

Field Guide

for Flood Control Facility Maintenance

Best Management Practices

*A Field Guide for Minimizing Environmental Impacts from
Stream and Channel Maintenance Activities*

June 2000



Operational Permits Committee



Photo courtesy of SCVWD

EOA, Inc.

INTRODUCTION

The purpose of this Flood Control Facility Maintenance Best Management Practices (BMP) field guide and associated manual is to provide guidance for maintenance field staff, engineers, and planners in selecting and implementing BMPs and devices that avoid or minimize impacts to natural resources while allowing for stream maintenance activities to proceed with minimal regulatory requirements. This field guide includes memory-jogging descriptions and approaches of the BMPs. For full descriptions, please refer to the desktop manual.

This field guide and the manual were prepared for the San Francisco Bay Area Stormwater Management Agencies Association's (BASMAA) Operational Permits Committee.

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VEGETATION MANAGEMENT

(SEE ALSO STRUCTURE REPAIR (EV-1, EV-2))

Vegetation Preservation (VDM-1). *Methods to minimize soil erosion by preserving existing vegetation.*

Applicability

- ◆ Inactive areas ◆ Stream banks or steep slopes ◆ Flood plains
- ◆ Where erosion control would be difficult ◆ Where required or beneficial

Approach Highlights

- Decide which vegetation will be preserved.
- Protect that vegetation from mechanical and other injury during maintenance project by physically defining a setback area.
- Repair any damage done.

Vegetation Removal (VDM-2). *Removal techniques to preserve channels' flood control functions, create stable channel environments, and /or provide safe access.*

Applicability

- Areas where: ♦ Work could damage existing vegetation or equipment.
♦ Flow is obstructed or diverted against a bank. ♦ Necessary for public safety.

Approach Highlights

- Use equipment that will minimize impacts. Protect stream shading.
- Consult with vegetation specialist when necessary.
- Minimize use of herbicides. Use herbicides that are approved for water use.
- In natural streams, avoid removing stumps. Do not top live willows.
- Remove non-native vegetation that inhibits native vegetation.
- Reuse vegetation as appropriate.

Revegetation (VDM-3). *Methods to revegetate sites after site disturbance to reduce bank erosion potential.*

Applicability

- ◆ Inactive areas ◆ Stream banks or steep slopes ◆ Sensitive areas
- ◆ Upstream of critical habitats ◆ Where required or beneficial

Approach Highlights

- Revegetate as soon as possible after construction.
- Use native plants and grasses.
- Use cuttings and seeds from existing native vegetation taken before disturbance.
- Revegetate at ratio of 1½:1. Regularly monitor revegetated areas.
- Supplement with water until established, if necessary.
- Use mulch or erosion control blankets as appropriate.

Qualified Pesticide Applicator (CU-1). *Persons performing pest control should be certified by the State of California. Persons applying Class I pesticides must obtain a qualified applicator certificate (QAC). Those persons who purchase Type I or Type II pesticides or who oversee the application of such pesticides, must obtain a qualified applicator license (QAL).*

Applicability

- ◆ All sites where pest control activities are necessary.

Approach Highlights

- Ensure personnel have obtained appropriate training.
- Use integrated pest management to control pests. Use pesticides with low environmental persistence, and prescribe at the lowest possible effective levels.
- Triple rinse empty pesticide containers and use the rinse water as product. Properly dispose of containers per label instructions.
- Handle and store materials safely. (See CU-3, and CU-4 in Structure Repair for more information on proper material handling and spill prevention and control.)

Pesticide Application and Aquatic Conditions (CU-6). Land application techniques for ensuring safe pesticide dosage for local conditions and for preventing excess runoff.

Applicability

- ◆ All sites where pest control activities are necessary.

Approach Highlights

- Perform work when tides are favorable to prevent off target movement.
- Make aquatic applications from the downstream to the upstream end of the project.
- Apply only herbicides, algaecides and surfactants that are registered for use in channel bottoms, regardless of whether water is present at the time.
- Use only USEPA-approved herbicides in areas where spray could contact aquatic life.
- Do not apply herbicides when rain may cause the herbicide to runoff the target.
- For any new structures or for any repairs to or replacements of existing structures coated with creosote, properly wrap the structure with plastic to prevent leaching. Only factory pressure treatments are acceptable as an alternative to creosote.

Pesticide Application and Landscape Conditions (CU-7). Land application techniques for ensuring safe pesticide dosage for local conditions and for preventing excess runoff.

