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Date

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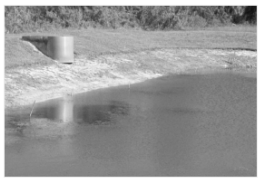

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  - Loading/unloading docks
- Parking lots
  - Parking areas
  - Treat to remove hydrocarbons