Applicability

- ◆ All sites for which pesticides are applied.

Approach Highlights

- Use integrated pest management practices whenever possible.
- Use new pesticides on small scale test plots first to determine local efficacy and minimum safe dosage needed to control weeds.
- Follow the product label instructions for proper application and disposal.
- Only use pest control equipment that is in good repair, safe to operate, and suitable for the proper application of pesticides
- Avoid spray drift. Cease spray operations before winds reach 10 mph.
- See also BMPs CU-2 and CU-5 in the BMP Manual for more information on equipment maintenance and wind conditions.

DEBRIS REMOVAL

(SEE ALSO VEGETATION MANAGEMENT (VDM-2, VDM-3), EROSION REPAIR AND PREVENTION (NR-3), AND STRUCTURE REPAIR (CU-8, EV-1, AND EV-2))

Debris Removal (VDM-4). *Methods for removing debris from channels to minimize pollution, protect habitat/wildlife, provide for public safety, and minimize erosion.*

Applicability

- ◆ For activities that generate by-products, residuals, or wastes.

Approach Highlights

- Use equipment and methods that minimize impacts.
- Divert runoff to control measures to remove wastes as necessary.
- Consider leaving stumps in place.
- Salvage and recycle useful debris as practical.
- Perform general housekeeping of site.

EROSION REPAIR/PREVENTION

(SEE ALSO VEGETATION MANAGEMENT (VDM-1, VDM-2); DEBRIS REMOVAL (VDM-4); AND STRUCTURE REPAIR (EV-1, EV-2))

Channel Protection and Restoration (NR-1). Practices to protect or provide habitat for fish and wildlife dependent on the riparian area.

Applicability

- ◆ Channels and stream work

Approach Highlights

- Schedule work to avoid nesting and wildlife breeding seasons.
- Regrade channel bottoms at end of work to as close to original conditions as possible.
- Release flow after work at a reduced velocity to minimize erosion.
- Keep disturbance to the minimum necessary to accomplish repairs.
- Natural channels: allow stable undercut banks and leave wood in place for habitat.

Biotechnical Bank Stabilization (NR-2). *Soft bank repair techniques incorporating biological materials such as seeds, plants, root wads and inert materials such as brush mats, wattles, branch packing or layering. These techniques help protect and provide suitable habitat for fish, amphibians, and wildlife dependent on the riparian area.*

Applicability

- ◆ Channels and streams requiring bank repairs

Approach Highlights

- With help of qualified person, create and implement a soft bank repair plan.
- Retain natural banks where feasible.
- Willow cuttings can be used effectively. Do not top live willows.
- Regularly monitor and maintain vegetation until established.

Scheduling (NR-3). Plan channel maintenance projects to minimize potential for erosion and to protect special status species.

Applicability

- ◆ All flood control maintenance activities

Approach Highlights

- Avoid disturbance during nesting and breeding seasons. Perform wildlife surveys.
- Avoid soil disturbance from October 15 through April 15.
- Monitor weather forecasts and prepare site with erosion and sediment controls when necessary. Be prepared for rain year-round and keep controls readily available.
- Incorporate staged seeding and revegetation of channel banks as work progresses.

Brush or Rock Filter (VR-1). Rock filter berms are created on level contours to cause ponding of sheet flow and to promote sedimentation. A brush barrier is created of brush wrapped in filter cloth and attached to the toe of the slope.

Applicability

- ◆ As check dams ◆ Below the toe of slopes ◆ Along streams/channels
- ◆ Below small cleared areas/spoils areas ◆ At culvert/pipe outlet sediment traps

Approach Highlights

- Rock Filters: use rock sized 3/4 to 3 in. in diameter. Use larger rocks in woven wire sheath staked to the ground in areas with greater volume or velocity of water.
- Place filter on level ground, in areas of sheet or rill flow.
- Allow enough area behind berm for runoff to pond, allowing settling of sediment.
- Brush collected during site clearing can be used to create a brush filter.

Check Dams (VR-2). *Small dam placed across swales/drainage ditch channels to slow stormwater flows. Check dams can reduce erosion and help sediment settle out.*

Applicability

- ◆ Across small, steep swales or drainage ditches with velocities >2 fps
- ◆ During establishment of grass linings
- ◆ When not enough time to establish erosion control linings

Approach Highlights

- Create to allow small pools that reach the toe of the upstream check dam to form between each one. Construct to withstand and allow for safe overflow of storms.
- Use rocks, logs, pea-gravel secured in sandbags, or properly-anchored brush filters. Do not use straw bales or silt fences.
- Use rock sized 8-12 inches or as suitable, and do not dump rock into channel. Use logs 4-6 inches in diameter and embed them at least 18 inches into soil.
- Construct and secure dam completely across channel to prevent washout.

Slope Roughening or Terracing (VR-3). Techniques to create unevenness on bare soil to reduce runoff velocity, trap sediment, or increase water infiltration. Techniques include furrows, stairsteps or terraces, and tracking up and down a slope.

Applicability

- ◆ Disturbed slopes where vegetation is planned
- ◆ Graded areas with smooth or hard surfaces
- ◆ To help seeding, planting, mulching
- ◆ Long slopes

Approach Highlights

- Tracking: Move bulldozer up and down slope (not across) to track horizontal grooves.
- Terracing: Terrace long, smooth slopes to control runoff. Make cuts ≤ 30 feet in height from trough base to top of bench. Any fill to make downslope terraces should be ≤ 25 feet in height. Length from bottom of cut trough to top of fill bench: ≤ 6.5 ft.
- Serrate shorter slopes between 6-15 in. apart and 1-3 in. deep.
- Waddles/Rolls: Install hay waddles/coconut rolls into slopes to reduce flow velocity.

Outlet Protection (VR-4). *A device made of rock, grouted riprap, or concrete rubble that is placed at outlets to channels and pipes to reduce water velocity, and to retain the embankment near the pipe inlets and outlets to control erosion and scour.*

Applicability

- ◆ Outlets of pipes, drains, conduits or channels
- ◆ Areas where lined conveyances discharge to unlined conveyances
- ◆ Inlets of slope drains and culverts (can use the flared culvert end section)

Approach Highlights

- For rock outlet protection, increase size for high velocity flows; use durable, angular rock. Construct rock apron on zero grade and align straight with receiving stream. Provide cutoff walls. For larger or higher flows, consult a registered civil engineer.
- Construct flared culvert end sections on zero grade; ensure water tight pipe connections.
- For temporary outlets with low flows, plastic or plywood can dissipate energy.

Storm Drain Inlet Protection (VR-5). *Devices temporarily constructed around storm drains to pond and filter sediment-laden runoff before it enters the storm drain system.*

Applicability

- ◆ When sediments may enter a storm drain inlet

Approach Highlights

- Bring disturbed area to grade of drop inlet and smooth and compact it.
- Do not use filter fabric to cover the inlet grate.
- Place several layers of gravel bags, overlapping the bags and packing them tightly.
- Leave a gap of one bag on the top row to act as a spillway. Do not allow flow from a 10-year average sized storm to overflow the curb.
- If the inlet is on a slope, the down-slope side of the inlet does not need to be protected as long as the slope is steep enough that runoff will not enter the drain from that side.

Erosion Control Blankets/ Mats (SS-1). Biodegradable or synthetic blankets used to stabilize disturbed soils, especially on slopes.

Applicability

- ◆ Channels with flows from 2 fps to 4 fps
- ◆ Channels that will be vegetated and flow velocity is greater than appropriate
- ◆ Disturbed areas where mulch needs to be anchored
- ◆ Slopes adjacent to sensitive areas
- ◆ Slopes steeper than 1:2
- ◆ Areas with high erosion danger
- ◆ Disturbed areas where plants are slow to mature

Approach Highlights

- Consider cost, effectiveness, acceptability, vegetation enhancement, installation and O&M requirements when choosing materials.
- Prepare sites and place blankets so blankets have complete soil contact.
- Seed the area first. Follow manufacturer's installation recommendations.

Dust Control (SS-2). Measures to minimize the amount of airborne dust particles and to reduce erosion and pollutants between the time of site disturbance and revegetation or paving.

Applicability

- ◆ Control dust from vehicles at work site
- ◆ Windy/wind-prone areas
- ◆ Sites with silt and clay soils
- ◆ Disturbed areas
- ◆ Demolition areas
- ◆ Material stockpiles
- ◆ Unpaved roads

Approach Highlights

- Schedule activities to minimize the amount of time an area is exposed.
- Use vegetation, mulch, spray-on adhesives, chemical measures to stabilize areas.
- Create stabilized site entry and exit points, and unpaved roads and staging areas.
- Use street sweepers on paved roadways. Clean sediments by sweeping, not washing. Cover trucks that haul soils and reduce amount of vehicle trips.
- Application rates for water is generally 0.125 gal/yd² every 20-30 min.

Temporary Stream Crossing (SS-3). *Stream or drainage crossings that minimize impacts to the stream bottom and reduce erosion. Includes culverts, fords, and bridges.*

Applicability

- ◆ Sites where vehicles will frequently cross a drainage or waterway
- ◆ Temporary crossings (< 1 year) ◆ Sites where alternatives to crossing are infeasible

Approach Highlights

- Select a site with minimal erosion probability. Stabilize disturbed areas before and during installation, and after removal of crossing. Install/remove during dry season.
- Have design approved by registered civil or structural engineer. Consider overtopping, flow backups and washout risks. Build near natural elevation of streambed.
- Install sediment traps downstream of crossing during construction. Protect culvert outlet to minimize erosion. Implement erosion and sediment controls.
- Divert road surface flow with a swale/dike. No hazardous material surface treatments.

Stabilized Unpaved Roads and Entrances (SS-4). *Measures to prevent vehicles from tracking sediments out of a work site onto paved roadways.*

Applicability

- ◆ Entrances or exits from an unpaved area to a paved roadway.

Approach Highlights

- Construct site access on level ground, using washed, well-graded gravel or crushed-rock from 1-3 inches in size to prevent tracking of rocks onto the roadway.
- Class II aggregate base (max. 1.5-in rock) can be used if street sweeper is used.
- Properly grade entrance. Place stones 6-in. deep. Track walk aggregate base.
- Minimum length: 50-ft; Minimum width: 30-ft (20-ft for smaller maintenance roads).
- Provide enough turning radii or driveway return at entrance.
- If necessary, adjust gates to allow for increased road height.

Temporary Drains and Swales (WD-3). *Swales and drains to divert runoff around disturbed areas to prevent erosion or to sediment basins or traps*

Applicability

- ◆ Prevent erosion from disturbed areas
- ◆ Divert runoff to sediment basins/traps
- ◆ Use with earth dike and slope drain (see BMP Manual (WD-1, WD-2)) to divert water from the top to the bottom of a slope.

Approach Highlights

- Install during initial grading, using local drainage design criteria. Conform to drainage patterns and capacities present before development. Grade should be 1-15%.
- Ensure a positive grade throughout, to stabilized outlet. Include outlet protection.
- Design to drain ≤ 5 ac.; Swale bottom width: ≥ 2 ft.; depth: ≥ 1.5 ft.; side slopes $\leq 2:1$.
- Construct swale to withstand 10-year, 24-hour storm. Stabilize all swales immediately (grade $< 5\%$: seed/mulch; grade $> 5\%$: rip-rap or sod). Ensure fill material along path is compacted.

SEDIMENT CONTROL

(SEE ALSO VEGETATION MANAGEMENT (VDM-1, VDM-3), EROSION REPAIR AND PREVENTION (NR-3, VR-1, VR-2, VR-3, VR-5, SS-2, SS-4) AND STRUCTURE REPAIR (EV-1, EV-2))

Dredging (SC-2). Practices to protect water quality from dredging.

Applicability

- ◆ Channels and streams requiring sediment removal.

Approach Highlights

- Perform wildlife and vegetation surveys prior to dredging. Use a hydraulic/barge-mounted dredge to reduce habitat impacts on channel banks. Dredge small channels with excavator. Desilt: later summer to avoid nesting birds.
- Monitor upstream and downstream water quality for sedimentation. Properly dispose of sediments (see BMP Manual SC-1 for more information on disposal).
- Remove sediment in large channels on one side only in alternate years or in checkerboard pattern to minimize wildlife disturbance.

Sediment Basins (SC-3). Structures designed to slow velocity and temporarily retain water to allow settling and prevent sediment-laden runoff from entering channels/drainages.

Applicability

- ◆ Use with dikes, temporary channels, or pipes
- ◆ Outlets of disturbed watersheds
- ◆ During rainy season maintenance projects
- ◆ Where detention basins will be located

Approach Highlights

- Locate where low embankment can be built across swale or excavation and allows for safety and easy maintenance.
- Size per Regional Board recommendations; build prior to wet season activities.
- Maximize residence time via length-to-width ratio and baffles.
- Locate outlet structure on firm, smooth foundation, with base secured with concrete. Connect riser pipe with watertight connection to the horizontal pipe that extends

through the embankment to the toe of the fill. Provide anti-seep collars.

- Include an emergency spillway—comprised of an open earthen or vegetated channel on top of undisturbed material (not fill) or constructed of non-erodible riprap—to handle overflows.
- Install a safety fence around the basin to keep children out.
- Per appropriate regulations, properly dispose of any contaminated or hazardous material that is excavated.

Straw or Sand Bag Barriers (SC-4). *Temporary devices of straw, biodegradable fiber, or sandbags that are placed to direct flow as to intercept sheet flow runoff and settle sediments behind barriers while slowly allowing water through.*

Applicability

- ◆ Along site perimeter ◆ Flood control channels as part of sediment removal work
- ◆ Straw bales: beneath flat disturbed areas subject to sheet and rill erosion; at grade

breaks and along face of exposed, erodible slopes to shorten slope length; along streambanks for stabilization and revegetation; and in drainage swales to slow flows

◆ Sand or Gravel Bags: Across channels to protect maintenance trenches or as temporary crossings; parallel to roads, for diverting water to sediment basin, as temporary barriers, upflow of storm drain inlets.

Approach Highlights

- Straw Bales: Place dikes on $\leq 2\%$ slopes, preferably; keep upstream drainage to 0.25/ac/100 ft; slope length to ≤ 100 ft. Allow 6 in.-5 ft of space between hay bale and toe of slope. Properly entrench bales at least 4 in. into the soil. Anchor with stakes.
- Fiber Rolls: Fine grade subgrade. Contour a concave key trench 2– 4 in. deep. Install rolls per manufacturer's recommendations in trench and stake both sides every 6 in. Do not overlap rolls.
- Sand/Gravel Bags: Use geotextile fabric, not burlap. Fill bags with 3/4 in rock or 1/4 in pea gravel. Place several layers of overlapping, tightly-packed sand bags.

Sediment Trap (SC-5). A basin with a controlled release structure to retain large sediment.

Applicability

- ◆ Wet season projects ◆ For nuisance groundwater ◆ Pre-sediment basin
- ◆ Areas where sediment-laden runoff may enter watercourse/storm drain system

Approach Highlights

- Size traps based on Regional Board recommendations before wet season begins.
- Locate in safe locations where low embankment can be built across a swale/ excavation, and that allow for maintenance access and sediment removal.
- Maximize residence time. Design length to width ratio > 3:1 (L:W) or include baffles.
- Protect outlet from erosion by using rocks or vegetation.
- Outlet: Use corrugated metal or reinforced concrete riser pipe with dewatering holes encased in gravel to prevent clogging. Build a crushed stone outlet section of the embankment at the trap's low point for easier dewatering.

Silt Fence (SC-6). *Temporary device of permeable fabric placed to intercept sheet flow runoff.*

Applicability

- ◆ Along (not across) streams/channels
- ◆ Along site perimeter
- ◆ Below toe of exposed/erodible slopes
- ◆ Around soil stockpiles

Approach Highlights

- Construct fence along level contours, keeping upstream drainage <0.25 ac./100 ft.
- Keep slope length that drains to fence to ≤ 100 ft; limit single fence length to 500 ft. Overlap by ≥ 12 in. but do not connect fence segments. Turn last 6 ft. of the face up-slope in a “J or “L” shape to allow for ponding.
- Do not locate across areas with concentrated flows (e.g. drainages), or not suitable for temporary ponding/sedimentation.
- To install, bury filter fabric ≥ 6 in. below ground and 6 in. across. Backfill with dirt or gravel. Allow 2-5 ft. at toe of slope for ponding. Add gravel backfill on up-slope side to strengthen. Anchor fence with rope attached to stakes and anchored up-slope.

Dewatering (Nuisance Water) (WD-4). Practices to remove water from a work area.

Applicability

- ◆ For areas where nuisance water is interfering with work activities in areas isolated from flowing water
- ◆ As water quality measure to prevent turbidity downstream

Approach Highlights

- Dewater site before beginning construction or maintenance repair work.
- Use coffer dams, sumps, water dams, or sheet pilings to keep water out of work area.
- Properly use gravity systems or pump/generator sets to regulate flow/prevent damage.
- Discharge nuisance water over an energy dissipater to keep erosion of downstream channel to a minimum.
- Use filtration devices or settling basins to reduce turbidity to natural conditions when discharging water from the disturbed or isolated area.

STRUCTURE REPAIR

(SEE ALSO VEGETATION MANAGEMENT (VDM-1, VDM-2, VDM-3); EROSION REPAIR AND PREVENTION (NR-3, SS-3, SS-4, VR-4); AND SEDIMENT REMOVAL AND CONTROL (SC-2))

Material Handling (CU-3). *Methods to ensure chemicals are handled in safe manner.*

Applicability

- ◆ All sites where chemical handling occurs.

Approach Highlights

- Use less toxic products when appropriate.
- Mix small batches of chemicals at a time to avoid excess. Follow label for exact rate, mixing and application of herbicides.
- Follow manufacturer's instructions.
- Do not mix or load chemicals where spill would be likely to enter storm drain inlet or channel.

Spill Prevention and Control (CU-4). Practices to prevent or reduce the discharge of chemicals to flood control channels and the storm drain system.

Applicability

- ◆ All sites where chemicals are stored or used.

Approach Highlights

- Place storage area for chemicals away from channel and storm drain system. Use double-walled containment; place items on pallet as possible. Keep well labeled.
- From October 15 to April 15, all chemicals need to have an impermeable cover.
- Be present when pesticides are delivered and store in separate storage unit. Keep on-site storage to a minimum. Have proper storage instructions posted.
- Have spill clean up materials readily available near storage areas, and immediately clean up spills: sweep dry spills, use absorbent material for wet spills on impervious surfaces; dig up wet spills on exposed soil. Properly dispose of materials. Contact regulatory agencies when appropriate.

Concrete Use and Disposal (CU-8). *Use, washout, and disposal practices for concrete activities to prevent leaching discharge to channels, waterways, and storm drain systems.*

Applicability

- ◆ Any time concrete may contact water.

Approach Highlights

- Avoid mixing extra concrete on site, to degree possible. Store materials under cover, away from sensitive areas (channel/storm drains).
- Do not wash concrete fines into street or sensitive areas. Return fines to aggregate base stockpile, or dispose of properly. Have positive shutoff on washout hose.
- Designate concrete disposal areas, including for vehicle washout, at least 50 ft. from storm drain inlets, drainage facilities or channels. Construct a pit or berm to contain the washout area. Dispose of hardened concrete regularly.
- Ensure concrete dust from sawcutting or sanding does not enter waterway. Isolate concrete that is used in channels for generally 2.5 weeks to one month for curing.

Equipment and Vehicle Maintenance (EV-1). *Methods to reduce pollutant discharge from vehicle and equipment maintenance.*

Applicability

- ◆ All equipment/vehicle maintenance activities associated with flood control maintenance

Approach Highlights

- Keep vehicles/equipment clean. Do not allow excessive grease buildup.
- Maintain and conduct fueling off site, or in designated protected areas. Locate designated areas away from drainage courses. Designate service area with barriers (berms).
- Use 110% secondary containment of equipment fluids > 55 gal. Use secondary containment to catch spills or leaks when changing fluids. Store and dispose of properly.
- Cover maintenance areas from Oct. 15 to April 15. Store materials under cover.
- Have spill cleanup materials readily available. Regularly inspect vehicles/equipment for leaks. Place cracked batteries in secondary container and remove from site.

Equipment and Vehicle Cleaning (EV-2). *Practices to reduce pollutant discharge from vehicle and equipment cleaning.*

Applicability

- ◆ All equipment that is used for flood control facilities and requires cleaning.

Approach Highlights

- Wash vehicles and equipment off-site whenever possible.
- If cleaning must be done on site, drain to sanitary sewer if possible. Otherwise, locate outside cleaning area away from storm drain inlets, drainage facilities, or channels; berm area to contain wash waters; configure wash area with sump to allow collection and disposal of wash water; discharge water as dust control or to pervious surface away from channel, or storm drain.
- Use as little water as possible. Avoid or minimize use of soap; use phosphate-free, bio-degradable soap when necessary.
- Do not permit steam cleaning without filtering devices, solvents, or degreasers on-site.

In Channel Flow Diversion Systems (WD-5). *Methods to prevent flowing waters in a channel or watercourse from entering the work area.*

Applicability

- ◆ During dry season when work must be conducted in channel with a residual base flow but little likelihood of storm flow

Approach Highlights

- Put dewatering systems in place before starting in-channel work.
- Design and maintain intakes/outakes so no contaminants are added to stream flow.
- Use filtration devices or settling basins to reduce turbidity to natural conditions when discharging water from the disturbed or isolated area. These could be as simple as filter fabric or hay bale barriers (SC-4, SC-6) or more complex systems (WD-4, SC-3, SC-5).
- Other measures may be needed to prevent and control other pollutants
- Following construction work, removal all system components and restore disturbed areas to pre-construction grades. Reduce water *slowly* back into work area.

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